

SAQQARA: SEASONS 2012 AND 2013/2014

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Abstract: After having finished the excavation in a zone located west of the Step Pyramid and spanning the area between the pyramid enclosure wall and the eastern border of the Dry Moat, the Polish–Egyptian mission started a new project aiming at a complex investigation of the Dry Moat. A geophysical survey of the area and excavations during these two campaigns focused on the east and west rock-hewn walls of the Moat, thus completing earlier research done in this part of the excavation field. A further part of the Upper Necropolis, containing simple burials from the Ptolemaic period, was unearthed and the exploration of the tomb inscribed for Ikhi/Mery and his namesake son was continued. Clearing the facade of the latter led to the discovery of another funerary structure cut in the rock below the general's tomb. The floor of the upper tomb turned out to be the ceiling of the lower one. Preparations for the exploration of the new structure were made in 2014.

Keywords: West Saqqara, Old Kingdom, Ptolemaic period, Dry Moat, Step Pyramid, Ikhi/Mery, rock-hewn tombs, burial shafts, burials of children, false door

The “Dry Moat” project, a new research program of the Polish team working on the western necropolis of Saqqara, was implemented for the first time in the campaigns in question. The so-called Dry Moat is a unique time capsule, a source for studies on the interdependence between the history of the Memphite necropolis and the natural environment.

It aims to investigate the rock-hewn structure, especially its western section, in a multilateral diachronic approach. The central part of this section, located near the western extension of the E–W axis of the stepped pyramid of Djoser, was already partly excavated in previous campaigns (Myśliwiec 2012: 854–857), but was never the subject of an overall study.

GEOPHYSICAL SURVEY

In the 2012 season, a geophysical survey was carried out in the area extending westwards from the step pyramid encl-

sure, the purpose being to determine the relationship between the geological structure of the West Saqqara limestone

plateau and archeological structures located there, especially those which remain buried under the sand (Welc, Malata et al. 2013; Welc, Trzciński, Kowalczyk et al. 2013).

Ground Penetrating Radar technology was applied to create images of sub-

surface structures. It is a nondestructive method that uses electromagnetic radiation in the microwave band (UHF/VHF frequencies) of the radio spectrum to detect reflected signals from subsurface structures.

Team

Dates of work: 1 September–18 October 2012; 12 February–29 March 2014 (delayed 2013 season)

Director: Prof. Karol Myśliwiec (Institute of Mediterranean and Oriental Cultures, Polish Academy of Sciences; 2012, 2014)

MSA representatives: Mokhtar Hamada Allah Hassem (2012), Mohamed Hussein Mohamed Hendawi, Samir Ramadan Mohamed (both 2014)

Archaeologists: Małgorzata Radomska (Institute of Mediterranean and Oriental Cultures, Polish Academy of Sciences), Agnieszka Kowalska (independent), Marek Woźniak (independent) (all 2012, 2014)

Egyptologists: Dr. Kamil O. Kuraszkiewicz (Institute of Archaeology, University of Warsaw; 2012, 2014), Dr. Teodozja Rzeuska, ceramologist (Institute of Mediterranean and Oriental Cultures, Polish Academy of Sciences; 2012), Dr. Fabian Welc (Institute of Archaeology, Cardinal Stefan Wyszyński University in Warsaw; 2012, 2014)

Architect: Beata Błaszczuk (freelance; 2012, 2014)

Geologists: Dr. Jerzy Trzciński, Sebastian Kowalczyk (both Institute of Geology, University of Warsaw; 2012), Prof. Dr. Anna Wysocka (Institute of Geology, University of Warsaw; 2012)

Anthropologists: Dr. Iwona Kozieradzka-Ogunmakin (University of Sheffield; 2012, 2014), Dr. Andrew Chamberlain (Manchester University; 2012)

Archeozoologist: Prof. Dr. Salima Ikram (American University in Cairo; 2012)

Conservators/restorers: Zbigniew Godziejewski (National Museum in Warsaw; 2012), Urszula Dąbrowska, Magdalena Abramowska (both freelance; 2012, 2014), Iwona Ciszewska-Woźniak (freelance; 2014), Amr Abdel Fatah Abdel Samea (Supreme Council of Antiquities, Saqqara; 2012, 2014)

Photographer: Jarosław Dąbrowski (freelance; 2012, 2014)

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Optimal depth penetration was achieved due to the dry sandy layers and monolithic structure of the limestone outcrop on which the ancient cemetery was located. Penetration depth with an antenna of 100 MHz was up to 45 m, and up to 15 m with an antenna of 250 MHz. It means that the Saqqara limestone plateau is practically an ideal site for using GPR surveying technology.

