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Series editor **Ashok Roy**

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Sebastiano del Piombo, *The Raising of Lazarus*, detail

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Sebastiano del Piombo's *Raising of Lazarus*: A History of Change

JILL DUNKERTON AND HELEN HOWARD

Commission and early history

The huge panel painting showing the raising of Lazarus from the dead, as recounted in the Gospel of Saint John (PLATE 1), was commissioned by Cardinal Giulio de' Medici from Sebastiano del Piombo, probably towards the end of 1516.¹ Shortly before, it appears that the cardinal had ordered from Raphael, Sebastiano's great rival, a painting of the Transfiguration, which was to be on a panel of the same dimensions. Both were destined to be set beneath the tall gothic arches of the cathedral of St Just in Giulio's bishopric of Narbonne.

Letters sent to Michelangelo (who had left Rome in December 1516 for Florence and Carrara) by his friend and assistant Leonardo Sellaio, as well as some from Sebastiano himself, are an important source of information for the competition between the two painters (at least from the point of view of the Sebastiano party). The letters also include occasional references to practical details of the making of the altarpiece. We learn from a letter from Sellaio dated 19 January 1517 that Sebastiano was responsible for arranging for the carpentry of the panel and that he had received funds for that purpose.² It seems that the panel was constructed from very long boards joined vertically, like those for Raphael's *Transfiguration* (see PLATE 38), rather than in the horizontal arrangement that would be expected in a Venetian panel of comparable dimensions. Whether the boards were of the usual poplar or a more unusual species, such as the cherry which has been reported as the wood for *The Transfiguration*,³ can no longer be known.

In the same letter Sellaio told Michelangelo that he believed that Raphael was holding back on the execution of his altarpiece in order to avoid direct comparison with Sebastiano, and, by implication, for fear of the borrowing of his inventions. Sebastiano did indeed take inspiration from recent projects of Raphael's, for example the Tapestry Cartoons and *The Way to Calvary* ('*Lo Spasimo di Sicilia*') (Madrid, Prado), but in designing the *Raising of Lazarus* he showed himself ready for the challenge of arranging a grand-scale narrative with attendant crowds while constrained by the vertical format of the altarpiece. In this he was famously aided by Michelangelo who supplied drawings

for Lazarus – still extant – and probably also for the figure of Christ.⁴

The progress of the altarpiece can be tracked from Sellaio's and Sebastiano's letters.⁵ On 26 September 1517 Sellaio informed Michelangelo that Sebastiano had stopped work on other commissions to concentrate on the altarpiece. In January 1518 Michelangelo himself was briefly in Rome and saw the *Lazarus*. In July Sebastiano reported to Michelangelo that he was delaying completion because he did not want Raphael to see it until Raphael had finished his own painting, apparently not even begun at this stage. In addition there was an issue about the frame, which Sebastiano wished to have made in Rome, whereas Raphael was trying to influence the cardinal to have it made in Narbonne, perhaps to avoid a public confrontation between the altarpieces. Nevertheless, in the spring of 1519 the *Raising of Lazarus* was placed on view, probably in Sebastiano's workshop; according to Sellaio 'everyone was stunned' ('ogni uomo resta balordo'). By December the painting had been varnished⁶ and the huge panel transported to the Vatican for a more formal presentation, where, according to the Venetian diarist, Marcantonio Michiel, it was much praised by all, including the Pope.⁷ This was followed by wrangling over Sebastiano's large bill. Meanwhile Raphael had at last made progress on *The Transfiguration*, the monumental scale and colours of the foreground figures clearly influenced by the work of his Venetian rival.⁸ Eventually, in April 1520, little more than a week after Raphael's death, both panels were brought to the Vatican (we know from Sebastiano himself that his panel had to be transported again, and had not simply remained there⁹) and exhibited together. According to Vasari the two works received equal praise.¹⁰

The Transfiguration remained in Rome, set up on the high altar of San Pietro in Montorio, and eventually, following a spell in Paris between 1797 and 1816, where it was restored but mercifully with minimal intervention to the panel,¹¹ it was placed in the Pinacoteca of the Vatican. *The Raising of Lazarus*, on the other hand, followed a more precarious course over the centuries. It is not known exactly when it left Rome; nor are any



PLATE I Sebastiano del Piombo, *The Raising of Lazarus* (NG 1), 1517–19. Oil on synthetic panel, transferred from original panel, 381 × 289.6 cm.

details known about its transport to Narbonne, which was presumably by sea, since the French city was still a port at the time. It seems that Sebastiano had his way over the making of the frame in Rome for the lower section of a frame, of highly sophisticated design with gilded ornament against a blue ground, still survives on the altar in St Just which now holds the copy of *The Raising of Lazarus* made in the eighteenth century by Carl van Loo.¹² The presence of Sebastiano's altarpiece in Narbonne in the sixteenth century is confirmed by reflections of the composition in French painting of the period and in 1599 it was the subject of an appreciative description by a Swiss physician, Félix Platter, who mentioned its great value and much-copied status.¹³

The painting remained on the itinerary for other visitors to the city until 1722 when it was acquired by Philippe, Duc D'Orléans, regent of France, in exchange for a grant for the repair of the cathedral and the copy by van Loo still on the altar.¹⁴ The original panel was moved to Paris, where it joined the duke's magnificent collection in the Palais-Royal.¹⁵

Transfer and re-transfer

The Raising of Lazarus is described as 'peint sur bois' in Du Bois de Saint Gelais's 1727 catalogue of the pictures at Palais-Royal; he also records the colours of several draperies, among them the 'jaune clair' of the kneeling Magdalen. Since this is a colour that would be indistinguishable from a darker yellow, or indeed from white, if the painting were covered with a heavily discoloured varnish, it has to be assumed that the painting was reasonably clean and visible at the time.¹⁶ In the 1770s, when the palace and its collection were in the hands of Louis-Philippe D'Orléans, grandson of Philippe, a systematic programme of restoration of the paintings was undertaken. This included the transfer to canvas of many of the paintings on panel, including *The Raising of Lazarus*. According to National Gallery records this was carried out, or at least begun, by 'Haquin' in 1771.¹⁷ The treatment is likely to have been protracted. The Haquin referred to must have been Jean-Louis Hacquin (before 1726–1783) rather than his son, François-Toussaint (1756–1832).¹⁸ Particularly after 1775 Jean-Louis was also responsible for the transfer and lining of a great many paintings from the French Royal Collection, now in the Louvre.¹⁹ It was believed that by transferring the paint layers from unstable and perhaps worm-eaten wooden panels to new canvas supports the future preservation of the works would be ensured. In practice, a great deal of damage was caused to the paintings, involving at best a complete alteration to the paint texture and at worst, the loss of large areas of the picture surface. Hacquin, originally a cabinet

maker (and, it would seem, the inventor of the cradle), was probably better than most, carving away the wood of the panels from the paint layers using planes and chisels (still the preferred method in those exceptional cases when transfer is unavoidable²⁰). This technique was certainly safer than that of his near contemporary Robert Picault who had a 'secret' method, which seems to have involved separation of the paint from the panel by breaking down the ground layer through prolonged exposure to nitric acid vapours; this allowed him to display intact the original wooden support alongside the transferred painting.²¹ The showmanship that was part of the process of transfer meant that its consequences were recognised by connoisseurs of painting such as Richard Payne Knight, who seems to have known *The Raising of Lazarus* before its transfer. He claimed many years later that 'those who have only seen it since that fatal operation of cutting away the pannel [sic] on which it was painted, and gluing cloth to the back of the colour in its place, can form but very imperfect notions of what it was before.'²²

There can be little doubt that this drastic and dangerous intervention was totally unnecessary. The distribution of damage to the painting shows that, given its great size, the panel had remained remarkably stable, with evidence for the opening up of only one of the vertical joins, that running through the standing figure of Martha and the right leg of Lazarus. As well as fashion, a reason for its transfer might well have been the size and weight of the panel – a report of 1749 concerning the proposed transfer of the two most famous Raphaels from the French Royal Collection, *Saint Michael* and *The Holy Family of François I*, which were regularly moved between the royal apartments at Versailles and the picture stores, observed that 'sont peints sur bois, ce qui, joint à leurs cadres, les rend d'un poids prodigeux et par consequent très difficiles à manier, ou les transporter'.²³ Given the readiness of Sebastiano and the cardinal to have the panel moved back and forth from the Vatican in the early sixteenth century, it would be a strange irony if this were one of the reasons for the transfer three centuries later.

Payne Knight was not alone in his criticism of the procedure and consequences of transfer²⁴ but the fact that a painting had been transferred from its original support seems to have had little effect on its value. In 1793, following a sequence of sales and changes of ownership, *The Raising of Lazarus* came to London with other Italian paintings from the Orléans collection, eventually being put up for sale in 1798, when it was bought by the insurance underwriter John Julius Angerstein for the considerable sum of 3,500 guineas; this was a higher valuation than that of many now celebrated paintings

by Titian and Raphael from the same collection and was surpassed only by Annibale Carracci's *The Dead Christ Mourned* ('*The Three Maries*') (NG 2923).²⁵ In part because of the association with Michelangelo, the altarpiece caused a sensation and much debate among artists; its most vocal admirer was Benjamin West,²⁶ who in about 1820 is supposed to have been responsible for the restoration and repainting of parts of Lazarus's damaged right leg.²⁷ West's intervention was recorded in the Manuscript Catalogue of the newly founded National Gallery, centred on the core collection of 38 pictures from the Angerstein collection which were acquired for the nation in 1824. The importance of Sebastiano's altarpiece was recognised by its being assigned the first number in the new catalogue.

Over the next few decades several entries were made in the Manuscript Catalogue relating to the painting's condition. On only one occasion is the support mentioned, in 1837, when it needed treatment for infestation by insects; these apparently fed on the glue of the lining adhesives and were probably either flour or biscuit beetles – this outbreak at the National Gallery occasioned a short report in the *Observer* of 19 September 1841. In general, there was greater preoccupation with the surface appearance and especially the varnish layers. Already by 1798 it was observed that many of the Orléans pictures appeared to have become 'dirty, or more sunk in their colours',²⁸ although the Sebastiano appears surprisingly bright and richly coloured in the watercolour by Frederick Mackenzie of Angerstein's pictures hanging in his Pall Mall house (PLATE 2). Nevertheless, it needed varnishing in 1834, 1852 and 1867. Two letters sent in 1865 by Sir Charles Eastlake to the Keeper, Ralph Wornum, express concern about the sunk and opaque condition of the varnish, but Eastlake was emphatic that 'no cleaning, in the picture cleaner's sense of the term, should on any account take place'; instead 'Pinti [Raffaello Pinti, the London-based Italian restorer most trusted by Eastlake] should endeavour to tone down what is prominent and crude, and in short to harmonize the whole.'²⁹ In 1881 following an enquiry among the Trustees, 'assisted by artists and others' who included the restorers Bentley, Dyer and Pinti,³⁰ it was agreed that the painting should be cleaned and revarnished by Dyer, although the extent of the cleaning is not known. Following this cleaning the frame was fitted with an enormous sheet of plate glass in order to protect the paint surface from the dirt and pollution of nineteenth-century London.

In the twentieth century it was the structural condition of the painting that caused the greater concern. In 1929 it was treated using a mixture of glue and rye flour for 'a large number of small blisters'. Some

of the old varnish was removed (suggesting that the previous cleaning was no more than a partial thinning), followed by a light revarnishing. At this point the restorers involved, Morrill and Holder, decided that the altarpiece showed no signs of having been painted on panel and that it must always have been on a canvas.³¹ In November 1939, when the painting had been evacuated to Penrhyn Castle in Wales, a 'sizeable' flake loss was noted and the following year areas of the surface were covered with facing paper in order to secure loose paint. Further attempts to secure the flaking paint were made in 1941 and again in 1951 but with little success.

Following the establishment of a Conservation Department at the Gallery in 1946 the stabilisation of *The Raising of Lazarus* became a priority. Eventually in 1958 it was decided that it should undergo a radical structural intervention with the aim of reducing the large amount of glue that was present as a result of the application of several canvases to the reverse following the transfer. Raking-light photographs taken at the time illustrate the alarming extent to which the contraction of the glue was causing compression and lifting of the paint film (FIG. 1). When treatment began, the intention was to remove three of the lining canvases, leaving a last canvas in place. The plan was that this would be stretched out and the paint flakes secured once there was sufficient space to reattach them. Unfortunately,



PLATE 2 Detail of a watercolour by Frederick Mackenzie showing *The Raising of Lazarus* at Angerstein's Pall Mall House (London, Victoria and Albert Museum).



FIG. 1 Raking-light detail taken in 1958 of the buildings in the background of NG 1.

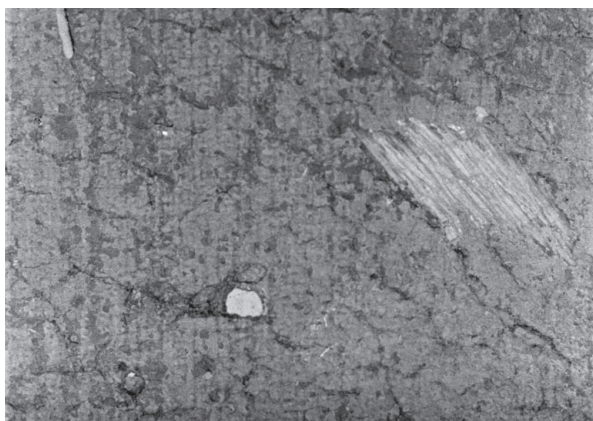


FIG. 2 Macro detail taken following removal of the eighteenth-century transfer canvases, showing splinters of the original wood panel.

once the first three canvases had been removed, it was discovered that the fourth layer was not a canvas textile, but instead consisted of sheets of paper. These were badly decayed and in many areas had separated from the paint and ground.

