

## Existing wall paintings and their condition

Heike Pfund, 30.11.2018

### Wall Paintings in Tuna el-Gebel

#### 1. Existent tomb houses with paintings

Tuna el-Gebel, the large Ptolemaic-Roman Necropolis of Hermupolis, is an art trove for wall paintings. Developing from a funerary place for priests and nobles to a necropolis for common citizens, tomb houses became numerous. Tomb houses erected for priests of the god Thoth<sup>1</sup> were usually built as temple like structures from solid stone. One splendid example is the tomb of Petosiris, with interiors decorated by stone carvings, painted in bright colours.

Nevertheless, the construction material for the majority of tombs were unburnt clay bricks, called adobe. Walls were built of adobe bricks, ceilings as well. Tombs were usually vaulted, and extensions often built on top of existing structures with staircases added to the exteriors.<sup>2</sup> Surfaces were plastered, sometimes stuccoed, and painted. Burnt bricks were originally only used to support areas, where static forces demanded a stronger material, as in vaults and for stairs.

Tomb houses were highly adorned with paintings. Interior paintings still remain in many tombs, though heavily fragmented. How exteriors were decorated is difficult to say, there is little evidence with far too few remains of plaster and paint. As remains of façade plaster with small traces of paint suggest, also exteriors were decorated with paintings (e.g. GB 27, figs.1, 2).

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<sup>1</sup> Katja Lembke, The Petosiris- Necropolis of Tuna el-Gebel, p.232 in: Tradition and Transformation: Egypt under Roman Rule, Hildesheim 2008, eds. Katja Lembke, Martina Minas-Nerpel, Stefan Pfeiffer

<sup>2</sup> K.Lembke, J.Helmbold-Doye, C.Wilkening, A.Druzynski von Boetticher, C.Schindler, Vorbericht über den Survey in der Petosiris-Nekropole von Hermupolis/Tuna el-Gebel (Mittelägypten) 2004-2006, p.80

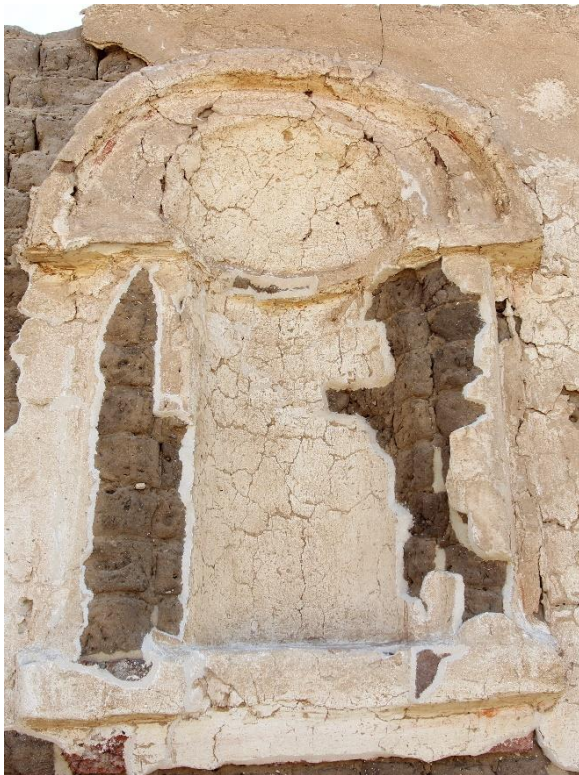


Fig.1 : GB 27 exterior, traces of red paint behind a later added adobe wall



Fig.2 : GB 27 exterior, decoration, red paint,

As the necropolis of Tuna el-Gebel has been in use approximately between 400 BCE until 400 CE, technique and style of decorations changed over the centuries. Most of the mud brick tomb houses existent can be dated to a period between the second and third century CE. Riedl and Winkels<sup>3</sup> have investigated wall paintings in 16 tomb houses and, referring to the observed technology, differentiated a scheme with eight stages of development (compare chapter “Technology of Wall Paintings”).

As stage one refers to tomb houses of stone, the second and third categories describe wall paintings performed in tomb houses built of mud bricks. In tombs GB 33 and GB 42 fragments of earlier figurative paintings in Egyptian style are evident. Here walls had been rendered with a clay plaster and paintings were performed on thin layers of lime-wash or lime plaster.

When Roman painting style came into fashion, most likely in the second and third centuries CE, scenes and motives of Roman mythology were depicted. Floral and vinicultural designs can be found. Colourful garlands refer to flowers used in burial ceremonies. Figurative scenes narrate legends and myths, partly related to Egyptian gods and funerary rites, partly related to Roman mythology.