A Swedish MALÅ GPR X3M system was used; it is based on the MALÅ GPR X3M Control Unit and MALÅ GPR and Shielded Antennas 100–250 MHz. The MALÅ GPR X3M control unit is an

integrated ground penetrating remote, fitted directly onto a shielded antenna and powered externally. All obtained electromagnetic profiles were initially archived using special Ground Vision software. In the next stage, all profiles will be transformed into professional GPR software – Reflex View. All individual GPR profiles collected over the surveyed area in Saqqara will be used to construct three-dimensional or tomographic images. The data may be presented as three-dimensional blocks, or as horizontal or vertical slices (Welc, Trzciniński, Kaczmarek et al. 2013).

ARCHAEOLOGICAL WORK

Archaeological work in 2012 was concentrated on the western facade of the Dry Moat (squares 1714, 1715, 1814, 1815). This area adjoins the rock-hewn tomb of Ikhi/Mery (dated to the reign of Pepy I) discovered by the mission in 2002 (Myśliwiec 2003; Kuraszkiwicz 2003; 2013). The facade of the tomb had remained unexplored at the time, as were two shafts in the chapel and four shafts in the neighboring Chapel 13.

The sand layer in this spot contained numerous simple burials in the form of mummies deposited directly in the sand. There were altogether 33 burials belonging to the group of the poorest found in this necropolis. Remains of wooden coffins were rare, and some small objects, like cartonnage or wrappings, faience amulets and simple bronze jewelry, were found in the context of the mummies. Meriting attention were burials containing more than one mummy or skeleton and particularly a group of five individuals buried together (Burials 626, 627, 628,

629, 630) (see recent studies on the Upper Necropolis: Radomska 2013a; 2013b; Myśliwiec forthcoming).

Excavation of the cult chapel of Ikhi/Mery was completed this season. The rock in which the chapel of Ikhi was hewn is very weak and crumbling, with several large cracks, thus a wooden supporting structure was introduced during the first exploration in 2002 to hold it up.

The rock-cut chamber, approximately 2 m high, is divided into two parts of different width [*Fig. 1*]. The rear (western) part of the chapel is practically square in ground-plan (2.50 m E–W by 2.50 m N–S), and there is a deep niche with a limestone false door and offering table in the west wall [see *Fig. 1*]. A shaft (No. 14/1) was cut in the floor in front of this offering place, its mouth about 1.40 m². It was explored in 2002 and found to be blocked with a massive, unfinished false door at a depth of 13.80 m [see *Fig. 1*]. In 2012, a team of specialists lifted the false door (which measured about 1.40 m by 0.90 m, and was

0.25 m thick, its weight estimated at about 600–750 kg), but further exploration of the shaft had to be postponed until a wooden scaffolding were introduced to

reinforce the rock in the lowermost part of the shaft.

