CONDITION REPORT OF THE TOMB OF A NOBLEMAN (TT 65) IN THEBES[1]

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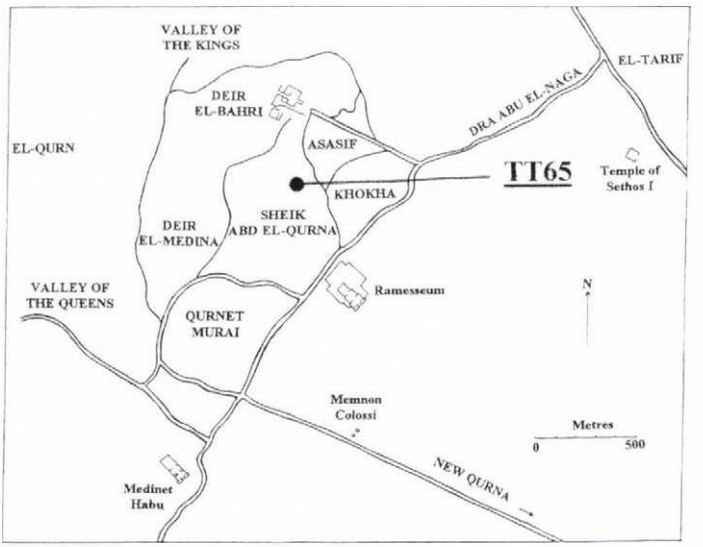
THEBES AND LUXOR

Egypt was the first state in Africa that controlled a huge territory. Nevertheless, the only regions where agriculture was possible and appropriate circumstances could be found for survival were the valley of the Nile, which crossed the country and some oases. The Nile divides Thebes, the religious centre of the country in the New Kingdom (1550-1070 BC), about 900 km south of Cairo, the capital of Egypt, into two parts. The present town of Luxor with Karnak, the magnificent main temple of the god Amun, is on the eastern river side, and is connected with Luxor temple, the other pearl of the town, by a processional road flanked by sphinxes.

The river separates two significantly different worlds. The narrow, green strip of arable land along the western bank is bordered by the grey, stony desert with barren mountains, which gave home to the "realm of the dead", the burial places of the New Kingdom. The Valley of the Kings and the Valley of the Queens can be found here and the Tombs of the Nobles, where high ranking Egyptians were laid into graves carved into the rock (Fig. 1).

The el-Korn peak dominates the region. The Sheik Abd el-Gurna hill lies below it with a village of the same name, composed of a cluster of houses built of adobe, at the foot of the hill. The smaller, round Khokha mound rises next to the village.[2]



1. The western side of ancient Thebes – the Realm of the Dead – with the Valley of the Kings and the Valley of the Queens, the royal burial temples and the Tombs of the Nobles

The Theban cemetery is located on these two hills and in their environs. The approximately 800 tombs of the members of the nobility are of various sizes, some are decorated, others are plain. Climbing along Khokha, among several closed or already restored tombs opened to the public, we tread on littered pottery fragments of different periods until we arrive at the tomb which is the object of the present study (TT 65). It is the burial place of Imiseba, a high-ranking priest of Karnak, who was the *chief of the temple archives of Amun*, and the *chief of the altar-chamber* at Karnak in pharaoh Ramses IX's time (1123-1105).

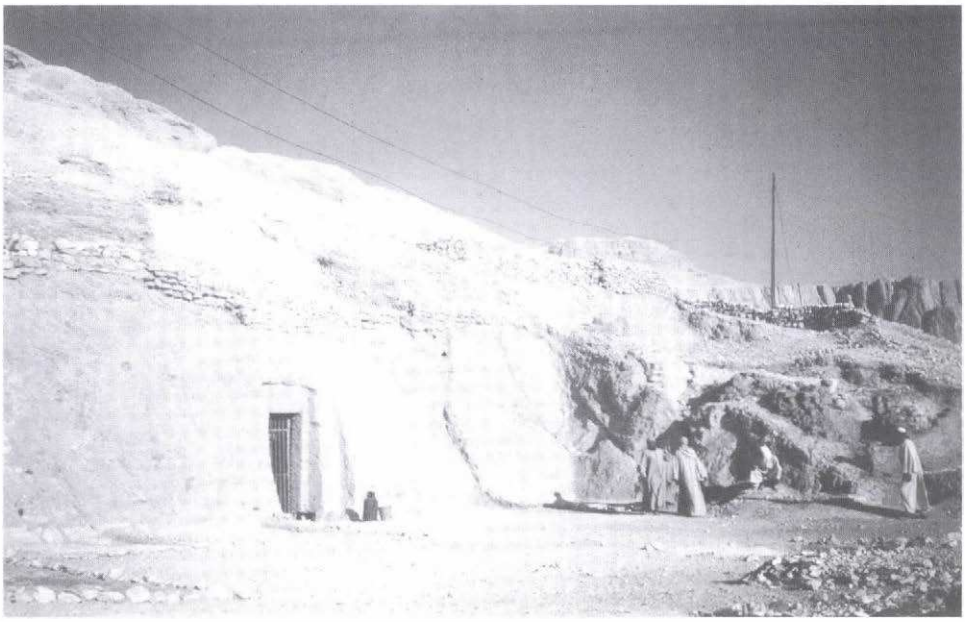
Archaeological work was started in the grandiose burial shrine, consisting of several rooms, by the TT65 project of the Eötvös Lóránd University, Budapest, headed by T. A. Bács in 1995. The walls, columns and ceilings are covered with wall paintings of high artistic standard. In the spring of 1997 assessment of the condition and photo-technical investigation of the wall paintings were carried out in preparation for future restoration, by Eszter Harsányi and Zsófia Kurovszky.

THE REALM OF THE DEAD

The ruins of the Ramasseum, the burial temple of pharaoh Ramses II, can be seen behind the village of Gurna from the terrace of the burial shrine carved into the rock on the eastern slope of the Sheik Abd el-Gurna hill (fig. 2). The reliefs on the columns and the walls used to stand out in vivid colours. Regrettably, the bright sunshine and the great temperature fluctuation took their toll, and only a few tiny spots of paint evidence how colourful they must have been. The Collossi of Memnon, the huge seated sculptures of Pharaoh Amenhotep III rise farther along the road to Luxor. Tradition holds that they used to greet the dawn with songs in ancient times.[3] The path leading to the Valley of the Queens meanders south of the tombs of the nobles, and the path to the Valley of the Kings winds northwards. North of tomb no. 65, the construction complex of the burial temple of Queen Hatshepsut lies at the foot of the steep rock wall under el-Korn (fig. 1). On the other side of the Nile, the pylons of the Karnak temple rise against the sky.

