

CONSERVATION REPORT, AMHEIDA FEBRUARY 2010
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SUMMARY OF WORK THIS SEASON:

We were on site from the 3rd to the 9th of February, 2010. During this brief visit, we completed the following tasks:

- Discussed the priorities for conservation treatment with Roger Bagnall, Paola Davoli, Delphine Renaut and Susanna MacFadden.
- Examined all of the 180 trays of plaster fragments in the storage room. Completed a detailed survey documenting the current conditions and necessary conservation for 64 of the trays which had been prioritized for future treatment by the art historians. [See attached excel spreadsheet, Wall Painting Fragments Survey.xls] Several of these trays contained mouse droppings which were cleaned up in the course of the survey.
- Completed an inventory of conservation materials and tools, and compiled a list of additional materials and tools required for future conservation campaigns. [See attached excel spreadsheet, Amheida inventory.xls]
- Completed a test detachment of a section of painted plaster from its thick mud brick. This detachment was used as a test case for such future work in following seasons. [See report in this document].
- Completed consolidation tests on fragments from the Green Room provided to us by Dorothea Schulz. These tests were used to identify what concentration of adhesives might be appropriate for the consolidation of plaster fragments in future seasons. [See report in this document].
- Examined the large painted plasters in the plaster storage room. Completed an emergency stabilization treatment on the large plaster fragment of the “lyre player” in the fragments storage room. [See report in this document]. Also examined plaster from the niche in Room 1 which is currently stored in the exterior courtyard of the first floor of the house.
- Lifted and stabilized the five low-fired ceramic coffins in storage so that they can be safely moved at the end of the season. This required emptying one of the already broken coffins. [See report in this document].
- Visited the site to understand some of the conditions which will effect future conservation interventions
- Prepared a proposal for future conservation treatment [See the end of this document].

PRIORITIES FOR IMMEDIATE AND FUTURE CONSERVATION TREATMENT:

Based on discussions with Roger Bagnall, Paola Davila, Delphine Renaut and Susanna MacFadden, as well as our own observations, these are the following priorities for treatment in the 2011 season:

1. Develop and implement a full conservation methodology for the consolidation and reconstruction of priority plaster fragments from Room 1. This will also involve removing painted plaster from large mudbricks in order to increase the storage space in the plaster room. The mold growth on three boxes of plaster fragments should also be addressed immediately as mold is a biohazard and cannot be safely handled.
2. Complete scientific analysis of wall painting materials so that only appropriate conservation adhesives, consolidants and fill materials are used for their conservation.
3. Develop a strategy for stabilizing any wall paintings or other fragile material that may emerge in subsequent excavations seasons.

4. Conserve the broken animal coffins next season so that their contents can be studied and the coffins removed for storage/registration.
5. Plan for the upcoming conservation season—including staff, conservation materials and time required on site.

SURVEY OF PLASTER FRAGMENTS:

All 180 trays in the plaster storage room were briefly examined to gain a sense of the sheer number of fragments, but also to ascertain the main conservation issues at play. A more detailed assessment was made of 64 trays which had either been prioritized for future reconstruction by the art historians, or could reveal evidence of past conservation treatments. Please refer to the document “Wall Painting Fragments Survey.xls” for more information. This spreadsheet details the basic dimensions, prior conservation treatments, current conditions and suggested conservation treatment for each tray. In addition, each tray has been assigned a priority number for future treatment so that the most important and/or most fragile fragments are identified for immediate treatment. The spreadsheet also identifies which trays require reassembly by the art historians before any conservation treatment can begin. Photographs of each tray were also taken for our reference.

Based on the survey of wall painting fragments [see attached report], there are 18 trays which are an immediate priority for treatment (priority 1 in the spreadsheet), and 14 trays which are high priority (priority 1-2 in the spreadsheet) for treatment. This prioritization suggests that fragments are either reconstructable, have major conservation problems which must be addressed immediately in order to prevent the loss of material (for ex., mold, failing old treatment, etc.), or are a priority for the study of the art historians. These high priority treatments should take place in the 2011 season.

