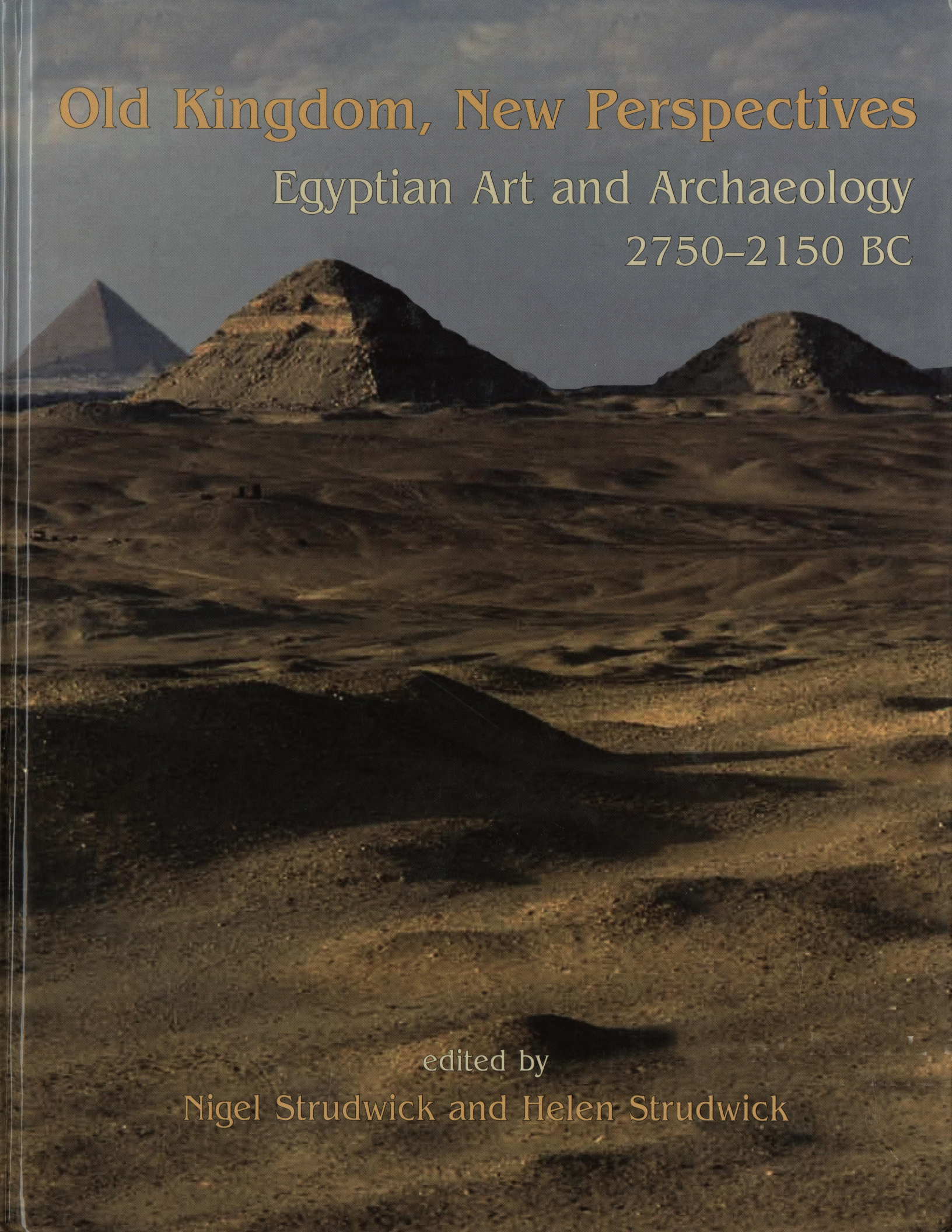
# Old Kingdom, New Perspectives

## Egyptian Art and Archaeology 2750–2150 BC



edited by

Nigel Strudwick and Helen Strudwick

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# Foreword

There can be no academic subject for which the general public has such an inexhaustible appetite as Egyptology, and no period more so than the age of the pyramids. But the popular writings in this area are notoriously variable. While there is no shortage of reliable and accessible surveys by leading scholars in the field, neither does one have to look far on book lists to find an abundance of 'pyramidology' and other nonsense which also finds a wide audience. It was therefore a very welcome opportunity that arose when Helen Strudwick proposed that the 2009 Old Kingdom Art and Archaeology conference be held at the Fitzwilliam Museum in Cambridge so as to coincide with our annual Glanville Lecture on Egyptology, thus bringing the fruits of recent excavation and research by leading scholars to a wide general audience. The resulting event, held on 20–23 May 2009, consisted of a three-day meeting of specialist researchers, followed by a day of talks by some of the foremost experts in the Old Kingdom, to which the public was also invited, all culminating that evening in the Glanville Lecture delivered by Dr Jaromir Malek on 'A city on the move: Egypt's capital in the Old Kingdom'. This volume publishes all but three of the twenty-seven papers presented at the conference, plus one additional offering.

The Fitzwilliam Museum is fortunate to have one of the most important collections of Egyptian antiquities in the UK and thus provides a very appropriate setting for the OKAA conference. The earliest Egyptian object to arrive – a very fine Third Intermediate Period coffin set – was given in 1822, only six years after the bequest of Viscount Fitzwilliam created the museum, and a quarter century before the building erected to house its collections first opened its doors. Since then the Museum's Egyptian collection has grown to nearly 17,000 objects, of which some one thousand are on display. The Egyptian galleries were refurbished in 2006 and remain the most popular in the museum.

Stephen Glanville, after whom the lecture is named, was Professor of Egyptology at Cambridge (1946–1956), as well as being Chairman of the Fitzwilliam's Syndicate and Honorary Keeper of Antiquities. Glanville saw it as essential that the Museum's Egyptian collections were actively used in teaching – as is still the case today – and that they continue to grow through acquisition. His commitment to engaging the public in the fascinating discoveries of professional Egyptologists has been continued by the Museum by the holding of a lecture bearing his name since 1977. We were delighted that Jaromir Malek accepted the invitation to give the 2009 lecture; and that so many distinguished scholars of Old Kingdom Egypt were able to attend the conference with which it was paired.

Special thanks are due to Helen Strudwick, at the time Senior Assistant Keeper, Antiquities, and Nigel Strudwick, the organisers of the conference, who have also edited the papers published here.

Timothy Potts
Director
The Fitzwilliam Museum
Cambridge

# Introduction

This volume presents twenty-five of the twenty-seven papers presented at the 2009 Conference Old Kingdom Art and Archaeology, generously hosted by the Fitzwilliam Museum in Cambridge. The history of these Old Kingdom meetings was admirably summarised by Miroslav Bárta in his Foreword to the proceedings of the 2004 conference, held in Prague, and it would be superfluous to repeat it here. The contents of the present volume show the wide range of subjects which this research group now embraces, from the Pyramid Texts through site reports, from the analysis of statue orientation to attempts to study the spatial arrangement of Old Kingdom cemeteries. Some of the papers are substantially the same as those presented at the meeting, but the editors have encouraged authors, where they feel it is necessary, to expand upon their ideas and to take them beyond the limited range of material which can be presented in a twenty-minute talk. One further paper which could not be presented at the conference is also included.

We were delighted to welcome to Cambridge colleagues from all over the Egyptological world, and they fairly represent where the Old Kingdom is studied most. We are delighted to be able to include the paper from Abdou el-Kerety (better known to his friends and colleagues as Hatem); visa problems meant that he was regrettably unable to be present at the conference, despite our best efforts with the UK authorities, but his contribution was read and appreciated in his absence. The paper of Gabriele Pieke could not be presented at the conference but we are happy to be able to include it. The longest paper presented here is by Mark Lehner and his co-authors and is a report on progress of his excavations at Giza; this has turned into a substantial publication and analysis and it is a great pleasure to be able to include it in this volume.

The final day of the conference was open to the public, focusing more particularly on papers relating to the archaeology and monuments of the Memphite region. This, and indeed the conference as a whole, formed a precursor to the thirty-third Stephen Glanville Memorial Lecture. This annual event, hosted by the Fitzwilliam Museum, has been an important fixture in the Cambridge and UK Egyptological calendar since 1977. In 2009, the Lecture was given by Dr Jaromir Malek on the subject 'A city on the move: Egypt's capital in the Old Kingdom'.

The editors would like to thank many persons without whose help and assistance the 2009 Old Kingdom Art and Archaeology meeting could not have taken place. First and foremost, we are deeply indebted to Dr Timothy Potts and all the staff of the Fitzwilliam Museum for enabling the events to take place so successfully, and for ensuring the efficient operation of everything from computer projectors through to the teas and coffees which sustained us. We also thank our colleagues whose enlightening papers and discussion made the meeting the success it was, and we acknowledge their efforts in enabling the completion of the manuscript just over two years since the meeting.

We are delighted to acknowledge the help and assistance offered by Oxbow Books in taking this publication into their archaeological series. To our editor, Clare Litt, and the head of production, Val Lamb, go our profound thanks for their advice and support.

Nigel Strudwick
Helen Strudwick

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# Re-examining the Khentkaues Town

*Mark Lehner, Daniel Jones, Lisa Yeomans, Hanan Mahmoud and Kasia Olchowska*

### *Introduction*

This article presents archaeological information from work during four seasons (2005, 2007, 2008 and 2009) in the Khentkaues Town (KKT).[1] KKT is the planned settlement north and south of the causeway leading east from the gigantic two-tier mastaba (LG 100) that served as the tomb and memorial of queen Khentkaues I, known from her figure, name, and titles carved into the granite doorjambs of her chapel (Fig. 1). The paper is in four parts: an introduction to the site, our methodology, detailed description, and conclusions.

Khentkaues I – to be distinguished from Khentkaues II, from a later generation at Abusir[2] – probably lived at the end of the fourth dynasty, when she may have given birth to one or two sons who became fifth dynasty kings. Egyptologists have variously translated her title, *mwt nswt bity nswt bity*, as 'the mother of the two kings of Upper and Lower Egypt', or 'king and mother of the king', or 'mother of two dual kings', or 'dual king and mother of a dual king',[3] or, possibly, one of these options with the embedded meaning 'the mother of a king – or two kings – who has the authority of kingship'.[4]

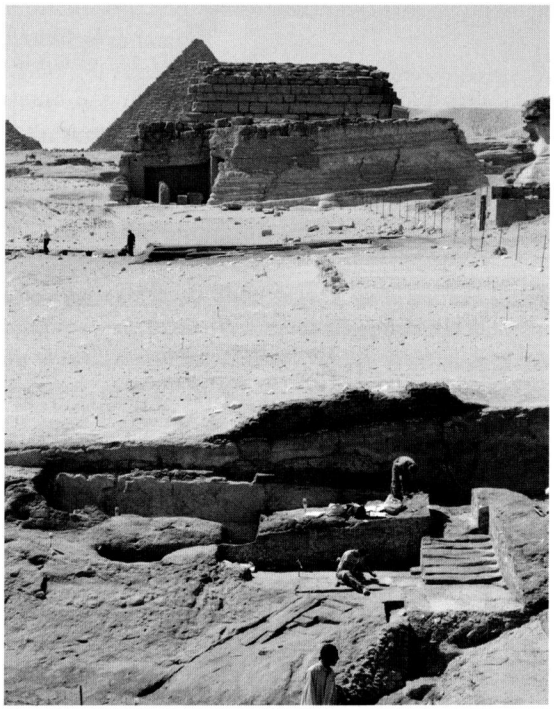

*Fig. 1: The Khentkaues I monument, view to the west. Daniel Jones and Kasia Olchowska work on the lower terrace and raised corridor of the eastern approach near the lower stairway ramp and stairs. The Khentkaues Town occupied the, flat, quarried boulevard sloping west. Sand covers the remains of the settlement, except for Building E where Hanan Mahmoud supervises work in the causeway trench. The pyramid of Menkaure rises on the high plateau to the upper left. Kasia Olchowska stands in the northern corridor with a rebuild of the eastern enclosure wall above her. To the left (south) the ascending ledge cut into the bedrock face marks the slope of the Northern Lateral Ramp. Daniel Jones works at on the lower terrace between the lower stairway ramp and the stairs*

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[1] A summary of site and AERA-specific abbreviations will be found at the end of this paper. Many AERA publications, including *AERAGRAM* and the Giza Occasional Papers (henceforth GOP) are available for download on the project's web site http://www.aeraweb.org/ (accessed 18 October 2010). A number of unpublished internal reports are cited below; these are abbreviated using the name of the author plus the title of the report.

[2] M. Verner, *Abusir* III. *The Pyramid Complex of Khentkaus* (Prague 1995); A. Dodson and D. Hilton, *The Complete Royal Families of Ancient Egypt* (London 2010), 65.

[3] Dodson and Hilton, *Royal Families*, 62.

[4] Verner, *Khentkaus,* 178.

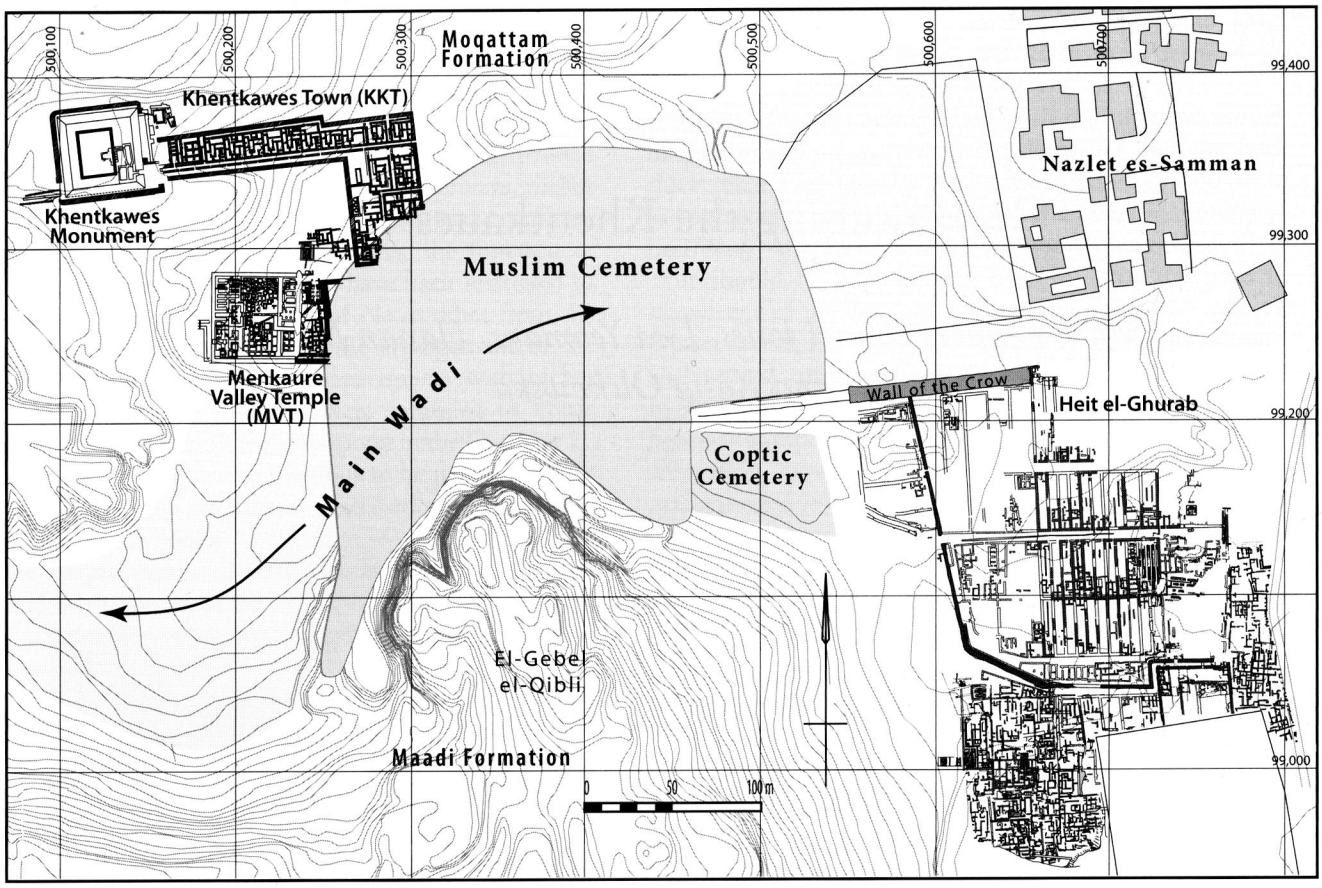


*Fig. 2: The location of the Khentkaues Town (KKT) and Menkaure Valley Temple (MVT) in the low, south-eastern part of the Giza Plateau, with the Heit el-Ghurab (HeG) site to the south-east (lower right). The main wadi between the Moqattam and Maadi Formation outcrops opens between the KKT/MVT and HeG settlement sites*

We are unaware of any explicit attestation of any family affiliation of Khentkaues I. Based on inference, many, but not all, commentators think that Khentkaues I was a daughter of Menkaure and a wife of Shepseskaf. Scholars have suggested Userkaf and Neferirkare, or Sahure and Neferirkare, or Userkaf and Sahure, Shepseskaf, and Manetho's Thamphthis as candidates for her kingly son or sons.

**Aims and interests**

Here, we do not go into Khentkaues I's family affiliations and the complexities of the possibilities, though what we present could be grist for that mill. Nor do we speculate a great deal on the royal/private elements in her tomb superstructure, another topic of much prior discussion,[5] and we avoid going into those issues for questions about dating the monument and for the royal status of this person. We do make inferences from attributes of material culture, but mostly from settlements and mud-brick architecture. Our purpose is to present archaeological information on the settlements of the KKT and the nearby Menkaure Valley Temple (MVT). We hope this information, if not our inferences about it, helps to address the lack of archaeological information as noted by some who have commented on those issues we do not address.

Ancient Egypt Research Associates (AERA) began work in the KKT in 2005 to compare this urban layout to the settlement we had been clearing, mapping, and excavating for twenty years in the site known locally as Heit el-Ghurab (HeG, Arabic for 'Wall of the Crow', after the large stone wall that is that site's defining feature (Fig. 2)). Evidence suggests that the HeG site was mostly abandoned at the end of the fourth dynasty, about the time that life began in the KKT.[6] We were interested in salvaging and conserving

[5] For LG 100 as a special case outside the developmental sequence of either kings' or queens' pyramid tombs, see P. Jánosi, *Die Pyramidenanlagen der Königinnen* (DGÖAW 13; Vienna 1996), 28–30. We do not cite here the extensive bibliography on these issues, but for a brief summary of Lehner's preliminary impressions from a field survey and observations about the building history of the Khentkaues monument, see note 158 here.

[6] M. Lehner, 'Introduction', in M. Lehner and W. Wetterstrom (eds), *Giza Reports* I. *Project History, Survey, Ceramics, and Main Street*

information that might remain in the KKT seventy-five years after Selim Hassan discovered and excavated the site in 1932.

**Fieldwork records**

Field methods and techniques to excavate and record information have changed since Selim Hassan's time. We knew little about the KKT beyond its footprint as Hassan's surveyors mapped it.[7] Hassan did not publish material culture, such as pottery, in a way that would inform us how long the KKT was occupied. From his excavations between 1908 and 1910 in the MVT, only 30 m south of the KKT, and in Menkaure's upper Pyramid Temple, George Reisner did publish pottery and other material including fragments of royal decrees on limestone and clay sealings impressed with kings' names.[8] From this we know that people served and lived in these temples over the course of three hundred years, from the fourth dynasty reign of Menkaure (*c.* 2490–2472 BC) into the sixth dynasty reign of Pepy II (*c.* 2246–2152 BC).

In part I, we showcase salient features that suggest building phases, abandonment, and reoccupation of the KKT upper town. In part II we relate these phases to corridors, ramps and stairs on a lower terrace along the eastern edge of the settlement (KKT-E). It is clear that Selim Hassan's workers saw and probed the ruins of these structures, but they did not excavate them from the thick layers of mud-brick debris that had collapsed against a vertical face of bedrock exactly along the base of the eastern enclosure wall.[9] Hassan's cartographer did not map these features, nor did Hassan mention them in his publication. In Part III we suggest how the phases of the KKT and the KKT-E relate to the building and occupation sequence that Reisner construed for the adjacent MVT.

We draw together this information from two kinds of field reports. When we excavate or record previously excavated areas we give each and every feature – layers, walls, hearths, as well as the cuts of pits and trenches – a unique 'feature number' (also known as a 'context number') that we log out of a running series so that numbers never repeat (for example, 27,919). We are now in the tens of thousands. Feature numbers appear in this text within parentheses for deposits, such as (32,026), or within brackets for cuts, for example [31,891]. At the end of the season, the Area Supervisors prepare the Data Structure Report (DSR) from pro-forma recoding sheets with prompts for all data essential for post-excavation analysis, from multi-context pre-excavation and post excavation plans, 1:20 single context plans of each stratigraphic feature, stratigraphic matrices, material culture registers, photographs, and interim reports that all team members file at the end of each week during the field season. After excavation stops, Area Supervisors first sort the hundreds of single features (deposits, cuts, walls, and so on) into groups. Then they organise feature groups into phases, designated by numbers and letter subdivisions, with labels, like 'Occupation', 'Post Occupation', 'Abandonment'. Supervisors follow a standard format when writing their DRSs, first analysing the stratigraphy in a stratigraphic summary, by phase and feature groups, from earliest to latest. They then use that analysis to construct the phased narrative, which involves more discussion, and interpretation, phase by phase, again from earliest to latest.

While the Area Supervisors write predominantly in an objective voice for the DSRs, the degree of interpretation increases with each step from the edge of the trowel to the final phase narrative. The DSR with its phasing has a great influence on subsequent analysis – for example prioritising deposits for material culture analysts in the field lab – and on presentation

While the DSR, in this format, is a honed, indispensable format for front-line reporting – a standard practice within a certain sphere of archaeology – we also recognise other forms of presenting and discoursing archaeological information.[10] So far in our work, 'alternative voices in the construction of data' include those of the site journals, diaries, and dispatches of Project Director, Mark Lehner and Field Directors, Mohsen Kamel and Ana Tavares. These documents are 'narrative recordings',[11] following either the course of excavation during the season, or from season to season, or the sequence of excavation top-down, or general topographic descriptions of given areas (like the KKT-E) as 'archaeological tableaux'.[12] This format differs from the phased sequence of a DSR in both the structure of its narrative and its graphics.

Parts I and II draw on DSRs by Lisa Yeomans who supervised work in the north-eastern part of the KKT in 2007 and the Building E excavation in 2009; Hanan

*and Gallery III.4 Operations* (Boston 2007), 46–47; M. Lehner and A. Tavares, 'Walls, Ways, and Stratigraphy: Signs of Social Control in an Urban Footprint at Giza, in M. Bietak, E. Czerny and I. Förstner-Müller (eds), *Cities and Urbanism in Ancient Egypt* (DGÖAW 60; Vienna 2010), 214.

[7] S. Hassan, *Excavations at Giza* IV. *1932–1933* (Cairo 1943), fig. 1.

[8] G. Reisner, *Mycerinus, The Temples of the Third Pyramid at Giza* (Cambridge, Massachusetts 1931).

[9] See M. Lehner, M. Kamel, and A. Tavares, 'The Khentkawes Town (KKT)', in M. Lehner, M. Kamel and A. Tavares (eds), *Giza Plateau Mapping Project. Season 2008. Preliminary Report* (GOP 4; Boston 2009), 36–40 for a description of pre-2007 trenches in the KKT-E.

[10] I. Hodder, 'Developing a Reflexive Method in Archaeology', in I. Hodder (ed.), *Towards Reflexive Method in Archaeology: The example at Çatalhöyük* (BIAA Monograph 28; Cambridge 2000), 3–14.

[11] S. Farid, 'The Excavation Process at Çatalhöyük', in Hodder (ed.), *Towards Reflexive Method in Archaeology*, 19–35.

[12] B.J. Kemp, 'In the Shadow of Texts: Archaeology in Egypt', *Archaeological review from Cambridge* 3:2 (1984), 19–28.

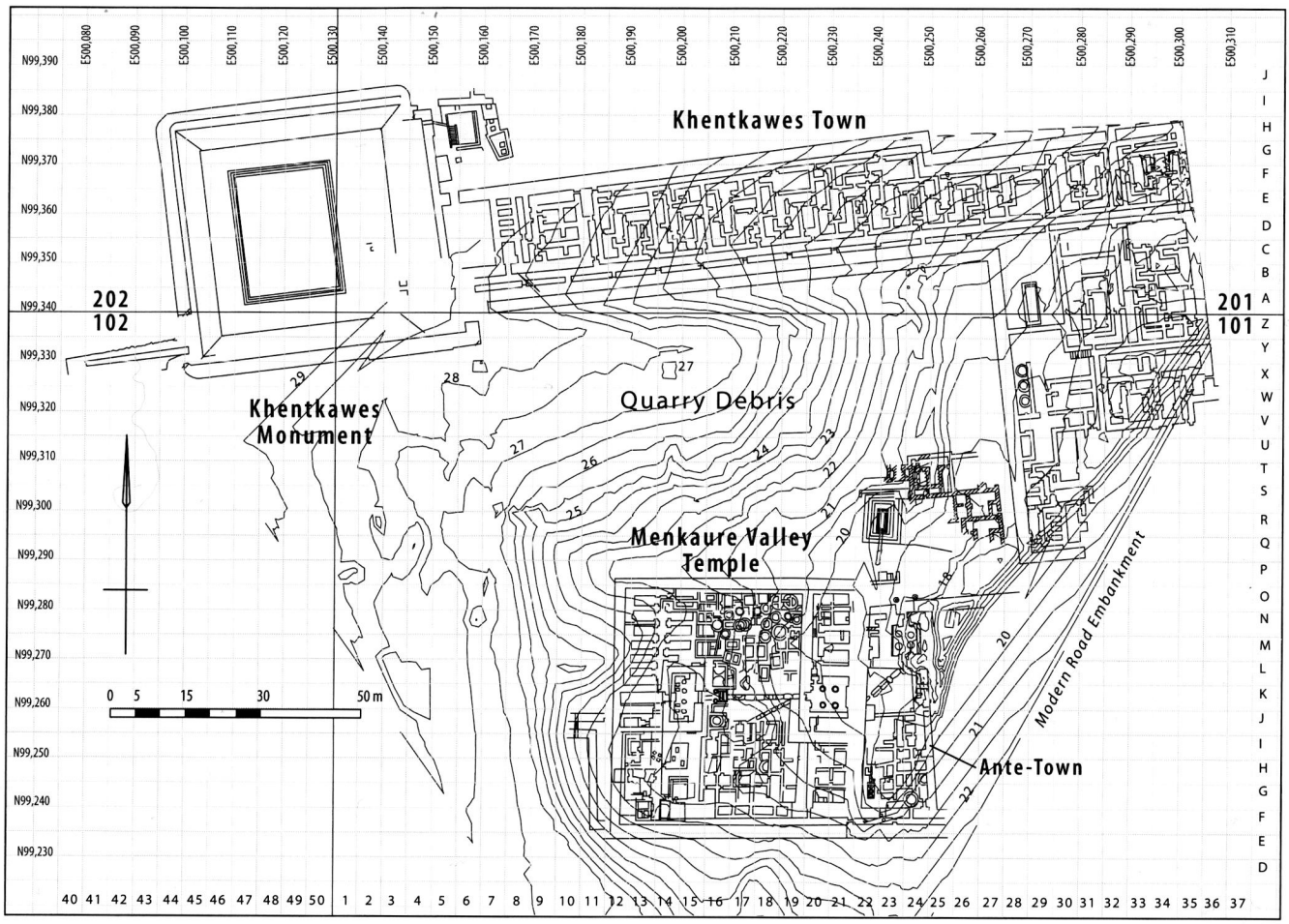


*Fig. 3: Giza Plateau Mapping Project grid and contours of the KKT and MVT projected onto Selim Hassan's map, published in 1943, of the Khentkaues Monument, Town (KKT), Menkaure Valley Temple (MVT), and ante-town. The contours reflect the fact that the ancient builders excavated areas for the southern part of the KKT and for the MVT into a massive dump of limestone quarry debris, which still rises between the two zones to 27 m above sea level. The GPMP grid is orientated to true north*

Mahmoud who supervised the causeway trench excavation in 2009; Kasia Olchowska, who supervised excavations in the southern part of the KKT-E in 2008; and Daniel Jones and Kasia Olchowska, who supervised excavations in the KKT-E in 2009,[13] and on Mark Lehner's 2009 notes and journal. The integrated phasing of the KKT and the KKT-E is the work of Jones and Yeomans.[14]

## *I. Changes in the upper settlement (KKT)*

The following narrative account proceeds generally according to the order of the phasing by Jones and Yeomans (2010, see previous note), whose phase numbers appear in parentheses after the headings. The phases are summarised in Table 1.[15]

### Bedrock base and quarry (1, 2)

As seen in the bedrock pedestal of the Khentkaues monument (Fig. 1), the natural limestone of the Moqattam Formation at Giza is characterised by a sequence of harder layers intercalated with thinner and softer, more clayey layers that dip from north-west to south-east by around 6°. The fourth dynasty quarrymen would take blocks of the harder layers by cutting the base along the softer layers, then prising the blocks up with large wooden levers inserted into sockets cut into the softer layer.