Stone imitations can be seen in many tomb houses, feigning precious stone finishes. The change of style was associated with a change of painting technique. The fresco painting

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<sup>3</sup> Alexandra Winkels, Nicole Riedl, Entwicklung von Putz- und Maltechnik in der Petosiris-Nekropole von Tuna el-Gebel, in: Die Petosiris-Nekropole von Tuna el-Gebel, Band 1, Hrsg. Katja Lembke und Silvia Prell, Verlag Patrick Brose, 2015, S.260-303

technique was introduced requiring lime plaster as substrate. Even if this technique was not always performed successfully, with a strongly bond surface as result, it can be presumed that it was intended to paint 'al fresco'. In this period six more development stages of wall painting techniques could have been detected, all involving lime as binder for the plaster substrate (compare chapter "Technology of Wall Paintings").

One obvious example for the development of techniques is tomb house GB 33. The ground floor room is plastered with mud plaster, decorated with single figurative scenes painted on layers of lime-wash, whereas the tomb built on top displays typical roman decoration in form of painted stone finishes on lime plaster (figs.3, 4 ).



Fig.3: GB33, door from antechamber (left) to the main room



Fig.4: Vaulted ceiling missing, allowing the view to the first floor room

In summary it can be said, that in the excavated area of Tuna el-Gebel 23 adobe brick tomb houses with ample remains of wall paintings are known.

(GB1,4,5,6,7,10,12,13,16,19,20,21,24,25,26,27,29,32,33,34,35 please refer to site map)

These are the good news. But even if there are many extant wall paintings, their condition is alarming. Tomb houses, permanently closed by doors, are relatively safe if the building itself is in a stable condition and if it is not infested by insects. But even here mechanisms of decay can be noticed.

If the house is open, as many houses with extant paintings are, the condition worsens rapidly from year to year. Human action, animals and the elements are speeding up deterioration processes.



Fig.5: GB 7, open portico: losses in reachable areas



Fig.6: GB27, interior: compressed walls and cracked, detached plaster

## 2. [Causes for decay](#)

Archaeological research in Tuna el-Gebel began more than one hundred years ago. But most of the tomb houses had been excavated by Sami Gabra, active in Tuna el-Gebel between 1931 and 1952. He discovered 17 stone temples and 24 tomb houses made of adobe bricks<sup>4</sup>. Black-and-White photos from those days show walls entirely decorated with paintings. Today only fragments remain. What could be the reasons?

### 2.1. [Exposure](#)

Tuna el-Gebel wall paintings had survived for more than 1800 years covered by sand. After excavation, wall paintings and their supporting walls were exposed: to the elements, to faunal activities and to human curiosity and action.

If it comes to the elements, wind and sand have abrasive forces and will take more and more surfaces away. Strong variations of temperature between night and day can cause micro-movements of fabric, when different materials expand and contract.

Recognised faunal activities are insects eating organic components of the plaster and adobe brick masonry or building nests in walls. There are examples, where insects have eaten fibrous components of the clay plaster like straw, and thus disconnecting the overlying

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<sup>4</sup> Katja Lembke, Die Petosiris-Nekropole von Tuna el-Gebel, in: Die Petosiris-Nekropole von Tuna el-Gebel, Band 1, Hrsg. Katja Lembke und Silvia Prell, Verlag Patrick Brose, 2015, S.4

plaster layer resulting in a loss of plaster (figs.10, 11). Bats have chosen to live in tomb houses where they trigger decay processes by mechanical action and by their excrements, visible in salt efflorescence at some surfaces.

The decay of architectural structures incorporates highly complicated processes influenced by many different factors. Furthermore, it has to be studied in detail, how exactly the mechanisms of deterioration work and how decay could be stopped or prolonged.

Nevertheless, human actions have by far the greatest impact on deterioration processes seen.

## 2.2. [Human intervention](#)

### 2.2.1. [Excavation](#)

The first massive intervention clearly was the excavation under Gabra, between 1931 and 1952. Uncovering the tombs and not reburying them afterwards left the archaeological architecture in a more vulnerable state. Many of the tomb houses had lost their roofs and ceilings, and walls were presumably not always in a stable condition. The elements and insects started to destroy the fabric. This had been recognized during Gabra's time, leading to the second intervention, the construction of new roofs over ancient walls during that period, sheltering the ancient fabric.