It could not have been known at the time, but the use of paper to back a transferred paint film is characteristic of a transfer by Hacquin. In his transfers of paintings by Domenichino and Eustache Le Sueur, now in the Louvre,³² Hacquin used sheets of paper cut from old printed books or manuscript texts. In the report on the treatment of *The Raising of Lazarus* there is no mention of any text on the paper layer, although it may have been so stained and decayed that this was overlooked. In the other transfers by Hacquin to have been investigated, two layers of fine silk (sometimes printed with a pattern) have been found embedded in the mixture of glue and flour paste which lies immediately behind the paint film, together with a residue of the original ground; he did not add a new

ground or 'enduit de transposition' – usually lead white and oil – as used in later transfers, including those by his son, François-Toussaint. In the case of *The Raising of Lazarus*, however, there is no mention of there having been any silk, but there is a new pinkish-brown ground, present in all the paint samples that include the full layer structure and consisting mainly of red earth, lead white and a carbon black pigment.³³ The gesso ground was removed completely but in some of the samples a thin layer of an unpigmented material, probably glue, can be seen between the new ground and the original paint layers. This was probably applied as part of the transfer rather than being the remains of an application of glue to seal the original gesso ground. At present too few of Hacquin's transfers have been examined to know whether he had a standard practice. The works by Domenichino and Le Sueur referred to above already had red-brown oil-based grounds (which were not removed), and so Hacquin may not have seen the need to supplement them with a second ground. With the Sebastiano, on the other hand, the removal of the gesso necessitated a new ground. An alternative and less likely possibility (which would contradict Payne Knight's admittedly distant memories of the operation) is that Hacquin's transfer was not the first, and that the painting had already been transferred by Picault who worked on Orléans pictures in the 1750s.³⁴ He did sometimes use a red-brown 'enduit de transposition'³⁵ and the premature failure of some of his transfers meant that they had to be reattached to new supports only a few years later.³⁶ Some record of such a major undertaking might be expected, however, and the survival of a few splinters of the wood of Sebastiano's panel (FIG. 2) is more indicative of a panel removal by mechanical means.

The alarming discovery made in 1958 that the first transfer layer was paper, and not canvas as expected, meant that the surviving original layers were held together only by a tissue paper facing, applied using a mastic and wax adhesive. As the treatment report³⁷ candidly records, this was adequate for the planned operation but not for a total re-transfer. There was no possibility of turning the painting over in order to attach a more substantial facing and the original layers were found to be sensitive to water-based adhesives ('wrinkling and breaking into minute fragments') and to the amount of heat needed to melt a solid wax-based adhesive; eventually it was decided to brush on multiple thin layers of warm wax-resin dissolved in white spirit, embedding a layer of inert terylene net fabric within the layers as they solidified. Although the discoloured varnishes had yet to be removed from the paint surface, the appearance of the picture was considered to be darker than intended as a result of lack of reflectance from

FIG. 3 *The Raising of Lazarus*, photographed in 1967 after re-transfer and cleaning, before restoration.



the ground and so titanium white (titanium dioxide) was added to the wax cement. This bright white layer appears in some of the paint samples (for example PLATE 3). These were taken only after completion of the re-transfer of the paint film and so the presence of the red-brown 'enduit de transposition', which negates any reflective properties of the new white ground, could not have been known – presumably its brown colour meant that previously it was taken to be a discoloured old glue layer.

Once the wax and titanium white layers had been built up to a sufficient thickness the paint film could then be mounted on a new solid support. This had previously been coated with wax-resin allowing a bond to be achieved by ironing with a thermostatically controlled iron to soften the wax-resin layers which then fused as they cooled. Although it is unlikely that these methods and materials would be used nowadays, the treatment can be judged a success in that there has been no further flaking of the paint layers. Unfortunately, the work took

place before the introduction of lightweight and stable panels made from glass fibre with aluminium honeycomb cores.³⁸ The painting is mounted, therefore, on a support constructed with 'sundeala' composite board outer faces and a core of paper honeycomb.³⁹ In spite of its wooden edges and an internal wooden framework this panel is now showing signs of instability, with a tendency to flex and twist when the painting is moved, an operation which is therefore avoided as far as possible.

With the paint film secure, removal of the old layers of varnish could proceed. Judging by the extent of the discoloration visible in the patches of varnish that still remained on Martha's dress and in the area of Lazarus's shroud and the forearm of the man supporting him when the painting was photographed before retouching in 1967 (FI FIG. 3), several layers of the notorious 'gallery varnish' (a mixture of mastic and drying oil) were present; Dyer's cleaning in 1881 can therefore have involved no more than a partial varnish removal. Six months of retouching then followed, but, considering



FIG. 4 Digital infrared reflectogram detail of Saint Peter.

all that the painting has been through, the amount of loss is less than might be expected. The many small scattered losses can be attributed to flaking, while certain patterns of damage atypical of panel paintings, for example the jagged lines through the group of bystanders in the background on the left, can be attributed to accidents in the original transfer process. The delicate condition of the painting meant that some of the older and relatively insoluble restoration, including the repainting down the join that ran through the figures of Lazarus and Martha, was not removed in the most recent cleaning; where it was very discoloured it was covered by new retouching. The paint layers of some of the figures are damaged by abrasion, particularly in the lower part of the picture (for instance the figures supporting Lazarus). In common with other paintings of its age, it is likely to have been cleaned wholly or partially on several occasions before its recorded conservation history; the distribution of the damage suggests that these first cleanings (including the removal of the varnish that we know from the documents was applied by Sebastiano) are likely to have taken place while it was still on the altar in Narbonne.

Painting technique

The condition of the painting following cleaning in 1967, with losses located in all the principal colour areas, allowed for the taking of an unusual number of paint samples. At the time some of these were mounted as cross-sections, which were used to identify the range of pigments employed.⁴⁰ No detailed study of Sebastiano's technique was undertaken. As is always the case, however, the samples, in the form of cross-sections and unmounted fragments of paint, were labelled and stored, and it is this archive that some forty years later provides the basis of the present study.⁴¹ The old cross-sections have been re-polished and re-photographed and many new cross-sections made from the unmounted samples. Fragments of unmounted sample have also been examined by Fourier transform infrared (FTIR) microscopy and analysed by gas chromatography–mass spectrometry (GC–MS), supplementing results of gas–chromatography originally published in 1976.⁴² Pigments and other inorganic materials have been identified by energy dispersive X-ray analysis (EDX) in the scanning electron microscope (SEM) and Raman microspectroscopy (RAMAN).

Underdrawing, *imprimitura* and flesh painting

The size and fragility of the support means that X-radiography with the equipment at present in use at the National Gallery is not feasible; for similar reasons it has so far only been possible to record an infrared reflectogram image of a test area (a detail is shown in FIG. 4).⁴³ A full infrared study is likely to shed light on Michelangelo's contributions to the design of the altarpiece in much the same way as with Sebastiano's *Pietà*, painted in 1512–15 (Viterbo, Museo Civico).⁴⁴ The character of the underdrawing detected on *The Raising of Lazarus* is similar to that in the *Pietà*, but it appears generally looser and with more revision, for instance the fingers of the right hand of the apostle in red and green in the group kneeling or crouching on the left were drawn extending into the area now covered by Christ's mantle. The underdrawing was executed with a brush, apparently over the broadly brushed *imprimitura*, hence the broken quality of the drawn lines, for instance around Christ's right knee. Particles of charcoal appear between the *imprimitura* and paint layers in some cross-sections (for example PLATES 25 and 32) and are probably connected with the underdrawing.

The broad horizontal brushstrokes used to apply the *imprimitura* over the gesso are clearly visible in the infrared image because of the black pigment present in the layer. It might be thought that the marked difference in tone between the upper and lower parts of the detail illustrated (a difference that extends further across the painting) was caused by a difference in composition of the priming, as appears to be the case with the *Pietà*, where the upper part has a white or very pale preparation and the lower part, comprising the foreground and the dead Christ, has a mid-grey underlayer.⁴⁵ In *The Raising of Lazarus*, however, cross-sections of samples from below and above this division (PLATES 3 and 4) confirm that the composition of the priming is essentially the same, consisting of a medium-rich mixture of lead white, a coarse carbon black pigment, a brown earth pigment and a little lead-tin yellow; therefore the differences apparent in infrared must be the result either of variations in thickness of the application or the mixing of a new batch of priming mixture – highly likely for a painting of this size – which contained a slightly lower proportion of carbon black pigment. The different explanations for what appears to be the same phenomenon in the two paintings are valuable reminders of the difficulties in interpreting infrared images.

Assessing the colour of an *imprimitura* on the basis of the pigments present and their appearance in cross-sections is not easy, but in the case of *The Raising of Lazarus* it is likely to have been a light to mid-



PLATE 3 Cross-section of a sample from the green shaded area of the Magdalen's dress. The green layer contains a copper green pigment, lead-tin yellow, lead white, yellow earth and a few large carbon black particles. The original mid-brownish grey *imprimitura* of lead white, a coarse carbon black, brown earth, and a little lead-tin yellow is visible under the green paint. All layers below this were added as part of the various transfer processes. The red ground layer is presumed to have been applied by Hacquin in the late eighteenth century, while the titanium white ground was added to the reverse in 1958.

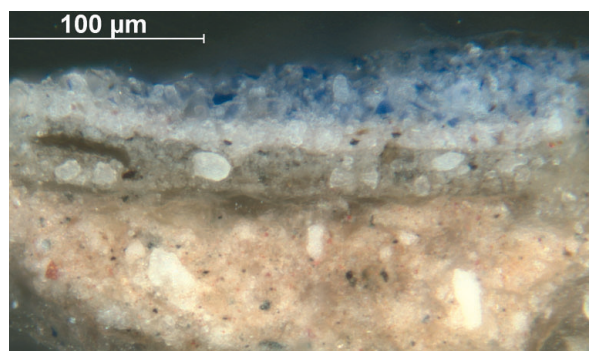


PLATE 4 Cross-section of a sample from the lightest blue of Christ's mantle. The light blue layer is composed of ultramarine combined with lead white over a pink underpaint of red lead with lead white. Beneath this is the original brownish-grey *imprimitura*, over Hacquin's red-brown ground. The colour of the *imprimitura* is similar to that shown in PLATE 3 though the two areas appear different in infrared.

brownish-grey colour, still light enough for lines of black underdrawing to be clearly visible to the painter. Over the course of his career Sebastiano seems to have favoured progressively darker preparations: *The Daughter of Herodias* (NG 2493), painted in 1510, shortly before he left Venice for Rome, has a very pale grey priming of lead white with a small amount of a fine carbon black, probably lamp black,⁴⁶ while from the 1520s onwards he tended to work on very dark grey painting surfaces, including unprimed slates – indeed it seems that he can be credited with the invention of this technique.⁴⁷

Given that the priming is a mid-grey colour, this raises the question of whether the loss of the original gesso and its replacement with the red-brown 'enduit de transposition' makes any optical difference to the paint



PLATE 5 Sebastiano del Piombo, *The Virgin and Child with Saint Joseph and Saint John the Baptist and a Donor* (NG 1450), 1517. Oil on panel, 97.8 × 106.7 cm.

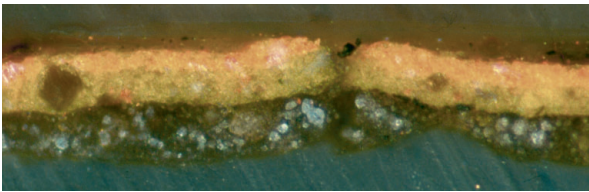


PLATE 6 Cross-section of a sample taken from the extension to the right edge of *The Virgin and Child with Saint Joseph and Saint John the Baptist and a Donor*, showing a priming of similar composition to that used in *The Raising of Lazarus*. The brownish-grey layer, which is medium-rich and contains lead white, black and a little lead-tin yellow, is especially thick since there is no gesso on the extension.



FIG. 5 *The Virgin and Child with Saint Joseph and Saint John the Baptist and a Donor*, infrared reflectogram detail.

layers, let alone the brilliant white ground added in the re-transfer.⁴⁸ Evidence from *The Virgin and Child with Saint Joseph and Saint John the Baptist and a Donor* (PLATE 5), of 1517, when work was beginning on *The Raising of Lazarus*, suggests that Sebastiano did not expect the reflective properties of a white gesso ground to play any part in the final effect. When he had a vertical plank of wood added to the right edge to extend the panel during the course of painting, he did not bother to apply gesso to this addition, preparing it instead with the same brownish-grey priming that he had used for the *imprimitura* brushed over the gesso of the rest of the panel.⁴⁹ The priming (PLATE 6) is similar in composition to that of *The Raising of Lazarus*, consisting of a medium-rich mixture of lead white, black and a little lead-tin yellow, and so in the infrared image (FIG. 5) it shows as very dark where the gesso is absent.

Changes with time as a result of Sebastiano's own choice of a non-reflective painting surface are evident in more thinly and directly painted parts of the altarpiece, where the inevitable increase with age in transparency of paint mixtures containing little lead white means that they no longer cover sufficiently the grey-brown priming. As a result the darker colours appear to merge with the priming, becoming 'sunk', and detail can no longer be distinguished. The structure of the rocky outcrop crowned with bushes and trees that rises immediately behind Lazarus and his attendants is now barely legible, and indeed it can easily be mistaken for an enormous tree. In areas that have been abraded or where the paint has broken up as a result of the transfer, for example some of the heads on the right, there is a similar loss of volume and detail.