The Khentkaues settlement was laid out on a natural

[13] L. Yeomans, 'Data Structure Report for the 2007 Season at Khentkawes (KKT)'; 'Data Structure Report for the 2009 Season at Khentkawes (KKT-N)'; H. Mahmoud, 'Data Structure Report for the 2009 Season at Khentkawes Causeway'; K. Olchowska, 'End of Season Report, KKT-E 2008'; D. Jones and K. Olchowska, 'Data Structure Report (DSR) for the Excavations at Khentkawes East (KKT-E)' (Ancient Egypt Research Associates, Inc., unpublished reports on file; Boston).

[14] D. Jones and L. Yeomans, 'Khentkawes (KKT) Archive Integration' (Ancient Egypt Research Associates, Inc., unpublished report on file; Boston 2010).

[15] Based on Jones and Yeomans, 'Integration 2010', 2–3.

**Table 1: Archaeological phases of the Khentkaues Town and its approach (KKT-N – KKT-E)**

| *Phase* | *Description* |
|---|---|
| 9 | Selim Hassan archaeological investigations |
| 8 | Post-abandonment collapse and infilling |
| 7 | Re-occupation of buildings along the causeway and post-abandonment events in KKT-E |
| 6b | Abandonment |
| 6a | Localised activity |
| 5c | Northern Ramp Construction in KKT-E |
| 5b | Occupation of mortuary complex and architectural modifications |
| 5aii | Internal features and southern causeway wall construction |
| 5ai | Main layout of mortuary complex |
| 4/5 | Architectural additions of uncertain phase |
| 4 | Early occupation in Buildings I, J, K and L, and KKT-E |
| 3 | Early wall alignments |
| 2 | Limestone quarry |
| 1 | Natural formations |

bedding plane, the top of one of the harder layers exposed after the quarrymen removed layers of limestone higher in the geological sequence. Because erosion has scoured away completely many of the mud-brick walls since Selim Hassan excavated in 1932, we could see the natural bedrock foundation at the north-east corner of the KKT, which Yeomans surveyed and mapped in 2007. This bedrock exposure is probably part of the same bedding plane over the 150 m from the eastern edge of the KKT to the Khentkaues monument. The pedestal of the queen's monument, shaped from a gigantic 10 m high block reserved in the bedrock layers, shows how deeply the fourth dynasty Egyptians quarried to create this surface. On the north they left a series of other bedrock blocks, which fifth dynasty Egyptians used as mastaba-like superstructures for rock cut tombs.

As we see elsewhere at Giza, the quarrymen cut sockets for levers and wedges that they used to split and lever up the blocks. They followed this procedure until they had exposed a large surface of the underlying harder bed. Yeomans recorded such sockets and other depressions that testify to the origin of the site as a quarry bed.[16]

**Early Eastern Buildings (3, 4)**

Two east–west fieldstone walls later incorporated into Building I might remain from the survey and layout, establishing the orientation and alignment of the town. Yeomans believed these walls were early builds, to which Jones and Yeomans assigned Phase 3, because they are composed of limestone and overlay directly the bedrock.

[16] Yeomans, 2007 DSR, 8, fig. 5.

*Quarry Debris for Levelling (4)*

In the southern part of the 2007 clearing, the builders had left a layer of limestone and marl rubble from the earlier quarrying activity to make a more level surface for the southern foot-end of the L-shaped KKT. In places to the north, the builders cut slightly into the bedrock to achieve a more level foundation. However, the entire KKT still slopes considerably from west to east and from north to south.

For levelling the southern end of the KKT, the ancient builders cut into and terraced a large dump of quarry debris that had probably already been dumped before the building of the town. They also cut into this massive dump for building both the southern part of the KKT and the MVT. This massive pile of limestone debris still rises to 27 m above sea level (asl) as a mound that fills the rectangular space between the northern KKT and the MVT (Fig. 3). They also used this debris, consisting of crushed marly limestone, for terracing and landscaping the southern foot of the KKT (KKT-F) and the approach area to the east (KKT-E; see below).

*Early Eastern Mud-brick Layout (4)*

The mud-brick walls, after 75 years of erosion since Hassan excavated in 1932, increase in preservation to the west and south from the north-eastern corner of the KKT. Even with walls diminished down to the lowest centimetres we could still see successive building phases indicated by overlaps and superimposition.

Yeomans found one of the first indications of two major phases in 2007. The western wall of Building I, the second 'house' from the east in the KKT leg (KKT-N), passes directly under the southern wall of the causeway leading

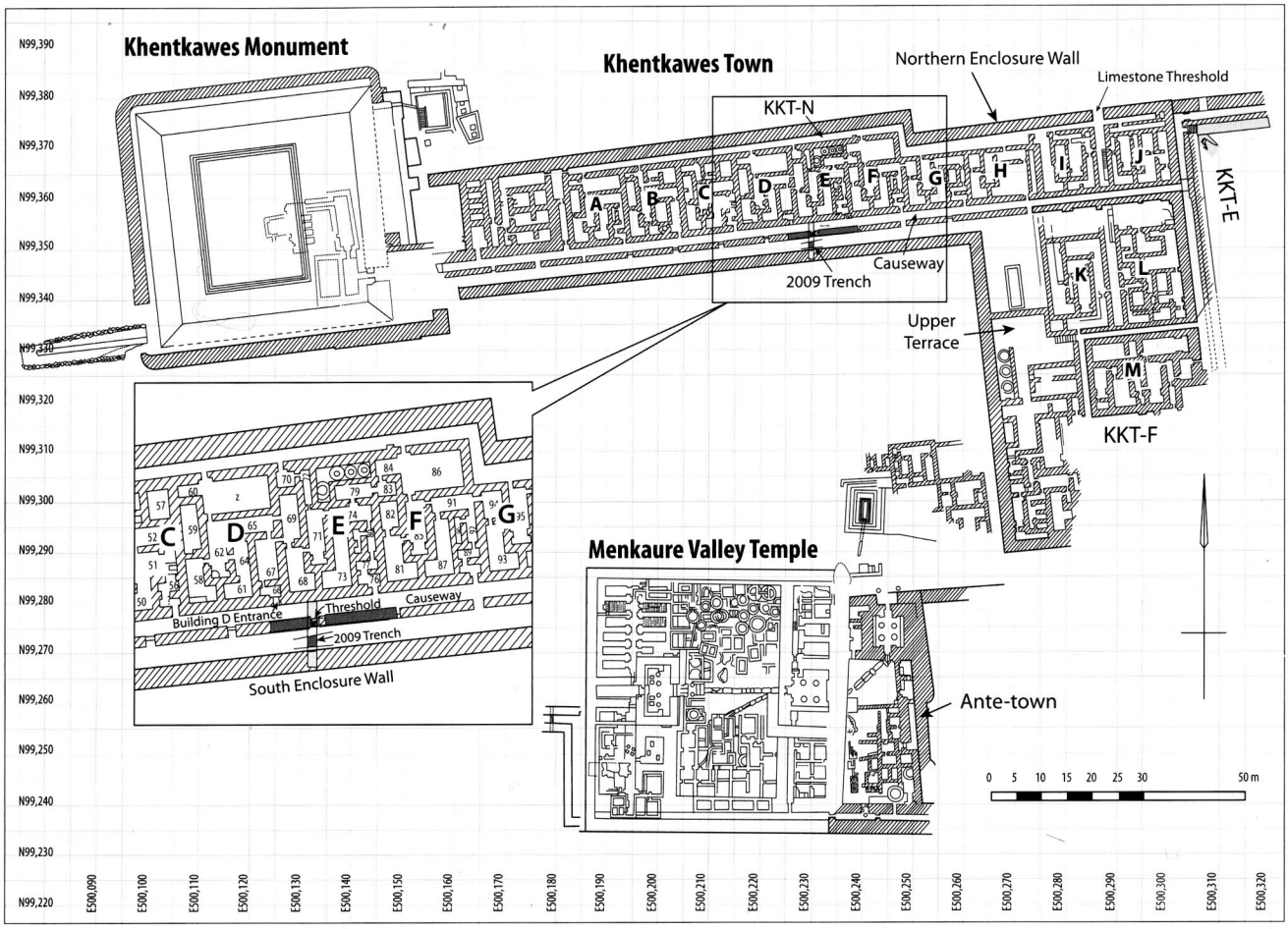


*Fig. 4: The Khentkaues Town and Menkaure Valley Temple adapted from Selim Hassan's map. Buildings designated A–M may have functioned as houses. The first building to the east (right) from the Khentkaues monument probably did not function as house, rather as a place of storage and activity connected to the funerary cult and monument*

to the Khentkaues monument (Fig. 4). Since Hassan's excavation, the western wall of Building I has deteriorated into separate patches a few centimetres thick, but enough remained to map the north–south alignment of this wall, with a marl plaster line on its exterior western face.

> This north–south wall ... appears to continue further to the north (27,919) and because it is has not eroded, whereas the northern girdle wall (27,615) [= northern KKT enclosure wall] has completely eroded away in this area, it seems to indicate that the north–south large mud-brick wall was earlier than the northern girdle wall. Interestingly, the southern external wall of the house units (Buildings I, J) becomes thinner at this point, perhaps indicating a change in the settlement with the western part and the associated northern girdle wall being later additions.[17]

The conditions that Yeomans describes can be explained as follows: when builders made the western wall of Building I, they plastered its exterior western face down to the very bottom. When builders subsequently made the causeway wall, the original western wall of Building I had been removed to within centimetres of its base, leaving a trace of the plaster as a light-colour marl line. Now both walls have been removed down to the lowest few centimetres, but in the parts that remain, we can still see the superposition of the later causeway wall and the later northern enclosure wall on the earlier western wall of Building I.

We have found similar traces of at least two phases elsewhere in the KKT, such as in Building K in 2008.[18] In fact, the mix between two or more building phases shows in Selim Hassan's map in both Buildings K and L. Walls in the southern part of Building L do not make sense as rooms because they belong to different periods of building and occupation. Hassan's cartographer mapped walls of different phases, to which Hassan makes passing mention.[19]

[17] L. Yeomans, 'Weekly Report 07ii15'. (Ancient Egypt Research Associates, Inc., unpublished report on file; Boston 2007).

[18] Lehner, Kamal and Tavares, in Lehner, Kamal and Tavares (eds), GOP *4*, 13–18.

[19] Hassan, *Giza* IV, 41.

*Fig. 5: View to the south along the boundary between lower (left) and upper (right) terraces, which marked a thick mud-brick wall that may have been the western enclosure wall of the phase 4 layout that included Buildings I, J, K, and L. To the north the wall shows a marl render with a white plaster line. Quarry debris of the upper western terrace of the KKT foot during the phase 5 expansion rises along the western side of the wall*

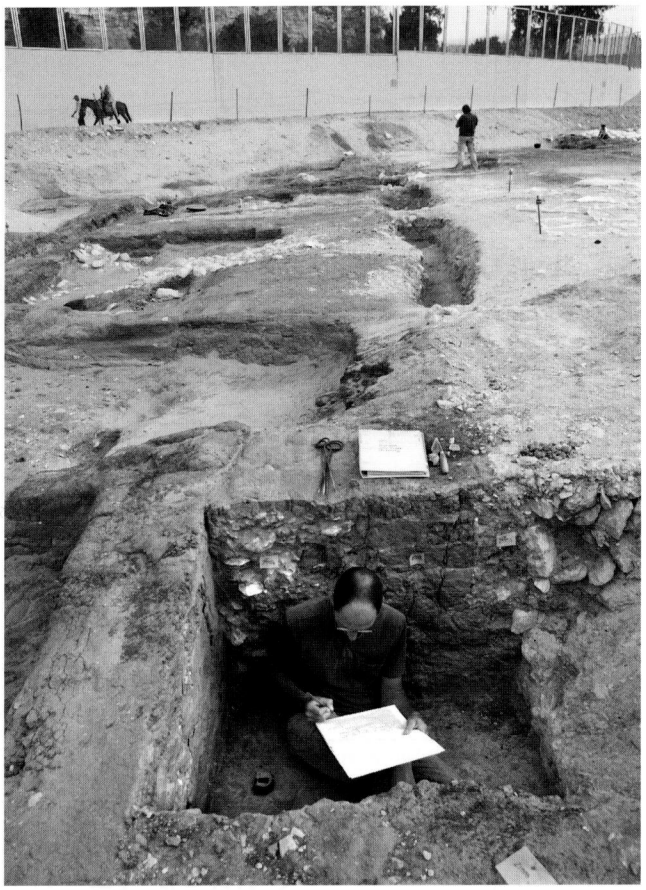

*Fig. 6: Daniel Jones in Trench A along the boundary between the lower terrace (left) and upper terrace (right). The thin wall on the left is the western wall of Building K. The lower wide mud-brick behind Jones may have been part of the original western enclosure wall of Buildings I, J, K and L with a thinner wall built upon what remains of it. Selim Hassan's workers emptied trenches along the western face, which occupants probably dug to repair and rebuild the wall. The early wall builders cut into the quarry debris of the western terrace (right)*

Yeomans concluded in 2007 that Buildings I and J on the north, and K and L on the south, all of which share the same width, belong to an early building phase, prior to the construction of the causeway that separated I and J from K and L, and prior to buildings A–H to the west along the northern side of the causeway. In short, the foot of the L-shape of the KKT existed before the 'leg'.

*Original western enclosure wall (4)*

Yeomans understood several aligned segments of mud-brick wall (27,919), (27,892), (27,880), (21,888), and (28,809) as patches of the original western boundary wall of the early layout which comprised Buildings I, J, K and L. Further south along this same alignment, we see additional exposures of an thick, early mud-brick wall. Whether the southern parts connect to the northern preserved segments of the original western boundary wall of Buildings I, J, K, and L remains to be investigated.

Selim Hassan's map barely indicates with a dotted line the thick wall (or walls?) along this alignment. On site, the large mud-brick wall, up to 1.70 m wide, shows very clearly with its top, as preserved, flush with the higher floor level of the later expansion of the settlement to the west (Fig. 5). Toward the north, the wall shows on the western side a thick marl render and a thin, near-white, coat of plaster. Although it might have been built in segments, this thick wall could be part of the same wall as that of the northern exposures. It is possible the original western enclosure wall ran for the entire north–south length of the KKT foot. To the south, we found a series of short trenches along its western side (Fig. 6).

In 2008 Daniel Jones investigated the walls along this

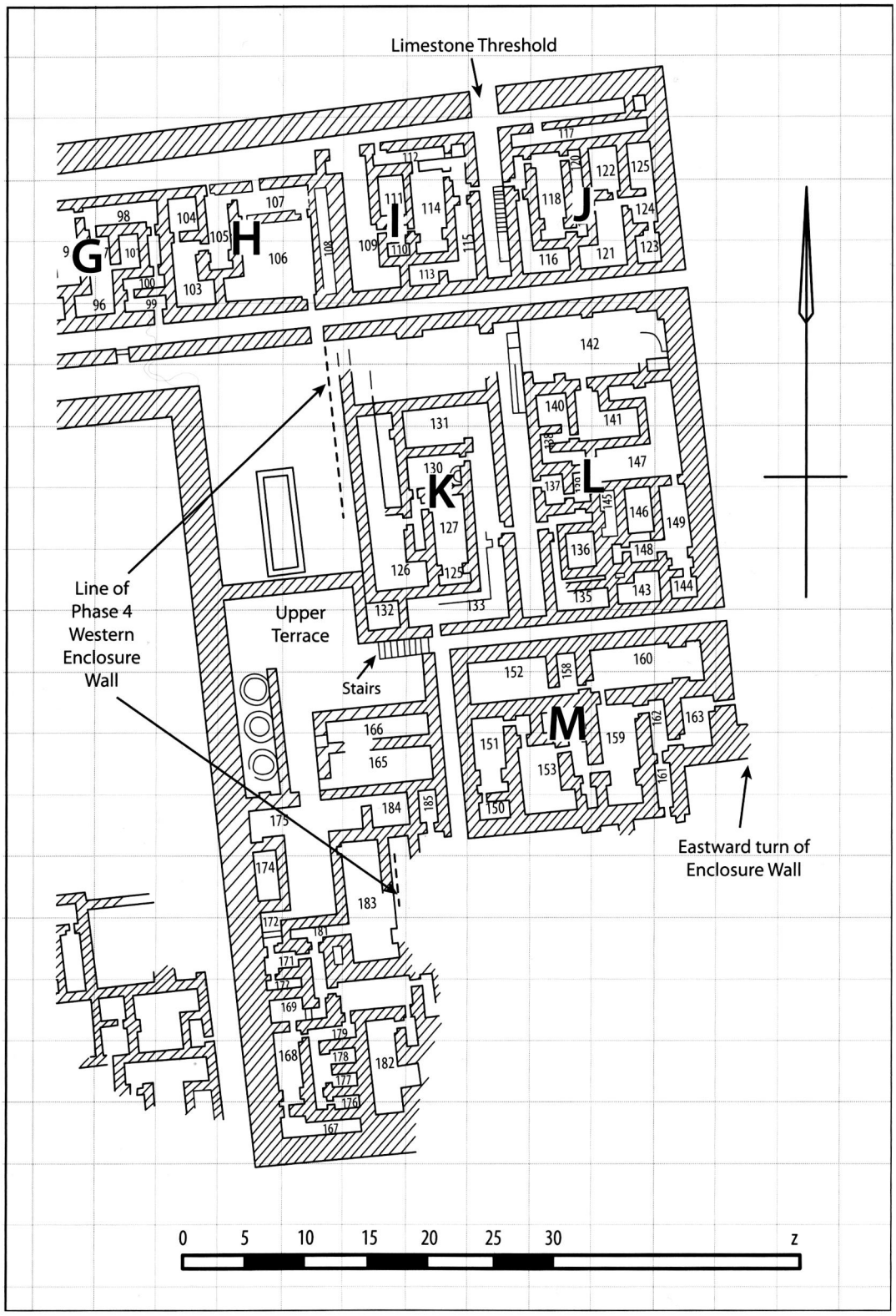


*Fig. 7: The southern foot of the Khentkaues Town (KKT-F), redrawn from Selim Hassan's map. The dashed line is where Hassan's cartographer indicated the presence of the thick, early mud-brick wall, that may have been the western enclosure wall of an early (phase 4) complex laid our north to south, which that might have included Building M and structures in the missing south-eastern corner*

*Fig. 8: View to the east. The limestone threshold of the north–south avenue that once ran between Buildings I and K on the west and J and L on the east. The threshold filled a doorway through the thick KKT northern enclosure wall, which has been completely eroded away since the 1932 excavations, exposing bare bedrock. To the north (left), grey silt fills a path cut into the bedrock. To the south, quarry wedge sockets punctuate the bedrock surface on its slope to the south*

line in two small sondages. He found that the builders based segments of this original western enclosure wall on a prepared bedrock surface that extended westward under a massive deposit of limestone quarry debris.[20] Near the southern end of Building K they built the western side of the wall against a vertical cut through the limestone debris, which is why the plaster with white lime wash visible further north does not show here (Fig. 5, Fig. 6).

When builders expanded the southern foot of the town (KKT-F) to the west (probably in phase 5, see below), they founded the expansion at a higher level upon the terraced quarry debris, creating an upper western and a lower eastern floor level. In at least one place, they projected the higher level east and upon this forward thrust they built the walls of the rooms numbered 165, 166, 184, and 185 on Hassan's map (Fig. 7). The walls of these rooms cross perpendicular to, and above the top of the older western enclosure wall. Otherwise, that enclosure wall now formed the boundary between the upper terrace on the west and lower town on the east. With the expansion, the builders took down the older enclosure wall (29,957) to where it was flush with the top of the upper terrace to build a new, thinner wall (21,909, 84 cm thick) directly upon the older one (Fig. 6). To the south they added at least two buttresses protruding 40 cm from the western face of the wall (21,909).

Selim Hassan recognised the two terraces in the foot of the KKT. In discussing the stairway to the higher terrace at the end of the corridor between Buildings K and L on the north and Building M on the south (Fig. 7) he stated:

> At this point the natural level of the ground was sloping and uneven, and this defect was remedied by a thick bed of rubble and debris, retained in place by a stout wall of mud-brick running across the entire width of this part of the city. The upper level, to which the above-mentioned stairway ascends, is occupied by a rock-cut water tank on the north, and a large granary on the south.[21]

But Hassan's map renders only with the dotted line the

[20] Lehner, Kamal and Tavares, in Lehner, Kamal and Tavares (eds), GOP 4, 18–21.

[21] Hassan, *Gîza* IV, 39.

distinctive boundary between the upper and lower terrace along the course of what might have been the old western enclosure wall. To the north, where the mud-brick wall forms the western border of Building K, it is much thicker than on Hassan's map. Hassan's cartographer put a dotted line west of Building K, about where the edge of the upper terrace is located, then continued this dotted line along the same alignment toward the southern end of the KKT foot, and then, to the west of the dotted line, drew a thin, solid line indicating the eastern face of a wall that then becomes the western face of a wall, with a projecting jamb, along the east of room 183 (Fig. 7). This is indeed confusing. In drawing a synchronic, schematic plan of the KKT, Hassan's map-maker did not know how to incorporate the diachronic complexities of the terraces, and walls of different phases that overlap and cross, or the trenches along the western face of the older, deeper enclosure wall, which the ancient occupants dug and then backfilled when they made repairs to the wall along this line (Fig. 5).

If the exposures of an early, thick wall along this line belong to the original western enclosure wall of the phase 4 layout of Buildings I–J–K–L, that layout extended 25 or more metres further south than Buildings K and L and possibly included Building M, which we have yet to investigate. The extension of the early layout this far south also brings it into close proximity to the MVT.

*Northern access and avenue (4)*

A north–south avenue, 2 m wide, ran between Buildings I and K on the west, and J and L on the east. A wide doorway through the northern enclosure wall gave access to this avenue. Six limestone slabs laid into a cut into the bedrock make up a threshold with remains on the east side of a pivot socket, 0.38 × 0.40 m, for a swinging door that shut against a jamb marked by a moulding on the western side of the threshold.[22]

We found this limestone threshold standing alone, rising slightly above the bedrock surface, because here the mud-brick northern enclosure wall has been eroded away completely down to bare bedrock (Fig. 8). Because of this we cannot be certain whether this large doorway functioned with an earlier phase of the northern enclosure wall that bounded the phase 4 layout, or whether builders installed the doorway when they built the northern enclosure wall to its full width of the later phase (5). We note again that Yeomans found a trace of the western wall of Building I running further north than the southern line of the northern enclosure wall. However, the limestone threshold may have been part of a door in the early phase, positioned as it is at the northern end of the avenue between the western and eastern buildings in the early phase (4).

After the construction of the causeway of Khentkaues I, separating Buildings I–J on the north and K–L on the south and leading to the queen's chapel, movement along the avenue necessitated an underpass cut into the bedrock, 0.90 to 1 m wide and 2.47 m below surface at its deepest point. Thirteen steps make the descent on the north, while the lesser slope on the southern end is without steps. The builders left the bottom of the tunnel unfinished as a series of humps rising half a metre, which would have made passage very awkward. Perhaps the post-causeway use of the north–south avenue was an idea that never took root, and people simply moved in and out of the newly divided complex in other ways, principally the eastern access point.

*Eastern entrance (4)*

The eastern entrance, where the causeway opens, offers one of the clearest indications of building phases. The causeway of Selim Hassan's published map runs around 1.54 m to 1.60 m wide, but widens out to about 1.72 m at its far eastern opening. When Yeomans cleared and excavated the this area in 2007, she found more evidence of at least two major phases in the KKT, and a late period of patching, repair and rebuild.[23]

In the same year Yeomans excavated a trench taking out the fill of half the width of the entrance and leaving a north-facing section through the fill on the centre axis of the causeway (Fig. 9) She excavated through a patch of sheet-collapse of small, reddish-brown bricks possibly made of burnt soil. These fell from a very late repair of the face of the southern causeway wall. Underneath, she found traces of marl plaster thinning out over a dark grey sandy surface. The thin layers remained from a floor that functioned with the causeway. When Yeomans excavated this floor, she exposed a large, fine limestone pivot socket, half-oval in shape, 52 cm wide and projecting 50 cm into the causeway from the northern wall.

This pivot socket, which functioned with an earlier floor (28,945) laid directly over the limestone bedrock, is similar to sockets belonging to chapels in the Djoser Step Pyramid complex at Saqqara and in the MVT (see note 19). The extension of the socket from the southern wall of Building J left a passage only 1 m wide next to the southern causeway wall, marked in the surface of the thin remains by the line of its marl plaster. The socket is too large for the width of the causeway.

However, 87 cm further south behind the southern causeway wall Yeomans found another marl line marking the plaster render on an earlier wall (28,985) that would have made a passage 2.38 m wide. This marl line juts north around a jamb that projects 21 cm on the east and 62 cm

[22] This limestone threshold and socket is comparable to thresholds and sockets in the MVT: Reisner, *Mycerinus*, 91, 94, fig. 19, pl. 30, Plan IX.

[23] Lehner, Kamal and Tavares, in Lehner, Kamal and Tavares (eds), GOP 4, 34–35, figs 30 and 31.

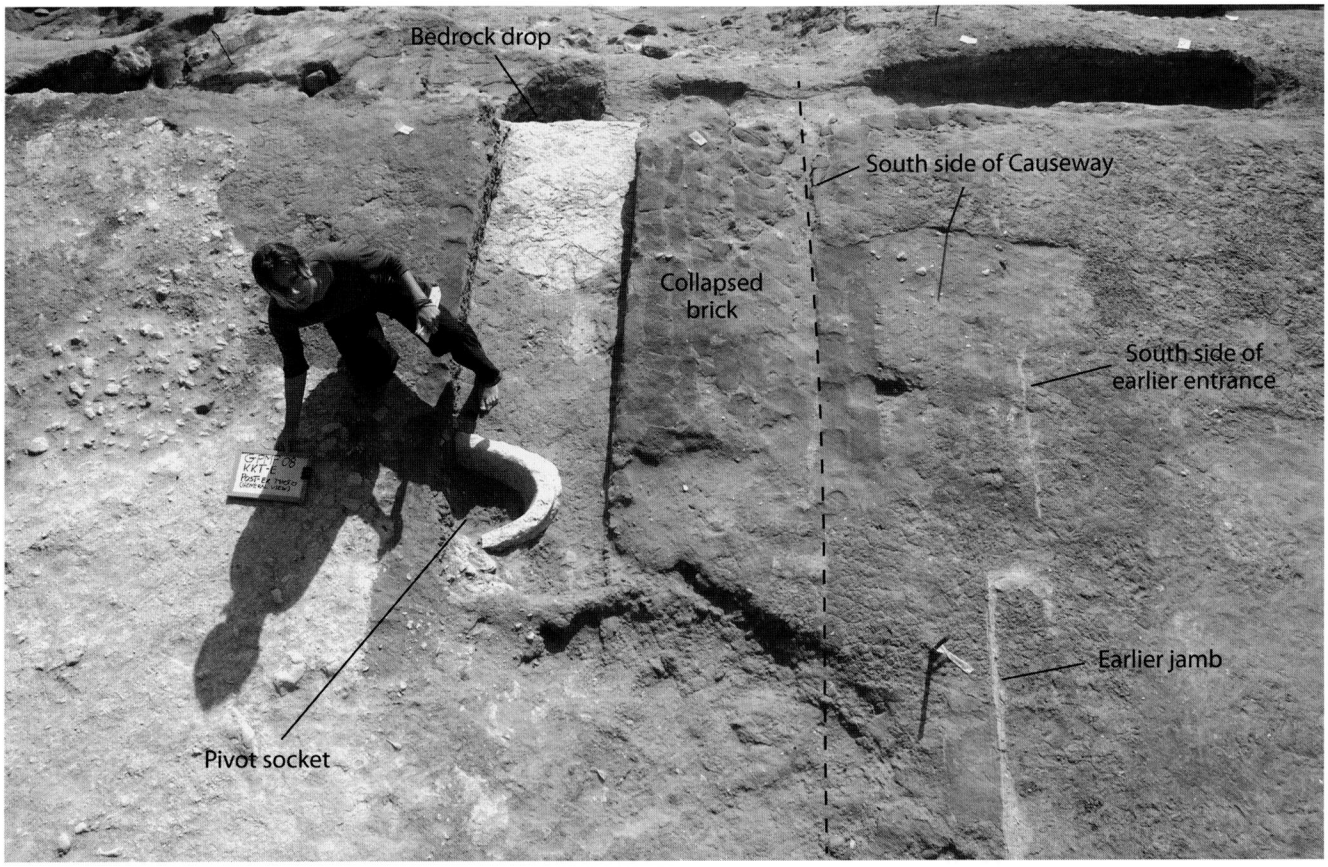


*Fig. 9: Two-phase eastern entrance to the KKT. Kasia Olchowska adjusts a label board beside the large limestone pivot socket that functioned with a marl-plastered jamb on the south (lower right) to make an early-phase doorway, 2.38 m wide. The ancient builders narrowed this corridor to around 1.60 m when they made the causeway, the southern line of which shows between the plaster line of the jamb and the pivot socket. The line immediately south of the pivot socket is the section through mud-brick collapse that Lisa Yeomans left from her 2007 excavation. View to the east*

on the west. The jamb on the southern wall lies immediately west of the socket on the northern wall, and the two features belong to a doorway that preceded the causeway, a more monumental entrance that left a passage of 2.26 m between the jamb and the northern wall, and 1.72 m between the jamb and the pivot socket.

