

# CONSERVATION WORK AT THE TEMPLE OF HATSHEPSUT, 1999/2000

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Preservation and restoration works in the reported period<sup>1)</sup> focused on the aesthetic finishing of the exposition of decorated

walls and architectural elements of the Upper Courtyard, the Main Sanctuary of Amun and the façade of the Upper Portico.

## UPPER COURTYARD

The final stage of work on the wall plastering of the Upper Courtyard required the aesthetic unification of the various parts, which had been restored over the past years using different techniques and materials. Care was taken, wherever replacing weathered and cracked old plaster, to have the new surfaces resemble in color and texture the visual properties of limestone. Surviving ancient stone elements were cleaned preserving the natural patina effect.

Continuous conservation monitoring revealed a zone of stone disintegration, in the form of small cracks, on the West Wall of the Courtyard running north toward the niches J, K, L, M, O. This phenomenon, due mainly to chemical erosion (desalination), is the result of evaporation processes following rainwater saturation

(coming from the Esna shale formation backing the wall) and insolation. Spot tests revealed a gray-cement mortar that had been used during earlier reintegration works. Spherical erosion was observed on the edges of architectural elements, such as the *cavetto*, *torus* and top of the wall.

Consolidation and protection of the stone material followed previously established principles.<sup>2)</sup> Consolidation of the most eroded blocks in the west wall (27 out of 151 in the northern part of this wall) was carried out with a silica-organic substance, Streinheger Funcosil 300 (Remmers), the wall surfaces having been cleaned first with water and a non-ionic detergent to remove dirt and dust. Small cracks were filled with putties using a silica-organic vehicle, Funcosil VM 857 KSE 500 STE (Remmers D). Old plaster,

1) The conservators worked on the site from Nov. 28, 1999 to April 14, 2000. For the Polish staff, see report by Z.E. Szafrński in this volume, n. 1 on p. 185. The Egyptian personnel was represented on site by: foreman Mr. Ragab Yassin and technical restorers from the Gurna Inspectorate: Mr. Ali Mohammed Mansur, Mr. Ahmed Hussein, Mr. Gamil Geres, Mr. Nagar Mohammed Nagar, Mr. Tajeb Abdelrahman, Mr. Said Basiuni, Mr. Raba Ahmed Raba, Mr. Mohammed Hussein, Mr. Badawy Hussein, Mr. Mahmud and Mr. Said Azab.

2) R. Gazda, "The conservation and aesthetic exposition of the decorated blocks at the Hatshepsut temple at Deir el-Bahari", Ph.D. thesis, in preparation (under the supervision of Prof. W. Domasłowski, UMK Toruń), and Gazda, *PAM XI, Reports 1999* (2000), 167-171. See also reports by F. Pawlicki in successive volumes of *PAM* starting with no. VI (1994). Also M. Witkowski, "Der Tempel der Königin Hatshepsut in Deir el-Bahari", *Antike Welt* 29 (1998); R. Gazda, *Technologische Probleme Der Konservierung Der Dekorierten Steine Des Tempels von Hatshepsut in Deir El-Bahari*. IBB-Forum auf der Denkmal'98, 1 (1998).

found to be inappropriate, was removed from the niches K, M, O, R, S and P, and replaced with new aesthetic plaster and putty.

In the southern part of the east wall, the two lowermost courses of undecorated blocks required special treatment in view of their rapidly deteriorating condition. The products applied included Antihigro (Remmers), which neutralized the disintegrating component of the stone, and Funcosil 500 (Remmers). Cracks here were filled using mineral plaster with Mörteldicht III (Remmers) added to extend its porosity properties. The wall surfaces were cleaned as elsewhere, the weathered and cracked plaster replaced and a few original slabs reintroduced. Consolidation of the decorated blocks was achieved using silica-organic Streinheger Funcosil 300 (Remmers) and injections of Primal E 330 (Rohm & Haas, USA).

The plasters used in the finishing phases of the current preservation works combine protective and aesthetic functions. The fine putties used in the spaces between areas of preserved polychromy were always depressed 1 mm compared to the original surface in order for the extent of restoration work to be readily discernible. On the restored façade wall a coarse plaster 2-3 mm thinner than the wall face was used for similar reasons. The plaster was made of white cement (1 part), powdered limestone (1.2 part), sand (2 parts) and mineral pigment (0.3-0.5 part). The mineral fractions ranged from 0.15 mm to 1 mm of grain size of unsorted material. For technical reasons the putties

were modified using as the vehicle an acrylic water solution, Primal E 330 (Rohm & Haas, USA).

