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**Condition Assessment  
and Treatment Report for  
The Old Hall,  
Queens' College,  
Cambridge.**

**January-May 2005**

**Queen's College, Cambridge  
The Old Hall**

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## Summary

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**Project:** Cleaning and restoration of the fireplace and polychrome decoration in the Old Hall, Queen's college, Cambridge.

**Nature of project:** Condition survey of the polychrome decoration on the ceiling and walls.

Condition survey of the fireplace

Cleaning and restoration of the polychrome ceiling and walls.

Cleaning and restoration of

**Name and address** Donald Insall Associates

**of Architect:** Chartered Architects

48 Sidney Street

Cambridge

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**Date of Project:** January-May 2005

**Methods employed:** Refer to 'Treatment record'

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# 1 Abstract

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On the instruction of Donald Insall Associates (Architects) Hirst Conservation was commissioned to stabilise, clean and restore the fireplace, polychrome ceiling and walls of the Old Hall, Queen's college, Cambridge. As stated in the preliminary documentation<sup>1</sup> the hall was originally a medieval structure that was altered in the 18<sup>th</sup> century and again in the 19<sup>th</sup> century. The 19<sup>th</sup> century decoration was over-painted to similar designs in 1961. The lower two thirds of the fireplace were designed and installed in the 1861 with the over-mantle added in 1875.

The approved conservation strategy for the ceiling, walls and oriel window included the consolidation of loose and flaking paint, the pinning and consolidation of unstable plaster substrates, the restoration of lost areas of plaster substrate, the removal of surface dirt, the filling and retouching of losses and the securing of gilded lead stars that had become loose.

Conservation of the fireplace included the selective removal of 20<sup>th</sup> century overpaint to reveal the original 19<sup>th</sup> century scheme, the retouching of losses, the varnishing of the painted surfaces, and the cleaning and retouching of the ceramic tiles.

Written and photographic documentation was maintained throughout.

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<sup>1</sup> Hirst Conservation, 'Condition survey and conservation recommendations for the interior decorations of the Old Hall of Queen's College, Cambridge: Tender Stage document' Unpublished report, September 2004.

## 2 History of the interior<sup>2</sup>

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The interior, as seen today, is a composite of numerous phases of intervention:

- The panelling dates from 1732. The appearance of the hall at this time is illustrated by two nineteenth century drawings, one of 1815, by Pugin and 1842, by F Mackenzie. In these drawings, the ceiling is flat, erected at corbel table level. The panelling appears to be the same as today, although the colour is known to have changed: Whilst the original surface coating, dating from 1732, is not known, the panelling was painted green up to 1961, when it was repainted in the present black and gold scheme.
- In 1846, the false ceiling was removed to reveal the timber roof structure. Presumably at this time, the angel corbels and spandrels to the trusses were added.
- In 1861-4, G.F. Bodley added the chimneypiece. The paintings on the tiles were made to the designs of Burne-Jones, Morris, Madox Brown and Rossetti. The floor was also constructed at this time.
- In 1875, the hall was redecorated to designs by Bodley, of which the only area remaining is found behind the over mantle, which was also erected during this phase.
- In 1948, there may have been some work to the decoration in preparation for the celebrations of the quincentenary of the College
- In 1961, the walls were over painted, using stencil designs taken from the existing painted decoration. The paintwork was executed in modern, resin-based paints. The panelling was painted black with applied gold leaf, a move away from the dark green, which had been in place prior to this.
- The hall was re-roofed in 2001
- The flagstone and tile floor was reconstructed in 2003

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<sup>2</sup> Information from [www.quns.com.ac.uk/Quenns/Images/OldHall.html](http://www.quns.com.ac.uk/Quenns/Images/OldHall.html)

- The Victorian interior of this building is significant both to the college, Cambridge and nationally, given the architects and designers who worked on the project. Any work that would alter or damage the significant paint films below the present decorative scheme must be truly justifiable for their long-term preservation.

### 3 Condition survey

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A preliminary condition survey was made in August 2004 for the pre-tender documentation. This is included below along with more detailed information gained when full access to the ceiling and upper walls was enabled by a full scaffold.

#### 3.1 Ceiling

The ceiling is made up of several component parts, ranging from painted beams and cornice, to carved, polychrome angels and gilded lead stars. For the purposes of this survey, each component will be considered separately, with areas of damage highlighted and illustrated with digital photographs.



**Figures 1 and 1a:** Images of components of the ceiling prior to treatment. Note the high level of surface dirt.

The entire ceiling was repainted during the 1961 campaign of restoration. It is probable that the present scheme follows the Victorian design<sup>3</sup>, although none of the original remains visible.

The timbers and paint appear to be in good condition. Some slight splitting of the timber was noted, which is probably to be expected on a roof of this age<sup>4</sup>. There appears to be some evidence of infestation, with evidence of large and small bore holes, probably attributable to death watch beetle and common furniture beetle respectively. Several of the holes have been painted over, presumably during the 1961 restoration, suggesting that the infestation is no longer active.

There is some failure of earlier paints and associated failure of the present paint film. This failure is very localised, occurring mainly in the tracery of the trusses. The present

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<sup>3</sup> No assessment of the form of early decoration has been made

<sup>4</sup> No dating of the structure was undertaken as part of the survey – the conclusion are based on research undertaken by others

paint film is discoloured through surface lying dirt, particularly pronounced on upward facing elements of design (see figures 1 and 1a). Accretions of nicotine, obvious as brown flecking, and yellow/brown run marks, are apparent on the lighter elements of the ceiling.

### Castellations



**Figure 2:** Image of the castellations before treatment

The wooden castellations, which run above the painted frieze, are decorated with red paint and gilded detail. The castellations are very dirty, with the upper slanted plane coated with dust and debris. The following irregularities include the omission of some sections:



**Figure 3** - The East wall, between trusses 2 and 3, the upper part of the castellation has not been gilded.

**Figure 4** - The top section of a castellation on the West wall between trusses 3 and 4 has been damaged due to the installation of a now defunct conduit.

**Figure 5** - Right, between trusses 4 and 5, the top sections have been removed to accommodate pipes.

### Corbels

The timber corbels are carved to resemble shield bearers. They are painted, with gilded hair and applied decoration.