Jones and Yeomans note that 'The western limit of the east–west doorjamb that formed part of the doorway in the eastern enclosure wall did not continue west' – as the later causeway wall did – 'but turned at a right angle to the south, suggesting there was no wall running to the west bounding a street. The construction phases of Buildings I, J, K, and L need to be carefully investigated, but it appears that one entered an open courtyard area bounded to the west by a western enclosure wall, to the north by buildings I and J, to the east by the eastern enclosure wall, and to the south by buildings K and L'.[24]

Stages of rebuilding the eastern access to the KKT are fairly clear. Builders widened the southern wall, thus narrowing the access, by adding bricks over the face of the jamb and earlier wall and creating the new face of the southern wall (27,606) of the causeway.

**Causeway and northern town (5, 6, 7)**

In 2009 Yeomans and Hanan Mahmoud cleared, mapped and excavated Building E, the sixth 'house' from the east along the causeway. Yeomans and Tavares have reported on the changes through time to Building E.[25] Here, we show the very graphic stratigraphy of changes over phase 5 to 7 in the causeway, as Hanan Mahmoud revealed in a trench she excavated across the Khentkaues causeway immediately south of Building E (Fig. 4, Fig. 10).[26]

We can match to the stratigraphic sequence in the

[24] Jones and Yeomans, 'Integration 2010', 9.

[25] A. Tavares and L. Yeomans, 'A House Through Time: Building, Abandonment, and Intermingling', *AERAGRAM* 10/2 (2009), 10–13; L. Yeomans and H. Mahmoud, 'KKT-N: Building E and the Adjacent Khentkawes Causeway,' in M. Lehner (ed.), *Giza Plateau Mapping Project Season 2009 Preliminary Report* (GOP 5; Boston 2011), 43–52.

[26] Mahmoud 2009 DSR.

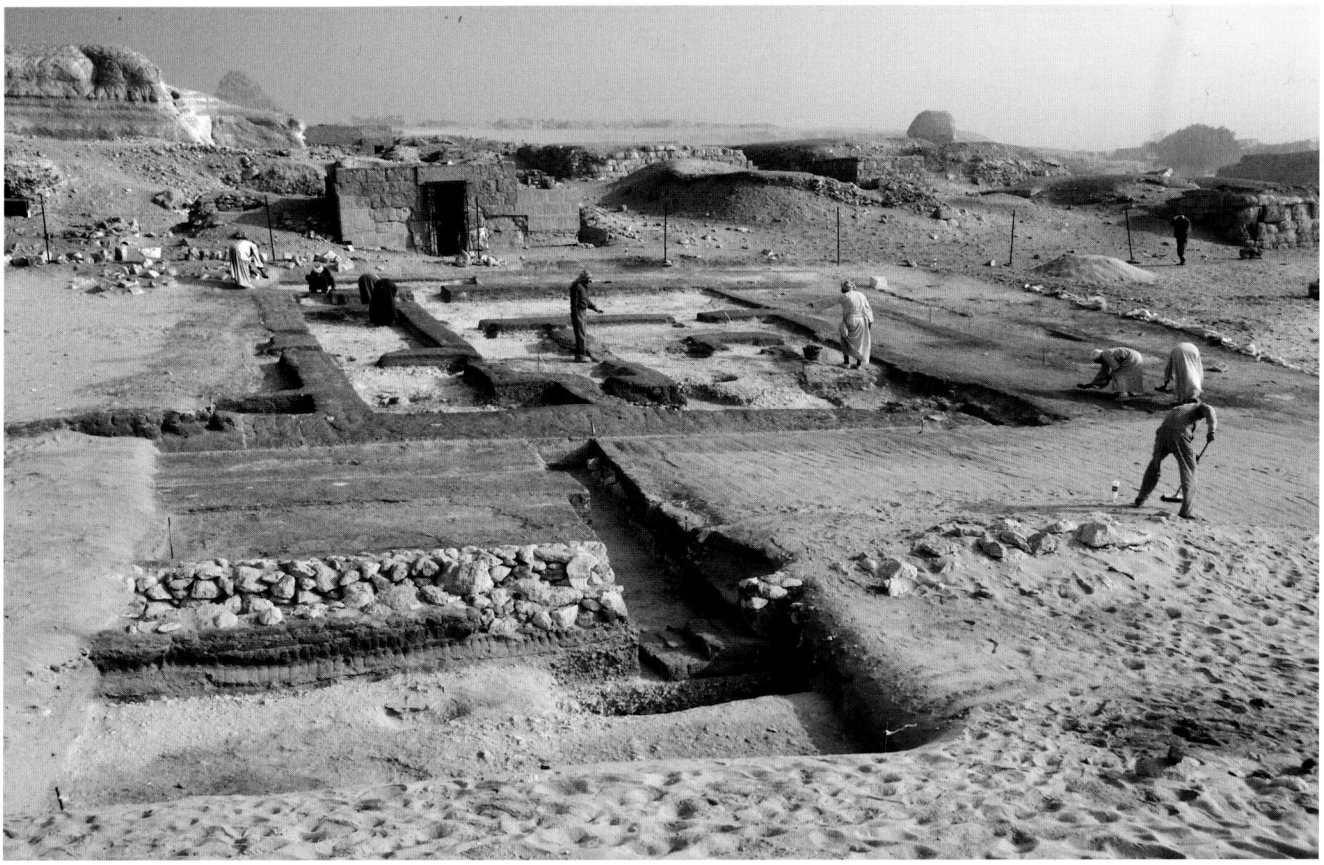

*Fig. 10: Hanan Mahmoud's 2009 trench across the causeway south of Building E. Yeomans and Mahmoud excavated Building E, in the background, down to the limestone foundation. View to the north*

causeway the sequence of plaster and blocking in the doorway into Building D, 3 m west of Mahmoud's trench. We have not yet assigned feature numbers to Building D, so we provisionally use A, and 1 through 3 to designate the different layers of plaster.

*Plaster at the south-eastern doorway of Building D (5, 6, 7)*

The doorway into Room 66, a foyer, of Building D, the next 'house' to the west of Building E, shows very clearly in the surface of the truncated southern wall of these houses, which wall (31,108) is also the northern wall of the Khentkaues causeway.

The lines of the original plaster (layer A), 2 cm thick, turn 90° from the east–west orientation along the southern face of the northern causeway wall to run north on either side of the doorway, 70 cm wide. Such a doorway opens between the causeway and each of Buildings A–H.

At some point this doorway was carefully blocked with well-laid bricks that remain in place to the height that the wall still stands. Then the blocking was plastered with a dark sandier marl layer, up to 3 cm thick (layer 1), across the width of the doorway. The wall was subsequently rendered again with a thinner layer (2) of light buff-coloured plaster, 0.5 to 1 cm thick, which runs across the patch of layer 1 plaster and continues over the original plaster layer, A. A thin layer (3) of lighter colour was applied as a finer and smoother finish over the base coat of layer 2.

We can clearly relate the stratification of this blocking and plastering to the vertical stratification revealed in Hanan Mahmoud's trench, 1 m wide across the causeway 3 m to the east of the Building D doorway. The trench crossed one of the series of eleven openings through the southern causeway wall. These openings, which do not correspond with the entrances into Buildings A–H north of the causeway, are shown with thresholds in Selim Hassan's map.

On its run between the doorway of Building D and this trench, the two distinct phases of plaster (A, and 2+3) make a combined thickness of 5 to 9 cm. In the trench, Hanan Mahmoud exposed the original render (A, feature 32, 027), 2.5 cm thick, extending down the southern face of the causeway wall (31,108) nearly to the original floor of the causeway. Plaster layer 2+3, on the other hand, lipped down onto a floor raised 40 cm higher, when the floor was raised. We suspect this was done after a period when the settlement had been abandoned. This late remodelling is commensurate with the small brown brick patching, repairs, and complete rebuilds of some walls that we are finding here and there throughout the KKT.

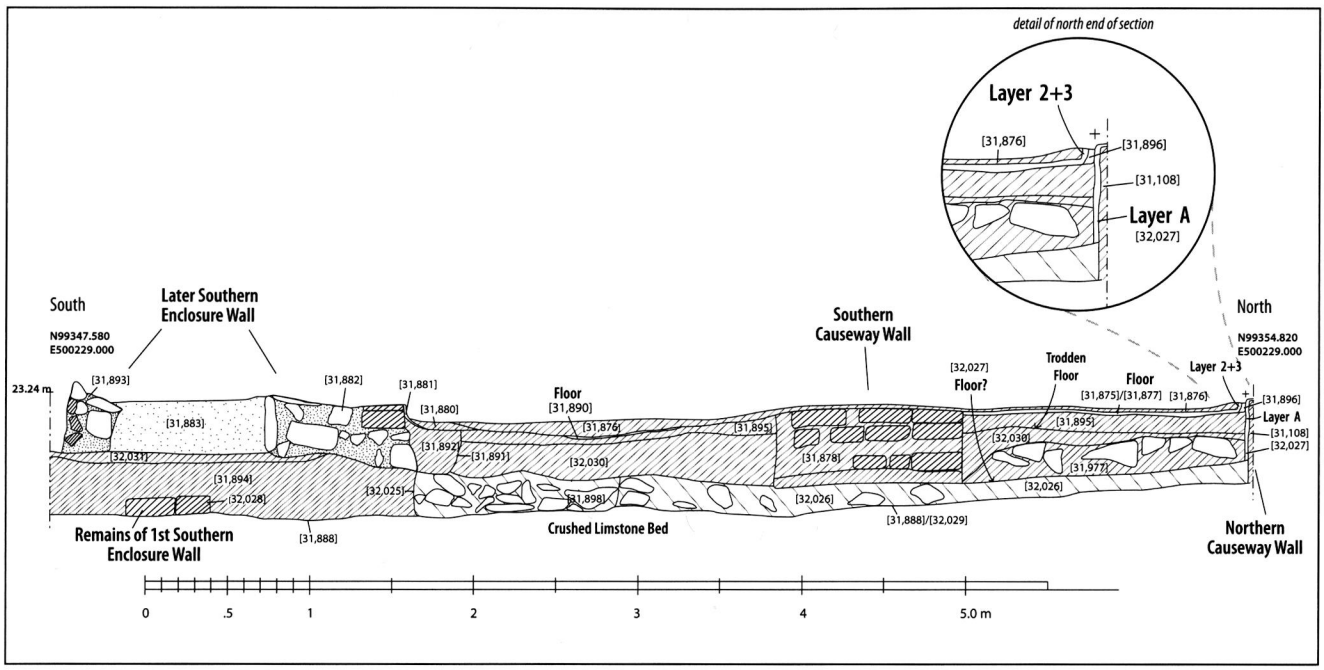


*Fig. 11: East-facing, stratigraphic section of Hanan Mahmoud's 2009 trench across the causeway. Based on original field drawing by Hanan Mahmoud*

*The Causeway Sequence (5, 6, 7)*

The 'history' of the Khentkaues causeway shows graphically in the east-facing, western section of Hanan Mahmoud's 2009 trench. This sequence begins when in phase 5 Khentkaues I's builders extended the settlement to the west of the phase 4 layout along a southern wall that would soon serve as the northern wall of the causeway. Here we list the steps of the sequence in reference to Hanan Mahmoud's drawing of the east-facing, western section of her trench (Fig. 11), and we make some observations about certain parts of this sequence. These paragraphs are a step-by-step account of the sequence of events indicated by that stratigraphic section, and to be understood must be read with reference to the feature numbers on that section and in the text.

A layer of crushed limestone (31,888)/(32,029) was laid down, on the surface of which (31,888) the northern causeway wall (31,108) and the southern enclosure wall (31,028) were built, creating a roadway, 5 to 5.20 m (10 cubits) wide.

In Hanan Mahmoud's trench, the original northern edge of the original southern enclosure wall (32,028) was not preserved. If the northern side of the original enclosure wall fell along the same line as the northern edge of the later phase southern enclosure wall (31,882 + 31,893), the roadway between the original enclosure wall (32,028) and the northern wall of the causeway (31,108) was 5 to 5.20 m (10 cubits). Hanan Mahmoud's section shows the width as 5.10 m. We might note that this is about the width of the principal east–west streets (North Street, Main Street, and South Street) through the Gallery Complex in the HeG site in the early phases.[27]

How long did this ten cubit width remain before the southern causeway wall (31,878) was created? We do not know, but the fact that we see little evidence of paving or accumulation on the surface of the limestone crush layer (31,888) suggested this 'street' was simply a step in the construction of the northern and western part of the KKT that included Buildings A–H, the causeway, and the northern and southern enclosure walls. The southern face of the northern wall (31,108) was only plastered down to a second layer of crushed limestone (32,026) on which the southern causeway wall was based.

A second layer of crushed limestone (32,026), 10.5 cm thick, was laid down against the unplastered southern face of the causeway wall (31,108).

The foundation layer of crushed limestone (32,026) runs under the southern wall (31,878) of the narrow causeway, but it stops at a cut [32,025] 85 cm south of this wall (31,878). The earlier phase of the southern enclosure wall (31,028) rests upon the earlier layer of limestone crush (31,888), so we cannot doubt than the original southern enclosure wall is earlier than the second limestone crush layer (32,026).

A coat of plaster (32,027) was applied to the southern face of the northern causeway wall (31,108) down to the

[27] M. Lehner, 'The Pyramid Age Settlement of the Southern Mount at Giza', *JARCE* 39 (2002), 58; A. Abd el-Aziz, 'Main Street Excavations', in Lehner and Wetterstrom (eds), *Giza Reports* I, 109.

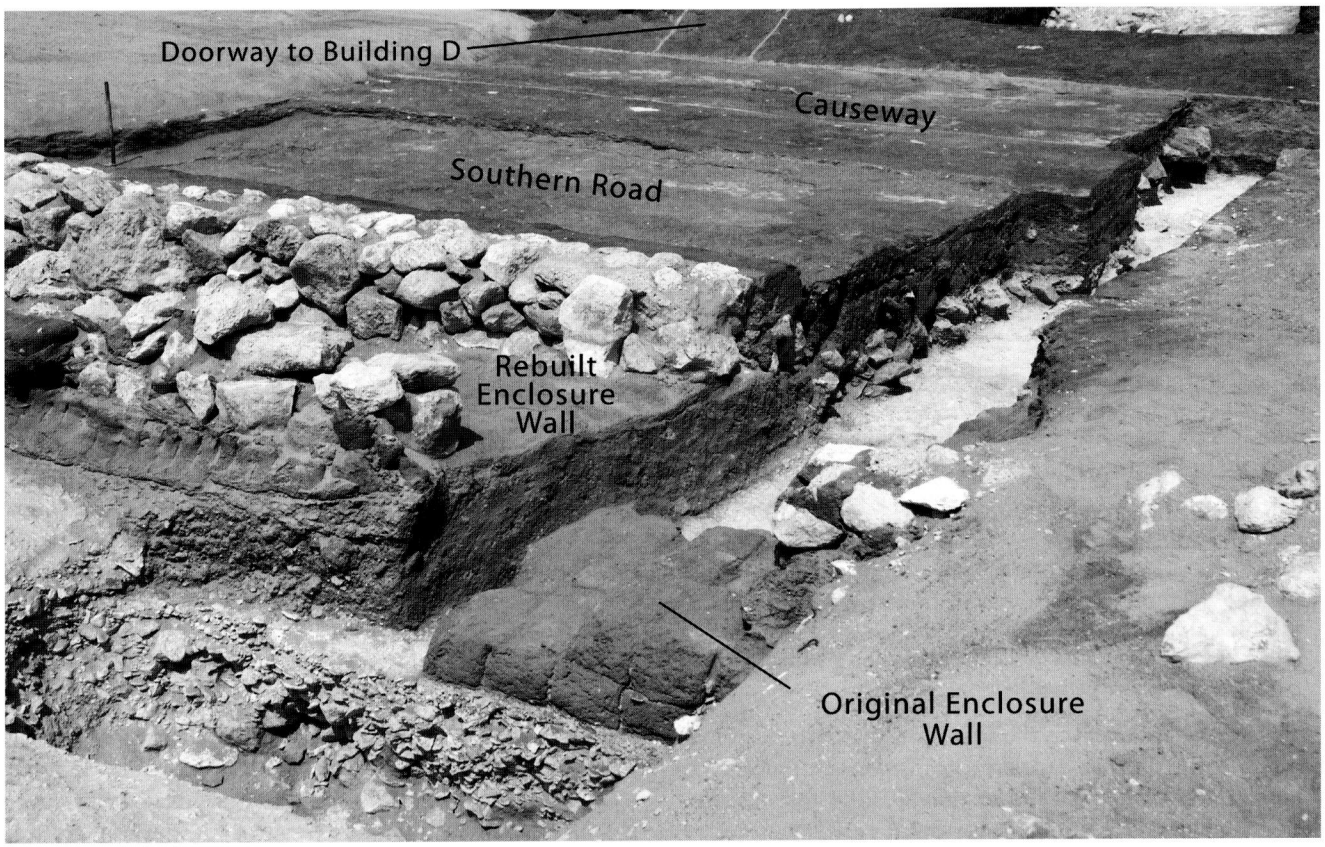


*Fig. 12: Hanan Mahmoud's trench across the causeway, with (phase 5) remains of original southern enclosure wall (foreground) and (phase 7) enclosure wall rebuilt with small bricks and limestone fragments on silty debris. Doorway to Building D, blocked in phase 7, in background*

(7 cm) layer of slightly silty sand (32,031) as bedding for the new southern enclosure wall.

The northern casing of the new southern enclosure wall was constructed with small bricks and limestone fragments (31,882) in the trench [31,891]. At the same time the builders created the southern casing (31,893) of the same materials (Fig. 12), and filled the space between the casings with sand and silt (31,883).

The foundation trench [31,891] was filled with fine silty sand with limestone flecks (31,892). The surface of the fill (31,892) of the foundation trench was re-plastered with marl (31,881) along the northern side of the enclosure wall (31,882).

Layers of marl plaster (31,896, 31,875) were applied over the original plaster (32,027) of the southern face of the northern causeway wall (31,108). At the same time the second of these plaster layers (31,875) was applied to the floor of the causeway. This is the same application as plaster layers 2 and 3 across the blocked doorway of the entrance to Building D (see above).

A layer of silt (31,876) from decayed mud-brick developed above the floor (32,895, 31,890) between the southern enclosure wall (31,882) and the southern causeway wall (31,878).

*Abandonment, return, rebuilding (7)*

Whereas the first southern enclosure wall consists of solid, large, dense mud-bricks of dark silt, the later builders made the second southern enclosure wall (31,882, 31,893) with casings on either side formed of limestone pieces and smaller brown, slightly reddish, mud-bricks of silty sand that may have been lightly burnt before being formed into bricks (Fig. 12). These are the same kind of bricks we see in the latest repairs at the eastern end of the causeway. The builders filled the core of the wall with sandy soil (31,883). This cheaply-made wall, altogether 2.20 m wide, was a complete rebuild of the older southern town enclosure wall (31,028), which had been robbed of most of its bricks at this spot and buried in a layer (31,894) of silty sand with brick fragments. The builders of the later enclosure wall did not reuse the bricks of the earlier one as far as we know. Did people remove these bricks for building elsewhere?

The stratification in Mahmoud's causeway trench shows a rebuilding after a period of abandonment. This order of events is evidenced in other places. For example, Yeomans recorded a late, phase 7 wall along the line of the east face of the western walls of Buildings I and K.[30] This late wall,

[30] Yeomans 2007 DSR, 24, fig. 7.

top of the second crushed limestone layer (32,026). This plaster (32,027) is continuous with plaster layer A in the doorway to Building D.

The surface, or floor, was plastered at the top of the second crushed limestone layer (32, 026) in the width (1.62 m) between the causeway walls (31,108, 31,878).

Lehner noted, post-excavation, a very thin marl render on top of the limestone layer (32,026) in the east-facing section of the trench, but this is not certain. He observed that the southern causeway wall (31,878) rests directly upon the top of this marl render. Hanan Mahmoud (2009) did not mention such a feature. In her DSR, she wrote: 'The wall (31,878) was founded upon a bedding layer of silty sand which was very similar to the wall and was approximately 10 cm thick'.[28]

The southern wall of the causeway was built, dividing the east-west 'street' between the causeway, 1.62 m wide on the north, and a roadway, 2.22 m wide, on the south. A floor (32,027) may have been made on the surface of the limestone crush layer (32,026).

Rough-hewn limestone pieces (31,899) were laid into the opening through the southern causeway wall, either as blocking or, more likely, as a kind of threshold. The limestone threshold sloped down from north to south.

The southern enclosure wall (31,028) was removed down to the last few courses of bricks.

We should place the removal of much of the southern enclosure wall at this stage in the sequence because it necessarily happened earlier than the silty deposit (31,894) that covered what remains of the wall (31,028), as shows in the western, east-facing section of Hanan Mahmoud's trench. Mahmoud positioned her trench through one of the openings through the southern causeway wall (31,878) through which some deposits are continuous. This point is important for the history of the settlement, because the partial erosion or demolition of the southern enclosure wall (31,028) was one of our first signs of possible abandonment of the KKT settlement, or the disuse of major parts.

We do not know if natural forces or man dismantled the southern enclosure wall (31,028) to a point where, in the trench, it exists as three rows of header bricks on the southern side, altogether 1.20 m wide (north–south, Fig. 12). These are large bricks of dark, slightly sandy silt ranging from 34 to 37 cm long and about 19 cm wide. Only two of these bricks show in the east-facing section of the trench. The squareness of the remaining patch of bricks of this wall (31,028) suggests the wall may have been intentionally dismantled.

A layer of concentrated silt (31,894), 39 cm thick, was laid down over the remains of the southern enclosure wall (31,028).

In her DSR, Hanan Mahmoud deals with layer (31,894) next after discussing the building of the southern causeway wall (31,878). She describes this layer as 'loose silty sand (40:60) mixed with frequent Nile clay, frequent plaster patches, very occasional granite fragments and moderate pottery sherds'.[29] Layer (31,894) may have been left from the dismantling of the original southern enclosure wall (31,028), and the fragments of plaster might reinforce this suggestion. The material could have been left as a bedding or make up layer, as Hanan Mahmoud suggested, for the subsequent rebuilding of the enclosure wall. The deposit (31,894) ends on the north just below, and about on line with, the northern side of the later southern enclosure wall (31,882) at a discontinuity that might be a cut [32,025], which was filled with deposit 31,898.

A shallow trench, 1.30 m wide, was dug along the northern side of where the original enclosure wall (31,028) had run. The southern side of this trench cut [32,025] through the northern side of the crushed silty sand and debris (31,894) from the demolition of the original southern enclosure wall (31,028). The north side cut through the higher foundation layer of crushed limestone (32,026). The bottom of the trench exposed the top of the lower layer of crushed limestone (31,888). We do not know the purpose of this trench; could it have been to ascertain the northern edge of the original enclosure wall to rebuild it?

This trench [32,025] was found filled with a layer, 30 cm thick, of limestone fragments in silty soil (31,898).

About the same time as they filled (31,898) the trench [32,025] on the south, to the north within the causeway builders covered the possible first marl floor with a layer of dark silty sand, 22 cm thick, with large limestone fragments (31,977).

South of the causeway, the limestone and silt fill (31,898) of the trench [32,025] and the top of the second layer of crushed limestone (32,026) was covered with a layer, 10 cm thick, of slightly sandy silt (32,030). The same layer (32,030) was laid down over the limestone and silt layer (31,897) within the causeway. The surface of the sandy silt layer (32,030) was trodden into a floor 22 cm above the possible first marl floor (32,027) of the causeway. This was the second floor within the causeway. A layer, 13 cm thick, of very compact, dark grey, brown silty sand (31,895) was spread over the floor surface trodden on the underlying silty layer (32,030) in the causeway, and paved with marl to the south (31,890)

Builders cut a trench [31,891], 28 cm deep, through the marl floor (31,890) and down through the dark gray, brown, silty sand (31,895) and through the lower layer of silty sand with frequent marl plaster fragments (32,030) along the line where they wanted to rebuild the southern town enclosure wall.

On the bottom of the trench, workmen laid down a thin

[28] Mahmoud, 2009 DSR, 5.

[29] Mahmoud, 2009 DSR, 5.