HISTORY OF THE BURIAL PLACE OF THE PRIEST OF KARNAK[4]

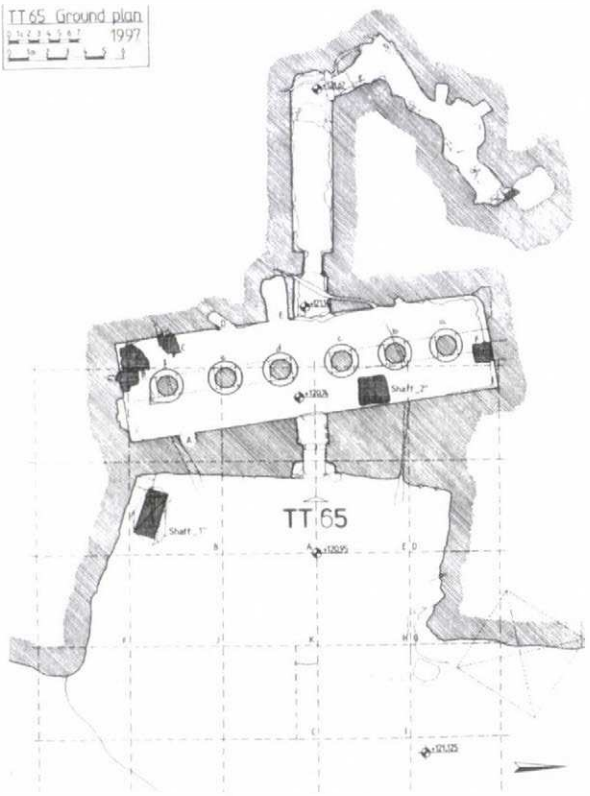
Due to specific weather conditions in Egypt, monuments, wall paintings and sculptures standing in the open have suffered serious damages. The ones that



2. The terrace carved from the hill in front of the rock tomb and the entrance of the tomb

were sheltered, as those in the Theban tombs carved into the rocks, survived the millennia some minor damages. Thus the rock tombs became the inexhaustible sources of ancient Egyptian art and religion. Tomb no. 65 is exceptional, in many respects, even among them.

Nebamun[5], the first owner, who filled in a high position at the time of Queen Hatshepsut, started the construction of his monumental rock tomb at the beginning of the New Kingdom but only the grandiose first chamber, the transverse-hall was completed (fig. 3). The nearly 4 m high, 20 m long and 5 m wide chamber was divided by six polygonal columns of sixteen sides, each with a diameter of 1 m. According to the original plans, high quality artistic reliefs would have ornamented the walls, but only smaller surfaces of the front wall were finished.[6]



3. Ground plan of tomb no. 65. From the terrace carved from the rock we enter the transverse-hall of six columns, then proceed in the axial passage, which leads to the sloping passage that turns to the right and ends in the burial chamber. (Drawing by Zsolt Vásáros architect)

Three hundred years later the above mentioned priest of Karnak chose the abandoned tomb for his burial place, towards the end of the New Kingdom when Egypt's position as a great power was declining and when decorated rock tombs became a rarity. He enlarged the tomb with an about 10 m long undecorated axial corridor perpendicular to the first colonnaded chamber, and a so- called "sloping passage" leading from it deep into the hill with a burial chamber cut at the end of it. (fig. 3). Earlier reliefs were plastered over and had the walls and the ceiling richly decorated with paintings and minutely elaborated hieroglyphic texts. He broke with the traditional depiction of picture strips, and arranged the scenes in panels. He intended to create an imitation of the burial temples of rulers and the tombs of the kings, and that is where the archetypes of the decoration of the tomb should be looked for. He supplemented these motifs with personal elements such as the life-size depiction of his own relatives[7] (fig. 4).

The history of the tomb did not end with Imiseba's death. Similarly to the neighbouring tombs, it was also robbed probably soon after it had been completed.[8] In the course of the centuries to come, more people were buried here in shafts and niches cut into the walls. In the 5th-7th centuries A.D. when Christianity spread in Egypt, Copt anchorites built a monastery in the area, which is named today "the Monastery of Cyriacus" after the only known superior

of the monastery. The building complex included tomb no. 65 together with several other neighbouring tombs.

Imiseba's rock tomb is an eminent production of Egyptian tomb architecture and it rightly attracted the attention of travellers and researchers already in the nineteenth century. One of them was the French J. F. Champollion the decipherer of hieroglyph scripture and founder of modern Egyptology. In 1914 and later, perhaps in 1927, American scientists worked in the tomb and its environs. German Egyptologists planned a research season in the 80's, but it was newer realised so it is the Hungarian expedition that can pay off the serious debt of international Egyptology and reveal the exceptional values of the undeservedly forgotten tomb to the public.[9]

RESTORER'S APPRAISAL OF THE TOMB

Parallel with the excavations we started to prepare for the restoration of the tomb in the spring of 1997. During the two and the half weeks spent in Thebes we carried out the detailed survey of the present condition of the transverse-hall and prepared its documentation. We tried to learn as much as possible about the technique and the materials used for the preparation of the wall paintings.

