

Old Plans versus Geophysical Surveys: the case study of Gurob (Fayum, Egypt)

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Introduction

The site of Gurob extends beyond the remains of the ancient town of Mi-wer, on the southern side of the Fayum oases entrance (Fig. 1). The town was built by Thutmose III (BC 1479-1425) in order to shelter a palatial complex. This was served by a harbour and was occupied at least until the reign of Ramesses V (BC 1147-1143). The site preserves the only palace from the Pharaonic period identified as a royal harem. The remains of the palace, the adjoining necropolis as well as written evidence found *in situ*, provide a better understanding of the organisation and administration of a harem during the New Kingdom. Therefore, this site proves to be of major interest. The harbour was connected with the Bahr Youssef, which is a waterway between Fayum and the Nile.

In the framework of the Gurob Harem Palace Project led by Dr Ian Shaw (University of Liverpool), investigations of the site, mainly around the harem (Shaw 2012, Yoyotte 2012), were conducted between 2005 and 2015. In 2016, the Institut français d'archéologie orientale (Ifao) gathered an interdisciplinary team in order to complete the results of the previous work and to initiate a new research project. Archaeological, geoarchaeological and geophysical studies, which have been carried out since then, have been focused on two major structures: the harem and the harbour. The objective is to: (i) gain more detailed knowledge of the spatial organisation of the area, (ii) identify possible settlements around the palace and (iii) locate the channel connecting the harbour with the plateau. Furthermore, two neighbouring areas, previously identified as a “fort” and kilns, are being re-investigated in order to establish a better chronology of the site.

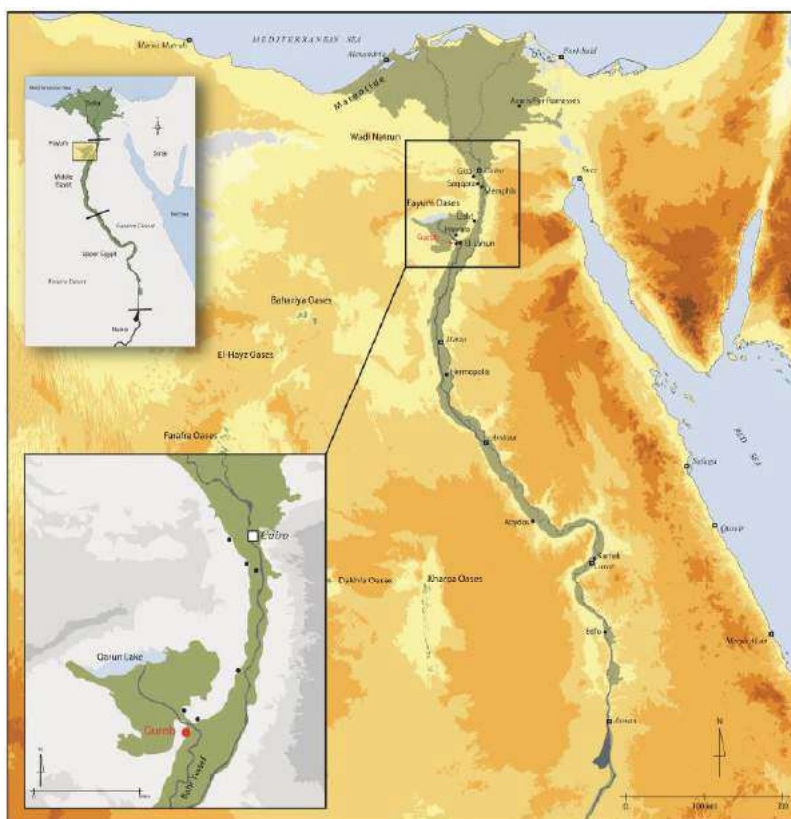


Fig. 1. Geographical location of Gurob. © Ifao.

Old excavations and plans

Flinders Petrie conducted two archaeological seasons on the site between 1888 and 1890. Following these works, he incorrectly identified the main building on the site as a temple of large dimensions, of which he drew a plan (Petrie 1891). In 1903-1904, Charles Currely and Leonard Loat spent three weeks in Gurob, although they were interested in the animal and predynastic cemeteries (Loat 1905).

In 1920, Guy Brunton and Reginald Engelbach (Brunton and Engelbach 1927) drew the first general map of the town and its nine cemeteries (Fig. 2). Northeast of the outer enclosure of the harem, they discovered a structure which they identified as a “fort” because of the thickness of its walls. It was dated to either the First (BC 2160-2055) or the Second Intermediate Period (BC 1650-1550). To the west of the fort, there was a small square enclosure, on top of which glass workshops and lime-kilns were located.

