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# TELL EL-BALAMUN

## GEOPHYSICAL AND ARCHAEOLOGICAL SURVEY, 2005

Tomasz Herbich, A. Jeffrey Spencer

*The British Museum expedition has been working at Tell el-Balamun in the northern Delta since 1991. Two temple enclosure walls of the Twenty-Sixth and Thirtieth Dynasties, the main temple of Amun, subsidiary temples of Nectanebo I and Psamtik I, the Fort and its Annex and Ptolemaic houses are the main features excavated and recorded by the expedition.<sup>1</sup> The size of the complex (approx. 420 by 450 m) did not allow for its exploration by regular digging; this led the director of excavations, Jeffrey Spencer, to consider a geophysical survey as a means of recording the site.*

*The geophysical survey in Tell el-Balamun is a joint project of the British Museum and the Polish Center of Mediterranean Archaeology of Warsaw University and will be completed by 2007. The whole area of the temple enclosure will be investigated. The geophysical survey was carried out by Tomasz Herbich with the assistance of Dawid Świąch.*

1 A. Jeffrey Spencer, *Tell el Balamun*, vols 1-3 (London 1996-2001).

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The southern part of the great temple enclosure at Tell el-Balamun was surveyed during the first season of magnetic prospection in April 2005. Research in the past decade in Qantir,<sup>2</sup> Tell Farkha,<sup>3</sup> Tell Daba,<sup>4</sup> Buto<sup>5</sup> and Sais<sup>6</sup> has demonstrated the efficiency of this geophysical method in surveying archaeological sites in the Delta.

The present prospection was carried out in units 20 by 10 m, covering a total area of 6.3 ha. Geoscan Research FM-36 gradiometers were used for measurements taken in parallel mode (instrument moving in one direction only), every 0.25 m along lines traced 0.50 m apart, the sampling grid being 0.50 by 0.25 m.<sup>7</sup> The results were presented as grayscale maps of changes in the intensity of the Earth's magnetic field.

The survey included areas in which monuments had been detected by excavation in previous seasons, as well as regions which had never been investigated [Fig. 1]. Consequently, in addition to providing

confirmation of the position of structures previously excavated and mapped by the British Museum expedition, the survey also revealed the presence of many additional buildings the existence of which had been totally unknown. The most substantial features in the former group were the two temple enclosure walls of the Twenty-Sixth and Thirtieth Dynasties, running parallel to one another only a small distance apart. Owing to the extent of these walls, the excavation of their full perimeter was impossible, but the magnetic map revealed some new details in areas previously not examined. The inner wall, of Twenty-Sixth Dynasty date, is better preserved [Fig. 2], although the most distinctive feature on the magnetic map is the space between the walls, characterized by higher values of intensity of the magnetic field due to the presence of ashes, burned soil etc. In the southwestern section of the inner wall (between the southwestern corner of D1 and the southern edge of G4), the survey has

- 2 H. Becker, J.W. Fassbinder, "In search of Pirameses - the lost capital of Ramesses II in the Nile Delta (Egypt) by caesium magnetometry", in: J. Fassbinder and W. Irlinger (eds), *Archaeological Prospection. Third International Conference on Archaeological Prospection, Arbeitshefte des Bayerischen Landesamtes für Denkmalpflege* 108 (1999), 146-150.
- 3 M. Chłodnicki, K. Ciałowicz, R. Abłamowicz, T. Herbich, M. Jórdeczka, M. Jucha, J. Kabaciński, A. Mączyńska, "Tell el-Farkha seasons 1998-1999. Preliminary report", *MDAIK* 58 (2002), 116-117, Pl. 14.
- 4 T. Herbich, "Archaeological geophysics in Egypt: the Polish contribution", *Archaeologia Polona* 41 (2003), 28-30; M. Bietak, J. Dorner and P. Jánosi, "Ausgrabungen in dem Palastbezirk von Avaris. Vorbericht Tell el-Dab'a/Ezbet Helmi 1993-2000", *Ägypten und Levante* 11 (2001), 27-119; I. Forstner-Müller, W. Müller, Ch. Schweitzer and M. Weissl, "Preliminary report on the geophysical survey at 'Ezbet Rushdi/Tell el-Dab'a in spring 2004", *Ägypten und Levante* 14 (2004), 101-109.
- 5 U. Hartung, P. Ballet, F. Béguin, J. Bourriau, P. French, T. Herbich, P. Kopp, G. Lecuyot, A. Schmitt, "Tell el-Farain-Buto", *MDAIK* 59 (2003), 199-267.
- 6 D. Hale, P. Wilson, "Geomagnetic surveys at Sais, Sa el-Hagar, western Delta, Egypt", *Archaeologia Polona* 41 (2003), 185-188.
- 7 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 cooperation agreement with the Polish Centre of Mediterranean Archaeology of Warsaw University.