The eastern part of the chapel, slightly irregular in ground plan, measured

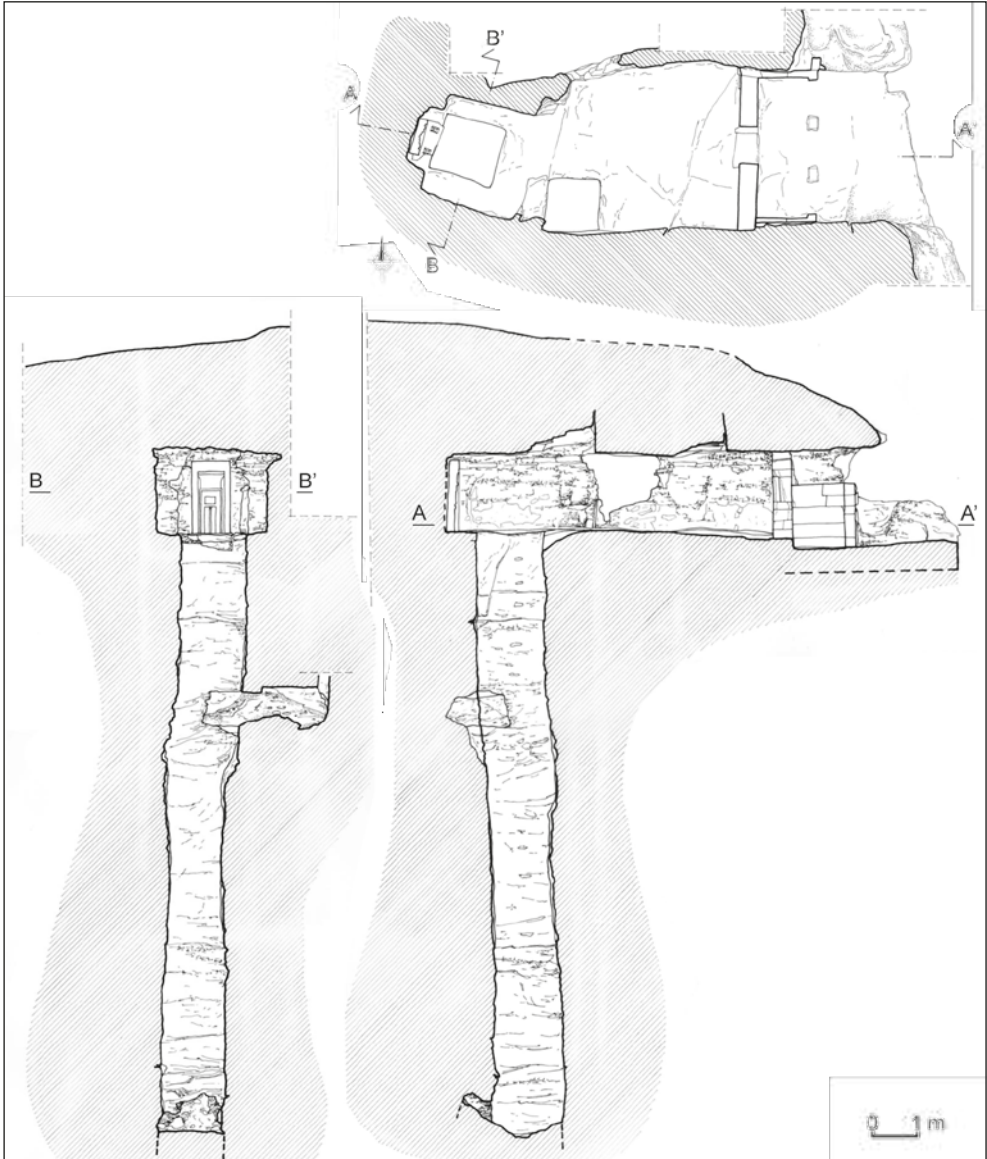


Fig. 1. Cult chapel and burial shaft of Ikhi/Mery in the west facade of the Dry Moat: top, plan; below, north-south (B-B') and east-west (A-A') cross sections (Drawing B. Błaszczuk)

3.80 m E–W by 4.50 m N–S. A subsidiary shaft (No. 14/2) was hewn in its southwestern corner, about 1.20 m² at the mouth. Along the western edge of the shaft, a rectangular shelf, approximately 1.00 m by 0.50 m, was hewn about 0.20 m below the level of the chapel floor. It was intended most probably as a socket for the false door found inside the Shaft 14/1. The shaft was explored to a point where it broke into a lower rock-cut structure at a depth of about 1.50 m. Further exploration was postponed.

The entrance niche (approximately 1.20 m E–W by 3.40 m N–S; 2.10 m high) consisted of three walls constructed of precisely cut, rectangular limestone blocks, framing it on the north, west and south, with two rectangular pillars on its eastern side [Fig. 2]. The pillars have not been preserved, but their bases were found *in situ*, fixed in sockets cut in the floor.

