

# ALEXANDRIA KOM EL-DIKKA. SEASONS 2014–2015

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with appendix by Emanuela Kulicka<sup>2</sup>

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**Abstract:** The Polish–Egyptian mission at Kom el-Dikka, ran by the Polish Centre of Mediterranean Archaeology, University of Warsaw, stepped up the already advanced preservation processes aimed at establishing an Archaeological Park at the site. Conservation work was carried out in the theater portico, the bath complex and the residential quarter of late Roman date in the eastern part of the excavation area. In turn, the western part was the focus of archaeological research centered on the exploration of some late Roman structures located underneath. The early medieval/Islamic cemetery overlying these remains was explored first. A detailed report from this work is appended to this article. The human skeletal remains from the cemetery were examined by anthropologists. The western gate to the bath complex, leading from the theater portico, was fully exposed. Finds from present and earlier work at the site continued to be studied: glass vessels, pottery, lamps, bone objects, painted wall plaster, and a vast collection of coins.

**Keywords:** Alexandria, Kom el-Dikka, medieval/Islamic cemetery, baths, portico, conservation

A basic program of archaeological excavation and conservation work was carried out at the site of Kom el-Dikka in Alexandria for two consecutive field seasons, balancing the objectives with the requirements stemming from the ongoing Site Presentation Project approved by the Egyptian Ministry of Antiquities.

Excavations were limited either to areas vital from the perspective of the Project or where the progress of work required only some additional research. The archaeological work was focused on excavation of two segments of the medieval cemetery in areas U and CV.

The Project also offered basic field training to a group of young archaeologists and conservators from the Ministry of Antiquities.

Ongoing documentation of all categories of finds from current and earlier excavations was coupled with dedicated studies by a team of specialists working in the field storeroom on site.

Barbara Tkaczow pursued her studies on painted plaster fragments excavated in the 2009–2013 seasons.

Barbara Lichocka centered her research on coin assemblages mostly from the 4th–5th century AD from the Roman-age houses as well as the theater building. Numismatic

studies were also continued by Katarzyna Lach, who focused in turn on a collection of coins from current excavations. A large group of coins found in area U was thoroughly cleaned and identified. Most of the coins are low denomination issues apparently of late Roman age, but their poor state of preservation rules out precise dating.

Research on glass was carried out as before by Renata Kucharczyk, who studied finds from recent excavations, covering a

span from the early Roman to the Mamluk period (see Kucharczyk 2016), as well as several other categories of glasses in the field store. Prominent among them was a group of mosaic glass representing either the early or late Roman period. Particularly important were pieces of wall panelling executed in glass to imitate *serpentino verde* (*lapis lacedaemonius*). Pieces of glass production waste, including large chunks of green and yellowish-green raw glass, as well

### Team

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*Deputy director:* Renata Kucharczyk, glass specialist (PCMA UW; 2014, 2015)

*SCA representatives:* Eman Mahmoud Hamdi Saleh, Ahmed Zakaria Khalil Abu El Enain, Walaa Mohammed Mahmoud, Mohammed Mohammed Mahmoud, Ramadan Hassan Mohammed Ahmed, Mohammed Ali Saleh, Mohammed Sobhy Tawfik Mohammed, Mohammed Ramadan Helal (all in 2014), Mohammed Faruk Agamy Abdel Halim, Safinaz Ali Mohammed Ali, Rehab El Sayed Mohammed, Hamdy Shaaban Mansour, Naglaa Abdel Gawad Ahmed (all in 2015)

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*Anthropologists:* Robert Mahler (PCMA UW; 2014), Urszula Okularczyk (independent; 2014)

*Small finds specialist:* Iwona Zych, oil lamps (PCMA UW; 2014)

*Student-trainee:* Aleksander Misiurny (Institute of Archaeology, Adam Mickiewicz University, Poznań; 2014)

*Conservators:* Ewa Parandowska (freelance, *emeritus*; 2014, 2015), Szymon Gąsienica-Sieczka, Zygmunt Nawrot (both freelance; 2014, 2015), Zuzanna Dudzińska (freelance; 2014)

*Architects:* Marcin Polak (freelance; 2014, 2015), Marta Grzegorek (freelance; 2014)

*Civil engineers:* Dr. Wojciech Terlikowski (Warsaw University of Technology; 2015), Piotr Bartosiak (freelance; 2015)

*Documentalist:* Agnieszka Dzwonek-Kozieł (independent; 2014, 2015)

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as fragments of glass with various stages of vitrification were also documented. The finds offered direct evidence of glassmaking at the site in various periods (from the late Roman to early Islamic).

A collection of oil lamps was documented by Iwona Zych. It included mostly fragments of lamps found during past excavations, ranging from the late Hellenistic to the early Islamic period. The same was done for a large group of decorated bone objects as well as production waste, exemplifying a well developed industry operating in the neighborhood in the late Roman period.

Anthropologists Robert Mahler and Urszula Okularczyk examined skeletal

material (over 150 individuals) from the exploration of the medieval cemetery in area U in the past two seasons (see Mahler and Okularczyk 2016, in this volume). The documented remains are part of an ongoing study contributing data on the anthropological profile of the population of medieval Alexandria.

Pottery from the present excavations was documented and studied by the author. Some ceramic finds from earlier excavations, stored on site, were examined, special attention being given to Byzantine glazed wares from various production centers in the northeastern Mediterranean.

## EXCAVATIONS

### AREA U

Fieldwork in 2014 was limited to the northwestern part of the site [*Fig. 1*]. Area U was first investigated in the 1980s (Rodziewicz 1991), followed by a small-scale excavation in 1990–1991 (Majcherek 1992); the site was reopened in 2011 (Majcherek and Kucharczyk 2014: 24–37), uncovering several structures of early Roman date (1st–3rd century AD). In addition, a substantial part of the early Islamic cemetery overlying the ancient Roman remains was also explored.

Continued research in this area necessitated an extension of the present excavation area. Activities were focused in the western part of area U, where a trench measuring approximately 24 m by 5 m was excavated. The topmost layers of the medieval cemetery, comprising graves U210 to U220 from the so-called Upper and Middle Necropolis horizons, had been explored in this area during the previous

season. In 2014, graves U300–U374 from the Lower Necropolis, dated to the 8th–9th century AD, were investigated (for details of the exploration, see the appendix below). Several simple inhumations from the southern part of the trench (U213–U218) were identified as belonging to the so-called Upper Necropolis phase of the cemetery.

The stratigraphy of the cemetery is quite clear, but a detailed phasing is impossible for lack of securely dated finds and recurrent disturbance of the explored contexts. A fragment of funerary stela inscribed in Kufic script from next to grave U213 unfortunately does not include a date. A typical array of pottery sherds came from the accompanying layers, but the only reliable *post quem* evidence was offered by several fragments of Early Lead Glazed vessels (usually dated to the 9th–10th century AD), found in the Middle Necropolis strata. Most of the finds,

however, belonged to the late Roman horizon and were apparently residual.

A substantial glass assemblage from strata associated with the cemetery covered a wide span of time, from early Roman to Ayyubid, although the overwhelming majority of the finds was typical of the late Roman/early Byzantine period (5th–7th century AD).

The late Roman layers cleared below the cemetery appeared to be accumulated levelling strata, deposited gradually sometime in the late 4th to 6th centuries AD. Two major stone collapses were identified in the

southern part of the trench. Both included large blocks originating from unidentified walls. Quite a number of blocks retrieved from the collapse retained large patches of original plasterwork, accompanied by a substantial quantity of loose fragments of painted plaster. Several architectural elements: a limestone capital, fragments of cornices and column fragments were found in the debris [Fig. 2]. The whole collapse was found to be over 1 m thick in places.

