CONSERVATION WORK, 2000

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As in the previous campaign, conservation activities focused on the funerary chapel of Meref-nebef, re-opened on August 28. Later in the season, more attention was paid to objects now discovered and requiring immediate treatment, both equipment of funerary shafts and elements of the architecture.

FUNERARY CHAPEL OF MEREF-NEBEF

A survey of the architrave and lateral walls that had been structurally impregnated at the end of the 1999 season with Remmers' Funcosil Antihygro and then Funcosil Steinfestiger 300 suggested that a considerable reinforcement of the rock structure has taken place. However, there are still places demanding further treatment, especially the horizontal strip of rock that runs across the middle part of the lateral walls, as well as some parts of the architrave.

Although no fragments of the decorated facade surface had fallen off between seasons, the layer of painting was found slightly detached in places and had to be re-attached to the ground. The same was true of certain areas of the painting inside the chapel, now found detached from the rock.

New concentrations of salt had appeared on the decorated surface. The biggest of these is a spot of white down (c. 25 by 15 cm) on the northern part of the eastern wall, c. 1 m above the floor. Smaller concentrations were visible at the southern end of the eastern wall. On the southern wall, c. 1.00 m-1.20 m above the floor, there was a concentrated strip of salt grains that has caused some detachment of the polychrome surface, as well as peeling and crumbling of the rock, which is particularly weak here. Smaller concentrations of salt were observed also on the northern wall and on the outside elevation of the chapel. The salt efflorescence was removed mechanically with scalpels and brushes. Some concentrations of salt have also affected the polychromy on a part of the ceiling, between the eastern wall and the crevice following the ceiling of the chapel.

The shelter built over the chapel in 1999 has radically stabilized interior climatic conditions, as demonstrated by repeated temperature and humidity measurements taken during the campaign. The temperature is stable at 26-28°C in front of the facade and 27°C inside the chapel. Relative air humidity inside the chapel is now slightly above 50% and does not exceed 60% (c. 55-57° between 7 a.m. and 1 p.m.) More extensive differences (up to 10%) have been observed in the room formed by the shelter in front of the facade. They are due to the bigger volume of this space, the presence of ventilation holes, and the opening of the shelter door during work. The values registered by the thermohygrometer usually vary between

48% and 62% (50-57% on the average), while temperature and humidity variations outside the shelter are much higher.

Conservation work inside the chapel focused on the treatment of disconnected parts and air holes. Almost all the walls (except the facade) were systematically subjected to this procedure, and particular care was given to the eastern (hunting scene) and southern walls, as well as to the entrance jambs. Primal E 330 in 8% water solution was used for attaching to the ground. Prior to this, a small quantity of 95% ethyl alcohol mixed with water in 1:1 proportions was injected in order to diminish surface tensions.

A different procedure was followed where the salt concentrations were particularly big or where applying a water solution of Primal initiated a process of salt concentration on the wall surface (southern wall and northern jamb). Here, the use of a 5-7% solution of paraloid in toluene proved more appropriate.