The short north and south walls of the niche were constructed of limestone blocks (about 0.20 m thick), lining the uneven surface of the rock. The walls ended in a kind of pilaster, aligned with the pillars of the portico and forming the jambs of the entrance niche. The four uppermost courses of blocks are missing from both of these walls. The decoration of the entrance niche was never completed; only some scenes and inscriptions are partly carved and partly sketched in red and black ink.

The eastern faces of both jambs were to be decorated in sunken relief, which was completed only on the northern side of the portico. The northern jamb bears a single column of inscription:

[...] *ḥtmtj ntr mtj n ʿpr jm3ḥw ḥr Pth Mrjj*
 [...] god's sealer, controller of the crew,
 honoured one by Ptah, Mery.



Fig. 2. West facade of the Dry Moat: Old Kingdom structures discovered in 2012, the floor of the chapel of Ikhy/Mery constituting the ceiling of the lower structure (Photo J. Dąbrowski)



*Fig. 3. Offering table scene on the west wall of the facade of the chapel of Ikhi/Mery
(Photo J. Dąbrowski)*



*Fig. 4. North wall of the chapel facade: lower part of the unfinished decoration
(Photo J. Dąbrowski)*

The lateral walls of the niche bore unfinished decoration in low raised relief. Two registers were observed on the north wall; in the upper one, a large figure of the tomb owner was represented facing right and leaning on a long staff. The lower register showed a row of four offering bearers facing left [Fig. 4].

The northern part of the west wall was decorated with a representation of the tomb owner seated in front of an offering table [Fig. 3]. The human figure was fully painted, while other elements of the scene were sketched in red and black ink. There was no trace of an inscription.

The courtyard (measuring 3.60 m N–S and 1.60–2.60 m E–W) was cut in sloping bedrock forming the western face of the Dry Moat. The north and south walls of the courtyard were plastered with *tafl*

mortar and whitewashed (preserved traces of this coating), while the floor was covered with a thin layer of mud and painted white. The east end of the courtyard ended in a rocky sill that turned out to be the lintel of another rock-cut chapel situated below that of Ikhi.

The lower structure could not be excavated without the enlargement of the excavation field in front of it and the securing of access to the entrance of the tomb from the west via a system of protective terraces. This was accomplished in the delayed 2013 season (which eventually took place in early 2014), digging a 10 m long (N–S) and 13 m wide (E–W) zone in squares 1714, 1814 and 1815, i.e., in front of the rock-hewn tomb of Ikhi/Mery. The exploration removed a stratum of mostly aeolian sand 6.20 m deep



Fig. 5. West side of the Dry Moat: area explored in 2014 (Drawing K.O. Kuraszkiwicz)