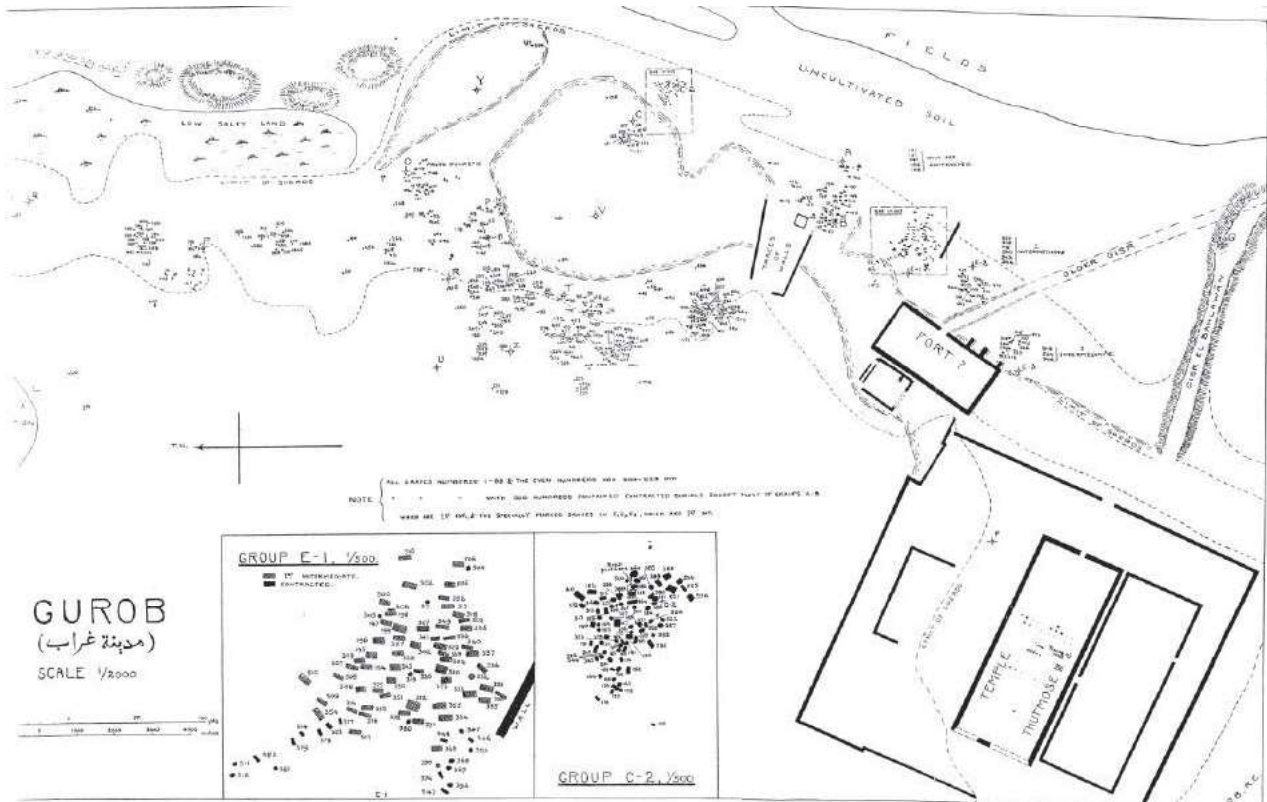


Fig. 2. Brunton and Engelbach’s plan (1927).

Geophysical surveys

To verify old plans and excavations, several geophysical campaigns were carried out:

- In 2006 and 2007, an area of 5ha was investigated using a FM36 fluxgate gradiometer (Geoscan) in the framework of the field programme of the Gurob Harem Palace Project (Shaw 2008). The main objective was to trace the internal structure of the two rectangular buildings of the harem.
- In 2017 and 2018, an area of 13ha was investigated using a G858 caesium gradiometer (Geometrics) in the framework of a broader study of the site and its landscape (Yoyotte *et al.* 2019). The main purposes of the geophysical surveys were as follows:
 - confirm the location of an access ramp mentioned on an old plan by Brunton and Engelbach and locate the ancient harbour;
 - complete the geophysical survey and understand the link between the harem palace and the fort;
 - acquire more details about the occupation area shown on several old plans (Brunton and Engelbach 1927, Kemp 1978).

The results of these magnetic surveys were processed with the open-source software WuMapPy (Marty *et al.* 2015, see also Vitale *et al.*, this volume), and combined with the archaeological structures mentioned in Brunton and Engelbach's plan using GIS software (Fig. 3).

