

# MARINA EL-ALAMEIN

## CONSERVATION WORK IN THE 2007 SEASON

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with contributions by

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*The PCMA Polish–Egyptian Restoration Mission to Marina el-Alamein completed the 13th season of work at the site of the early Roman town from 15 April to 30 May 2007.<sup>1</sup> The program covered the complex of 2nd to 4th century AD houses marked as H1, H2 and H21c on the plan and the main town square [Fig. 1], where the mission restored the outer colonnade of the South Portico and the bench running along its back wall.*

*The mission also undertook in extra time to inventory the architecture south of the Forum, where an SCA team and the ARCE–EAP project directed by architect Agnieszka Dobrowolska conducted investigations in 2006 and 2007. The inventorying also included the bath complex to the north of the town square.*

1 The team included Prof. Dr. Stanisław Medeksza, director; Dr. Rafał Czerner, Wiesław Grzegorek and Małgorzata Krawczyk-Szczerbińska, architects; Dr. Grażyna Bąkowska and Monika Więch, archeologists; Piotr Zambrzycki, Joanna Lis and Irma Fuks-Rembisz, stone and sculpture restorers; Prof. Dr. Janusz Skoczylas and Małgorzata Mrozek-Wysocka, geoarchaeologists; and periodically archaeologists Renata Kucharczyk (ancient glass specialist) and Dr. Grzegorz Majcherek (pottery specialist), who also kindly consulted the coin finds. The Egyptian side was represented by Mahmud Yasin, SCA Marina Site Director, Naama Sanad Yakoub, SCA Inspector, and Ahmed Rashad Ahmed, restorer, to whom we are indebted for their assistance throughout the season.

The Mission is grateful, as always, to the Supreme Council of Antiquities and to Secretary General Dr. Zahi Hawass. AKME Zdzisław Wiśniewski again provided additional funding for the fieldwork. Iwona Zych kindly edited the published version of this report.

## ARCHITECTURAL RESEARCH, BUILDING CONSERVATION AND RESTORATION

Cleaning, which is a prerequisite to starting work each season, includes removal of drifted sand and new vegetation from features where work is either currently in progress or planned shortly. This was done in houses H1, H2 and H21c. Moreover, comprehensive clearing of the debris of many years was started in a bath establishment, where so far no work was ever done after the discovery during salvage operations in the mid 1980s. Since there was reason to expect undisturbed deposits in this building, strict

archaeological supervision was ensured. Archaeological testing in Houses H1 and H2 was aimed at investigating construction phases essential for the proper planning of building restoration works.

Conservation methods have not changed from previous years (see successive reports in PCMA's annual reports, *Polish Archaeology in the Mediterranean*, published since 1995). Maintenance work is required continuously on progressively corroding joints, building stone and wall structure. Conservation

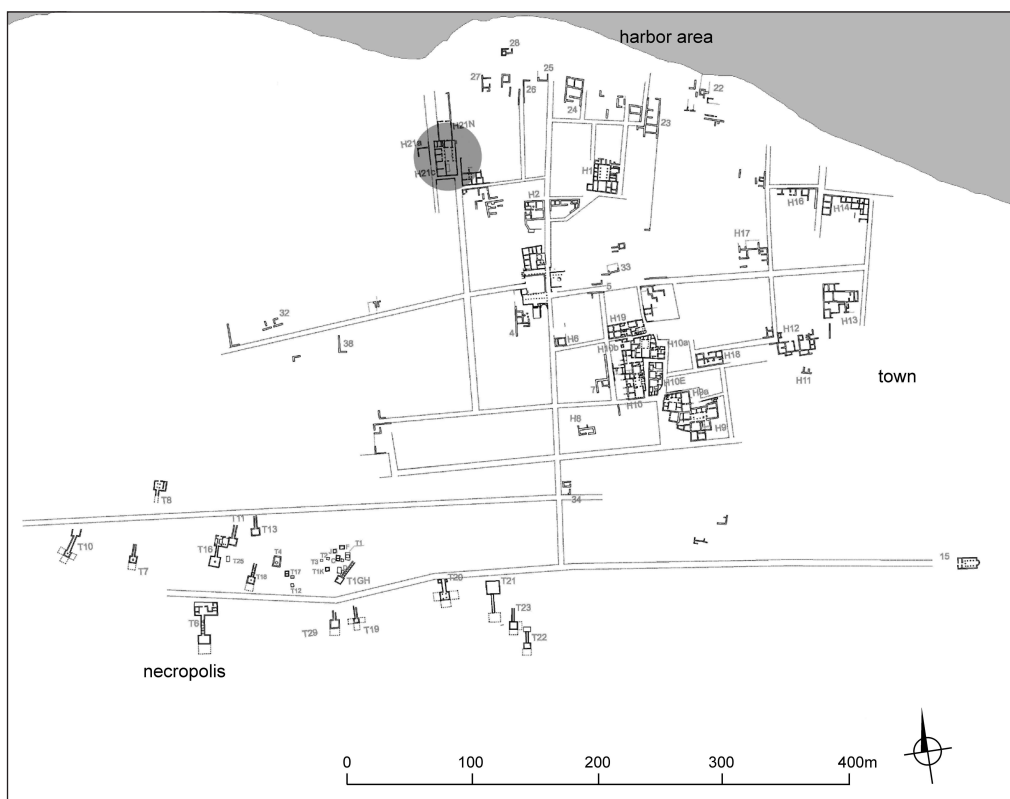


Fig. 1. Plan of Marina el-Alamein (Polish–Egyptian Preservation Mission, after Polish Archaeological Mission, PCMA)

practice over the years has demonstrated the need to add white cement to the lime mortar used for this work in order to counter the effects of the poor quality of lime available locally (standard mix: 6 parts sand, 3 parts lime and no more than 1 part white cement). New stone is used only where absolutely necessary, most of the restorations being accomplished with seasoned material of ancient origin, salvaged from various dumps around the site. A major problem is the clay jointing and clay undercoat for plasterwork, which can be protected only with the use of protective lime and lime-cement mortars.

