
CONSERVATION OF WALL PAINTING DEPARTMENT
COURTAULD INSTITUTE OF ART

**Peterborough Cathedral, nave ceiling:
Scientific examination of the original
decoration**

❧ *Volume II Plates*

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Plate 1. Peterborough Cathedral, nave ceiling: detail showing the figures of *St. Peter* (centre right), *St. Paul* (left) and the *Psaltery Player* (lower left).



Plate 2. Detail of ceiling showing *St. Peter* and the *Agnus Dei*.

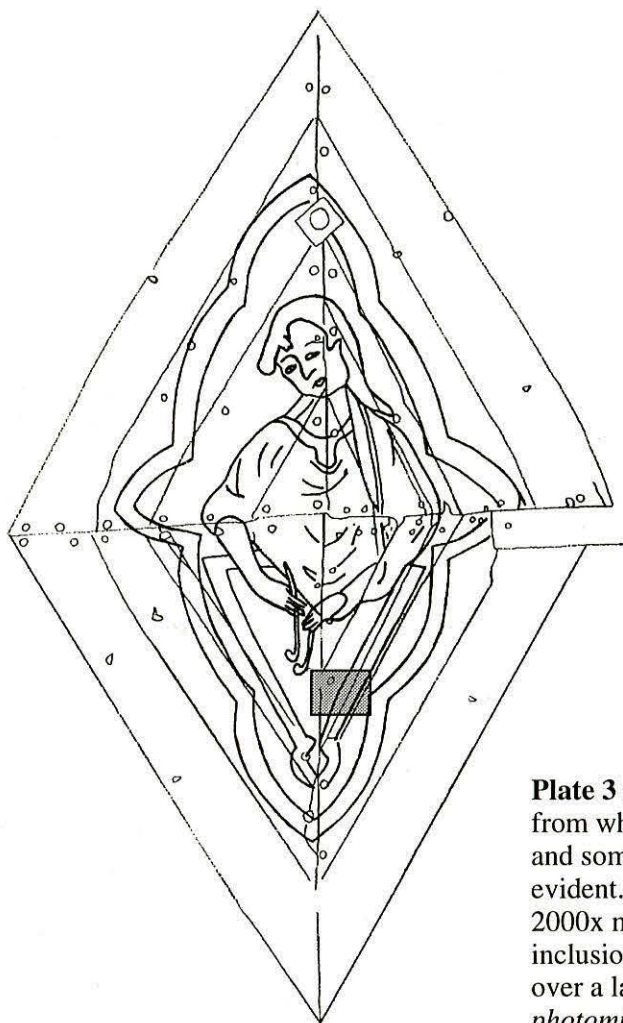


Plate 3 (below). Detail of the *Psaltery Player* showing the pinky/grey area from which Sample 1/2093 was taken. The extent of paint loss in this area, and some crudely retouched linear details in white and brown are also evident. **Plate 4 (above).** Cross-section of Sample 1/2093 shown here at 2000x magnification. The rough texture of the paint is due to the siliceous inclusions in the yellow iron oxide-rich paint layer, which has been applied over a layer of red iron oxide. (*Macrophotograph Heritage/Howard 1997, photomicrograph Howard 1997*).



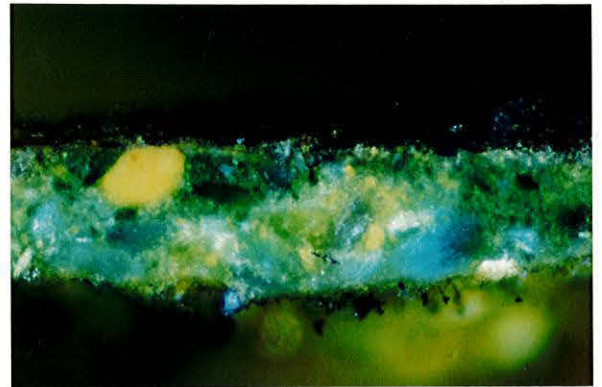
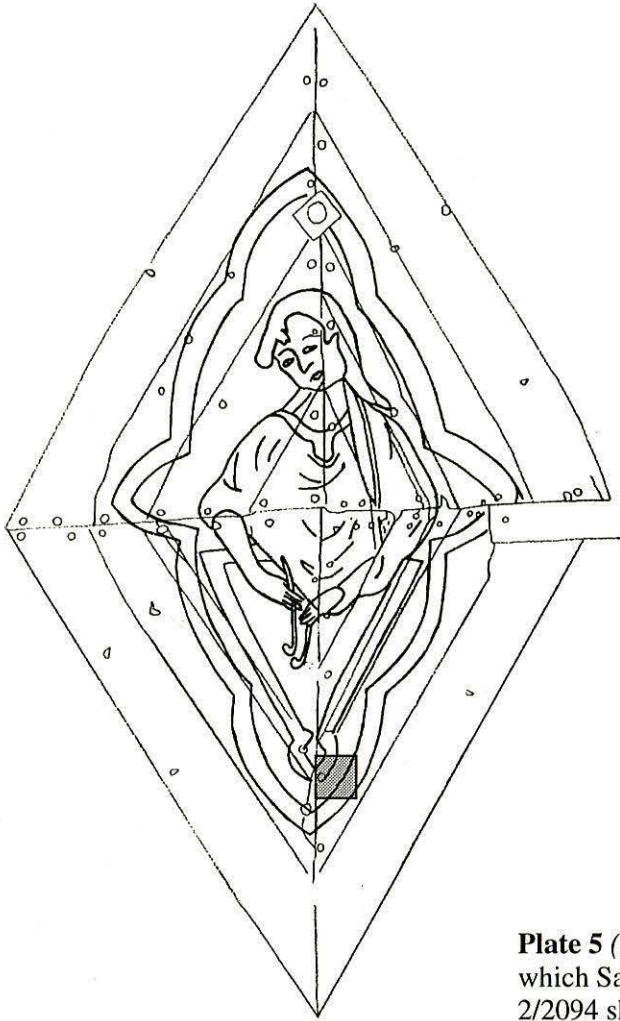


Plate 5 (*below*). Detail of the *Psalter* *Player* showing the green area from which Sample 2/2094 was taken. **Plate 6** (*top*). Cross-section of Sample 2/2094 shown at 2000x magnification. Particles of basic verdigris have been combined with yellow iron oxide to produce the yellow/green paint layer. One of the particles of verdigris, photographed in plane polarised transmitted light, is shown at 3320x magnification in **Plate 7** (*above*). (*Macrophotograph Heritage/Howard 1997, photomicrographs Howard 1997*).



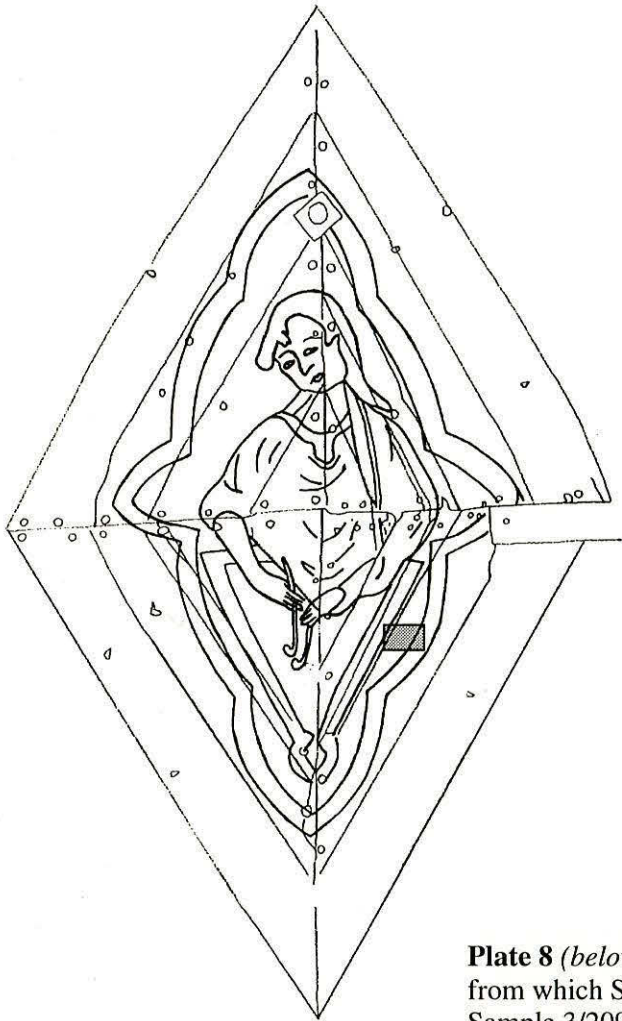


Plate 8 (below). Detail of the *Psaltery Player* showing the blue/green area from which Sample 3/2095 was taken. **Plate 9** (above). Cross-section of Sample 3/2095 shown at 672x magnification. Prussian blue combined with lead white has been applied over the verdigris and yellow iron oxide (mid-green paint layer) below. (*Macrophotograph Heritage/Howard 1997, photomicrograph Howard 1997*).



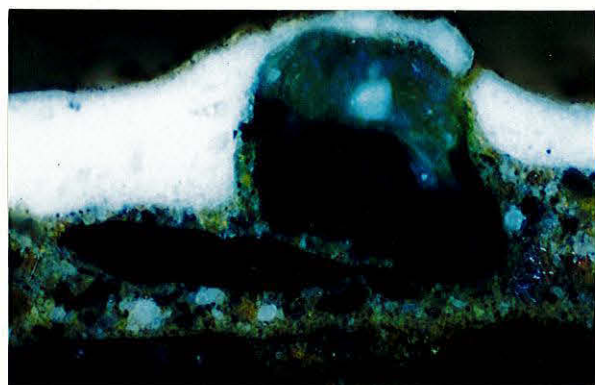
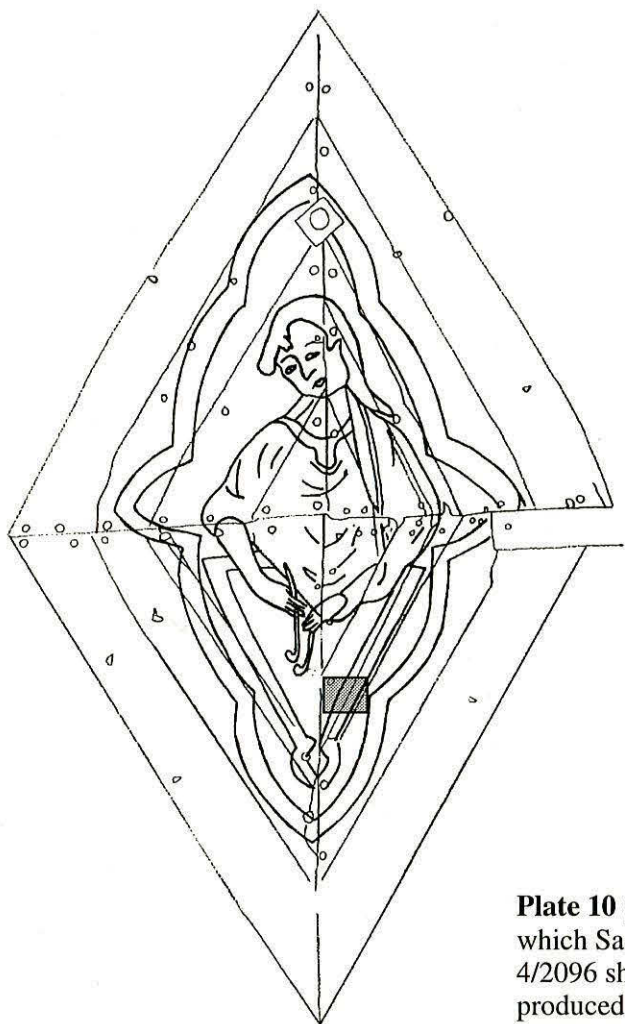
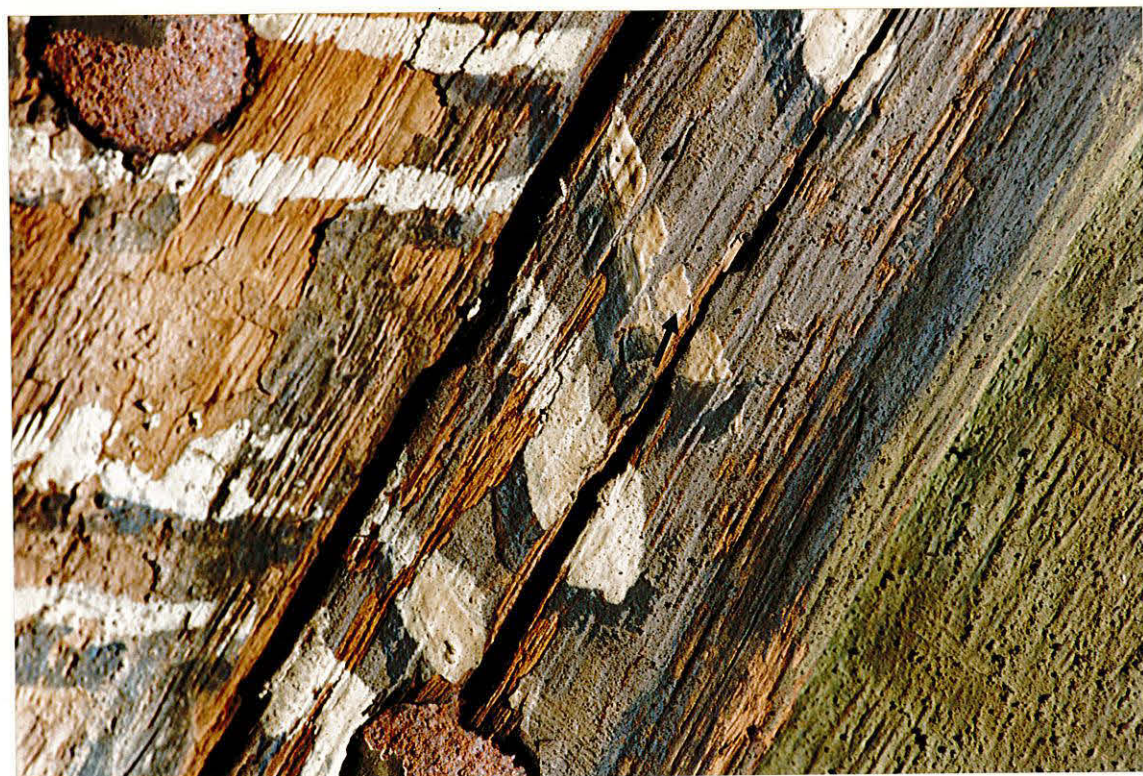


Plate 10 (*below*). Detail of the psalter, showing the pale purple area from which Sample 4/2096 was taken. **Plate 11** (*above*). Cross-section of Sample 4/2096 shown at 1752x magnification. The purple appearance has been produced by combining red and yellow iron oxide pigments with carbon black and lead white. A large inclusion of verdigris is also evident in this paint layer. A linear detail in lead white has been applied in impasto over the purple area. Crude retouchings white are also visible. (*Macrophotograph Heritage/Howard 1997, photomicrograph Howard 1997*).