The functional character of the area is still unclear. It was adjacent to a large public latrine excavated to the east, but

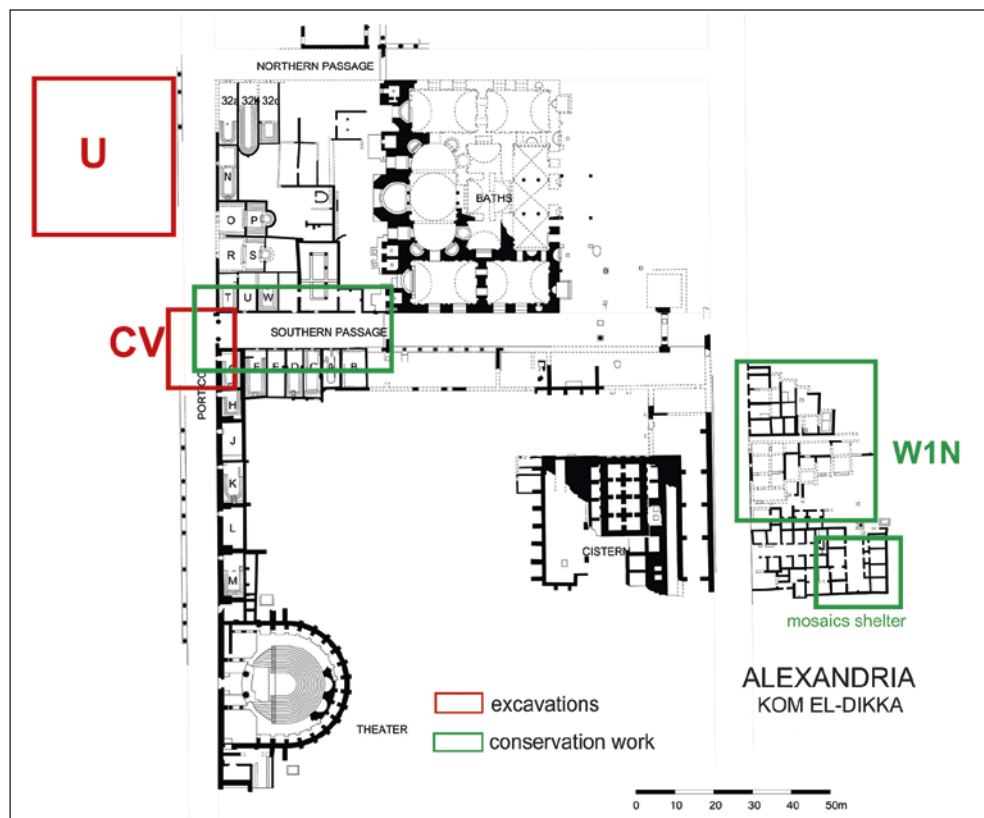


Fig. 1. Areas of work during the 2014 and 2015 seasons  
(Drawing W. Kolář, D. Tarava)



does not seem to be functionally related to it. The latrine excavated in 2012–2013 (Majcherek 2015: 31–40) was separated from this area by a huge wall of which only a small portion (0.60 m long) was preserved in the northern part of the trench. West to it a small, rectangular storage bin (1.20 m by 0.75 m) was found. It has been emphasized already that the most peculiar feature recognized in area U is the different orientation of the uncovered structures, aligned almost precisely N–S, unlike the ancient street network and other monuments of early Roman age discovered earlier on Kom el-Dikka. The reason for this is as yet unclear; it may be that it respected the alignment of the earlier pre-Roman structures in this part of the city. Importantly, the two small structures (wall and storage bin) discovered in 2015 follow the same orientation. The work was halted at this level and exploration of the early Roman layers will be continued in an upcoming season.

The artifactual material recorded during exploration provided a sound chronological basis. Beside pottery, a number of coins and lamps was recovered, including among the latter surprisingly



Fig. 2. Limestone capital, 4th–6th century  
(Photo M. Polak)

common handles featuring Serapis [Fig. 3]. At this stage of research one can assume that the occupation of the area ended somewhere in the late 3rd or the first half of the 4th century AD at the latest. Most of the dateable items from the overlying layers were of 4th–5th century AD date, although earlier finds are also strongly represented. Pottery finds included a typical spectrum of Egyptian and imported fine wares, common wares and amphorae. Apart from several fragments of Red Slip Wares originating from Northern Africa (ARS) [Fig. 4:1] and Cyprus (CRS) [Fig. 4:2,3], a limited number of Egyptian ceramics was also recorded. The latter were mostly represented by bowls made of kaolinitic fabric (Egyptian Red Slip A) produced in the Aswan region [Fig. 4:4] and dated to the mid 4th–early 5th century AD (see Gempeler 1992: form 311a, 91–92, Fig. 34). Transport amphorae formed most of the recorded pottery material with imported containers

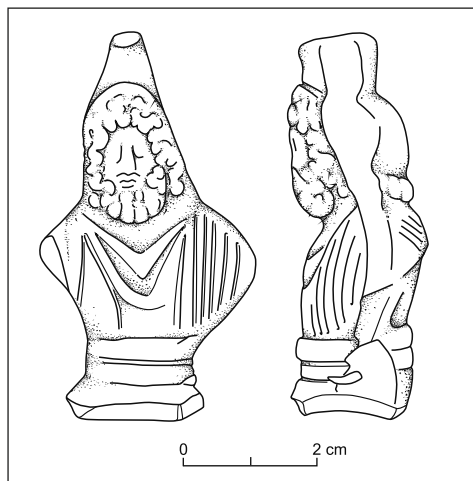


Fig. 3. Oil lamp handle featuring relief figure of the god Serapis (Drawing A. Dzwonek-Kozieł)

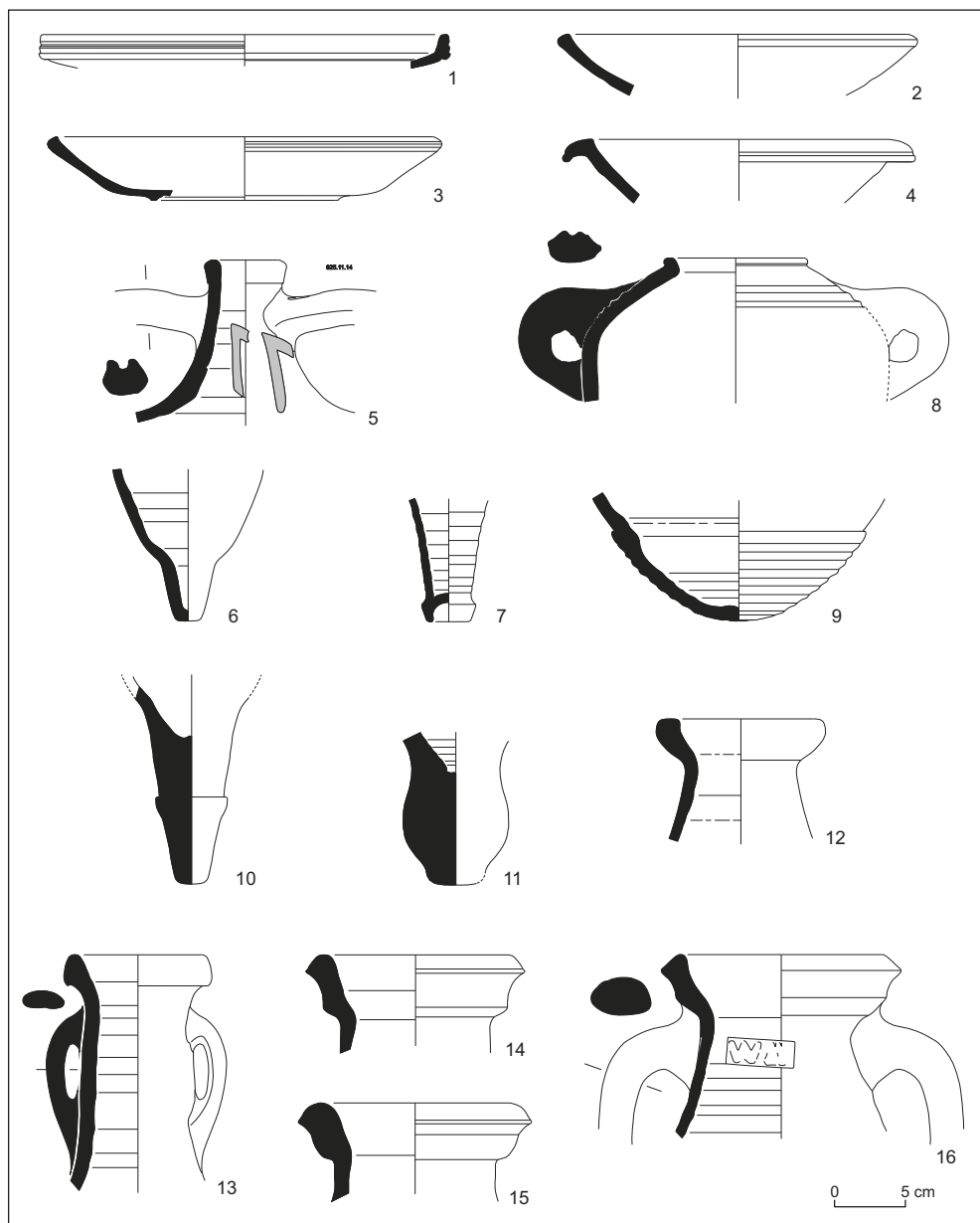


Fig. 4. Selection of pottery from area U: 1 – Red Slip Ware; 2, 3 – CRS ware; 4 – Egyptian Red Slip Ware from Aswan; 5 – LRA 1a; 6 – ARS Ware; 7 – LRA 3A; 8, 9 – LRA 4a; 10 – LRA 7; 11–13 – African amphorae; 14–16 – Tripolitanian amphorae (Drawing A. Dzwonek-Kozieł)

