

# THE PERRY LITHGOW PARTNERSHIP

CONSERVATORS OF WALL PAINTINGS AND POLYCHROME DECORATION

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**PETERBOROUGH CATHEDRAL: THE NAVE CEILING**

**PHASE 2: ROWS 28 - 35**

**CONDITION SURVEY AND CONSERVATION TREATMENT**

**MAY - JULY 1999**

**VOLUME II PLATES**



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### 1. NAVE CEILING

**Plate 1** Nave Ceiling during conservation, showing the scaffolding in place for Bays 2 and 3.

### 2. THE CEILING STRUCTURE

#### TECHNICAL SURVEY:

#### THE ORIGINAL CEILING STRUCTURE, UPPER SIDE

**Plates 2 to 25** Upper side of the ceiling before treatment. **Plates 2-7** show *Panel I* in bays 35, 34, 33, 32, 31, 30, 29, and 28; **Plates 8-13** show *Panel II* in bays 35, 34, 33, 32, 31, 30, 29, and 28; **Plates 14-19** show *Panel III* in bays 35, 34, 33, 32, 31, 30, 29, and 28; **Plates 20-25** show *Panel IV* in bays 35, 34, 33, 32, 31, 30, 29, and 28.

#### Noggins

**Plate 26** Panel noggin in *Panel 34 II*. This noggin, or the bird's beak joint for it, first appears to the west of Joist 9 in *Panels II* and *III*, and is found in all subsequent bays in this phase of work.

**Plate 27** Birds beak joint for a panel noggin in *Panel 31 II* on the west side of Joist 18.

#### ROOF RAFTERS

**Plate 28** An oak rafter on the south side above *Panel 31 IV* with an ancient halving joint.

#### Lower Ends of Sloping Ceiling Joists

**Plates 29 to 33** Probable original joints at joist ends to original roof structure. **Plate 29** - south end Joist 19. **Plates 30, 31, 32** - south end Joist 12. **Plate 33** - south end Joist 9.

#### THE ORIGINAL CEILING STRUCTURE, LOWER SIDE

**Plates 34 to 35** These show the oak dowels linking adjoining boards in the base boards; **Plate 34** shows the dowels in the open joint in *Panel 35 III*; **Plate 35** shows one half of a dowel exposed in *Panel 29 II* where the top surface of one of the boards has broken away to reveal the dowel.

**Plates 36 to 39** **Plates 36 to 38** show geometric shapes made with scribes or compasses (see the centre point to the lower circle in **Plate 38**). **Plate 39** shows three freehand scratch marks crossing two boards.

**Plate 40** Shows a sample board of new oak grooved with a plough plane using a single plough with a single blade which was moved twice to cut the two inner grooves. Even the length of time taken to groove one board was a matter of minutes.

**Plate 41** Shows a situation where two nails have been driven overlapping each other.

**Plate 42** Shows a nail driven very close to the edge of a square edged board where the head of the nail has been clenched over to follow the line of the board. This would seem to indicate an importance attached to not deforming the edges of boards.

#### 1740's / 1830's RESTORATION

**Plate 43** Context shot *Panels 33* and *34 IV*.

- Plates 44 to 46** Show the inside face of the inner parapet wall and the space between this wall and the ashlar boarding. This space is divided at regular intervals by stone plinths built to carry the cast iron shoes for the principle rafters. **Plate 46** clearly shows the rear face of the ashlar boarding covered with hessian as for the rest of the ceiling.
- Plate 47** Shows where the cast iron shoe interrupts a ceiling joist, how the joist was cut back to sit on the top of the stone plinth.
- Plate 48 to 50** These plates show typical ashlar posts and their fixings to adjoining sloping joists. **Plate 49** shows one of the situations where the ashlar post has been cut off and has no link with the joist above at all.
- Plate 51** This is a detail looking up at the end grain of the sloping joist seen in **Plate 48**.
- Plate 52** This shows fragments of wood buried in the floor of the space between the ashlar boarding and the inner parapet wall. The fragments of wood were not disturbed and could either be remnants of a wall plate or merely pieces of decayed wood, which have got buried in the rubble and dirt in this area.
- Plates 53 to 76** **Plates 53/54, 55/56, 57/58, 59/60, 61/62, 63/64** show the junction of the flat ceiling with the sloping ceiling on the north side. **Plates 65/66, 67/68, 69/70, 71/ 72, 73/74, 75/76** show the same junction on the south side on the ceiling. Each pair of photographs consists of one taken from directly above and one at an oblique angle. These photographs clearly show the 1926 repairs where composite joists join onto the original (see for example **Plates 63, 64** - the joist in the foreground, and **Plates 67, 68** - the centre joist). These should be compared with much more typical 1830's repair. (See **Plates 71, 72** the upper joist, where the joint has been savagely cut apart and either not made good or repaired with fragments of timber nailed haphazardly).
- Plate 77** This shows a typical 1830's repair to Joist 17 at the south end, and what is of particular interest is that the upper end of the sloping joist has been nailed to the new truss tie beam.
- Plate 78** This shows a dovetail in the south end Joist 13 which is thought to be associated with earlier roof repairs and the hanging of this joist from the roof structure above.
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- Plate 82** This shows the three main types of nail used throughout the ceiling. That on the left being the original, the other two being added nails identified so far. That in the centre is what we have called a "domed" headed nail and that on the right, the "lost" headed nail. The two added nails are distinguished by the flat rectangular shank with the spear type end to the domed headed, and the much more longly even tapered shank of the lost headed nail. We have called the lost head by this name, as the head is quite small and often the nail was driven right home so that the head is actually level or below the level of the wood into which it has been driven.
- Plate 83** This shows a domed headed nail that has been driven up from beneath and clenched over above at the junction of two boards.
- Plate 84** This is a good example of both types of added nail which have been driven down from above. The one in the upper part of the Plate is a domed headed nail, which is the flat nail with the spear type end, and in the lower part of the photograph is a lost headed nail with the long thin tapered shank.