confirmed that the wall was built as separate panels of brickwork. In the EW section of the wall, there is a gate approximately 180 m from the south corner (in the western part of square D7). The outer wall (from the Thirtieth Dynasty) has been eroded away

and only the inner face of the wall was well recorded by the survey. The magnetic map clearly showed the older structures which had preceded the wall, arranged along the exterior of the Twenty-Sixth Dynasty enclosure. Many of these buildings (e.g., in

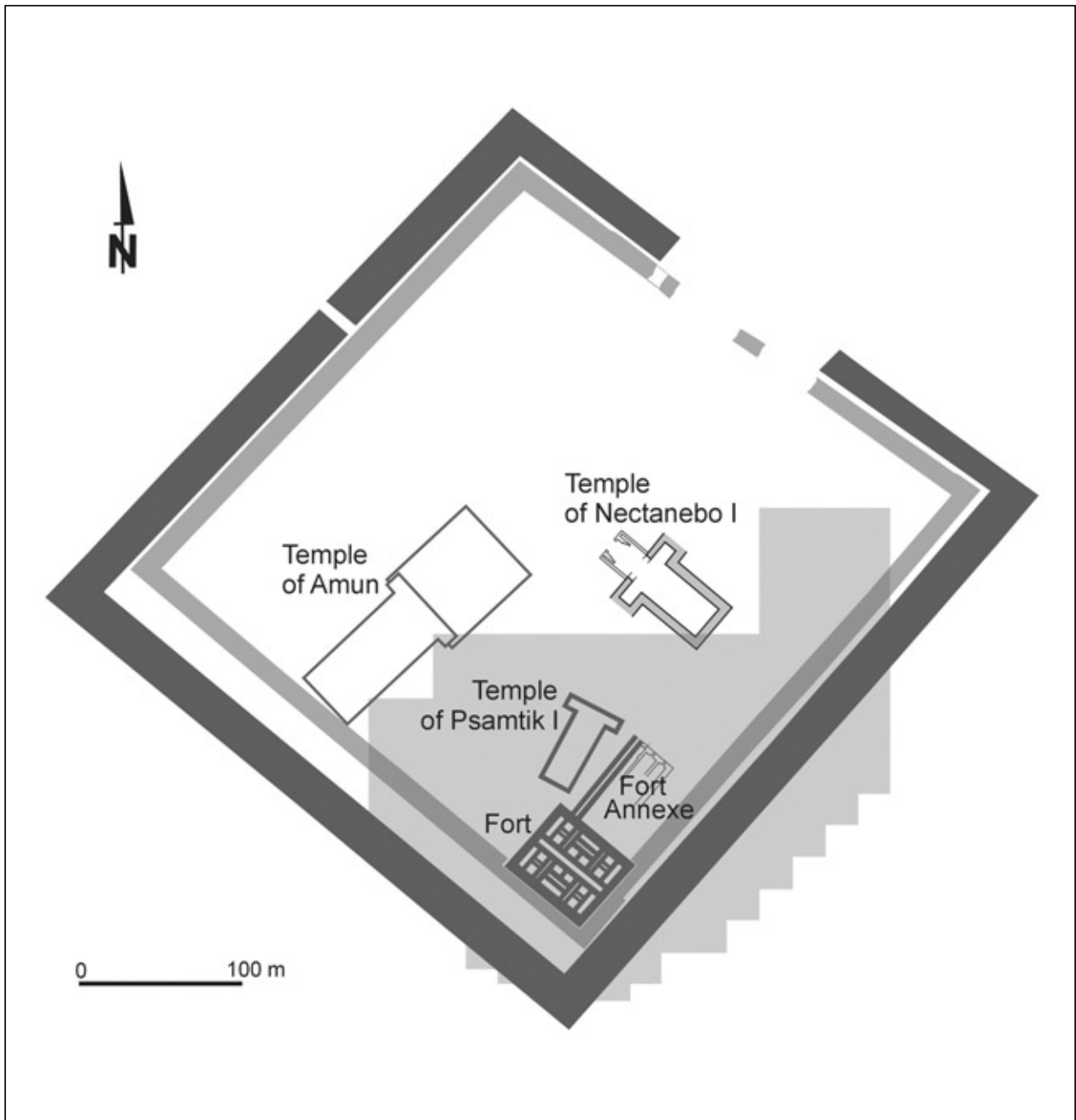


Fig. 1. *Tell el-Balamun, the great temple enclosure: wall of the Twenty-Sixth Dynasty in light grey, of the Thirtieth Dynasty in dark grey. Area of magnetic scanning shown in transparent gray (Prepared by T. Herbich)*

G6, E7-E8, D8) possess substantial cellular foundations and they were clearly official structures.

