

# Funerary Archaeology and Bioarchaeology of Predynastic to Early Dynastic Remains from the site of Kafr Hassan Dawood, North-eastern Egypt: Report on the 2019 Season

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## Abstract

The Delta site of Kafr Hassan Dawood (KHD) is of considerable importance to understanding the nature of Egyptian society in the Predynastic (PD) to Early Dynastic (ED) periods. Previous work has revealed a large cemetery, a settlement, and some reuse of the area by later groups. There is some uncertainty regarding how typical KHD is of PD-ED Lower Egyptian sites, and to what extent the unusual settlement and bioarchaeological profiles are attributable to social vs. ecological/geographical factors. The University of Winchester's mission has scheduled a multi-season project to address these issues, commencing with a pilot season in 2019. In the 2019 season, 18 PD-ED grave cuts were located, containing 1-3 individuals per grave. Simple and mud-lined/filled pit graves were noted. Grave goods were typically modest, including beads, plain ceramic vessels, and large ceramic sherds. There was some evidence for organic coffins or shrouds. Body position and orientation varied, but with a tendency towards flexed burials, oriented towards the north, and facing the east. The sexes were unequally represented, around a quarter of the individuals were subadults, and there was evidence for grave re-opening/reuse as well as element harvesting and manipulation. No pathological conditions or trauma were noted. The implications of these findings are discussed. We anticipate that this project will provide important information concerning the PD-ED transition, as well as how Dynastic and later groups utilised this region.

يقع تل حسن داوود جنوب قريه البعاوله بعزبه الدوايده علي بعد حوالي ٤ كم من طريق الاسماعيليه \_ الزقازيق. ويتمتع كفر حسن داوود بأهمية كبيرة حيث يساعدنا على فهم طبيعه المجتمع المصري في فتره ما قبل الاسرات و بداية الاسرات. وقد كشفت البعثات السابق و التي بدأت عملها في عام ١٩٨٩ عن مقبره كبيرة تضم العديد من الدفنات و آثار لمستوطنه ، و أيضاً ادله تشير إلي استخدام هذه المنطقه في عصور لاحقه... و هناك بعض الشكوك حول اذا ما كان كفر حسن داوود يعد موقعاً نموذجياً يمثل فتره ما قبل الاسرات و كذلك فتره بداية الاسرات في منطقه مصر السفلي... حيث يبدو الموقع مختلفاً عن باقي المواقع التي تنتمي لنفس الفتره التاريخيه. و لم يستطع أحد تحديد ما إذا كان هذا الاختلاف يرجع إلي الطبيعيه البيئيه و الجغرافيه للمكان او بسبب تغير بعض العوامل الاجتماعيه الخاصه بالسكان في تلك الفتره... و قد قامت جامعه وينشستر بوضع خطه للعمل في الموقع على مدار عدده مواسم ، و ذلك للكشف عن الألغاز المحيطه بالموقع. ... بدأت البعثة عملها بموسم تجريبي في عام ٢٠١٩ ، حيث تم تحديد موقع حوالي ١٨ مقبره ترجع لعصر ما قبل الاسرات و عصر بدايه الاسرات ، تحتوي كل مقبره علي حوالي ١-٣ دفنات... و كذلك لوحظ مجموعه من المقابر البسيطه و التي تم تخطيطها و

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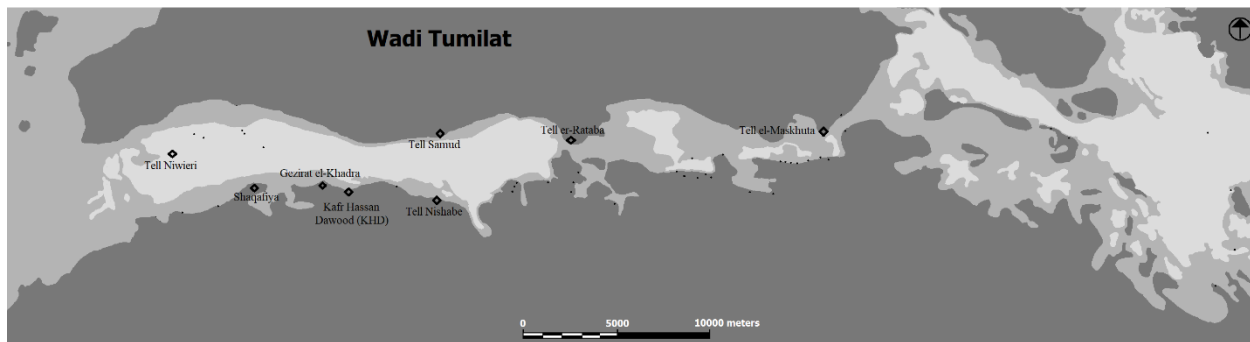
تحديدها بالطين... وقد احتوت المقابر على مقتنيات بسيطة تمثلت في بقايا خرز من الواضح أنه كان مستخدم في صناعه حلي بسيطه ، وكذلك بعض الأواني الفخارية ، و اجزاء من بقايا أواني فخارية كبيرة.. وكذلك لوحظ وجود آثار بسيطة تدل على وجود توابيت و اكفان عضويه... اختلفت أوضاع الدفنات واتجاهاتها ، ولكن معظمها كان في وضع القرفصاء ، و متجهه ناحية الشمال و الوجه في اتجاه الشرق.. أما بالنسبة لنوع الدفنات ذكر/ انثى فكانت غير متساوية وكذلك تفاوتت الاعمار ، حيث ترجع حوالي ربع الدفنات لبالغين.. و قد عثرت البعثة أيضا على آثار تدل على التلاعب و السرقة بهذه المنطقة... و نتوقع أن يستمر هذا المشروع في تقديم معلومات مهمه عند كيفية انتقال هذا الموقع من عصر ما قبل الاسرات إلى عصر بداية الاسرات. وكذلك كيف تم التعامل مع هذا الموقع في عصور لاحقه من قبل الاحكام و الجماعات