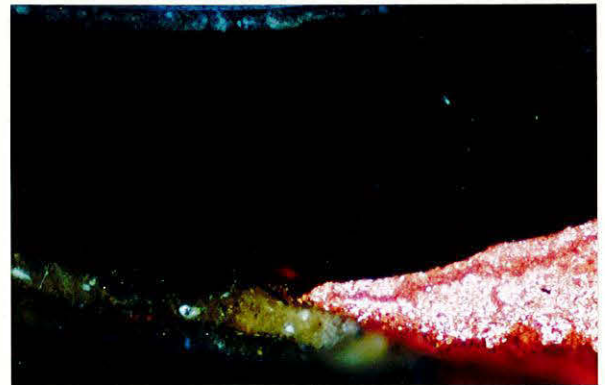
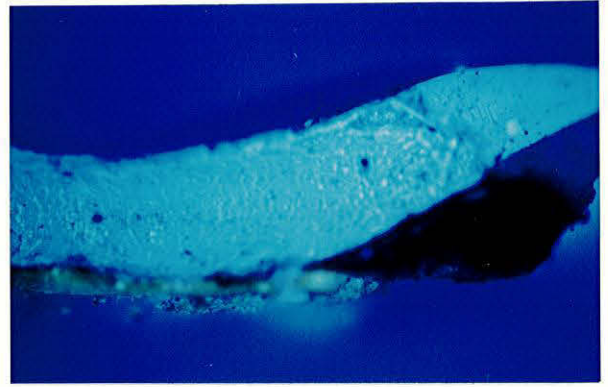
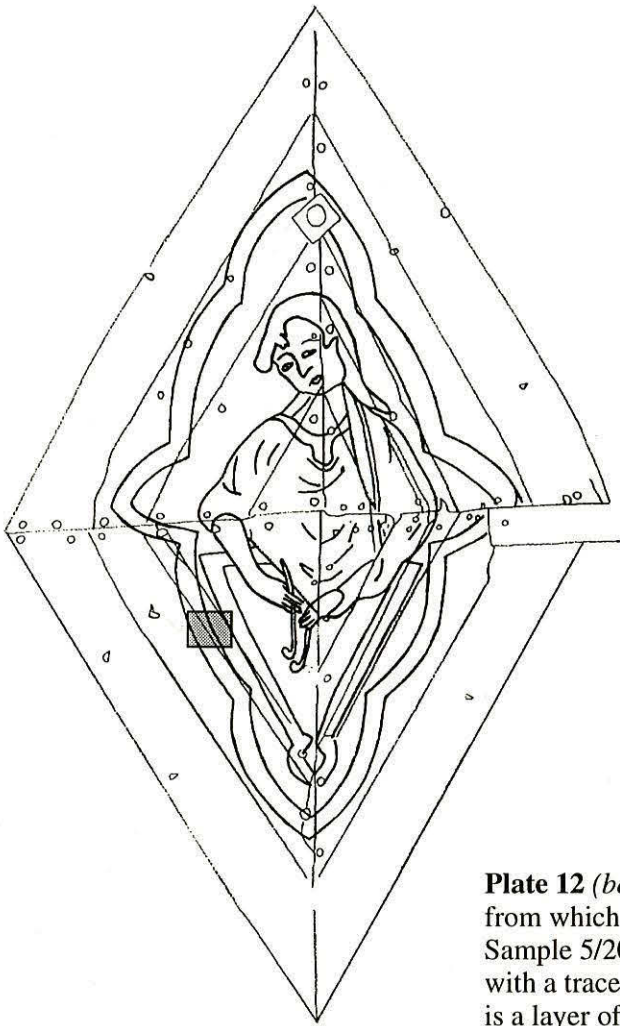


Plate 12 (below). Detail of the *Psaltery Player* showing the brilliant red detail from which Sample 5/2097 was taken. **Plate 13** (above). Cross-section of Sample 5/2097 at 724x magnification, showing a layer of pure vermilion with a trace of a creamy white preparation below. On top of the red pigment is a layer of glue 330 μm thick. This layer of animal glue, and the accretion of dirt which has accumulated on its surface, is clearly visible in UV light, as shown in **Plate 14** (top). (*Macrophotograph Heritage/Howard 1997, photomicrographs Howard 1997*).



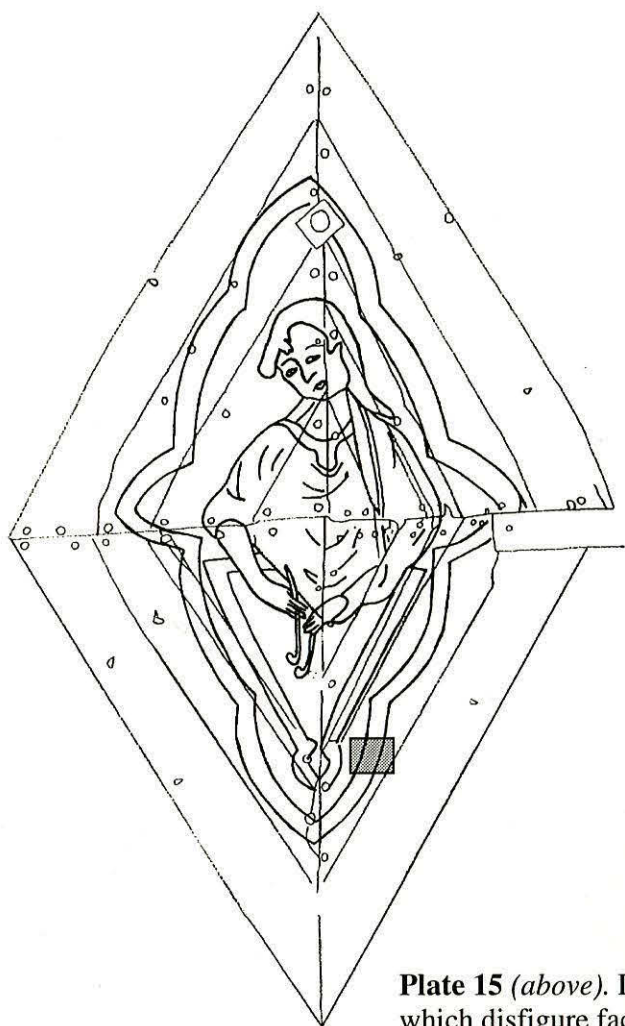
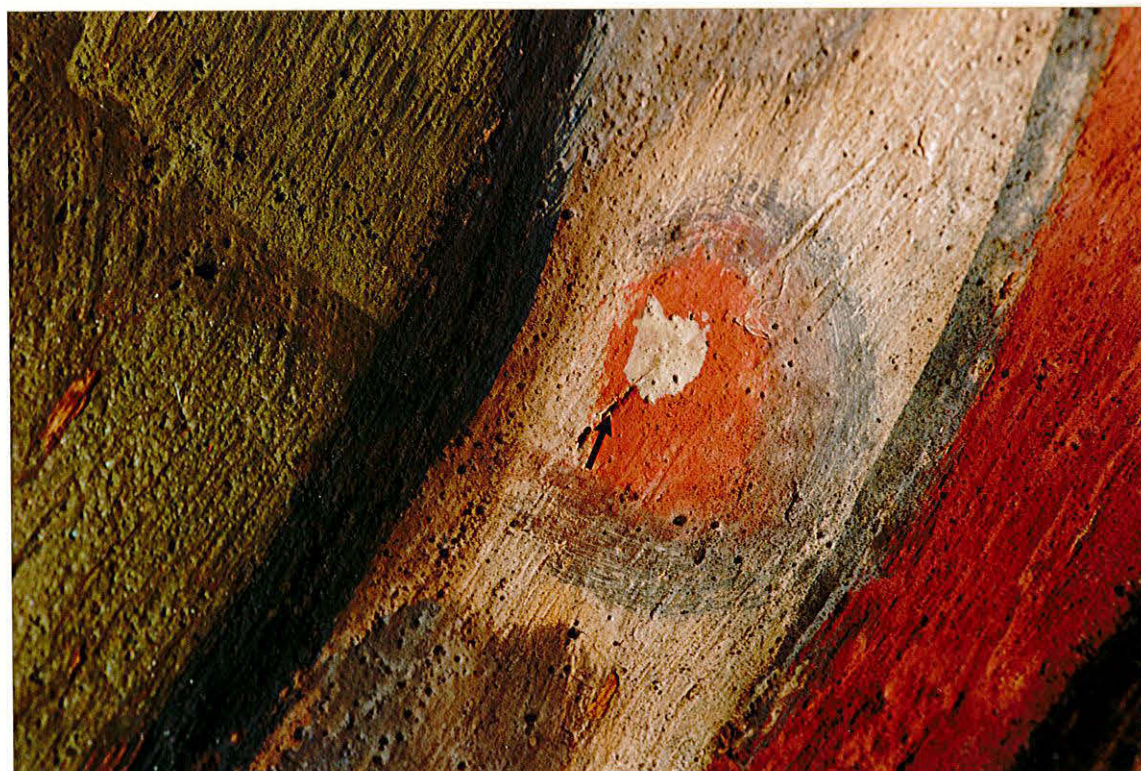


Plate 15 (above). Detail of the *Psaltery Player* showing some of the crude retouchings which disfigure facial detail such as the eyes, mouth and cheeks. **Plate 16** (below). Detail of the *Psaltery Player* showing the brilliant red detail from which Sample 6/2098 was taken. Examination of a dispersion of Sample 6/2098 confirmed the presence of vermilion. (*Macrophotographs Heritage/Howard 1997*).



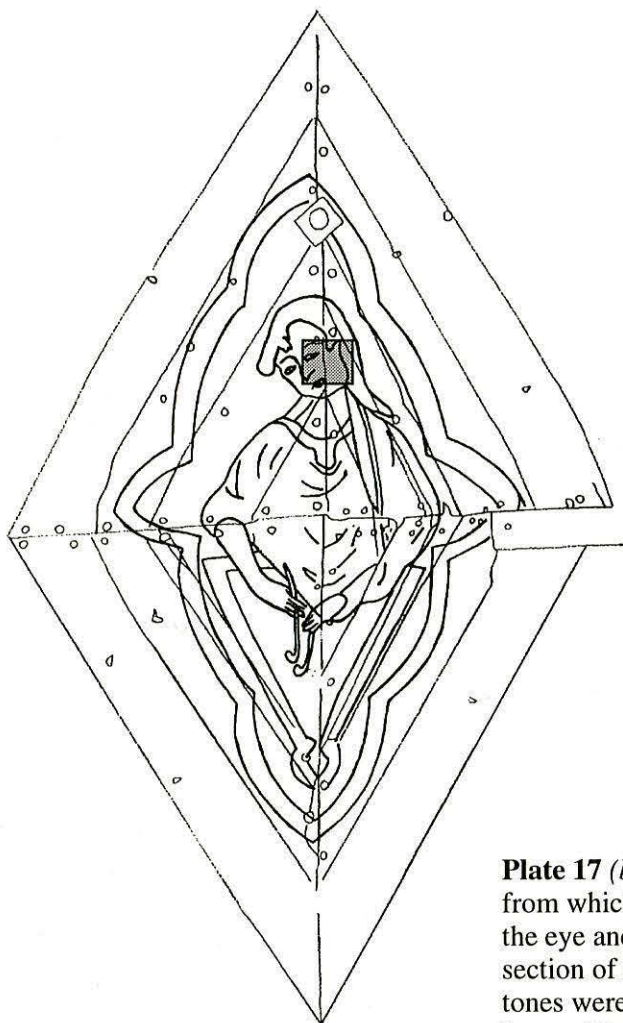


Plate 17 (below). Detail of the *Psaltery Player* showing the area of flesh from which Sample 7/2099 was taken. The crude linear reinforcement of the eye and other details is also clearly visible. **Plate 18** (above). Cross-section of Sample 7/2099 at 2000x magnification, showing how the flesh tones were built up by the application of vermilion combined with yellow iron oxide and carbon black over a grey ground. An accretion of surface dirt is clearly visible over the highlight of the flesh which consists of lead white combined with a little vermilion. (*Macrophotograph Heritage/Howard 1997, photomicrograph Howard 1997*).



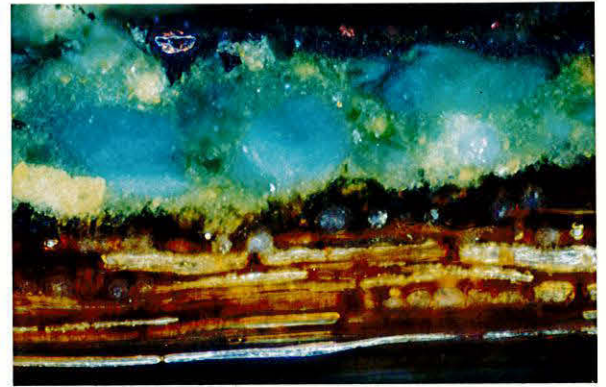
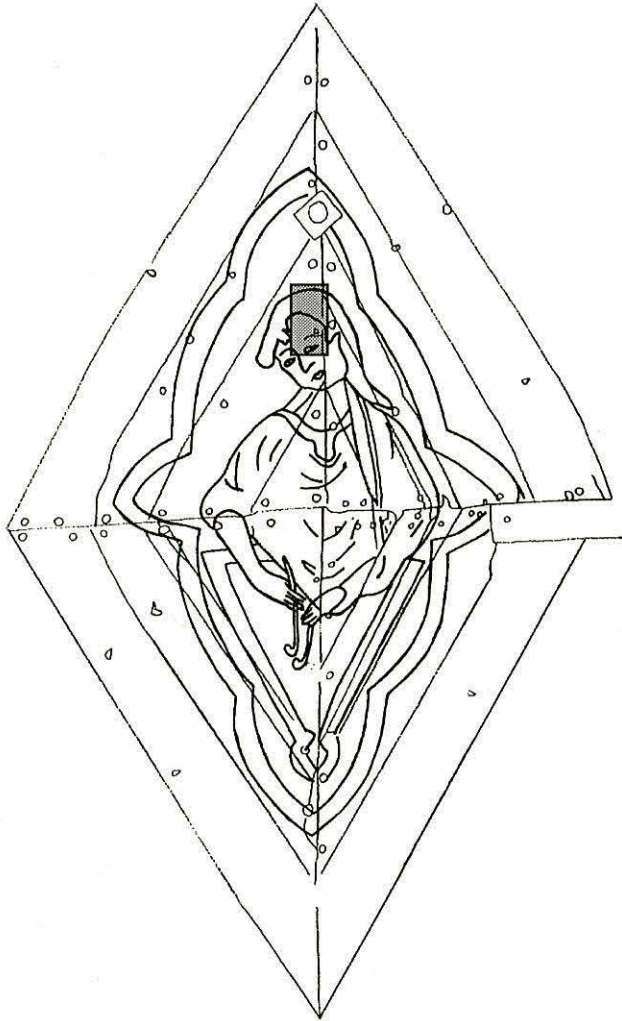
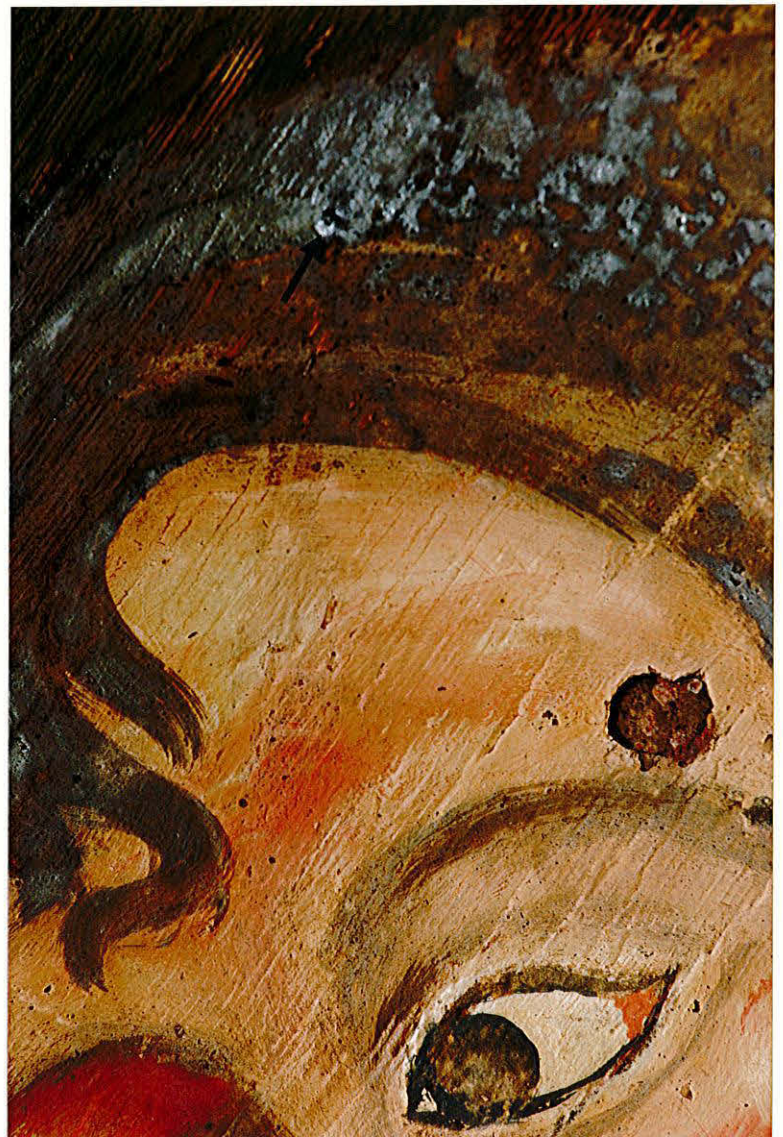


