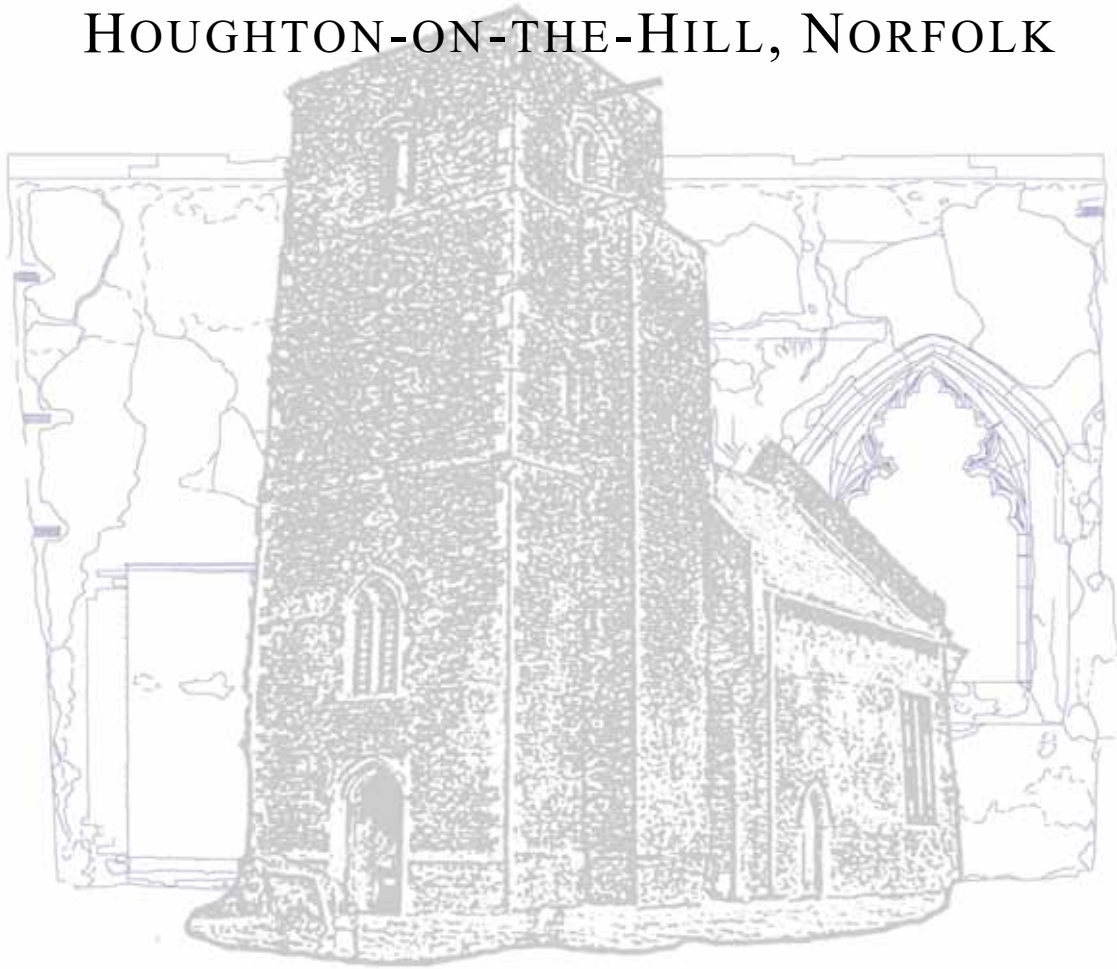


TOBIT CURTEIS ASSOCIATES

ST MARY'S CHURCH HOUGHTON-ON-THE-HILL, NORFOLK



CONSERVATION OF THE WALL PAINTINGS

NOVEMBER 2006

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1.0 INTRODUCTION

The wall paintings at Houghton on the Hill, which were partially uncovered in 1996 during the building repairs being undertaken as part of the Norfolk County Council Ruined Churches Repair Programme, are one of the most significant discoveries in recent decades. They are the earliest large scheme of wall paintings in the country and include subject matter and iconographic details unknown elsewhere.

Following their discovery a steering group was formed to guide the course of the conservation project. As well as a short phase of emergency conservation, extensive research into the paintings and the causes of deterioration was undertaken and a detailed programme of repairs was carried out on the building structure. Once the building structure and the deterioration factors were stabilised, a programme of conservation treatment was commissioned. This was undertaken by Tobit Curteis Associates between September and November 2006, and is the subject of this report.

Copies of this report have been provided for relevant bodies involved in the project including the Friends of St Mary's Church, Norfolk County Council, the Council for the Care of Churches, the Church Surveyor, English Heritage and the National Survey of Medieval Wall Painting at the Courtauld Institute of Art.

2.0 THE BUILDING

St Mary's Church is situated in an isolated position on a small hill between North and South Pickenham, some four miles to the south east of Swaffham.