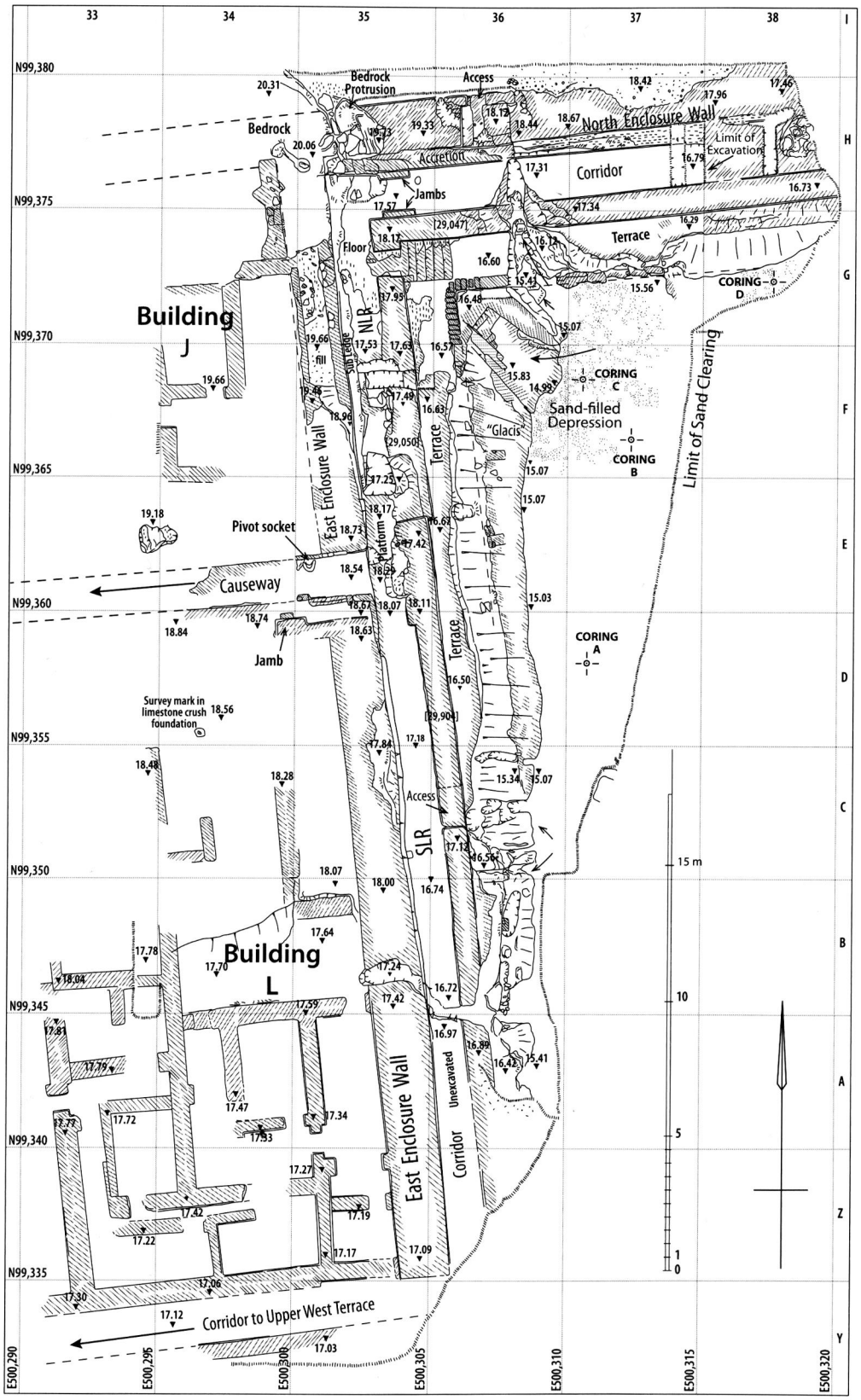


*Fig. 13: Form-line map of KKT-E and eastern KKT, showing all features exposed and left in place at the end of the 2009 season*

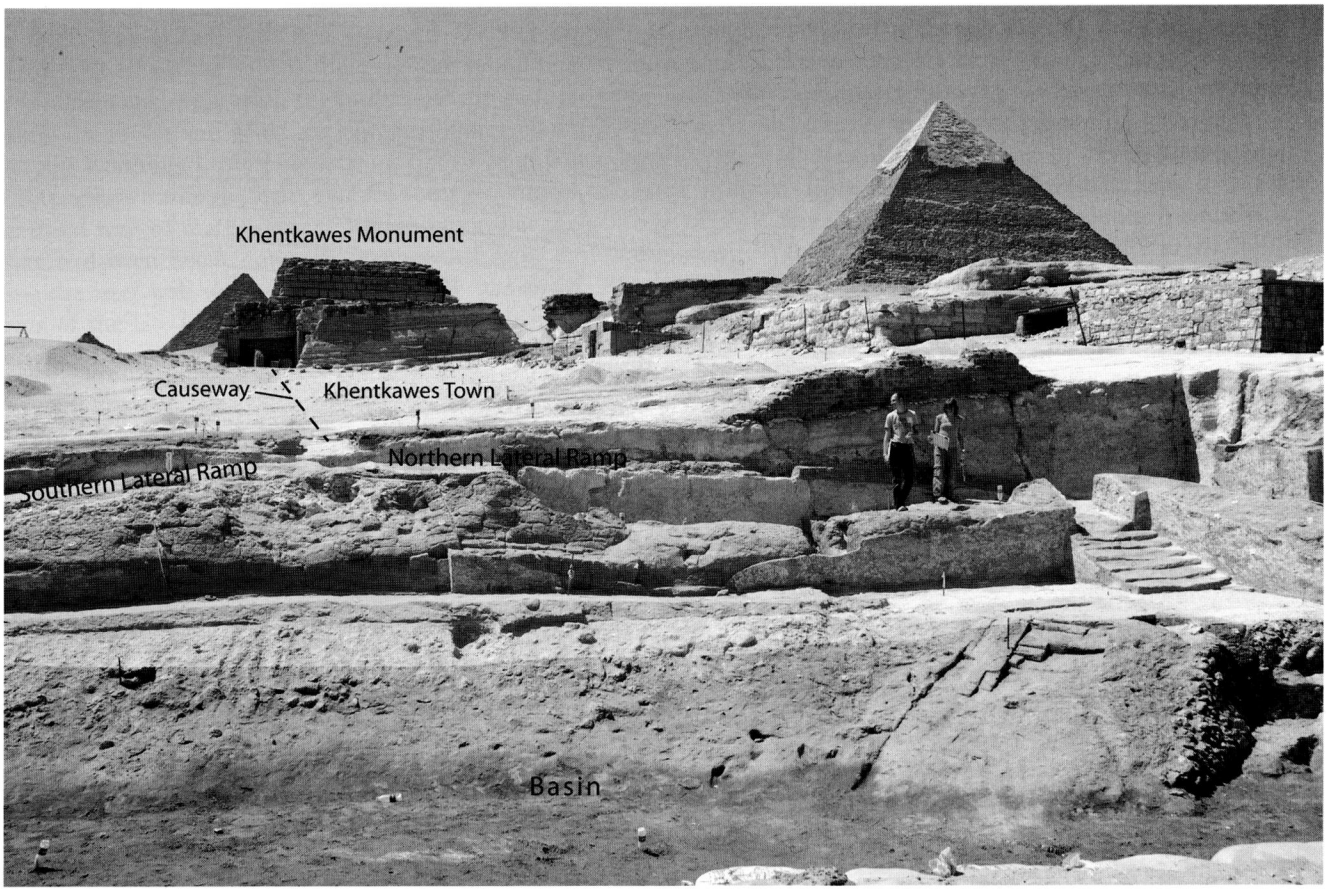


*Fig. 14: KKT-E at the end of the 2009 season. View to the west. Daniel Jones and Kasia Olchowska stand in the northern corridor where the North Lateral Ramp was removed, leaving the bedrock ledge to mark its slope to the causeway threshold*

separated units, reflecting a different administrative and economic order, as well as social change in the settlement.

### *II. Khentkaues valley complex (KKT-E)*

Between 2007 and 2009, even as our team carefully mapped and decoded the phasing of what remained of the KKT upper town, we excavated mud-brick structures that comprise an eastern ascent via corridors, ramps, and stairs from a lower L-shaped terrace around a deep depression (KKT-E). We then faced the question of the relationships in time between the structures of the lower approach and the upper town.

In 2007 Yeomans found that the bedrock surface on which the KKT was built drops vertically exactly along the eastern base of the eastern enclosure wall. Between 2007 and 2009 we excavated a mud-brick complex built onto an L-shaped lower terrace or shelf along the western and northern sides of a deeper cut into the bedrock (KKT-E).[38]

The northern terrace, walls and corridor (see below) extend east beyond the eastern limit of our excavation (Fig. 13).

It is hard to convey the immensity of the sand deposit, and the great depth to which we excavated to expose the lower approach. At the beginning of our season 2009, the sand mounded as high as elevation 24.00 m asl. Our deepest excavation through the sand filling the depression reached 14.60 m asl, where we had to stop because of the water table. The drop of 9.4 m made this one of the deepest, most dramatic excavations we have ever undertaken at Giza, almost double the depth of our 2004–2005 excavations through essentially the same sand deposit north of the Wall of the Crow. From the bedrock floor at the north-eastern corner of the KKT (20.00 m asl) the surface drops 5.4 m to the lowest point we could excavate in the depression.

As we removed the sand, we witnessed the gradual emergence of a dark grey mass of toppled mud-brick up against north-western corner of the dramatic drop. The mud-brick ruins descended at a steep slope ever deeper into a depression filled with clean sand. Within this mass, the continuation of the KKT northern enclosure wall (29,008) was clear, running thick and strong to the east at a slight downward slope. We could also make out the eastward

[38] M. Lehner, M. Kamel, and A. Tavares (eds), *Giza Plateau Mapping Project Seasons 2006–2007 Preliminary Report* (GOP 3; Boston 2009), 11–12; D. Jones, 'KKT-E, The Mystery of the Lower Buried Building', in Lehner (ed.), GOP 5, 17.

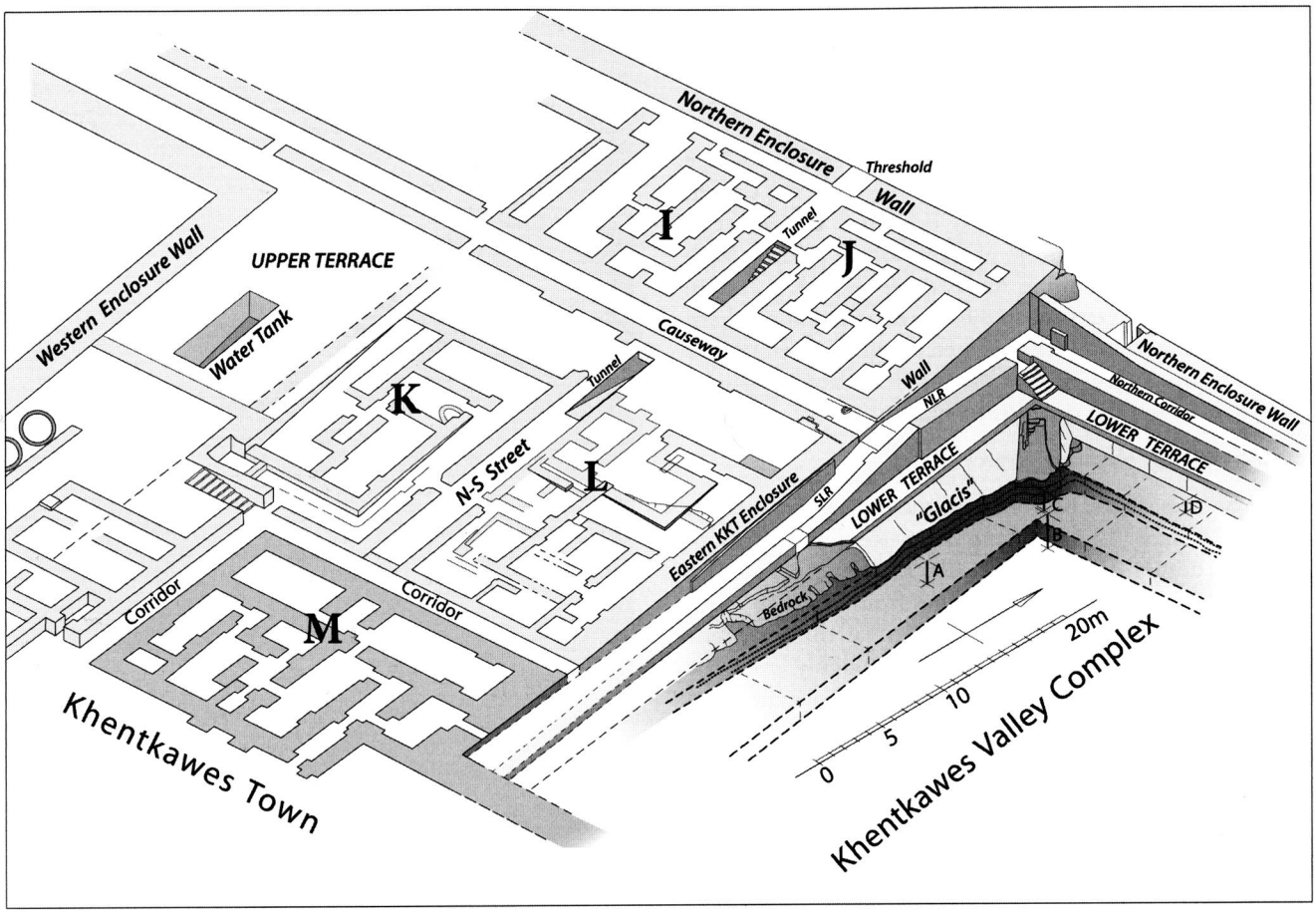


*Fig. 15: Schematic, isometric drawing of the lower approach, KKT-E and the north-eastern corner of the upper town, KKT. The drawing represents all features known as of the end of the 2009 season, while reconstructing features and walls. The ground plan of Buildings I, J, K and L is based on Selim Hassan's map*

continuation of a parallel wall forming a corridor. A deep, irregular erosion channel ('the Gully') begins at the top of the mud ruins through a wide doorway in the northern enclosure wall. The running water that most probably created this channel cut down to bedrock through the entire sloped mud mass, including the corridor wall.

During the 2009 season Daniel Jones and Kasia Olchowska supervised excavations into the mass of mud-brick, beginning in the north-western corner. Jones worked to the south excavating and recording the stairs, lateral ramps and terrace. Olchowska worked toward the east, excavating parts of the corridor, the northern enclosure wall, and the access through it.

Here we describe components of the lower approach in sequence with the integrated phases that Jones and Yeomans worked out recently for both the KKT and the KKT-E.[39] Figures 13, 14, and 15 show all features known, from the earliest to the latest phases, as of the end of our 2009 season. The report of Jones and Yeomans on the integration of phasing in the KKT and the KKT-E includes maps of the features of individual phases from earliest to latest.

**Bedrock cut to lower levels (2)**

Because Khentkaues' builders founded her town upon a natural geological plane, the whole town slopes to the south-south-east following the dip of the Moqattam Formation outcrop at Giza. At some point, quarry workers cut the vertical drop [28,849] into the bedrock surface (Fig. 1, Fig. 15). This ledge runs exactly along the base of the eastern KKT enclosure wall and forms the western side of the valley complex. The top of this ledge [28,849] slopes down 6° from north to south following the dip of the geological bedding.

Certain features of this terracing make it difficult to conclude the KKT builders simply used bedrock forms left fortuitously by the large-scale quarry work. These features suggest that the KKT builders custom cut the bedrock as a foundation for the terraced mud-brick architecture east of the settlement, the area we call the KKT-E, or the Khentkaues valley complex.

[39] Jones and Yeomans, 'Integration 2010'.

*Bedrock foundation for the northern enclosure wall (2)*

Those who cut the northern end of the vertical drop [28,849] left an eastward protrusion (29,068) of bedrock, 2.10 m wide and extending 2.62 m (5 cubits), as a base for the extension of the northern enclosure wall just where this wall continues east beyond the corner with the eastern KKT enclosure wall as mapped by Selim Hassan (Fig. 16). This bedrock extension, and the corner it forms with the bedrock ledge running flush under the KKT eastern enclosure wall, suggests that either the eastern and northern enclosure walls already existed when the quarrymen cut the vertical bedrock face, or that the builders already planned those walls when the quarrymen made their cut.

*Uniform level of the lower terrace (2)*

At the bottom of the bedrock cut, the quarry workers left a shelf or terrace (32,418) along the western and northern sides of a deeper drop to the bedrock. The upper surface on which the KKT is founded slopes from north to south following the natural dip of around 6° of the limestone bedrock strata, while the lower terrace is roughly level. The result is that the upper surface rises 3.44 m above the lower terrace on the north. At the end of the KKT causeway, the upper bedrock rises about 1.89 above the lower bedrock terrace. The top of the higher bedrock surface rises only 1.26 m above the level of the lower bedrock terrace at the southern end of the area we excavated in 2009.[40]

*Orientation of settlement and bedrock terracing (2, 3, 4)*

The whole of the KKT is shifted slightly west of true north and thus counter-clockwise to our survey grid, as is the 'quarry cut' between the bedrock base of the upper town and lower terrace (Fig. 3). The shared orientation suggests that those who built the early settlement (phase 4) were following a plan when they made the bedrock cut and built the first structures in the KKT-E.

**The lower drop in level (2)**

Here and there we see, exposed from under the mud-brick ruins, patches of the lower edge of bedrock where the lower terrace drops into the deeper depression. From these patches we gain some indication of the width of the lower bedrock terrace. In a wide and deep erosion channel (the Gully) immediately north of the lower stairway ramp we see an exposure of bedrock that descends in five steps, 12 to 40 cm high, crossing the north-western corner of the KKT-E at an angle (Fig. 13). The stepped bedrock is 7.10 to 7.60 m east of the vertical bedrock face. A patch of bedrock that protrudes from the bottom north-eastern corner of the lower ramp is 8.30 m east of the vertical bedrock face. Close by the southern side of the lower stairway ramp (see below) part of the lower bedrock shelf that Selim Hassan's workers exposed in a small trench extends 4.04 m from the face of the higher ledge. Fifteen metres further south we found the bedrock foundation of the terrace exposed where the terrace floor and bedding of crushed limestone debris had been eroded away. Here the lower bedrock edge is very irregular and extends 4.60 to 3.80 m east of the line of the vertical drop.

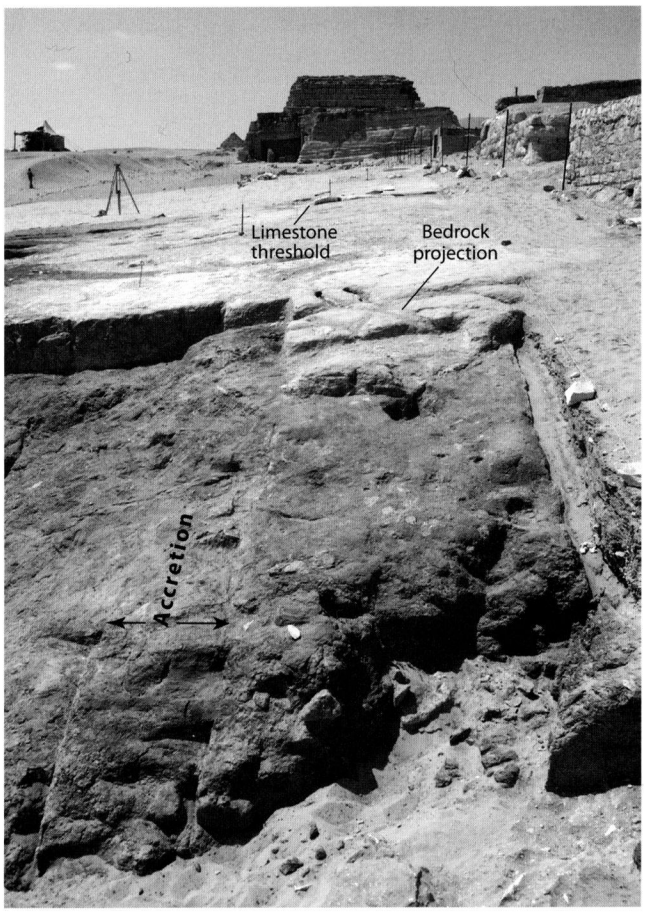


*Fig. 16: The northern enclosure wall of the KKT, completely scoured down to bedrock along on the west, continued in marl-plastered mud-brick to the east beyond the corner with the eastern enclosure wall (also scoured away down to bare bedrock). The foundation of the wall extends as a bedrock projection. View to the west*

From these exposures we conclude that the bedrock descent into the deeper basin, still filled with sand that we probed only by our core drilling, thins from north to south and is less regular than the cut between the upper and lower terraces. The irregular stepping suggests the quarry workers did not leave clean-cut faces or a good 90° corner in the lower bedrock as they did for the upper bedrock ledge in the north-western corner below the eastern and northern KKT enclosure walls. That higher vertical face and corner, with an orientation shared by the later town, and with an extension of bedrock carefully reserved for the base of the northern enclosure wall (Fig. 16), must have been started

[40] M. Lehner, 'KKT-E: 'Notes and Reconstructions (Foldout 3)', in Lehner (ed.), GOP 5, 31.

when the idea for the KKT-E complex and the upper town, in some form, was already conceived.

We do not know how much of a bedrock shelf exists running from west to east under the northern side of the KKT-E because the stretch we have exposed so far is covered by the built terrace, corridor and the northern enclosure wall. The stepped bedrock exposed in the north-western corner lies 6.1 m south of the original southern face of the northern enclosure wall (before its 'accretion' was built). Another patch of bedrock exposed 4 to 4.5 m east of the corner extends 5.5 m south of the original enclosure wall, so it is likely that a bedrock shelf exists on the north and thins to the east.

On the south of our exposure, where the bedrock becomes very irregular, two channel-like cuttings frame a hump of bedrock 1.60 m wide (Fig. 13, Fig. 15). Lehner considered that these features could indicate where a lower stairway ramp attached on the south, symmetrical with the lower stairway ramp at the north-western corner.[41] The two channels are orientated slightly south-west to north-east, roughly symmetrical with the orientation of the northern lower stairway ramp, north-west to south-east. A doorway through the corridor wall that functioned in an early phase of the Southern Lateral Ramp (see below) is just above these features cut in bedrock. If a lower stairway ramp existed here, the counterpart to the one in the north-western corner, we might expect it to mark the south-western corner of the basin and terrace of the KKT-E, which would imply an edge and possibly a corridor running east, the counterpart of the northern edge and corridor. The south-western corner would then be about 17 m from the north-western corner, as measured from the southern side of the lower stairway ramp to the northern side of the southern cuttings in the bedrock face.

Against this possibility, the lower bedrock edge continues on to the south and aligns neatly with the mud-brick retaining wall (30,848) marking the edge of the terrace at the north-western corner and at the upper end of the lower stairway ramp. So it does not appear that we have here a south-western corner to the terrace and basin.

*Bottom of the basin (2)*

The lower bedrock terrace drops about 1.91 m into the basin, based on the average level of the bottom of the basin as determined in four core drillings through the unexcavated sand. The bedrock appears to descend into the basin in steps. The bedrock exposed by the Gully under the north-eastern side of the lower stairway ramp descends in irregular steps (see above). As of the end of our 2009 season, the basin remained filled with sand, saturated with ground water below elevation 15 m asl. We made four boreholes to find the bottom (A to D, Fig. 13, Fig. 15). Lehner's isometric reconstruction (Fig. 15) drawing shows in dashed lines a possible bedrock step along the northern side at elevation 14.54 m asl, where borehole D stopped at a hard surface.[42]

Borehole C, in front of the lower stairway ramp, stopped at a hard surface at elevation 13.63 m asl, possibly a bedrock step or terrace along the western side of the basin. Borehole A stopped at a hard surface at elevation 13.54 m asl about 9.5 m further south. Borehole B, the farthest east of the four, encountered a hard surface at elevation 12.43 m asl, which is as deep as the best estimates for the level of the Nile flood-plain in the Old Kingdom.[43] It is possible that further east the bottom of the basin slopes or steps down even deeper.

*L-shaped cut into bedrock (2)*

The artificial 90° cut into the bedrock, which drops the surface nearly 10 m, must continue for some distance further east. The bedrock exposures just north of the KKT-E suggest this continuation. Immediately to the north of our area KKT-E, the rock-cut and built tombs of the eastern part of the Central Field, excavated by Selim Hassan, continue at least 50 m further east of our 2009 excavations, and the Khafre Valley Temple and the bedrock terrace in front of it extend about 150 m east of the eastern end of the KKT. The bedrock surface immediately west and south-west of the Khafre Valley Temple slopes down to the south-south-east at the 6° dip of the bedrock layers, because the quarrymen exposed the top of a natural limestone bed, as they did for the foundation of the KKT.

A deep 90° cut along straight east–west and north–south lines into the natural south-easterly dip of the bedrock, to make the northern and western sides of an expansive lower, open area, has its parallel in the terrace of the Sphinx Temple and Khafre Valley Temple. Those temples sit in an open space defined by a linear cut into the bedrock immediately east of the Sphinx that left a ledge more than 88 m long.[44] Drill cores and other evidence suggest that at some point east of these temples, the bedrock drops again, to much deeper levels.[45]

A similar large 90° cut was made into the natural dip of the bedrock layers to make the northern and western sides of the low, open area east of the KKT, but with two

[41] Lehner, in Lehner (ed.), GOP 5, 31.

[42] M. Lehner, 'Valley Complex for a Queen Who Would be King', *AERAGRAM* 10/2 (Fall 2009), 6–9; Lehner, in Lehner (ed.), GOP 5, 32.

[43] M. Lehner, 'Capital Zone Walk-About 2006: Spot Heights on the Third Millennium Landscape', in Lehner, Kamal and Tavares (eds), GOP 3, 142.

[44] H. Ricke, 'Der Harmachistempel des Chefren in Giseh', *BeiträgeBf* 10 (1970), 3–6; M. Lehner, 'Unfinished Business: The Great Sphinx', *AERAGRAM* 5/2 (2002), 10–15.

[45] Lehner, in Lehner, Kamal and Tavares (eds), GOP 3, 112–114.

differences. Firstly, the bedrock cut east of the Sphinx, the deeper drop east of the Sphinx Temple, and the descent of the approach ramps into a deeper cut east of the Khafre Valley Temple, lie approximataely on a line with the eastern escarpments of the Moqattam Formation to the north, and the Maadi Formation to the south. The eastern facades of these temples are about 50 m west of a line drawn from the north-eastern point of the Moqqatam Formation outcrop near the Khufu causeway to the eastern edge of the Maadi Formation knoll, the Gebel el-Qibli. The depression east of the KKT lies more than 150 m west of that line, and nearly 350 m west of the eastern end of the Wall of the Crow. Secondly, the cut east of the Sphinx left a flat terrace that builders filled with the Sphinx Temple and Khafre Valley Temple, whereas east of the KKT the cut descends step-wise into a deep depression.

*Harbour basin?*

Up to our 2009 season when we found the structures in the KKT-E, a functioning harbour east of the Menkaure Temple appeared to be as implausible as harbours fronting other valley temples.[46] Certain findings here, and in Dahshur South,[47] force us to reconsider the possibility that the Menkaure and Khentkaues valley complexes fronted onto basins that held water, at least seasonally.

The level at which we stopped clearing the sand filling the KKT-E depression, around 14.60 m asl, is very close to the average base level, 14.74, of Old Kingdom settlement in the Nile valley east of the Giza Plateau, as determined by archaeological exposures and core drilling during the AMBRIC waste water project in the late 1980s.[48] Those settlements would have stood on islands and levees above the inundation during the peak flood (August–September), when the floodwater reached 1.5 m average depth above the floodplain.[49]

To reiterate, the results suggest that the bedrock descends in steps, like the bedrock exposed by the erosion channel, the Gully, under the north-eastern side of the lower stairway ramp. The drawing of the reconstructed complex (Fig. 15) shows in dashed lines two hypothetical bedrock steps based on borehole D, which stopped at a hard surface at elevation 14.54 m asl, and boreholes A and C, in front of the western terrace and lower stairway ramp, which hit a hard surface at elevations 13.54 and 13. 63 m asl. Borehole B, the farthest east of the four, hit a hard surface at elevation 12.43 m asl, and again, this is close to our best estimates for the level of the Nile floodplain in the Old Kingdom.[50] The total depth of the basin below the level of the terrace, as determined by the augur B, is 4.07 m. It is possible that the bottom of the basin slopes or steps down even more deeply to the east.

The core samples from drill holes A and B and the material from a sondage near the bottom of the lower stairway ramp indicated that, under the immense accumulation of clean sand (29,858), and upon the basin bottom, lies a sandy, clay layer (30,861) with 'degraded mudbrick, pottery, and charcoal fragments; inclusions not present in 29,858'.[51] As close as these probes were to the base of the terrace, the material could be from the erosion of the structures and the cultural material upon them.

In the drawing (Fig. 15) of the reconstructed arrangement in the KKT-E the dotted lines correspond to elevations 14.00 and 14.50 m above sea level, again our best estimate for the highest water during the peak of the annual Nile flood in the early Old Kingdom. The bottom of the mudbrick retaining wall immediately east of the lower stairway ramp (see below) reaches elevation 15.60 m asl. The higher estimate (14.50) of the flood is more than a metre lower than this wall. The water at the estimated flood maximum would fill the basin to a depth of 2 to 1.5 m, again, the lower value being the average depth of the flood over the floodplain in the 19th century AD.

To receive floodwater, the basin would need a connection to the edge of the floodplain during inundation, to a water way connected to the Nile, or to the main Nile channel. Independent studies estimate that in the early Old Kingdom, the main channel or a subsidiary branch, flowed around 200 m east of the end of the Wall of the Crow,[52] which is about 325 m east of our exposure of the Khentkaues valley complex, so the Nile or a tributary flowed more than 500 m east of the KKT-E basin. How this connection was made requires an assessment of the KKT-E basin with other evidence about the interface 4,500 years ago between the Giza monuments of the high desert, the HeG and the KKT settlements on the low desert, and the Nile and its floodplain. This assessment requires evaluation in another forum.

[46] Lehner, in Lehner, Kamal and Tavares (eds), GOP 3, 129–136; D. Jeffreys, 'High and Dry? Survey of the Memphite Escarpment', *EA* 19 (2001), 15–17; id., 'The Survey of Memphis: Recent Results', *EA* 29 (2006), 14–15; id., 'Archaeological Implications of the Moving Nile', *EA* 32 (2008), 6–7; I. Casey, 'Settlements at South Saqqara', *EA* 15 (1999) 24–25; S. Seidlmayer, *Historische und moderne Nilstände: Untersuchungen zu den Pegelablesungen des Nils von der Frühzeit bis in die Gegenwart* (Berlin 2001), 47–48.

[47] The German Institute mission found an artificial, deeply excavated and revetted enclosure in the wadi east of the so-called valley temple of the Bent Pyramid. We would like to thank Nicole Alexanian and Dirk Blaschta for a visit to their excavations in April 2010, and for permitting us us to mention this.

[48] Lehner, in Lehner, Kamal and Tavares (eds), GOP 3, 132.

[49] W. Willcocks, *Egyptian Irrigation* (London 1889), 44.

[50] Lehner, in Lehner, Kamal and Tavares (eds), GOP 3, 142.

[51] Jones and Olchowska, 2009 DSR, 21.

[52] Lehner, in Lehner, Kamal and Tavares (eds), GOP 3, 135.


*Fig. 17: Erosion reveals possible phases of the Southern Lateral Ramp. A lower sloping layer of crushed limestone (1) may be the earliest phase. A higher crushed limestone layer with a thick silt paving (2) is designated phase 4. The line between gray silt and marl render on the vertical face (3) marks the floor of a final phase 6*

**Lower terrace (2)**

Workers augmented the bedrock shelf or terrace with a layer, 2.60 m thick, of crushed limestone mixed with Nile silt. They dumped this material against the face of the bedrock shelf to extend it eastward and southward, and spread it out over the top to build the bedrock shelf slightly higher and even it out, creating a terrace along the western and northern sides of the basin.