Based on this survey, some basic conservation issues include:

1. Extremely fragmentary condition of the decorative motifs, and the fact that fragments from the same motif may be spread across several trays. The art historians will have to address this issue before any large scale conservation treatment can begin. This is also noted in the spreadsheet column “work for art historians.”
2. Extensive salt damage, and less extensive salt incrustation is present on approximately 40% the fragments; this is a result of conditions at the site and must be taken into consideration during conservation treatment.
3. Evidence of biological damage such mouse droppings in several trays, which suggests that the current storage conditions need to be improved. In the case of fragments on thick mud plaster renders, the boring action of termites is easily visible and seriously undermines the physical stability of these large fragments.
4. Several trays of fragments have been previously conserved, but there is inadequate information about which adhesives and consolidants were used. This information will be necessary for future conservation treatments.
5. Greenish white mold on at least three of the trays. It is unclear whether the mold is growing on adhesives used in prior conservation treatments. The boxes are currently covered and clearly labeled as biohazards. They should not be opened until the mold can be removed in the 2011 season.
6. Some fragments are relatively robust and can be easily handled for reconstruction; others, however are extremely fragile and must be consolidated prior to any reassembly.
7. Fragments range in thickness from a millimeter to over 10mm in section. These variations will have to be addressed during the conservation treatment, with care required to ensure that the thicker fragments do not break during examination or re-assembly.

INVENTORY OF CONSERVATION MATERIALS:

We examined the materials and tools available on site for our inventory [see attached document Amheida inventory.xls]. Given the expectation of a full-scale conservation treatment season in 2011, there are many essential materials and tools which are lacking, as well as necessary safety equipment that must be purchased in preparation for this work. The inventory details the materials and their amounts to be ordered, along with a list of their suppliers. Some specialized materials will have to be purchased in the United States and transported to site. However, several materials can be purchased in Cairo. Basem Gehad, as a conservator based in Cairo, is well-placed to source and purchase these materials for the project.

TEST DETACHMENT OF PAINTED PLASTER

We completed a test detachment of a section of painted plaster from its associated mud brick. This detachment was used as a test case for such future work in following seasons. Please see photographs.

The procedure involved the following steps:

Figure 1: Front face of plaster/mud brick prior to treatment

Figure 2: Side view of plaster/ mud brick prior to treatment

Figure 3: Front view, after consolidation of plaster surface using a melt of cyclododecane. The molten cyclododecane was brushed onto the painted surface until it was evenly covered. Strips of cheesecloth were then placed over the face and around the edges of the plaster and painted with more molten cyclododecane.

Figure 4: Side view, after consolidation with cyclododecane.

Figure 5: A thin saw blade was used to gently cut through the thickness of the mud brick.

Figure 6: After detachment of a thin section of the mud brick (approx 4cm) with the painted plaster.

Figure 7: Front view, after detachment

Figure 8: Back view, after detachment

The back of the detached section was then consolidated twice using 3% Acryloid B72 in acetone. This hardened the mud brick and made it safe to handle. The detached section was then wrapped in polyethylene (plastic sheet) and placed on foam in a tray for storage. The polyethylene limits the air flow around the detached section and will prevent the cyclododecane from sublimating (“evaporating”) from the surface until the fragment can be treated next season. In 2011, the cyclododecane will be allowed to completely sublimate, leaving the painted plaster surface intact with no chemical residue; at this stage, the painted surface will be consolidated with 3% Acryloid B72 in acetone and the mud brick thinned further.



Figure 1



Figure 2



Figure 3



Figure 4



Figure 5



Figure 6



Figure 7



Figure 8

CONSOLIDATION TESTS ON PAINTED PLASTER

Painted plaster fragments from the Green Room were tested with different concentrations of Acryloid B72 in acetone to understand whether this would be an appropriate material for consolidation of fragile paint and plaster fragments. Acryloid B72 was chosen for experimentation because it has been used extensively as a consolidant on excavated material both within Egypt and elsewhere; it is among the most stable of conservation materials; and it can be applied in different concentrations to suit different consolidation needs. In this case, Acryloid B72 was mixed in concentrations of 3% in acetone and 5% in acetone, and applied by both brush and using a spray method.