#### HOUSE H1

Owing to repeated rebuilding in Antiquity the house poses considerable difficulties not only for the study of particular construction phases, but also for the building-conservation works which need to take into account all the different stages in an effort to select elements for display. A full architectural and functional interpretation is pending completion of archaeological testing [*Fig. 2*].

Quake-related damages to the wall structure have largely obliterated the original wall bonding, hugely encumbering research on the building stratigraphy. Nonetheless, the latest phase of the building now appears as a rectangle with the long axis aligned N-S. The units identified in 2006, Rooms 6 and 26, appear not to belong to the 4th century phase, the amphorae and other pottery discovered there pointing to their use in the building of the 2nd and 3rd century. Also the foundation trench for the western perimeter wall of the 4th century house cut across this cooking and storage area, confirming its earlier date (the storage wares found in these apparent cellars are dated to the 1st, 2nd and 3rd centuries). In the 4th century, unit 6 was subdivided and

presumably continued to be used as a kitchen. The rectangular subunit of this room (marked as 27 on the plan in *Fig. 1*) was sunk below the floor of room 6 and may have been a cellar; its walls were made of regular blocks and it had a fine stone-paved floor. A well (?) is located in the northeastern corner.

Relics of the earlier building started appearing at a depth of c. 0.60–0.80 m below the pavement. Testing in Room 21 revealed an occupational level connected with these earlier relics at a depth of 0.80 m, but it is still difficult to assign an absolute date to these remains. Earlier substructures have been observed also in the fill under rooms 24, 14, 15 and 16. The standing walls show numerous rebuildings, additions and enlargements of the existing structure, which are difficult to stratify at present. It does seem, however, that the phase preceding the standing ruins was destroyed sometime in the end of the 3rd or the beginning of the 4th century. The phase that is being restored can be dated provisionally to the 4th–5th century on the grounds of ceramic and numismatic evidence.

The restoration of the perimeter wall on the northwest and west sides of the house was completed in 2007, continuing the work begun in the previous season. The reconstruction of the latrine (units 1, 2, 21) in the northwestern corner of the house proceeded, encompassing the small colonnaded courtyard that was presumably connected with it. The entire bottom of the latrine was reconstructed, thus restoring the northwestern corner of the house as well [*Fig. 3*].

New parts raising the original walls were distinguished from the ancient wall substance by evidently thicker jointing and the leveling of particular courses of stone blocks. The original courses and walls

follow the various cavities that appeared in the building as a result of the damages incurred. Furthermore, the foundations under the footing were constructed in antiquity of blocks laid crosswise to wall axis, while above the footing the blocks, 0.30 m thick, were placed lengthwise in the walls. By the end of the season the

southwestern corner and west wall in the center (by Rooms 20, 7 and 19) were completed, advancing the task of closing the rectangular outline of the house. A marble block which had served presumably as a pedestal under a lifesize bronze statue, was set up in its original position in Room 7. The west wall after restoration will serve as

