

An early dynastic ritual landscape at North Saqqara: An inheritance from Abydos?

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Abstract

Drawing on previously published work by the current author, the aim of this article is to undertake a wider exploration of the influence that landscape may have had on the development of North Saqqara during the first three dynasties of the pharaonic era. After discussing the topography of the site, the article presents a summary of the current understanding regarding known Early Dynastic monuments at Saqqara, together with an account of previously unpublished information obtained by the Saqqara Geophysical Survey Project. By considering the evidence for the influence of landscape on the early development at Saqqara, the research presented here reveals a number of hitherto unsuspected spatial relationships within the site, as well as identifying features that may be shared by both Saqqara and the earlier royal necropolis at Abydos.

Keywords

Abydos, Early Dynastic, geophysics, Gisir el Mudir, landscape, mortuary development, Saqqara

كولن ريدير

مساحة طبيعية للطقوس في شمال سقارة من العصر العتيق: إرثاً من أبيدوس (؟)

إعتماداً على مقالات سابقة لنفس الكاتب، تهدف هذه المقالة لاكتشاف تأثير الطبيعة على تطوير منطقة شمال سقارة خلال الأسرات الثلاثة الأولى. بعد عرض الطبيعة الطبوغرافية للموقع، تعرض هذه المقالة ملخصاً للآثار التي ترجع للعصر العتيق في سقارة بالإضافة إلى بعض المعلومات الغير منشورة والتي تم الحصول عليها ضمن مشروع المسح الجيوفيزيقي لسقارة. من خلال الأخذ في الاعتبار دلائل تأثير طبيعة المكان على تطور منطقة سقارة، يعرض هذا البحث العلاقة بين تفاصيل المنطقة داخل الموقع حتى اليوم بالإضافة إلى تحديد السمات المشتركة مع الجبنة الأقدم في أبيدوس.

North Saqqara was the focus of almost unbroken mortuary activity for a period exceeding 3000 years, and as development of this important site progressed it became necessary for the construction of new tombs and temples to take account of existing features.¹ The objective of the current article is to broaden the scope of previously published work,² to present an exploration of the role that landscape and other factors may have played in the earliest phases of development at Saqqara, from the start of the First Dynasty until the reign of Netjerikhet. During this period, development at North Saqqara will have been relatively sparse and existing features will have presented a far less significant constraint to new construction.

The inspiration for these enquiries was a programme of geological mapping undertaken by the current author as part of the Saqqara Geophysical Survey Project (SGSP – formerly the National Museums of Scotland Saqqara Survey Project), which operated from 1990 until 2007 under the direction of Ian Mathieson. The primary objective of the SGSP was ‘To produce an up-to-date archaeological and subsurface geophysical map of an interesting and relatively

little-studied area of Saqqara’.³ As shown in Fig. 1, the SGSP concession focused on the Abusir *wadi*, extending along its main axis from the Gisir el-Mudir in the south to the ‘Abusir Lake’ in the north. A summary of each year’s fieldwork was presented to the Egyptian authorities in a series of unpublished Preliminary Reports and a number of more comprehensive articles were produced.⁴ Sadly, Ian Mathieson passed away in 2010, leaving a great deal of the information obtained by the SGSP unpublished. Although it is beyond the scope of the current article to address all this unpublished work, permission has been obtained from Mrs Anne Mathieson and Dr Campbell Price,⁵ to refer to the SGSP Preliminary Reports during the research for the current

³I. J. Mathieson et al., *National Museums of Scotland: Saqqara Project Report 1995* (unpublished preliminary report), 1.

⁴Including I. J. Mathieson and A. Tavares, ‘Preliminary Report on the National Museums of Scotland Saqqara Survey Project’, *JEA* 79 (1993) and I. J. Mathieson et al., ‘The National Museums of Scotland Saqqara Survey Project: Earth Sciences 1990–1998’, *JEA* 85 (1999).

⁵Formerly the acting Director of the Saqqara Geophysical Survey Project.

¹For example, the causeway of the pyramid of Teti is thought to have been constructed to avoid the earlier pyramid Lepsius XXIX. See P. Collombert, ‘Les papyrus de Saqqâra. Enquête sur un fonds d’archives inédit de l’Ancien Empire’, *BSFE* 181 (2011), 29.

²C. D. Reader, ‘On Pyramid Causeways’, *JEA* 90 (2004), 63–71.

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article, for which the author is extremely grateful.⁶ It should be stressed that the views presented in this article are those of the current author only and do not represent the views of the SGSP or others associated with the project.

Archaeological interest in Saqqara can be traced back at least to 1821.⁷ However, given the vast number of structures present at the site, many areas remain little explored and poorly understood. The SGSP has shown that among these little-explored areas of the site, the generally featureless Abusir *wadi* conceals a large number of stratified archaeological remains, the vast majority of which remain unexcavated.⁸ It is evident therefore that our current understanding of the North Saqqara necropolis is far from complete and the current author fully acknowledges that the ideas presented here are likely to require revision as more data are collected from this fascinating and critically important site.

Topography

The generally low topography of North Saqqara is summarised in Fig. 1, with ground levels across the site presented as a series of contours drawn at 5 m vertical intervals. Two of these contours have been emphasised for the following discussion. The heavy black contour is the 45 m line, which defines the approximate extent of the Abusir *wadi*. The white contour is the 55 m line, which identifies the more elevated areas of North Saqqara.

As shown in Fig. 1, the Nile Valley and the inundation lie immediately to the east of the study area, with ground levels below 25 m AMSL.⁹ The relatively steep eastern escarpment of the North Saqqara Plateau rises from the inundation to reach levels in the order of 55 m AMSL at the eastern plateau edge. For much of the study area, the plateau is some 1.5 km wide, decreasing toward the north and reaching a narrow promontory overlooking the modern village of Abusir. A geological fault defines the western edge of the North Saqqara Plateau,¹⁰ with ground levels descending towards the Abusir *wadi*. To the west of the *wadi* ground levels rise across the West Saqqara Plateau, with a series of isolated hills reaching levels in the order of 90 m AMSL.

Unlike the North and West Saqqara Plateaux, the surfaces of which can be characterised as limestone outcrops with a generally thin cover of aeolian sand, the Abusir *wadi* has a significantly thicker sand cover, which obscures underlying features.¹¹ At the northern end of the *wadi*, is the Abusir Lake, which lies at approximately 20–25 m AMSL. The southern limit of the Abusir *wadi* is defined by a prominent

east–west-oriented ridge that is not only evident on the ground, but can clearly be seen on topographic maps and aerial photographs.¹² This ridge runs through the southernmost sections of the Gisir el-Mudir and continues east towards the pyramid enclosure of Sekhemkhet (see the heavy dashed line in Fig. 2).¹³ At a point along this ridge, approximately mid-way between the Gisir el-Mudir and the escarpment of the North Saqqara Plateau, is a puzzling feature that initially appears to be part of the natural *wadi* system: Point MT6 in Fig. 2 marks a gap in the natural ridge with what appears to be a short length of *wadi* extending some 300 m south to MT6'. This '*wadi*' is curious because its axis appears to be relatively straight and its walls to be largely featureless, which (as shown in Fig. 2) contrasts with the meandering system of *wadis* to the south, with their more typical dendritic morphology. MT6 is a geophysical anomaly, which was identified by the SGSP at the southern limit of Traverse III (see Fig. 2: inset).¹⁴ In addition to Traverse III, the survey of this area included four east–west traverses, of which the southernmost (C1) ran along the topographic ridge. For a distance of some 120 m to the east of Traverse C1, clusters of shallow circular grave pits were identified on the ridge, flanking MT6 (Fig. 2: inset).¹⁵ Despite extending C1 west along the ridge for over 600 m and surveying three other east–west traverses (C2–C4), no other clusters of burials were noted at similarly prominent locations. These initial geophysical results were supported by subsequent surface observations, which identified mud-brick remains at MT6,¹⁶ together with evidence for Early Dynastic activity across this general area.¹⁷ Although further fieldwork is required to understand the origins of the features in the vicinity of MT6, the presence of a cluster of apparently Early Dynastic burials flanking the gap in the topographic ridge raises the possibility that the Early Dynastic Egyptians may have considered the landscape features at this location to have some ritual or other significance.

The earliest known development

A review of existing literature reveals that the earliest known burials at North Saqqara are dated to the First

⁶As a gesture of gratitude, a complete set of SGSP Preliminary Reports has been provided to the National Museums of Scotland (in PDF format) as a resource for future researchers.

⁷J. P. Lauer, *Saqqara* (London 1978), 11.

⁸I. J. Mathieson and J. Dittmer, 'The Geophysical Survey of North Saqqara, 2001–2007', *JEA* 93 (2007), Fig. 1. The varying shades of grey of the features shown on this figure suggest that the remains are present at a range of depths.

⁹AMSL = above mean sea level. Mapping data are taken from Egyptian Ministry of Housing and Reconstruction Sheet Cairo H22.

¹⁰Mathieson et al., *JEA* 85.

¹¹Mathieson and Dittmer, *JEA* 93, Fig. 1.

¹²The ridge is formed from an outcrop of gravelly limestone, part of the upper beds of the Giran el-Ful Member. See I. J. Mathieson et al., *National Museums of Scotland: Saqqara Project Preliminary Report 2001* (unpublished), 14.

¹³The ridge does not reach the Sekhemkhet pyramid, as it is truncated by the previously discussed fault that defines the western limit of the North Saqqara Plateau (Mathieson et al., 2001, Fig. 8).

¹⁴I. J. Mathieson et al., *National Museums of Scotland, Saqqara Project Report 1990* (unpublished), 7.

¹⁵Mathieson et al., *Saqqara Project Report 1990*, Map Sheet 4, Section C1.

¹⁶Mathieson et al., *National Museums of Scotland, Saqqara Project Report 1991* (unpublished), 4.

¹⁷Mathieson et al., *Saqqara Project Report 1990*, 7, discuss tomb shafts (numbered for reference) and low mounds with 'surface sherds which suggest an early dynastic date'. Of the numbered anomalies, MT9 is identified to the west of MT6 (Fig. 2: inset), suggesting a possible Early Dynastic date for this cluster of burials. It is apparent from the 1990 report, however, that Early Dynastic material was observed generally across the area at the eastern end of cross sections C1 to C4, rather than being confined only to the burials on the ridge.