Following the overall restoration principles adopted by the Mission, an effort was made to clarify the decoration program on the restored walls. This goal was achieved by carving the missing outlines of particular figures and scenes in the artificial stone of the restored parts, thus joining together originally preserved fragments of the decoration. This new restoration idea has been approved by the Supreme Council of Antiquities and has been acknowledged by other specialists.<sup>3)</sup>

Reconstruction of the figural representations above the niches K, M, O, as well as of the figure of Thutmosis III (standing in front of Amun) was carried out in mineral plaster in relief technique, as was also the partial reconstruction of representations of Thutmosis II and Thutmosis III in cult scenes, symbolic representations of the Nile and the scene of the purification of the king by Seth and Horus, located above the scene of the kings being joined by Amun (*Fig. 1*). The missing outlines of four barks in scenes on the southern part of the east wall were carved in plaster, thus clarifying this register of the decoration (*Fig. 2*).

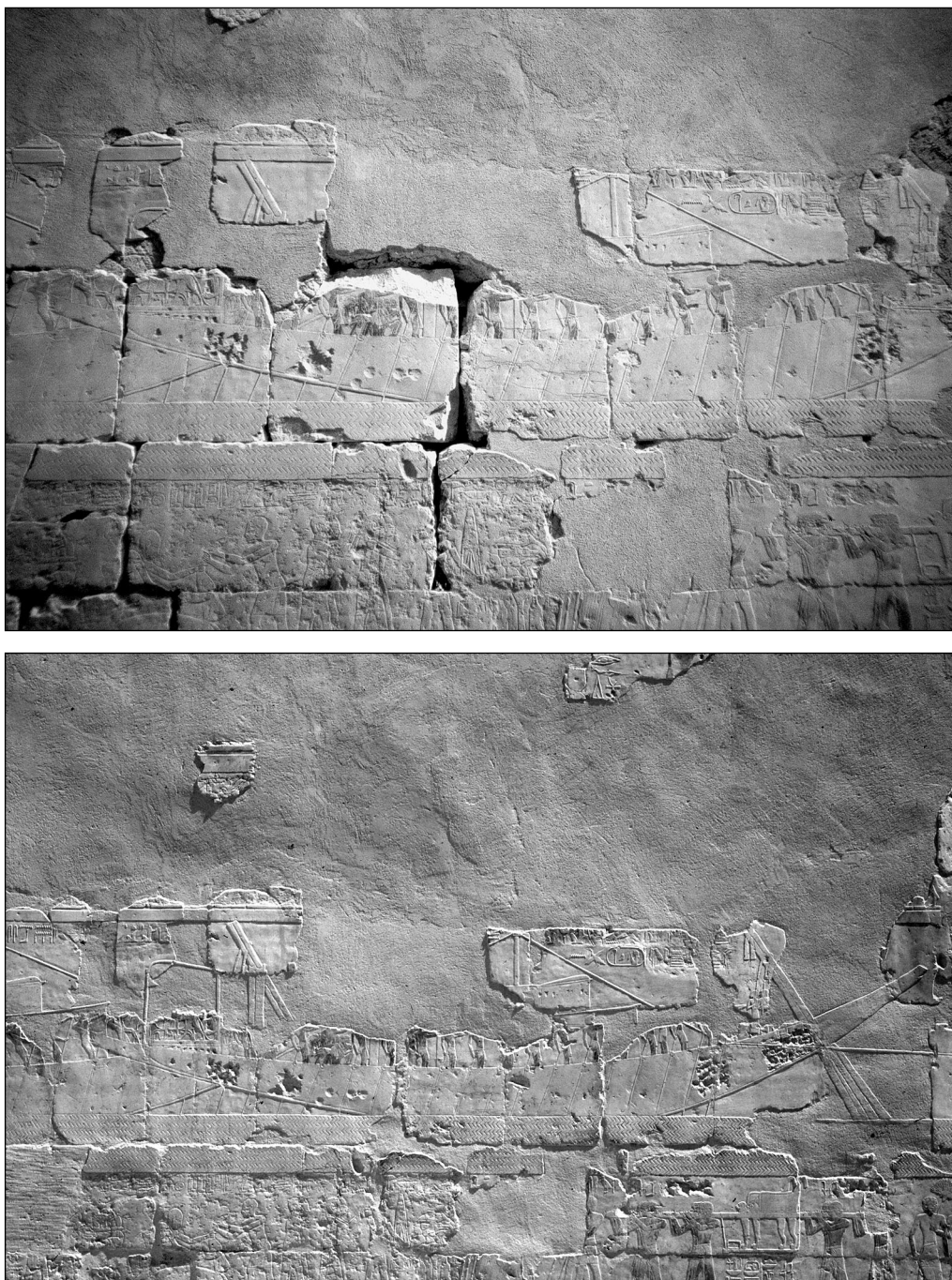
The top surface of the decorated walls (east and south) was protected with mineral putties. This operation is part of the currently executed project for draining rainwater away from the temple.