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## Introduction

The archaeological site of Kafr Hassan Dawood (KHD) is located in the western part of the Wadi Tumilat, North-east Egypt [Fig 1], and has been on the Egyptian Ministry of Tourism and Antiquities (MoTA) endangered sites list since 2018. Although the site was discovered in 1930 (Redmount 1989: 143; Schott et al. 1932: 73), little work was conducted until the area was threatened by land reclamation in the 1970s and 1980s, prompting an excavation project by the local inspectorate of the Egyptian Department of Antiquities (Supreme Council of Antiquities [SCA], now part of the Ministry of Tourism and Antiquities). Between 1989 and 1995, this project identified several cemeteries and a probable settlement (Bakr et al. 1996: 277; el-Hangary 1992). In 1995, Prof. Abdel-Helim nour el-Din (then Secretary-General of the SCA) requested that the site be evaluated by Prof. Fekri A. Hassan (then Petrie Professor, Institute of Archaeology, University College London [UCL]), leading to a collaborative SCA/UCL mission that ran from 1995-1999 (Hamdan 2003; Hassan et al. 2003; Lovell 2001; Rowland 2014; Tassie & van Wetering 2003; Tassie et al. 2008, 2017, 2021; Tassie 2015; Tucker 2003; van Wetering & Tassie 2003). These projects confirmed the presence of significant cemetery remains from different periods. The Western Cemetery contained at least 769 early burials dating to the late Predynastic, Protodynastic, and Early Dynastic periods (c. 3300 – 2700 BC), in addition to at least 200 burials dating to the Late Period, Ptolemaic, and Roman periods (672 BC-AD 305 (Tassie et al.2021: 719)). The Eastern Cemetery contained a further 152 late burials (Tassie & Hassan 2017: 15). The SCA/UCL joint project was discontinued in 1999. Further early burials seemingly dating to the Late Period were discovered in the SE corner of the Western Cemetery and SW corner of the Western Cemetery during local inspectorate investigations directed by Dr Ghadiry in 2018/2019.

The MSA registered KHD as a site under risk in 2018, owing to the joint threats of agricultural expansion, urban development, and rising groundwater levels. The University of Winchester's mission – designed by Dr Lawrence Owens and the late Dr Geoffrey Tassie in response to the 2018 MSA call – undertook a pilot season to the site during the late summer of 2019, headed by Dr Owens (Dr Tassie having passed away earlier that year). A further four seasons were subsequently scheduled to conduct a thorough archaeological and bioarchaeological review of the site, and to contextualise it on local, regional, and inter-regional scales. The 2019 season aimed to determine the viability of retrieving bioarchaeological information from the northern sector of the western cemetery. Previous research in this area had shown both flood activity and grave outlines; excavation work (1995-1999) and test pitting (1999) also revealed the presence of pre-modern Islamic graves (unexcavated).



**Figure 1:** Map of the Wadi Tumilat, and major archaeological sites, North-eastern Egypt

## Environmental setting

The Wadi Tumilat is a defunct Nile distributary that runs from Abassa to Lake Timsah over a distance of 52 km (Redmount 1989: 18) [Fig. 1]. The wadi can be divided into three distinct sections: a wide alluvial plain to the west, a series of lakes with variable alluvial and desert terrain to the centre, and an area of swamps and scrub-covered dunes (dominated by Lake Timsah) towards the east (Redmount 1989: 22-38, fig. 4). These regions comprise atypical East Delta environments, resulting in idiosyncratic human occupation patterns that are tied to erratic water availability (Hudakova & Hudec 2017: 8; Redmount 1989: 8). The western region could exploit either seasonal flooding or a permanent/seasonal lake that lies beneath the 5m contour line, neither of which were optimal for agricultural activity (Redmount 1989: 46, 53-7, fig 9). Data from Tell el-Retaba also suggests that the floodwaters shed most of their fertile soil deposits in the

southern Delta, so only exceptionally low levels of such deposits reached the eastern half of the western region (Hudec et al. 2018: 275). These factors make the western region suboptimal for agriculture, and more suited to mixed subsistence based upon hunting, fishing, pastoralism, and limited agriculture (Redmount 1989: 57). Flooding continued to decline into the 3<sup>rd</sup> millennium BC (Redmount 1989: 41), presumably impacting upon early phase KHD populations into the 2<sup>nd</sup> Dynasty, as seen elsewhere (Butzer 2002: 90). This would make the western region unsuited to the development of extensive settlements with large populations, impacting subsistence activity, and perhaps leading to physiological stress among KHD's inhabitants (Tucker 2003).

KHD is one of many sites in the eastern delta to be abandoned by the start of the 2<sup>nd</sup> Dynasty, perhaps reflecting environmental stresses or national administrative changes. The site's location on the wadi's southern escarpment made it vulnerable to north-tracking dunes, and the archaeological remains are therefore deeply buried (Redmount 1989: 19). While the 1982 Wadi Tumilat Survey (WTS) visited KHD, the deeply buried remains were not detected; excavations in 2018 and 2022 have since indicated as much as 3-4 metres of aeolian sand. The escarpment sand terraces increase in height towards the south, more closely resembling the low desert in Middle and Upper Egypt than 'typical' Delta configurations of Nile branches on broad floodplains, with archaeological sites situated on turtlebacks and sand geziras. Geoarchaeological studies [Fig.2] have confirmed low desert in the N/NW sectors and have also identified the ancient floodplain in the NE sector (Hamdan 2003: 221, fig 1). While the former is located beneath the village of Hassan Dawood and thus inaccessible, it is possible to assess the floodplain to study fluvial developments, escarpment formation, and the spatial development of settlement funerary activities in early KHD human populations.