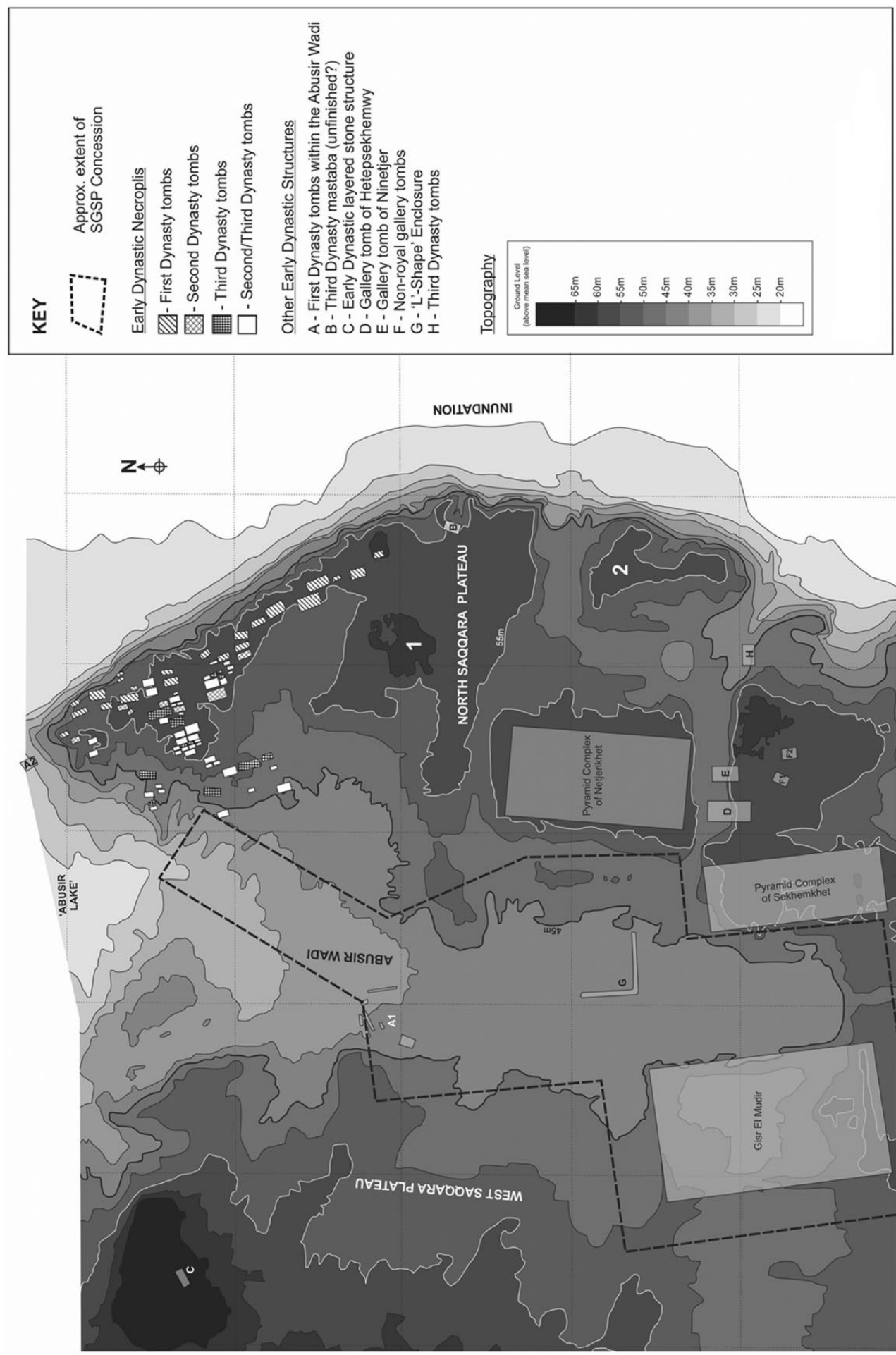


Fig. 1. Map of North Saqqara.

Dynasty and appear to focus on the north of the necropolis. Their distribution is often linked to the status of the tomb owner, with the suggestion that lower status burials were located in the Abusir *wadi* (Fig. 1: A1) and low-lying areas to the north (Fig. 1: A2), with tombs of the elite built high on the North Saqqara Plateau.¹⁸ The presence of a group of evidently high-status burials (Group E) within the cemetery at A1 (Fig. 1), however, challenges this assumption.¹⁹ The feature at A1 excavated by Rizkallah Macramallah²⁰ has been interpreted as a site of royal mortuary ritual associated with the death of the First Dynasty pharaoh Den.²¹ According to Werner Kaiser, this area can be considered as a *Kultbezirk*, the focus of a ceremony enacted at North Saqqara before Den's body was removed to Abydos for burial.²² Other researchers have suggested that the burials at A1 and A2 may form part of a more extensive early cemetery, and although surveys undertaken by the SGSP did identify a large area of buried structures in the northern sections of the Abusir *wadi*, the age of these features remains unknown until excavations are carried out.²³

The majority of the known First Dynasty elite burials at North Saqqara were built at prominent locations along the eastern edge of the North Saqqara Plateau (generally along the 55 m contour – see Fig. 3a). The earliest of these tombs dates from the reign of Aha, with later First Dynasty tombs extending both north and south along the escarpment edge at locations that were visible from the inundation and possibly also from the capital at Memphis.²⁴ It is generally considered that, as this cemetery developed during the Second and Third Dynasties, visibility from the inundation remained an important influence on tomb location, despite the fact that later tombs had to be set back from the escarpment edge.²⁵ Given, however, that at least one Third Dynasty tomb (Fig. 3b: 3308) was built on the site of a First Dynasty structure (Fig. 3a: 3357),²⁶ it is evident that if visibility from the inundation had been a key consideration, continued development along the edge of the escarpment would have been possible. Furthermore, as shown in Fig. 3b, except for an isolated and possibly unfinished Third Dynasty tomb to the east of the pyramid complex of Teti (marked 'B' in Fig. 1 and the lower right of Fig. 3b),²⁷ the

distribution of the known tombs of the Second and Third Dynasties does not follow the alignment of the eastern escarpment as generally assumed. As Fig. 3b illustrates, Second and Third Dynasty tombs generally extend towards the western edge of the plateau, with many sites lying below the 50 m contour at positions that can only have been visible from the Abusir *wadi*. A recent study has used GIS-modelling to assess the relative visibility of individual structures within the Early Dynastic necropolis at North Saqqara.²⁸ This study confirms that whilst the locations of the First Dynasty tombs were indeed visible from the inundation, once tombs began to be set back from the eastern edge of the escarpment these lines of sight were broken. The study also confirms that the later tombs that were not visible from the Nile Valley were visible from viewpoints within the Abusir *wadi*, as Fig. 3b suggests. As the Early Dynastic Period progressed, therefore, it would appear that the Abusir *wadi* took on greater significance, with visibility from the *wadi* becoming an increasingly important consideration for the owners of elite tombs.

The increasing significance of the Abusir *wadi* during the Early Dynastic Period may also be demonstrated by development associated with a prominent hill ('Khaemwaset Hill') on the opposite side of the *wadi* from the Early Dynastic necropolis.²⁹ Excavations undertaken since 1991 by a team from Waseda University³⁰ have shown that although the summit appears to have been the focus for activities in the New Kingdom, an unusual late Second or early Third Dynasty structure was built against the lower flanks of the hill (Fig. 1: C). This structure combines a masonry platform with associated rock-cut chambers and has been interpreted as an early cult temple.³¹ Although views to the north and west are restricted by the topography of Khaemwaset Hill, the uninterrupted views from this monument to the south and east may serve to emphasise the importance of the Abusir *wadi* at this early time.³²

Royal tombs of the Second Dynasty

It is generally accepted that throughout the First Dynasty, Egyptian royal burials had taken place at Umm el Qa'ab, Abydos.³³ For reasons that are not fully understood, however, the focus of royal burials shifted to North Saqqara at

¹⁸A. Tavares, 'Saqqara North, Early Dynastic Tombs' in K. A. Bard (ed.), *Encyclopedia of the Archaeology of Ancient Egypt* (London, 1999), 700–4.

¹⁹E. F. Morris, 'Sacrifice for the State: First Dynasty Royal Funerals and the Rites at Macramallah's Rectangle', in N. Laneri (ed.), *Performing Death* (Chicago, 2008), 22–3.

²⁰R. Macramallah, *Un cimetière archaïque de la classe moyenne du peuple à Saqqarah* (Cairo, 1940).

²¹W. Kaiser, 'Ein Kultbezirk des Königs Den in Sakkara', *MDAIK* 39 (1985), 47–60.

²²Morris, in Laneri (ed.), *Performing Death*, 23.

²³D. Jeffreys and A. Tavares, 'The Historic Landscape of Early Dynastic Memphis', *MDAIK* 50 (1994), 150.

²⁴Jeffreys and Tavares, *MDAIK* 50, 149; T. el-Awady, *Sahure, the Pyramid Causeway: History and Decoration Program in the Old Kingdom* (Abusir XVI; Prague, 2009), 16.

²⁵Tavares in Bard (ed.), *Encyclopedia of the Archaeology of Ancient Egypt*, 703.

²⁶Jeffreys and Tavares, *MDAIK* 50, 149.

²⁷J. E. Quibell, *Excavations at Saqqara: 1905–1906* (Cairo, 1907), pl. III.

²⁸Kluciewicz – Geography <<https://siricerasi.wordpress.com/2011/09/09/the-early-dynastic-mastabas-at-saqqara-a-spatial-analysis/>> accessed 7 November 2015.

²⁹See also A. Dodson, 'Go West: On the Ancient Means of Approach to the Saqqara Necropolis', in C. Price et al. (eds), *Mummies, Magic and Medicine in Ancient Egypt: Multidisciplinary Essays for Rosalie David* (Manchester, 2016), 3–18.

³⁰S. Yoshimura and I. H. Takamiya, 'Waseda University Excavations at North Saqqara from 1991 to 1999', in M. Barta and J. Krejci (eds), *Abusir and Saqqara* (Prague, 2000), 161–72.

³¹N. Kawai, 'An Early Cult Centre at Abusir-Saqqara', in R. F. Freedman and P. N. Fiske (eds), *Egypt at its Origins 3: Proceedings of the Third International Conference: Origin of the State. Predynastic and Early Dynastic Egypt* (Leuven, 2011), 801–28.

³²Kawai, in Freedman and Fiske (eds), *Egypt at its Origins 3*, 801–28.

³³D. Wengrow, *The Archaeology of Early Egypt* (Cambridge, 2006), 250–8.

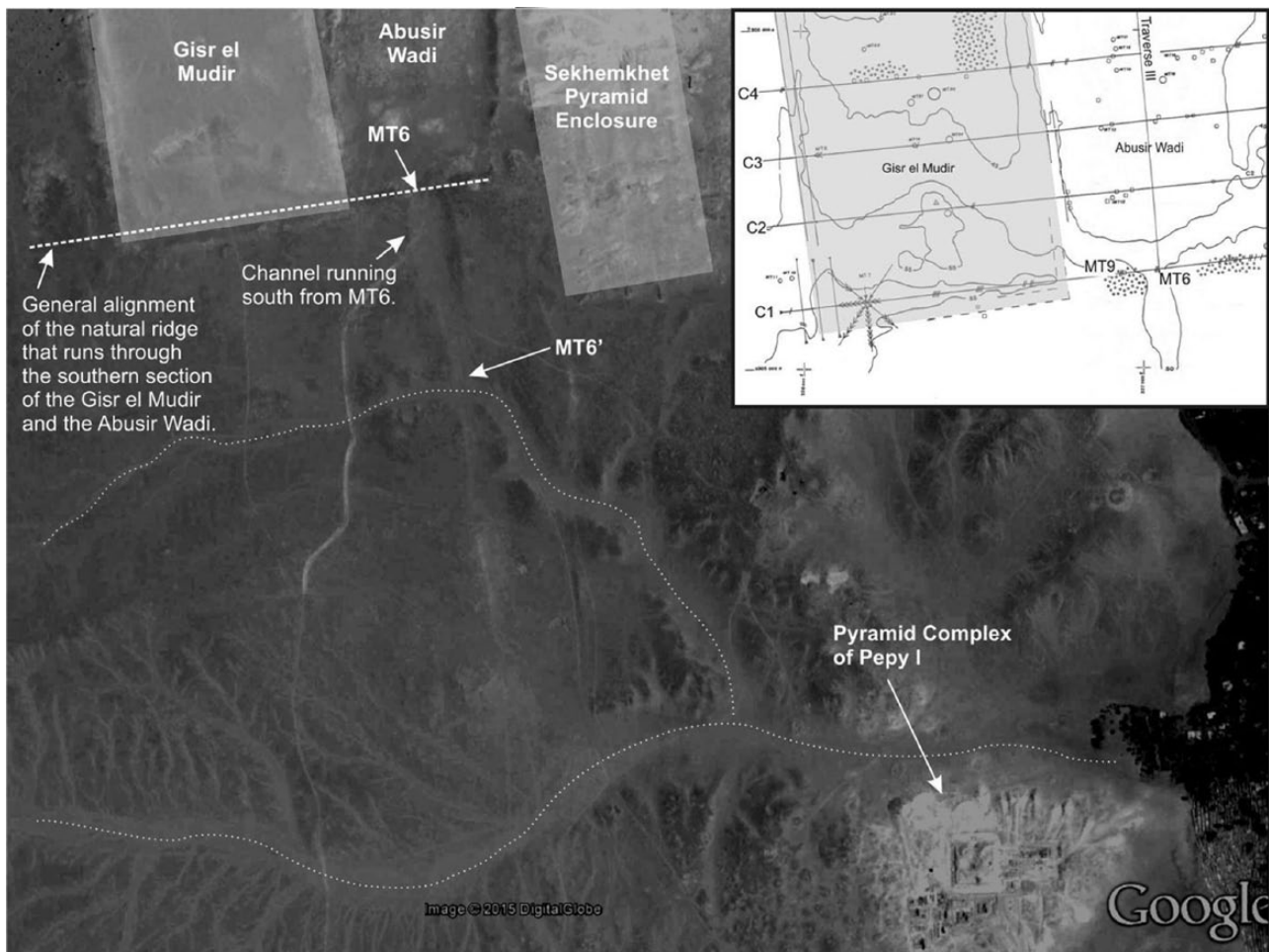


Fig. 2. Main image: Google Earth extract showing the area south of the Abusir wadi and the channel between points MT6 and MT6'. The finer dashed lines indicate wadis that drain this area and discharge towards the inundation, past the pyramid of Pepy I. Inset: Annotated extract from Mathieson et al. (1990), Map 4, showing the Gisir el-Mudir and the southern area of the Abusir wadi. Anomaly MT6 is shown, flanked by two areas of shallow grave pits on the prominent ridge that crosses this part of the site.