The present church is a two celled structure with an unusually tall nave, a disproportionately small chancel, and a square west tower. (*Plate 1*) The walls, which are approximately 90cm thick, are constructed of coursed flint rubble, with some limestone and Roman brick quoins, and limestone dressings and tracery. Externally the walls retain some parts of their original render, while inside all of the walls are plastered. The nave and chancel roof are covered with clay tiles and the tower is covered with lead. Internally, the nave roof is open to the timbers while the chancel has a plaster ceiling. The nave and tower floors are constructed of porous terracotta tiles laid in sand, while the chancel is paved with ledger stones laid in cement.

Although almost certainly situated on the site of an earlier church, the surviving architectural details, including the characteristic double splayed windows, suggest that the earliest part of the existing building dates to the period soon after the Norman Conquest. In the mid 12th century, the south wall of the nave was opened up with two large arches and an aisle being added. The door was apparently inserted in the north wall at the same time. Probably in the 14th century, the aisle was demolished and the arches were blocked, and a large decorated window was inserted in the nave north wall. Incision lines in the 11th century plaster on the east and west walls suggest that other structural changes were contemplated, but were not implemented. The tower was added in the 15th century and at the same period the north and south walls were heightened and the large south window was inserted.¹ The basic structure of the church then remained unchanged until the 18th century, when the chancel was demolished and replaced with the small square construction seen today. In the 19th century the south window was changed to its present restored state.²

¹ The heightening of the north and south walls only, would have altered the pitch of the roof, significantly reducing the angle.

² I am most grateful to Stephen Heywood for his views on the dating of the building structure.

3.0 THE WALL PAINTINGS

3.1 *Description*

During the course of the conservation programme at least six schemes of painting have been identified. The earliest, and most extensive is executed on the first layer of render and appears to be contemporary with the original construction of the building in c.1090. (Diagram 9)

3.1.1 *East Wall*

The painting on the east wall shows a large and highly unusual Last Judgement. (*Plate 69*) The painting is dominated by a monumental Trinity in a triple mandorla. (*Plate 2*) God is shown seated on what is presumed to be a low seat or throne, with rich drapery hanging down around him. The folds of the drapery are highly stylised, and in some areas the internal surface of the material is shown with a different colour, suggesting an ornate lining. On his knee is a decorative quatrefoil. (*Plate 3*) The figure of God supports a cross and the figure of Christ in front of him. Although only the left side of the figure is visible, Christ (who is depicted as less than half the size of God) hangs on an unusually designed cross, with a short cross bar at the wrist and a characteristic wedge shaped end. (*Plate 4*) To the left of God's halo is the numbered dove of the Holy Ghost in a roundel. (*Plate 5*) Surrounding the mandorla are a collection of haloed figures, presumably saints or martyrs, who all look in at the Trinity. (*Plate 6*) Above the mandorla, are the remains of a large red and yellow band of chevrons, which appear to form the upper border of the painting. Across the centre of the whole wall, is a thick white band, which is thought to have been a large text. No lettering is presently visible, but it is probable that this has simply been lost.³

The rest of the wall is separated into a number of scenes, sometimes by simple linear borders and sometimes by painted arcades. On the right hand of God are a group of possibly three numbered figures wearing red robes and white tunics, with heavily stylised folds in the drapery. (*Plate 7*) The right-most figure is the clearest with his halo visible at the top and his splayed feet shown below the text band. Interestingly, with his left hand he reaches out behind the line of the frame to hold a long staff. This apparent playing with the architectural perspective of the scene indicates a level of sophistication not obvious elsewhere in the painting. Below this is a figure in an arcade. (*Plate 8*) On God's left hand are fragments of a number of halos suggesting another group of holy figures. (*Plate 9*) However, further to the south are fragments of a number of figures tumbling towards the ground in apparent chaos. (*Plates 10 & 11*) five faces have been identified, one of which appears to wear a crown, indicating that he is a king. (*Plate 12*) The posture and location of the figures suggests that the scene may well be one of the Damned being driven down towards the mouth of Hell, although no demons have been found, and the area where the mouth would have been situated, is lost.

Below these scenes is a band of roundels with figures holding up scrolls of text.⁴ (*Plate 13*) The backgrounds to the roundels are painted in red, yellow and white, although the pattern of counter changing is not consistent. The figures on the north side, who face towards the centre, are all numbered and appear likely to be saints or apostles. They are dressed in drapery with the characteristic stylised folds discussed above, (*Plates 14 & 15*) and their hair has an unusual pattern of curls at the edge. In the centre is a figure with a crossed nimbus, who looks straight out of the painting. (*Plate 16*) The halo suggests a figure of Christ, although it is unusual that he does not have a beard. To the south only two roundels survive, both of which appear to contain demons in profile, also holding scrolls, and facing towards the centre, apparently in mockery of their counterparts on Christ's right hand. (*Plate 17*) The first figure is most clearly seen with a large red head with a pointy nose and spiky hair. (*Plate 18*) His elbows are raised up at an awkward angle, with the scroll clasped in his red hands below. The figure in the next roundel is badly damaged, and only the red teeth in his mouth can be clearly see. However the arms and scroll are more visible below.

