FINAL REPORT

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"Conservation of Roman Wall Paintings in Luxor Temple"

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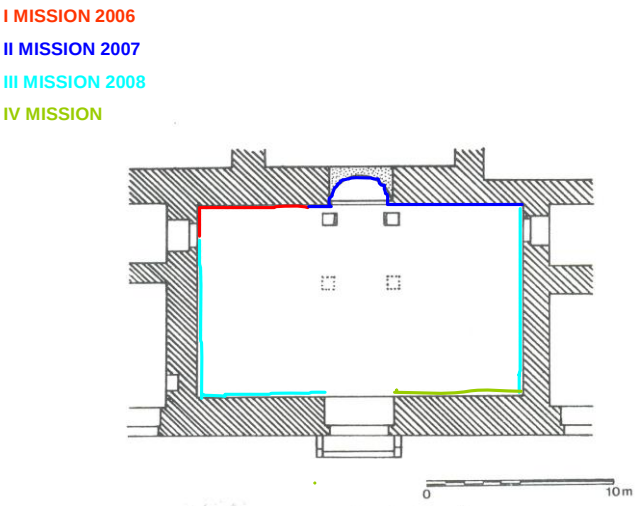
INTRODUCTION

The third campaign to restore the Tetrarchic wall paintings in Luxor Temple ran from 28 October until 20 December 2008. Work was undertaken on the surface of the east wall (with the exception of the section of the north corner already restored during the course of the first campaign in 2006), the whole of the west wall and the east half of the north wall.



LUXOR TEMPLE, IMPERIAL CULT HALL

The restoration work enabled us to decipher the fragments of wall painting and we can now appreciate a number of elements in the scenes depicted on the east wall **(photo 1)** and the *opus sectile* of the west wall **(photo 2)**.

photo 1

photo 2

As can be seen in Wilkinson's watercolors, the procession in the *adventus* scene that starts at the sides of the entrance to the Imperial Cult Hall, moves in two opposing

directions (the figures in the left-hand area to the west and those in the right-hand area to the east) to converge on a single focal point on the south wall **(plate I)**.

plate I

The scenes painted on the east wall depict soldiers leading their own horses, armed with lances and circular shields and wearing short tunics with a decorative border. All that now remains of this in the lower tier is part of the soldiers' legs and the horses' hooves. Two elements well documented in Wilkinson's watercolors have been identified: part of a lance on the left **(photo 3)** and the point of the scabbard of the sword of one of the last soldiers at the extreme right, before the door **(photo 4)**.

photo 3

photo 4

The evidence derived from the fragments that reappeared after cleaning confirmed the reliability of the English archaeologist's record and, despite the loss of major portions, it is still possible to appreciate the sense of movement to the right of the numerous figures depicted. In the upper tier (not painted by Wilkinson, presumably because it was covered with wash) interesting elements can now be made out in the south east corner. The recovery of the fragment of ochre-colored masonry with the individual blocks picked out in red to the left of the blue shield has been completed. On this, painted fragments stand

out, suggestive of devotional objects (such as a decorated brazier and a large rounded vase) and an architectural feature[1] **(photo 5)**.

photo 5

The striking fragments of fake marble on the west wall have enabled us to understand better the composition of the *opus sectile*. In this case too, the paintings confirmed the eighteenth-century watercolors. Wilkinson recorded the various geometrical designs that are repeated on the walls on a page of his notebook **(plate II)**.

plate II

Elaborate circular compositions depicting overlays of polychrome marble are inscribed in large square panels bordered by horizontal and vertical yellow bands. These alternate with rectangular panels with a portrait orientation that are painted green with black

[1] This could be the base of a small temple associated with the masonry on the right if, as reported in some literature on the Imperial Chamber (Kalavrezou-Maxeiner, I.,"The Imperial Chamber at Luxor", in Dumbarton Oaks Paper, 29, 1975), it depicts that oriental variant of the *adventus* known as *komasì*, during which statues of the divinities were brought out of the temples to greet the emperor. Alternatively, it could be part of an architectural backdrop such as those seen in *adventus* scenes in reliefs or on coins.

veining **(photo 6)**. Both the square and rectangular panels are outlined by thin red bands. These painted decorations rest on a wainscot of alternate gray and purplish bands and are separated from them by a thin white band.