the start of the Second Dynasty.³⁴ Although the succession of the Second Dynasty remains the subject of ongoing debate,³⁵ the first three kings are generally acknowledged to have been Hetepsekhemwy, Ra'neb and Ninetjer, and evidence indicates that at least two of these pharaohs were buried at North Saqqara. Rather than select a prominent location high on the northern escarpment, in the area that had been used by elite of the First Dynasty, the earliest of these royal tombs was built adjacent to the site of the later pyramid of Unas (Fig. 1: D). Discovered at the turn of the twentieth century,³⁶ the remains of the tomb are entirely rock-cut, extending some 6 m below the surface of the plateau, with no trace of any tomb superstructure remaining.³⁷ The tomb's

layout is influenced primarily by a 120 m long central corridor that leads from an entrance in the north to a group of rock-cut chambers in the south.³⁸ A large number of secondary corridors and chambers branch off the central corridor and provide the tomb with its distinctive, comb-like appearance.³⁹ Although never fully excavated and despite cylinder seals bearing the names of both Hetepsekhemwy and Ra'neb

³⁴T. A. H. Wilkinson, 'Dynasties 2 and 3', in W. Wendrich et al. (eds), *UCLA Encyclopedia of Egyptology* (Los Angeles, 2014), 4.

³⁵Wilkinson, in Wendrich et al. (eds), *UCLA Encyclopedia of Egyptology*, 2.

³⁶A. Barsanti, 'Rapports de M. Alexandre Barsanti sur les déblaiements opérés autour de la pyramide d'Ounas pendant les années 1899–1901', *ASAE* 2 (1901), 244–57.

³⁷C. Lacher, 'Das Grab des Hetepsekhemui/Raneb in Saqqara: Ideen zur Baugeschichtlichen Entwicklung', in E. M. Engel et al. (eds), *Zeichem aus dem Sand: Streiflichter aus Ägyptens Geschichte zu Ehren von Gunter Dreyer* (Wiesbaden, 2008), 5. Lacher also explored the possible forms of the Second Dynasty royal tomb superstructure.

³⁸Lacher, in Engel et al. (eds), *Zeichem aus dem Sand*, Fig. 2. The chambers at the southern end of the main corridor have been interpreted as a representation of the royal palace and are thought to include the burial chamber.

³⁹Some researchers have questioned whether the tomb has the regular orthogonal layout that is generally assumed (see A. Dodson, 'The Mysterious Second Dynasty', *KMT* 7[2] [1990], 22). It is possible, however, to confirm that for the main axis of the tomb at least the published illustrations appear to be generally correct. Site inspection (in September 2015) identified the entrance cutting to the tomb together with two other locations in which the roof appears to have collapsed or has been exposed by excavation. One of these exposed sections of the tomb, close to the south-east corner of the Unas Pyramid, reveals a narrow passage that appears to follow a straight north–south alignment back to the entrance cutting, just as the published drawings show.

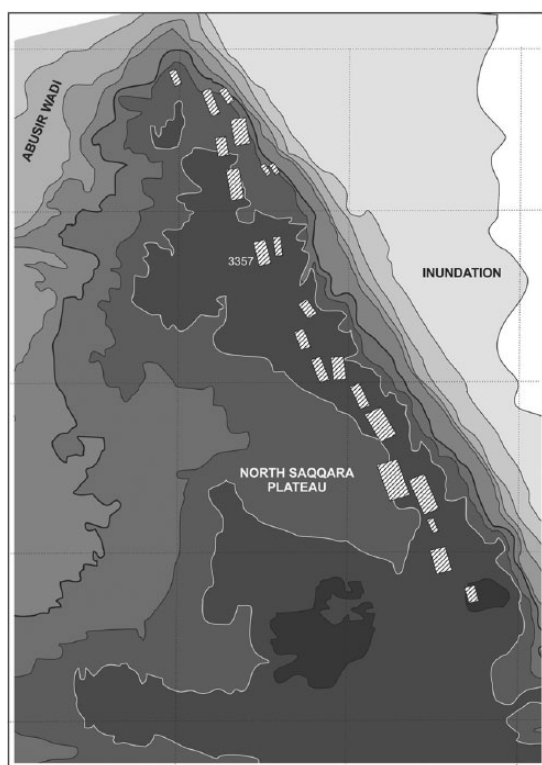


Fig. 3a. General alignment of First Dynasty elite tombs along the 55 m contour defining the eastern limit of the North Saqqara Plateau. Specific tombs referred to in the text are numbered.

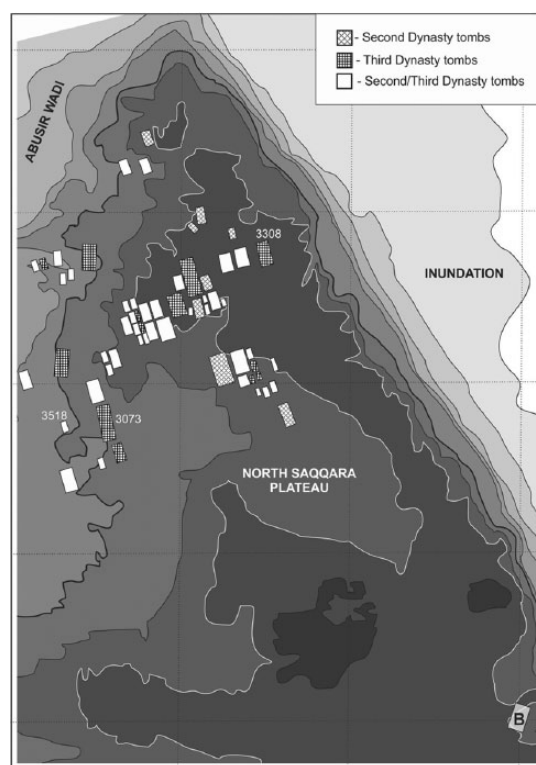


Fig. 3b. General alignment of Second and Third Dynasty elite tombs in the same area of North Saqqara as shown in Fig. 3a. A distinct shift towards the Abusir wadi in the west is evident in the majority of these later tomb locations.

having been found, the tomb is generally regarded as belonging to Hetepsekhemwy, the first king of the Second Dynasty.⁴⁰ Other than a sketch of the tomb published in 1936 by Jean-Philippe Lauer,⁴¹ there has been relatively little interest in this important structure, which is surprising not only because the Second Dynasty remains poorly understood,⁴² but also because this is the first known royal tomb *not* to have been built at Abydos.

The tomb of the third king of the Second Dynasty, Ninetjer, is also present in the same area of Saqqara (Fig. 1: E) and like the preceding royal tomb, takes the form of underground rock-cut galleries, some 6 m deep. As with the tomb of Hetepsekhemwy, no remains of the superstructure of the Ninetjer tomb have been identified.⁴³ This tomb has been subject to recent detailed excavation, which in addition to numerous storage chambers and magazines identified a group of chambers at the south of the tomb that have been interpreted as a model of the royal palace.⁴⁴ When

compared with the tomb of Hetepsekhemwy, however, the Ninetjer tomb has a number of notable differences. In addition to being shorter along the north–south axis than the earlier tomb, perhaps the most striking difference is the general lack of straight corridors and of a regular orthogonal layout in the later of the two tombs.⁴⁵ In what appears as a retrograde development, the main corridor of Ninetjer's tomb is not straight and does not dominate the tomb layout in the manner of the central axis of Hetepsekhemwy's tomb.

Non-royal Second Dynasty tombs

A review of available literature identifies that two other Second Dynasty gallery tombs have been identified to the south and east of the tombs of Hetepsekhemwy and Ninetjer (Fig. 1: F1 and F2). Located in an area better known for its New Kingdom tombs, an assessment of the pottery and stone vessels recovered from the galleries underlying the tomb of Maya firmly indicates a late Second Dynasty date.⁴⁶ This date is also consistent with the discovery of a single, partially preserved seal impression with the name Khasekhemwy.⁴⁷ On the basis of the available evidence, these tombs have been interpreted as belonging to high ranking officials of the late Second

⁴⁰Lacher, in Engel et al. (eds), *Zeichem aus dem Sand*, 1–2.

⁴¹J. P. Lauer, *La Pyramide à degrés: Fouilles à Saqqarah I* (Le Caire, 1936), 4 and Fig. 2.

⁴²Wengrow, *Early Egypt*, 250–1.

⁴³Earlier suggestions that a 1 m-high rock-cut step in the plateau above the tomb may have been associated with a superstructure have recently been challenged. This rock-cut feature (and the remains of a wall found along its crest) have been interpreted as part of later development by Unas. See C. M. Lacher-Raschdorff, *Das Grab des Königs Ninetjer: Architektonische Entwicklung frühzeitlicher Grabanlagen in Ägypten* (Archäologische Veröffentlichungen 125; Wiesbaden, 2014), 155–9.

⁴⁴Lacher-Raschdorff, *Das Grab des Königs Ninetjer*, 59, 251.

⁴⁵Lacher-Raschdorff, *Das Grab des Königs Ninetjer*, Fig. 2.

⁴⁶I. Regulski, 'Investigating a New Dynasty 2 Necropolis at South Saqqara', *British Museum Studies in Ancient Egypt and Sudan* 13 (2009), 225.

⁴⁷Regulski, *British Museum Studies in Ancient Egypt and Sudan* 13, 225.

Dynasty.⁴⁸ The general layout of these non-royal gallery tombs has more in common with the tomb of Ninetjer than with the orthogonal layout that characterises Hetepsekhemwy's tomb and, as with the royal gallery tombs, very little trace of superstructure has been identified. A 'densely packed mud floor', however, may be part of the Second Dynasty construction.⁴⁹

The great rectangular enclosures – the 'L-shape' Enclosure

The influence of landscape on the large rectangular enclosures at North Saqqara was discussed by Nabil Swelim.⁵⁰ Although he applied the term 'rectangular enclosures' to a number of monuments at North Saqqara, for current purposes this term will be applied only to the Gisir el-Mudir and the L-Shape Enclosure.