The terrace slopes slightly from north to south, from 16.66 m asl near the north-western corner to 16.44 about 19 m to the south. The terrace shows a greater slope from west to east, from 16.60 m asl in the north-western corner to 16.29 around 8 m to the east.

It is compelling to think that the builders evened and augmented the bedrock terrace with limestone debris in the KKT-E as soon as they had the intention of creating the inverted L-shaped open terrace in the early phase of the settlement, when it was limited to Buildings I, J, K and L with the wide eastern doorway (see above). To ascend from the terrace to the doorway, the builders made the Southern Lateral Ramp (SLR) against the face of the bedrock drop. Erosion of the SLR and its ruins exposed its internal composition. We see in the core a sloping layer of crushed limestone and marl that may indicate an earlier build of this ramp when it was steeper and shorter (Fig. 17). Until we excavate the SLR further to ascertain this earliest phase, it remains uncertain.

In their phasing, Jones and Yeomans provisionally place this earlier phase of the SLR with phase 3 of the upper KKT settlement – which would be prior to Buildings I, J, K and L.[53] If the earlier phase of the SLR is real and belongs to phase 3, then the lower terrace must have already been levelled and extended with the crushed limestone in phase 3, which would imply the existence in phase 3 of the mud-brick retaining walls (30,848) that hold the limestone debris in place. Here we therefore describe these walls next in the KKT-E sequence.

*Retaining walls (4)*

In the north-western corner of the open, inverted L-shaped terrace, the builders placed mud-brick walls (30,848) into a 90° corner holding back the limestone debris. These walls probably extended further east and south (as reconstructed

[53] Jones and Yeomans 'Integration 2010', 6.

40 cm thick, had eroded into two segments (27,903 on the north, 28,610 on the south). Like the late rebuilding of the southern enclosure wall, the builders made casings of broken limestone and filled the core with silty material capped by more limestone. The northern segment (27,903) overlays on its southern end the scant remains of the northern wall of the causeway. This suggests that the causeway had been taken down, at least at this spot, by the time the later wall was built. However, the two main segments of the late limestone wall leave an opening for the passage of the causeway.

*Reoccupation and house intermingling (7)*

Selim Hassan recognised two distinct phases in the KKT, especially in the area of Buildings K and M:

> The space lying between the ramp of the subway and the eastern girdle wall of the city had been occupied during two successive periods, the later houses being erected upon the ruins of their predecessors; thus we find two levels of ground at this spot. The later buildings are in a bad state of preservation, and the bricks used in their construction are smaller than those of the earlier period.[31]

Hassan surely refers to the small brown bricks of sandy silt that were used to repair the causeway entrance and rebuild the southern enclosure wall. We also found these bricks used in extensive repairs in Building E.

The transformations during a re-occupation and rebuilding that we found in Building E carry implications for the social and economic organisation of the settlement. The preservation of the walls in Building E is much better than in houses at the eastern end of the northern KKT. Yeomans found walls standing 30 to 32 cm high at the western side, and 9 to 10 cm high at the eastern side of the northern end, 50 cm high at the south-eastern corner, and 75 cm down to the limestone crush foundation layer spread at the south-western corner due to the pronounced slope to the south.

Through the first phases of occupation, Building E underwent a number of modifications, including blocking of doorways and construction of four round grain silos in the northern open court (Hassan's 'reception hall') of Space 79.[32] In the latest phase (Jones and Yeomans 2010 phase 7; Yeomans's 2009 phase 6), several of the walls in the south-eastern corner of Building E were extensively repaired, a screen wall (31,072) was added on the east of the silos in Space 79, and a new wall (31,100) built between spaces 73 and 74. For most of these repairs the builders used 'small, (21 × 11 × 7 cm) brown, sandy mudbricks',[33] again, slightly reddish, as though the soil had been burnt before its use for making bricks.

These differ noticeably from the bricks used in all earlier phases. For the longest stretches of rebuilding (31,852) in the eastern wall (31,075) of Building E, the builders used these bricks 'to form the eastern and western faces with a core of dark grey ashy silt containing moderate quantities of pottery'.[34] This construction is, again, similar to the late rebuilding of the southern enclosure wall in Mahmoud's trench, and to the wall along the western sides of Buildings I and K.

Yeomans noted:

> There is some evidence that ... the building [E] was abandoned before a phase of rebuilding and occupation ... a number of the walls in the southeastern part of the building were rebuilt. In order to rebuild, the earlier Nile clay walls were cut, almost down to the base in some parts, before rebuilding with small brown sandy bricks with a core fill. This would suggest that there was significant damage to the earlier walls, possibly after a period of abandonment.[35]

Our work so far indicates that during this late occupation, Building E was a functional extension of Building D to the west. People had carefully blocked and plastered (Layers 2 and 3, see above) over the causeway doorway to Building D, while the causeway doorway to Building E still functioned.[36] By this time, in the earlier period of occupation, the access from Building E to the northern street had already been blocked. It is possible that people could enter the combined interior of Buildings D and E through the northern wall of Building D, but we have not yet examined that building. Our work in 2009 indicates that in the late phase the people built four round silos in the broad room or court of Building E. However, they had also completely blocked access from the rest of Building E into this space, which could now be accessed only from Building F to the east.[37]

The change of access could reflect change of residence between and across buildings A–J. As part of the complex that included the causeway (phase 5), these appear to have been conceived as houses organised on the same or similar ground plan for residents serving a similar purpose, an expression of some authority's plan for a social and economic order. During the reoccupation, residences may have extended across and between the prior boundaries that

[31] Hassan *Gîza* IV, 41.

[32] Yeomans, 2009 DSR, Phases 5b–c.

[33] Yeomans, 2009 DSR, 7.

[34] Yeomans, 2009 DSR, 12.

[35] Yeomans, 2009 DSR, 12; Yeomans and Mahmoud, in Lehner (ed.), GOP 5, 50–51.

[36] Hassan, *Giza* IV, 38 noted that, after the causeway doorway in Building A was blocked, the vestibule 'seems to have been used as a stable for some animal, as can be proved by the presence of a limestone tethering block set in the floor against the southern wall'.

[37] Tavares and Yeoman, *AERAGRAM* 10/2 (2009), 10–13; Yeomans and Mahmoud, in Lehner (ed.), GOP 5, 48–49.

in Fig. 15), retaining the debris that augmented the northern and western parts of the terrace.

The walls were preserved in this corner because mud-brick debris from the collapse of the eastern and northern KKT enclosure walls along the edge of the higher town level shielded the north-western corner of the lower terrace from erosion. Also the lower stairway ramp (see below) held the retaining walls (30,848) and debris in place like a buttress (Fig. 1). At the north-western corner, with the limestone debris and retaining walls in place, the terrace extends 7.85 m from the upper bedrock ledge [28,849] on the west to the mud-brick retaining walls (30,848).

A wide and deep erosion channel (the Gully) cuts the terrace immediately east of the lower ramp. The east-facing section of the Gully shows that the mud-brick retaining wall (30,848) extends vertically 90 cm, narrowing in thickness from 39 cm at the top to 21 cm at the bottom. This is not very substantial for a wall meant to retain limestone debris without the additional support of the lower stairway ramp, but we do see traces of the wall to the east along the northern side of the deeper depression.

*'Glacis'*

For much of the 2009 season we thought that the fourth dynasty builders left the face of the crushed limestone accretion at a 30° slope on purpose, as a glacis (Fig. 1, Fig. 14). When Dan Jones found, after removing three later plaster floors, the mud-brick retaining walls (30,848), we considered that the walls extended further east and south, holding back the debris that augmented the northern and western parts of the terrace. It is possible that when these walls toppled, their mud-brick decayed and vanished, the limestone debris slumped, and subsequent forces of erosion shaved it into the very regular 30° slope down into the basin.

That this 30° slope results at least partly from erosion cannot be doubted, for it is flush with the higher eroded surface of the collapse of the mud-brick walls of the ramps and corridors (see below) built onto the terrace. On the other hand, the builders might indeed have left the limestone debris below the terrace at a slope as a purposeful skirt or glacis that descended deeper into the basin than the bottom of the terrace retaining wall (30,848). An intentional glacis may be indicated by the fact that the face of the bedrock underneath the crushed limestone, where we see it to the south, also slopes.

The composite isometric drawing of the KKT at the end of all building phases (Fig. 15), indicates this glacis at the base of the western side of the terrace. The slope would have helped protect the terrace from being undermined by water and by the weight of the architecture upon it.[54] We exposed this slope, intentional or otherwise, of the lower foundation down to elevation 15.00 m asl.

*Layers showing in the lower slope*

The eastern face of the slope through the foundation material shows two distinct layers (faintly discernible in Fig. 14).[55] The upper layer consists of more silt-free crushed limestone. It begins at a patch of exposed bedrock 1.50 m south of the southern side of the lower stairway ramp where it is 0.20 to 0.30 m thick. It thickens to 1.30 to the south over what appears to be a lower layer also composed of crushed limestone but mixed with more dark alluvial silt. This lower layer is about 1.50 m thick on the north near the lower stairway ramp, and thins to the south. Toward the sand filling the basin, the material becomes more of a silt matrix rather than crushed limestone. On March 10, 2009, our workers scraped down the face of the 'glacis' which indicated that the lower, darker, silt matrix and the lighter, more purely crushed limestone of the upper band are distinct layers, and not just a surface layer, staining or patina.

The vague boundary between the two layers slopes down from north to south, which prompts us to wonder if the lower, darker, more silty layer indicates an early, lower ramp that ascended laterally from some level within the basin along the lower bedrock face to the terrace.

**KKT-E and the early Upper Settlement (4)**

It is compelling to think that the features comprising the KKT-E layout in its early phase offered access to the upper settlement in its earliest form. Our evidence suggests the early (phase 4) north–south layout was comprised of Buildings I, J, K and L, entered through the wide doorway fitted with a large wooden door, as indicated by the large jamb and limestone pivot socket, about 2.60 m west of the edge of the bedrock drop to the lower terrace (Fig. 9).

*Link between lower terrace and upper town (4)*

The north enclosure wall, bisected by an entrance, links the lower terrace of the KKT-E and the upper town that Selim Hassan excavated. Unfortunately, in the years since those excavations, the mud-brick walls at the north-eastern corner of the upper town almost completely eroded away, down to bare bedrock (Fig. 16). Therefore we cannot trace the structural or stratigraphic links between the substantial remains of the northern enclosure wall spanning the lower level of the KKT-E and its run to the west along the upper town.

Yeomans found indications further west that the western wall of Building I ran under the northern enclosure wall. But the patchy, scant remains here, down to centimetres, make it difficult to know to which building phase of the

[54] Lehner, *AERAGRAM* 10/2 (2009), 8–9; Lehner, in Lehner (ed.), GOP 5, 32.

[55] Lehner, 'Notes 2009', 11.

enclosure wall these traces belong. We believe that the large limestone threshold of a doorway opening through the north enclosure wall onto the north–south street between Buildings I/K and J/L dates to phase 4 (Fig. 8). But since this threshold now stands alone on bare bedrock we cannot be certain that the northern enclosure wall in the KKT-E is continuous and of same build as the northern enclosure wall of the upper town, though the same alignment indicates this is certainly possible. As noted, the builders seem to have planned the continuation of the northern enclosure wall when they quarried the bedrock for the eastern layout, because they left a protrusion of bedrock beyond the eastern limit of the upper town for the foundation of the wall. Beyond this protrusion, on its run further east, the northern enclosure wall probably rests on the foundation of bedrock augmented by dumped limestone debris, but this is not certain.

*Lower stairway ramp (4)*

A ramp (32,426) provided access up to the terrace from the lower, open area or basin. The builders made the ramp from compact silty mud over compact crushed limestone up against the corner formed by the mud-brick walls (30,848) that retained the crushed limestone of the terrace. The lower ramp is 3.90 m long on the horizontal and around 2.10 m wide at the top. It descends from elevation 16.45 m asl, flaring out at the bottom to 3.15 m. The part that we cleared ascends 1.45 m at a slope of 20°. We did not find the base in the clean and wet sand filling the basin.

Two yellow, marl plaster lines running through the mud mass at an angle about 30° to the north–south line of the terrace mark a banister on the south-western side of the ramp. We have not excavated this side, which merges with the 'glacis-like' slope of silt and crushed limestone. It could be that to the south the silty render hides a retaining wall that holds the ramp in place, like the stony revetment (30,849) that forms the opposite, north-eastern side of the lower stairway ramp (Fig. 1). This revetment is built up against the northern section of the mud-brick retaining wall (30,848) that holds back the limestone debris, which debris extended the terrace over three steps in the bedrock that protrude from the base of the revetment. The erosion that cut the wide Gully exposed these steps and the revetment.

Yasin Hasan Abdalahi, the oldest and most gifted of our Qufti excavators, articulated three or four steps in the silty material at the top of the ramp. These steps are not regular, and may be partially an artefact of his excavation. The remainder of the steps, if they existed, wore away.

*Southern Lateral Ramp (4)*

The KKT-E builders created a lateral ramp upon the terrace that ascends from the south up to the north against the face of the bedrock [28,849]. People could ascend from the lower terrace to the wide eastern doorway into the upper settlement. Builders created this Southern Lateral Ramp (SLR) in a corridor between the bedrock face running north–south at the eastern edge of the upper town and a parallel mud-brick wall (29,904), 90 cm thick. They filled the corridor with crushed limestone to make an ascending floor.

During our 2008 season we recognised the SLR in the 'mud mass' banked against the bedrock ledge immediately to the east and south of the end of the Khentkaues causeway, but we did not free it from the eroded and tumbled mud-brick.[56] During 2009, Dan Jones supervised the excavation of two phases of the SLR.

We see evidence of a possible older phase in the layers exposed by erosion through the fill of the SLR and through its eastern wall (29,904) (Fig. 17). Toward the northern top of the SLR slope, we discern two layers of crushed limestone, an upper one (29,912) with more silt that directly overlays a cleaner layer of crushed limestone and marl clay (29,897). The lower layer slopes up to its highest level just under the alluvial silt paving of the level platform at the top of the SLR. The upper layer (29,912) begins about 1.20 m south of the southern edge of the Khentkaues causeway opening. These two layers remain in direct contact for a distance of 1.80 m to the south. At a point 3 m south of the southern side of the causeway, the lower layer continues as a marl line or seam in the eroded cut through the SLR, and 3.52 m south of the southern side of the causeway the two layers separate, parted first by mud-brick fragments, and then by two courses of bricks laid either as headers or stretchers.[57]

The crushed limestone layer and marl surface could mark the first roadbed of the SLR, as it sloped 14° over a horizontal distance of about 6.30 m (Fig. 17,1). The marl line and its slope end 1.14 m north of a doorway or passage from the terrace through the eastern wall of the SLR. It is possible the doorway functioned with the SLR in its earliest phase, at the base of the sloping bed marked by the lower crushed limestone layer (29,897).

Later builders lengthened the ramp to 11.20 m and raised it to the north to level off at a platform of compact silt (Fig. 17,2). Now the ramp rose 1.06 m at a slope around 11° in a corridor, 1.30 m wide, between the bedrock face on the west and a wall, 0.90 m wide, on the east. At the bottom the floor levels off near the doorway through the eastern wall. Jones and Yeoman relate this phase to the early phase of the upper settlement (see below). It is almost certain that the level corridor continues south (beyond the area we re-excavated) as far as the end of a corridor

[56] Lehner, Kamal and Tavares, in Lehner, Kamal and Tavares (eds), GOP 4, 36–43; A. Tavares, 'Two Royal Towns: Old Digs, New Finds, *AERAGRAM* 9/2 (2008), 8–11.

[57] M. Lehner, 'KKT-E: Elevation View (Foldout 2)', in Lehner (ed.), GOP 5, 26.

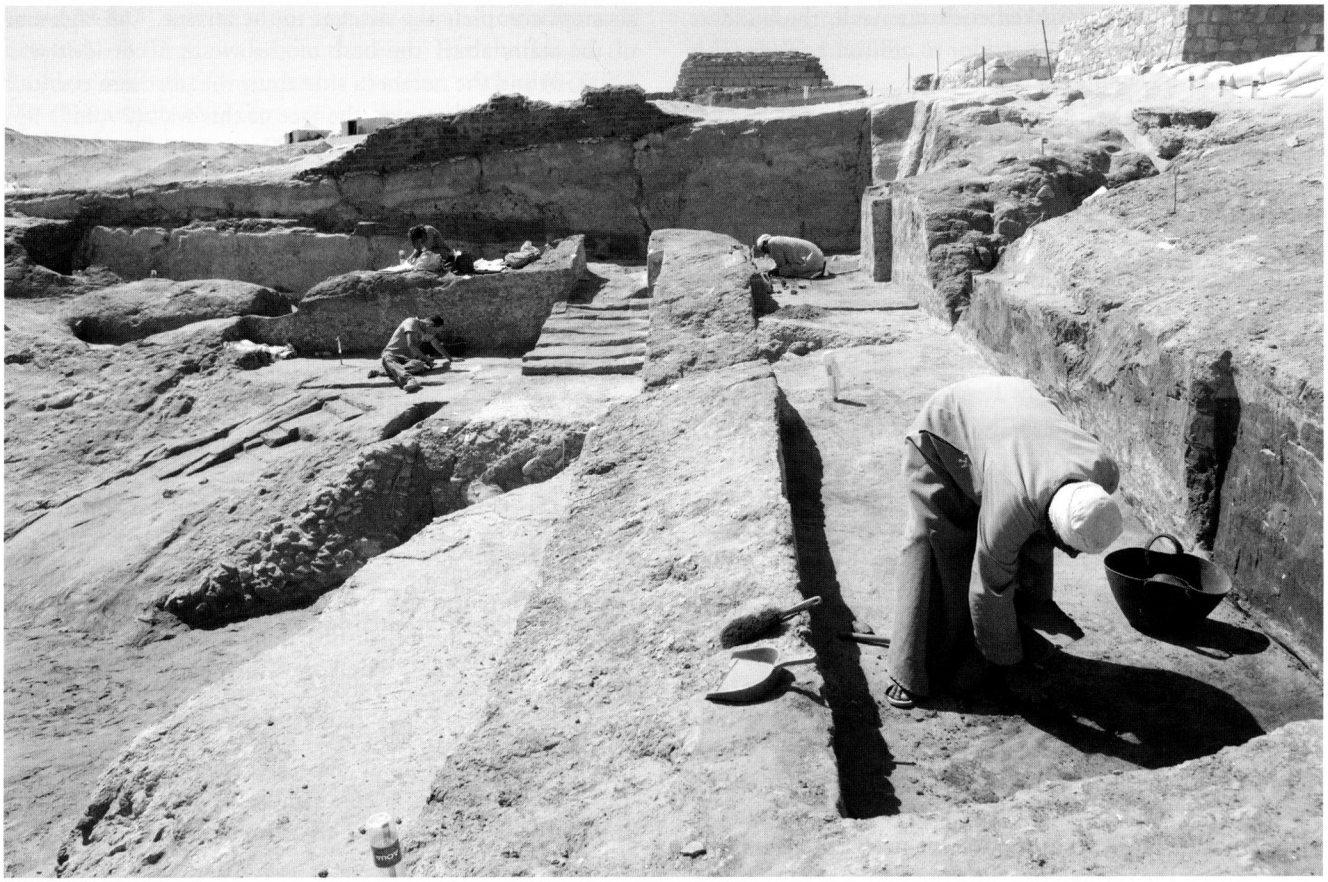

*Fig. 18: The northern corridor (right) with floor level raised above the terrace (left). Worker in the background excavates the collapsed southern jamb just before the corridor turns south onto the Northern Lateral Ramp. The northern side of the corridor (right) is the face of an accretion added to the northern enclosure wall. A cache of pottery lay on the floor where the worker cleans in the foreground. View to the west*

*Northern corridor (5aii)*

So far, our reconstruction of the KKT-E building sequence would have the SLR alone on an open terrace. Builders next added walls to form a corridor on the north of the L-shaped terrace (Fig. 18). Jones and Yeomans relate this to the transformation of the upper settlement into the overall footprint that comes down to us from Selim Hassan's excavations and mapping: the KKT enclosure walls, the northern causeway wall across the north–south avenue between Buildings I and K and J and L, the underpass cut into the bedrock, the outer bounding walls of Building E, and probably the outer walls of Buildings A–D, F–H (and possibly Building M).[62]

During this phase the doorway into the KKT-E through the northern enclosure wall was blocked. The access through the eastern wall (29,904) of the base of the SLR, near the base of its slope, was also blocked. It could have been about this time that the upper eastern entrance was narrowed and the causeway constructed with the addition of the brick lining (28,842) to the southern wall of the old entrance. Again, the stratigraphic link is gone because of the addition of the repair in small brown bricks of the late phase. The fact that the entrance-way in the eastern enclosure wall remained an access point for the causeway suggests that the deep open area, the basin, and the lower terrace were still required, and that they formed an integral part of the complex.[63]

The construction of the northern corridor on the lower level in the KKT-E was achieved by adding two mud-brick walls about one  wide. One wall (29,050) runs from the back end of the SLR to the north for 9.10 m to end at an opening, 1 m wide; the second wall (29,047) makes a tight 90° turn to run east. When they abutted wall 29,050 up against the back retaining wall of the SLR (29,904), the eastern face of the wall 29,050 came 20 cm east of being flush with the eastern face of the eastern SLR corridor wall.

*Accretion and rebuilds (5aii)*

The second wall (29,047) runs east, parallel to the northern enclosure wall. By adding an accretion (29,057) on the

[62] Jones and Yeomans, 'Integration 2010', 10.

[63] Jones, in Lehner (ed.), GOP 5, 22–23.

running west into the settlement between buildings K–L on the north and M on the south, which might indicate that building M also relates to this early phase.

Finally the ramp was raised again with a plaster surface upon a thin layer of crushed limestone that sloped by 8° to 10° (Fig. 17,3) . If extrapolated, the line of this slope arrives to same level as the causeway threshold, but we believe this latest slope also levelled off at the surface of the previous platform. The SLR was raised and lengthened at the same time as the Northern Lateral Ramp (NLR, see below) was built.

*Access into the early settlement (4)*

The builders extended the SLR 1.18 m beyond the northern side of the eastern entrance into the upper town. They made a buttress-like back wall (29,040), plastered on its outer northern face, leaning in to retain the fill between the corridor wall and the bedrock ledge. The sloping SLR floor ascended to a platform supported by the back wall, opposite the wide eastern doorway of the layout of Buildings I,J,K, and L (phase 4). Jones and Yeoman link this floor and platform to the earlier access into the settlement.[58]

South of the platform, a jamb projects from the eastern corridor wall (29,904) to create a restriction, possibly a doorway, 1.05 m (2 cubits) wide, which made the platform into something like a vestibule. Between Buildings I and K, the eastern doorway with the large jamb and limestone pivot socket formed a second vestibule that extended 2.60 m (5 cubits) west of the bedrock edge. Anyone entering stepped up 16 cm over the bedrock edge from the platform at the top of the SLR into a slightly raised porch. The inner door would have opened outwards (to east) into the porch.

Beyond this doorway into the settlement, we find no evidence of an east–west street in the early phase (4) of the settlement, nor evidence that a western entrance existed between Buildings I and K.

> The constructional phases of buildings I, J, K, and L need to be carefully investigated, but it appears that from the [eastern] entranceway in question one entered an open courtyard area bounded to the west by a western enclosure wall, to the north by buildings I and J, to the east by the eastern enclosure wall, and to the south by buildings K and L.[59]

With this phasing, we cannot relate the early eastern entrance, 2.38 m wide, with the broad street, 5.20 m wide, further west between the northern causeway wall (31,108) and the southern town enclosure wall (31,028). As Jones and Yeomans integrate the phasing from the two areas, it is clear that part of the settlement did not yet exist when the broad eastern doorway was in use. In fact, it appears that a thick enclosure wall bounded the early settlement on the west.[60]

At this point, people could also access the early settlement from two openings in the northern enclosure wall. In the upper settlement, the doorway, 2.04 m wide, with its large limestone threshold opened to the avenue between Buildings I and K on the west, and Building J and L on the east (see above). Because the mud-brick enclosure wall has been scoured away, down to bare bedrock, the limestone slabs that compose the threshold are all that remains of the wall and this doorway. Therefore we have lost stratigraphic relations that would secure its phasing, or that of the northern enclosure wall, as noted above.

The second northern access opened through the northern enclosure wall on the north of the KKT-E. The marl plaster line of the northern side of this access is clear in the ruins, with a single brick jamb at the northern end of the western side. But we have not yet articulated satisfactorily the structure of the eastern side of the entrance. A single large brick on the northern end seems to form a jamb complementing that on the western side and forming a restricted doorway, about 70 cm wide. This entrance was filled and blocked when the accretion along the southern face of the northern enclosure wall was added (see below).

**Causeway, (5ai) Northern Corridor, Stairs (5aii), and North Lateral Ramp (5c)**

Although we have found no definitive stratigraphic link between the upper town and lower KKT-E approach, from what we know and infer about the building phases in the upper town (KKT) and the layout of the lower access in the KKT-E, we sense this is the stage when Khentkaues' builders extended the settlement to the west along the northern side of a long and narrow causeway to the queen's chapel, built into the south-eastern corner of her massive monument.

*Eastern doorway changed to causeway entrance (5aii)*

Because the causeway is narrower than the early doorway, the masons were required to add mud-bricks (28,842) to the southern side, covering over the doorjamb, and bringing the new face to the line of the southern wall of the causeway. They also laid a new floor that covered the limestone door socket. Unfortunately, any possible link of the brick addition (28,842) with the SLR is gone due to a later repair to the south side of the causeway entrance using the same small, burnt mud bricks that we see in the latest wall repairs of Building E and the Southern Enclosure Wall in Hanan Mahmoud's trench. Here the brown brick repair lines both sides of the causeway and extends around the outer corners with the Eastern Enclosure Wall.[61]

[58] Jones, in Lehner (ed.), GOP 5 (2011), 20.

[59] Jones and Olchowska, '2009 DSR', 27.

[60] Jones and Yeomans, 'Integration 2010', 7–8.

[61] Jones and Olchowska, 2009 DSR, 19.

southern face of the northern enclosure wall, the builders restricted the width of the corridor to around 1.60 m. This addition (29,057) appears to be

> ... a series of rebuilds. At the eastern end of our excavation of the corridor, the accretion is 67 cm thick, which, added to the thickness of the wall, here about 1.90 m, makes a total width of 2.57, nearly 5 cubits. Toward the east, people seem to have been struggling with the southern face of the Enclosure Wall bowing outward and collapsing. They mortared back onto the eastern face major chunks that had collapsed, with marl plaster faces turned inward. These add to the laminations we see in the horizontal erosion cut through the wall. In fact, Kasia Olchowska found the lower part of the last plastered face bellying out into the corridor, left in near-collapse before the upper part of the wall had toppled and filled the corridor with mudbrick debris.[64]

Both walls and the corridor they define continue east beyond the limits of our excavations. In 2009, Olchowska excavated the corridor eastward 12.40 m from the corner where it turns south, or 13.85 m east of the higher bedrock ledge. We see the marl lines of the interior corridor walls continuing in the unexcavated mud-brick ruins for at least another 5 m eastwards.

After they built the northern walls, the builders raised the floor of the corridor. Over the length of our excavations, the latest floor level of the corridor slopes down slightly to the east, from 17.57 to 16.79 m asl, a drop of 0.98 m over 11 m. Along the north side, the floor of the corridor runs 0.97 m higher than the floor of the terrace on the west, and about 50 cm higher than the floor of the terrace at the eastern extent of our excavations. The difference is due to fact that the slope of the corridor floor is steeper than that of the terrace, which was left extending about 2 m from the base of the corridor wall (29,047) along the northern side. The western leg of the terrace extends 1.8 m from the base of the wall (20,050).

At some point after they had finished the corridor, the builders added broad jambs at western end of northern corridor, one on the north (30,856) against the accretion (29,057), the other (30,873) on the south against the northern face of the southern corridor wall (29,047). The jambs constricted the corridor to a width of 1.20 m.

The surfaces of the floors, walls and jambs of this phase were rendered with marl followed by a white lime wash.