It might also be thought that the colour of the *imprimitura* is responsible for some of the very dark flesh tones, especially of the male figures. However, a sample from the highlight on the muscle along the top of Lazarus's left leg (PLATES 7 and 8) shows a sequence of brown undermodelling layers, some of them superimposed wet-in-wet, which contain brown, yellow and red earth pigments with very little lead white. These layers are sufficiently thick and opaque to conceal completely the colour of the priming. The highlight was then applied with a single layer of pale yellow flesh tint based on lead white with yellow and brown earth pigments. Since Lazarus has only just been raised from the dead his skin is sallow, but a sample from the bronzed arm of the muscular young man on the right who supports him confirms that other flesh tones were built up on the same system, but with a healthy colour achieved by the addition of red earth to the final layer. There is likely to have been a loss of covering power in the uppermost layers of the flesh tints, especially where

PLATE 7 *The Raising of Lazarus*, detail.



they become thinner in the transitions from highlight to shadow, which can result in abrupt juxtapositions of light and shade, for example the sharp edge formed along what should be the rounded muscles of Lazarus's upper arm.⁵⁰ Nevertheless, the wide tonal range and dramatic chiaroscuro in the modelling of flesh tints is clearly intended, even if exaggerated by time.

Sebastiano's adoption of chiaroscuro modelling systems⁵¹ and strongly directional lighting is, however, far from consistent, even in his rendering of the many heads and hands. The profile head of the kneeling Magdalen, whose head ought to be in shadow, is pale and brightly illuminated, for obvious dramatic and design purposes. Similarly, the fine idealised profile of Saint John the Evangelist, the young standing apostle on the left who gestures towards Christ and whose gospel is the source for the miracle, stands out from the swarthier heads around him.⁵²

When it came to the painting of the many draperies, Sebastiano seems to have been equally prepared to abandon consistency of method, employing colour modelling techniques that he brought from Venice in combination with new approaches learnt in Rome. Account has to be taken of the ways in which some of the pigments have changed; nevertheless, it seems

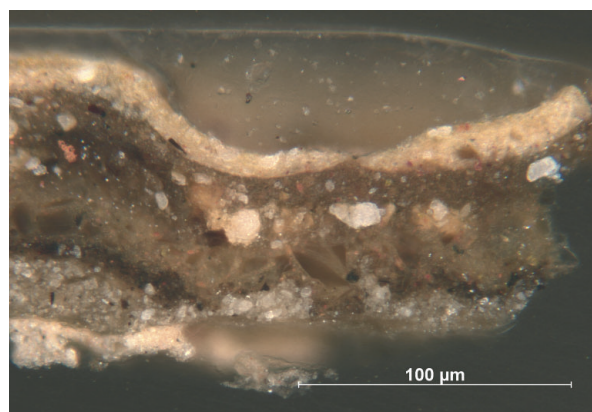


PLATE 8 Cross-section of a sample from the top of Lazarus's left thigh. The highlight of the pale yellow skin-colour consists of lead white combined with yellow and brown earth pigments. This was applied over a sequence of brown undermodelling layers of varying combinations of red, brown and yellow earth pigments with a little lead white.



PLATE 9 *The Raising of Lazarus*, detail.

possible that Sebastiano set out to proclaim his Venetian origins by showing the Roman public (and Raphael) the greatest and most subtly varied range of colours ever seen in a single painting. As a Venetian, he was also well placed to source an extensive range of the highest quality pigments, even if, as is likely, he had to arrange for them to be sent from his home city.⁵³

Blue and purple draperies

One pigment that was almost certainly procured via Venice is the ultramarine blue of Christ's mantle (PLATE 9). The superior quality of the lapis is best demonstrated in the shadows where it is used unadulterated with white (PLATE 10); the highlights are modelled by the addition

of lead white (see PLATE 4). Since ultramarine in oil – in this case confirmed as linseed oil⁵⁴ – has poor covering power when used without lead white, some form of underlayer was needed, especially if its brilliance was to be preserved when there was a grey painting surface. The mantle therefore was underpainted with a pale pink mixture of red lake and lead white, apparently blocked in without any preliminary modelling of the folds. The pink colour is clearly intended to intensify the rich purple-blue of the lapis and Sebastiano used the same technique for the Virgin's mantle in *The Virgin and Child with Saint Joseph and Saint John the Baptist and a Donor* (PLATE 5).⁵⁵ The use of red lake to underpaint areas of blue can be seen on the works of later Venetian painters,

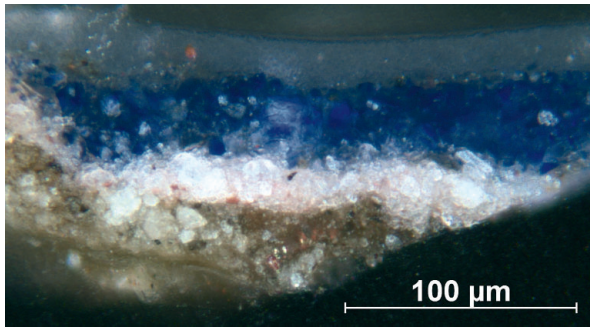


PLATE 10 Cross-section of a sample from the deepest blue shadow of Christ's mantle. The uppermost layer consists of high-quality ultramarine with just a little lead white. This has been applied over a pink layer of red lake with lead white.

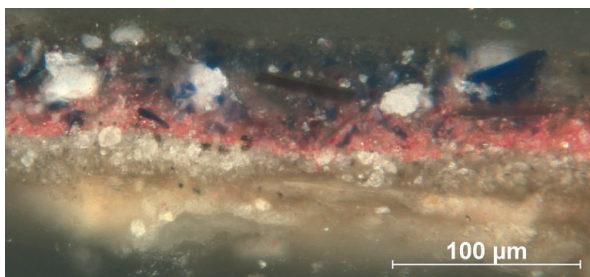


PLATE 11 Cross-section of a sample from the shadow of Martha's deep mauve sleeve, showing a layer of red lake combined with ultramarine and a little lead white over a strongly coloured undermodelling of ultramarine combined with red earth.

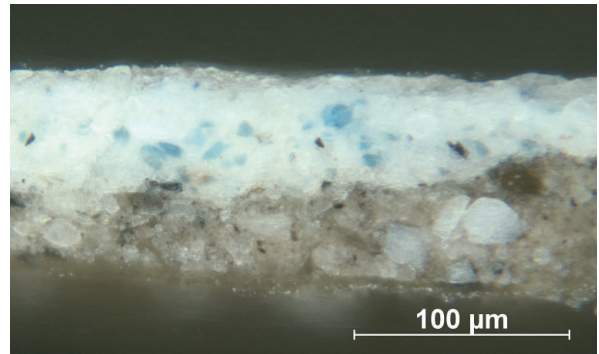


PLATE 12 Cross-section of a sample from Saint Peter's pale greenish lilac robe. At the base of the sample, the brownish-grey *imprimatura* is clearly visible. Over this is a thick layer of azurite combined with lead white and a carbon black pigment. At the surface there is a thin layer of lead white with red lake, now much faded, and a few tiny particles of ultramarine.

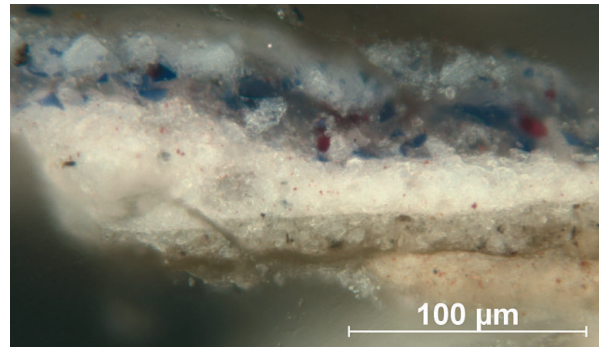


PLATE 13 Cross-section of a sample from the highlight of Martha's sleeve, showing a pale pink undermodelling; over this are two layers of ultramarine, red lake and lead white combined in varying quantities. The red lake pigment in the uppermost layer has faded.

especially Veronese,⁵⁶ but in early sixteenth-century Venice it was more usual to underpaint ultramarine with the greener blue azurite. Pink underpaintings for ultramarine have also been found in some Roman works by Raphael, such as *The Holy Family of François I*,⁵⁷ but the possibility that he learnt the technique from Sebastiano is supported by its discovery in the Virgin's mantle in *The Adoration of the Shepherds* (Cambridge, Fitzwilliam Museum), a work which is thought to have been painted either immediately before Sebastiano left Venice or shortly after his arrival in Rome.⁵⁸

The soft greenish-lavender colour of the robe of Saint Peter kneeling in the lower left corner is, however, underpainted with a layer of azurite and lead white (PLATE 12). Scumbled over it, often covering only parts of the underlayer, is a thin layer of lead white with red lake, now much faded, and a very little ultramarine. Essentially this is the same technique as that used in the lilac draperies with a cool slightly metallic sheen which are characteristic of Sebastiano's Venetian predecessors, Giovanni Bellini and Cima da Conegliano.⁵⁹ Even if

there has been some loss of colour from Saint Peter's draperies, Martha's violet dress at the centre of the painting was probably always more intense in colour and it has a very different layer structure. Here relatively substantial layers of ultramarine, red lake and lead white were applied over a strongly coloured purple-red underpainting, now visible in many areas as a result of abrasion to the upper paint layers. Unlike the pink underlayer for Christ's mantle, this drapery appears to have been modelled at this underpainting stage, for a sample from the shadowed side of the sleeve shows a deep mauve containing red earth and ultramarine (PLATE 11), whereas one from the highlight has a very pale pink (PLATE 13). Some of the structure and volume of this drapery has been lost as a result of blanching of the upper paint layer containing ultramarine and red lake; this is especially marked in the area below Christ's outstretched hand. Rather surprisingly, given the conservation history of the painting, the ultramarine of Christ's mantle is relatively little affected with only a few small patches of slightly grey pigment.



PLATE 14 *The Raising of Lazarus*, detail.

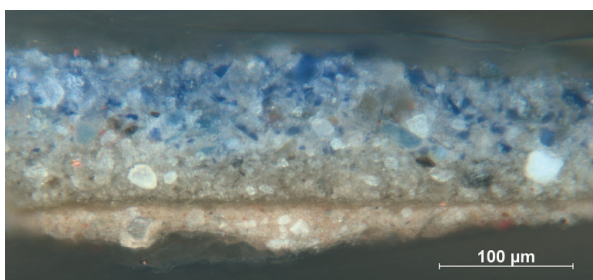


PLATE 15 Cross-section of a sample from the mid-blue sky above the clouds. Here ultramarine combined with a little lead white and red lake has been applied over azurite with lead white, red lake and a few tiny particles of other mineral red pigments.

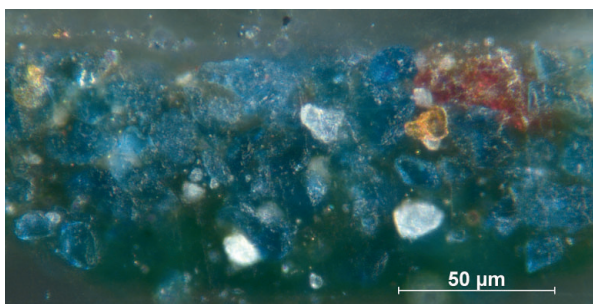


PLATE 16 Cross-section of a sample from the dark band of sky below the clouds showing azurite with very little lead white in a matrix of discoloured medium.

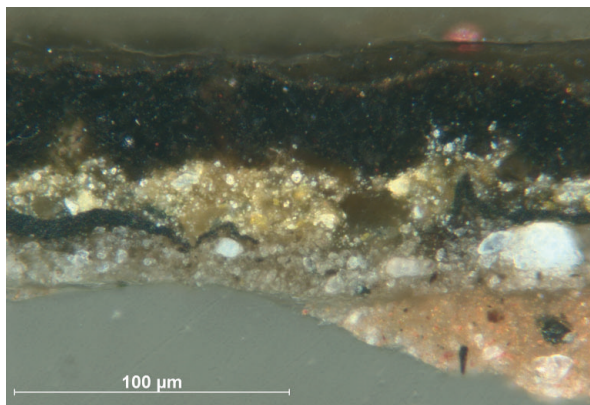


PLATE 17 Cross-section of a sample from the foliage of a bush growing out of the lower part of the rocky outcrop. The uppermost dark brown paint layers consist of black and red earth pigments. These layers have been applied over the lighter green employed for the river bank which incorporates a copper green, lead-tin yellow, yellow earth and lead white.

The landscape

More ultramarine appears in the sky, where it is used in the classic Venetian manner over an underpainting of azurite and lead white (PLATES 14 and 15). In both layers there is a small amount of red lake, resulting in a slight purple cast, especially in the lighter area above the clouds. However, the streaks of a dark greenish blue towards the horizon give the impression of a nocturnal scene⁶⁰ – at odds with the rest of the landscape which appears illuminated with shafts of late afternoon sunlight. This paint (which registers as black in an infrared photograph taken before the treatment in 1958) consists of coarsely ground azurite, mixed with only a small amount of lead white and rich in binding medium (PLATE 16); clearly it was intended to be an intense deep blue – and the individual pigment particles retain their colour – but the paint now appears dark as a result of a reaction between pigment and medium which has caused the oil to discolour.

The grassy banks of the river in the background are painted with muted green mixtures comprising a copper green, lead-tin yellow, yellow earth and lead white, while the clumps of grass and small plants in the foreground are painted with much brighter greens based on a copper green and lead-tin yellow. It might be thought that the foliage of the trees and bushes that grow out the rocks was once green but is now discoloured to brown. However, an autumnal setting was clearly intended, exactly as in certain paintings by Titian from around this time;⁶¹ the leaves seen against the sky were always a rich red brown and in a sample from the foliage of the bush growing out of the lower part of the rocky outcrop, taken at a point where it goes over the light green nearer bank of the river, there is no

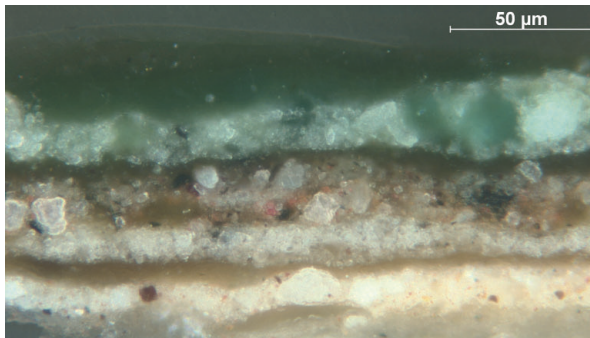


PLATE 18 Cross-section of a sample from the brilliant green drapery of the woman holding her cloak to her face, behind and to the right of Martha. Here an opaque layer of copper green combined with lead white and a little black is modelled with a translucent copper green glaze. The brown layer (earth pigment combined with carbon black and lead white) beneath the green may be connected with pentimenti in this area.