The L-Shape Enclosure is located below the 45 m contour in the eastern part of the Abusir *wadi* (Fig. 1: G) and a geophysical survey undertaken by the SGSP established that some 140 m of the western wall and 200 m of the southern wall remain *in situ*.⁵¹ These remains consist of linear mounds of gravel and sand with mud-brick and limestone traces, which were formed predominantly from natural materials collected from the surrounding *wadi* surface.⁵² A lack of evidence for the use of masonry led the SGSP to conclude that the remains may have been intended as preliminary outlines for a construction project that never fully materialised.⁵³ To address the absence of the north and east walls of the enclosure, the SGSP concluded that they may have been 'dispersed or removed' during the late Old Kingdom as part of the development of an area of higher ground to the north-east.⁵⁴ As shown in Fig. 4, however, the remains of the L-Shape Enclosure are separated from these Old Kingdom tombs by a 'deep sandy wadi' that the SGSP describe as running along the 45 m contour line.⁵⁵

⁴⁸I. Regulski, 'Reinvestigating the Second Dynasty at Saqqara', in M. Barta et al. (eds), *Abusir and Saqqara in the Year 2010* (Prague, 2012), 707.

⁴⁹J. Van Wetering, 'The Royal Cemetery of the Early Dynastic Period at Saqqara and the Second Dynasty Royal Tombs', in S. Hendrikx (ed.), *Proceedings of the Origins of the State: Predynastic and Early Dynastic Egypt Conference, Krakow, 2002* (Leuven, 2003), 1068.

⁵⁰N. Swelim, 'Some Remarks on the Great Rectangular Monuments of Middle Saqqara', *MDAIK* 47 (1991).

⁵¹Mathieson et al., *Saqqara Project Report 1991*, 5.

⁵²Mathieson et al., *Saqqara Project Report 1991*, 5. A number of mud-brick structures in the north-western sector of the enclosure and numerous tombs throughout the area were also identified by the SGSP. Excavations identified the large mud-brick features as a series of Late Period structures, possibly associated with the Serapeum, some 400 m to the north.

⁵³I. J. Mathieson et al., *National Museum of Scotland, Saqqara Project Report 1993* (unpublished), 5.

⁵⁴Mathieson et al., *Saqqara Project Report 1993*, 6.

⁵⁵I. J. Mathieson et al., *National Museum of Scotland, Saqqara Project Report 1992–1993* (unpublished), 7. This 'wadi' was also identified by de Morgan, see J. de Morgan, *Carte de la Necropole Memphite* (Cairo, 1897), Sheet 10 and is not to be confused with the 'Dry Moat'. As shown on Figure 4 the 'deep sandy wadi' and Dry Moat are separate features, the Dry Moat lying above the 45 m contour line.

The SGSP found no evidence to suggest that the walls of the L-Shape Enclosure extended across the 'deep sandy wadi' and there is no reason to believe that the construction of the later Old Kingdom tombs would have required their removal from this area. Based on the available information therefore, the current author considers that the limited extent of the L-Shape Enclosure may be because work on the structure had been abandoned. Alternatively, it may be the case that a closed rectangular enclosure had never been intended. The 'deep sandy wadi' may also be significant for other reasons. Given that water tends to run down rather than along a slope, it would be unusual for a natural drainage feature such as a *wadi* to run along a contour in the manner described by the SGSP. Furthermore, unlike many natural drainage features, the 'deep sandy wadi' is generally straight-sided. As shown in Fig. 4, if the alignment of this 'wadi' is projected to the south-east, it appears to meet the south-west corner of a man-made feature referred to as the Dry Moat (to be discussed in more detail later). This raises the possibility that like the Dry Moat (and possibly the feature between MT6 and MT6' discussed earlier) the 'deep sandy wadi' may not be an entirely natural feature.

The current author is generally cautious when identifying alignments within ancient sites and the relationships identified in Fig. 4 could be coincidental. It is noteworthy, however, that despite there being no evidence for the continuation of the 'deep sandy wadi' to the north, when its alignment is projected to the north-west, it appears to extend across the entrance cutting of the Serapeum, passing through the First Dynasty *Kultbezirk* excavated by Macramallah (Fig. 1: A1), through the Abusir pyramid field and on to the sun temple of Userkaf, the earliest Fifth Dynasty structure built in the Abusir/Abu Ghurob area (Fig. 4: inset). One obvious criticism of this northward projection is that it connects a series of monuments from almost every part of the pharaonic era. In the absence, however, of any understanding why the Fifth Dynasty pharaohs chose Abusir for their necropolis and ignorance of the factors that influenced either the location of Macramallah's site or the Serapeum, tentative alignments such as those shown in Fig. 4 are intriguing, at the very least.

The Gisir el-Mudir

Despite its considerable size (over 600 m long and 400 m wide), the Gisir el-Mudir is not a particularly prominent feature of the North Saqqara necropolis, its walls denuded and obscured by wind-blown sand. The feature was described by Perring, Lepsius and de Morgan, yet it was not until 1947 that (unpublished) excavations were undertaken by Abdel Salam Hussein. His work revealed the remains of limestone masonry along the west, north and east of the enclosure and pottery dating from the Third Dynasty.⁵⁶ Hussein found no evidence for masonry along the south wall of the Gisir, leading to the initial conclusion that the south of the enclosure was defined by the natural topographic ridge that also defines the southern limit of the Abusir *wadi* (see Fig. 2).

⁵⁶Mathieson et al., *Saqqara Project Report 1990*, 7.

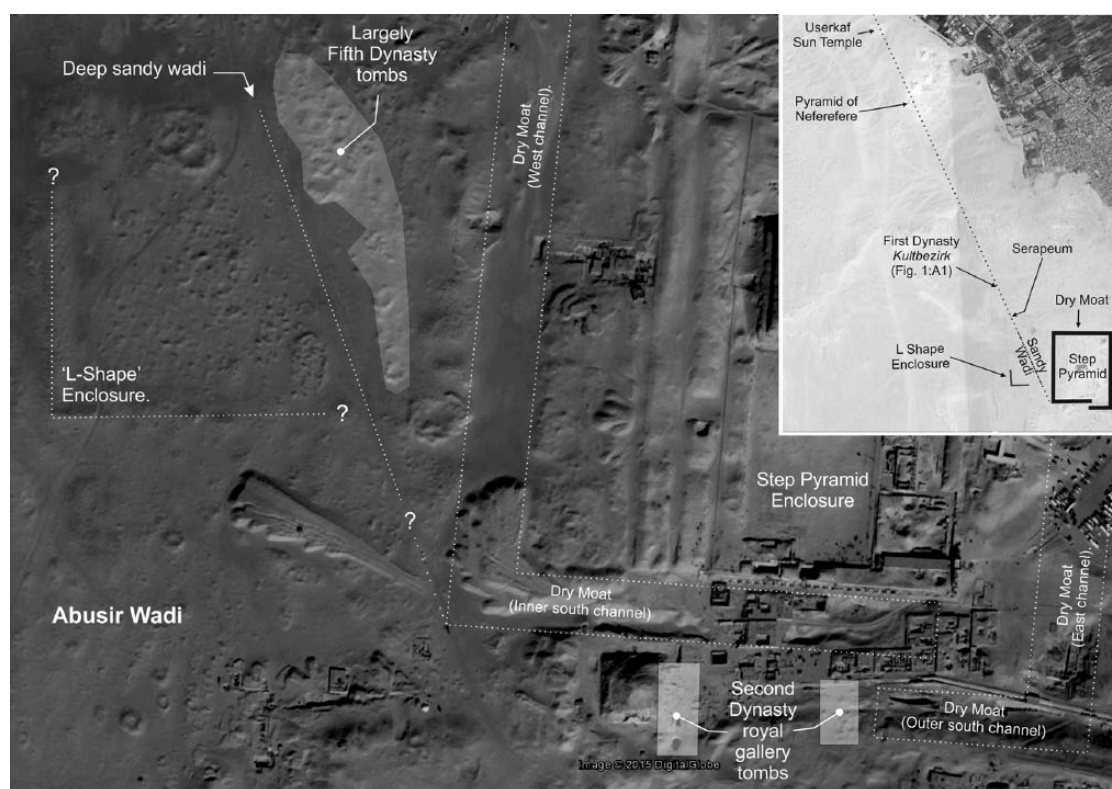


Fig. 4. Google Earth view showing the tentative relationships identified between the 'L-Shape Enclosure, the 'deep sandy wadi' and sections of the Dry Moat around the Step Pyramid enclosure.

Inset: Tentative north-west projection of the 'deep sandy wadi', which passes through an otherwise unconnected series of features from all periods of the pharaonic era, including the entrance cutting of the Serapeum and the pyramid field of Abusir/Abu Ghurob.

The Gisir el-Mudir was the focus of the SGSP between 1990 and 2000, which employed a range of geophysical techniques combined with targeted excavation in order to examine this little understood monument. Initial excavations in 1993 were undertaken in the south of the enclosure and established that a linear anomaly identified by geophysical techniques was a sand-filled trench, an ancient excavation located on the southern side of the natural topographic ridge. In addition to the walls of the trench making the natural ridge appear more prominent, rough blocks of stone had been placed on its top to enhance the natural feature.⁵⁷ To the north of this enhanced topographic ridge, fieldstones had been used to form a second distinct parallel ridge, and both features had been over-filled with quantities of sand and gravel gathered from surrounding areas.⁵⁸ Although this appeared to confirm the absence of a conventional masonry wall in the south of the Gisir el-Mudir, the conclusion was revised in 1995 following excavations at the south-west corner.⁵⁹ The internal masonry that was exposed in 1995 stood up to 14 courses high and included a number of primitive features, one of these being the manner in which the corner had been formed simply by abutting the masonry of the western wall against the southern wall, with abundant use of mortar to fill the resulting gaps.⁶⁰ With hindsight, it is unfortunate that the

SGSP did not extend the 1995 excavations to expose the area where the masonry met the enhanced natural ridge (see Fig. 5) as this may have allowed us to understand the structural relationship between the various elements of the southern wall that had been identified. Further evidence for the use of masonry to form the southern wall of the Gisir was obtained in 1999, when excavations exposed up to two courses of masonry at the south-east corner, resting in a shallow foundation trench.⁶¹ Interestingly, and as shown in Fig. 5, the enhanced natural feature found in 1993 does not appear to align with the section of masonry identified in 1999.⁶² This suggests that the southern wall of the Gisir el-Mudir may have a similar layout to the southern section of the Dry Moat, a feature that will be discussed later.⁶³

Excavations on the west wall of the Gisir were undertaken during the 1993 and 1995 field seasons. The 1993 excavations (some 200m north of the south-west corner) revealed the inner face of the western wall standing to a height of 12 courses (3.2m) above the ancient desert surface.⁶⁴ The single skin of semi-dressed masonry was not laid in a foundation trench and was supported by a buttress

⁵⁷Mathieson et al., *Saqqara Project Report 1993*, 2.

⁵⁸Mathieson et al., *Saqqara Project Report 1993*, 3.

⁵⁹Mathieson et al., *Saqqara Project Report 1995*, Map Sheet 1, sondage A12.

⁶⁰Mathieson et al., *Saqqara Project Report 1995*, 3.

⁶¹I. J. Mathieson et al., *National Museums of Scotland, Saqqara Project Report 1999* (unpublished), 4.

⁶²Mathieson et al., *Saqqara Project Report 1999*, Fig. 2.

⁶³This observation appears to have been made independently by Nabil Swelim. See *A Presentation On: The Dry Moat of the Step Pyramid Complex*, slide 16 <<http://www.nabilswelim.com/dry.asp>> accessed 12 March 2016.