- Plate 85** All three types of nail head. On the left hand side are two dome headed nails, on the right hand side of the Plate, the upper nail is a lost headed nail, and the lower is an original nail.
- Plate 86** This looks to be like a lost headed nail which has dropped and is assumed to have been originally driven through a patch above, but when this was taken out, the nail survived and the depth of the shank before it clenches over, would have been the thickness of the patch.
- Miscellaneous**
- Plate 87** A fragment of slate tucked between two boards and must have been pushed there when the roof was repaired in the 1830's.
- Plate 88** This shows a series of holes cut in boards. At the present time there seems to be no pattern for these holes.
- Plate 89** A good example of an original board that has been moved, as no grooved boards were used for the figurative panels. Here is an example of a grooved board that has been moved and is now painted with foliage.
- Plate 90** This shows a tongue and grooved ashlar board, which has been replaced in the ceiling in *Panel 31 I*.
- Plate 91** An original board with a scarf which is now revealed as the adjoining board has been pushed underneath. Interestingly this repair would seem to be 1740's as there is an empty nail hole from a domed headed nail in the face of the exposed scarf. The much smaller hole for the original nail from the upper part of the scarf can be seen on the right hand side.
- Plate 92** This shows a series of semicircular indentations, these are most likely to have been made from the ball of a hammer driven into the face of the board to locate it into its present position.
- Plate 93** Gun shot damage. It would seem that the centre board which has the damage has been inserted into this position since the shot was fired as both adjacent boards are completely unmarked.
- Plates 94-96** These plates show foundry marks on the shafts of the bolts and on the face of the washer.
- Plate 97-98** The marks here would have been made by the washers when the bolts were originally being tightened. It would seem that in these two instances there was no one below to hold the bolts steady as the man above was tightening the nuts, so he has actually turned the whole bolt around causing the washers to dig into the wood.
- Plate 99** Cathy Groves of Sheffield University is seen here testing edges of boards at eaves level for suitability for sampling for analysing the species of timber.
- 1926 Repairs**
- Plate 100** This shows the two methods for supporting the upper binders from the roof structure, in the foreground a wrought iron hanger can be seen bolted to the side of the double truss. One bay further back, a block can be seen as being nailed to the face of the principle rafter over which the binder has been notched.
- Plate 101** The Type 3 noggin where the triangular piece is supported on top of a lamination cut to the same width (see **Drawing 8**).

- Plate 102** Shows the Type 3 design in conjunction with a laminated joist, here the triangular piece can be seen to run over the bottom laminates of the joist and it will in fact be continuous on either side of the joist (see **Drawing 8**).
- Plate 103** Shows an angled board as a supporting piece on the side of the joist which has been carefully notched over the individual boards (see **Drawing 7**). This photo is also of interest in showing that the upper binder is held by an iron hanger and the lower binder is notched over wooden blocks.
- Plate 104** Shows an angled board fixed to a noggin which has been carefully shaped to the profile of the boards beneath (see **Drawing 7**). As this is on a sloping panel, maybe this was made as a step.
- Plate 105** Here can be seen a rather crude attempt at linking two adjoining panel noggins across a laminated joist. It would seem that after fixing the three flat laminates over the ceiling boards, a galvanised strap was fixed to the ends of the noggins and passed over the flat laminates. The joist was then built up over the strap. This would seem to indicate that it was thought important to maintain the continuity of the link of the two noggins across these two panels.
- Plate 106** This plate is interesting because the screws have been inserted through the hessian so they can be seen. It shows that the purpose of the screws was to fix adjoining boards together because the screws run adjacent to the edges of the boards.
- Plate 107-110** **Plates 109** and **110** show in detail a slither of wood already with its own covering of hessian. This piece was pushed into the gap between two adjacent boards as can be seen in **Plate 107**, the gap is clearly seen after the slither had been withdrawn in **Plate 108**. **Plate 110** shows the slither of wood repositioned after treatment.
- Plate 111** Hessian was **taken** up in this area as a sample for testing by UMIST. When it was taken up, a further layer of hessian was revealed beneath which was already very dirty.
- Plate 112** Patches of hessian were found in this phase of works glued over the general covering of hessian. This is an example of a small patch. In other parts of the ceiling larger patches seem to have been applied, see **Plate 12**.
- Plate 113** This is the same example as shown in **Plate 112** after taking the patch off. There is no evidence of major tear or loss of the original hessian to necessitate the patch except for the little cut in the hessian towards its upper edge (in this plate). What will also be seen is the black deposit, just above where the patch had been. Whether this is associated with the cut in the hessian and the subsequent patch I cannot say. If the patch was meant to be placed over this cut, then it hasn't been placed very well. The darkened area around the patch is not noticeable under ordinary lighting, and has only become noticeable in the photograph taken with flash. One assumes is the extra layer of glue applied before the patch was applied.
- Plate 114** Graphic X shows areas where strips of canvas have been glued over the hessian. This plate shows some of these strips which in addition have traces of lettering, from some previous notice printed on the material. A sample was carefully detached to see why these patches had been applied, but in this case there seemed to be no fault with the hessian beneath and therefore no reason for the patch.
- CONDITION
- Plate 115** Here is a good example of cross checking caused by fungal decay in the grooved board without the nail in it.
- Plate 116** Is an example board showing very minor signs of surface fungal decay and cross checking.

**Plate 117** This plate shows typical splitting in both the original boards and the replacement boards. In the oak boards the splits all pass through nails and in the softwood board the nail is obviously what is restraining the left hand part of the board so that the right hand part has split away although the split has not gone right through the centre of the nail hole. I would suggest that all these splits have been caused by subsequent shrinkage, and are not splits from when the boards were first nailed into position. Part of the evidence for this is that other nails close to the edges of the original boards have not split the boards.

**Plate 118-119** These two plates show the effect of nail heads on the subsequent appearance of the surface of the timber. In **Plate 118** a deeply striated surface is minimised beneath the nail head, and in **Plate 119**, the segment of wood in the band of the grooved board that would have been raised is now only raised where it was protected by the nail head. The timber on either side has reduced in height.

#### 1999 PHASE II REPAIRS

**Plates 120-123** This sequence shows the repair of an area of an original board which had been seriously broken out from above with large fragments of wood pushed downwards but luckily still attached. **Plate 121**, shows the fragments of wood in their existing positions protected by tissue. **Plate 122** shows a prop in position with softening to hold the fragments whilst the glue was curing. **Plate 123** shows the same area after repair.

**Plates 124-127** In **Plate 124**, Cameron Stewart is seen preparing to undo a hanging bolt assisted on the left by Bob Chappell. **Plate 125**, shows Bob Chappell stopping the bolt from twisting using the walky-talky to keep in touch with his colleague above who is loosening the bolt. In **Plate 124**, the joist carrier can be seen in position clamped to the joist from which the hanging bolt is about to be taken out. **Plate 126**, shows Bob Chappell carefully passing up a temporary bolt having taken out the original bolt and **Plate 127** shows an original hanging bolt back in position with Plastazote packer beneath the washer.

**Plate 128** Shows the centre of the ceiling with the walkway taken out and the joist carrier in position having just exchanged a number of original bolts for temporary ones.

**Plate 129-130** **Plate 129**, is an example of a screw that has pushed down a sliver of wood from the edge of a board. **Plate 130**, shows the same situation after the screw has been withdrawn.

**Plate 131-134** This sequence shows the system for locating and extracting screws which have penetrated below the underside of the ceiling. In **Plate 131**, Bob Chappell is locating a screw with a circuit tester which has a built-in bulb so that as soon as the screw which is already attached to the other end of the circuit with a crocodile clip is touched by the probe, the bulb lights up indicating that the correct screw has been located. **Plate 132**, Clare Cully is helping to locate screws by measuring from existing ones that have already been located. In **Plate 133**, Bob Chappell is extracting the screw that has been identified, and **Plate 134** shows the old screw placed on the hessian next to the new screw to be inserted, and the circuit breaker and the metal detector used to locate the screws.