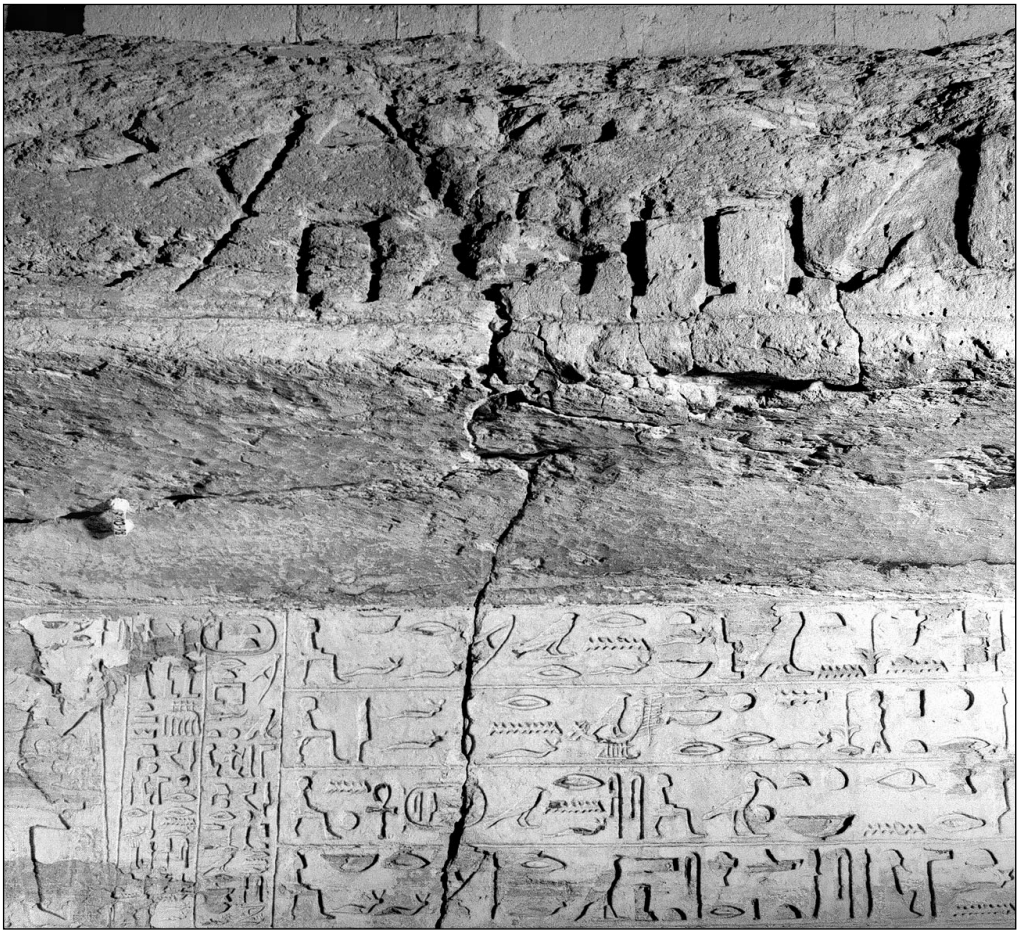

Fig. 1. Façade of the funerary chapel of vizier Meref-nebef. Re-inserted fragments of the "outer architrave" (Photo J. Śliwa)

Wherever the detached decorated surface could not be re-adhered without risk to the painted surface (south wall and southern part of west wall), the voids were filled with a water solution of Primal AC 33 (8%), using as fillers pure sand, sifted and devoid of salt, and chalk. Where necessary (e.g. at the outer edges of detachments), a small quantity of pigment (natural sienna) was added to this putty.

Some peeling on walls without a layer of painting, resulting from impregnation work carried out upon discovery in 1997, was now removed with scalpels, having first been softened with acetone.

Another ten fragments of plaster found on the chapel floor in 1997 were now re-attached to the matrix in original position. One of the main objectives of the present campaign was the conservation of the "outer architrave" in the chapel of Meref-nebef. Falling fragments of the rock and three inscribed fragments made of artificial stone had to be put back in place (*Fig. 1*). The overall surface of this part of the architrave is c. 45 by 20 cm. The artificial stone turned out to be a gypsum mortar, the gypsum being no more than a filler and binder. It also contained quartz and dispersed vegetal black and loamy matter. The latter, probably originating from ground local limestone, was also used as filler. This mortar, porous and very friable, has been consolidated by means of repeated dripping with a solution of Paraloid B 72 in toluene (2-3%).

Once the falling rock fragments of this part of the architrave were removed, the inside of the rock structure was found to be completely disintegrated. Cleaning resulted in an empty space directly above the place where the fragments of rock were to be reintroduced. The "ceiling" of this empty space has been reinforced with strips of stainless metal netting overlaid with an adhesive substance made on the base of a two-component epoxy resin called Viscacid Epoxy Bauharz Rapid by Remmers. This substance also contained chalk filling and fine-grained, sifted sand.

