

**Report on the work of the  
Egyptian-German Mission at Matariya / Heliopolis in spring 2014\***

by

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The spring season of the joint mission of the Ministry of State of Antiquities and the University of Leipzig at Matariya / Heliopolis was carried out from February 17<sup>th</sup> 2014 till March 31<sup>st</sup> 2014. The excavation work focussed on the area of the main temple west of the obelisk, known as Misraa es-Segun. Minor investigations were carried out in the western part of the temple (Site 200 – “Suq el-Khamis”) and at the southern enclosure wall of the temple.<sup>1</sup> In addition, photographic documentation was done in the storerooms of the MSA at Tell Hisn. As in the past seasons, a geomorphological survey was carried out by drill corings in Misraa es-Segun. In this season, significant points were taken on various parts of the site with a differential GPS.<sup>2</sup> This topographical survey aims to determine precisely the orientation of of all the architectural remains identified in the past on the site and of

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The Supreme Council of Antiquities was represented by the inspectors TAMER AHMED MOHAMMED MAHMUD, HEND ABD EL-NABI MOHAMMED, MARIAM FEKRI SHAWKY ZAKI. To them we would like to express our sincere thanks for their kind support and cooperation.

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<sup>1</sup> For earlier publications of the Egyptian-German joint expedition, see A. ASHMAWY – D. RAUE – M. DE DAPPER – T. HERBICH, Report on the work of the Egyptian-German Mission at Matariya/Heliopolis in Autumn 2012, *ASAE* (forthcoming) and M. ABD EL-GELIL - R. SULEIMAN - G. FARIS - D. RAUE, The joint Egyptian-German Excavations in Heliopolis in Autumn 2005, in: *MDAIK* 64, 2008, 1-9.

<sup>2</sup> This mission was held with the financial support of the *Labex-Archimede*, AAP 2, 2014, *Axe 2 Pouvoirs : Espaces de pouvoirs et constructions territoriales*; projet OrTempSol. Participants were LUC GABOLDE and DAMIEN LAISNEY. A differential GPS was kindly lent by the IFAO.

Egyptian temples devoted to solar deities in general. These measurements shall pave the way to the research on the potential astronomical orientation of the great temple of Atum at Heliopolis.

Several hectares of the temple area were lost due to house construction during 2012 and 2013, especially in the western part. Modern garbage dumps are piling up to a height of up to 6 meters and a large apartment house was built immediately southwest of the obelisk museum. **(Fig. 1)**. Excavation work, combined with geomorphological and geophysical investigations, were started in the centre of the temple west of the obelisk **(Fig. 2)** in the Misraa el-Segun area: Area 210, a section of 130 x 15 m, was opened for the investigation of the so-called “High Sand of Heliopolis” in order to understand its connection with the axis of the main temple as indicated by the position of the obelisk of Sesostris I. The “High Sand” is a large circular structure mapped by W.M.F. Petrie and never investigated thereafter. While Petrie considered this structure as a “fort bank” of the Hyksos Period<sup>3</sup>, others argued in favour of a platform of a sanctuary.<sup>4</sup>



Fig. 1: Area of the central temple of Heliopolis (Misraa es-Segun) with the Matariya Museum and the Obelisk of Senusret I., seen from west (Photo: D. RAUE).

<sup>3</sup> W.M.F PETRIE – E. MACKAY, *Heliopolis, Kafr Ammar and Shurafa*, BSAE 24, London 1915, 3-4, Pl. I.

<sup>4</sup> H. RICKE, Der „Hohe Sand in Heliopolis“, in: ZÄS 71, 1935, 109-111.



Fig. 2: Area of the temple of Heliopolis with the Matariya-Museum and the sites 210, 211 and 220 (Misraa es-Segun) and the western part of the temenos (Suq el-Khamis) and the sites 200 and 202 (Photo: GOOGLE EARTH).

### 1. Excavations in the area of the Main Temple

A large mud brick wall of more than 20 m width was uncovered in the northern part of Area 210 (**Fig. 3-4**). The bricks measure up to 52 x 21 cm and are much larger than the bricks of outer enclosure wall of the temple (see below). They consist of various qualities of mud and contain limestone debris and potsherd of different dates that provides a terminus ante quem for their fabrication. The high ground of this wall was later on used for limestone kilns in medieval-modern times. A stone structure in the north of Area 210 is probably dating to the late Ottoman Period.

Beyond any doubt, the mud brick wall is identical with the structure that W.M.F. Petrie indicated in his 1912 publication in this location. However, it remains an open question, whether this wall is a part of the “High Sand” or whether these are the lower courses of a straight double enclosure wall that ran in east-west direction in this position. According to Petrie, the double wall of the temenos was destroyed in this location but it was proven in

other areas of the temple that his plan mainly based on assumptions from surface observations.<sup>5</sup>



Fig. 3: Area 210 – northern part: Mud brick wall, indicated by Petrie as “Fort Bank” (Compilations of drawings: P. COLLET)

<sup>5</sup> The most striking example is the gate close to the main temenos with the column of Merenptah that was not indicated in the plan of the temple of Heliopolis, A. TAWFIQ – H. AL-AZAM – D. RAUE, Two Excavations at Arab el-Hisn, in: *BSEG* 19, 1995, 41-44. This ensemble was located 300 m west of the wall in Area 210, see D. RAUE, *Heliopolis und das Haus des Re*, *ADAIK* 16, Berlin 1999, Pl. 3-4.



Fig. 4: Area 210 – northern part: Mud brick wall, indicated by Petrie as “Fort Bank” (Photo: D. RAUE)

After an initial study of the pottery, there is no doubt that at least a part of these brick courses can be dated to the later part of the Late Period, probably to sometime in the 4<sup>th</sup> century BC. Identical vessels were found in the construction phase of the outer southern enclosure wall of the main temple in Area 5 (**Fig. 2**).<sup>6</sup> Pottery finds in square 231TI-5, abutting the southern fringe of the wall, date to the Ramesside Period (**Fig. 5**)<sup>7</sup> and there is other evidence for building phases. Further cleaning and sections are needed to answer these questions.

There is evidence for artisanal activity in the main temenos of Heliopolis from surface layers. Among the finds there is a mould of an Udjat-amulet, dated probably to the New Kingdom/Late Period (**Fig. 6**)<sup>8</sup>, and a limestone inlay for an eye of a colossal sculpture (**Fig. 7**).

<sup>6</sup> A. ASHMAWY – D. RAUE – M. DE DAPPER – T. HERBICH, Report on the work of the Egyptian-German Mission at Matariya/Heliopolis in autumn 2012, in: *ASAE* (forthcoming).

<sup>7</sup> We are grateful for these initial observations contributed by Pamela Rose.

<sup>8</sup> Cf. Udjat-moulds from Ramesside aera in Qantir: CHR. HERRMANN, Weitere Formen für ägyptische Fayencen aus der Ramsesstadt, in: *Ägypten und Levante* 1, 1991, 39 No. 64/Reg 6564.



Fig. 5: Area 210 – northern part: Southern fringe of large mud brick wall with accumulation of pottery of the Ramesside Period (Photo: D. RAUE)

More recent pottery finds, like a vine-amphora handle of the Rhodian producer Linus (2<sup>nd</sup> century BC.) or Ottoman pipe heads, were found decontextualized in surface material.<sup>9</sup>

AA – DR



Fig. 6: Area 210: mould for Udjat-amulets, baked clay (Photo: M. WENZEL)

<sup>9</sup> The identification is owed to CORNELIA ROEMER who will publish this fragment in a forthcoming volume of *MDAIK*. Another, badly preserved stamped handle was found previously in Area 200 (Find-No. K21-5-1-3).