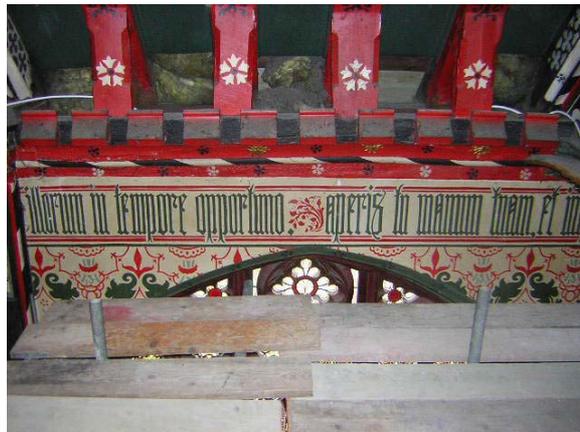
The corbels were generally found to be in good condition, although failure of the painted decoration was extreme on each of them, manifesting itself as lifting and delamination of macro flakes of paint (**see appendix 1, photograph 6**).

The surface of the paint was covered with a layer of particulate dust and dirt. In addition, nicotine staining and other imbibed deposits were apparent on the paler colours of decoration.

## **3.2 Walls**

### Painted frieze and border

The frieze is in generally sound condition but has areas of delaminating and lost paint (**see appendix 1, photographs 1-5**).



**Figures 6** – A broader view of the inscription

A Latin inscription runs below the ceiling along the east and west walls. It consists of dark green lettering on a cream background with a red border and decorative infills. The paint is applied to a plaster substrate. The description reads:

*Oculi omnium in te sperant Domine:  
et tu das escam illorum in tempore opportune.  
Aperis tu manum tuam,  
et imples omne animal benedictione.*

This translates as:

*The eyes of all wait upon you, O Lord:  
and you give them meat in due season.  
You open your hand,  
and fill every living thing with blessing.*

There are several anomalies in the wording and grammar of the inscription, including the word 'Dominn' which should read 'Domine' and two full stops that should be colons, which may have occurred when the inscription was repainted during the 1960's.

A red border with white and black flowers runs above the frieze, at the centre of which is a moulded rail decorated with black and cream chevrons. All are painted onto a wooden substrate

### **3.2.1 Definition of wall areas**

For the purpose of discussion, the walls have been subdivided into four categories (**see appendix 1, photograph 7**):

The upper wall (found on the north and south walls only) is the area above the roof trusses, painted in a cream and red design.

The mid wall (found on the north and south walls only) is the area immediately below the wall trusses, painted in a mid green with dark green stencil design

Main wall area (found only on the east and west walls) is the whole wall area, where not concealed by panelling, painted on plaster in a green and red stencil design.

The panelling – found on all walls, presently painted black and gold.

### **3.2.2 The upper walls**

The upper wall area on each wall is approximately 10m<sup>2</sup>. The painted decoration, which is applied onto an uneven plaster surface, is a burgundy damask pattern on a cream background. It has been executed by stencil application, and appears to be a modern, resinous paint of low/mid sheen.

Investigation of this area identified macro flaking, each area being between 10 and 20 cm<sup>2</sup>, and with approximately four or five of these areas per square metre (**see appendix 1, photograph 8**). The plaster was also found to be hollow in areas, although it appears stable at present. The paint film is discoloured by heavy surface dirt and nicotine staining. More problematic to the cleaning process is the manner in which the painting has been executed; the pattern has also been part hand painted, which became more obvious on cleaning. From the ground, however, this difference is less noticeable.

Assessment of this area by capacitance metre did not indicate any areas of high moisture content suggesting failure may be linked to environmental conditions and failure at the interface between incompatible paint films.

### **3.2.3 The mid-walls.**

The upper wall area on each wall is approximately 10m<sup>2</sup>. The painted decoration, which is applied onto an even plaster surface, is a dark green damask pattern on a mid green background. It has been executed by stencil application, and appears to be a modern, resinous paint of low/mid sheen.

Assessment in raking light reveals that, prior to redecoration, failure of the historic paint scheme had occurred. The present paint film appears sound, although some very small areas of flaking were noted. More problematic to the cleaning process is the manner in which the painting has been executed; the dark green stencils have also been part hand painted, and this became more apparent through cleaning. From the ground, however, this difference is less noticeable.

Assessment of this area by capacitance metre did not indicate any areas of high moisture content, suggesting failure may be linked to environmental conditions and incompatible paint films.

### **3.2.4 Main wall area**

The main wall area is decorated with a red and green damask pattern applied onto a cream background. Investigation behind the over-mantel revealed that the original design still exists in this area and is clearly hand painted, rather than stencilled as with the present design (**see appendix 1, photograph 9**). Close examination of this area was not possible, due to extremely limited access.

**East wall (see appendix 1, photographs 10-12).**

The painted decoration on this wall is generally sound, although discoloured through imbibed and heavy surface soiling as noted on all of the other painted surfaces.

Little failure was noted, with the exception of the painted inscription above the oriel window where the failure is extreme and across most of the inscription surface with a small area of failure above the panelling. Both of these areas may relate to external factors; the former may have occurred as a result of the movement of moisture from the roof of the oriel window through the wall, and the latter may be related to an early window that was later in-filled by brick courses. Assessment with the capacitance metre indicated that moisture content was high in these areas. In addition, the failure above the panelling may have been exacerbated by heat emissions from lighting positioned at this height.

Some voids in the plaster substrate were noted, although these appear generally stable and do not require grouting.

**West wall (see appendix 1, photographs 13-16)**

Investigation indicated that there is a void behind the plaster to the left of the fire. This area exhibited movement and weakness, and requires grouting in order to stabilise. In addition, two areas of damage caused by impact were also noted directly above the chimneypiece, which also require consolidation, filling and reintegration with the original.

Flaking of paint was also obvious in this area, but more markedly toward the north end, where moisture and salt movement have resulted in loss of painted decoration over a moderate area. This localised failure of the paint film appears to be related, in location, to a projecting building and also corresponds with the end of a run of guttering. Assessment with the capacitance meter indicated that the concentrations of moisture in this area were very high, almost certainly as a result of direct water ingress. No further investigation of the cause of the failure was undertaken as part of this survey, although it is important that any ingress of water is halted well in advance of restoration of the scheme to allow sufficient drying-out time to prevent further failure following conservation treatment.

