# St Paul's Cathedral

# Cleaning and refurbishment projects 2003–5

**John Schofield**
**Cathedral Archaeologist**

**2005, revised 2014**

**Contents**

Note: I have slightly revised this report, originally of 2005, in 2014; and added one figure received in the interim, the engineering analysis of steps in the Geometric Stair, from the cathedral engineer, Robert Bowles (Fig 74).



Appendix 1: 'Proposals for repair of the west steps', 4th edition, August 2002 (Martin Stancliffe Architects)
Appendix 2: 'Detailed proposals for the conservation and repair of the Geometric Stair following access', June 2004 (Martin Stancliffe Architects)
Appendix 3: 'Proposals for the new floor for the OBE Chapel sanctuary', October 2002 (Martin Stancliffe Architects)

These three appendices are not included in this digital form of the report, but are included in the bound version of the report of 2005.

**List of figures**

Tables:

**Summary**

This report presents the results of archaeological monitoring and recording of five separate refurbishment and cleaning projects at St Paul's Cathedral, London, in 2003–5: 1. Cleaning of the exterior of the west end, with notes on repairs and conservation by the Surveyor; 2. Taking up and relaying of the west steps, with some repairs; 3. Repairs to the Geometric Stair in the south-west tower; 4. Replacement of the revolving doors in the north-west and south-west entrances; and 5. Refurbishment of the floor of the OBE Chapel at the east end of the crypt, including removal of parts of the mosaic laid down there in 1875.

All these projects were preceded by evaluation by the Cathedral Archaeologist, and in several cases the archaeological evaluation was included in a proposal brochure produced for the individual project by the Surveyor. The three most relevant to the archaeological work are reproduced here as appendices: Appendix 1, on the west steps (August 2002); Appendix 2, on the Geometric Stair (June 2004); and Appendix 3, on the new floor in the OBE Chapel (October 2002). These appendices include details of investigations for each project undertaken by the Surveyor and his staff. The recording of the standing cathedral is a joint exercise between the Surveyor and the Cathedral Archaeologist.

The results of the archaeological recording by the Cathedral Archaeologist and members of the Museum of London Archaeology Service (MoLAS), in summary, were:

1. Cleaning of the west end: photography of a number of 18th-century graffiti around the west door and north-west door; and workmen's graffiti in the dome at the top of the south-west tower.

2. West steps renewal: recording of the vaulted sub-base from the original Wren steps, and the outlines of the lower flared walls from the original Wren design.

3. Replacement of the doors: recorded only at the north-west door, where there was a previously unknown socket of unknown purpose in the threshold.

4. Repairs to Geometric Stair: two photographs were taken.

5. OBE Chapel floor: the only item recorded was a 19th-century heating duct which crossed the site from north to south.

In addition bricks were sampled from the original west steps, the vault of the crypt as exposed in the north-west entrance, and co-incidentally from electricians' work which required the removal of bricks in the high vaulting over the north aisle of the church at the west end.

## Introduction

This report is of archaeological monitoring of five separate building recording projects at St Paul's Cathedral, London, during 2003 and 2004, finishing in early 2005. Individually they were small pieces of work and all share the Museum of London sitecode SWG03. The five projects are:

1. Cleaning of the exterior of the west end, with notes on repairs and conservation by the Surveyor
2. Taking up and relaying of the west steps, with some repairs
3. Repairs to the Geometric Stair in the south-west tower
4. Replacement of the revolving doors in the north-west and south-west entrances
5. Refurbishment of the floor of the OBE Chapel at the east end of the crypt, including removal of parts of the mosaic laid down there in 1875.

The present report is structured into five parts to reflect this arrangement.

The proposed project for relaying of the west steps, the repairs to the Geometric Stair and the refurbishment of the OBE Chapel floor were described in detail in individual reports by the present Surveyor, Martin Stancliffe, which formed part of the proposals to the cathedral's Fabric Advisory Committee (FAC) and the Cathedrals Fabric Commission for England (CFCE) for each project. These three proposal documents also included details of some exploratory recording. They are included here as Appendices 1–3, as follows:

Appendix 1: 'Proposals for repair of the west steps', 4th edition, August 2002;
Appendix 2: 'Detailed proposals for the conservation and repair of the Geometric Stair following access', June 2004;
Appendix 3: 'Proposals for the new floor for the OBE Chapel sanctuary', October 2002.

Since the small amount of archaeological recording presented here (nearly all of it in the form of photographs) is a response to and follows from these documents, the archaeological reporting is best read after reading each of the appendices.

The project to record and conserve the statues on the west end is not directly covered here. The proposals are the subject of a fourth brochure by Martin Stancliffe Architects of 19 July 2004, titled 'Proposals for the conservation and recording of the west front, south transept and north transept statues and reliefs'.

One further drawing from the Surveyor is included in paper form with the archive report lodged with the Museum of London: a plan (drawing SP2869 of November 2002) which details the repairs and replacements to the steps, including the numbering system to be used for taking up and relaying the majority of the individual blocks. This is noted as Fig 61 below.

Though unconnected, the projects are of repair, cleaning and in the case of the OBE Chapel renewal and redesign; all reflecting the use of the Wren building since its completion in 1714. The appearance of the west end before the present cleaning project is shown in Fig 1.

*Fig 1 The west end of St Paul's Cathedral before the cleaning of 2003–4*

## Part 1: Cleaning of the exterior of the west end

### *Documentary evidence for construction of the west end and towers*

The foundations of the west end had been dug and constructed in 1688, but the main work on the west front followed the inauguration in 1697 (Fig 2). The editor of *Wren Society* volume XV, A T Boulton, asserted that Samuel Fulkes and William Kempster had half the work of the west front and their dividing line went down the middle of the west door (WS XV, xv). This is not correct; the construction of the great west door case was divided, but between Fulkes and John Tompson. They each sawed half the marble blocks for it in March 1699 (WS XV, 49). They both set up and polished the marble case of the door in early 1700 (WS XV, 60–1). Fulkes was paid for much of the work on the west front, including carving 'three whole capitals' at £60 each, June 1704 (WS XV, 109); he was working on the 'great upper portico' in June 1706 (WS XV, 140). Kempster's first work on the portico seems to date from 1705 (WS XV, 124). Fulkes did the mason's work laying the keystone for the great west window (WS XV, 125); but Kempster carved a cherubim's head with wing on the keystone (WS XV, 140).

Fulkes, who had been employed on the cathedral since 1688, was the third most used master mason on the cathedral, out of the twelve main contractors employed, as measured by his invoices (WS XV, xiv); overall, his work was over three times the value of Kempster's.

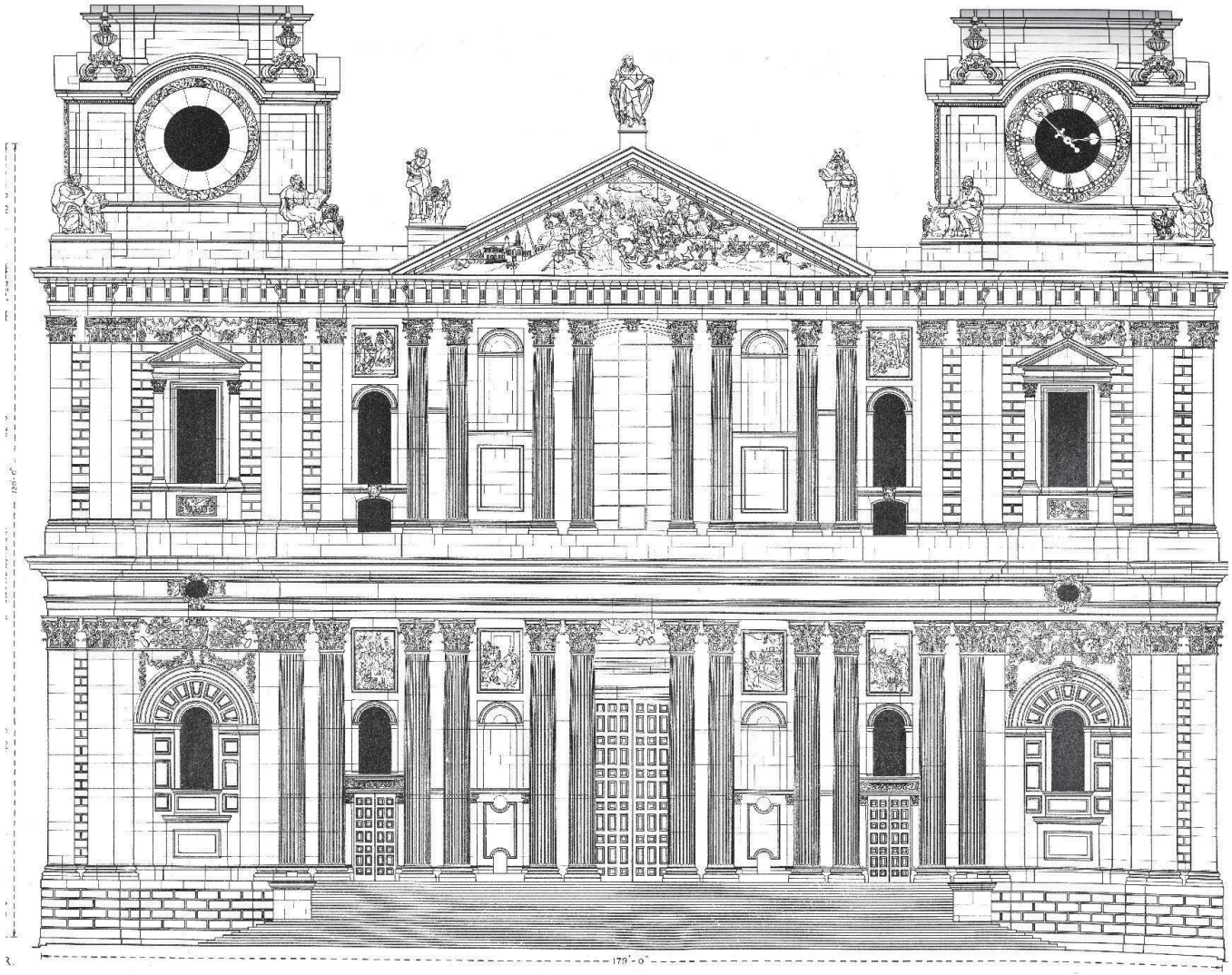

*Fig 2  The west front apart from the tops of the towers, by Poley in 1927*

In March 1706 Francis Bird was paid for carving the large panel over the west door (WS XV, 133). This was '16ft broad and 14ft high & the principal figures 18in imbost' and had a large Italian moulding round it (WS XV, 134). [He also carved the smaller panels on the west front (WS XV, 203, 206); these panels have been photographed before cleaning separately (photographs by A Chopping of the museum, in the fabric archive). In 1714 J Thomson was paid for painting the two carved panels at the west end (WS XV, 219).]

In December 1706 Bird was paid £650 for 'carving the great pedament of the west portico, in length 64ft and in height 17ft, being the history of St Paul's Conversion, and containing 8 large figures, 6 whereof on horseback, and several of them 2½ft imbost (WS XV, 146) (shown below as drawn by Poley, Fig 3).

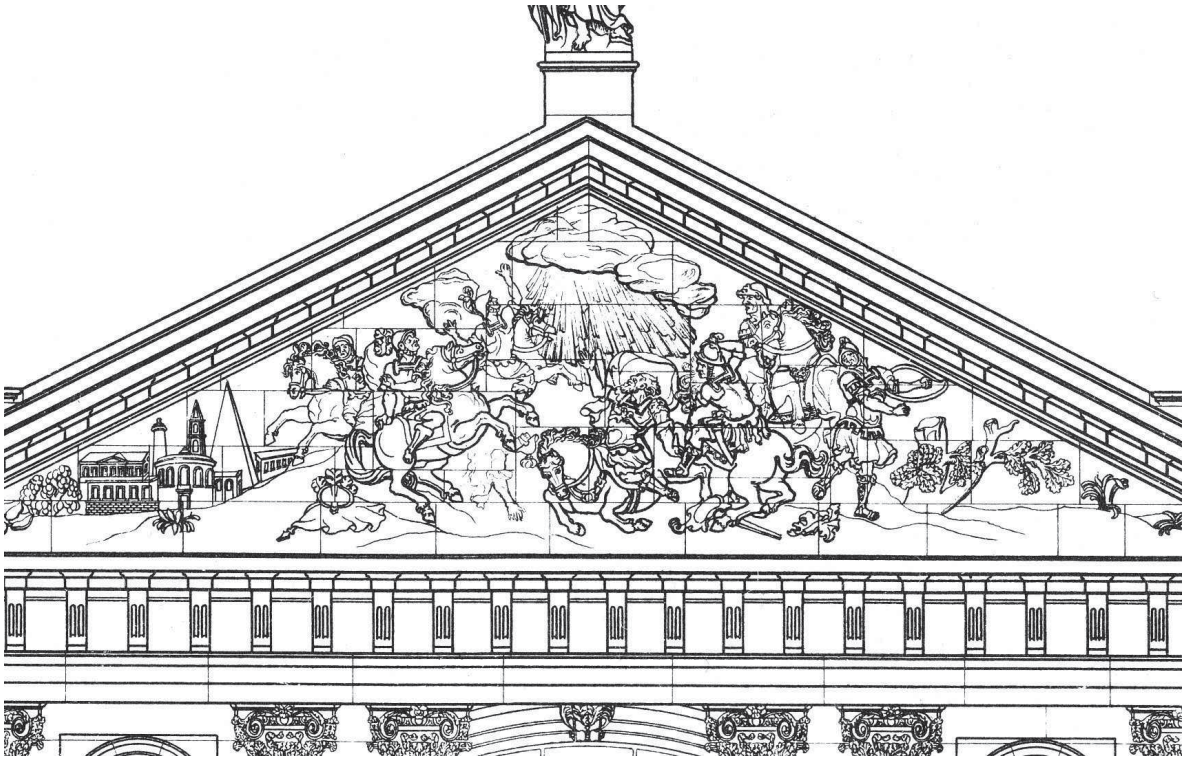

*Fig 3 Extract from F E Poley's elevation of the west end, showing Bird's sculpture in the architrave (1927)*

In the present project, the pediment was cleaned but no repairs were necessary. No archaeological recording took place, but the opportunity of taking some photographs close up was taken.

*Fig 4 The pediment at the west end, showing Bird's sculpture; looking south from about the middle to the south end*

*Fig 5 The pediment at the west end: St Paul (left centre, weathered)*

*Fig 6 The pediment at the west end: the soldiers with Paul*

The seven statues on the west end were erected and carved in situ between 1718 and 1725; they were painted four times in oil (WS XV, 224–5). In the present project, these were recorded and conserved in a separate programme of work by the Surveyor, and are only noted incidentally here.

*Fig 7 West end statue: St Peter*

*Fig 8 West end statue: St Peter*

*Fig 9 West end statue: St Paul*

The statue on the north-west corner, of St Matthew, is shown below in Fig 14 and Fig 15.

The building history of the towers could be detailed from the accounts, but only the briefest of outlines is given here. John Smallwell, joiner, produced a model for one of the towers in the summer of 1700; and it may be this model which a man of his altered, 'to show the winding stairs and raising it higher and making the corners square which were hollow before' in September 1701 (WS XV, 62, 74).

The construction of the towers was initially divided, with Fulkes constructing the north-west tower and Kempster the south-west tower (he took over after the death of Tompson in 1700). Fulkes was paid for the masonry of the north-west tower 'from the top of the Upper Capitals to the top of the Upper Entablature' and for vaulting the tower in September 1701, The stage around and above the 'dyalls' may have been later, since Fulkes was only paid for it in June 1707 (WS XV, 77–8, 153).

Kempster had two small jobs here, inserting one of the chains and making a model for the finishing of the tower. The roof was being framed in June 1708, when Jean Tijou provided the 'pine' or pineapple to go on top. Fulkes was paid for finishing the tower in December 1708 (WS XV, 152, 163, 171).

The south-west tower was built up to the main cornice by John Tompson until his death in 1700; William Kempster took over and constructed it to the upper composite order in 1701. When construction of the nave roof reached the west end in 1704, a floor was also constructed in what was now known as 'Mr K's tower' (WS XV, 65, 79, 114).

The Dean's door, already in place at the foot of the south-west tower facing south, was cut to allow introduction of the great bell in December 1706. Kempster seems to have finished the tower by June 1707; his bill included 416ft of 'cleansed Rigate ashler' which were evidently used somewhere in the upper part. Payment to carpenters for framing

the tower followed in July, though other bills by them concerned with stairs date from March 1710. Bird himself carved a model of the pineapple (WS XV, 146, 152, 154, 165, 186). The clock was in place in the south-west tower by 1720. The west end is shown in many engravings and paintings from about 1750, and one by Malton of the 1790s is given here as Fig 10.

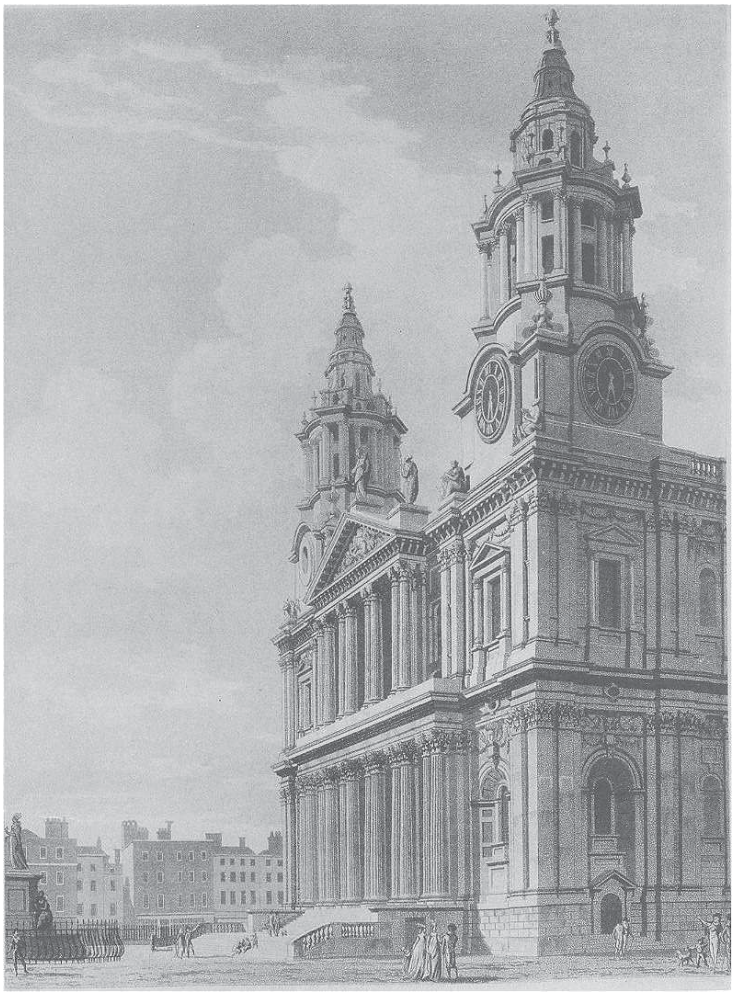

*Fig 10 The west end of St Paul's from the south side, by T Malton, 1798 (from WS XIV, plate XVII). This shows the curved west steps and the cast iron railing (not Wren's oroginal design, but the second imposed by the Commissioners) around the statue of Queen Anne (both railing and statue since replaced)*

### *The cleaning process in 2002–5*

The cleaning of the west front was managed by architects Purcell Miller Tritton under the supervision of the Surveyor.

The cleaning of the west front (Fig 1), including all faces of the two west towers, was preceded by a photogrammetric survey of all the exterior faces (e.g. Fig 11); the project drawings, including site plans and other drawings showing the practicalities of the project,

can be found in the St Paul's Fabric Archive or at Martin Stancliffe Architects' office. The elevation drawings showed all the repairs which might be done, such as stone replacement. These are the tender drawings; the work was done by Wates. In the event the amount of repair work was smaller than the scope shown on the tender drawings, so these tender drawings must not be taken as a record of what was done. A set of drawings showing the actual repairs has been prepared separately by Purcell Miller Tritton.

