MAGNETIC SURVEY AT TELL TABILLA, NORTHEASTERN NILE DELTA, EGYPT

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Abstract

A proton magnetometer survey was recently carried out at the archaeological site of Tell Tabilla. The site is a large mound located in the northeastern Nile Delta of Egypt which would appear to have been occupied from the Old Kingdom period until the Late Periods (Dynasties 4-30). Excavation was conducted in 1908 and 1910, and some salvage excavation had to be carried out (1995) on the site's northwestern perimeter due to the recent construction of a water treatment plant. As a precursor to the planned excavations, a magnetic survey was carried out on two portions of the remaining mound which once measured 400 m x 400 m; but which is now much reduced to a 'J' shaped configuration facing to the North of 385 m x 300 m. Two grids were set out. The largest on the stem of the 'J' and running North-South was 250 m (N-S) and 100 m (E-W). Line spacing was 5 meters and stations spacing was 1 metre. The second grid was 25 m x 25 m and was placed on the 'hook' of the 'J'. Line spacing was 2 metres and station spacing was 1 metre. The GSM-19T magnetometers (mobile and base station) from Gem Systems, Richmond Hill, Ontario, Canada generated data corrected for diurnal fluctuations in the earth's magnetic field. These data were plotted using standards contour and imaging software packages. Results suggest a substantial amount of subsurface architecture still exists at the site below surface. These geophysical targets will be integrated into the planning for future research oriented excavation objectives.

Résumé

Un relevé au magnétomètre à protons a été effectué récemment au site archéologique du tell Tabilla. Ce site, qui est un gros tumulus situé dans le Nord-Est du delta du Nil, en Égypte, semble avoir été occupé de l'Ancien Empire jusqu'aux périodes plus récentes (de la 4e à la 30e dynastie). Des fouilles y ont eu lieu en 1908 et en 1910, et il a fallu en effectuer d'urgence (1995) à la périphérie nord-ouest du site en raison de la construction récente d'une usine de traitement de l'eau. À titre de prélude aux fouilles prévues, on a procédé au relevé magnétique de deux parties du tertre restant qui, s'il mesurait autrefois 400 m sur 400 m, est désormais réduit de beaucoup et forme un J orienté en direction nord qui ne fait plus que 385 m sur 300 m. Deux carrés de fouille ont été établis. Le plus grand, situé sur le jambage du J et orienté nord-sud, avait 250 m (N-S) sur 100 m (E-O). Les lignes étaient espacées de cinq mètres et les stations d'un mètre. Le second carré, de 25 m sur 25 m, se trouvait dans la boucle du J. Les lignes étaient espacées de deux mètres et les stations d'un mètre. Les magnétomètres GSM-19T (station mobile et station de base) de Gem Systems (Richmond Hill (Ontario), Canada) ont engendré des données corrigées en fonction des fluctuations diurnes du champ magnétique terrestre. Ces données ont été reportées sur la carte à l'aide de logiciels de contournage et d'imagiciels standard. Les résultats obtenus portent à conclure qu'il existe encore sur le site, sous la surface, une considérable quantité d'éléments architecturaux souterrains. Ces objectifs géophysiques seront intégrés à l'établissement des objectifs de recherche des fouilles futures.

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Site Location

Tell Tabilla, which is variously known as Tell Balala, Billi, Tell Billeh, Tell Tébilleh, Tell Tibilla, Tell Tiblah, Tell Tibla, Tell el-Débéléh, Tell Debleh, or Tell Tabilla is located at Latitude 31ϒ3' North and Longitude 31ϒ36' East (Daressy 1930:89, map location of "Tell Tebilleh"; Kümmerly and Frey 1989:Map of Egypt). This site is in the province of Daqahliya in the district of el-Dikirnis in the northeast Delta, about 20 kilometres east of el-Mansura and the Damietta branch of the Nile. Although Tell Tabilla does not appear on a 1:25000 scale map of the delta, it is three kilometres South of the town of Dikirnis which appears at grid coordinate 93/660 on the Survey of Egypt 1948 map (van den Brink 1988:314, 321). (See Fig. 1a,b)

