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**Abstract:** In the 2012 and 2013 seasons, the conservation program of the Polish–Egyptian Conservation Mission to Marina el-Alamein included conservation activities in selected rooms of the complex of Roman (southern) baths in the central part of the town and, in 2013, elements of the monumental tomb T21, as part of the general program for the preservation of its remains. In 2013, conservation of selected items, wall paintings in particular, from the stores was undertaken.

**Keywords:** Marina el-Alamein, Tomb T21, southern baths, stone conservation, painting conservation

## أعمال مختارة من مارينا العلمين في موسم 2012 و 2013

Marlena Koczorowska, Wojciech Osiak

**الملخص :** إن برنامج الصيانة و الترميم في البعثة البولندية المصرية إلى مارينا العلمين في موسم 2012 و 2013 قد تضمن أنشطة لحفظ غرف مختارة من المجمع الروماني ( الجنوبي ) للحمامات في وسط المدينة وفي 2013 العناصر التذكارية للمقبرة 21.T كجزء من البرنامج العام للحفاظ على بقاياه . وفي 2013 بدأ العمل على حفظ المواد المختارة خاصة اللوحات الجدارية من المخازن والمحلات .

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# POLISH ARCHAEOLOGY IN THE MEDITERRANEAN

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RESEARCH



## ABBREVIATIONS

<i>AA</i>	<i>Archäologischer Anzeiger; Jahrbuch des Deutschen Archäologischen Instituts</i> (Berlin)
<i>ANM</i>	<i>Archéologie du Nil Moyen</i> (Lille)
<i>ASAE</i>	<i>Annales du Service des Antiquités de l'Égypte</i> (Cairo)
<i>AV</i>	<i>Archäologische Veröffentlichungen, Deutsches Archäologisches Institut, Abteilung Kairo</i> (Berlin–Mainz am Rhein)
<i>BAAL</i>	<i>Bulletin d'archéologie et d'architecture libanaises</i> (Beirut)
<i>BAH</i>	<i>Bibliothèque archéologique et historique</i> (Paris)
<i>BAR IS</i>	<i>British Archaeology Reports International Series</i> (Oxford)
<i>BASOR</i>	<i>Bulletin of the American Schools of Oriental Research</i> (Ann Arbor, MI)
<i>BCH</i>	<i>Bulletin de correspondance hellénique</i> (Paris)
<i>BdE</i>	<i>Bibliothèque d'étude</i> (Cairo)
<i>BIFAO</i>	<i>Bulletin de l'Institut français d'archéologie orientale</i> (Cairo)
<i>BSAA</i>	<i>Bulletin de la Société d'archéologie d'Alexandrie</i> (Cairo)
<i>BSFE</i>	<i>Bulletin de la Société française d'égyptologie</i> (Paris)
<i>CCE</i>	<i>Cahiers de la céramique égyptienne</i> (Cairo)
<i>EtTrav</i>	<i>Études et travaux. Travaux du Centre d'archéologie méditerranéenne de l'Académie des sciences polonaise</i> (Warsaw)
<i>FIFAO</i>	<i>Fouilles de l'Institut français d'archéologie orientale</i> (Cairo)
<i>GAMAR</i>	<i>Gdańsk Archaeological Museum African Reports</i> (Gdańsk)
<i>GM</i>	<i>Göttinger Miszellen</i> (Göttingen)
<i>IAMS</i>	<i>Institute of Archaeo-Metallurgical Studies</i> (London)
<i>JARCE</i>	<i>Journal of the American Research Center in Egypt</i> (Boston–Princeton–New York–Cairo)
<i>JEA</i>	<i>Journal of Egyptian Archaeology</i> (London)
<i>JGS</i>	<i>Journal of Glass Studies</i> (Corning, NY)
<i>JJP</i>	<i>Journal of Juristic Papyrology</i> (Warsaw)
<i>JRS</i>	<i>Journal of Roman Studies</i> (London)
<i>MDAIK</i>	<i>Mitteilungen des Deutschen Archäologischen Instituts, Abteilung Kairo</i> (Wiesbaden)
<i>OIP</i>	<i>Oriental Institute Publications</i> (Chicago)
<i>OLA</i>	<i>Orientalia lovaniensia analecta</i> (Louvain)
<i>PAM</i>	<i>Polish Archaeology in the Mediterranean</i> (Warsaw)
<i>PSAS</i>	<i>Proceedings of the Seminar for Arabian Studies</i> (London)
<i>SAAC</i>	<i>Studies in Ancient Art and Civilisation</i> (Kraków)
<i>SAK</i>	<i>Studien zur altägyptischen Kultur</i> (Hamburg)
<i>SAOC</i>	<i>Studies in Ancient Oriental Civilization</i> (Chicago)
<i>WVDOG</i>	<i>Wissenschaftliche Veröffentlichungen der deutschen Orient-Gesellschaft</i> (Berlin–Leipzig)