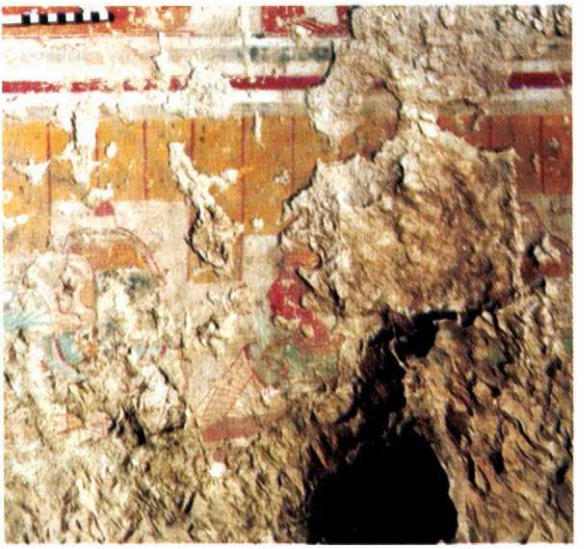
The first few days we viewed the tomb with scrutiny and registered our observations. The instruments measuring temperature and relative humidity content attested to an ideal environment for wall paintings. The temperature measured at various points of the tomb varied between 23.5 and 24.5 °C, RH between 39 and 40%.[10] The rock tomb does not have natural lighting, so UV radiation did not have any harmful effect. It is not by chance that the more than 3000 years old wall paintings survived in a relatively good condition. The little light infiltrating through the entrance is soon swallowed by darkness, so first we had to solve the problem of the installation of electricity, which was indispensable for our work. We met with many difficulties. The voltage frequently fluctuated and electric current was often cut of at the most unexpected moments.

4. Imiseba's great grandmother from the life-size depictions of the relatives. It can be seen on the damages how the Copt anchorites, for fear of demons, ruined the figural paintings.

To appraise the tomb and make photos seemed a difficult task and not only at the start. Terrain, the unevenness of the ground, the lack of scaffolding and fine dust that quickly settled on everything caused some new problems each day. Within such circumstances we started the photo-technical investigations in ultraviolet, visible and infrared ranges of radiation.

We took luminescent photos of the selected details in ultraviolet light, for which we only needed to stop the light infiltrating through the entrance. Materials that seem to be the same colour for the naked eye, could be differentiated on the basis of their different luminescence.

In the visible spectrum, we took photos in normal and projected light. In normal light we documented in detail the condition of the painted layer, characteristic deficiencies, gaps, smears, the traces of Coptic interference, dirt and wear, and places from where samples were taken. The photos made in projected light revealed the deficiencies caused by the peeling of the painted layer and of the fallen out pieces of rock of the uneven surface of the smoothing layer serving as a base for the wall paintings and the traces of the tools used in carving out the rock.(fig. 5).



5. The lower field on the northern rear wall is decorated with the long list of Imiseba's relatives. The faded inscriptions in the yellow columns list the names of the persons that squat under them in ornamental dresses with balm cones on their heads.

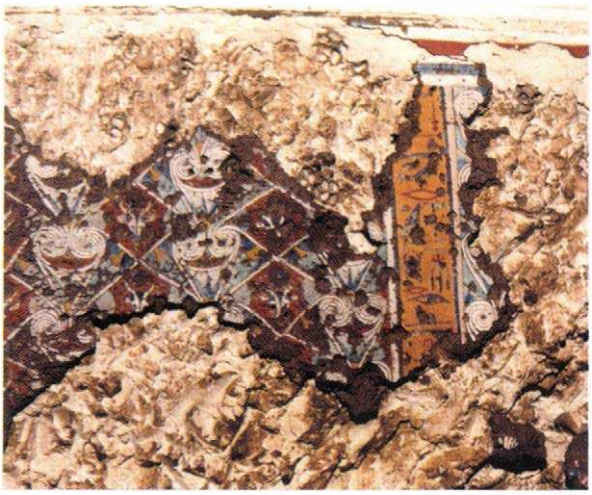
The camera we used for infra-red photography was sensitive to 1050 nm and the images were recorded on videotape. The evaluation of the shots is in progress.

Following the non-destructive photo-technical examinations we took samples from the rock, the mortars, the plasters, the grounding, the pigments and soiling, which were necessary for the physical, chemical and microscopic analyses indispensable for the planning of the restoration.

6. Detail from the north-western corner of the ceiling of the transverse-hall. Donkey excrements and their imprints and traces of the handwork can be seen in the mortar.

THE PREPARATION OF THE GROUNDING AND THE RESULTING PROBLEMS

The spacious interior of the rock tombs were carved with hard and systematic work around the columns. The rock was suitable for carving in the lower layers of the hill, while the quality became poorer towards the top. It frequently changes in tomb no. 65 and in its environment, sometimes

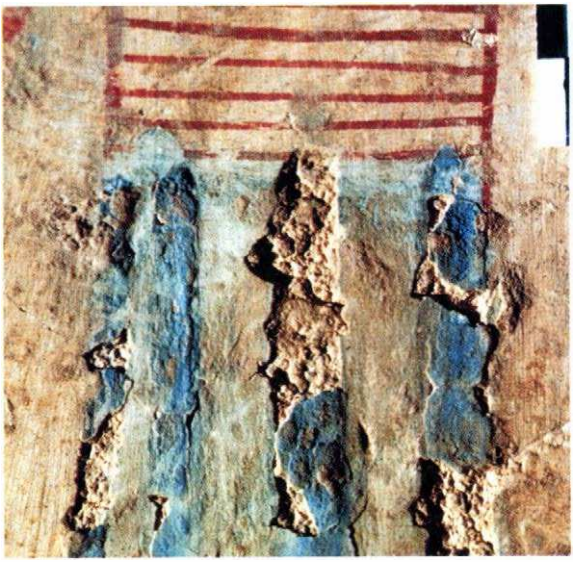


7. Very few surfaces survived from the paintings applied on mud plaster. At the same time, this revealed how the rock was carved. The characteristic cell structure nests of the mud daubers appear here as well.

the rock is solid, sometimes it separates in to paper-thin lamellae. At many places a network of fissures developed, which can reach a width of 20-30 cm (fig. 5). Therefore Nebamun, the former owner of the tomb, had the relief carved in the plaster on the front wall and not into the rock. This plaster is visibly different from the one applied 300 years later.