⁶⁴Mathieson et al., *Saqqara Project Report*, 1993, 4.

of undressed blocks, behind which was a second buttress of limestone fragments in a sandy matrix. Overlying the buttresses was a body of fill consisting of sand, silt, small limestone fragments, gravel and flint nodules set in a mud matrix.⁶⁵ The 1995 excavations on the west wall located up to 14 courses of the inner dressed masonry skin in the south-west corner of the enclosure and similar methods of construction were identified (i.e. dressed outer skins with inner buttresses and a core of finer fill material). These excavations suggested that the western wall of the Gisir el-Mudir had originally been some 15 m wide at the base.⁶⁶

Where exposed, the north wall of the enclosure had survived to between five and seven courses high, with the lowest masonry set in mud mortar within a foundation trench up to 0.6 m deep.⁶⁷ Unlike the western wall with its core of unconsolidated material, the northern wall appears to have been built entirely of articulated and coursed limestone blocks.⁶⁸ In addition to the main wall, a low masonry structure was identified (two to four courses high), which extended some 6 m to the north from the base of the main wall and was interpreted as a later addition to the enclosure.⁶⁹

Along the eastern wall of the Gisir el-Mudir, excavations were initially targeted at the point where ground elevations begin to rise towards the topographic ridge, some 150 m north of the south-east corner of the enclosure. After removing about 1.5 m of sand, five courses of the inner skin of the wall were exposed; however, the standard of construction was noted to be poor, with irregularly finished masonry and much use of smaller infill stones and abundant mortar.⁷⁰ In a second sondage to the north, the exposed masonry was even less well constructed, with the wall built using very little mortar. Excavations intended to locate the external face of the eastern wall initially encountered a substantial depth of sand, which, once removed, exposed a step cut into the limestone bedrock. The base of the sand to the east of this step could not be reached by excavation and boreholes were required to locate bedrock at a depth of approximately 3 m. The excavated step in the limestone bedrock was found to be a quarry wall that was aligned generally north–south and ran along the western margins of the Abusir wadi, some 12 m east of the walls of the Gisir el-Mudir. The SGSP concluded that this quarry was a source of stone used to build the enclosure.⁷¹ Sondages were extended from the quarry wall towards the Gisir and although a shallow foundation trench indicated the position of the outer skin of the enclosure wall, few traces of masonry remained. The presence of an east–west aligned ramp-like structure dated to the late

Old Kingdom,⁷² together with sections where the core of the main enclosure wall had collapsed, were taken as indications of widespread stone robbing from relatively early times. The most prominent geophysical anomaly in this area was a robbers' trench, 2.2 m deep, which exposed the lower two courses of the enclosure wall together with a number of large worked and dressed limestone 'megaliths'. The most accessible of these large blocks took the form of an inverted 'L' shape and given the parallels between their location and the entrance to the pyramid enclosure of Netjerikhet, it was concluded that these features were the remains of the entrance to the Gisir el-Mudir.⁷³ Excavations further north along the eastern wall exposed a low masonry platform, which from the description provided by the SGSP appears to be similar to the feature that had previously been found outside the northern wall.⁷⁴ The masonry platform to the east of the Gisir was built from articulated limestone blocks, set in a sand/mud mortar. However, unlike the 6 m-wide feature in the north, the eastern platform extended only 3 m.⁷⁵ When discussing the northern feature in 1994, the SGSP suggested that if similar structures were found surrounding the Gisir el-Mudir, it might be possible to compare them with the low walls that surround the enclosures at Abydos and Hierakonpolis, strengthening the case for the Gisir el-Mudir being a development in stone of these earlier mud-brick funerary enclosures.⁷⁶ After exposing the eastern platform in 2000, however, the SGSP did not explore this issue further, making no reference to the northern platform and concluding that the feature along the eastern wall was associated with the original entrance to the enclosure.⁷⁷ In 2007, the SGSP carried out another geophysical survey along the eastern wall of the Gisir el-Mudir, using a technique that is particularly useful for detecting sub-surface mud-brick remains. However, this work did not identify any significant mud-brick structures.⁷⁸

In contrast to many of the funerary enclosures at Abydos,⁷⁹ no significant structures were identified within the Gisir el-Mudir,⁸⁰ despite the enclosure being subject to a number of detailed geophysical surveys. In addition to limestone chip-pings, red granite and black basalt fragments were identified across a considerable part of the north-west quadrant,⁸¹ and areas of limestone fragments were found outside the enclosure, at the south-west and north-west corners. The SGSP

⁶⁵Mathieson et al., *Saqqara Project Report*, 1993, 4.

⁶⁶Mathieson et al., *Saqqara Project Report*, 1993, 4 and Fig. 17.

⁶⁷I. J. Mathieson et al., *National Museums of Scotland, Saqqara Project Report 1994* (unpublished), 3.

⁶⁸Mathieson et al., *Saqqara Project Report 1994*, 3 and Fig. 7. A reference on p. 3 of the 1994 report, which suggests that the north wall of the Gisir had been built using rough masonry and abundant mortar is not consistent with subsequent text on the same page or with the details shown on Fig. 7 of the same report.

⁶⁹Mathieson et al., *Saqqara Project Report 1994*, 3.

⁷⁰I. J. Mathieson et al., *National Museums of Scotland, Saqqara Project Report 1998* (unpublished), 4.

⁷¹Mathieson et al., *Saqqara Project Report 1998*, 5.

⁷²Mathieson et al., *Saqqara Project Report 1998*, 5.

⁷³I. J. Mathieson et al., *National Museum of Scotland, Saqqara Project Report 2000* (unpublished), 5.

⁷⁴Mathieson et al., *Saqqara Project Report 2000*, 4.

⁷⁵Mathieson et al., *Saqqara Project Report 2000*, 4.

⁷⁶Mathieson et al., *Saqqara Project Report 1994*, 3.

⁷⁷Mathieson et al., *Saqqara Project Report 2000*, 5.

⁷⁸C. Price, 'East of Djoser: Preliminary Report of the Saqqara Geophysical Survey Project, 2007 Season', in P. Kousoulis and N. Lazaridis (eds), *Proceedings of the Tenth International Congress of Egyptologists, University of the Aegean, Rhodes, 22–29 May 2008* (Orientalia Lovaniensia Analecta 241; Leuven, 2015), 428.

⁷⁹L. Bestock, *The Development of the Funerary Cult at Abydos: Two Funerary Enclosures from the Reign of Aha* (Wiesbaden, 2009), Figs 18, 20, 22, 23, 27 etc.

⁸⁰Mathieson et al., *Saqqara Project Report 1990*, 8.

⁸¹Mathieson et al., *Saqqara Project Report 1991*, 3.

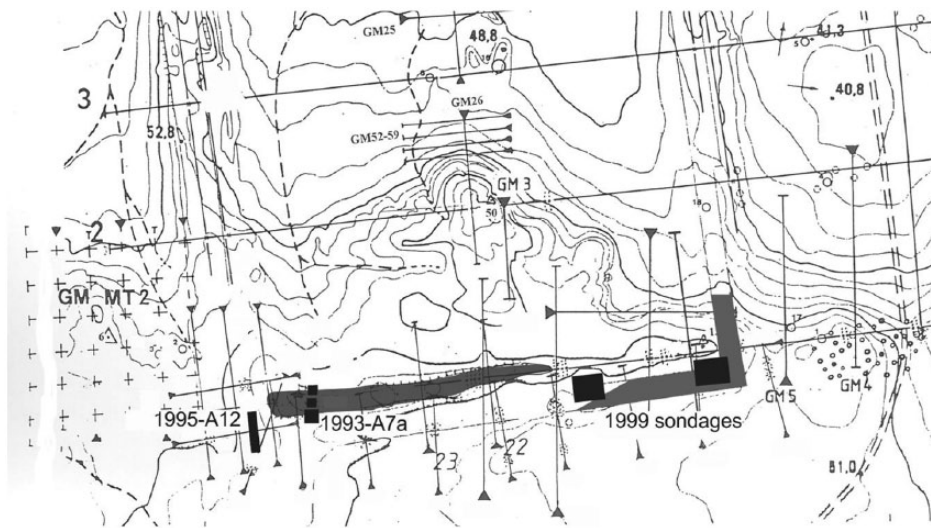


Fig. 5. Extract from Mathieson et al. (1995), Map Sheet 1, showing Sondage 1993-A7a and 1995-A12. 1993-A7a exposed an enhanced natural feature, the approximate alignment of which is identified by grey shading (left). 1995-A12 exposed an inner masonry face at the south-west corner of the enclosure.

Two 1999 sondages have been added along with what is inferred from Mathieson et al. (1999), Fig. 2, as the walls of Girs el-Mudir in the south-east corner (also shaded grey – right). The south wall exposed in the 1999 sondages does not appear to align with the enhanced natural ridge identified in 1993.

interpreted the areas of limestone fragments as possible workshops.⁸² However, their location on the opposite side of the enclosure from the only identified area of quarrying is somewhat problematic. The remains of what may have been areas of pavement were identified at a number of locations within the enclosure. The lower 1.5 m of masonry of the inside of the west wall was obscured by a layer of compacted sand, the upper 5 cm of which was embedded with mud-brick and limestone fragments.⁸³ In the south-east of the enclosure, a limestone pavement was exposed, with slabs between 3 cm and 14 cm thick, laid on mud mortar. The date and precise relationship of this limestone pavement to other nearby features, however, could not be established with any certainty.⁸⁴ In 1993, excavations in the south-west of the enclosure revealed an area in which the natural desert surface had been paved with a single course of mud brick (Fig. 6), overlain in places by linear mortar ridges, up to 3 cm high. The size of the bricks, their light colour and the general absence of pottery and organic inclusions in the fabric led the SGSP to conclude that these bricks were ‘archaic’, of a type generally associated with funerary monuments.⁸⁵ The current author notes that this brick-paved area is strikingly similar to a paved area at Abydos, found within the First Dynasty funerary enclosure referred to as Aha III.⁸⁶ In the example from Abydos, a more extensive upper plaster layer was exposed, suggesting that the mortar ridges found at Saqqara may be the weathered remains of what was originally a more extensive plaster finish. Perhaps the most interesting feature inside the Girs el-Mudir, however, is the southern mound. Given its association with the natural topographic ridge that forms the southern boundary of the Girs, the SGSP considered that the southern mound was a natural

promontory, a conclusion that was generally supported by the findings of a series of boreholes drilled in 1995. Although these boreholes confirmed the largely natural origins of this feature, they established that the mound had been enhanced by the placement of between 2.5 m and 5 m of sand and gravel on its crest and down its flanks.⁸⁷

As to the date of the Girs el-Mudir, the SGSP Preliminary reports indicate a range of masonry features that are considered to be early. For example, it was noted that naturally occurring layers of soft tafl had not been trimmed away from the more competent layers of limestone, before the masonry blocks had been incorporated into the structure.⁸⁸ In addition, the irregular size and shape of the blocks, the irregular coursing and the absence of quoining at the corners,⁸⁹ were all identified as features that predate the more refined masonry techniques used in the Third Dynasty pyramid complex of Netjerikhet.⁹⁰ Of the datable sherds from the SGSP excavations,⁹¹ a substantial proportion could be dated to the late Old Kingdom and First Intermediate Period and were generally found in association with rubble and other material that indicated collapsed sections of wall, brought about by stone robbing.⁹² Earlier material (from the late Second or early Third Dynasty) was often found in secure contexts within the rubble core of the walls,⁹³ providing the strongest evidence for the date of the Girs el-Mudir. Taking the evidence for the

⁸²Mathieson et al., *Saqqara Project Report 1991*, 3.

⁸³Mathieson et al., *Saqqara Project Report 1993*, 4.

⁸⁴Mathieson et al., *Saqqara Project Report 2000*, 4.

⁸⁵Mathieson et al., *Saqqara Project Report 1993*, 3.

⁸⁶Bestock, *The Development of the Funerary Cult at Abydos*, Fig. 64.

⁸⁷Mathieson et al., *Saqqara Project Report 1995*, 4 and Figs 4, 5. *Contra* A. Cwiek, ‘History of the Third Dynasty: Another Update on the Kings and Monuments’, in H. Vymazalová and M. Barta (eds), *Chronology and Archaeology in Ancient Egypt: The Third Millennium B.C.* (Prague, 2009), 97.

⁸⁸Mathieson et al., *Saqqara Project Report 1993*, 4.