Below this band, on the north side, is a scene of the Raising of the Dead. The scene is flanked by two angels blowing cornet-like trumpets to wake the dead, who rise from their coffins. (*Plates 19, 20 & 21*) The angels are robed in the stylised lined drapery seen above, some of which is white and some yellow. Each has four wings, the inner pair of which is white, while the outer pair are patterned with red, yellow and white bands.⁵

³ An examination using UV illumination and a near infra-red digicam (examining a band of approx. 750 – 1050nm) did not reveal further information.

⁴ The texts were examined in UV and IR as above, but again no further details were apparent.

⁵ The red band was painted in red lead which has since darkened to brown.

On the south side of the wall, part of a wing of an angel is visible, suggesting that a similar scene existed here, although how this would fit in with the iconography of a Last Judgement is not entirely clear.

Although fragments of limewash were found on the painting, there was no evidence of a paint scheme applied directly over the 11th century paintings. However, there is a reference in the report on the uncovering (Carrington 1996) to the presence of fragments of masonry pattern, which were then removed. The first surviving decorative scheme is on a layer of lime plaster applied over the paintings, and appears to date to the 15th century. Particularly noticeable is the foliate scrollwork on the south side of the wall. (*Plate 22*) On top of some parts of the 15th century painting on the north side are fragments of post-Reformation black and white texts, in a black and white frame. (*Plate 23*)

The fragmentary layers above the text appear mainly to be white limewash, but one of the later layers is a bright yellow ochre limewash or distemper.

3.1.2 North Wall

The 11th century painting on the north wall appears to be divided into two registers of narrative panels, each separated with red or white borders. (*Plate 71*) The upper band runs to the height of the original wall (i.e. just above the small window), and it is possible that below the lower band there would have been some form of decorated dado. No evidence of the original decoration is visible in this area, but it is possible that it may have been some form of drapery, as is seen at St Botolph's Church Hardham, about a decade later. (*Plate 24*) The most visible scene is the Creation of Eve which is at the eastern end of the upper register. (*Plate 25*) Here, a large figure of God, with a crossed green nimbus, (*Plate 26*) pulls the equally large and naked figure of Eve from the chest of the small figure of Adam, who sits slumped at the base of the painting. To the right is a large stylised tree with the fragmentary yellow serpent wrapped around it.

This suggest that the upper register may have contained a number of scenes of the Genesis, leading to the Creation of Eve, on the west part of the wall, and one further scene to the right (in the area now occupied by the window) which might possibly have been the Expulsion from the Garden of Eden.

On the lower register, there are numerous fragments of painting but very little can be identified. Most significant is the scene in the centre of the wall, where a figure in a red robe, with red or pink hair, raises his arms apparently holding an object. (*Plate 27*) In the scene to the left, a red robed figure is seen at the top of a large, rectangular, yellow structure. While any identification is speculative at this stage, it has been plausibly suggested that this is part of a scheme of Old Testament scenes including Noah's Ark, of a type known from contemporary examples in southern Europe.⁶

The frames run around the small window, the soffit and splays of which are decorated with a red and yellow cushion pattern. (*Plates 28 & 29*) In addition, the window retains its original wooden frame, one of only very few surviving examples.

Fragments of later painting are seen in a number of areas, but there is little indication either of the date or the subject matter. The one section which can be made out is a black dado with a scalloped top which runs along the base of the wall to a height of 124cm. (*Plate 30*)

3.1.2 South Wall

Identification of the paintings on the south wall is complicated by the insertion and then infilling of the arches associated with the south aisle. (*Plate 72*) However, on the areas which were not effected by the structural alteration, large areas of 11th century painting have survived.

The most significant painting is in the centre of the wall and shows a figure in a white robe, reaching up with both hands to grasp what appear to be the spokes on a large wheel. (*Plate 31*) The bearded face of the man is shown tilted upwards facing right, with a small flat red hat on his head. (*Plate 32*) His white robe has the same heavily stylised concentric circular folds seen elsewhere in the scheme, and at his small waste is a thick red belt, which then hangs down in front of the lower part of the robe. (*Plate 33*) His legs, which can barely be seen, are very widely spaced, giving him an awkward stance. The wheel to his right is yellow with two red outlined spokes poking through. To the right, above the line of the arch, is a small fragment of painting

⁶ I am most grateful to David Park for suggesting this parallel.

which appears likely to form part of the same scheme. Although the subject matter is not certain the details are consistent with the iconography of a Wheel of Fortune.

It is interesting to note that the scale of the painting is far larger than the scenes on the north wall and covers both registers. Therefore it would have dominated the wall and would clearly have been the most important image.