being the most abundant. The widely distributed Eastern amphora LRA 1 type is represented by a number of necks and bases belonging to the earliest type-form, LRA 1a (Pieri 2005: 70–75) [Fig. 4:5]. Quite a few of the recorded examples bear traces of notations in red ink, so typical of these vessels. Of great interest are several pointed and hollowed bases, signalling the presence of the immediate predecessor of LRA 1, dated to the 3rd century AD (Reynolds 2008: 70–72, Fig. 3) [Fig. 4:6]. Early forms of ubiquitous Aegean vessels (LRA 3A) with hollowed, open foot, although less common, were also identified [Fig. 4:7]. LRA 4 is traditionally the most frequently noted container. All the recorded fragments belong to the early wide bodied variety LRA 4A with massive handles [Fig. 4:8,9] (Majcherek 1995). Egyptian production was represented by fragments of an early version of LRA 7, characterized by solid spikes with a prominent ring [Fig. 4:10]. Of interest, similarly as in earlier seasons, is the unexpectedly high frequency of African oil amphorae, either originating from present-day Tunisia [Fig. 4:11–13] or from Tripolitania, including a stamped example (Bonifay 2004: 99–145) [Fig. 4:14–16]. The quantity and variety of recorded amphorae are particularly valuable for assessing the role that Alexandria played in the long-distance trade. While the relations with the Eastern Mediterranean are traditionally well evidenced in the ceramic material, the scale of the exchange with the West is still being probed.

The glass material from layers below the necropolis is mostly of late Roman/early Byzantine date, with only some residual finds dated to the early Roman period. Among rarely encountered finds

one should mention several fragments of unguentaria with a low spherical body and long cylindrical neck, usually ascribed to the 1st–early 3rd century AD. Additionally, fragments of industrial glass debris, including chunks of raw glass of green, yellowish-green and aubergine color, were found, clearly demonstrating the operation of secondary glass workshops in the area (R. Kucharczyk, personal communication).

#### AREA CV

In 2015, fieldwork was limited to the western section of area CV which plays an important role in the planned visitors' itinerary. However, the necessity to keep open communication routes for future evacuation of earth and debris from the site had an obvious impact on the location and size of planned trenches, as well as the excavation strategy.

The area under excavation was located next to the western gate of the bath complex where a trench measuring 12 m by 10 m was set out. Investigations in this area started back in the 1997–1998 campaign, when a fragment of necropolis was explored and a trial pit was dug, revealing a section of the gate leading to the bath complex (Majcherek 1999: 30–34). The monumental entrance now explored in its entirety was flanked by two Doric columns (approximately 0.85 m in diameter) standing 3.50 m apart. The southern one (two drums high) was preserved to a level of approximately 1.10 m above the foundation wall, while of the northern one only a single drum has been preserved [Fig. 5].

Similar Doric drums often used in foundations were also found in several locations in the northern section of the stereobate of the theater portico (Majcherek

and Kucharczyk 2014: 24–26). It seems that these apparent *spolia* may have originated from some unknown monumental building of assumed Ptolemaic age, ruined and dismantled in the late Roman period. That such ruined buildings existed throughout the city is perhaps best evidenced by the remains of a Doric style building (stoa or temple), discovered approximately 50 m northeast of the Kom el-Dikka site (Riad 1967). Both columns stood on a massive foundation wall, approximately 1.55 m wide, built of large blocks in a manner closely recalling sections of the stereobate investigated earlier in front of the theater. The pavement adjoining the gate from the east was very poorly preserved, in fact

only several isolated pavers have survived. But even in this state of preservation it was obvious that the flagging was laid on a markedly higher level (approximately 0.55–0.60 m) than the original pavement of the portico. Stairs were certainly needed to manage the difference in levels. Indeed, several blocks, apparently leftovers of steps, were cleared in front of the gate [Fig. 6]. Contrary to other structures, they were made of hard nummulithic limestone, their heavily worn upper surfaces pointing to prolonged use. The dimensions of isolated surviving fragments of the lowermost steps and their location with regard to the threshold suggested the presence of at least two steps. A fragment of walling



Fig. 5. Western gate of the baths  
(Photo G. Majcherek)



built later over the original threshold, was found still *in situ*. Several small patches of the portico flagging were uncovered in this area, mostly next to the portico back wall and the portico stereobate. Preserved fragments have markedly worn surfaces owing to long use. Lying immediately over them was a thick (0.15–0.20 m) layer of crushed pottery sherds, bricks and small rubble making up the final, late antique surface of the portico.

As could be expected, the exploration produced a rather mixed assemblage of pottery, consisting mostly of common-ware sherds: storage vessels and amphorae. LRA 1 and LRA 7, as well as the omnipresent LRA 4 predominated among the latter. Fine wares were recorded occasionally, being limited to a few

fragments of Egyptian Red Slip Ware A, and African Red Slip ware of 6th–7th century AD date. Few of these sherds are of any dating significance in view of the widespread truncation and disturbance of archaeological deposits, which have made the whole evidence questionable.

In the western and northern part of the trench, a part of the medieval cemetery was explored (see the appendix below). Several quite well preserved graves of the Upper Necropolis were uncovered, identifying in the process two principal sub-phases. Most of these graves were cleared within a large rectangular enclosure, of which only the southern part has been excavated (7.20 m to the side).

Similar enclosures, encompassing several graves, were recorded in the past also in other areas of the early Islamic cemetery on Kom el-Dikka (Promińska 1972: Pl. II; Majcherek 1999: 34; 2008: 31). However, two of the latest tombs stand apart (CV 161 and CV 163, see below, appendix, page 62), presenting fairly unusual architectural features. Both were apparently intended for multiple burials, hence their special design. They were equipped with vertical, rectangular shafts opening at ground level and giving easy access to the burial chambers. Both chambers were covered with stone-made barrel vaults built of small regular limestone blocks [Fig. 8].

Graves CV 201–CV 209, usually ascribed to the 9th–10th century AD (Middle Necropolis phase), were cleared in the western part of the trench [see below, appendix, Fig. 20]. Two broken and fragmentarily preserved inscribed funerary stelae were found next to grave CV 207 [see below, appendix, Fig. 21]. Both featured Quranic verses, engraved in Kufic script. No date was preserved. Both the crushed



Fig. 6. Remains of steps in front of the western gate (Photo G. Majcherek)

pottery layer and underlying pavement were severely damaged by early Islamic burials (the Lower Necropolis phase). A number of graves belonging to this initial phase of the early Islamic cemetery, scattered all over the area, was mapped, but their exploration was scheduled for the next season.

The layers accompanying the cemetery produced a typical array of finds, mostly pottery sherds. The overwhelming majority of finds, however, belonged to the late Roman horizon and was apparently residual. Glazed pottery, which is the best chronological indicator, came mostly from layers overlying the graves, thus substantially reducing prospects of



*Fig. 7. Inscribed fragment, cut from a bowl of Early Islamic Lead Glazed ware (Photo G. Majcherek)*



*Fig. 8. Tomb CV 161. Vaulted burial chamber (Photo G. Majcherek)*



detailed chronological evidence for all phases of the cemetery. The collected assemblage consisted mostly of fragments of Fatimid Polychrome glazes, several small fragments of Ayyubid Underglaze Painted ceramics, as well as some Mamluk Sgraff and Slip painted wares sherds. Few fragments of imported wares mostly from the northeastern Mediterranean and the Aegean, were also identified. Sherds of Early Lead Glazed vessels (usually dated to the 8th century AD), showing a typical kaolinitic body, and splashed decoration were also recorded. Of particular interest was a base fragment covered with yellow

glaze over a creamish slip and bearing an Arabic inscription painted in manganese [Fig. 7].

The glass collection was fairly limited in number, yet presented a surprisingly large assortment of shapes and decorative techniques: constricted toilet flasks, molar kohl flasks, bowl and beakers, featuring grooved, cut and mold blown decoration. Vessels made of colorless glass with a greenish tinge, as well as pale yellow, bluish-green, and green glass of various shades and noticeably poor quality, were all most probably of local, Egyptian manufacture.