# SELECTED CONSERVATION WORK IN MARINA EL-ALAMEIN IN THE 2012 AND 2013 SEASONS

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**Abstract:** In the 2012 and 2013 seasons, the conservation program of the Polish–Egyptian Conservation Mission to Marina el-Alamein included conservation activities in selected rooms of the complex of Roman (southern) baths in the central part of the town and, in 2013, elements of the monumental tomb T21, as part of the general program for the preservation of its remains. In 2013, conservation of selected items, wall paintings in particular, from the stores was undertaken.

**Keywords:** Marina el-Alamein, Tomb T21, southern baths, stone conservation, painting conservation

The program of the Polish–Egyptian Conservation Mission to Marina el-Alamein is carried out in close cooperation with professional restorers from the Academy of

Fine Arts in Warsaw, who are responsible for developing and implementing proper procedures. The present report discusses some of these undertakings.

## BATH COMPLEX: CONSERVATION OF WALLS, PLASTERS AND FLOOR MOSAICS

### ROOM 4 (2012)

In the first stage, the state of preservation was documented. The mosaic in the southern portico of the courtyard (room 4), which had undergone conservation treatment in the previous season, was cleared of accumulated loose dirt (the site lies out in the open) and its condition following the winter season inspected (for

a plan of the baths and their location within the urban layout of the ancient town of Marina, see below, Fig. 1 on page 115). The bands protecting the edges were found to be slightly damaged, hence the need to reinforce them in places and to fill in the gaps. Detached tesserae were reinserted and the protective band repainted. In both cases a lime–cement mortar with

sand filler was used. The whole process was documented as a standard procedure.

Protective bands were introduced around numerous relics of plaster and wall painting on the east, south and west walls. Patches of stone were prepared for the east wall (surrounding the *alveus* = room 7a). Slabs 15–20 cm thick were used, matching their size to the original blocks. They were mounted then in prepared sockets using mineral lime–cement mortar with sand filler. Several eroded remnants of limestone blocks and lime mortar were removed from the top layers of the wall. Slabs matching the original ones were found to replace them, and they were set with the use of mineral mortar [Fig. 1].

#### ROOM 7A–B (2012)

Areas of vital conservation work were established following documentation of the state of preservation of the architecture.

In the *alvei*, 7a and 7b, protective bands were put around the edges of plaster that had become detached from the wall. Damaged joints were filled in with lime–cement mortar with sand filler (six parts sand to one part lime to one part white cement). Putties from mineral mortar as above were used to protect the edges of preserved plaster on the walls of the bath. The top surface of the wall surrounding the *alveus* (7a) was reconstructed in places [Fig. 2].

The biggest breach in the east wall built of broken stone was filled with blocks of local limestone set in lime mortar. Apart from sand, finely crushed pottery was used as filler to make the mortar similar to the preserved original one. A layer of ancient bricks salvaged

from rubble heaps lying nearby was placed on the tops of the wall. Whole bricks or pieces of them were chosen and fitted not to exceed 4 cm in height and 24 cm in length. Four whole bricks and 10 fragmentary ones (surviving 30–50% of the original brick) were used. Lime–cement mortar as above was used with ceramic filler similar to the original one preserved in the ancient mortar.

In the other *alveus* (7b), it was necessary to protect numerous extensive relics of plasters. On the front (southern) wall, big losses in the corners were filled in and bands were put around the mortar which used to be the base for setting a facing of marble slabs. Deep losses of the joints were filled in, as well as gaps in the upper parts of the wall resulting from intensive weathering of the limestone [Fig. 3].