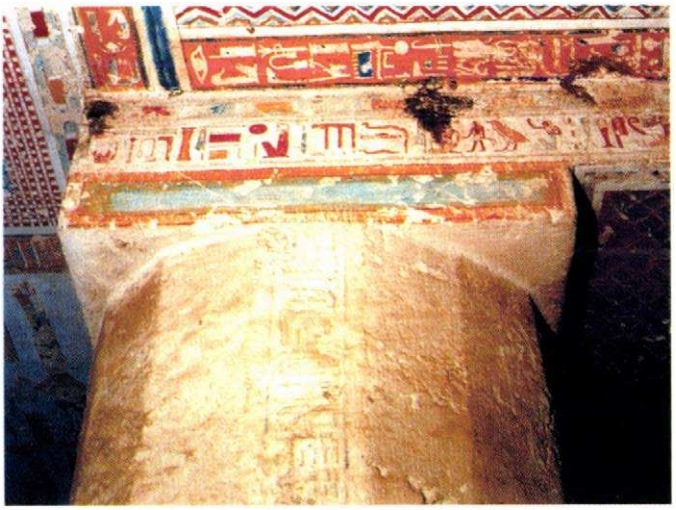
As a result of the fissures and the frequent qualitative alternation of the rock, sometimes large blocks of even a cubic metre fell out from areas that were not intended to be removed during the carving out of the shrine. These gaps and fissures were filled in with mortar or mud sometimes mixed with rubble or vegetal fibres or both. Small stone pieces were inserted into this binding substance, then carved slabs of stone were put on top aligned with the surface of the wall. Some of them have been preserved in their original position. The mortar layer fissured along the fitting during the millennia outlining the edges of the blocks. Many of them fell out from their places in consequence of geological movements.[11] Some of them were still in various parts of the tomb, but most of them, however, together with the painted surfaces, became the victims of the orderliness of later occupants (fig. 5).

8. Macrophoto of the southern rear wall. It shows the bound stalks of a bunch of lotus flowers at the foot of the richly laden altar that stands in front of Osiris.



The gaps and uneven surfaces of the ceilings and the holes left by the break-offs were smoothed over, already in Imiseba's time, with much lighter material used than the ones used on the walls, although they did not always prove successful. The builders probably plastered the roughly carved rock with mud, which seems to have been mixed with donkey excrement to decrease its weight and to increase its volume. Sun-dried donkey excrement, which mostly consists of hay and vegetal fibres, is really light

compared to its volume and it most probably fits the purpose, although, in the lack of scaffolding we could not closely inspect it on the ceiling. However, all the local people who carried water from the central well on the back of donkeys agreed that the brown globules certainly came from this animal. It could clearly be seen, even without scaffolding, that the mud plaster has conserved the fingerprints of the workers for more than 3000 years (fig. 6).



9. The western side of column d in the transverse-hall. A meticulously painted, coloured hieroglyph text runs on the side of the carved architectural element that imitates a stone beam laid horizontally on top of the columns. The inscriptions painted in blue above it on the ceiling all fell out.

The roughly prepared surfaces were plastered with different materials in an average thickness of 3-5 cm reaching 10 cm at some places. The smoothed walls have an uneven surface, depressions and that even palm sized areas are not free from protrusions. A many-layered, light coloured plaster was applied in the transverse-hall. The luminescent photos made of the southern end wall in ultraviolet light (366 nm) revealed interesting pieces of information about the rock, the plasters, the priming and the paint layer. A plaster layer could clearly be separated from the rock, it was covered with a thinner, 0.3-1 cm thick light coloured grounding then a lighter coloured background layer on which the paint was applied (fig. 11).

The surface of the "recess" that bridges the difference sin height between the transverse-hall and the axial corridor were levelled with the application of an eggshell-coloured mortar mixed with vegetal fibres, then, unlike in the transverse-hall, it was smoothed over with a mud plaster that contained vegetal fibres. Mud plaster, that was less expensive than other types of plaster, did not prove to be very durable in grave no. 65, it often separated from the rock and most of it fell off (fig. 7).

Very often several different types of work was performed within the same area at the same time: rough stone carving, plastering and levelling of walls, sketches for wall painting, etc.. As soon as the smoothing layer was completed on a stretch of the wall, the draughtsmen and painters started their work.[12]

PAINTING TECHNIQUE OF THE WALL PAINTINGS AND THE RESULTING PROBLEMS

In Egyptian wall painting, the painting process usually began with the drafting of the frame elements, the larger compositionally interconnecting elements, the texts and the scenes using red paint (fig. 15). At the same time, the boundaries of the colour surfaces were delineated. A thin layer of a light background colour was often applied over the draft. This afforded the refining of the draft, its

modification if necessary and lent a milder impression to the undercoat with the network of auxiliary lines without entirely covering the drafts. The next step was the painting of the scenes and the texts, and finally the contours were drawn.[13]

The red sketchy draft is visible at several places in tomb no. 65, which was followed by a more precise painting. The same procedure can be followed at the hieroglyphs. The carefully designed and drafted original idea was usually strictly followed and modifications were rare. On the base of the transverse-hall, however, later modifications of the designed figural depictions can be observed in more than one instance. On the northern rear wall, for example, a long list of the owner's relatives was painted instead of the designed figural depictions (fig. 5). The painted layer was damaged at some places on the lower part of the wall and it totally perished at other parts revealing the outlines of the originally designed figures drafted in red.

The wall paintings were applied on the dry plaster with pigments mixed with binding substances. Relatively few colours were at the disposal of the contemporary draughtsmen for the painting of the scenes, but mixing them they produced many shades of blue, green, yellow, pink and red. The several thousand years old paintings appeared in vivid colours where dirt was removed in the course of testing cleaning. We found earth pigments of various colours,[14] which, in the case of TT 65, came most probably from a nearby paint mine.[15]

The organic binding material used on Egyptian wall paintings could be wax, vegetal resins,[16] glue, egg, lime, etc according to the descriptions.[17] We found that white and yellow pigments were the best preserved in the tomb. Blue was evidently applied in a thicker layer. Motifs painted in this colour often got completely dislodged and fell out of the surface leaving a negative impression on the naked plaster. One of the explanations of the phenomenon can be that pigments of large grain sizes need much binding substance, sometimes more than the proportion of the colour-bearing component. When the binding substance dries, it shrinks, which can tear off the paint. The same problem could be observed in several tombs in Thebes especially on details painted in blue[18] (figs. 8, 9).

