

Ancient Monuments Laboratory
Report 58/97

WALL PAINTING CONDITION AUDIT,
BERRY POMEROY CASTLE, DEVON

J Davies
T Manning

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Summary

This condition audit of wall paintings at Berry Pomeroy Castle includes a wall painting record, general audit information, documentation of original materials and execution of the painting, and deterioration and damage including previously used materials and treatment, as well as proposals for treatment and monitoring strategies.

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Berry Pomeroy Castle

Devon

The following report has been generated by the Wall Painting Section database. This archival system provides a computerised record of all wall paintings in English Heritage Historic Properties and is intended to comprehensively document the collection. Each report has been subdivided into four sections to present the data in a clear format. These include:

1 Wall Painting Record:

Includes a description of the site and paintings, as well as archival information, such as bibliographic references and photographic records.

2 General Audit Information:

Describes any monitoring undertaken and a synopsis of future conservation requirements.

3 Technique:

Documents the nature and condition of the original materials and execution of the painting which is described according to its stratigraphy and any related analysis.

4 Deterioration and damage, added materials, treatment:

Deterioration and damage lists the types of alterations which may have occurred, that is either deterioration (natural alterations such as cracking or delamination) or mechanical damage (such as graffiti).

Added Materials documents all non-original materials present on or within a painting. These may include naturally occurring substances (accretions, such as dirt and dust) or deliberately added materials (coatings, coverings and repairs).

Treatment documents previous interventions and proposed treatment and monitoring strategies.

Throughout each section, an area of painting is assigned a number between 1 and 4 which is intended as a general indication of present condition. These are: 1 good, 2 fair, 3 poor, 4 unacceptable.

This report is based on information gathered prior to March 1996 and does not include any changes in condition, further research or treatment undertaken after this date. Amended editions will be produced as necessary.

1 Wall Painting Record

Property name	BERRY POMEROY CASTLE		
Region	South West	County	Devon
Location of painting	Gatehouse		
Orientation	EAST TOWER, EAST WALL.		
Century 15 th	Date	Height (cm) 130	Width (cm) 262
Subjects included	Adoration of the Magi		

Description

The Gatehouse chamber is a large rectangular room along the south side of which is an arcade of three bays which separates the main body of the room from the area thought to have served as a chapel or oratory. The wall painting of the Adoration of the Magi is situated on the east wall of the east tower. This scheme is an important example of high-quality late medieval painting, showing religious subject matter in a secular context, and as such is one of the most important wall paintings under the care of English Heritage. There is evidence of contemporary paintwork on the remaining walls of the chamber. However, these survivals are very fragmentary and so it is unclear whether this was anything more than purely decorative.

HISTORY

The site became the property of the de Pomeroy family in the eleventh century, following the Norman invasion. The tenth Henry Pomeroy held the estate between 1446 and 1487. He undertook various rebuilding projects, including the gatehouse, dated to c.1480. The wall painting has been dated to between 1480 and 1500 by E. Clive Rouse and Professor Lasko (Gordon Slade, 1990, 26). The estate was purchased by Edward Seymour, 1st duke of Somerset in 1547. Upon Somerset's execution the estate passed to his descendents. The castle was abandoned c.1690 and by 1730 the castle was in ruins. The east tower became derelict at some point between the eighteenth and nineteenth centuries. The wall painting was rediscovered c.1978 by a DOE chargehand who was employed in removing moss, ivy and other vegetation from the gatehouse. The painting was subsequently inspected by K. Barakan on 11 September, 1978, who reported the surface to be covered with moss and the painting to have been executed in 'buon fresco' technique. On 28 May, 1980 the painting was inspected by E. Clive Rouse, Mr Gordon Slade and Jan Keevil. Conservation work was undertaken by Krystyna Barakan and completed by c.1982. The gatehouse was re-roofed and glazed by Feb. 1984.

A technical examination of the painting was undertaken in September 1995 in order to verify Barakan's assertion that the original technique of the painting was executed in 'buon fresco'. However, examination of samples mounted in cross-section and dispersion showed pigments inconsistent with a fresco technique. In addition, it is possible that the white surface 'veil' over the surface of the painting is composed of the lead alteration product cerrusite which has given the painting a mineralised appearance mistakenly identified in the past as evidence of a 'buon fresco' technique.