A heavy layer of tenaciously held dirt and nicotine staining discolours the painted surface.

### **3.3 Windows**

The painted decoration, which is applied onto an even plaster surface, is a dark green damask pattern on a mid green background. It has been executed by stencil application, and appears to be a modern, resinous paint of low/ mid sheen.

The paint film has become extremely discoloured by a tenaciously held dirt layer and nicotine staining.

It was noted that this decoration was failing in localised areas on all four window reveals, although the northern most window on the west wall, and the southern most window on the east wall were observed to be the worst affected. Capacitance metre readings in these areas were very high, suggesting that the failure is related to moisture movement through the wall.

### **3.4 Oriel Window**

The Oriel Window has been ornately decorated in red, green and gold with an intricate pattern of stylised roses offset against the brightly coloured stained glass installed in 1854 by Hardman of Birmingham. Above the Oriel Window is another Grace, which was painted in 1875 and reads:

*Benedictum sit sanctum nomen Domini  
Pro Reginis fundatricibus nostris caeterisque Benefactoribus*

Which translates as:

*God's holy name be blessed  
for the Queens our foundresses and other Benefactors.*

The decoration in the oriel window has been severely effected by moisture ingress and salt efflorescence. This failure, on the south face of the window, is extreme and has resulted in the loss of much of the painted decoration. Assessment with the capacitance metre revealed extremely high moisture content. **(see appendix 1, photographs 17, 18).**

### 3.5 Panelling



**Figure 7:** The Gilded panels on the South wall.

Generally the panelling is sound although this is beyond the scope of this report. The gilding, however, appears dull. Whilst there will inevitably be some loss of lustre through ageing of the leaf, the quality of the gilding may also have affected its appearance.

### 3.6 Chimneypiece<sup>5</sup>



**Figure 8:** The upper portion of the chimneypiece before restoration.

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<sup>5</sup> Information from [www.quns.com.ac.uk/Quenns/Images](http://www.quns.com.ac.uk/Quenns/Images)

The chimneypiece forms the focal point of the room. Constructed from alabaster and decorated with polychrome and hand painted tiles, it is a significant collaboration of the decorative talents of late nineteenth century artists/designers, notably William Morris, Edward Burne-Jones, Ford Madox Brown and Dante Gabriel Rossetti. The tiles were produced by Morris, Marshall, Faulkner & Co in 1864, although the top left and right settings of foundress Queens (Margaret of Anjou and Elizabeth Woodville), designed by Madox Brown, were produced by Morris & Co in 1873.

Numerous elements of original polychrome on the alabaster, in the form of shields and rosettes above the over-mantel, have been over painted. However, where the original still exists, the quality is found to be in extremely good condition **(see appendix 1, photograph 19)**.

Much of the deterioration of the tiles is related to the failure of glazes, which have become porous, allowing them to take on pollution and staining. This has previously given rise to over-painting, which appears to have been clumsily undertaken, leading to loss of definition and detail **(see appendix 1, photographs 20, 21)**. The current appearance of the tiles allows little distinction between the ceramic tiles and alabaster.

There is some suggestion that the tiles may originally have been much brighter in colour, and that discolouration of the tiles is partly attributable to movement of moisture and pollutants through the chimneystack<sup>6</sup>. The designs on these tiles are not unique, and where other examples by the same designers exist, the colours used to illustrate are noticeably brighter. Without early visual or literary records of the chimneypiece, it is not possible to measure the change of colours which may have occurred or confirm the original palette.

Above the chimneypiece is a gothic-style timber over mantle, which is currently painted in the same manner as the ceiling.

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<sup>6</sup> [www.quns.com.ac.uk/Queens/Images/mantel-tiles.html](http://www.quns.com.ac.uk/Queens/Images/mantel-tiles.html)



**Figure 9** – The hearth before conservation. Note the heavy discolouration and the over-painted strip beneath the purple marble mantel.

The hearth is in poor condition, having been heavily abraded during use. Furthermore its appearance has become even more unsightly due to the thick coating of varnish that has discoloured significantly. In conjunction with this is a layer of dirt, slightly oily in nature, that is probably a combination of smoke from the fire and nicotine staining, causing the pattern beneath to be barely apparent. Possibly as a result of this, and in an attempt to revive it, the strip immediately below the mantel has been over-painted with colours that differ to the original (see **figure 9**), causing an unbalanced appearance.

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## 4 Comment

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Failure of decoration was noted on localised areas throughout the hall. The causes for this failure have not been identified as part of the research, and may be attributable to a number and combination of factors:

**Direct water ingress:** This is the possible cause of failure in the oriel window, and on the east and west walls. Moisture readings taken with the capacitance meter suggested that moisture content was extremely high at these areas and at the window reveals, where failure of the paint film is also apparent.

**Hygroscopic salts:** It is important to determine whether the moisture is 'free' or that absorbed from the atmosphere.

**Incompatible paint films:** The early paint film on the walls appears to be a porous layer, similar to a distemper<sup>7</sup>. This may be creating a weak interface with the overlying modern films. Whilst this is generally not causing a problem in this instance, moisture movement within the walls may lead to failure at the interface between the differing paint films. Failure also appears to be more greatly concentrated in areas of green paint, possibly due to varying layer thickness or porosity.

**Environmental conditions:** Some areas of paint, for example the corbels and spandrels, exhibit flaking of the paint, which may be attributable to environmental conditions in the hall. The incompatibility of the paint films will inevitably lead to failure under certain environmental systems. On the day of the survey, the relative humidity was found to be very low<sup>8</sup>. From readings taken no calculation of vapour pressure was made, although it is possible that a low RH and VP may be drawing moisture through the walls. A more in-depth assessment of the impact of these effects should be made in order to truly understand the causes of ongoing failure.

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<sup>7</sup> Analysis to be provided as a separate document

<sup>8</sup> On Tuesday 25<sup>th</sup> May 2004 at 3pm Temp: 21°C; RH: 41.8%; dew point 7.4 °C

## 5 Cleaning tests

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### 5.1 Cleaning tests to painted decoration

(see appendix 1, photographs 22, 23, 24).