Good consolidation results were obtained with 3% Acryloid B72 in acetone using both the brush and spray methods; the surfaces were consolidated, and there was no perceptible color change in the pigments. With the 5% Acryloid B72 solution in acetone, there was a slight darkening of pigments, but this may be unavoidable as fragments that have already been previously treated with ethyl silicate (or other materials) do not respond to the 3% solution. Photographs of these experiments are stored on the Amheida server until the folder "Consolidation tests."

STABILIZATION AND STORAGE OF LARGE PLASTERS:

The large painted plasters which had been formerly conserved by C. Silver in the 2006 season had been placed on tables in the plaster storage room with inadequate tissue and aluminum foil covers over them. Considering that additional damage had already resulted from these covers being frequently removed, it was decided to place these plasters in more protective wooden boxes with lids. After examining the edges and paint layers of the plaster representing the "Lyre player" for stability, the fragment was carefully lifted on its metal support board [Figure 9]. Unfortunately, during the lift, we realized that the support board was flexible, and despite immediately laying the fragment down, it cracked along a pre-existing crack on its proper left side [Figure 10]. This suggested that the previous consolidation treatment with ethyl silicate was not effective in completely penetrating the thick mud plaster and mud brick, and that all sizeable fragments treated in this way should be evaluated before moving them. After consulting with R. Bagnall and the art historians, the unstable paint layer along the crack in the "Lyre Fragment" was consolidated with a 5% Paraloid B72 in acetone and stabilized with small lens tissue "bandages", as lens tissue was the only tissue available on site [Figure 11]. As the plaster surface had already been consolidated with ethyl silicate, a higher concentration of B72 (i.e, 5%) was used because lower concentrations could not penetrate the consolidated surface. This should be kept in mind for conservation of pre-treated surfaces in future seasons. After consolidation, the plaster fragment was shored up using pieces of mattress foam and then gently slid onto a hard wooden board [Figure 12]. The board was then placed on a table for storage and covered with a wooden lid [Figure 13].

The other two large plaster fragments were not moved at all because of our concern that they would not be thoroughly consolidated by the ethyl silicate treatment. Instead, they were left in their locations and simply covered with two layers of lens tissue and a cover of Tyvek synthetic textile which was weighed down in place with small sand bags. Photographs of all of the fragments were posted directly above them in the hope that people will not be tempted to lift up the coverings in order to see them [Figure 14].

These plasters should all be evaluated, re-treated and re-housed in stable storage containers in the next seasons.



Figure 9



Figure 10



Figure 11



Figure 12



Figure 13



Figure 14

MOVING OF ANIMAL COFFINS:

Five low-fired ceramic animal coffins found in Area 4.1 (Temple of Thoth area) in the 2008 season were examined and moved during our visit. They were lifted from the field and transported to the excavation house in various states of preservation; one is complete with its contents intact [inventory #13449]; four are cracked open, with three of these having had their contents either partly or entirely removed [Figure 15, for example]. During removal from the field, the coffins had been wrapped in layers of cheesecloth and duct tape or packing tape. They were stored on the floor of a room in the excavation house and rested unevenly on flexible metal sheets, and wads of cotton wool and mattress foam [Figure 16]. Furthermore, the room itself was relatively damp, as evidenced by the wetness of some of the cotton wool.

Since the coffins are slated to be moved from this room at the end of this season, we decided to place them on more stable wood boards (2.5cm thickness) after being shored up with new mattress foam; this would lift them off the floor, make them easier to lift and carry out of the room. Each coffin was shored up using pieces of mattress foam before being gently slid on its metal board onto a new wooden board. One of the coffins [inventory #13448] had to be partially emptied in order to make it stable enough to safely move [Figure 17]. The contents were given to the registrars for sieving; animal bones, egg shells and textile fragments were recovered during this process. The coffins were then placed on mattress foam “spacers” so that they rest slightly above the ground and are therefore easier to pick up [Figure 18].

Paolo Davoli requested that these coffins be conserved in the upcoming season. This will include emptying the contents of coffin #13261 which is already broken, as well as reconstructing and stabilizing the remaining coffins as possible.