Photographic Record

29/6/94 EH 'current' contact photo files; Nov. 1984; stereo binocular microscope and air abrasive, during cons. F840039/1/2/3/4/5/6/7, stereo binocular microscope and scalpel, during cons. F840039/8, wall painting detail F840039/9, wall painting detail F840039/10; Aug. 1985; coloured plaster; E850483, E850484, E850485, E850487. Computer keyword search; Wall painting Nov. 1984, K900846.

Photographic prints in studio files:

15-8-80

*J355-1-80 Overall view of wall painting, prior to conservation.

*J355-2-80 View of area above adjacent window?

*J355-3-80 Detail of visible figure in wall painting.

*J355-4-80 Detail of robes of visible figure in wall painting.

23-6-81

*J228-1-81 Detail centre of painting, during conservation.

*J228-3-81 Detail centre of painting, during conservation.

*J228-4-81 Detail edge of painting, during conservation.

*J228-5-81 Detail small figure above Mary in stable.

*J228-6-81 Detail leg of cradle, during conservation.

*J228-7-81 Detail edge of painting, during conservation.

*J228-8-81 Detail edge of painting, during conservation.

*J228-9-81 Detail edge of painting with ivy roots.

*J228-10-81 Detail edge of painting.

9-7-1981

*J251-1-81 KB working on scaffolding.

*J251-2-81 Detail KB's hands working and bottles of 'N-butyl amine' and 'Formic acid'.

*J251-3-81 Detail wall painting, heads and architectural background scene.

*J251-4-81 Detail wall painting.

*J251-5-81 Detail wall painting, robes of kneeling figure.

*J251-6-81 Detail wall painting, negro king.

*J251-7-81 Detail wall painting, head of negro king.

17-9-1981

*J318-1-81 View of wall adjacent to painting.

*J318-2-81 Overall view of wall painting and wall.

*J318-3-81 View under arch to room adjacent to wall painting.

*J318-4-81 Detail spandrel of arch adjacent to wall painting.

*J318-5-81 Overall view of wall painting.

*J318-5-81 Overall view of wall painting.

*J318-6-81 Overall view of wall painting.

*J318-7-81 Detail centre of wall painting.

*J318-8-81 Detail small figure near stable.

11-1984

*F840039/4 KB with air abrasive and microscope.

*F840039/5 KB with air abrasive and microscope.

*F840039/6 KB with air abrasive and microscope.

*F840039/7 KB with air abrasive and microscope.

*F840039/8 KB with air abrasive and microscope.

*F840039/9 Detail edge of stable.

*F840039/10 Detail chest of bearded figure.

8-1985

*E850482 Detail wall texture with salts.

*E850483 Wall texture and temporary wiring?

*E850484 View of wall, two openings/doorways?

*E850485 Detail of wall above openings.

*E850486 Wall above an opening.

*E850487 Wall with opening.

9-1994 TM/JD audit record HPBP 280994 (40)C/1-19

Unlabelled B&W print showing overall view.

Small colour prints, unlabelled, KB on site?

Photograph search, DOE files, EH photo library (JD24/03/95)

Berry Pomeroy Castle; no relevant DOE photographs found.

TM/JD audit slides/prints (9/94) in conservation studio slide library.

TM/SS sampling photographs 8/95 (colour prints) normal and raking light, areas sampled, also slides of cross-sections (CIA) 9/95.

Bibliography

EH internal files; 70644/2 parts 1 and 2.

Anon, 'An Illustrated Guide to Berry Pomeroy Castle, Totnes, Devon', n.d., printed by Caradon Printers, Metherell, Callington, Cornwall. (Old guide book)

Anon, 'Berry Pomeroy Castle', Illustrated Official Guide, National Monuments Record, n. d. (Good early history)

Gordon Slade, H. 'Berry Pomeroy Castle, Devon', English Heritage Guide Book, English Heritage, London, 1990. (Useful)

Powley, B. E., Berry Pomeroy Castle, Devon, 'Country Life', 12th Dec., 1941. (General history)

Rouse, C. E., 'Wall Painting at Berry Pomeroy Castle, Devon', unpublished report on the paintings, commissioned by English Heritage, February, 1984. (Useful)

Stewart, S., and Manning, T., Berry Pomeroy Castle: technical examination of the Adoration of the Magi, internal EH report, October 1995.

