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## Tell El-Balamun: Geophysical and Archaeological Survey, 2006

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# TELL EL-BALAMUN

## GEOPHYSICAL AND ARCHAEOLOGICAL SURVEY, 2006

Tomasz Herbich, A. Jeffrey Spencer

*The geophysical survey at Tell el-Balamun, aimed at generating a complete magnetic map of the temple precinct (c. 22 ha), is a joint project of the British Museum and the Polish Centre of Mediterranean Archaeology, undertaken in 2005 (Herbich, Spencer 2007). It is directed by Tomasz Herbich, who is assisted in the work by Dawid Świąch. Archaeological testing of the structures mapped by the survey is carried out by the British Museum team excavating Tell el-Balamun, headed by Jeffrey Spencer with the assistance of Patricia Spencer.<sup>1</sup>*

<sup>1</sup> One of the instruments was provided by the Programa de Estudios de Egiptología (Consejo Nacional de Investigaciones Científicas y Técnicas, Buenos Aires) on the grounds of a co-operation agreement with the Polish Centre of Mediterranean Archaeology of the University of Warsaw.

## GEOPHYSICAL INVESTIGATIONS

The geophysical survey in 2006 was carried out in the eastern part of the temple enclosure, to the north and east of the area covered in 2005 [Fig. 1].

With the 6.9 ha scanned this year, it gives a total of nearly two-thirds of the temple enclosure mapped by the end of the

2006 season (13.2 ha) (see also Herbich, Spencer 2006: 16-19). As in 2005, the instruments used were Geoscan Research FM36 gradiometers. Measurements were taken in parallel mode following a measuring grid 0.50 m by 0.25 m, that is, every 0.25 m along lines 0.50 m apart,