The modern resin-based paint has become dirty and discoloured with thick, surface-lying accretions of dust and cobwebs and through the accumulation of nicotine and food deposits. The surface dirt was found to respond well to cleaning tests. A range of materials were tested:

**Removal of surface dirt:** this was achieved using soft brushes and Wishab™ Sponges<sup>9</sup>, in conjunction with vacuum extraction.

**Removal of staining:** The overall aim of the cleaning tests was to determine appropriate cleaning strategies for the painted surfaces. Specifically, cleaning tests were carried out to establish the following:

- The characteristics of the surface dirt.
- The sensitivity of paint to particular cleaning strategies.
- The level to which the surface can be cleaned

Tests included the use of de-ionised water, a 2% solution of Synperonic A7<sup>®10</sup> in de-ionised water, white spirit, and ammonium hydroxide solution (pH9).

De-ionised water represents the starting point for cleaning tests in the cleaning of painted surfaces. Elements of surface dirt may either be soluble in or dispersed by de-ionised water, but it can be difficult to wet-out resin painted surfaces with water alone, therefore making cleaning difficult. While some improvement was observed, this was not as successful as other methods tested. The addition of Synperonic A7 exhibited little enhancement of this result.

White spirit, applied by swab, was found to have little or no visible effect on the dirt layer.

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<sup>9</sup> Adsorbent silicone sponges

<sup>10</sup> Non-ionic, biodegradable detergent.

Ammonia solution is able to wet resin paint surfaces more easily than water and acts as a detergent.

The use of ammonia solution proved effective in reducing surface staining (see appendix 1).

## 5.2 Cleaning tests to chimneypiece

Tests were undertaken to establish the parameters of improvement possible through cleaning. The following methods were tested:

**Swabbing with de-ionised water**, a solution of Synperonic A7<sup>®</sup> 2% in de-ionised water, 7% ammonium hydroxide solution in de-ionised water. The latter was effective in removing some surface lying accretions, but had little or no effect on the ceramic body.

**Swabbing with a 10-20% solution of Biotex<sup>11</sup> and Calgon<sup>12</sup>** was found to remove surface staining and generally improved the appearance of the tiles.

**Poulticing with hydrogen peroxide.** A 7% solution of hydrogen peroxide was applied with blotting paper then sprayed lightly with ammonium hydroxide (pH8). This was then covered over with Melinex, to reduce the evaporation of the solution, and left for several hours. This method significantly reduced the yellowing of the tiles and removed the surface dirt. However, it would be necessary to repeat this method systematically to get an even clean.

**Controlled application of Solvol autosol<sup>13</sup>.** This method was possible due to the high density and low porosity of the ceramic body and exhibited some visual improvement. The residues were removed with white spirit. This method removed the inappropriate overpaint, but did not reduce the staining.

The overall appearance of the chimneypiece can be enhanced through cleaning, removal of inappropriate overpaint and careful and selective retouching to facilitate restoration of designs and sheen: Extensive retouching, believed to date from 1960s, currently obscures the original detail to the tiles and alabaster. Following cleaning, a greater impression of the condition of the original glazes will be gained and this will guide the level of retouching required.

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<sup>11</sup> Biotex – contains enzymes which remove organic stains

<sup>12</sup> Calgon – Sodium hexametaphosphate chelating agent.

<sup>13</sup> Fine abrasive paste consisting of diatomaceous earth, methylated soap, ammonia (2%) and white spirit

## **6 Recommendations:**

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### **6.1 Conservation rationale**

The current proposals for the restoration of the hall involve retention of the present scheme: whilst the previous scheme is still extant below the existing, no attempt is to be made to uncover or recreate the original at this time. In the future, consideration may be given to this more intrusive form of intervention, as the resin-based paint continues to age. In particular, some of the failure, which is most probably related to this less porous paint, may be halted by removal of the resin paint. Should the 1875 scheme be re-instated, this would also necessitate repainting of the panelling to recreate the interior as a whole.

One of the most vital elements of the proposed conservation is the stabilisation of the building envelope and internal environment: without minimising the impact of these factors on the interior, any work undertaken on the decoration may only be effective for a short time.

The points of water ingress on the west wall and the oriel window are severe. Following further investigation, it may be necessary to remove the plaster substrate in these areas, as this is now heavily contaminated with salts (dependant on further assessment). Ideally, following remedial work to the building envelope, and a sufficient drying out time, these areas could then be replastered. Unfortunately, this high profile interior cannot reasonably be left in a half complete state of restoration, so some ongoing failure of paint layers can be expected in vulnerable areas such as the Oriel window. This work has several implications:

- The underlying decoration would first have to be assessed, to ensure that there are no unique elements of Victorian design underlying the present scheme, or that any earlier plaster and paint which may be extant will not be damaged.
- The exposed wall would ideally be left for some time whilst the building dries out, but this is unlikely to be an option in this high profile interior.
- The stonework in the oriel may require poulticing to reduce the salt concentrations.

The carved detail on the panelling is gilded. The present gilded decoration has little lustre, which appears to be due to the method of application. Regilding could improve

this although the new, brighter gold may appear out of balance with the rest of the room even after cleaning, thereby necessitating the new gold to be distressed. Therefore, whilst proposals can be given for this work, it may be more appropriate to consider if this element of decoration is required at a later date, following cleaning of the painted decoration.

The situation of the fireplace is removed from that of the room. The recent work to the flagstone and tile floor and the proposed cleaning of the ceiling and walls will inevitably cause the already faded tiles of the chimneypiece to blend into the alabaster surround. There are several issues surrounding the proposed restoration of the chimneypiece:

- The present polychrome is partly original (1860's), and partly overpaint. The overpaint on the fireplace is contemporaneous with the 1960s scheme of redecoration: to remove it would be to alter the completeness of the interior as a whole. However, to remove the overpaint and reconstruct the original finishes would not only bring the appearance of the chimneypiece in line with the newly restored floor (these are the only two tiled elements in the room and this would therefore appear to be a sensible approach) but also return definition and re-instate the chimneypiece as the focal point of the room.
- The failure of the glazes on tiles is such that cleaning alone may return some definition to the patterns and offer an improvement of approximately 35%. Retouching will add further definition, although no attempt should be made to re-instate colours that are not supported by firm archival or physical evidence.