The colours were mixed with the binding material in advance for the surface to be painted in a single phase. When they ran out of paint, another batch was made. Several examples show that they did not always succeeded in mixing exactly the same hues. In the ornamental textile motifs on the ceiling, the change between the sections made with freshly mixed colours can often be observed. These sections can, as well, indicate a day's work. The density of the paint also changed within these sections. It can be observed that when only a little paint was left it was diluted several times to postpone the mixing of a new batch. Accordingly, the about 9x1 m large stripe was made in three phases (fig. 6).

Surfaces painted in black faded everywhere, sometimes fell out, often together with the surrounding plaster. At some places they are hardly visible or not at all to the naked eye (fig. 5). This happened to the black hieroglyphs that give the names of the pharaohs within the ochre field beside the figures of the 12 pharaohs in the eastern part of the southern end wall (fig. 10). We took a luminescent photo to show some possibly surviving binding material, but we found no traces of any.[19] (fig. 11). Infra shots, however, helped to recognise the faded inscriptions. Champollion misread one of the coronation names described in hieroglyphs for Amenhotep II during his investigations. The inscriptions were already difficult to see in the nineteenth century. The high contrast photo made with an infra camera of the cartouche, that includes the name of the king, proved that the king, who previously seemed to be Amenhotep I according to the

10. Imiseba had the figures of the twelve pharaohs he revered the most painted beside the scene of Ramses IX's offering on the southern end wall of the transverse-hall. The black layer applied on the jewellery of the kings does not match the carefully elaborated depiction. It can be seen beside one of the kings that the names painted in black on the yellow background of the cartouches have faded.

11. Strong luminescence characteristic of organic materials can be observed on the crown, the necklace and the apron in the luminescent photo of the king.

iconographic signs, was **really** Amenhotep I.[20] The infra photos also showed that the faded black colour used for the painting of the hieroglyphs did not contain carbon.

Some details painted in Egyptian blue, as the crowns and royal insignia of the pharaohs, offerings and flowers, were later covered with a layer that seems to be black today. This was certainly not meant to be decorative (Figs. 10, 15). They appeared much more sharply in the infra photos beside the high contrast inscriptions, which attested to the obvious difference of the two materials. The luminescent photo demonstrated a great amount of organic material (fig. 10.). It still remains unanswered why this was put over the wall painting at all. There are several theories. A possibility also occurred that it was a base for gilding, which was never made. It would be interesting to find out why this material was applied so lavishly on the otherwise carefully painted surfaces.

DAMAGES AND SOILING

Several harmful factors affected the wall paintings during the millennia after they had been painted. One of the greatest enemies of wall paintings is moisture that

enhances the movement of water-soluble salts.[21] In the case of tomb 65, we, luckily, did not have to count with ground water because it lies much higher than the water table of the Nile. The rare but ample precipitation that infiltrates through the fissures of the rock into tomb shrines on higher elevations usually creates only some moist spot. However, rushing water from the mountains collects in the valleys causing significant damages in the tombs.

We have found only one spot, so far, in the tomb that can be connected with moisture infiltrating through a nearby fissure. It is a horizontal, about half a metre long and 20 cm broad, dirt stripe on the southern wall of the recess under the ceiling. Nothing similar could be seen on the other wall surfaces. In the soiling itself are different strips of discoloration.

Damages and soiling can be observed on the wall paintings beside natural changes occurring in the materials. Some of these were caused by animals. Bats, birds and mud daubers inhabited the tomb until the entrance was closed in 1905. Regrettably, they left their traces at many parts of the tomb.

Fruit bats preferred the joining of the vertical walls and the ceiling, especially close to the corners, where they demolished the painted layer of the ceiling and left large brownish black spots on the vertical walls. Where the depositions measure several millimetres, they totally cover the surface. At the edges, nevertheless, the surviving inscriptions could be seen under the thinner layers (fig. 9).

Birds made their homes in the rock crevices, the damages they caused are mainly in such regions and on the mural fragments under them in the shapes of long white runs. They luminesce in a different way from their environs in the photos made in UV light and appear with sharper contrast.

The cell structure nests of mud daubers can be found on almost all the walls. Round these nests the painted layers are sometimes totally worn off. They stick solidly and strongly to the surface and the holes with which they were fixed can reach 1-1.5 cm deep into the plaster.[22] It can be seen in the luminescent photo taken of the place of a removed nest that the surviving painted surface is strongly luminescent under the nest and is covered with an organic layer (fig. 11).

Apart from damages and soiling caused by animals signs of human interference is also visible. It frequently occurred in Thebes, similarly to this case, that tombs cut earlier were chosen for burial places during the subsequent centuries as well. People who used these tombs later had niches cut into the walls of the painted tomb for their coffins. The painted surfaces perished together with the rock and all we can see today are only gaping holes (fig. 3).

For a long time, the tomb was a part of the Copt monastery built on the hill. The anchorites caused much damage to the ancient depictions that could not be reconciled with their belief and made them scared. They methodically carved off the noses, the mouths, and the eyes of nearly each figural depiction, sometimes smeared the whole face and put mud over large surfaces (fig. 4). Intentional incisions and engraved crosses can be seen at several parts of the walls, which were made either against evil or came from the liturgical function of the hall. Probably this was the time when the lower parts of the murals were damaged.

Nevertheless, traces of restoration can also be observed beside the harmful effects of the Copt presence. The plaster had fallen off the walls and the original mud plaster was substituted with a mud plaster mixed with vegetal fibres for example in the recess, which was probably made in this period.

RESULTS OF THE INSTRUMENTAL ANALYSES OF THE SAMPLES FROM TT 65

Samples taken from the rock, the mortars, the plasters, the paint layers and the soiling were analysed with microscopic method by Erika Vadnai and X-ray diffraction method by László Kriston in Hungary. Nikon stereo, polarisation and fluorescent microscopes (with objectives of 5x, 10x, 20x and 40x magnification in the latter case) were used for microscopic analyses. X-ray diffraction analyses were made with a Philips automatic powder diffractometer and a Debye-Scherrer camera used of a diameter of 114.8 mm.

ROCK, MORTARS AND PLASTERS

Rock sample was taken from the gap beside the lower part of the Uas-stick in god Khonshu's hand on the northern rear wall of the transverse-hall. It is a compact, greyish white rock that consists mainly of *calcite*. The results corroborate the local name "Chalk-hill" of the hill that encloses the rock tomb.

