Head Office
Laughton, Sleaford,
Lincolnshire NG34 0HE

Tel: 01529 497449
hirst@hirst-conservation.com
www.hirst-conservation.com

Title: S03 Grand Staircase

Treatment Report

Manchester Town Hall

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Manchester Town Hall

S03 Grand Staircase, Treatment Report

30/06/2023

Ver 1.0: For Approval

HIRST Conservation

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1. Specified scope of works

Scope of work in accordance with the tender:

3.01.01 General Cleaning and Assessment of the painted plaster surfaces:

Carry out a general clean to all the existing painted plaster ceiling surfaces above the Grand Staircases. A chemical sponge dampened with de-ionised water will be effective in removing dirt from these areas and they are to be thoroughly dried with cotton wool after treatment.

3.01.02 Validation Inspection:

The areas of oil alkyd overpaint carried out in the 1990s on the vaulting groins appear from visual inspection to be generally compatible with the original paints (the pattern of which can be discerned below the current layers) as there are no identified condition issues. They have a glossy sheen and in other locations these paints tend to peel in the areas of condition concern due to their surface tension and lack of permeability. Consequently, following the general clean it will be essential that the conservators carry out a full visual inspection of the painted surfaces, prior to the other recommended conservation works on starry night vault groins, to determine any condition issues that have not been foreseen and to validate the scope of any further required action.

The extent of any minor defective overpainting to be removed may therefore require further assessment, however, it must be assumed until this has been done that all the areas are sound.

A more detailed understanding of the overpaint will inevitably be achieved during the actual works, from increased familiarity of the painted surface and the impact of the general cleaning. All areas that are subsequently identified to be removed should be fully recorded in detail (photographically and with gridded tracings) to enable faithful reinstatement.

3.01.03 Cleaning Areas of Stencilled Gilding on the Starry Night:

These features can be additionally cleaned with a solution of tri-ammonium citrate (3% in deionised water) applied with cotton swabs, cleared with deionised water, and dried with cotton wool. This process effectively removes the dirt coating on the gilding and greatly improves the reflectance properties. This is considered to be beneficial to all the gilding and is included in the scope required.

Any significant losses of gilding are to be in-filled to match with equivalent quality and colour of gold leaf on oil size but as the current gilding is relatively recent it is assumed at present that all the gilding will clean without any loss.

1.1. Validation Survey Scope

The validation survey was produced in June 2022 and the works undertaken in June- August 2022 based on agreement of additional elements of work.

See OTH-HIR-TH-XX-RPT-X-0041, Hirst Conservation Validation Survey Part 1, S03 Grand Staircase June 2023

2. Condition of the ceiling

2.1. Plaster

2.1.1. General

The plaster support was found to be in sound condition. The ceiling had suffered some small losses and areas of water ingress, but these were extremely limited.

2.1.2. Blown/ delaminating plaster

Areas of blown/ delaminating plaster were noted to the ceilings:

- S16
- N14

One small loss was found to have been previously overpainted on panel S1. This was stable.

2.1.3. Air gun pellets

A low number of panels were noted to have small, fresh losses which appear to relate to air gun pellets, similar to those found in the Great Hall.

2.2. Paint decoration

2.2.1. General

The decoration dates to the 1990s. Generally, the painted decoration is very stable. Assessment in UV light indicated that the paint was varnished before the gilded detail was applied. The varnish has discoloured in areas, creating a patchy appearance to some of the groins. It was not considered appropriate to remove/ reduce the varnish because this would have caused loss of gold. Gold skewings had bonded to the varnish (this is not apparent from a distance, but at close range, causing loss of definition on the edges to the gilded designs).

2.2.2. Surface lying dust and dirt.

There is a thin veil of surface lying accretions was present across all panels.

2.2.3. Moisture and salt damage

Flaking and loss of decoration was limited to S02, limited to the gilded and lined border above the window arch. The plaster substrate was exposed in this area.

2.2.4. Loss of gilding

Loss of gilding to the outer band, particularly on the south ceiling appeared to relate to masking tape or latex poultice used on the stonework. The yellow base coat to the gilding remained stable and intact, providing a suitable ground for regilding.

3. Treatment undertaken

3.1. Surface Cleaning:



Figure 1: During cleaning trials

The ceiling was first dry cleaned to remove loose surface dust using soft brushes and vacuum extraction.

Cleaning trials with melamine sponges indicated that this caused marking of the varnish surface and therefore cleaning using this method was limited.

Cleaning was achieved by deionised water and cotton wool swabs, which was less aggressive and removed surface dirt.

3 % tri ammonium citrate (TAC) in deionised water was applied on cotton swabs to gilding. The whole surface was then cleaned with deionised water to clear the TAC.

3.2. Plaster Stabilisation:

One blown section of plaster was noted to S15. This was secured by careful removal of the section and rebedded and filled with casting plaster/ lime putty mix and retouching in stable, artists acrylics.

Cracking to the base of panel N14 was stabilised through injection of dispersion K500.

3.3. Paint Consolidation and retouching:

Prior to any surface cleaning from taking place, the vulnerable areas of paint delamination to panel S02 were consolidated with Paraloid B72 (8- 12% in acetone) applied by brush or syringe and laid flat using a heated spatula (65°C) through silicone release paper to retain as much original material as possible and ensure paint stability. The plaster surface was first coated with dispersion K500 to provide a stable porosity prior to retouching. Areas of loss were integrated with stable, artists acrylics. Due to the small areas of integration required, no glazing was necessary to integrate. The areas of lost gilding were reinstated as per item 3.4.