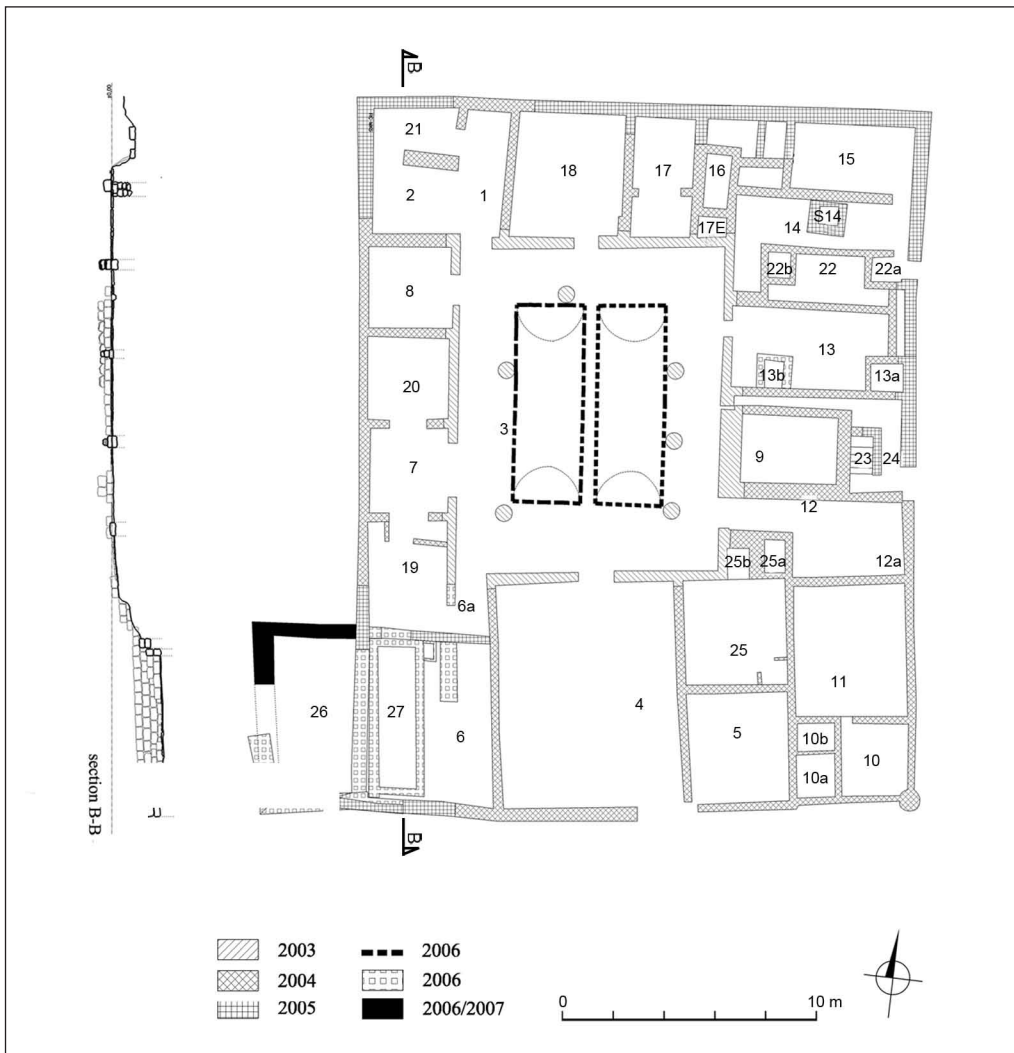


Fig. 2. House H1. Updated inventory plan after the 2007 season; on left, N-S section through the western wing looking east (Plan M. Krawczyk-Szczerbińska)



*Fig. 3. The latrine in the northwestern corner of House H1: before (top) and after restoration in 2007 (Photo S. Medeksza)*



a backdrop for this monument. Moreover, the gaps in the paving in Rooms 2 and 21 were filled in with slabs of an average thickness equal to 12 cm. The next season will be devoted to restoring completely the northeastern corner, the south wall and southern part of the west wall.

### HOUSE H2

House H2 lies to the southeast of complex H21 and west of House H1, just a short distance north of the remains of the main square with adjoining baths. The building appears to have formed the eastern side of an insula, bordered on three sides, from the north, south and east by streets. The entrance was probably from the north and corresponded to the long axis of the house running through the vestibule, peristyle courtyard (1) and main hall (2) [*Fig. 4*]. There was only one centrally positioned column in the peristyle with corresponding pilasters in the north and south walls. The southern of the pilasters doubled as a drain, the vertical hole pierced through it still preserving the hydraulic mortar facing. It joined a channel in the courtyard floor, running to the north and emptying into a cistern 4.20 m long N-S and 1.40 m wide E-W, located under courtyard 1 and room 11. The depth of this cistern could not be ascertained as water appeared 2.10 m down.

A well with square wellhead 0.58 x 0.45 m was discovered in the northeastern corner of the courtyard, immediately next to the northern entrance. It was connected with the cistern. The northern end of the courtyard could have been roofed over, forming a kind of rectangular vestibule with one side open to the courtyard. If this were the case, the courtyard would have had two porticoes, although only the western one would have been furnished with the said column and pilasters.

Agglutination was the common form of architectural development in Marina and House H2 is no exception. Evidence is found in different wall bonds and in the outline of Room 7 (built of broken stone as it is), projecting beyond the outer wall of the house on the north side. The original construction phase made use of stone blocks arranged in a single row, measuring half a royal cubit or 0.26 m in width.

Room 2 remains to be cleared completely, but even at this point it demonstrates evidence of rebuilding. The original walls of blocks measuring half a royal cubit in width had to be reinforced (possibly after some cataclysmic event) by walls of broken stone built up against them on the inside. This theory, however, is countered by the fact that Rooms 3, 4, 5 and 6 represent the last phase of use with occupational levels located 0.80 m higher than the floors in Rooms 1, 2 and 8. The broken stone wall in Room 7, separating the unit from the courtyard, was quite obviously dismantled before Room 6 was constructed, thus leading us to suggest that Rooms 3–6 were operational after the house itself with the courtyard and Rooms 2 and 8 had been abandoned in effect of some catastrophe.

An analysis of house layout reveals the same spatial disposition as in other houses. The entrance, latrine and staircase are blocked together. Room 8 is separated from the courtyard by a wall made of a row of regular stone blocks and it incorporates a double-flight staircase and a latrine under the higher flight. Preceding the two annexes is a small rectangular room that functions as a vestibule for the said steps and latrine.

Exploration of the western part of the house was impeded by a viewing platform introduced as part of a site presentation project by an ARCE–EAP mission. The trench was extended as far west as the platform allowed in order to trace the west

wall of Room 10, already partly cleared in 2006. The northwestern part of the house was also cleared. A courtyard (14) with double portico presumably opened north of Room 10; this courtyard was later divided by an E-W wall into compartments 14a: 3.25 by 2.20 m and 14b: 2.20 by 3.55 m. Originally, the courtyard had measured 6.25 m N-S by 5.40 m E-W. Two stylobates under the

columns of the portico were preserved in the courtyard, 0.52 m wide, which makes them equal to 1 cubit. They are parallel to the east and west walls of Rooms 14, 14a and 14b, at a distance of respectively 1.00 m and 1.10 m. The clearing of floors in the next rooms to the north revealed further subdivisions inside the house. Room 15 (1.50 by 1.80 m) contained a marble Attic base with octagonal