photo 6

On the basis of color and veining, the marble types represented in the paintings could be respectively:

yellow	yellow antique	*marmor numidicum*
red	red antique	*marmor taenarium*
reddish purple	porphyry	*porphirytes*
green	verde antique cipollino	*marmor thessalicum* *(or marmor atracium)* *marmor caristium*

During the conservation campaign the old pointing between the blocks was cleaned and maintenance was carried out in the area treated during the previous mission to remove the bird droppings deposited in the period between the second and third conservation campaigns, particularly from the faces of the dignitaries to the left of the apse and the large fragment with the priests on the right **(photo 7)**.

photo 7

During this most recent campaign, in addition to detailed photographic recording, the data necessary to establish the bases for graphic documentation was assimilated.

WORKING METHODS

Masonry and preparatory layers

In the east and west walls the pharaonic structure has been substantially preserved. The modifications made during the Roman period are associated with the blocking up of the two access doors to the side rooms, near the north east and north west corners respectively. In the first case, where the plaster is patchy, it is possible to see where the aperture was closed with sandstone blocks, the exposed faces of which bear the characteristic marks of Roman stone working already encountered in the apse **(photo 8)**.

photo 8

We have been unable to ascertain whether these are reused blocks from the same room; the decorated face could have been positioned inward. The other two openings (near the

south east and south west corners) through which access is still gained to the side rooms were modified during the Roman period and perhaps earlier. On the intrados of the aperture, fragments of Roman plaster are still preserved, proving that it belongs to the era of the Tetrarchy **(photo 9)**.

photo 9

The rooms located both to the east and west of the hall constituted the *principia* of the Roman *castrum*, the psychological heart of the camp[2]. It would be interesting to identify the order of the changes made to these rooms over the course of time, considering that some of them retain traces of the same Roman plaster.

As already observed during the earlier campaigns, the plaster was applied to the surface of the masonry in several layers including one preparatory coat and one final coat. The latter seems to have been applied in a single, continuous layer which is overlaid by the third coat of plaster of the high band of *opus sectile*, measuring approximately 2.5 m. It is possible that the technique and materials employed, such as straw[3] and sandstone

[2]During the High Roman Empire, the *principia* occupied the center of the camp and comprised two courtyards, one large and one small (the latter was often transformed into a basilica around the beginning of the third century) as well as a series of smaller rooms. Some of these were used to store weapons and others were used for administrative and accounting purposes. Others still, known as *scholae*, were used by the elite military units. The central room at the back was where the standards were grounded. This was the real heart of the *castrum*, before which the last defender was supposed to fall if the camp was taken by the enemy. Often the standards room terminated in a semi-circular apse. (From Y. Le Bohec, *Armi e guerrieri di Roma antica. Da Diocleziano alla caduta dell'impero* [Weapons and warriors of Ancient Rome. From Diocletian to the fall of the Empire] Rome, 2008).

[3] The use of straw is common in the Orient. It was used to keep the plaster damp and elastic.

containing a high percentage of salts, prolonged the drying time of the plaster, thereby allowing the artists to use the fresco technique even on such a large surface.

As already described in the reports for the previous campaigns, the surface of the plaster was primed with a very thin layer of lime applied using brushes whose bristles left clear signs and picked up small grains of sand. Where this finish has been abraded on the fake marble wainscot on the left half of the east wall, dark rectilinear and circular markings can be seen **(photos 10 and 11)**. These designs could be associated with the division of the space or, more likely, are graffiti left by the workmen before the application of the above-mentioned third coat.

photo 10

photo 11

Preparatory design

As already observed during the missions of 2006 and 2007, a preparatory design executed fairly rapidly in a red earth pigment was used to sketch in the details of the figures. This is a rapid method of composition but one which in some cases succeeds in capturing the essence of the figures.

Paint layer

Large backgrounds are rapidly painted in, enlivened by swift and impressionistic brush strokes in rich colors.

The palette comprises both natural pigments such as green earth, red ocher, yellow ocher and jarosite, and artificial ones such as black, white and blue[4].

Whilst working on the band of *opus sectile* on the west wall, we were able to observe certain characteristic features of the working method. Two different reds were used for the porphyry painted in the square panel and the wainscot below: the background color, which is darker, was obtained by mixing a red ocher with black whilst the drops representing inclusions in the marble were obtained by mixing the same ocher with white **(photo 12)**.

photo 12

At the end of the work, *fritta egizia* or Egyptian blue, a pigment widely used in all the painted decorations in the hall **(photo 12)** was used in the geometric overlays within the panels.