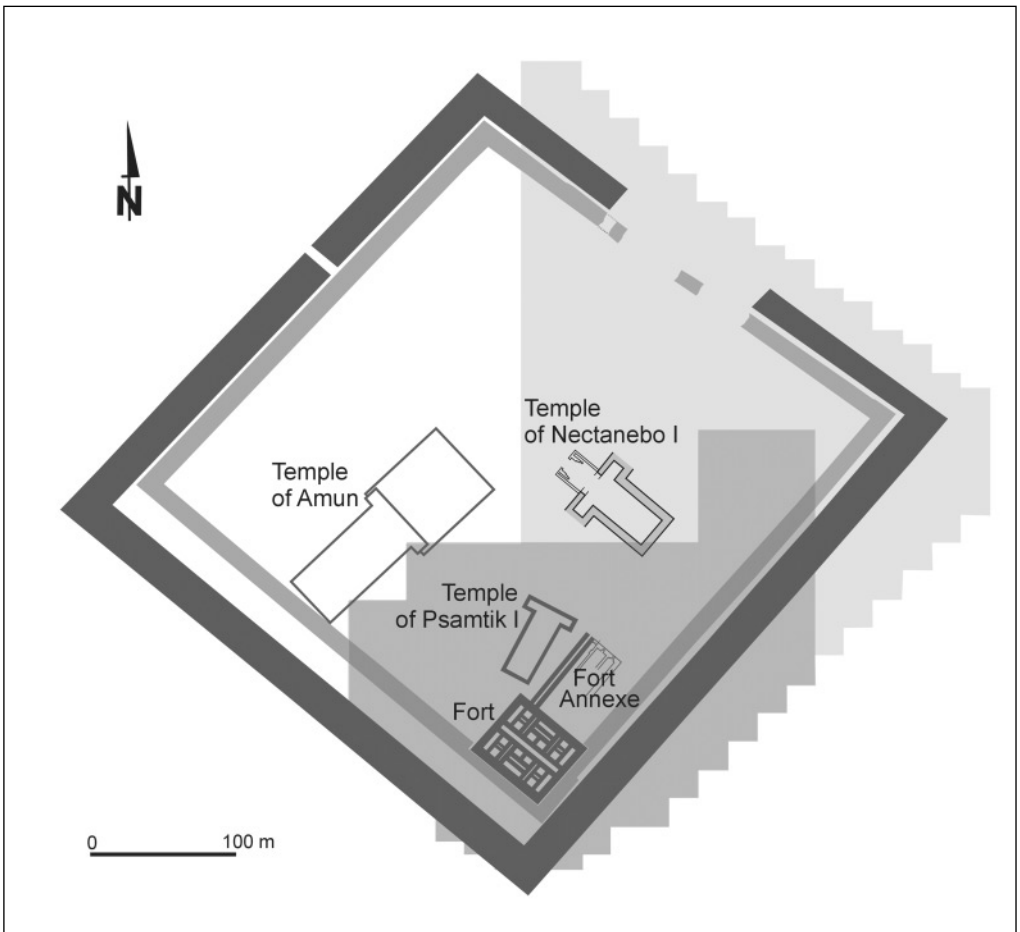


Fig. 1. *Tell el-Balamun, the great temple enclosure. In light grey, the enclosure wall of the Twenty-sixth Dynasty; in dark grey, the enclosure wall of the Thirtieth Dynasty. In transparent dark grey, the area of the magnetic survey in 2005; in transparent light grey, the area of the magnetic survey in 2006 (Prepared by T. Herbich)*

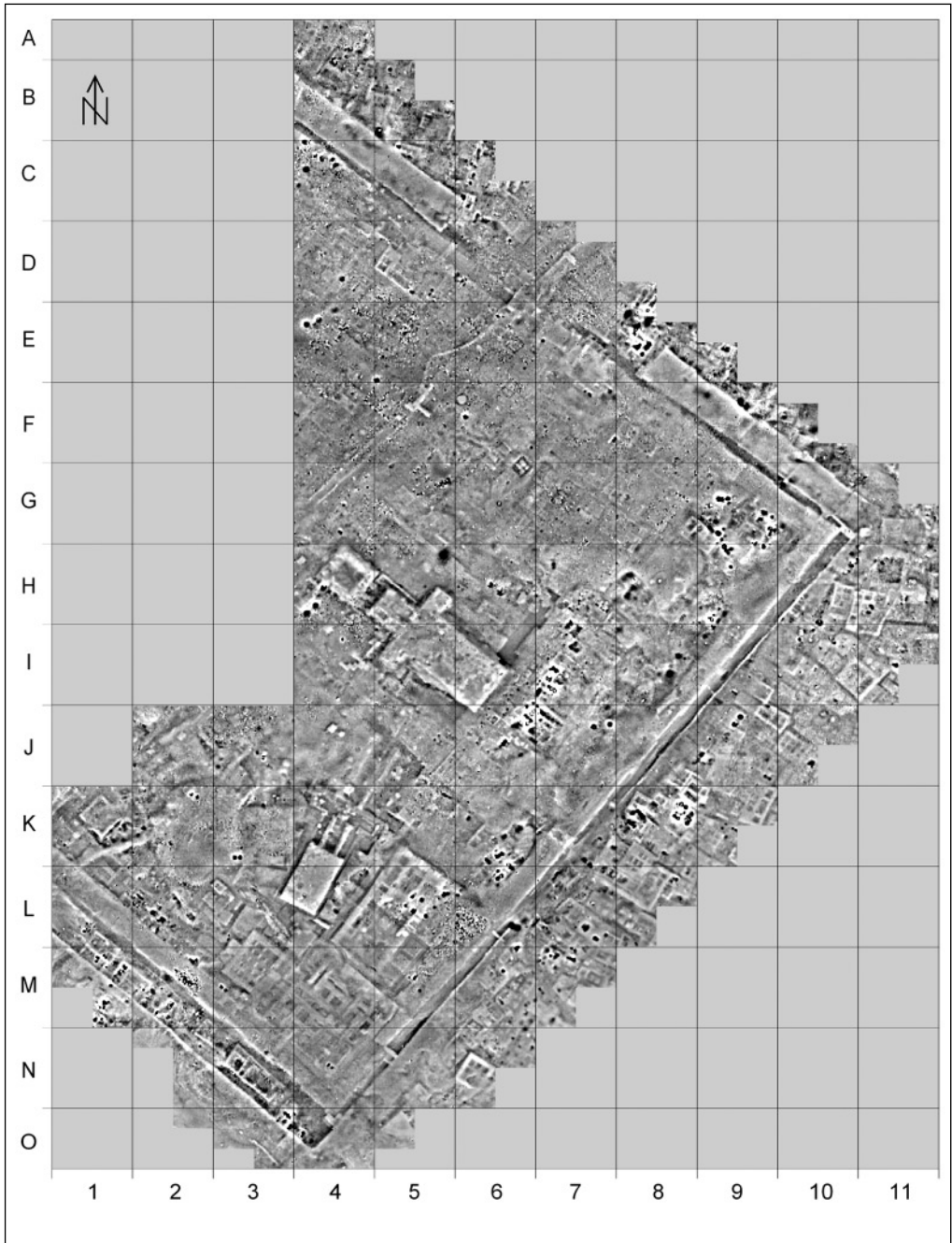


Fig. 2. Magnetic map of Tell el-Balamun. Fluxgate Geoscan Research FM36 gradiometers. Sampling grid 0.25 by 0.50 m, interpolated to 0.25 m by 0.25 m. Dynamics  $-9$  nT (white)/ $+16$  nT (black). Grid lines every 40 m (Processing T. Herbich)