Fig. 7: Area 210: limestone eye inlay for a colossal statue (Photo: M. WENZEL)

## 2. Geomorphological Survey

The survey of the geology of the surface materials was continued in areas 210, 211 and 220<sup>10</sup>. Drillings up to 8 m depth that were made by Eijkelkamp hand auger equipment. This season, the use of special tubular plastic casings avoided the collapse of the drilling hole, thereby allowing for deeper drilling in sandy sediments than before. The drillings were located in area 210, 220 and 211.<sup>11</sup>

<sup>10</sup> For previous work, see ASHMAWY – RAUE – DE DAPPER – HERBICH, Report Autumn 2012, in: *ASAE* (forthcoming). As in the past season, the altitude Z of the observation points was measured by means of a total station Leica TS02. The Z-measurements refer to a marked elevation point of + 16.7 m (Sh. El Saada, X = 3.336.085, Y = 3.334.103) indicated on the 1978 cadastral map “LE CAIRE K11” at scale 1/5,000; this map is based on the geodetic control network of the Survey of Egypt which uses the official Egyptian land-datum

<sup>11</sup> Another drilling was started in Area 5, the southern enclosure wall south of the army camp in Misraa es-Segun. The drilling started on top of the outer enclosure wall that can be dated to the last decades of the Late Period: 14.94-14.44: sub-recent slope deposits >>> 14.44 – 13.14: fine sandy silt, 10YR 4/3 – 3/3 (dull yellowish brown – dark brown), loose, no lamellation: mud brick wall, abrupt change to >>> 13.14 – 11.54 m, slightly fine sandy silt; 10YR 3/3 (dark brown); more or less loose, quite homogeneous; very fine lamellation?, very few angular fragments of ceramics, up to 3 cm diameter; sample: MAHE/14/015/S1/340: week regular fired Nile B open fabrics, Middle Kingdom beer bottles of MK-wall, 1x beer jar Old Kingdom: Nile flood silt or older mud brick wall?, abrupt change to >>> 11.54 – (10.74): very slightly fine sandy, clayey silt to silty clay 10YR 2/3 (brownish black); very homogeneous, very fine lamellation; Nile flood silt; drilling was stopped before reaching the *gezira* sand.

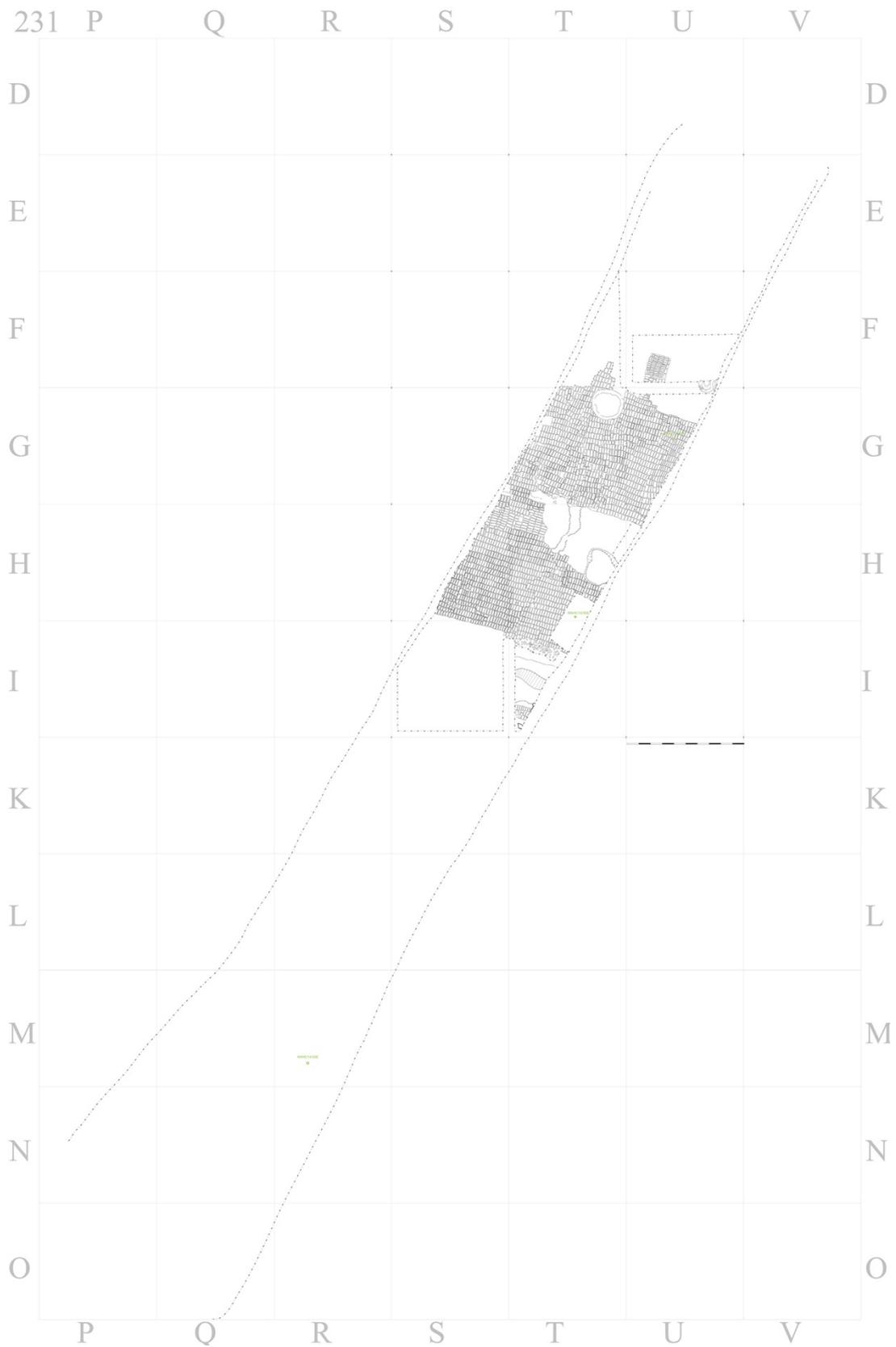


Fig. 8: Area 210 – northern half: Mud brick wall, indicated by Petrie as “Fort Bank” with location of drilling MAHE/14/006, 007 and 008 (Drawing: P. COLLET)

A first group of drillings was made in the long trench Area 210<sup>12</sup> that connects the large mud brick wall with the axis of the main temple (**Fig. 4 and 8**). It provided the first secure evidence for a Late-Pleistocene *gezira* that is underlying the area. It furthermore proves its ascent of about 3% (1.68 m on a distance of 55 m) toward the centre of the area enclosed by the circular structure called the “High Sand of Heliopolis”:

Altitude: meter above sea-level	Depth below surface - Sediments and archaeological finds	Geomorphological setting	Approximate archaeological age
<b>MAHE/14/006 = Observation Point MAHE/14/007</b> (southern half of the mud brick wall in area 210)			
13.30 – 12.80	0 – 50 cm: Slightly fine sandy, clayey silt; 10YR 3/3 (dark brown); Heterogeneous; no distinctive pottery finds >>> abrupt change to	Mud brick wall	-
12.80 – 11.05	50 – 225 cm: Slightly fine sandy, clayey silt; 10YR 3/3 (dark brown) Homogeneous; very fine lamellation; >>> gradual change to	Nile flood silt	-
11.05 – 10.80	225 – 250 cm: Slightly fine sandy, clayey silt; 10YR 3/3 (dark brown); homogeneous; no distinctive pottery finds; >>> very abrupt change to	Nile flood silt	-
10.80 – 4.30	250 – 900 cm: Medium sand; 10YR 5/4 - 6/4 (dull yellowish brown - dull yellowish orange); very homogeneous	<i>gezira</i>	Late Pleistocene

<b>MAHE/14/007 = Observation Point MAHE/14/008</b> (northern half of the mud brick wall in area 210)			
13.94 – 13.27	0 – 67 cm: Slightly fine sandy clayey silt; 10YR 3/3 (dark brown) Heterogeneous; >>> more or less abrupt change	Mud brick wall	-
13.27 – 10.94	67 – 300 cm: Slightly fine sandy clayey silt; 10YR 3/3 (dark brown) Homogeneous; very fine lamellation; few distinctive pottery finds in samples MAHE/14/008/S7/67 – 100 and MAHE/14/008/S9/200 – 300 >>> gradual change to	Nile flood silt, between 11.94 and 1094 with sharp limestone pieces	-
10.94 – 10.44	300 – 350 cm: Fine sandy silt 10YR 2/3 (brownish black); homogeneous; very fine lamellation; Few small fragments of Middle-New Kingdom pottery from samples: MAHE/14/008/S6/300-420 and MAHE/14/008/S10/300-350 >>> more or less abrupt change	Nile fluvial silt with rounded limestone pieces; anthropic input	Probably 2 <sup>nd</sup> Millennium BC
10.44 – 9.27	350 – 400 cm: Slightly silty medium sand; 10YR 3/3 – 2/3 (dark brown – brownish black); heterogeneous;	Reworked <i>gezira</i> sediment with	-

<sup>12</sup> Ground water was met at an altitude of 12.95 m asl. on March 8<sup>th</sup>, 2014.