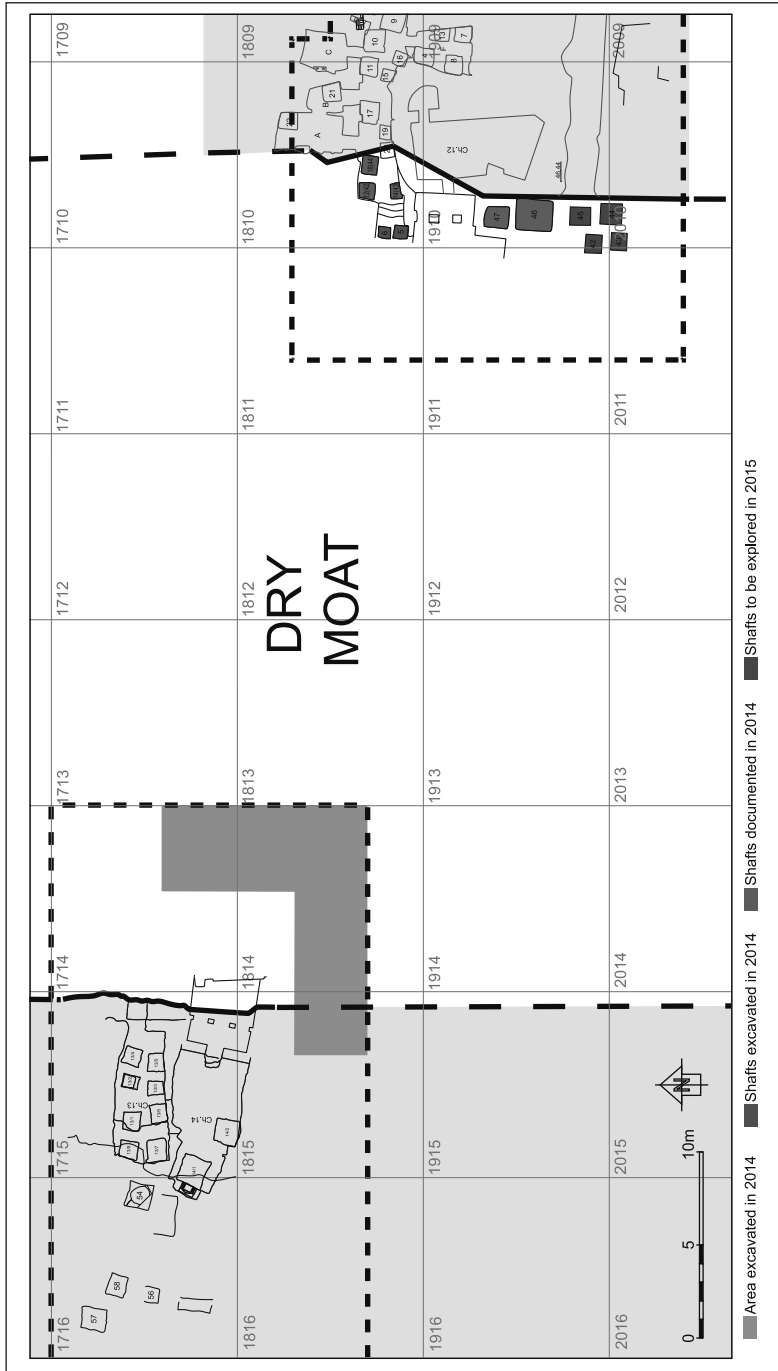


Fig. 6. General plan of Old Kingdom structures explored in 2013–2014
(Drawing K.O. Kuraskiewicz)

from the present surface down to the level of the “lower tomb” [Figs 5, 6].

A layer 3.50 m thick, located at a depth from 0.50 to 4.00 m, yielded burials constituting an extension of the Upper Necropolis southwards. The burials in this part of the Ptolemaic period necropolis turned out to be poorer than the northern part of the area where several wooden and ceramic coffins, as well as mummies wrapped in richly decorated cartonnages, were discovered before (Radomska et al. 2008: 184–254). However, an original feature of the section explored in this campaign is a considerable number of children buried, and some unusual ways of tomb arrangement. Altogether 33 burials were found and fully documented (description, drawing, photography) during this campaign in the Upper

Necropolis. Some of them merit special attention:

- Nos 655–658: four bodies buried together;
- No. 662: the body in an unusual position, resting on its back with legs bent (knees upward);
- Nos 668, 670, 676, 681 and 687: burials of children (e.g., Fig. 7), concentrated in a relatively small area in square 1814;
- No. 680: body with remains of cartonnage decoration, buried in a coffin made also of cartonnage.

Below the Upper Necropolis, there was a layer 2.50 m thick of pure aeolian sand overlying a layer of compact *dakka* at a depth of approximately 6.00 m below the present surface. The excavation stopped on the surface of the *dakka*, and the area was secured with sequences of stone walls



Fig. 7. Double burial of children (Nos 673–674) in square 1814
(Photo J. Dąbrowski)

surrounding a square central part, where a thick layer of sand bags was placed on the *dakka* surface. Excavation should be continued here in the next campaign.

