The ex-situ Painted Wall-Plaster from Glastonbury Abbey

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The Excavated Material

30.3kg, approximately 474 fragments of painted wall-plaster were presented from the excavations for report and analysis. The friable nature of painted plaster resulted in only small fragments surviving. Many monastic sites, including Greyfriars in Carmarthen (Carmarthenshire), which may well have originally contained some painted plaster decoration, have not reported any fragments from their excavations (James 1997), whilst other sites such as Clarendon Palace (Wiltshire), have recorded only a fraction of what we might have expected from historical sources (James and Robinson 1988, 250-258). Consequently, the presence of this number of painted plaster fragments suggests evidence of extensive internal décor.

After initial quantification and visual appraisal, it was clear that only a limited range of pigments and colour schemes had been used. Consequently a 5% sample (25 samples) which included examples of all the different colours used in the wall-paintings were selected and the pigmented surface subject to qualitative analysis using an Energy Dispersive X-Ray Fluorescence (EDXRF) Spectrometer (Link Systems XR200). This detects the presence of all elements with atomic numbers greater than 11 (Caple 2006, 155-7). Given the limited number of pigments available in the medieval period (Howard 2003), identification of the elements present and analysis of peak heights, peak height ratios and comparison with known materials, enables the mineral pigments used to be identified (Table 1). Elements present from the plaster itself, such as calcium, magnesium and strontium were excluded from these reported results. Given the thin pigment layer of variable thickness above the plaster, quantitative results would potentially be misleading.

Wall-paintings in 12th-16th-century Britain were not normally executed in true (*buon)* fresco, as in southern Europe, but in *fresco secco*, in which the dry plaster was painted with pigments that were dissolved in lime-water, possibly with an additional skimmed milk binder *(secco)* (Caiger-Smith 1963). This technique held the pigments in a partially lime-cemented layer on the surface. Occasionally, pigments were applied in other *(tempera)* media, such as egg or oil; the wall-paintings of the Byward Tower, Tower of London (Caiger-Smith 1963), St Stephen's Chapel, Palace of Westminster (London) (Van Geersdaele and Goldsworthy 1978) and the Feretory of St Albans Cathedral (Hertfordshire) (Howard 1993) are examples. *Tempera* media were often used to apply valuable pigments, such as ultramarine (lapis lazuli), or unstable pigments, including lakes (inorganic materials, such as powdered chalk, which had been dyed), which could discolour in direct contact with the alkaline environment of the plaster (Caiger-Smith 1963). Wall-paintings were normally executed either by journeyman painters, who travelled from one building project to another applying paint to the walls of recently constructed and plastered buildings (Babington *et al* 1999, 15) or by members of the monastic community.

All the wall-painting samples from Glastonbury have a base plaster or render layer (*arricio*) surmounted by a thin layer of smooth, hard white plaster (*intonaco*), which is virtually devoid of sand, gravel or other filler material. It was onto this surface that painted layer was applied. At least two different types of base plaster layer; a hard sandy render/plaster and a coarse white lime plaster with little sand were noted in these fragments from Glastonbury. The pigments were in most but not all cases well adhered on and into the top of the plaster layer. These appear to have been applied in limewater, possibly with a dilute protein binder solution such as skimmed milk

(Rouse 1991). No tests were conducted to determine the nature, if any, of any binding medium. In almost all cases the decoration is in the form of red line on white plaster. In two cases (W39, W11) examples of a scale pattern is visible this can be interpreted possibly as feathers from birds or angels' wings, shingles of house roofs, or armour on knights. In reality no fragments are large enough to provide any certain indication of the nature of the drawing, save that the curving nature of many lines indicate that they are complex designs such as plants or scrollwork designs and not simply the red-line, ashlar block style which is present at numerous sites such as Marten's Tower, Chepstow Castle (Monmouthshire) (Turner and Johnson 2006, 163), or the hall and chapel at Oakhampton Castle (Devon) (Kenyon 1990). Several examples of drapery were also detected amongst the fragments.

Analysis of the plaster background (*intonaco*) indicates that there are traces of iron (oxides) in the lime used to make the plaster, and thus it appears in almost all analyses. The white background to the designs is normally achieved by the basic lime plaster itself, in which case only the small amounts of the iron contaminant are detected. However, in a number of examples (16, 24) lead is present in the white plaster exterior coat and thus the presence of lead white pigment (cerussite) can be inferred. This is certainly the case for the sample from context W65 (16-19) and from W56 (23, 24) all of which have very high lead values associated with their background white colours. These fragments show that other colours were painted over the white, giving high lead values wherever you analyse on the sample. Lead white was used, both as a white pigment for specific areas, as in the mid 14th-century wall-paintings in St Stephen's Chapel in the Palace of Westminster (London) (Van Geersdaele and Goldsworthy 1978), and as a general base coat or priming layer, as seen in the wall-painting of an Archbishop Saint in the Feretory of St Albans Cathedral (Hertfordshire) (Howard 1993, sample 9).