Two new figures of the Queen as Osiris were reconstructed in Niches L and R. The structure of each ancient fragment was

3) The first restoration of this type, the *sema-tawy* scene in the Bark Hall, was executed by R. Gazda in January 1998, cf. F. Pawlicki, *PAM X, Reports 1998* (1999), 123-125, fig. 4. Selected representations were subsequently restored: in the Bark Room by R. Gazda (1998-2000) and on the East Wall of the Upper Courtyard by A. Wiaderny (1998) and R. Gazda (1998-99), and also on the North Wall by A. Kann (1999), cf. R. Gazda, *PAM XI, Reports 1999* (2000), 169-171 fig. 2, and F. Pawlicki, *PAM XI, Reports 1999* (2000), fig. 3 on p. 156.



*Fig. 1. Temple of Hatshepsut, Upper Courtyard. South Wall, restored figural representations  
(Photo R. Gazda)*



*Fig. 2. Temple of Hatshepsut, Upper Courtyard. East Wall, representation of a bark, before (above) and after (below) restoration (Photo R. Gazda)*

preserved with Primal AC 33; the cracks were filled with plaster and Vinacet E-330, and the surface covered with Funcosil 500. Remains of color paint were protected with the application of a 3-5% solution of Paraloid B-72. The final form of a reconstructed statue was shaped in a plaster mixture containing limestone powder, sand, pigment and white cement (proportions: 1.5 + 2.0 + 0.5 + 1.5, respectively).<sup>4)</sup>

A new figure of the Queen as Osiris was reconstructed in Niche G. It was composed of a dismantled stone fragment from a previously existing figure in Niche A and six original fragments, discovered this season.

The last point of the program was to paint the newly introduced plaster and putties with transparent paint on a silica-organic base – Funcosil Silicon Pulverfarbe (Remmers). Silica-organic paint Funcosil LA (Remmers) was used to recreate the patina on new blocks.<sup>5)</sup>

The conservation program for the painted reliefs in Niches B, D, F, H and G, included cleaning, injection, consolidation of the painted relief on plaster and stone bedding (with 4% Paraloid B-72 in xylene and 6-8 % Primal AC 33 (Rohm & Haas, USA)), repainting, aesthetic plaster and finishing of the surface.

The cleaning work revealed two different colors of the paint on the body of representations of Queen Hatshepsut in

niches B and D. The original pink layer of paint had a red one superimposed on it. A similar observation has been made with regard to the representation of Hatshepsut from the Hall of the Cult Statue in the Sanctuary of Amun.

The artificial division of the wall into blocks, used in the previous reconstruction to give an idea of the wall structure, especially in the southern part of the south wall, was abandoned in favor of an unified new plaster surface.

#### UPPER COURTYARD COLONNADE

While the relatively modest quantity of preserved ancient material was sufficient to support a scientific reconstruction of the form, a full restoration required much more than was available.<sup>6)</sup> Upon consideration of all the aspects: historical, educational, aesthetic and display, it was decided to carry out a partial restoration in the form of a historic ruin.

The restoration program for the Upper Courtyard Colonnade was revised following recent breakthrough architectural studies.<sup>7)</sup> The plan of the complex was clarified by moving or introducing bases of columns in their proper positions. The adopted restoration principle called for the anastylosis to be carried out down to the last preserved ancient piece. The parts of the colonnade structure that were restored emphasize the entrance to the Complex of Royal Cult Chapels.<sup>8)</sup> The composition

4) J. Smaza has developed the method for reconstructing these statues and applied it in previous seasons to the reconstruction of two statues in the Bark Hall and the Horus (hawk) figure at the foot of the Upper Ramp, as well as a gargoyle in the southern part of the Upper Portico.

5) This paint was used in conservation work on the south wall in the Punt Portico by R. Gazda in February 1998.

6) The form of the colonnade, as well as the stone substance, was practically totally destroyed in antiquity in consequence of earthquakes and rockfalls. Hence, a full reconstruction of the architectural structure with original material dispersed in a mass of new material would have been contrary to the spirit of the Venetian Charter.

7) For a discussion of the studies concerning the arrangement of the Upper Courtyard colonnades, see report by Z.E. Szafranski in this volume.

8) Architectural restoration concept by A. Kwaśnica and P. Dąbrowski.

comprises an arrangement of four columns, including two with an architrave block on top.<sup>9)</sup>

The architrave blocks were displayed on benches built specially for the purpose (out of a silica brick and plastered). The benches were raised on bases, thus marking the position of the preserved architrave blocks. Several of the fragmented architrave blocks had to be joined together, but the joins were left visible as testimonial to what had remained in the wake of numerous earthquakes. In order to clarify the architectural design of the colonnade, architrave sockets were worked into the walls of the courtyard.