A patch of stone was fitted into a highly weathered block in the face of the east wall. The entire face of this block was cut back 25 cm in order to fit in the replacement, which was set using mineral mortar as described above.

#### ROOM 7C (2012)

Relics of plasters and vertical ceramic elements of the heating system were protected [Fig. 5]. Mineral mortar as above was used. The loss of ceramic elements amounted to about 60%. The best two matching elements from among the pieces that were recovered during excavation of the chamber were mounted in place, next to the only surviving one. Mineral mortar as above was used for the purpose. The ceramic elements were restored with glue. The highly weathered wall around the ceramic elements was made smooth and reinforced with lime–cement mortar.



*Fig. 1. Bath courtyard (room 4): external walls of room 7 before (top) and after (bottom) conservation in 2012 (Photos R. Czermer)*





*Fig. 2. Baths, alveus 7a before (top) and after (bottom) conservation in 2012  
(Photos R. Czermer)*



*Fig. 3. Baths, alveus 7b before (top) and after (bottom) conservation in 2012  
(Photos R. Czerner)*



## ROOM 8 (2012)

Protective bands were put around the relics of plaster on the full length of the east wall and the lower part of the west wall excavated this season (8b). Mineral mortar with sand filler as above was used. Repairs were made to the damaged parts of bands put in the previous seasons around plaster surviving on the north and west walls of room 8a. In the lowest part of the west wall in room 8a, two sockets were cut to fit patches the size of the whole surface of the highly weathered blocks. Patches were prepared and set with the use of mineral mortar.



*Fig. 4. Baths, room 8a–8b: marble columns after partial anastylosis and conservation in 2012 (Photo R. Czerner)*

Square plinths were levelled above the marble floor in room 8, preparing the place for the anastylosis of two ancient marble bases [Fig. 4]. Horizontal insulation against humidity in the form of bitumen paper of high resistance was introduced between the plinths and the bases. The biggest losses in the bases were filled in with lime–cement mortar in proportions as above. Joints were filled between the plinths and marble. A relic of a column shaft made of similar veined marble was placed on the eastern one of the two bases. The shaft had been found in this room in the previous season. It was smoothed on the surface and mounted with the use of mortar as above. A joint was introduced. The two plinths were partly reconstructed to a square plan in order to make their geometric form more evident.

CRYPTOPORTICO (ROOM 8A)  
(2013)

Sockets were cut in the wall to fit two reinforced concrete beams. The beams were set using mineral mortar as above. Two stone blocks of suitable size were placed on the beams. They were fixed in place by fitting the concrete beams into sockets of gutter-shape cut into their undersides. Thus a base was prepared for the reconstruction of the upper parts of the wall.

PASSAGE BETWEEN ROOMS  
5 AND 6, AND 6 AND 7

Multi-layered plaster on the walls on either side of the passage was protected with bands. In room 6, the only surviving limestone slab was protected by placing a band of lime–cement mortar around it.

### LATRINE (2013)

After documentation of the state of preservation, it turned out to be possible to partly reconstruct a small gutter surrounding the floor in the latrine to the west (see below, Fig. 3 on page 118; Czerner, Bąkowska-Czerner, and Majcherek 2015, in this volume). Marble revetment tiles discovered during excavation were grouped by thickness and matched to the surviving elements or fitted in place where their dimensions were suitable. Lime-cement mortar was used for the purpose. Tiles were fixed in the northwestern corner of the floor and at the entrance to the latrine. The most endangered relics of plaster

on the north wall and the edge of the floor on this side were protected with mortar bands.

### TOMB T21 (2013)

Following documentation of the preservation, measurement was taken of the bases of both engaged columns framing the main entrance and a reconstruction of the drums above the bases was carried out. The diameter was 0.54 m, the height 0.31 m. Once the three bottom courses of stone walls of the mausoleum had been laid by a team of masons, the shape of the jambs in the two door openings was cut in the new stone to match the original.