### **KHD: Socioeconomic and political context**

The Wadi Tumilat was an important route of communication and transport between the Nile proper, central, and south Sinai, and thence to the Levant [Fig. 1] (Hassan et al. 2015: 83; Rowland 2014: 270; Tassie & Hassan 2017: 14; Tassie et al. 2021: 750). Redmount suggests that it may also have functioned as a defensive position and a centre for trade-related activities (Redmount 1989: 57). The founding of KHD during the mid-late fourth millennium BC may therefore have been

connected primarily with accessing distribution networks, which the KHD community may have used to trade copper, given the high prevalence of copper objects at the site compared to other locales in the eastern Delta (Rowland 2014: 270).

### **KHD: Early occupation (mid/late fourth – early third millennium BC)**

The Wadi Tumilat has yielded no evidence of extensive occupation in the fourth-third millennium BC. The 1982 survey found a single 4<sup>th</sup> millennium BC occupation at Tell el-Niwieri, while evidence for early occupation on both sides of the wadi recorded by the 1930s German survey (Schott et al. 1932) is based upon undated surface finds (Redmount 1989: 137-9, 176-198, 209-10). Survey data suggests a possible early date for Tell el-Rataba, although this is yet to be confirmed. It is probable that most early sites were covered by alluvial deposits and dunes, or have been destroyed by modern development (Redmount 1989: 210). KHD is the largest Predynastic/Early Dynastic cemetery site in the Delta and has been estimated to contain over 1000 burials. The fact that it is also the only extensively investigated early site in the Wadi Tumilat has hampered regional comparisons, as the only comparable sites lie in different riverine networks and entirely different local environments.

The earliest burials date to the Late Predynastic-Protodynastic (Naqada IID–IIIA), although burial distributions suggest that earlier interments may be located near the early settlement, which was located by drill-coring in 1996 [Fig. 2] (Hamdan 2003; Hassan et al. 2015: 78). In general terms, therefore, the earliest graves within the KHD cemetery are found in the north, with a tendency – albeit not absolute – to temporal-chronological progression from north to south. Preliminary work indicates that later burials were consistently placed in clusters, reflecting kinship or other social groupings (Hassan et al. 2015; Rowland 2003, 2014: 284; Tassie et al. 2021). Eleven oval/round ceramic coffins were found, but the rectangular coffins that characterise NE Delta sites such as Kufr Nigm were absent, indicating as yet unexplored regional complexity (Rowland 2014: 274).

The near-absence of mud-lined elite tombs at KHD is another example of regionalised behaviour, with one or two mudbrick tombs – which are often seen on a range of early NE Delta sites – appearing in the later periods of KHD's early occupation (Lovell 2001: 34, 37-8; Tassie et al. 2021:

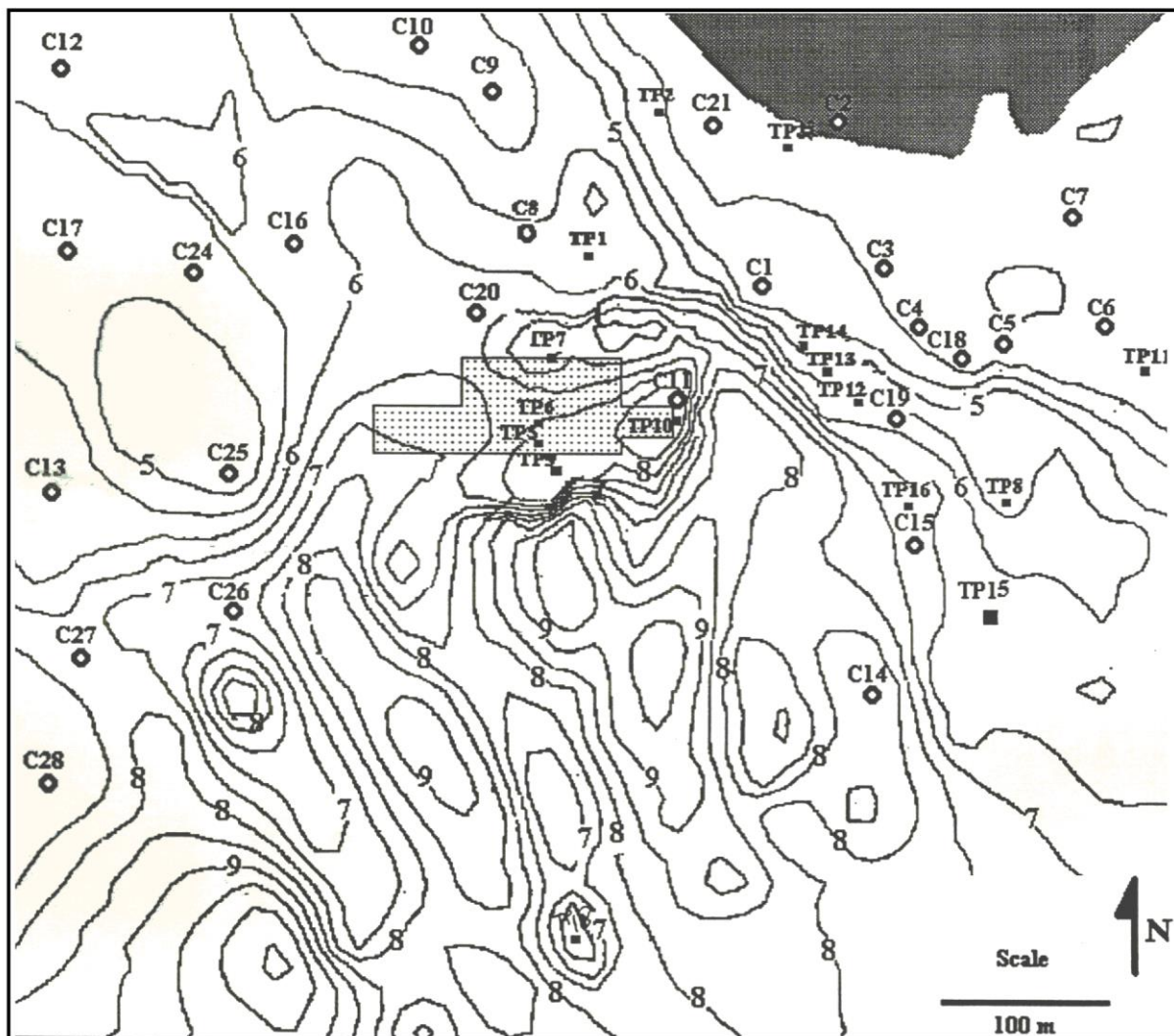
738-740). These varied funerary traditions may reflect KHD's unique geographical/riverine positioning, its distinctive links to the Sinai (and to a lesser extent the Levant), and possible trade connections to the Memphite region. However, as KHD is at present the sole excavated early site in the Wadi Tumilat, these assertions remain tentative.