## CONSERVATION

### CONSERVATION STUDY AND DOCUMENTATION

In the 2015 season, the underground vaulted complex of the baths was an object of thorough examination and documentation in view of planned conservation work. The complex excavated back in the 1960s, and then provisionally protected, is now in dire need of professional intervention. In many cases, especially in the western wing, vaults and side walls have lost their structural integrity. Many blocks are severely damaged. To mitigate the effect of almost fifty years of exposure to sun and weather and to preserve the historic fabric for the future, prompt and extensive conservation is required. As a prerequisite for future work, a team of specialists (Wojciech Terlikowski and Piotr Bartosiak) from the Warsaw University of Technology surveyed and examined the structure. The western corridor of the complex was scanned with a photogrammetric laser scanner Faro Focus X 33 LLS [Fig. 9]. The high precision scans are prerequisite for preparing

the framework of a comprehensive conservation program.

The current program continued operations already well-advanced in different areas of the site.

### RESIDENTIAL QUARTER (AREA W<sub>1</sub>N)

Conservation work continued the program opened in 2009. Buildings G and H were completed in earlier seasons (Majcherek 2012: 41–43; 2013: 49–50; Majcherek and Kucharczyk 2014: 40–43). In 2014 and 2015, the western part of the quarter adjoining street R4 was conserved. In building H, it was decided to raise a large section of its street facade (i.e., west wall), adding one to two courses of masonry (each approximately 0.35–0.40 m high) on top of the original wall. Blocks used in restoration originated either from this wall or from similar neighboring structures and were found during excavations in the 1980s.

The aim of this operation was twofold. It made the structure more “legible”,



*Fig. 9. Photogrammetric scan of the underground vaulted structure, western wing  
(Processing W. Terlikowski, P. Bartosiak)*



*Fig. 10. House H4 western elevation following conservation  
(Photo M. Polak)*

articulating its historical importance in the planned site presentation. It also introduced a physical barrier that secured safe passage for visitors in the future. The same idea stands behind the blocking of the original doors leading from street R4; the small-stone masonry used for the purpose visually differentiated these sections from the original wall fabric.

A section of the wall approximately 17 m long, enclosing a series of rooms (H1, H3a, H4a and H8a), was treated in the course of this project [Fig. 10]. It was originally built in the pseudo-isodomic technique with sections structured in varied courses, apparently using mostly recycled material. In accordance with the established procedures, newly added blocks were separated from the original wall fabric with a strip of bituminous roofing tar felt. The tar felt acted at the same time as an insulation layer preventing rain water penetration. A slanting wall coping was formed as an additional dampness countermeasure, using a more resilient layer of well hardened mortar with some white cement added. Both procedures have been validated by long term monitoring at the site.

A large portion (approximately 4 m long) of yet another wall dividing H3a and H4a was also restored. It was found to be largely destroyed, disintegrated and partly dismantled in late antiquity. The restored wall was structured according to the original technique, again with large blocks obtained from the excavations. All restored fragments of the walls were separated by an insulation layer made of bitumen tar felt, acting also as a clear border between historic and new fabric. Weakened and deteriorated joints along the entire length of the wall were either filled with new mortar or re-

pointed, while some smaller losses and gaps were completed with new stones.

The inspection shaft (approximately 0.90 m by 1.10 m), leading to a deep sewage channel, running below a small east–west side passage between buildings H and G, was also restored. The well-head was now covered with two large limestone slabs, well fitted and level with the passage. Slabs were supported additionally by an H-shaped frame made of welded galvanized steel pipes (Diam. 2.5 cm). The newly created surface now ensures safe and unimpeded visitor traffic along the passage.

Limited conservation measures were undertaken in several other locations calling for immediate intervention. These were areas where accelerated weathering had caused severe deterioration of the wall fabric. One of the pillars flanking the northern entrance to the mosaic shelter is the best case in point. It was part of the south wall of room F5, belonging to a 5th–7th century AD house, later incorporated into the fabric of the modern mosaic shelter (Kołątaj, Majcherek, and Parandowska 2007). Several of the seriously weathered stones had to be replaced with new ones, joints were completed with a new mortar and the whole structure stabilized.

### THEATER PORTICO

The gate leading from the portico to the bath complex was also scheduled for conservation. Both the massive pilasters flanking the entrance had been damaged seriously by medieval burials and partly dismantled. They were now consolidated, and to a certain extent restored. The northern one was restored to a height of 1.55 m above the level of the gate threshold, with three courses of masonry added to the existing structure [Fig. 11]. Adjoining



sections of walls were also treated. This operation involved the restoration of two stretches of respectively the western and southern wall of auditorium T. The work,



*Fig. 11. Western gate of the baths, restored northern flank (Photo M. Polak)*

however, was limited to adding only two courses of masonry, making two sections, not exceeding 2.50 m in length. All newly added blocks were separated from the original wall fabric by a layer of bitumen tar felt.

Similar treatment was applied to the southern flank of the entrance (next to auditorium G). There, however, the intervention was even more limited as the structure was in much better shape. Only one course of stonework was added to the pilaster and the adjacent south wall of the bath passage.

Drums of two Doric columns flanking the entrance were found to be in need of conservation treatment. Discovered back in 1997, they had suffered severely from



*Fig. 12. Restored western wing of seats in auditorium W (Photo M. Polak)*

prolonged exposure despite being made of rather resilient, dense and hard limestone. To prevent further deterioration due to environmental factors, restorer Szymon Gąsienica-Sieczka consolidated them chemically, using KSE 300 stone strengthener (manufactured by Remmers Baustofftechnik GmbH) diluted with ethanol (1:1). The same procedure was also successfully applied to some weathered bases in the theater portico. In two cases, re-profiling of the original surface and moulding were needed due to the extent of the deterioration. This was achieved using ready-to-use Remmers restoration mortar.

#### AUDITORIUM W

In auditorium W, cleared in the 2005 season (Majcherek 2008: 33–34), conservation work focused on restoration of stone benches, placed along the west wall. The benches are in fairly good condition, but their structural integrity is endangered by missing blocks and mortar joints. A section of the lowermost bench, approximately 5 m long, was restored almost entirely, using limestone blocks retrieved from the excavations in the auditorium. The northern segment of the topmost bench was likewise restored, while seriously deteriorated or missing blocks were replaced with new ones [Fig. 12]. The entire structure was consolidated: empty joints refilled with new mortar and extant patches of plaster reinforced.

#### AREA CS AND CV

In the 1960s and later in the 1980s, a substantial segment of the paved southern passage of the bath was explored in this area (Kubiak 1967; Kiss et al. 2000). Within the 9 m wide passage, large parts of extant pavement were then cleared, mostly in its

eastern part. The pavement made of regular limestone pavers of varied dimensions was now found to be in need of conservation. Some of the pavers were seriously affected both by natural agents and human factors: eroded, broken or disintegrated.