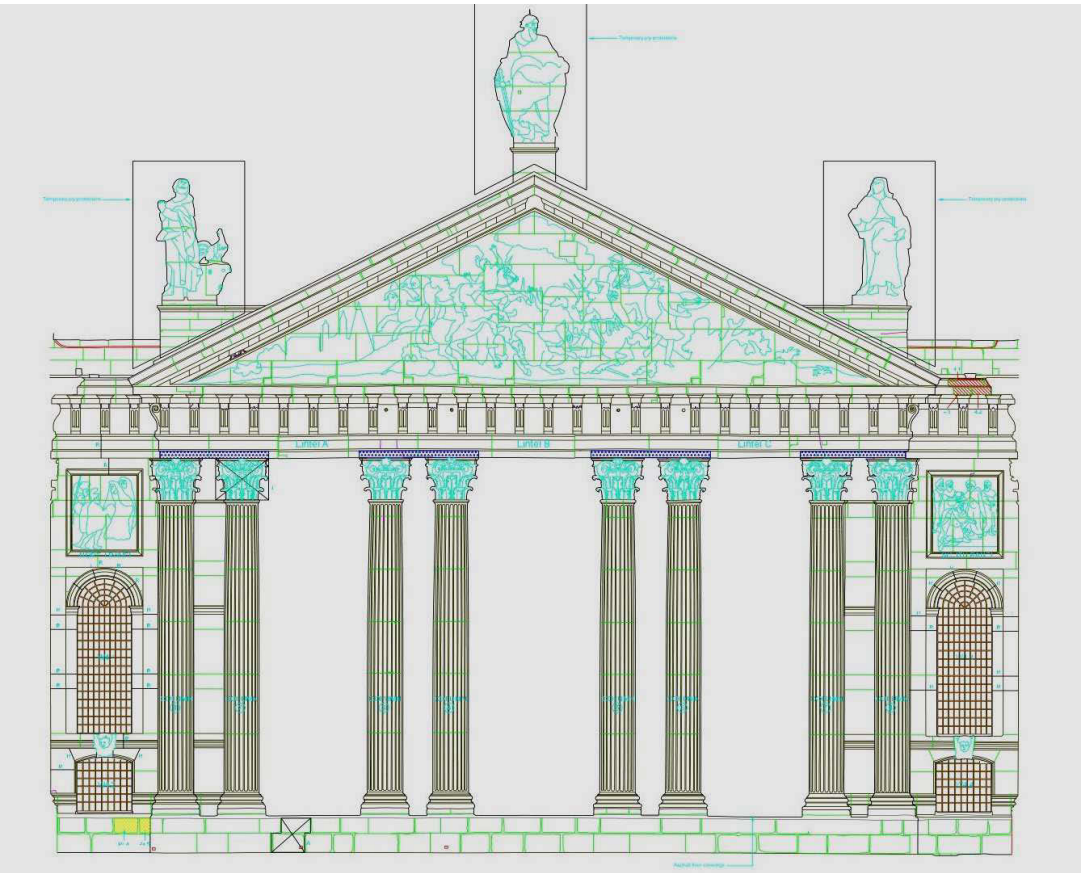

*Fig 11 Extract from PMT drawing 04-300, showing the upper portico and the pediment carving by Francis Bird; compare Fig 2*

For the present purpose, Table 1 lists all the project tender drawings in AutoCAD format; a CD containing these tender drawings forms part of the SWG03 archive at the Museum of London. Two examples are given in this report: Fig 12 shows the main west elevation and sides of both west towers, and Fig 13 is one of the more detailed drawings showing repairs proposed on the north elevation of the north-west tower. It was intended that these drawings would form the basis of any archaeological recording, but in the event there were very few repairs and no archaeological records were made, except as noted below. Sufficient records of the repairs which were undertaken and the cleaning process should be found in the architects' records of their work (to be lodged in the Fabric Archive).

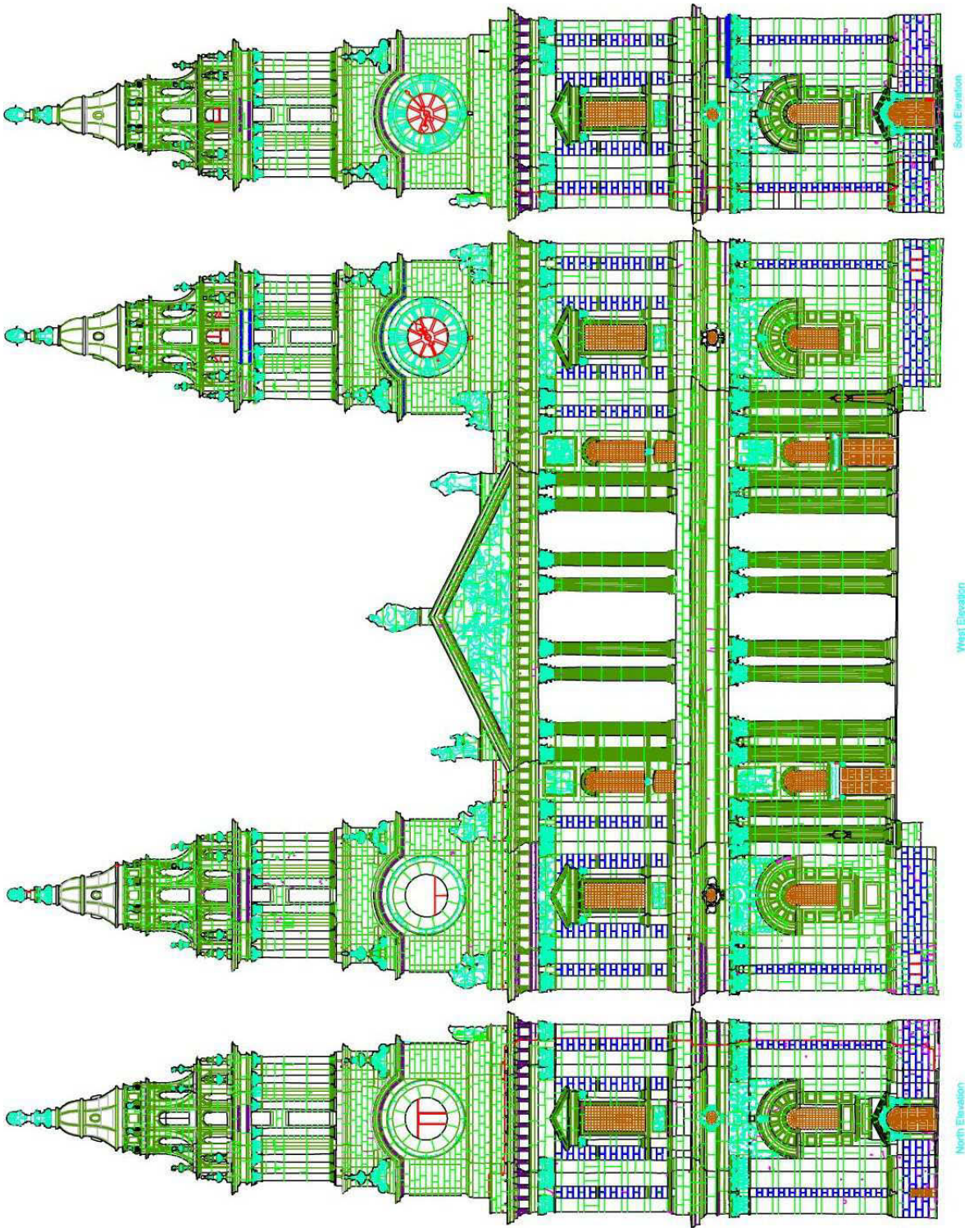


*Fig 12 Extract from tender drawing 00-301B by Purcell Miller Tritton, showing the main west elevation and sides of the west towers*

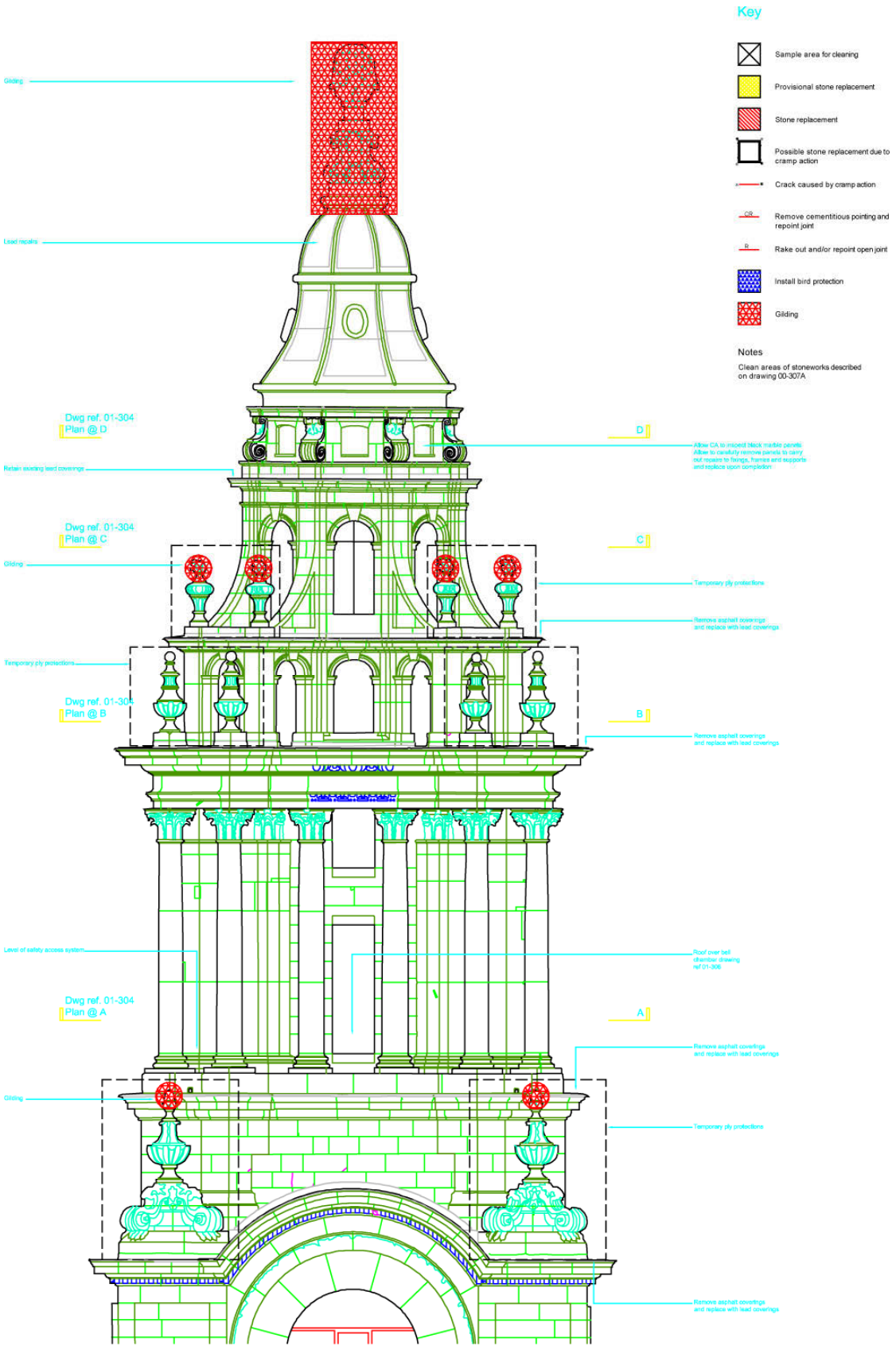


*Fig 13 Tender drawing 01-300A by Purcell Miller Tritton, showing repairs proposed on the north elevation of the north-west tower*

| | |
|---|---|
| 00-300 | Contractor's Area |
| 00-301 | Elevations to West Front & North & South towers (*, Fig 12) |
| 00-302 | Diagrammatic Elevations of Hoardings and Sheeting |
| 00-303 | Diagrammatic Elevations of Hoardings showing Banners |
| 00-304 | Contractor's Area including Banner Design |
| 00-305 | Hoarding Design for Crypt and Cathedral Entrance |
| 00-306 | Typical detail of covering for mid and upper cornice |
| 00-307 | Diagram Showing Extent of Cleaning to Tower |
| 00-308 | Crypt and Ground Floor Plans |
| 00-309 | Triforium and Nave Roof Plans |
| | **ZONE 1: NORTH-WEST TOWER** |
| 01-300 | Zone 1: North elevation: Repairs (*, Fig 13) |
| 01-301 | Zone 1: South elevation: Repairs |
| 01-302 | Zone 1: West elevation: Repairs |
| 01-303 | Zone 1: East elevation: Repairs |
| 01-304 | Zone 1: Plan and Section: Repairs |
| 01-305 | Zone 1: North Aisle Roof Access Ladder |
| 01-306 | Zone 1: Details of new roof over bells |
| 01-307 | Zone 1: New Lead Coverings to Roundels |
| | **ZONE 2: SOUTH-WEST TOWER** |
| 02-300 | Zone 2: North elevation: Repairs |
| 02-301 | Zone 2: South elevation: Repairs |
| 02-302 | Zone 2: West elevation: Repairs |
| 02-303 | Zone 2: East elevation: Repairs |
| 02-304 | Zone 2: Plan and Section: Repairs |
| 02-305 | Zone 2: South Aisle Roof Access Ladder |
| 02-306 | Zone 2: Details of new roof over bells |
| | **ZONE 3: WEST FRONT BELOW NORTH-WEST TOWER UPPER LEVEL** |
| 03-300 | Zone 3: West elevation to Belfry: Repairs |
| | **ZONE 4: WEST PORTICO UPPER LEVEL** |
| 04-300 | Zone 4: West elevation: Repairs |
| 04-301 | Zone 4: West internal elevation: Repairs |
| 04-302 | Zone 4: North elevation: Repairs |
| 04-303 | Zone 4: South elevation: Repairs |
| 04-304 | Zone 4: Plan: Repairs |
| 04-305 | Zone 4: Reflected ceiling plan: Repairs |
| 04-306 | Zone 4: Cornice repair details |
| 04-307 | Zone 4: Spare |
| | **ZONE 5: WEST FRONT BELOW SOUTH-WEST TOWER UPPER LEVEL** |
| 05-300 | Zone 5: Elevation: Repairs |
| | **ZONE 6: WEST FRONT BELOW NORTH-WEST TOWER LOWER LEVEL** |
| 06-300 | Zone 6: West Elevation All Soul's Chapel: Repairs |
| | **ZONE 8: WEST FRONT BELOW SOUTH-WEST TOWER LOWER LEVEL** |
| 08-300 | Zone 8: Elevation: Repairs |
| | **ZONE 9: NORTH ELEVATION BELOW CLOCK TOWER UPPER LEVEL** |
| 09-300 | Zone 9: North Elevation to Belfry: Repairs |
| | **ZONE 10: NORTH ELEVATION BELOW CLOCK TOWER LOWER LEVEL** |

| | |
|---|---|
| 10-300 | Zone 10: Crypt Entrance: Repairs |
| | **ZONE 11: SOUTH ELEVATION DEAN'S STAIRCASE UPPER LEVEL** |
| 11-300 | Zone 11: South elevation: Repairs |
| | **ZONE 12: SOUTH ELEVATION DEAN'S STAIRCASE LOWER LEVEL** |
| 12-300 | Zone 12: South elevation: Repairs |
| 12-301 | Zone 12: Plan & Section of south steps: Repairs |

*Table 1 Full list of project tendering drawings for the west front cleaning and repairs by Purcell Miller Tritton. The drawings included in this report are marked * and their figure numbers in this report shown*

The cleaning of the west front did not require detailed monitoring by the Cathedral Archaeologist, who made occasional visits to the work. Details of the very small amount of stone replacement, and of investigation of iron chains in the fabric of the north-west tower, are to be found in the architect's drawings in the Fabric Archive. The project photographs (held at MoL under the sitecode) include a small number illustrating the small-scale removal of stonework to expose and inspect one of the chains in the north-west tower.

*Fig 14 Statue at the north end of the west façade, that of Saint Matthew (see also Fig 15)*

*Fig 15 The lower part of the Saint Matthew statue, with his emblem, an angel (see also Fig 14)*

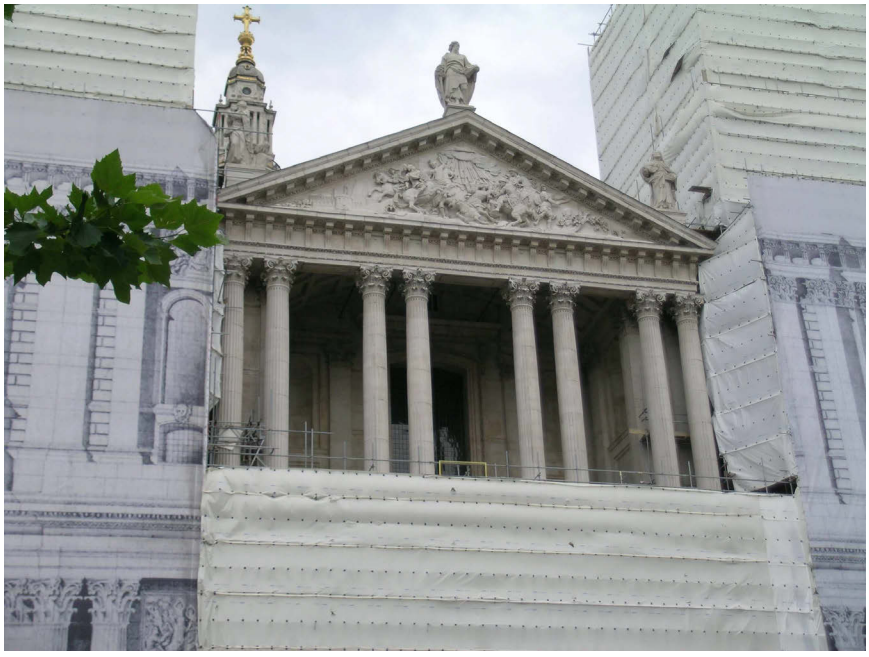

*Fig 16 The central section of the west front revealed after cleaning, June 2004*

The coverings were removed and the cleaned west end revealed towards the end of 2004 (Fig 17).

*Fig 17 The west front when the cleaning was finished, 2004 (from the cathedral's Annual Report for 2004)*

***The graffiti***

A part of the recording brief was to record by photography, before cleaning took place, a representative selection of the historic graffiti to be seen around the west doors. Naturally these were at a height where they could have been incised by people either standing or perhaps on small temporary supports such as boxes; they were nowhere higher than 2.3m from the floor. The graffiti were photographed in September 2003 just before the cleaning process reached them.

During the cleaning of the south-west tower, attention was brought to several painted graffiti within the dome of the tower, apparently painted in white on the soot-blackened inner surface. These were also photographed.

The photographs, in digital format, are archived on CDs which accompany this report. In the following pages are images at reduced resolution of the photographs, with their negative numbers, enabling the image on the CD to be located. The images are presented here and on the CD in numerical order of their negative numbers in the archive. Although many are given here in black and white, the original images are all in digital colour.

*The great west door and north-west door areas*

The locations of the photographed graffiti around the great west door and the north-west door are given on the plan, Fig 18. No recording visit was made to the south-west door.

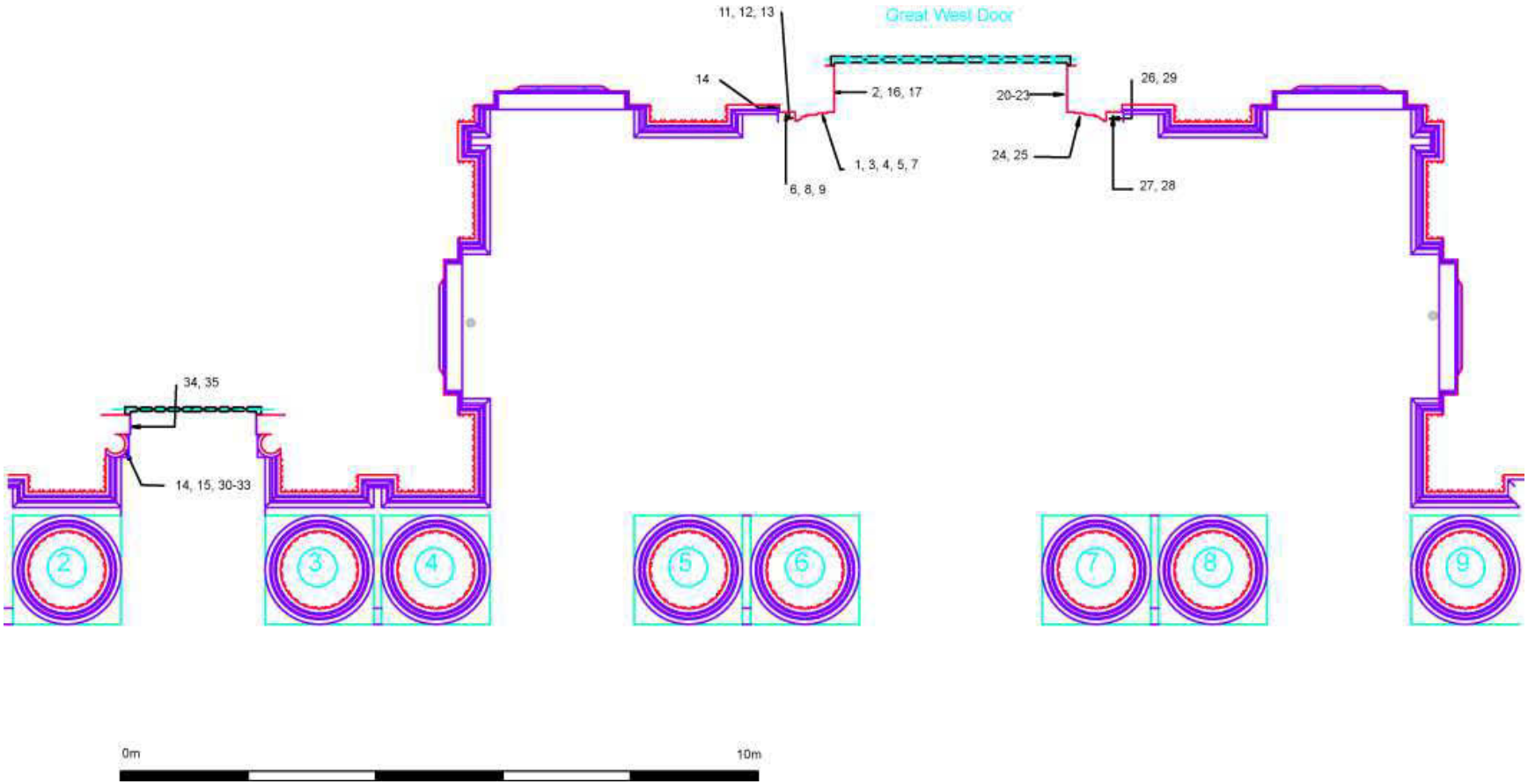


*Fig 18 Plan of ground floor of west end outside the west doors, showing locations of photographed graffiti [based on PMT site plan 07-304]*

