

SAQQARA GEOPHYSICAL SURVEY PROJECT

PRELIMINARY REPORT

2004

**GLASGOW MUSEUMS
GLASGOW CITY COUNCIL
20 TRONGATE, GLASGOW G1 5ES
SCOTLAND**

SAQQARA GEOPHYSICAL SURVEY PROJECT 2004

Jon Dittmer, Salima Ikram and Ian Mathieson

Abstract: An interim report on the work carried out during the 2004 season covering the use of the model 18 Geoscan Gradiometer equipment to test previous geophysical results and record archaeological features on the north side of the Serapeum leading to the Teti Pyramid. The main discovery being the Serapeum Way leading to the Serapeum galleries.

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THE SAQQARA GEOPHYSICAL SURVEY PROJECT

PRELIMINARY REPORT OF THE SAQQARA SURVEY PROJECT 2004

By Jon Dittmer, Ian Mathieson

The aims of the Saqqara Geophysical Survey Project have been:

a) To produce an up-to-date archaeological and subsurface geophysical map of an interesting and relatively little-studied area of Saqqara, the great necropolis of Memphis, this was the major city of Egypt from c.3000 BC to Hellenistic times. The area concerned comprises the Gisir el-Mudir 'the Great Enclosure' in the south; the structures lying to the west of the mastabas of Ptah-Hotep known as the L-shaped enclosure; the Serapeum and its dependencies; part of the Archaic necropolis; and the Sacred Animal Necropolis complex near the village of Abusir in the north (see plan of concession area).

b) To adapt and combine a series of well-known geophysical techniques to the special problems of plotting large monuments, cemeteries, catacombs and natural features in desert conditions where unexcavated and previously excavated monuments are buried either under drift-sand or under the dumps of former excavations. These techniques incorporate resistivity survey, electro-magnetic impulse profiling, ground conductivity, proton magnetometer survey, sonic profiling, field inspection, archival research and test-excavation (for descriptions see 1992/3 Report pp. 1-4).¹

The Glasgow Museums, Scotland, acknowledge with gratitude the help and co-operation of the Supreme Council for Antiquities with whose permission the Museum's work is carried out; the Chairman Dr Zahi Hawass, Mr Magdy El Ghandour at the Secretariat, Mr Kamal Wahid Director of Saqqara, the Chief Inspector Hasama el Shami, Mr Abdel Ghafar Abdel Meniam the inspector attached to the mission. The September - November 2004 season was undertaken with the generous financial support of grants from the Russell Trust, Friends of the Glasgow Museums and private donors.

The Glasgow Museums of Scotland field team comprised Ian Mathieson-field director, Jon Dittmer-geophysicist and Dr Salima Ikram-faunal analyst. The 2004 season opened on 1st September and continued until 1st November.

Previous Fieldwork - 1990-2003

During the 1990 season resistivity work was completed along the length of the concession area and four of the proposed cross-sections covering the large enclosure known as the Gisir el-Mudir were surveyed (fig. 1). In 1991 the complete concession area was field-walked and all visible surface indications of structures and old excavations were located for inclusion on the base maps. Work was completed in 1992 on the observation of the resistivity data covering the southern two-thirds of the original concession area, from the northern access road to the Serapeum to the southern limit of the concession, some 100m south of the southern boundary of the Gisir el-Mudir². In 1993 sondage trenches were opened on anomalies in the southwest corner of the Gisir-el-Mudir to confirm the

¹ See I. J. Mathieson et al., *JEA* 85 (1999), 21-43.

² See I. J. Mathieson and A. Tavares, *JEA* 79 (1993), 17-31.

structures the resistivity data had shown at these points. A mud-brick platform was discovered inside the enclosure at the SW corner and the construction of the enclosure walls was investigated (1993 Report, Map Sheet 1, A7 & A8). In the 1994 season sondage trenches were opened to confirm the geophysical findings on profiles taken over the North Wall (1994 Report, Map Sheet 1, GMNWXS2). The construction of the wall was found to extend to the North with a buttress formation on the North face. Several graves were found on the South side of the wall, one of which had a stela of the Persian period deposited in the sub-structure (Reports 1990 - 1994)³.