In the small temple of Psamtik I, the survey showed two parallel lines (linear anomalies of lower values of intensity of the magnetic field, in the centre of D4) linking the front pylon of the temple to the naos

area. This pattern was reminiscent of the architecture of the main temple of Amun, where there was a colonnaded approach behind the Saite pylon.

Two small test trenches were excavated in the temple to investigate whether the anomalies were caused by the presence of foundation-trenches [Fig. 3]. Revealed in

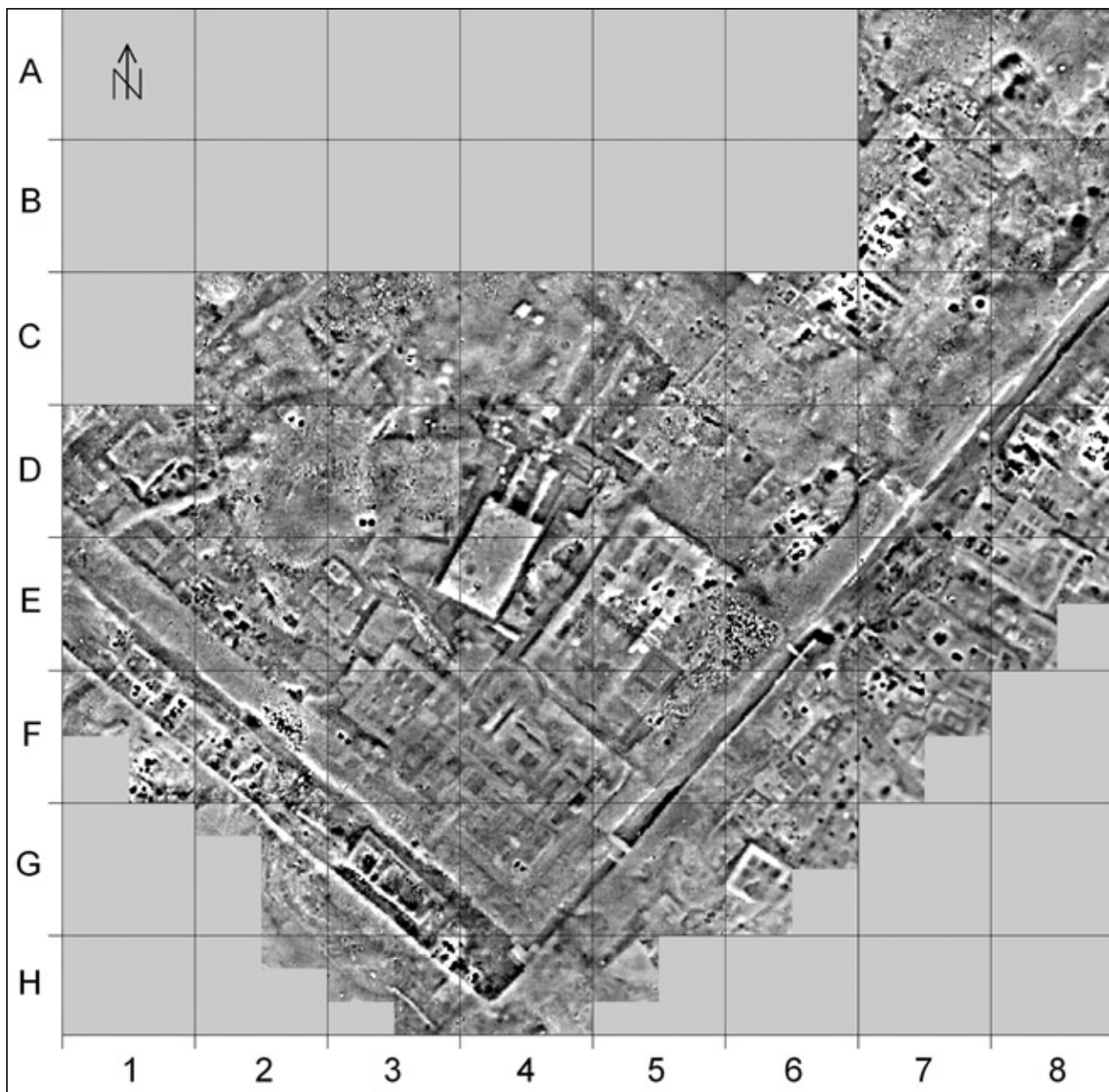


Fig. 2. Magnetic map of Tell el-Balamun. Fluxgate gradiometers Geoscan Research FM36. Sampling grid 0.25 m by 0.50 m, interpolated to 0.25 m by 0.25 m. Dynamics  $-8.7$  nT (white)/  $+15.4$  nT (black). Grid lines every 40 m (Processing T. Herbich)



each testing were the remains of a foundation-trench for one side of a corridor-like approach, which was probably colonnaded originally. Although the original

masonry of the foundations had been robbed out in antiquity, the location of the trench was quite clear from it having been refilled with mixed debris and mud, and the original