	>>> very abrupt change to	anthropic input	
9.27 – 8.27	400 – 500 cm: Medium sand; 10YR 5/4 - 6/4 (dull yellowish brown - dull yellowish orange); very homogeneous	<i>gezira</i>	Late Pleistocene

<b>MAHE/14/008 = Observation Point MAHE/14/009</b> (40 m southwest of MAHE/14/006 = Observation Point MAHE/14/007 in area 210)			
13.80 – 12.90	0 – 90 cm: Slightly fine sandy, clayey silt; 10YR 2/3 (brownish black); homogeneous; very fine lamellation; Fragments of Late Roman amphorae from sample MAHE/14/009/S1/0 – 90; with burnt and rounded limestone >>> abrupt change to	Nile flood silt	Late Roman era – more recent times
12.90 – 12.80	90 – 100 cm: Concentration of angular fragments of limestone, up to 8 cm diameter; pieces of slag, up to 8 cm diameter; no distinctive pottery finds >>> abrupt change to	Anthropic layer (linked to lime kilns?)	-
12.80 – 10.98	100 – 282 cm: Very slightly fine sandy, clayey silt to very slightly fine sandy, silty clay 10YR 3/3 – 2/3 (dark brown – brownish black); very fine lamellation; very homogeneous >>> very abrupt change to	Nile flood silt, Anthropogenic-construction layer?	-
10.98 – 9.50	282 – 430 cm: Medium sand; 10YR 5/4 (dull yellowish brown - dull yellowish orange); very homogeneous.	<i>gezira</i>	Late Pleistocene

A pair of drillings (MAHE/14/009-010) was carried out in area 220 (Fig. 2)<sup>13</sup>. The results point to constructions of large scale that cannot be fixed chronologically at this time. As it was encountered in earlier drill cores from MAHE12/003<sup>14</sup>, a stratum of the second quarter of the 3<sup>rd</sup> millennium BC is well attested underneath these remains. The surface of the *gezira* lies considerably lower than in the drilling MAHE/14/008. In the other direction, 200 m further to the east in MAHE12/003, the *gezira* sand was hit at a level of 5,42 m asl.:

<b>MAHE/14/009 = Observation Point MAHE/14/010</b> ( )			
14.38 – 13.46	0 – 92 cm: Slightly fine sandy, clayey silt; 10YR 2/3 (brownish black); homogeneous; very fine lamellation Sample MAHE/14/010/S1/0 – 92 with pottery of 2 <sup>nd</sup> Millennium BC (in more recent stratification) >>> abrupt change to	Nile flood silt	-
13.46 – 12.78	92 – 160 cm: Slightly fine sandy, clayey silt (matrix) ; concentration of subrounded fragments of	Nile flood silt mixed with	-

<sup>13</sup> Ground water was met at an altitude of 12.91 m asl. on March 12<sup>th</sup>, 2014.

<sup>14</sup> MAHE/12/003 with evidence for anthropic layers of Naqada III-Dynasty 5/6 at an altitude of 12.42 – 5.92 m asl., see ASHMAWY – RAUE – DE DAPPER – HERBICH, Report Autumn 2012, in: ASAE (forthcoming).

	limestone, up to 6.5 cm diameter Sample: MAHE/14/010/S2/92 – 160 with small MK/NK-pottery fragments (in more recent stratification); >>> more or less abrupt change to	transported limestone fragments	
12.78 – 10.88	160 – 350 cm: fine sandy silt to silty fine sand (matrix); 10YR 7/2 (dull yellowish orange); concentration of angular fragments of limestone, up to 3 cm diameter; >>> more or less abrupt change to	Anthropic: con-/destruction layer?	-
10.88 – 10.48	350 – 390 cm: Slightly silty medium sand; 10YR 5/3 (dull yellowish brown); more or less homogeneous; very few angular fragments of limestone, up to 2 cm diameter >>> abrupt change to	Anthropic-foundation sand?	
10.48 – 10.28	390 – 410 cm: Fine to medium sandy, clayey silt; 10YR 3/3 - 2/3 (dark brown to brownish black); homogeneous Fine lamellation >>> abrupt change to	Nile flood silt	-
10.28 – 8.78	410 – 560 cm: Clayey, silty medium sand; 10YR 3/3 - 2/3 (dark brown to brownish black); heterogeneous; Sample: MAHE/14/010/S4/410 – 560 with ED/OK-bread moulds and beer jars; >>> more or less abrupt change	Reworked gezira sediment with anthropic input	Advanced Early Dynastic Period to Early Old Kingdom (Dynasty 2 – 4)
8.78 – (6.38)	560 – (800) cm: Fine to medium sand 10YR 6/4 - 5/4 (dull yellowish orange - dull yellowish brown); very homogeneous. Late Pleistocene gezira	<i>gezira</i>	Late Pleistocene

<b>MAHE/14/010 = Observation Point MAHE/14/011</b>			
()			
14.48 – 12.84	0 – 164 cm: Fine to medium sandy, slightly clayey silt; 10YR 2/3 (brownish black); more or less homogeneous; few subrounded fragments of limestone, up to 6 cm diameter >>> more or less abrupt change to	Nile flood silt	-
12.84 – 12.68	164 – 180 cm: Fine to medium sandy, slightly clayey silt (matrix); 10YR 2/3 (brownish black); concentration of subangular and subrounded fragments of limestone, up to 5 cm diameter >>> abrupt change to	Nile flood silt mixed with transported subrounded limestone fragments and angular limestone fragments of local source	-
12.68 – 10.98	180 – 350 cm: Fine sandy slightly clayey silt (matrix); 10YR 3/3 – 2/3 (dark brown to brownish black); few thin layers of limestone dust; 10YR 7/3 (dull yellow orange); concentration of angular fragments of limestone, up to 6 cm diameter >>> abrupt change to	Anthropic: con-/destruction layer?	-
10.98 – 10.48	350 – 400 cm: Medium sandy silt to silty medium sand; 10YR 4/2 (dull yellowish brown); homogeneous	Nile flood silt mixed with anthropic-	

	>>> abrupt change to	foundation sand?	
10.48 – 8.48	400 – 600 cm: Silty medium sand; 10YR 2/2 (brownish black); very heterogeneous; many angular pieces of limestone, up to 4 cm diameter 1 angular piece of silicified sandstone, l.: 4 cm; Sample: MAHE/14/011/S2/400 – 600 with nine fragments of storage jars, bread moulds and beer jars >>> abrupt change to	Reworked gezira sediment with anthropic input	Naqada IIID (- Early Old Kingdom?)
8.48 – (7.78)	600 – (670) cm: Medium sand; 10YR 4/3 (dull yellowish brown) at top 10YR 7/4 (dull yellowish orange) at bottom; very homogeneous.	gezira	Late Pleistocene

Area 211 lies the closest to the obelisk of Sesostris I.<sup>15</sup> After the geophysical survey indicated interesting anomalies, three cores (MAHE/14/11-13) were made. The drilling MAHE/14/011 hit a hitherto unknown large limestone structure or foundation. Further south (MAHE/14/012) the destruction debris was still discernible, while the southernmost core (MAHE/14/013) yielded no direct evidence for this part of the temple anymore.