[WO]

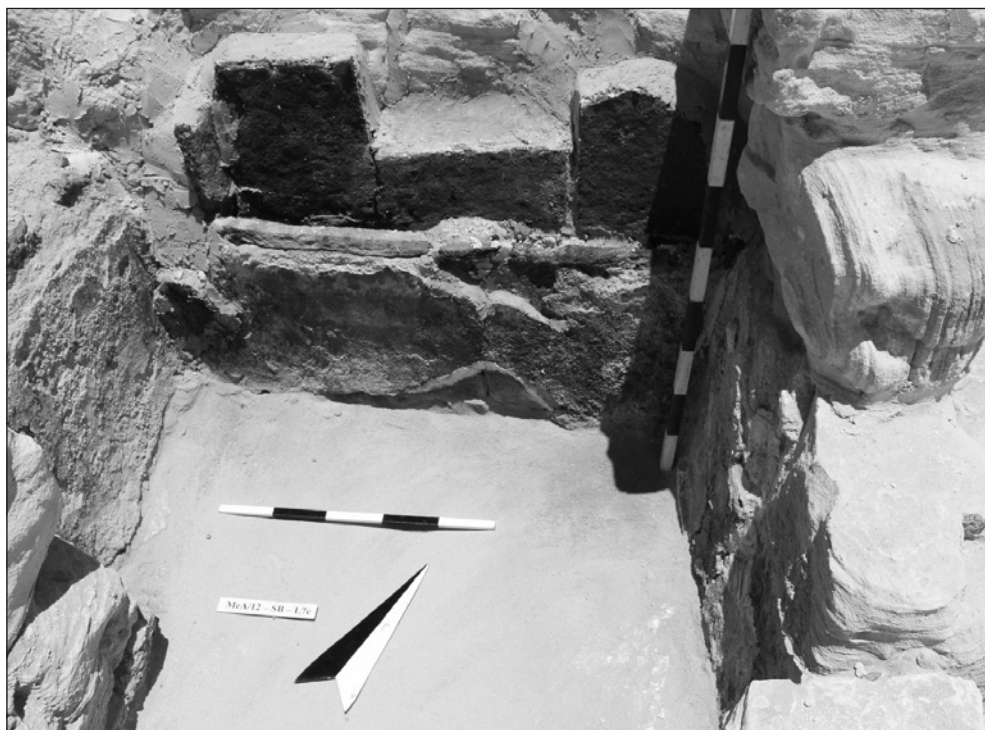


Fig. 5. Baths, room 7c: element of the heating system after conservation in 2012  
(Photo R. Czerner)

## WORK ON SELECTED FINDS FROM THE STORE

Conservation turned into salvage work after inspection of stone items conserved earlier and kept in stores for years without monitoring showed advanced deterioration due to migration of salts to the surface of the stone. As a result of the efflorescence, the component layers of the original (mortar, paint layer) had lost

their structural cohesion, as well as layer adhesion.

### QUEEN IN NAUTICAL CROWN

[Fig. 6A top]

Standard documentation of the state of preservation of the wall painting was carried out first. Loose deposits were



Fig. 6A. Wall painting fragments, before (left) and during (right) salvage conservation in 2013: top, portrait of a queen in nautical crown; bottom, depiction of Heron (Photos M. Koczorowska)





*Fig. 6B. Wall painting fragments with representations of Helios, Harpokrates and Serapis before (top) and after (bottom) salvage conservation in 2013 (Photos M. Koczorowska)*

cleaned from the surface. The painting had undergone thorough conservation in 1999, after being transferred to substitute ground. Damp in the storeroom caused the thin paint layer to become detached from the mortar layer and to start to crumble. In numerous places the paint and mortar layers have also become detached from the substitute ground.

The weakened spots were reinforced by injection of PRIMAL AC 33 with water (1:3), after an earlier reduction of the surface tension by ethanol with water (1:1). Wet layers were pressed against the ground with flat marble pieces, and simultaneously small fragments of non-adhering paint layer were put in place. The process was completed with the making of the final documentation.

### THREE GODS: HELIOS, HARPOKRATES AND SERAPIS [*Fig. 6B*]

The same preliminary procedure was followed in the case of the second transfer which had also been conserved in 1999 and which also suffered from the damp in the storeroom. About 60 percent of the mural had become completely detached from the substitute ground and a considerable part of the painting was missing from the central section.