Plate 19 (below). Detail of the *Psaltery Player* showing the 'metallic sheen' which is evident on areas of the hair and the adjacent green background from which Sample 8/2100 was taken. **Plate 20** (above). Cross-section of Sample 8/2100 at 1952x magnification, showing the dense dark layer incorporating black and red particles which has been applied over the green background of verdigris and yellow iron oxide. (*Macrophotograph Heritage/Howard 1997, photomicrograph Howard 1997*).



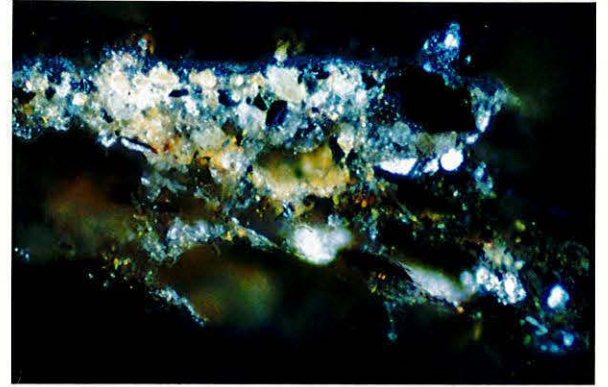
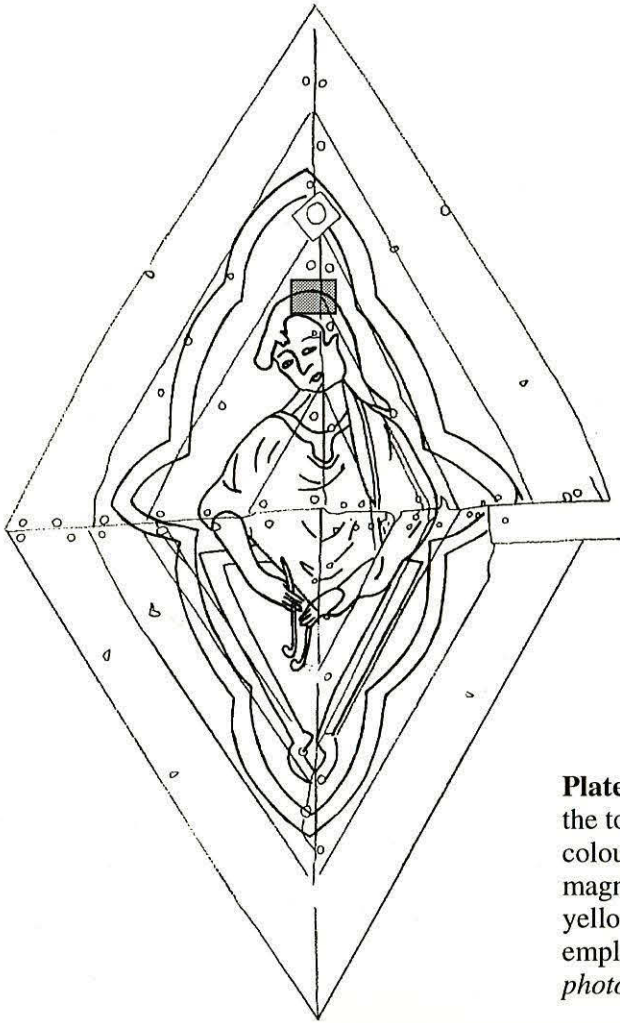
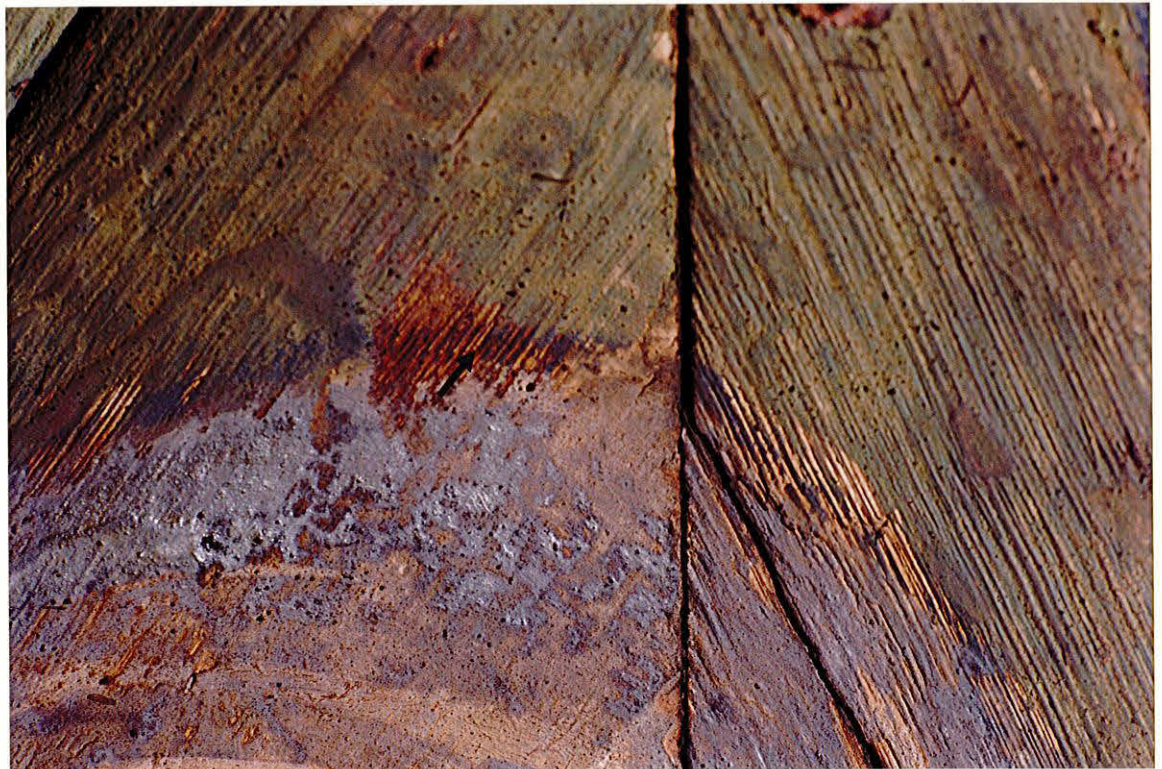


Plate 21 (below). Detail of the *Psaltery Player* showing the line indicating the top of the figure's head which is clearly beneath the green background colour. **Plate 22** (above). Cross-section of Sample 9/2101 at 2000x magnification which indicates that a mixture of carbon black, brown and yellow iron oxide pigments, together with a single particle of massicot, were employed for this dark line. (*Macrophotograph Heritage/Howard 1997, photomicrograph Howard 1997*).



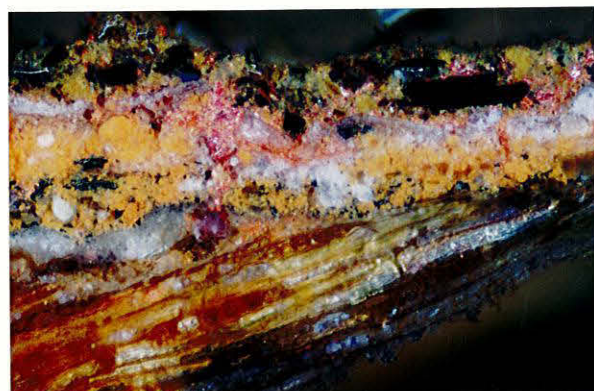
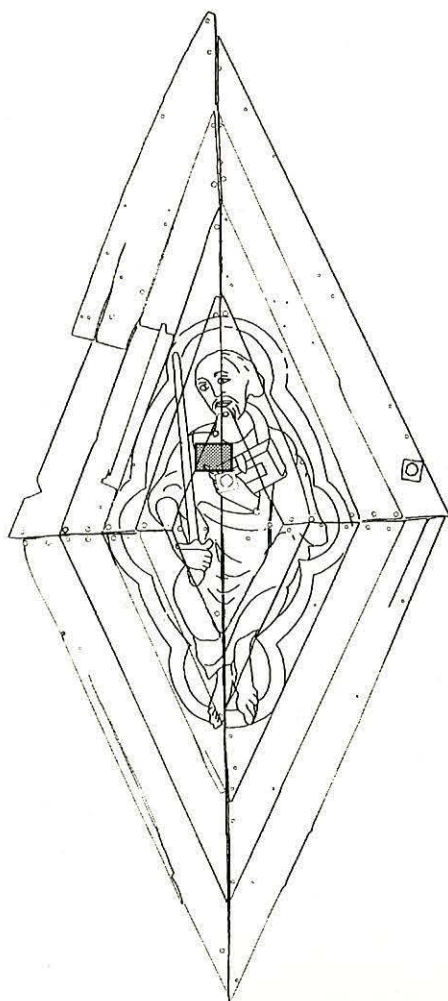
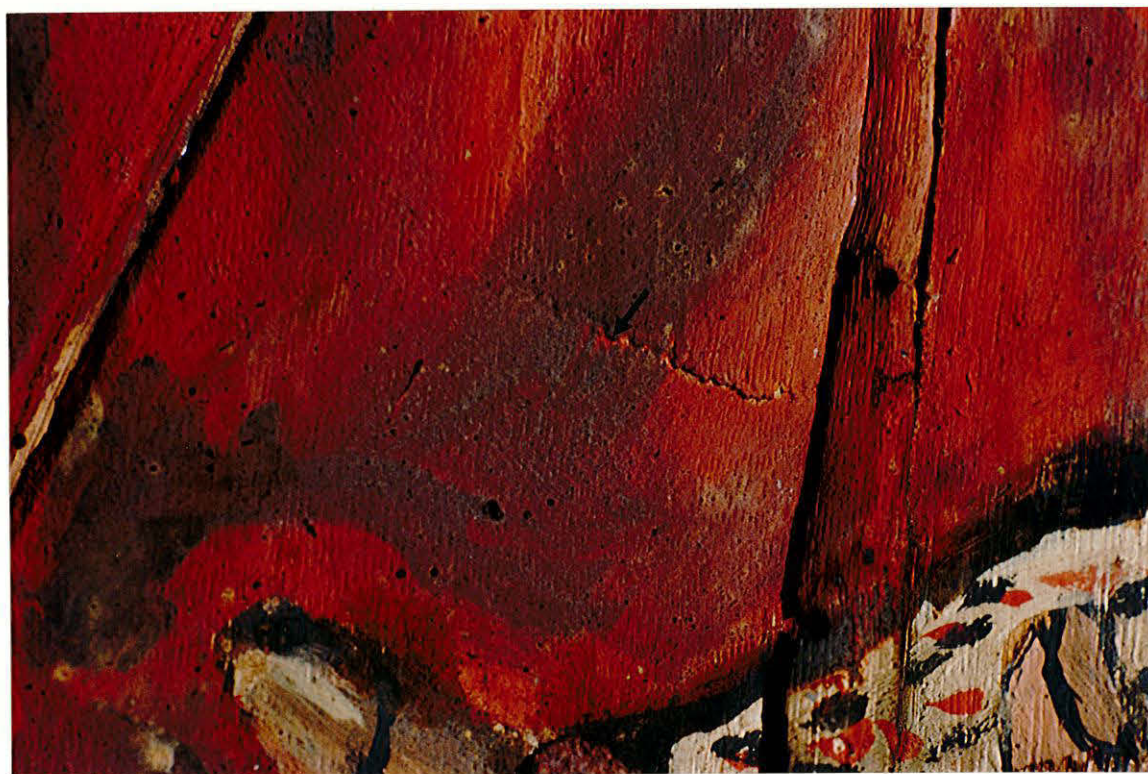


Plate 23 (*below*). Detail of the St. Paul's red drapery showing the grey linear detail which was found to bloom readily in contact with water. **Plate 24** (*above*). Cross-section of Sample 10/2102 at 1480x magnification, and with a few particles in the uppermost layer stained pink to show the presence of the sulphate ion (SO_4^{2-}). It seems likely that the layer of red lead combined with a carbon black pigment, together with the red lead and vermillion layers which overlay it, are original. The rather crude, thick, and now grey-coloured line which is made up of yellow iron oxide combined with carbon black, lead white, calcium sulphate and clay-rich particles is likely to have been added later. (*Macrophotograph Heritage/Howard 1997, photomicrograph Howard 1997*).