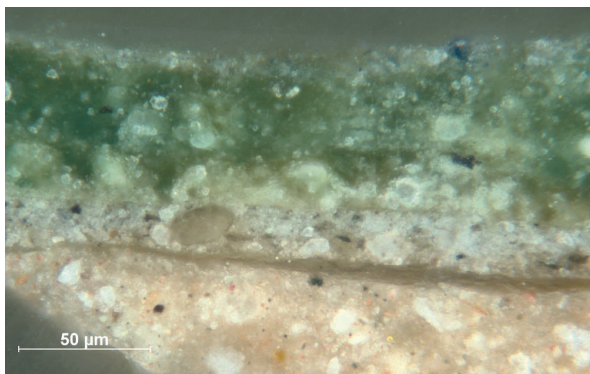


PLATE 19 Cross-section of a sample from Saint John's sleeve. The cool blue-green colour has been achieved by applying a thin scumble of ultramarine with a little lead white over several layers of verdigris with lead white in oil. A few black particles (perhaps underdrawing) are visible on top of the *imprimatura*.

discoloured copper green, only a mixture of black and red earth pigments (PLATE 17).

Green draperies

The many green draperies distributed across the composition generally contain the same pigments as in the green foliage but combined and layered in several different ways with a remarkable variety of effects. The distribution of these various greens confirms that Sebastiano had little interest in using colour to make his figures recede in space, any more than he had in their logical positioning. A deep saturated colour is as likely to appear in the draperies of a background figure as on one in the foreground, creating a tension – or some would say imbalance – between the painting surface and the implied recession of the arc of figures for which neither restorers nor the effects of time can really be blamed.⁶² The richest and deepest green appears on the cloak of the Pharisee on the right of the group of three

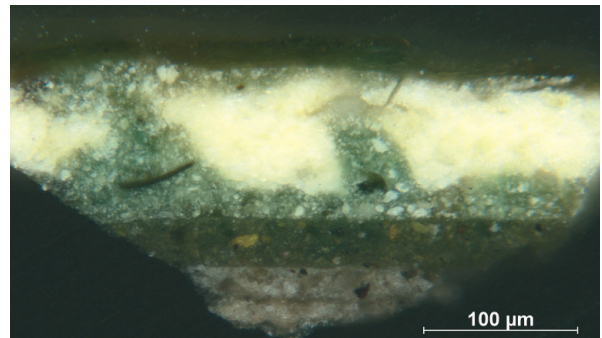


PLATE 20 Cross-section of a sample from the highlight of the bright green sleeve of the apostle crouching to the left of Christ. The acid green has been produced by a layer of lead-tin yellow applied wet-in-wet over copper green combined with lead-tin yellow, lead white and a few large dark earth particles. The underlying dark green layer of verdigris and earth pigments was clearly dry before the upper layers were added.

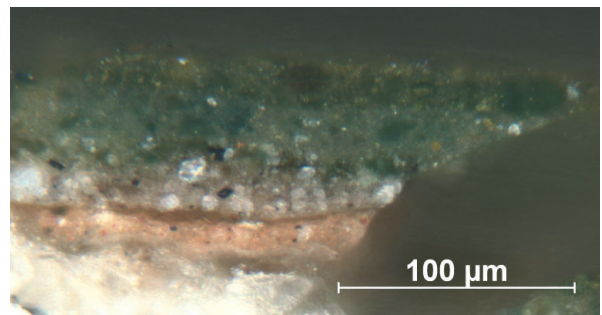


PLATE 21 Cross-section of a sample from the cloak of the elderly apostle with hands raised behind Christ's left shoulder. The moss-green colour of the drapery has been produced by applying a layer of dull yellow earth combined with copper green over the more intense green underpaint of copper green with lead white.

in the left background and on the woman who holds her cloak to her face, behind and just to the right of Martha (see PLATE 9). A sample from the latter (PLATE 18) confirms that this is a true Venetian green, with an opaque underlayer of copper green and lead white with a little black, modelled with translucent glazes of copper green, applied even over the highlights. Where thinly applied, the glazes are now somewhat rubbed, but they appear to have retained much of their original intensity of colour. The brown paint layer under the green layers in the sample can probably be explained by the evident pentimenti in this area (see PLATE 23). The shadowed part of the robe of the young apostle on the left, immediately below Saint John, is also richly glazed, but where the dramatic lighting picks out his shoulder and cuff Sebastiano applied bold highlights of lead-tin yellow, painted wet-in-wet over the still soft underlayer and modified for the mid-tone with a thin green glaze (PLATE 20). The paler rather cold blue green of Saint



PLATE 22 *The Raising of Lazarus*, detail.

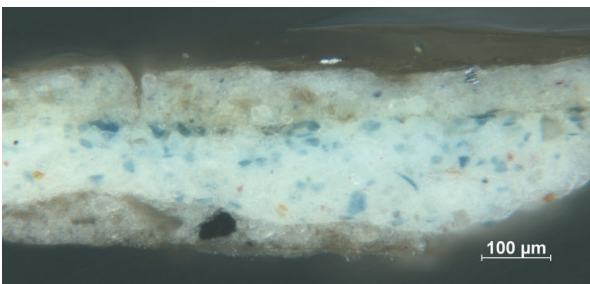


PLATE 23 Cross-section of a sample from the dull green tunic of the man leaning over Lazarus. The layer at the surface includes lead white with small particles of ultramarine, translucent yellowish copper-rich inclusions and a few shiny dark particles of galena (lead sulphide). The lower layers, perhaps associated with pentimenti, consist of azurite combined with lead white over a pale mauve of azurite, red lake and lead white.

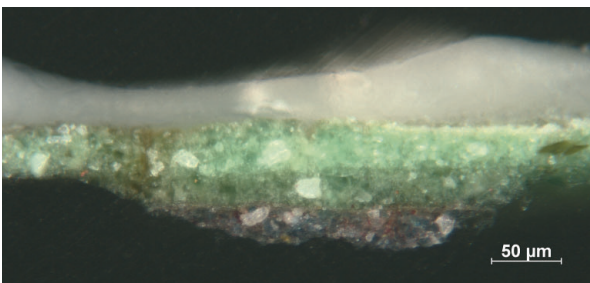


PLATE 24 Cross-section of a sample from the sleeve of the man with a turban at top right. The lowest layer contains azurite combined with red lake and lead white. Over this are two layers of verdigris combined with lead white and, for the highlights, a thin scumble of lead-tin yellow and lead white.

John's robe immediately above might seem to be the result of loss of glazes in a past cleaning; the bluish tinge, however, was clearly intended since in the sample the sequence of green layers was completed with a thin scumble of ultramarine and lead white (PLATE 19). Yet another variation occurs in the softer moss green of the elderly apostle with his hands raised, to the right of Christ: here the brilliance of the copper green and lead white underlayers is suppressed by the addition of a dull yellow earth to the final layer (PLATE 21).

An even more muted green features in the jerkin of the man who bends over Lazarus as he lifts him from the tomb (PLATE 22). In the sample illustrated (PLATE 23) the principal paint layer consists of a pale mauve colour, containing azurite, lead white and a little red lake (more red lake is evident in a second sample). Whether this is part of the build-up of colour or whether it is related to an alteration is not clear. Even with the naked eye it can be seen that Sebastiano made considerable changes in this area, including, it would appear, to the shoulder of this figure. In adjusting the design he may also have revised the colour distribution, especially since the figure of Martha to the left is also wearing a lilac-coloured drapery. That he was prepared to change the colour of a drapery is confirmed by a sample from the light green sleeve of the bystander wearing a pinkish-mauve turban; underneath the three progressively paler layers of verdigris and lead white is a rich purple, containing azurite, red lake and lead white (PLATE 24).

Returning to the figure supporting Lazarus, the eventual dull bluish-green colour of his jerkin was applied very thinly, and apparently when the underlying mauve colour had been dry for a considerable time; in the sample the crack in the paint affects only the upper layer and the boundary between layers is clearly defined. The composition of the upper layer is unusual, containing lead white combined with small particles of natural ultramarine, translucent yellowish copper-rich inclusions and a few shiny dark particles of galena (lead sulphide). Although translucent yellow-brown particles containing copper have been noted in other paintings, the identity and nomenclature of the pigment has not yet been securely established.⁶³ Sparkling black galena (iron sulphide) has been identified in a number of other Italian easel paintings from the late fifteenth and early sixteenth centuries, including on two altarpieces at the National Gallery, both north Italian: *The Virgin and Child Enthroned between a Soldier Saint and Saint John the Baptist* ('*La Pala Strozzi*') (NG 1119) begun by Gianfrancesco Maineri and completed, probably in 1499 by Lorenzo Costa, where galena was used for the soldier's armour, and *The Circumcision* (NG 803)

by Marco Marziale, dated to 1500. Here galena was used with stibnite, another grey black pigment, mixed together in the grey decorative border of the red cloak of the boy kneeling in the foreground of the painting.⁶⁴ Whether painters recognised the differences between these various grey and black pigments, and what they asked for when they bought them from their suppliers is not yet known.

The final variation on the colour green occurs in the extraordinary acid yellow-green of the kneeling Magdalen's dress; this is, in fact, a *cangiante* fabric, with green shadows containing copper green, lead-tin yellow, lead white, yellow earth and some large black particles, which may be responsible for the sour edge to the green (see PLATE 3), and highlights of pure lead-tin yellow over a pale lime green, consisting of lead-tin yellow with a little copper green and yellow earth (PLATE 25). Green and yellow *cangiante* fabrics appear on Michelangelo's Sistine ceiling,⁶⁵ but with almost no blending at juxtapositions between highlight and shadow, which results in clean pure colour. In adapting this colour combination to the oil medium, with its potential for more blended transitions, Sebastiano has produced a lime green colour which appears novel to panel painting.⁶⁶

Yellow and orange draperies

Nowhere on the altarpiece did Sebastiano paint a true yellow drapery. The headdress and cloak of the woman at the back of the group behind Martha have the same green cast as the Magdalen's dress, while other yellow areas tend towards gold or pink. The small area of yellow on the apostle kneeling immediately behind Saint Peter in the lower left corner (see PLATE 9) contains mainly a golden yellow earth, with only a little lead-tin yellow (PLATE 26). This was painted over a lilac layer, of the same composition as elsewhere on the painting – the change is another example of Sebastiano's concern to achieve the widest possible distribution of colours across the design.

The brightest highlights of the cloak of the elderly man at the right edge in the middle background, who shields himself from the stench of the dead Lazarus, are painted with pure lead-tin yellow, but over an undermodelling of yellow earth, which becomes pinker towards the shadows, probably because of the addition of a red earth (PLATE 27). In the paint sample the layers of yellow earth are interrupted by a thin dark layer, either black or possibly a very dark green since it contains copper. This layer is not easily explained but the sample point is close to the area affected by revisions to the design. In both hue and tonal range the drapery of this bystander is now similar to the cloak

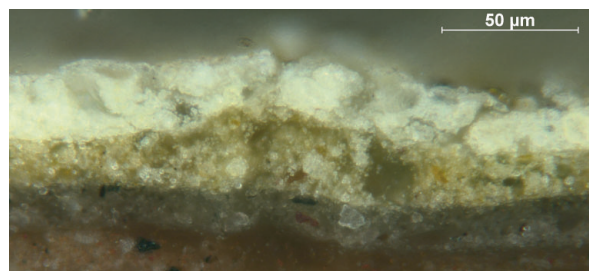


PLATE 25 Cross-section of a sample from a highlight of Mary Magdalene's robe. The acid-yellow highlight contains lead-tin yellow type I (confirmed by Raman spectroscopy) and lead white. This has been applied over a pale lime-green underpaint of lead-tin yellow, copper green, yellow earth and a little lead white.

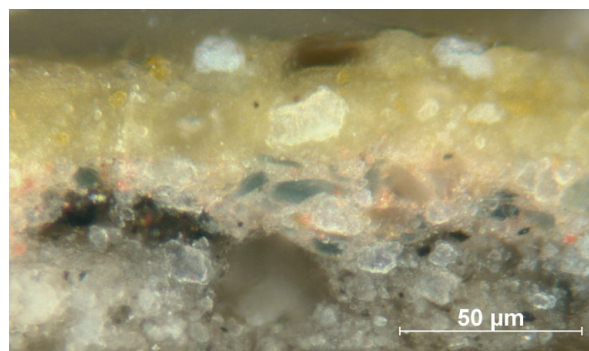


PLATE 26 Cross-section of a sample from the deep yellow collar of the apostle kneeling behind Saint Peter. The yellow paint layer consists of a golden-yellow earth pigment combined with a little lead-tin yellow and lead white. This has been applied over a pale mauve containing azurite with red lake, red earth, vermilion and lead white.

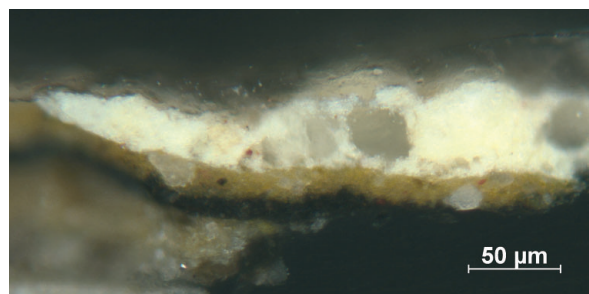


PLATE 27 Cross-section of a sample from the highlight of the yellow cloak of the man covering his nose on the far right. A layer of lead-tin yellow lies over an undermodelling of yellow earth with a little red earth. Below, is a dark copper-rich layer, and another yellow earth based paint layer on top of the *imprimitura*.