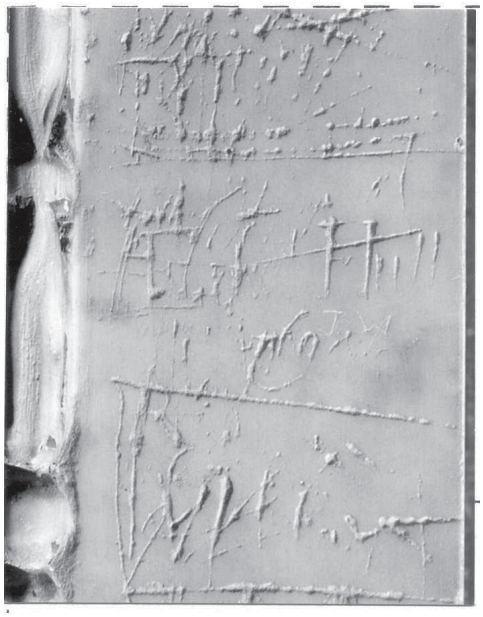

*Fig 19 Graffito 1 group, neg 16003001*

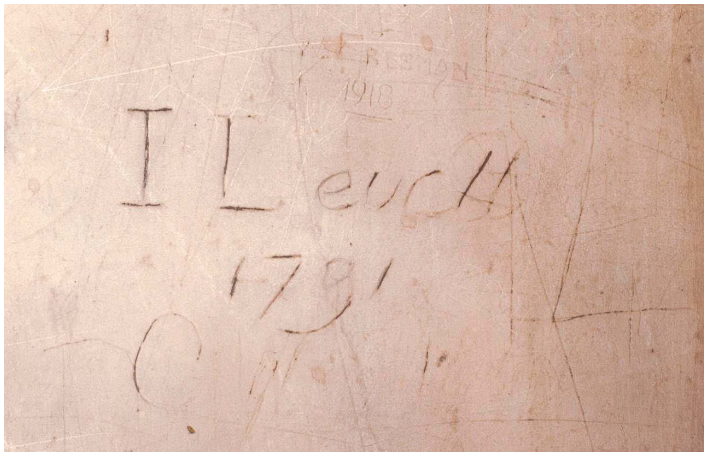


*Fig 20 Graffito 2, neg 16003002*

*Fig 21 Graffito 3 group, neg 16003003*

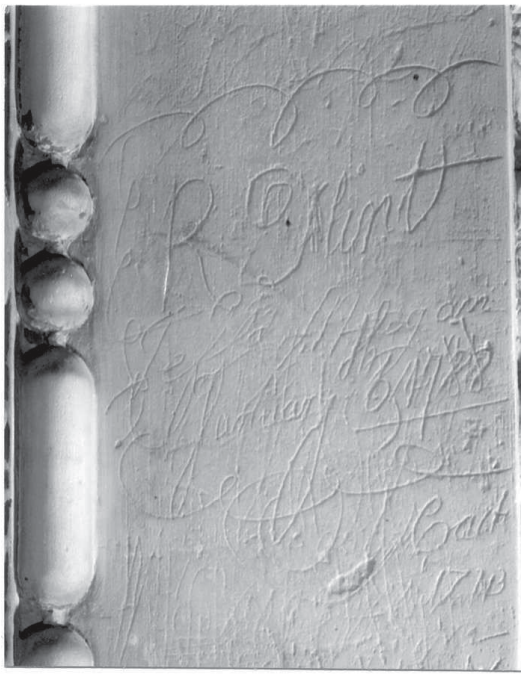

*Fig 22 Graffito 4 group, neg 16003004*

*Fig 23 Graffito 5 group, neg 16003005*

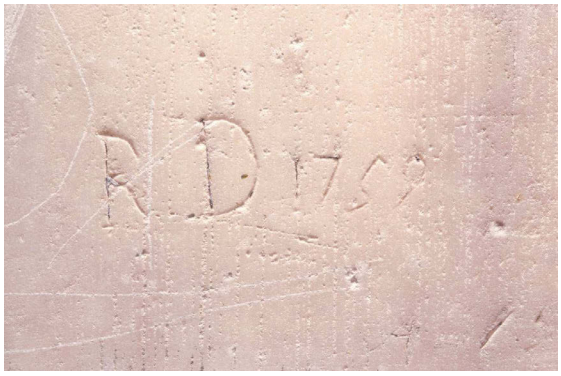

*Fig 24 Graffito 6, neg 16003006*

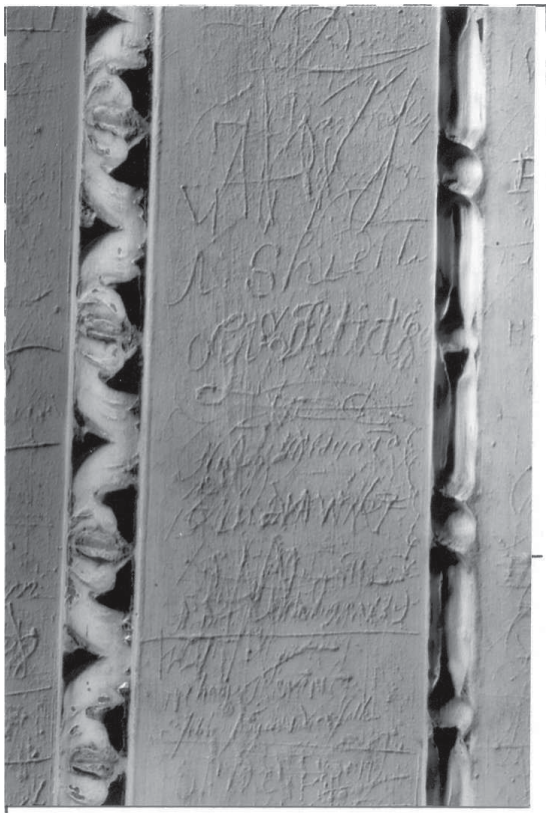

*Fig 25 Graffito 7 group, neg 16003007*

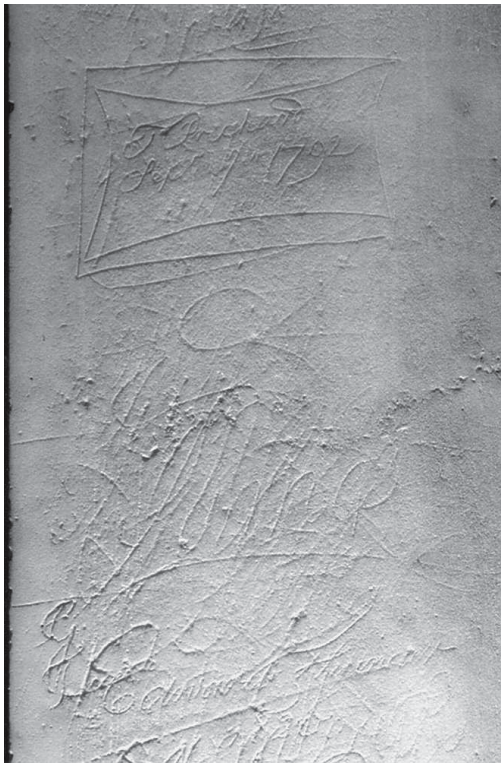

*Fig 26 Graffito 8 group, neg 16003008*

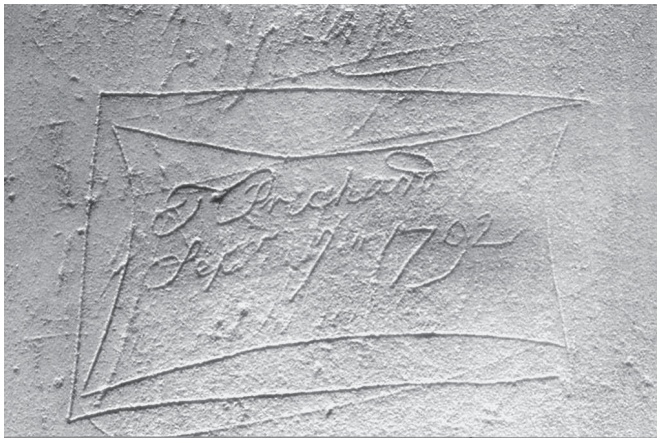

*Fig 27 Graffito 9 group, neg 16003009*

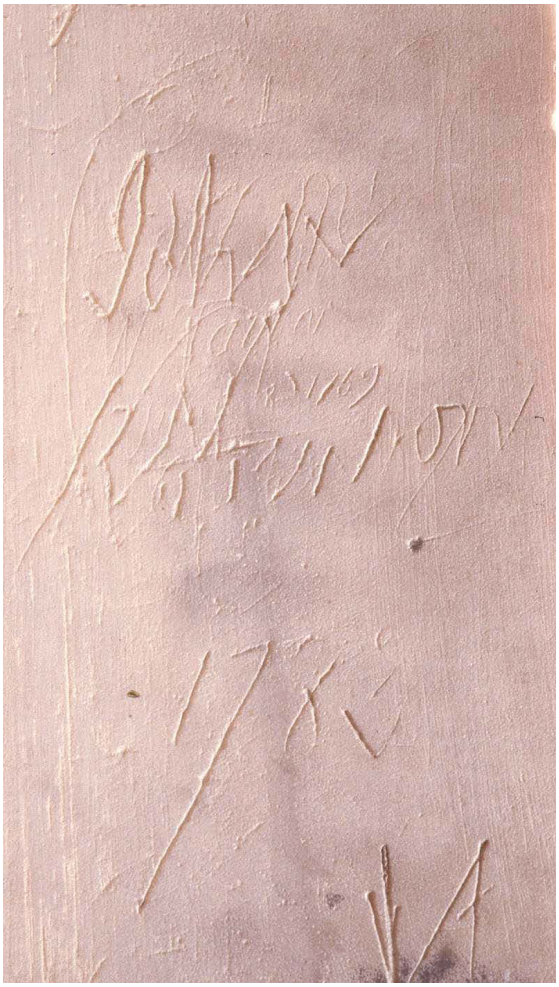

*Fig 28 Graffito 10 group, neg 160030010*

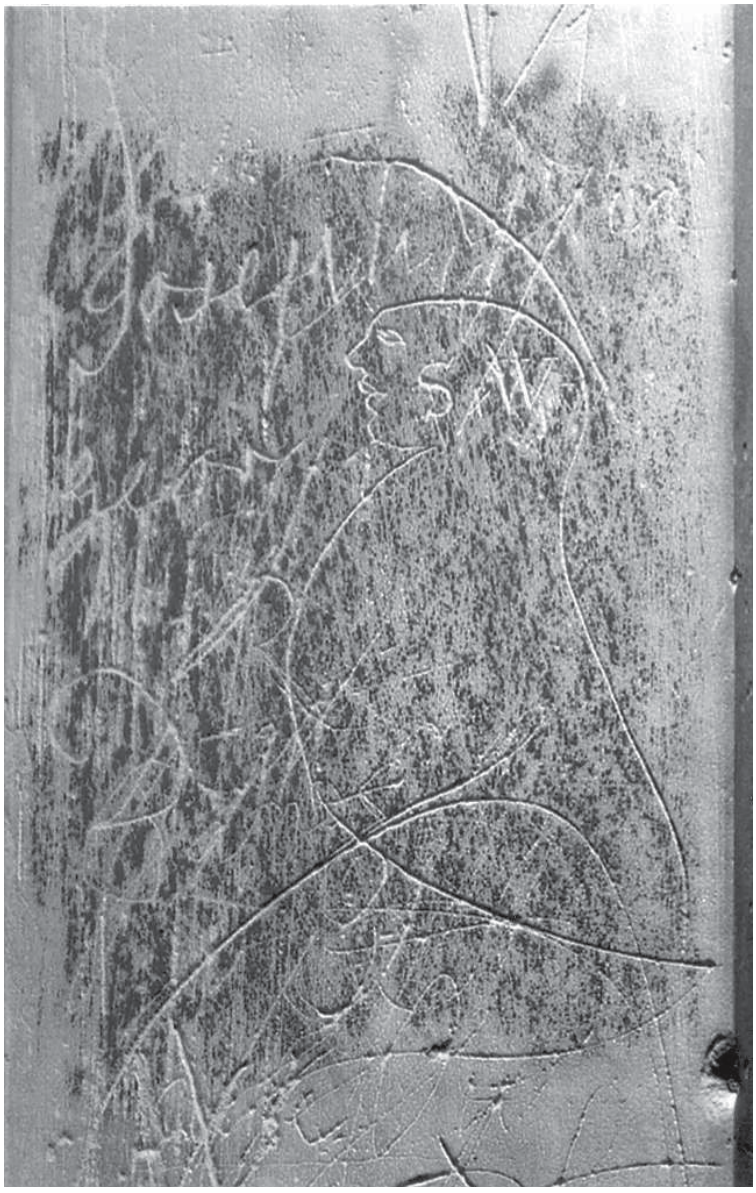

*Fig 29 Graffito 11 group, neg 16003011*

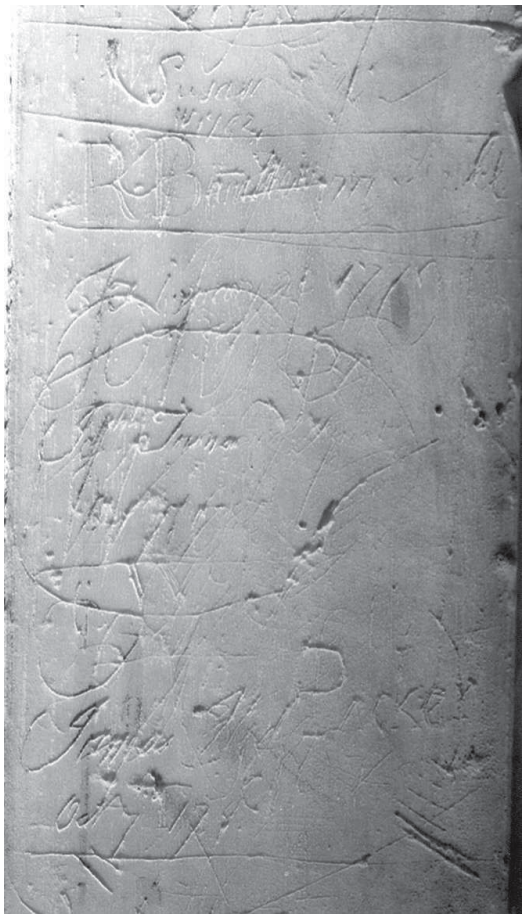

*Fig 30 Graffito 12 group, neg 16003012*

*Fig 31 Graffito 13 group, neg 16003013*

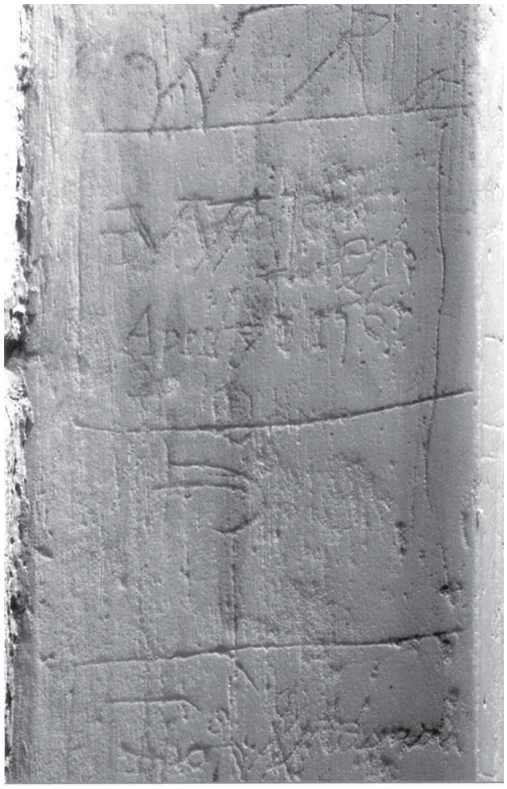

*Fig 32 Graffito 14 group, neg 16003014*

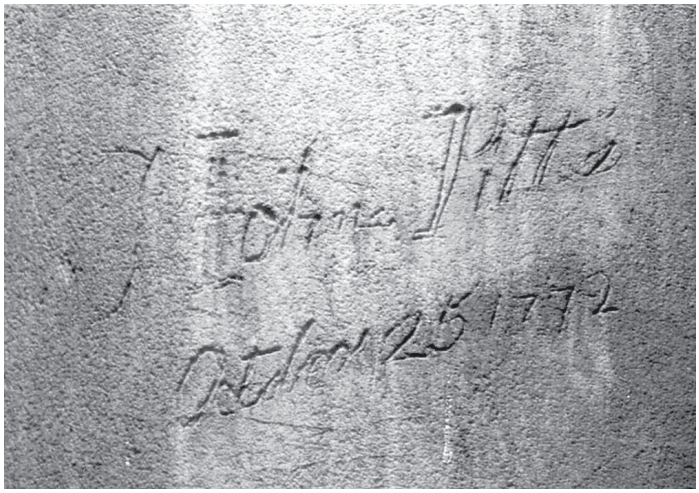

*Fig 33 Graffito 15, neg 16003015*

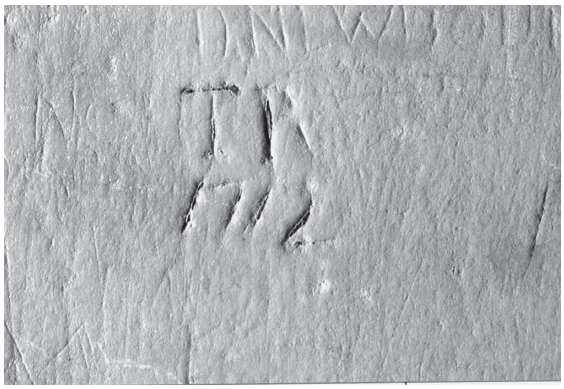

*Fig 34 Graffito 16, neg 16003016*

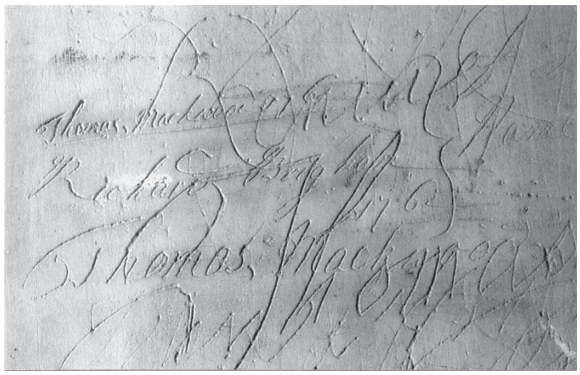

*Fig 35 Graffito 17 group, neg 16003017*

*Fig 36 Graffito 18 group, neg 16003018*

*Fig 37 Graffito 19 group, neg 16003019*

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*Fig 38 Graffito 20, neg 16003020*