⁸⁹Mathieson et al., *Saqqara Project Report 1995*, 3.

⁹⁰Mathieson et al., *Saqqara Project Report 1995*, 6.

⁹¹Mathieson et al., *Saqqara Project Report 1995*, 4.

⁹²Mathieson et al., *Saqqara Project Report 1998*, 5.

⁹³Mathieson et al., *Saqqara Project Report 1995*, 4.

nature and standard of construction together with the datable finds, the SGSP concluded that the Gisir el-Mudir most likely dates to the very latest part of the Second Dynasty and represents an intermediate phase between the mud-brick *Talbezirke* of Hierakonpolis and Abydos and the pyramid enclosures of Netjerikhet and Sekhemkhet.⁹⁴ The interpretation of the Gisir el-Mudir as a *Talbezirk* has been challenged by Andrzej Cwiek, on the basis that its location at the southern end of the Abusir *wadi* is very different from the situation at Abydos, where the enclosures are located at the edge of the inundation.⁹⁵ For this reason, Cwiek questions the proposed Second Dynasty date of the Gisir el-Mudir, preferring a Third Dynasty attribution instead. The late Second Dynasty attribution established by the SGSP presents less difficulty, however, if the Gisir (and perhaps the L-Shape Enclosure) is considered as a development of the First Dynasty *Kultbezirk* excavated in the Abusir *wadi* by Macramallah (Fig. 1: A1). The focus of Macramallah's *Kultbezirk* appears to have been an open central space,⁹⁶ a feature that may be echoed by the undeveloped areas within the Great Rectangular Enclosures of North Saqqara.

The pyramid complex of Netjerikhet

A great deal has been written about the Step Pyramid of Netjerikhet and the complex of buildings that surrounds it, and space prohibits a detailed review of the entire complex in the current article. When exploring the influence of landscape on North Saqqara in a previous article,⁹⁷ the current author noted that when originally conceived as a relatively low-lying mastaba, the location of the tomb of Netjerikhet was unlikely to have been selected on the basis of visibility from the inundation. The Step Pyramid is set well back from the eastern edge of the North Saqqara Plateau at a position in which the initial mastaba would have been barely visible when viewed from the Nile Valley.⁹⁸ It also appears unlikely that the presence of existing development influenced Netjerikhet's choice of site.⁹⁹ In their publication on excavations at Saqqara,¹⁰⁰ Firth and Quibell make frequent reference to the presence of debris from earlier buildings that infilled the passages and chambers beneath the Step Pyramid.¹⁰¹ It seems unlikely, however, that such large volumes of debris would have been taken into passageways deep below the pyramid and Mark Lehner provides an interesting

⁹⁴Mathieson et al., *Saqqara Project Report 1993*, 6.

⁹⁵Cwiek, in Vymazalová and Barta (eds), *Chronology and Archaeology in Ancient Egypt*, 96–7.

⁹⁶Morris, in Laneri (ed.), *Performing Death* (2008), Fig. 2.4.

⁹⁷Reader, *JEA* 90, 63–71.

⁹⁸If visibility from the inundation had been an important factor, the areas above the 55m contour that are marked '1' and '2' on Fig. 1 will both have offered more suitable locations.

⁹⁹Van Wetering, in Hendrikx (ed.), *Predynastic and Early Dynastic Egypt*, 1071. See also T. A. H. Wilkinson, *Early Dynastic Egypt* (London, 1999), 242.

¹⁰⁰C. M. Firth and J. E. Quibell, *Excavations at Saqqara, The Step Pyramid I* (Cairo, 1935).

¹⁰¹Firth and Quibell, *Excavations at Saqqara I*, 3 (n. 1) and 19–20.

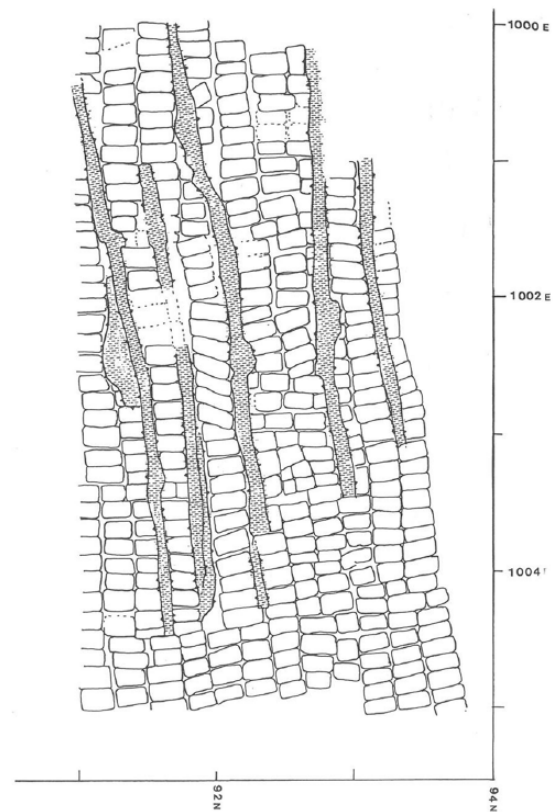


Fig. 6. Mathieson et al. (1993), Fig. 12A. Plan of mud-brick paving in the south-west corner of the Gisir el-Mudir.

alternative interpretation, suggesting that the debris may be the remains of an early phase of Netjerikhet's burial chamber.¹⁰² Several other possibly early below-ground features have been identified within the Step Pyramid enclosure, particularly in the largely unexplored northern court. In the north-west of the enclosure, inside the northern wall, are two rows of cell-like structures generally referred to as granaries. The open passage between these granaries was found to contain the entrance to a rock-cut substructure in which sealings from the reigns of Khasekhemwy and Netjerikhet were found.¹⁰³ Mariette found lion-headed alabaster altars in one of four entrances to a separate set of underground galleries,¹⁰⁴ which Borchardt suggested may have come from an earlier temple destroyed by the building activity of Netjerikhet.¹⁰⁵ A short distance further south, three unfinished stairway tombs have been dated to the Third Dynasty and are presumed to have been under construction when Netjerikhet took charge of this area for his pyramid complex.¹⁰⁶ It has also been suggested that the Western Massif (Fig. 7) may predate the reign of Netjerikhet,¹⁰⁷ yet this does not appear to be supported by the available evidence. The Western Massif consists of three masonry elements (Massif

¹⁰²M. Lehner, *The Complete Pyramids* (London, 1997), 87.

¹⁰³Firth and Quibell, *Excavations at Saqqara I*, 8.

¹⁰⁴Wilkinson, *Early Dynastic Egypt*, 251.

¹⁰⁵Firth and Quibell, *Excavations at Saqqara I*, 77.

¹⁰⁶Firth and Quibell, *Excavations at Saqqara I*, 78; and Wilkinson, *Early Dynastic Egypt*, 251.

¹⁰⁷Stadelmann, quoted in Wilkinson, *Early Dynastic Egypt*, 251.

I, II and III) and according to drawings published by Lauer,¹⁰⁸ it appears that Massif I was built against the lowest step of the Step Pyramid in a manner that could only be achieved if the pyramid had been completed first.¹⁰⁹ Further evidence for the date of the Western Massif has been revealed by the expedition led by Karol Myśliwiec. Inspection of the outer masonry of Massif III has identified pottery shards within the mortar that have been dated to the reign of Netjerikhet.¹¹⁰

Whilst the superstructure of the Western Massif may not pre-date Netjerikhet, the remains of an earlier mud-brick structure have been identified directly beneath the lowest masonry course of the western Step Pyramid enclosure wall.¹¹¹ Furthermore, it is possible that a series of galleries cut at depths in the order of 6 m beneath the Western Massif are also early. With the only known entrance in the north and a very regular orthogonal layout, these galleries closely resemble the tomb of Hetepsekhemwy, although at a length of over 400 m, the galleries beneath the Western Massif are considerably larger. Unfortunately, only superficial investigations of these galleries have been undertaken to date.¹¹²

An unusual feature of the pyramid complex of Netjerikhet is the inclusion of the so-called South Tomb, which was built beneath the southern enclosure wall (Fig. 7) and incorporated a number of features that appear to copy elements of the substructure beneath the Step Pyramid, including a 28 m deep shaft and a burial chamber too small to have held a complete human burial.¹¹³

The Dry Moat

In 1998, using a range of aerial photographs and topographic maps, Nabil Swelim proposed the existence of what has become known as the Dry Moat surrounding the Netjerikhet pyramid enclosure.¹¹⁴ Although initially the existence of the feature was not widely accepted, subsequent fieldwork has strengthened Swelim's hypothesis.¹¹⁵

¹⁰⁸Lauer, *La Pyramide à degrés: Fouilles à Saqqarah II* (Le Caire, 1936).

¹⁰⁹Contra R. Stadelmann, 'Die Oberbauten der Königsgräber der 2. Dynastie in Sakkara', in P. Posener-Kriéger (ed.), *Mélanges Gamil Eddin Mokhtar* (Le Caire, 1985), 300–1.

¹¹⁰I. Teodorzja et al., 'Some Remarks on the Western Massif in the Step Pyramid Complex', *Polish Archaeology in the Mediterranean* 19 (2007).

¹¹¹F. Welc, 'Some Remarks on the Early Old Kingdom Structures Adjoining the Enclosure Wall of the Netjerikhet Funerary Complex on its West Side', *Polish Archaeology in the Mediterranean* 22 (2008).

¹¹²Wilkinson, *Early Dynastic Egypt*, 251.

¹¹³Lehner, *The Complete Pyramids*, 92.

¹¹⁴N. Swelim, 'The Dry Moat of the Netjerikhet Complex', in J. Baines et al. (eds), *Pyramid Studies and Other Essays Presented to I. E. S. Edwards* (London, 1988), 12–22.

¹¹⁵Including F. Welc et al., 'Western Section of the "Dry Moat" Channel Surrounding the Step Pyramid Complex in Saqqara in the Light of Ground-penetrating Radar Prospection', *Archaeological Prospection* 22 (2015), 293–305; T. Herbich and A. Jagodzinski, 'Geophysical Investigation of the Dry Moat of the Netjerikhet Complex in Saqqara', in Z. Sulgostowska et al. (eds), *Man, Millennium, Environment: Studies in Honour of Romuald Schild* (Warsaw, 2008), 273–80.

Except for the southern section, the Dry Moat is understood to be a single continuous trench some 40 m wide and 6 m deep, enclosing an area larger than the Gisir el-Mudir. The southern section of the Dry Moat consists of two channels (Figs 4 and 7) with parallel alignments, which project inward from the south-east and south-west corners. This overlapping arrangement and the presence of a large number of significant structures, including the Pyramid complex of Unas and the gallery tombs of Hetepsekhemwy and Ninetjer (Fig. 7) make the southern section of the Dry Moat particularly difficult to interpret.

It is possible that the presence of two overlapping channels in the south of the Dry Moat was unintentional;¹¹⁶ however, this seems unlikely. Although, like the southern wall of the Gisir el-Mudir (see earlier and Fig. 5), the overlapping inner and outer channels give the Dry Moat the appearance of the hieroglyph for 'enclosure',¹¹⁷ it is probable that the original purpose of the Dry Moat was rather mundane. Unlike other pyramid sites, there are few readily identifiable quarries at North Saqqara,¹¹⁸ although excavations undertaken to the west of the Step Pyramid enclosure have established that the Dry Moat and the terraces to the east appear to have been used as quarries in the Third Dynasty.¹¹⁹ When considering the practical issues associated with quarrying and transporting stone for the construction of an enclosure wall such as that around the Step Pyramid, the use of a moat-like quarry as a source of building stone has a number of advantages, principally minimising the distance between the quarry-face and the ever-changing point of construction. It is possible, therefore, that the Dry Moat was initially excavated as a source of stone for the Netjerikhet enclosure wall and that this simple quarry developed a ritual significance, as the Step Pyramid complex evolved.