**Plates 135-137** These plates show typical stainless steel fastenings used to repair the ceiling boards. In **Plate 135**, the left-hand softwood board has been attached with two stainless steel angles and two screws with washers all of which have been touched in on completion of work. In **Plate 136**, a single stainless steel angle can be seen through the hole in the original board before retouching. The white strip halfway up on the left-hand side of the same board is a piece of tape to hold a splinter in position whilst the glue cures. **Plate 137**, shows two stainless steel screws and washers in position before retouching.

**Plates 138-139** **Plate 138** shows stainless steel screws replacing old steel screws and a single angle with nuts and washer can be seen above the hessian. **Plate 139** shows where the upper surface of the board was unreliable, so the stainless steel angle has been located through a softwood wedge and bolted above this.

- Plate 140** Shows Jonathan Porter taking out steel screws from 1926 noggins and exchanging these for stainless steel. These screws did not penetrate through to the underside of the ceiling but were exchanged merely as good practise to reduce the overall number of steel screws in the structure.
- Plates 141-142** Show two softwood patches where large numbers of steel screws were exchanged for stainless steel before they were covered with sail cloth.
- Plate 143** Shows patches of sail cloth being attached.
- Plate 144** Shows completed areas where screws have been extracted and exchanged for stainless steel and subsequently covered with sail cloth patches.
- Plate 145** Shows a typical splinter in a softwood board after the screw has been extracted but before the splinter has been refixed.
- Plate 146** A splinter has been refixed in the black area in the board in the centre of the photograph.
- Plate 147** Paraloid based fillers have been placed in edges of boards which have been previously consolidated with Paraloid B72. These areas were subsequently retouched
- Plates 148-154** This shows the various stages in making good the patch in this part of the ceiling. Note that the boards have been purposely cut to leave the thickness of a saw cut between the new and original boards. Note also how the boards have been fixed with stainless steel screws from both below and above. **Plate 150** shows Bob Chappell planing down one of the boards during preparation. **Plate 154** shows the completed repair.
- Plates 155-157** These show the sequence of repair and making and retouching a new patch.
- Plates 158-160** These show an area where two patches were required one in the base board and one in the board below that with the scarf. **Plate 158** shows the situation before repair and **159** shows the two patches in position and **160** after retouching. Note that the board with the scarf was not repaired as the hessian above it could be retouched so that the overall pattern was not in anyway altered by the loss of timber.

### 3. THE PAINTED DECORATION

#### CONDITION SURVEY AND TREATMENT RECORD

- Plates 162 to 321** Sections of the Ceiling structure lower side and painted decoration in before and after treatment sequence. Refer to Plate Reference Sheets for locations.
- Plates 322 to 337** Sections of the Ashlar boards and painted decoration in before and after treatment sequence. Refer to Plate Reference Sheets for locations.
- Plates 338 to 377** The ten full figurative lozenges and four half lozenges within Bays 2 and 3 in before and after treatment sequence. All ultra-violet (UV) illumination photographs taken before treatment. Refer to Plate Reference Sheets for locations.
- Plates 378 to 381** Details of two figurative lozenges before treatment under incidental light UV illumination: the monkey holding an owl while riding backwards on a goat (**Plates 378/79**) and the dragon (**Plates 380/81**). This dragon has been found to be a 1740s invention. Underpaint visible in raking light indicates the original scheme had a Renard occupying only one quarter (*33 III*) of the lozenge. Not enough low relief underpaint survives within the other three-quarters of this lozenge to suggest the original subject.

#### VISIBLE UNDERPAINT



**Plates 382 to 399** Examples of the original scheme visible in raking light beneath the 1740s and 1830s overpaint. **Plates 382, 389** show variations in the trefoil shape and end scroll design on different boards. **Plate 382** is an illustration of why the theory that these relief details were created by shallow carving is questionable. The prominent medullary rays are level with the raised trefoil shape. This suggests the softer wood between the rays has receded through decay where it was not protected by a paint layer. It is inconceivable that a carver would have only carved the lower ground between the medullary rays. **Plate 384** depicts a re-used original ceiling board with the 'bent over' trefoil design facing the wrong way joined to an original board with the more conventional trefoil design. **Plate 385** shows an additional feature to the decorative scheme, which has only become evident during Phase 2. The centre of some trefoils is embellished by a raised dot. The dots have a grainy texture and surface microflaking. Although at first thought to be part of the original design, sample analysis indicates they are an 1830s addition<sup>1</sup>. **Plates 386-389** depicts differing examples of the end scroll design. **Plate 390-391** show respectively red and white paint apparently protected by original nail heads (now missing). These examples suggest: (a) this paint survives from the original C13th scheme; (b) the original painted design on the grooved boards – was similar to the coloured bands boards; (c) being under original nails the grooves must have been painted before the board was fixed in place. No paint was detected on a sample taken from the 'white' groove; the red paint is a mixture of red and white lead applied directly over the wood<sup>2</sup>. **Plates 392-395** depict original wave, bun and stepped chevron patterns underlying the 1740s and 1830s overpaint – (the coloured bands board underpainted with stepped chevron pattern shown in Plate 395 is a re-positioned board. These original patterns are all linear in design. **Plates 396-399** show original underpaint on foliate and figurative lozenge boards. **Plates 396, 398, 399** indicate that the 1740's restorer generally followed closely the original foliate and figurative designs: the lozenge detailed in **Plate 397** being the sole exception identified to date. Here raking light defines the head and neck of a fox in low relief beneath overpaint. The fox occupies only one quarter of the lozenge. This image also illustrates the way the wood surface of the background has decayed: the softer part of the growth rings being more affected and thus resulting in a ridged surface.

#### 1740S/1830S REPAINTING

**Plates 400 to 405** Examples of the paint layer exposed from under temporally removed 1830s Ceiling bolts and washers. The 1740s paint has been protected from subsequent overpaint and surface accretions. These examples indicate the condition of the painted decoration immediately prior to the 1830s intervention and provide visible confirmation of the analysis findings and our interpretation of the conservation history. The patch of red paint revealed in **Plate 400** has been identified through analysis as belonging to the 1830s restoration.<sup>3</sup> **Plate 401 and 402** show the Prussian blue, 1830s paint overlying the gritty textured, olive green copper bearing pigment of the 1740s. **Plates 403-405** as well as showing the exposed 1740's paint illustrates the extent of discoloration resulting from surface accretions since the 1830s. In **Plate 405** it is just possible to see a bright white edge of the 1830s white lead background overpaint where it had been brushed under the rim of a ceiling bolt washer.

**Plates 406 to 409** Details of visible underpaint on replacement or displaced boards. **Plates 406 and 407** show crudely painted key pattern design on softwood boards. Very few examples of this carelessly applied underpaint on softwood boards exist in Bays 1 – 3. No paint samples have been obtained from these examples but the type of board and the quality of the underpaint point to an 1830s date. In **Plate 408** the coloured bands design shows faintly through the white background paint also on a softwood board is thought to be 1830s. This board has a characteristic general bloom, which has the appearance of a coating of white dusty material noticeable on many of the 1830s replacement boards. **Plate 409** shows linear stepped chevron underpaint on a replacement oak board. In **Plate 410** two layers of

<sup>1</sup> *Peterborough Cathedral Nave Ceiling Paintings: Scientific Examination Phase 2* Dr Ioanna Kakoulli, December 1999. Sample 8 (pls. 18-20).