in units 20 m by 10 m. The results were presented as greyscale magnetic maps, i.e., maps of changes of intensity in the Earth's magnetic field [Figs 2, 3].

The mapping revealed a significant amount of new data about the site. In the northeastern part of the surveyed area, valuable information was produced about

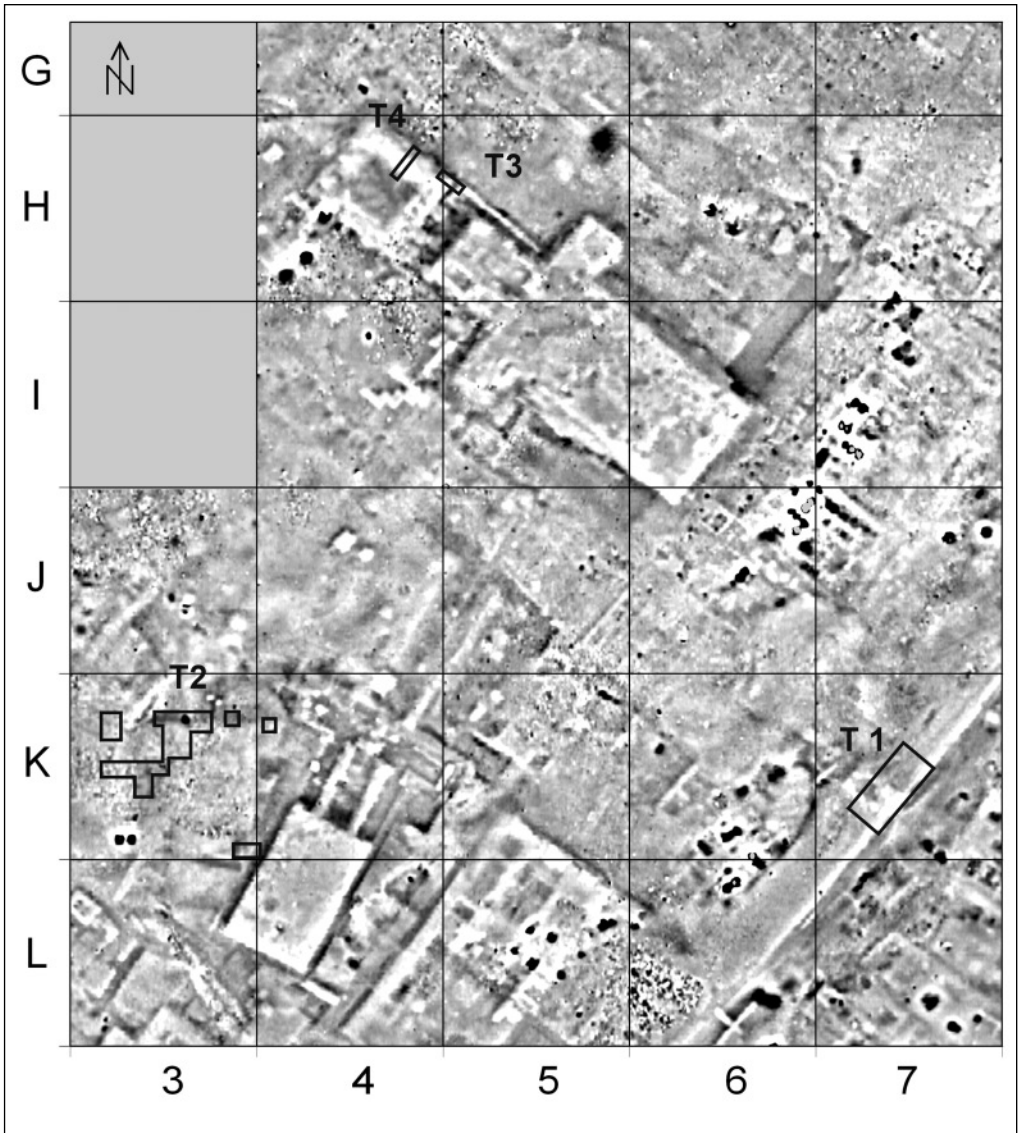


Fig. 3. Magnetic map of the area of the temples of Psamtik and Nectanebo and the location of trenches. Dynamics  $-5 \text{ nT}$  (white)/ $+17 \text{ nT}$  (black). Grid lines every 40 m (Prepared by T. Herbich and A.J. Spencer)