Historical Context

The earliest occupation reported from Tell Tabilla dates primarily to the Old Kingdom and First Intermediate Period. Other remains include scarabs of Thutmose III (Dynasty 18; probably late-re-issues), a monument bearing a fragmentary prenomen cartouche best equated with Sheshonq I (Dynasty 22), a late Saite period to early Ptolemaic period statue of Sieset (Dynasties 26-30), and other Late Period remains (Lefebvre 1933:87-90). The extant mound encompasses a greatly diminished necropolis area with mudbrick tombs, and a citadel area with granite blocks and traces of a temple. Blocks from the site and ex-situ monuments in the Cairo Museum and elsewhere provide the name of the temple: H. wt-Ḫzj (H. wt-h3s). Inscriptions from other monuments from Tabilla attest to the presence of other deities, such as Osiris, Osiris-Onnophris, Osiris-ḫzj, Isis, Horus, and Sobek (Malek 1985:39). Although it has been debated in the past (Edgar 1914:278; Gauthier 1925:121-22), most scholars now accept that "the district of Ro-nefer" (R3-nfr; R-nfr) (mentioned in inscriptions from Tell Tabilla) lay within Lower Egyptian Nome XVI in the east delta rather than Lower Egyptian Nome VII in the northwest Delta (Kees 1932:In H. De Meulenaere and P. MacKay, *Mendes II*. 1976: 148-150; Montet 1957:140-41; Kitchen 1986:366, section 328, note 710; Malek 1985:39).

Previous Excavations at Tabilla

Relatively little excavation has been conducted at Tell Tabilla. In 1908 Hossein Abdallah investigated several areas of the ancient necropolis at this site, discovering scarabs of Thutmose III, bronze statuettes of Osiris, a bronze box, a bronze axe, a limestone statuette, and brick tombs containing mummies with terracotta masks (Chaban 1910:28-30). Mohammed Effendi Chaban and M.C.C. Edgar visited Tell Tabilla, and continued the work begun by Abdallah (Chaban 1910:29-30). Chaban recovered a large limestone sarcophagus, two bronze statuettes (Selket; serpent Ramen), a statuette of Osiris, a bead necklace, and several scarabs (Chaban 1910:29-30). Chaban also published a summary of the work begun by Hossein Abdallah, including a hieroglyphic inscription from one of the statuettes discovered in 1908, namely the Commander of Troops and Mayor in Mendes, Osiris-nakht (Chaban 1910:29; Edgar 1914:277; Lefebvre 1933:90-91, note 8). In 1914 M.C.C. Edgar published a report concerning his archaeological discoveries in the Delta, and mentioned the discovery at Tabilla (in 1910 or later?) of a limestone block which bore an inscription from a temple dedicated to Osiris-Khes (Edgar 1914:277-78; Lefebvre 1933:91, note 2). Edgar also mentioned the discovery of a limestone block bearing part of the prenomen cartouche of Sheshonq I?, which was found in the necropolis at Tel Balala [Tabilla] (Edgar 1914:277-78; Porter and Moss 1934:39), and discusses an inscription on a statuette found by Hossein Abdallah in 1908 (Edgar 1914:277-78; Chaban 1910:29-30; Daressy 1930:78-94, 89 map). More recent investigations by the Supreme Council for Antiquities (SCA) have revealed Old Kingdom remains in the necropolis area which occupied the