[4] See report on the conservation campaign of Fall 2006 'Conservation of the Roman wall paintings in Luxor Temple. Study of constituent materials and techniques used to carry out the different phases of painting' by Artelab s.r.l.

STATE OF PRESERVATION AND PREVIOUS RESTORATION WORK

The current state of preservation of the paintings can be attributed to both natural and human[5] agents. The state of the east wall is essentially the result of natural deterioration connected with environmental factors. Solar radiation which varies in impact, intensity and location according to the season, variations in temperature, wind, atmospheric pollution, bird droppings and, not least, the contribution of moisture from the adjacent Nile, have resulted in the advanced abrasion of the paint layer and underlying plaster[6].

Masonry

Considering the hall in its entirety, the south wall is more intact than the others even though the top part is missing. A large part of the pharaonic era masonry has been lost, particularly from the east and north walls, that are only standing to the height of the strip of *opus sectile* **(photo 13)**.

photo 13

Two parallel cracks along the line of the previously described aperture in the north west corner show where the opening was blocked up during the Roman period.

[5] As already stated in the reports for the previous campaigns, the current state of preservation of the plaster is the result of both a desire to rediscover the underlying Ancient Egyptian reliefs and the *damnatio memoriae* to which the paintings in the apse in particular had already been subjected in antiquity.
[6] The action of precipitation must not be underestimated: although rain falls very rarely, it can be extremely heavy.

In the north and west walls, two interconnecting holes have been drilled in the sandstone of the pharaonic blocks. These were used to tie up animals **(photo 14)**.

photo 14

Preparatory layers

In the areas restored during this most recent campaign the state of preservation of the plaster is fairly uniform.

On the east half of the north wall only very small fragments of plaster without a paint layer remain.

On the west wall the first two layers of plaster are well preserved and show the pick marks described earlier whose purpose was to give the third layer of plaster a good purchase. However, this layer is extremely patchy, particularly in the center **(photo 15)**.

photo 15

The preparatory layers on the east wall are more intact than on the other walls with the exception of the strip of *opus sectile* of which only a small fragment remains in the central area. There are two large gaps in the upper part, distinguished by their rectangular shape[7] **(photo 16)**.

photo 16

With the exception of the top right corner above the door and a fragment of the yellow cornice of the *opus sectile* band **(photo 17)**, the plaster is severely abraded all over the wall. As we will explain below, this is the result of exposure to atmospheric agents, namely the action of the sun, changing temperatures and wind, which have caused a gradual loss of cohesion, flaking and alveolization **(photos 18 and 19)**.

photo 17

[7]The regular shape suggests that these areas of plaster were removed intentionally either to investigate the underlying pharaonic reliefs or to remove sections of painting depicting the heads of figures on horseback.

photo 18

photo 19

All over the wall, the preparatory layers are failing to adhere to each other or to the masonry.

As we have already seen in earlier campaigns, the edges of the plaster fragments and, in some cases, the smaller gaps were fixed during earlier restoration work with somewhat invasive ribbon pointing that encroaches on the original surface **(photo 20)**.

photo 20

Paint layer

The state of preservation of the paint layer varies considerably on the three walls restored during this campaign. As indicated in the previous paragraph, only small fragments of plaster without a paint layer have been preserved on the right half of the north wall.

On the west wall, where the third layer of plaster with *opus sectile* is present, the paint layer is in a good state of preservation, even though it is covered with a thick layer of particulate matter and a coating of salts (carbonates and sulphates) that have crystallized both on the surface and at the interface with the plaster **(photo 21 and 22)**. As already observed on the south wall, the entire lower part of the wall is affected by this crystallization to a height of about one meter above ground. This has also had the effect of "fixing" the pigments by enclosing them in a thin layer of carbonates.

photo 21

photo 22

The state of preservation of the east wall differs from the others in that, although its preparatory layers are more or less intact, it has almost entirely lost its paint layer **(photo 23)**.