the outer enclosure wall from the Thirtieth Dynasty. Corresponding to this wall on the magnetic map is an anomaly 16 to 18 m wide, characterized by stable magnetic field intensity values; it can be traced between the western edge of B4 and the western edge of G11 [cf. *Fig. 2*]. The clarity of the anomaly indicates that in this section of the wall, the structure at the shallowest point is preserved to a depth of at least 1-2 m. This is in keeping with the lie of the ground, because in the northeastern part the wall runs up a slope (the height of the kom at the northern corner of the enclosure is c. 6 m higher than at the eastern corner). The measurements have confirmed an observation made in 2005 that the southeastern section of the wall is completely eroded. The only evidence of its existence is a line on the magnetic map corresponding to the inner wall face, observed between G10 and O4.

The map confirmed the existence of a gap c. 120 m long in the outer enclosure wall, observed earlier during fieldwalking of the area (between the northwestern corner of D6 and the middle of E8). The image of the wall is so clear that in some parts individual brick sections clearly appear on the scan with alternate projecting panels visible (best between F9 and G10). These sections measure 30 m in length, the projecting panels being c. 18 m long and the receded ones 12 m. The map also helps to reconstruct the run of the northeastern section of the inner enclosure wall from the Twenty-sixth Dynasty. Its width is variable: c. 12 m by the eastern corner of the enclosure (in G9-10), narrowing to c. 8 m by the gap in the wall of the Thirtieth Dynasty (between the southwestern corner of C5 and E7). The continuity of this wall appears to be broken only in one place, where there was

a gate later overbuilt by a Roman road above the former temple axis. The latter road has been mapped for close to 200 m (between the western edge of G4 and the northern edge of D7). Its existence was recorded in earlier excavations (Spencer 2005: 233-241).

The map outlines precisely the perimeter of the sand-filled foundation of the subsidiary temple of Nectanebo I, traced during earlier excavations (Spencer 1996: 43-45, Pl. 19), as well as an entirely unknown structure directly in front of the temple. The latter structure is a square-shaped anomaly noted in H4, the sides equaling c. 22 m. The distinctly lower values of magnetic field intensity as compared to the surroundings suggested that the anomaly corresponded to either a sand-filled foundation trench (up to c. 5-6 m wide) or a wall of the same width, constructed of stone devoid of magnetic properties, like limestone or sandstone. Immediate testing verified that the feature corresponding to the anomaly is built of limestone blocks (see below). No trace of a stone masonry building had been visible on the surface in this spot.

The survey has also mapped previously unidentified structures both to the southwest and the northeast of the Nectanebo temple. The area to the northeast is characterized by fairly stable values of the magnetic field; on the southeast it is cut off by a long anomaly, which is c. 7 m wide, demonstrating slightly higher values than the surroundings (seen between the center of I6 and the southwestern corner of H7). The shape of the anomaly, as well as of the two extensions visible on the southeastern side, suggest that it images the remains of a wall with buttresses. The anomaly touches upon the northeastern edge of the temple of Nectanebo and appears to run on directly to the southwest

of the temple where it takes a sharp turn at right angles and continues parallel with the side of the temple toward the northwest (the corner of the wall would apparently be located in the northwestern corner of J6 and the northeastern corner of J5).

A compact suburb of Ptolemaic houses was identified in the northeastern part of the sacred area, southeast of the Roman road.<sup>2</sup> The magnetic map provides data for reconstructing the street grid in this district. Buildings (of unknown date, but with the same orientation as structures from the Ptolemaic period) can be seen also to the northwest of the Roman road (this is particularly clear in D5 and F4). Narrow linear anomalies of high amplitude on an orthogonal plan and featuring the same orientation as the neighboring buildings have been mapped between the road and the building in the northeastern corner of F4. They could correspond to shallow-lying drain pipes of clay (known from other parts of the site, cf. Spencer 1996: 14, Pl. 7) or, but less likely, to narrow partition walls constructed of baked brick.