Mortar sample was taken from the light greyish white coloured substance that filled in the large gap in the rock in column b. The main ingredients of the substance are *anhydrite*, *quartzite*, *feldspars* and some *calcite*. X-ray diffraction could not establish, however, if calcite was an additive substance (ground limestone) or a binding material (lime) in the mortar. If calcite came from the binding material, a very "thin" mortar was used.

The uneven surfaces of the southern rock face where the recess was carved out were levelled with a light coloured **mortar** strengthened with vegetal materials. The majority of the sample comprises *calcite* and some *quartz* and *anhydrite* could also be identified.

This levelling mortar was covered with a greyish **mud plaster** strengthened with vegetal materials. Its main ingredients are *quartz*, *feldspars*, *chlorite* and *swelling clay minerals* (fig. 7). This layer is very sensitive to the changes of relative humidity. This may explain the observation that the grounding applied on this layer did not stick properly and was not well preserved.

It can be seen under the microscope that the grounding applied on the mud plaster is different from the one used in the transverse-hall (fig. 12).

The plaster layer used for the carving of the reliefs for Nebamun the first owner of the tomb in the northern front wall of the transverse-hall contained mostly *anhydrite*, *calcite* and some *quartz*. The quantity of calcite suggests that a lime-anhydrite plaster was applied.

The paint layers peeled off from a section of goddess Mut's dress on the northern rear wall of the transverse-hall. We took a sample of the white **plaster** right from the rock. The main ingredient was *anhydrite* used as a filling substance ($CaSO_4$). The small amount of *calcium-sulphate-hemihydrate* ($CaSO_4 \cdot H_2O$) and *calcium-sulphate-dihydrate* (gypsum $CaSO_4 \cdot 2\,H_2O$) imply that the binding substance of the grounding was partly or wholly gypsum. There can be two explanations to the presence of hemihydrate. Total hydration could be hampered by the organic component mixed to the material of the grounding and/or by the climatic conditions. It is also possible that the already formed dihydrate later lost crystal water. Shrinking that follows the loss of volume causes fissures. This could explain the low mechanic solidity and crumbly character of the layer. Beside calcium-sulphate, there is a very low proportion of *quartz*, which can be regarded as soiling in this case.

The transverse-hall was carefully plastered. Some of the samples analysed under microscope showed grains with plain surfaces, which suggests that the dry plaster was polished prior to applying the grounding layer.

The microscopic investigation demonstrated a homogenous, thinly applied grounding layer on the plaster with approximately uniform grain size.

PAINT LAYER

Anhydrite content ($CaSO_4$) is uniformly characteristic of the paint layers on the northern rear wall of the transverse-hall.

In **white** paints *calcite* ($CaCO_3$) could also be found, which indicates that lime was used as a binding substance. The proportion of anhydrite and calcite varies in the samples taken from different places. Huntite ($CaCO_3 \cdot 3\ MgCO_3$) can also be found in the white layer of Khonsu's dress, while it is missing from the lower framing motive that closes the composition of the Theban Triad (Amun, Mut and Khonsu). The white paints of god Konshu's dress and the one in the framing motive were made of different raw materials. This can mean that the two motives were not painted at the same time, even a longer period could have elapsed between them. It can also mean, if they were painted at the same time, or shortly one after the other, that a different paint was used. The latter theory is supported by Egyptological research, namely that all the murals of the tomb can be connected to Imiseba. According to the descriptions, the ornamental motifs and the figural compositions were not made by the same artist, which can explain the difference between the paints they used.

Experiences at the site revealed that some paints stuck better when first a white paint layer was spread on the background colour, and the finishing coat was applied on this layer.

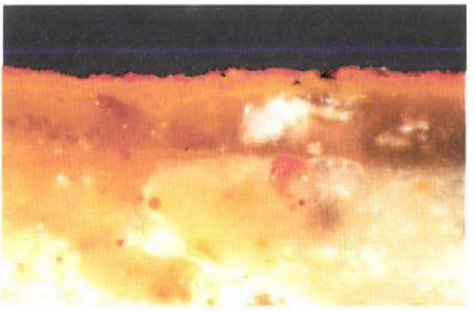
Two samples of **yellow** were taken from the hand of goddess Mut and the left column of the kiosk with the triad of Theban Gods on the rear wall of the transverse-hall. The analysis with X-ray diffraction demonstrated that they were basically identical. The main component in both samples was *anhydrite*. The joint presence of *goethite* ($FeO(OH)$), *quartz* (SiO_2) and *phyllosilicate* of 0.7 nm implies yellow ochre, while *calcite* points to lime being used as binding substance. This is corroborated by the local observation that, similarly to white paint, yellow paint layers are well preserved and stayed in a relatively good condition as compared to the rest of the colours.

Microscopic analyses have demonstrated that the yellow pigment used in the recess was of poorer quality than the ones in the transverse-hall, which means that the quantity of the soiling grains was greater, and the layer was about twice as thick (figs. 12, 13).

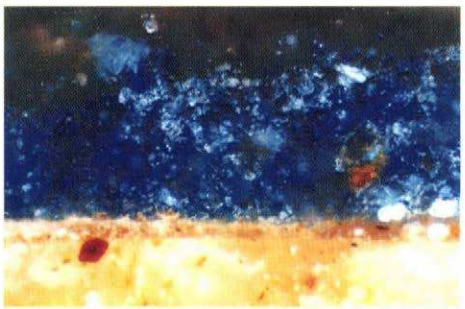
Red paint sample was taken from the framing motive closing the composition of the Theban Triad on the northern rear wall of the transverse-hall. The X-ray diffraction analyses shows that the main component was again *anhydrite* and the colouring material was *hematite* (Fe_2O_3). The presence of *calcite* suggests that the binding material was lime in this case as well. The main component of the red pigment was *hematite* and the low proportion of *quartz* and *phyllosilicate* implies that it was of high quality.

Microscopic investigations revealed similar differences in the case of red as of yellow. The thickness of the applied paint in the recess is also about twice of that in the transverse-hall where paint made from a higher quality pigment was used (Figs. 12, 13).