<b>MAHE/14/011 = Observation Point MAHE/14/012</b> (Area 211, point A in Fig. :::)			
13.54 – 12.28	0 – 126 cm: Very slightly fine sandy, clayey silt; 10YR 2/3 (brownish black); homogeneous; few subrounded fragments of limestone, up to 6 cm diameter; >>> gradual change to	Nile flood silt	-
12.28 – 11.61	126 – 193 cm: Very slightly fine sandy, clayey silt; 10YR 2/3 (brownish black); homogeneous; few subrounded fragments of limestone, up to 3 cm diameter >>> abrupt change to	Nile flood silt mixed with transported subrounded limestone fragments	-
11.61 – 11.34	193 – 220 cm: Fine sandy silt (matrix); 10YR 4/2 (greyish yellow brown); concentration of angular fragments of limestone, up to 6.5 cm diameter Sample: MAHE/14/012/S2/193-200 with fragments of Late Roman pottery >>> very abrupt change	Anthropic layer: Destruction level of building	Late Roman era – more recent times
11.34	220 cm: Very hard and massive surface prevents further drilling Few angular limestone flakes in auger head	Limestone structure as indicated by white line in Fig. :::	Temple wall or wall foundation of unknown date

<sup>15</sup> Ground water was met at an altitude of 12.86 m asl on March 16<sup>th</sup>, 2014.

<b>MAHE/14/012 = Observation Point MAHE/14/013</b> (Area 211, point B in Fig. :::)			
13.51 – 12.28	0 – 123 cm: Slightly fine sandy, clayey silt 10YR 2/3 (brownish black); very homogeneous; fine lamellation; few subrounded fragments of limestone, up to 4.5 cm diameter >>> more or less abrupt change	Nile flood silt	-
12.28 – 12.04	123 – 147 cm: Slightly fine sandy, clayey silt; 10YR 2/3 (brownish black); very homogeneous; many subrounded fragments of limestone, up to 4 cm diameter >>> more or less abrupt change to	Nile flood silt mixed with transported subrounded limestone fragments	-
12.04 – 10.89	147 – 262 cm: Fine sandy silt; 10YR 4/2 (greyish yellow brown); few angular to subangular fragments of limestone, up to 6 cm diameter; at 200 cm (0 11.51 m asl.): piece of subangular burned limestone >>> abrupt change to	Nile flood silt mixed with angular to subangular limestone fragments from local source	-
10.89 – 9.71	262 - 380 cm: Silty medium sand to medium sandy silt; 10YR 2/2 (brownish black); heterogeneous Sample: MAHE/14/013/S3/262 – 380: thin walled Nile B1-fabrics, beer jar fragments of OK <a href="#">tortoise shell</a> fragment; >>> abrupt change to	Reworked <i>gezira</i> sediment with anthropic input	Old Kingdom / Middle Kingdom
9.71 – (9.51)	380 – 400 cm: Medium sand; very homogeneous; 10YR 5/3 (dull yellowish brown)	<i>gezira</i>	Late Pleistocene

<b>MAHE/14/013 = Observation Point MAHE/14/014</b> (Area 211, point C in Fig. :::)			
13.59 – 11.74	0 – 185 cm: Very slightly fine sandy, clayey silt; 10YR 2/3 (brownish black); very homogeneous; very fine lamellation ----- gradual change to	Nile flood silt	-
11.74 – 11.19	185 – 240 cm: Fine sandy, clayey silt; 10YR 4/2 (greyish yellow brown); homogeneous; very few subrounded fragments of limestone, up to 2 cm diameter >>> abrupt change	Nile flood silt mixed with transported subrounded limestone fragments	-
11.19 – 9.19	240 – 440 cm: Silty medium sand 10YR 2/2 (brownish black) Very heterogeneous Sample: MAHE/14/014/S1/240 – 440 >>> abrupt change to	Reworked <i>gezira</i> sediment with anthropic input	Old Kingdom / Middle Kingdom
9.19 – (9.04)	440 – 455 cm: Medium sand; very homogeneous; 10YR 5/3 (dull yellowish brown)	<i>gezira</i>	Late Pleistocene

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### 3. Geophysical Survey

The geophysical survey in 2014 was carried out in three areas: area 220 (Fig. 9) on flat ground (used as a soccer field) in the western part of the circular structure known as “High Sand” or “Fort Bank” (Fig. 15); area 211 also within this structure, north of the center and west of the museum with the obelisk (Fig. 2); area 210 cutting across the northern section of the enclosure wall / “High Sand - Fort Bank” (Fig. 4).<sup>16</sup>

Electrical resistivity profiling was carried out in all areas, coupled with magnetic measurements in area 210. Electrical resistivity was measured with the Schlumberger asymmetric array with probe spacing adjusted to the depth of the expected structures in each area. The choice of this particular array was the result of prospection in the park west of the obelisk in autumn 2012.<sup>17</sup>



Fig. 9: Area 220 seen from south-west (Photo: D. ŚWIĘCH).

<sup>16</sup> The measurements were taken on 1–15 March 2014 and were completed by the author and DAWID ŚWIĘCH.

<sup>17</sup> ASHMAWY – RAUE – DE DAPPER – HERBICH, Report Autumn 2012, in: *ASAE* (forthcoming). Measurements taken at distances of 1 m from one another followed lines set one meter apart. A fluxgate gradiometer was used for the magnetic survey, measurements being taken every 0.25 m along lines set 0.5 m apart.

*Area 220:* The prospection covered 60 x 60 m, using the following array of probes: AM = 7 m, MN= 2, NB=∞ which permits tracing of electrical resistivity at depths of approximately 3 – 3.5 m. The aim was to trace remains of stone temple architecture, expected to be mapped as anomalies of higher resistivity. A zone of higher resistivity was noted in the southern part of square C1 and in squares C2 and C3 (Fig. 10A). The zone in square C1 has a distinct northern border that is continued in C2 and a western one, both running straight and meeting at right angles. Two areas of lower resistivity in western section of the zone (in C1) took on a roughly square shape, one 4 m to the side the other 3 m. The layout of anomalies could suggest a connection with architectural remains: linear anomalies of higher values, in the range of 13–14. ohm-m, at the northern and western edges of the zone could correspond to walls, whereas the areas of lower resistivity (12–13 ohm-m) could be rooms. An area of values in the range of 17–21 ohm-m was recorded in the southern part of C2; it ran at an angle to the borders of the prospected area and revealed no internal divisions. This kind of image suggests a concentration of stone debris.

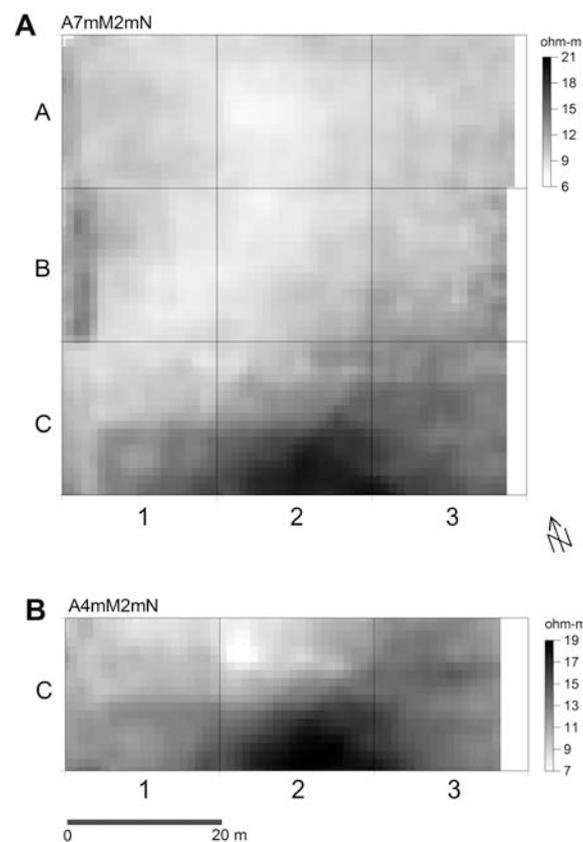


Fig. 10: Area 220. Resistivity maps. A – AM=7m, BM=∞, MN=2m. B - AM=4m, BM=∞, MN=2m. Ada-05 resistivity meter.