<sup>2</sup> Kakoulli 1999: Samples 26 and 57

<sup>3</sup> Kakoulli 1999: Samples 22

wave pattern are visible on the slightly displaced original board. This finding is an anomaly and calls into question the hypothesis that the wave pattern boards were not overpainted in the 1740s intervention. Paint samples were not obtained from this board so we cannot rule out the possibility that this underpaint dates from the 1740s intervention. However, sample analysis has identified one example of an original wave pattern board with two layers of 1830s decoration<sup>4</sup> and this may be another instance.

**Plate 411** The grey chevron board is a 1740s softwood replacement. It is exceptional for having a curved edge and because the grey chevron design was not overpainted in the 1830s. From Row 34 westwards the 1730s 'leaf' or V shaped embellishment (detailed as impasto underpaint in Plate 429) has been replaced by the 1830s white dashes (see also Plate 429 and 430).

**Plates 412 to 417** A series of three details photographed in incidental light and UV illumination showing how UV light enhances the difference between the restorations. The 1830s white paint appears as a brown wash in Plates 413 and 417. In Plate 415 the 1830s red paint appears much lighter than the 1740s red under UV illumination.

**Plate 418** Analysis of the bright blue-green paint surrounding the empty nail hole was inconclusive<sup>5</sup>. The 1830s restorers may have applied it when the original nail was removed.

**Plate 419** An unpainted scalf joint. It is not clear why this joint was left unpainted.

**Plate 420** An 1830s softwood replacement board with a thin reddish-brown setting out line. Such setting out lines appear to have been used for lining up painted decoration in the few instances where one wide replacement board has been used to replace more than one original board. These lines were not noted in Bay 1. The paint on this obviously 1830s softwood boards has a characteristic milky or silvery surface sheen. Analysis indicates this is a thin pale coating as yet unidentified. It does not respond to surface cleaning with Wishab sponges.

**Plate 420** also depicts loosely adhering dust found where drafts have deposited material. This happens where there are gaps or voids in the ceiling allowing air movement between the nave and the roof space above before the hessian was applied in 1926.

#### BLACK PAINTS & SURFACE ACCRETIONS

**Plates 421 to 423** During this phase close attention was paid to the wide variety of black paints employed by the 1740s and 1830s restorers. It was apparent that different shades of black had been used intentionally to decorate different patterns in the lozenge border pattern sequence. Paint sample analysis has identified three black paints belonging to the 1740s scheme and four belonging to the 1830s restoration. **Plate 421** depicts: a key pattern board with 1740s brown/black strengthened with a lustrous black layer with red and yellow inclusions; a wave pattern board with what appears to be a dense 1830s black overpainted with a varnish coating with some black pigment inclusions; a stepped chevron board with 1740s brown/black strengthened with a lustrous black layer with red and yellow inclusions. As an illustration of the seemingly arbitrary way in which the 1830s restorers worked, **Plate 422** shows the same sequence of boards with the 1740s brown/black key pattern not overpainted, the wave pattern with only the dense, matt black 1830s layer and the stepped chevron pattern overpainted as in the previous photograph. **Plate 423** is a detail of a stepped chevron with the 1740s brown/black overpainted, in this instance, with the 1830s brownish matrix of brown and yellow iron oxide particles combined with brilliant yellow and black. Generally, it is mainly the stepped edges that are strengthened, rarely is the whole pattern overpainted.

<sup>4</sup> *Peterborough Cathedral, nave ceiling: Scientific examination of the original decoration of Bays 36-39 H.* Howard September 1998. Sample 19

<sup>5</sup> Kakoulli 1999: Sample 28

- Plates 424 to 427** **Plate 424** shows under raking light very characteristic efflorescence like a drawn chalk line only found on boards decorated with the wave border pattern. The chalk line follows the shape of the decoration, and occurs in the off white colour. **Plate 424** also illustrates microflaking of the deep, velvety black paint of the wave pattern. This type of damage is associated only with this type of black paint and occurs only on the wave pattern. Visual examination suggests that the microflaking has occurred where there is a single layer of paint and no preparation layer. Samples obtained of this type of black paint (but without microflaking) had a more than one layer of paint<sup>6</sup>. **Plate 425** shows a detail of wave pattern with apparently a layer of microflaking, black paint directly over the wood: this layer is partly covered by a varnish coating with some black pigment inclusions. Plates 426, 427 were taken with raking light pointing towards the camera to enhance the surface shine produced by the varnish coating with some black pigment inclusions. The brush strokes demonstrate that it is a separate layer unlike the thick resinous black paint/ coating associated with patchy white surface accretions shown in **Plates 428, 430**.
- Plates 428, 431** The patchy white surface accretions associated with the thick resinous black paint/ coating remain unidentified. These were considered to be some form of microbiological growth (MBG) but analysis by Dr Brian Ridout<sup>7</sup> indicates they are accumulations of irregularly shaped translucent, plate-like crystals.
- Plates 432** Detail of paint shrinkage cracks associated exclusively but only very rarely with 1830s black paint on softwood replacement boards.
- Plates 433 to 434** In addition to the with patchy white surface accretions, initially considered to be MBG, Ridout was asked to sample and analyse three other categories of surface accretion. Only the tendril deposits (**Plate 433**), which resemble miniature spider web, joining larger elements together, may have originated through microbiological action: some collapsed strand material was found. The other categories - brown spots and brown blotches (**Plate 434**) – are described by Ridout as of irregularly shaped translucent granules. These accretions are widespread across the Ceiling.

#### REPLACEMENT BOARDS WITH FRIEZE DECORATION UNDERPAINT

- Plates 435 to 438** Examples of softwood replacement boards, which have as underpainting the bold on the Ashlar boards. **Plates 436 to 438** are details of a board that appears to have the 1740s composite black paint covering the floral scheme. A paint sample has been obtained from this board and will be analysed during Phase 3. The analysis will concentrate on identifying barytes as a component of the white background paint. If barytes were not present it would add weight to the current theory that these replacement softwood ceiling boards with the frieze decoration as underpaint were inserted during the 1740s restoration.

#### 1880s REBUILDING OF THE TOWER & GRAFFITI

- Plates 439 to 445** Findings during this phase suggest that the nave was screened off during the rebuilding of the tower in the 1880s. **Plates 439 and 440**, taken before surface cleaning, show a band of thick dirt across the ceiling boards in Bay 2, Row 32. This coincides with vertical strips of masking tape adhered to the north and south Ashlar boards (**Plates 441 and 442**). **Plates 443 and 445** show the strip of masking tape on the north side being removed - the tape was wetted to soften the adhesive – and the residual adhesive following removal of the tape. The residue was later removed using damp swabs. **Plate 445** shows fragments of the tape after removal.
- Plate 446** Detail of graffiti written in pencil onto a ceiling board immediately to the east of the dirt band on *Panel 33/II*. The graffiti reads ‘*Wm George Higgs January 16 1883*’. No graffiti was found to the west of the dirt band on the ceiling boards; although on the Ashlar boards in Bays 1, 2 and 3 there are a number of examples dated 1890. This graffiti on the Ashlar boards records that limewash was scraped from the nave walls during 1990. As no

<sup>6</sup> Kakoulli 1999: Samples 45 and 46

<sup>7</sup> Dr B Ridout. Unpublished letter to J Limentani, 16 June 1999.