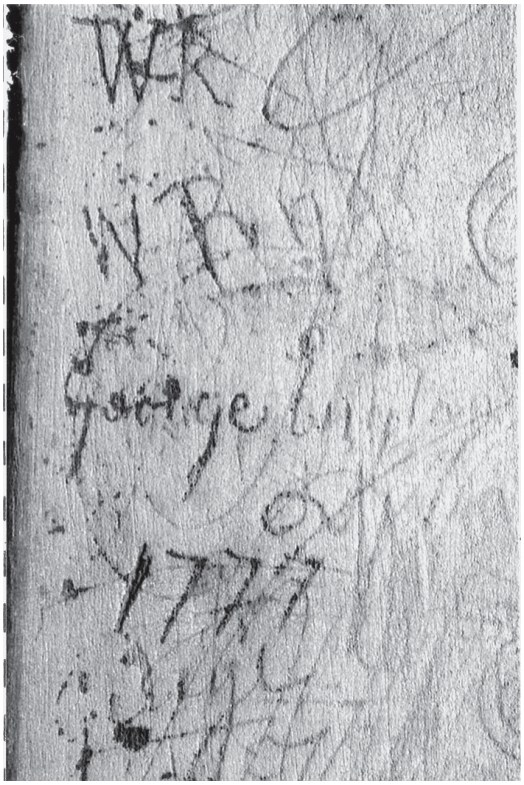


*Fig 39 Graffito 21 group, neg 16003021*

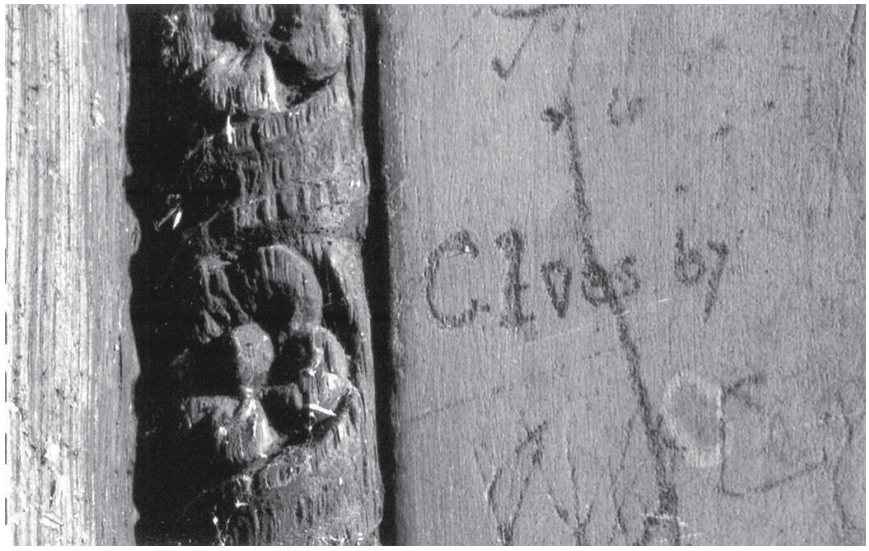


*Fig 40 Graffito 22, neg 16003022*

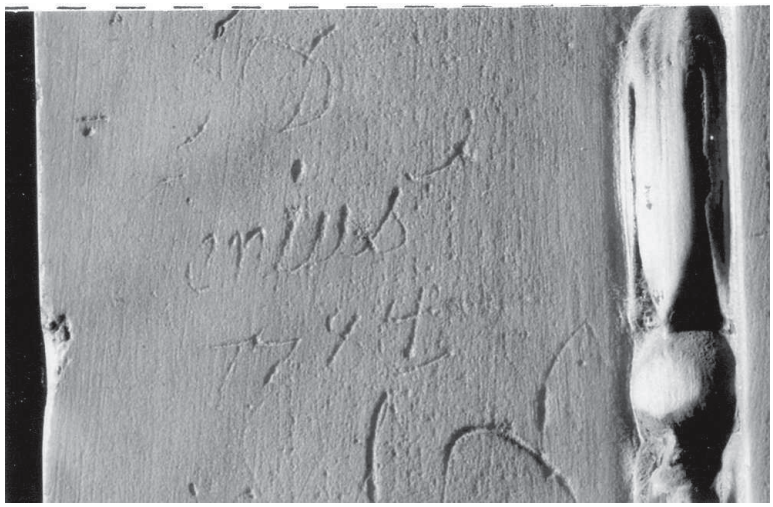


*Fig 41 Graffito 23, neg 16003023*

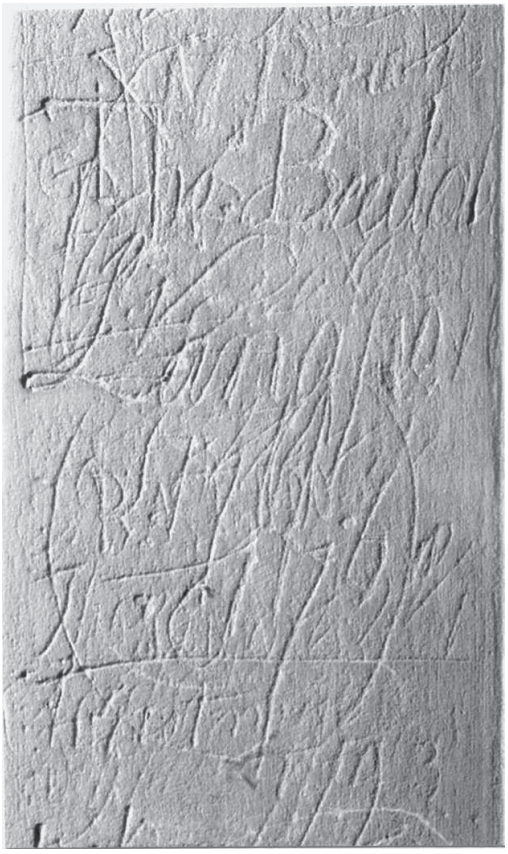


*Fig 42 Graffito 24 group, neg 16003025*

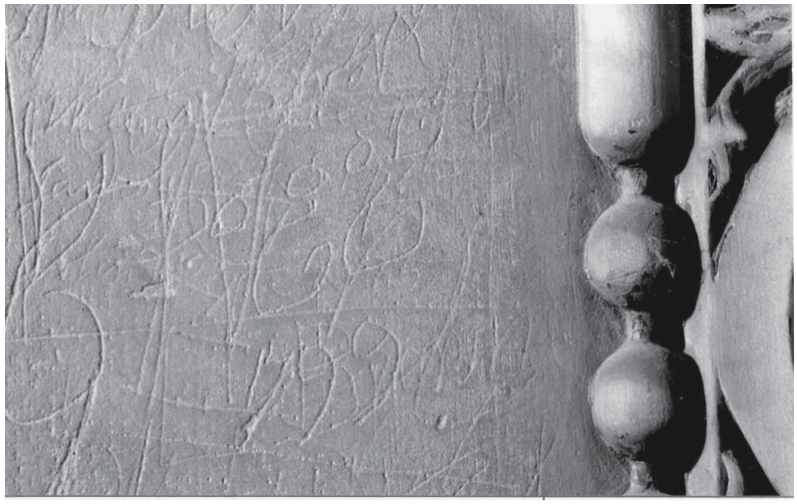


*Fig 43 Graffito 25 group, neg 16003026*


*Fig 44 Graffito 26 group, neg 16003027*

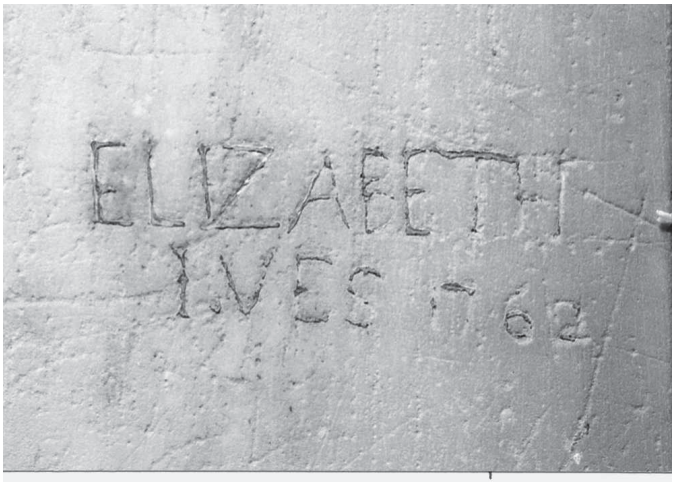



*Fig 45 Graffito 27, neg 16003028*

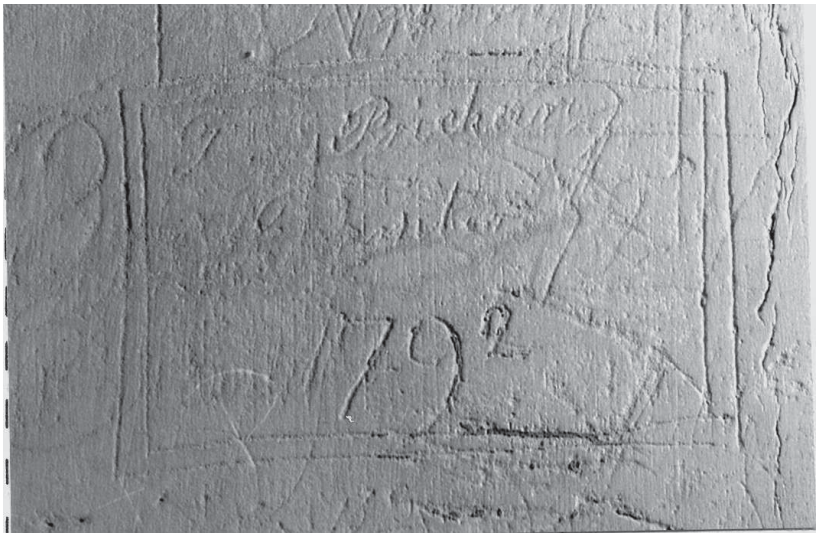



*Fig 46 Graffito 28, neg 16003029*

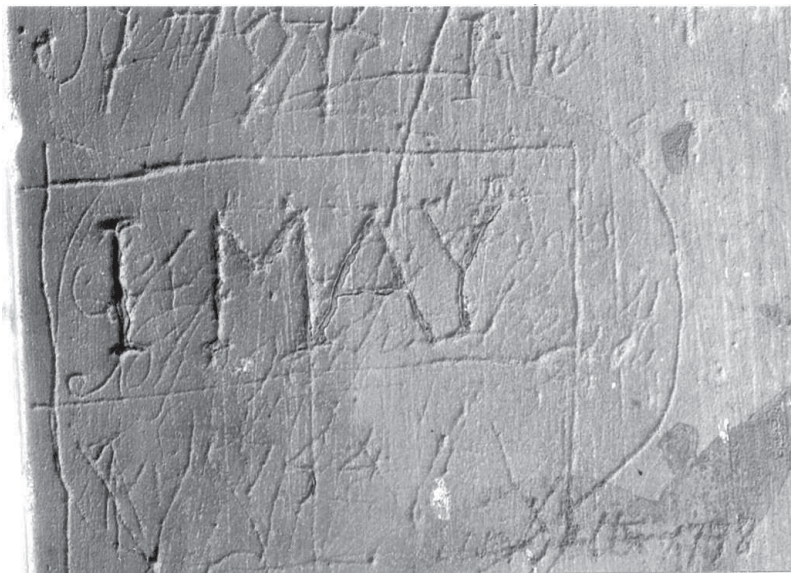


*Fig 47 Graffito 29, neg 16003030*

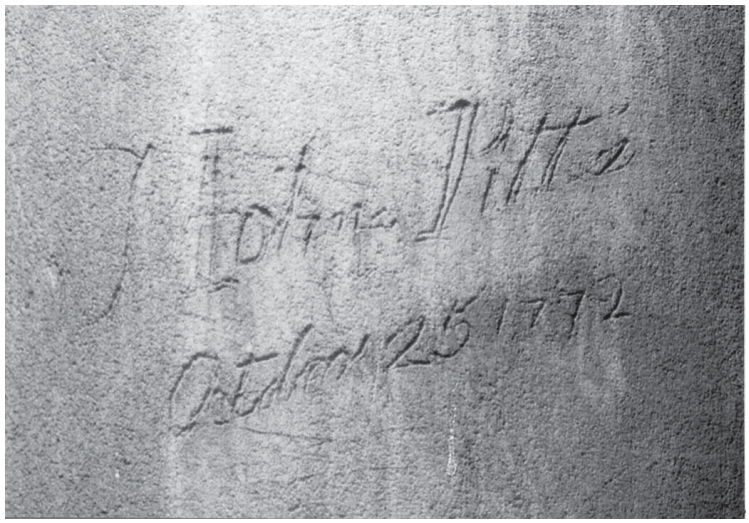


*Fig 48 Graffito 30, neg 16003033*

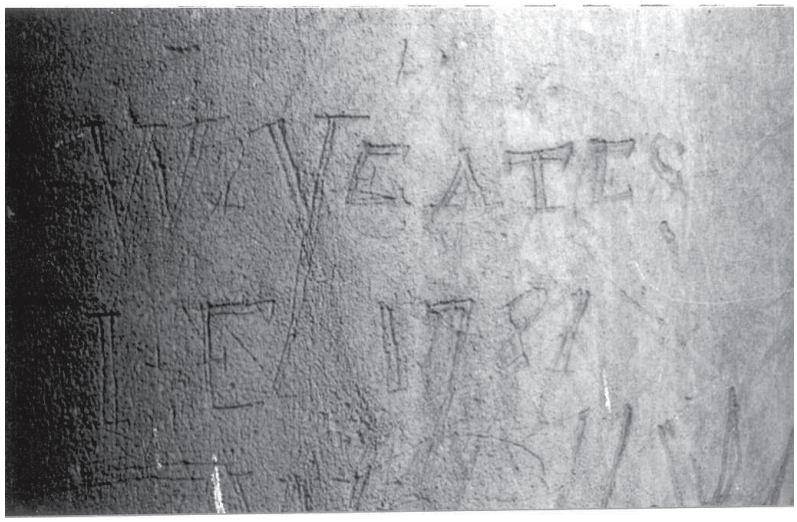


*Fig 49 Graffito 31, neg 16003035*

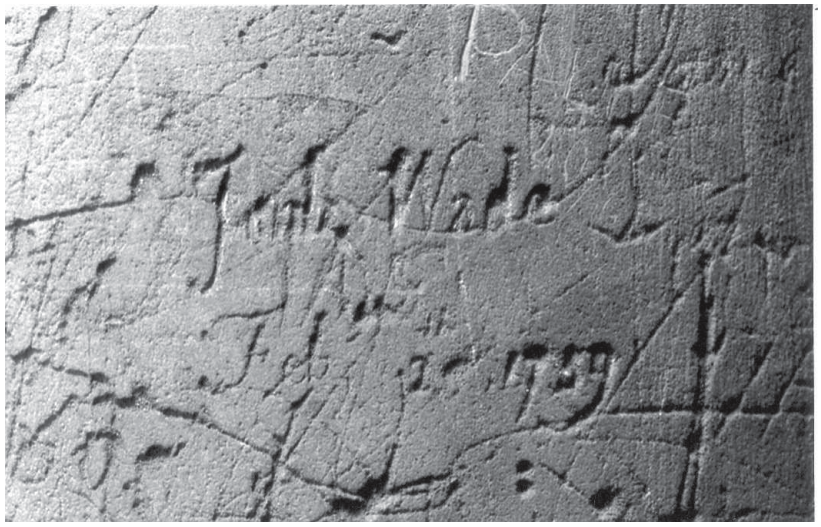


*Fig 50 Graffito 32, neg 16003036*

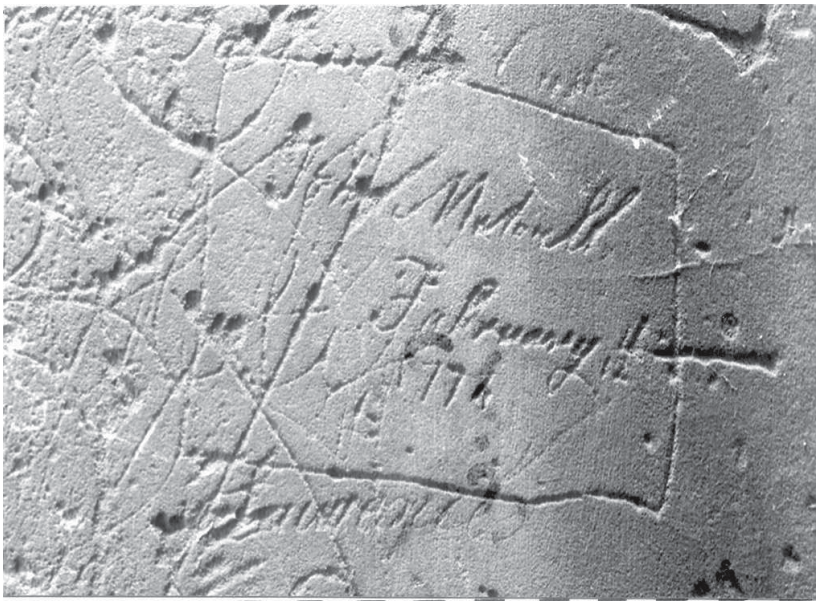


*Fig 51 Graffito 33 group, neg 16003037*

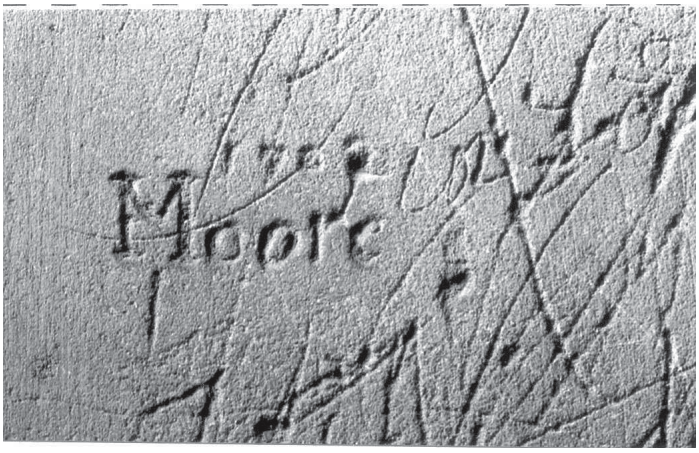



*Fig 52 Graffito 34, neg 16003038*

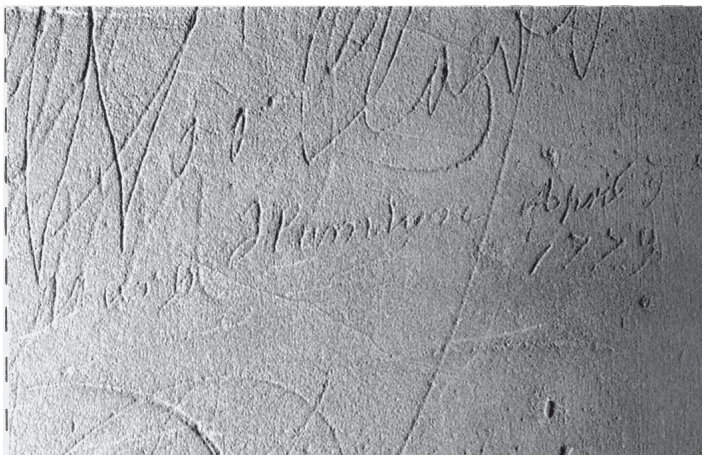


*Fig 53 Graffito 35 group, neg 16003039*

*The inside of the dome of the south-west tower*

The cleaning and repair project also included inspection of the south-west tower, where one capital was to be renewed. This disclosed some more graffiti inside the dome of the tower (Fig 54).

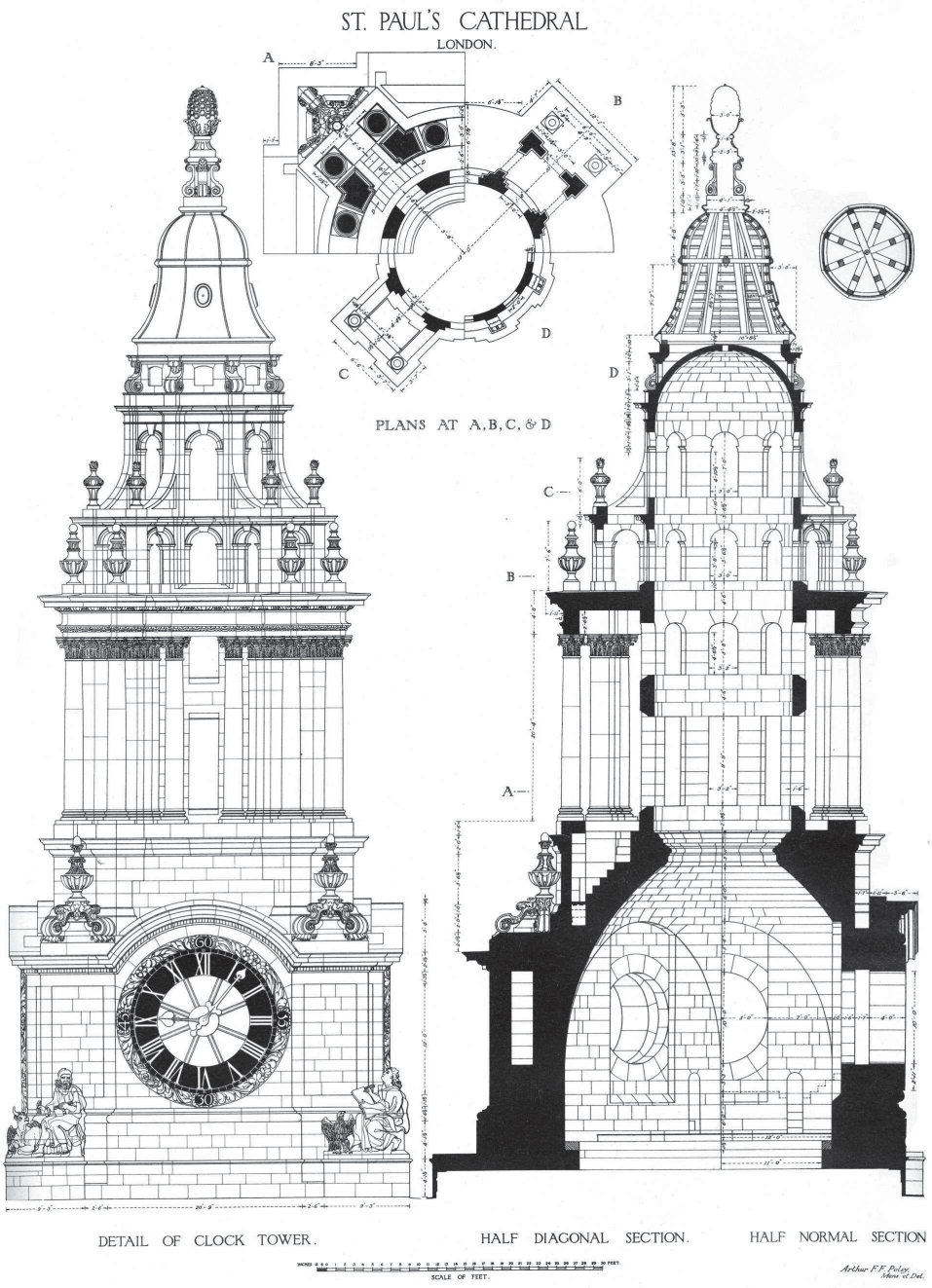



*Fig 54 Elevation and section of the south-west (clock) tower by F E Poley (1927); the location of the painted graffiti shown in the following figures is the inside of the dome, shown in the section on the right*


*Fig 55 Graffito 36 group, neg 16003048*


*Fig 56 Graffito 37 group, neg 16003049*


*Fig 57 Graffito 38, neg 16003050*


*Fig 58 Graffito 39, neg 16003051*

Several initials, names and dates were inscribed with white paint on the soot-blackened ashlar of the inside of the dome (which has been left uncleaned again) (Fig 55 to Fig 58). The two dates are both 1788, indicating that some kind of inspection or repair was undertaken on the south-west tower in that year, during the long Surveyorship of Robert Mylne (Surveyor 1766–1811) (Stancliffe 2004, 293). No further research has been undertaken for the present report.

## Part 2: Relaying and repair of the west steps

### *Documentary evidence for the west steps*

The traditional story of the design of the steps is given by Downes (1988a, 138); I have not found all the sources for this. The present design with 'squared' lower side flights reproduces what appears to have been Wren's original design, present from 1675. Samuel Fulkes made a model for the steps in October 1708 (* ref) and it is supposed that this model was of the squared form. But then this design was abandoned and a second design actually built, in which the lower flight had flared, curving sides. In 1872 Penrose rebuilt and relaid the steps, changing the design of the lower flight to the present squared form, which he believed was Wren's original intention.