During 1995 further sondage trenches were opened (1995 Report, Map Sheet 1, A9-14), to inspect anomalies over the southwest corner of the monument where the inside corner was located and surveyed⁴. In 1996 electro-magnetic impulse equipment, kindly loaned by ERA Technology of Leatherhead, Surrey, was used for the first time in Saqqara. Many scanning profiles were taken over existing resistivity surveys and the results confirmed the previous findings and gave a much-enhanced interpretation of the sub-surface conditions (Report 1996). In 1997 conductivity surveys were carried out using the Geonics EM 31 covering half of the Gisir el-Mudir and a portion of the L-shaped structure (Report 1997). In 1998 the conductivity survey of the Gisir el-Mudir was completed and several auger holes were drilled to determine the elevation of the bedrock. Sondage excavations examined the structure of the East Wall (Report 1998). In 1999 the project was fortunate to obtain the loan of Global Positioning Satellite equipment from The Natural Environment Research Council and surveyed all the main triangulation stations in the Saqqara area. The position of the South Wall of the Gisir el-Mudir and the southeast corner were located (Report 1999). In 2000 the Gradiometer was used for the first time and the results obtained showed this to be an ideal instrument for tracing mud brick structures. On the northern boundary of the L-shaped enclosure a line of rectangular anomalies was found and these formed the area for sondage excavation in 2001. In 2001 small sondages at the north side of three of the anomalies showed that they were probably temple casement foundations with entrance stairways on the north sides. In 2002 the project was sponsored by the Glasgow Museums and further geophysical findings showed more temple type structures and many tombs on the North side of the Serapeum and a study of the pottery from the 2001 sondage. During 2003 the entrance to one of the northern temple sites was excavated and proved to be similar to the southern temples in pointing directly at the Serapeum site. Geophysics was extended to the limit of the concession at the village of Abusir with many more tombs and structures located. A geological borehole survey was carried over the site of the assumed Lake of Abusir and showed that the lake had fluctuated between dry and wet conditions over the centuries.

The Objectives of the 2004 season under the sponsorship of Glasgow Museums were:

1. To continue the electromagnetic survey of the Gisir el-Mudir, the L-Shaped enclosure and continuing across the Serapeum into the Sacred Animal Necropolis and down the wadi to the Old Lake of Abusir using the Geoscan Gradiometer instrument to measure the apparent influence of the surface material to a depth of approximately 3 metres.

³ See I.J. Mathieson et al. *A Stela of the Persian period from Saqqara*. JEA 81 (1995), 23-41.

⁴ See I.J. Mathieson et al. *The National Museums of Scotland Saqqara Survey Project 1993-1995*. JEA 83 (1997)

2. To re-observe certain areas previously surveyed by other electronic means to obtain comparative results.

Fieldwork

Geoscan Gradiometer surveys.(Figs. 1, 2 & 3) Dr Jon Dittmer

The magnetic gradiometer is an instrument that enables the surveyor to measure the earth's magnetic field very accurately. The device is moved across the surface of the area being surveyed and readings are taken approximately every 25cm. This fine density of readings gives an accurate picture of the variations in the magnetic field. As two sensors are used, the instrument is very sensitive to local variations caused by shallow-buried (up to 4 - 5 metres) archaeological features. Features that contain concentrations of magnetic compounds (in particular iron) such as mud brick, ditches, kilns, hearths etc produce measurable anomalies. Due to the diversity of features on the site, the concession area is eminently suitable for this instrument. (Fig.1)

Following our extensive geophysical coverage of 2002 and 2003 and discovery of many tomb structures and a complicated area of structures which could be large tombs subdivided by smaller burials, workshops or living quarters. It was decided to extend this survey to the east and south covering areas of very disturbed ground where excavations during 1850 to 1960 had uncovered many structures but the results had not been accurately surveyed and the structures were now covered by windblown sand and therefore lost to records.

Fig. 1 shows the present extent of the survey which has again discovered many new tombs and it is obvious that many of the structures are similar to early finds made by Mariette and De Morgan in the 1890's.

In addition to several large mastabas and smaller structures the major find of the season has been the rediscovery of the **Serapeum Way** which had first been excavated in 1852 by Mariette. (Fig.2) On visiting Saqqara in 1850 he found a sphinx half exposed on the surface of the desert which reminded him of the report by Strabo (63 BC – 21 AD) the Greek philosopher who had visited Saqqara in 24 BC and had seen exposed sphinxes in the same area. Mariette found 134 sphinxes (Plate 1) lining the ceremonial route from the Pyramid of Teti to the Serapeum along which the Apis bulls were taken for burial in the underground galleries of the Serapeum. (Fig.3) Further excavations uncovered the dromos entrance, the galleries and the temples to Serapis and Apis, also a semicircle of statues to the Greek philosophers and poets. (Plates 2 & 3) Most of the sphinx statues are in the Cairo Museum and the Louvre, Paris, France. The whole area with the exception of the philosopher's statues is again buried under many metres of sand. (Plate 3)

Unfortunately we only have the sketch map by Mariette as shown in Fig. 2, a few photographs and the descriptions of the finds in his *Le Serapeum de Memphis, 1857, Paris 1882* as his excavation diary is lost and no academic publication of the Serapeum Way exists.

Conclusions – Ian Mathieson

The geophysical survey was extended on the north side of the Serapeum and over to the tourist access road to the Ptah-Hotep tombs. We can now say that we have found or rediscovered the sub-surface signatures of most of the tombs and chapels reported by De Morgan and Mariette in 1882-

1889.⁵ What is interesting is that there appears to be many more features in this area than those recorded by the two excavators.