1990s graffiti exists above the frieze it is likely that the workers did not have access to the ceiling boards at that time. By intention the examples of pencilled graffiti were not removed during surface cleaning.

#### ASHLAR BOARDS

**Plates 447 to 456** A series of details photographed in incidental light and UV illumination showing the underpaint that exists on the north and south Ashlar boards from Row 34 westwards. This first scheme is significantly different from the overpainted design. We are now certain that the Ashlar boards and the visible frieze decoration date from the 1830s. One theory to explain the existence of the underpainting in Bays 1 and 2 is that this initial design did not meet with approval. Having begun work at the east end the painters were required to start afresh.

**Plate 457** Detail of a small section of Ashlar board immediately above wall plate level showing an area of exposed pink underpaint. This pink underpaint is not overall but exists sporadically in small areas beneath the 1830s scheme on both the Ashlar and ceiling boards.

**Plate 458** Detail showing fragments of red and blue-green paint found immediately below the wallplate on a stone arch moulding of the north wall in Bay 2. The scheme was on limewash covering the stone. It must have been scraped from the walls in 1890.

#### WATER DAMAGE AND STAINING

**Plates 459 to 466** Sections of the Ashlar boards within Bays 2 and 3 had been considerably affected by water infiltration. **Plates 459 and 460** show an area of water damaged frieze decoration before treatment in incidental light and UV illumination. **Plates 461 - 466** depict areas during and after treatment to remove water stains. The treatment process involves surface cleaning with Wishab sponges, removal of the stains by localised swabbing with deionised water and finally, toning out with water-colour paint the 'blanched' or 'cleaner' areas of decoration resulting from the stain removal.

**Plate 467 to 475** There are a number of different categories of staining, all resulting from liquid material penetrating down between the boards or through cracks in deteriorated boards. **Plate 467** depicts an example of a stain from a clear liquid that has penetrated a replacement board. This category of stains resembles paint saturation: they are not overly distracting and therefore were not treated. The same image depicts staining of the paint over a knot in the wood. This is found on softwood boards only and is sometimes accompanied by resin drips from the knot. **Plates 468-470 (UV)** show a dark stain over the 1830s repaint before and after reduction: acetone was the solvent used. Analysis of a sample from a similar stain in Bay 1 indicated the presence of shellac in the stain material.<sup>8</sup> It is likely a preservative material used to coat roof timbers caused the stain. **Plates 471 and 472** shows a large lighter brown stain before and after reduction. **Plate 473** shows the same area during toning down of 'blanching'. The brown stain shown in **Plate 345** has come through the thickness of the paint. **Plates 474 and 475 (UV)** show characteristic light-brown drips on the edge of an original board. These are prevalent across Bays 1, 2 and 3. The material having dripped through holes and splits in the boards and around boards edges.

#### SURFACE GLUE

**Plates 476 & 477** Details showing typical damage caused by thick glue drips over the paint surface before treatment. The water-soluble animal glue was used to adhere hessian to the Ceiling boards upper side during the 1926 intervention. The liquid penetrated between the boards, accumulating on the horizontal board edges and in places running across the surface of the Ashlar boards and canted ceiling boards. In these examples the thick glue has contracted and detached from the surface pulling away the underlying paint.

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<sup>8</sup> Howard 1998: Sample 11

**Plates 478- 489** A series of photographs before treatment in incidental light and. Ultra-violet light is particularly helpful when checking for glue residue during the treatment process. These photographs illustrate how the glue has run across the canted panels and Ashlar boards (**Plates 479, 481, 483 and 485**) whereas on the horizontal boards it has accumulated on the edges. **Plates 488, 490 and 491** show glue drips on a curved-edged horizontal board before treatment, after surface cleaning and glue removal and after toning in of the blanched areas. Attempts to re-adhere the paint detached as a result of overlying glue contraction are not always successful. **Plate 482** depicts an example of what we describe as adulterated glue. Glue drips with a sugary/crusty texture, possibly resulting from the glue having been altered by the action of another chemical.

**Plates 492 & 493** Show an example, before and after treatment, of a thin glue film across the surface of a board.

**Plate 494** A photograph in UV illumination illustrating the extent of glue penetration through the gaps between ceiling boards.

#### FLAKING PAINT

**Plates 495 to 498** Typical example in raking light of paint 'delamination' usually associated with the thick, 1740s compound black layer on stepped chevron and grey chevron and base boards. **Plate 498** shows an area of such damage on a base board being re-adhered with the aid of a heated spatula after the consolidant had been injected behind the flakes.

#### PAINT RE-ATTACHMENT

**Plates 499 & 502** Reattachment of flaking paint on metal fixings. **Plates 499, 500** show a typical example of corrosion on a ceiling bolt and washer with associated paint loss and flaking, before and after treatment. **Plates 501, 502** details of flaking paint on nail head with raking light during and after treatment. The flaking paint is infused with two applications of Paraloid B72 (10% in acetone); once the solvent had evaporated a localised heat source (Preservation Pencil) was applied to the flakes relaxing them sufficiently and enabling them to be pressed back into place with a small spatula.

#### SURFACE CLEANING

**Plate 503 to 510** Sections of the Ceiling decoration during surface cleaning using Wishab sponges. This method of cleaning without the use of solvents achieves a uniform and acceptable cleaning level without causing the paint surface to shine.

#### DISGUISE OF WOOD LOSS

**Plate 511** An area of wood loss revealing the hessian backing. The light brown hessian colour was noticeable from ground level so has been disguised with black acrylic paint.

#### ENVIRONMENTAL MONITORING

**Plate 512** A surface temperature probe attached to the panel 33 III. This has been left in place to record the effect of solar radiation on the back of the ceiling from the roof lights<sup>9</sup>.