Figure 15



Figure 16



Figure 17



Figure 18

PROPOSAL FOR CONSERVATION WORK IN THE 2011 SEASON:

We recommend the following steps for conservation for next season:

1. Targeted scientific analysis of the physical and chemical properties of the painted plaster and mud brick. This work will be essential in ensuring that the appropriate conservation materials are used. Considering that prior treatments may have failed due to the lack of information about some of the components of the mud plaster, this is a crucial and ethical step in developing future conservation treatments. This work should be completed by B. Gehad in Cairo, and would require two weeks of Gehad's time to compile and interpret the analytical results. See Appendix 1 for specific information on types of analysis and approximate costs.
2. Some research into possible problems with retreating previously consolidated fragments. Considering that several important figural sections have been previously treated with a variety of conservation materials, any potential negative interactions between those materials and adhesives/consolidants we might use should be investigated. This work can be shared by Balachandran and Gehad.
3. Acquire necessary conservation materials and tools. Some can be purchased in Cairo by B. Gehad. This would require approximately three days of work in Cairo. Refer to Amheida inventory.xls. While the initial investment in tools and materials may seem high, the suggested items should provide ample monitoring and treatment materials for several seasons.
4. Considering the hope of extensive conservation and reconstruction of plaster fragments in the following season, it will be essential to bring another wall paintings conservation specialist on site for the entirety of the season. At least one conservator may have to arrive on site before and with the art historians so that fragments that require re-assembly can first be consolidated and made safe to handle. After the large scenes have been reassembled by the art historians, the conservators can reconstruct them using the appropriate conservation materials.
5. Set aside approximately one week for the conservation of the animal coffins.

APPENDIX 1: PROPOSAL FOR SCIENTIFIC ANALYSIS

Prior to, or concurrent with the next excavation season, it is recommended that a diagnostic and precise series of analytical tests be completed on extant wall painting fragments. This is absolutely essential as it will guide the conservation treatment of the fragments, and will avoid the use of conservation materials which may be inappropriate for use. While some preliminary analysis was previously undertaken by C. Silver, many fundamental identifications of wall painting materials from the site are yet to be clarified.

To summarize Silver's findings:

- In 2004, 11 samples from the reception hall and 5 samples from different areas of the villa were analyzed for salts using x-ray fluorescence; this technique does not specifically characterize the type of salt, but rather only provides elemental information (i.e., "calcium", "silicon", etc. are present). Therefore, specific information on what salts are present on site (and therefore what specific deleterious effects they can have) has yet to be identified, and will be best understood by X-ray diffraction.
- In 2004, 6 samples of mural painting and plaster were studied by cross-section and staining for binder analysis; a mixture of oil and protein based binders was suggested, but no specific binder was identified. A more precise method would be Fourier Transform Infrared Spectroscopy (FTIR) or High Performance Liquid Chromatography (HPLC).
- In a report from 2004, she refers to the white ground of the mural painting fragments as a mixture of gypsum and clay but does not mention if this is a result of analysis. Based on our visual inspections, this does not appear to be a gypsum-based plaster. However, this must be identified before any conservation work can continue.
- A random sampling of moisture levels on site was completed; rising damp was found to be up to 1.5m up the height of walls in the villa. A more precise reading of rising damp is required for different parts of the site as this will guide in situ stabilization as well as conservation treatments.

Given the paucity of precise information about the materials, techniques and conditions at the site, it is recommended that targeted analysis be completed in Cairo by B. Gehad. Gehad has had extensive experience carrying out such research on wall painting materials from other Egyptian sites and is familiar with the different laboratories and conservation scientists who can provide usable information from samples. Please refer to the attached spreadsheet [Analysis.xls] for the suggested analyses to be completed before or during the 2011 season; a low resolution image of the spreadsheet is reproduced on the following page. The spreadsheet mentions specific reasons for the choice of each analytical technique and provides information about how much sample is required, and the cost of each test. Samples have been kept to a minimum as destructive analysis results in the loss of original material. A small selection of samples were taken by Gehad in the 2010 season (as noted in the spreadsheet) and are currently stored in the excavation house.

Compiling and interpreting the analytical data will require approximately 2 weeks of Gehad's time once the conservation scientists have finished their work. It may take approximately 1-3 months for the results of different analyses to be made available for use.