The vault for the west steps began to be constructed in 1708 and continued throughout 1709 (WS XV, 167, 171, 175). The brickwork beneath the steps was laid by Richard Billinghurst (who also laid the bricks in the dome cone and the nave saucer domes); he was paid for the substructure of the steps in March 1709 (WS XV, 174). Fulkes and Kempster each laid half of the Irish marble steps (WS XV, 180).

Kempster was paid in 1711 or 1712 for constructing the two side walls for the steps (WS XV, 205). Payment for two sets of railings 'with scroles and spikes and fluted columns' for the west steps in June 1710 (WS XV, 189). These are presumably the curved railings on the lower steps which are shown in engravings.

The completed steps appear on the plan of all the church floor probably by William Dickinson, undated but probably of 1710, and a smaller plan of the west end and its environs which is by Dickinson and dated 24 February 1709/10 (Downes 1988a, nos 202–3). It also appears on the plan of the completed church floor, probably by Dickinson, which is in Guildhall Library (Fig 59; Dickinson 1988a, 48). The general arrangement of the space outside the west end is shown in paintings and engravings from the middle of the 18th century. One extract from a painting by Canaletto of 1754 is given here as Fig 60, and a view from the south by Malton, around 1790, has been given above as Fig 10. The Canaletto painting shows the context of the earliest of the graffiti around the west door, which are also of the 1750s.

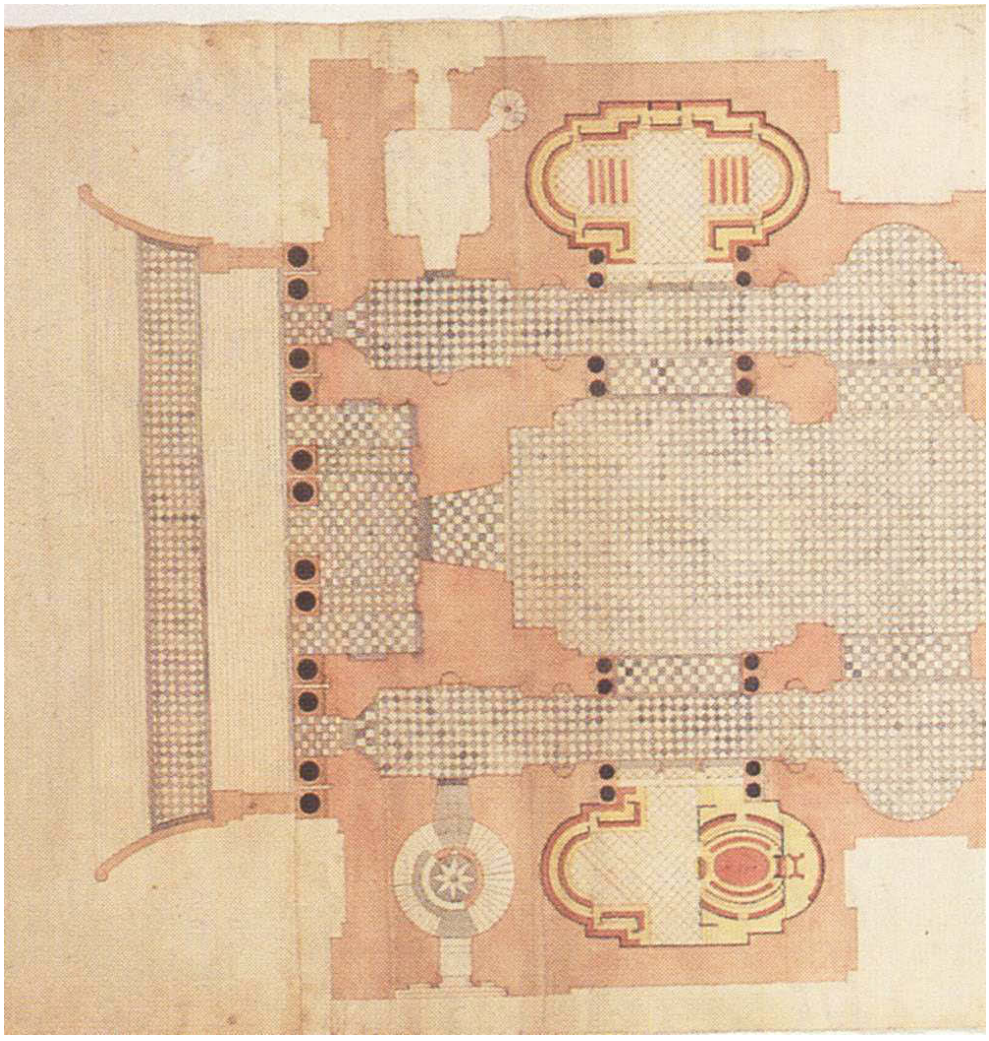


*Fig 59 Detail of the floorplan of the completed cathedral, probably by William Dinkinson (original in GL, now LMA: from Downes 1988a, 48)*

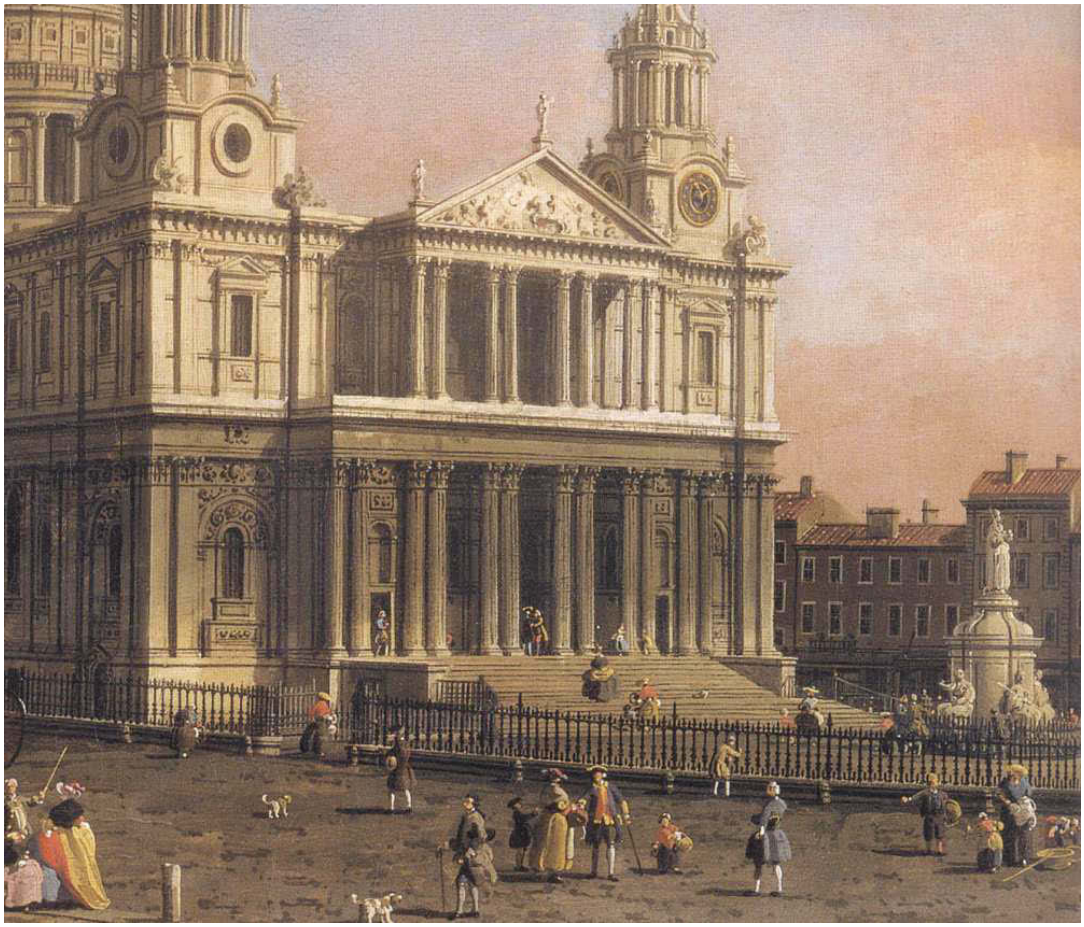
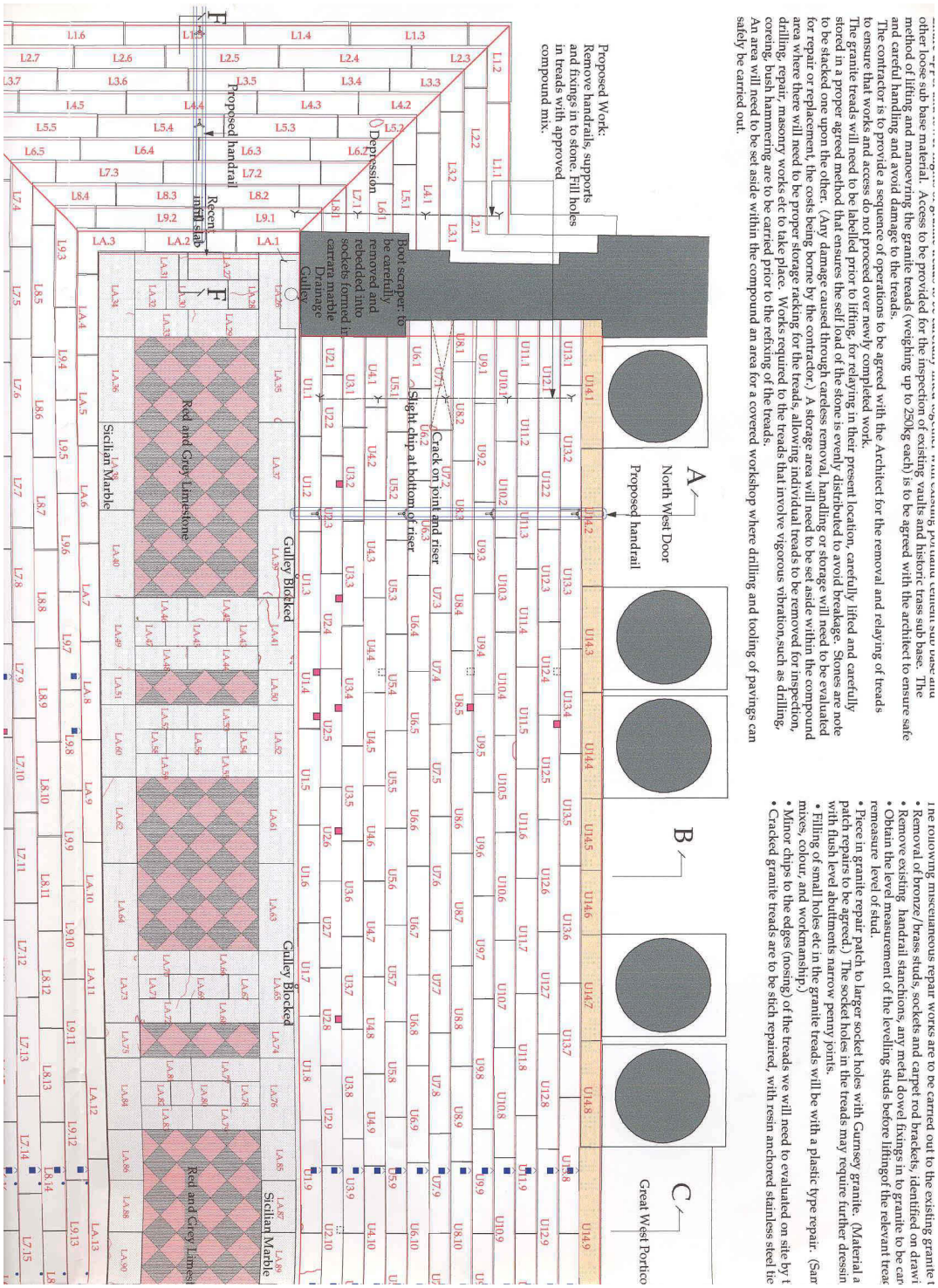


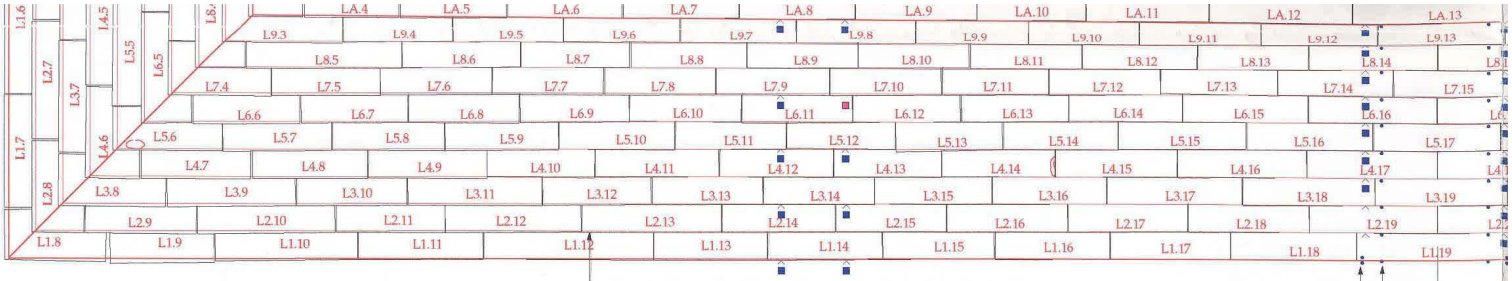
*Fig 60 An extract from the view of the cathedral from the north-west, painted in 1754 by Antonio Canaletto (Yale Center for British Art; from Keene et al 2004, fig 30)*

***The relaying and repair project***

The proposed setting out and improvements plan for the west steps was detailed in a drawing of November 2002 by Martin Stancliffe Architects (Fig 61, kept in paper form in LAARC; reproduced here in four parts, a-d).

*Fig 61 Proposed setting out and improvements plan for west steps, Nov 2002 (MSA drawing SP2869) [in paper form in archive report in LAARC; here in four parts, with north to top in each case]*





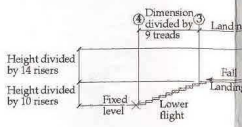

| Key | | Proposed Works: |
|---|---|---|
| Chips and Cracks | | Chips to be evaluated on site and filled with agreed repair compound as directed or matching patch repair Cracks to be evaluated by architect once stones are removed and stitched or tie repair as directed. |
| Hole in riser | | Holes in risers to be filled with an agreed repair compound or matching granite patch repair. |
| Cut out in tread | | Cut outs in tread to be filled with an agreed repair compound or matching granite patch repair. |
| Bronze fixtures | | Remove bronze fixings, hand to Clerk of the Works. Fill the holes in granite treads with approved compound or matching granite inset plug or patch repair. |
| Missing bronze fixtures | | Fill holes with approved compound matching granite inset plug or patch repair. |

Existing Materials

| | |
|---|---|
| Grey limestone (Brunflo Sweden) | |
| Red limestone (Brunflo Sweden) | |
| Sicilian white marble | |
| Top step | |
| Granite<br>Proposed stainless steel<br>Stitched repair of cracked steps granite treads | |

LANDING: Stones referenced LA, excluding Granite treads.
Entire landing marble and limestones to be carefully lifted, set aside for inspection by the architect and clerk of the works (for possible retention by the Cathedral Works Department). Removal of concrete sub-base layers to expose brick vaults and historic trass bedding/fill. Following inspection and grouting works to the vaults, refered to elsewhere, relay new sub base, bedding and paving as described on detail drawings.
The replacement paving is to follow the stone layout patternand jointing of the existing stones. Joints are to be butt joints, stone dimensions on plan are to replicate the existing, subject to minor variation resulting from the reset steps. Stone and marble to be 60mm thick, bush hammered followed by light honed finish, to approved sample. Stones to be: Red- Rouge Griotte (Pisani), Grey- Belgian fossil (Pisani), White Carrara marble CD grade (pisani).
Tolerances: dimensional variation of stones will be kept to an absolute minimum in order to ensure the butt joint detail required, the rubbing down of stone on site may be required to achieve the standard. Workmanship of the very highest standard will therefore be required to achieve the standard required.
TOP STEP: Stones reference U14-
Carefully lift and set aside for storage and inspection the histric "Wren" period top step. Replace as diected with replacement Irish marble treads.

SETTING OUT PRINCIPLES :
For further details of setting out of se
The setting out of the proposed steps
paving. From these fixed points the r
Across the steps North to South there
between sections.
It is improtant to note that the presen
phenomenom is
refered to as entasis and is an essenti
setting out proposal provides levels a
the contractor at min. 2m intervals lo
lines in the relaid stepswhere existing
It should also be noted that the west
in levels of the west front and steps.
Given the constrained nature of the a
of fixed dimension the contractor wil
adjusted to suit the site constraints.




Section 1:200

ıe existing granite treads:
dentified on drawing. To be cut out by a mason.
to granite to be carefully removed and voids filled.
of the relevant treads and after relocation of treads

ranite. (Material a d workmanship samples for these
ıire further dressin to enable a neat repair to be carried out

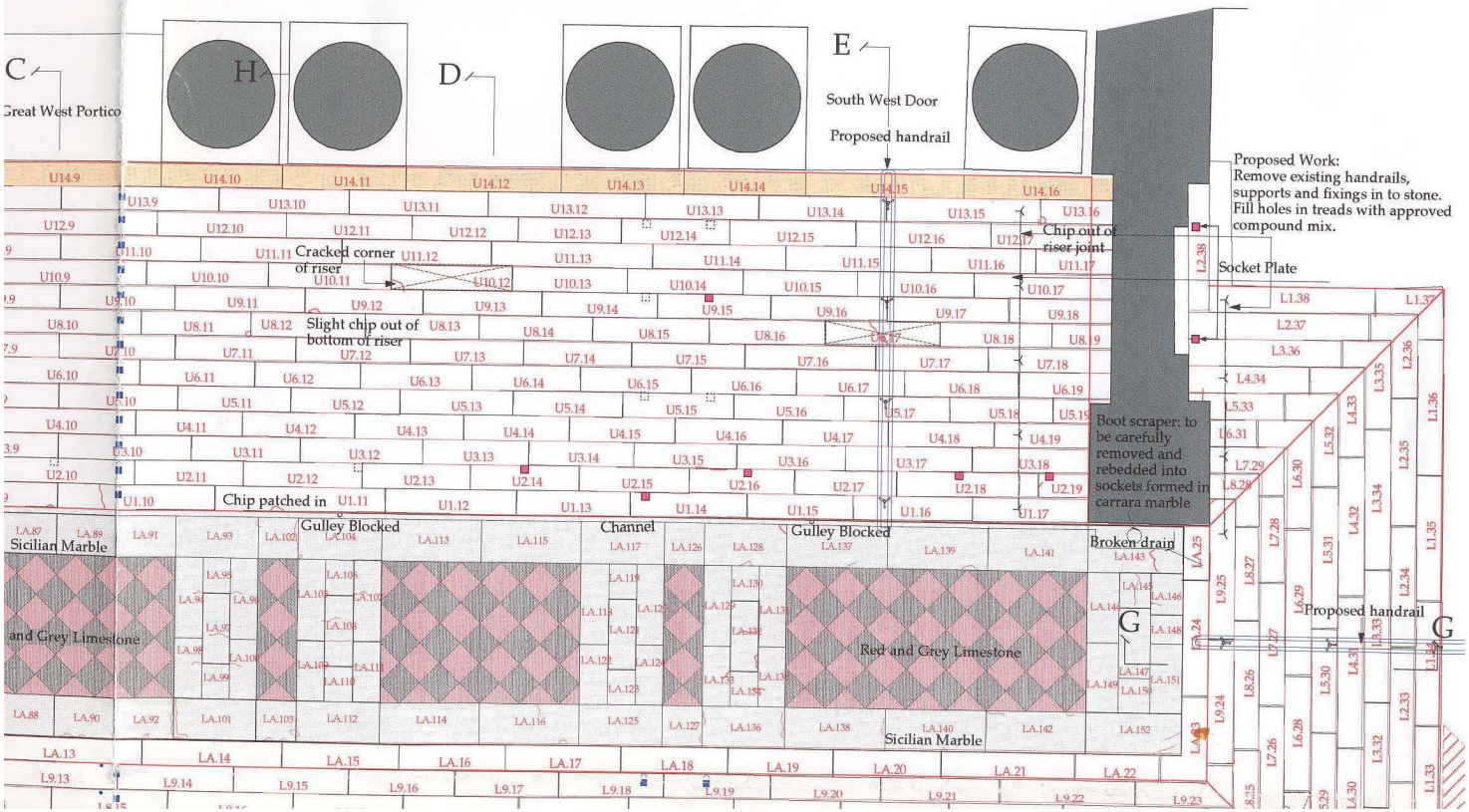
c type repair. (Samples for plastic repairs to be agreed;

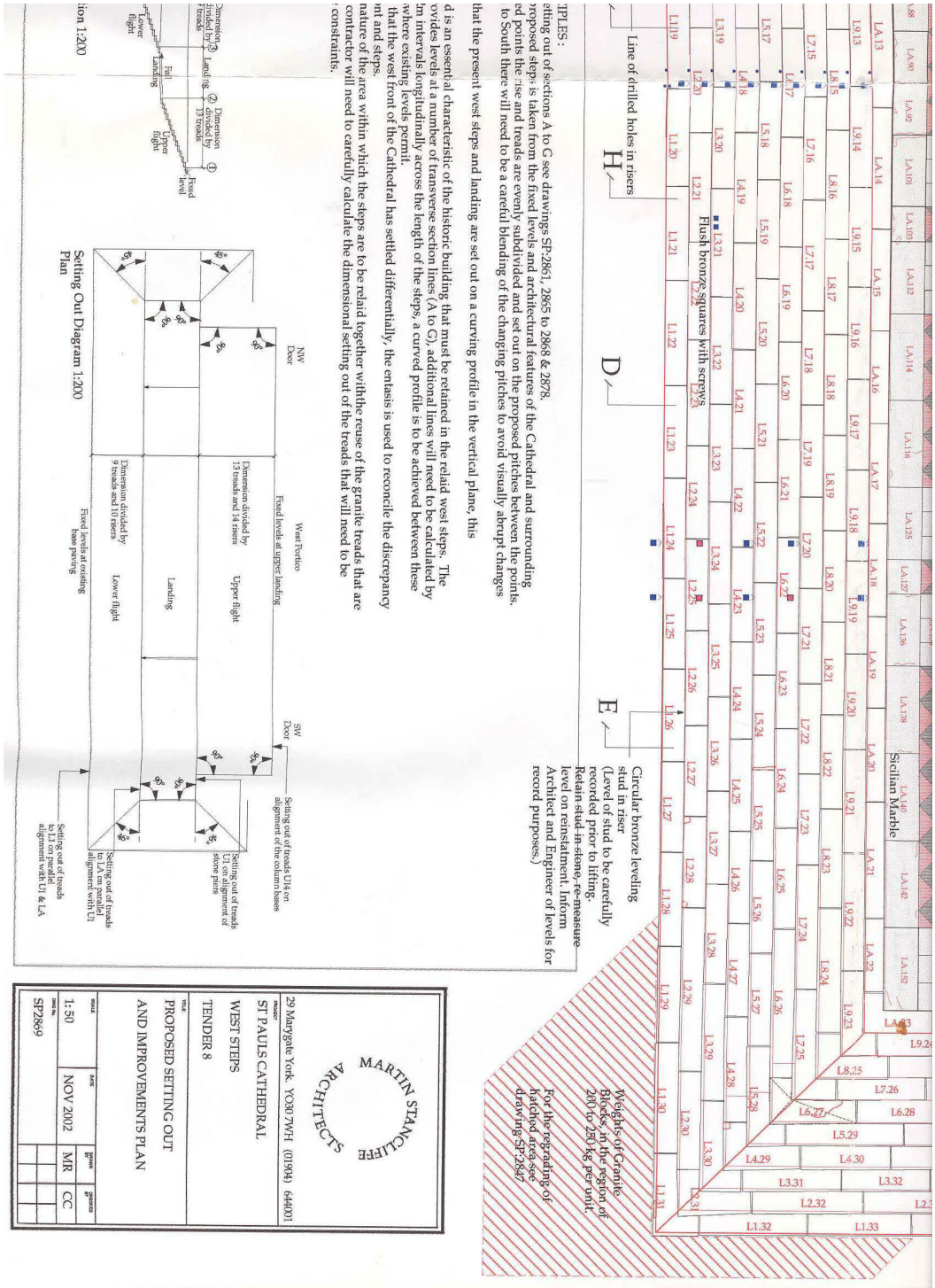
ıluated on site by the Architect for repair.
d stainless steel tie cored through the tread sections.