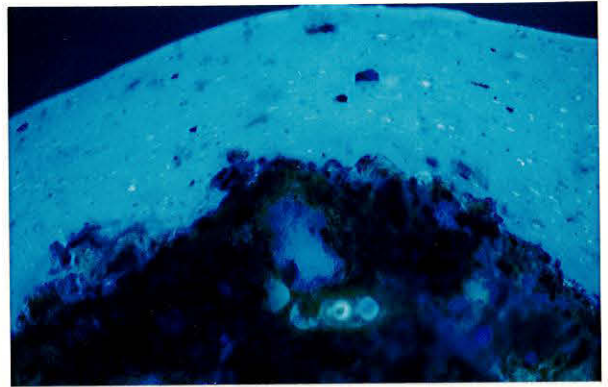
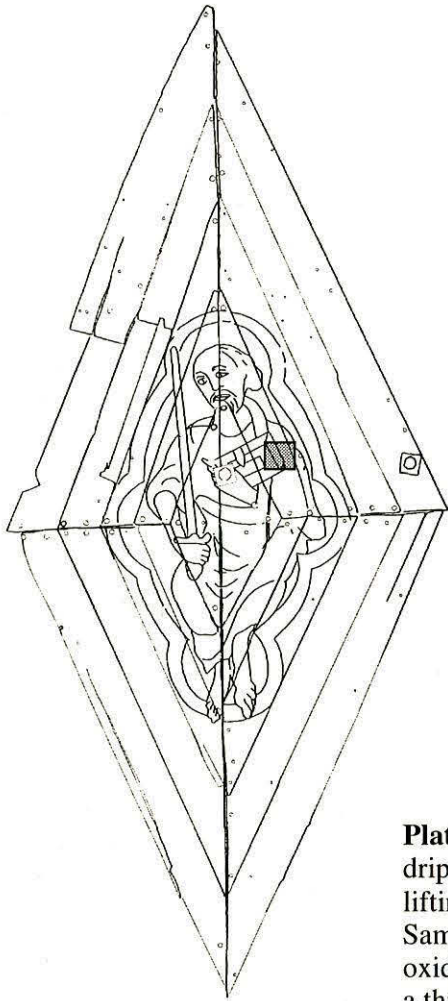
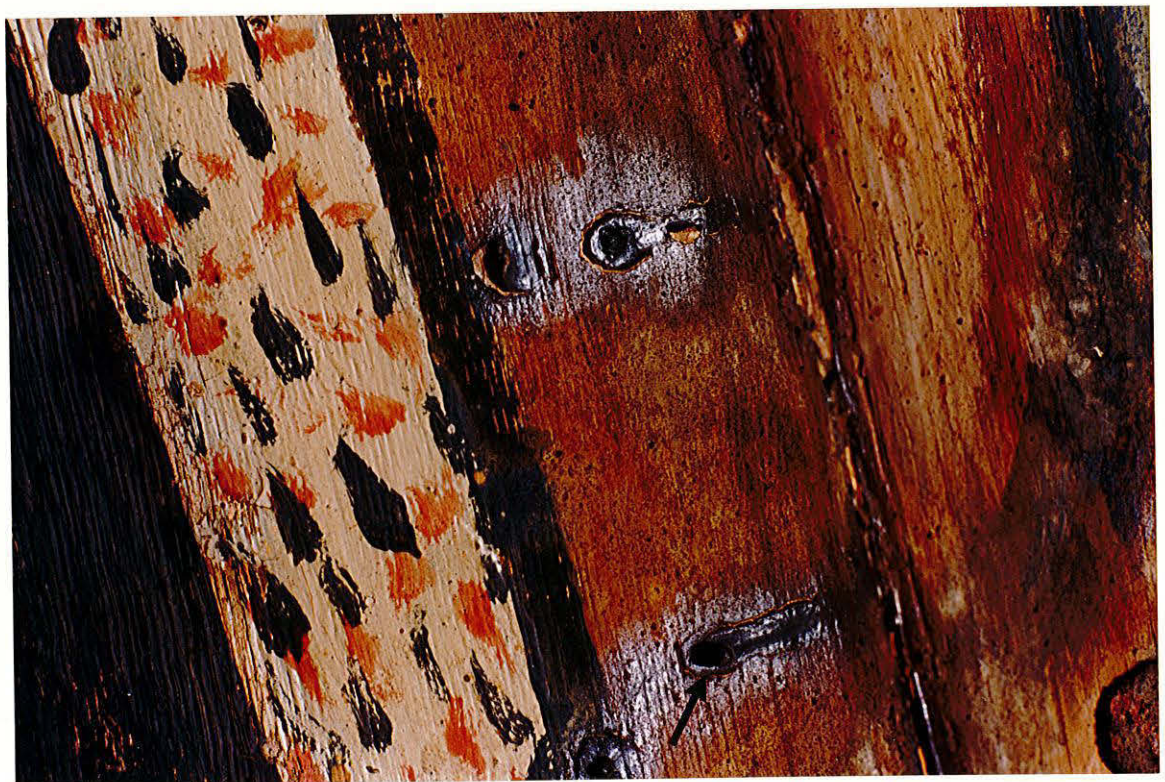


Plate 25 (*below*). Detail taken from the area adjacent to St. Paul's bible where drips of a material which is clearly causing considerable contraction and lifting of the paint layer are evident. **Plate 26** (*above*). Cross-section of Sample 11/2103 at 1160x magnification, showing a layer of a yellow iron oxide pigment with a trace of a lead white ground beneath. On the surface is a thick layer of animal glue which is more clearly visible when the sample is viewed in UV light, as in **Plate 27** (*top*), since the material fluoresces a pale blue colour under these conditions. (*Macrophotograph Heritage/Howard 1997, photomicrograph Howard 1997*).



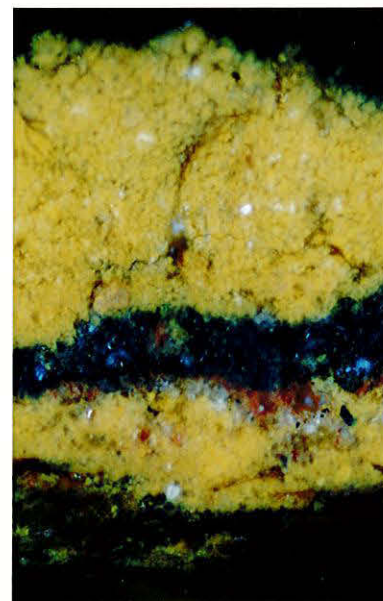
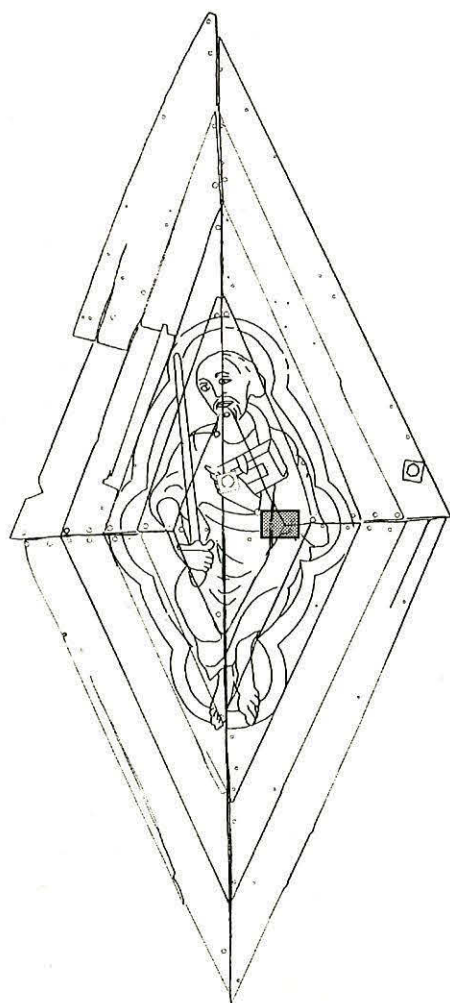


Plate 28 (*below*). Detail taken from St. Paul's left proper sleeve showing the intense yellow colour which is evident when the surface dirt is removed from raised particles in the paint layer. **Plate 29** (*above*). Cross-section of Sample 12/2104 at 1328 x magnification, showing two layers of yellow iron oxide pigment divided by a layer of carbon black. Though the uppermost layer of yellow clearly represents a level of repainting, it is not clear whether the lower yellow paint layer is original or not. (*Macrophotograph Heritage/Howard 1997, photomicrograph Howard 1997*).



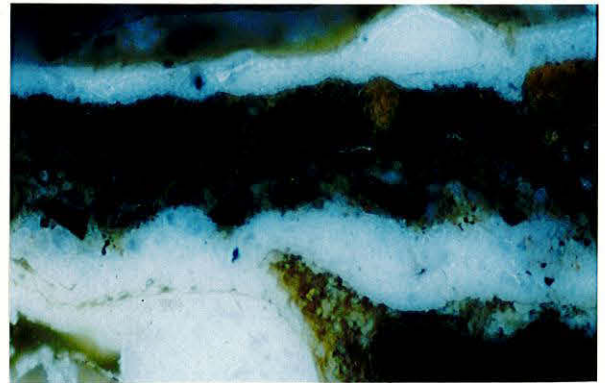
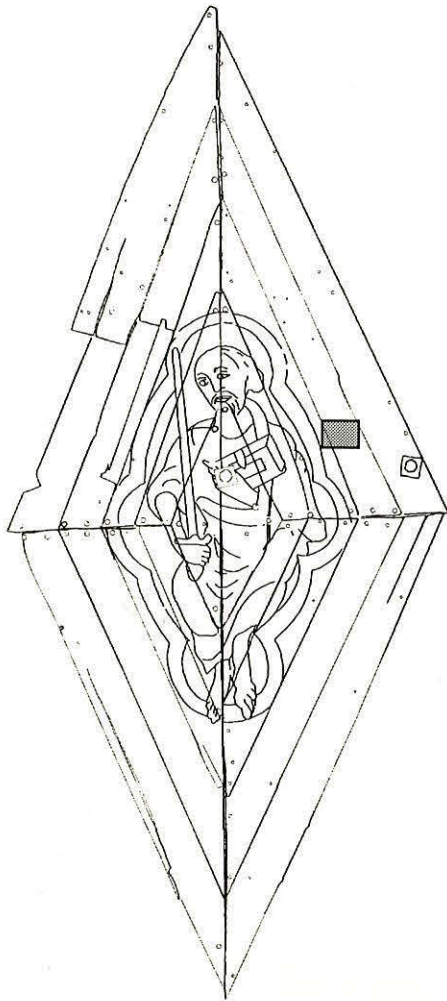


Plate 30 (*below*). Detail taken from the key pattern around *St. Paul*. Sample 13/2105 was taken from the edge of the area of loss shown in the centre of the plate, at the edge of the black key pattern. **Plate 31** (*above*). Cross-section of Sample 13/2105 at 1728 x magnification, showing the lead white ground layer penetrating into the wood support, over which is a layer of carbon black combined with yellow iron oxide particles. Another lead white ground covers this black paint layer but the uppermost layer of black repainting is not present in the sample. (*Macrophotograph Heritage/Howard 1997, photomicrograph Howard 1997*).



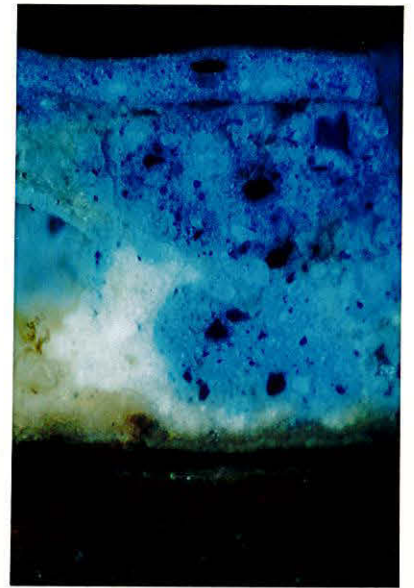
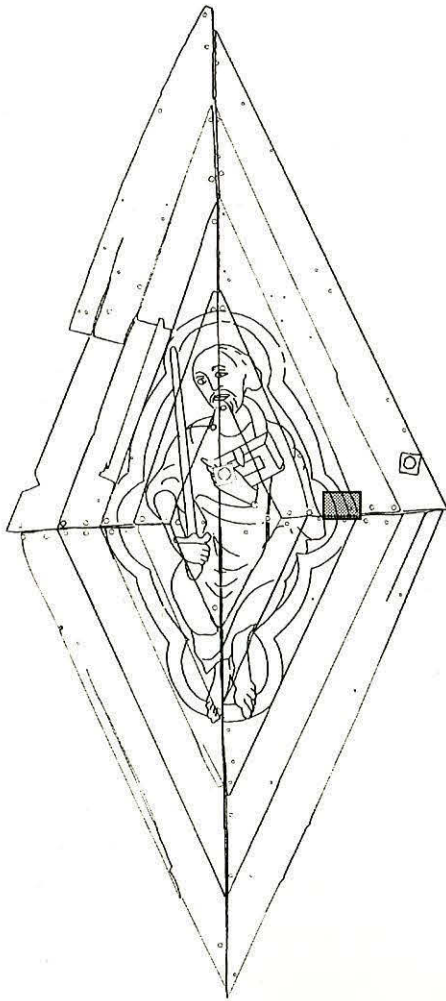


Plate 32 (*below*). Detail taken from the cusped mandorla around *St. Paul*, showing the thick 'petrol' blue paint layer. **Plate 33** (*above*). Cross-section of Sample 14/2106 at 1856 x magnification, showing two layers of Prussian blue combined with lead white - the lower containing a higher proportion of lead white. Both of these layers are clearly part of the 19th-century retouching of the scheme. (*Macrophotograph Heritage/Howard 1997, photomicrograph Howard 1997*).



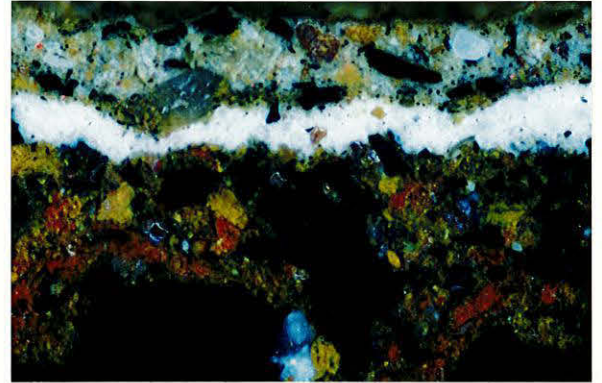
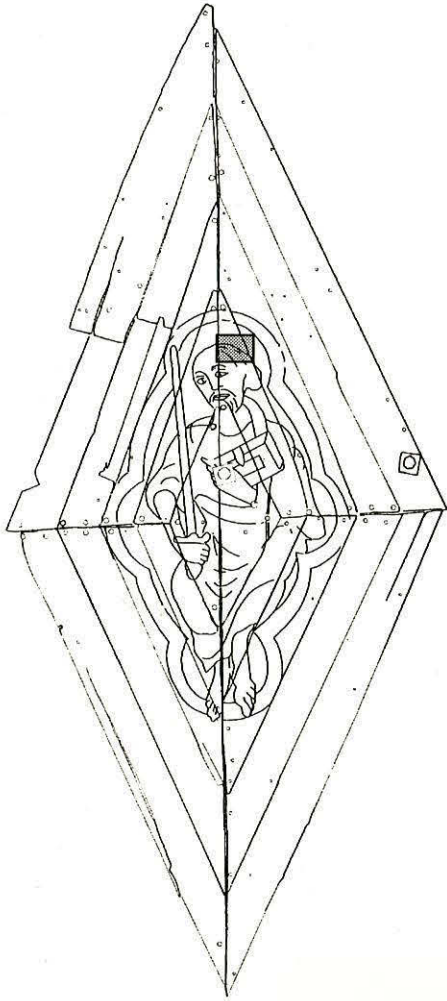


Plate 34 (*below*). Detail of St. Paul's, hair. **Plate 35** (*above*). Cross-section of Sample 15/2107 at 1056 x magnification, showing large particles of carbon black combined with red and yellow iron oxide pigments applied in a layer 300 microns thick. Over this a lead white ground has been applied, and a layer consisting of lead white combined with carbon black and yellow iron oxide on top. It seems likely that the lead white ground and overlying paint layer represent a phase of repainting. (*Macrophotograph Heritage/Howard 1997, photomicrograph Howard 1997*).