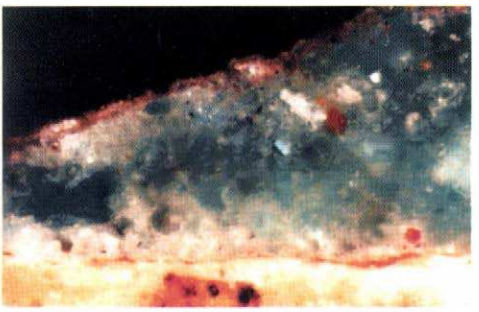
12. Microscopic cross-section of the sample taken from the southern wall of the recess. A yellow ochre layer can be seen on the ground layer applied on the mud mortar. Egyptian blue overlies the yellow layer, which is covered by red ochre.



13. Microscopic cross-section of the sample taken from the frame motive that closes the composition of the Theban Triad on the northern rear wall of the transverse-hall. The thickness of the yellow and red ochre layers is about the half of those illustrated in the previous photo and the ground is also different.



14. Microscopic cross-section of the Egyptian blue pigment taken from goddess Mut's hair on the northern rear wall of the transverse-hall.



15. Microscopic cross-section of the Egyptian blue pigment taken from the lotus flower that Imiseba's daughter holds on the southern rear wall of the transverse-hall.

Blue paint was sampled from goddess Mut's hair on the northern rear wall of the transverse-hall. According to the X-ray diffraction analysis the main component was *Egyptian blue* ($CaO{\bullet}CuO{\bullet}4\ SiO_2$) and very little *anhydrite* and *quartz* could be detected beside it. *Anhydrite* and *quartz* could come from the grounding as well, but X-ray diffraction could not exactly determine this. The tested sample did not contain calcite, the binding material must have been organic in this case. This can explain why the blue layers are the worst preserved ones (fig. 14).

Imiseba and his family offered sacrifice to the god Osiris on the southern rear wall of the transverse-hall. The samples taken from the lotus flower in the hand of the owner's daughter and from the blue layer of Osiris's throne were significantly different from the previous sample. A greyish layer can be observed on their surfaces, in which *wollastonite* ($CaSiO_3$) and *quartz* could be detected. The light and dark blue colouring grains proved to be *Egyptian blue* (fig. 15).

The composition and structure of the blue paint layers on the southern and northern rear walls of the transverse-hall were, accordingly, significantly different. This can be due to the imperfection of production technology of

Egyptian blue or to the different qualities of the raw materials. It became evident that the two analysed pigments were the end products of different production processes. It is not certain, however, if the two types of pigments were used at the same time or a relatively long time passed between the two phases of painting.

The colour, grain size and purity of the blue pigments taken from the rear wall of the transverse-hall also proved different under a microscope. The quality of the blue pigments used in the recess is significantly lower, the grain size is smaller and, consequently, the layers are much thinner (fig. 12).

The **dark blue** used in the recess proved to have been mixed from vine black and Egyptian blue according to the microscopic analysis.

Beside the three main colours – **yellow** (*goethite*), **red** (*hematite*) and **blue** (*Egyptian blue*) – **black** (e.g. *vine black*) and **white** (*anhydrite* or *calcite*) were used.

SOILING AND SALTS

Colourless small **salt efflorescences** of saccharoidal texture can be seen on one side of the rock sample taken from the gap beside the Uas stick held by god Khonshu on the northern rear wall of the transverse-hall. It is pure rock salt (NaCl).

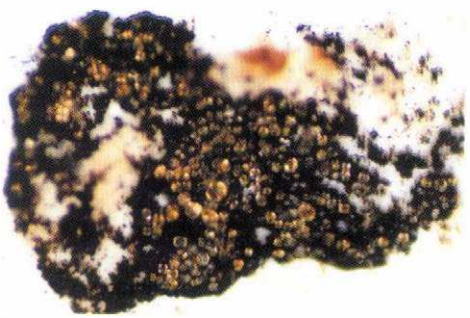
Dark coloured spots of pinhead sizes could be observed on the plaster around the bunch of flowers in front of Amun the Theban main god. Their main ingredient is guanine: $C_5H_3(NH_2)N_4O$; ASTM 28-2012 (fig. 16, 17).

A **white** flour-like **coating** can be found on the compact brownish rock in the gap at god Amun's head. X-ray diffraction analysis determined it to be *quartz*, which developed from the siliceous veins in the rock probably in consequence of climatic effects.

The white needle-shaped crystals found on the dark coloured dirt spot near the ceiling on the southern wall of the recess consisted of *carbamide* (CH_4N_2O; ATSM 8-882) and *potassium-ammonium-phosphate* ($0.73\ NH_4H_2PO_4 \cdot 0.27\ KH_2PO_4$; ASTM 20-0855).

The crystalline component of the brownish black bat guano deposited on the wall in the upper corner at the joining of the southern rear wall and frontal wall of the transverse-hall was *ammonium-potassium-hydrogen-phosphate* ($(NH_4, K)H_2PO_4$; ASTM 29-74, the common ingredient of bat guano.

16. Microscopic photo of guanine taken from the rock beside the bunch of flowers in front of Amun on the northern rear wall of the transverse-hall.



17. Microscopic cross-section of the sample illustrated in the previous photo.

PURPOSE OF THE CONDITION REPORT

The purpose of an on the spot restorer's survey is not to make a report on the scenes and iconographic programs of excellent wall paintings or about the amazement of people who visit the site thousand years after they had been finished. The task is to tell what damages, how and to what degree affected the investigated art objects. All negative facts, but even after the listing of these facts we can state that Imiseba's tomb was preserved in a very good condition as compared to other tombs. It is free, among others, of the soot layer that covers everything at many other places.[23]

It is great honour to Hungary and the Hungarian science that with the excavation and study of the tomb it can contribute to a better knowledge of ancient Egyptian culture and art. We hope that the beauty of the cleaned and restored wall paintings will be attainable not only to the members of the research team, since the purpose of the investigations and appraisals started in TT 65 in 1997 was that the eminent artistic, cultural historical and linguistic values, which belong to the cultural heritage of the world, could be opened for the scientific world and the public.

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Fotos – Harszky: 2, 4-11; Vadnai: 12-17.