More substantial buildings were mapped on the exterior of the southeast side of the enclosure, including several large cellular platforms of mud brick, which are more likely to have been the foundations for official buildings rather than ordinary houses. These probably belong to the Saite Period, since they lie just below the level of the eroded enclosure wall of the Thirtieth Dynasty. Architectural remains can also be seen to

the northeast of the outer enclosure wall (but not opposite the passage in the outer wall, mapped between C6 and D8).

A series of oval high-amplitude anomalies, from 2 to 3 m across, correspond to furnaces; concentrations of these are potential evidence for the industrial character of production. The biggest concentration has been noted in the eastern corner of the sacred area (in G9, northern part of H9). At least five furnaces can be pinpointed in the northwestern corner of C4. The concentration in the eastern corner of the enclosure is adjacent to the wall of the Twenty-sixth Dynasty, while the C4 concentration is superimposed on the line of this wall (this stretch of the wall is not reflected on the magnetic map). This should be read as indicating an earlier date for the concentration in the eastern corner as compared to that in C4. Single or double furnaces can be seen in H4, H6, E4, D4, E5, F6, F7. They can also be observed at the northeastern edge of the gap in the wall of the Thirtieth Dynasty (in C6) and on the outside of this wall, to the northeast of the enclosure. Slag on the surface corresponds to images of furnaces in H6, E4 and C4; nothing on the ground can speak for the presence of furnaces in H4 and in G9 and H9, as well as F6. From the shape of groups of high-amplitude anomalies in E8 (and D8) it is to be presumed that they are a reflection of concentrations of ashes and slag filling a room (outlines approximating a rectangle). They could constitute evidence of a workshop of some kind (metal production?).

2 One house in this suburb was excavated in 1994, see Spencer 1996: 72-73, Pl. 50. The greater clarity of the mapped image of this house (it is to be seen on the border of F6 and G6, cf. Fig. 2) is due to its having been excavated already.

## ARCHAEOLOGICAL TESTING OF STRUCTURES MAPPED IN THE GEOPHYSICAL SURVEY

Excavation of features located by the survey has continued parallel to ongoing geophysical work. Some of these had been found in 2005 and are briefly mentioned in the previous report (Herbich, Spencer 2007). These included a gate in the southeast side of the inner enclosure wall (recorded on the magnetic map in the western part of K7, cf. *Fig. 2*) and a much destroyed temple situated immediately west of the temple of Psamtik I, most of which can be seen in K3 (for proposed exact position, cf. Herbich, Spencer 2007: *Fig. 3* on 121).

### THE GATE IN THE SOUTHEAST SIDE OF THE INNER ENCLOSURE WALL

The existence of the gate, situated about 180 m from the southern corner of the wall, was quickly confirmed by excavation in 2006. The width of the gate was 5.80 m and the brickwork of the southern jamb was intact, with a rebate part-way along its length, where the edge stepped back by a distance of 0.46 m [*Fig. 4*]. The north jamb had been built in a similar fashion, but most of it had been cut away in a later pit [*Fig. 5*]. Between the jambs of the gate was a deep sand-bed, which would have



*Fig. 4. Trench T1/2006. Southern jamb of the gate in the Twenty-sixth Dynasty enclosure wall  
(Photo P. Spencer)*



*Fig. 5. Trench T1/2006. View across the gate in the Twenty-sixth Dynasty enclosure wall, from the northeast  
(Photo P. Spencer)*



served as a foundation for the stone masonry of the gate, all of which had been removed in antiquity. Following the robbing of the stone, the empty axis of the gate became filled with accumulated fill and mud, which hid the remains of the sand-bed. This fill was leveled off at a later period and covered by a thin layer of mud brick, one or two courses thick. It is likely that this brickwork dates from the Thirtieth Dynasty, when a new enclosure wall was constructed outside the older one. To the south of the gate, the wall had been cut by a very large pit, probably of Ptolemaic date. The preserved parts of the gate described above lay within about half the thickness of the enclosure wall, all of the inner part having been destroyed by

another large pit, probably associated with Ptolemaic industrial activity in the area. The outlines of both of these pits were visible on the magnetic map.