The deep trenches in the inner channel of the southern Dry Moat

There is another group of features associated with the southern channel of the Dry Moat that is seldom discussed and yet considered to be amongst the most remarkable features of the entire Saqqara Necropolis. These rock-cut trenches, which are some 3 m wide and more than 20 m deep, were

¹¹⁶For example, the westward continuation of the Outer Channel may have been prevented by the rock cut tomb of Ninetjer (see Fig. 7).

¹¹⁷Gardiner sign O4 (reed enclosure) or O13 (fortified enclosure). See Swelim, in Baines et al. (eds), *Pyramid Studies and Other Essays*, 13. The overlap used in the hieroglyphs is to the left of the rectangular area (not beneath as in the case of the Saqqara monuments) and in the case of the hieroglyphs, the path from the outer to inner limb of the enclosure wall runs clockwise, rather than anti-clockwise as is the case with the monuments at Saqqara.

¹¹⁸F. Welc, 'The Third Dynasty Open Quarry West of the Netjerikhet Pyramid Complex (Saqqara)', *Studia i Prace XXIV* (2011), 272.

¹¹⁹Welc, *Studia i Prace XXIV*, 301; and K. Mysliwiec, 'West Saqqara in 2002', in M. Gawlikowski and W.A. Daszewski (eds), *Polish Archaeology in the Mediterranean XIV* (2002), 111–27.

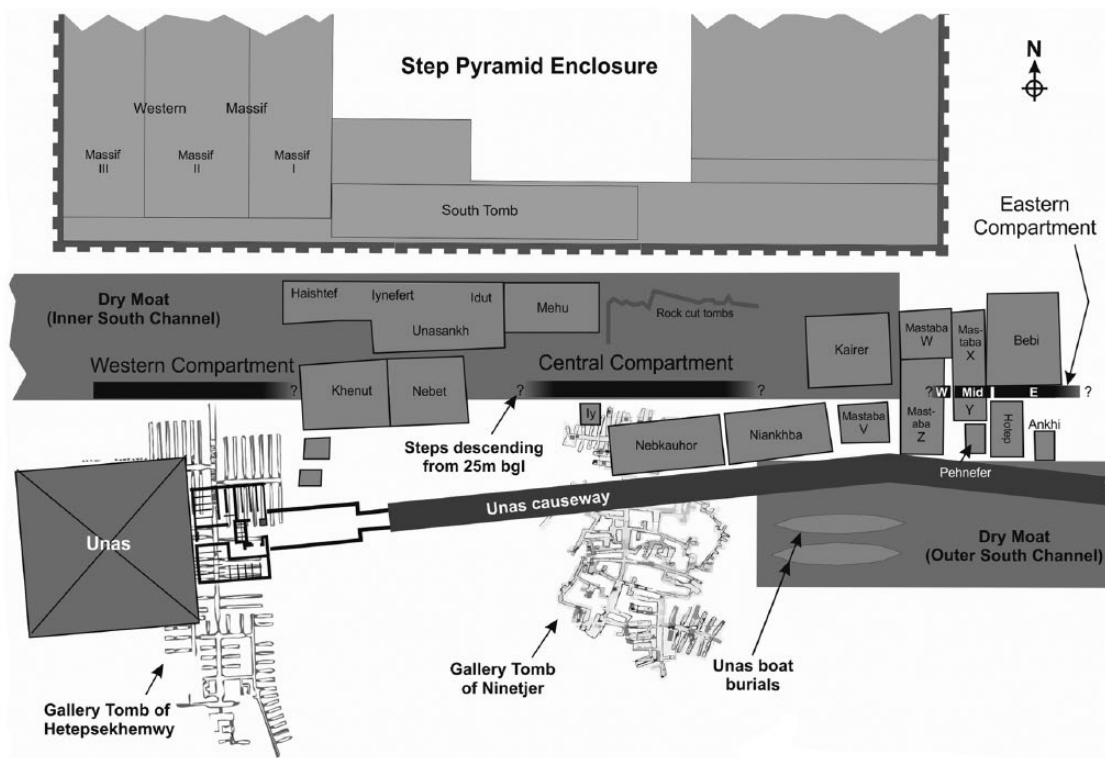


Fig. 7. Indicative layout of the area south of the Step Pyramid enclosure, showing the Dry Moat, the three compartments of the deep trenches and other features referred to in the text.

partially cleared in the 1930s and 1940s, although the work was never fully published.¹²⁰

Forty linear metres of the eastern compartment were cleared of sand in 1937–8 by Selim Hassan, to expose three separate chambers (labelled ‘W’ (west), ‘Mid’ (middle) and ‘E’ (east), in Fig. 7).¹²¹ All three chambers of the eastern compartment were originally excavated from ground level, with the west chamber found to have only been quarried to a depth of approximately 6 m.¹²² The substantially deeper middle chamber begins some 5 m to the east and all four walls were cleared, allowing the full extent of this short section of trench to be established (Fig. 7).¹²³ After a short length of intact bedrock, the western limit of the eastern chamber was identified, close to the south-west corner of the mastaba of Bebi (Fig. 7). However, the eastern limit was not located, with Hassan’s clearance terminating within

sand infill. In places, broken sections of the competent limestone layer that forms the plateau surface in this area (the ‘upper hard rock stratum’) were found partially projecting over the trenches,¹²⁴ suggesting that this limestone layer may originally have been left *in situ* to provide a roof over the ancient excavations.¹²⁵ The three chambers of the eastern compartment were connected by short narrow passages that appear to share a common vertical and horizontal alignment.¹²⁶ If, as has been suggested, the chambers were roofed by leaving the upper hard rock stratum in place, these passages would have provided the only access between the chambers.¹²⁷

Some 60 m west of the eastern compartment is a second section of deep trench that was partially cleared by Zaki Saad in 1939–40 (the central compartment – see Fig. 7).¹²⁸ This was cleared for a distance of 80 linear metres and extends from the base of the dry moat, to a depth of 25 m.¹²⁹ The walls of the trench were found to be generally vertical, except for a section some 6 m below ground level (corresponding with the approximate level of the base of the Dry

¹²⁰N. Swelim, ‘The Dry Moat, the South Rock Wall of the Inner Channel’, in E. Czerny et al. (eds), *Timelines: Studies in Honour of Manfred Bietak I* (Orientalia Lovaniensia Analecta 149; Leuven, 2006), 363–76. See also Z.Y. Saad, ‘A Preliminary Report on the Excavations at Saqqara 1939–1940’, *ASAE* 40 (1940), 692–3; Z. Y. Saad, ‘Royal Excavations at Saqqara and Helwan (1941–1945)’, *Supplement ASAE* 3 (1947), 66–7.

¹²¹Swelim, in Czerny et al. (eds), *Studies in Honour of Manfred Bietak*, 366.

¹²²The western limit of the western chamber was not located, as the sand infill to the trench extended beneath the adjacent mastaba z. The eastern limit of the western chamber was identified as a rock wall, close to mastaba y (see Fig. 7).

¹²³Although no depth is given in Swelim, in Czerny et al. (eds), *Studies in Honour of Manfred Bietak*, Fig. 2, the depth of the middle and eastern chambers is greater than 20 m.

¹²⁴Swelim, in Czerny et al. (eds), *Studies in Honour of Manfred Bietak*, 368. The terms ‘upper and lower hard rock strata’, were coined by Swelim.

¹²⁵Swelim, in Czerny et al. (eds), *Studies in Honour of Manfred Bietak*, 375.

¹²⁶Swelim, in Czerny et al. (eds), *Studies in Honour of Manfred Bietak*, 368 and pl. 2.

¹²⁷Swelim, in Czerny et al. (eds), *Studies in Honour of Manfred Bietak*, 368.

¹²⁸Saad, *ASAE* 40.

¹²⁹Swelim, in Czerny et al. (eds), *Studies in Honour of Manfred Bietak*, 370.

Moat) where the partially projecting remains of a second competent limestone layer (the 'lower hard rock stratum') suggest that this limestone bed may also have formed a roof over the deep excavation. At the base of the western end of the central compartment, Saad found a series of rock-cut steps that descended to even greater depth. Given that the fill at the western end of Saad's clearance appeared to be supporting the late Fifth Dynasty mastaba of Nebet (Fig. 7), no further clearance was undertaken. With both the eastern and western ends of Saad's clearance being limited by the presence of fill supporting overlying mastabas, the full extent of the central compartment was not established.

Before the end of the 1938–9 field season, Saad exposed a short section of the western compartment to the west of the mastaba of Khenut. It was not until the 1942–3 season, however, that he was able to return to Saqqara to resume this work. Rather than continue to chase along the trench, Saad began clearance at a point near the south-west corner of the Dry Moat.¹³⁰ Initially, the depth of the accumulated sand was found to be generally consistent with the base of the Moat and within this shallow clearance, Saad discovered rough masonry resembling the 'buildings ... under the *temenos* wall of the Step Pyramid'.¹³¹ A short distance further east of this early masonry, however, Saad discovered that the lower hard rock stratum had been removed: Saad had located the western limit of the western compartment. The western compartment was cleared initially to a depth of 26m, where a mortared stone pavement was encountered. After removing this pavement, the base of the trench was found to be an irregular natural limestone surface, up to 27.5m below ground level. As was the case elsewhere, broken sections of the lower hard rock stratum suggested that the western compartment had originally been roofed (Fig. 8).¹³² Saad was able to confirm this when a masonry-filled opening was found immediately underlying the *in situ* lower hard rock strata at the top of the western rock wall (Fig. 8, circled). It is not known whether Saad removed this masonry to discover what, if anything, lay beyond.

The deep trenches cleared by Hassan and Saad in the 1930s and 1940s are an enigma. Given that they appear to pass beneath a series of Fifth Dynasty mastabas, it is evident that the trenches pre-date the late Old Kingdom,¹³³ yet it is not clear whether they were originally conceived as part of the Dry Moat or should be regarded as a separate development. Furthermore, the relationship between the western and central compartments (within the Dry Moat) and the

eastern compartment (beyond the Dry Moat) has not been established. If, as discussed earlier, the Dry Moat was originally intended as a quarry, it seems unreasonable to consider the deep trenches in the same way. Quarrying operations to such depth and from beneath the 'roof' provided by the hard rock strata would have been wholly impractical and are unlikely to have required the paving found near the base of the western compartment. Most remarkable, however, is the observation that the cleared sections of the central and western compartments occupy positions immediately to the north of the Second Dynasty gallery tombs of Hetepsekhemwy and Ninetjer (Fig. 7). This observation must be treated with caution. The presence of overlying Old Kingdom tombs limited the clearance that Saad was able to undertake and the possibility remains that the western and central compartments are part of a single, continuous excavation. Saad's identification of the western rock wall of the western compartment (Fig. 8), however, demonstrates that the trench does not extend for the full length of the inner channel of the southern Dry Moat. We therefore cannot rule out the possibility that unquarried sections are present elsewhere, perhaps in the areas that Saad was unable to clear between the central and western compartments.¹³⁴ Indeed, it would have been appropriate for the Old Kingdom mastabas that cross the line of the trench to have been built over such unquarried areas to ensure adequate foundations for these tombs.

The Dry Moat and deep trenches are insufficiently explored and future investigation will be required to address the many outstanding issues that they present. For the time being, it is extremely difficult to reach firm conclusions regarding their purpose or their spatial and temporal relationships with surrounding features. Even if future investigations were to identify unquarried sections between the western and central compartments, confirming the spatial relationships between the deep trenches and the tombs of Hetepsekhemwy and Ninetjer suggested in Fig. 7, this would not necessarily imply that the trenches had been excavated during the construction of the royal gallery tombs.¹³⁵ The only observation the current author is able to offer at this time is associated with the depths of these and other Early Dynastic features in the vicinity. In general, the below-ground early Second Dynasty features in this part of Saqqara are at depths of 6m,¹³⁶ a depth that may have been influenced by the presence of the lower hard rock stratum. By contrast, many of the later below-ground features, such as the shafts beneath the Step Pyramid and beneath the South Tomb, all reach significantly greater depths, beyond

¹³⁰Swelim, in Czerny et al. (eds), *Studies in Honour of Manfred Bietak*, 374.