A large-scale polity – stretching from the Mediterranean to the 1<sup>st</sup> Cataract – was established by Thinite kings (from the Abydos region in northern Upper Egypt) towards the end of the 4<sup>th</sup> millennium BC. The particulars of this process are poorly understood, which has led to an oversimplified narrative of Upper Egyptian dominion over a passive Lower Egypt, very much predicated on ancient Egyptian ideological propaganda. Furthermore, recent research has demonstrated that Upper Egypt was not a unified polity at this time, while the political landscape of Lower Egypt is both unclear and far from centralised. It is therefore difficult to ascertain whether socioeconomic transformations occurring around this time were triggered by the changing political environment (as assumed in previous research on KHD) and/or the result of environmental dynamics (worsening conditions in the western region of the Wadi Tumilat).

It seems that the KHD community benefitted from economic development during the Protodynastic Period, as evidenced by numerous copper objects deposited as grave goods in the cemetery (Rowland 2014: 276, 283-91). However, this perspective may be skewed by a current lack of information concerning the development of the cemetery before the late Protodynastic/Naqada IIIB, and the lack of information from the early settlement. While it is clear that the KHD population was involved in wider exchange networks, the extent of that involvement is open to speculation: they may have played a primary role in copper refining, or – equally – merely tapped into the flow of copper running from the Sinai and the Levant to the court of the 1st Dynasty kings, diverting relatively small amounts that were used to heighten status among the living and as grave goods (Tassie et al. 2021: 750-2).

Alternatively, the KHD community may have received copper ingots from the east, and worked them into artefacts, before forwarding them to the Memphite region and/or other eastern Delta sites at the behest of the centralised administration. The volume of copper seems at odds with the small number of imported ceramics (13 vessels, including one from the Northern Levant) and

so-called *serekhs* (proto-hieroglyphs within a rectangular “palace” symbol, representing the king’s name), while these also suggest some involvement in international trade networks (Tassie et al. 2021: 747, 749) the particulars of that role are currently poorly understood (Tassie and van Wetering 2003; Tassie et al. 2008, 2017).



**Figure 2:** Map of KHD with drill-core locations (Hamdan, 2003)

It has been theorised that the Wadi Tumilat was a vital staging area for the centralised administration’s expeditions to the Sinai, a bridging point between riverine and overland transport, and that the KHD community benefitted one way or another from this activity (Rowland 2014; 271, 287-91; Tassie et al. 2021: 750-2). The accuracy of these claims can only be addressed by a comprehensive analysis of the KHD settlement, forthcoming as part of the current

project. It is currently unclear as to why KHD seems to have been abandoned by c. 2700 BC (Tassie et al. 2021: 740). While a political change was not unlikely, it is impossible to ignore the evidence of climatic deterioration (due to decreased flood levels), which caused the inhabitants to create an artificial channel that brought water from the higher parts of the southern escarpment (Hassan et al. 2003: 40; Hassan et al. 2015: 78, 87-8). These actions, and the economic agitations likely caused by climatic deterioration, may have reached a tipping point at the end of the 1<sup>st</sup>-early 2<sup>nd</sup> Dynasty, making occupation unsustainable without major state involvement (i.e., water management projects). The area does not seem to have been populated again for around 2000 years, when an artificial canal made the western region of the Wadi Tumilat again a suitable place to reside.

### **KHD: Middle occupation (2<sup>nd</sup> millennium BC)**

The Wadi Tumilat was reoccupied from the Second Intermediate Period into the early New Kingdom, with many sites showing Hyksos-related presence (Redmount 1989: 179, 211-2, fig. 23). To date, no solid evidence has emerged that KHD was in use during this period.

### **KHD: Late occupation (1st millennium BC – early 1st millennium AD)**

The Wadi Tumilat was reoccupied from the Saite period onwards, with several large settlements (including Shaqafiya, just west of KHD) and numerous scattered villages along an artificial Nile canal that ran the length of the wadi (Redmount 1989: 16-7, 185-7, 197-8). This canal revitalised the Wadi Tumilat, and allowed communities to prosper through the Wadi Tumilat and towards Suez (and the Red Sea). The rationale underlying the low intensity of Late Period (Saite) settlement in the western region is currently unclear (Redmount 1989: 177, 182-5), but will be addressed using the recently discovered Late Period cemetery at KHD by Dr Ghadir and his team. At the time of writing, the late cemeteries are under-explored; findings from the 1989-1995 project (where many of the late graves were excavated) are only partially published; while during the 1995-1999 project, the late graves were mapped but not excavated. While currently considered to be discrete western and eastern cemeteries, these graves may in fact be part of a single large burial area.