DO NOT SCALE FROM THIS DRAWING
THE CONTRACTOR IS TO CHECK ALL DIMENSIONS ON SITE
THIS DRAWING IS SUBJECT TO COPYRIGHT

continued
HANDRAIL FIXINGS

- The stanchions to the new handrails will need three dowelled fixings into the granite. Sockets will need to be drilled out of the granite for these fixings to a depth of 75mm.
- The nosing markings will need to be 25mm diameter at max. 100mm centres, drilled out of the granite to a depth of 25mm with a 22mm bronze or contrasting granite plug insertedand resin bonded into the socket.
- Fibre optic lighting scheme to the handrail. This will require a route for the fibre optic cables running from a light box situated in the under croft, through the vault structure to the handrail. (The route will need to be cored through the under croft structure (upvc sleeved) and treads to a suitable riser within the handrail stanchion.






The method statement for relaying and repair of the west steps, and details of investigative works by the Surveyor, are given in Appendix 1. Here also is given Penrose's [lan of the west steps before his reconstruction (p.4 of the appendix; plan in SPFA). The ;project proposal is given in detail in Section 5 of the appendix.

A survey of the steps was undertaken by the architect, and this has been edited to form Fig 62 and Fig 63.

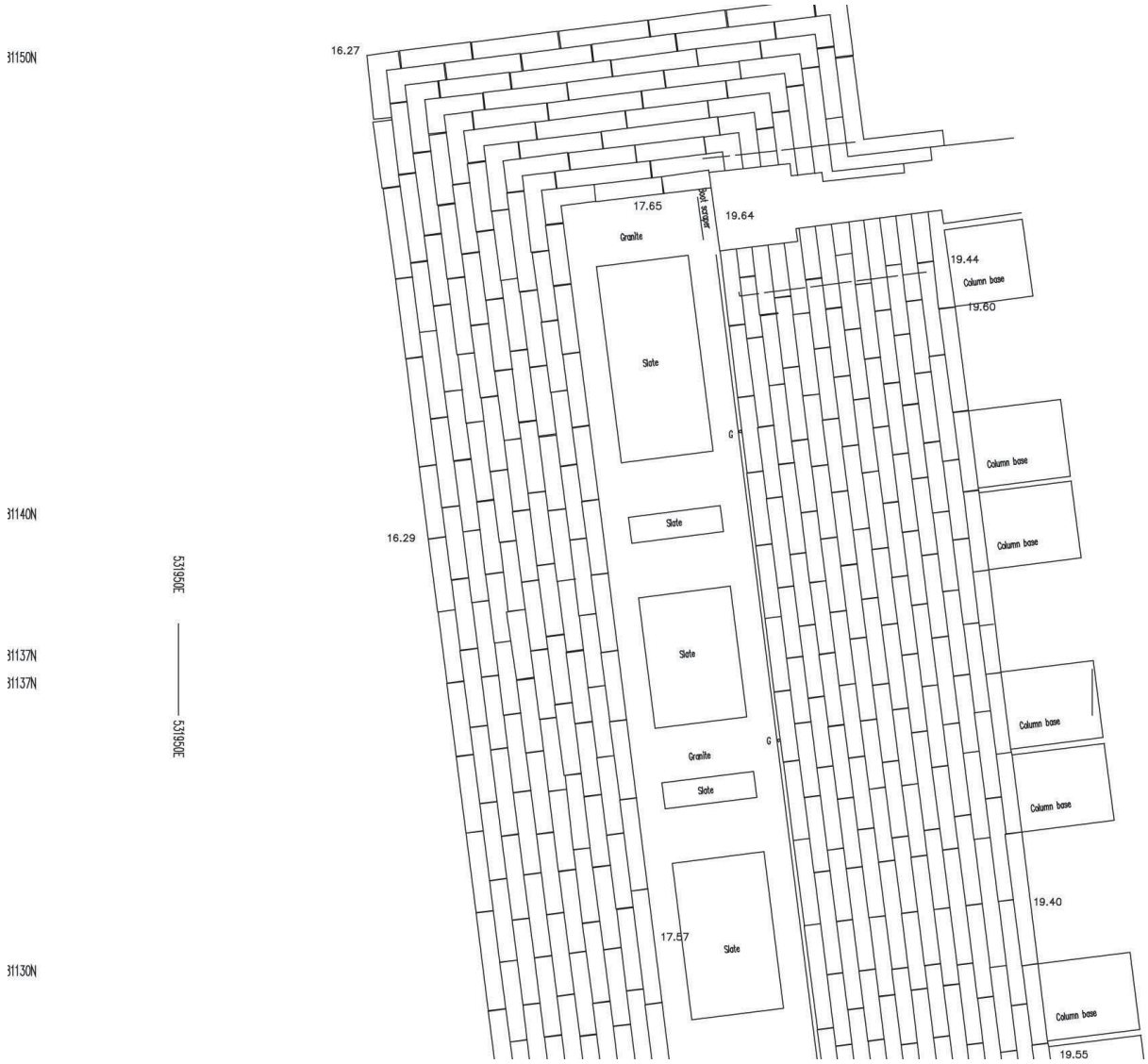



*Fig 62 Survey of west steps, N part (PMT). The original CAD drawing has levels on every block of each step*

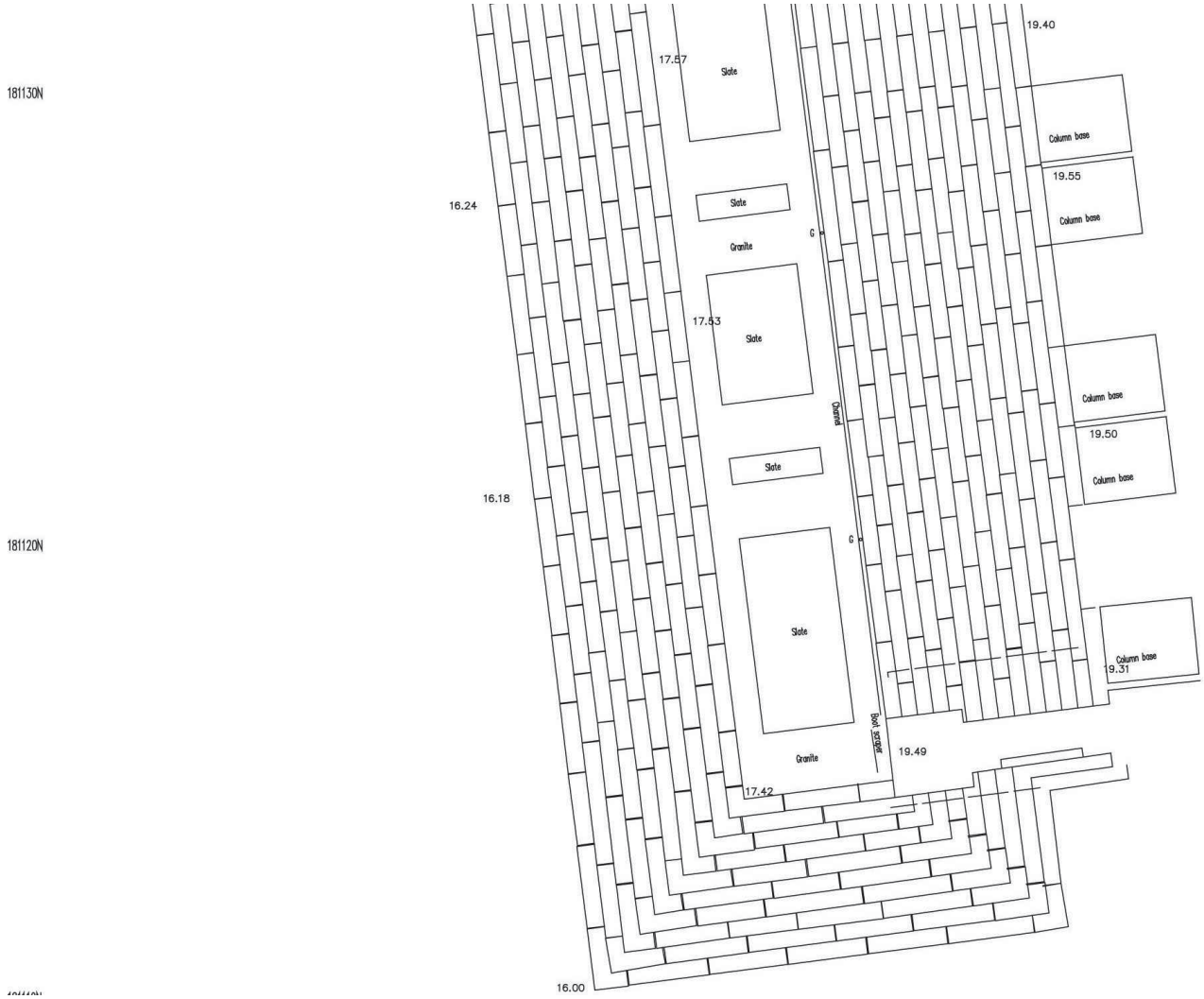



*Fig 63 Survey of west steps, S part (PMT)*

*Fig 64 The west steps from the south-west, with the majority of steps removed; those on the right remain from the pre-restoration arrangement*

Fig 64 shows the site from the south-west, and the manner of working; the majority of the steps were removed, but those at the south end left in place for public access to the cathedral via the south-west door (to the right in the photograph). The archaeological recording comprised only a general monitoring and recording of the brick substructure of the steps, including evidence of the original curved outer edges of the lower section (Fig 65-Fig 66).

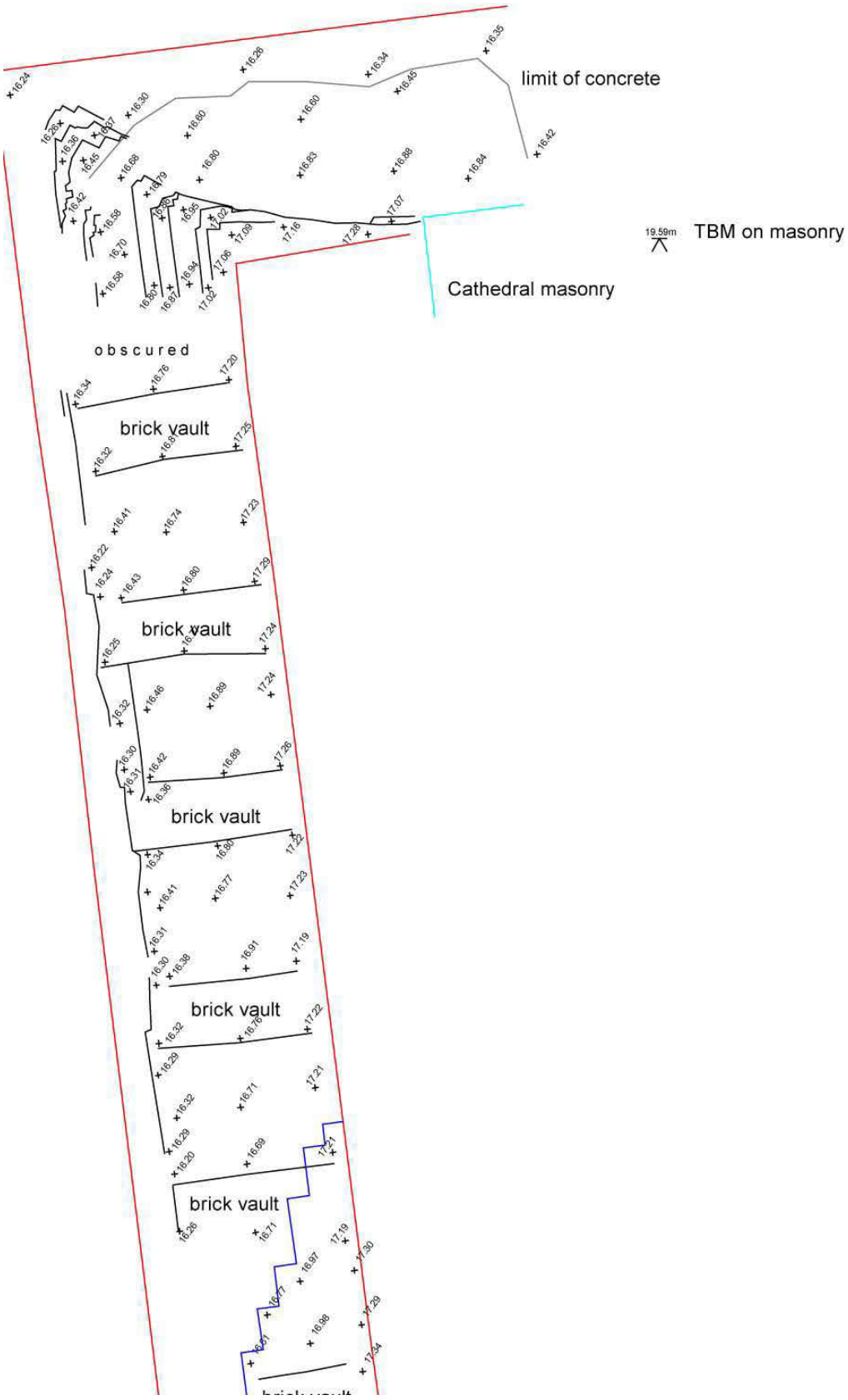



*Fig 65 MoLAS survey plan of the base of the Wren stair, N part (MoLAS)*

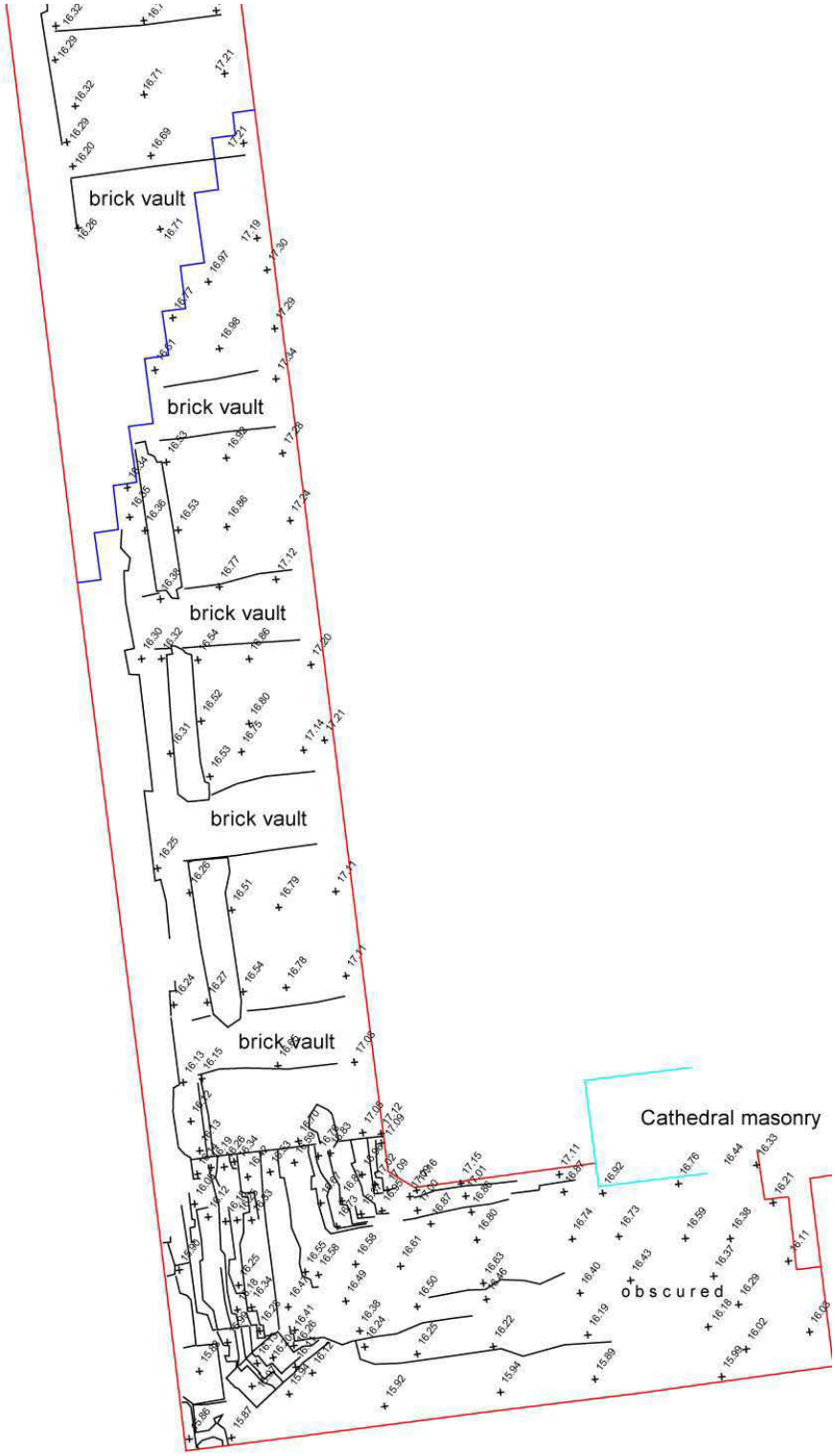



*Fig 66 MoLAS survey plan of the base of the Wren stair, S part (MoLAS)*

*Fig 67 The substructure of the Wren steps, looking south, with the pre-restoration steps of the south part still in place*

The substructure of the Wren steps was exposed, but not investigated (Fig 67), as it was not to be disturbed. It comprised a rough concrete screed probably laid down or amended by Penrose. This screed layer lay on top of the vaulting of the Wren stairs, which could only be roughly surveyed as it was greatly obscured by the screed. The sides incorporated one and possibly more low arches of brick to form tubes which ran into the vaulted area (Fig 70), but these were not investigated further.