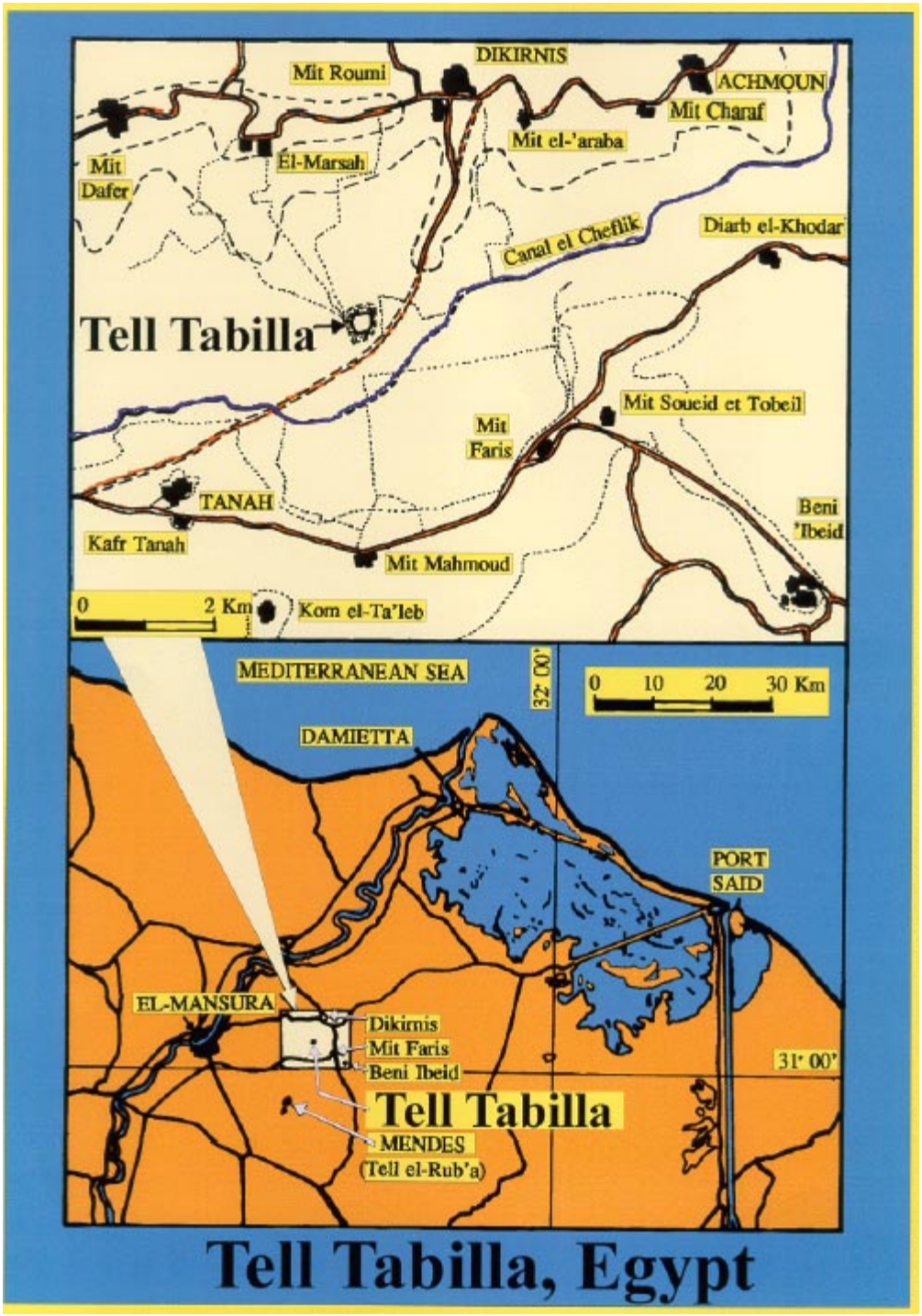

Figure 1a (bottom). General location of Tell Tabilla in the Eastern Nile delta.
Figure 1b (top). Location of Tell Tabilla with respect to the town of Dikirnis.

location of the present-day water plant (Chief Inspector Selim El-Boghdady, personal communication 1995). The 1999 University of Toronto Winter expedition confirmed this observation.

Aside from reports from colleagues who have visited the site as tourists, a search through the Egyptological literature and annual reports of archaeological excavations in Egypt (*Orientalia*, *Nova Series*, 1948-98, vols.17-67; Porter and Moss, 1934:39) has revealed no record of additional archaeological excavation at Tell Tabilla.

An attempt to consolidate the evidence to date from Tabilla reveals the remnants of monumental cultic and mortuary stone architecture across the mound's surface, consisting of pieces of granite, limestone, diorite, and banded alabaster (calcite). The granite pieces are reported to have lain on the surface for several decades and represent both inscribed and uninscribed fragments of a shrine: Wall blocks, a shrine/naos(?) corner, doorway fittings, and possibly worn fragments of statuary. One granite L-shaped piece bore a fragmentary inscription: mry [Pta]h? di ankh ("Beloved of P[tah], given life"). Some granite and limestone pieces bear lines of wedge-shaped indentations indicating dismantling and quarrying of the shrine for other construction purposes dating to the Roman period or later. The limestone pieces associated with this structure include several dozen rectangular, dressed blocks (mainly from the water plant area), a rectangular wall block re-cut with rounded edges (decorated with two kneeling figures), a long U-shaped drain-pipe, a large column base (77 cm. in diameter), and three small column bases (43 cm. in diameter). Votive statuary is represented by three pieces: the headless statue of a mayor of Mendes (originally dedicated or reused at Tabilla) (Yoyotte 1953:180-181), a worn alabaster piece resembling a limb segment, and a headless royal statue with an inscribed back pillar (found recently in the water plant grounds by the SCA and awaiting examination).