The analysis indicates that the red pigment was composed of iron oxides such as red ochre / haematite and lead oxide minium. The iron oxides give a brown red colour, which can appear pink when partially worn away or applied in thin coat. The lead oxide - minium is orangey. In most cases the red pigment applied is a mixture of haematite/red ochre and minium. This gives a strong mid red colour, though it is possible that iron oxides were just used as an extender to make the more expensive minium go further. The lack of any arsenic detected in the red pigmented areas of these samples indicates that there are no analysed examples of the use of the expensive pigment cinnabar / vermillion (mercury sulphide) at this site. The single example of a trace of mercury (sample 26), comes from an orange pigment and is probably contamination from the extremely large quantity of red lead (minium) present in the sample. Vermilion / cinnabar (mercury sulphide) is a bright scarlet colour and visual inspection had previously suggested that it was not present on any of the recovered fragments of wall plaster. Cinnabar was normally imported from Spain, where the mineral was mined (Gettens and Stout 1966), and was probably imported through Bristol, it was frequently used on high-status wall-paintings of the later medieval period, such as the wall-paintings of St Gabriel's Chapel, Canterbury Cathedral (Kent) (Howard 1997, 44), and it is a surprise not to find it used at Glastonbury.

There are a number of examples of a yellow brown pigment; these also only contain iron and lead. It is probable that the yellow pigment is the iron oxide yellow ochre. The presence of lead in some samples may suggest small amounts of lead white (cerussite) or the yellow lead oxides litharge or massicot as present in the yellow pigment mixture. There was no trace of arsenic, which would indicate that the bright and expensive pigment orpiment (As_2S_3), present in any of these samples. Again visual inspection did not detect any examples of bright yellow on any of the excavated fragments. Also imported from Spain, it is again a high status pigment which suggests a plainer simpler form of decoration at Glastonbury.

Copper was detected in three samples, (7, 10, 35). In two cases it is used to form a blue/black line. The copper probably derives from the presence of the blue pigment azurite (copper carbonate); small amounts of this blue pigment mixed with black or grey pigments such as charcoal (carbon black) and iron minerals (magnetite). Azurite (basic copper carbonate) was first used in Britain in the mid 12th-century wall-paintings at Kempley (Gloucestershire) (Babington *et al* 1999), but was also used on high-status wall-paintings, such as the early 14th-century saint images in the Feretory of St Albans Cathedral (Hertfordshire) (Howard 1993, 38) and the mid to late 14th-century wall-paintings in the Chapel of Our Lady Undercroft, Canterbury Cathedral (Kent) (Howard 1997, 48). It was increasingly used in Britain during the later medieval and post-medieval periods and was probably mined and imported from countries in Central and Eastern Europe. Azurite is found more commonly as a pigment in Continental, rather than British, wall-paintings (Caiger-Smith 1963).

Manganese is detected as present in most samples. It occurs as a contaminant of iron oxides (typically Fe:Mn = 9:1). Some higher levels of manganese are detected in some samples and may indicate the selection of manganese rich iron oxides giving browner colours, though there is no unambiguous evidence of the exploitation of manganese as a separate brown pigment.

Though the majority of the samples show a single phase of wall-painting, normally red line decoration of white plaster with occasional blue black lines and areas of ochre yellow, several fragments do show a second phase of wall-painting, in which, after the deposition of a very thin grey plaster covering and obscuring the initial paint scheme a second layer of orange pigment was applied. Sample 26 (W108) is typical. The orange is created like the red with a mixture of minium and red ochre, but with a higher percentage of the orangey minium. The presence of mercury and titanium (another iron impurity) distinguishes it from the earlier pigments. This later orange pigment was noted in the following contexts W50, W60, W27, W17. A later redecoration phase is clearly suggested, though the lack of identifiable motifs prevents dating.