3.4. Gilding

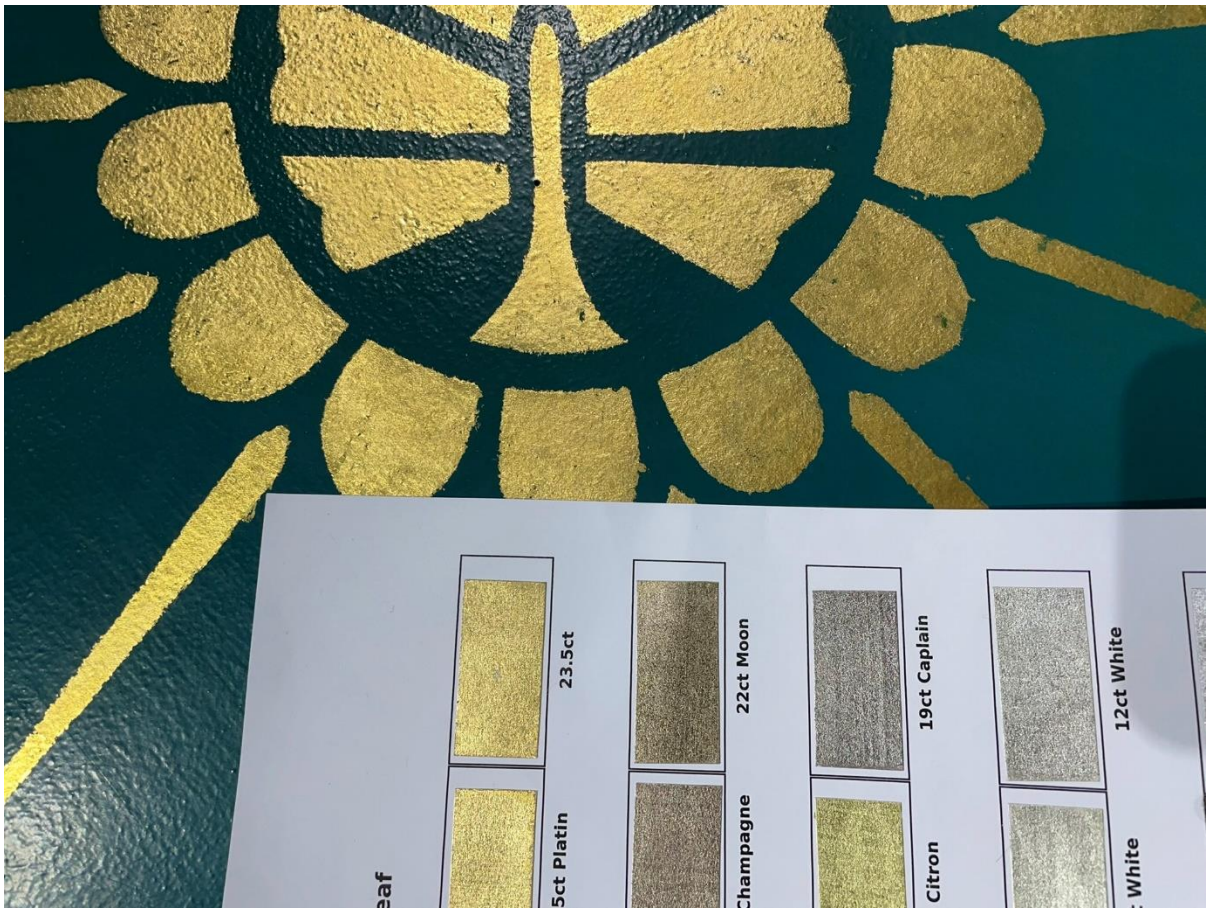


Figure 2: Matching gold

Loss of gilding to the outer band, particularly on the south ceiling was regilded based on the following criteria:

- Traces of latex were removed manually by hand or dry cotton swabs.
- It was agreed that only areas of loss in excess of 5mm width would be regilded. Areas less that this were left.
- The shade of gold was selected after cleaning the entire surface of the panels to avoid shade, colour and shin differences. The gold used was Gold Leaf Supplies 23.5 carat transfer leaf.
- Before applying the oil size, the border was masked with low tack masking tape to provide straight edges to the gilded outer band. The tape was easily removed after gilding without any damage to the surrounding area.
- The gilding size chosen before gilding was Charbonnel 24h oils size, however, due to weather condition size was ready to apply gold after 10 to 12 hours.
- 15 books of transfer gold were used for gilding.

3.5. Retouching



Figure 3: Retouching to panel S15

Retouching was limited to very localized areas; A small area of flaking to panel S02 and air gun pellets were necessary for retouching. The plaster repair to S15 required integration of the fill. For paint retouching were used “Golden” acrylic paints mixed with two types of acrylic mediums (glossy and matt) to obtain the appropriate level of shine.

4. Panel referencing

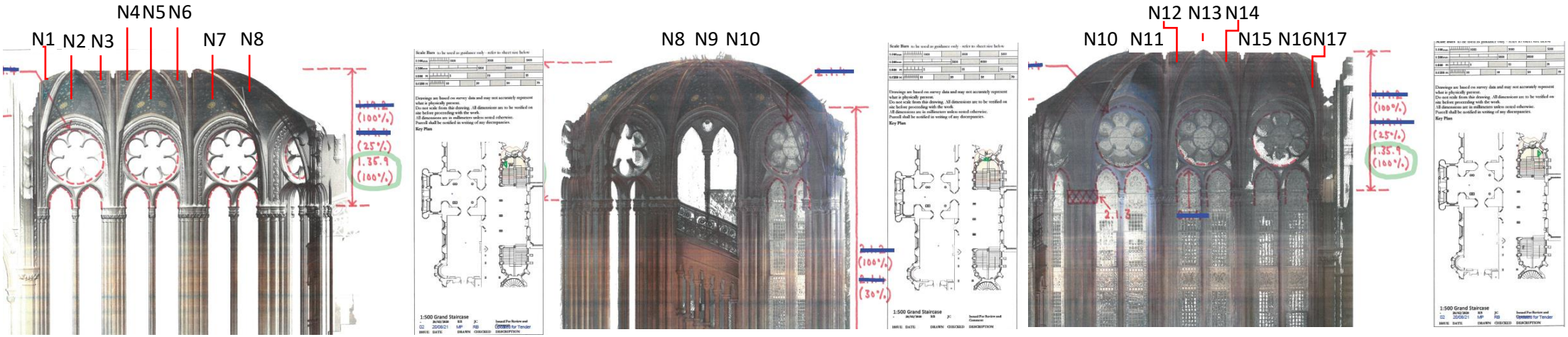


Figure 5: Left, north stairs, west elevation; centre, north stairs, north elevation; right, north stairs, east elevation

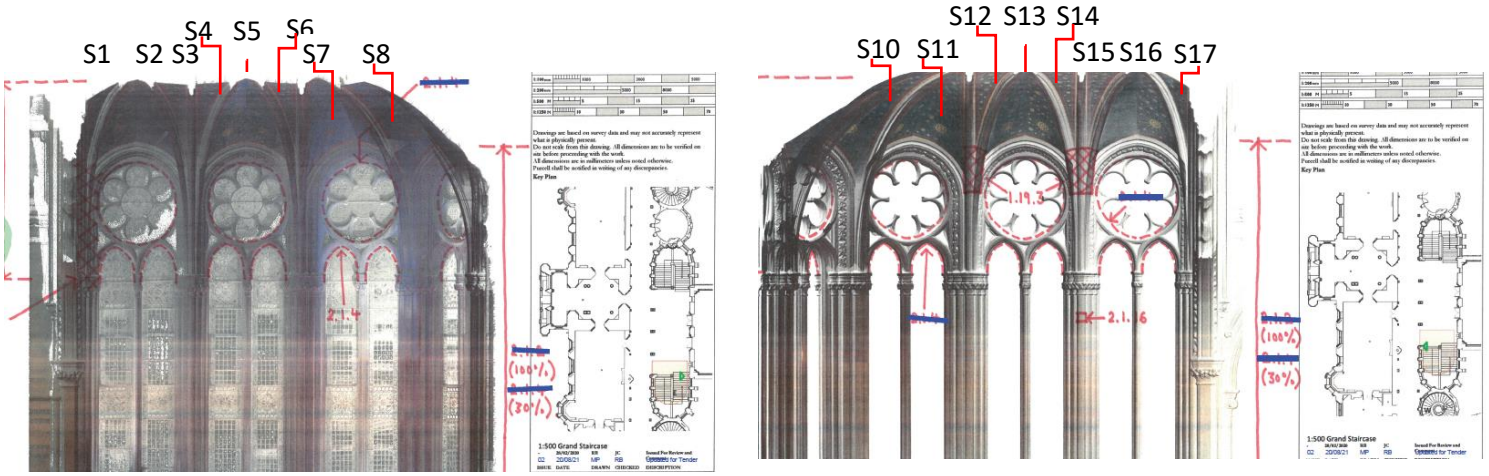


Figure 4: Left, south stairs, west elevation; right, south stairs, east elevation