Our work this year has once again proved the value and accuracy of the geophysical and topographic surveys. The use of the gradiometer to delineate sub-surface features has been amply proved by the small-scale *sondage* trenches excavated in 2001, 2002 and 2003 to test the anomalies. In all cases the accuracy of the topographic survey has enabled the *sondage* to be opened exactly over the anomaly shown by the geophysical data. The saving of labour time and the ability to keep the excavation to strict size limits means the environmental damage is controlled and at the same time the archaeological interpretation of the site is enhanced.

Archaeological science must see Mariette's work done once again and the Serapeum Way cleared and recorded so that the results of this research can be made accessible in a recognised scientific publication.

In 1927 the German archaeologist, U. Wilcken⁶ made the following comments.

The report in "Le Serapeum" is everything that we expect today of a scientific publication. We will read with excitement and interest of the joys and sorrows of his excavations, but will look in vain for clear sharp answers to many important questions. That is all the more to be regretted, as almost everything which Mariette uncovered in four years work with enormous effort, was buried again in the sand, except for the Apis tombs, which were kept open as an important tourist attraction.

Particular finds, for the most part, found their way to the Louvre, some to Cairo, but important pieces, such as the Greek images of Dromos, were nearly all abandoned to the sand and even before they were scientifically studied.

Of the numerous Greek Graffiti which covered the sphinxes, statues and walls of the Dromos (Ie Serapeum 30 and 34) to my knowledge only two have been published and not by Mariette but by H Brugsch (Monthly news of the Berlin Academy 1853 S 727). These also disappeared again under the sand, and yet how important this knowledge would be for many questions which are of great importance for us today.

Thus science must request that Mariette's work be done once again, that the Memphis Serapeum be excavated for the second time and that this time the results of this research be made accessible in a knowledgeable exhaustive scientific publication.

⁵ A. E. Mariette, *Les Mastabas de l'Ancien Empire*. G. Maspero Paris, 1889. J. de Morgan, *Carte de la Necropole Memphite*. Cairo 1897

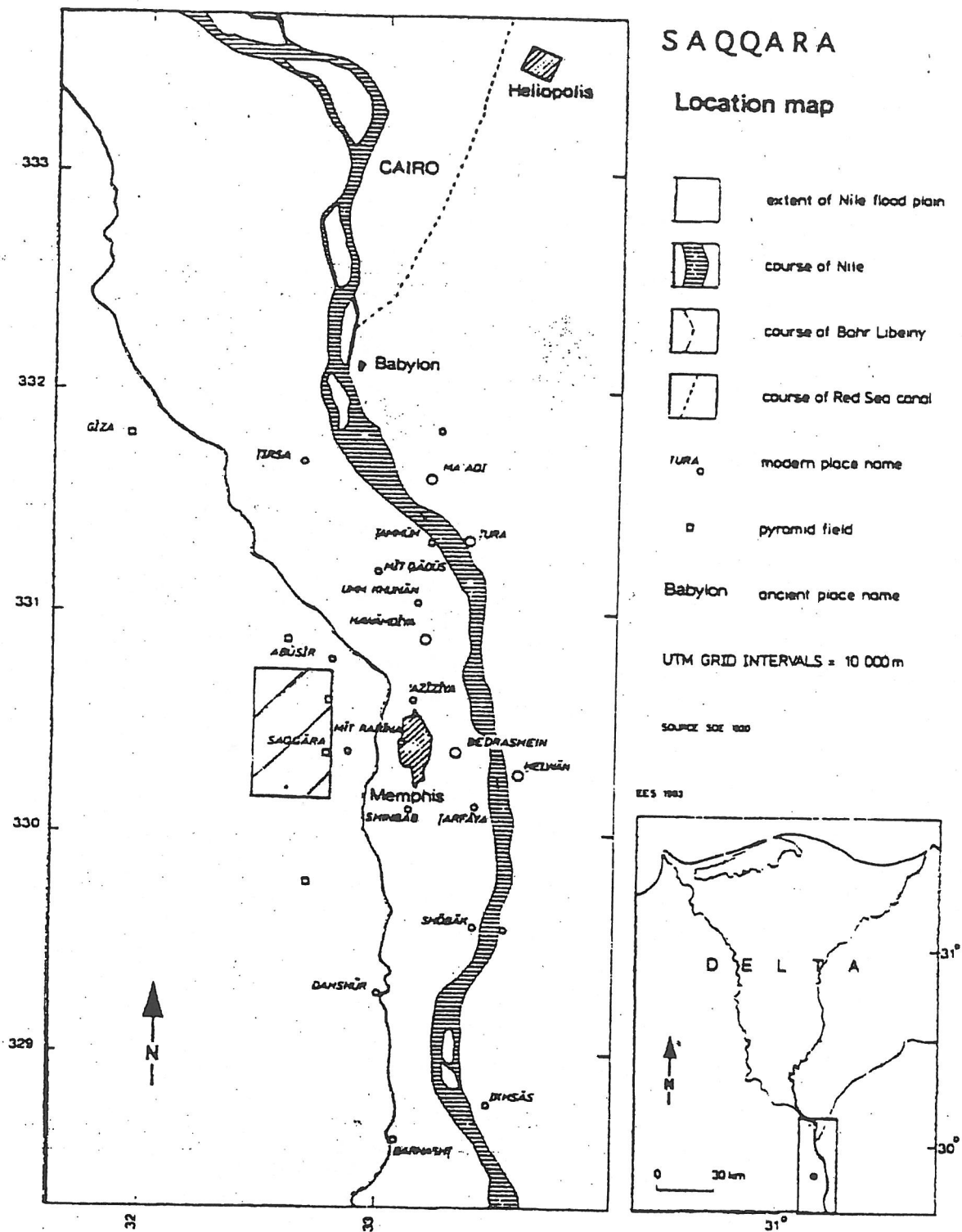
⁶ U. Wilcken, *Urkunden der Ptolemaerzeit* Volume 1, Berlin, 1927. Verlag von Walter de Gruyter & Co.