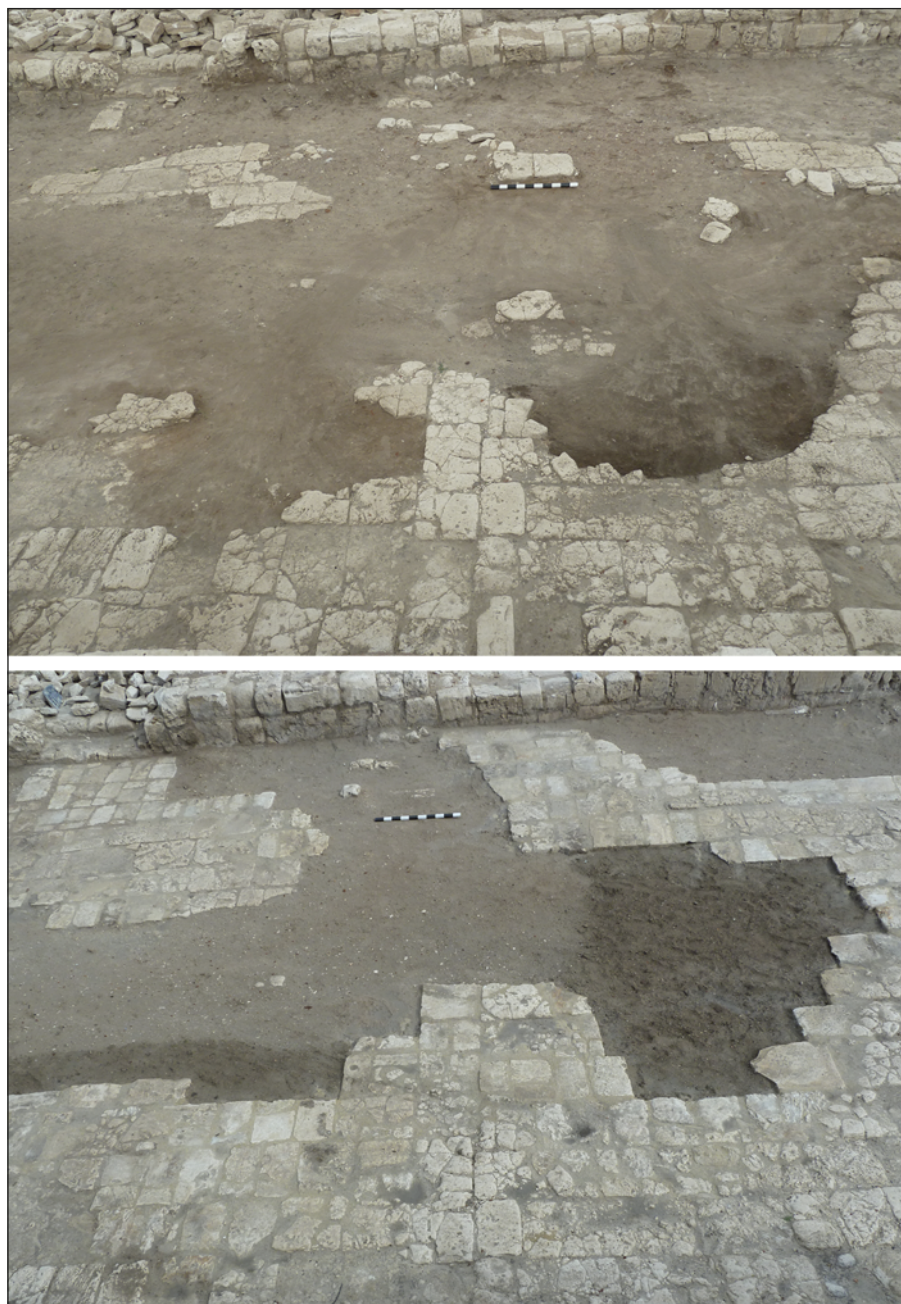
In accordance with general principles of conservation observed at the site (Petzet 2009), the intervention was limited to only the most necessary operations. The applied measures included consolidation of damaged pavers or exchange of the most deteriorated ones (work supervised by Marcin Polak). Original pavers found during the excavations nearby were used for this purpose. To minimize further deterioration of extant sections of original pavement, a single row of new pavers was added around the most endangered patches, creating thus a sort of protective edge. As a result of this procedures some minor gaps in the pavement were now totally repaved [Fig. 13].

#### AUDITORIUM B

Preservation work in auditorium B was limited to its east wall. The wall discovered back in the 1980s survived practically at ground level (Kiss et al. 2000). Its partial restoration now was determined by the need to secure the area that will be accessible to tourists as part of the planned site presentation project. The entire stretch (9.80 m long) of the wall originally structured in pillar technique was rebuilt and raised to the height of 1.20 m above surrounding ground level, thus securing another objective, which is protection of the original wall fabric.

#### MOSAIC SHELTER

Conservation inside the “Villa of the Birds” was the focus of the 2014 program.



*Fig. 13. Pavement in the southern passage of the bath: top, before restoration, and bottom, after restoration (Photos M. Polak)*



The condition of the mosaics and the shelter itself called for a more integrated approach. Year-round monitoring revealed alarming changes of the microclimate inside the shelter, affecting the state of preservation of the mosaics. Engineering measures introduced under the supervision of Zygmunt Nawrot eliminated certain serious drawbacks of the construction, preventing further deterioration and ensuring better control of the microclimate inside the shelter.

Controlling indoor air quality in the shelter has always been one of the most important conservation issues. Some time ago, when the natural ventilation (through doors and windows) proved to be rather ineffective, a mechanical system (electric fan) was introduced as more suitable and efficient. In the 2014 season, the exhaust ventilation system was further developed with a specially designed electric switching station installed next to the northern door of the shelter. The station is equipped with a current circuit breaker 30 mA, secured by 6A, 10A, and 16A fuses. A new system of air humidity control was also installed. It consisted of three humidity sensors (MaxPlus), installed in various locations inside the shelter. They were fixed to specially prepared holders, made of profiled aluminum bars, positioned under the wooden gangway. The controllers are connected by wires (OM 4 x 0.5 mm and 5 x 0.5 mm), making an interdependent system that switches on the exhaust fan automatically whenever the air humidity in the shelter increases above a predefined level (set at 60%). Moreover, in order to protect the iron structure of the shelter against static currents, proper earthing was introduced.

A new drainage system around the “panther” mosaic ( $\alpha$ -6), implemented

successfully in 2013, proved to be effective (Majcherek 2015: 50–51). The humidity in the bedding was substantially reduced, and ensuing salt migration decreased. It was, therefore, decided to apply similar solutions also in the case of other, equally endangered mosaic floors. Aeration and a draining system have been designed, taking into consideration specific features of each mosaic.

The ground around the black-and-white geometrical mosaic ( $\alpha$ -2) was excavated approximately 0.30–0.40 m below the floor level. In the trenches, sections of polypropylene pipes (Diam. 50 mm and 150 mm) were laid horizontally along the edges of the mosaic [Fig. 14 top]. All pipe segments were perforated with four regularly spaced lines of openings around the circumference in order to ensure free air circulation. The pipes were then covered with a thin layer of cobbles and gravel.

The “mosaic with birds” ( $\alpha$ -5) was treated in a more complex way. The ground around the mosaic was excavated approximately 0.90–1.00 m below the surface. The trenches were left empty and then covered with a specially designed ventilation grille [Fig. 14 bottom]. It was made of expanded steel wire and mesh (3 mm thick, 30 mm by 12 mm). The mesh was welded to the frames made of angled steel (30 mm by 30 mm, 4 mm thick), additionally reinforced with flat bars. The frames were bolted (M13 bolts) to the stone supporting pillars set at regular intervals.

Along the western and southwestern edges of the mosaic, where there was not enough room for installing frames, perforated polypropylene ventilation pipes (Diam. 50 mm) were introduced.

Another pressing issue was the ground water penetration in the area of the



mosaics. In the past (Kołątaj, Majcherek, and Parandowska 2007), a horizontal insulation preventing capillary action was introduced in some of the restored ancient walls. In 2015, some fifteen years after the initial Mosaic Conservation Project, it was decided to reintroduce damp-proof vertical insulation on the east and northeast walls of the mosaic shelter.

The foundation of these walls (restored in 1999) was uncovered on a stretch approximately 11 m long. Old, largely damaged and worn-out insulation was removed. Foundations were cleaned mechanically, joints were repaired and the entire wall surface levelled. All the foundations, down to the footing



*Fig. 14. Mosaic shelter: top, ventilation pipes around mosaic  $\alpha$ -2; bottom, ventilation grille around mosaic  $\alpha$ -5 (Photos G. Majcherek)*

(i.e., approximately 0.70 m below the mosaics level) were treated. A new layer of torch-applied waterproofing membrane (APP Roflex, polyester reinforced, 5 mm thick), was applied. The operation was done using a propane gas-burner, at a mean temperature reaching 280°C.

### MOSAIC CONSERVATION

Unstable environmental factors in the “Villa of the Birds”, a high degree of humidity in the bedding, an ineffective drainage system introduced about 15 years back and above all lack of appropriate professional maintenance on the part of relevant authorities in charge of the shelter, resulted in a serious threat to the condition of the decorative pavements exhibited in the shelter. A team of conservators (Ewa Parandowska and Szymon Gąsienica-Sieczka with the help of two Egyptian restorers, Ahmed Zakaria Khalil and Mohamed Mahmoud el Korshy, and a qualified technician Esama Morsy), continued the cleaning and stabilizing of the mosaic floors started in 2009. Three of the most endangered mosaics ( $\alpha$ -2,  $\alpha$ -5 and  $\alpha$ -6) were treated again in the 2014–2015 seasons.

The conservation measures consisted of standard, universally applied procedures. The efflorescence of water soluble salts on the surface was removed either mechanically or through poultices made of paper tissues soaked with distilled water. Detached and loose original tesserae were set in new mortar of washed and sifted fine sand and MULTISCHPACHTEL (Remmers) (1:1). Mosaic bedding as well as some disintegrated tesserae were treated with industrial consolidant KSM diluted with ethanol (1:1 solution). Old and disintegrated sections of protective mortar

band were removed from the mosaics' edges and replaced with new bands (mortar composed of washed and sifted coarse sand and MULTISCHPACHTEL, Remmers) (1:1).