Fuller information on the depth at which the structures could be expected in the areas of higher electrical resistivity was obtained by taking measurements in an area 20 m by 60 m with a probe array AM=4m, MN=2m, NB=∞ reaching depths of about 2 m. The image of structures in C1 lost in distinctness, unlike the anomaly in C2 which became more distinct (Fig. 10B). A comparison of images for two different depths indicated that the structure in C1 occurred mostly in the deeper layer, whereas in C2 it was present in both layers. Drilling in the area of the structure in C2 verified it as limestone debris forming a layer more than 1.9 m thick (see above, drilling MAHE/14/009).

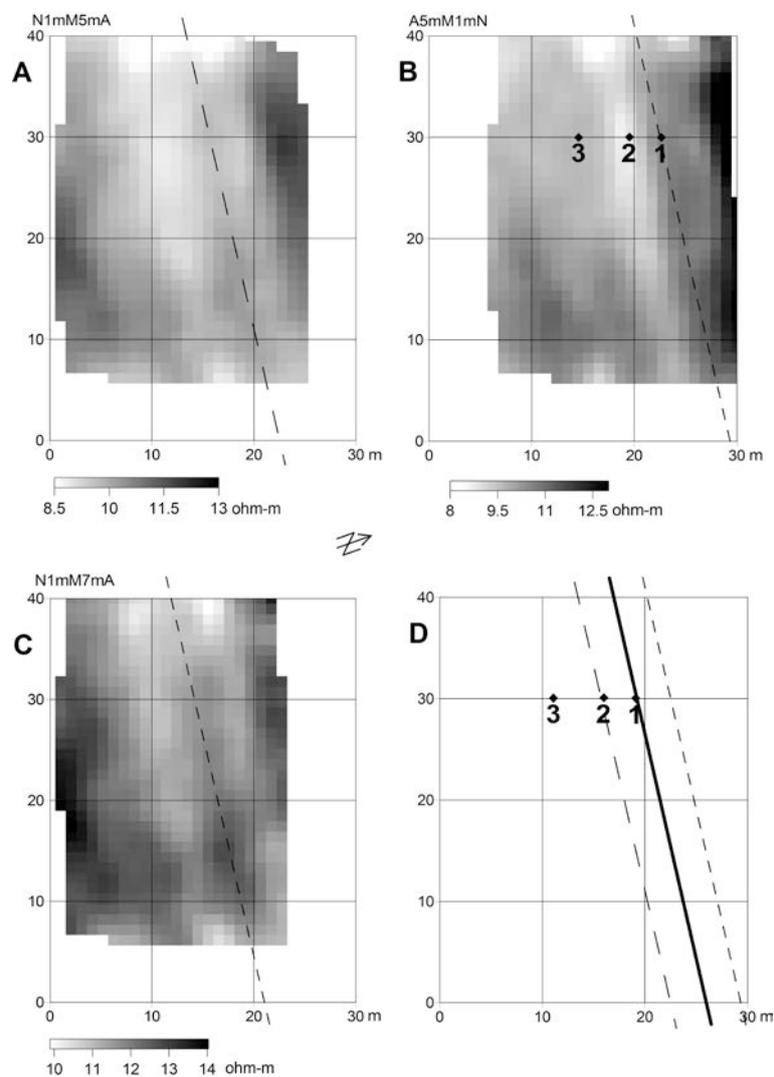


Fig. 11: Area 211. A – C - resistivity maps, Ada-05 resistivity meter. A - AM=5m, BM=∞, MN=1m. Current probe A on the northern side of the array. Dotted line marks anomaly interpreted as a wall. B – AM=5m, BM=∞, MN=1m. Current probe A on the southern side of the array. Dotted line marks anomaly interpreted as a wall. 1 -3 – locations of auger drillings referring to position of anomalies on the resistivity map. C – AM=7m, BM=∞, MN=2m. Current probe A on the northern side of the array. D – left dotted line marks the position of the hypothetical wall after map A; right dotted line marks the position of the hypothetical wall after map B; solid line marks the real position of the anomaly interpreted as a wall. 1 – 3 – locations of auger drillings referred to the site grid. 1 - MAHE/14/011; 2 - MAHE/14/012; 3 - MAHE/14/013.

*Area 211:* The survey aimed at recording architectural remains in an area close to the temple axis marked by the obelisk. A probe array AM=5m, MN=1 m, NB=∞ reaching a depth of about 2.5 m traced an elongated structure approximately 2 to 3 m wide, running parallel to the temple axis, surrounded by features of lower resistivity (Fig. 11A and 11B).

Measurements with an asymmetric array of probes give a displacement effect of the position of the anomaly corresponding to a structure in the direction of the mobile current probe. Measurements with a reverse array, that is, with the mobile current probe on the opposite side of the potential probe, allowed the real position of the anomaly to be determined (Fig. 11A, mobile current probe to the north of the potential probe, Fig. 11B, opposite arrangement). The results of the second measurement were almost exactly the same, the displacement of the elongated structure being 7 m to the south. Based on these results the elongated structure may be assumed to follow a line at half distance between the positions set by the results of measuring with the two probe arrays (Fig. 11D). Verification with an array reaching deeper layers (AM=7 m) gave an identical image of electrical resistivity, the displacement effect moving the elongated structure about a meter to the south if compared to result obtained by AM=5m array (Fig. 11C).

The results determined the location of drillings made for the purposes of verification of the findings. A concentration of angular fragments of limestone up to 6.5 cm in diameter was recorded at a depth of +11.61 asl in drilling MAHE/14/011, see above. Below this layer, at +11.34 asl (2.20 m below the ground surface), a hard structure prevented further drilling. The drilling to the south of the structure (see above MAHE/14/012, see Fig. 11B and C), revealed a concentration of angular fragments of limestone at a depth between +12.28 and 10.98 asl. The limestone in the lower part (below 12.04 m asl) derived from a local source, indicating stages of the destruction of the stone structure. A fragment of burned limestone might suggest that the structure was being crushed for the purposes of burning to produce lime. A core further to the south (see above MAHE/14/013), recorded only a layer of rounded limestone fragments (between 11.74 and 11.19 m asl.).

Results of electrical resistivity profiling coupled with drillings support the interpretation of the higher-resistivity elongated structure as a limestone wall, which is surrounded and covered by limestone fragments originating from the wall (local fragments).