To the east of the 11th century window are fragments of two scenes separated by a horizontal border, suggesting that the layout is a two register narrative as seen on the north wall. (*Plate 34*) Very little of the painting is visible, and it is not possible to make out the subject matter.

As on the north wall, the frames run around the window showing that it was an integral part of the scheme. The decorative scheme within the window splay is very fragmentary, but is clearly of a different design to that on the north wall.

Very little of the inner surface of the arch is visible, but in the areas of the soffit that can be made out, there are the remains of a light pink limewash which extends out and runs over the adjacent painting. (*Plate 35*) On archaeological grounds it can be assumed that this is contemporary with the insertion of the arch in the 12th century. When the arch was filled in, in the 14th century a new scheme of paintings was applied. The most obvious surviving section is the red foliate scroll work over the south door, which must have been constructed at the same time. (*Plate 36*) To the east, at the left hand edge of the arch, is a fragment of painted white drapery with a red lining. Fragments of this same scheme are seen further to the left, overlying areas of the 12th century limewash and the 11th century Wheel of Fortune. (*Plate 37*) It is possible that this scheme was contemporary with the masonry pattern removed from the east wall.

The paint surface was then heavily keyed, (through the 11th, 12th and 14th century paintings) and a layer of plaster, up to 10mm in depth, was applied. On this layer, over the north door, are the fragmentary remains of a monumental figure, thought to be St Christopher. The hunched figure with a dark robe can be seen in the centre of the wall, with a small red tunic beneath and the outline of a leg, just above the right hand jamb of the door. (*Plate 37*) On stylistic and archaeological grounds this appears to date to the 15th century and is likely to be part of the same scheme seen on the east wall.

Small fragments of painting from a number of schemes are also visible on the lower part of the wall.

3.1.3 *West Wall*

Although large areas of the original render survive on the west wall, there are only a few areas of surviving painting. (*Plate 70*) The most significant is on the upper part of the wall where an evil figure is shown with his face in profile, with a hooked nose and spiky hair, clutching the leg of an inverted figure (much of which is lost). (*Plate 38*) Above the scene is a red and yellow chevron border, similar to that on the east wall, which marks the upper boundary of the scene. (*Plate 39*)

A number of fragments of painting were also partially visible on the south side of the painting, particularly on the area level with the top of the arch. One area appears to show a second evil figure, also in profile and with spiky hair, holding up a long staff or instrument. Immediately below the figure are a number of other fragments of, as yet unidentified, figurative painting.

The wall below is covered with the 15th century render and no figurative painting is visible, although there are extensive areas of the late yellow wash.

3.2 Original materials and painting technique ⁷

It appears likely that the 11th century walls would have been pointed, to fill large voids between the stones, and then rendered with a single layer of plaster.⁸ The plaster appears to have been relatively coarse with inclusions of pebbles, flints, slate and quartz, some <10mm in diameter, and numerous pieces of chalk or unburnt lime.

In raking light it was possible, in some areas, to identify the sequence in which the walls were rendered. This was particularly evident on the north wall where the joins between plaster layers were clearly visible, it appeared that the wall had been rendered in a series of bands, roughly 70-90cm in width, starting at the top of the wall and working down.⁹ This type of plaster patch, generally referred to as a *pontata*, has previously been observed in a number of Romanesque wall paintings in England, and was clearly a commonly used technique. Although the basic constituents for the renders in each layer were the same, there were large variations in the proportions of materials, so, for example, between the top band and the second band there is a significant difference in the colour and the amount of pebbles in the mortar. (*Plate 40*) Despite the fact that the mortar is very coarse and the overall surface topography is relatively uneven, the surface itself is surprisingly smooth.

The 15th century plaster layer also contains small pebbles and other inclusions, generally < 4mm, but is considerably smoother than the 11th century plaster and does not appear to contain the same level of chalk or unburnt lime.

The analysis indicated that in many areas the iron oxide red outlines were painted directly onto the plaster. (Kakouli & Cather 2000) In some areas a limewash ground was identified, but this was not consistent. No other preparatory techniques were observed and it appears that the outlines were intended to act both as underdrawing and the principle feature of the linear style of painting. However, the loss of a significant amount of the upper paint layers has resulted in the red outline being more visually dominating than would have originally been the case.

The range of pigments used indicated a significant degree of sophistication on the painting technique. Pigments identified in the 11th century scheme were red and yellow earth, lime white, vermilion and cinnabar, green earth, red and possibly white lead (now mainly converted to brown plattnerite).¹⁰ However, it is probable that the palette would have been more extensive.

The analytical study suggested that the basic ochre painting may have been applied in the fresh plaster in a fresco technique, although in some cases the use of an uncarbonated limewash ground, or even the addition of limewash to the pigment, may have occurred. (Kakouli & Cather 2000) The presence of pigments such as vermilion and red lead, which are incompatible with the highly alkaline environment of the fresco technique, clearly indicates that organic media were employed in some areas.