Appendix 1: Record of intervention

S1, S2, S3



Figure 6: Left, 15th March 2022; Right, 25th May 2022. Inset, flaking and loss to panel S2

Plaster substrate	Assessment from below indicates that the plaster is sound. Some previous losses have been overpainted. These appear to relate to mechanical damage. No remedial works undertaken
Painted decoration	Generally in sound condition. Between March and May 2022, the outer gilded border appears to have lost gold leaf, exposing the yellow ground. This appears to relate to masking tape/ latex application. All panels cleaned. S02 exhibited on small area of water/ salt damage directly above window arch. S02: Failing paint and gilded decoration was consolidated with Paraloid B72 in acetone, applied with brush and syringe and laid flat with heated spatula through silicone release paper. S02 Plaster first coated with dispersion K500 prior to retouching using Golden Acrylic paints and regilding. See appendix 4.
Gilding	Cleaned with 3% TAC cotton wool swab application and cleared with deionised water . Latex deposits removed by hand and localised areas of loss of gold to banding were regilded (see Appendix 5)

S4, S5, S6



Figure 7: Left, 15th March 2022; Right, 25th May 2022

Plaster substrate	Assessment from below indicates that the plaster is sound. No remedial works undertaken
Painted decoration	Generally in sound condition. Cleaning only undertaken
Gilding	Cleaned with 3% TAC cotton wool swab application and cleared with deionised water . Latex deposits removed by hand and localised areas of loss of gold to banding were regilded (see Appendix 5)

S7



Figure 8: Left, 15th March 2022, Right 25th May 2022. Inset, loss of gilding

Plaster substrate	Assessment from below indicates that the plaster is sound. No remedial works undertaken
Painted decoration	Generally in sound condition. Cleaning only undertaken
Gilding	Cleaned with 3% TAC cotton wool swab application and cleared with deionised water . Latex deposits removed by hand and localised areas of loss of gold to banding were regilded (see Appendix 5)

S8



Figure 9: Left, 15th March 2022; Right 25th May 2022; inset, detail of loss of gilding

Plaster substrate	Assessment from below indicates that the plaster is sound. No remedial works undertaken
Painted decoration	Generally in sound condition. Cleaning only undertaken
Gilding	Cleaned with 3% TAC cotton wool swab application and cleared with deionised water . Latex deposits removed by hand and localised areas of loss of gold to banding were regilded (see Appendix 5)

S9



Figure 10: Left, 15th March 2022; Right 25th May 2022; inset, detail of possible loss of gilding

Plaster substrate	Assessment from below indicates that the plaster is sound. Some previous losses have been overpainted. These appear to relate to mechanical damage. No remedial works undertaken
Painted decoration	Generally in sound condition. Varnish is discoloured, noted as patchy brown appearance. Cleaning only undertaken
Gilding	Cleaned with 3% TAC cotton wool swab application and cleared with deionised water . Latex deposits removed by hand and localised areas of loss of gold to banding were regilded (see Appendix 5)

S10



Figure 11: Left, 15th March 2022; Right 25th May 2022; inset, detail of loss of gilding

Plaster substrate	Assessment from below indicates that the plaster is sound. Some previous losses have been overpainted. These appear to relate to mechanical damage. No remedial works undertaken
Painted decoration	Generally in sound condition. Varnish is discoloured, noted as patchy brown appearance. Cleaning only undertaken
Gilding	Cleaned with 3% TAC cotton wool swab application and cleared with deionised water . Latex deposits removed by hand and localised areas of loss of gold to banding were regilded (see Appendix 5)

S11



Figure 12: Left, 15th March 2022; Right 25th May 2022

Plaster substrate	Assessment from below indicates that the plaster is sound. No remedial works undertaken
Painted decoration	Generally in sound condition. Cleaning only undertaken
Gilding	Cleaned with 3% TAC cotton wool swab application and cleared with deionised water . Latex deposits removed by hand and localised areas of loss of gold to banding were regilded (see Appendix 5)

S12-14

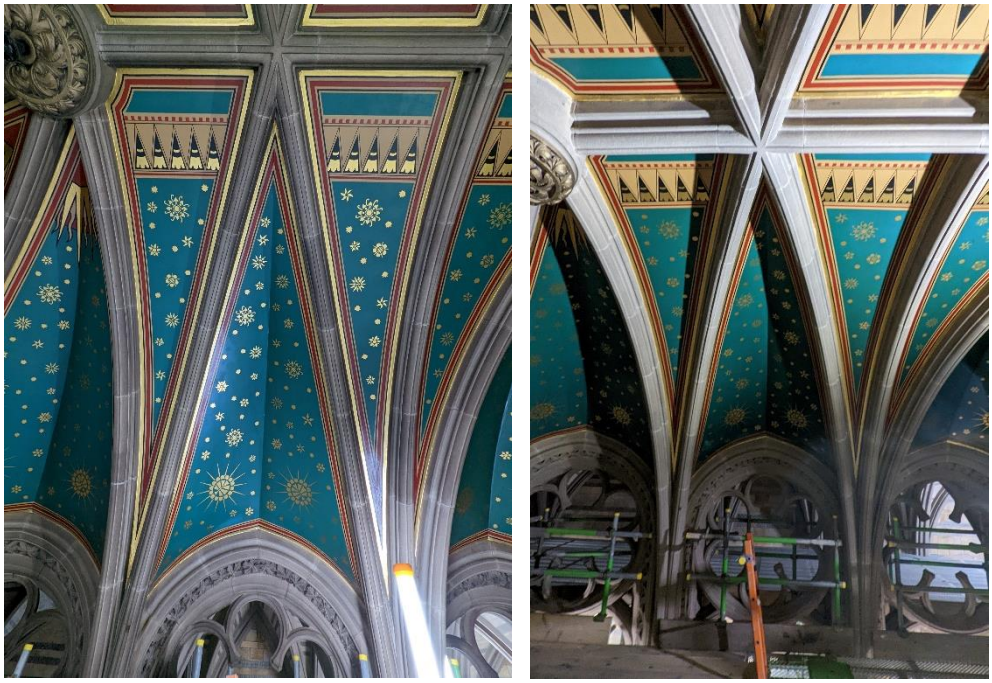


Figure 13: Left, 15th March 2022; Right 25th May 2022

Plaster substrate	Assessment from below indicates that the plaster is sound. No remedial works undertaken
Painted decoration	Generally in sound condition. Cleaning only undertaken
Gilding	Cleaned with 3% TAC cotton wool swab application and cleared with deionised water . Latex deposits removed by hand and localised areas of loss of gold to banding were regilded (see Appendix 5)