With the permission of the Supreme Council for Antiquities the Saqqara Geophysical Survey Project plan to continue the work through 2005 and complete the geophysical survey of the concession with particular reference to the area between the Gisir el-Mudir and the Sekhemkhet complex, the proving of the L-shaped enclosure structures and the area leading to the western edge of the Step Pyramid.

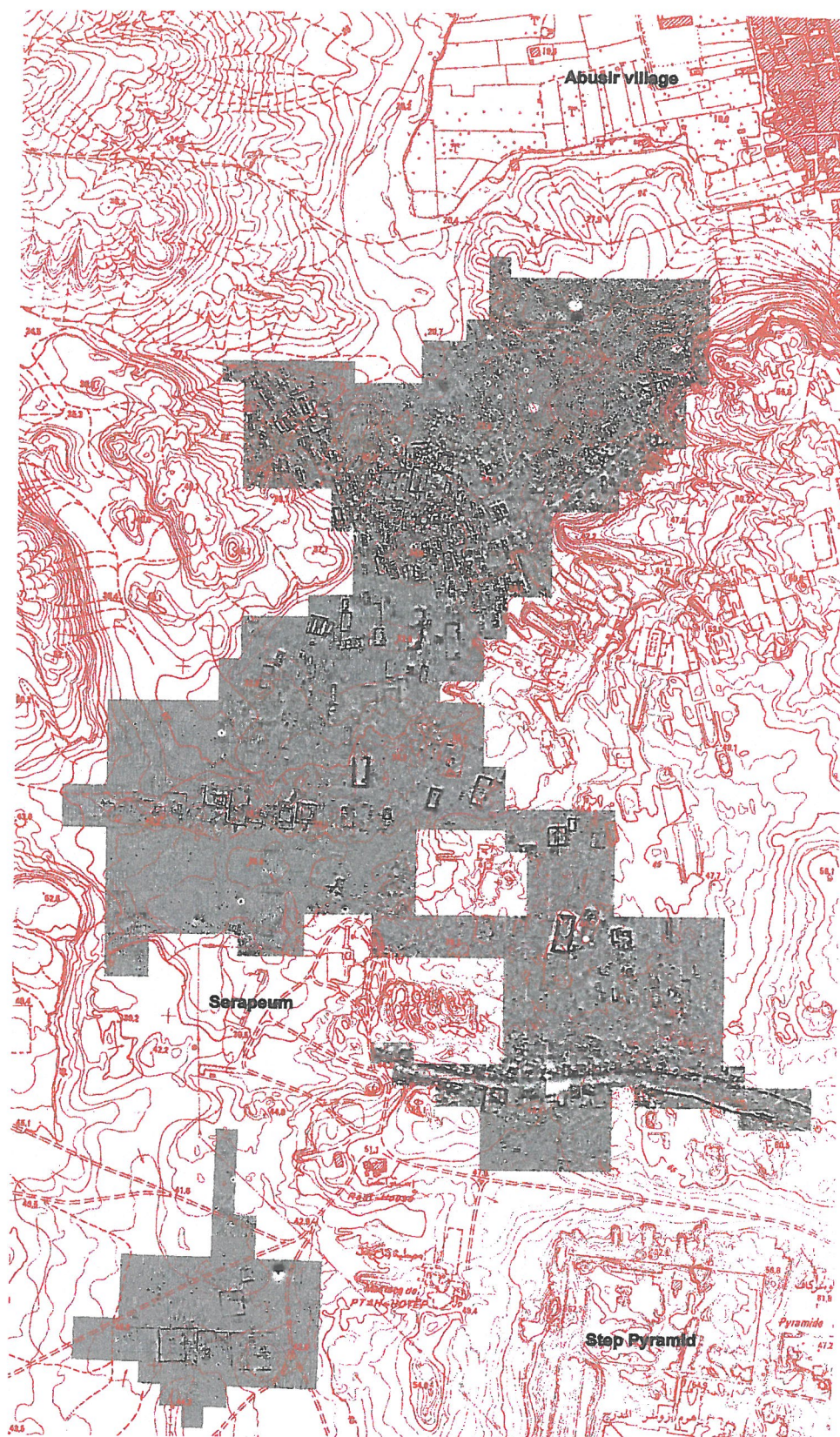
We also hope that permission will be granted to clear and record the hieroglyphic texts and graffiti covering the walls and chapels of the Serapeum Way and to record and describe the construction details of the road with particular reference to any traces of how the huge sarcophagi of the Apis bulls were transported along this route.