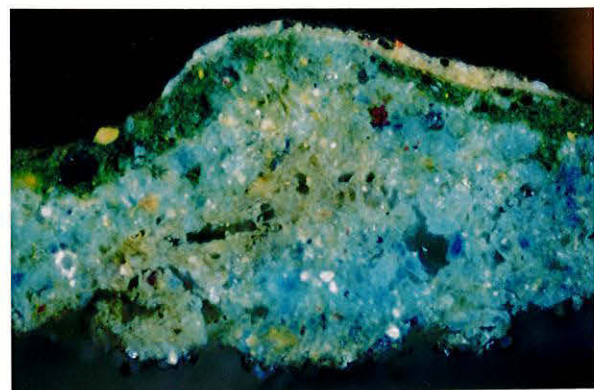
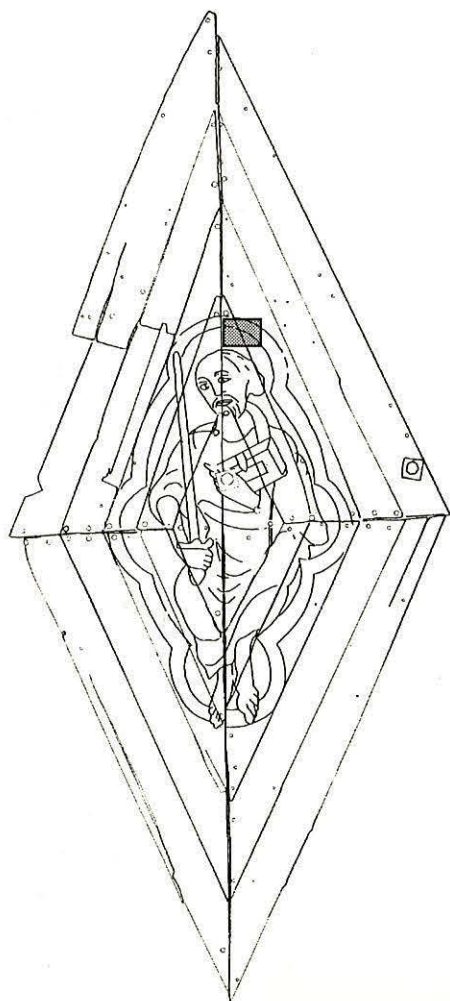
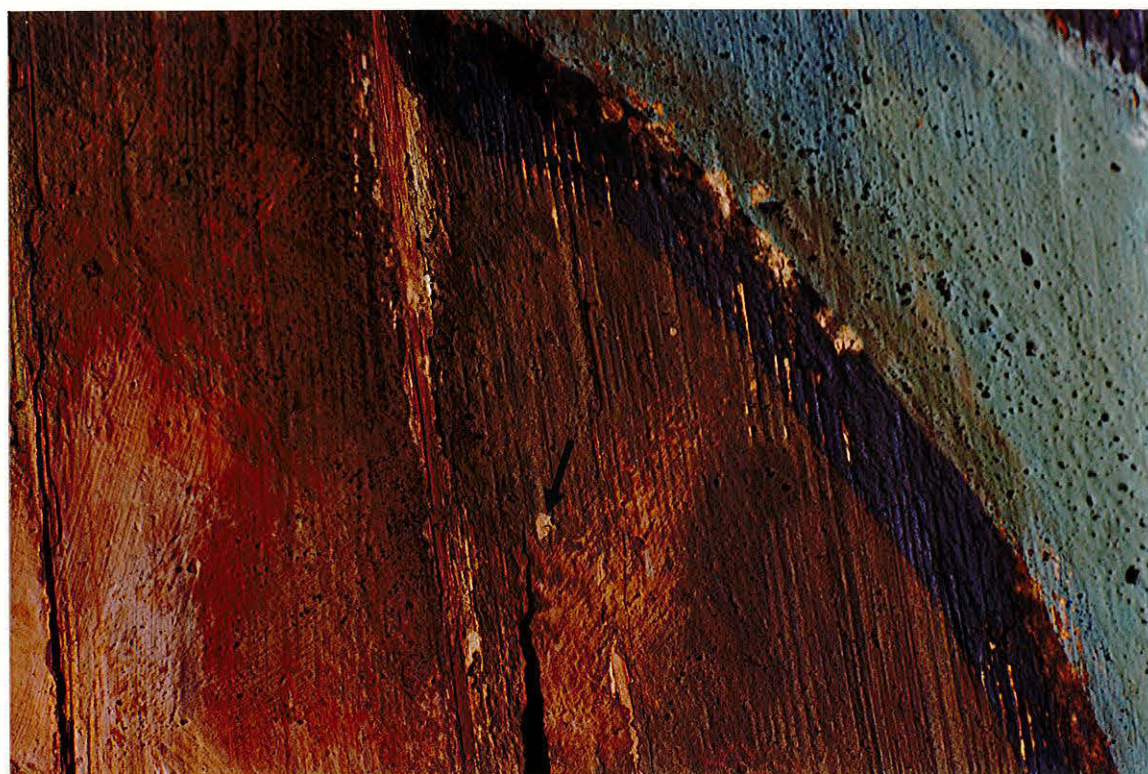


Plate 36 (below). Detail of the inner zone of the cusped mandorla around *St. Paul*. **Plate 37** (above). Cross-section of Sample 16/2108 at 1088 x magnification, taken from the dark green zone shown in the left portion of plate 36. A layer of natural azurite combined with a little yellow iron oxide, which almost certainly represents the original layer, is evident at the base of the sample with a layer of verdigris and yellow iron oxide on top. A thin layer of lead white mixed with vermilion and yellow iron oxide lies on the surface of the green layers. (*Macrophotograph Heritage/Howard 1997, photomicrograph Howard 1997*).



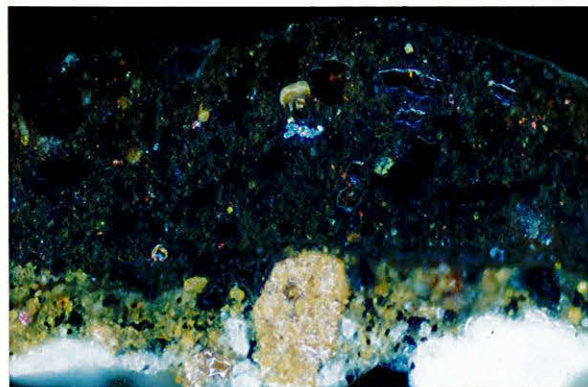
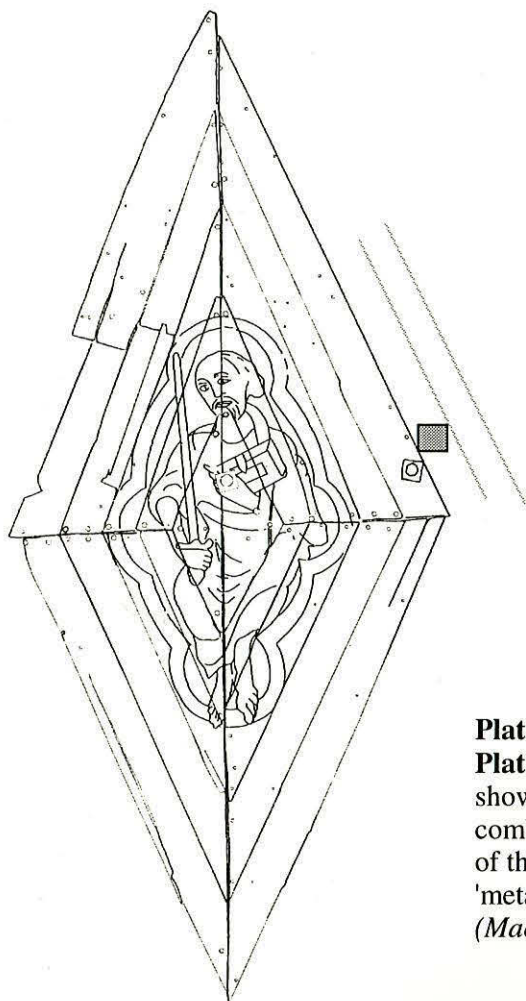


Plate 38 (*below*). Detail of the stepped border which surrounds *St. Paul*.
Plate 39 (*above*). Cross-section of Sample 17/2109 at 1808 x magnification, showing a thick layer of dark repainting and, beneath, a layer of carbon black combined with yellow iron oxides and lead white. On the uppermost surface of the sample is a thin coating (or layer of consolidant) which produces a 'metallic sheen', as seen in the lower left corner of Plate 38.
(*Macrophotograph Heritage/Howard 1997, photomicrograph Howard 1997*).



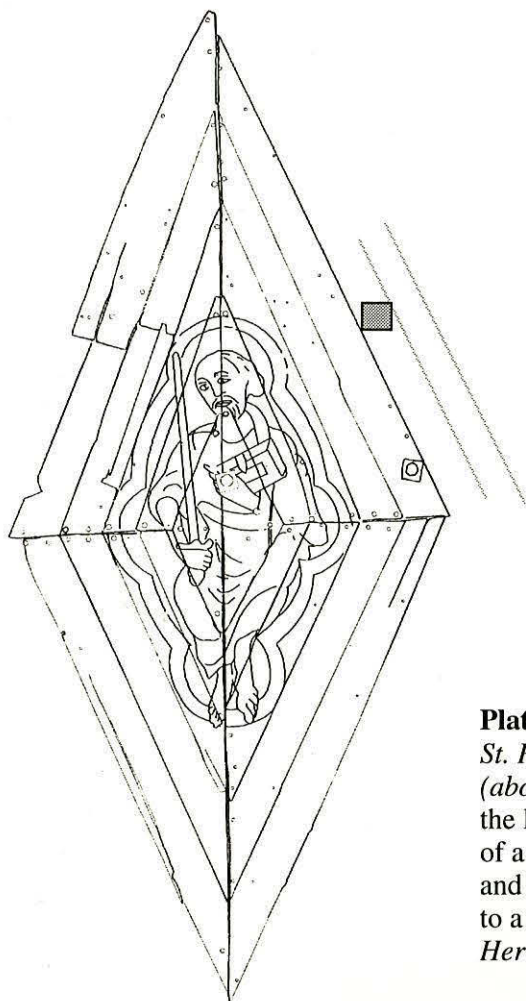


Plate 40 (*below*). Detail of a portion of the stepped border surrounding *St. Paul*, which has been painted on a replacement pine board. **Plate 41** (*above*). Cross-section of Sample 18/2110 at 1256 x magnification, showing the lead white preparatory layer, and dark brown paint layer which consists of a mixture of brown and yellow iron oxide pigments combined with barytes and carbon black. The silvery sheen on the surface of the paint layer is due to a pale coating which has not yet been identified. (*Macrophotograph Heritage/Howard 1997, photomicrograph Howard 1997*).