### 2.2.2. [Construction of new roofs](#)

The new roofs are flat and quite heavy, resting mostly on the ancient adobe brick walls. If walls were incomplete, adobe bricks and burnt bricks were randomly used to complete the walls before adding the roof (fig.9). Roofs were constructed of wooden beams and planks, bricks, tiles, plaster and cement, even steel beams had been used for some roofs. After constructing the roofs, interiors were repaired, by rendering areas where original plaster was missing with a white smooth but stiff material, most likely containing gypsum. For exteriors another type of repair plaster was used presumably containing cement.

In some places it appears, that new walls were added to exteriors to bear the load of the new roof. Those support structures were built higher than the adobe walls, keeping a distance to the original mud brick wall (example: GB 11, 12, 13, figs.12, 13).

Still, in most places the new roofs had changed the static forces and more weight is since then resting on the adobe masonry, compressing it and causing wall plaster to detach, bulge and finally fall off.

Built with good intentions, these roofs protected the interiors but in some cases most likely caused further damages. This is an issue for further research.



Fig.7: Exteriors of GB 24 (left) and GB 27 (right): walls were completed with burnt bricks, ceilings made of wood and covered by more burnt bricks, or coated with a cement layer



Fig.8: Interior of GB 27, revealing the structure of the modern roof



Fig.9: GB 42, wall repaired by adobe and burnt bricks



Figs.10+11: Remaining wall painting in GB 42, condition in 2012 and 2015



Fig.12: Exterior of GB 11, 12, 13, under one modern roof, supported by added pillars of burnt bricks



Fig.13: Interior of GB 13, second room, rear wall, a distance was kept between original adobe wall and new roof structure, bridged by metal mesh and plastered with white stiff render

### 2.2.3. [Conservation attempts](#)

As the occurring damages and deterioration phenomena show, conservation is urgently needed. But if inappropriate materials and methods are used, this can result in more damages.

The first attempt to preserve wall paintings and keep their plaster support in place was the re-plastering of adjacent areas. There are two different repair plasters visible: one white, fine material, presumably gypsum, and one yellowish plaster with a fine grain, both materials possibly containing cement. Both materials are much harder than the adobe masonry, the mud plaster and the lime plaster. This is most likely the reason for numerous cracks in the repair plaster but also in original plasters touching adjacent repair plaster sections being very stiff and not able to follow the slight movements of the softer original materials.

The next intervention was the conservation of wall paintings in the so-called “Egyptian House” discovered in 1935.<sup>5</sup> Here termites first did their destructive work, feeding on plant fibres inside the adobe bricks and the clay plaster, destroying the connection between masonry and plaster layers. After painted plaster had fallen off the walls and pest control had not been successful, it was decided to take remaining painted plaster off in a controlled way. In 1964 an unknown team of restorers started to detach the paintings with their plaster support in portions, in order to reattach them with a new support. For this purpose the painted surfaces were first secured by a facing layer consisting of cotton canvas and

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<sup>5</sup> For details refer to: Robert Rogal, Tuna el-Gebel, The Ègyptian House`Murals Conservation Project, First Season 2005

paraffin. Unfortunately the works could not be completed and the detached paintings were left in the tomb for another 42 years. During this period decay progressed rapidly.

Organic components of the mud plaster, the cotton canvas and new supports were affected by insects leading to disintegration of the detached painted plaster into many small pieces.

A team of polish restorer-conservators came in 2005 to preserve as much fabric as possible and was working on stabilizing and remounting parts of the paintings, but could not complete the task during that season, hence much work is still to be done.<sup>6</sup>

Other exemplary conservation work was done by German teams during archaeological campaigns of the Roemer-and-Pelizaeus Museum Hildesheim in the areas of GB 12, GB 20 and 25, where lime plaster was used for securing original painted plaster.<sup>7</sup>

Conservation measures continued with conservation on the tomb pillar of Hermokrates in 2009 by Winkels and then continued with the development of an emergency conservation concept for all wall paintings, developed by Riedl and Winkels, implemented during campaigns in 2010 and 2011.

A first, evaluation of plaster conservation work in 2012 showed good results and the concept was adopted for the field schools from 2012-2018, when mixed teams from Minia University, Middle Egypt, and Hildesheim University HAWK, Germany, did further conservation work.

#### 2.2.4. [Site accessibility](#)

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The site is visited mainly by people living in the area. As they use it for Friday outings, many children roam the place, playing football and occasionally climbing on ruins. Whereas foreign tourist groups are usually accompanied by guides, local residents seem to receive less guidance and it is not clear, whether rules and regulations for the safeguard of Tuna el-Gebel 's wall paintings are existing and if they are reinforced.