Preliminary data from the SE part of the eastern cemetery includes a circular configuration of 16 cattle and 14 ovicaprine burials, interspersed with later interments of children (Tassie & Hassan 2017: 15, 17); this area has considerable potential for understanding ritual behaviour, animal cults and the significance of the later burials' positioning. A series of 21 unidentified structures in the eastern sector (Tassie & Hassan 2017: 15-16) are likely to reflect late settlement along an artificial channel (from the Delta proper towards the Red Sea) created along the southern escarpment and surviving in part at Gezirat el-Khadr (Redmount 1989: 143-4) just west of KHD. Given the local environmental stressors cited above, this new waterway is likely to have influenced settlement and behaviour in the later periods at KHD, and the Wadi Tumilat in general. Late Period KHD seems to be intermediate in size between the large sites and small scattered villages in Redmount's model (1989: 16-7, 185-7, 197-8), and would thus seem to be instrumental in understanding the late occupation of the western Wadi Tumilat. We suggest that funerary archaeology and bioarchaeology of excavated and recently discovered late burials will help us understand lifeways, behaviour, and environmental impacts at the time, in the same manner as for 4<sup>th</sup>/3<sup>rd</sup> millennium BC interments (see above).

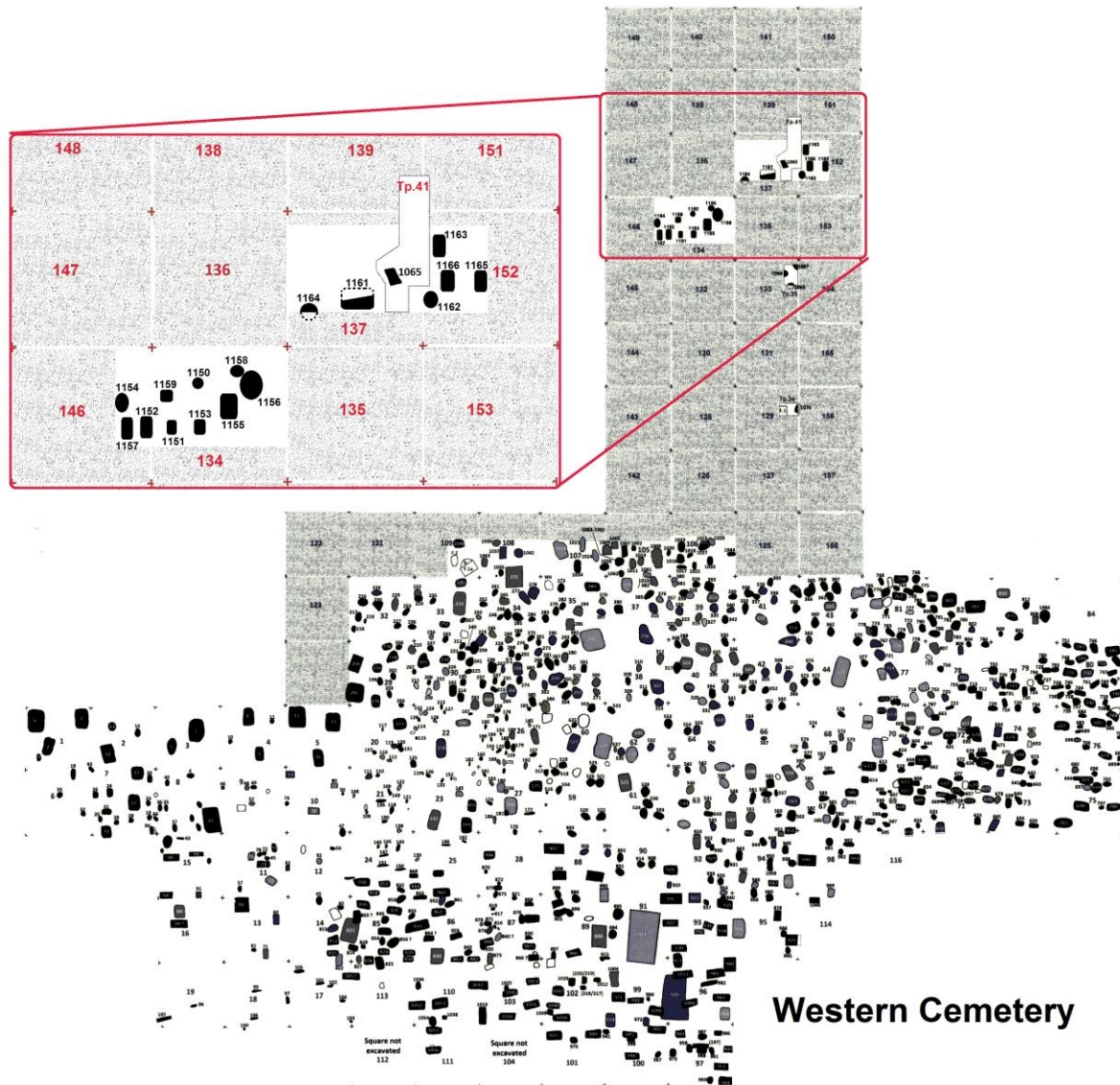


Figure 3: Squares excavated during the 2019 season.