*Stairs (5aii)*

Probably not long after making the raised corridor, builders added a stairway (30,832) descending 70 cm from the opening between the corridor walls (29,050 and 29,047) down to the floor level of the terrace (Fig. 1, Fig. 14, Fig. 18). A simple slope to the floor descends through a passage, 0.96 m wide and 1.06 m long, between the walls, and then six steps complete the descent to the terrace. The high end of the stairs abuts the base of the western corridor wall (29,050) and the northern side abuts the northern corridor wall (29,047). Plaster on the face of this wall (29,047) lips down onto the tops of the steps. The stairs measure 1.36 m long and 1.45 m wide. The steps range from 0.25 to 0.30 m wide, and 0.07 to 0.10 m high. A small banister, one brick (18 × 24 cm) wide, remains along the southern side of the topmost two steps.

*Pottery on the stairs (5b)*

Jones and Olchowska found repairs to the floors within the corridor, and resurfacing layers on the terrace at the base of the steps. Jones excavated a deposit of pottery on and against the stairs (30,829) that included beer jars, some of which were complete, miniature plates, and a fragment of a vat (type CD22). The pottery was 'concentrated and dense around the immediate area of the steps and over them, lensing out toward the south and east'.[65] All of these 'can be well dated to the fourth/fifth dynasty ... 1991 diagnostic pieces were found in total' possibly deriving from 295 vessels, mostly miniatures.[66]

The way the deposit covers the stairs suggests it might have been dumped all at once or over a very short time. The cache of votives is comparable to other such pottery caches that people dumped after ritual use outside funerary temples.[67]

*Northern Lateral Ramp (5c)*

Initially, one could turn left at the top of the stairs into a chamber, 8.70 m long and about one metre wide, that ended at the back retaining wall of the SLR. This may seem like mere dead space, dysfunctional for any room, but it fits the profile of long narrow magazines that we find in fourth dynasty temples and settlement buildings.[68] Late in the history of the KKT-E, builders converted this narrow room into a ramp that ascended from the north to the entrance of the causeway, a Northern Lateral Ramp (NLR) counterpart, if not exactly symmetrical, to the SLR.

Like the SLR, the NLR sloped up within a corridor, 1.42 m wide, between the marl-plastered vertical bedrock

[64] Lehner, in Lehner (ed.), GOP 5, 30.

[65] Jones and Olchowska, 2009 DSR, 16; Jones, in Lehner (ed.), GOP 5, 22.

[66] A. Wodzińska, 'Khentkawes Town 2009: Pottery Overview', in Lehner (ed.), GOP 5, 173–177.

[67] S. Marchand and M. Baud, 'La céramique miniature d'Abou Rawash. Un dépôt a l'entrée des enclos orientaux', *BIFAO* 96 (1996), 267.

[68] For example, a magazine 5 m long × 0.90 m wide that contained a cache of pottery vessels in the domestic unit, North Street Gate House, in the Heit el-Ghurob settlement; M. Lehner, M. Kamel and A. Tavares, *Giza Plateau Mapping Project. Season 2004. Preliminary Report* (GOP 1; Boston 2009), 12–13.

face [28,849] on the west and the parallel corridor wall (29,050), 1.01 m wide, on the east. For the NLR, the builders filled the long, narrow chamber with silty debris. We should note that the sections through this mass left by the 1932 probe trenches of Selim Hassan's workers showed no floors, only a rough bedrock surface at bottom. We might expect some floor for the earlier use of this space as a magazine, unless the NLR building followed quite soon after the creation of this corridor. It is also possible that this dumped debris includes mud-brick fragments from some structure that had been dismantled.

The surface of the ramp was bedded with crushed limestone, topped by a thick layer of alluvial silt, and then a paving of desert marl clay. We can still see, where a bedrock ledge slopes up to the south (Fig. 1, Fig. 14, Fig. 18), how the marl plaster (28,859), 4 to 7 cm thick on the vertical bedrock face [28,849] lips down onto the horizontal surface of the alluvial paving of the ledge. For widening the sloping NLR floor, the vertical bedrock face [28,849] was cut back to make this ledge (30,809), which slopes gently up to the south, widening from 8 to 45 cm, then narrowing again to 14 to 17 cm at a point abut 2.10 m north of the northern edge of the causeway (Fig. 1, Fig. 14). The fill of the NLR corridor was later trenched out, partly for human burials, leaving the ledge (30,809) as testimony that the NLR floor had once sloped up to the causeway threshold.

The ledge shows a rise of 40 cm over a run of 8.41 m, giving a slope around 4°—much gentler than the SLR. As mentioned, the floor of the approach corridor itself slopes slightly from east to west, through the added jambs and into the turn south. The slightly greater slope of the NLR begins just inside the doorway at the stop of the stairs, which, by this time, may have been transformed by wear and deposits into a ramp.

It was likely at this time that the surface of the SLR was raised and lengthened to reduce its slope 8 to 10° to increase the symmetry of two ramps. At this point the interior west wall of the SLR corridor was re-plastered with a thick coat that lipped down as a thick re-plastering of the floor (Fig. 17). Now the corridor measured 1.25 m wide between the marl render, 16 cm thick, on the bedrock face and the render on the western face of the eastern corridor wall.

We imagine people accessed the NLR via the doorway at the top of the stairs, in which case it is hard to imagine that they did not clear away the pottery, if, as our current phasing would have it, this pottery had been strewn about before the NLR came into existence. This point needs further inquiry. On the other hand, is it possible people no longer used the stairs, and instead entered from the east through the raised corridor? The wide doorjambs at the western end of the corridor, before its turn south onto the NLR, marked the entrance to the NLR. If the pottery that practically covered the stairs dates stratigraphically after the creation of the NLR, could the pottery have been tossed out of the magazine before the builders filled it with debris to make the NLR?

*Causeway and corridor: parallel to Menkaure?*

On its run to the east, the northern corridor ranges 1.58 to 1.64 m wide for the length we have excavated between its southern wall and the inner accretion on the northern enclosure wall. This is practically the same width as the Khentkaues causeway. We might see the NLR and the northern corridor as a continuation of the causeway passage in the late phase of the KKT-E approach. This continuation of the causeway as a corridor that turns north and then east around the basin bears some similarity to the continuation of the Menkaure causeway as a corridor, 1.55 to 1.60 m wide, that turned south and then east around the valley temple in its first phase, completed, so we infer, by Shepseskaf. Reisner had reason to mention that the eastward addition of the corridor onto front of the temple might have extended at least 70 m east.[69]

*Pottery in the approach corridor (5c)*

Olchowska found another cache of pottery (given feature numbers 30,840 and 30,845) in the northern corridor toward the eastern limit of our 2009 excavations. Jones and Olchowska see reasons why 'this deposit appears stratigraphically later than the above-mentioned pottery assemblage' on and beside the stairs.[70] The corridor cache lay directly upon the marl paving (30,871) that covered the corridor floor all the way west to the NLR bedrock ledge. The thick mud-brick collapse (29,925) of the corridor walls lay directly above the pottery.

Wodzińska determined that the pottery fragments that Olchowska excavated in the corridor derive from 493 vessels, and consist mostly of miniature plates and jars, beer jars, large serving plates, tall and low stands, a single red carinated bowl with rounded shoulders, and seven fragments of flat bread trays.[71] Wodzińska notes, citing Rzeuska[72] that tall stands and flay trays could serve as offering tables. With one possible exception, the corridor pottery, like that on the stairs, dates from the fourth to the fifth dynasties. The possible exception 'is a hemispherical bowl with trimmed base. Its shape resembles Middle Kingdom hemispherical cups'.[73]

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[69] Reisner, *Mycerinus*, 43, 53.

[70] Jones and Olchowska, 2009 DSR, 30.

[71] Wodzińska, in Lehner (ed.), GOP 5, 174.

[72] T. I. Rzeuska, 'Some Remarks on the Old Kingdom White Painted Funerary Cult Pottery from West Saqqara', in J. Popielska-Grzybowska (ed.), *Proceedings of the Second Central European Conference of Young Egyptologists. Egypt 2001: Perspectives of Research, Warsaw 5–7 March 2001* (Warsaw 2003), 398.

[73] Wodzińska, 'Khentkawes Town 2009. Pottery', 5.

*Fig. 19: Yasin Hasan Abdalahi excavates the sheet collapse of the southern jamb at the western end of the northern corridor. The jamb collapsed as one piece directly onto the corridor floor. The base of the jamb remains in place to the left of his hand. The corner of the northern jamb is at the far right of the photograph. The floor to the west was raised and the collapsed piece used as a step up for a short time before the entire eastern approach fell into ruin*

**Abandonment (6)**

In the KKT-E we can track stratigraphically the dereliction, repairs, abandonment and burying of the architecture to an extent no longer possible in the upper town after Selim Hassan excavated the buildings down to the occupation phases, and after the forces of erosion scoured the buildings in the 76 years since Hassan excavated.

*Initial collapse (6a)*

Jones and Olchowska found the sheet-collapse (30,857) of the southern wide jamb at the western end of the northern corridor, one of the earliest signs of the end of building and maintenance of the KKT-E complex (Fig. 19). Like the pottery in the corridor, this single piece collapsed directly onto the marl plaster of the floor. It appears that people used the fallen piece, where it lay neatly between the base of the jambs, as a step up onto a raised floor to the west.[74]

So people continued to use the corridor even as they put up with its structural failings, as also indicated by the multiple builds and the bowing out of the accretion of the southern face of the northern enclosure wall forming the southern side of the corridor. 'This was possibly due to windblown and dumped deposits building up against the outside' of the enclosure wall.[75]

*Dereliction of the KKT-E (6b)*

Sometime within this late phase, as the KKT-E architecture became derelict, a curious gypsum-lined, long rectangular box (30,863) was made into a cut [30,867] through the blocking structure in the entrance through the northern enclosure wall. The feature resembles a grave, but it appears to have never received an interment. A pit was also cut [30,804] in the floor at the base of the NLR and used as a hearth, leaving residues of pottery, charcoal, and bits of copper. With this feature, one gets the impression of squatters keeping warm or working tools in what had been a sacral passage.

When the catastrophic collapse happened, the mud-brick and silt from the walls came down directly onto the marl paving of the corridor floor, with only the sheet collapse

[74] Jones and Olchowska, 2009 DSR, 30.

[75] Jones and Yeomans, 'Integration 2010', 13.

*Fig. 20: Enormous sand deposit covering silty ruins of the northern corridor wall and northern enclosure wall. The walls collapsed almost directly on the corridor floor and (right) onto the lower terrace. No sand intervenes between the collapsed material and the floors, nor within the collapse. Erosion shaved the mud-brick ruins into an even slope down into the basin. View to the east*

(30,857) of the southern jamb and the pottery deposit in the northern corridor (30,840/30,845) intervening between collapsed material and the floor (Fig. 20).[76]

> The cause appears to be the quite sudden collapse of the Northern Enclosure Wall, which probably knocked down the east west wall of the corridor in a domino effect. No sand or debris was found between the collapsed material and the floor surfaces on which it was situated, indicating this was a very sudden event.[77]

On the western side, it was probably the collapse of the KKT eastern enclosure wall along the higher edge of the bedrock face that left the substantial deposit of collapsed mud-brick debris upon the SLR. Whether this occurred at the same time as the collapse of the NLR, we do not know.[78]

Rebuilding probably occurred to parts of the eastern enclosure wall in the last (Phase 7) occupation of the upper town. One stretch of a later rebuild remains standing above the northern corridor and the bedrock ledge of the NLR (Fig. 1, Fig. 14, Fig. 18). Yeomans expressed the idea that this stretch is a modern rebuild, because it contains modern inclusions (paper and so on).[79] However, the style of building is very much like that of the phase 7 southern enclosure wall in the causeway trench south of Building E (see above), with outer casings of small sandy, silt bricks and sandy fill in between. It is possible that the modern inclusions blew into interstices, because this stretch of wall has stood above the surface over all the years since Selim Hassan's excavations. If this segment of wall dates to the late phase of occupation, the original eastern enclosure wall had been denuded down to a few millimetres of bricks. If the rebuild dates to the small brown brick reoccupation phase (7), the wall of which it was a part could also have collapsed to the east, onto the NLR corridor.

We have not yet fully excavated this corridor, but trenches probably dug by Selim Hassan's workers show layers of degraded mud-bricks mixed with sand (29,899).[80] The deposits in this corridor are made more complex by the fact that parts of the original fill were dug out before

[76] Jones and Olchowska, 2009 DSR, 30; Jones, in Lehner (ed.), GOP 5, 23–24.

[77] Jones and Yeomans, 'Integration 2010', 14.

[78] Jones and Yeomans, 'Integration 2010', 13.

[79] Yeomans, 2007 DSR, 22.

[80] Jones and Olchowska, 2009 DSR, 20.

which we were accustomed from twenty years of excavation at the fourth dynasty Heit el-Ghurab settlement.[82]

**Reoccupation (7)**

Phase 7 takes in the reoccupation of the upper town after a period of abandonment.[83] We can assign no features in the KKT-E to this phase. Like much of the connection between the upper town and the lower approach, this is largely an inference made in lieu of stratigraphic connections, which were lost with the scouring away of much of the upper town exactly along the eastern bedrock drop.

Perhaps most salient is the lack of any repairs in the KKT-E using the small brown bricks so characteristic of the very latest builds in the upper town, including the eastern end of the causeway, the southern enclosure wall in Hanan Mahmoud's trench and Building E. These small brown bricks repair the very mouth of the causeway, which was a remodelling of the wider eastern doorway, and this late repair work turns the corner as a patching at the base of the KKT eastern enclosure wall. Yet we see nothing of this repair, or any such bricks, anywhere in the KKT-E structures.

According to our inferred phasing, following a period of abandonment, people reoccupied the upper town (KKT) when the KKT-E lateral ramps, terrace, and stairs had fallen into ruin. We suggest that when they returned, sand had already filled the deep basin and buried much of the mud-brick ruins in the KKT-E to the upper edge of the bedrock between the upper town and the lower approach structures in KKT-E and to the very threshold of the causeway.

During our 2008 season, Lehner and Olchowska excavated a trench extending east with a northern section line on the axis of the causeway, extending a section Yeomans had started the previous season through the deposits filling the causeway mouth, which included sheet collapse of the small brown brick repairs.[84] The very worn, compact silt of the platform immediately in front of the causeway threshold at the top of the SLR showed up right away in the extension of this trench. The platform surface probably remained a step up into the causeway during the reoccupation. But to the east and spreading to either side over the clean sand we found only silty deposits cast up from pre-2007 trenches and pits that had been dug into the ruins. We found no pathway or trodden surface leading to the mouth of the causeway. If such a path existed over the clean sand, the pre-2007 excavations obliterated any traces.

## *III. The match to Menkaure*

When was the KKT abandoned and the lower eastern approach left to collapse? When did people return and rebuild with the small brown sandy bricks? Selim Hassan's excavations, the limitations of his publication, and the erosion of the site since he excavated, reduce severely the archaeological record. However, another sequence exists close by, in the MVT. From his excavations in Menkaure's Pyramid Temple and Valley Temple a hundred years ago, George Reisner left a more detailed published record, which he arranged into phases, and we can begin to compare that with our phasing of the KVT.

**The Menkaure upper temple record**

Reisner found evidence that heavy stone-working came to a rather abrupt end. Workers had yet to raise the walls of the valley temple upon megalithic limestone foundation and core-wall blocks. In the upper temple they had only completed the granite casing in the portico and offering room and the corridor (13) leading to the inner temple. They had barely started dressing flat the sixteen granite courses casing the pyramid.[85]

Reisner made a compelling case that Menkaure's successor, Shepseskaf ordered the preparation of the white-washed mud-brick casing that covered the limestone core blocks and granite casings already laid, to provide a finish to the walls in the upper temple and to build the valley temple in mud-brick upon the massive limestone block foundation. Fragments that Reisner found in the portico of the upper temple belong to a stela of Shepseskaf dated to the year after the first cattle count, which he reconstructed as *ir-n-f m mn[w-f n i] t-f... nśwt-bity [rˁ-mn-kꜣw]*, and translated as as 'He made it as a monument for his father, King of Upper and Lower Egypt, [Menkauwra]'.[86] Shepseskaf's workforces must have been very busy with brick construction; Reisner believed they were responsible for building five temples in the Menkaure Pyramid complex including chapels for the three subsidiary pyramids.[87]

A later generation cared enough about Menkaure's memorial to bring the upper temple up-to-date as regards what was thought to be required at that time for a king's memorial temple. The building of a screen wall of mud-brick was ordered that closed off the portico from the open court, thereby achieving a stricter separation of the inner from the outer temple, which we find in fifth and sixth dynasty pyramid temples. Stone-workers returned to build an actual inner temple into the space between the back of the upper temple and eastern base of the pyramid. Inside a doorway (25) at the end of the northern corridor (space 13),[88] they created a small square antechamber with a single pillar, a feature that we otherwise find situated in

[82] Wodzińska, in Lehner (ed.), GOP 5, 178, fig. 17.14.

[83] Jones and Yeomans, 'Integration 2010', 14.

[84] Lehner, Kamal and Tavares, in Lehner, Kamal and Tavares (eds), GOP 4, 33–36.

[85] Reisner, *Mycerinus*, 26.

[86] Reisner, *Mycerinus*, 15, 31, 278, pl. 19b; N.C. Strudwick, *Texts from the Pyramid Age* (Atlanta 2005), No. 16, 97–98.

[87] Reisner, *Mycerinus*, 72.

[88] Reisner, *Mycerinus*, pl. I.

the route to the offering hall, for the first time in Niuserre's pyramid temple at Abusir. To the west they framed in and roofed a series of magazines with locally quarried limestone, but never finished dressing down the walls. To the south, they made but never finished a hall of pillars. They built these elements of the inner temple around a core offering chapel of Tura limestone upon a platform on line with the pyramid central axis. This platform and chapel had been built, Reisner thought, soon after Menkaure died.[89]

Reisner inferred that those who built the inner temple of local nummulitic limestone removed a mud-brick and Tura limestone inner temple that Shepseskaf's workmen may have built. We do not know who ordered the Tura limestone structure. Based on 41 fragments also found in the portico of the front temple and from two possible limestone stelae bearing decrees, one of which possibly bore the Horus name of Merenre, Reisner suggested this sixth dynasty king commissioned the inner stone temple.[90]

This hybrid upper pyramid temple of Menkaure must have been used because Reisner found in Room 22 a total of eight clay seal impressions, from sealing boxes or, most probably, from a door.[91] Room 22 is a small antechamber between a magazine (24) and a short corridor (21) leading to the western end of the corridor (13) to the doorway of the small square antechamber and inner temple. In later times the doorway into Room 22 was blocked. It is compelling to think that those who opened the string lock on the antechamber door tossed the sealings to the south, into the dead space of this magazine. The impressions bear the names of Menkaure, Niuserre, Izezi, Teti and Pepy I.[92] To these we might add Merenre, whose name was possibly found on a stela fragment from the upper temple, and Pepy II, named on the stela from the valley temple. The list suggests service in Menkaure's temples over a span of 220 to 320 years. If there is a gap in this limited series, it is widest in the early fifth dynasty (Userkaf, Sahure, Neferirkare, Shepseskare, Neferefre, with Menkauhor and Unas also missing). We wonder how many more sealing fragments might have been found with our retrieval methods today.

Reisner said of the doorway (25) into the small square antechamber: 'During the last period of occupation the doorways right and left to the magazines were closed with rough walls of crude brick, but doorway 25 to the west was open leading to the inner temple of limestone'.[93] He found a sunken pathway worn in the antechamber floor around the right of the pillar, worn by those who walked through to sloping passage room (28) leading to the inner temple.

### The Menkaure valley temple record

Knowledge of the sequence in the Menkaure upper temple is required for understanding the phases in the KKT in broader context. We must pay even closer attention to the sequence in the valley temple, in close proximity with the southern end of the KKT – in fact, on the other side of a (shared?) broad ramp (Fig. 3, Fig. 4).

The first step of Shepseskaf's builders in the MVT was to spread limestone debris – Reisner called it gravel – to fill in between the huge limestone blocks and build up the foundation, just as builders did over the bedrock to raise and extend the lower terrace in the KKT-E.[94]

In the MVT, Reisner found a very stark separation between three major periods of temple building, with two intervening general phases of occupation and an occupation within and around the second temple. The phasing of the settlement is not entirely clear, in part because Reisner did not excavate the whole temple stratigraphically nor phase by phase, rather in early July 1908 he excavated the deposits in the area of the portico, sanctuary and western magazines, apparently going through all phases (layers) at once. Reisner suspended work for seventeen months as he worked in Nubia and Palestine, returning to the MVT in December 1909, continuing in the western and southern parts, and beginning a strip on the north. In January he realised an open court lay in between, and his workers cleared houses in the layers above it. He now worked at the same time in the north-west quarter and in a strip along the southern corridor, where he dug down to trace the foundations. From

[89] Reisner *Mycerinus,* 26–33.

[90] Reisner, *Mycerinus*, 31–32, 279–280, pls 19e–I, A2–5. Reisner suggested a very small fragment (his pl. 19h) might be part of the Horus name of Merenre.

[91] Reisner, *Mycerinus*, 19.

[92] Reisner, *Mycerinus*, pls 17 a–b and p. 19 where Reisner gives the object numbers of eight sealings from Room 22: 07-1-81 to 07-1-88. A search in the Giza Archives (http://www.gizapyramids.org/code/emuseum.asp?newpage=library, Dec. 14, 2010) of the first in this series gives rendition (Photo ID) numbers B193_NS, B195_NS, and B2066_NS for photos of sealings. Under 'Description' these entries give: 'Mud sealings (with seal impressions) from Menkaure pyramid temple, corridor 21/22, [GLYPHS] (serekh) Neferkara: top row: 07-1-87, 07-1-88, 07-1-88; bottom row: 07-1-88 (upper item), 07-1-86 (lower item), 07-1-81, 07-1-82'. Under 'Remarks' the entry gives: 'Original entry read: room G (= corridor 13), W end, which would be N end of corridor 21/22; provenance obtained from publication (p.19) suggests S end of corridor 21/22'. Under 'Problems/Questions' these entries give: 'VERIFIED: identifications made based on comparison with publication and objects; all registration numbers based on publication (no registration records from this date); Reisner reference verified'. In G.A. Reisner and W.S. Smith, *A History of the Giza Necropolis* II, *The Tomb of Hetep-heres the Mother of Cheops* (Cambridge, MA 1955), viii, the figure list gives fig. 56 as 'Sealings of Mycerinus, Isesy, and Teti from the Mycerinus Valley Temple'. However in the discussion on p. 53 of *Giza Necropolis* II, Sm.ith gives: 'Mycerinus Pyramid Temple: Tety (?). In *Mycerinus*, p. 19, Dr. Reisner suggested that these two fragments contained the Horus name of Tety, Sehep-[tawy]. There appears to have been two Horus hawks standing facing each other on a wide frame. See Fig. 56'.

[93] Reisner, *Mycerinus*, 26.

[94] Reisner, *Mycerinus*, 39.

February to mid-March Reisner's men cleared the southern court, and to conserve mud-brick walls, 'the sand from the southern half of the court was thrown into the rooms in the southern part of the inner temple'. As they worked eastward, they dumped sand back into the southern court. They then turned north, to excavate the vestibule and magazines to the north of it. They spent last two weeks in early April excavating the north-eastern part of the court.[95] So no-one, including Reisner himself, has ever seen the entire temple area exposed at once. His map must be a compilation of successive exposures of the different parts.

Although he did not excavate stratigraphically, Reisner reconstructed, post-excavation, the three major phases which he termed I, II and III.[96] Were we to phase it today, we would start with the substrata before Menkaure's stone foundation. Reisner designated as phase I the colossal limestone blocks of the foundation and beginning of two courses of the western and northern temple walls. He designated the first mud-brick temple as phase II.

II.1. The earliest occupation probably included houses in the southern end of the ante-town that Reisner said 'may safely be ascribed to the time of the early use of the temple ...'[97] These lay under 'houses' that Reisner dated to the same time as those built on the floor debris of the court. Hassan, who completed the excavation of this spot, also recognised two periods of domestic structures, with earlier walls laid directly onto the original floor.[98] We might expect that because these structures lay outside the temple, they might be somewhat earlier than walls built on the floor of the court, which 'belong to the time when the funerary service was maintained in the first temple'.[99]

Reisner's multi-phase map of the MVT[100] and Hassan's map of the MVT attached to the KKT (adapted as Fig. 3, Fig. 4 here) attempt to show all phases at once, making it harder to sense the layout of a given phase. Also, Reisner stated that the walls upon the floor of the court were badly preserved. So it is with these caveats that we say the structures of this phase, more complete in the southern end of the court, look more like storage bins than houses.

II.2. Reisner give a probable date for the construction of a mud-brick screen wall and doorway across the portico, like that in the upper temple, as the fifth dynasty.[101]

He does not designate as a separate phase a layer of debris of decayed mud and sand, on the floor, but this layer is an important stratigraphic fact. The layer accumulated to a depth of 20 cm in the centre of the court and sloped up as high as 40 and 70 cm on the sides. This debris contained 'fragments of stone vessels and shattered statues'.

II.3. 'Thus all walls founded on this debris had been built after the first serious plundering of the older temple ...' Reisner added that the walls of this phase were 'the best preserved of all'.[102] It has been said that the settlement inside the MVT was a disorganised 'sacred slum',[103] but this is not entirely true. Reisner distinguished five residences, or apartments in a fairly orthogonal, bonded complex of rooms in the southern side of the court. In contrast, the occupants appear to have reserved the northern side of the court for 'circular granaries and single rooms or pairs of rooms',[104] and these may in fact have been storage bins.

II.4–6. Reisner then designates as phases II.4–6 various alterations in the western storerooms, a blocking in a door from the vestibule to the northern corridor and the construction of rooms over the magazines south of the vestibule.

II.7. Reisner designates as a distinct phase 'the plundering of the magazines; the removal of vessels and statues to be broken up continued through the rest of the time of both the first and second temples'.[105]

II.8. Reisner sees as a distinct phase the 'gradual decay of the temple, the decay and fall of the roofs, the deposition of debris from 40–100 cm in the court; the sanctuary apparently kept clear'.[106]

II.9. Next comes an event that bears importance for the wider archaeological record in the KKT and the general region. Sudden, intense rain sent a stream down the northern side of the Menkaure causeway that ripped through the middle of the western wall right behind the sanctuary where Menkaure's builders left a gap in the monolithic core blocks. This 'gully through the sanctuary' sent water and artefacts to a pool in the court. This may have been a time of transition between moister and drier climates, a time that saw both accumulating sand, and episodic strong rain that produced powerful desert flooding (see below).

III. The second mud-brick temple was built upon the ruins of the first. This rebuilding involved, for the most part, a new portal or vestibule, a new portico and offering room, and new outer walls.[107] Tellingly, the builders added a glacis-like, rubble embankment, 1 to 2 m high, along the base of the western and northern walls, the sides vulnerable to flash flooding.

Reisner said he found no trace of an eastern wall for the second temple. Selim Hassan describes finding the blocked entrance through the eastern wall of the temple,[108]

[95] Reisner, *Mycerinus*, 35–38.
[96] Reisner, *Mycerinus*, 53–54 for a summary outline.
[97] Reisner, *Mycerinus*, 53.
[98] Hassan, *Giza* IV, 59–60.
[99] Reisner *Mycerinus*, 51.
[100] Reisner *Mycerinus*, pl. VIII.
[101] Reisner *Mycerinus*, 41.
[102] Reisner *Mycerinus*, 51.
[103] M. Lehner, *The Complete Pyramids* (London 1997), 232.
[104] Reisner, *Mycerinus*, 52.
[105] Reisner, *Mycerinus*, 53.
[106] Reisner, *Mycerinus*, 54.
[107] Reisner, *Mycerinus*, 46.
[108] Hassan, *Giza* IV, 57.

and this must be the first temple, but he offers no real clarification – he did not speak of phases. But Hassan did find the eastern limit of the temple/town in both phases – the reinforced eastern boundary wall of the annex, or ante-town as we call it, which he called the Valley Temple of Khentkaues, built along the edge of a 2 m drop (Fig. 4). The phasing of the ante-town with respect to the first and second temples may yet be possible to establish from the records that Reisner and Hassan left.[109]

III.10. Rooms were built within the second temple enclosure 'partly over the denuded walls of the first temple, and partly over the debris-filled magazines, and partly over the older structures in the court'.[110] Reisner also indicates that the phase III.10 structures were built about one metre over the floors of Phase II.3. Some of the III.10 walls were built above the exterior corridor, which had become dysfunctional since phase II.8, when roofs collapsed.

The settlement during the period of the second temple, that is 'the town as it stood when abandoned', was badly eroded, especially to the south. So we receive the impression of having only fragments of this vernacular architecture, which, in Reisner's all-phase map, are orthogonal and oriented with the temple to the cardinal directions, while the photos give more the impression of a village-like warren.[111]

III.11. The phase III.10 settlement structures and the second temple fell into ruin.[112]

**Phase matching: KKT and the Menkaure Temple records**

We can suggest matches between the combined KKT and KKT-E phasing of Jones and Yeomans with Reisner's phasing of the settlement and architectural sequence in the MVT. We begin with the latest phases and move roughly back through time.