Ian J Mathieson

Project Director

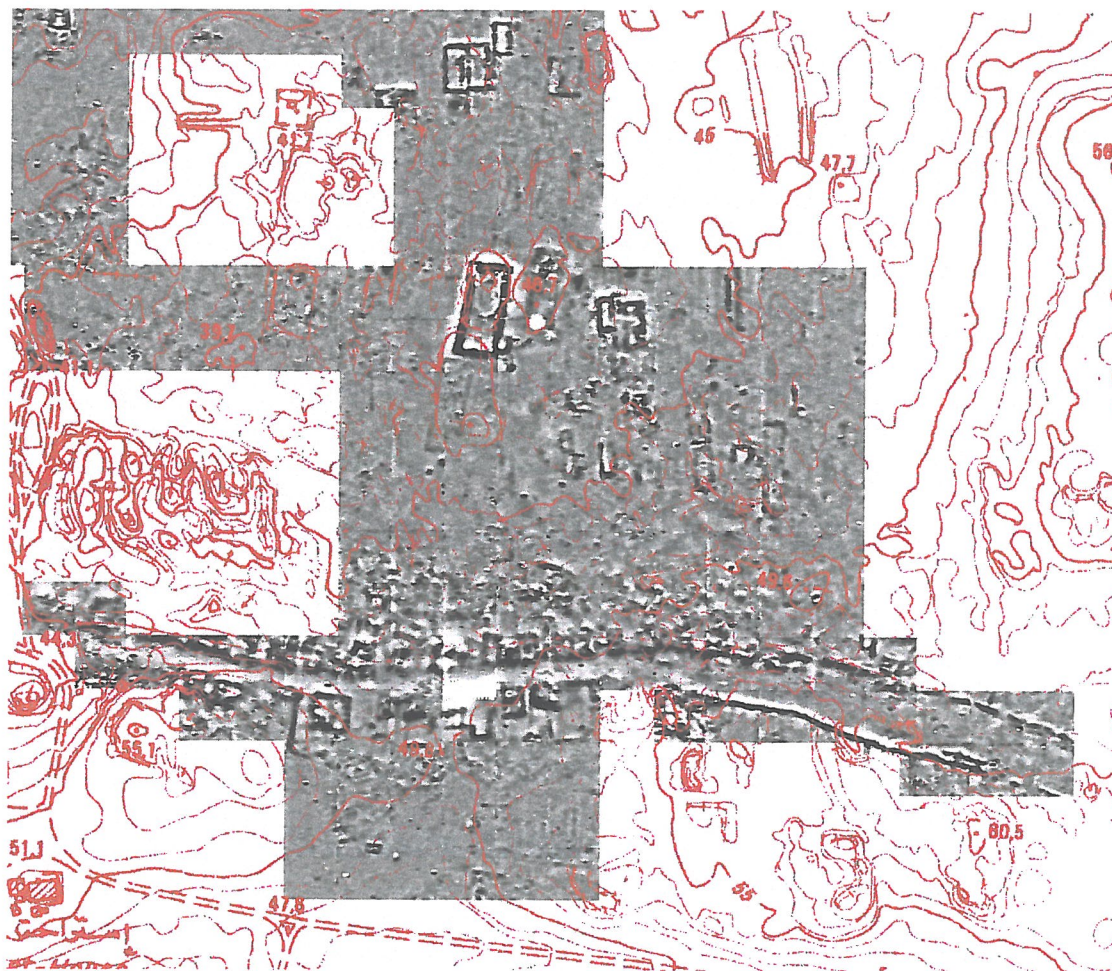


Glasgow Museums – Saqqara Geophysical Survey Project



Saqqara Geophysical Survey Project 2000-2004
Plan showing extent of geophysical survey