S15-17

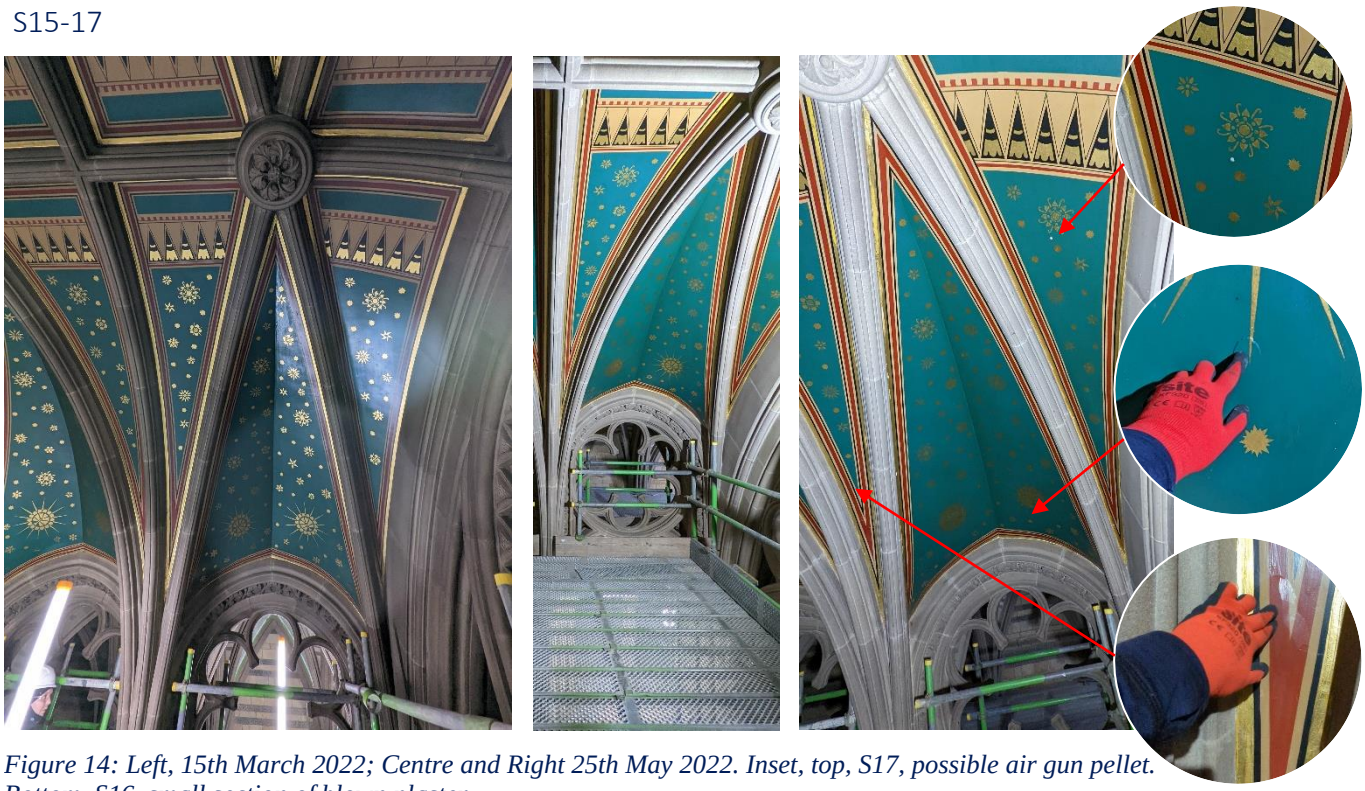


Figure 14: Left, 15th March 2022; Centre and Right 25th May 2022. Inset, top, S17, possible air gun pellet. Bottom, S16, small section of blown plaster.

Plaster substrate	Assessment from below indicates that the plaster is sound. S15 – Lower section blown, detaching plaster exhibiting movement. Area approx. 12cm x 8cm. S16 – one small blown section noted to north face, see inset image. S17 – possible small loss (air gun pellet?) to upper section, see inset image.' S15: Plaster repair undertaken, see Appendix 3 S16: removed and repaired with casting plaster/ lime putty mix.
Painted decoration	Generally in sound condition. Cleaning undertaken retouching to S15, S16 and S17 using Golden Acrylic paints and regilding. See appendix 4.
Gilding	Cleaned with 3% TAC cotton wool swab application and cleared with deionised water . Latex deposits removed by hand and localised areas of loss of gold to banding were regilded (see Appendix 5)

N1, N2, N3



Figure 15: Left, 15th March 2022; Centre and Right, 25th May 2022

Plaster substrate	Assessment from below indicates that the plaster is sound. N3 – impact damage, possible air gun pellet. No repair work undertaken
Painted decoration	Generally in sound condition. Cleaning only undertaken N3: Air gun pellet hole retouched with Golden Acrylic paints. See appendix 4.
Gilding	Cleaned with 3% TAC cotton wool swab application and cleared with deionised water . Latex deposits removed by hand and localised areas of loss of gold to banding were regilded (see Appendix 5)