*Sixth dynasty return (KKT 7 and MVT III.10)*

A preliminary assessment dates the pottery from the KKT-E stairs, terrace and corridor to the late fourth or early fifth dynasty. The one caveat is a hemispherical bowl with trimmed base that resembles Middle Kingdom hemispherical cups in the cache from the corridor.[113]

Pending the determination of the date of the latter fragment, Wodzińska's 'ceramics dating from the late Old Kingdom, or perhaps even First Intermediate Period', from the sand that covered the already collapsed ramps suggests that the KKT-E approach fell out of use by the late Old Kingdom, phase 7, when walls in the KKT-E were repaired and rebuilt with the small brown, slightly reddish bricks of sandy silt. To reiterate, we found none of these bricks in any phase of the KKT-E structures.

After the phase II.8–9 flood (see below), the MVT lay in utter ruins. Reisner said that a surface of decay formed.[114] We might expect that the upper town in the KKT was abandoned about this time.

It would follow that the return and rebuilding in the KKT phase 7 corresponds to the rebuilding in the MVT, Reisner's phase III.10. Both the second temple builders and the builders of phase 7 in the KKT created walls on roughly the same alignments of the older walls. Mud-bricks are not very reliable for dating;[115] however, as these phase 7 bricks are so distinct from earlier phases, we have to feel disappointment when Reisner addresses himself specifically to mud-bricks, gives a rough mean for the sizes used in the Shepseskaf work (40 × 20 × 12 cm), but says nothing about the sizes in the second phase valley temple.[116]

It is probable that the second MVT was built at some point during the sixth dynasty. Reisner was not certain of that point. He suggested it was in the reign of Merenre, who, he guessed, might have rebuilt the inner part of the upper temple in local limestone. Between stela fragments and sealings, the textual records from the Menkaure temples include a mention of all kings of the sixth dynasty. Reisner noted that the upper temple and the valley temple might have fallen into ruin at different times. It is compelling to see the MVT restored about the time of Pepy II's decree that Reisner found near the first vestibule and dated, probably, to the 31st occasion and so sometime in the last third of his reign.[117]

*Abandonment (KKT 6b and MVT II.8–9)*

Prior to the sixth dynasty restoration, and after the flash flood, the MVT lay in ruin. Roofs of corridors, magazines and storerooms had collapsed, and debris partly filled rooms. Reisner says the 'corridors became filled with drift sand', which is exactly what we do not see in the KKT-E (Fig. 20). 'The temple appears to have lain in complete ruin. A surface of decay was formed, and it may well be doubted whether even a pretence was made of maintaining the temple

[109] During our 2008 season, we investigated the eastern half of the vestibule ('Vestibule 2') at the northern end of what we call the ante-town, seeing this addition as an extension of the settlement and valley temple of Menkaure; see Lehner, Kamal and Tavares, in Lehner, Kamal and Tavares (eds), GOP 4, 22–27. We hope to articulate the structural relationships between this addition and the eastern MVT wall in a coming field season.

[110] Reisner, *Mycerinus*, 52.

[111] Reisner, *Mycerinus*, Plan VIII, pl. 31a–b,

[112] Reisner, *Mycerinus*, 50.

[113] Wodzińska, in Lehner (ed.), GOP 5, 178, fig. 17.13.

[114] Reisner, *Mycerinus*, 44–45, 54.

[115] As Reisner, *Mycerinus*, 73 indicates.

[116] Reisner, *Mycerinus*, 73.

[117] Reisner, *Mycerinus*, 54; 280, pl. A,1; W.S. Smith, 'Inscriptional Evidence for the History of the Fourth Dynasty', *JNES* 11 (1952), 113; Strudwick, *Texts from the Pyramid Age*, No. 23, 106–107. Between stela fragments and sealings, the textual record from the Menkaure temples mentions all the kings of the sixth dynasty.

service'.[118] This might correspond to the abandonment of the KKT.

In this case, Reisner's phase II.8–9 corresponds to the KKT (+KKT-E) phase 6, 'localized activity and abandonment'.[119] This may have been a time of transition between moister and drier conditions of the local environment and climate, when sand had begun accumulating, yet episodic hard rain could cause wadi flooding. Just before a wadi stream breached the western temple MVT wall, a metre of sand- and water-borne debris had accumulated against the northern and western walls. 'At this time, or at any rate before the restoration of the temple, the accumulation of sand and debris on the western, northern, and southern sides of the temple had reached such a height that the causeway corridor and exterior corridor were buried to just above their roofs'.[120]

So, too, sand may have accumulated against the northern enclosure wall and corridor in the KKT-E. And in the KKT-E, it appears as if water eventually breached a gap in the wide access through the enclosure wall. The stream cut a wide and deep gully through the mud-brick ruins down to bedrock (Fig. 21). These stresses may have begun before the catastrophic collapse of the enclosure wall. This may be why people blocked the access and built an accretion across the entire southern face of this wall in phase 6a (Fig. 16, Fig. 18).

Perhaps about the same time, concern for sudden rains prompted the inhabitants to block with a similar accretion the original eastern entrance of first MVT. Hassan's discovery of this doorway came through the same process of rain causing pressure:

> ... heavy rains caused part of the wall to collapse at this place, and the damage has revealed the fact that an entrance did actually exist here, and has also explained why we were unable to trace it. It seems that the Queen's architect bricked up the doorway in a normal manner ... he next thickened the wall by building against it another wall, two bricks thick, which entirely hid the first alteration. The rain water having percolated down between the original wall and its thinner facing, caused the latter to collapse, and thus revealed the vertical joint between the original doorjambs and the brick work with which the entrance was blocked.[121]

The events in the KKT and MVT may reflect regional climate change in the middle Old Kingdom. We have evidence that forces of erosion scoured down to waist or ankle level the mud-brick settlement ruins of the HeG site before the end of the Old Kingdom.[122]

Judith Bunbury relates the work of Kuper and Kröpelin[123] and Kröpelin et al.[124] in the Western Desert to her work with missions from Saqqara to the Sudan, which shows that 'desertification of the Sahara swept southwards producing Sahel and then desert conditions in Egypt ... evidence from the north of Egypt suggests that the early Old Kingdom was the time when the Sahara started to become a wilderness and the Nile floodplain less wild and the Nile focused into a few large channels like those of today'[125]

Most pertinent for the KKT and MVT location on the northern shoulder of the main wadi between the Moqqatam and Maadi Formation outcrops (Fig. 2), during the Saharan Wet Period, grasses, shrubs and other plant life stabilised the wadis by holding and absorbing the rainwater in the soil. When the monsoonal rain belt began to move south, hinterland vegetation collapsed, and the now more intermittent rains 'destabilized the denuded wadi sands, washing them into the flood plain'[126] through a series of events like those that cut through the MVT and KKT-E. Following their abandonment, those who returned in the sixth dynasty may have experienced much drier and sandier conditions than the people who first occupied these settlements.

*Alterations and plundering (KKT 5c, MVT II.4–7)*

The alterations of these phases are of too small a scale in both the KKT and MVT to permit correlations. Reisner's phase II.7 involves a 'plundering of the magazines and removal of vessels and statues to be broken up'.[127] Jones and Yeomans phases 5-c include the dispersal of pottery in the KKT-E northern corridor, which could also reflect a clearing out of magazines, or just a disposal of used offering vessels, but their phase 5c also includes building the NLR as an alternative route to the Khentkaues causeway. We might want to see the NLR as earlier than the pottery dump. Phase 5b sees the accumulation of pottery on and around the stairs.

*Main occupation (KKT 5b; MVTII.2–3)*

Because of Hassan's excavations and the subsequent erosion we have so far found only scant deposits from the long-term occupation of the KKT. We can only hypothesise that the KKT was occupied during the period when the MVT was occupied.

From Reisner's published record, it seems that the

[118] Reisner, *Mycerinus*, 45.
[119] Jones and Yeomans, 'Integration 2010', 13.
[120] Reisner, *Mycerinus*, 45.
[121] Hassan, *Giza* IV, 57.
[122] Lehner, Kamal and Tavares, GOP 1, 38–39.
[123] R. Kuper and D. Kröpelin, 'Climate-Controlled Holocene Occupation in the Sahara, Motor of Africa's Evolution', *Science* 313 (2006), 803–807.
[124] S. Kröpelin et al., 'Climate-Driven Ecosystem Succession in the Sahara: The Past 6000 Years', *Science* 320 (2008), 765–768.
[125] Bunbury, Judith, 'Egypt and the Global Cooling Crisis', *Ancient Egypt* 10.1 (August/September 2009), 53–54.
[126] Bunbury, *Ancient Egypt* 10.1, 54.
[127] Reisner, *Mycerinus*, 53.

long-term occupation in the first temple included two stable periods interspersed with two periods of looting. The later of these (II.7) happened as the first temple was becoming derelict, and just before the disastrous flood. But the first looting happened just prior to the best preserved, and rather orderly, bonded complex of rooms within the temple during phase II.3.

To reiterate, Reisner does not designate as a separate phase the sandy layer of mud-brick debris that contained fragments of stone vessels and shattered statues. Upon this layer were built at least five residences, or apartments in a fairly orthogonal, bonded complex of rooms in the southern side of the court and a series of granaries and bins in the northern court (II.3). When did occupants produce these layers?

Below the debris layer Reisner found the earliest houses in the first temple, and we have to imagine that these, or certainly the ones on the floor of the terrace in front of the temple, date to the reign of Shepseskaf or shortly thereafter, based on the narrative that he had the first temple built. Reisner dates the complete pottery vessels retrieved from the debris layer under room 302 in the southern court to the fifth dynasty.[128]

It seems to have been Reisner's impression, from all his direct experience with the archaeological and textual record of Menkaure's temples, that this king's cult suffered most from the temple occupants themselves during the fifth dynasty, and then, perhaps, the early sixth dynasty. The early fifth dynasty kings, Userkaf, Sahure, Neferirkare, Shepseskare, and Neferefre, are missing in the – albeit limited – series of sealings that Reisner found in the upper temple. So Reisner concluded that the temple service was maintained in some degree during the reigns of Niuserre and Izezi, but that the whole pyramid temple was neglected like the valley temple during the fifth dynasty. But in the sixth dynasty, both temples became the object of a certain amount of pious attention.[129]

Perhaps it seems counter-intuitive to us that the very people privileged to live within the MVT were those who began to plunder the magazines and break up Menkaure's statues. Perhaps the royal house had turned its attention away from Menkaure's temples, soon after Shepseskaf completed them, as the administration built monuments and settled people at South Saqqara, North Saqqara and Abusir.[130]

The phase II.3 formal complex of bonded rooms on the layer of plunder and debris might signal the return of royal attention, perhaps in the reign of Niuserre, a guess based on the sealings in the upper temple. Is it possible that it was already Niuserre who ordered the construction of the inner temple against the base of Menkaure's pyramid?

*Layout of KKT (KKT5, MVT II.1)*

When was the KKT laid out and built? Keeping in mind that our matching of the KKT and MVT sequences is for now a series of hypotheses, we have just suggested above that Reisner's MVT phases II.2–3 might coincide with the reigns of Userkaf to Neferefre, which, according to a recent chronology, spanned 31 years.[131] We could envisage the creation of the KKT during that time, but we tend to think of the settlement as built and inhabited during the late fourth/early fifth dynasty. Between the end of Menkaure's reign and the beginning of Userkaf's, this recent chronology gives us seven years.

We encounter the problem of just where to fit Khentkaues I into the sequence, both historical and archaeological. In terms of the site, we see this as an archaeological and architectural problem, as much a genealogical, chronological, or historical issue. Do we have to imagine Shepseskaf's workmen building the five mud-brick pyramid temples in the Menkaure complex, and (the same workforce?) building the Khentkaues monument and town within this four- to seven-year time frame? When could the late fourth dynasty (or early fifth dynasty?) Egyptians have expended so much labour, building in both stone and mud-brick to create the monumental Khentkaues tomb and town?[132]

With this question foremost, it seems that for now we can at best suggest that the construction of the KKT occurred during the earliest settlement in the MVT, soon after Shepseskaf finished the upper and lower Menkaure temples and the chapels of pyramids GIII-a, b, c for three of his queens. But just here our hypotheses encounter a difficulty concerning Menkaure's pyramid town and Khentkaues I's 'valley temple'.

Early in the MVT sequence, people built rooms (houses?) on the floor of the court at 'the time when funerary service was maintained in the first temple'. Reisner could map only scant traces; the walls embedded in the debris were 'crushed and difficult to follow'.[133] Both Reisner and

[128] Reisner, *Mycerinus*, 51.

[129] Reisner, *Mycerinus*, 32.

[130] We might note here the pivot socket for the swinging door into the second vestibule that faced north to the top of the broad ramp in the ante-town. The socket was formed right into the foot of one of Khafre's statues, next to his *serekh* and cartouche (Hassan, *Gîza* IV, 55, pl. XXV). We do not know the relative or absolute date of this addition onto the front of the MVT. Enough remains that we can investigate its articulation with the first temple in coming seasons.

[131] E. Hornung, R. Krauss and D.A. Warburton (eds), *Ancient Egyptian Chronology* (Handbook of Oriental Studies. Section 1. The Near and Middle East 83; Leiden 2006), 491.

[132] For that matter, can we expect Menkaure's workmen to have finished what stone-working they did in the six years given to his reign in a recent chronology? Kraus and Warburton believe so; R. Krauss and D.A. Warburton, 'Conclusions', in Hornung, Krauss and Warburton (eds), *Ancient Egyptian Chronology*, 485, 489, 491

[133] Both quotations from Reisner, *Mycerinus*, 51.

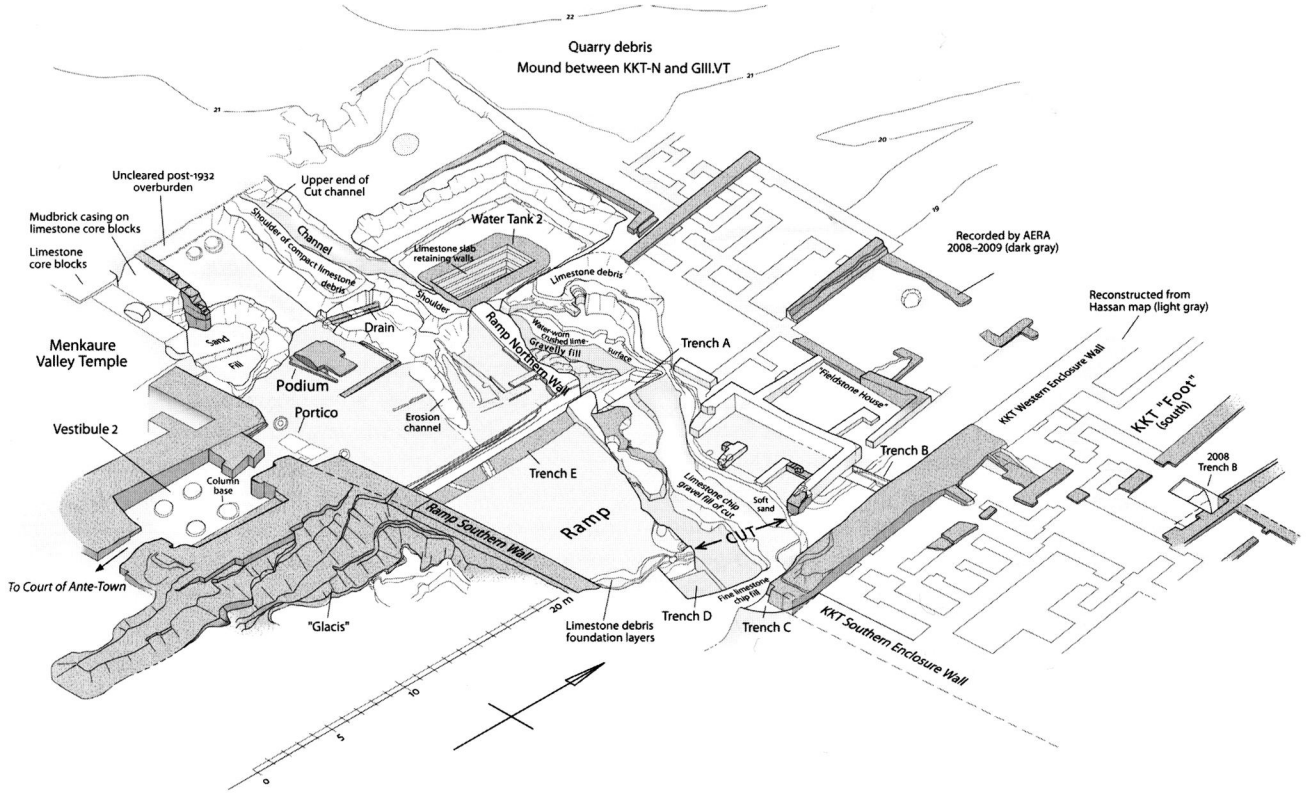


*Fig. 22: Isometric drawing of Area KKT-AI, the interface between the MVT and its eastern ante-town (left) and KKT (right)*

Hassan saw two periods of houses close against the southern end of the exterior eastern front of the temple, including early walls built on the floor. Near the eastern limit of his excavations in 1910, Reisner thought this 'pyramid city of Mycerinus' extended eastward for perhaps 70 m from the eastern face of the temple because the boundary of the southern exterior corridor continued east beyond the limit of his excavation.[134] In 1932, Selim Hassan extended the excavations just a little further east and found the eastern boundary wall of an enclosed annex, 15 m wide and 41 m long, grafted onto the eastern facade of MVT. This ante-town, as we have called it, included a second vestibule, a court, and domestic structures to the south. The eastern wall appears from Hassan's plan to have been strengthened a few times by thick accretions. Hassan thought this was a valley temple for Khentkaues, but it is assuredly an extension of the MVT town and temple.

Already in a 1983 publication, Kemp described this eastern extension as an annex of the MVT and its town, and he saw the second vestibule as a new 'gatehouse'. In a later publication where he elaborated on the MVT as an example of the 'villagization of a monument', Kemp labels the second vestibule as 'the village gateway' and sees the combined annex and MVT as a unity, a walled temple town.[135]

Within this annex, in a magazine fitted tightly between the second vestibule and the original eastern façade of the MVT, Hassan found part of an alabaster offering table with a very worn, incised inscription. The signs on the right can be read 'her father, king's daughter'.[136] On the far left side is an incised figure of a queen seated on a block throne. The top of the queen's head may show the vulture cap, but this is by no means clear in the disturbed surface. Below the queen we can make out the signs *qsf p* ... To the left of these Hassan read the upper three of five signs as the three *k3* signs in Khentkaues' name. This is very possible, but also not clear, as none of these lower signs are entirely preserved.

Even if this piece once bore the name of Khentkaues I, we doubt it helps make a case that the addition onto the eastern front of the MVT is a valley temple for Khentkaues I. A misunderstanding might arise from Hassan's statement at the beginning of his section entitled 'The Valley Temple of Queen Khent-kawes':

[134] Reisner, *Mycerinus*, 53.

[135] B. J. Kemp, 'Old Kingdom, Middle Kingdom, and Second Intermediate Period *c.* 2686–1552 BC', in B. G. Trigger, B. J. Kemp, D. O'Connor and A. B. Lloyd (eds), *Ancient Egypt, A Social History* (Cambridge 1983), 92–94; id., *Ancient Egypt, Anatomy of a Civilization* (London 1989), 144–149; second edition (London 2006), 205–211.

[136] Hassan, *Giza* IV, 57–58. I would like to thank Vivienne G. Callender for drawing my attention to this piece.

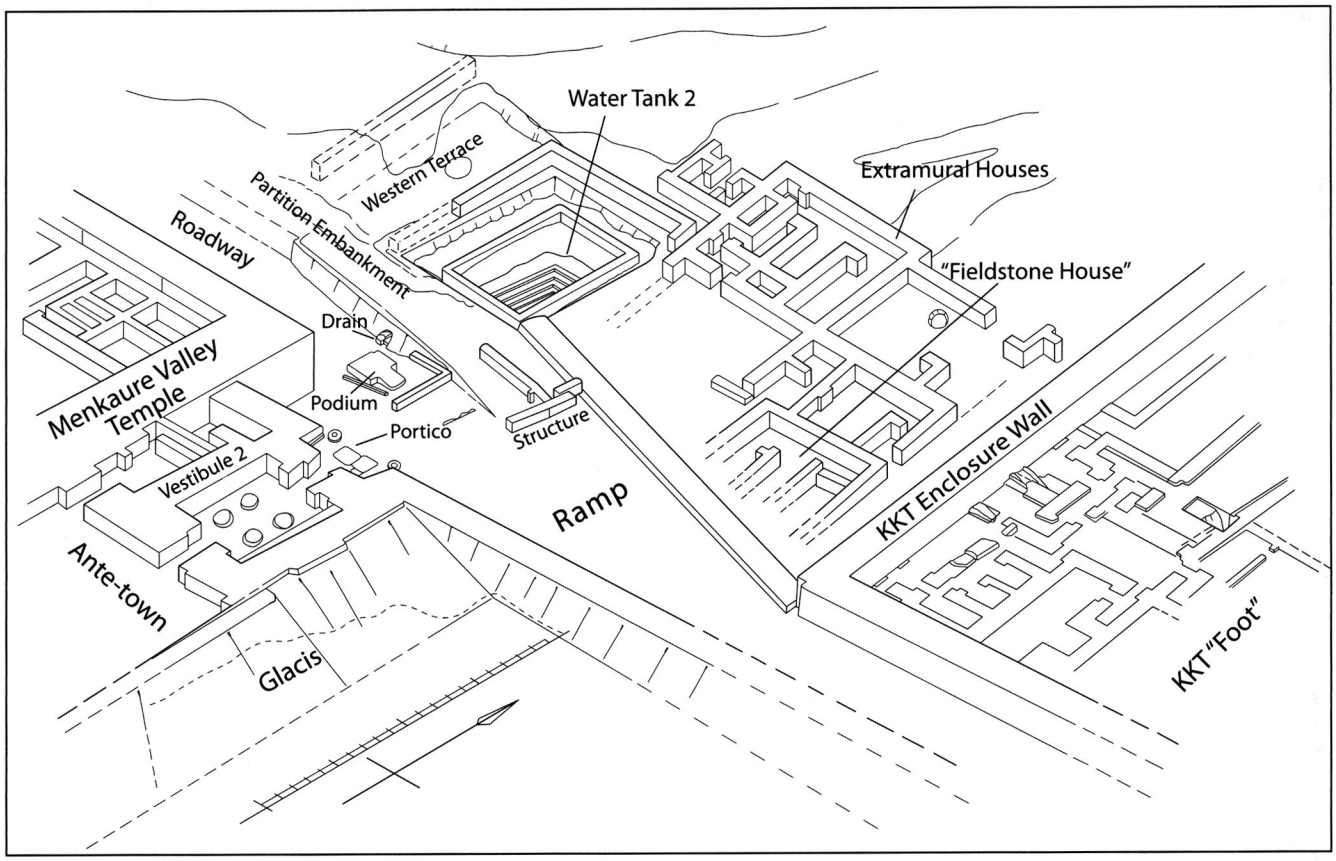


*Fig. 23: Reconstruction of Area KKT-AI with the broad ramp ascending between the KKT-F (the foot of the L-shaped town) and the MVT*

A further clue was afforded by the causeway which runs from

> the [Khentkaues] Pyramid-chapel due east, and then turns at right angles, continuing in a southerly direction, where it merges into a wide, brick-paved causeway running up from the valley. This latter causeway leads directly to the spot where the basin is located. It was clear then, that the [Khentkaues valley] temple must lie in the immediate vicinity.[137]

Hassan's 'wide, brick-paved causeway' is a broad ramp, widening from 7 to 12 m as it ascends from the east between the southern end of the KKT and the northern wall of the ante-town addition to the MVT (Fig. 22, Fig. 23), parts of which we have cleared and mapped from 2005 to 2009.[138] But so far, no connection has been found between this ramp and the Khentkaues causeway, which does not turn south, rather leads straight east to the lateral ramps we found in the last few years ascending from a lower terrace and basin (Fig. 4). The broader road along the southern side of the Khentkaues causeway opens into the walled court with the bedrock-cut basin in the southern foot of the KKT, and affords no throughway to the south. Hassan's plan shows the thick enclosure wall completely enclosing the southern side of the road, the western side of the southern KKT foot, and turning to run east to encompass the southern end of the KKT. According to Hassan's plan, and what we so far know from our survey, the most direct access between Khentkaues' monument and the addition onto the front of the MVT would have been to exit the opening through the enclosure wall south-east of the upper chapel, walk over or around the mound of quarry debris (Fig. 3), and to cross the broad ramp (which had a low shoulder wall) to the portico and vestibule in the eastern extension of the MVT, the ante-town, as we call it. Of course, we are lacking the south-eastern corner of the KKT. Before we speculate on possible connections between the KKT and MVT in this area, we need to return to the question of Menkaure's pyramid town.

When we had cleared 21 m of the length of the eastern enclosure wall of the ante-town wall in 2005 and 2008, we found that it drops steeply. Lehner called it a glacis (Fig. 22).[139] As far as we could trace its lower part in a cramped

[137] Hassan, *Gîza* IV, 51.

[138] M. Lehner, M. Kamel and A. Tavares, *Giza Plateau Mapping Project Season 2005 Preliminary Report* (GOP 2; Boston 2006), 15–16; Lehner, Kamal and Tavares, in Lehner, Kamal and Tavares (eds), GOP 4, 22–24; M. Lehner, 'Ascending Giza on a Monumental Ramp', *AERAGRAM* 11/1 (2010), 8–13.

[139] Lehner, Kamal and Tavares, GOP 1, 16; Lehner, Kamal and Tavares, in Lehner, Kamal and Tavares (eds), GOP 4, 21–22.

corner with the curve of the modern road around the modern cemetery, the wall drops two metres, to 16.00 m asl from the floor level of the vestibule at 18.00 m asl. This is comparable to the 1.89 m drop in level from the eastern KKT causeway entrance to the lower KKT-E terrace. The terrace on which the MVT vestibule, court and domestic structures were later built must have fronted the MVT, at least already in its first mud-brick phase (II). Otherwise anyone exiting the front doorway would have fallen two metres! It is possible that already Menkaure's builders extended the MVT foundation from the platform of megalithic limestone blocks using massive layers of quarry debris. However, this debris is probably held in place by the glacis-like eastern mud-brick wall, similar to the way the northern wall of the ramp retains limestone debris (see below).

From its early phase, then, one approached the MVT either from the south, via the external corridor, whence openings existed to the exterior terrace and into the interior magazine corridor south of the first vestibule, or from this broad ramp on the north. Like the Khafre Valley Temple, the approach to the MVT consisted of two ways, a northern and a southern. The two ways are also comparable to the two ways approaching the Khentkaues complex, at the end of its building sequence, one via the northern corridor and lateral ramp (NLR), another through the southern corridor and lateral ramp (SLR). The double access bears similarities to the sixth dynasty valley temple of Pepy II.[140]

In spite of our own nomenclature, the 'ante-town' terrace leaves only 18.5 m width on the south, and about 12 m width on the north, for a 'pyramid city of Menkaure'.[141] The interior court offered additional, but limited, space for domestic structures and we could think that this is one reason for the spread of rooms inside the temple. Again, we know very little of the early phase II.1 layout on or near the temple floor. The II.3 layout was comprised of about five apartments to the south, and bins and granaries to the north. Do these five 'houses' comprise a pyramid town or city? On the other hand, the KKT itself contains only ten to thirteen 'houses'. In fact the bins, granaries to the north, and possibly even the apartments in the southern court, may have emphasised claims to shares in temple offerings by stakeholders who lived elsewhere, a situation similar to the small chambers, bins, stelae and house models found in the secondary enclosure around the pyramid of Wedjebten in the sixth dynasty pyramid complex of Pepy II.[142]

Where else could the settlement of Menkaure's pyramid town have been? It is possible we have yet to see settlement to the south under deep sand so far unexcavated. The low floor level of the day and proximity to the main wadi channel, as well as the way the causeway corridor closes off the southern side of the temple, causes us to doubt this possibility.[143] To the north and west people built a few houses east of a deep masonry-lined basin (the 'Water Tank 2', see Fig. 22, Fig. 23), and we know at least one more of these extra-mural houses was built into the slope of quarry debris to the west of the tank.[144] But these were probably built late in the history of the site.[145]

The sum total of domestic rooms within and next to the MVT is quite small in comparison with the sophisticated, planned settlement that lay just 35 m east and 5 m north of the MVT – the southern foot of the KKT. As of phase 5, around the corner, on the northern side of a huge pile of quarry debris, lay the planned, modular series of buildings along the Khentkaues causeway. Because they do line that causeway, we have assumed that here lived 'priests' of her cult. How did the people occupying this expansive, planned pyramid town of Khentkaues interact with those occupying, or using, the considerably more modest structures occupying the walled space of the MVT and the narrow terrace in front?