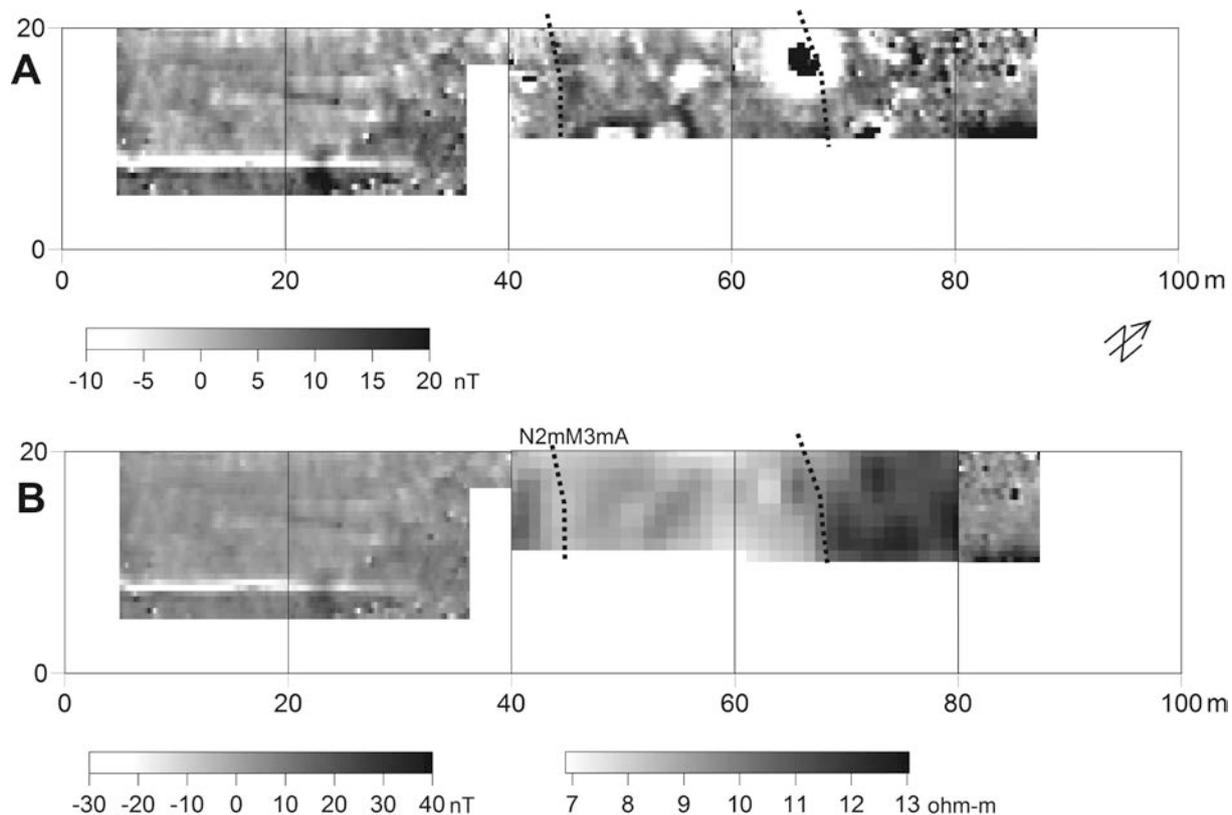


Fig. 12: Area 210. A – magnetic map. Geoscan Research fluxgate gradiometer FM256. Sampling grid 0.25 x 0.50 m. Dynamics -7/+20 nT (white/black). Dotted line marks edges of the wall of the Fort Bank (see fig. ...). B – resistivity map superimposed on magnetic map. Dynamics 6.9/ 13 ohm-m; -21/+40 nT (white/black). Ada-05 resistivity meter.

*Area 210*: Prospection, carried out with two methods: electrical and magnetic resistivity, was aimed at determining whether a wall, the opposite ends of which had been recorded in excavation trenches (Fig. 4), would show up as an anomaly. A fluxgate gradiometer was used to take measurements in a grid 0.25 x 0.50 m. Three zones could be distinguished on the map: one with uniform values of magnetic field intensity (in the shallower southern part of the trench), another with differentiated values (without point anomalies) and the third with distinct point anomalies (Fig. 12 A). The wall is located within the center zone, but it can hardly be said to correspond, considering that the margins of the zone were wider by 5 m on the north and 10 m on the south. The most distinct element on the magnetic map is an oval anomaly of high amplitude, about 7 m in diameter. It corresponded to a furnace dug into the wall in the Late Roman or more recent period.

Electrical resistivity prospection was carried out exclusively in the northern, deeper part of the area. The array used for measurements was  $AM = 3\text{ m}$ ,  $MN = 2\text{ m}$ ,  $NB = \infty$  proper for observing changes at depths down to 1.5 m. Corresponding to the wall is a zone of lowered resistivity values (below 9 – 10 ohm-m, Fig. 12 B). The correlation of the borders of the zone

of lowered values with the wall edges is much better than in the case of magnetic mapping. The borders of the zone are displaced with regard to the wall by about 3 m in a southerly direction. Drilling within the area of the wall demonstrated that the preserved top can be found at a depth of about 0.5 – 0.7m below ground surface. The image would have been much better had the probe array used been dedicated to a three times lesser depth.

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#### 4. The enclosure walls of Heliopolis

In spring 2014 the investigation of the southern enclosure walls of the temple of Matariya were resumed.<sup>18</sup> The temple area of Heliopolis was enclosed by two parallel courses of mud brick walls of different date, measuring about 1100 east to west and 900 m north to south (Fig. 13).<sup>19</sup>



Fig. 13: Sketch of the position of the large double enclosures of the temple of Heliopolis in Matariya and Arab el-Hisn: black: as indicated by Petrie in 1912; yellow: inner course, probably New Kingdom; green: outer course, probably latter Late Period (Photo: GOOGLE EARTH, adapted by M. BEIERSDORF)

<sup>18</sup> Previous investigations had been carried out by YUSSUF HAMID KHALIFA and his team since 1984, see M. ABD EL-GELIL, M. SHAKER and D. RAUE, Recent Excavations at Heliopolis, 134 No. 5. The work was supported by the Division of Building Archaeology of the German Archaeological Institute in Berlin and it is currently continued in the context of the research training group „Kulturelle und technische Werte historischer Bauten“ at the BTU Cottbus-Senftenberg/Germany. The architectural survey was supported by the members of the training course directed by ASJA MÜLLER and by CHR. BRENINEK and K. DIETZE.

<sup>19</sup> For excavations in the northeastern section (area 13) that is nowadays covered by modern construction and garbage dumps, see A. TAWFIQ – H. AL-AZAM – D. RAUE, Two Excavations at Arab el-Hisn, in: *BSEG* 19, 1995, 41-44 with Fig. 1–4.

According to a current study, carried out by Marie-Kristin Schröder, the outer enclosure wall in the southern part of the temenos can be dated to the latter decades of the Late Period.<sup>20</sup> Approximately 100 m of this outer enclosure wall, parallel to modern Sharia Mostorod (area 5), are well preserved to a height of 3 m. The architectural survey finished the documentation of 60 m and pursued a section on top of the outer enclosure wall (squares 241AL/241BL) to investigate the junction of two segments<sup>21</sup>.

The wall is built of mud bricks of various qualities, some of them containing large amount of potsherds and all kind of settlement debris. The average brick size is about 42 x 21 x 12 cm. The bricks are laid in undulating, alternating convex and concave courses (**Fig. 14–15**). Closer to the junctions, the bricks are laid almost horizontally again. The segments measure alternately 20 (concave) resp. 13 (convex) meters in length. The concave segments are marked by a slight protrusion. These observations allow for drawing further conclusions about the building process. Perhaps that kind of construction promoted a faster building progress since many groups of bricklayers were able to work independently. In this progress, the convex segments were built first and later on filled with the concave segments.

The original height can only be estimated in comparison to parallel and contemporary constructions in Karnak (with 12 m width) and Elkab. According to these parallels, the overall height of the walls of Heliopolis will probably not have been less than 20 m. Such an estimate would allow the rays of early sunrise to hit the obelisks of the 12<sup>th</sup>, 18<sup>th</sup> and 19<sup>th</sup> Dynasty with their overall height of about 20.5 – 24 m.

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<sup>20</sup> A preliminary report for the MDAIK is in preparation.

<sup>21</sup> The section could not reach the southern fringe of the wall because of the bypassing Mostorod street. In the north, it could not be measured because of the superimposing Sh. Arab el-Tawil, see A. TAWFIQ – H. AL-AZAM – D. RAUE, Two Excavations at Arab el-Hisn, in: *BSEG* 19, 1995, 42 Fig. 1. According to Petrie, the overall width of the wall measured 17 metres.