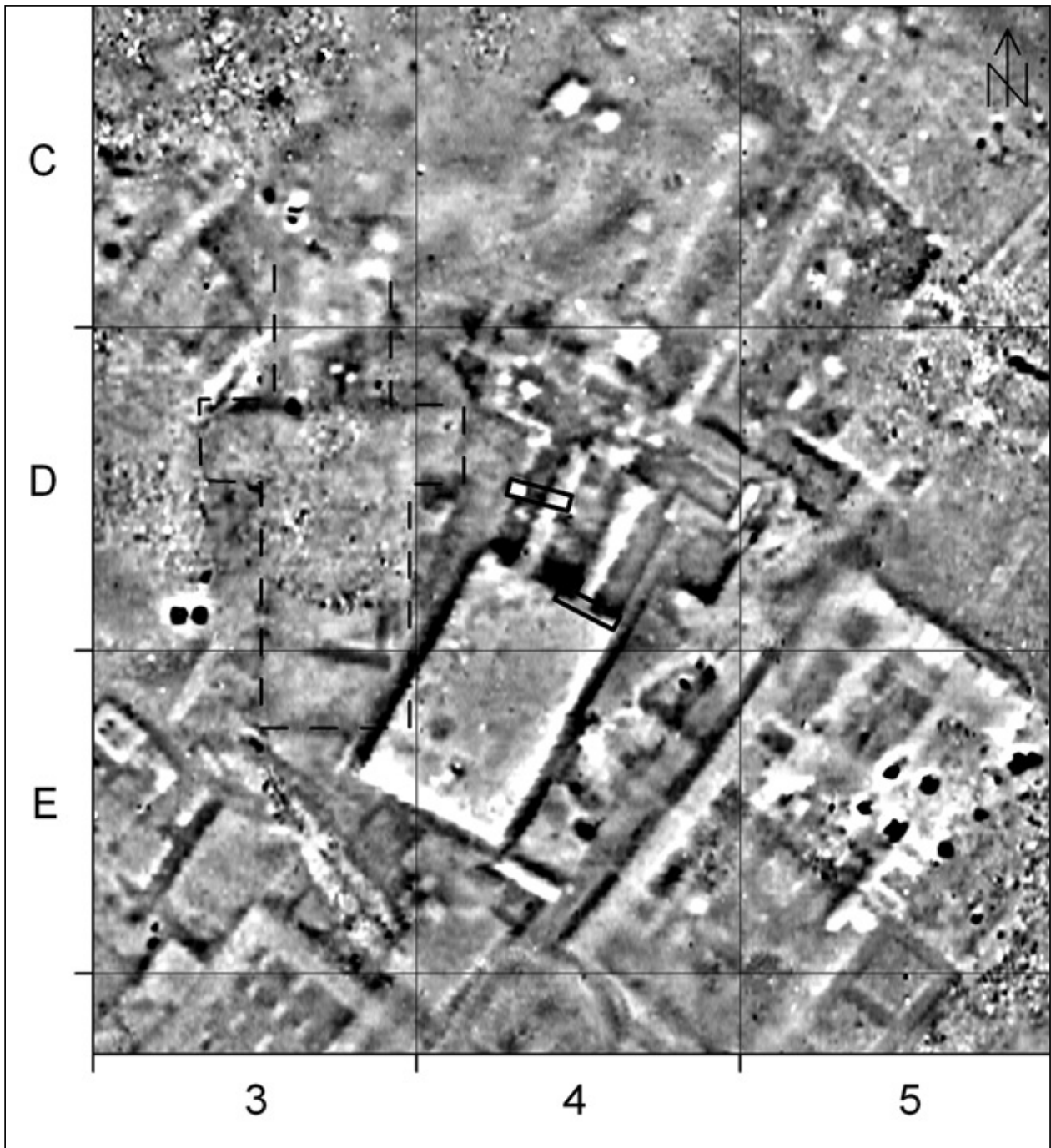


Fig. 3. Magnetic map of the area of the temple of Psamtik and location of test trenches. Dashed line marks the outline of a new temple. Dynamics -8 nT (white) / +15 nT (black). Grid lines every 40 m (Processing T. Herbich)

cut into the pre-temple ground was also evident. The southern test trench detected the beginning of the eastern foundation trench and the boundary between the sand filling of the naos area and that used in the front part of the temple [Fig. 4]. These two areas, each characterized by different values of the magnetic field, proved to contain different types of filling: yellow sand in the naos (of low values) and more compact dark, greenish sand at the front (of high values). In the design of the foundation, the yellow sand in the naos had been kept in place during construction by leaving a section of the original earth between the two colonnade-trenches, as a barrier between the front and rear parts of the foundation. At the sides,

between the colonnade trenches and the sides of the temple, the same effect had been achieved by constructing retaining walls of mud brick. The boundaries of the different features in the ground agreed well with the information provided by magnetic scanning.

The approach to the temple of Psamtik proved to be more elaborate than previously supposed. Two parallel anomalies of lower value of the magnetic field's intensity showed up in front of the pylon (eastern part of C4, western part of C5, northeastern corner of D4, cf. Figs 2,3). They appear to have been structures lining the sides of a processional way leading to the temple. A test trench made in 1993 had actually intercepted the western feature, but all that