2 General Audit Information

Property name	BERRY POMEROY CASTLE	County	Devon
Region	South West		
Location	Gatehouse		
Orientation	EAST TOWER, EAST WALL.		
Century 15th	Date	Height (cm) 130	Width (cm) 262
Auditor(s)	TM/JD	Start date	28/09/94

Overall condition score **2**

Recommendations

The painting has been treated in recent years and would appear to be in a relatively stable condition. However, there is some limited flaking of the paint layer which should be stabilised in the near future. Bat excreta should also be removed from the surface of the painting. [Timescale: 1-2 days within one year].

It is recommended that the paintings are inspected every 2 years. The auditor should be aware of the possibility that the lead-based pigments may be darkening. There are currently no preventative measures that can be taken to prevent this occurring.

Further investigation of salt activity is required as any active deterioration that could be occurring may be confused with the possible alteration of the lead-based pigments. The microbiological growth and the bat activity also require close monitoring.

It would also be hoped that the existing information display be updated to incorporate the results of the recent technical examination of the painting.

3 Audit Information: Technique

Property name	BERRY POMEROY CASTLE		
Region	South West	County	Devon
Location	Gatehouse		
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Auditor(s)	TM/JD	Start date	28/09/94

Overall Condition Score **2**

Stratigraphy

Layer type	Support Layer	Specific condition Score	2
Thickness	10 cm		

Comments

Stone support, comprised of shist or limestone rubble with granite or freestone dressings.

Layer type	Render Layer 1	Specific condition Score	2
Thickness	0.5 cm		

Comments

Lime/sand levelling layer over rough dressed stone support. Variable thickness. The surface is dense, smooth and compacted. Aggregate varies from coarse large pieces 1-2 cms to fine, rounded grains of sand and local stone. Slate and mica also appear to be present as aggregate. Trowel marks are visible in raking light.

Layer type	Ground Layer 1	Specific condition Score	3
Thickness			

Comments

Possible presence of a white calcium carbonate ground, possibly with the addition of white lead. Further analysis required to confirm the use of this mixture generally as it was only identified in one sample.

Identified pigments Colours

white lead	white
lime white	white

Analysis undertaken

Method **POLARIZING LIGHT MICROSCOPY**

Person H Howard/SS/TM **Date** 01/10/95

Comments 9 samples were prepared at English Heritage, and kindly examined by Helen Howard, Leverhulme Research Fellow at the Conservation of Wall Painting Department, Courtauld Institute of Art. Sample 3 ground layer contains lime white and lead white.

Layer type	Paint Layer 1	Specific condition Score	3
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Thickness**Comments**

'There is no apparent evidence of the preparatory techniques that would be expected with the buon fresco technique. However, for horizontal and vertical elements, such as the stable in the background of the composition, it appears as though some type of straight edge has been used. The paint was applied following this edge, causing a thick ridge of paint along it. It also appears that an underdrawing was executed in black. The final painting does not always follow this initial sketch.

After the underdrawing in black, it appears that the main blocks of colour were applied. Highlights and shadows were then worked in, often using fine brushstrokes to build up colours, and the figures were then finally outlined in a dark red. This sort of technique has resulted in a thick impasto.

The palette appears to be complex on first observation, the visible colours being a dark red, a brown, a bright red, a pinkish red, a flesh tone, a bright green, a pale green, and a yellow. However, the artist has used mixtures of simple pigments to achieve different shades. The actual palette is quite limited. Analysis has shown the use of three reds (vermillion, red lead and red earth), green (a copper green), yellow (yellow earth), black, and white (calcium carbonate with the possible addition of lead white).

Although a limited palette would be consistent with a fresco technique, three of the pigments employed indicate the use of an additional binding medium. Vermillion and red lead were used as an admixture for the rich red (which now appears pink) throughout much of the painting. The combination of these two pigments is common in medieval painting, as vermillion was an extremely costly pigment, and was often extended (either by the artist or the colourmen) with the cheaper and more readily available red lead. Equally, the use of a copper green, such as verdigirs, indicates the use of an organic binding medium. These pigments are traditionally known to deteriorate rapidly in an alkaline medium and are normally applied a secco, ie. with an organic binder such as oil, egg, or size.'

[From 'Berry Pomeroy Castle: technical examination of the Adoration of the Magi', unpublished report, October 1995, Wall Painting Section].