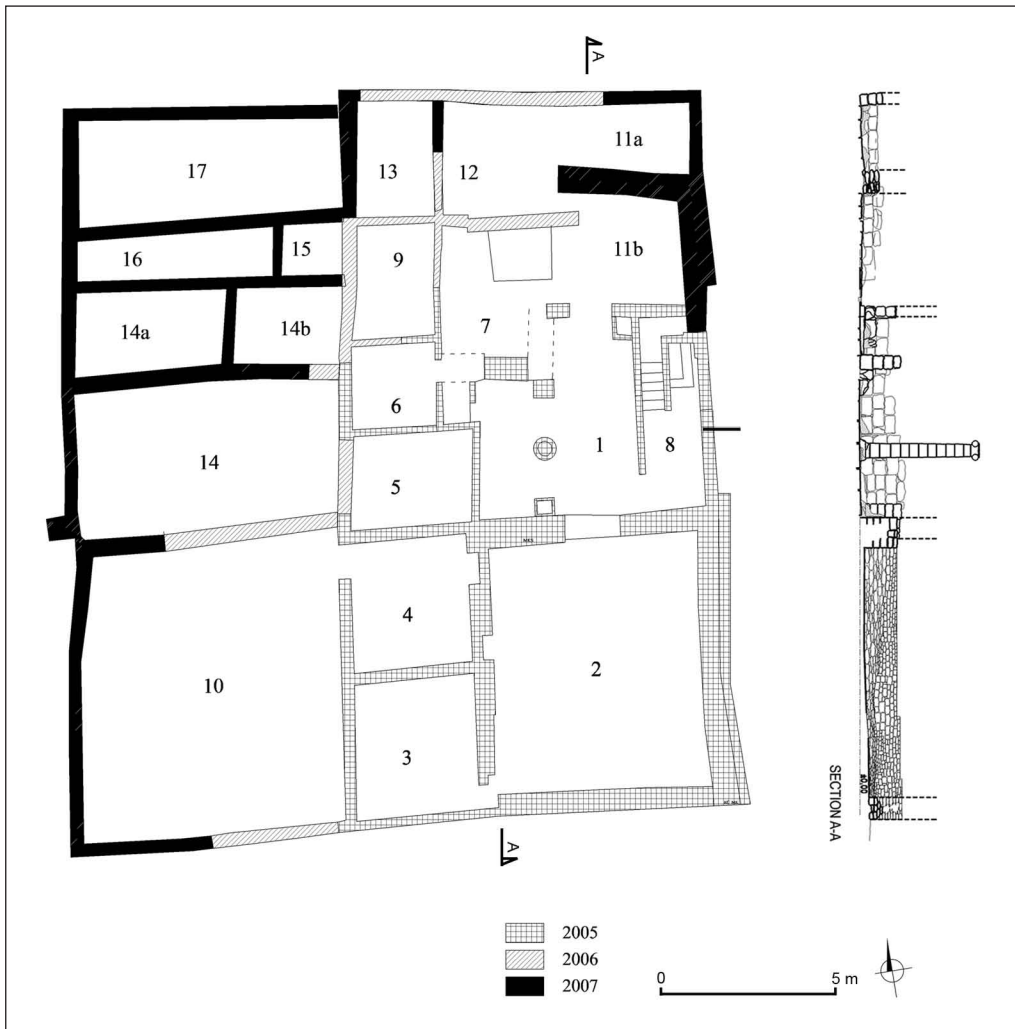


Fig. 4. House H2. Updated inventory plan after the 2007 season; on right, N-S section through the eastern wing looking east (R. Czerner, updated M. Krawczyk-Szczerbińska)

pedestal (see below), apparently reused as a table [Fig. 5]. Rooms 16 (1.50 x 5.00 m) and 17, which remain to be explored, closed the outline of the house on the northwest.

Only three fragments of walls were restored, mainly the west wall closing room 10 and 14 in the uncovered part (the viewing platform should be dismantled before the work can be completed). The broken-stone wall between Rooms 1 and 7 was raised along a stretch 2.50 m long, and the south wall and part of the wall around Room 3 were also reconstructed.

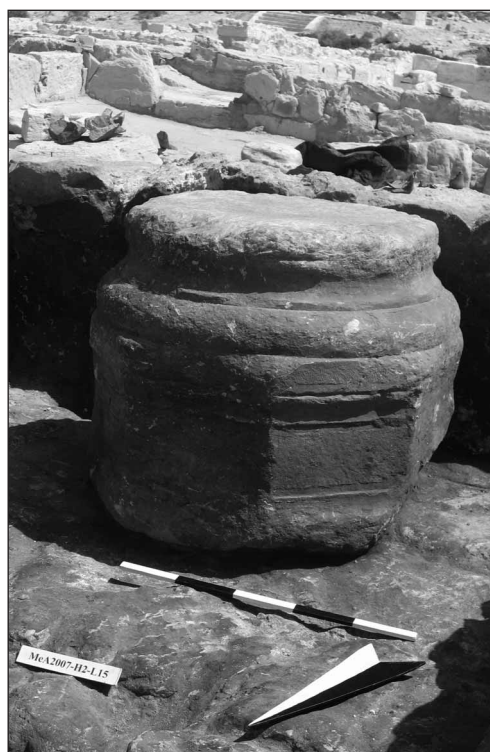


Fig. 5. *Marble Attic base with octagonal pedestal found in House H2*  
(Photo S. Medeksza)

## HOUSE 21C:

### COMMEMORATIVE MONUMENT<sup>2</sup>

The project has been ongoing since 2001. In the course of the past few seasons, a pilaster and two columns have been restored to full height on the platform base, plus a third column to one-fourth of its height and the base of the other pilaster. The west wall, serving as a backdrop for this monument, was now built up to the height of the architrave which was cut in new stone and reconstructed on it and the pilaster, providing the setting for the original elements of a dentil cornice. The height and divisions of the architrave were reconstructed on the basis of parallels and canons of proportions established for the architectural order. The mortar used to join all the elements was mixed of three parts sand, two parts lime and one part white cement. The base of the fourth missing column in the northeastern corner of the monument was also reconstructed.