N4, N5, N6

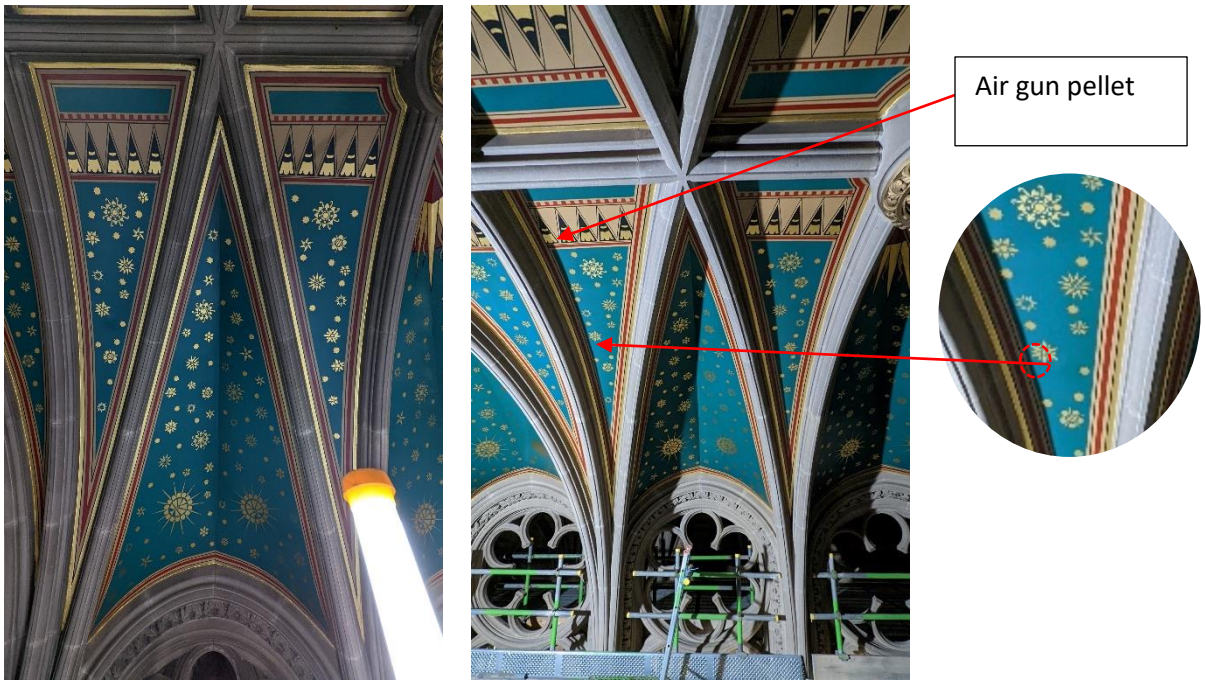


Figure 16: Left, 15th March 2022; Centre and Right, 25th May 2022

Plaster substrate	Assessment from below indicates that the plaster is sound. N4 – Section of blown plaster approx. 8cm diameter. 1 no. impact damage, possible air gun pellet. N4 blown plaster stabilised by dispersion K500 (formerly Plextol B500) by injection.
Painted decoration	Generally in sound condition. Cleaning undertaken. Retouching to N4 air gun pellet hole using Golden Acrylic paints (See appendix 4).
Gilding	Cleaned with 3% TAC cotton wool swab application and cleared with deionised water

N7

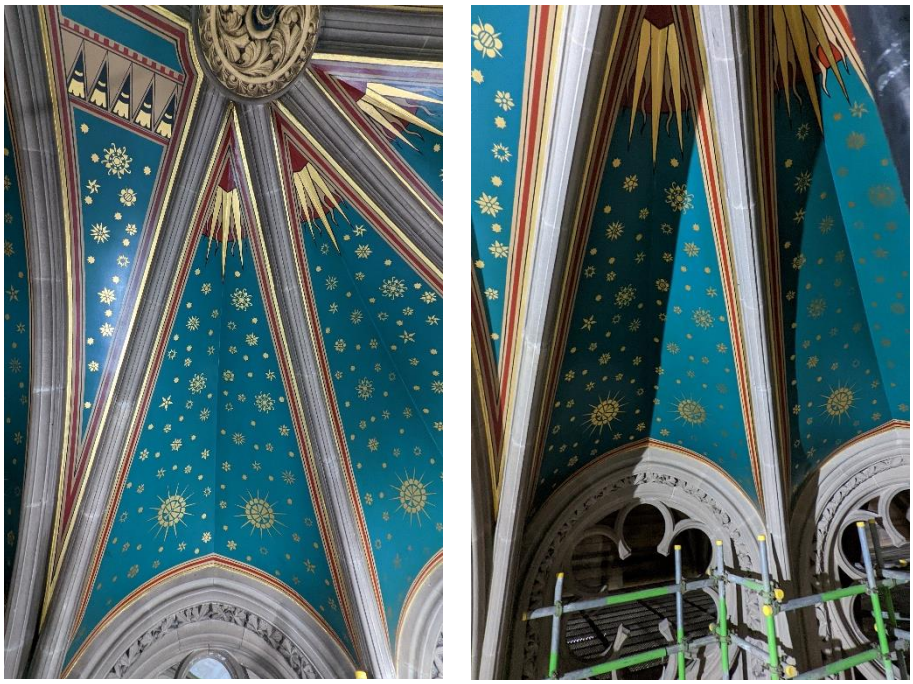


Figure 17: Left, 15th March 2022; Centre and Right, 25th May 2022

Plaster substrate	Assessment from below indicates that the plaster is sound. No remedial works undertaken
Painted decoration	Generally in sound condition. Cleaning only undertaken
Gilding	Cleaned with 3% TAC cotton wool swab application and cleared with deionised water .

N8



Figure 18: Left, 15th March 2022; Centre and Right, 25th May 2022

Plaster substrate	Assessment from below indicates that the plaster is sound. No remedial works undertaken
Painted decoration	Generally in sound condition. Cleaning only undertaken
Gilding	Cleaned with 3% TAC cotton wool swab application and cleared with deionised water .

N9



Figure 19: Left, 15th March 2022; Centre and Right, 25th May 2022

Plaster substrate	Assessment from below indicates that the plaster is sound. 1 no. impact damage, possible air gun pellet. No remedial works undertaken
Painted decoration	Generally in sound condition. Cleaning undertaken Retouching to N4 air gun pellet hole using Golden Acrylic paints (See appendix 4).
Gilding	Cleaned with 3% TAC cotton wool swab application and cleared with deionised water .

N10



Figure 20: Left, 15th March 2022; Centre and Right, 25th May 2022

Plaster substrate	Assessment from below indicates that the plaster is sound. No remedial works undertaken
Painted decoration	Generally in sound condition. Cleaning undertaken
Gilding	Cleaned with 3% TAC cotton wool swab application and cleared with deionised water .

N11



Figure 21: Left, 15th March 2022; Centre and Right, 25th May 2022

Plaster substrate	Assessment from below indicates that the plaster is sound. No remedial works undertaken
Painted decoration	Generally in sound condition. Cleaning undertaken
Gilding	Cleaned with 3% TAC cotton wool swab application and cleared with deionised water .

N12-14



Figure 22: Left, 15th March 2022; Centre and Right, 25th May 2022

Plaster substrate	Assessment from below indicates that the plaster is sound. No remedial works undertaken
Painted decoration	Generally in sound condition. Cleaning undertaken
Gilding	Cleaned with 3% TAC cotton wool swab application and cleared with deionised water .