Leaving an empty space above the inserted fragments relieved the architrave at the reconstructed spot. Two of the three decorated fragments made of mortar were first stuck together, and then attached to the reinserted stone fragment of the architrave (using UHU Epoxy Quick). Given the limited adhesion surface, a kind of security hanger made of the same epoxy-covered metal netting had to be prepared

Fig. 2. False door inside the funerary chapel of Seshemnefer (Photo J. Śliwa)

in order to prevent the fairly heavy pieces from falling. The third mortar element with a broader adhesion surface was fixed with UHU Hart. The void between the rock and the mortar elements, visible from below, has been veiled with cardboard of appropriate shape, reinforced with epoxy-covered metal netting. Joints and epoxy-covered surfaces were masked with a thin layer of putty produced on the base of Paraloid B 72 with chalk, calcareous carbonate, sand and pigment added, designed to adapt to the color of the context.

To consolidate foliating and crumbling fragments of the facade, a velostymous silico-organic impregnating substance, Funcosil KSE 300E by Remmers, was sprayed on with a low-pressure spraying device. Reacting with water in the pores or with atmospheric humidity, this substance results in the precipitation of a hydrated gel of silicon dioxide. The precipitation of the binder should have occurred after a period of c. 3 weeks (20°C, 50% Rh).

A device for measuring humidity and temperature ("Hygrolog" made in Switzerland by Rotronic AG) was installed inside the chapel of Meref-nebef at the end of the season. It will take measurements every two hours over the entire coming year, until the next campaign, providing more complete information about changes of climatic conditions inside the shelter during the different seasons of the year.

FUNERARY CHAPEL OF SESHEMNEFER

The friable limestone lintel with sparse remains of a hieroglyphic inscription above the entrance to the chapel of Seshemnefer was reinforced with a solution of 2-3% Paraloid B 72 in toluene. Inside the chapel, there is a false door covered with at least three layers of lime(?) whitewash (*Fig. 2*). The latter is powdering and very rifted. A large part is detached from the bedding, which is also partly disintegrated and extremely fragile, falling at the slightest touch. In order to make possible a facsimile of the false door without affecting the whitewash, the latter had to be reinforced and made to adhere to its background. A series of injections was made at the weakest places. Primal AC 33 in 8% water solution was used as the binder. Also in this case, a small quantity of ethyl alcohol with water (1:1) was introduced prior to the action of gluing.

WOODEN COFFIN FROM SHAFT 36

Dehydration of the material has resulted in a complete loss of internal cohesion, hence it was essential to impregnate the object, gradually as it was uncovered, with a mixture containing 20% of ethyl polyglicol 1000 solution in alcohol and 7% solution of Paraloid B 72 in acetone in the proportion 1:10. Once the solvent had evaporated and the preserved fragments had been catalogued, they were subjected to further treatment outside the tomb. Broken fragments were stuck together with a vinyl polyacetate glue (Cola Blanca Para Madera, Spain). Fragments that had been joined together with wooden dowels were treated separately. Finally, all the 15 pieces (stuck together from the 29 that were collected) were reinforced by dripping them with a 5% solution of Paraloid B-72 in toluene.

WOODEN HARPOON FROM CORRIDOR 1

The cedar(?) wood harpoon is 2.60 m long and appears to be in excellent condition (*Figs. 3 a*, *b* and *c*). The insignificant deformation is due to humidity and the weight of overlying strata, including stone implements. Slight damages that are observable to the spearhead seem to be purely mechanical.

The cylindrical casing it was found in has suffered more extensive damage. The walls are very thin (8-16 mm) and the wood with its many knots is in considerably worse shape than the harpoon. The casing consists of two long, hollowed out semi-cylindrical elements, each with many taps. The top part is considerably split and cracked. The fragments, which are partly detached from the main body, are deformed. The damages to the outside of the casing were caused by damp, as well as insects. The wooden plug at the top of the casing has concentric rifts. Its outer surface preserves a layer of whitewash (gypsum?) that is powdering.