*Fig 68 Original line of lower balustrade of west steps, north side, looking east*

*Fig 69 Original line of lower balustrade of west steps, north side, looking west*

*Fig 70 Brick arch in north side of foundation for lower balustrade*

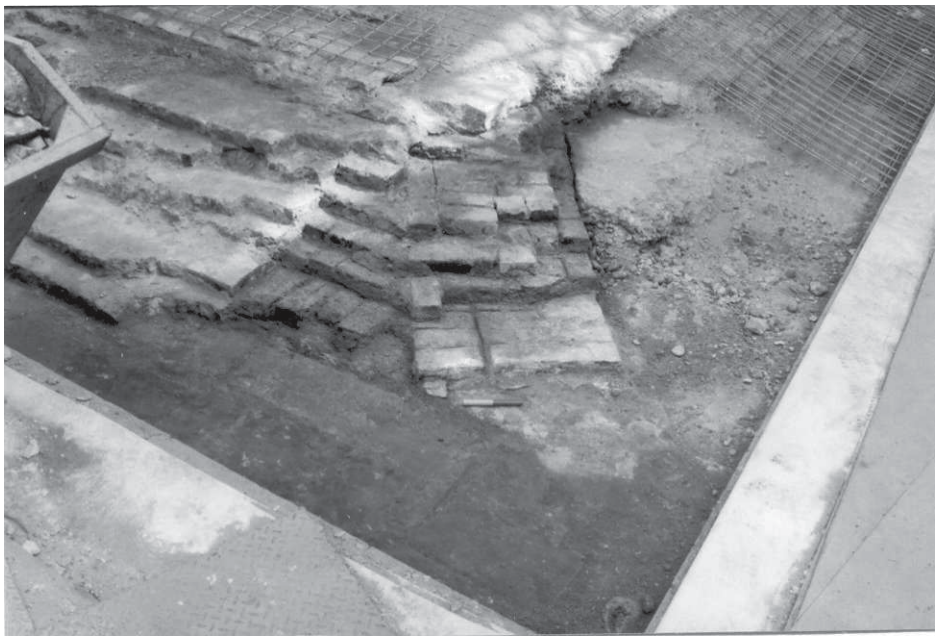


*Fig 71 Original line of lower balustrade of west steps: the south-west corner, looking north-west*

*Fig 72 Original line of lower balustrade of west steps, south-west corner, looking north; pre-1873 paving is showing on the left*

Periodic visits were made to monitor the cleaning work on the west front during the cleaning, but there was in the event little to record. An investigation of one of the iron

chains in the masonry of the north-west tower was recorded in five photographs, which are in the site photographic archive on contact cards.

## Part 3: Cleaning and repair of the Geometric Stair

### *Documentary outline of the Stair*

William Kempster the elder, brother of Christopher Kempster, built the Geometric Stair in the south-west tower. There is payment to him in November 1701 for a model for 'coveing of the great stayres at the south-west end of the church', but there is then a gap until the making of another model, perhaps of the whole structure, in February 1704 (WS XV, 80, 104).

Kempster's bills for much of the construction work on the stair date from June 1705. It includes payment for 'Cutting Way in the Portland ashler in south-west tower to let in the steps of great stairs' from Sept 1704 to June 1705. The accounts also record a payment of £20 to Kempster 'for Extraordinary Diligence & Care used in the said Carving and his good performance of the same' (WS XV, 122–4).

### *The cleaning and repair project*

The method statement for cleaning and repair of the Stair, and full details of the investigative works by the Surveyor and the cathedral engineer R Bowles, are given in Appendix 2.

Although monitoring visits were made by the Cathedral Archaeologist during the works, there was no need for extensive archaeological recording. Two photographs were taken by A Chopping of the museum: a view of the stair looking upwards, before cleaning started (Fig 73); and a detail of the investigation into the side wall of the stair, which revealed one of the iron shims which were used to tighten the joint of each tread of the stair within its seating in the wall (Fig 74). More details of this investigation are given in Appendix 2. The engineer has furnished an analysis of the stair which is given here as Fig 75.

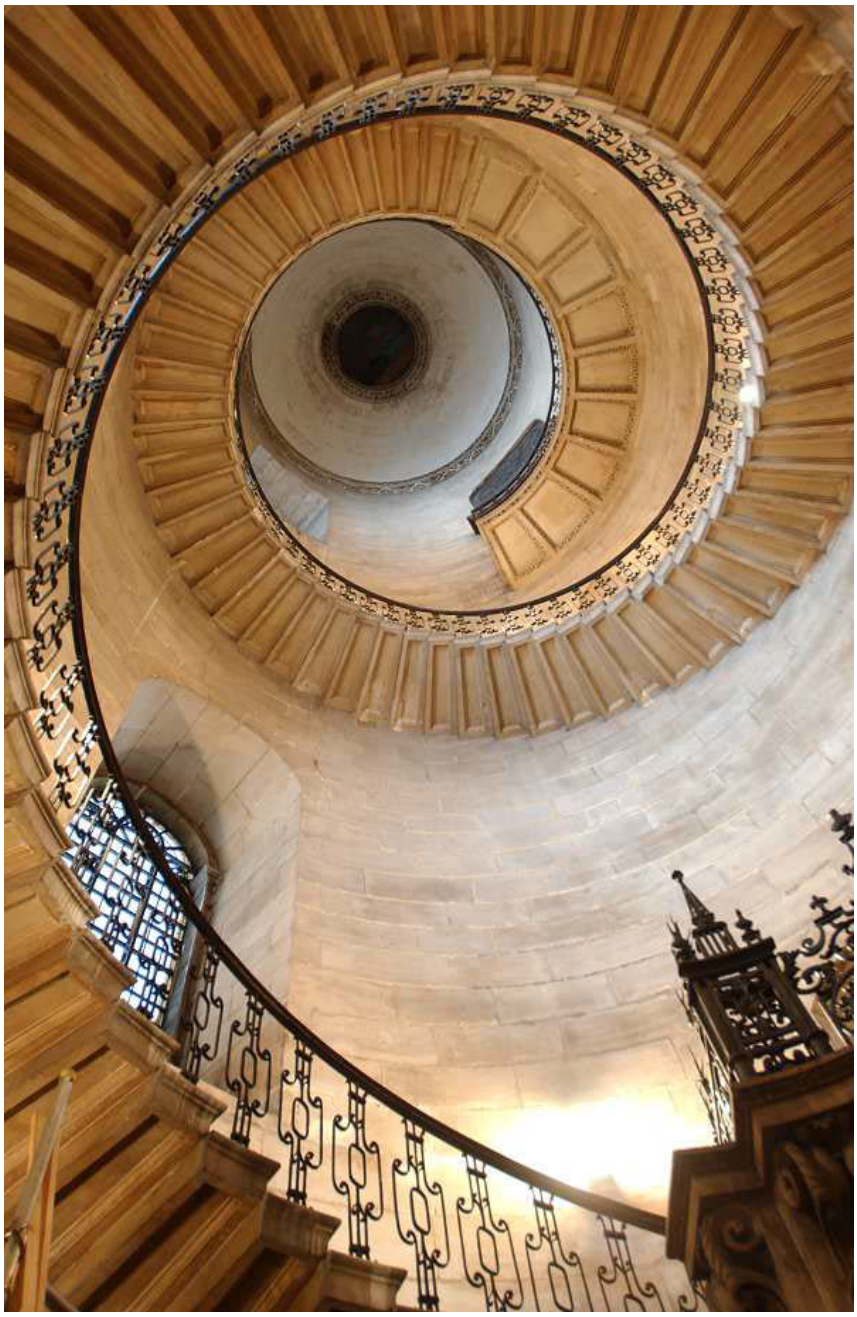


*Fig 73 Geometric Stair, looking upwards from the bottom, before cleaning started (A Chopping, MoLAS)*

*Fig 74 Detail of the investigation into the side wall of the stair. This shows the exposed iron shim which was inserted by Kempster to tighten the joint between the tread and the surrounding wall; each tread has its end inserted into the wall. Scale is 10 x 10mm units*

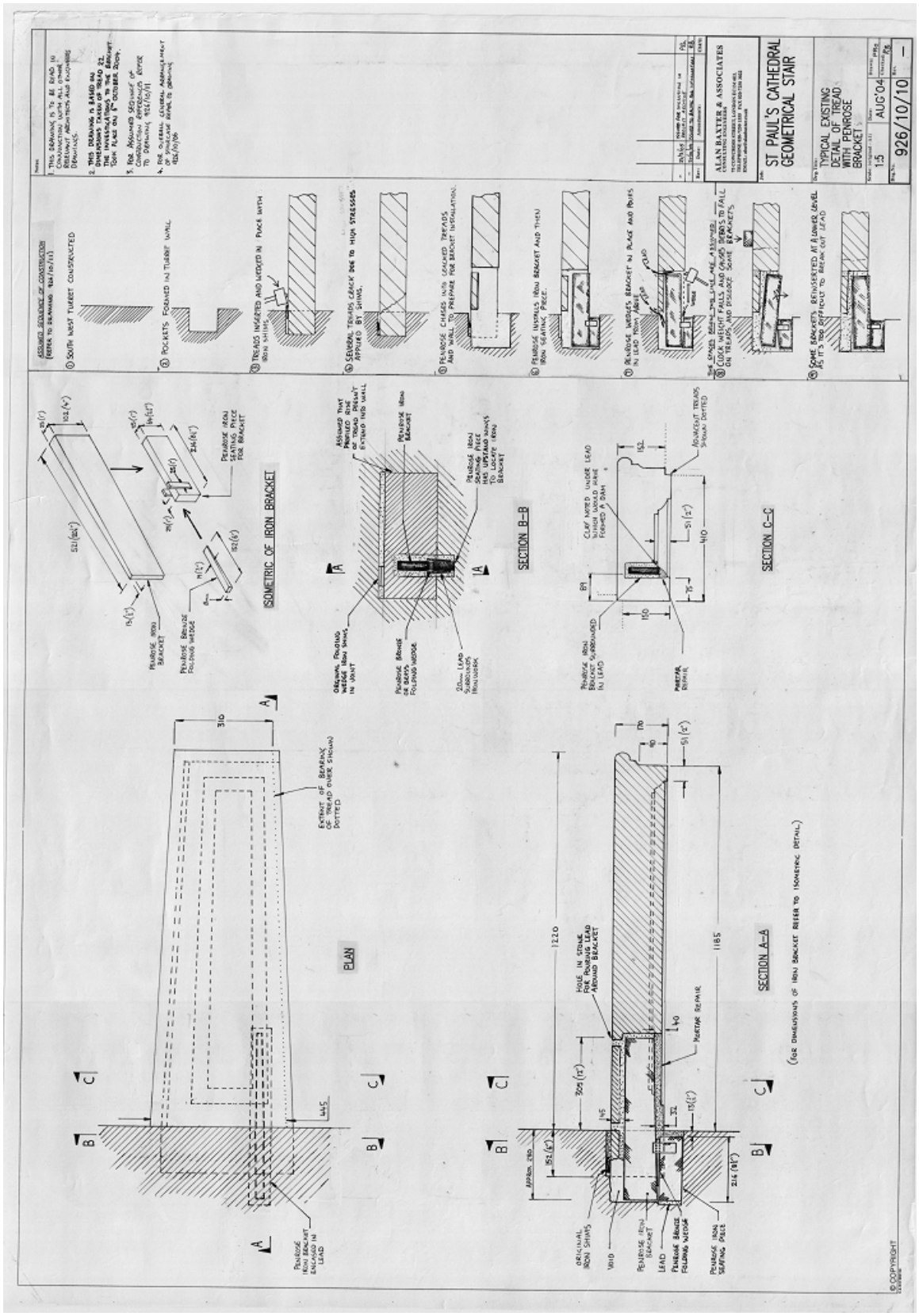



*Fig 75 Analysis of a step in the Geometric Stair by Alan Baxter and Associates, 2004 (drawing 926/10/10)*

**Part 4: Replacement of the revolving doors in the south-west and north-west entrances**

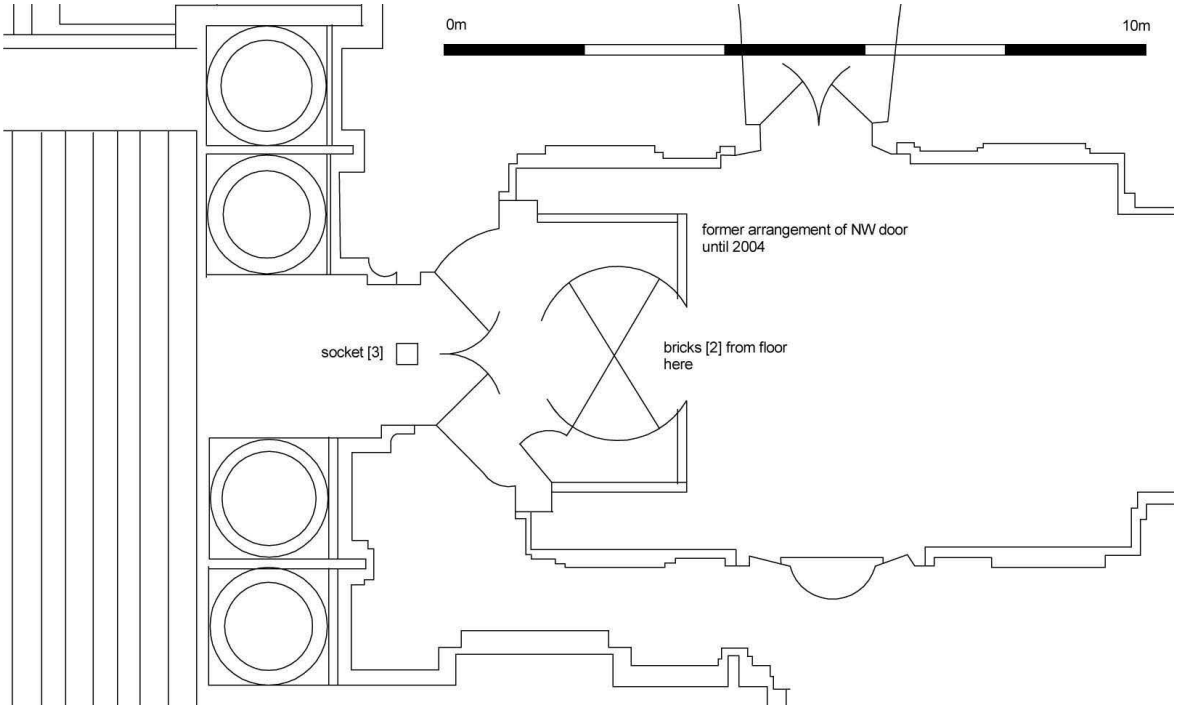



*Fig 76 north-west door refurbishment: location of socket [3] and general location of point from which brick samples [2] were recovered*

In 2004 the existing doors in both lobbies at the west end were replaced with revolving doors. This required the removal of small areas of brickwork from the floor of each lobby, to accept the foundations and fittings of the new doors.

In the north-western lobby an unexplained socket, context [3] lay in the floor of the entrance (Fig 76; Fig 77). It was formed on all four sides and at the bottom by stone blocks let into the brickwork of the vault of the underlying crypt. The internal dimensions were exactly 1ft (30cm) cube. Its purpose is unknown. It may have been a socket for a large vertical timber, such as part of some scaffolding, but its position within the threshold of the door argues against this. The top of the brick vaulting of the underlying crypt had been excavated for the works; bricks were sampled from the vault which was briefly exposed [2]. At the same time as this refurbishment, electricias were inserting new wiring into the vaulting above, that is the vault over the north aisle, and a brick from that vault was recovered by Emma Hardisty of Martin Stancliffe Architects; this is noted as context [4]. The specialist report on these bricks by Terence Smith follows.

*Fig 77 The NW doorway, with the former revolving door removed: socket [3], looking SW*

*Fig 78 The area of the crypt vaulting, within the NW doorway, which had to be removed to install the new revolving door, looking E; the crown of the crypt vault is shown. This is the site of the sampled bricks [2]*

### *Sampled bricks*

*Terence Paul Smith*

Two complete bricks from context [1], the substructure of the original west steps, two half-bricks from context [2], the vault over the crypt, and one almost complete cut brick from context [4], the vault over the north aisle, have been examined. The top of the crypt vault (context [2]) was laid *c*1688. The west steps (context [1]) date from 1708. The vault over the north aisle (context [4]) dates from the first decade of the 17th century.

The standard MoL descriptions of the fabrics in this report are as follows:

**3032** Red or purplish red, often with yellow surface tinge; hard texture with yellow or white carbonate specks and often with dark organic inclusions or voids where these have burned out during firing

**3033** Orange or red; soft, sandy with moderate quartz and black iron oxides

**3034** As 3032 but with white or yellowish streaky inclusions

**3047** Orange; fine sandy with common quartz and dark red iron oxides and with distinctive fine moulding sand on surfaces

The bricks from contexts [2] and [4] are in a fine version of MoL fabric 3033, close to fabric 3047; that from context [4] is similar but with a few small silty inclusions. Dimensions of the bricks are given in Table 2. All are hand-moulded products with sharp arrises and quite smooth faces. They are of high quality, superior to the general run of fabric 3033 bricks. Occasional strike marks are visible on the upper bedfaces. One from context [2] has particularly smooth faces, and one header and one stretcher face are very slightly vitrified, the result of slight overfiring in the clamp or kiln. That from context [4] has been cut, most probably with a brick-axe, removing most of one bedface and rather more than half of a stretcher face. This gives a broad sloping face so that the brick could serve as a springer in an arch or for some similar purpose; or it may be that the brick was cut simply to enable it to fit in an awkward space within the vault ceiling. The brick-axe – a sort of double-ended chisel with a central circular section used as a handle – was the normal tool for cutting bricks from the Middle Ages onwards and is used as an apt symbol of the craft of bricklaying on the shield (twice) and in the crest of the arms of the Worshipful Company of Tylers and Bricklayers of the City of London, granted in 1569 (Bromley and Child 1960, 246–8; Smith 2003, 10–11). The bricks do not have sunken margins, and indeed their smooth faces and sharp arrises almost certainly indicate that they were made as *stock* bricks rather than as *place* bricks. The latter were carried singly and still in the mould to the drying ground (the *place*, as it was called) and demoulded to lie flat for drying. Stock-moulded bricks were formed with the mould placed over a small wooden board (the *stock*) and were demoulded at the moulder's bench and carried in batches, the individual bricks separated by small wooden pallets, to the drying ground, where they were set on edge for drying. The latter procedure would also account for the absence of squodge marks along the arrises of the lower bedfaces, for these are not formed

on stock-moulded bricks. (For more on these two methods of brick manufacture see Smith 2001, 39–40; Campbell and Saint 2002, 172–8.)

| Context | L | B | T | Comments |
|---|---|---|---|---|
| [2] | ? | 98 | 65 | Sharp arrises |
| [2] | ? | 98 | 63 | Sharp arrises; some slightly vitrified faces |
| [4] | 215 | 98 | 59 | Sharp arrises; 1 bedface cut to form sloping face |

*Table 2 Dimensions of brick samples in fabric 3033 (mm); stock bricks*

The two bricks from context [1] are in MoL fabric 3032, although one of them has fewer organic/burned inclusions and rather more calcium carbonate than usual. Dimensions are given in Table 2. Both bricks have blackish surfaces, probably the result of slight overfiring. In that respect, they may be regarded as 'seconds'. But they were used in a utilitarian structure within the cathedral, the substructure of the west steps: for such an application they were entirely serviceable products.

| Context | L | B | T | Comments |
|---|---|---|---|---|
| [1] | 218 | 103 | 61 | Blackish surfaces |
| [1] | 222 | 108 | 66 | Blackish surfaces; fewer inclusions than usual |

*Table 3 Dimensions of brick samples in fabric 3032 (mm)*

The organic/burned inclusions – known as 'Spanish' at the time – are the result of adding ash and cinder, derived from domestic fireplaces, to the raw material. According to a document of 13 May 1714, the advantages of this were discovered accidentally, in Moorfields, 'about forty years since' – that is, in the 1670s (Cox 1989, 4, citing Lambeth Palace Library MS 2723, ff 21v–22). Thereafter, bricks of this sort rapidly superseded earlier types throughout the London area. The advantages included a saving on fuel, given extra point by the imposition of the Coal Tax to pay for the reconstruction of public buildings after the Fire. Like the redder bricks already discussed, though unlike most fabric 3033 bricks, these too were made as stock rather than as place bricks. Aesthetically, the newer bricks were valued for their dark red, almost plum, colour, which acted as an effective foil to the brighter red-brick dressings to doorways, windows, and other features, as on the former St Paul's Deanery in Dean's Court (1672), which must represent one of the earliest uses, and the St Paul's Chapter House (1712–14). (The brighter bricks, which could be easily cut and rubbed, were brought in from elsewhere, principally from the Weald of Kent.) The same building method was employed for some of the City churches, whether by Wren himself or by Robert Hooke, for example at St Benet, Paul's Wharf (1678–84 and 1692–3: Smith 2000, 14–16).

Indeed, bricks in fabric 3033 (and variants) were largely superseded, during the last three decades of the 17th century, by those in fabric 3032 (and in the related fabric 3034). From a letter written in 1708 to a friend on the Commission for Fifty New Churches, however, it is clear that Wren disapproved of contemporary (post-Fire) brickmaking practices. 'Brick-makers,' he avers, 'spoil the Earth in mixing [that is, presumably, adding the 'Spanish'] and hasty burning, till the bricks will hardly bear Weight'. And yet, he adds, 'the Earth about *London*, rightly managed, will yield as good Brick as were the *Roman* Bricks, (which I have often found in the old Ruins of the City) and will endure, in our Air, beyond

any Stone our Island affords' (Wren 1750, 319–20). Earlier, Wren, as a member of the Royal Society, would have been aware of the interest that the Society took at one time – albeit briefly – in the making of good quality bricks. In the immediate aftermath of the Fire, on 31 October1666, Robert Hooke, the Society's Curator of Experiments and a close friend of Wren, was directed at a Society meeting to 'make trial of several earths by burning them in a wind-furnace, to see, which kind would yield the best brick', although it is unclear whether this work was ever carried out or, if it was, whether it yielded any practical results (Cooper 1997, 163). Others shared Wren's concern about the quality of the post-Fire bricks (Lloyd 1925, 48–50), and there certainly was, on occasion, cause for concern: in 1719 the Middlesex Sessions heard that Peter Steel, a brick*layer* (not himself a brick*maker*) of St James Westminster, forced his apprentice, John Besswick, to make bricks in his master's cellar (George 1966, 416.) But such cases must have been rare, and the evidence of standing buildings and of bricks recovered during archaeological excavations shows that most fabric 3032 bricks were entirely adequate for the uses to which they were put.

Given Wren's attitude to them, on the other hand, it not surprising that he continued to use bricks closer to, and indeed of rather better quality than, the older sort, even in the early 18th century, when bricks in fabric 3033 and its variants had passed from general use in central London. That these particular samples are of such good quality – their fabric finer than many in fabric 3033 and their arrises sharp – recalls Wren's remark about the possibility of London bricks being 'as good … as were the *Roman* Bricks'.