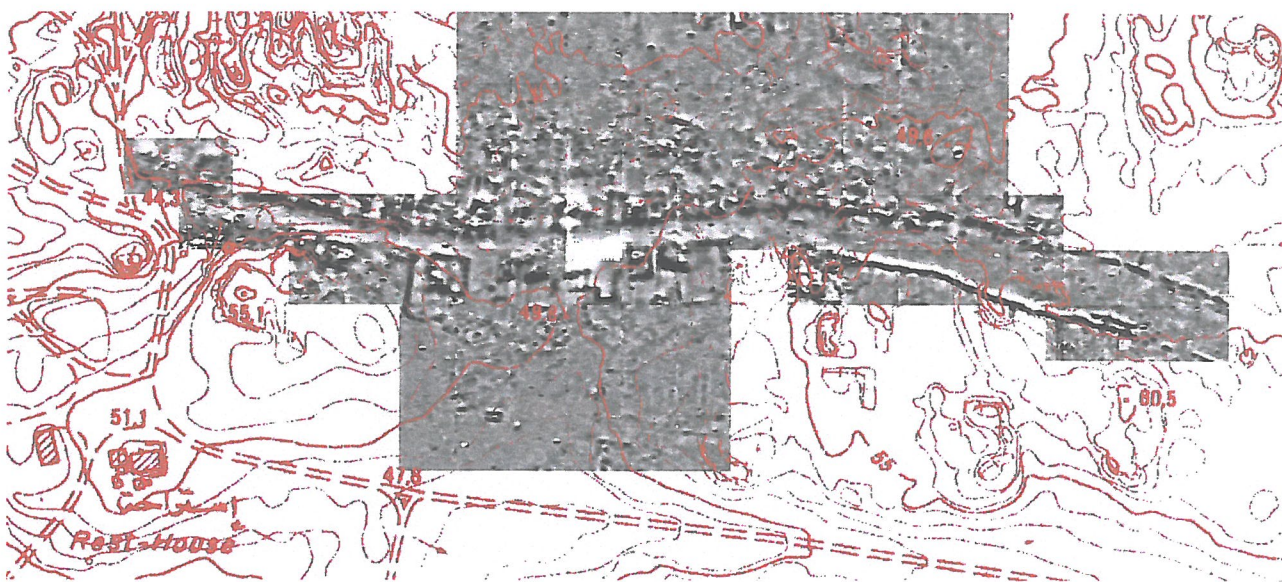
Fig. 1



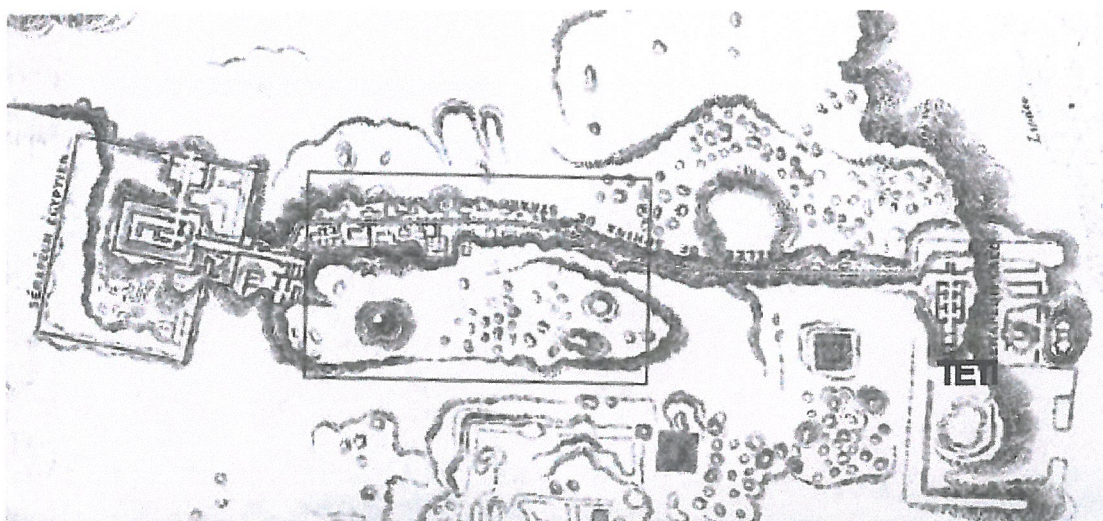
Saqqara Geophysical Survey Project 2004
Survey area September-October 2004

Fig. 2

Geophysical survey preliminary report



Geophysical data showing the route of the Serapeum Way



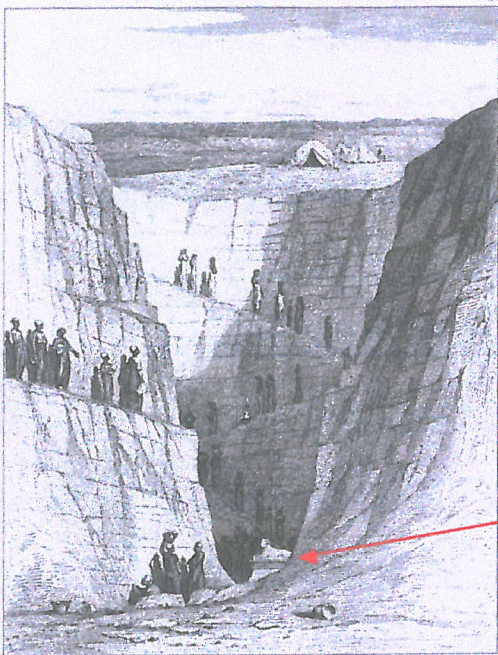
Sketch plan from Mariette 1882 of the Serapeum Way
2004 survey area shown outlined