PLATE 28 *The Raising of Lazarus*, detail showing Saint John the Evangelist.

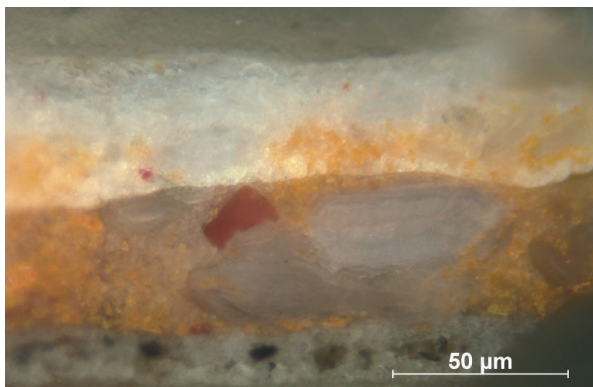


PLATE 29 Cross-section of a sample from Saint John's pale orange robe showing two layers of red lead, with some red lake in the lower layer. Semi-translucent white lead soaps are present throughout the paint layers but at the surface the alteration is so complete that no red lead particles remain.

of Saint John the Evangelist on the opposite side of the composition (PLATE 28). This was not always so, however, for the colour of the latter is considerably altered. Originally it must have been a bright reddish-orange colour, containing red lead with some red lake, especially in the shadows, but, as the cross-section (PLATE 29) shows, the red lead has reacted with the linseed oil medium forming translucent lead soap inclusions which are white.⁶⁷ These inclusions are present throughout the layer structure, but at the top surface the deterioration of the red lead is so complete that it now appears as a very pale pinkish-orange highlight.⁶⁸ Although Sebastiano clearly wished to draw attention to this figure by clothing him in bright colours, these unintended highlights now compete with the strong side-lighting of Christ and also of the apostle below Saint John.

Some alteration has inevitably occurred to the orange cloak typically assigned by Venetian painters to

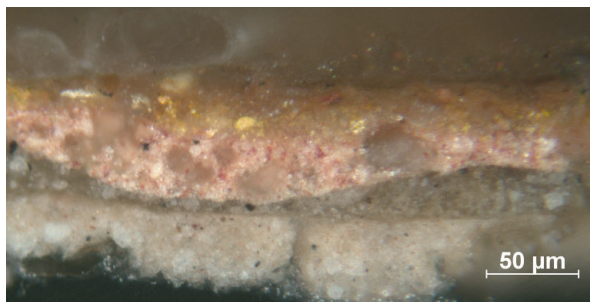


PLATE 30 Cross-section of a sample from Saint Peter's deep red-orange cloak. The uppermost paint layer contains realgar, now partially transformed to its yellow polymorph, pararealgar. This was applied over a red-orange underpaint of red earth combined with lead-tin yellow and lead white.

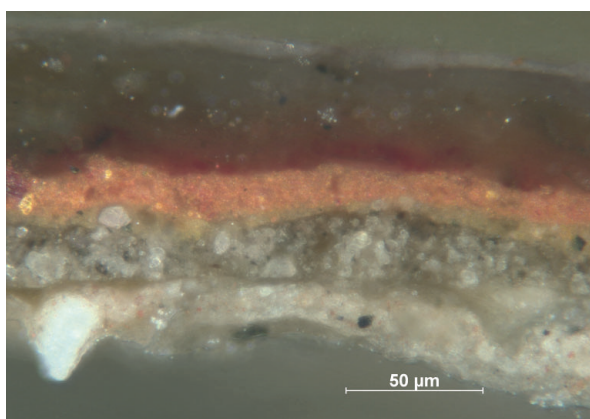


PLATE 31 Cross-section of a sample from the decayed orange-brown cloak of the apostle leaning over Christ's shoulder showing arsenic sulphide pigments (realgar and orpiment or pararealgar) combined with red and yellow earth and glazed with red lake.

Saint Peter (PLATE 30); this was laid in with red earth combined with lead-tin yellow and lead white and then finished in the mid-tones with the orange arsenic trisulphide mineral, realgar, widely used in Venice in the early years of the sixteenth century, but probably something of a novelty in Rome. In the sample both realgar and its yellow polymorph pararealgar are present. Pararealgar is a naturally occurring mineral, but is also produced by a light-induced transformation of realgar.⁶⁹ The breakdown of parts of the paint film on this drapery suggests that the pararealgar found here is related to the deterioration of realgar rather than being a deliberate addition of a golden yellow pigment. Moreover, in another sample from a lighter area the yellow arsenic trisulphide mineral, orpiment, is present. The darker orange-brown drapery of the apostle peering over Christ's right shoulder also contains an arsenic sulphide pigment (PLATE 31), but in the sample it occurs mixed with red earth rather than over it. The

damaged condition of parts of this drapery indicates that realgar is probably also present. Where there is a final glaze of red lake, which gives this drapery a richer deeper colour than the orange of Saint Peter's, the paint is generally better preserved.

Red and pink draperies

With one exception, all the areas of red in the altarpiece incline towards orange; the samples show that Sebastiano usually added an orange-red earth to his vermilion for the lighter areas of red, for example the cloaks of Martha (PLATE 32) and the apostle at the left below Saint John (PLATE 33), as well as the tunic of the young man who supports Lazarus on the right. Vermilion and white alone appear only in the Magdalen's cloak in the foreground. In the sample from Martha's drapery (PLATE 32) there is a layer of lead white immediately above the brownish-grey *imprimitura* (present only as a trace, perhaps as a result of the transfer process). A few black particles of possible underdrawing appear over the lead white. There is no obvious reason why this figure should have been assigned a lighter, more reflective preparation, and so it may be that the sample point coincides with an area where the underdrawing was revised and the lead white was used to cancel the previous design. The salmon-pink highlight of the apostle's cloak (PLATE 33) also includes yellow earth but the composition of a sample from the depths of a fold (PLATE 34) is rather unexpected, in that it consists of a single layer of purple made from red lake combined with vermilion, lead white and a mineral blue pigment. In contrast to this direct technique of modelling, Martha's drapery was completed in the shadows with glazes of red lake over the underlayer of vermilion and red lake (PLATE 35). Sebastiano reserved the cool pink of pure red lake for the robe of Christ, where it balances the purple blue of his mantle, the only area of the painting where the natural ultramarine pigment is used in its fully saturated form. Analysis of the red lake dyestuff has identified it as kermes with a little madder. The madder is only in the lower layer; it may have been a deliberate choice by the painter, but it is also possible that it is present as a result of the inclusion of shearings of cloth dyed with madder together with the kermes-dyed textiles from which the greater part of the pigment was extracted.⁷⁰ In the final layers of the pink robe (PLATES 36 and 37) a little ultramarine was added to the red lake to enhance its purple tinge and to link its colour to that of the ultramarine mantle (itself underpainted with red lake). In addition, particles of powdered glass (see Appendix, pp. 48–51) have been identified in the red lake paints, and also in a few other samples, for example that from Lazarus's leg (PLATE 8); it is

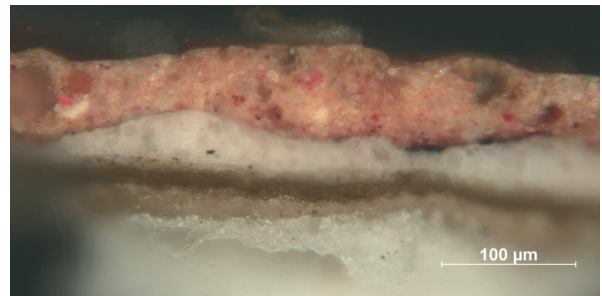


PLATE 32 Cross-section of a sample from Martha's orange-red cloak. The orange-red paint layer consists of vermilion and red earth combined with lead white. Immediately below this, at the right side of the paint sample, is what appears to be a trace of underdrawing in carbon black. This fine black layer has been applied over lead white. A trace of the grey-brown *imprimitura* is present at the base of the sample. It is possible that a revision was made to the underdrawing in this area over a fresh layer of lead white.

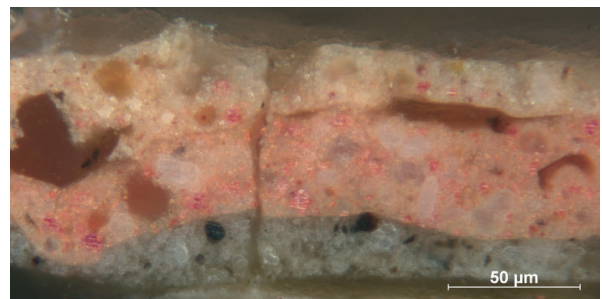


PLATE 33 Cross-section of a sample from the pale terracotta-red of the cloak of the apostle below Saint John. The bright orange-red underpaint contains vermilion combined with lead white. Over this, the terracotta-pink highlight is composed of vermilion, lead white, earth pigments and a little lead-tin yellow.

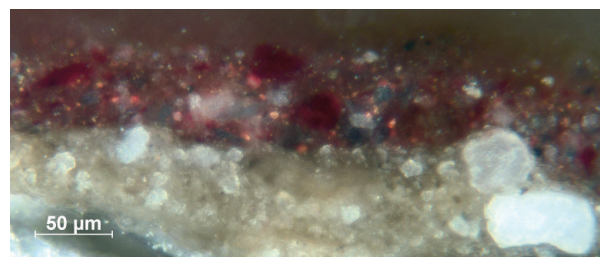


PLATE 34 Cross-section of a sample from the purple shading of the cloak shown in PLATE 33. The uppermost layer of the sample consists of red lake combined with vermilion and a blue mineral pigment and a few large dark inclusions applied directly over the *imprimitura*.

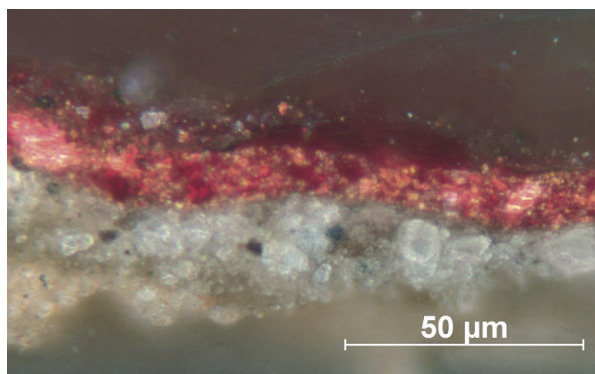


PLATE 35 Cross-section of a sample from Martha's cloak, showing a layer of vermilion combined with red lake over the *imprimatura*. This has been glazed with red lake to produce the deep shadow of the drapery.

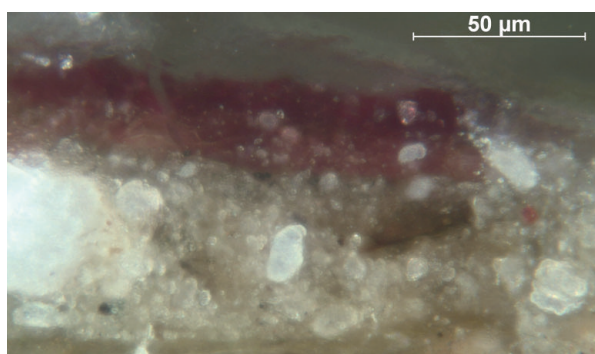


PLATE 36 Cross-section of a sample from the shadow of Christ's robe, showing kermes lake combined with a little madder and a little lead white and then glazed with the same combination of lake pigments, with the addition of few particles of ultramarine and ground glass, probably added as a siccativ (see Appendix, PLATE 39).

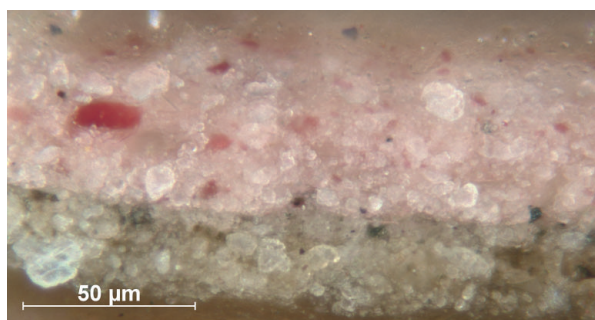


PLATE 37 Cross-section of a sample from a highlight of Christ's robe, showing red lake was combined with lead white and a little ultramarine. There is significant fading of the red lake at the upper surface of the sample.

now evident that the addition of powdered manganese-containing glass to increase the drying rate of slow-drying pigments, such as lakes when used in an oil medium, was a common practice throughout Europe in this period, and was certainly known to Raphael.⁷¹ On *The Raising of Lazarus* where there is a substantial amount of red lake in the paint layer, for example the glazed shadows, the colour is still rich and intense. In the lighter areas, on the other hand, where the lake is mixed with large amounts of lead white, it can be seen in the cross-section (PLATE 37) that there is some loss of colour at the upper surface. This fading exaggerates the contrast between highlight and shadow but does not greatly diminish the splendour of Christ's garments. Sebastiano was still following the tradition of using the two most costly pigments, ultramarine and kermes, to distinguish the most important figure; moreover, he set apart Christ and his apostles (and therefore a large part of the picture surface) by not giving them any white draperies, whereas creamy-white fabrics, painted with the relish that one would expect from a Venetian, are widely distributed across Lazarus's side of the altarpiece.

When Raphael eventually made progress on *The Transfiguration* (PLATE 38) he chose to echo Sebastiano's Christ by using the same colours for the draperies of the woman who kneels to the right of centre in the foreground (an important figure in the design, if not the narrative). Although Raphael never allowed colour to disrupt or compete with the design, it is clear from the extended palette used for his altarpiece, including acid greens and many shades of red, orange and brown, that he was responding to the challenge set by the Venetian. It is not surprising that he was impressed; what is perhaps more remarkable is how, in spite of its conservation history and the many changes to its appearance – some not apparent until this study and some perhaps less important than previously thought – *The Raising of Lazarus* can still inspire admiration for its magnificence, just as it did in early sixteenth-century Rome.