4.0 ICONOGRAPHY, AUTHORSHIP AND PATRONAGE

The period after the Norman Conquest saw one of the largest programmes of church building ever known, with stone buildings being erected across the country. Almost all of these churches would have had some form of painted decoration and the majority would probably have had figurative or narrative paintings, such as those at Houghton. Therefore, there must have been a significant number of schools of painters throughout the country. The fact that synthetic pigments were being used suggests that this was an organised industry rather than a simple adhoc arrangement, but beyond this it is difficult to say how formal the organisation was. In the later medieval period, the guild system was tightly controlled with rules and regulations governing how all aspects of painting should be run.¹¹ However at this early period there is very little evidence as to how commissions were arranged.

⁷ Pigment identification was undertaken by Ioanna Kakoulli and Sharon Cather (Kakouli & Cather 2000)

⁸ Kakouli and Cather suggest that two layers of render were present (Kakouli & Cather 2000) but it appears that the lower "layer" is not consistently applied to form a surface, but is rather applied between the flints to produce a smoother surface over which the main plaster layer is applied. However in some areas the flints protrude to the extent that they almost break through the surface plaster layer.

⁹ The presence and location of the bands of plaster had been recorded in the 1996 condition survey. (Rickerby 1996)

¹⁰ The mechanism by which this form of deterioration occurs is complex and is associated with conditions of high alkalinity, humidity and the presence of an oxidising agent. (Matteini 1990)

¹¹ It is clear that in many cases the rules were not followed, as would typically be the case for trade organisations today.

The paintings show workmanlike competence, but are clearly not fine art of the type that might be associated with the Court or higher echelons of the church. However, the iconography is unquestionably sophisticated, suggesting a patron with a clear idea of how the scheme should be constructed. Because of the unique nature of the paintings at Houghton there are now no direct parallels in English wall painting. However, at the time, it is entirely possible that such parallels existed and it may have been possible for a patron simply to refer the painters to a nearby example. However it is also possible that there was a source such as a manuscript, with which the patron could demonstrate how aspects of the scheme should be laid out.

Parallels for some aspects of the painting do exist in other media. The most significant is the magnificent tympanum at the Cathedral of Conques in the Midi-Pyrenees region of France, thought to date to the first half of the 12th century, which shows God in Majesty at the centre of a Last Judgement. (*Plate 41*) Although there are some significant differences between the overall iconography of the tympanum with that at Houghton (such as the single central figure of God rather than a Trinity), the basic structure is remarkably similar. In the centre there is the figure of God in a mandorla, while the fields to his right and left are separated into a number of panels. On his right hand there are a group of numbered saints, as at Houghton, while on his left hand there are angels (at Houghton there is a further group of unidentified numbered figures). Far to the left side of God is a scene of Hell, as at Houghton, while beneath him are groups of figures separated into demons on his left, and the Blessed on the right. Although the position of the angels raising the dead and the group of saints or apostles are transposed at Houghton, the same principle applies.

Certain details are seen in other closer parallels. The triple mandorla is used in the mid 12th century wall paintings on the vault of the chancel at Kempley Church, in Gloucestershire, (*Plate 42*) and figures in roundels with scrolls are found in the nave of St Gabriel's Chapel at Canterbury Cathedral dating to the late 1170s (*Plate 43*) Chevron or bent ribbon borders are not uncommon but a fine example is seen on the painting of St Paul and the Viper at Canterbury Cathedral from the 1160s. (*Plate 44*) The use of the heavily stylised drapery with almost concentric circles is seen in a tympanum at Malmsbury Abbey also from the 1160s, (*Plate 45*) Numbered doves representing the Holy Ghost are also known at this period, a fine example being that shown in the early 12th century Shaftesbury Psalter. (*Plate 46*)

One particularly unusual feature of the painting is the shape of the cross, with its characteristic bar at the wrist and the wedge shaped end. Although this is not known in English examples, it is a common feature of Danish and Scandinavian crucifixes of the time, and is found in examples such as the Alskogkrus crucifix (Gotland) of c.1100. (*Plate 47*)¹² Whether this is an indication of the provenance of the source material, or an indication of the training (or indeed nationality) of the painters is unclear.

Although the Wheel of Fortune is not unknown in English medieval wall painting,¹³ if the identification is correct, this would make the wheel at Houghton, the earliest surviving depiction, by some considerable time.¹⁴ The basic iconography of the surviving fragment is consistent with later depictions of the Wheel and there are even parallels for details such as the way in which the spokes poke through the rim of the wheel, seen in the 13th century Codex Buranus (Schicksalsrad). (*Plate 48*) However, while there are parallels for the type of wide legged figure holding onto the wheel in other subjects, such as the mid 12th century Deposition from Erill La Vall, Lleida in Spain, (*Plate 49*) no example has been seen in this context.