## Pilot season 2019

In 2019, four squares were opened in the northern part of the western cemetery (approximately 60 m north of the area investigated by previous projects [Fig. 3]). It was determined that some of the ‘outlines’ identified as graves during the limited test excavations of the 1999 season were the result of flood activities. However, the area did contain several early graves (all investigated) and a single late mud-brick grave (currently unexcavated).

## Burial contexts

Eighteen grave cuts were identified via colour and textural changes in the ancient floodplain, under c. 1.5m of aeolian sand. Interments were single except for G1152 (triple burial) and recut burial G1156. These interments differed in comprising deliberate reuse of the same grave for three separate burials (G1152A/B/C) and the partial recutting (and disturbance/partial removal) of G1156A to deposit G1156B. Pit shape was recorded.

In the analysis, each 'burial' was only counted once, even if there was evidence of reworking the grave (i.e., G1152/1156). Fifteen graves were scored in this manner, 53.3% of which (8/15) were rectangular, 20% circular (3/15), 20% oval (3/15) and 6.7% circular/oval (1/15)<sup>2</sup>. In the three cases where the remains of organic materials suggesting shrouds or coffins were noted, the grave cuts were rectangular.

The orientation of the burials was also noted. Of the sixteen individuals that could be scored, 50% (8/16) were oriented towards the north, 18.7% (3/16) towards the NW, 18.7% (3/16) to the south, 6.3% (1/16) to the SW and 6.3% (1/16) to the southeast. If the N/NW orientation data are combined, the figure is 11/16 (69%). The direction in which the interred individuals' faces were directed was also scored for fifteen individuals. Seven individuals were facing east (46.7%), three to the NE (20%), 3 to the SE (20%), 1 (6.7%) towards the NW, and 1 (6.7%) towards the west. If the E/NE/SE data are combined, 86.7% of the burials were facing at least generally towards the east [Table. 1].

**Table 1: KHD Grave Characteristics**

Grave	Square	Form	Orientation	Facing	Finds
1065	137	Rectangular	N	W	Jar sherds
1150	134	Oval	N	E	None
1151	134	Oval	N	E	None
1152/A	146	Rectangular	N	-	Beads
1152/B	146	Rectangular	N	W	4 ceramic vessels
1152/C	146	Rectangular	N	-	None
1153	134	Rectangular	SE	NE	1 sherd
1154	146	Circular/Oval	NW	SE	None
1155	134	Rectangular	NW	E	Beads (by hand)

<sup>2</sup>. Percentage values have been rounded

<b>1156/A</b>	134	Oval	NW	-	4 ceramic vessels
<b>1156/B</b>	134	Oval	-	-	1 ceramic vessel
<b>1157</b>	146	Rectangular	SW	NE	2 sherds
<b>1158</b>	134	Circular	NW	NE	1 large bead
<b>1159</b>	134	Circular	N	E	None
<b>1160<sup>3</sup></b>		-	-	-	1 sherd
<b>1161<sup>4</sup></b>	137	TBD	TBD	TBD	TBD
<b>1162</b>	152	Circular	S	NW	Bread mould frag.
<b>1163</b>	152	Rectangular	N	SE	3 vessels, 4 sherds
<b>1164<sup>5</sup></b>	137	TBD	TBD	TBD	1 ceramic vessel
<b>1165</b>	152	Rectangular	S	NE	5 ceramic vessels
<b>1166</b>	152	Rectangular	S	SE	None

This tendency has been noted in Lower Egyptian cultures such as the Maadian (not currently known at KHD) yet is much less common in Upper Egypt cultures (Stevenson 2009). Body position was predominantly semi/flexed (12/15 = 80%), with the remaining three individuals being supine, prone, or semi-supine. In most cases, the pits were plain with no special treatments, although this may be an artefact of poor organic preservation.

<sup>3</sup>. Not a grave – disturbed remains likely looted from G1156, associated with a sherd

<sup>4</sup>. A large mudbrick grave truncated by a later grave. To be excavated. Likely dating to the Late Period to the Late Antique.

<sup>5</sup>. Grave running under S baulk in Square 137. Ceramic vessel recovered. To be excavated.





**Figure 4:** KHD 2019: Burial G1163

Three individuals (G1153, G1155 and G1163 [Fig. 4]) retained organic traces indicative of coffins/boxes, while a further individual (G1166) was surrounded by a dark halo, perhaps indicating a textile/botanical wrapping. A single mud-filled grave was also noted (G1165) [Fig. 5].





**Figure 5:** KHD 2019: Burial G1165

### **Burial offerings**

Burial goods comprised ceramic vessels/sherds (spanning Naqada IIIB to the 1<sup>st</sup>-2<sup>nd</sup> Dynasty), a fragment of a bread mould, and a range of white, black, and red (carnelian) mineral beads, [Fig. 6] in a variety of forms. Their location in the grave suggests they were originally part of necklaces,



anklets, and bracelets. There was no clear distinction between male/female grave goods. The single bread mould fragment was associated with a subadult burial (unsexed). The largest number of grave goods were recovered from G1152 [Fig. 6], specifically multiple ceramic vessels and several groups of beads in the vicinity of necks and wrists. Poor preservation may be obscuring evidence for organic remains such as textile or basketry, and even ivory or bone objects. Copper items were absent. While coffins/shrouds may have been present (see above), no mudbrick or ceramic coffins were noted.