Acknowledgements

We are very grateful to Ann Massing for discussion of French transfer techniques in the eighteenth century and for allowing us to consult the manuscript of her forthcoming book on the history of restoration in France, and to Renate Woudhuysen-Keller for sharing information about Sebastiano's *Adoration of the Shepherds* (Cambridge, Fitzwilliam Museum), which she is currently restoring at the Hamilton Kerr Institute. We would also like to thank Janet Ambers, Science Group, Department of Conservation and Scientific Research,



PLATE 38 Raphael, *The Transfiguration*, 1516–20. Oil on panel, 410 × 279 cm. Vatican Museums, Vatican City inv. 40333.

British Museum, for Raman microspectroscopy of samples; and at the National Gallery, Marika Spring and Rachel Morrison for work on the samples, Rachel Billinge for infrared reflectography, and Martin Wyld, Carol Plazzotta and Nicholas Penny for helpful comments and references. In this issue of the *Technical Bulletin* which celebrates the thirtieth year of its publication we especially want to acknowledge the contribution of Joyce Plesters. Even though she was not able to develop this material for publication, she recognised the value of taking a wide range of samples while the painting was undergoing restoration and the sample points were available – ‘samples for a rainy day’ as she used to call them. Forty years later the day finally came; we hope that we have done justice to the material.

Notes

- For the commission see M. Hirst, *Sebastiano del Piombo*, Oxford 1981, p. 66.
- Letter dated 19 January 1517 from Leonardo Sellaio in Rome to Michelangelo in Carrara: ‘à avuti danari per fare e’ legname’. P. Barocchi and R. Ristori eds., *Il Carteggio di Michelangelo*, Florence 1965, Vol. I, p. 243, cited in Hirst 1981, op.cit., p. 66, note 2.
- F. Mancinelli, ‘La “Trasfigurazione” e la “Pala di Monteluce”’: Considerazioni sulla loro tecnica esecutiva alla luce dei recenti restauri’ in J. Shearman and M. B. Hall eds., *The Princeton Raphael Symposium. Science in the Service of Art History*, Princeton University Press 1990, pp. 149–60, esp. pp. 149–50.
- For Michelangelo’s part in the design and his drawings see Hirst 1981 (cited in note 1), pp. 69–71.
- These are cited with references in the account of the altarpiece given in Hirst 1981 (cited in note 1), pp. 66–75.
- Letter dated 10 December 1519 from Leonardo Sellaio in Rome to Michelangelo in Florence: ‘Bastiano... à vernichato la [ta]vola, che è mirabile’. P. Barocchi and R. Ristori eds., *Il Carteggio di Michelangelo*, Florence 1967, Vol. II, p. 205, cited in Hirst 1981 (cited in note 1), p. 69, note 19.
- See Hirst 1981 (cited in note 1), p. 69.
- For Raphael’s response to Sebastiano in the colouring of the lower half of *The Transfiguration* see M. B. Hall, *Color and Meaning. Practice and Theory in Renaissance Painting*, Cambridge University Press 1992, pp. 134–5.
- Letter dated 12 April 1520 from Sebastiano del Piombo in Rome to Michelangelo in Florence: ‘avisovi come hozi io ho portato la mia tavola un’altra volta a Palazzo, con quella che ha facto Rafafello, et non ho havuto vergogna.’ Barocchi and Ristori 1967 (cited in note 2), p. 227.
- The passage from Vasari is quoted in full in Hirst 1981 (cited in note 1), p. 67, note 7.
- Having been brought to Paris in 1797 as the most prized of all the Napoleonic spoils, *The Transfiguration* was cleaned and restored in 1802. Although thinning of the panel and possible transfer by François-Toussaint Hacquin (son of Jean-Louis) had been recommended by the Conseil d’Administration, caution prevailed and instead the panel was braced by iron cross bars. See A. Massing, *Towards a History of Painting Restoration: the origins of the profession in France*, forthcoming 2009, Chapter 8, ‘François-Toussaint Hacquin, painting restorer for the New Régime’. The three horizontal battens of chestnut inserted in dovetail grooves described by Mancinelli in Shearman and Hall 1990 (cited in note 3), p. 150, may well be original to the panel. The two narrower battens visible in the X-radiograph (plate 332), inserted between these are perhaps F-T. Hacquin’s additions. The panel has since undergone extensive structural treatment.
- C. Gardner von Teuffel, ‘Sebastiano del Piombo, Raphael and Narbonne: new evidence’, *Burlington Magazine*, 126, No. 981, 1984, pp. 265–6.
- C. Gardner von Teuffel, ‘An early description of Sebastiano’s Raising of Lazarus at Narbonne’, *Burlington Magazine*, 129, No. 1008, 1987, pp. 185–6.
- The Regent had been negotiating for the acquisition since 1706. See F. Mardrus, ‘Le Régent, mécène et collectionneur’ in *Le Palais Royal*, exh. cat., Musée Carnavalet, Paris 1988, pp. 79–115, esp. p. 98.
- For an account of the Orléans Collection, see N. Penny, *National Gallery Catalogues: The Sixteenth Century Italian Paintings*, Vol. II, London 2008, Appendix of Collectors’ Biographies pp. 461–70. See also Mardrus 1988 (cited in note 14).
- [L-F. Du Bois de Saint-Gelais], *Description des tableaux du Palais-Royal*, Paris 1727, pp. 448 ff. He also notes: ‘J. C. habillé de rouge avec une draperie bleuë’ and Saint Peter with ‘une robe d’un bleu clair avec une draperie jaune par dessus’.
- National Gallery Manuscript Catalogue, transcribed into the Conservation Record for NG 1. The source for this date is not clear.
- For biographical details of Hacquin father and son, see Massing, forthcoming (cited in note 11), and also F. Barrès, ‘Les peintures transposées du Musée du Louvre, étude des techniques de transpositions en France, de 1750 jusqu’à la fin du XIX^{ème} siècle’, *ICOM Committee for Conservation 14th Triennial Meeting The Hague*, 12–16 September 2005, Preprints Vol. II, pp. 1001–8.
- See Massing, forthcoming (cited in note 11), chapter 4, ‘Jean-Louis Hacquin and François-Toussaint Hacquin. Painting restoration under the Ancien Régime’.
- M. Wyld and J. Dunkerton, ‘The Transfer of Cima’s “The Incredulity of St. Thomas”’, *National Gallery Technical Bulletin*, 9, 1985, pp. 38–59.
- Massing, forthcoming (cited in note 11), chapter 2, ‘Robert Picault and the transfer procedure in France’, especially the section on Picault’s ‘secret’ technique.
- R. P. Knight (anon. at time of publication), ‘Northcote’s “Life of Reynolds”’, *Edinburgh Review*, XLVI, September 1814, pp. 263–92, esp. pp. 283–4. In a rather confused (and all too familiar) diatribe Knight claimed that glue from the transfer had penetrated the surface and ‘diffused over it that general hue of dim and opaque brown [more probably a discoloured old varnish]...

- which the operator then endeavoured to remove by the usual process of scouring away all the delicate and transparent glazing, by which the various splendour of the various parts had been tuned and harmonized together into one brilliant mass', now reduced to 'monotony and crudeness'. We are grateful to Nicholas Penny for drawing our attention to this account
- 23 A. Conti, *Storia del Restauro e della Conservazione delle Opere d'Arte*, Electa, Florence 1988, p. 126; translated by H. Glanville as *A History of the Restoration and Conservation of Works of Art*, Oxford 2007, p. 147.
- 24 Initially criticism of Picault – and his eventual fall from favour – was as much about the outrageous sums that he charged for his transfers as for the consequences (see Massing, forthcoming, cited in note 11, chapter 2), but by the end of the century a report on the conservation of Raphael's *Saint Michael* and *Saint Margaret* (both in the Louvre) noted that their deteriorating condition was caused by the reactive nature of the layers of glue applied in the transfer, and regretted the loss of the smooth surface characteristic of panel paintings, since they were now imprinted with the texture of the transfer canvases; Conti 1988, p. 140, and 2007, p. 167 (both cited in note 23).
- 25 Penny 2008 (cited in note 15), p. 467.
- 26 J. Pomeroy, "'To comprehend the excellencies of that performance'" Sebastiano del Piombo's *Raising of Lazarus* comes to England', *The British Art Journal*, Vol. II, no. 3, Spring/Summer 2001, pp.63–8.
- 27 The restorer John Seguier, in his evidence to the House of Commons Select Committee on the National Gallery, 1853, p. 43, reported: 'The Sebastiano del Piombo was so much damaged when Mr. Angerstein bought it, that Mr. West repaired it considerably'. Landseer, in his 1834 catalogue of the collection, described West's intervention more extravagantly: 'the Lazarus of Michael Angelo was not only dead, but was fast sinking into the ground, when Mr. West was empowered to stand before it, and again command Lazarus to "come forth"'. He commended West for his 'dexterous and successful restorations' (J. Landseer, *Descriptive, Explanatory, and Critical Catalogue of Fifty of the Earliest Pictures Contained in the National Gallery of Great Britain*, London 1834, p. 111).
- 28 Penny 2008 (cited in note 15), p. 467.
- 29 Letter from Sir Charles Eastlake in Milan, 20 October 1865, to Ralph Wornum, National Gallery Archive. Pinti was paid 19 guineas (£19 19s.) for his work on the Sebastiano.
- 30 Minutes of the Trustees of the National Gallery, 8 May 1881. National Gallery Archive.
- 31 'During these operations it became clear that the statement that the picture had been transferred from wood was inaccurate. 1) The apparent cracks are the joins (longitudinal) of four strips of canvas. 2) The grain of the original canvas is visible in the paint and there is no trace of wood grain; the latter could not have been completely removed by transfer. 3) The canvas visible under the relining canvas is of the 16th cent. coarse Italian type. Probably for "transferred" should be read "relined"'. National Gallery Manuscript Catalogue transcribed into Conservation Record for NG 1.
- 32 See Barrès 2005 (cited in note 18), pp. 1004–5, and also E. Martin, J. Bret and C. Naffah, 'Le décor du petit cloître de la Chartreuse de Paris peint par Le Sueur. Etude technique et historique des restaurations', *Techné*, no. 1, 1994, pp. 85–102, esp. pp. 89–91.
- 33 The composition of this 'enduit de transposition' is not unlike that of oil grounds that were still being applied to canvases for painting. For example, *Le Comte de Vaudreuil* (NG 4253), painted by François-Hubert Drouais in 1758, has a double ground of the type often seen on seventeenth-century French canvases, with a first layer of orange red, 'composed of a siliceous natural red earth' and an upper layer of light to mid-brownish grey, 'made up of lead white, some calcium carbonate, wood charcoal (splintery particles) and a small amount of yellow earth' (report by Ashok Roy, 23 January 2003, in Scientific Department file).
- 34 Picault's transfer in 1751 of a Raphael Madonna for the Orléans Collection was highly praised; of the three Raphael paintings from the collection that retain their attribution to Raphael, *The Bridgewater Madonna*, *The Holy Family with a Palm* (both now Edinburgh, National Galleries of Scotland), and *The Macintosh Madonna* (NG 2069), the transfer of the first was attributed by Waagen to Hacquin. The painting transferred by Picault would therefore have to be either *The Holy Family* or *The Macintosh Madonna* (although the transfer of the latter, now a ruin, could hardly be considered worthy of admiration). See Conti 1988, p. 128 and p. 231, and 2007, p. 150 and p. 177, note 12 (both cited in note 23, although here the translation confuses the issue by conflating the two Bridgewater pictures).
- 35 For example he replaced the gesso ground of Andrea del Sarto's *Charity* (Paris, Louvre) with an inappropriate red-brown ground; see G. Emile-Mâle, 'Histoire rapide de la restauration des peintures du Louvre. 1ère partie: Des origines jusqu'à 1848', *Coré*, no. 3, October 1997, pp. 52–7, esp. p. 55.
- 36 For example Raphael's *Saint Michael* and del Sarto's *Charity* (both Paris, Musée du Louvre) had to be re-transferred by Hacquin père in 1776 and 1780 respectively. See Barrès 2005 (cited in note 18), p. 1002.
- 37 Treatment Report by A.W. Lucas, October 1967 (National Gallery Conservation Record for NG 1).
- 38 See Wyld and Dunkerton 1985 (cited in note 20), pp. 54–8.
- 39 A.W. Lucas, 'The Transfer of Easel Paintings' in G. Thomson ed., *Recent Advances in Conservation: Contributions to the IIC Rome Conference*, London 1963, pp. 165–8.
- 40 This information was supplied by Joyce Plesters to Michael Hirst. See Hirst 1981 (cited in note 1), p.73.
- 41 Only three new samples were taken in order to resolve specific questions that arose as result of the examination of the archived samples.
- 42 See J.S. Mills and R. White, 'The Gas Chromatographic Examination of Paint Media. Some Examples of Medium Identification in Paintings by Fatty Acid Analysis', *Conservation and Restoration of Pictorial Art*, London 1976, eds N. Brommelle and P. Smith, pp. 72–7, esp. p. 75.
- 43 This preliminary examination by infrared was carried out by Rachel Billinge with the painting hanging in the Gallery. The SIRIS prototype digital infrared camera was used.
- 44 See C. Barbieri ed., *Notturmo Sublime. Sebastiano e Michelangelo nella Pietà di Viterbo*, exh. cat. Museo Civico, Viterbo 2004, esp. pp. 32–7, 89–105, and R. Bellucci and C. Frosinini, 'Il processo di elaborazione dell'immagine in Sebastiano del Piombo: "La Pietà" e "La Flagellazione di Viterbo"' in C. Barbieri, E. Parlato and S. Rinaldi eds, *La Pietà di Sebastiano a Viterbo: storia e tecniche a confronto*, postprints of study day at Università della Tuscia, Viterbo, 10 June 2005, Rome 2009, pp. 148–69, esp. pp. 156–64.
- 45 See B. Marocchini, 'La Pietà di Viterbo: la tecnica di esecuzione' in Barbieri ed. 2004 (cited in note 44), pp. 89–93, esp. pp. 90–1 and p. 95 (for the cross-sections, although the location of the sample points is not clearly described).
- 46 See J. Dunkerton and M. Spring, 'The Development of Painting on Coloured Surfaces in Sixteenth-century Italy', *Painting Techniques: History, Materials and Studio Practice*, Contributions to the Dublin Congress of the International Institute for Conservation, 7–11 September 1998, A. Roy and P. Smith eds, pp. 120–30, esp. p. 128. See also J. Dunkerton, 'Tra Venezia e Roma: il disegno preparatorio nei dipinti londinesi di Sebastiano' in Barbieri, Parlato and Rinaldi eds 2009 (cited in note 44), pp. 170–85, esp. pp. 172–3.
- 47 J. Dunkerton, S. Foister and N. Penny, *Dürer to Veronese: Sixteenth-Century Painting in the National Gallery*, New Haven and London 1999, pp. 274–5, and A. Cerasuolo, 'I dipinti di Sebastiano del Piombo del Museo di Capodimonte. Note sulla tecnica', in Barbieri, Parlato and Rinaldi eds, 2009 (cited in note 44), pp. 128–47.
- 48 Hirst 1981 (cited in note 1), p. 72, note 38, suggests that the addition of a white ground has resulted in an imbalance in the tonal transitions. Other explanations for this are presented in this article. Moreover, back in 1834, Landseer commented on Sebastiano's colour distribution, observing that 'the women who are muffling their olfactory nerves from the diminution of their dimensions...we are taught to think of are at some distance; yet the lights on their head gear are as bright as the white drapery around the head of Lazarus'. Landseer 1834 (cited in note 27), p. 116.
- 49 See Dunkerton in Barbieri, Parlato and Rinaldi eds 2009 (cited in note 44), pp. 181–3.
- 50 The similar sharp edge to modelling of his right shin, however, is the result of repainting in the course of past restorations.
- 51 For Sebastiano's use of chiaroscuro on panels and walls see Hall 1992 (cited in note 8), pp. 134–5 and 138–41.
- 52 Hirst 1981 (cited in note 1), p. 72, draws attention to the contrasting flesh tones.
- 53 On 22 September 1518, Beltrame Costabili in Rome wrote a letter of introduction to Alfonso d'Este in Ferrara on behalf of one of Raphael's *garzoni*, who was on his way to Venice, 'mandato da epso Raphael, credo per comperere colori' [sent by the said Raphael, to buy colours, I believe]; J. Shearman, *Raphael in Early Modern Sources (1483–1602)*, New Haven and London 2003, Vol. I, p. 373. Given the date, it is possible that these pigments were purchased for *The Transfiguration*.
- 54 See Mills and White 1976 (cited in note 42), p. 75. GC-MS analysis by Rachel Morrison of two further samples, from Saint John's green sleeve and from the dull green tunic of the figure leaning over Lazarus, found heat-bodied linseed oil in both.
- 55 See Dunkerton in Barbieri, Parlato and Rinaldi eds 2009 (cited in note 44), pp. 183–4.
- 56 For example, *The Consecration of Saint Nicholas* (NG 26); see N. Penny and M. Spring, 'Veronese's Paintings in the National Gallery. Technique and Materials: Part I', *National Gallery Technical Bulletin*, 16, 1995, pp. 4–29, esp. p. 13.
- 57 See S. Béguin, *Nouvelles analyses résultantes de l'étude et de la restauration des*