The usual examination and recording of anthropological and ceramological material, as well as various groups of small objects from current and earlier excavations, were accompanied by an extensive geological study of the archaeological strata visible in various sections all over the excavated area. This study turned out to be particularly telling on the lowermost rock-hewn platform adjacent to the eastern border of the Dry Moat. Traces of tools, as well as cracks and rifts left in the process of extracting stone, proved that this area was originally a stone quarry (Welc 2011). The lowermost strata, containing black-colored mud bricks, stone chips, blocks with painted marks, and *dakka* with a great deal of potsherds, proved that the quarry was used in the times of the Third Dynasty, most probably as a source of stone for the pyramid of Djoser or its gigantic enclosure wall. A sequence of irregular steps hewn in the rock and leading eastward to the next

platform, located approximately a meter higher up, must be interpreted as a track used by stonemasons for transporting blocks to the pyramid. Parts of the rock surface on both the lower and the upper platforms were overlaid with dark mud or a brick layer, proving that some features of the quarry may have been reused for other purposes, possibly of a ritual nature, right after or a short time after the stone had been extracted.

In this context it is important to observe that rock-hewn Corridor 1 ending in a chamber containing two deposits (wild animal bones and a unique wooden harpoon, which is now on display in the Imhotep Museum at Saqqara) was correlated with a rock-hewn ledge separating the two lowermost platforms of the quarry from one another. This would confirm an earlier assumption that some of these early, very fragmentarily preserved walls in the ex-quarry may have belonged to the superstructure of a ritual complex encompassing the subterranean crypt perhaps as early as in the times of the Third Dynasty, and not just later (Sixth Dynasty), as had been assumed before.

APPENDIX

CONSERVATION WORK IN SAQQARA (2012 AND 2014)

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In the 2012 and 2014 seasons conservation work took place both on the site and in the storerooms of the Supreme Council where registered objects from previous campaigns are stored.

In 2012, monitoring of the state of preservation of the decoration in the chapels of Merefnebef and Nyankhneferkemnef showed that climatic conditions inside them were improving from year to year.

Humidity levels varied in the range 40–60%Rh during the period from November 2011 to September 2012. Maximum humidity was observed in the period from mid-June to mid-August (slightly above 60%Rh).

Lesser humidity variability resulted in diminished efflorescence on the walls of the chapels. The improvement was also due to recent practices, such as strategic backfilling of shafts and other pits after exploration, as well as covering excavated rock surfaces with a layer of sand to protect against rainfall water penetration deep into the rock through numerous cracks and crevices. Water moving through the rock transports soluble salts, causing them to effloresce on the surface.

Once the efflorescence was removed, the state of preservation of the reliefs and paintings was examined. Sporadic detachments of the polychromy layer were observed on small surfaces. They were more numerous in the chapel of the vizier, probably due to a higher degree of humidity and particularly its considerable variations registered by the thermohygrometer, over day/night or short periods spanning a couple of days.

The work in chapel 14 (Ikhi/Mery) was concentrated on the tomb facade, unearthed in 2012. The facade, hewn in the rock, had a facing made of excellent white limestone blocks. The preservation state of this structure was very poor. Multiple cracks of the rock mass, as well as disintegration of the ceiling and its progressive falling caused serious damages to the limestone blocks. There are many rifts, displacements and detachments of the blocks that were crushed under the pressure of the rock. Some of them were completely detached and destroyed. Most

of them were moved from their original position.

The white limestone used for the facing is very soft, and it had often been filled in with mortar (most probably gypsum mortar) in places where parts of the stone were lost, as in the south lateral wall. This mortar was fairly coarse-grained, pinkish in color owing to the addition of ground pottery. Originally, the joints between blocks and the rock-hewn ceiling were pointed with this mortar as well. Degradation of the gypsum binder resulted in a weakening of the mortar, which has become very brittle and disintegrating.

The red line drawing on the white limestone surface was very well preserved. Only small fragments of the drawing were affected by the pressure of the mass of stone. Both the red and the black color in the representation of the deceased seated at the offering table is in perfect condition. The painting was executed either directly on the stone surface or on a thin layer of gypsum (whitewash) without any elements added. Such a whitewash was found on most blocks in this structure. Its adhesion to the matrix is very weak. A fragmentarily preserved sketch of an inscription executed in black ink can be seen on the lateral north wall. In places the ink has faded or has become obliterated.