It can be suggested that wall-paintings, even in ecclesiastical buildings, had three roles; to support religious ideals through reproducing scenes from the Bible or allegorical tales, for visual interest - the enjoyment of colours, shapes and the ideas and emotions it generated and as a sign of wealth and sophistication. The fact that only churches, monasteries and lordly private apartments were decorated in this manner at this period clearly marked them out as places of importance, where the affluence of their owner was displayed. The extensive use of red line decoration using iron and lead pigments, with black line and areas or red and yellow infill are the type of basic schemes we might expect in a local parish church. There are no analysed examples of the high value pigments such as ultramarine, cinnabar or orpiment which might be expected of a high status abbey and no visual traces of the bright colours associated with these pigments.

The Painted Wall-Plaster in the Museum Display — C.P. Graves

This material had to be assessed by eye, and it was not possible to weigh the pieces so that area was calculated where possible. As the paint was not sampled, it is difficult to relate these pieces to the analysed pieces (above) except where design elements were obviously comparable.

1) A concave-curved piece with brown/buff background, painted with semi-circles in white with a star in the left-hand semi-circle, with long points; and perhaps of lobed flower in the right-hand semi-circle. Some painted curves beneath. This piece is the most likely of the displayed pieces to represent some sort of floral or semi-geometric detail, perhaps even a form of acanthus or palmette, perhaps echoing the decoration on Romanesque or even early 13th-century door surrounds or friezes, e.g. The Nativity,

Ashampstead, St Clement, Berkshire, dating to the 13th century (Rosewell 2008, 44, Fig.46). (Mus. Marked add. 986289).

2) One partial leaf of an architectural fleuron (area: c.48cm^2), with an orangey-coloured base, and traces of gilding in the hollows. Probably 14th-century.

3) One piece (area: c.54cm^2) with two concentric lines terminating in a transverse line, and two smaller lines on either side closer to the bottom of the piece. These lines are in black or pale buff and divide the surface into blocks of green/yellowish paint on either side. Inside the outer concentric line there is a thick 'shadow' of pale pink tint. Could be a form of interlace or trellis. (Mus. Marked M12)

4) Two pieces with a white base and simple red line work, one single straight line; the other with a right-angle. Fine brushwork finish on the plaster. Probably imitation stonework joints / false masonry. This form of paintwork was used throughout the Romanesque period, the 13th century and into the 14th century. (Mus. Marked M13).

5) One piece (area: c.30cm^2) with a pink/pale buff background or base, painted with a series of converging, curved radial lines, creating a series of thick red lines interspersed with pale pink/buff, white and probably ochre yellow. Looks like an architectural springer and the mouldings of an arch. Alternatively, if inverted, this may be the gathers of a piece of textile or drapery (as seen suspended from a series of hooks in the north altar alcove of Durham Cathedral Galilee Chapel, c.1180, and below roundels depicting The Miracles of St Nicholas, Romsey Abbey, Hampshire, mid-13th-century (Rosewell 2008, 21, Fig.25). (Mus. Marked A or 4)

6) One piece (area: c.30cm^2) with white ground, with curved incised lines bordering an area of solid red paint, and an area of radiating red lines to the left and above this. Similar to the way in which palm fronds are sometimes represented. (Mus. Marked B)

7) One piece (area: c.30cm^2) with a cream background, a broad curve of red at the top demarcated by an upstanding curve in cream, beneath which is an area of oyster colour. The upstanding curve was probably formed when the wet plaster was incised or marked out prior to painting. (Mus. Marked S or 5)

8) One piece with large patches of bright turquoise paint, very abraded. (Unmarked)

9) A very small-scale architectural pinnacle finial, with at least one crocket, covered with red paint. May have come from a tomb or piece of liturgical furnishing decorated with micro-architecture. The red may be largely a base colour, which may have been gilded in places. Decorated style, first half of the 14th century. (Unmarked).

These pieces were obviously picked for display due to their representative quality (the false masonry) or their startling colour (the turquoise paintwork) or their complexity (the red springer/drapery). It has only been possible to suggest the source or identity of the painted designs in a few cases. The red line masonry pattern is repeated in a number of samples analysed above. The fact that some of those were clearly painted over at a later date is interesting, although hardly surprising as new patronage, new liturgical foci, and new fashions in architecture and concomitant decoration required re-furbishing of spaces within the abbey complex. There is little in this collection reflecting the fabulous and expensive polychromy surviving in the Lady Chapel at Glastonbury, e.g. the expensive ultramarine c.1187, comparable with the use of the same pigment in the Holy Sepulchre Chapel, Winchester Cathedral, c.1175 (Howard 2003, 29). However, the sample is excessively small relative to the wall area which must have been covered throughout the

abbey precinct, and as such, can hardly be representative of the whole range of dates, motifs and colour sources once used.

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