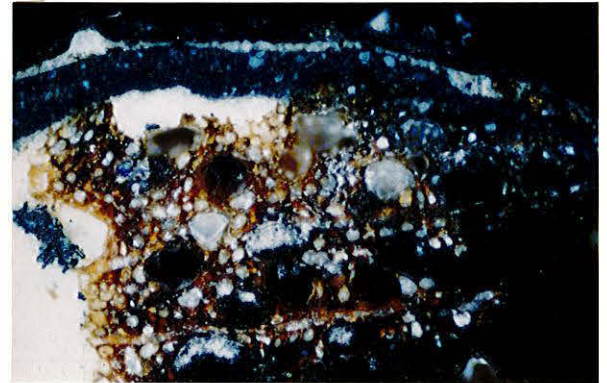
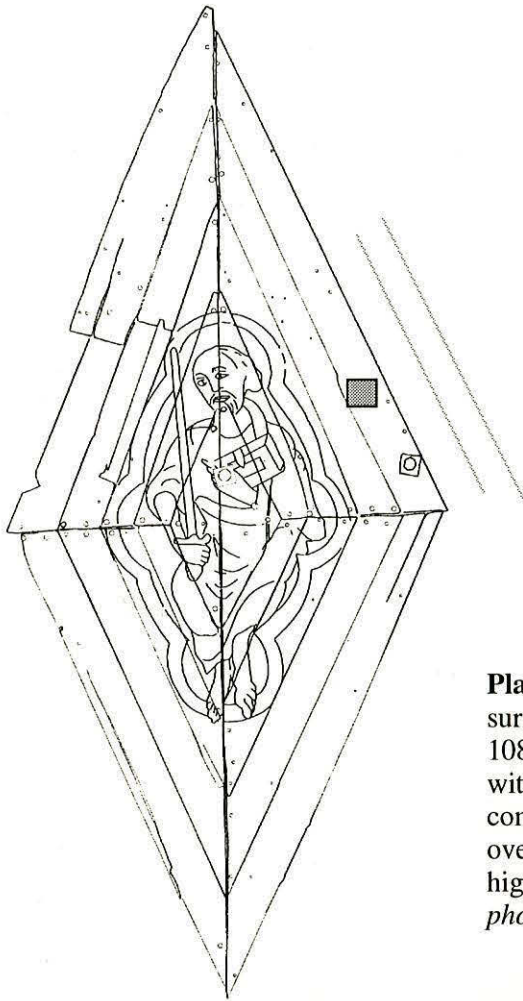
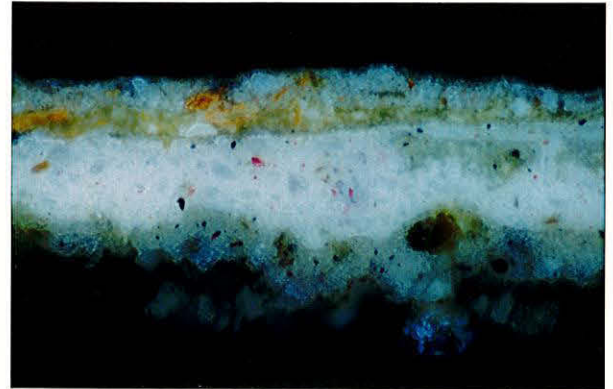
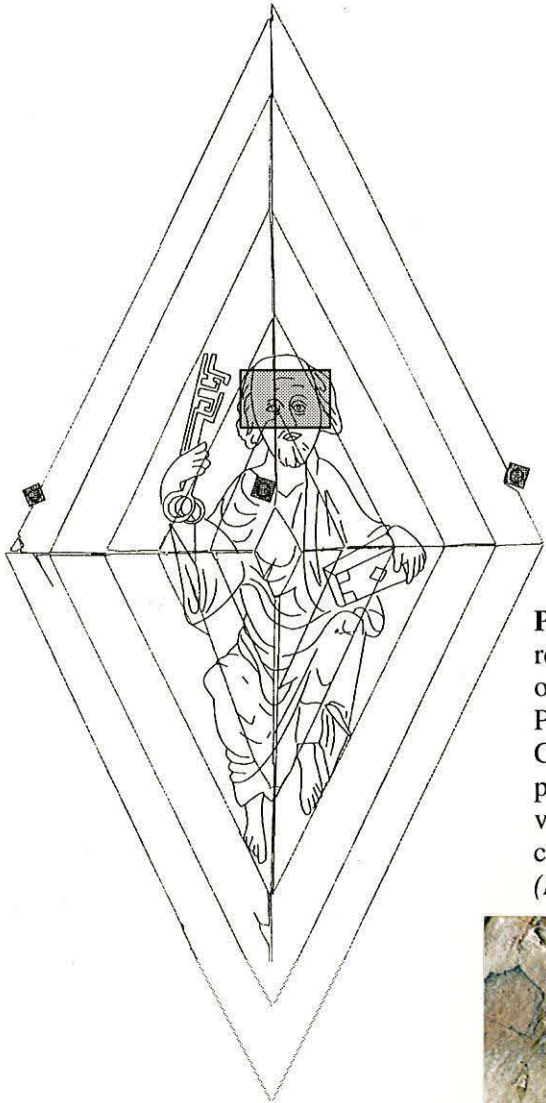
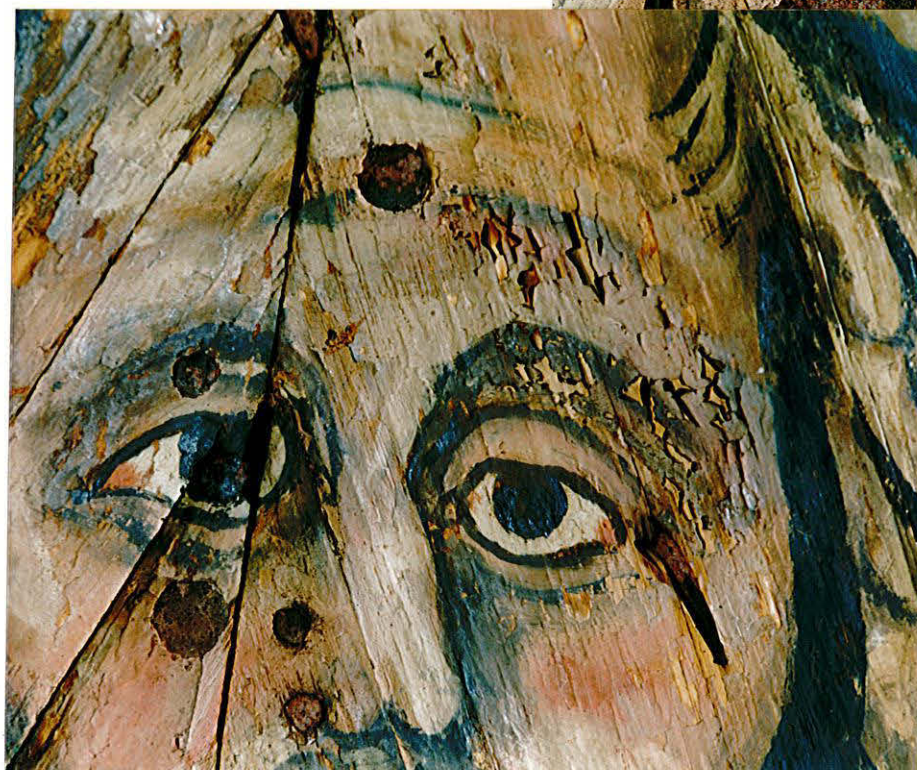


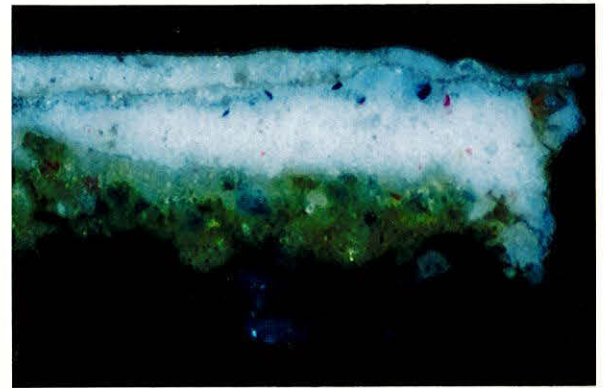
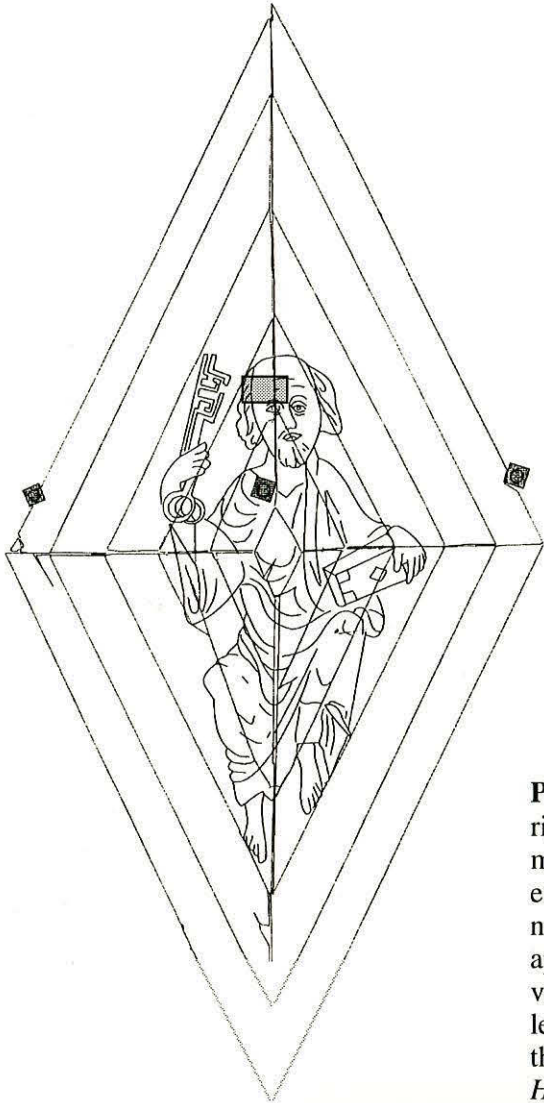
Plate 42 (*below*). Detail of a portion of the wave-pattern border which surrounds *St. Paul*. **Plate 43** (*above*). Cross-section of Sample 19/2111 at 1080 x magnification, showing the wood support which has been prepared with a lead white ground and, over this, a dense layer of carbon black combined with lead white. A second lead white ground has been applied over the lower black layer. The uppermost layer of the sample consists of highly reflective black particles. (*Macrophotograph Heritage/Howard 1997, photomicrograph Howard 1997*).



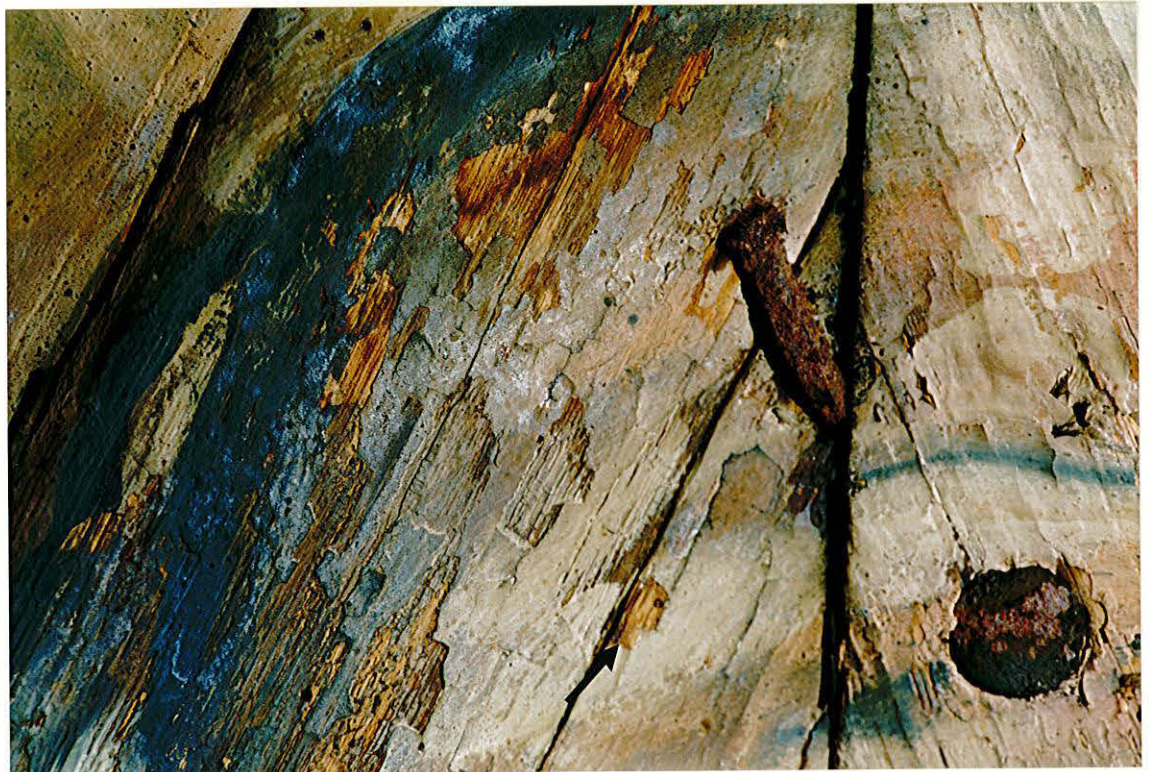


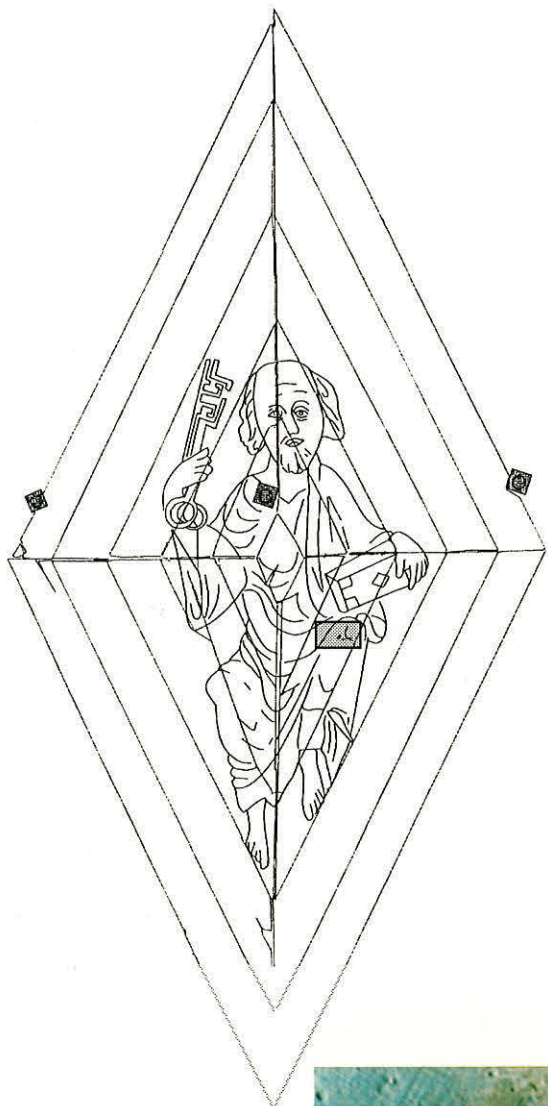
Plates 44 & 45 (below). Detail of St. Peter's head, showing the crude repainting and the severe cupping and lifting of the paint layers. The area of paint shown at the left of the plate has been re-laid by the Perry Lithgow Partnership in their recent phase of conservation. **Plate 46** (above). Cross-section of Sample 20/2112 at 2000 x magnification, showing the grey preparation applied to the wood support, over which the flesh tone of vermilion combined with lead white in an oil medium was applied. The crude repainting has been undertaken in red lead combined with lead white. (Macrophotographs Heritage/Howard 1997, photomicrograph Howard 1997).