Top priority this season was given, however, to conservation of yet another mosaic pavement. The main point was the transfer of mosaic MC-1 to a new support in order to be displayed in the mosaic shelter. The multicolored mosaic included a main geometrical design field and figural emblema in *opus reticulatum*. The said mosaic was removed in the 2003 season to a field store at the site (Lis 2004). For technical reasons, it was then removed in five separate sections, each protected with two layers of cotton gauze and a layer of thick canvas glued with polyvinyl acetate, placed between cardboard and laid face down in the field store room. The initial plan was to exhibit the mosaic in the future Mosaic Museum in Alexandria, but because of the prolonged delay in its construction, it was decided to proceed with regular conservation of the floor in order to prepare it for display in the mosaic shelter at the site. The reverse of each section was cleaned mechanically and remains of the original bedding were removed. A new lime bedding was prepared.

The mortar, composed of one part each slaked lime, marble powder and sifted and washed sand, and 0.1 part PRIMAL AC 33, was applied in two layers, each approximately 1 cm thick. It was then fixed, using epoxy resin ARALDITE 1306 (produced by Huntsman Corp.), to supporting AEROLAM honeycomb aluminum supporting panels. For easier handling and transportation, the mosaic was moved as two separate panels to be put together on location inside the Villa.



Next, remains of PVA glue were removed from the surface of tesserae and the interstices between them. Disintegrated bedding was replaced wherever necessary with lime-based mortar with 1% acrylic resin (PRIMAL AC 33 of Italian manufacture). The work, due to its time consuming character, could not be completed this season and will be continued next year.

### COINS CONSERVATION

About 700 coins from past excavations kept in the field storeroom were conserved by Zuzanna Dudzińska and Katarzyna Lach in May–July 2014. The coins were first cleaned in water, then placed in a 5% solution of disodium aedate ( $C_{10}H_{18}O_{10}N_2Na_2$ ) for several hours. Mechanical cleaning was applied where necessary. The objects were then dehydrated in acetone or a water-soluble alcohol and coated with a solution of PARALOID B82 to prevent, or at least reduce, corrosion processes.

### SITE PRESENTATION AND LANDSCAPING

Tracing visitor routes at the site was an essential operation carried out during the last two seasons. Safe accommodation to visitors requires certain areas of the site to be cordoned off. This was achieved with railings that consisted of evenly spaced (3.0–3.5 m) posts and two-four levels

of string wire stretched between them. Posts were made of steel pipes (Diam. 2.5 cm) cut to the prescribed length and fixed to concrete bases, sunk in the soil. The wire (Diam. 0.5 cm) was coated with polyethylene coating. Altogether 52 posts were installed, mostly along the southern bath portico, creating a railing of a total length of 148 m (work done by Zygmunt Nawrot).

The entrances to the auditoria were closed with movable iron railings. They were shaped as large rectangular frames made of iron bars filled with welded vertical bars. The railings rest on legs made of sections of C-bars [Fig. 15].



*Fig. 15. New railing in the entrance to auditorium L (Photo G. Majcherek)*

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later layers of which were excavated in the previous season in area (sector) U and on the successive strata of the cemetery, from the turn of the 10th century and from the 11th/12th century in area CV [for the location of the areas, see the general plan



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in *Fig. 1*]. The bone material was collected for further anthropological examination (for a preliminary report, see Mahler and Okularczyk 2016, in this volume).

#### AREA U: LOWER NECROPOLIS

Altogether 60 graves were excavated in area U which is situated in the northwestern corner of the site [*Figs 17, 18*]. The burials belonged to the so-called Lower Necropolis, the elevation of the graves falling in the range between 7.30 and 8.35 m a.s.l.

Ten were simple earthen burials with no superstructure (data on particular graves and their inventory numbers has been collected for convenient reference in *Table 1*). Simple grave pits also had a covering of limestone slabs running askew, apparently always higher on the southern

side [*Fig. 19*; see also *Fig. 17*]. These were individual burials for the most part with only three burials containing the remains three of an adult and one of a child; in one case (U 317), there were four individuals.

The most typical form among the excavated graves were stone boxes (altogether 36). The boxes were constructed of upright limestone slabs or blocks, forming a rectangle, 0.30–0.35 m by 1.60–1.65 m, laid in the soil without any substructure. A large number had a covering of limestone slabs laid flat (21 in all); in the remaining identified graves the form of covering could not be determined. So far, there has been no record of any superstructures securely dated to the Lower Necropolis phase.

The burials were for the most part individual, the body of the deceased lying on the

*Table 1. Summary of graves excavated in area U by type (table compiled based on additional data from the anthropological record)*

Type of grave	Number of graves	Grave Inventory No.
Earth pit with no covering	10	U 311, U 348, <b>U 349</b> , U 350, <b>U 352</b> , <b>U 353</b> , U 357, U 358, U 359, U 360
(no bones preserved)	1	U 345
Earth pit with slab covering	5	U 307, U 312, <b>U 317</b> , U 332, U 333
(no bones preserved)	5	U 303, U 304, U 308, U 310, U 313
Stone box with slab covering	21	U 300, U 301, <b>U 302</b> , <b>U 305</b> , <b>U 306</b> , U 309, U 316, U 318, <b>U 319</b> , U 325, U 326, U 329, U 330, U 331, <b>U 334</b> , U 335, <b>U 337</b> , U 340, U 342, U 343, U 354
(no bones preserved)	3	U 339, U 346, U 351
Stone box, unknown form of covering	7	<b>U 315</b> , U 321, U 322, U 327, <b>U 328</b> , U 341, <b>U 344</b>
(no bones preserved)	8	U 314, U 320, U 323, U 324, U 326, U 328, U 347, U 356

Key: Grave inventory number in bold indicates presence of bones of more than one individual (in 10 out of 13 cases an adult and a child); the number in gray refers to identified tentative grave structures with no bones preserved from the burial.