**Figure 6:** Beads found in G1152A, G1155, G1158 & G1162

### **Human skeletal remains**

Human skeletal remains were exposed, recorded, drawn, and photographed in situ then lifted *en bloc* where possible. The bones were often highly fragmented and had suffered extensive hydrological damage. Preliminary demographic and anatomical observations were made in the field in case of post-excavation deterioration. Biological sex was ascertained via morphology of the pelvis (sciatic notch, composite arch, preauricular sulcus, subpubic angle, subpubic concavity, ventral arc, and ischiopubic morphology) and the skull (glabellar profile, supraorbital ridges,

supraorbital margin, suprameatal crest, mastoid process, nuchal crest, and mental eminence), using principles as laid out in Bass (2005), Buikstra and Ubelaker (1994), Phenice (1969), Krogman and İşcan (1986) and White et al. (2011) [Table. 2]. Individuals over 17 years of age were classified as probable female, possible female, indeterminate, possible male, or probable male (F, F? ?, M? M). Subadults were identified and aged using dental and bony development (Schaefer et al. 2009), while adults were aged on the basis of pubic symphysis and auricular surface morphology, cranial suture closure and dental wear (Brooks & Suchey 1990; Buikstra & Ubelaker 1994; Lovejoy et al. 1985). Dental wear was most often used for adult ageing (and odontogenesis for subadults), while frontal/temporal/occipital anatomy was most frequently used for sexing. Pathological indicators were also sought, as were indicators of height and body mass.

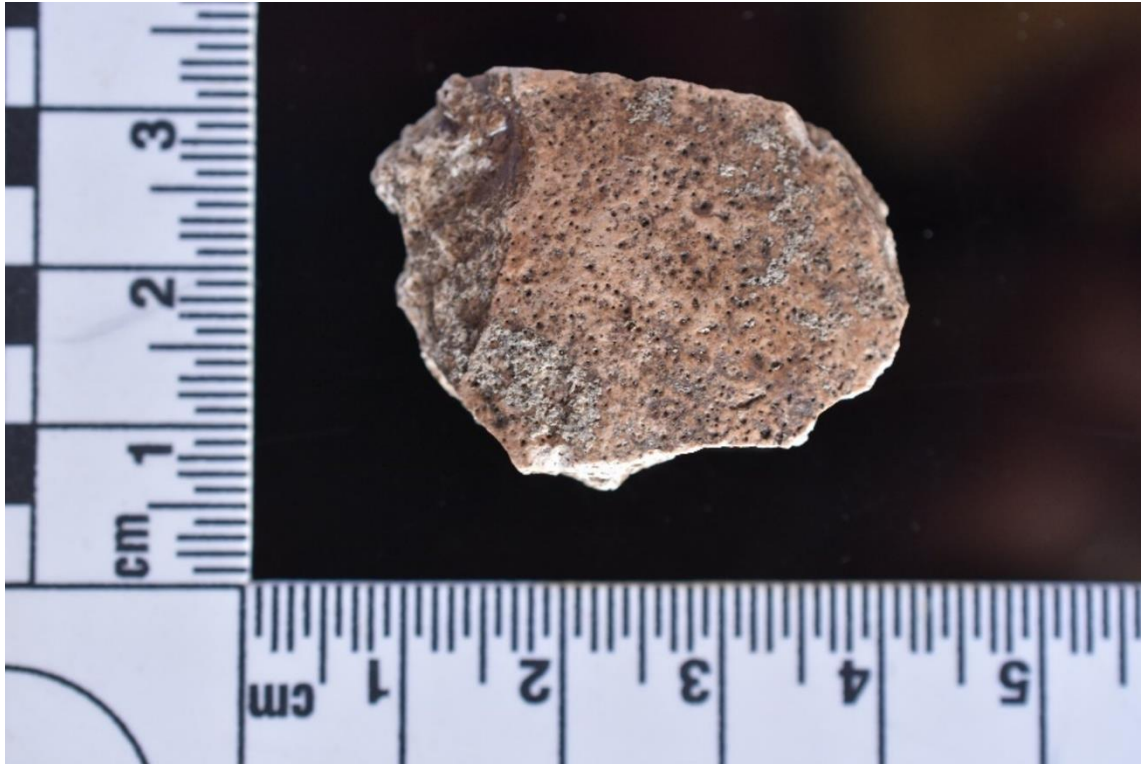
**Table 2: KHD Bioarchaeological Data**

Grave	Position	Age	Sex	Stature
1065	Supine	17-25	?	-
1150	Flexed?	20+	? F	-
1151	Semi/Flexed, L side	45+	F	-
1152/A	Prone	20-35	? M	-
1152/B	Semi-Supine	16-18	? F	-
1152/C	Unknown	20-35	F	-
1153	Semi-flexed, R side	35-50	F	-
1154	Semi-flexed, R side	30-45	F	-
1155	Semi-flexed, L side	20-35	? F	-
1156/A	Unknown	25-35	?	-
1156/B	Unknown	-	-	-
1157	Flexed on R side	20-35	? F	-
1158	Flexed?	1-2	N/A	-
1159	Flexed on L side	20+	? M	-
1160	-	-	-	-
1161	TBD	TBD	TBD	-
1162	Flexed on L side	7-8	N/A	-
1163	Flexed	40-50	M	-
1164	TBD	TBD	TBD	-
1165	Flexed, R side	<12	N/A	-
1166	Semi-Flexed	50+	? M	-

Many methods could not be applied given the poor preservation of bones. Four of the 15 scorable individuals (26.7%) were subadults: one infant, one child and two adolescents. Six individuals (40%) were young adults (20-35), 3 (20%) were middle adults (35-50) and 2 (13.3%) were older adults (50+). Fourteen adults could be sexed, of which 8 were probably/female (57%), 3 were probably/male (21.5%) and 3 could not be sexed (21.5%). The subadult remains were not sexed.



It was not possible to calculate stature (height) or body mass (weight) in adults, owing to the severe deterioration of the vertebral column and long bone epiphyses.