- Raphaël du Louvre, in Shearman and Hall eds 1990 (cited in note 3), pp. 39–55, and esp. the appendix, pp. 54–5.
- 58 This very badly damaged painting – also a victim of a French transfer while in the Orléans collection – is at present undergoing treatment by Renate Woudhuysen-Keller at the Hamilton Kerr Institute.
- 59 For example the young apostle to the left of Christ in Cima's *The Incredulity of Saint Thomas* (NG 816); see J. Dunkerton and A. Roy, 'The Technique and Restoration of Cima's "The Incredulity of S. Thomas"', *National Gallery Technical Bulletin*, 10, 1986, pp. 4–27, esp. p. 14 and plate 2d.
- 60 So misleading is this darkening of the azurite that Hall 1992 (cited in note 8), p. 134, actually describes *The Raising of Lazarus* as 'a night scene'.
- 61 See J. Dunkerton and M. Spring, 'The Technique and Materials of Titian's Early Paintings in the National Gallery, London', in *Titian, Jacopo Pesaro being presented by Pope Alexander VI to Saint Peter*, Vol. 3, no. 1 of *Restoration*, journal of the Koninklijk Museum voor Schone Kunsten, Antwerp 2003, pp. 9–21, esp. p. 17.
- 62 Conti writes of 'a serious imbalance due to poor cleaning' (see Conti 2007 [cited in note 23], p. 166 – this passage is not in the first edition of 1988). It is questionable whether the painting was ever harmonious in its colouring, or indeed was intended to be so. Moreover, its conservation history and the many alterations to the painting materials – some not previously identified – make it unlikely that a so-called balanced cleaning could have been achieved.
- 63 A yellow-brown pigment containing copper has been noted on a painting by Quinten Massys at the National Gallery; see J. Dunkerton, 'The Technique and Restoration of "The Virgin and Child with Four Angels" by Quinten Massys', *National Gallery Technical Bulletin*, 29, 2008, pp. 60–75, esp. p. 70 and p. 75, notes 25 and 26 (supplied by Marika Spring).
- 64 See M. Spring, R. Grout and R. White, "'Black earths": A Study of Unusual Black and Dark Grey Pigments used by Artists in the Sixteenth Century', *National Gallery Technical Bulletin*, 24, 2003, pp. 96–113, esp. pp. 107–10; and M. Spring, 'Raphael's Materials: some new discoveries and their context within early sixteenth-century painting', in *Raphael's painting technique: working practices before Rome*. Proceedings of the Eu-ARTEX+CH workshop, National Gallery, London, 11 November 2004, eds A. Roy and M. Spring, Nardini Editore, 2007, pp. 77–86.
- 65 For example, on the prophet Daniel and on the Delphic Sibyl.
- 66 The novelty of this colour is commented upon by M. Hall, 'La "Resurrezione di Lazzaro" di Sebastiano e la sfida al colore di Raffaello' in Barbieri, Parlato and Rinaldi eds, 2009 (cited in note 44), pp. 26–41, esp. p. 38. In this paper Hall also argues that the extraordinary palette of *The Raising of Lazarus* is to some extent a response to paintings by Raphael such as the '*Spasimo di Sicilia*' (Madrid, Museo del Prado).
- 67 For a discussion of the reactions between red lead (and lead-tin yellow) and the fatty acids present in oil binders, see: C. Higgitt, M. Spring and D. Saunders, 'Pigment-medium interactions in oil paint films containing red lead or lead-tin yellow', *National Gallery Technical Bulletin*, 24, 2003, pp. 75–95; and M. Spring and C. Higgitt, 'Analyses reconsidered: the importance of the pigment content of paint in the interpretation of the results of the examination of binding media', in *Medieval Painting in Northern Europe: Techniques, Analysis, Art History; Studies in Commemoration of the 70th Birthday of Umm Plahter*, ed. J. Nadolny, with K. Kollandsrud, M.L. Sauerberg and T. Trøysaker, Archetype Publications Ltd, London 2006, pp. 223–9, esp. pp. 223–5.
- 68 The possibility that this alteration had already occurred by 1727 is suggested by Du Bois de Saint-Gelais's description of 'S. Jean qui a une robe verte & par dessus une draperie jaune' (Du Bois de Saint-Gelais 1727, cited in note 16). Although he also described Saint Peter's yellow-orange robe as 'jaune', unaltered red lead would be more likely to be described as orange or red rather than yellow.
- 69 The presence of realgar and pararealgar were confirmed by Raman spectroscopy at the British Museum. We are grateful to Janet Ambers for undertaking this analysis. Realgar may alter to pararealgar by a light-induced transformation. Pararealgar is less dense and of greater volume than realgar and initially forms on the surface of mineral samples as a thin layer or nodules and then, on reaching a critical thickness, cracks and spalls forming a powdery orange-yellow material. Recent studies have also shown that the alteration process involves the formation of an intermediate phase, phase P, which appears to be a precursor to pararealgar (D.L. Douglass and C. Shing 'The light-induced alteration of realgar to pararealgar', *American Mineralogist*, 77, 1992, pp. 1266–74, and A.C. Roberts, H.G. Ansell and M. Bonardi, 'Pararealgar, a new polymorph of As₂S₃, from British Columbia', *Canadian Mineralogist* 18, 1980, pp. 525–7). The P phase has been identified by XRD on a polychromed sculpture dated to c. 700, confirming that, in this instance, the artist originally employed orange-red realgar and that partial alteration to yellow pararealgar has occurred (M.C. Corbeil, 'The P file', *Canadian Conservation Institute Newsletter* 22, 1988). The P phase was not detected in samples from the *Raising of Lazarus*, but the very deteriorated nature of the paint layer and the presence of pararealgar and realgar in the samples suggest light-induced alteration rather than the use of mineral pararealgar by the artist. Pararealgar has also been identified in the *Holy Family and Saints*, tentatively ascribed to the school of Titian and now in Winnipeg Art Gallery (M.C. Corbeil and K. Helwig, 'An occurrence of pararealgar as an original or altered artists' pigment', *Studies in Conservation*, 40, 1995, pp. 133–8).
- 70 The HPLC analysis of the red lake was carried out by Jo Kirby. The madder was present in two of the three samples, but it was not possible to determine for certain that there was a deliberate layering of lakes as in Lorenzo Lotto's two versions of *A Virgin and Child with Saints Jerome and Nicholas of Tolentino* (see J. Dunkerton, N. Penny and A. Roy, 'Two Paintings by Lorenzo Lotto in the National Gallery', *National Gallery Technical Bulletin*, 19, 1998, pp. 52–63, esp. pp. 55–6) or whether the lake was made from a mixture of dyestuffs (see J. Kirby, 'The Identification of Red Lake Pigment Dyestuffs and a Discussion of their Use', *National Gallery Technical Bulletin*, 17, 1996, pp. 56–80, esp. pp. 67–8).
- 71 Spring has identified soda-lime glass in Italian paintings and high-lime or mixed alkali glass in paintings from Germany and the Netherlands. See M. Spring, 'Raphael's Materials: some new discoveries and their context within early sixteenth-century painting', (cited in note 64).

Appendix

For the deep crimson shadow of Christ's robe (see PLATE 36), an opaque layer of red lake combined with lead white was glazed with a further layer of translucent red lake pigment. Examination of the paint cross-section in ultraviolet light (PLATE 39) revealed the presence of translucent inclusions with glassy fracture in both paint layers, though the particles are particularly clearly visible in the pale pink underpaint. Several of these particles were separated from the paint layer by micromanipulation, mounted as dispersions in Meltmount (which has a refractive index of 1.662) and observed in plane polarised transmitted light. These particles display the distinctive conchoidal fracture and stress lines which are characteristic of broken glass (PLATE 40). Soda-lime glass has been identified in a number of works by Raphael (see M. Spring, 'Raphael's Materials: some new discoveries and their context within early sixteenth-century painting', in *Raphael's painting technique: working practices before Rome*. Proceedings of the Eu-ARTEX+CH workshop, National Gallery, London, 11 November 2004, eds A. Roy and M. Spring, Nardini Editore, 2007, pp. 77–86) and in paintings from all over Italy and throughout Europe at this period. It seems likely that the powdered glass was added as a drier to the oil paint with the manganese acting as a siccativ. A particularly large elongated glass particle (20µm in length) is visible in the deep rich glaze of Martha's drapery (see PLATE 35) when the sample is viewed in ultraviolet light (PLATE 41).

In the backscatter scanning electron image (FIG. 6) of the sample taken from the moss-green jerkin of the figure leaning over Lazarus (see PLATE 23), one of the copper-containing semi-translucent yellowish-green areas is visible in the centre of the image as a large mid-grey area. The lead white matrix appears white (due to its high atomic number). Of particular interest here are the elongated particles found within the translucent copper-rich yellowish-green areas which were also found to contain lead and sulphur, sometimes with a little zinc, which are clearly visible in the backscatter electron image below (FIG. 7). Spot analysis of the highlighted area shown in the insert confirmed the presence of lead and sulphur

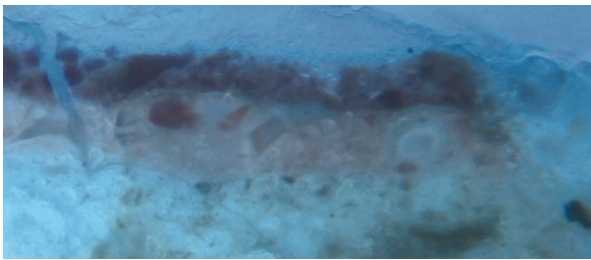


PLATE 39 Cross-section of a sample from the shadow of Christ's robe (PLATE 36) photographed in ultraviolet light.

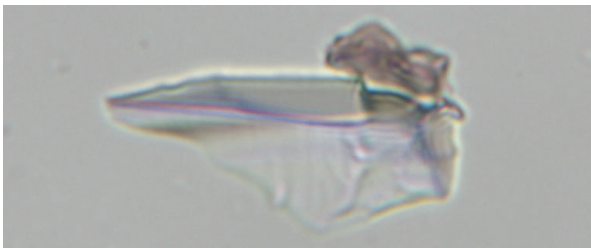


PLATE 40 Particle of glass from glaze layer in PLATE 39, photographed in transmitted semi-polarised light.