### SOUTH PORTICO: ANASTYLOSIS OF COLONNADE<sup>3</sup>

The deep portico on the south side of the main square had a double row of columns of the pseudo-Ionian type commonly used in Marina. An anastylosis to full height of two westernmost columns in the second, back row of the portico was completed in 2007 [Figs 6–7]. Five drums accounting for more than half the height of a third column in this row were also reintegrated, preparing them for full anastylosis in the coming season. The engaged column closing the front row of columns on the west was raised to the height of two drums.

The pseudo-Ionian columns of the South Portico were about 3.60 m high

- 2 Contributed by R. Czerner. The work was carried out by the author of these remarks and W. Grzegorek. For an in-depth presentation of this project, see contribution by R. Czerner and S. Medeksza in this volume.
- 3 The work was carried out specifically by R. Czerner, I. Fuks-Rembisz, W. Grzegorek, P. Zambrzycki.



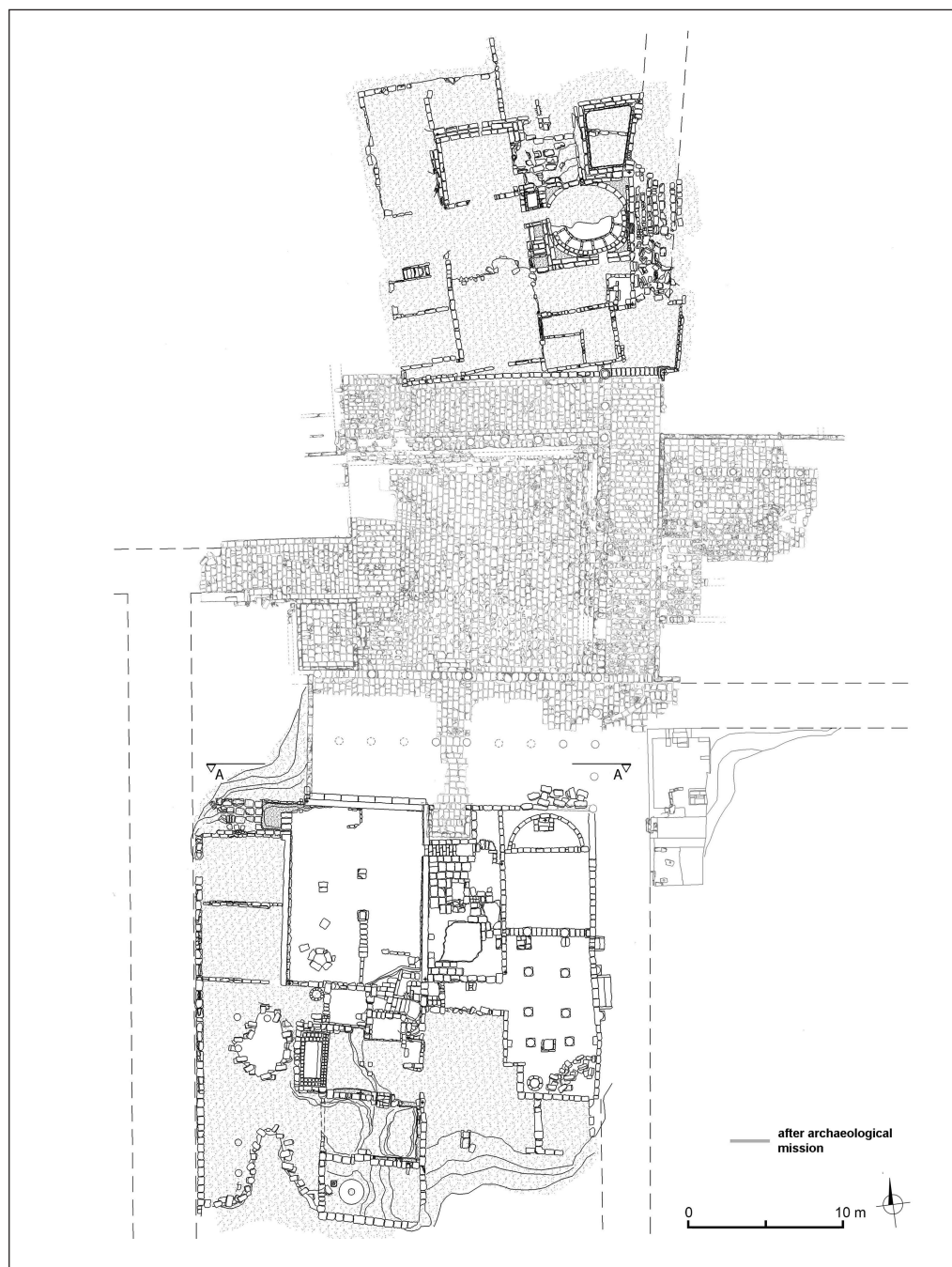


Fig. 6. *Plan of the Main Square and Baths, updated inventory plan for 2007 (Plan J. Dobrowolski, A. Błaszczuk, updating by M. Krawczyk-Szczerbińska)*

according to W.A. Daszewski (2005: 86), who excavated a full column lying next to the base from which it had toppled, including all the drums, capital and joining mortar. Columns of this kind had either eight or nine drums beside the capital and base, all made of limestone and measuring from 28 cm (exceptionally 11 cm) to 35 cm in height. The bottom drums of bigger diameter were usually composed of two separate halves. Despite their considerable height, the columns were not very slender,

having a diameter of 50 cm; moreover, the shafts were covered with thick double coating of plaster, the top layer modeled in imitation of fluting. The stuccowork decoration of the columns has been preserved on the upper parts of one of the columns, but even after conservation treatment (carried out by J. Lis as part of the Polish Archaeological Mission's program in 2005, cf. Daszewski *et alii* 2006: 88–90), it is too fragile to be restored *in situ* and can be displayed only in controlled museum