Fig. 14: Area 5: Southern enclosure wall of the temple of Heliopolis, Late Period (Photo: D. RAUE)

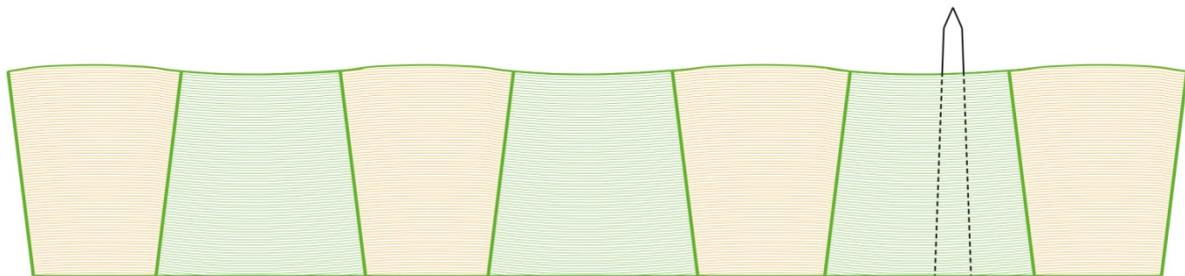


Fig. 15: Reconstruction of the height of the outer enclosure wall of Heliopolis in relation to an obelisk of the size of the Heliopolitan Obelisks of Thutmose III. or Sethos I (Graphics: M. BEIERSDORF).

## 5. Excavations in the area 200 – Suq el-Khamis

Due to the rapid encroachment towards the site of previous work in area 200 “Suq el-Khamis” it became necessary to remove all layers above the ground water table that supposedly contained fragments of the Amarna Period from medieval destruction layers<sup>22</sup>. All baulks of the squares H24, I23/24, K23/24, L22/23/24, M22/23/24, N22/23/24 were removed (**Fig. 16**). As in the past years, an interesting group of carved fragments was discovered as further evidence for the activity of Akhenaten in Heliopolis. Several fragments

<sup>22</sup> This work was facilitated by a grant of the Fondation Michela Schiff Giorgini to whom we would like to express our deep gratitude.

were attributed to palm leaf capitals built of *talatat*-blocks. To complete the documentation of the Amarna Period remains, the documentation of blocks found between 2006 and 2010 by the SCA mission (**Fig. 17**), was continued<sup>23</sup>.

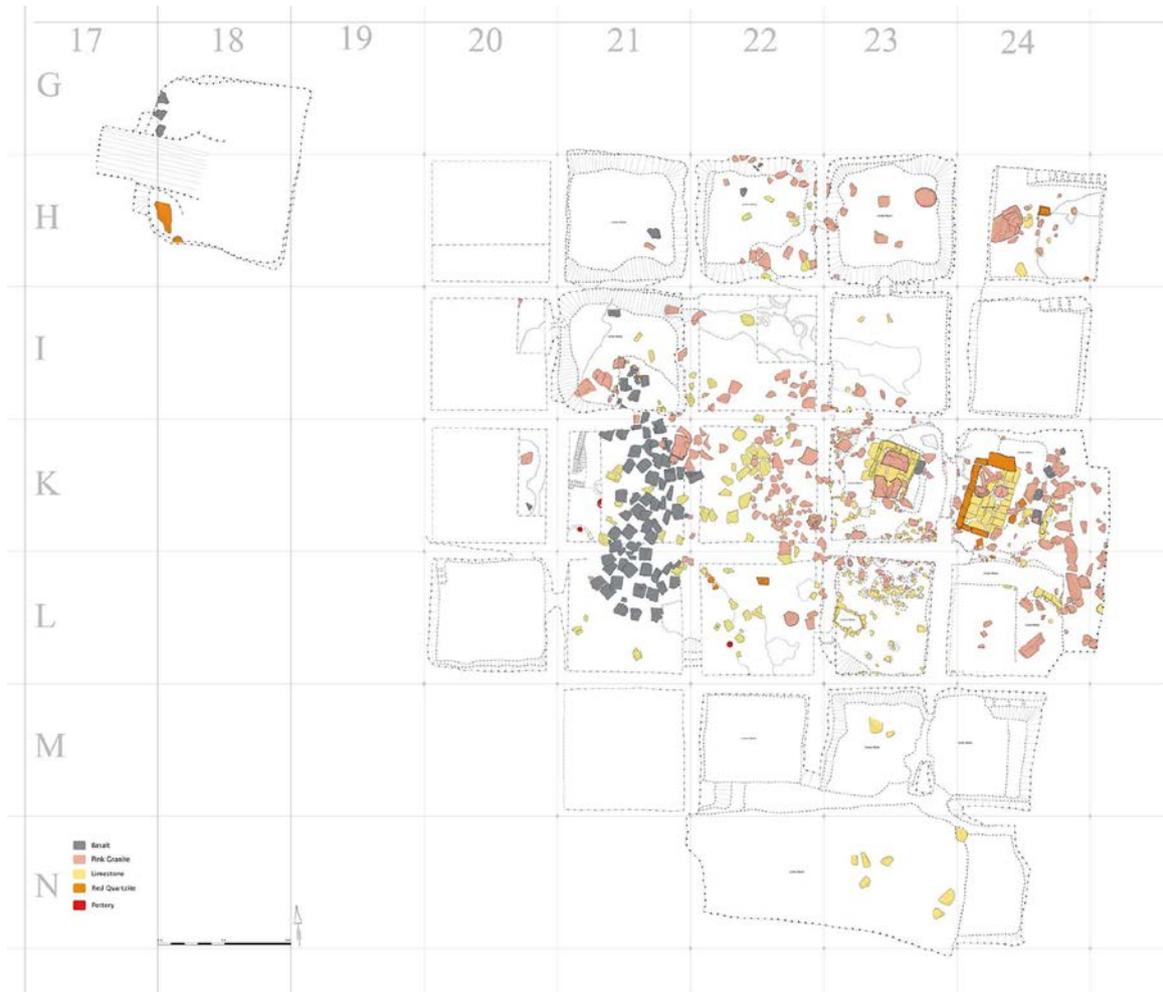


Fig. 16: Area 200, Temple Site after excavations 2001-2014 (Compilations of drawings: P. COLLET).

<sup>23</sup> A comprehensive publication of all epigraphic and architectural evidence of the Amarna Period by the authors in cooperation with GAMAL FARIS is supposed to include the finds of the Amarna Period from various places in modern Matariya and Ain Shams.

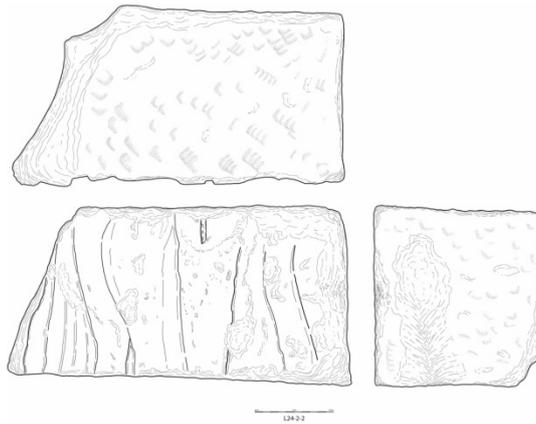


Fig. 17: Area 200, talatat block L24-2-2: legs of Akhenaten and Nefertiti (Drawing by P. COLLET).



Fig. 18: Area 200, squares K24/L24: granite fragments of colossal statuary of the Middle Kingdom, reused in the Ramesside temple (Photo: D. RAUE)

To trace these layers, excavations were extended toward the modern houses. After having removed the medieval and modern destruction layers, new fragments of colossal statues of the Middle Kingdom were unearthed. Elements of these have repeatedly been found since 2005: Their back pillar is uninscribed as a rule, but the faces and the style of the nemes headdress point clearly to the earlier Dynasty 12<sup>24</sup>. A large fragment of an uninscribed back pillar was found in square K24/L24 (**Fig. 18**). A large fragment of a back part of a royal nemes-headdress of the Middle Kingdom was recovered from the pedestal of large statuary from square K24. Stratigraphically there exists no doubt, that these sculptures were reused in the context of a Ramesside temple building. More traces of building blocks made of silicified sandstone might point to a second pedestal in K24/25 as it was found in K24 but further investigation were prevented by the vicinity of modern habitations with poor foundations. The façade that is indicated by the northern orientation of the monumental statuary in the squares I21 to K25 seems to continue under the modern houses. Further important additions for that corpus of statuary and the corpus of talatat-fragments can be expected when pumps or drainage facilities are used to lower the groundwater table.