This state of affairs can be attributed confidently to a series of factors acting upon the wall simultaneously and in synergy: the climate (strong solar radiation and wind) and human causes. We can assume that when Wilkinson recorded the images in the hall in watercolor, part of the paintings must have been newly revealed following the removal of

later structures inside the Temple. By comparing the English archaeologist's record of the east wall with its current state of preservation, we can infer that the deterioration of the paintings over the last century has been both rapid and dramatic **(photo 23)**.

photo 23

During restoration work carried out in the Seventies a consolidating substance was applied that over time has assumed the appearance of a grayish patina, considerably dulling the colors of the paintings[8] **(photos 24 and 25)**.

[8] Given that this is a fairly recent intervention and that the substance has not been found to contain polysaccharides (cf. Artelab s.r.l. report, Fall 2006 Campaign), it could be a polyvinilic alcohol.

photo 24

photo 25

This layer, already encountered during earlier campaigns, has contracted considerably in some areas as a result of solar radiation and its own rapid desiccation, causing the paint layer to become raised, flake off and ultimately be lost. **(photos 26, 27 and 28)**.

The best preserved portion of painting is in the south east corner above the door. It owes its current condition to the fact that it is in a more protected position and is partially covered by a white-colored wash[9].

[9] Following laboratory analyses carried out as part of the previous campaign, this wash has been found to be made up of calcite, calcium sulphate, silicates, calcium oxalate and a protein (probably animal glue) (Report by Artelab s.r.l., 2006, p. 17).

photo26

photo27

photo28

RESTORATION WORK CARRIED OUT

Unconsolidated deposits of particulate matter were removed from the entire surface and the top of the walls using flat brushes with soft bristles.

Where necessary, the paint layer was consolidated using an acrylic resin in emulsion injected into clearly defined areas using small syringes. In some cases light pressure with a flexible spatula was necessary, interposing a sheet of siliconized paper between the paint layer and the surface.

The preparatory layers were consolidated where they had become detached from the masonry by means of injections of a liquid hyraulic mortar similar in composition to the original plaster. In some cases, the edges of the plaster had to be anchored by means of clearly defined injections of a 30% emulsion of acrylic resin (Acryl 33) and some areas were protected against possible detachment in the future using small strips of Japanese paper stuck to the surface with a solution of acrylic resin. Some pointing was carried out in cracks and at the edges of the plaster to prevent the liquid mortar from leaking out and to give immediate support to areas where the plaster had become detached.

The surface was cleaned using the method developed during the Fall campaigns of 2006 and 2007, namely by applying compresses of cellulose fiber soaked in a solution of ammonium carbonate (60 gr/liter) with the addition of a cellulose gel-forming ether (hydroxymethylcellulose). The function of these compresses is to hold water and keep it at the interface between the compress and the plaster without unduly soaking the latter. Contact times, developed on a case by case basis depending on the state of preservation and the nature of the pigments, varied from 10 to 20 minutes. This method rehydrated the substances applied over the paint layer which were then removed using bristle brushes and natural sponges. Next, the surface was carefully rinsed by patting it with natural sponges. On the surface over the door in the east wall, large areas of the paint layer were recovered by mechanically removing the thin layer of white wash using scalpels.

On the lower part of the west wall, decorated with *opus sectile*, the widespread saline efflorescence present on the second layer of plaster was removed mechanically using small chisels and an electric micro-drill.

The numerous areas of pointing filling the gaps between the stone blocks were retained on the basis that they are still serving their intended purpose. However, they were overhauled and cleaned, employing the same method used to clean the paintings, and where necessary, consolidated. Where reasons of conservation dictated, some gaps were filled using a mortar similar in composition and grain size to the original[10]. Small gaps in the second layer on the west wall were also filled in for esthetic reasons.

Areas of the paint layer that were failing to adhere were consolidated using a low percentage solution of acrylic resin applied with a brush (Paraloid B 72 at 1.5% in a nitro diluent).

Our aim in terms of esthetic presentation is to enable the pictures to be 'read'. The abraded and patchy state of the paint layer did not allow the figures and overall composition to be appreciated as a whole. The so-called 'dirty water technique' was therefore used to tone down gaps in the paint layer using Windsor & Newton watercolors. The gaps were toned down to blend with the natural deposits seen in the oldest gaps.

At the end of the work described above the entire restored surface was misted with a solution of acrylic resin (Paraloid B 72 at 1.5% in a nitro diluent) to provide protection for the paintings and areas toned down using watercolors.

[10] With two parts powdered stone obtained by grinding stones similar to those used in the masonry, one of yellow sand and slaked lime.

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