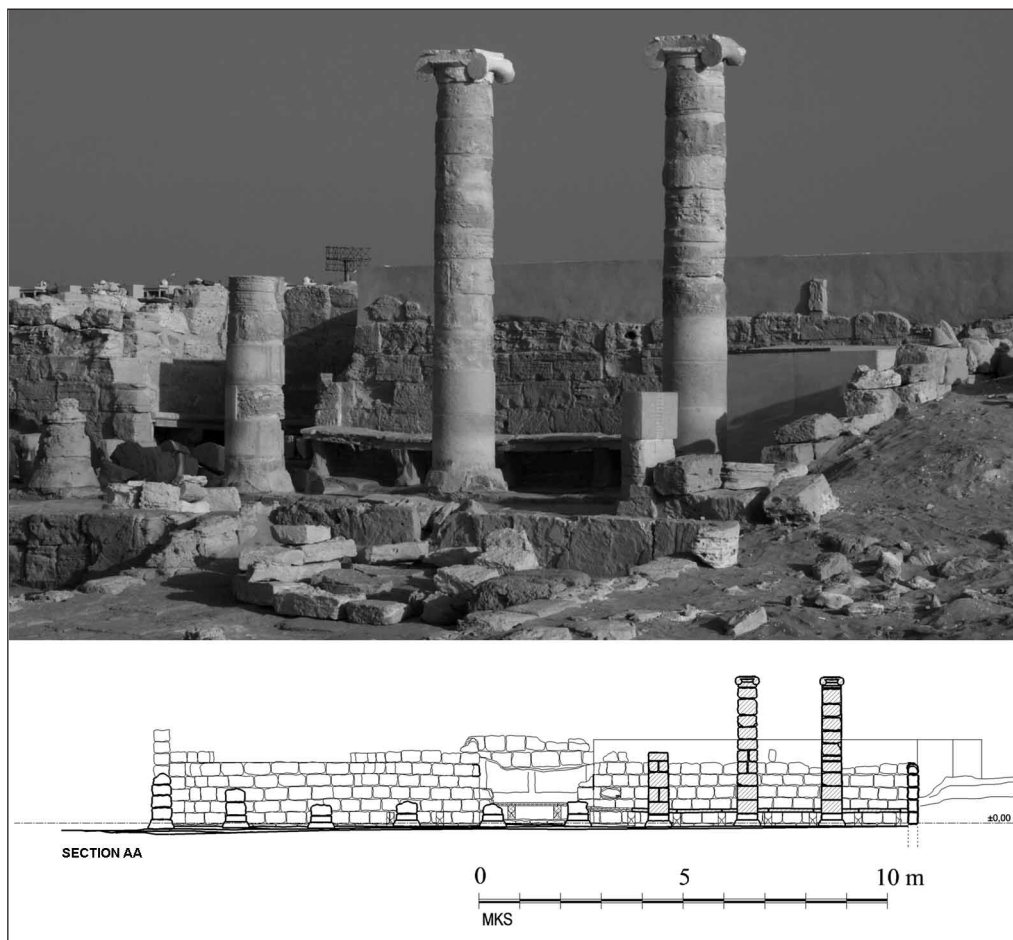


Fig. 7. South Portico with restored columns and bench in the background (top); section (AA in Fig. 6), state after the 2007 season (Photo S. Medeksza, drawing M. Krawczyk-Szczerbińska)

conditions. Therefore, the anastylosis which was based on Daszewski's research used other relics of columns discovered in the debris nearby.

The columns had the bases preserved *in situ*, including in some cases the lowermost drums, which were the most damaged and eroded at the point where they had broken and collapsed. For this reason these drums, although partly preserved, were replaced in the reconstruction with replicas. The original pieces were structurally too weak to carry the upper parts of the columns. The reconstructed drums were cut from single blocks of stone unless only one half of the drum had to be replaced. They were set up on the original bases, which were in satisfactory condition and required only minor consolidation and reinforcement of the substructure.

The upper parts of the columns were reconstructed of original elements as follows (for details of the conservation methodology, see below):

Column first from the west: The four lower drums are from this column, the upper ones come from the sixth column from the west, part of which was very poorly preserved. The original top of this column, which is the

one which underwent conservation earlier, has been moved to storage in preparation for display in museum conditions.

Column second from the west: Set up from original elements found near its base during excavations. Only the lowermost two were replaced with drums of identical size but better preserved, coming from elsewhere in the portico, but without exact provenience.

Column third from the west: Reconstructed to a height of 1.82 m, replacing with replicas half of each of the two lowermost drums and the entire third drum. Mounted on this were two more original drums composed of halves.

Engaged column from front row: Base *in situ*, one original half-drum and one reconstructed element.