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## 6. Minor works

Current construction work in the area of the shopping mall “Suq el-Khamis” led to the discovery of some objects of the Ramesside Period in area 202 (**Fig. 2**). For many years, several important objects from tomb contexts were discovered in that area or its environs.<sup>25</sup> In this case, the objects were discovered in the profiles of a construction pit in clearly modern stratification. Coins that were minted in 1958 were closely associated with a complete bowl and large amphora fragments of later Ramesside manufacture. It seems obvious by this mixture of objects that the reason that so many funerary objects are found within the temple is due to the construction work for the Higher Polytechnic Institute and

<sup>24</sup> Other heads of statues were found in 2005 in the squares K21, K22 and L22, M. ABD EL-GELIL – R. SULEIMAN – G. FARIS – D. RAUE, The Joint Egyptian-German Excavations in Heliopolis in autumn 2005. Preliminary Report, *MDAIK* 64, 2008, 4–6, Pl. 5–6.

<sup>25</sup> Y. H. KHALIFA – D. RAUE, Excavations of the Supreme Council of Antiquities in Matariya: 2001-2003, in: *GM* 218, 2008, 50–53; M. ABD EL-GELIL – Y. HAMID – D. RAUE, Two Ramesside Officials at Heliopolis, in: *GM* 150, 1996, 33–35; in summer and autumn 2012, two adjoining pieces of an offering table of a god-father – clean of hands – of the house of Ra” with the name Meryra was discovered in the same location, see ASHMAWY – RAUE – DE DAPPER – HERBICH, Report Autumn 2012, in: *ASAE* (forthcoming). That priest might be identified with a namesake on a family stela of Dynasty 19, see D. RAUE, *Heliopolis und das Haus des Re*, *ADAIK* 16, Berlin 1999, 205-206: *Mry-R*<sup>c</sup> (2).

surrounding buildings that took place in 1956 in the middle of the necropolis of the New Kingdom<sup>26</sup>, when the construction firm decided to dump their debris from digging the foundations in the empty space where the temple of Matariya once stood.

The most important object recovered this season is a doorjamb of a *ḥm-ntr*-priest of the estate of Amun (**Fig. 19**). Since there is a cult and a personal of Amun attested at Heliopolis since the Dynasty 18 at least, it seems appropriate to add this official to the clergy of the Heliopolitan sanctuary of Amun. Even more interesting is the fact, that the block has two



Fig. 19: Area 202, block from a door jamb of a priest of the Domain of Amun, Dynasty 19–20 (Photo: D. RAUE)

<sup>26</sup> RAUE, *Heliopolis und das Haus des Re*, 476 – 478, Taf. 3–4 No. 70–78.

decorated faces. While the inscription was probably visible from the inside of a courtyard or room, the remains of an image show the shoulder of a lady executed in a fine sunk relief. It is therefore one more piece of evidence for the presence of decorated free-standing tomb-chapels in the Heliopolitan necropolis of the Ramesside Period<sup>27</sup>.

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## Conclusions

The geomorphological survey proved for the first time the existence of a palaeo-landscape marked by at least one sand hill. The topographical setting of Heliopolis is to be reconstructed with a *gezira* sand hill that had a difference in level to the western surroundings of at least 5.5 m when first settlement took place. It seems plausible to add to the reasons of the construction of huge walls of up to 20 m width the effect of efficient flood protection. This may be true for the circular structure around the obelisk of the Middle Kingdom, but it may also be relevant for the planning and building of the large outer enclosure walls of Matariya.

Technical observations with regard to construction, for example, the dating of the wall with undulating courses to the latter part of the Late Period, will provide a better understanding of this gigantic building project. These observations will also elucidate the modification of the surrounding landscape and region both by the hand of man and nature.

Excavations in area 220 offered insights into the structures of the temenos south of the main axis of the temple. Again, as was observed in past seasons further to the East (MAHE/12/005), the geophysical survey and the drillings suggest the presence of large-scale constructions, probably temple units, thereby providing an indication for the size of the temple.

The drill cores were very efficient due to directly combining the geomorphological investigation with the geophysical survey. Thus, in area 211 it was possible to detect a limestone structure of considerable extent of more than 30 meters, and to determine its exact depth. Future excavation work will have to rely on such localisations and have to be prepared for work under groundwater.

Finds, such as the architectural elements, enlarge our knowledge about the site of Heliopolis that is despite its importance for the Egyptian history and culture, still poorly understood.

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<sup>27</sup> RAUE, *Heliopolis und das Haus des Re*, 59–60;

One of the most remarkable discoveries of the season is based on the geological analysis. Bearing in mind that the top of this *gezira* was considered to be the mound of creation, it seems plausible to assume that the huge ring-wall was built as a protection against the rising flood levels. If this is indeed the case, both earlier assumptions about this area would have to be corrected: it was neither a fortress of the Hyksos Period as assumed by Petrie in 1912, an artificial platform filled with sand to gain higher ground, but rather, a piece of engineering to reify the idea of the primeval mound and the centre of creation.

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## Abstract

The joint Egyptian-German Mission at Matariya continued work in the temple of Heliopolis, a site that is greatly threatened by modern construction and garbage dumps. Excavations in the Main Temple Area, known as Misraa es-Segun, were carried out. Clear evidence of a Late Pleistocene *gezira* was discovered. In addition, a combined approach of geophysical survey methods and drillings led to the identification of a limestone structure west of the obelisk of Sesostris I. A part of the wall, identified by Petrie as a fort bank of the Hyksos Period a hundred year ago, proved at least partially to be of considerably younger date. Numerous fragments of a temple of Akhenaten were found in the temple site of area 200 ("Suq el-Khamis"). An architectural survey was concerned with the Southern Enclosure Wall of the temenos.

## Text for Figures

Fig. 1: Area of the central temple of Heliopolis (Misraa es-Segun) with the Matariya Museum and the Obelisk of Senusret I., seen from west (Photo: D. RAUE).

Fig. 2: Area of the temple of Heliopolis with the Matariya-Museum and the sites 210, 211 and 220 (Misraa es-Segun) and the western part of the temenos (Suq el-Khamis) and the sites 200 and 202 (Photo: GOOGLE EARTH).

Fig. 3: Area 210 – northern part: Mud brick wall, indicated by Petrie as “Fort Bank” (Compilations of drawings: P. COLLET)

Fig. 4: Area 210 – northern part: Mud brick wall, indicated by Petrie as “Fort Bank” (Photo: D. RAUE)

Fig. 5: Area 210 – northern part: Southern fringe of large mud brick wall with accumulation of pottery of the Ramesside Period (Photo: D. RAUE)

Fig. 6: Area 210: mould for Udjat-amulets, baked clay (Photo: M. WENZEL)

Fig. 7: Area 210: limestone eye inlay for a colossal statue (Photo: M. WENZEL)

Fig. 8: Area 210 – northern half: Mud brick wall, indicated by Petrie as “Fort Bank” with location of drilling MAHE/14/006, 007 and 008 (Drawing: P. COLLET)

Fig. 9: Area 220 seen from south-west (Photo: D. ŚWIĘCH).

Fig. 10: Area 220. Resistivity maps. A – AM=7m, BM= $\infty$ , MN=2m. B - AM=4m, BM= $\infty$ , MN=2m. Ada-05 resistivity meter.

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Fig. 15: Reconstruction of the height of the outer enclosure wall of Heliopolis in relation to an obelisk of the size of the heliopolitan Obelisks of Thutmosis III. or Sethos I (Graphics: M. BEIERSDORF).

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Fig. 19: Area 202, block from a door jamb of a priest of the Domain of Amun, Dynasty 19–20 (Photo: D. RAUE)