## **6.2 Conservation methodology**

### 6.2.1 The building envelope

In the past three years significant improvements have been made to the building envelope. In particular the re-roofing in 2001 should provide a sound, watertight structure for many years. Other areas of the building envelope may still be allowing water ingress and an assessment of these areas is required prior to any internal work. These areas have been identified as the oriel window, in particular the roofing and narrow reveals to the north and south, the blocked-up window to the north end of the east wall, the guttering/junction with an adjoining building to the north end of the west wall and the window reveals. Any points of water ingress require remedial works prior to conservation of failing paint films in the interior.

### 6.2.2 Condition survey from scaffold

Whilst this survey has established the key elements for the formulation of conservation proposals, access to all areas of the roof and walls was not possible during the time allotted for the work. It is therefore recommended that all areas be assessed and photographically recorded to establish any further areas of failure. Photographs should be used to illustrate areas of failure and should form an integral part of documentation at the end of the project.

### 6.2.3 Environmental monitoring and moisture survey

Areas of failure on the roof and wall area may be linked to the environmental conditions within the hall. Recent re-roofing and insulation of the building will have had an impact on the internal conditions, and may have resulted in some of the failure. In addition, a low RH (approx 41%) noted on the day of the survey may suggest that the internal conditions are drawing moisture through the walls. This may be the cause of failure in the window bays, where moisture is more readily drawn through the thinner masonry.

In order to establish the exact cause of failure on the localised areas, and to lessen failure occurring in the future through informed environmental monitoring of the internal and external environment is necessary. Without this understanding, ongoing failure of the type apparent today is likely to continue. Ideally monitoring should be undertaken for the period of one year to establish seasonal trends, although after 3-4 months

meaningful interpretations can be made and work should be able to progress on this basis.

It is suggested that a moisture survey is undertaken, together with a programme of environmental monitoring. Ideally, one moisture survey should be undertaken at the beginning of the monitoring period, and one following building works, when the masonry is believed to have been stabilised.

**The moisture survey** will involve the removal of core samples for assessment of moisture and salt concentrations at increasing depths in the walls. A total of 4 sites may be assessed and should include the oriel window (area of obvious failure), the west wall north end (area of obvious failure), window reveals and a control area where moisture movement is low.

**Environmental monitoring.** A total of four monitors will be required for this space:

1 external monitor, including fixing bracket, to monitor external temperature and relative humidity. This will require fixing to an external face on the complex, but may be situated on a building of lesser significance.

3 internal monitors, suitably fixed, to monitor ambient relative humidity and temperature and surface temperature at roof level, main wall area and oriel window.

#### 6.2.4 Remedial work to plaster and stone substrates

It may be necessary to remove contaminated plaster from the west wall and the oriel window.

Initially, an investigation of decoration in this area should be undertaken to establish the nature of the underlying decoration; it is essential that no significant decoration be lost without prior assessment for significance.

Removal of plaster should be carefully undertaken.

Areas of stone and masonry may need desalination.

Replastering should be undertaken in a lime plaster, which will be suitably porous, gauged with appropriate aggregate and to match the existing.

#### 6.2.5 Conservation/ restoration of the painted decoration

**Initial cleaning of painted decoration** - To be undertaken using soft brushes, Wishab™ sponges and vacuum extraction

**Timber treatment** - Should the full condition survey indicate the presence of live infestation, the advice of a specialist should be sought.

**Stabilisation of loose plaster** - Where voids are noted in the plaster substrate but are found to be stable, no intervention should be undertaken. If the plaster is loose and in danger of loss, the plaster requires stabilisation. This can be achieved by grouting. No analysis of the plaster has been undertaken; the plaster type will dictate the final grout mix, although this is likely to include lime putty slurry with low micron size spherical aggregate and pozzolan. The extent of work required will be established once the scaffold has been erected in the room.

**Consolidation of failing paint** - Where paint is flaking and failing, consolidation will be required. Application of adhesive by injection and fine brush may be supplemented by laying flakes flat with a heated spatula.

**Integration of areas of failure** - Areas which have been lost, or which are badly deteriorated due to water ingress, should be reintegrated to match the existing. This may be undertaken in a medium that closely matches the existing, although there may be some benefits from using a more porous paint. Where failure has occurred through moisture movement, this would more readily allow continued drying out of the substrate.

**Cleaning of painted decoration** - Tests indicate that the painted decoration can be cleaned using ammonia solution (varying concentrations) by swab application.

#### 6.2.6 Conservation/ restoration of the chimneypiece

**Cleaning of chimneypiece** - Tests indicate that the tiles and stone to the chimneypiece can be cleaned with a poultice using a 7% hydrogen peroxide solution in conjunction with ammonium hydroxide (pH8), carefully rinsed with deionised water, ensuring all residues are removed. The timber over mantel should be cleaned in the same manner as

the walls. The over-paint can be removed using a solution of ammonium hydroxide (pH10) applied with cotton wool swabs.

**Retouching of tiles** - Retouching of the tiles should only be taken following re-assessment of the decoration after cleaning. Inevitably, as over-paint is removed, some retouching will be necessary, but the level will be dictated by the overall appearance in the context of the interior.

**Reconstruction of polychrome** - Should only be taken following re-assessment of the decoration after cleaning, and following reintegration of tiles. Further investigation (uncovering tests) would be required in order to establish the original design.

**Gilding of carved detail to panelling** - Should be cleaned by removal of surface lying dirt with soft brushes and vacuum extraction. Following cleaning of the painted decoration, the need to improve the appearance of the gilding should be re-assessed (given the quality of the present leaf, a total re-gild would be necessary to improve the appearance but this may be out of context with the rest of the room).

## **7 Treatment Record**

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Treatment of the ceiling decoration and chimneypiece commenced following a series of preliminary trials, made to establish the most appropriate cleaning and conservation methods. The results of these trials are documented in chapters 5.1 and 5.2, and photographs of the result in the photographic appendix.