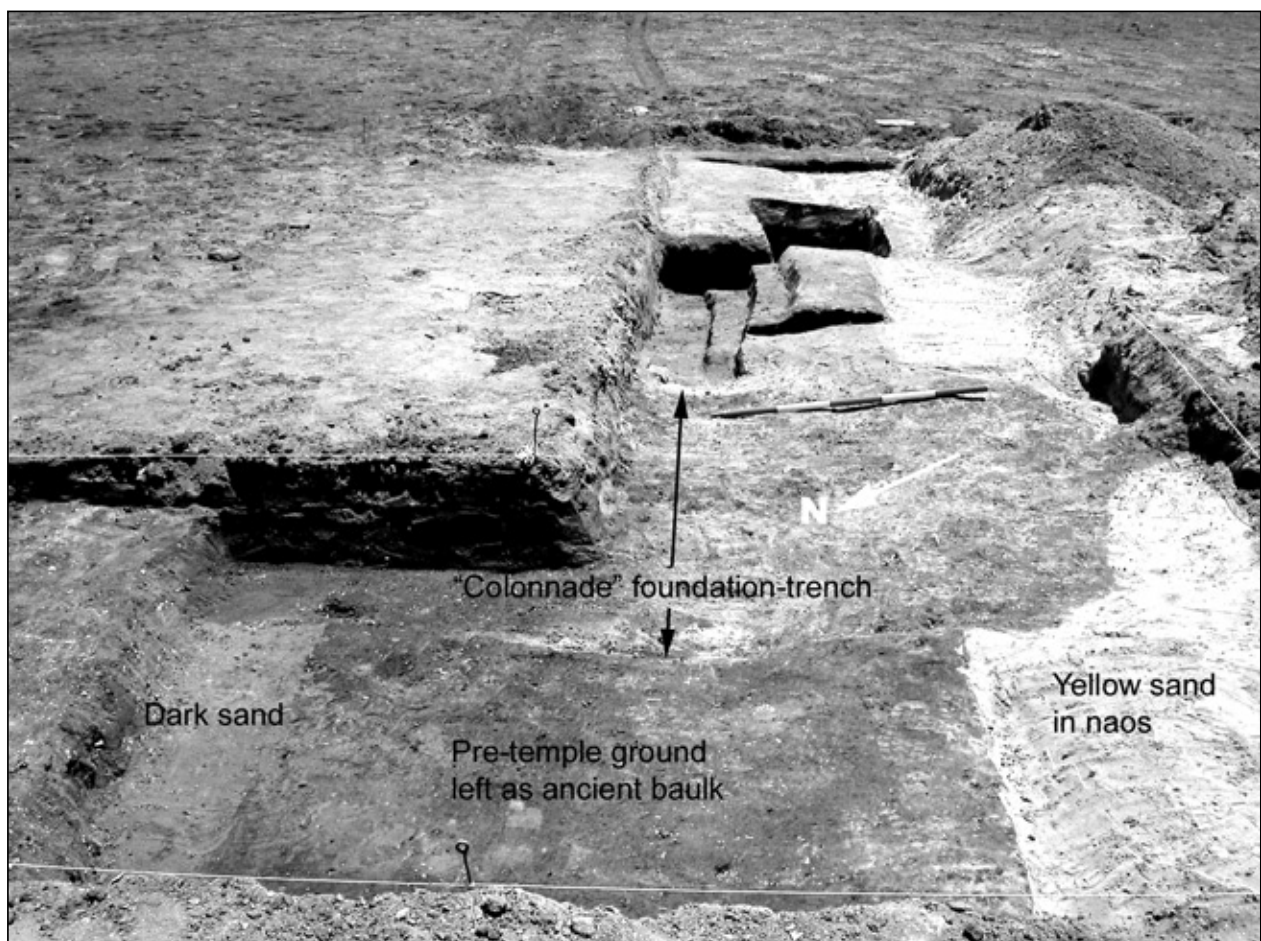


Fig. 4. Tell el-Balamun, 2005 excavation. Southern test trench, seen from the northwest (Photo P. Spencer)

was found in the small area excavated was some broken limestone and, without the advantage of the magnetic plan, there was no way to interpret the significance of it. The magnetic result suggests that the stone debris may have been part of a stone-built avenue or similar construction. If so, this approach appears to end in the area to the west of the gate detected by the magnetic survey in the inner enclosure wall. The end of the avenue is marked by an anomaly of slightly higher magnetic values (in C5) with an orientation rotated about 12 degrees east relative to the pylon of the temple of Psamtik, but the nature of this needs further investigation.

To the west of the small temple of Psamtik the magnetic map revealed the outline of an earlier temple [cf. *Fig. 3*]. Although the date of this building has not yet been confirmed, it must be older than the temple of Psamtik, since the foundation of the latter monument cut through the rear part. The magnetic map shows the usual outline of a temple with a wide front pylon and narrower naos, and also indicates that the pylon was approached by some kind of avenue. Three trenches were excavated to a shallow depth to check whether the position of the foundation of this temple could be confirmed. This work revealed the different phases of construction in the area, beginning with the interior of the foundation pit of the Psamtik temple, with some of the remaining sand filling, retained by a mud-brick wall, 2.34 m thick. Beyond this for some 0.90 m was a band of fill which marked the extent of the original cut made in creating the foundation for the Psamtik temple, then further west the edge of the foundation of this older temple, revetted with mud brick and aligned approximately north-south. In the small excavation there was insufficient pottery to permit an