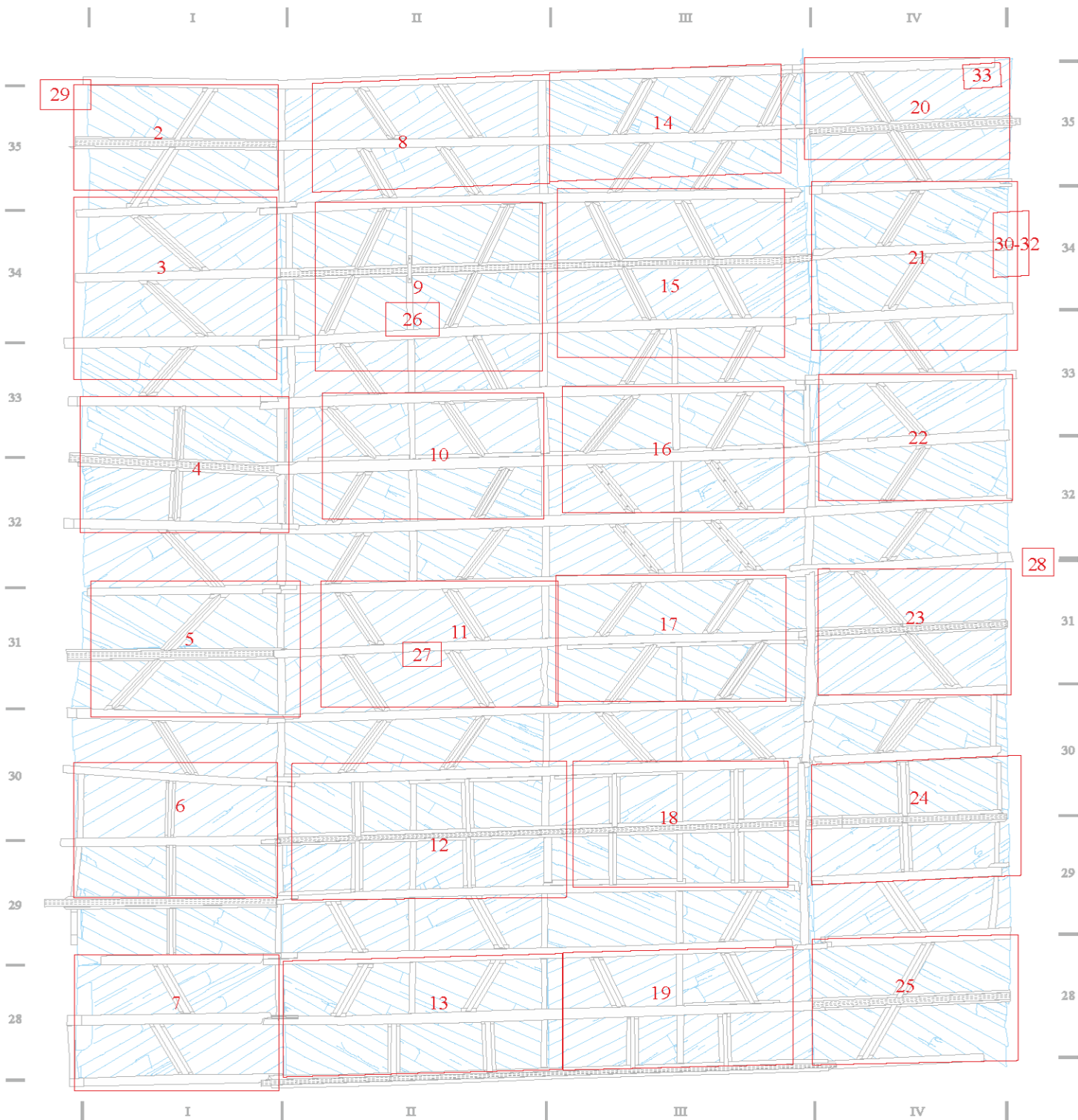
#### STRUCTURE

**Plate 513** Shows the slither of wood depicted in **Plates 107 and 108** repositioned after treatment.

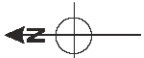

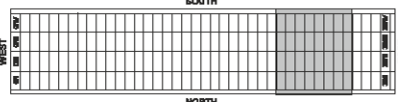
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<sup>9</sup> *Peterborough Cathedral: Environmental Monitoring of the Nave Ceiling. March 1998 – January 2000. Preliminary Report.* Tobit Curteis Associates. (Page 4).

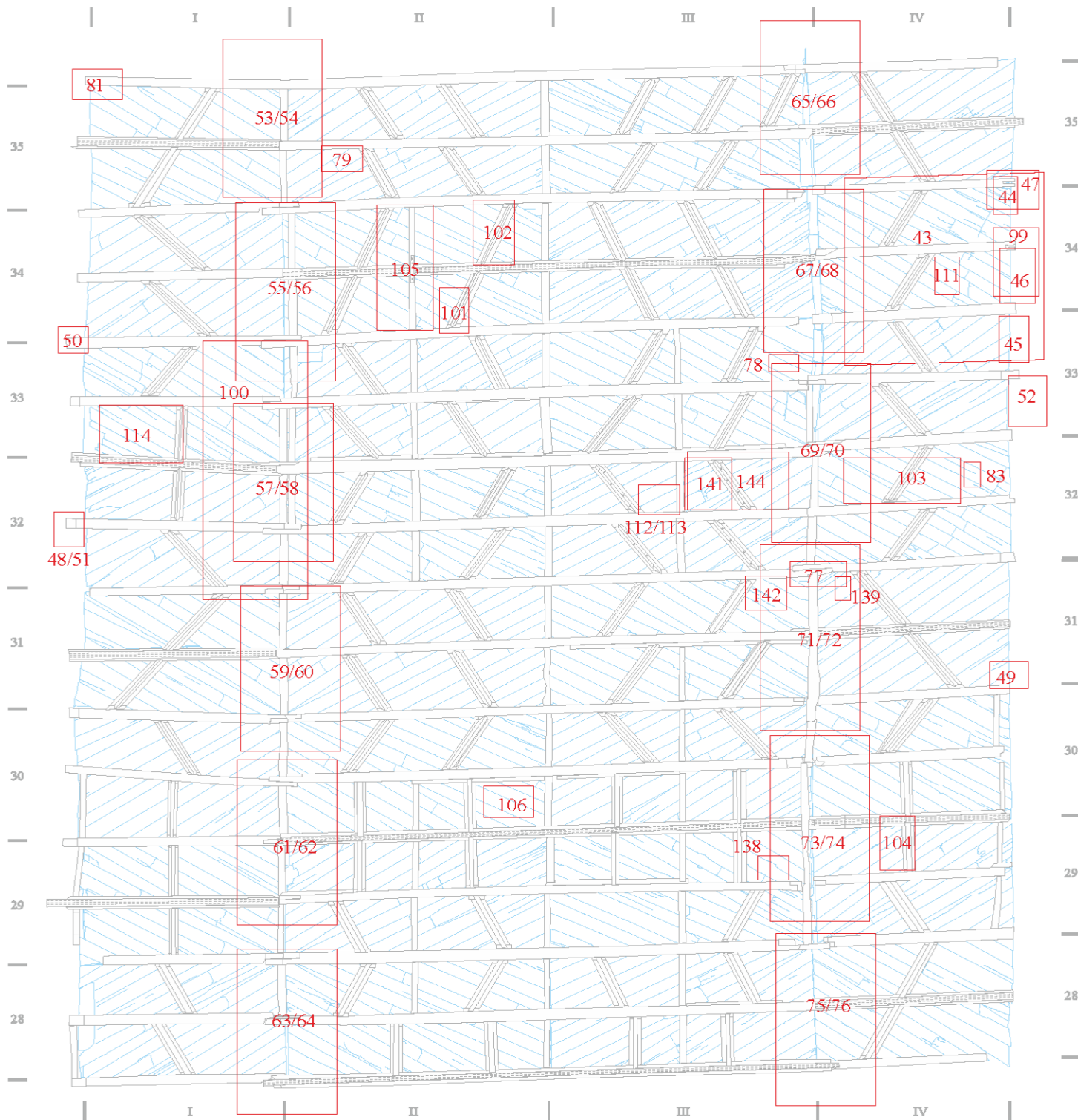
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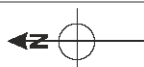
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# EAST