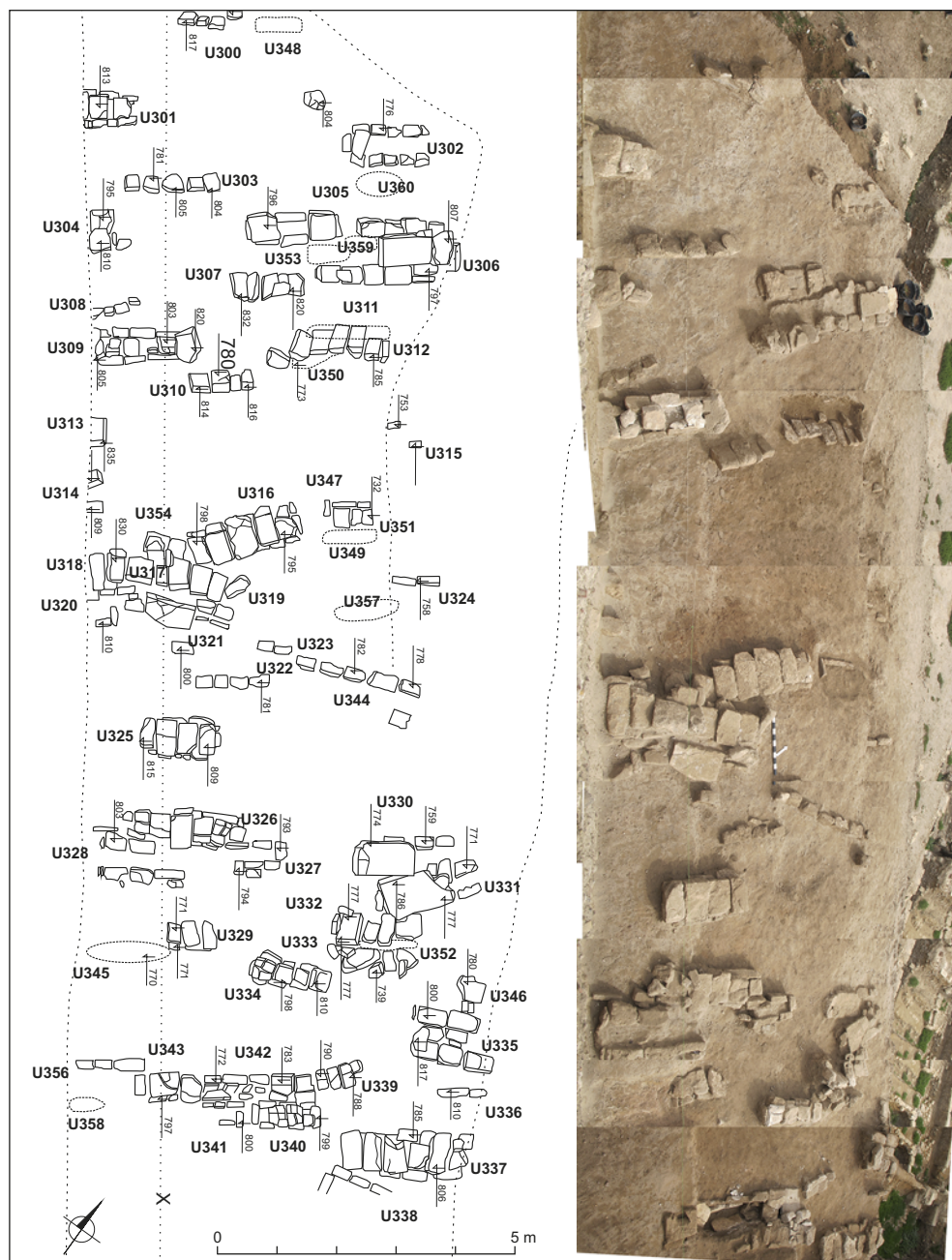


Fig. 17. General plan of the excavation area in area U and top view of the Lower Necropolis horizon (Plan and photo E. Kulicka)



Fig. 18. Top view of burials from area U: U 305 (on the left, remains of a secondary burial in the upper layer); U 334, mixed bones of several individuals; U 317, reburied bones (Photos E. Kulicka)



side, the face turned in the direction of the Qiblah. In nine graves there were multiple burials, mostly of an adult and a child, but in two cases, U 334 and U 315, the number of identified individuals was set at 5 and 4 respectively. Smaller box graves contained single child burials (U 309, U 325, U 327, U 329, U 340, U 341, U 343, U 354). The smallest ones were 0.20–0.25 m by 0.45–0.60 m measured inside.

Several grave boxes were destroyed or their covering was lost. In such graves, more often than not no bones were preserved (altogether 11 such cases) [see *Table 1*].

Some graves were different compared to graves known from sections of the Lower Necropolis investigated in earlier seasons (Kulicka 2015: 63–65 with further references). In these four instances, groups of bones appear to have been moved from earlier graves. Grave U 305 contained a later burial [*Fig. 18 top*]. Grave U 334 yielded a skeleton in anatomical position; however, the fill inside the stone box contained mixed human bones [*Fig. 19 center*]. Grave U 317 was located under two

diagonally set stones, on top of a group of earlier graves. Bones apparently collected from other graves — arm and leg bones and the remains of two skulls — were reburied here [*Fig. 18 bottom*]. A similar grave (UD 25) was found in area U during excavations in 1982 (unpublished). It, too, was not a primary burial and contained four skulls which had been collected and reburied. One possible explanation for this violation of Muslim tradition of not exhuming corpses is the building or extension of a mosque or mausoleum in the neighborhood, necessitating the moving of collected human remains.

#### AREA CV (WEST): MIDDLE AND UPPER NECROPOLIS

##### Middle Necropolis

Graves of the so-called Middle Necropolis were found at 8.77 m to 9.06 m a.s.l. in the western part of area CV, located at the intersection of the theater portico and the southern portico of the baths. The trench excavated in the 2015 season measured 7 m by 10 m [*Fig. 20*].



*Fig. 19. Slab covering of burial U 312 in area U (Photo E. Kulicka)*

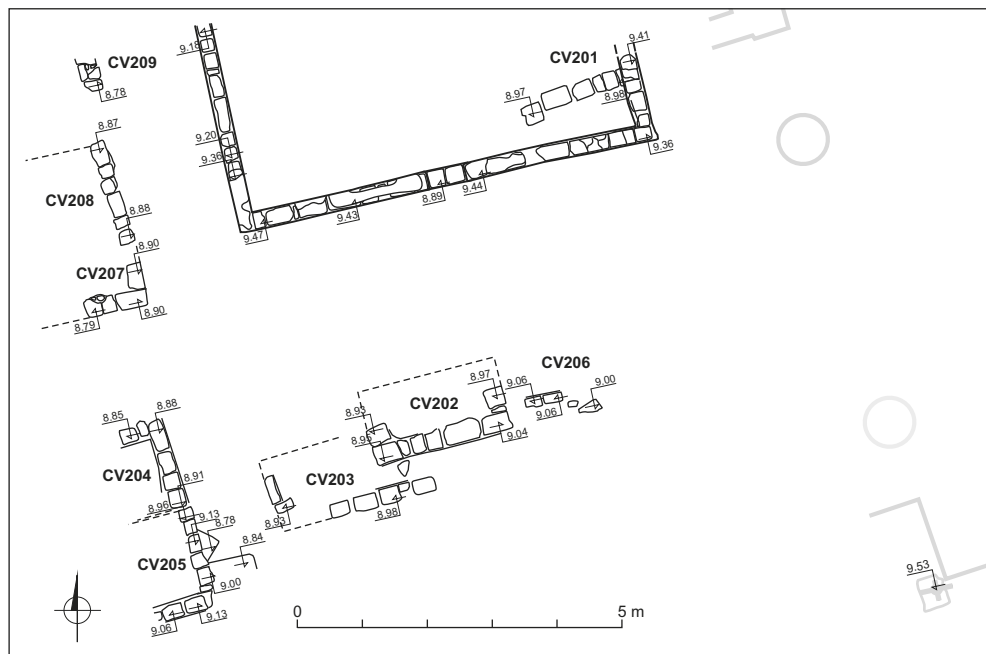


Fig. 20. The Lower Necropolis horizon in area CV (west)  
(Drawing E. Kulicka)



Fig. 21. Funerary stelae, Reg. Nos 5270 (left)  
and 5271 (Photos E. Kulicka)

A typical burial from this period consisted of an earthen grave with a tombstone above it. The superstructure consisted of from one to three rows of plastered limestone blocks. Nine tombs (CV 201–CV 209) were fragmentarily preserved, having probably been dismantled and the material reused in a later mausoleum wall in the Upper Necropolis. No bones were preserved in these graves. The walking level around the superstructures was covered with earth mixed with pebbles and rounded potsherds.

Secondary evidence suggests that at least some superstructures were furnished with stelae, customarily made of marble, inscribed with Qu'ranic verses and the name and date of death of the deceased. Two fragments of stelae, damaged presumably during the salvage of building material for other purposes, were recorded (see also above, page 41) [Fig. 21].

## Upper Necropolis

### Earlier graves

The graves recorded in the trench formed two complexes, an earlier and a later one, within the same chronological horizon. The earlier ones comprised six tombs with fragmentarily preserved superstructures [Fig. 23 top]. Three of these (CV 166, CV 167 and CV 170) were very simple. They were built of upright limestone slabs forming a rectangle. Of the other three, CV 168 comprised a plastered platform, shaped as a rectangle in the middle and raised by 13 cm. Similar tombs were present in the Upper Necropolis in area U (Kulicka 2015: 70–71).

The remaining two tombs, CV 171 and CV 173, were both decorative. They were constructed of small limestone blocks and bricks, and plastered on the surface. The middle sections of the superstructures were destroyed by later activity and



Fig. 22. Enclosure around tomb CV 173; note door post inside the blocked door in the enclosure wall (Photo E. Kulicka)