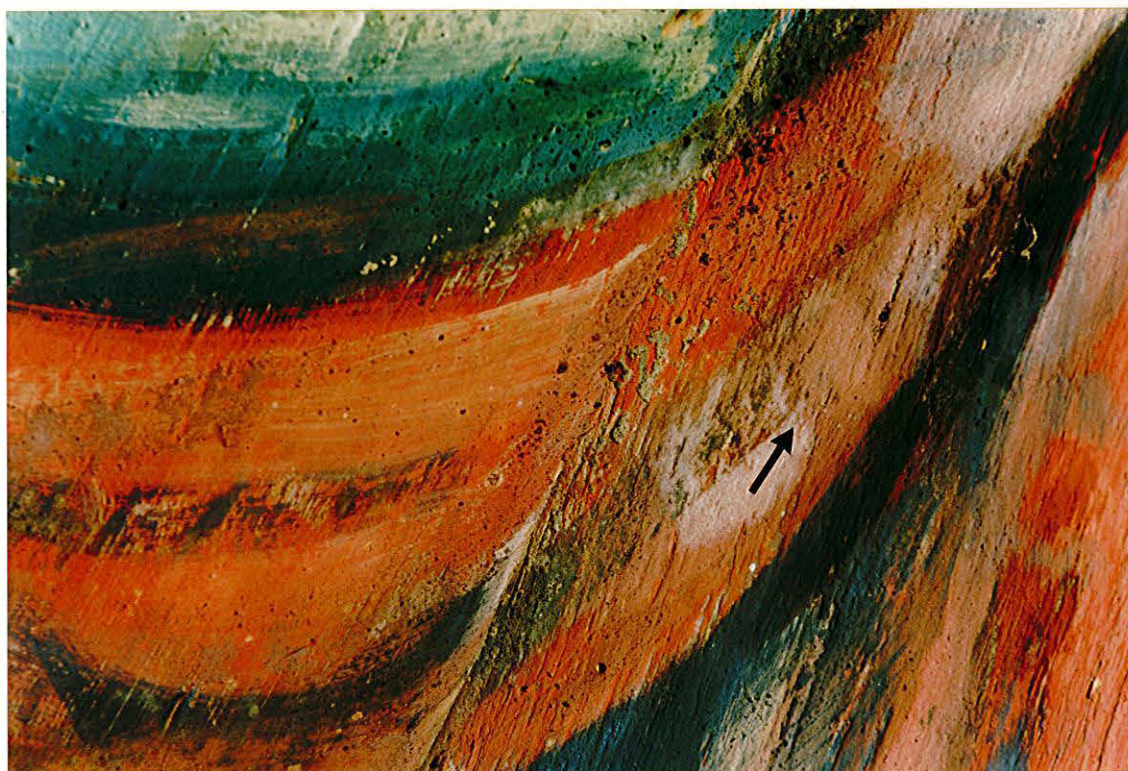


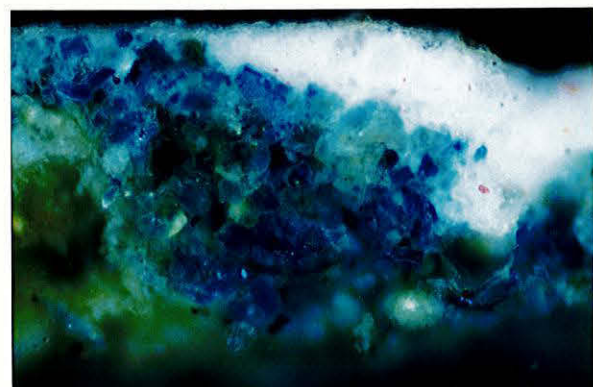
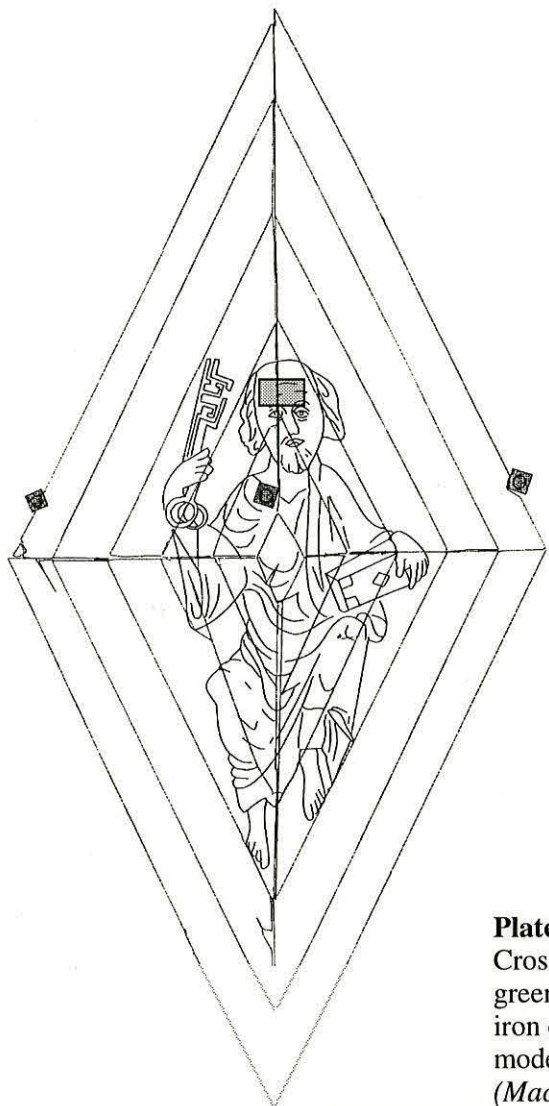
Plates 47 (below). Detail of St. Peter's head, showing the region above his right eye. **Plate 48** (above). Cross-section of Sample 21/2113 at 2000 x magnification, showing that an underpainting in pale green was originally employed to model the flesh tones. This underpaint consists of a layer of natural azurite combined with yellow iron oxide and lead white, and was applied in a layer 60 microns thick. Over this was applied the flesh tone of vermilion combined with lead white. A layer of repainting, consisting of lead white combined with a little carbon black, is evident on the surface of the sample. (*Macrophotograph Heritage/Howard 1997, photomicrograph Howard 1997*).





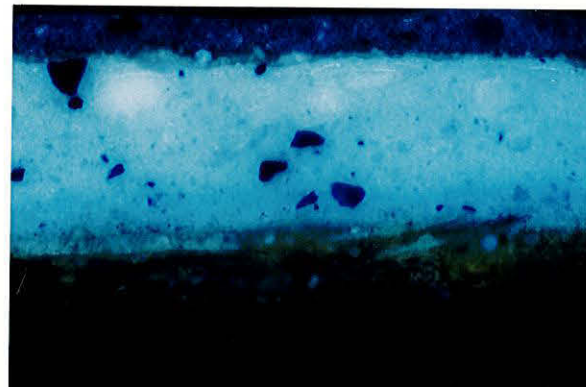
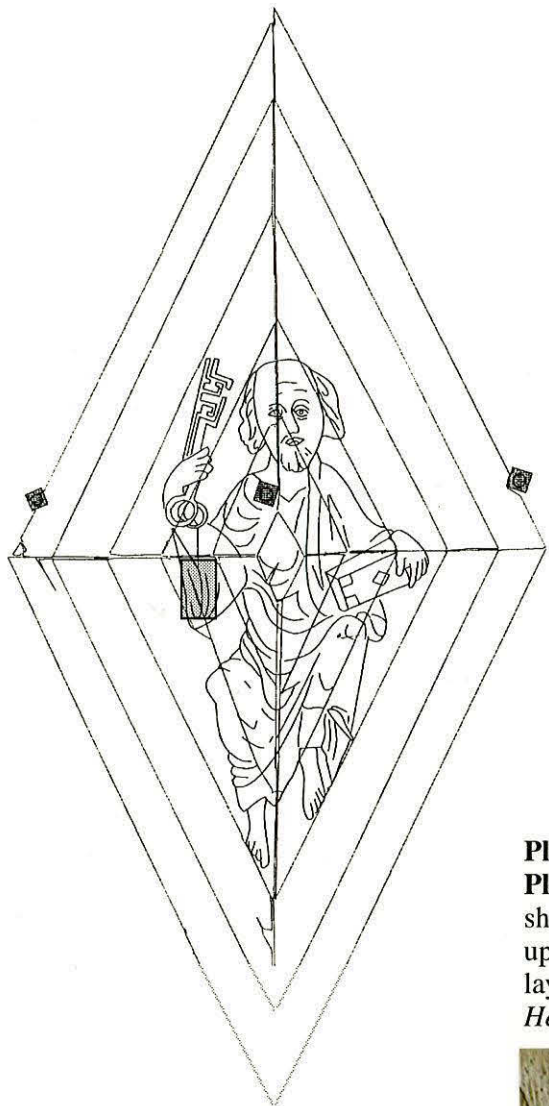
Plates 49 (below). Detail of the red drapery over St. Peter's left knee. The pale greyish highlight of the drapery was found to bloom readily in contact with water. **Plate 50** (above). Cross-section of Sample 22/2114 at 1712 x magnification, showing a layer of red lead combined with a little carbon black and lead white which was applied in preparation for the thick vermilion paint layer. The uppermost layer contains red lead, lead white, and a sulphate-rich component. (*Macrophotograph Heritage/Howard 1997, photomicrograph Howard 1997*).





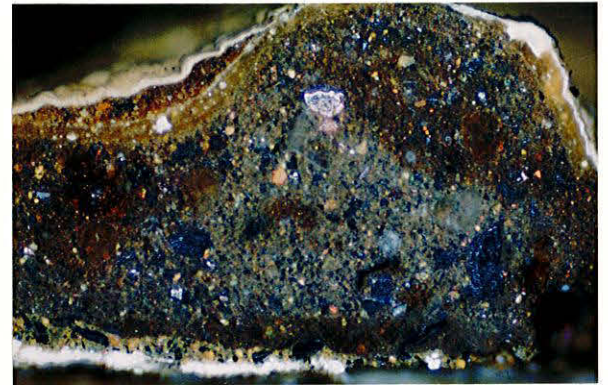
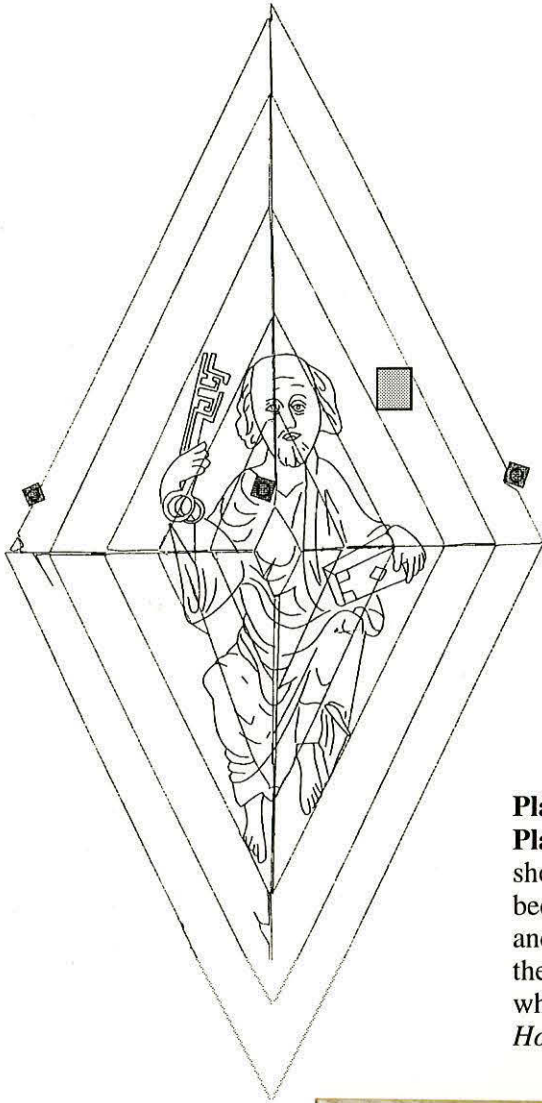
Plates 51 (*below*). Detail of St. Peter's left temple. **Plates 52 & 53.** Cross-section of Sample 23/2115 at 2000 x magnification. A layer of dark green underpainting produced by mixing natural azurite and some yellow iron oxide in a lead white matrix (*above*) was employed to produce the tonal modelling for the flesh tones of vermilion combined with lead white (*top*). (*Macrophotograph Heritage/Howard 1997, photomicrographs Howard 1997*).





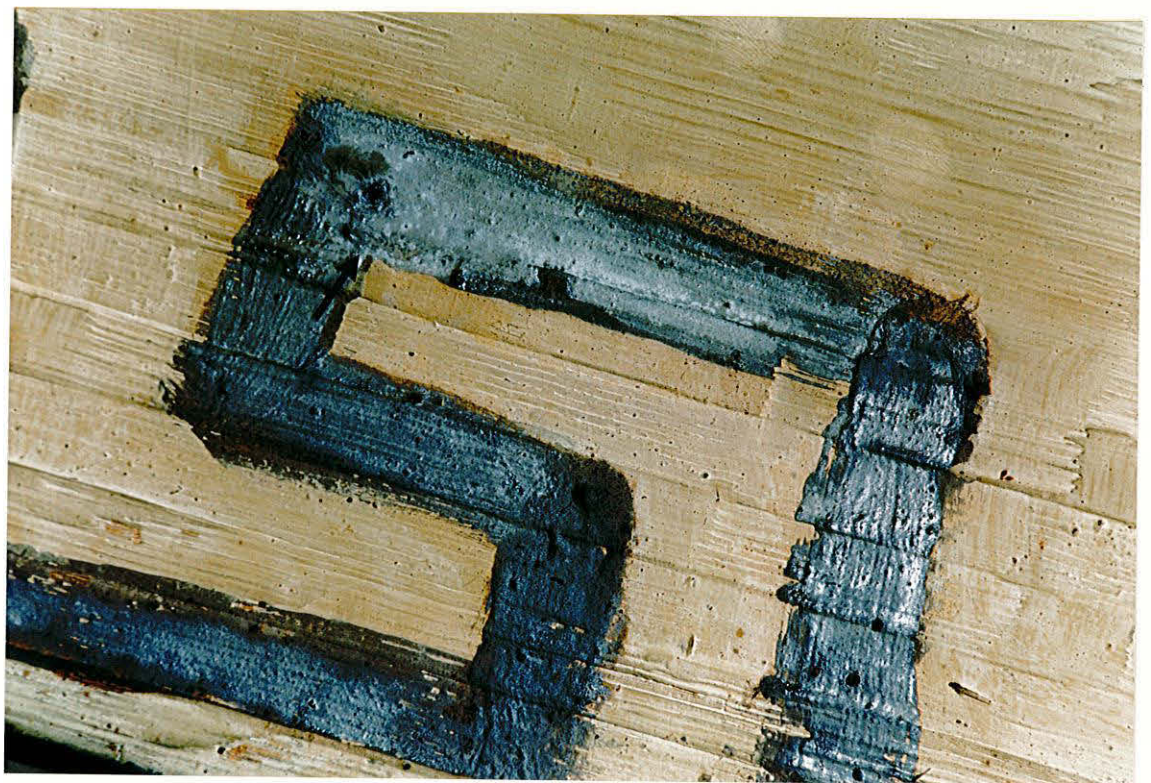
Plates 54 (*below*). Detail of the blue drapery of St. Peter's right sleeve.
Plate 55 (*above*). Cross-section of Sample 24/2116 at 800 x magnification, showing two layers of Prussian blue combined with lead white. The uppermost layer contains a higher proportion of Prussian blue, and both layers are part of a 19th-century phase of repainting. (*Macrophotograph Heritage/Howard 1997, photomicrograph Howard 1997*).