Standard mortar was used for bonding all the restored elements (3 parts sand to 2 parts lime to 1 part white cement). The halves of two-part drums were clamped with stainless steel rods (ø 8 mm) on top.

The wall benches in this portico were also preserved (see below), continuing work started in the previous two seasons in the exedra and portico itself. The work is part of a long-range conservation program being implemented by the mission.

## CONSERVATION OF STONE ELEMENTS IN THE 2007 SEASON<sup>4</sup>

The conservation project was aimed at completing a limited reconstruction of the architectural decoration of the Main Town Square and House H21. In the area of the Forum work focused on the preservation of stone benches in the southwestern part of the South Portico and a reconstruction of three columns in the South Portico.

### CONSERVATION PREMISES AND CONCLUSIONS

Under a detailed agreement with the Egyptian side (SCA), the work is aimed at preservation of the ancient substance uncovered during excavations and limited restoration of architectural decoration based on specific research. In keeping with

<sup>4</sup> Contributed by I. Fuks-Rembisz and P. Zambrzycki.

Egyptian guidelines and binding professional conservation standards, the selection of materials is carried out under strict supervision. The use of new material is reduced to a necessary minimum.

An important issue in substantial projects like this one is acquiring appropriate limestone with technical parameters corresponding to the original stone used in ancient buildings. Years of experience with the stone coming from excavations (considered as out of context) have confirmed the usefulness of this material for reconstruction purposes. Other kinds of limestone from quarries in the vicinity of Cairo, e.g. Tura and Helluan stone, have a definitely lesser resistance to the corrosive climatic conditions present on site at Marina el-Alamein. In turn, the limestone coming from local quarries in el-Alamein is of very poor quality. The original limestone used in Antiquity must have come from some other layers, hence its better technical parameters. Reconstructions of architectural decoration made of the "original" material as described above have been under supervision for many years, fully confirming the validity of these premises. Moreover, the aesthetic effect of restorations completed in this manner is also of importance.

#### STATE OF PRESERVATION AND REASONS OF DESTRUCTION

The state of preservation of elements of architectural decoration, both the decorated legs and profiled seating, is exceptionally poor. The damages can be classified as due to natural ageing of the stone, mechanical percussion and negative impact of the surroundings on excavated elements that were not assured proper provisional protection. The latter factor is particularly deleterious in the end effect. Newly

excavated stone has a tendency to filtering accumulate damaging mineral salts from the ground. The structure of the objects is thus weakened and is particularly intensive when sedimentation layers are arranged vertically. This leads to delamination of the stone substance as, for example, in the carved bench legs. The top surfaces of the seating are washed and deeply pitted. The visible granular disintegration of the stone is due to direct contact with the fill, resulting in capillary filtering and chemical and mechanical action of salts. Preserved evidence of ancient repairs confirms the low usage durability of elements of interior decoration.

In 2006, the state of preservation of the elements in question was recorded in preparation for planned restoration in 2007. All of the seats were found to be broken as a result of mechanical impact. Since the collapsed fragments were supported on undisturbed ancient fill, it should be assumed that the damage occurred in antiquity. Documentation in April 2007 revealed new damages, presumably connected with the building works being carried out on the south wall of the South Portico, which is the back wall of the benches. The cracked seating slabs had been dismantled and the bench legs were used as provisional supports for scaffolding needed in the building works. Fragments of the benches were displaced with regard to their original position, preventing the restoration of fragments in their original position.

In keeping with the approved scope of work, the conservation of these wall benches was supposed to be solely preventive. However, in order to satisfy the envisioned display function, it proved necessary to consolidate fragments and reinforce the construction appropriately.



## IMPLEMENTATION

The bench legs displaced by the movement of the substructure were mounted on the floor in their original position. The natural dilatation at the joining with the south wall was not refilled intentionally in order to reduce the amount of rainfall flowing from the high wall onto the surface of the bench. (A historical joint was left in place by the extreme leg as proof of its existence).

The damage to one of the legs was considerable, necessitating the making of a limestone replica. The ancient piece was recomposed and stored for display in the future museum exhibition.

Bigger losses of the stone were filled in with stone patches following appropriate technical parameters. For structural reasons

all bench restoration was also made of material with appropriate technical parameters. The adhesive used was a modified mass based on epoxy resin KEMAPOXY 150 by C.M.B. The structure was reinforced with stainless steel rods ( $\varnothing$  12 mm).

Small losses and cracks were filled with lime-cement putty with lime filler. The seating slabs were mounted on the legs, and the joints were only partly filled [*Fig. 8*] (in anticipation of the need to dismantle the benches for conducting further building work on the back walls).

With regard to the columns of the South Portico, the state of preservation of particular elements (drums) varies from good (no additional conservation work required)



*Fig. 8. Benches in the South Portico, state after full restoration in 2007  
(Photo S. Medeksza)*



through losses requiring restoration for structural reasons, to extensive damage necessitating the making of replicas. For elements of the second category, stone patches were made of specially selected material with corresponding technical parameters (original stone from blocks found out of architectural context). The adhesive used for consolidation was a modified mass based on epoxy resins KEMAPOXY 150 by C.M.B. Half-drums were further joined with stainless steel clamps (250 x 150 x 12 mm). Delaminated original stone was fixed with KEMAPOXY 150 with lime filler.

The missing part of the capital of the column situated first on the west side of the South Portico was reconstructed and fixed in place using KEMAPOXY 150 with lime filler on stainless steel rods ( $\varnothing$  12 mm); the joints were filled in with a lime–cement putty with fine-grained lime filler.