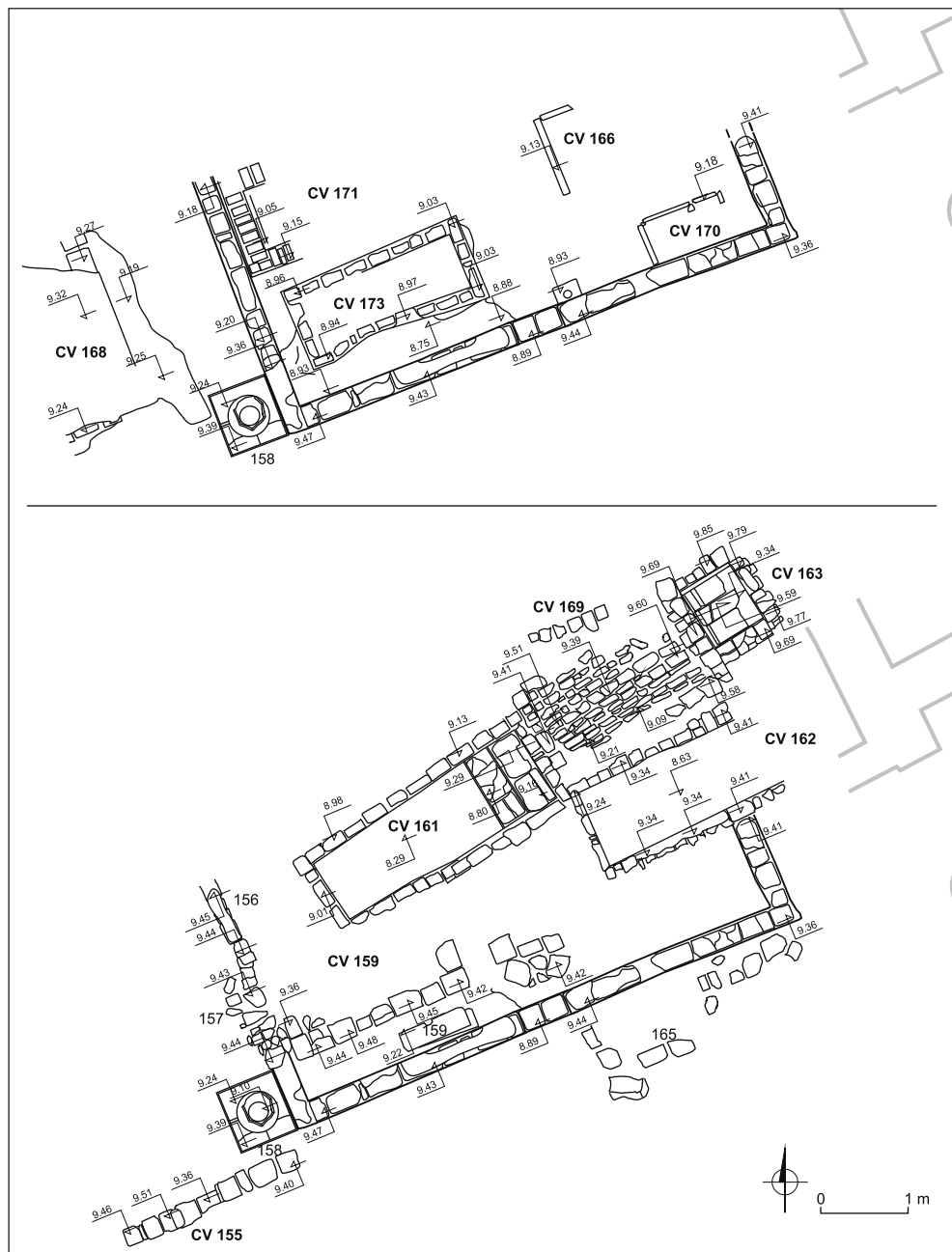


Fig. 23. The Upper Necropolis horizon in area CV (west): top, level of earlier graves; bottom, level of later graves (Drawing E. Kulicka)



the burial boxes and the burials themselves did not survive. A walking level was preserved around the headstone of CV 173 [Fig. 22], which was undoubtedly constructed contemporaneously with the enclosure wall, surviving in its southern section together with stubs of the east and

west walls (destroyed by later tomb construction). An entrance, which existed in the south wall, was blocked and there was a stone door post just inside it, on the left. Attached to the corner of the enclosure wall at the southwestern corner on the outside was a square installation with a built-in

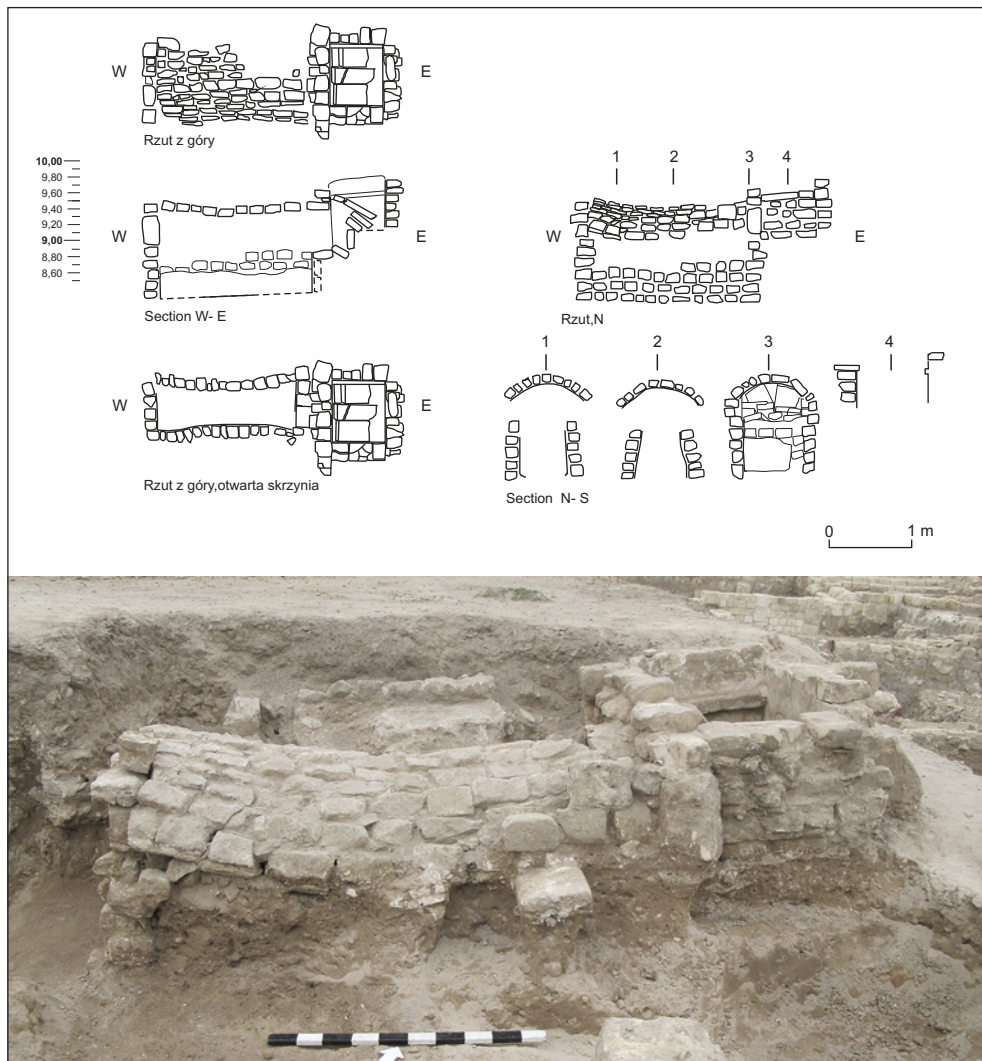


Fig. 24. Tomb CV 163 in area CV (west)  
(Drawing and photo E. Kulicka)

flat-bottomed water container of the *zir* type. The plastered walls, 1 m high at present, were built of limestone blocks salvaged (partly at least) from the earlier Middle Necropolis superstructures.

The building must have been a kind of a mausoleum with at least tomb CV 173 within the walls built more or less at the same time. Family graves at the Kom el-Dikka necropolis tended to be surrounded by low walls, which formed a prayer house of sorts with a *mihrab* on the southern side. In this case, the walls were more solid and an entrance replaced the prayer niche on the south.

#### Later graves

A complex of graves evidently of later date [Fig. 23 bottom] comprised five graves and a few stone clusters that could not be established satisfactorily to be funerary structures. The high burial intensity in this area over an extended period of time is reflected in some tombstones being located 0.60 m above earlier markers. Graves consisting of a superstructure over a grave pit or a box were typical of the

period. Later burials, including CV 155 and CV 159, are most likely the remains of decorative superstructures with a *mihrab*. The burial boxes here were not preserved. A still later group of graves, CV 161, CV 162 and CV 163, survived at the box level.

Burial boxes CV 161 to CV 163 are exceptional. They are large and are furnished with a trapdoor in a shaft situated on the eastern side [Fig. 24; see also above, Fig. 9]. The entrance to the burial chamber was fitted with stairs and the chamber itself was vaulted. The box was built of small stones and plastered on the inside. The inside dimensions fall within the range of 0.90 m by 2.80 m, the chamber itself measuring 0.90 m by 2.10 m. The floor, located 0.75 m below the line of walls, was filled with a 10 cm layer of sand. Each of these graves contained a skeleton of a single individual. Similar graves were present at other locations in the Kom el-Dikka cemetery. One, C 12, was situated, in area C to the east (Kołataj 1976: Pl. III). Yet another similar grave T 98 was uncovered in area AW in the baths.

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