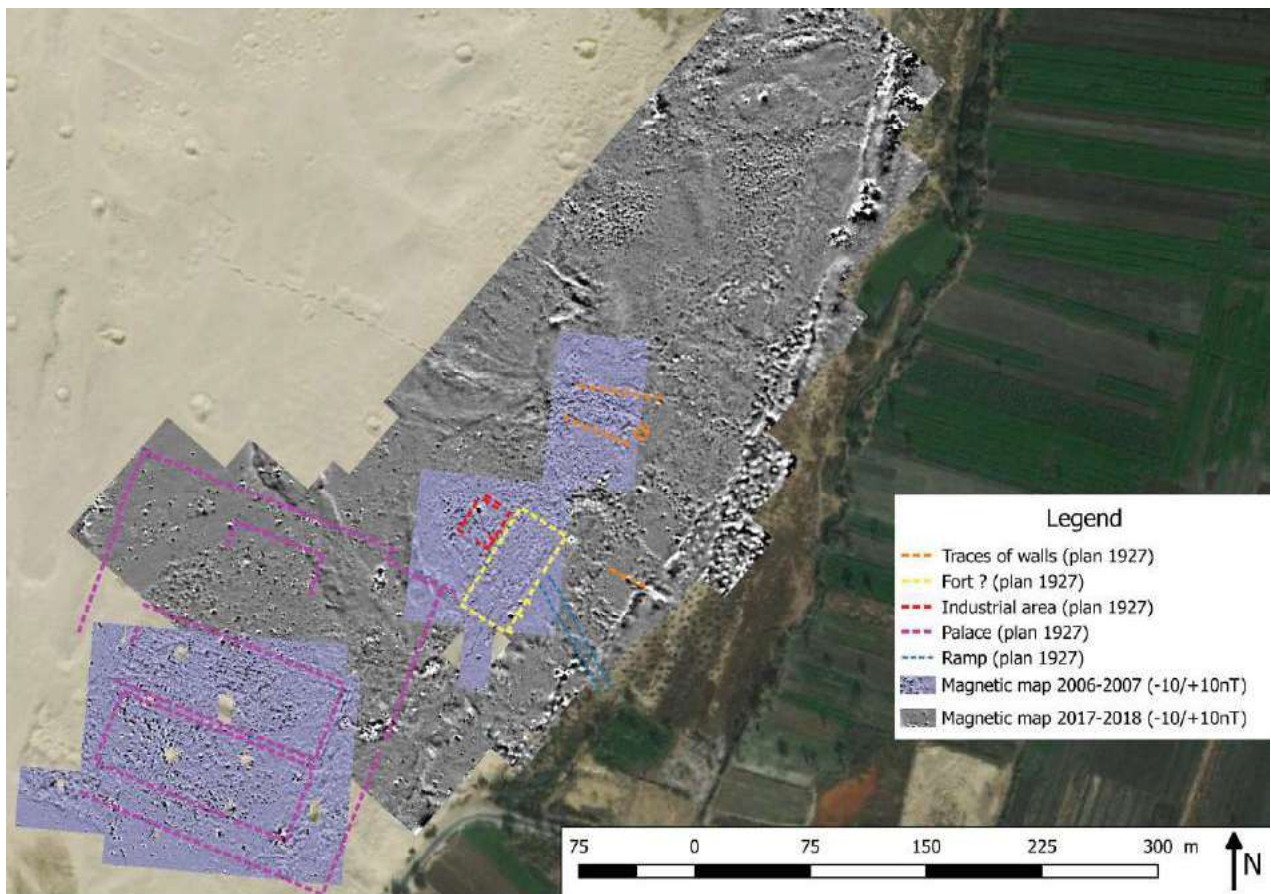


Fig. 3. Magnetic map (-10nT, white / +10nT, black) of the site of Gurob.

On the large-scale magnetic map, a number of homogeneous and heterogeneous areas are visible. An estimation of the anomaly source depth helped to better characterize the previously inhabited areas and deep structures of the north town (Kemp 1978).

On the eastern edge of the magnetic map, numerous anomalies seemed to match with modern pits visible on the surface. However, a small-scale excavation in the south-eastern part revealed archaeological structures which might correspond to a New Kingdom jetty or quay. A closer analysis of these anomalies revealed other alignments that could be evidence of archaeological structures.

In the centre of the map, near the fort mentioned by Brunton and Engelbach, a lot of isolated circular positive anomalies are visible. Some alignments seem to correspond to the fort (Fig. 3, yellow lines), while other positive discrete anomalies are probably more related to earlier buildings (Fig. 3, red lines). Some of them are strong positive discrete anomalies corresponding to kilns: the kiln area was verified (and kilns confirmed) by excavations in 2009 and 2012 (Hodgkinson 2017: 348-360). Furthermore, other, less strong, positive discrete anomalies could correspond to ancient pits or buried boulders.

In the case of the harem palace (Fig. 3, pink lines), several plans have been drawn based on the results of the field surveys (Petrie 1891; Brunton and Engelbach 1927) or by combining older plans (Kemp 1978). The results of the magnetic surveys were also used to draw the final plan.

Conclusion

The four geophysical campaigns carried out between 2006 and 2018 made it possible to verify and complete old archaeological plans. Furthermore, the purpose of the surveys was to improve our knowledge of the north town and to find the link between the fort and the harbour. Finally, the prospection allowed to precisely locate the inner walls of the two main structures of the harem palace. Future excavation will help to better understand the connection between the geophysical image and archaeological structures hidden below the surface.

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