Very few examples of Genesis cycles exist in wall paintings of this period. Perhaps the closest parallel for the scene of Noah's Ark is that found in the late 11th century manuscript (Cotton Claudius B.iv) now in the British Museum. (*Plate 50*) While very few details survive in the wall painting, the fragments which remain show distinct similarities with the manuscript image, particularly the figure of Noah, standing at the top of the ark.¹⁵

¹² I am most grateful to Marie-Louise Sauerburg for drawing my attention to this parallel.

¹³ The Wheel of Fortune, and subsequently the Wheel of Life, were popular subjects from the 12th to the 14th centuries, allowing artists a visual means to portray themes relating to the progression of life and the interaction with the Divine. The Wheel of Fortune is ultimately derived from the sixth century philosopher Boethius who, in his *Consolation of Philosophy*, depicted the figure of Fortune as blind, deaf, inconstant and two-faced, giving and taking favours as she pleased. (Sears 1986, 145) This is further described as Fortuna turning a wheel where man is pinned to the rim and powerless to stop. However, greater than Fortune is God, whose divine plan encompasses and influences these apparently random acts.

¹⁴ The earliest known depiction in English wall paintings is the painting at Rochester Cathedral of 1245-50.

¹⁵ I am very grateful to David Park for identifying this parallel.

5.0 CONDITION BEFORE CONSERVATION

Following the uncovering of the paintings in 1999 (Carrington 1996), detailed studies of the condition of the paintings and the underlying causes of deterioration (including environmental factors) were undertaken by in 1996 (Rickerby 1996), 1999 (Courtauld Institute January 1999 and Courtauld Institute September 1999) and 2001 (Rickerby & Shekede 2001). In addition a programme of emergency treatment was undertaken in 1997 (Rickerby & Shekede 1997). For the most complete understanding of the physical history and condition of the paintings the present report should be read in conjunction with these reports. A re-examination of the condition at the beginning of the present project showed little change from that recorded previously.

5.1 *The Building*

Prior to the 1990s, the building was in a parlous condition. The roof had collapsed in some areas, the walls had deteriorated badly, with severe structural cracking and the building was covered by a vigorous crop of ivy. (*Plate 51*) During the 1990s there was an extensive programme of repairs including the repair of the structural cracks, (which were tied with terracotta tiles) the replacement of the roofs and the installation of new windows. New rainwater goods and drainage was also installed. As a result, the condition of the building at the beginning of the present phase of treatment of the wall painting was generally good.¹⁶ (*Plates 52, 53, 54 & 55*)

5.2 *The Wall Paintings*

While there were a number of large losses, resulting from deterioration and structural changes, much of the original 11th century render remains throughout the nave. In almost all areas it was well bonded to the wall below, although in some small sections at the base of the wall there was some minor delamination cracking. (*Plate 56*) The surface of the plaster too was in good condition in many areas. However, on the parts of the walls which had been exposed to severe water infiltration, the surface was damaged, with the finer material having been washed away and the larger aggregate left exposed. Almost all of the remaining 11th century plaster had been keyed, apparently for the application of the 15th century plaster. (*Plate 57*)

Large areas of the 15th century plaster had been lost in the past, and in many areas repairs had been applied. It is not entirely clear what period of plaster was removed from the east wall in 1996, but it is probable that a considerable amount of the 15th century scheme was lost. Large areas of later plaster repairs also survive, some of which contain hair. In general, these have a reasonable level of adhesion to the 11th century (keyed) plaster, but in some small areas there is some delamination. This is most significant towards the base of the wall, where there is also considerable mechanical loss and delamination associated with moisture activity. (*Plates 58 & 59*) Extensive salt efflorescence had been recorded at the base of the wall in the 1996 survey (Rickerby 1996). However, although the areas effected appeared to be similar, the level of visible salts was relatively low.

At the top of the wall (where it had been raised in the 15th century), there were considerable losses and later repairs. Large areas of the flint wall and the lower layer of pointing plaster was exposed and there was evidence of modern repairs, presumably carried out as part of the building repairs in the 1990s. (*Plate 60*)

Despite the survival of so much of the 11th century plaster, much of the painting on the north, south and west walls has been lost. There was extensive abrasion and mechanical damage, as well as areas which appear to have been effected by liquid water running over the surface. However, the fragmentary painting which survived generally retained a good level of cohesion with only small areas of delamination. Certain areas had been treated in the past, and evidence of the use of using lime milk was apparent around the fragments of painting in the window in the north wall.¹⁷ (*Plate 61*)

The main areas of 11th century painting are located on the east wall of the nave. Here, the painting is in the best condition on the north side of the wall, with the south side having suffered from more extensive abrasion and water damage. Both forms of damage appear to be largely historic. The exposed painting generally retained a high degree of cohesion, with limited areas of delamination and flaking. The areas identified as delaminating in this and other parts of the painting were generally consistent with those identified by Rickerby in 1996.

¹⁶ A fine crack was observed along the edge of the repair on the south wall of the tower, and some leaks from the roof were observed during periods of driving rain. Both were brought to the attention of David Watt.