Traces of the elite segment of Tabilla's population is reflected through the existence of four limestone sarcophagi removed from the water plant grounds. These containers still contain a clay and silt filling and have rounded head ends. A Late Period diorite sarcophagus, now found at the southern end of the mound, is different in form, being roughly finished along most exterior sides with smoothing only at the head end and top ledges. From reports by local workmen and villagers, it would appear that the shrine lay toward the northern end of the site. This same area yielded limestone wall blocks and column bases both within and outside the water plant compound, and it is hoped sufficient portions of the shrine remain buried to the east of the water plant. The elite sarcophagi reportedly originated from the area immediately south of the shrine's precinct. Further investigation of exposed sections south of the water plant yield traces of burnt mud brick walls, protruding bone fragments, and dense ash layers, possibly indicating the continuation of the necropolis discovered in 1908. The overall dense clay debris covering the mound and noticeable inhibition of vegetation growth indicates the presence and erosion of massive, state-engineered mud brick walling systems. The detrital evidence for a stone temple suggests the significance of Tabilla within the Third Intermediate Period and Late Period governmental and religious infrastructure.

Geotechnical Work

Three mapping activities were carried out at Tell Tabilla prior to undertaking excavations:

1) a topographic map of the extant portions of the site was produced;
2) surface artifact density measurements were made to ascertain the former extent of the site;
3) a magnetometer survey was carried out on a portion of the site thought to have the best potential for substantive subsurface architecture.

Topographic Mapping

The Tell today has been greatly reduced in size by intense agricultural activity in the region which consists of a three and a half crop rotation per year with the summer crop being rice which raises the water table to the surface. The average elevation of the agricultural landsurface in the vicinity of the Tell is approximately 4.25 metres asl. The surface gradient between Tell Tabilla and Tell el Rub'a (or Mendes) to the South suggests that the now extinct Mendesian Branch of the Nile would have had a flow gradient of