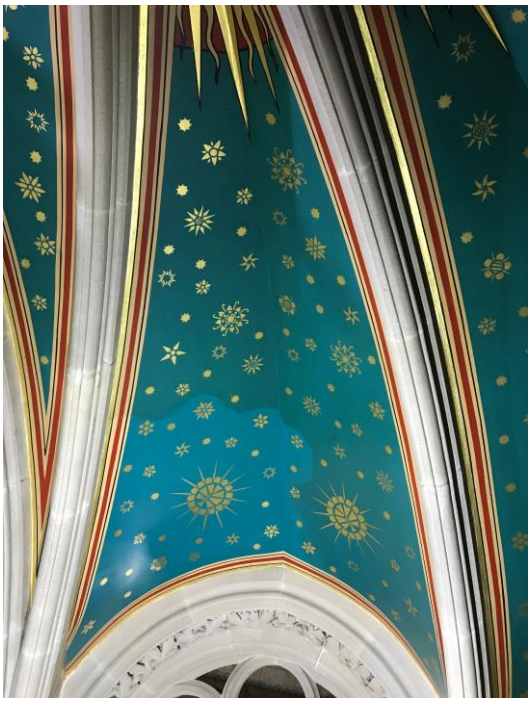
N15-17

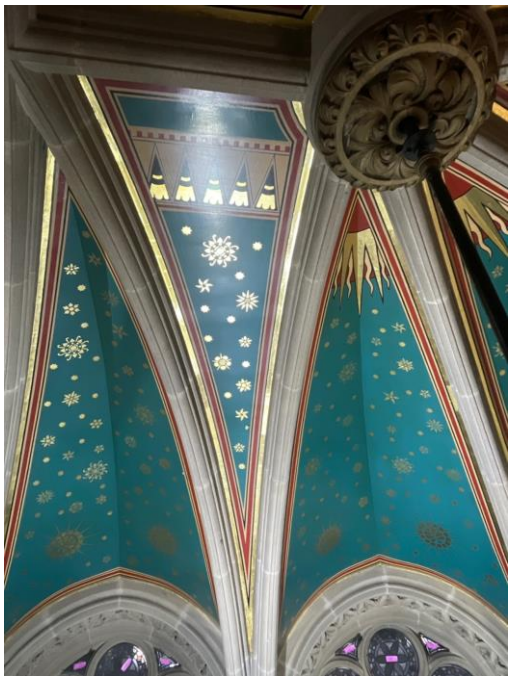


Figure 23: Left, 15th March 2022; Centre and Right, 25th May 2022

Plaster substrate	Assessment from below indicates that the plaster is sound. No remedial works undertaken
Painted decoration	Generally in sound condition. Cleaning undertaken
Gilding	Cleaned with 3% TAC cotton wool swab application and cleared with deionised water . Latex deposits removed by hand and localised areas of loss of gold to banding were regilded (see Appendix 5)

Appendix 2: Cleaning

	Deionised water initial cleaning
	Cleaning in progress, stage after using H2O and during 3%TAC cleaning.

	Final cleaning result.

Appendix 3: Plaster Repair, S15 and N14

(1)



11.jpeg

Created: Thu 29 Sept 16:04 2022

Group: South Side Plaster Repair, Panel S15

Before repair

(2)



12.jpeg

Created: Thu 29 Sept 16:04 2022

Group: South Side Plaster Repair, Panel S15

Facing prior to repair, faced with acid free Japanese tissue and Klucel G in deionised water.

(3)



13.jpeg

Created: Thu 29 Sept 16:04 2022

Group: South Side Plaster Repair, Panel S15

During repair

(4)



14.jpeg

Created: Thu 29 Sept 16:04 2022

Group: South Side Plaster Repair, Panel S15

Delaminated plaster removed for rebedding

(5)



15.jpeg

Created: Thu 29 Sept 16:04 2022

Group: South Side Plaster Repair, Panel S15

During repair works

(6)



16.jpeg

Created: Thu 29 Sept 16:04 2022

Group: South Side Plaster Repair, Panel S15

Plaster bedded back and filled with casting plaster/ lime putty mix.

(7)



17.jpeg

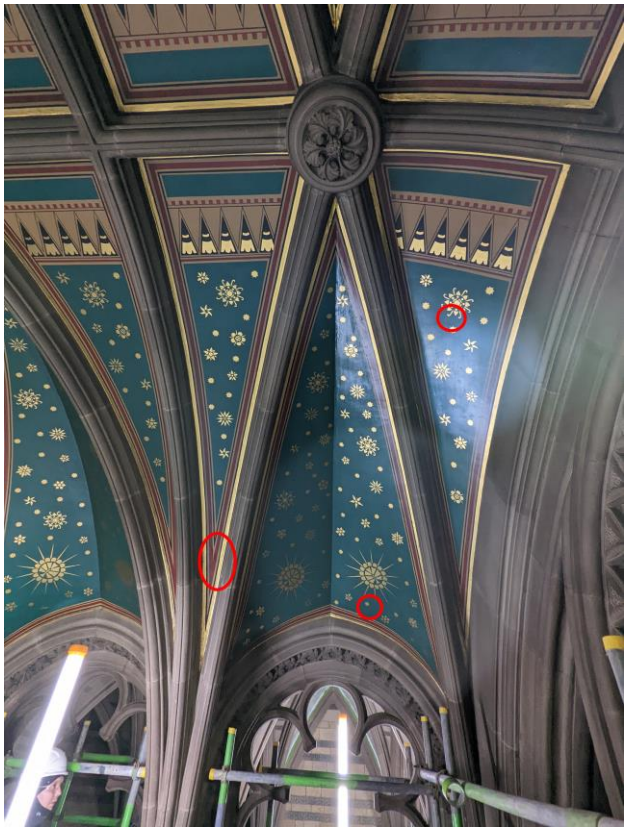
Created: Thu 29 Sept 16:12 2022

Group: North Side Plaster Repair, Panel N14

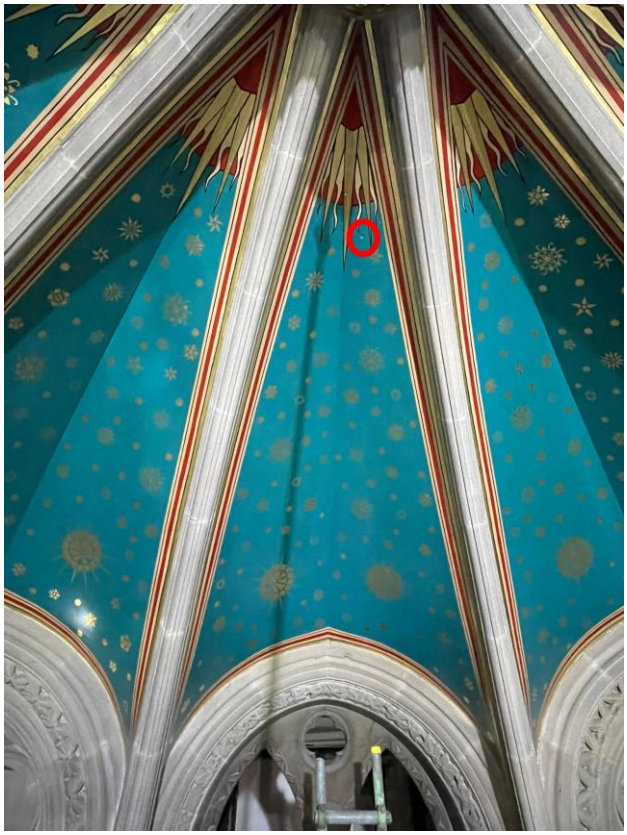
Plaster stabilised by consolidation with dispersion K500 (formerly plextol B500) by injection

Appendix 4: Retouching

Retouching locations (South):