The Treatment record should be read in conjunction with the Condition survey, so that when, for example, flaking paint is identified as occurring on a given panel, it should be assumed that this was corrected using the method described in the treatment record. The treatment of each individual feature is recorded only in those instances where the defects are exceptional.

### **7.1 - Chimneypiece:**

#### 7.1.1 - Tiles:

- Yellow staining was reduced on the tiles using a solution of hydrogen peroxide (3% in de-ionised water).
- The tiles were poulticed with blotting paper soaked with hydrogen peroxide (3%), sprayed with dilute ammonium hydroxide solution (pH10), before being covered with Melinex and left for a number of hours. This process was repeated as necessary until an even clean was achieved.



**Figures 10**– Figure 10 shows some the tiles during cleaning. The right side having been cleaned is visibly brighter, the left side is starting to be cleaned.

- Discoloured overpaint was removed using scalpel blades, leaving behind red staining (see figure 10).



**Figures 11 and 12** – Figure 11 (left) shows an example of the flaking over-paint.  
Figure 12 (right) an example of the staining after the removal of the over paint.

- The tiles were then retouched using dry pigments bound in Paraloid B-72 in xylene.



**Figures 13 and 14** – Figure 13 (left) shows the tile shown in figure 11 after retouching.  
Figure 14 shows a larger section of the tiled area after cleaning and retouching.



**Figure 15** – An overview of the tiles after cleaning and retouching.

### 7.1.2 - Alabaster:

- The alabaster and purbic marble mantelpiece was cleaned using ammonium hydroxide solution (pH10).
- The alabaster and purbic marble mantelpiece were then given a coating of Renaissance wax and buffed to a sheen.

### 7.1.3 - Fire Surround:

- Discoloured varnish was removed with a combination of ammonium hydroxide solution (pH10) followed by acetone.



**Figure 16 and 17** – During the removal of the varnish from the hearth, and during cleaning of the rose motif.

- Overpaint was removed with ammonium hydroxide solution (pH10) to reveal the intact original scheme.
- Overpaint was also removed from the moulding beneath the over-mantel to reveal two different patterns not repeated in the overpaint.
- Scalpels were used to mechanically remove localised unidentified residues that didn't respond to the ammonium hydroxide treatment.
- Some small areas of damage were repaired using Miliput and filled using fine surface Polyfilla.
- An isolating varnish of Paraloid B-72 (8%) in xylene was applied to the fireplace.
- The darker background colour was retouched using dry pigment and Paraloid B-72 (8%) in xylene and the paler colour in acrylics. The lower right area of the hearth was extremely badly damaged and it was therefore necessary to cut a stencil using thick acetate to reconstruct the design. Using this stencil the paler colour was stippled onto the darker colour (see **figure 18**).



**Figure 18** – Reinstating the design with stencilling.

- The gilded purbic marble detail was retouched using Paraloid B-72 (8%) in xylene and Mica.
- The fire surround was then given a final coating of matt varnish (20% MS2A in white spirit with the addition of a small amount of microcrystalline wax) to protect.



**Figure 19** – The hearth after cleaning, varnishing, retouching and application of final varnish.

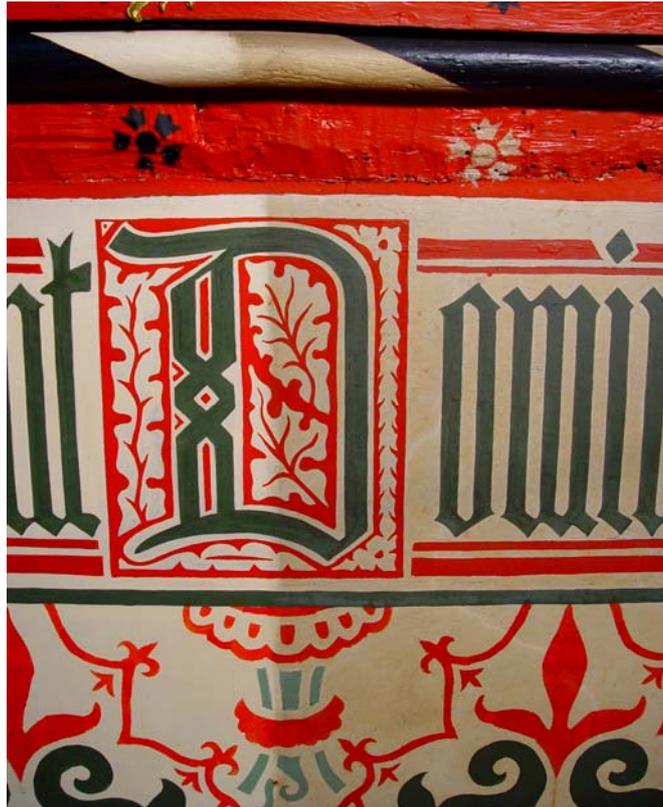
- Some 1970s overpaint remains on the shields and rosettes above the mantelpiece. This could be removed at a later date, as tests show that an original paint film, largely undamaged, survives beneath.

#### 7.1.4 - Hood:

- The red and green decorative hood was cleaned using a dilute ammonium hydroxide solution (pH10).
- Minimal retouching was performed with acrylic paint.

#### 7.2 – Walls:

- The walls were cleaned using a dilute ammonium hydroxide solution (pH10).



**Figure 20** – A detail of the wall during cleaning. The left side has been cleaned.

- An area of damaged plaster to the right of the doorway in the gallery (old doorway) was secured and pinned. Areas of loss were filled with fine putty comprising Mowiol 4-98 and whiting, when dry this was levelled. The walls were retouched using acrylics.
- Areas of severe flaking were consolidated using Plextol B500 diluted with water (10%). This adhesive solution, with the addition of IMS to reduce the surface tension, was also injected into areas of blind cleavage using a hypodermic syringe. Blisters and flakes were laid flat using a hot spatula set to 75°C. Some particularly unstable areas of the wall, blown due to soluble salt efflorescence, were scraped back. All areas of loss were then filled using a Mowiol 4-98 and whiting putty, which was levelled when dry (see figure 22).

- All losses to the walls were retouched using acrylic paint (see figures 21 and 22 for examples).



**Figures 21 and 22** - show a section of the upper wall on the south wall after filling but before (left) and after (right) retouching.