Identified pigments Colours

---	black
---	pink
vermillion	red
red lead	red
yellow earth	yellow
red earth	red
lime white	white
copper green	green

Analysis undertaken

Method	POLARIZING LIGHT MICROSCOPY		
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Person	H Howard/SS/TM	Date	01/10/95
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Comments	Samples were prepared at English Heritage, and kindly examined by Helen Howard, Leverhulme Research Fellow at the Conservation of Wall Painting Department, Courtauld Institute of Art. See 'Berry Pomeroy: technical examination of the Adoration of the Magi'.		
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4 Audit Information: deterioration and damage, added materials, treatment

Property name	BERRY POMEROY CASTLE		
Region	South West	County	Devon
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DETERIORATION AND DAMAGE

Deterioration phenomena

Type delamination (render layer)
Location Virgin's robe and areas below.
Comments These areas are hollow but appear to be stable.

Type salt activity
Location efflorescences visible in areas of loss below and to the right edge of the painting
Comments Fine white powder and crystalline efflorescences surrounding losses.

Type delamination (paint layer)
Location localised areas
Comments Some limited flaking.

Mechanical damage

Type minor losses
Location general
Comments There are numerous losses and the painting generally has an abraded appearance. This is probably a result of the previous mechanical action of ivy suckers and roots plus other vegetation and micro-biological growth.

ADDED MATERIALS

Accretions

Type cobwebs

Location general

Comments Fine deposit in several areas.

Type biodeterioration

Location general

Comments Green micro-biological growth was treated during conservation treatment undertaken in the early 1980's. Minor patches are still visible to the walls of the room although none is evident on the surface of the painting.

Type dust

Location general

Comments Thin deposit.

Type bat excreta

Location general

Comments Numerous deposits of bat excreta. Bats known to be roosting in the Gatehouse.

Type surface 'veil'

Location generally wherever lead-based pigments were used

Comments The veil, previously identified as a crust of soluble salts, was thinned during treatment in the 1980's but is still present over much of the surface. Comparison of photographs dating to the early 1980's and the current condition of the painting indicates that the white veil is relatively stable. However, Barakan noted that it appeared to re-form several years after treatment. The technical examination in 1995 identified that this veil is possibly cerussite, an alteration product of the red lead pigment present in the paint layer, which would explain its constant re-formation.

'Both white and red lead pigments are traditionally known to darken to a brownish-black substance known as plattnerite, and recent research by the Conservation of Wall Painting Department, Courtauld Institute of Art seems to indicate that cerussite may be an intermediary product in the transformation of red lead to plattnerite. Although the causes of this chemical conversion are not entirely clear, humidity, an alkaline environment, and the presence of an oxidising agent have all been cited as possible catalysts in its alteration. These two environmental factors have been, or are, present in the gatehouse and would favour the occurrence of such a reaction. In addition, microbiological growth has also been suggested as a possible oxidising agent for the conversion reaction. Cross-sections of the paint layer showed the remains of plant growth still present within the stratigraphy. This is extremely important in terms of the future preservation of the painting, as the white 'glassy layer' thought to be present is actually not a surface accretion but a continually changing paint layer. Further removal of the 'whitish veil' on the surface of the paintings would involve the loss of original material. Unfortunately, until the mechanisms of the conversion of lead pigments are fully understood they cannot be controlled, and the eventual darkening of the red paint layer is likely to be inevitable'.

It is possible that in addition to the deterioration of the lead-based pigments there is also some salt activity. It is recommended that this is further investigated.

[From 'Berry Pomeroy Castle: technical examination of the Adoration of the Magi', unpublished report, October 1995, Wall Painting Section].

Repairs

Type lime:sand

Location Losses in painting to left, centre and lower areas of the painting.

Comments Lime mortar repairs inserted by K. Barakan. These repairs are slightly recessed behind the paint surface. See photographs for locations of damage.

Type modern lime plaster

Location Edge repairs to plaster below painting.

Comments Lime mortar repairs, possibly by K. Barakan or DOE/ EH craftsmen?

TREATMENT

Past Treatment

Type SALT REMOVAL Date 19/07/81

Person K. Barakan

Comments No final report of conservation treatment has been found to date. The information contained within this section has been gathered from correspondence and hand written notes within the conservation studio site file. Barakan states that she softened the surface veil with N-Butyl which were scraped off with a scalpel together with 5% Formic acid in distilled water. Encrustations of salts, reported to be up to 3 mm thick, were removed using the air abrasive tool. Photographs DOE J251-2-81 (July 19, 1981) and EH F840039/2 (Nov. 1984) document these processes respectively.

K. Barakan may also have used an ammonium carbonate poultice followed by barium hydroxide treatment. It is unclear whether she actually undertook this treatment or merely noted it as a possibility.