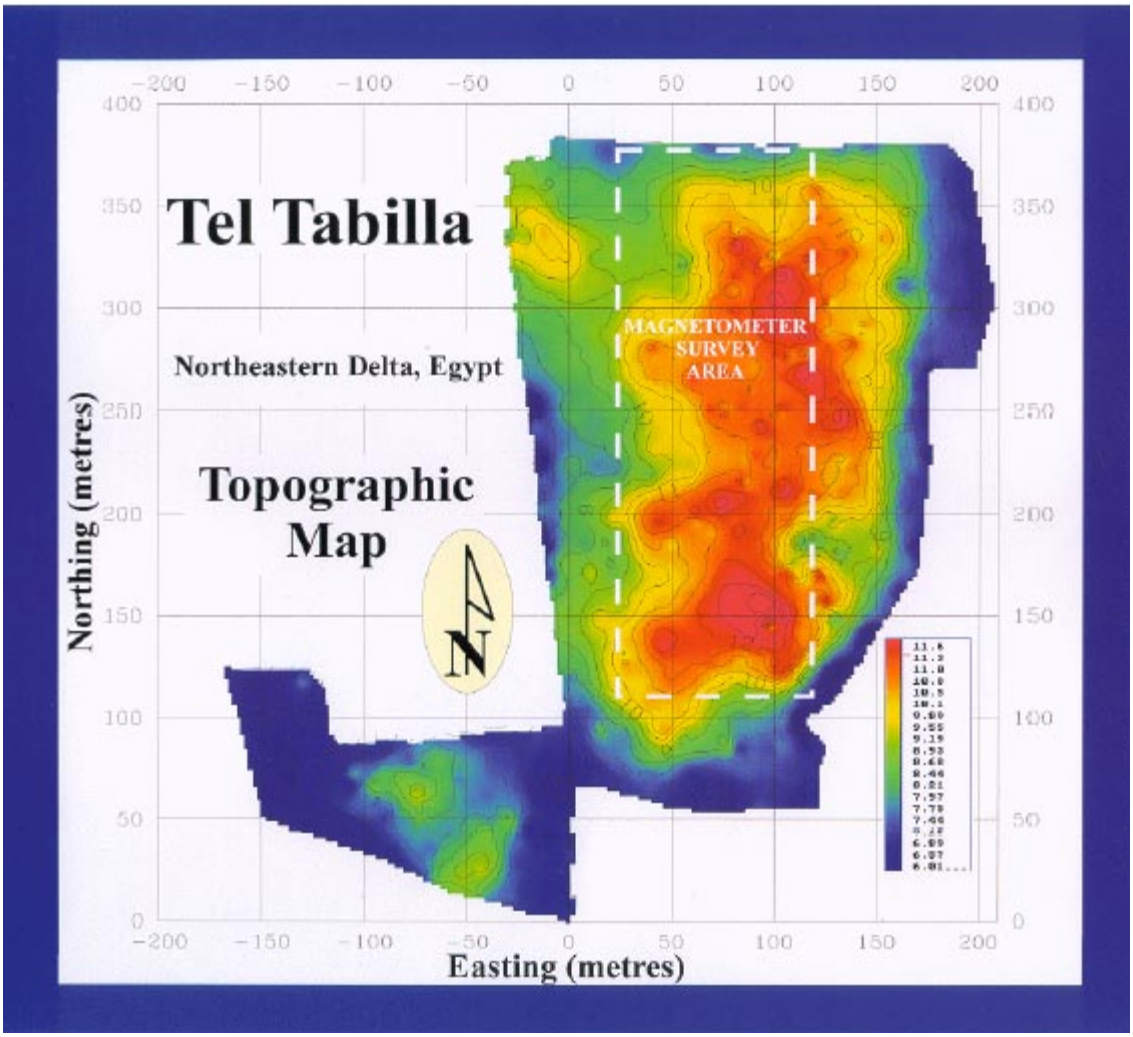

Figure 2. Topographic Map of Tell Tabilla (elevation in metres asl) showing the Magnetometer Survey Area.

less than 1 in 20000. Such a gradient would tend to produce both braided and meandering Mendesian channel components which undoubtedly influenced the degradation and final termination of this branch of the Nile.

The Tell Tabilla remnant rises to an elevation of approximately 13.5 metres above sea level or slightly more than 9 metres above the surrounding countryside. The 'citadel' region of the Tell is a North-South ridge approximately 250 metres in length with a width between 50 and 100 metres. The surface area of the 'citadel' is approximately 1.6 hectares ([16300 square metres] calculated on the arbitrary base elevation of 10.5 metres asl) (Fig. 2)]. The mean elevation of the Tell is 8.9 metres asl with a total surface area of approximately 7 hectares (70350 square metres).

This mound has a 'J'-shape with a maximum North-South extent of 375 metres and a maximum East-West extent of approximately 250 metres. The volume of the Tell above the regional landscape is approximately 266000 cubic metres. The rate of accretion of Nile alluvium in the general region is about 1mm per year. Thus, in many locations at the site, Old Kingdom materials are well below present day landsurface and water table precluding their easy excavation. Sediment coring suggests a possible hiatus in occupation of the site for a period of approximately a millennium following the Old Kingdom.