Fig. 3

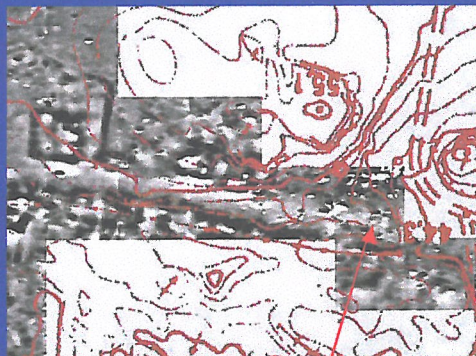


FIG. 13. - Un des sphinx de l'Allée du Serapeion.

The 134th Sphinx
lining the
Serapeum Way and
positioned every 6
metres in line with
the route.

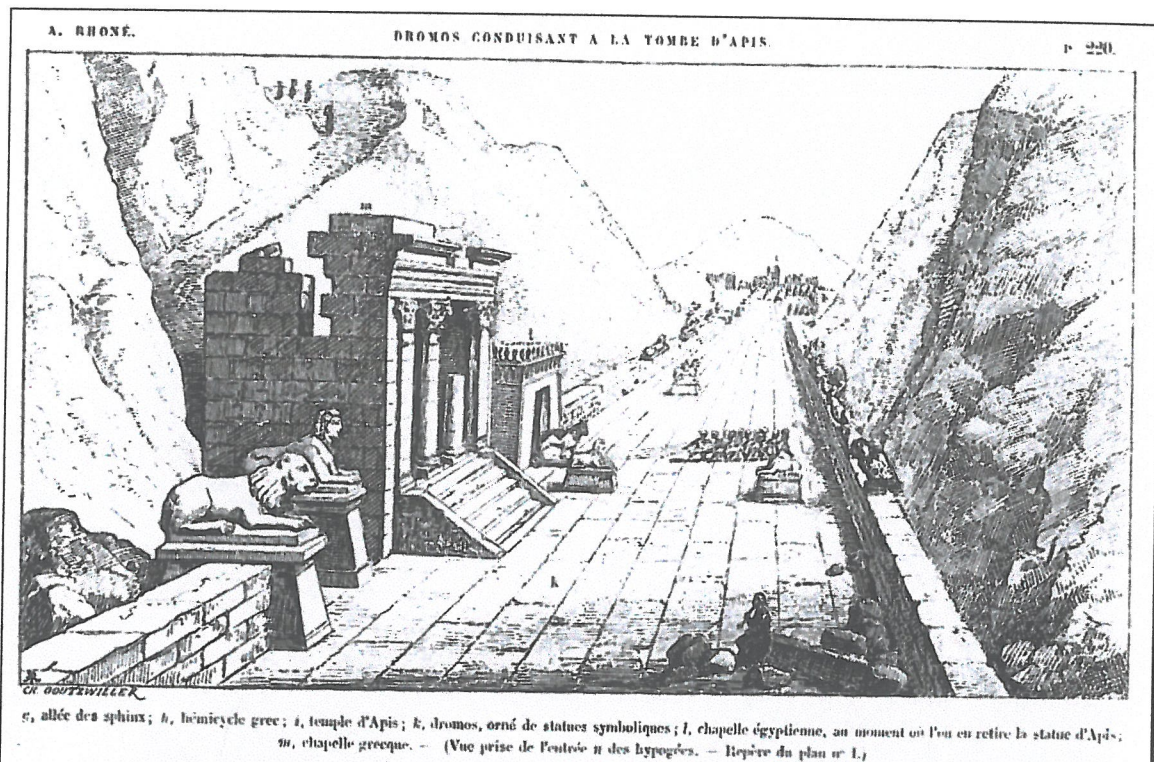


TRANSCHÉ DE LA ROUTE A TRAVERS L'ALLÉE DU SPHINX.