What may at first be striking about these bricks at St Paul's is the use of such good quality products – fine fabric, sharp arrises – in locations where they were not 'on show'. Presumably, Wren's remark about 'bear[ing] Weight' is relevant here, for in vaults it is important that the bricks be strong enough not to break or crumble under the stresses that are put upon them. Good quality bricks, in MoL fabric 3047 and possibly imported from the Netherlands, were used even in the drains at St Paul's, firmly dated to the 1680s (Smith 1998, 42–4). This may be due to the fact that these finer bricks were less pervious, and therefore better suited to drain construction, than the fabric 3032 bricks. The latter were deemed satisfactory for the substructure of the west steps, where their ability to bear weight was not a serious consideration – certainly such structures would not be subject to the stresses set up within, say, a vault or a dome.

The particular value of these bricks, as of others from various works at St Paul's, is that they can be closely dated from the documentary records of the building programme. Further archival research may be able to determine the more precise sources of the bricks in question. The fabric 3032 bricks are generally regarded as local, although they were manufactured within a wide surrounding area, including parts of Middlesex and much of Thames-side Essex and Kent. The finer red bricks in fabric 3033 may have come from even further afield. Bricks used at Marlborough House, Pall Mall (1709–11) by 'Mr Christopher Wren' (that is, probably, Christopher Wren junior) were apparently brought over from the Netherlands to Deptford in ships that had been hired to take troops and supplies to the Duke of Marlborough's Continental armies (Bolton and Hendry 1930, 227). They are similar in colour, size, and surface texture to the fabric 3033 bricks from St Paul's, although it seems more likely that the import of the Marlborough House bricks was due to particular (military) circumstances. It is less likely perhaps, though not impossible, that the St Paul's bricks were imported. But even if Marlborough House is by Wren's son, the greater architect must surely have been involved in an advisory capacity, and the

provenance of the bricks serves to underline his worries about obtaining suitable bricks from within the London area.

## Part 5: Refurbishment of the floor of the OBE Chapel

### *Introduction*

The detailed method statement for refurbishment of the floor of the OBE Chapel, and details of the history of the Penrose design and the chapel itself, is in the Surveyor's project proposal which is given here as Appendix 3.

An archaeological assessment was undertaken by the Cathedral Archaeologist (Schofield 200*), parts of which are reproduced here to give further illustration of the approach to relaying the floor.

A plan of the east end of the cathedral at crypt level in 1929 is given here as Fig 79.

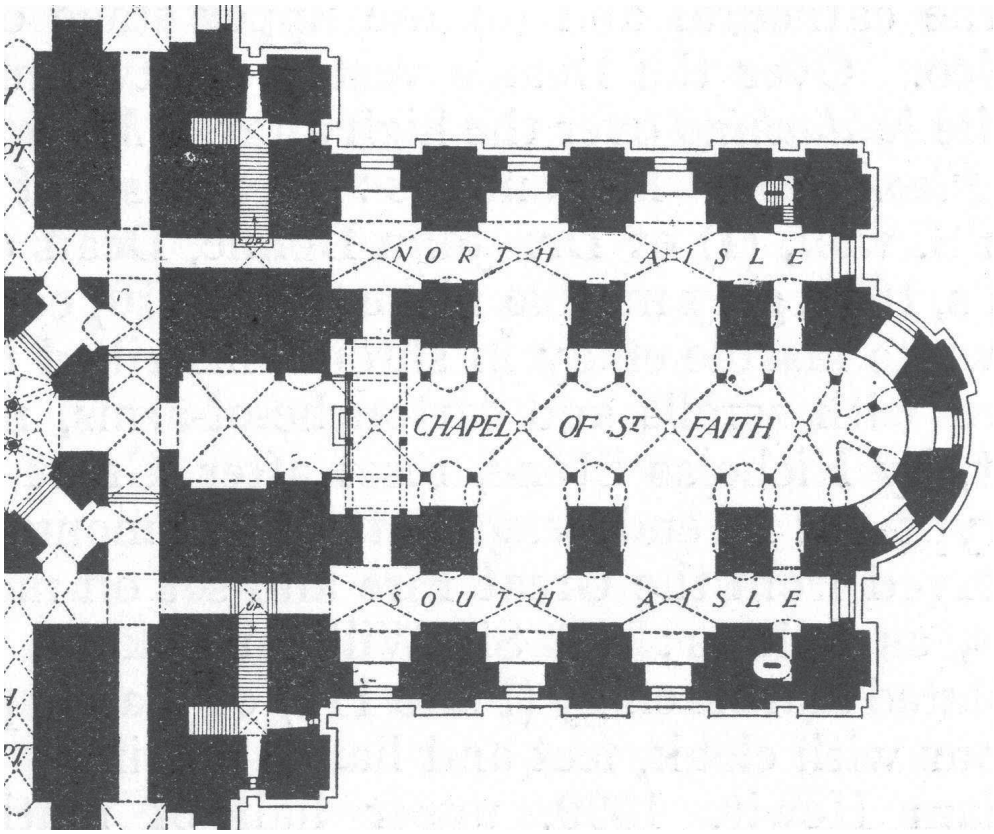



*Fig 79 Plan of the east end of the cathedral at crypt level in 1929, showing the pre-War arrangement and general character (RCHM 1929)*

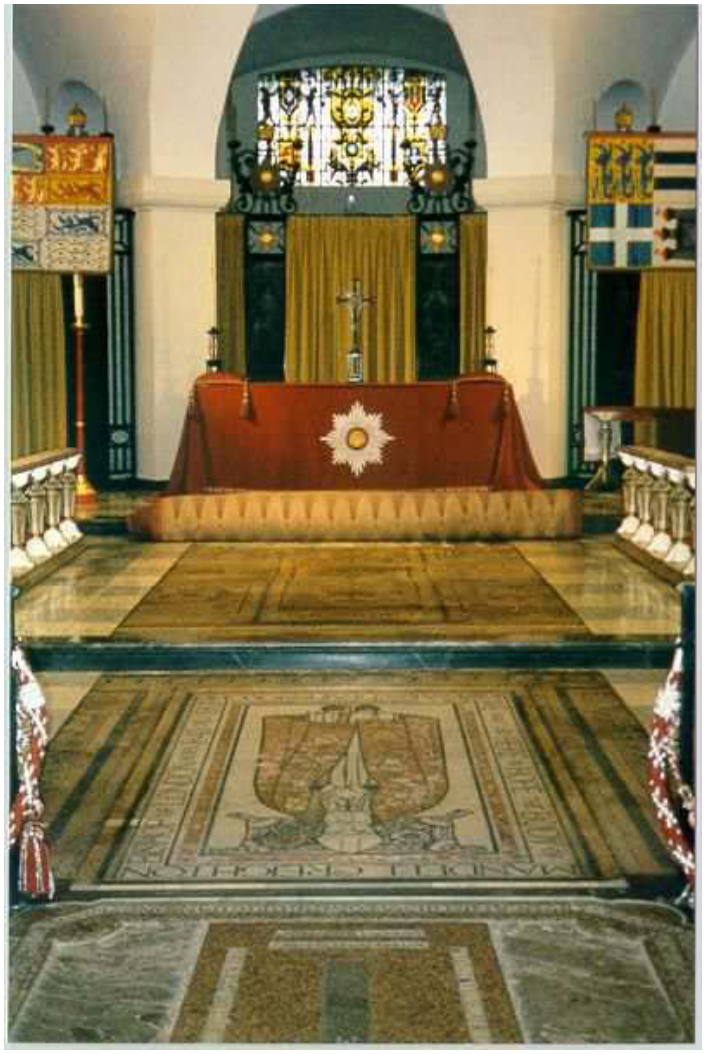


*Fig 80 OBE Chapel, looking east: the ledger of Bishop Creighton in the foreground, Penrose's mosaic on both sides and to the east, and the 1950s vinyl tiles (some of which have been removed)*

The protracted discussions about this project, which went through several different design proposals, is laid out in the Surveyor's proposal document of October 2002 which outlined the final proposal which was carried out. The general wish was to improve the floor of the OBE Chapel, which was a conglomerate of parts of the mosaic laid here by Penrose in 1875, the fine ledger of Bishop Mandell Creighton of 1901, and vinyl tiles of the post-War creation of the OBE Chapel (Fig 80; Fig 81).

*Fig 81 the exposed central panel of the Penrose mosaic, looking east*

The Dean and Chapter and the Committee for the Order of the British Empire had been carrying out a phased refurbishment of the OBE Chapel for the last few years. This has comprised the provision of new chairs, the removal of the existing organ, relighting, and the redecoration of the chapel. Martin Stancliffe provided a new wooden screen to form the western end of the chapel in 1994. A further phase was now envisaged to address a general unhappiness with the quality of finish of the floor of the sanctuary of the chapel, which was currently in vinyl tiles. These had been removed from most of the sanctuary floor, and substantial remains of the mosaic floor inserted by F C Penrose in 1875 were revealed (Fig 81). Also revealed is the decorated ledger stone of the burial of Bishop Mandell Creighton (1901), which must have been inserted into the Penrose floor.

The Surveyor proposed:

1. To expose, clean and leave in position the mosaics in the three apses to the ambulatory.

2. To lay a new floor in the ambulatory, to a pattern from Hopton wood and blue lias, on a new base up to 250mm deep, but keeping the present level.

3. To clean and conserve the ledger stone to Bishop Mandell Creighton.

4. In the western bay, to take up the surviving patches of mosaic on either side of the Mandell Creighton ledger and replace them with a stone floor, which would need a new base up to 250mm deep.

5. To store the surviving and removed portions of mosaic in the north nave triforium, to await proper housing there in the future.

*Fig 82 detail of the step between the central bay (left) and the western bay (right), looking south*

6. In the central bay, to clean and restore the central part of the mosaic, making up its eastern section where it has been damaged by the insertion of a step (Fig 82). This will be done with tesserae taken from the removed parts of the mosaic.

7. In the central bay, also, to replace the existing side panels of the mosaic with stone flooring, on the pattern of tasks 2 and 4 above, which will need a new base up to 250mm deep.

8. To renew the step between the western and central bays, and that between the central and altar bays, in blue lias.

9. To renew in blue lias, if necessary, the marble base to the wrought iron screens which divide the main vessel of the chapel from the ambulatory.

A small trial hole had been dug to a depth of about 300mm in the ambulatory behind the chapel altar. This showed concrete to its full depth, and one of the Cathedral staff

remembered laying that concrete. The archaeological assessment concluded that the question of intrusion into underlying archaeological deposits did not arise; but that the Archaeologist should monitor the works just to make sure.

***The Penrose mosaic***

The 'mosaic pavement' was designed by Penrose in 1875 and work commenced in that year or 1876, when he reports it as being in progress (Surveyor's annual reports). It was finished by June 1877 (Fig 83). The tesserae or cubes were made by women prisoners at Woking jail, but the four medallions of the evangelists (see the lion of St Mark, Fig 84) may have been done by professional mosaicists.

*Fig 83 View of the east end of the crypt looking east c 1900, with Penrose's floor in place and some of the pre-Fire monument fragments located against the north wall (RCHM 1929)*

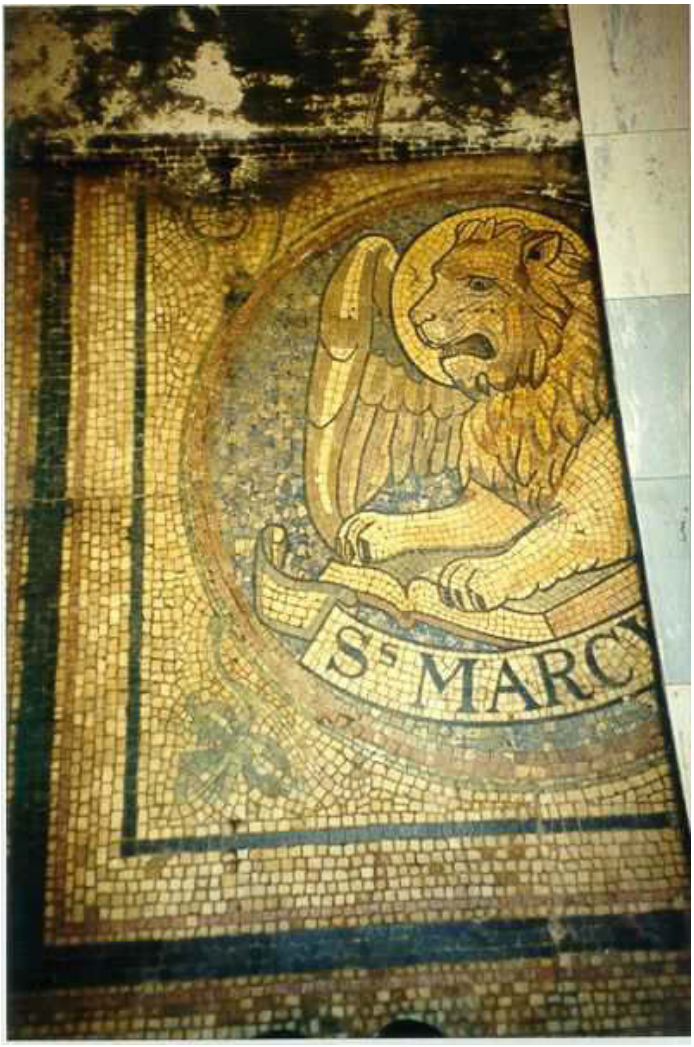



*Fig 84 Detail of the medallion of St Mark, at the south-east corner of the main panel of mosaic*

It was virtually certain that the present ambulatory floors of concrete (Fig 85; Fig 86) have totally removed the partial mosaics formerly in the ambulatory.

*Fig 85 View of the OBE Chapel from the south-west, showing the main bays and the south ambulatory (right)*

It also seemed likely that nearly all mosaic work in the apsidal altar bay has been removed. The extent of the mosaic work on either side of the Bishop Mandell Creighton ledger was not exactly known, as the vinyl tiles have only been removed for a short distance on either side. Thus the surviving area of mosaic was perhaps 25 per cent of the original area, when all the area of the ambulatory is considered.

*Fig 86 The north ambulatory passage, looking east; the concrete floor had been laid within living memory of cathedral works staff*

***Detailed proposals***

The architect proposed:

1. To expose, clean and leave in position the mosaics in the three apses to the ambulatory.
2. To lay a new floor in the ambulatory, to a pattern from Hopton wood and blue lias, on a new base up to 250mm deep, but keeping the present level.
3. To clean and conserve the ledger stone to Bishop Mandell Creighton.
4. In the western bay, to take up the surviving patches of mosaic on either side of the Mandell Creighton ledger and replace them with a stone floor, which will need a new base up to 250mm deep.
5. In the central bay, to clean and restore the central part of the mosaic, making up its eastern section where it has been damaged by the insertion of a step (Fig 6). This will be done with tesserae taken from the removed parts of the mosaic.
6. In the central bay, also, to replace the existing side panels of the mosaic with stone flooring, on the pattern of tasks 2 and 4 above, which will need a new base up to 250mm deep.
7. To renew the step between the western and central bays, and that between the central and altar bays, in blue lias.

8. To renew the floor of the altar bay in stone as in tasks 2 and 4 above. It is possible that the Penrose mosaic survives under the present flooring here. The Penrose mosaic would be left untouched here if found, but this is not thought to be likely.
9. To renew in blue lias, if necessary, the marble base to the wrought iron screens which divide the main vessel of the chapel from the ambulatory.

### *Archaeological monitoring*

Since the intention was to dig down, during replacing the various parts of the floor, only to a depth of 250mm or less if possible, and a trial hole has already indicated in excess of 300mm of concrete in the ambulatory behind the altar, there was little implication in these proposals for the disturbance of archaeological strata beneath the modern concrete. The archaeological assessment of this project pointed to the possibility that removal of the concrete flooring of the side aisles, and of the mosaic itself, might reveal intact stratigraphy of the Roman to medieval periods beneath, though this was a remote possibility. Monitoring of the building works by the Cathedral Archaeologist was carried out for this purpose, but in the event no such stratigraphy was observed as the new works did not intrude into strata prior to the 19th century. The line of a heating duct, previously little known, was recording crossing the crypt from north to south, with pipes in within it which still functioned as part of the heating system inserted by Macartney in the first decade of the 20th century. This decade therefore seems to be the date of the re-arrangement of the ledgers. The duct is shown on the plan next, Fig 87.

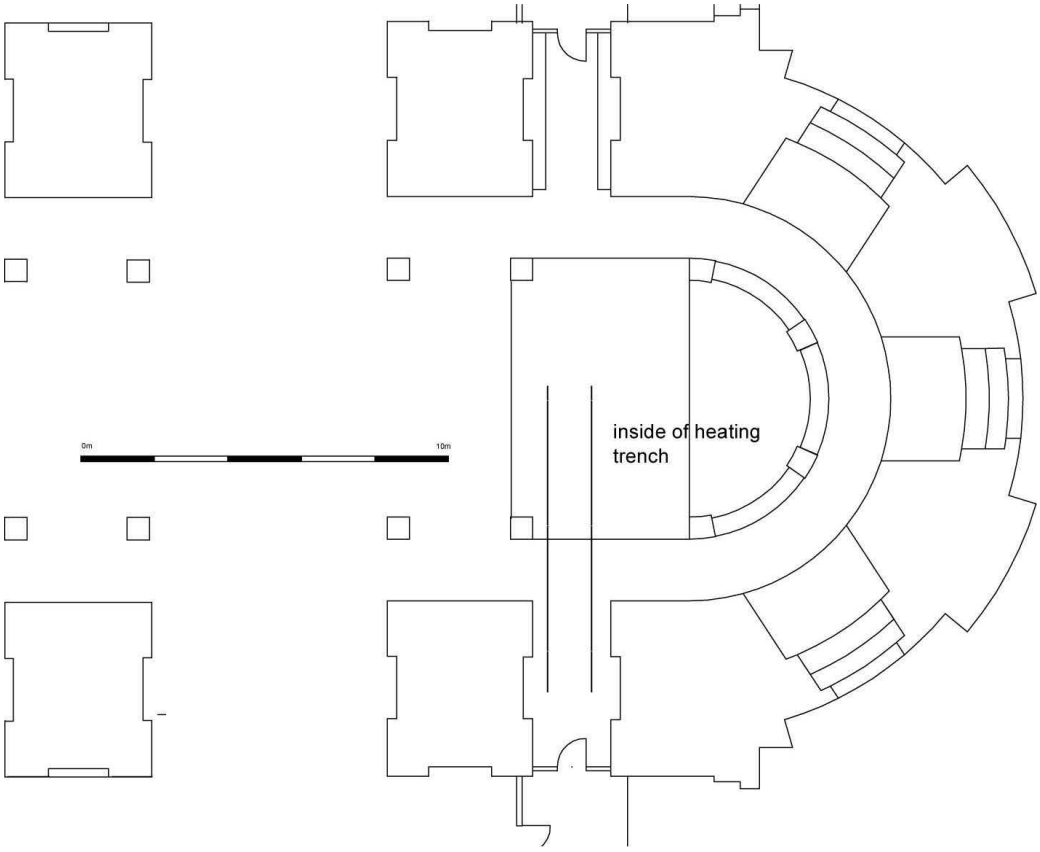



*Fig 87 plan, heating duct below floor of OBE Chapel*

**NMR OASIS archaeological report form**

**OASIS DATA COLLECTION FORM**

OASIS ID: johnscho1-11788

| | |
|---|---|
| Project details | |
| Project name | Cleaning and refurbishment projects at St Paul's, 2003-5 |
| Short description of the project | Five small projects of cleaning and refurbishment: cleaning the west end, relaying the west steps, cleaning and repairing the Geometric Stair, replacement of north-west and south-west doors to the nave, and refurbishment of the floor of the OBE Chapel and removal of a 19th-c floor mosaic |
| Project dates | Start: 01-03-2003 End: 31-01-2005 |
| Previous/future work | Yes / Not known |
| Any associated project reference codes | SWG03 - Sitecode |
| Type of project | Building Recording |
| Site status | Listed Building |
| Current Land use | Other 2 - In use as a building |
| Monument type | CATHEDRAL Post Medieval |
| Significant Finds | BRICKS Post Medieval |
| Prompt | Faculty jurisdiction [term used on the form as CFCE approval not mentioned as a possibility] |
| Project location | |
| Country | England |
| Site location | GREATER LONDON CITY OF LONDON CITY OF LONDON St Paul's Cathedral |
| Postcode | EC4 |
| Study area | 2000.00 Square metres |
| National grid reference | TQ 32060 81177 Point |
| Project creators | |
| Name of Organisation | John Schofield, Cathedral Archaeologist |
| Project brief originator | John Schofield, Cathedral Archaeologist |
| Project design originator | John Schofield, Cathedral Archaeologist |
| Project director/manager | John Schofield, Cathedral Archaeologist |
| Project supervisor | John Schofield, Cathedral Archaeologist |
| Sponsor or funding body | Dean and Chapter |
| Project archives | |

| | |
|---|---|
| Physical Archive recipient | LAARC |
| Physical Contents | 'other' [brick samples] |
| Digital Archive recipient | LAARC |
| Digital Archive ID | SPFA |
| Digital Contents | 'Stratigraphic','other' |
| Digital Media available | 'Survey','Text' |
| Paper Archive recipient | LAARC |
| Paper Archive ID | SPFA |
| Paper Contents | 'Stratigraphic','other' |
| Paper Media available | 'Context sheet','Drawing','Notebook - Excavation',' Research',' General Notes','Photograph','Plan','Report' |
| Project bibliography 1 | |
| Publication type | Grey literature (unpublished document/manuscript) |
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