# WEST

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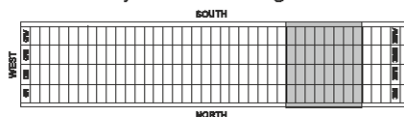
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Location of Plates: 43-144

SCALE  
c. 1:70



POSITION Bays 2 & 3 Ceiling Panels



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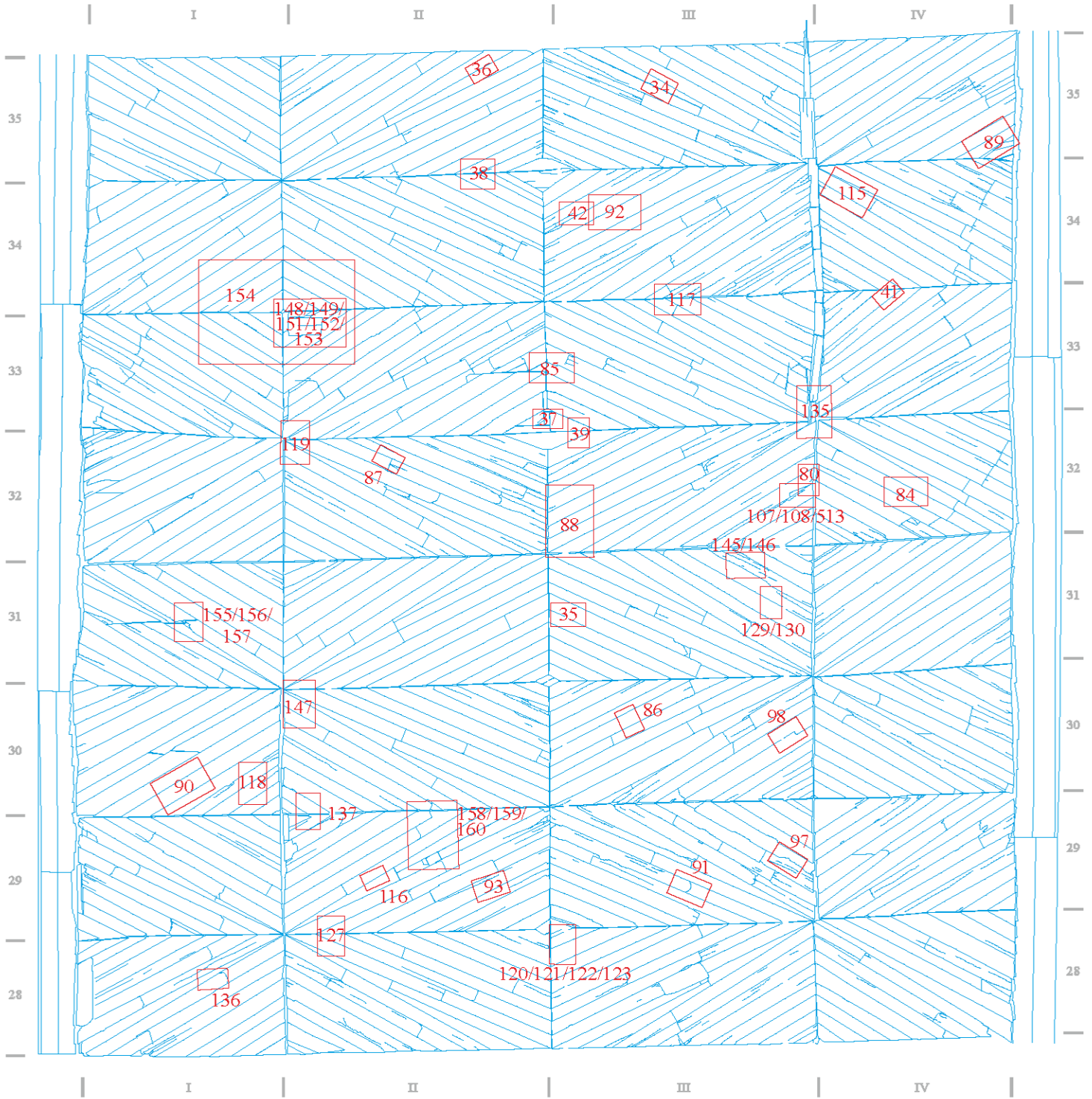
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Conservation Programme Phase 2 (May - July 1999)

STAGE  
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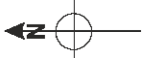
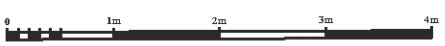
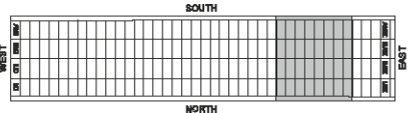
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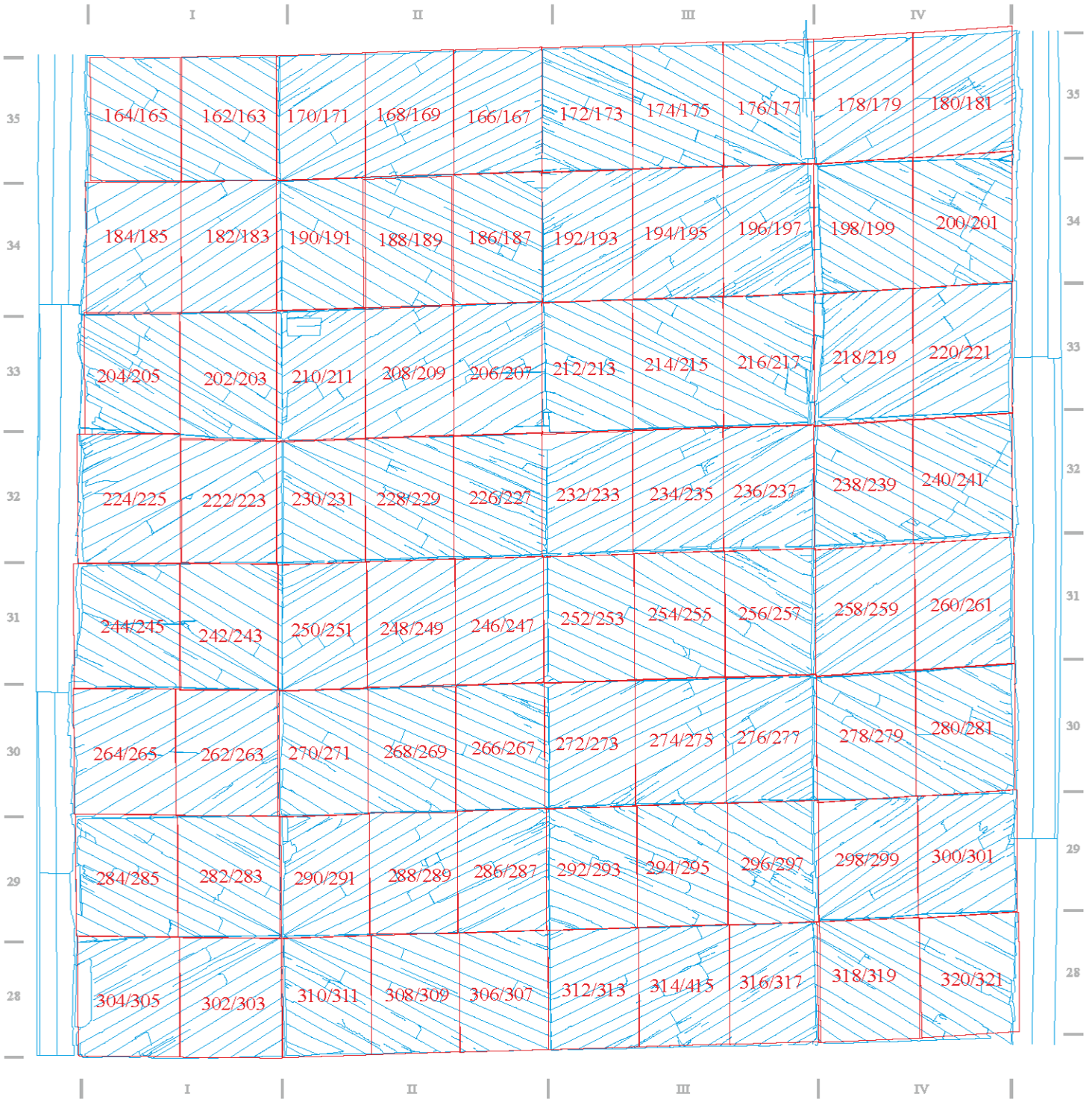