¹³¹Swelim, in Czerny et al. (eds), *Studies in Honour of Manfred Bietak*, 374.

¹³²Swelim, in Czerny et al. (eds), *Studies in Honour of Manfred Bietak*, 374.

¹³³The eastern chamber of the Eastern Compartment passes beneath the north part of the mastaba of Hotep (Fig. 7). Swelim, states that mastaba z is built of limestone slabs bridging the compartment, and that cracks in the east and west elevations suggest that the tomb post-dates the excavations beneath (Swelim, in Czerny et al. (eds), *Studies in Honour of Manfred Bietak*, 368 and 370).

¹³⁴Given that we do not know what (if anything) lies beyond the masonry-filled void near the top of this western wall, it is possible that there is a further section of trench to the west. Although Saad cleared the Dry Moat from the south-west corner, working along the base of the accumulated sand at depths in the order of 6m, it is possible that in this section the roof formed by the lower hard rock stratum remains *in situ*, with further chambers lying beneath.
¹³⁵*Contra* Dodson in Price et al. (eds), *Mummies, Magic and Medicine*, 9.

¹³⁶The gallery tombs of Hetepsekhemwy and Ninetjer, the private Second Dynasty gallery tombs (figs 1:F1 and F2) and, possibly, the galleries beneath the Western Massif.

25 m. Although conjecture at this stage, it seems reasonable to consider that rather than having been excavated in the early Second Dynasty, the deep trenches cleared by Hassan and Saad are part of the later, more technically accomplished Third Dynasty development at Saqqara.

Discussion

It has generally been considered that First Dynasty mortuary development at North Saqqara followed certain protocols, with elite tombs built on the eastern crest of the plateau overlooking the inundation and lower status burials in less prominent locations within the Abusir *wadi*. The interpretation of at least part of Macramallah's excavations (Fig. 1: A1) as a First Dynasty *Kultbezirk*, however, suggests such a simple analysis is not valid. The long-standing view that the development of the eastern crest of the Saqqara Plateau was intended to achieve visibility from the inundation also appears to be largely untenable. Whilst the westward shift in tomb location identified in Figs 3a and 3b may have been driven by increasingly limited available space in the east of the escarpment, the known reuse of First Dynasty burial sites suggests this is unlikely and strengthens the conviction of the current author that the Abusir *wadi* became increasingly important as the Early Dynastic Period progressed. The importance of the *wadi* may be further supported by the presence of an Early Dynastic stone-built structure at the base of 'Khaemwaset Hill' (Fig. 1: C). With its uninterrupted views to the south and east, the location and orientation of this building strongly suggest that the Abusir *wadi* was a dominant landscape feature at this time.

The dawn of the Second Dynasty saw the first royal burials at Saqqara, yet the reasons why Hetepsekhemwy abandoned the traditional royal necropolis at Abydos in favour of a new location at Saqqara are not understood.¹³⁷ Rather than follow the precedent set by the First Dynasty elite and build their tombs high on the eastern escarpment at Saqqara, the Second Dynasty royal tombs (Fig. 1: D and E) were built at an apparently unremarkable location to the south. The suggestion that the location of these tombs was influenced by the natural topography of the minor 'Unas *wadi*' is unconvincing.¹³⁸ Although modified by ancient development, there is little evidence to suggest that the Unas *wadi* represented a significant landscape feature on the scale of the Abusir *wadi*, particularly in the areas to the west of the tomb of Niankhkhnum and Khnumhetep.¹³⁹ Indeed, it is likely that the Unas *wadi* only gained significance in the later Old Kingdom, when its course lent itself to the inclusion of an east-west aligned causeway in what by that time had become the 'standard' layout of pyramid complexes. In a previous article, the current author suggested that the Abusir *wadi* might



Fig. 8. The clearance by Saad of the western compartment of the deep trench. The surface at the top of the trench to the right lies within the Dry Moat (after Swelim, *Studies in Honour of Manfred Bietak*, pl. 10). Surviving sections of the lower hard rock stratum, which is thought to have formed a roof to this compartment are visible (arrows). At the top of the western rock-cut wall (circled), the lower hard rock stratum appears to remain *in situ*, spanning an underlying masonry-filled cavity.

have been an important landscape feature at Saqqara in the Early Dynastic Period. The less arid climate that lasted until the end of the Old Kingdom¹⁴⁰ is considered to have sustained more extensive areas of scrub vegetation, which at Saqqara perhaps extended as far as the natural ridge that defines the southern limit of the Abusir *wadi* (Fig. 2). These considerations led to the conclusion that in the Early Dynastic Period, the vegetated Abusir *wadi* became regarded as some form of 'cordon sanitaire',¹⁴¹ with the key Early Dynastic monuments such as the Gisir el-Mudir and the Netjerikhet pyramid complex focused around the southern end of this natural extension to the Black Land.¹⁴² It was further argued that the concept of the pyramid causeway emerged as the climate became more arid and *wadi* vegetation receded. In this model, the use of mud-plaster or mud-brick paving along the earliest causeways was interpreted as a means to replicate the benevolent aspects of vegetated areas such as the Abusir *wadi*, within the construction of the artificial causeway, allowing mortuary-related activities to continue, free from the ritual chaos of the surrounding Red Land. Although the idea that the pyramid causeway evolved to address a changing environment in ancient Egypt has been criticised,¹⁴³

¹³⁷El-Awady, *Sahure, the Pyramid Causeway*, 16.

¹³⁸Lacher-Raschdorff, *Das Grab des Königs Ninetjer*, 165.

¹³⁹PM² III.2, 641–4 and plan LXII. Although a number of middle-ranking late Third/early Fourth Dynasty burials have been identified within the Unas Wadi (Fig. 1:H), these lie within the better defined lower reaches of the wadi to the east of the tomb of Niankhkhnum and Khnumhetep. See H. Ghaly, 'Ein Friedhof von Ziegelmastabas des Alten Reiches am Unasaufweg in Saqqara', *MDAIK* 50 (1994), 57–69.

¹⁴⁰Reader, *JEA* 90, 68.

¹⁴¹Reader, *JEA* 90.

¹⁴²Reader, *JEA* 90, 67.

¹⁴³El-Awady, *Sahure, the Pyramid Causeway*, 86.



Fig. 9a. Google Earth Image showing the general alignment the 'Processional Valley' at Abydos and its relationship with the Umm el Qa'ab.

the current author stands by the reasoning that was previously presented. Indeed, as Tarek el-Wady points out, the Abusir *wadi* is not the only example in which a natural drainage feature appears to have taken on elements of ritual significance.

Throughout his publication on Abydos, David O'Connor identifies a 'processional valley' on maps of this important early royal necropolis.¹⁴⁴ Aerial photographs clearly show this processional valley is in fact a shallow *wadi*,¹⁴⁵ which took seasonal rainfall from a narrow gap in the escarpment behind Abydos and discharged the run-off to the inundation. Like the Abusir *wadi*, it is highly likely that in the Early Dynastic Period, the processional valley at Abydos will have been more extensively vegetated than is the case at present. In many respects, the terms 'processional valley' and 'cordon sanitaire' are interchangeable: both hint at concepts associated with the safe passage of celebrants through the desert fringes to attend to the needs of the dead. What is remarkable, however, is that these considerations of the landscape of Abydos not only reinforce the concept that *wadis* served an important ritual function in Early Dynastic Egypt; they may also provide an explanation for the location of the Second Dynasty royal tombs at Saqqara. Fig. 9a is an aerial photograph of Abydos, on which the approximate axis of the processional valley has been marked, together with the position of the Early Dynastic royal necropolis, the Umm el Qa'ab. The Umm el Qa'ab is located some 2 km along the axis of the



Fig. 9b. Google Earth Image showing the general alignment of the Abusir Wadi at Saqqara and its relationship with the Early Dynastic Royal Necropolis.

processional valley from the limit of the inundation and is set back to the east. Fig. 9b is an aerial photograph of North Saqqara at a similar scale and shows not only that the Early Dynastic royal necropolis at Saqqara is equally some 2 km south along the axis of the Abusir *wadi*, but that it is also set back a similar distance to the east. When the key features of these ritual landscapes are compared, it is evident from Figs 9a and 9b that they are remarkably similar, a similarity that will have been more evident in the Early Dynastic Period, given the more extensive *wadi* vegetation prevailing at that time. Assuming that these similarities are not coincidental, these observations raise a number of interesting issues. In terms of landscape, was the gap in the topographic ridge at Saqqara (Fig. 2: MT6) intended to represent the gap in the escarpment behind Abydos, from which the processional valley discharged?¹⁴⁶ In terms of royal burials, was the selection of the site for Hetepsekhemwy's tomb an attempt to mimic the ritual landscape of the earlier royal cemetery at Abydos, but at a new location closer to Memphis? If so, does the 'deep sandy wadi' and its associated alignments (which appear to extend as far as Abu Ghurob) represent an element of this ritual landscape? Rather than having evolved to become an important ritual landscape, can we argue that it was Hetepsekhemwy's intention to create a ritual landscape at North Saqqara from the outset? Such conclusions may explain why Netjerikhet built his mortuary complex in this otherwise unremarkable and previously occupied part of

¹⁴⁴D. O'Connor, *Abydos: Egypt's First Pharaohs and the Cult of Osiris* (London, 2009), Fig. 3 etc.

¹⁴⁵Google Earth, accessed 27 February 2016.

¹⁴⁶See O'Connor, *Abydos*, Fig. 3.

North Saqqara and they may help us towards an explanation for the enigmatic deep trenches that lie between the Step Pyramid enclosure and the Second Dynasty royal tombs. Were the deep trenches an attempt to create a division in negative space between the subterranean elements of the Second and Third Dynasty royal burial complexes?¹⁴⁷ If so, does this imply significant differences between the ideologies of the two traditions? Alternatively, do the deep trenches in some way represent the lack of continuity brought about by the return to Abydos for the burial of the last two kings of the Second Dynasty, Peribsen and Khasekhemwy? If as discussed earlier, the great rectangular enclosures at Saqqara can be considered as later developments of the First Dynasty *Kultbezirk* found in the Abusir *wadi* by Macramallah, it may be possible to consider the attribution of the Gisir el-Mudir and L-Shape Enclosure to these late Second Dynasty kings, an attribution that is consistent with the age of the Gisir el-Mudir as determined by the Saqqara Geophysical Survey Project.

Author biography

I am an Independent Researcher and Chartered Geologist with an interest in the development of engineering and construction methods in Ancient Egypt and other early cultures. My research interests include the age of the Great Sphinx at Giza and its links with the development of sun worship in early Egypt, the landscape origins of the causeway in Egyptian pyramid complexes and the geology of Egypt, particularly in terms of the evolution of the landmass and of features such as the Nile and the Red Sea Hills. Publications include: 'A Geomorphological Study of the Giza Necropolis with Implications for the Development of the Site', *Archaeometry* 43:1, 2001; 'On Pyramid Causeways', *JEA* 90, 2004; 'The Netjerikhet Stela and the Early Dynastic Cult of Ra', *JEA* 100, 2014; 'The Meidum Pyramid', *JARCE* 561, 2015; 'A Potentially Significant Dimension Recorded on an Old Kingdom Papyrus from Saqqara', *Journal of Ancient Egyptian Architecture* 2, 2017 <http://www.egyptian-architecture.com/JAEA2/JAEA2_Reader>.

¹⁴⁷Compare Dodson in Price et al. (eds), *Mummies, Magic and Medicine*, 9.