As in the case of the first transfer, injections of PRIMAL AC 33 with water (1:3) were made after an earlier reduction of the surface tension by ethanol with water (1:1). Wet layers were pressed against the ground with flat marble pieces, and simultaneously small non-adhering fragments of the paint layer were replaced. Furthermore, wherever the mortar layer had degraded and crumbled, empty spaces had formed, depriving the original paint

layer of a support substrate. These spaces were filled with a suspension of LEDAN TC1 with water (1:1). Next, losses of mortar were filled with lime-sand mortar with filler consisting of fine-grained sand and marble powder (1:1) in a proportion of 1:3, adding water with about 2 percent of PRIMAL AC 33 as a plasticizer. The layer of mortar applied was minimally thinner than the original, and its surface was smoothed. Next, on the filled in spots a kind of levelling whitewash made of LEDAN TC1 colored with pigments was applied. On the ground prepared like this, a retouch is planned using pigments with 5 percent solution of PRIMAL AC 33 in water. Standard final documentation was prepared.

### HERON [*Fig. 6A* bottom]

This transfer proved to be in the worst condition, 80 percent of the surviving original having become detached. A considerable part of the painting was missing from the top right corner. The whole surface of the paint layer was covered with a salt deposit about 0.5 mm thick, which became hard and strongly integrated with the polychromy. The painting had become much less clear, and was rising and swelling due to the constant migration of salt to the surface.

Standard documentation was made. The paint layer was cleaned of loose deposits. In 1999, the painting had been cut from the wall with a fragment of the limestone block that was the original ground. A thorough conservation of the paint layer together with the mortar layer was carried out at the time. The damp in the storeroom affected this piece in a similar way as the previous two transfers.

Injections of PRIMAL AC 33 with water (1:3) were made after an earlier reduction of the surface tension by ethanol with water (1:1). Wet layers were pressed against the ground with flat marble pieces and with spatulas, and simultaneously small fragments of the paint layer non-adhering to the ground were put back in place. Empty spaces where the mortar layer had degraded and started to crumble were filled with a suspension of LEDAN TC1 in water (1:1). Losses in the mortar layer were filled in next, using lime-sand mortar with filler consisting of fine-grained sand and marble powder (1:1) in a proportion of 1:3, adding water with about 2 percent of PRIMAL AC 33 as plasticizer. The layer of mortar applied was minimally thinner than the original, and its surface was smoothed. Next, a kind of levelling white-wash made of LEDAN TC1 colored with pigments was applied to the newly filled spots. Retouch is planned using pigments with 5 percent solution of PRIMAL AC 33 in water. Final documentation was made.

#### POLYCHROMED COLUMN SHAFT

The item is in bad condition; 80% of the whole area has become detached from the stone ground and between the mortar and paint layers. The main reason is the migration of salt to the surface of the stone, resulting in rising and separation of layers.

The condition of the column shaft was documented. Lime-sand bands were introduced around the original mortar layer and paint layer, adding PRIMAL AC 33 as plasticizer. The paint layer was cleaned of loose deposits. Similarly as

in the case of the transfers restored earlier, PRIMAL AC 33 with water (1:3) was injected after an earlier reduction of the surface tension by ethanol with water (1:1). Wet layers were pressed. In places of heavily degraded and crumbled mortar layer, empty spaces were filled with a suspension of LEDAN TC1 with water (1:1). Filling in the gaps in the layer of mortar and whitewashing are planned next, including retouch using pigments with 5 percent solution of PRIMAL AC 33 in water. Final documentation was made.

#### MURALS FROM ROOM 4 OF THE SOUTHERN BATHS

A selected fragment with multi-layered plaster bearing a layer of polychromy was protected again with bands of lime-cement mortar. Once the mortar had dried, empty spaces were filled with injections of PRIMAL AC 33 with water (1:3) after an earlier reduction of the surface tension by ethanol with water (1:1), and then with a suspension of LEDAN TC1 with water (1:1). Photographic documentation was made.

[MK]

#### REMOVING EROSION FROM MINOR BRONZE FINDS

Small objects made of bronze (two rings, five coins) found during current archaeological work underwent a two-stage process of removing erosion. All stages of the process were documented. Objects covered with alkaline copper carbonate and alkaline copper sulfate were first treated with citric acid. They were then scrubbed mechanically using a Wishab sponge and a small brush with nylon fibre. The objects were placed in a solution



of disodium edetate, and then they were scrubbed mechanically once again. The last stage was cleaning the objects in an ultrasonic cleaner. The cleaning revealed

an inscription engraved on one of the rings. The procedure was completed with final documentation.