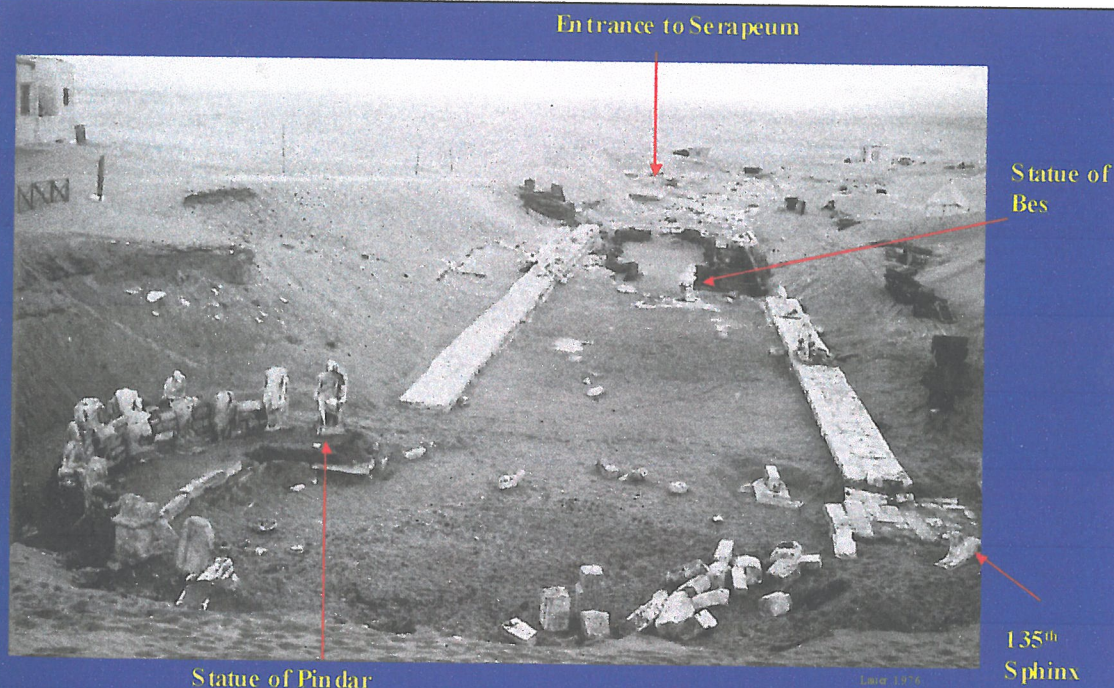


Position of sphinx

The 135th Sphinx at right angles
to the others due to the route
suddenly turning to the south at
the entrance to the dromos.



The Dromos looking East



Dromos leading to Serapeum looking West
during excavation Mariette 1850



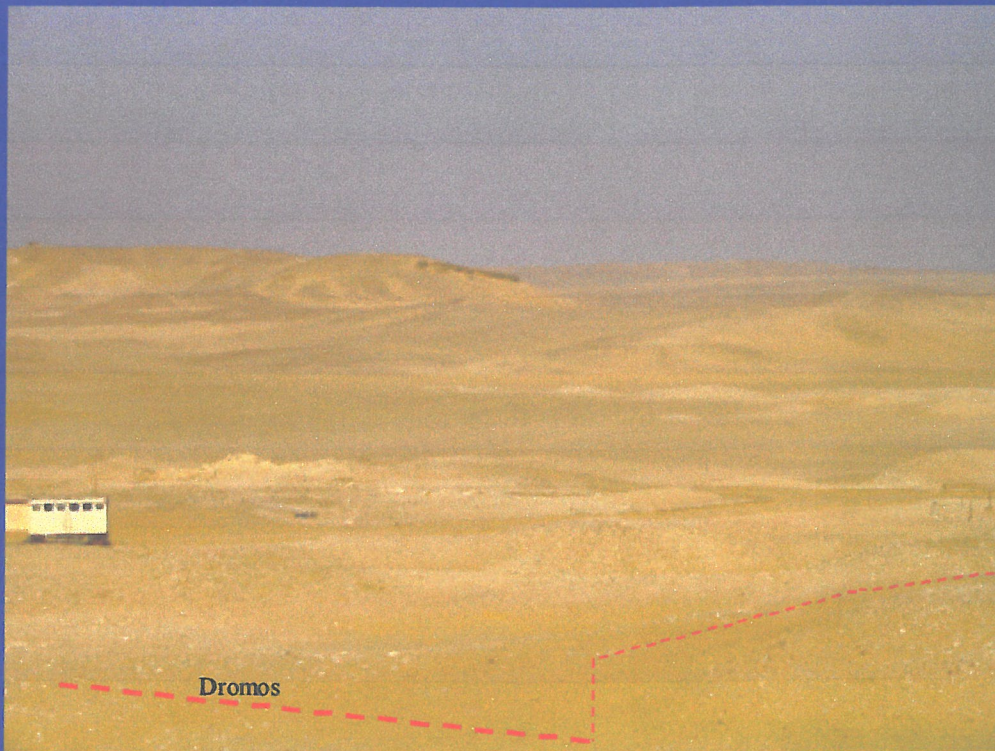
Statue of the god Bes

Later 1976



Greek poet Pindar 518-438 BC

Later 1976



Dromos

View to the West over Serapeum and Dromos