- Part of the Latin inscription that runs around the top of the walls was badly damaged as a result of soluble salts. The large losses were filled with a whiting and Mowiol 4-98 putty, which was levelled when dry. The design was reconstructed using a stencil made from surviving lettering. This was then retouched with acrylic paints (see figures 23-26).



**Figures 23 and 24** - The area of inscription that was badly damaged before treatment (left) and after consolidation and filling (right).



**Figures 25 and 26** – The area of inscription that was badly damaged during (left) and after reconstruction (right).

- There were three parts of this Latin inscription that had been painted incorrectly during one of the previous restoration schemes (two full stops should have been colons, and Dominn should have read Domine). These inaccuracies in the inscription were corrected using acrylic paints as requested by the client (see figure 27).



**Figure 27** – A section of the inscription after being corrected.

### 7.3 - Crenallated brackets:

- There was a row of these brackets that had not been gilded. These were given a coating of oil size and were gilded using 23½ carat gold leaf.
- After removal of an old conduit, there were a number of crenallated brackets that needed to be built up by the in-house carpenter. The new wood was painted with

red acrylic paint, coated with 3-hour oil size, and then gilded using 23½ carat gold leaf.



**Figures 28 and 29** – One of the partially damaged crenellated brackets during repair, and after redecoration.

- Missing stars at this level were located and reattached.

#### **7.4 – Corbels - Angels (large and small):**

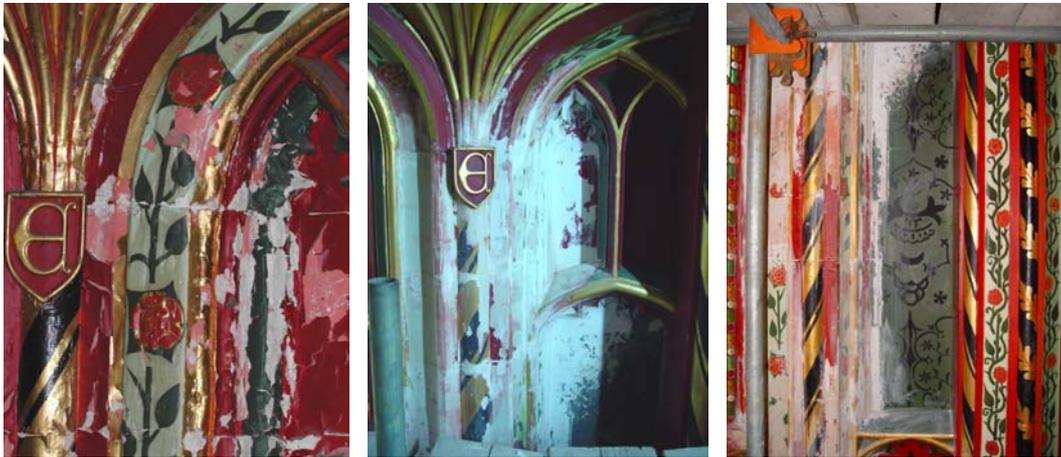
- These were cleaned using ammonium hydroxide solution (pH10).
- Areas of flaking were consolidated using Plextol B500 diluted in water to a concentration of 10%.
- Losses were filled with a putty of Mowiol 4-98 and whiting that were levelled when dry.
- Losses were reintegrated using acrylic paints.

#### **7.5 – Ceiling:**

- Fibreglass insulation and debris was removed from the eaves, and then vacuumed to remove large quantities of loose particulates.
- Ceiling panelling, stars and beams were dry brushed and vacuumed.
- Ceiling and beams were surface cleaned using ammonium hydroxide solution (pH10) with the addition of a few drops of Synperonic A7 (a non-ionic detergent).
- The surface was then rinsed with de-ionised water.
- Areas of flaking were consolidated using a 10% solution of Plextol B500 in water.
- Small areas of loss were then retouched using acrylics.
- The stars were then dry brushed to remove remaining gold skewings.

## 7.6 – Oriel Window:

- All areas of blown stone and plaster, damaged as a result of soluble salts, were scraped back and filled with fine surface Polyfilla. These areas were then sanded (see figures 30, 31 and 32).



**Figures 30-32** – Figure 30 shows part of the Oriel before treatment, 31 and 32 after filling and sanding.

- The extensive areas of damage to the decorative scheme were reconstructed using acrylic paints and gold leaf (see figures 33-36).



**Figures 33-36** – Figures 33-35 show the reconstruction of the damaged Oriel window involved copying existing design and extending it. Figure 36 shows a particularly damaged area of the Oriel window after restoration.

### **7.7 – Windows:**

- The window reveals and tracery/window mullions were cleaned using a solution of ammonium hydroxide (pH10).
- Areas of flaking were consolidated with Plextol B500 (10% in deionised water).
- The larger losses were filled using putty comprising Mowiol 4-98 and whiting.
- The losses were reintegrated with the surround using acrylic paints.

### **7.8 – Gilded panelling:**

- Gilding on upper pediment cleaned with a dilute ammonium hydroxide solution (pH8).
- Horn ornament re-gilded and distressed. Together with this horn the damaged crown and eagle at the top of the pediment were repaired and reattached by the in-house carpenter
- Painted panelling to be repainted by others. The gilding on the panelling was cleaned with a solution of 3% tri-ammonium citrate in deionised water to remove the surface dirt. This was done from tower scaffolding after the removal of the fixed bird-cage scaffold, as prior to this access was restricted.

### **7.9 – Gilded frames:**

- The frames of the three oil paintings that hang on the South wall were cleaned with a dry brush and vacuum cleaner.
- 1% ammonium hydroxide solution was used to remove the imbibed dirt and food stains.
- Loose gesso was consolidated with an acrylic emulsion adhesive.
- Intractable dirt and stains were reintegrated with acrylic paint and mica powder.

## Appendix 1 Photographic appendix

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**Photograph 1** - Frieze below Angel 2 showing holes in the paint and plaster that may have contained fixtures. The plaster substrate is crumbling slightly.



**Photograph 2** - Right, between trusses 3 and 4, two holes of crushed paint and plaster, likely to have been caused by scaffold poles.