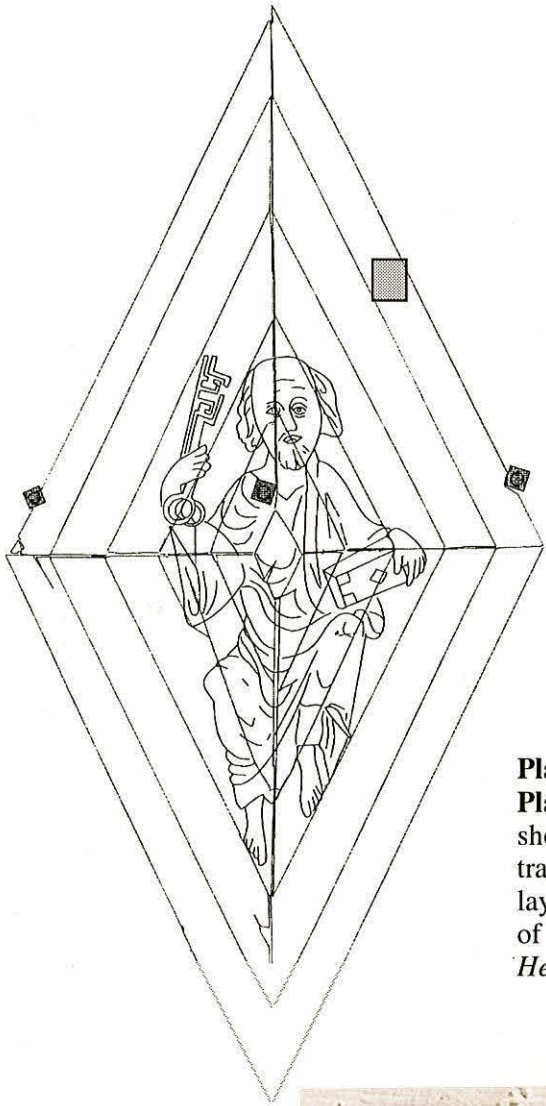




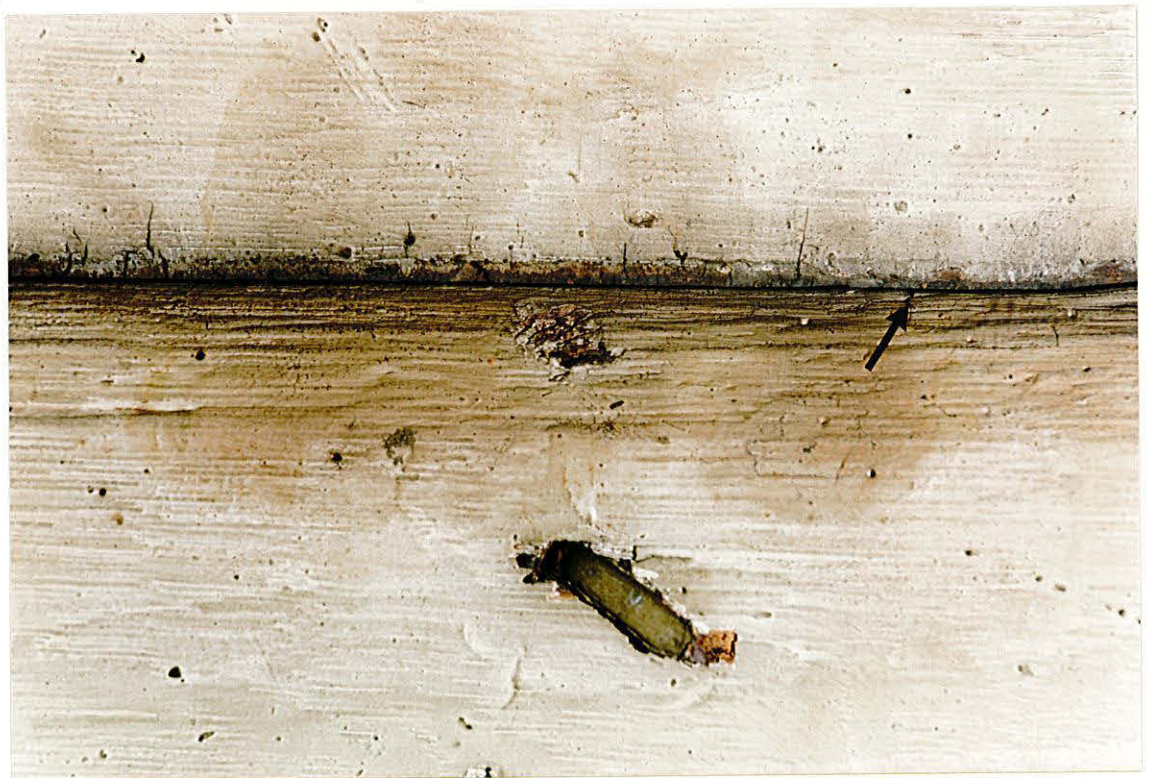
Plates 56 (below). Detail of the key pattern border around St. Peter.

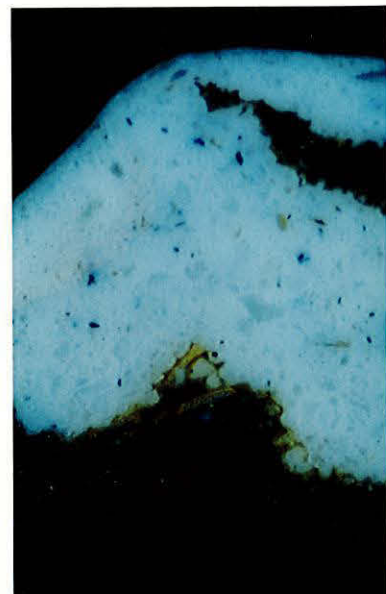
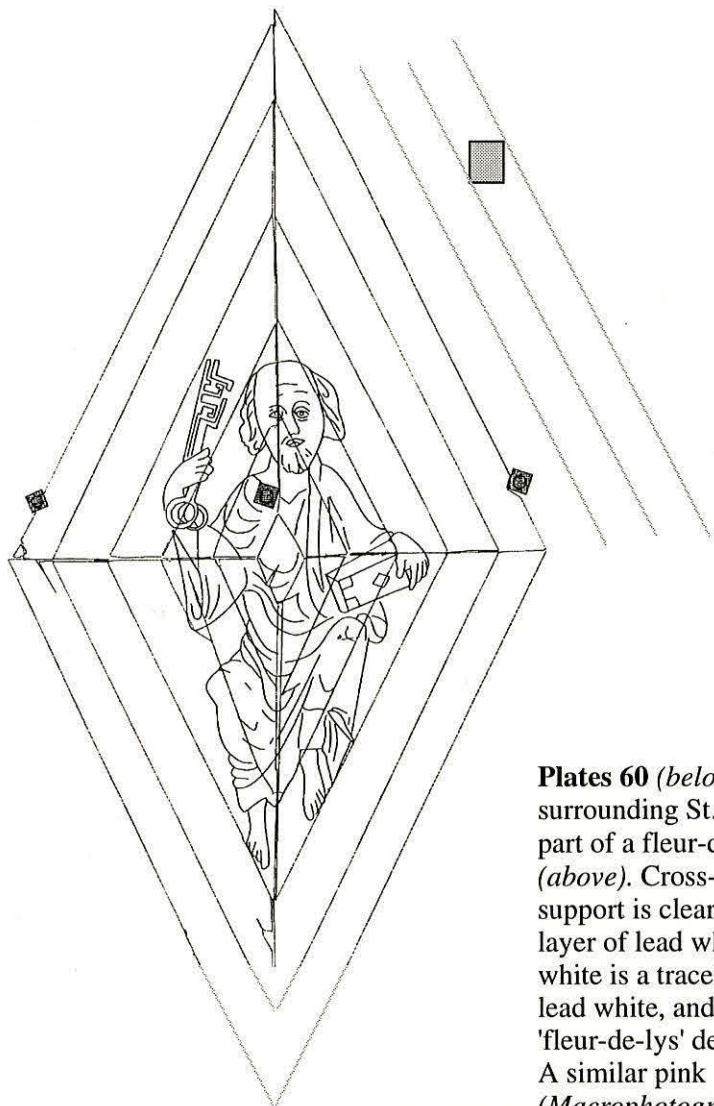
Plate 57 (above). Cross-section of Sample 25/2117 at 552 x magnification, showing a thick dark layer of black, brown and yellow inclusions which has been applied directly over a layer containing yellow iron oxide, carbon black and lead white on a lead white ground. The metallic sheen on the surface of the paint layer, evident in plate 56, is due to the unidentified surface coating, which remains on the surface of the sample. (*Macrophotograph Heritage/Howard 1997, photomicrograph Howard 1997*).





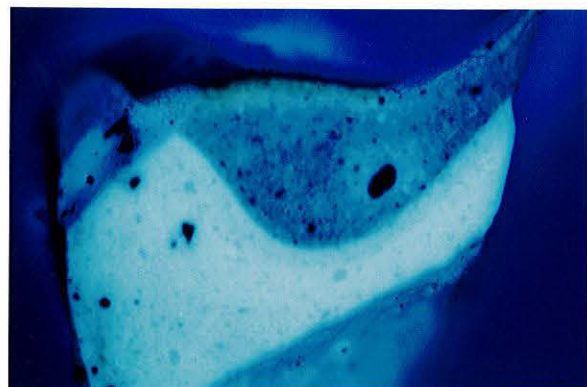
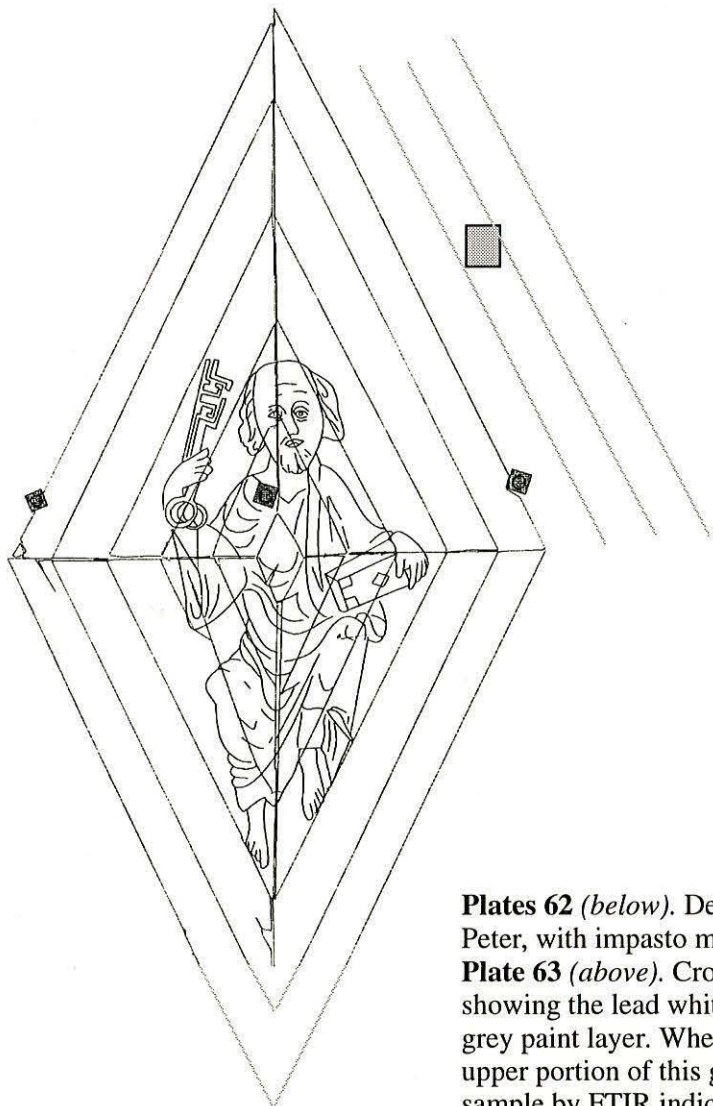
Plates 58 (*below*). Detail of wave-pattern border surrounding St. Peter.
Plate 59 (*above*). Cross-section of Sample 26/2118 at 1208 x magnification, showing the wood support over which a layer of lead white is evident. A trace of vermilion is apparent towards the upper part of this thick white layer which compares closely to that found in Sample 27. A thick accretion of surface dirt is visible at the top of the sample. (*Macrophotograph Heritage/Howard 1997, photomicrograph Howard 1997*).





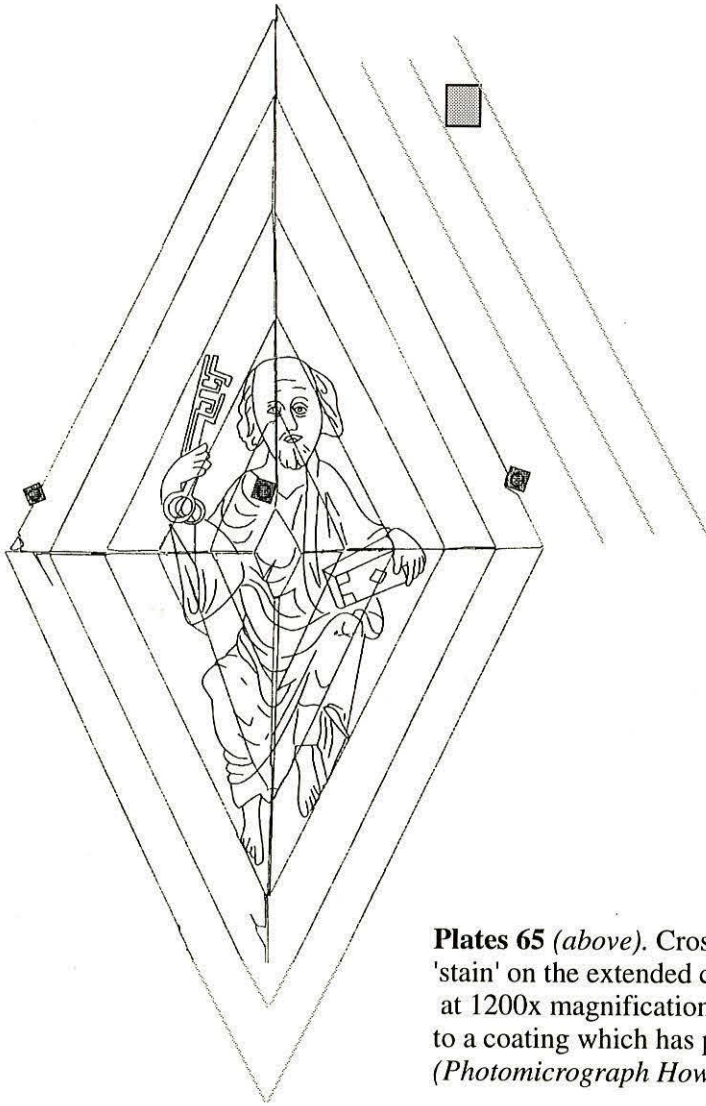
Plates 60 (*below*). Detail of centre of extended chevron pattern border surrounding St. Peter. In the centre of the plate the ghost of an image perhaps part of a fleur-de lysis visible beneath the lead white repainting. **Plate 61** (*above*). Cross-section of Sample 27/2119 at 1160 x magnification. The wood support is clearly visible at the bottom of the cross-section, and over this a layer of lead white has been applied. Approximately 3/5 up this layer of lead white is a tracebarely visible in the photograph of vermilion combined with lead white, and it seems likely that this combination was employed for the 'fleur-de-lys' decoration. A second layer of lead white covers the pink motif. A similar pink layer is visible in Sample 26/2118 (Plate 59). (*Macrophotograph Heritage/Howard 1997, photomicrograph Howard 1997*).





Plates 62 (below). Detail of grey chevron-pattern border surrounding St. Peter, with impasto motifs clearly visible below the grey and white repainting. **Plate 63 (above).** Cross-section of Sample 28/2120 at 720 x magnification showing the lead white layer which was applied in impasto, and the overlying grey paint layer. When viewed in UV light, as shown in **Plate 64 (top)** the upper portion of this grey layer fluoresces. Analysis of this portion of the sample by FTIR indicated that shellac may be present. (*Macrophotograph Heritage/Howard 1997, photomicrograph Howard 1997*).





Plates 65 (*above*). Cross-section of Sample 29/2121 taken from a brown 'stain' on the extended chevron pattern border surrounding St. Peter, shown at 1200x magnification. The brown appearance of the surface is clearly due to a coating which has penetrated into the lead white paint layer. (*Photomicrograph Howard 1997*).