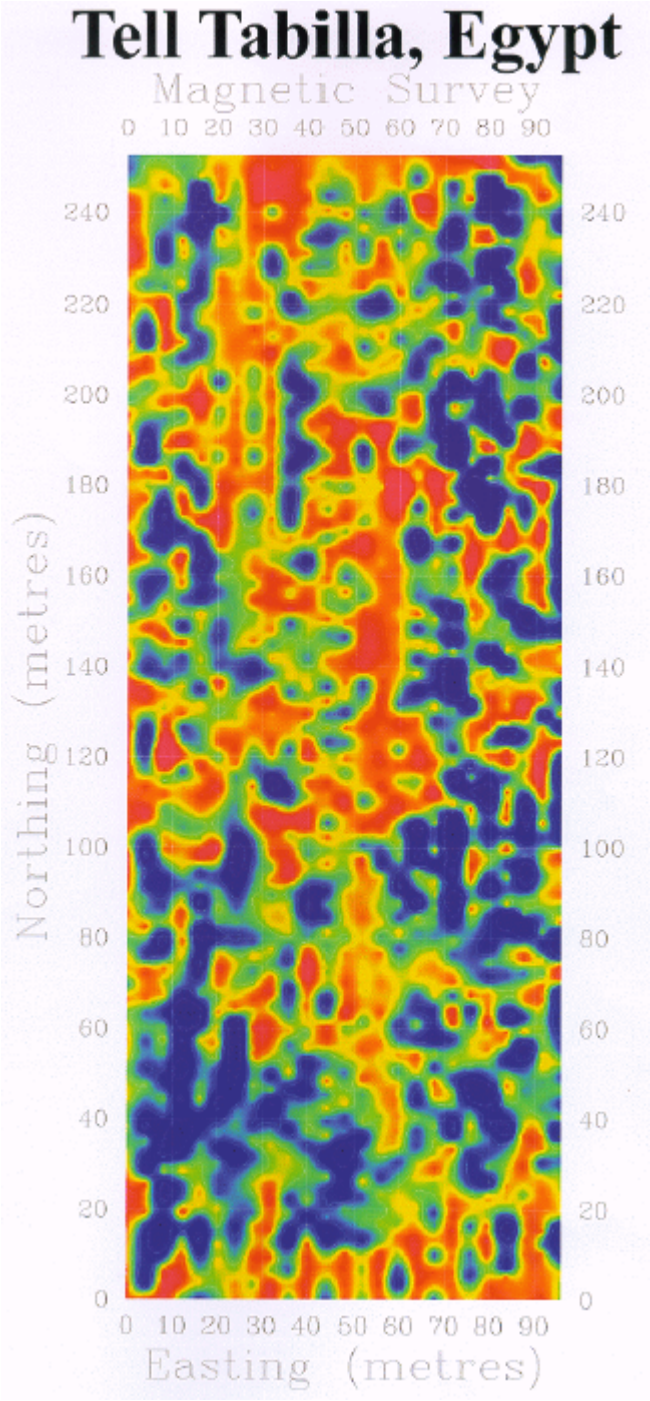

Figure 3. The colour contoured results of the magnetic survey. The red regions are magnetic highs and the blue regions are the magnetic lows.