attempt at dating the temple substructure, so this area will require more investigation in the next season.

Other areas of the survey produced evidence for many mud-brick structures and for industrial areas with pottery kilns or similar manufacturing facilities. A number of industrial features, such as kilns (marked by anomalies of oval shape, of high values of intensity of the magnetic field, recorded in C6, C7, B7, cf. *Fig. 2*) lies to the east of the small temple of Nectanebo I. An industrial zone seems also to have developed between the two enclosure walls on the southwest side, where a series of buildings is visible, accompanied by kilns or similar structures (in F1, F2, G3, northeastern corner of H3). The alignment of these buildings between the walls suggests that this part of the Saite wall was still standing to some height even after the construction of the Thirtieth-Dynasty enclosure. This would agree with the modern contours of the ground, where both walls on this side are embedded in a high ridge of debris.

In some places the magnetic map shows evidence of structures on multiple levels as, for example, in the building described as the Fort Annex, excavated by the expedition in 1993. At the time of excavation, the detection of the southern part of this building proved very difficult. The magnetic scan now reveals that this part was completely overbuilt by a later structure of rectangular shape, with its longer dimension aligned from the north-west to the south-east (southeastern corner of E4, southwestern corner of E5, northwestern corner of F5 and northeastern corner of F4; cf. *Fig. 2*). The presence of this second level of building has proved far simpler to detect on the magnetic scan than through actual excavation, and again shows the value of magnetic scanning as preliminary to other fieldwork.