Past Treatment

Type CONSOLIDATION Date 01/01/82

Person K. Barakan

Comments Barakan states that she used a grout of casein and lime with sand (1:3 sand) diluted in water. PVA with cotton [wool?] and sand were used for 'fixing' and cotton [wool?]casein and lime swabs inserted [into hollows?].

Type FILLS/REPAIRS INSERTION Date 01/01/82

Person K. Barakan

Comments Barakan states that she used a lime mortar of 3 parts sand Dartmouth [?] river, 0.5 yellow Bushey Priory [?], 0.25 brick dust and 2 parts slaked lime. She also notes the use 'for adhesion' of 0.33 part of PVA.

Type MBG REMOVAL Date 01/01/82

Person K. Barakan

Comments Barakan states that she used Thaltex 20 (diluted 1:19 in distilled water), a tin quaternary ammonium compound produced by Wykamol Ltd. The Thaltex was applied by spray to the moss growth. Two months were allowed for the moss to die and to dry out at which time it was removed by hand. Following moss removal the wall was re-sprayed with dilute Thaltex 20. The surrounding walls were also treated.

Proposed Treatment

Type CLEANING Date 28/09/94

Person TM/JD

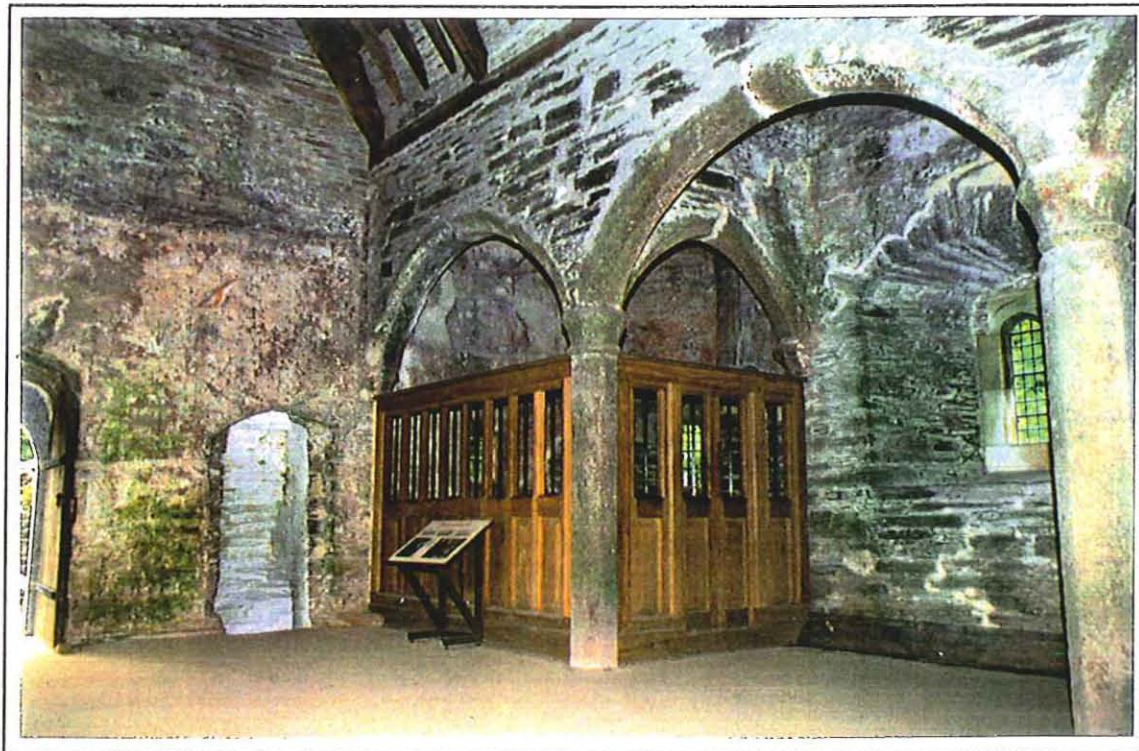
Comments Removal of bat excreta. 1 day within 1 year.

Type MONITORING CONDITION **Date** 28/09/94
Person TM/JD
Comments Inspection by specialist conservator every 2 years is recommended.

Type TECHNICAL ANALYSIS **Date** 28/09/94
Person TM/JD
Comments Salt analysis.

Proposed Treatment

Type FLAKE FIXING **Date** 01/10/95
Person SS/TM
Comments 1-2 days within 1 year.



Gatehouse, general view of southeast corner



East wall, *Adoration of the Magi*