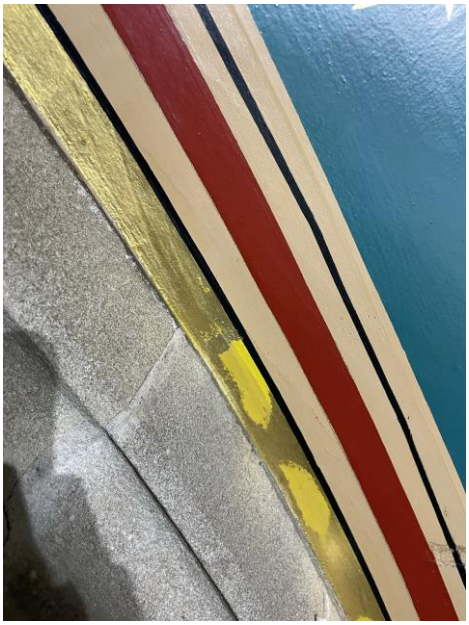
	
Panel S02	Panel S15, S16, S17

Retouching locations (North):

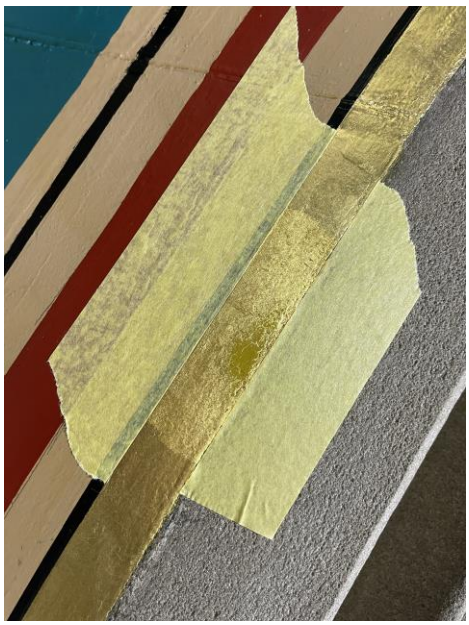
	
Panel N03 and N04	Panel N09

Appendix 5: Gilding

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Example of damaged gilding

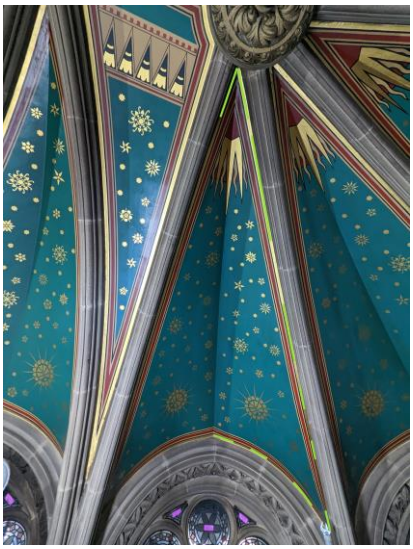


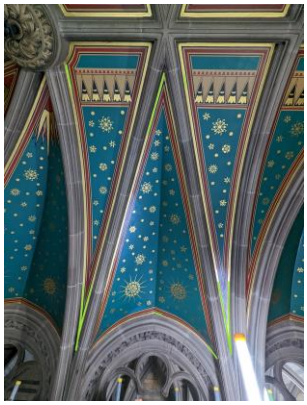
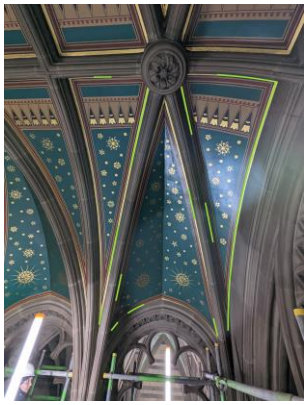
Before gilding preparation, tape protection and oil size applying.



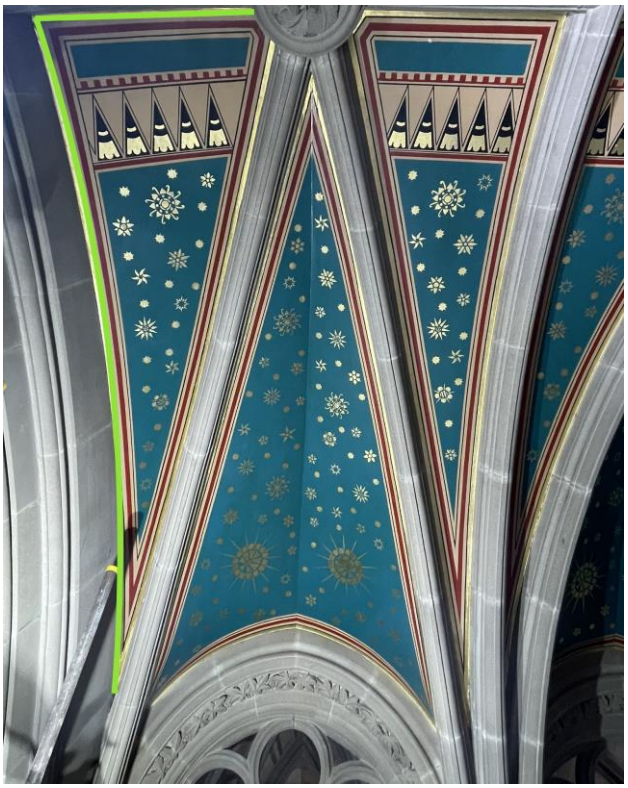
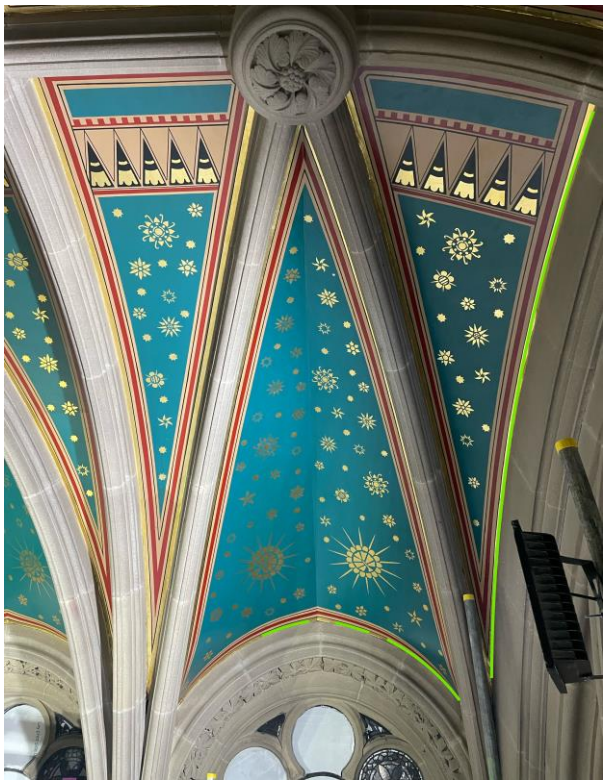
Final result of gilding damaged areas.