NOTES

1 TT = Theban Tomb

2 The Khoha hill hides the grave of the high-ranked Djehutimes and his wife Iset (TT 32) from the reign of pharaoh Ramses II (1279-1212 BC). The tomb has been unearthed by the Hungarian Mission in Thebes under dr. László Kákosy's direction since 1983. Many tombs can be found in its environment. Two of them have also been being unearthed by Hungarian Egyptologists since 1995. Zoltán Imre Fábián studies Nefermenu's tomb (TT 184). He was the king's scribe and proconsul of the southern part of the town during Ramses II's reign. Dr. Ernő Gaál unearthed Bakenamun's tomb (TT 195) who was scribe of the Amun-treasury at the time of the 19th dynasty (1314-1200 BC).
Publications on TT 32:
KÁKOSY, L.: Dzsehutimesz sírja Thébában [Djehutimes's tomb in Thebes], Pytheas, Budapest, 1989.
KÁKOSY, L.: 13 preliminary reports annually since 1984. In:Acta ArchHung.
KÁKOSY, L. et al.: The Tomb of Djehutimes. In print.
KÁKOSY, L. – FÁBIÁN, Z. I.: Hárfás dal Dzsehitimesz sírjában In: Antik Tanulmányok, 1993. 1-2, pp. 178-187.
Harper's Song in the Tomb of Djehutimes (TT32) In: Studien zur Altägyptischen Kultur 22, 1995, pp. 211-225.
KÁKOSY, L. – FÁBIÁN, Z. I.: Notes on the Opening of the Mouth in Theban Tomb 32. In: Acta ArchHung 47, 1995, pp. 11-22.
FÁBIÁN, Z. I.: Grafitti in TT32. In: Studia Aegyptiaca XIV, 1992, pp. 137-156.
Publication on TT 184:
FÁBIÁN, Z. I.: Preliminary Report on the First Two Seasons in Theban Tomb 184 (Nefermenu). In: Studien zur Altägyptischen Kultur 24, 1997, pp. 81-102.

3 Until they fell silent in consequence of restoration ordered by Septimus Severus (146-211) Roman emperor of African origin.
4 BÁCS, T. A.: First Preliminary Report on the Work of the Hungarian Mission in Thebes in Theban Tomb No. 65 (Nebamun/Imiseba). In: Mitteilungen des Deutschen Archäologischen Instituts Kairo, 1998, pp. 49-64.
5 18th dynasty: 1550-1319 BC.
6 We do not know anything about Nebamun's fate, why he had to abandon the preparation of his tomb.
7 BÁCS, T. A.: Art as Material for Later Art: The Case of Theban Tomb 65. In: Colour and Painting in Ancient Egypt. Symposium held in the British Museum, W. V. Davies (ed.), London.
8 At the present stage of excavations, the sloping passage leading to the burial chamber and the burial chamber that has perhaps preserved the early remains of the priest of Karnak are not yet known since they are closed up to the ceiling by the fallen rock blocks. The finds that are often recovered from among the blocks and from the rubble are being restored and conserved by Gyula Tóth restorer.
9 Dr. Tamás Bács archaeologist and Egyptologist started the archaeological excavations and epigraphic investigations of Imiseba's tomb. The architectural survey of the unearthed rooms of the tomb and its environment and also the cartographic survey of the Theban tombs of the nobles were carried out by five students of architecture from the Technical University of Budapest – Mónika Gábor, Csilla Kéri, Tamás Karaba, Zoltán Ölbei and Zsolt Vasáros in 1997. They have finished their studies since then. Szilárd Somlai, who finished his studies at the Department of Geography of the BDTF gave them a helping hand. From the local survey they have prepared the exact axonometric ground plans and section drawings of the rooms that could be entered in the tomb.
10 The measuring was made in March. The values can somewhat differ in summer.
11 Strabo tells in his records that an earthquake devastated the territory in 27 BC. (see: Strabo: Geographica XVII. 1,46).
12 SHEDID, A. G.: Stil der Grabmalereien in der Zeit Amenophis' II.: Untersucht an den Thebanischen Gräbern Nr. 104 und Nr. 80, Philipp von Zabern, Mainz am Rhein, 1988, pp. 18-24.
13 SHEDID, A. G.: Stil der Grabmalereien in der Zeit Amenophis' II.: Untersucht an den Thebanischen Gräbern Nr. 104 und Nr. 80, Philipp von Zabern, Mainz am Rhein, 1988, pp. 18-24.
14 LUCAS, A.: Ancient Egyptian Materials and Industries, J. R. Harris, Oxford, 1962, pp. 338-351.
15 The paint mine can be found on the road from the craftsmen's village Deir el-Medinei to the tombs of the nobles.
16 VIEILLESCAZES, C. – LE FUR, D.: Identification du Liant dans la Peinture Murale Egyptienne (Temple de Karnak) In: BSEG 15, 1991, pp.: 95-100.
17 LUCAS, A.: Ancient Egyptian Materials and Industries, J. R. Harris, Oxford, 1962, pp. 1-9.
18 PEARCE, G.: The Conservation of Wall Paintings in Tomb 35 at Dra Abu el-Naga. In: Expedition, The University Museum Magazine of Archaeology / Anthropology 11.2., University of Pennsylvania, 1969, p. 40.
19 We also took luminescent and infra photos of the field where the names of Imiseba's relatives are listed on the lower part of the northern rear wall.
20 The inscriptions of the names of the two pharaohs differ, of course, not only in the numbers indicating the order of reign. The hieroglyphs represent in the relevant fields (cartouches) the holy divine royal name the pharaohs were given when they ascended the throne.
21 PREUSSER, F.: First Report on Analyses of Samples. In: Corzo, M. A. (ed.) Wall paintings of the tomb of Nefertari. Scientific Studies for their Conservation. First Progress Report, 1987, pp. 82-93.
In Nefertari's tomb in the Valley of the Queens, for example, NaCl that crystallised between the limestone and plaster layers endangered the wall paintings.
22 PEARCE, G.: The Conservation of Wall Paintings in Tomb 35 ar Dra Abu el-Naga. In: Expedition, The University Museum Magazine of Archaeology / Anthropology 11.2., University of Pennsylvania, 1969, p. 43.
23 Most of the Theban tombs were robbed soon after they had been completed. Some of them are still used as dwelling places. Greasy soot settled from the hearths on the walls and the ceiling.

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