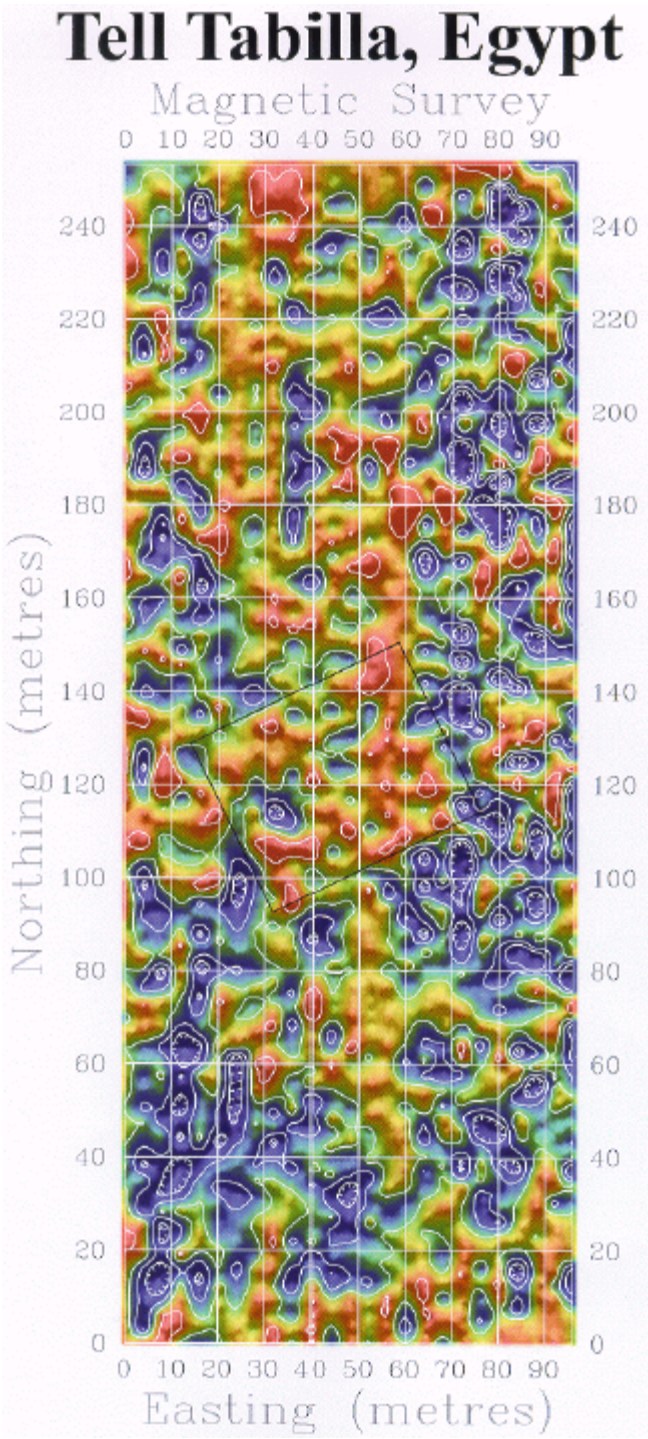

Figure 4. the coloured imaged and contoured results of the magnetic survey showing one region of interest.

Artifact Distribution

There is a great deal of confusion amongst scholars (e.g., historians, map makers, surveyors, archaeologists, etc.) about the size of Tell Tabilla when it was an active community. It seems likely that the site, like its much larger sister site, Mendes to the South, would have been a source of raw building materials from the Roman Period onward. Little evidence remains of these activities today except for a few massive stone blocks with characteristic lines of chiselled holes. Thus, the site's original extent probably encompasses many hectares of agricultural land surrounding the present-day remnant.

The earliest account of the site's size comes from a land registry carried out in AD 1375 by Ibn el-Ji'an (M.G. Daressy 1930:86-87, note 3). He assessed 'Dibleh' 15 dinars for a land area of 461 feddans which is equivalent to approximately 200 hectares or about 28 times the present site size. This land area is equivalent to a circular plot of land approximately 785 metres in radius or a square land parcel 1400 metres on a side. In the context of the period one may assume that the agricultural lands adjacent to the 14 th Century Tell Tabilla occupation were included in the tax assessment. The Napoleonic map of 1800 published in the *Description de l'Egypte* locates Mendes at the site of Tell Tabilla and appears to ascribe the former site's dimensions to it (2000 metre long quadrilateral) (Jomard 1829: In H. De Meulenaere and P. MacKay, Mendes II 1976: 44-45). In 1841 de Bellefonds' map shows the Mendes North mound (Rub'a) to be about the same size as Tel `Debeleh' (1500 metres N-S and 800 metres E-W: 120 hectares) (R. B. Holz *et al*. 1980: Plate 11d). The Daressy map of ca. 1890 shows Mendes to be twice the size of Tel 'Debeleh' (approximately 60 hectares). A report by Daressy in 1930 ascribes 225 feddans to Tabilla (approximately 96 hectares); but his accompanying map describes the site as a quadrilateral with a North side of 312 metres and the other three sides of 600 metres in extent which is equivalent to slightly more than 27 hectares (M.G. Daressy 1930:89 map).

A series of sampling traverses were carried out radiating from the modern Tell. Artifact densities per square metre unit were determined. The results indicated that a significant artifact concentration was present in an 800 metre by 800 metre land parcel with the Tell roughly centrally located. These results suggest that Daressy's observations of modern site size and the subsequent diminution of the mound due to agricultural impact are acceptable approximations.

In addition, a random 0.1% sample of the artifact densities on the Tell was taken. The results show a clearly positive correlation between sample location, elevation and sample size per square metre. These results demonstrate that surface finds were affected by gravity, sheetwash and/or aeolian activities implying that mass wasting was the dominate geomorphic force on the upper elevations of the extant Tell.

Magnetometer Survey

As a precursor to the planned excavations, a magnetic survey was carried out on the citadel portion of the remaining mound which according to sample artifact density measurements once measured at least 800 m x 800 m in extent; but which is now much reduced to a 'J'-shaped configuration facing North of 375 m x 250 m. The grid was set out on the stem of the 'J' and ran 250m (N-S) and 100m (E-W) effectively covering the 'citadel' region of the site. Line spacing was 4 meters and stations spacing was 1 metre. The GSM-19T magnetometers (mobile and base station) from Gem Systems, Richmond Hill, Ontario, Canada generated data corrected for diurnal fluctuations in the earth's magnetic field. The mean magnetic value was approximately 43000 gammas. Low magnetic readings are shown in blue on the coloured contour map (Fig. 3). High magnetic values are shown in red. Figure 4 is a colour imaged map that clearly shows a 40 by 40

metre multi-roomed structure on the citadel centred on 120 North/50 East and aligned to the north-northwest. Other smaller structures are also visible. These data were plotted using standard contour and imaging software packages. These geophysical targets will be integrated into the planning for future research oriented excavation objectives.