*Fig. 3. Temple of Hatshepsut, Upper Courtyard. Restored column no. i 7 (Photo R. Gazda)*

The conservation program for the ancient stone required the following steps:

- Protection of the fragments (prior to their re-joining) with silica-organic hydrophobic substance (11 % solution of Steinfestiger (Wacker) applied on the inner surfaces).
- Cleaning of the superficial layer of the stone and preserved painting layer with water and 2% solution of ammonia water.
- Consolidation of the painted layer on plaster bedding with 4% Paraloid B-72 (Rohm & Haas, USA) in toluene.
- Assembly of some of the architrave blocks, mended with epoxy glue: Araldit PY (Egypt, Ciba Geigy Licence and Bauharz, Remmers), e.g. blocks on benches: I 14/ I 8 & I 6 / D 13, H 13& I 13 and C 12& C 14.
- Consolidation of the cracked structure of architrave blocks, damaged mechanically and by spherical erosion, with injections of Harz 100 (Remmers).

The process of column anastylosis followed one of two methods, depending on the quantity and form of the surviving original fragments. The first was the stonemason's method using new blocks and inserting the original elements into appropriate niches cut into the new stone (columns restored in the 1980s: C 12, I 12, I 14, i 8, i 6). The second method and one that permitted a more neutral working of the background around original parts, required a structural core to be prepared out of mineral putty (reinforced with stainless steel) and covered with aesthetically treated plaster. The tops of the columns were modeled in imitation of natural mechanical destruction processes occurring in the past, e.g. i 9, i 7, i 5, i 3 (Fig. 3).

9) The architrave consisting of three pieces, joined together in the previous season by the present author.

It should be noted that the task of restoring the colonnade of the Upper Courtyard was no small effort in technical terms. The total mass of the original fragments of architrave and column blocks that had to be moved in the process weighed about 80 tons.

The last step was an aesthetic finishing of the new column surfaces with silicon paint in the same technique that had been

developed for the walls of the Upper Courtyard.

#### PTOLEMAIC PORTICO

The Ptolemaic Portico, restored in the 1960s,<sup>10)</sup> was now cleaned and the graffiti protected with an acrylic preparation. The relatively thick joints between blocks were revealed in an effort to emphasize the secondary character of this structure.

### MAIN SANCTUARY OF AMUN

The conservation program of the painting on the walls of the Bark Room entered its final stage, following six years of studies and restoration works.<sup>11)</sup> Currently, after having removed a thick layer of soot and dirt from the walls, conservators concentrated on the top of the wall decoration, the *kbeker*-freeze, and the eastern wall, under the ceiling vault. The peeling painted surface was reattached to the stone and all the air pockets and blistering were removed. The joins and losses in the cleaned surface of the walls and ceiling were filled with mineral putties. The cleaning required repeated soaking with a 3-5% solution of ammonia water and 2-4% solution of Conrad 2000 (Italy).

Cleaning by mechanical and chemical means took off a thick layer of dirt also from the surface of the two granite gates (at the entrance to the Upper Courtyard and in the facade of the Bark Room) leading to the discovery of new inscriptions and details of the decoration.

#### PTOLEMAIC SANCTUARY

The final element of the restoration project in this part of the temple was the facade of the sanctuary, which now shines with all the splendor of its gilded decoration. Some of the original sandstone pieces were now reinserted into the jambs (*Fig. 4*). Small pieces of the gilding can be seen also on the west wall of the sanctuary.

### MIDDLE TERRACE

Conservation monitoring of parts of the Punt Portico, Birth Portico, Anubis Chapel vestibule and the sculptured decoration of the Ramp, which had undergone treatment in previous seasons, revealed them to be in good condition.

With regard to the Hathor Shrine, structural damages to the ancient blocks were observed in the northeastern part of the vestibule. Cracks are noticeable in wall blocks, ceiling slabs and in at least one of the lintels. The northern part of the

10) L. Dąbrowski, "Preliminary Report on the Reconstruction Works of the Hatshepsut's Temple at Deir el-Bahari, Seasons 1963-64", *ASAE* IX (1968).

11) Cf. annual reports by F. Pawlicki in successive volumes of *PAM*, starting with no. VI (1994). Conservators in charge: A. Bogusz, R. Gazda, K. Rachuta, A. Wiaderny, B. Wołosz, M. Lulkiewicz-Podkowińska.





*Fig. 4. Temple of Hatshepsut, Ptolemaic Sanctuary. Restored facade with traces of gilded inscription on the jambs (Photo W. Jerke )*



vestibule, including two niches, appears to be unstable. The wooden protection there is of a temporary nature. The painted reliefs require consolidation, especially their plaster bedding.

An overall program for the protection, restoration and conservation of the structure of the shrine especially, and of its unique decoration in particular, is obviously in order.