Loam and clay mixed with sand have been removed from the object. Remains of a dark-red pigment(?) were observed on the surface of both parts of the casing. Samples of glues used at the ancient joints and pigment have been taken for analysis.

Fig. 3a. The harpoon and its casing, after conservation. Bottom end (Photo Jakub Śliwa)

Given the material, the conservation had to be carried out in stable climatic conditions, in this case, on the spot, that is, in the chamber at the end of Corridor 1, where the temperature is 27°C and the degree of humidity around 70-73%.

All cracks and disconnected fragments were stuck together with the Cola Blanca wood glue. The process of gluing was followed by dripping the whole object with a solution of paraloid B-72 in toluene (5%). The aim of this procedure was to reinforce the object and protect it against changing climatic conditions. The casing and particularly its weakened parts were subjected to impregnation with a mixture of Paraloid B-72 in acetone and ethyl polyglicol in alcohol (see above).

Fig. 3b. The harpoon and casing, after conservation. Top end (Photo J. Śliwa)

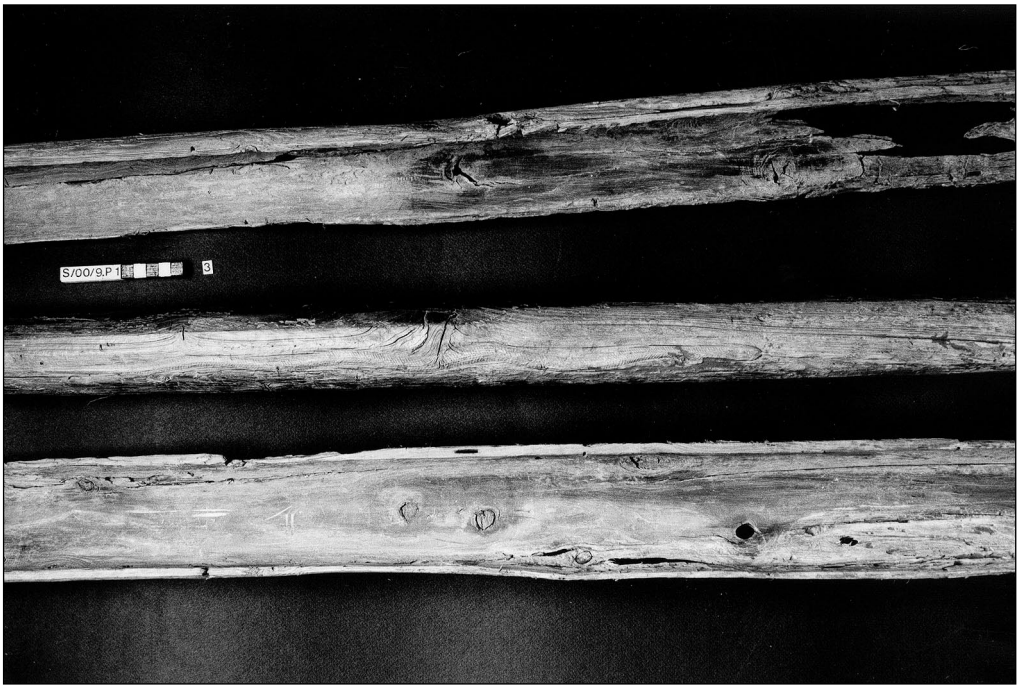

Fig. 3c. The harpoon and its casing, after conservation. Central section (Photo J. Śliwa)

FALSE DOOR OF THE PRIESTESS KHETI

Some fragments of the limestone false door of the priestess Kheti, discovered in 1999 in Shaft 14, have now been stuck together with UHU Epoxy Quick. The joints of particular fragments have been reinforced with a putty made on the base of Viscacid Epoxy Bauharz Rapid (Remmers) with a filling containing fine sand, chalk and lime carbonate.

Several other small objects and their fragments, made of wood or gypsum, as well as mudbricks have also been subjected to conservation procedures. In most cases, they were treated with solutions of Paraloid B-72 in acetone or toluene.