**Figure 7:** Periosteal disturbance on a skull fragment from G1165

### **Palaeopathology**

Although bone condition was non-optimal, no bony markers indicative of infective, metabolic, neoplastic, or endocrine disorders were noted. Trauma was also absent. The only pathological indicators were small dental enamel hypoplastic lesions on two individuals (G1151, G1155) – traditionally associated with childhood physiological perturbations such as starvation or fever – and two slight periosteal disturbances (G1158 [tibia] and G1165 [frontal]) [Fig. 7], indicative of physiological stresses or localized periosteum injury/infection (White et al. 2011). The left scaphoid of G1155 was affected by pathology indicative of degenerative joint disease; poor preservation hampered attempts to check the vertebrae for similar conditions. Very low levels of dental caries were noted, and limited *antemortem* tooth loss; this tends to suggest good overall dental health, and perhaps reduced reliance upon carbohydrates, although small sample size is

an issue. Bone texture and integral robusticity seem to have been generally good, with no signs of osteoporotic conditions or bone mass reduction.

### **Burial interpretation**

Almost all the KHD graves are single interments. The sole triple interment comprises evidence for grave re-opening, body deposition, element harvesting and manipulation G1152 [Fig.8], while G1156 shows recutting across an earlier grave and the removal of skeletal materials but leaving grave goods untouched. The fact that discarded elements (G1160) were still in articulation when removed from their original grave (likely originating from G1156) suggests that the recutting took place when the remains were still bonded by soft tissues, a few months or at most a couple of years after the original interment. The body positions, orientations, and the directions in which they were facing seem to be largely independent of any other factor, including burial offerings, age, or sex.

The cultural and demographic asymmetry of the sample – notably the male/female disparity and the lack of young subadults – suggests that the KHD population did not randomly place their deceased; it is probable that there were specific areas for certain lineages, and that certain demographic groups received different treatments. The seemingly random distribution of grave goods (which is also unconnected to sex or age) further suggests that there were no specific ‘markers’ for the sexes or age classes, although it should be noted that (unlike the adults) all the subadults possessed at least one grave good. That said, the full ‘suite’ of burial goods noted in previous KHD excavations was absent in this sample, and it may be that these individuals originate from a specific and probably non-elite social stratum that did not have access to materials such as copper alloy or imported goods.

Complex burial treatments (at least, those that can be detected archaeologically, namely coffins/boxes and linen/botanical shrouds) were also applied to males, females and subadults. There was no apparent difference between the sexes in terms of longevity – most were young to middle adults at the time of death – although this may be an artefact of preservation rather than a reflection of ancient demographic reality.



**Figure 8:** Multiple burial G1152 (previously G1102)

Furthermore, there was no apparent connection between sex/age and body position or orientation in the adult sample, as males and females were buried in all positions and orientations (although generally favouring the north). However, the remarkably high proportion of individuals that were interred with their faces towards the east (or NE/SE) is striking, and may be a regional

characteristic (Stevenson 2009) with cosmological or religious significance (Raven 2005). Bodies were interred on their left and right sides, as well as prone and supine. Slight patterning emerged in the subadult group, where the infant and child burials were buried on their left sides, while the adolescents were interred on their right side, or supine. However, the sample is far too small for certainty on this point. The probability of considerable ethnic diversity across the Protodynastic-Early Dynastic transition<sup>6</sup> should be considered, which is likely to have resulted in different traditions and attitudes towards burial practice. The poor preservation of most skeletal elements hampered detailed analyses of palaeopathological and traumatic markers. However, while it is probable that some data has been lost – and given that not all pathological conditions leave bony traces – it would nonetheless appear that the KHD population within this sample was not extensively affected by pathological conditions, perhaps reflecting low population density and/or a relatively healthy diet and environment.

The low prevalence of caries and associated conditions may, again, be partly a function of preservation, but is at least partially attributable to the low proportion of dietary carbohydrates in ancient KHD diets, reflecting a varied and perhaps protein-rich diet in tune with their riverine environment. The fact that the environment of the western Wadi Tumilat seems to have been sub-optimal for agriculture and therefore unlikely to have resulted in very dense human population distributions is likely to have favoured dietary diversity and generally improved systemic health. The studies underpinning this principle are largely based on Near Eastern and Native American populations (Larsen 2015), and it behoves us to assess whether it can be reliably applied to early Egyptian populations in the same way.

## **Concluding observations and future aims**

The long-term objectives of the mission are 1: to undertake a comprehensive (re-) investigation of the archaeological remains at KHD; 2: to locate the northern, eastern, and southern extent of the western cemetery; 3: to carry out a fully comprehensive analysis of the skeletal remains from the site and to relate these data with cultural findings, and 4: to undertake floodplain

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<sup>6</sup>. Preliminary work by Jucha (Pers. Comm.) indicates that the graves' ceramic sequence spans the Late Protodynastic/slightly earlier (G1165), Naqada IIIB to 1st Dynasty (G1152), and 1st-2nd Dynasty (G1163/G1156).

geoarchaeological research to understand the interrelation dynamics of the floodplain and contemporary settlement. The size and complexity of the cemetery and the temporal range it represents make it a valuable asset in an investigation of social hierarchies and inequalities, the impact of exotic groups, and the social changes wrought by expansion as a centre of production and trade. This work relies upon an elision of cultural and biological data. Archaeological research entails a full review of ceramics, metalwork, imported goods and early textual links to Upper Egypt, while bioarchaeological research focuses on population biology (i.e., genetic origin) markers, bony indicators of illness, dental disease and pathology, and profiling of demographic factors to detect how men, women and children's roles, diets, activities, and relative status changed during this period. The cemetery's growth will inevitably track changes in human socio-biology, making it possible to assess whether dietary constraints (as argued above) were the main cause of KHD's abandonment, or whether other possibilities should be explored. We believe that this project has the potential to considerably enhance our understanding of early Egypt.

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