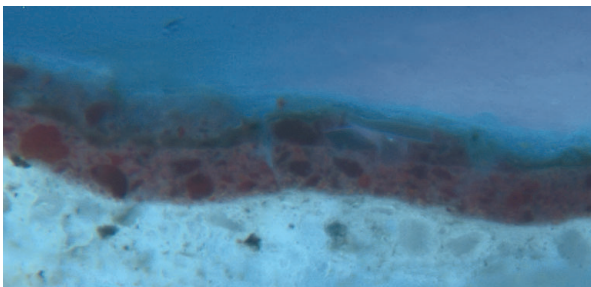


PLATE 41 Cross-section of a sample from Martha's cloak (PLATE 35) photographed in ultraviolet light.

with a little zinc. Elemental analysis of the yellowish-green translucent material itself confirmed the presence of copper, lead and sulphur. The overall moss-green appearance of this paint is likely to be due to a combination of the small number of tiny blue ultramarine particles with the yellowish translucent material and a few grey particles of galena (lead sulphide) combined with lead white.

The backscatter scanning electron image (FIG. 8) of the sample taken from the area of dark green-blue sky (see PLATE 16) shows angular particles of the mineral blue pigment azurite, with a very few inclusions of lead white (which appear bright white due to their high atomic number) embedded in the oil binding medium. The ratio of pigment to binder is low and it is the darkening of the medium which produces the dark greenish-blue appearance of the paint layer.

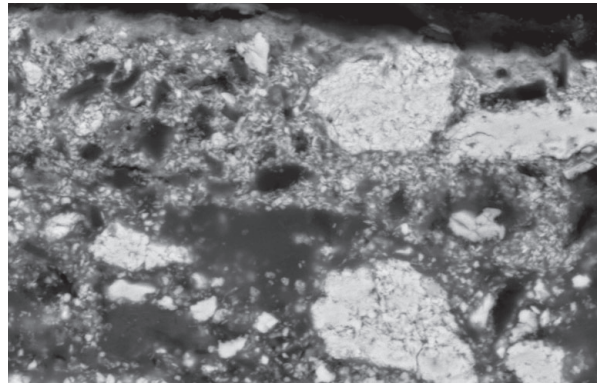


FIG. 6 Backscatter scanning electron image of the sample from the dull green tunic of the man leaning over Lazarus (PLATE 23).

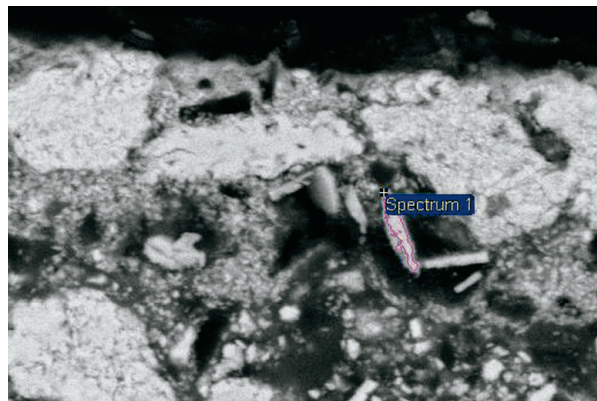


FIG. 7 Backscatter scanning electron image of another area of the sample from the dull green tunic of the man leaning over Lazarus (PLATE 23), with highlighted insert.

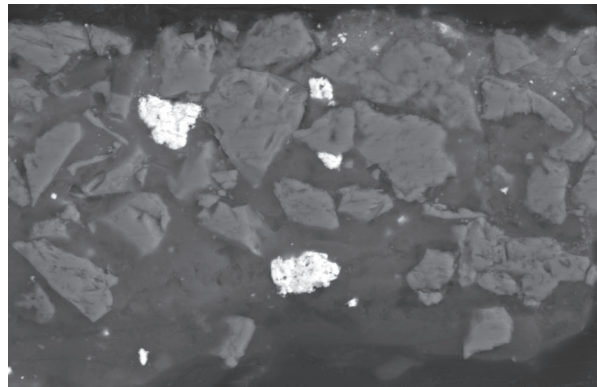


FIG. 8 Backscatter scanning electron image of the sample from the dark band of sky below the clouds (PLATE 16).

Table of pigments and paint stratigraphy
(priming and transfer layers not included)

Blue and Purple	Red	Orange	Yellow and Brown	Green
<p><i>Lightest blue of Christ's cloak.</i> PLATE 4</p> <ul style="list-style-type: none"> ultramarine combined with lead white pale pink layer of lead white combined with red lake 	<p><i>Deep terracotta pink of cloak of the apostle below Saint John (area of highlight).</i> PLATE 33</p> <ul style="list-style-type: none"> lead white combined with vermilion, yellow and red earth pigments and a little lead-tin yellow vermilion combined with lead white 	<p><i>Pale orange-pink of cloak of the apostle in profile at the left edge of the painting.</i> PLATE 29</p> <ul style="list-style-type: none"> red lead. This layer exhibits significant lightening, particular at the upper surface, due to the formation of lead soaps at the right side of the sample a thin layer of red lake divides the two layers of red lead red lead combined with a few red lake particles. This layer exhibits significant lightening due to the formation of lead soaps 	<p><i>Highlight of yellow robe of Mary Magdalene's robe.</i> PLATE 25</p> <ul style="list-style-type: none"> lead-tin yellow type I combined with lead white lead-tin yellow combined with a copper green pigment and a few yellow earth particles 	<p><i>Green shadowed area of yellow Mary Magdalene's robe.</i> PLATE 3</p> <ul style="list-style-type: none"> green paint layer incorporating copper green, lead-tin yellow, lead white, yellow earth and large black particles
<p><i>Deepest blue of Christ's cloak.</i> PLATE 10</p> <ul style="list-style-type: none"> pure ultramarine pale pink layer of lead white combined with red lake 	<p><i>Dark orange-red of Martha's cloak.</i> PLATE 35</p> <p>Appendix PLATE 41</p> <ul style="list-style-type: none"> red lake glaze (kermes with a little madder) with particles of powdered glass vermilion combined with red lake 	<p><i>Deep reddish-orange of Saint Peter's cloak.</i> PLATE 30</p> <ul style="list-style-type: none"> realgar and pararealgar (confirmed by Raman spectroscopy) red earth combined with lead-tin yellow and lead white 	<p><i>Deep yellow of collar of apostle kneeling behind Saint Peter, left-hand edge of picture.</i> PLATE 26</p> <ul style="list-style-type: none"> brilliant yellow layer of lead white combined with yellow earth and lead-tin yellow pale mauve layer of azurite combined with lead white, red and yellow earth, vermilion and a particle of red lake pigment 	<p><i>Bright green of cloak of woman holding her cloak to her face, behind and just to the right of Martha.</i> PLATE 18</p> <ul style="list-style-type: none"> copper green glaze copper green combined with lead white and a few carbon black particles brown underpaint containing earth pigments and some large carbon black particles with lead white
<p><i>Patchy pale lilac-blue of Saint Peter's robe.</i> PLATE 12</p> <ul style="list-style-type: none"> lead white with a few particles of ultramarine and a trace of very faded lake pigment at the surface of the sample azurite combined with lead white, a little red lake and a few particles of carbon black 	<p><i>Deep crimson shadow of Christ's pink robe.</i> PLATE 36</p> <p>Appendix PLATES 39 and 40</p> <ul style="list-style-type: none"> red lake (kermes lake with a little madder), powdered glass and a few particles of ultramarine red lake (kermes lake with a little madder) and powdered glass combined with lead white 	<p><i>Decayed orange of the cloak of the apostle leaning over Christ's shoulder.</i> PLATE 31</p> <ul style="list-style-type: none"> red lake glaze red earth combined with yellow earth and an arsenic sulphide pigment yellow earth 	<p><i>Bright yellow highlight of the yellow cloak held to cover the nose of the man on the far right of the painting, near edge.</i> PLATE 27</p> <ul style="list-style-type: none"> lead-tin yellow yellow earth dark green/black copper-rich layer yellow earth combined with lead white and a few red particles 	<p><i>Brilliant lime-green (mid-tone) of sleeve of the apostle below Saint John.</i> PLATE 20</p> <ul style="list-style-type: none"> copper green glaze layer lead-tin yellow with inclusions which look like lead soaps copper green combined with lead white, lead-tin yellow and dark earthy particles mixed dark green layer of black particles with yellow earth and copper green

Blue and Purple	Red	Orange	Yellow and Brown	Green
<p><i>Pale blue of Martha's sleeve.</i> PLATE 13</p> <ul style="list-style-type: none"> • disrupted surface layer of lead white combined with ultramarine and possibly a now faded red lake • ultramarine combined with red lake and lead white • pale pink layer of lead white with a few tiny red particles 	<p><i>Light pink of Christ's pink robe.</i> PLATE 37</p> <ul style="list-style-type: none"> • lead white combined with red lake (kermes lake with a little madder), with powdered glass and a few particles of ultramarine • lead white combined with red lake (kermes lake with a little madder) and powdered glass 	<p><i>Orange-red of Martha's cloak.</i> PLATE 32</p> <ul style="list-style-type: none"> • orange-red layer of red earth and vermilion with lead white • trace drawing in black • lead white priming 	<p><i>Brown of the foliage of a bush growing out of the lower part of the rocky outcrop.</i> PLATE 17</p> <ul style="list-style-type: none"> • thin dark brown layer of red earth and black particles • thick dark brown layer of black and red earth particles • pale green of landscape background comprising a copper green, lead-tin yellow, yellow earth and lead white • thin dark brown/black layer composed of black and red particles, with one large red earth inclusion visible 	<p><i>Lightest green of Saint John's left sleeve.</i> PLATE 19</p> <ul style="list-style-type: none"> • thin layer of ultramarine combined with lead white • verdigris combined with lead white and a few black particles • verdigris combined with lead white and a few black particles • at the right side of the sample a black layer is visible beneath the copper green. A large particle of red lake is also present at this level
<p><i>Central area of sky, above cloud and below foliage: brilliant mid blue.</i> PLATE 15</p> <ul style="list-style-type: none"> • ultramarine combined with lead white and a little red lake • azurite combined with lead white, red lake and a few tiny particles of other red mineral pigments 	<p><i>Red of cloak which Mary Magdalene kneels upon.</i> (not illustrated Sample 11)</p> <ul style="list-style-type: none"> • vermilion combined with lead white and a little red lake 	<p><i>Bright orange of Saint Peter's cloak.</i> (not illustrated Sample 4)</p> <ul style="list-style-type: none"> • arsenic sulphide pigment • red earth combined with lead-tin yellow and lead white 	<p><i>Flesh of Lazarus's left leg, light area.</i> PLATE 8</p> <ul style="list-style-type: none"> • pale yellow flesh tone of lead white with yellow and brown earth pigments • dark brown flesh tone of brown, red and yellow earth pigments with some lead white • two layers applied wet-in-wet, the upper part containing earth pigments with lead white, while the lower contains large silica-rich particles and earth pigments • dark layer containing earth pigments 	<p><i>Moss-green of cloak of the old apostle with hands raised behind Christ's left shoulder.</i> PLATE 21</p> <ul style="list-style-type: none"> • yellow earth with copper green and a few black particles • copper green with lead white and yellow earth particles

Blue and Purple	Red	Orange	Yellow and Brown	Green
<p><i>Central area of sky, just above pale buildings: very dark blue/black area.</i></p> <p>PLATE 16</p> <p>Appendix FIG. 8</p> <ul style="list-style-type: none"> • azurite combined with a very few particles of lead white in a very darkened binding medium 	<p><i>Red of shirt of man supporting Lazarus at bottom right (mid-tone).</i> (not illustrated Sample 14)</p> <ul style="list-style-type: none"> • red layer of vermilion with a little red earth in a matrix of calcium carbonate, silica and a little lead white • pale brown layer with large silica-rich particles in a matrix of yellow and brown earth pigments with a few black particles 	<p><i>Deeper, more yellow orange of cloak of the apostle in profile at the left edge of the painting (green beneath?).</i> (Sample not illustrated)</p> <ul style="list-style-type: none"> • red lead combined with a little red lake. This layer exhibits significant lightening, particularly at the upper surface, due to the formation of lead soaps • at the left side of the sample a copper green layer divides the two layers of red lead. The copper green is combined with a little red lake • red lead combined with a few red lake particles. This layer exhibits significant lightening due to the formation of lead soaps 		<p><i>Pale green tunic of man leaning over Lazarus (light tone, resampling of S. 23: pale blue/green)</i></p> <p>PLATE 23</p> <p>Appendix FIGS 6 and 7</p> <ul style="list-style-type: none"> • lead white with a translucent yellow-green copper-containing pigment, ultramarine and a few shiny dark particles of galena (lead sulphide) • thick layer of azurite with lead white a few particles of yellow/brown earth pigments • pale mauve layer of lead white with azurite and a few particles of red lake
<p><i>Deeper (mid) blue of Saint Peter's robe.</i> (not illustrated Sample 7)</p> <ul style="list-style-type: none"> • ultramarine combined with red lake and lead white • single azurite particle at the base of the sample 				<p><i>Bright 'emerald' green of sleeve of man with a turban at top right of the painting.</i></p> <p>PLATE 24</p> <ul style="list-style-type: none"> • very thin pale layer on surface at the right side of the sample which may contain lead-tin yellow as well as lead white • verdigris combined with lead white • verdigris combined with lead white • purple layer of azurite combined with red lake and lead white
<p><i>Deep mauve of Martha's sleeve.</i> PLATE 11</p> <ul style="list-style-type: none"> • ultramarine combined with red lake and lead white • red earth combined with ultramarine and a little red lake and lead white 				<p><i>Green of foliage along bottom edge of picture.</i> (Sample 8)</p> <ul style="list-style-type: none"> • verdigris with a little lead-tin yellow • lead-tin yellow with verdigris • mixed brown paint layer of red, yellow and brown earth pigments
<p><i>Purple shading of deep terracotta pink of cloak of the apostle below Saint John.</i></p> <p>PLATE 34</p> <ul style="list-style-type: none"> • purple layer of red lake combined with vermilion, lead white, azurite and a few black particles 				