[MK, WO]

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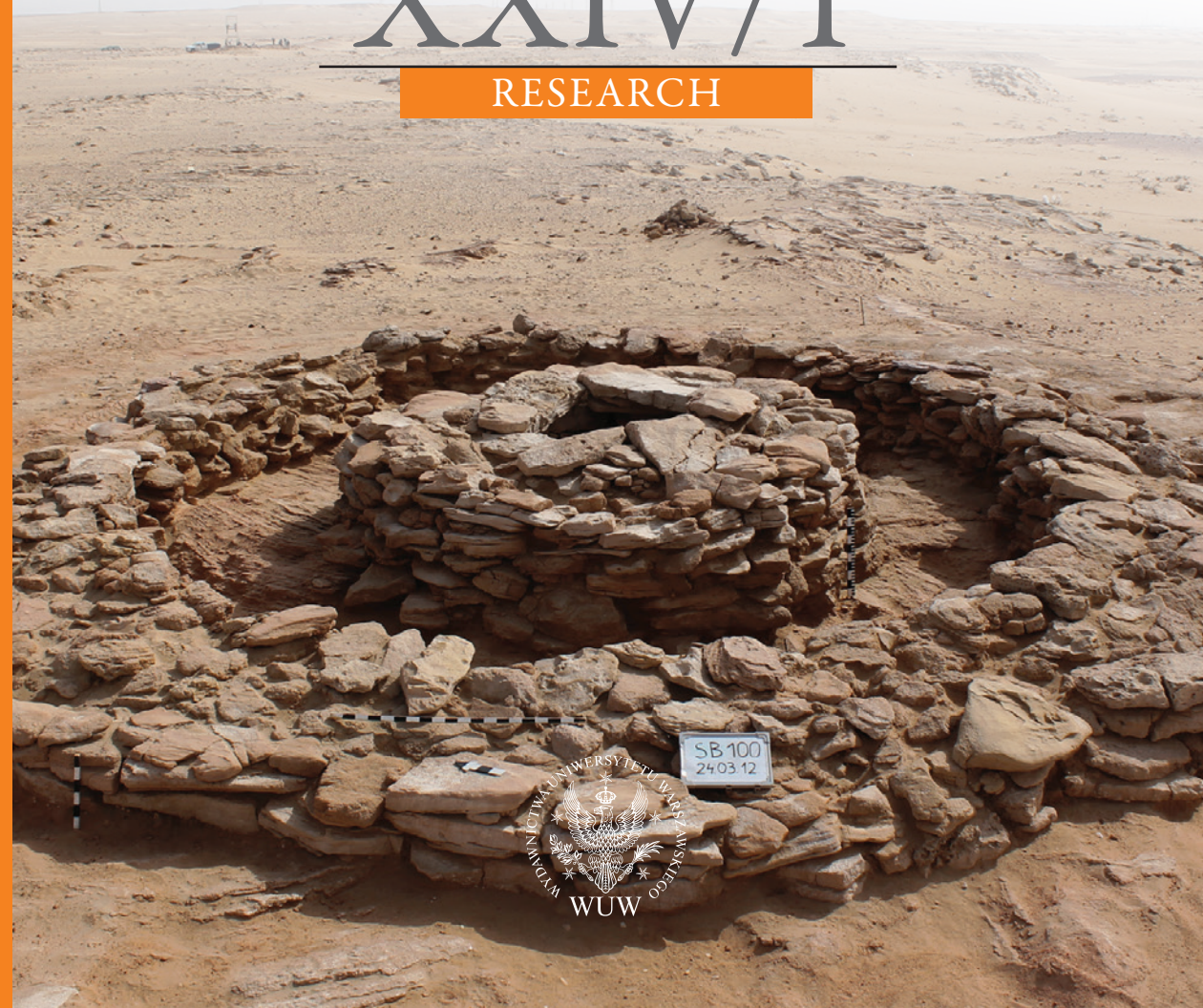
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