¹⁷ There was also one area on the west splay of the north window where there appeared to have been some limited watercolour retouching.

On the central area of the painting, over the lower half of the figure of God and the upturned faces of the Blessed, was a thin wash of a yellow limewash or distemper. It was unclear when or why this had been applied, as it filled the key marks and appeared to be painted around some of the figurative details. (Plate 62 & 63)

Disfiguring residues of limewash, left by the uncovering process, were present over many areas of the painting. These were distinct from layers of lime paint used in the original painting for body colour and flesh tones. There was also a considerable layer of superficial dirt and cobwebs on the paintings which further obscured the image. (Plates 64)

One of the most disfiguring aspects of the condition was the extensive green microbiological growth, which occurred throughout the nave. (Diagrams 1, 3, 5 & 7) The damage was most serious on the west wall, where the wall had been exposed to dispersed rainwater for a long period. (Plate 65) While in some areas there was merely a fine veil of the growth, in other areas there was a thick green layer which obscured all of the plaster and painting beneath.

Although a significant proportion of the 11th century painting was exposed either by long term deterioration or during the uncovering in 1996, significant areas remain covered over. In some areas this is behind 15th century plaster and painting, while in others they are covered by fragments of later unpainted plaster.

6.0 CONSERVATION TREATMENT (Diagrams 2, 4, 6, 8)

6.1 Aims and Methodology

The aims and methodology of the present phase of work were established by the Steering Group in 2002, based on the extensive survey and research work which had taken place since 1996. Five levels of intervention were considered, ranging from *De Minimis* treatment, (to stabilise all plaster layers and reduce potential surface deteriorogens including microbiological growth, but remove no later material) to a highly interventive programme including the removal of all post 11th century material and significant aesthetic treatment of losses. (Gowing 2003) The approach chosen by the Steering Group was largely the *De Minimis* one, although it was subsequently agreed that certain aesthetic measures could also be adopted. Treatment trials were undertaken in 2003 (Paine and Stewart 2003) which formed the basis of the treatment specification of 2004 (Watt 2004).

6.2 Treatment Materials and Techniques

The materials and techniques used for the treatment were based on the tests carried out during the condition surveys and treatment evaluation trials. (Paine and Stewart 2003) However further tests were carried out at the beginning of the programme and modifications to materials and treatment techniques were made based on these results.

- *Repair of the plaster substrate*

Because of the agreed aims of the project, almost all stable plaster layers and later repairs were left in place. Losses were repaired with 1:2:1½:¼ lime putty, coarse light local sand, fine dark local sand and chalk particles.¹⁸ (The chalk particles were included to reflect the unburnt lime particles found in the original mortar). This mix, which was settled on after extensive testing, achieved a texture and setting colour which blended with the variety of surfaces encountered, which varied from exposed coarse 11th century plaster to the later limewashed surfaces. (Plate 66) Some fine repairs to open cracks were made with 1:4 lime putty and silver sand. In order to stabilise the later plaster layers, and the exposed edges of the 11th century render, plaster edging repairs (1:3½:½) lime putty, coarse light local sand and chalk particles) were applied to all such exposed areas.

- *Readhesion of the plaster layer*

In most areas where there was delamination between the plaster layers, readhesion was achieved using a grout of 1:2 lime putty and trass.¹⁹ The areas were first injected with an IMS: water mixture in order to remove loose dirt

¹⁸ The light coarse sand was supplied by Longwater Gravel at Costessey, near Norwich and contained a light fine aggregate with larger darker inclusions up to approx. 3mm. The dark fine sand was supplied by Travis Perkins (Swaffham) and contained equally graded fine brownish aggregate. The chalk was sieved to 2-4mm particles.

¹⁹ Trass is a naturally occurring pozzolanic material.

and reduce the surface tension, and then injected with the grout at varying levels of viscosity, depending on the required level of travel once injected.

The exception to this was with one plaster type, which was found, in some small areas, to lack cohesion and to be severely delaminated. This appeared to be part of one of the latest sets of repairs (possibly 18th century) and included no painted decoration. Readhesion of this material would have involved the application of grout directly over the 11th century paint surface, where the condition of the paint layer was unknown. In the few examples where this occurred, the late plaster was removed and the edges of the surrounding plaster stabilised as described above.

- *Readhesion of the paint layer*

The readhesion of the paint layers to the limewash ground was carried out using a solution of the acrylic dispersion Plextol B500, following pre-wetting with a mixture of 1:1 IMS and deionised water.²⁰ In the worst cases a concentration of up to 20% was found to be necessary, but in other areas a concentration of up to 5% was successful. Any superficial residues were removed with acetone.

- *Removal of limewash residues*

Residue remaining from later limewash layers were removed mechanically with scalpels and small brushes. (Plate 67) In some areas particular care had to be taken due to the weak cohesion of the paint layer. However, pigment consolidation was not found to be necessary. Some residues were removed using deionised water on cotton wool swabs. Some limewash and dark mortar residues were removed using small stiff brushes.