Results suggest a substantial amount of subsurface architecture made of low iron limestone and high iron mudbrick still exists at the site below surface. Temple precinct architecture is consistent with the magnetic anomalies. Several clusters of ex-situ limestone and granite blocks lie within the southern and northern parts of the site, while numerous limestone blocks lie in the water plant's enclosure. The surface finds of limestone shatter and slag at the site also bear these observations out.

Concluding Comments

The question of where one ought to excavate when faced with a featureless, vegetationless 70000 square metre tract of land is a very valid one in this era of diminishing budgets and escalating costs. This magnetic survey demonstrates clearly the cost-effective advantage of including geophysical prospection as a strategic component in organized archaeological excavation planning.

References Cited

Chaban, M.E.
1910 Monuments recueillis pendant mes inspections. *Annales du Service des Antiquites de l'Égypte*, tome 10:28-30.

Daressy, M.G.
1930 Recherches géographiques. *Annales du Service des Antiquites de l'Égypte*, tome 30:69-94.

Edgar, M.C.C.
1914 Notes from my inspectorate. *Annales du Service des Antiquites de l'Égypte*, tome 13: 277-84.

Gauthier, H.
1925 *Dictionnaire des noms géographiques dans les textes hiéroglyphiques,* tome III. Note: Pg.121, tome IV Note: Pp. 121-2. Tell Tebilla. Cairo.

Holz, R.B., D. Stieglitz, D. Hansen, and E. Ochsenschlager
1980 *Mendes I*. Cairo: ARCE, Plate 11d.

Jomard, E.-F.
1829 Nome Mendésien, on pp.369-81 extracted from "Description des antiquités d'Athribis, de Thmuis et de plusiers nomes du Delta oriental," from *Description de l'Égypte ou Recueil des Observations et des Recherches qui ont été faites en Égypte pendant l'Expédition de l'Armée Français*, Tome IX. Paris: L'Imprimerie Impériale (2nd edition). Reprinted in 1976 on Pp.39-48 in H. De Meulenaere and P. MacKay. *Mendes II*. Warminster: Aris & Phillips Ltd (1976).

Kees, H.
1932 Mendes. Cols.780-84 in Pauly-Wissowa (ed.). *Realencyclopedie XV*. Stuttgart: 1932. Reprinted in 1976 on Pp.148-50 in H. De Meulenaere and P. MacKay. *Mendes II.* Warminster: Aris & Phillips Ltd. (1976).

Kitchen, K.A.
1986 *The Third Intermediate Period in Egypt (1100-650 B.C.)*. Warminster: Aris and Phillips (2nd edition with supplement).

Kümmerly and Frey
1989 *Ägypten Egypte Egypt: Bildungs- und Kulturkarte; Carte éducative et culturelle; Educational School-Map 1:950000.* Cairo: Lehnert and Landrock.
Lefebvre, M.G.
1933 Textes Égyptiens du Louvre. *Revue d'Égyptologie*, tome 1:87-104.
Malek, J.
1985 Tell Tibilla, P.39. In *Lexikon der Ägyptologie,* W. Helck and E. Otto (eds.). Band VI Lieferung 3. Wiesbaden: Otto Harrassowitz.
Montet, P.
1957 *Geographie de l'Égypte ancienne, tome 1*. Paris: Imprimerie Nationale Librairie C. Klincksieck. Note: See pp.140-42, and RdE 1:88 note 1.
Porter, B. and Moss, R.L.B.
1934 *Topographical Bibliography of Ancient Egyptian Hieroglyphic Texts, Reliefs, and Paintings. Vol.IV: Lower and Middle Egypt (Delta and Cairo to Asyut).* Oxford: Oxford University Press. Note: Tell Balala (Tell 'Tebilla') listed on page 39.
Van den Brink, E.C.M.
1988 Appendix A, Pp.314-25. In *The Archaeology of the Nile Delta: Problems and Priorities*, E.C.M. van den Brink (ed.). Amsterdam: Netherlands Foundation for Archaeological Research in Egypt.
Yoyotte, J.
1953 La Ville de 'Taremou' (Tell el-Muqdam), *Bulletin de l'Institut Français d'Archéologie* Orientale, tome 52:179-92.

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