**Photograph 3** - Right, between trusses 3 and 4, unevenness in the red band and some moderate flaking. Worm flight holes in this section have paint over them confirming that the worms are no longer active



**Photograph 4** - Right, truss 4, flaking in the red border



**Photograph 5** - Area of damage on wall beneath corbel on the west wall caused by water ingress.



**Photograph 6** - failing paint on corbels. Note also thick dirt on upper surfaces



Upper wall area

Mid wall area

**Photograph 7** - south wall

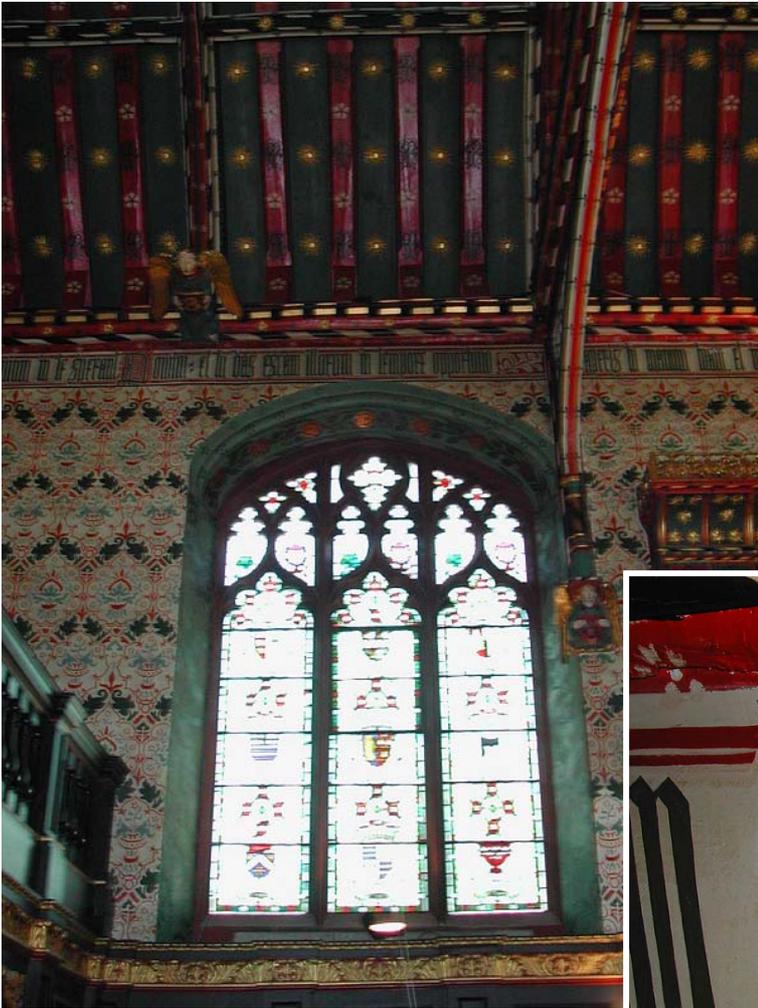


**Photograph 8** – upper wall area, flaking and delamination of paint.



**Photograph 9** – main wall area, original paint behind over-mantel.

**Photograph 10** – East elevation main wall area, south end



Area of failure



**Photograph 11** – East elevation main wall area central section



Area of failure related to water ingress

**Photograph 12** – East elevation main wall area north end

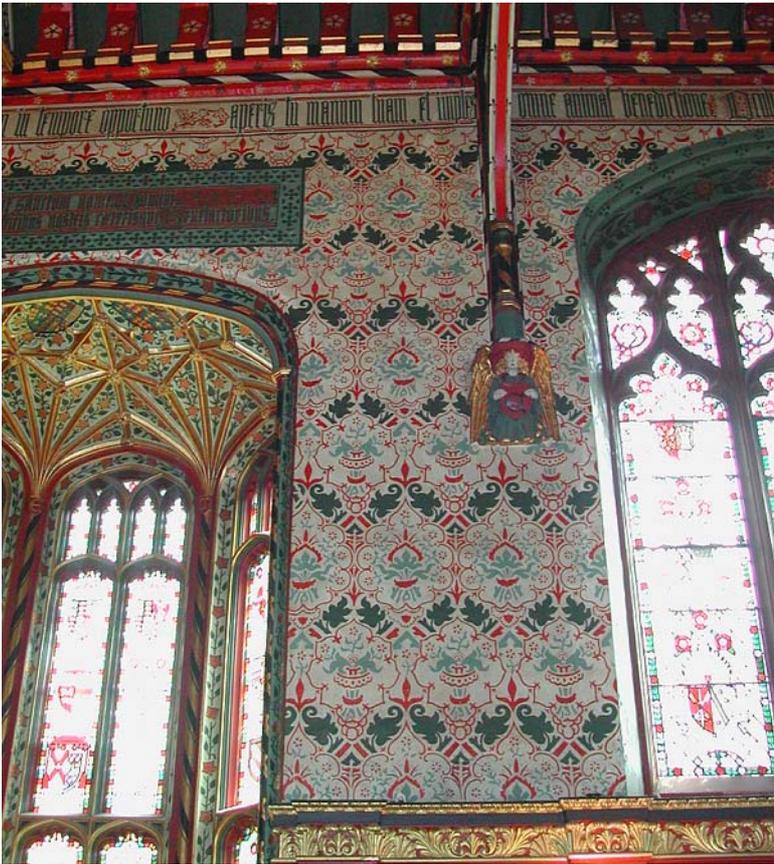


Area of failure

**Photograph 13** – mid wall area, east wall, north end



**Photograph 14** – mid wall area, east wall above oriel window



**Photograph 15** – mid wall area, east wall, pier between oriel window and central window



**Photograph 16** – mid wall area, east wall, pier between central window and southern most window



**Photographs 17 and 18:** Oriel window, failure of paint film due to water ingress.





**Photograph 19** - detail of chimney piece

Original polychrome

Overpaint.



**Photograph 20, 21** - detail of painted tiles of chimney piece, illustrating surface soiling and staining of the ceramic body.





**Photograph 22 (top) and 23 (above)** - before and after cleaning



**Photograph 24** – mid wall area above chimneypiece, illustrating the results of cleaning tests using dilute ammonia solution.