### TEMPLE OF THE THIRD

#### INTERMEDIATE PERIOD (TEMPLE D)

Part of the small temple revealed by the magnetic mapping of 2005 was investigated briefly in that year, but the monument was studied more fully in 2006. Unlike the other temples of the site, it is oriented facing to the north. Excavation was carried out at the front of the building, where remains of one side of a brick pylon were found to the west of the temple axis [Fig. 6]. The preserved distance from the west end of the pylon to the axis was 15.70 m, indicating a full width across the entire pylon of 31.40 m, equivalent to 60 ancient Egyptian cubits. Unfortunately, tests on the eastern side of the pylon failed to find any preserved remains, the area having been cut by deep pits of later date. In the axis of the pylon there had been a sand-filled foundation within a brick retaining-wall, to act as a foundation for a stone gate. Most of the sand and all of the stone had been removed by ancient quarrying, to leave only small chips of limestone.

In front of the temple pylon was an approach avenue flanked by a pair of screen-walls, which showed on the magnetic map, due the fact that the foundation trenches, the only element from these walls to survive, were filled with sand. The depth of sand in these trenches was not great, extending to just 0.70 m below the ground surface. Only the ends of the trenches close to the pylon were excavated, but the magnetic map shows that they had continued for nearly 20 m to the north (to the southeastern part of J3, cf. Fig. 2, 3). The western trench had cut

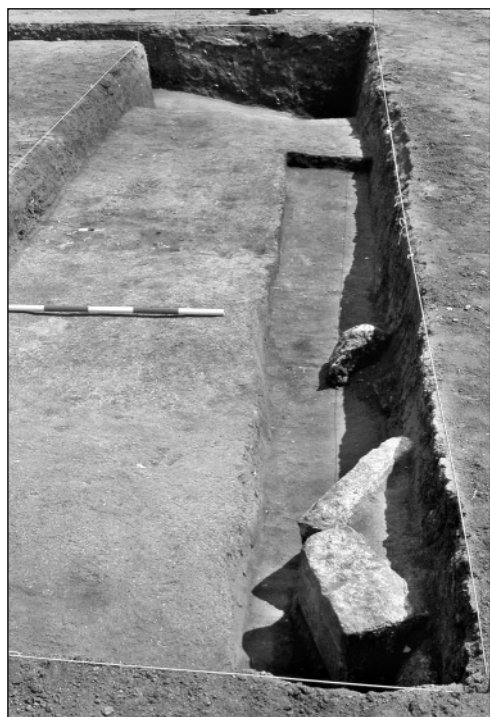


Fig. 6. Trench T2/2006. Rear edge of the brick pylon in the newly-discovered temple (Photo P. Spencer)

through an older oven, situated in the original pre-temple ground in front of the pylon foundation and evident as an oval anomaly of high magnetic values on the magnetic map (in the northeastern part of K3). The width of the avenue between the screen-walls built on these foundation-trenches was 5.30 m, no doubt intended to be 10 cubits.

From the rear of the west side of the pylon, the side wall of the temple, also built of mud brick, extended towards the south. This wall had been founded on a layer of limestone chips, perhaps the remains of an older monument cleared away to make room for the temple. Only a short length of this wall could be traced because it disappeared into a pitted area. A small part of the eastern wall of the building was also identified but part of this had been cut away by the later foundation for the temple of Psamtik I. Unfortunately, attempts to acquire dating evidence about the temple did not meet with great success. The building must pre-date that of Psamtik, because it is cut by the foundation of his adjacent temple, but no foundation deposits were discovered to identify the builder. Some of the ground beside and below the foundation contained Ramesside pottery, but the quantity of sherds was limited and does not permit a very precise dating. The open-pit design of the foundation suggests a date somewhere within the Third Intermediate Period, when there was activity at the site with the construction of a pylon in the main temple of Amun by Sheshonk III (Spencer 1996: 11ff.). Although the remains of the temple were found to be not very well preserved in the excavation, the magnetic map still shows an almost complete outline of its original ground plan, with a length of around 40 m. This shows that disturbance of the ground

caused by the construction and later demolition of the temple has left a measurable magnetic trace.