The column reconstruction required the making of a substructure under one column and the restoration from analogous material of a missing part of the preserved base of the second column. A lime–cement mass with silica filler (desalinated and sieved sea sand) was used.

## ARCHAEOLOGICAL CONTROL<sup>5</sup>

The archaeological work carried out on site was integrally connected with current conservation work in particular complexes.

### HOUSE H1

Testing in a gap in the paved slab floor of Room 21 revealed a bedding layer of mortar 0.10–0.15 m thick laid on top of fill. The north wall (of the latrine) goes down 1.30 m below the paving. The south wall was constructed of large stone blocks on a foundation provided by an earlier wall of broken stone. The broken stone wall reaches 1.60 m below the level of the paving in the room. The same kind of bedding layer was recorded in another test pit dug in a gap in the pavement in Room 2. At 0.80 m below the paving, a wall of irregular stones appeared, running N-S and joining the north wall, which was also made of the same stone. The walls terminated at a depth of 1.30–1.40 m (counting the pavement) and were evidently of the same phase as Room

26 discovered in the previous season. Finds included pottery, faunal remains and a few dozen mosaic-floor tesserae (8 x 6 x 7 mm), which are of a dark gray siliceous rock, judging by the considerable hardness, cryptocrystalline structure and undulating break.

Continued work in Room 26 concentrated on clearing the broken-stone walls (0.70 m wide), recording a possible doorway 2.20 m wide in the west wall. A structure of small stones, 0.70 x 0.50 m, stood in the northwestern corner. In the northern part of the room and under the level of the amphorae deposit discovered in the previous season there was a fireplace with a small vessel sunk in the ground.

Clearing the northern trench section revealed another wall running northward from the north wall of the room. The section shows three layers corresponding to phases of construction and rebuilding of this house.

5 Contributed by G. Bąkowska with remarks on the Attic base from House H2 by M. Mrozek-Wysocka.



Fig. 9. Selection of archaeological finds from the season  
(Photo W. Grzegorek)

## HOUSE H2

A concentrated effort was made to clear the rest of the house, starting with Room 10 (8.40 x 7.20 m) where the west wall was to be restored (preserved, like the north and east walls as a single course of blocks; the south wall is non-existent). A doorway 1.10 m wide was pierced in this wall, 0.40 m from the northwestern corner.

A courtyard (no. 14 with subunits 14a and 14b; 3.80–4.30 x 7.20 m) of trapezoidal shape, wider at the western end, features two stylobates, each 0.60 m wide, running a meter away from the east and west walls (and retained in a later phase when an E-W partition wall divided the room into two units, 14a and 14b). Paved slabs lying at an angle in the floor in the eastern end of the courtyard testify to the presence of a channel running from the east wall in a generally southwesterly direction, possibly to a cistern under the courtyard. A well found in the western part (0.45 x 0.48 m) still bears traces of hydraulic mortar on the walls. Preserved in the northeastern corner of subunit 14b was a structure of small stones (0.70 x 0.60 m), measuring 3.55 x 2.25 m, which may have served as a shelf, and a big vessel (dia. 0.50 m) encased by small stones sunk 0.20 m below the pavement in the eastern part. A layer of dark burned soil filled the entire room.

Rooms 15 (1.80 x 1.70 m), 16 (1.80 x 5.35 m) and 17 (7.30 x 3.20 m) were traced in the northern part of the house. A curious find from Room 15 is an Attic base (Dia. 0.55 m, H. 0.52 m) [cf. *Fig. 5*], obviously reused here seeing that it stood in an accumulation layer of dark burned soil 0.35 m deep, separated from the flagstone pavement by a 0.03 m thick layer of sand. The base had been set up against the south

wall with stones erected on either side of it. It was made of grey-white marble of medium blastic structure, macroscopically identified as Proconessian. A hearth or fireplace was found in the northwestern part of the room; a big damaged cooking pot had stood there, surrounded by small stones. The south and east walls are from the original phase of construction of the room, while the west wall stood on 0.10 m of sand and the north one on 0.20 m of sand.

Room 11b (3.60 x 2.70 m) also contained in its southern part a fireplace constructed of plastered mud brick (1 x 0.80 m). Pottery was found in abundance, plus some painted plaster fragments. The fireplace was erected when the west wall of the building had already been dismantled. Mortar on a clay ground has survived just above the floor on the north wall of this room. The paving floor slabs have subsided in the northern part. Under the floor there is a cistern that was cleared in 2006.

## HOUSE H21B

A small test pit in the southwestern corner of Room 1 revealed a layer of burning, 0.10 cm thick, containing pottery and shell fragments. A second floor made of lime mortar was found 0.90 m further down, apparently on the same level as the road surface between Houses 21b and 21c. About here the road drops abruptly by 0.50 m, similarly as by House H21c. The difference in levels may have been navigated originally by a set of steps.

GEOARCHEOLOGICAL  
RESEARCH<sup>6</sup>

Geoarchaeological research this season included a sedimentological analysis of deposits observed in the trench sections in

6 Contributed by M. Mrozek-Wysocka.

Houses H1 and H2. In the bottom part of the section west of House H1, sand deposits are intercalated with layers of clay, testifying to a gradual filling of the feature, interrupted by seasonal flooding and stagnation of standing water. In the middle part of the sections no intercalated clay appears, indicating that the area had been dry at this

level. Above this comes a form of land sedimentation localized close to the coast. The top surface of this layer is undulating. Ooids are the chief structural element in sand deposits. In the upper part, directly above natural deposits, there is a layer of debris from building leveling works carried out prior to the discovery of the site in the mid 1980s.

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