Record of gilding to the South Staircase panels:

		
Panels 1-3	Panel 4-6	Panel 7

			
Panels 8-9	Panels 10-11	Panels 12-14	Panels 15-17

Record of gilding to the North Staircase panels:

	
Panel 1	Panel 16-17

Appendix 6: Materials and suppliers

- Casting plaster
  Industrial Plasterers
  63 Netherstreet, Bromham
  Chippenham
  SN15 2DP
  Tel: 01380 850616
  Link to Technical data: https://industrialplasters.com/products/fine-casting-plaster?_pos=1&_sid=b813be222&_ss=r

- Dispersion K500
  Atlantis Art
  Unit 6 Bayford Street Industrial Centre
  London
  E8 3SE
  Tel: 0207 377 8855

- Gold Leaf 23.5ct gold transfer leaf
  Gold Services Co Ltd
  t/a Gold Leaf Supplies
  Unit c, Ogmore Court
  Abergarw Trading Estate
  Brynmenyn
  CF32 9LW
  Tel: 01656 720566

- Gold size – charbonnel 24 hour
  Gold Services Co Ltd
  t/a Gold Leaf Supplies
  Unit c, Ogmore Court
  Abergarw Trading Estate
  Brynmenyn
  CF32 9LW
  Tel: 01656 720566

- Golden Acrylics
  Jackson's Art Supplies
  1 Farleigh Place (off Farleigh Road)
  Stoke Newington
  London
  N16 7SX
  Tel: 0207 254 0077

- Lime
  Cornish Lime Ltd
  Brims Park
  Old Callywith Road
  Bodmin
  Cornwall
  PL31 2DZ
  Tel: 01208 79779
  Technical Data Sheet link - https://cornishlime.co.uk/products/lime-binders/lime-putty/

- Magic Sponges
  CIC Vileda Professional
  Vileda House
  2 Chichester Street
  Rochdale
  OL16 2AX
  Tel: 01706 759597

- Paraloid B72
  Kremer Pigmente GmbH & Co.KG
  Hauptstr. 41 – 47
  DE 88317
  Aichstetten
  Germany
  Tel: +49 7565 91448-0

75600 Dispersion K 500

Description
Aqueous emulsion of a thermoplastic, pure acrylic resin.

Storage
Keeps for 1 year if tightly closed, protected from frost and strong heat.

Product Properties

Solids content (DIN 53 189)	50 %
Actual viscosity at 20°C (Brookfield viscosimeter II/6)	1100 - 5000 mPa.s
Ionic character	non ionic
pH value (DIN 53 785)	9.5
Density	1.07 g/cm^3
Average particle diameter	~ 0.15 µm
Minimum film-forming temperature (MFT) (DIN 53 787)	~ 7°C

General Information

Film Properties (after air-drying, unpigmented)
Tensile test (DIN 53 455)
(cross-head speed: 100 mm/min)

Tensile strength	σ_R	~ 3 N/mm^2
Elongation at break	ε_R	~ 500%

Applications
Binders for the manufacture of weather-resistant, non-saponifiable and non-yellowing coatings.

Dispersion K 500 is suitable for the manufacture of abrasion-resistant interior paints, aqueous primers for absorbent substrates, synthetic resin-bound plasters, additives for hydraulic compounds and for the formulation of emulsion paints resistant to mineral oils.

Dispersion K 500 is particularly proven as a binder for high-quality coatings of aerated concrete.

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67400 Paraloid™ B-72

Solid Grade Thermoplastic Acrylic Resin

Summary

Paraloid™ B-72 is an excellent general purpose acrylic resin, supplied as a 100 % solid grade or as a 15 % solution.
It can be applied in either clear or pigmented coatings by a variety of application methods and can be air-dried or baked. Paraloid™ B-72 has a very low reactivity with sensitive phosphorescent and luminescent pigments. The durability and non-yellowing characteristics also make it valuable for use with these pigments.
Paraloid™ B-72 is compatible with other film forming materials such as vinyls, cellulosics, chlorinated rubbers, and silicones and can be used in combination with them to produce coatings with a wide variety of characteristics.

Paraloid™ B-72 is very resistant against water, alkalis, acids, oils and chemical fumes. The coverings are very elastic and adhere on many different surfaces, e.g. also on light metals.

Paraloid™ B-72 is unique in possessing a high tolerance for ethanol. The property allows its use in applications in which strong solvents cannot be tolerated. The alcohol dispersions may be cloudy or milky; however, clear, coherent films are formed.

Melting Point

Paraloid™ B-72 is an acrylic resin with a high molar mass, thus, it doesn´t have a defined melting point. It starts to melt at 70 - 75°C; the flowing point is at 145 - 150°C. TG: 40°C

Physical Properties

(Not to be used as specifications)

Physical form	Pellets
Bulk density, 25°C, lb/gal	9.6
Solubility parameter	9.3
Transition temperature, Tg, °C	40
Ultimate hardness of clear films, KHN	10 to 11
Chemical composition	EMA Copolymer

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Solubility of PARALOID™-Acrylic Thermoplastic Resins

(Values given are Viscosity, cps, at 25°C of a 40% solids solution, except as noted)

Solvents	PARALOID™ Types				
	B-44 No. 67460	**B-66** No. 67480	**B-67** No. 67420	**B-72** No. 67400	**B-82** No. 67440
Alkohols					
2B Alcohol	-[c]	-[c]	-[c]	Dc	PScd
Isopropanol	-	-	2 800	-	-
n-Butanol	-	94[e]	2 500	130[e]	-
Isobutanol	-	5 600[fg]	3 200	-	-
n-Amyl alcohol	-	-	3 200	-	-
Diacetone alcohol	10 000	6 200	2 300	3 500	3 000
Chlorinated Hydrocarbons					
Methylene chloride	2 700	850	520	960	1 200
Carbon tetrachloride	860[g]	280[e]	20 000	280[e]	6 000[f]
Ethylene dichloride	5 500	1 200	640	1 300	1 800
Trichloroethylene	12 000	7 200	2 100	4 800	3 400
Esters					
Ethyl acetate	1 800	940	240	500	610
n-Propyl acetate	1 800	570	180	550[g]	580
n-Butyl acetate	2 600	875	250	700	630
Isobutyl acetate	3 100	960	240	660[g]	700
Amyl acetate	5 600	1 110	320	850	980
1-Ethyl hexyl acetate	-	6 900	770	-	-
Ethers					
Dioxane	5 600	880	830	1 300	1 700

c. Code for used letters: - = Insoluble; D = Dispersed; PS = Partially soluble
d. Results when using pure 2B alcohol. Paraloid™ B-82 is soluble in different alcohol/water-mixtures.
e. Viscosity determined at 20 % solids.
f. Viscosity determined at 30 % solids.
g. Hazy solution.

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Head Office

Laughton, Sleaford,

Lincolnshire NG340HE

Tel: 01529 497449

Fax: 01529 497518

hirst@hirst-conesrvation.com