#### STONE BUILDING IN FRONT OF THE NECTANEBO I TEMPLE

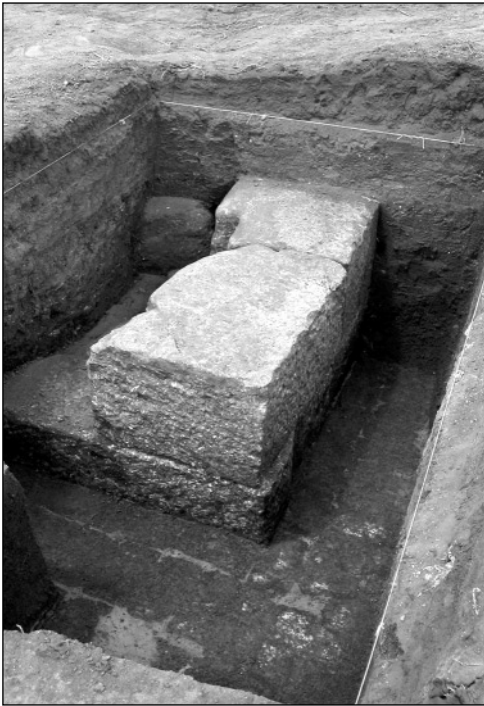
Trial-excavations conducted in 2006, immediately after discovering the structure, revealed the east corner and part of the northeast wall of a monument composed of limestone blocks. At the east corner, the remaining masonry consisted of two large and fairly rough blocks of an upper course from the northeast face of the wall, with a lower course of four blocks below [*Fig. 7*]. Much of the stone had been removed from the building in antiquity, particularly from the inner side of the wall, and the presence of several nearby kilns suggests that lime-burning was a major cause of the destruction. No decoration was present on the masonry and the surfaces of the blocks were only dressed to moderate smoothness. The magnetic scan suggests that the entrance to the building consisted of an access ramp at in the middle of the northwestern side, so all the masonry so far discovered probably belonged to a podium. The wall had been built in a foundation-trench, cut from a level 0.90 m below the top of the upper blocks, and filled with mud bricks bedded in sand. The level of this trench is deep below that of the floor of the nearby temple of Nectanebo I and it is clear that the two monuments are of different periods.

A second excavation-trench on this building was situated 6 m further to the northwest and, like the excavation at the corner, it revealed the stone-robbers' trench with some remaining masonry below it [*Fig. 8*]. Three blocks from the upper course were found, but they had all been displaced from their original

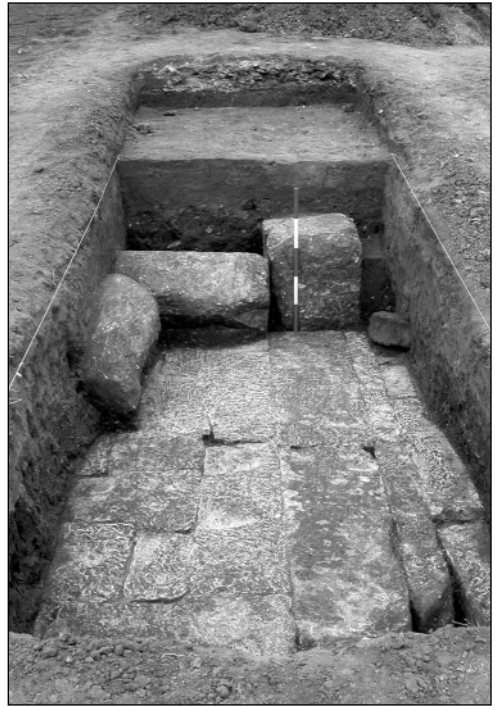
positions and left lying at various angles, embedded in the surface mud. The lower course of white limestone blocks was relatively intact and the thickness of the wall was measured as 3.68 m. All the remains were buried only by a relatively recent deposit of water-laid mud, brought in by the winter rains and completely lacking any archaeological material.

The location of this monument is of interest not because of its proximity to the temple of Nectanebo, with which it has no connection, but because it stands close to the site of the Ramesside pylon of the temple of Amun. It is situated immedi-

ately to the right side of this pylon just outside the front of the New Kingdom temple, in the traditional location of a bark-station chapel and probably served as such a monument. The square plan would certainly agree with this possibility. If it was a bark-station, it would have been the precursor of the nearby subsidiary temple of Nectanebo I, which fulfilled the same function for the Amun-temple in the Thirtieth Dynasty. Work on the building will be continued in 2007 to examine the remainder of its perimeter and attempt to establish its date and function more precisely.



*Fig. 7. Trench T3/2006. East corner of the stone building  
(Photo P. Spencer)*



*Fig. 8. Trench T4/2006. Masonry in the northeast wall of the stone building  
(Photo P. Spencer)*

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