#### 2.2.5. [Vandalism](#)

Time and again people access tomb houses forcefully, and destroy interiors, presumably searching for treasures in empty tomb houses. Several houses are secured by sealed iron doors, protecting them from intruders. But far too many tomb houses are open, and suffer from being easily accessible.

Other traces of destruction as scratched wall paintings, demolished interiors or an imprint of a ball tell their own story.

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<sup>6</sup> Ibid.

<sup>7</sup> Lindner u. Quast 2007 Olaf Lindner, Astrit Quast: Arbeitsreport, konservatorische und restauratorische Maßnahmen an den antiken polychromen Wandfassungen, Nekropole Tuna el-Gebel (Mittelägypten), Oktober 2007, S. 1-5; unveröffentlichter Konservierungsbericht zur Grabungskampagne 2007. Schindler 2007 Claudia Schindler: Restaurierung, S. 115-122; in: Lembke et al. (2007)



Fig.14: GB 24, human made scratches on wall surfaces

### [3. Condition of wall paintings](#)

As described, various factors are causing the progressing decay of wall paintings, plaster and stucco in Tuna el-Gebel. Phenomena of decay are classified in the following way.

#### [3.1. Masonry](#)

##### Adobe walls:

- Are disintegrating due to insects feeding on fibrous contents; if exposed to the elements, other organic contents are decomposing and the abrasive forces of wind and sand weaken the mud bricks.

Result: sandy surfaces and disintegrating adobe bricks, weakened walls in many areas

- Static forces compress walls, bricks get loose and fall out, cracks open

Result: instable walls, collapsing walls; plaster work detaches and falls off in many areas

### 3.2. [Plaster](#)

#### Clay plaster:

- In interiors, it is disintegrating due to insects feeding on fibrous contents; if walls crack, plaster cracks as well and becomes loose

Result: cracked and instable clay plaster in many areas

#### Lime washes:

- Separate from clay plaster due to compressed walls by heavy roof load and/or insect action between plaster and wash

Result: Detached, cracked, instable lime washes in many areas, bulging, bound to fall off completely

#### Lime plaster

- Separates from adobe masonry due to insect action between plaster and masonry and compressed walls by heavy roof load
- Cracks up together with stiff repair plaster transmitting tensions

Result: Detached, instable plaster, cracked, cavities between plaster and masonry, bulging, bound to fall off completely in many areas

### 3.3. [Wall Paintings](#)

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#### Paint layers

- Exteriors: if exposed to the elements, organic binders are decomposing and the abrasive forces of wind and sand reduce paint layer

Result: Reduced or completely lost paintings; only traces remain in some areas

- Mainly in interiors, animal excrements affect the paintings. Bird droppings on painted walls cause chemical and mechanical damage; excrements of bats contain salts that infiltrate surfaces and cause salt efflorescences

Result: Reduced or completely lost paintings in some areas

## 4. [Conclusion](#)

Conservation can always be just as good as the actual state-of-the-art provides. The history of conservation in Tuna el-Gebel proves, that authorities together with expert teams coming from inside and outside Egypt did their best to safeguard the beautiful wall paintings of Tuna el-Gebel. Still more research and analysis has to be done in Tuna el-Gebel to completely clarify the specific mechanisms of decay. Only then the final conservation concept can be developed in the frame of a master plan for the entire site, and then be implemented.

Preventive conservation measures could be educational advertisings on site, and raising awareness among the public at large for the unlikeliness of finding treasures here. Cooperations with schools could help developing understanding for the value of the site starting with the youngest citizens.

Humans have built the necropolis, humans have excavated it, humans are contributing to its decay and only humans can preserve it.

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<sup>8</sup>[https://books.google.de/books?id=4wPAmml1G9sC&pg=PA210&lpg=PA210&dq=Sabottka+1983&source=bl&ots=YuWnt\\_ZSta&sig=dosmWWeHgagWIIIXgiXwahFcCY&hl=de&sa=X&ved=0ahUKEwjlybD7orzAhUKQMAKH e3aCa8Q6AEIPDAE#v=onepage&q=Sabottka%201983&f=false](https://books.google.de/books?id=4wPAmml1G9sC&pg=PA210&lpg=PA210&dq=Sabottka+1983&source=bl&ots=YuWnt_ZSta&sig=dosmWWeHgagWIIIXgiXwahFcCY&hl=de&sa=X&ved=0ahUKEwjlybD7orzAhUKQMAKH e3aCa8Q6AEIPDAE#v=onepage&q=Sabottka%201983&f=false)