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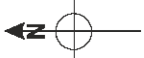
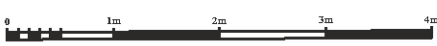
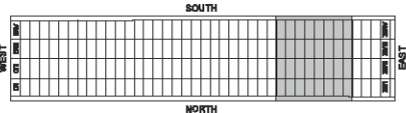
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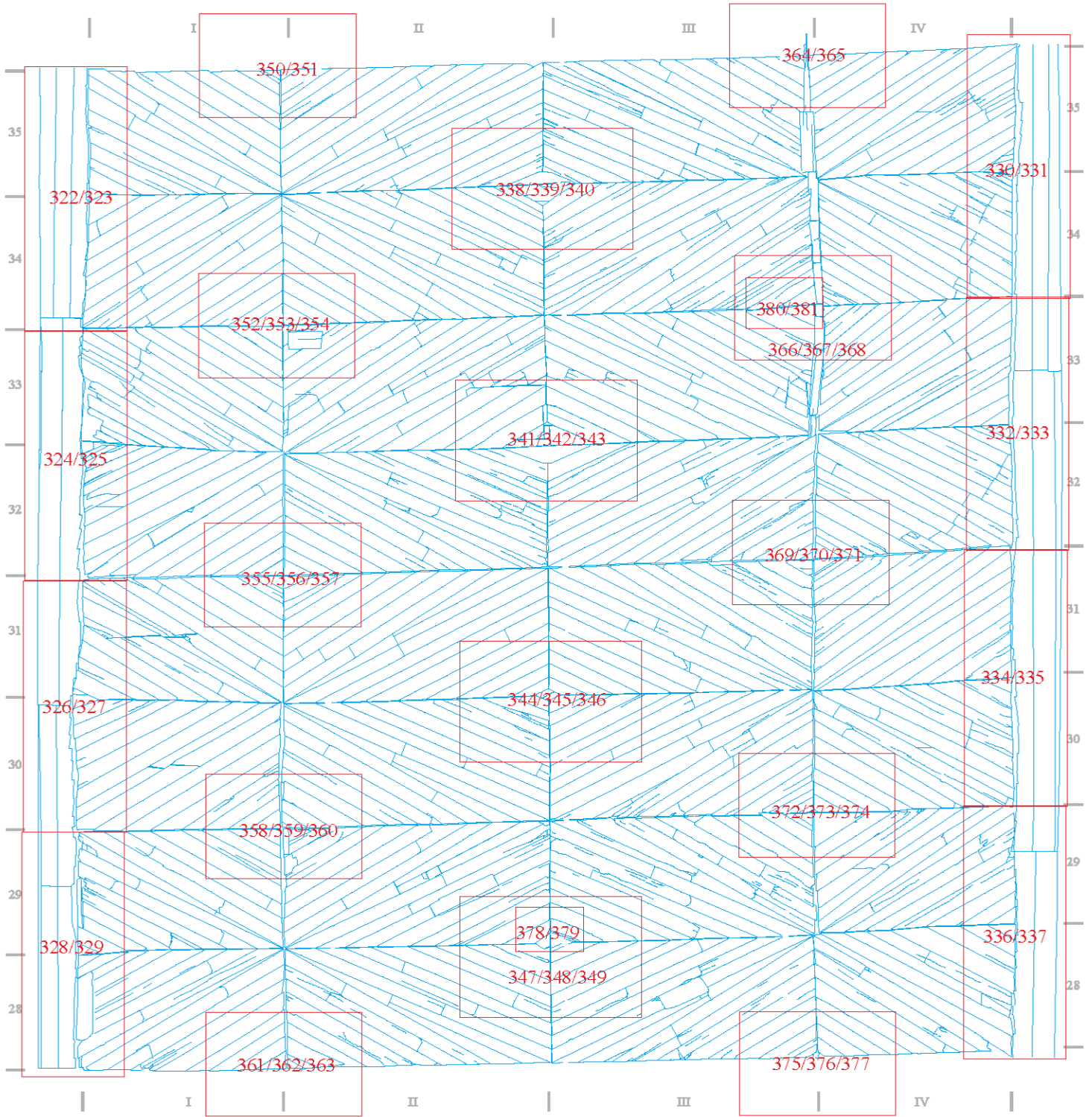
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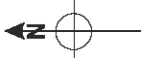
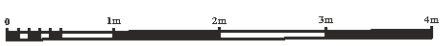
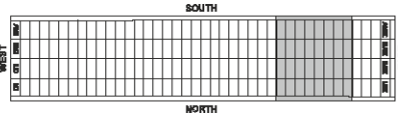
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	STAGE CONDITION SURVEY AND TREATMENT	DESCRIPTION PLATE REFERENCE SHEET		
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Sheet Number: 5			LOWER SIDE OF STRUCTURE
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Plates are in before and after treatment sequence. Ultraviolet (UV) illumination photographs taken before treatment.	TITLE PETERBOROUGH CATHEDRAL - NAVE CEILING Conservation Programme Phase 2 (May - July 1999) STAGE CONDITION SURVEY AND TREATMENT		DESCRIPTION PLATE REFERENCE SHEET Photogrammetry courtesy of English Heritage Survey Team & Photarc Surveys Ltd. The Perry Lithgow Partnership 1 Langston Lane, Station Rd, Kingham, Oxon OX7 6UW Tel. 01608 658067