Conservation of the facade and courtyard walls this season consisted of removing soil, salt and sand concentrations, as well as damp patches from the surface of the blocks, in order to facilitate a recording of the decoration. Used for this purpose were such tools as brushes of various hardness, scalpels, spatulas and wooden depressors. Remains of the gypsum mortar were repeatedly trickled with an acetone

solution of PARALOID B72 (3–5%) and then with a PARALOID acetone/alcohol solution, providing a longer and deeper penetration, as well as lesser migration to the surface.

The surfaces bearing painting or red or black sketches were also dripped with a similar solution, using for the purpose delicate cosmetic sprayers and thin brushes.

Rifts in limestone blocks, caused by pressure of the rock, have been dripped with a binder in order to avoid further disintegration of the stone. MOWILITH 50 in an acetone solution was applied for the purpose, injecting the solution with syringes.

Some of the lesser stone fragments were removed upon exploration and remounted later. Treated in the same way were also some fragmentary blocks found during the exploration of the doorway.

The delayed 2014 season, which took place in winter, permitted the state of conservation of objects to be checked under different climatic condition, following a break of more than 12 months. Work started on 11 February 2014 with relatively low air temperatures of 8–12°C in the first weeks.

As soon as the cult chapels were reopened, data from devices measuring temperature and humidity (Rotronic products), installed earlier in the chapels of Merefnebef and Nyankhnefertem, were checked for the period from 14 October 2012 to 12 December 2013. Humidity in the chapel of Merefnebef varied between 33% and 60%Rh and in the neighboring chapel between 39% and 60%Rh. On the grounds of the decision of the Supreme Council of Antiquities of 13 November 2013, three devices for

measuring the dimensions of the cracks in the rock walls of both structures, as well as the temperatures, humidity and condensation of CO₂, were installed in the chapels. The average temperature and humidity values registered by these devices on the day of the opening of the chapels were: for the Merefnebef chapel, humidity 44%Rh, temperature 21.3°C; for the Nyankhnefertem chapel, 45%Rh, temperature 22.6°C.

While the salt threat is similar in the chapels of Merefnebef and Nyankhnefertem, it is less acute in the facade of the chapel of Ikhi/Mery, because the latter reliefs and polychromy were executed on specially prepared blocks of white limestone which are less susceptible to water and salt migration than the structures described above.

The work in the chapel of Ikhi/Mery focused on its facade. The state of preservation, good in 2012, had not changed essentially. Tiny detachments of degraded parts of the stone and whitewash were mounted using PRIMAL E-330 and PRIMAL AC-33 (3–7%). Larger fragments were treated with MOWILITH 50 in acetone. The shelter built in front of the facade proved very efficient for stabilizing temperature and humidity parameters.

Regarding small finds, the conservation team focused its efforts on a wooden coffin from Burial 652 found in the fill of an Old Kingdom shaft in front of Corridor 2 (east side of the “Dry Moat”) [Fig. 8]. The rectangular box had walls whitewashed on both sides, decorated with a red border at the upper edge of the lateral walls and the lid, with some traces of ochre. The exploration of this object was extremely difficult due to the petrified structure of the fill, containing loamy substances

stiffened through long-term deposition of rainwater [Fig. 9 left]. Two conservators participated in the exploration, using support holders and centrifugal structures to keep the present shape of the object

and prevent its disintegration. Once the wooden elements were suitably documented (photographs, drawings, description), they were dismantled and conserved. The coffin was reinforced



Fig. 8. East part of the Dry Moat: Old Kingdom funerary shafts explored in 2014, in front of Corridor 2 (Photo J. Dąbrowski)



Fig. 9. Old Kingdom child burial (No. 652) in a wooden coffin in a burial shaft; right, the coffin after restoration (Photos J. Dąbrowski)

structurally, retaining all secondary deformations, including the pegs preserved in the lid. Larger missing elements at places of construction joints were completed with balsa cones, glued with MOWILITH 50 in acetone [Fig. 9 right].

The conservation state of the objects kept in the storerooms of the SCA was monitored during the stay of the mission at Saqqara. All the objects, as well as the

conditions in which they are stored were checked, as well as security methods used for their safeguarding.

The cartonnages are objects of special attention. Some detachments observed on their surface were mounted using a water dispersion of the acryl resin PRIMAL AC 33 (2–5%). Other objects were cleaned and partly reinforced with suitable solutions.

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