- *Reduction of microbiological growth*

After extensive testing, it was found that the microbiological growth was best removed using a variety of short haired brushes. The rigidity of the brushes and the mechanical action necessary to achieve the most effective removal of the growth, without unduly effecting the paint or plaster layer below varied considerably across the wall, and effected the level of cleaning that could be achieved. The south side of the west wall proved the most delicate as it had lost most of the paint and limewash surface. However, the effect was generally very successful. (Plate 68)

- *Cleaning and reduction of the superficial dirt layer*

The removal of loose surface dirt was carried out mechanically using soft brushes and Wishab sponges. In some areas a solution of 5% ammonium bicarbonate in deionised water applied on cotton wool swabs was used to remove accumulated dirt.

- *Reintegration and Presentation*

Very little reintegration was undertaken. Two of the large grey cement repairs, which could not be removed without damaging the original render were painted with limewash tinted with ochre. A watercolour wash was then applied over the surface. A small number of repairs were treated with a watercolour wash where the original render was so different in colour as to cause visual disturbance.

6.3 *Education and Presentation*

In addition to the technical conservation of the paintings, one of the further aims of the project was to increase accessibility of the paintings to members of the public. To this end a number of talks were held in the church for groups of visitors. Considerable media coverage was encouraged with the project being reported on BBC television news as well as in the local and national papers. The project was also featured as part of a BBC2 documentary screened in the autumn of 2005. Material was also provided for the production of brochures, posters and a website, to be undertaken by Norfolk County Council.

²⁰ Plextol B500 is a product of Röhm

7.0 CONCLUSIONS AND LONG TERM CONSERVATION

The present programme of treatment has been successful in stabilising the plaster and the paintings, largely *as found*, and reducing surface deteriorogens such as the microbiological growth. The building is now in a good structural condition and, as a result, the rate of deterioration of the paintings should be minimal.

The improvement in the appearance of the paintings and the huge amount of detail which is now visible, was an unintended but a very welcome consequence of the treatment. This has allowed the paintings to be studied in much greater detail and has confirmed that they are an outstanding and unique survival in early Romanesque art. However, it has also demonstrated that there is a great deal more art historic research which needs to be done if the paintings are to be understood in their proper context.

Paintings of this type generally deteriorate as a result of mechanical damage or due to moisture related issues. Because of the good condition of the building, and the level of ongoing maintenance, deterioration is likely to be limited, at least in the short term. It is essential however that there is a regular programme of checking and maintenance of the building structure and the rainwater disposal system, and that any damage is treated immediately. In conjunction with the church architect's quinquennial inspection it is recommended that an inspection is undertaken by a qualified wall paintings conservator.

Detailed conservation and management plans are now in place (Watt 2001 and Watt 2002) and it is important that the recommendations within these documents are followed.

The installation of electricity has allowed the paintings to be lit in a manner which has not been possible in the past. However, the use of high wattage halogen fittings (up to 2.4kw) will introduce a significant amount of heat, inevitably destabilising the environmental conditions. Research into the microclimate of the church has shown that microclimatic stability is necessary for the long term conservation of the wall paintings. Therefore, it is recommended that the lighting is used only when necessary. The availability of electricity also raises the possibility of installing heating. It is recommended in the strongest terms that heating should not be installed. Without the use of a highly sensitive control system, heating would inevitably destabilise the environmental conditions and encourage the long term deterioration of the wall paintings.

At present there is no formal policy or funding in place for the renewal of the UV filters on the nave north and south windows.²¹ While it has been shown that much of the photosensitive material on the wall paintings has already suffered chemical conversion (and therefore the painting can be regarded as less in need of measures to control photo deterioration) it should be recognised that UV film of the type which has been used is generally considered to have a useful lifespan of some 10 years.²² Therefore, consideration should be given to the question of whether the UV film should be replaced and, if so, the practical and financial mechanism which would allow this to take place.

The question of further uncovering has been raised on a number of occasions during the present work. On the basis of the information which has come to light during the treatment, it is confirmed that some areas of the 11th century painting are directly covered by later paint layers or by plaster layers on which there are later paintings. In these circumstances, it would be entirely unjustified to destroy later painting simply out of curiosity to see the earlier scheme (which may or may not be have survived in that area). However, there are also areas where there is unpainted plaster of a relatively late date covering the 11th century scheme. In such areas there would be a reasonable argument for removing the later plaster, given the importance of the possible painting beneath. However, while it might be interesting to see what lies beneath, there is no technical conservation reason for taking this approach. Indeed the process of uncovering is not without risk and were further uncovering to take place it would have to be undertaken with the greatest caution.

²¹ The need for renewal has been high lighted in the Quinquennial Inspection report.

²² Although manufacturers guidelines sometimes recommend replacement after five years, the experience of organisations such as the National Trust suggest that films remain effective for ten or twelve years.

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