Here we might note that, as far as we know, the expanse of the KKT contained only eight or nine small granaries, including three on the upper, western terrace in the foot (KKT-F) of the town, one in Building B (Room 34), and four in Building E (Room 79),[146] and this was one of the later modifications at the end of the main occupation sequence (5c) in Building E.[147] The court of the MVT and the southern end of the annex were crowded with small chambers, bins, and granaries during the middle occupation phase (II.3), and we sense that this was true as well in the earliest (II.1) and last (III.10) phases of occupation from the all-too scant traces. From Reisner's multi-phase map,[148] we count from a very incomplete record somewhere near 25 bins and silos of the first occupation (II.1) of the court, 11 bins and silos, excluding the rooms of the five apartments, during phase II.3, and 37 chambers, bins and

[140] G. Jéquier, *Le monument funéraire de Pepi II^e^. III: Les approaches du temple* (Cairo 1941). We might add the MVT and KKT-E to the comparisons between valley temples and depictions of the Ibu and Wabet in the embalming ritual.

[141] Lehner, Kamal and Tavares, in Lehner, Kamal and Tavares (eds), GOP 4, 22.

[142] G. Jéquier, *La Pyramide d'Oujebten* (Cairo 1928), 21–31.

[143] Reisner, *Mycerinus*, 36 states he extended the clearing, in mid-December 1910, 4 m south of the southern side of the temple, 'over a mud surface about a meter lower down and sloping away to the south'. This lower silty deposit could be from the remains of settlement south of the MVT. On the other hand, it suggests the edge of the ruin mound tapering away.

[144] Lehner, *AERAGRAM* 11/1 (2010), 8–9.

[145] We know, from our 2009 Trench B, that the KKT western enclosure wall predates the fieldstone house to the west, see Fig. 22.

[146] Hassan, *Giza* IV, 38 (Hassan mentions five silos in this room which he calls 75), 40.

[147] Jones and Yeomans, 'Integration 2010', fig. 9; Yeomans, 2009 DSR, 9–10.

[148] Reisner, *Mycerinus*, pl. VIII.

silos (counting nearly all chambers shown) during phase III.10. Again, we might compare this situation to that in the secondary enclosure around the pyramid of Queen Wedjebten in the Pepy II pyramid complex. We might consider the MVT as the grain reserve for a larger pyramid community that included the KKT.

This question may relate to the development of the 'two separate parts' of this pyramid community[149] during the time of Shepseskaf's mud-brick works, or even earlier, when heavy stone-working was in progress to the west.

*The first MVT of Shepseskaf and Buildings I, J, K and L (KKT4, MVT II)*

In our phasing of the KKT, we have to imagine that some amount of time had to pass between the construction and use of the phase 4 complex, Buildings I, J, K and L, and the demolition of part of the original western enclosure wall of that complex and the modification of the eastern doorway for the construction of the Khentkaues causeway and town. In our hypothesised match of the KKT and MVT phases, we are left with the suggestion that the phase 4 KKT complex functioned during the time of building the first MVT and the other mud-brick works of Shepseskaf. This ties to the MVT the early eastern and southern parts of what became the KKT.

Technically and strictly speaking, we have no hard evidence for the purpose of the early, phase 4, eastern layout of Buildings I, J, K L (and possibly M), but it is highly probable that the occupants of these buildings served either the memorial foundation of Menkaure, whose valley temple is located around 60 m to the south-west, or Khentkaues I, whose foundation at some point took over the colossal bedrock block 150 m to the west. Or could they have served both?

If the original western enclosure wall of the phase 4 Buildings I, J, K and L extended 25 to 30 m south of Buildings K and L, it would have come to within 48 m of the MVT. So,

> its closest neighbor is the Valley Temple of Menkaure. During the process of completing Menkaure's Valley Temple in mud brick by his successor Shepseskaf, is it possible that the [early phase 4] settlement was built at the same time to house the personnel responsible for maintaining the mortuary cult of Menkaure? The ... basin in KKT-E could have been the access point for goods from the east required for this function to reach the settlement.[150]

A rectangular layout reaching this far south, possibly including Building M, would have extended to the left front of the MVT, making this an L-shaped footprint around the south-eastern corner of the very rectangular, massive mound of quarry debris that rises 9 m high between the MVT and northern leg of the KKT (Fig. 3).

*Building with heavy stonework (KKT4, MVT I)*

As an alternative, could Buildings I, J, K and L have already been occupied during Reisner's Phase I, when Menkaure's workmen were still undertaking considerable stone-work that involved large-scale quarrying to the west, and importing Tura limestone and granite to the east? Administrators of these works might have occupied the phase 4 complex, possibly including Building M and other structures further south, situated as they were along the edge of the eastern approach, possibly at the head of harbours.[151] If Buildings I, J, K and L stood already during the time of major stone-work, they would precede both the first functioning MVT and the KKT.

Three generations of fourth dynasty workers quarried stone at the south-easterly slope of the Moqqatam Formation for the pyramids, tombs and temples in a great circular area, 400 m in diameter (Fig. 24). Through the years, the quarrymen carefully reserved at the centre a gigantic bedrock block, 45 m square and 10 m tall. This block became the pedestal of the Khentkaues memorial monument.[152] Workers never exploited the south-eastern quadrant between Khentkaues and the Sphinx as deeply as the other three quadrants. So they left a row of other large, isolated rectangular blocks of bedrock that later Egyptians used for rock-cut tombs lining the northern side of the south-east quadrant, which the KKT would occupy.[153] Between these bedrock blocks and the massive mound of quarry debris, they cleared a bedrock plane, like a broad boulevard, 30 m wide, sloping for 150 m gently east. This plane became the foundation of the Khentkaues Town.

We can only speculate why the quarrymen reserved this block at centre to the height of the original, natural plateau surface. To isolate the block from where it thrust forward from its attachment to the SE quarry quadrant, workers cut a 6 m wide corridor along the northern side. At this point they must have intended the gigantic block to serve as a monumental superstructure, and this intended use of the block and of the quarried boulevard must go together. We note this quarrying is some distance from what was probably

[149] Kemp, *Ancient Egypt* (second ed.), 205.

[150] Jones and Olchowska, 2009 DSR, 27.

[151] As Kemp, *Ancient Egypt* (second ed.), 207 wrote concerning the KKT: 'The reason for the L-shaped plan is not really clear, although it must be remembered that, according to the reconstruction of the overall layout of the Giza plateau ... the quays and basins of the reception zone for building materials probably lay close by, and provided a limit to eastward building. But the effect was to bring the southern extension almost into contact ... with the Valley Temple of King Menkaura'. Kemp refers to M. Lehner, 'A Contextual Approach to the Giza Pyramids', *AfO* 32 (1985), 136–158. See also, M. Lehner, 'The Development of the Giza Necropolis: The Khufu Project', *MDAIK* 41 (1985), 109–143.

[152] Lehner, *AERAGRAM* 9/2 (2008), 14–15.

[153] Lehner, *MDAIK* 41 (1985), 122 (B13).

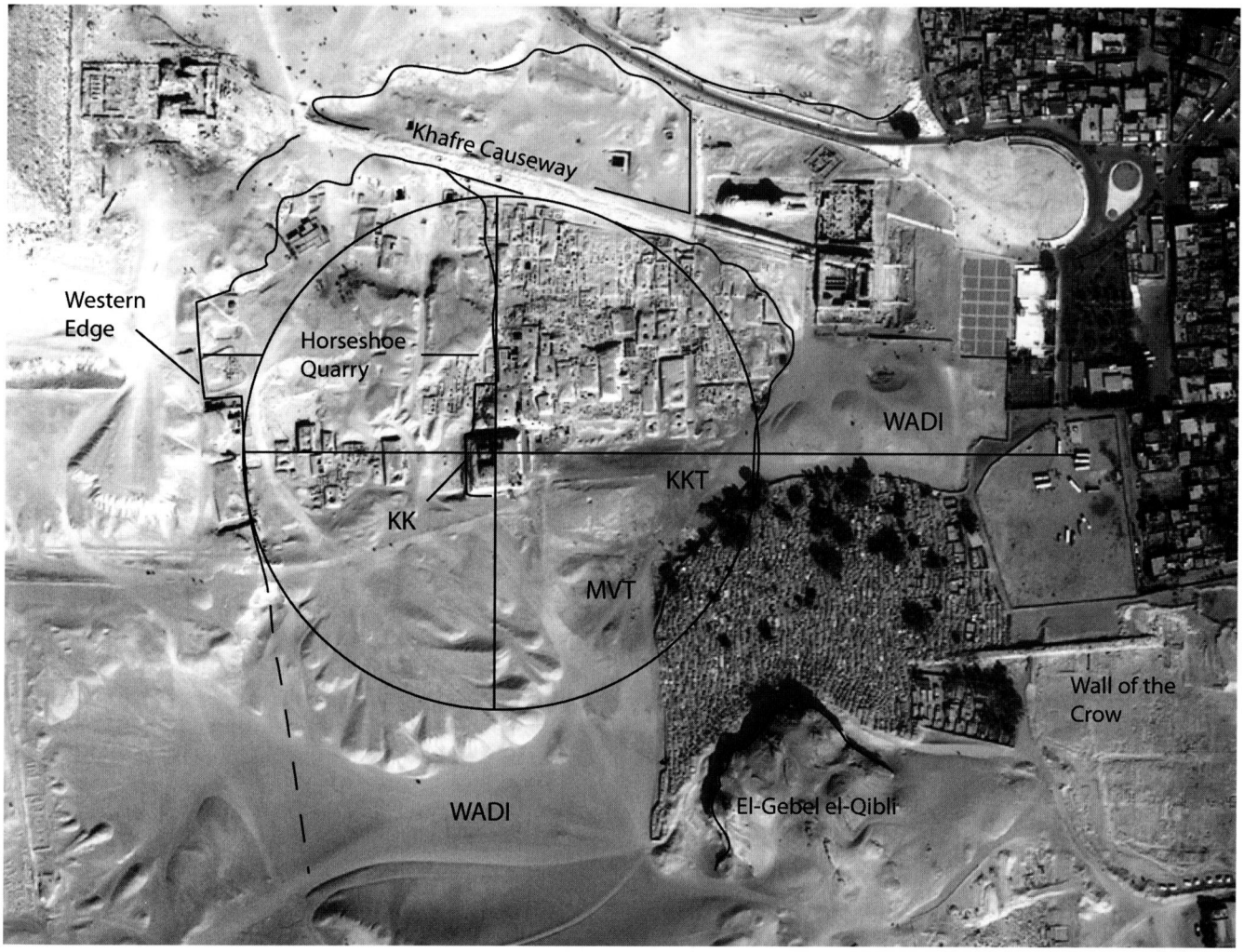


*Fig. 24: The 'circle of quarrying' with the Khentkaues monument at centre, superimposed on an excerpt from a Quickbird Satellite Sensor Image of the Giza Pyramids Plateau, taken in February 2002, Copyright 2007 Digital Globe. The 'horseshoe' quarry, in the north-western quadrant, is probably the main quarry, up to 30 m deep, for the Khufu Pyramid, which extended south into the south-western quadrant. The KKT and MVT occupy the south-eastern quadrant, where the layers dipped low into the wadi. The fourth dynasty quarry workers never exploited the north-eastern quadrant so deeply, leaving rectangular bedrock blocks used as tombs from the fifth dynasty. Quarry workers cut back to the north the southern line of this quadrant, clearing a bedrock plane that became the foundation of the KKT. Recent excavations have revealed the quarry north of the Khafre causeway is only about 2.5 to 3 m deeper than the Khafre causeway. The modern cemetery fills the mouth of the wadi between the Wall of the Crow (lower right) and the KKT and MVT*

the main quarry for the Menkaure Pyramid, which opens as a discrete 'hole' due south-east of that pyramid and its subsidiary pyramids.[154]

By the time the authorities ordered the isolation of the bedrock block and clearance of the broad strip east of the Khentkaues pedestal all the way east to the drop in bedrock levels at the KKT-E, they probably intended that strip as a platform for a town attached to a great pious foundation. The early complex of Buildings I, J, K and L lies at the eastern end of the strip, exactly along the edge of the vertical drop to the lower terrace (see below). The wide eastern doorway that opened in the centre of the phase 4 early layout (see above) is positioned, like the causeway that later restricted this access, in line with the spot that became the granite entrance door into Khentkaues I's chapel, built into the south-eastern corner of the massive bedrock pedestal, 150 m up the slope of the bedrock boulevard to the west.

The point here is that we can hardly envisage Khentkaues' builders positioning her gigantic tomb and its chapel to align with the doorway into the mud-brick Buildings I, J, K and L because the bedrock podium and boulevard are the result of many years, maybe decades, of quarrying. So we would think Building I, J, K and L came later. And yet, if we assign the phase 4 layout to the administration of building the MVT, especially the stone working phase (I), it implies the Khentkaues monument was well on its

[154] Reisner, *Mycerinus,* 9, 74.

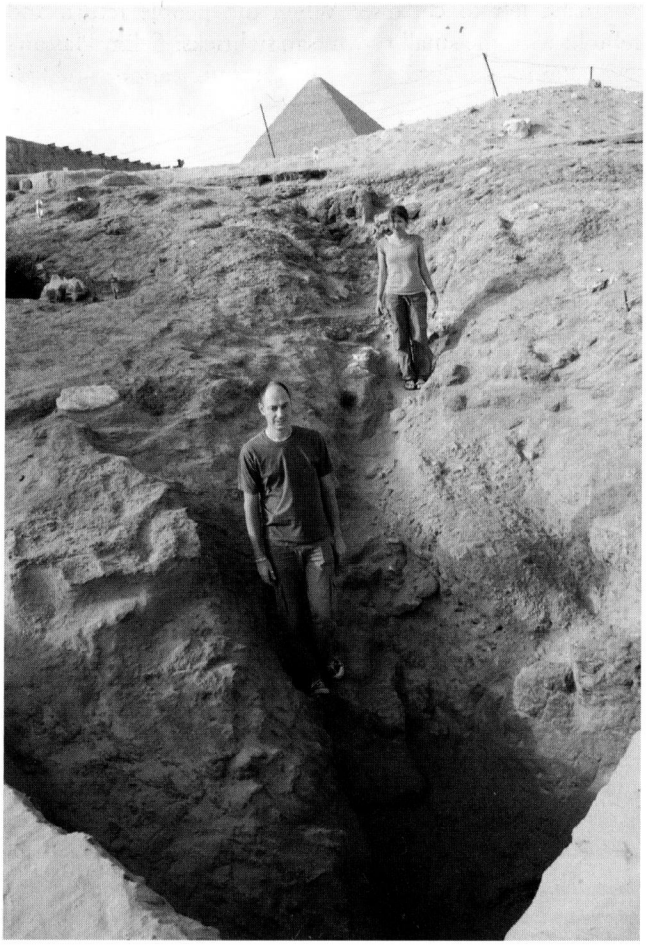

*Fig. 21: Kasia Olchowska and Daniel Jones descend the gully, shortly after workers cleared it of sand. Water running from an opening built into the original northern enclosure wall cut this channel. Under the washed sand and limestone debris, the gully had cut through the collapsed mud-brick, the original walls, and down to the bedrock. Jones stands on bedrock steps. In the mass to the left he excavated the lower stairway ramp*

Selim Hassan's excavations for burying the dead. Our team excavated one human skeleton that may date to the 8th century AD, based on a coin found nearby.[81]

Where we lack such obvious later cuts into the original collapse (as in the corridor on the northern side), we found little evidence indicating that architecture had been left to deteriorate gradually for a long period – for example, there was a lack of intercalated wind-blown sand and then silt from the erosion of the mud brick walls. Rather, we found mud-brick collapse directly upon the latest floor.

*Erosion, Gully, and sand (6b)*

The collapse of the major mud-brick walls left a large amount of debris sloping down into the basin (Fig. 20). The rather thin mud-brick retaining walls of the terrace slumped or collapsed, except where the lower stairway ramp held them in place in the north-west corner, spilling the crushed limestone that the builders had used to level and build out the bedrock shelf.

Natural forces – perhaps a combination of rain, wind, and sand – abraded the mud-brick collapse, the top of what remained of the major walls and the limestone foundation debris into a flush, regular, glacis-like plane that sloped at 30° (Fig. 14, Fig. 20).

During an occasion of especially heavy, sustained rain, or a period of several such episodes, water accumulated around the wide entrance (29,068) through the northern enclosure wall in the KKT-E, and, helped by the cut [30,867] for the gypsum-lined burial box (30,863), streamed down the slope, cutting a deep channel or Gully [30,826], 0.90 to 1.30 m wide and 0.50 to 0.70 m deep, all the way through the architecture and down to the stepped bedrock (Fig. 21). The Gully fanned out just east of the retaining wall of the lower stairway ramp (Fig. 13). Sand with irregular limestone pieces, crushed limestone and deteriorated mud-brick (30,837) filled the Gully before clean sand completely covered it. The fill perhaps indicates occasional flushes of water through the limestone foundation debris and mud-brick ruins during the time environmental conditions began to stabilise and allow the sand to accumulate.

These changes prevented any further use of the KKT-E architecture. At least in this area due east of the Khentkaues causeway, access to the lower, open terrace, and from there to the SLR and NLR, was no longer possible.

*Sand (6b)*

We might be inclined to take the sand (29,858) that covered these ruins for granted. But the magnitude of this deposit, the fact that we find no sand on the floors under the collapsed walls, the fact that it lies directly upon ruins abraded so severely into an even, flush, plane, and its magnitude and thickness, makes the sand an important part of the environmental history of this site and the larger region (Fig. 20). It is also important to the cultural history of this site, to the extent that it had begun to blanket the area prior to the reoccupation (phase 7) of the upper town.

So consistent was the clean sand, from the top of its mounding that covered the site to the deepest fill of the basin, that we could assign it a single stratigraphic feature number (29,858). As we removed the sand down and away from the 30° slope of the SLR ruins directly below the opening of the Khentkaues causeway in 2008, we found 'ceramics dating from the late Old Kingdom, or perhaps even First Intermediate Period' including a complete bread mould strikingly different from the many bread moulds to

[81] J. Kaiser, 'Human Osteology 2009', in Lehner (ed), GOP 5, 188, pl. 10a.

way, or finished earlier than, or concurrently with, work on Menkaure's pyramid complex.

So we consider that the early layout of Buildings I, J, K and L served for state-sanctioned work on both the Menkaure and Khentkaues complexes. We sense that major works of quarrying and terracing the limestone bedrock, hauling in granite from Aswan, cutting and setting stone for monumental superstructures, chapels, false doors, casings and door jambs was over by the time Shepseskaf completed Menkaure's upper temple and valley temple, queens' chapels and causeway in mud-brick, and perhaps as well when the town attached to the Khentkaues I memorial was built.

Khentkaues' workers brought to her monument very large, granite slabs weighing tens of tons for the huge false doors in the inner room of her chapel, multi-ton granite beams to line her descending passage and to stand as jambs of her outer chapel. They also brought in tons of Tura-quality limestone from the eastern quarries for casing her superstructure (evidence indicates they cased both the podium and the mastaba). The quarrymen created an east-facing yawning gap in the south-eastern corner of the bedrock pedestal in order to introduce these large granite beams (Fig. 1). The broad boulevard of flat bedrock sloping gently straight up to the west, possibly from the edge of a harbour, is the most probable route. To access this route from much lower levels to the east, the haulers would need to cross the vertical bedrock drop. The lower terrace and early SLR are too narrow for hauling stone of such sizes and quantities. They might use a temporary debris-ramp, but if Buildings I, J, K and L already stood in some form, those who off-loaded and hauled the stone would have had to go round those mud-brick structures. An entryway on the north to a track way between the quarry and these structures might work, but the most convenient access was where the bedrock dipped lowest.

As we noted, the upper edge of the vertical bedrock drop in the KKT-E, and the entire broad bedrock platform of the KKT, slopes down by about 6° to the south-east (Fig. 14). We lose the connection between the KKT-E and the area east of the MVT under the embankment of a modern road that curves around the modern cemetery (Fig. 24). But it is likely that a common construction access existed just here, where the bedrock dips helpfully low as it slopes down toward the main channel of the wadi between the Moqattam and Maadi Formation outcrops.

Unfortunately, most of this spot lies under the modern cemetery and road. Just to the west, we have cleared and mapped the monumental ramp that Hassan called a 'causeway' (Fig. 22, Fig. 23)[155] We see in cuts through this ramp that it is composed of accretions, like construction ramps elsewhere at Giza, and we believe it may have served for the introduction of exotic stone for the pyramids and temples of Menkaure. When stone-working stopped, the ramp was paved several times over what must have been a considerable period (Reisner's II.1 to III.10) with alluvial and marl clay, as it served to access the MVT at the north-east corner of that temple, and continued as a roadway west passing the northern side of the MVT.[156] Our 2009 Trench C at the south-western corner of the KKT enclosure wall, just where it turns east (Fig. 22), indicates the upper paving layers post-date the south-eastern corner of the mud-brick enclosure wall of the KTT. We need to excavate lower to ascertain if underlying layers of the ramp are stratigraphically earlier. (The 2009 probe was dangerously below our cut into the road embankment, and the scores of horse and camel riders passing above limited the time and space in which we could work here).

If Khentkaues I's builders used this ramp (in its early construction phase), or generally the low south-eastern part of the site, for bringing in heavy stone, they would have to proceed west and then turn north (left) to navigate around the immense mound of quarry debris that was already piled high during the major quarry works between the MVT and the boulevard east of Khentkaues (Fig. 3, Fig. 24). The early, phase 4, complex of Buildings I, J, K and L left space between its western enclosure wall and the base of the debris mound, space later taken up by the westward expansion of the KKT southern foot onto the higher terrace. It is also possible haulers proceeded straight west on the roadway at the top of the ramp, passing the mound to approach the queen's chapel from the south. Or, they may have diverted granite and Tura limestone from holding yards near the Menkaure pyramid complex, some distance to the south-west, if the two monuments were under construction at the same time, or, perhaps as stone-working was winding down or had stopped on Menkaure's structures.

Buildings I, J, K and L, possibly M and any contemporary buildings in the missing south-eastern corner of the settlement, that is to say, the early north–south layout, would have been positioned to the north of this

[155] See note 137. For a full report on this ramp, and our work in the area between the KKT and MVT (area KKT-AI), see M. Lehner, 'KKT-AI: Between Khentkawes Town and the Menkaure Valley Temple', in Lehner (ed.), GOP 5, 53–92.

[156] Lehner, AERAGRAM 11/1 (2010), 8–13. A major erosion channel cuts through the interface between the southern end of the KKT and the MVT, taking out much of the northern side of the ramp and then, exactly at the south-western corner of the KKT enclosure wall, the channel turns south to truncate the ramp (Fig. 22). Settlement debris collapsed from a structure on the northern shoulder of the ramp into the channel ('the Cut'; see Lehner, Kamal and Tavares, in Lehner, Kamal and Tavares (eds), GOP 4, 29–31). Anna Wodzińska dates pottery from this and from gravel fill that people subsequently dumped into the channel to the late sixth dynasty. It is very possible the 'Cut' in the KKT-AI was made by the same forces, about the same time as the flash flood Reisner recorded in the MVT (phase II.8–9) and the Gully in the KKT-E (phase 6).

monumental ramp and the lowest south-eastern access into the whole area. It is compelling to see this early layout as an administrative centre for the major stone-working to the west. These accommodations would have been within the building zone, near its eastern access point, and just far enough west of the dust and din of the continuing major stone-working.

It is rather noteworthy that while Menkaure's pyramid complex, with four pyramids, two temples begun in megalithic masonry, and a monumental stone causeway foundation, exceeds in stonework the colossal monument of Khentkaues I, the work forces never completed Menkaure's complex,[157] but all evidence indicates they did complete the Khentkaues monument.[158] Could they have finished the Khentkaues I monument before the end of Menkaure's reign? This is one of three possibilities: before, during or after. If after, do we need to fit Khentkaues stone works into the four to seven years between Menkaure and Userkaf, or consider it part of tomb building, albeit at a higher order of magnitude, that still went on at Giza in the fifth dynasty?[159]

We might allow ourselves to speculate whether the major quarrying and stone-working was concurrent for both Menkaure and Khentkaues I, which would have to put the beginning of construction for the Khentkaues I monument in the reign of Menkaure, just as we might envisage the major mud-brick works for both complexes in the reign of Shepseskaf.

*A combined pyramid town?*

According to the narrative so far reconstructed from text and archaeology, Menkaure's son and successor, Shepseskaf, finished his father's temples in mud-brick even as he transferred stone-workers to South Saqqara for building his own memorial in the form of a gigantic mastaba, with elements similar to the Khentkaues complex.[160] Given the seven years between the reigns of Menkaure and Userkaf, and the four or five years that Shepseskaf was on the throne, how much time could have passed between Shepseskaf's mud-brick work on the Menkaure temples and the layout and building of the phase 5 Khentkaues Town?

Subsequent to stone-work stopping on their respective monuments (around the same time?), Menkaure's complex received an enclosure wall around the pyramid, five mud-brick temples and a causeway. Khentkaues received a mud-brick causeway, an elaborate well-planned town and an enclosure wall around her tomb and town. Were it not for orientations, we might conclude both these extensive mud-bricks works were done together, after large-scale stone-working had ended. This is the implication of matching the KKT phase 5 with MVT phase II.1.

While we recognise that mud-bricks may not be securely diagnostic of date, we have been impressed at the similarity of the mud-brick ascribed to Shepseskaf and that in the KKT. In 2004 Mansour Boraik, then Chief Inspector of the Giza Pyramids, exposed several patches of the remains of the mud-brick walls of the Menkaure causeway, midway between the upper temple and the valley temple. In 2005, when we began to map the western enclosure wall of the KKT foot, we were struck by the fact that the same dark, dense alluvial silt seemed to have been used for bricks of about the same size in these two structures.

Reisner wrote that Shepseskaf's bricks are in the size range 34 to 41 cm long, 16 to 20 cm wide, and 9 to 12 cm thick, with the most common size 40 × 20 × 12 cm.[161] He also noted that such bricks were used in the screen wall across the portico in Menkaure's upper temple, which he dated to the fifth dynasty, and he noted such bricks are found in mastabas of the Giza cemetery, but that smaller sizes are more usual in the cemeteries. Bricks of the original KKT southern enclosure wall in the causeway trench opposite Building E range from 34 to 37 cm long and about 19 cm wide. Further east, in 2005, Pieter Collet mapped bricks of the same wall 40+ cm long and 17 cm wide.

[157] Kraus and Warburton, *Ancient Egyptian Chronology*, 485, 498, see the unfinished state of Menkaure's pyramid complex as evidence of a short reign. They award him six years.

[158] Yukinori Kawae directed a laser scanning survey of the Khentkaues monument for AERA in 2006; Y. Kawae, 'Giza Laser Scanning Project', GOP 3, 166–175; 'Mapping Khentkawes', *AERAGRAM* 8/2 (2007), 10–12. In 2009 Lehner took extensive notes on the monument; 'Khentkawes: Unusual Tomb for an Enigmatic Queen' (Ancient Egypt Research Associates, Inc., unpublished report on file; Boston 2009). Certain details suggest to him that workers completed casing the sides with Tura limestone and paved the top of the bedrock pedestal and they cased the upper mastaba, all as part of one project. Lehner's preliminary impression is that the mastaba and the pedestal do not appear to belong to different building periods. Certainly, sculptors carved in relief on the bedrock southern face of the pedestal a false door pattern (with tall and narrow false doors interspersed with low and wide false doors), then covered this work when they cased the pedestal. Lehner sees no evidence of such carving on the other three sides. Rather, certain evidence indicates that such relief decoration would not have been applied to those faces. Among other factors, due to insufficient bedrock on the west and upper north-western corner, the builders had to square the podium with thick packing and then casing stones. It is doubtful they ever had the flat planes of the southern and eastern faces that would allow the elaborate decoration, although on the east they probably built a northern false door into the casing, set into a rebate in the bedrock face. It appears that the carving on the southern face was an early step that the designers abandoned during a single building period.

[159] As suggested by Maragioglio and Rinaldi, *L'Architettura delle Piramidi Menfite Parte VI–Testo* (Rapallo 1967), 168.

[160] M. Verner, 'Archaeological Remarks on the 4th and 5th Dynasty Chronology', *Archiv Orientální* 69 (2001), 383 suggests Shepseskaf could have finished the mud-brick works for Menkaure in two years. I thank John Nolan for drawing my attention to Verner's article.

[161] Reisner, *Mycerinus*, 73.

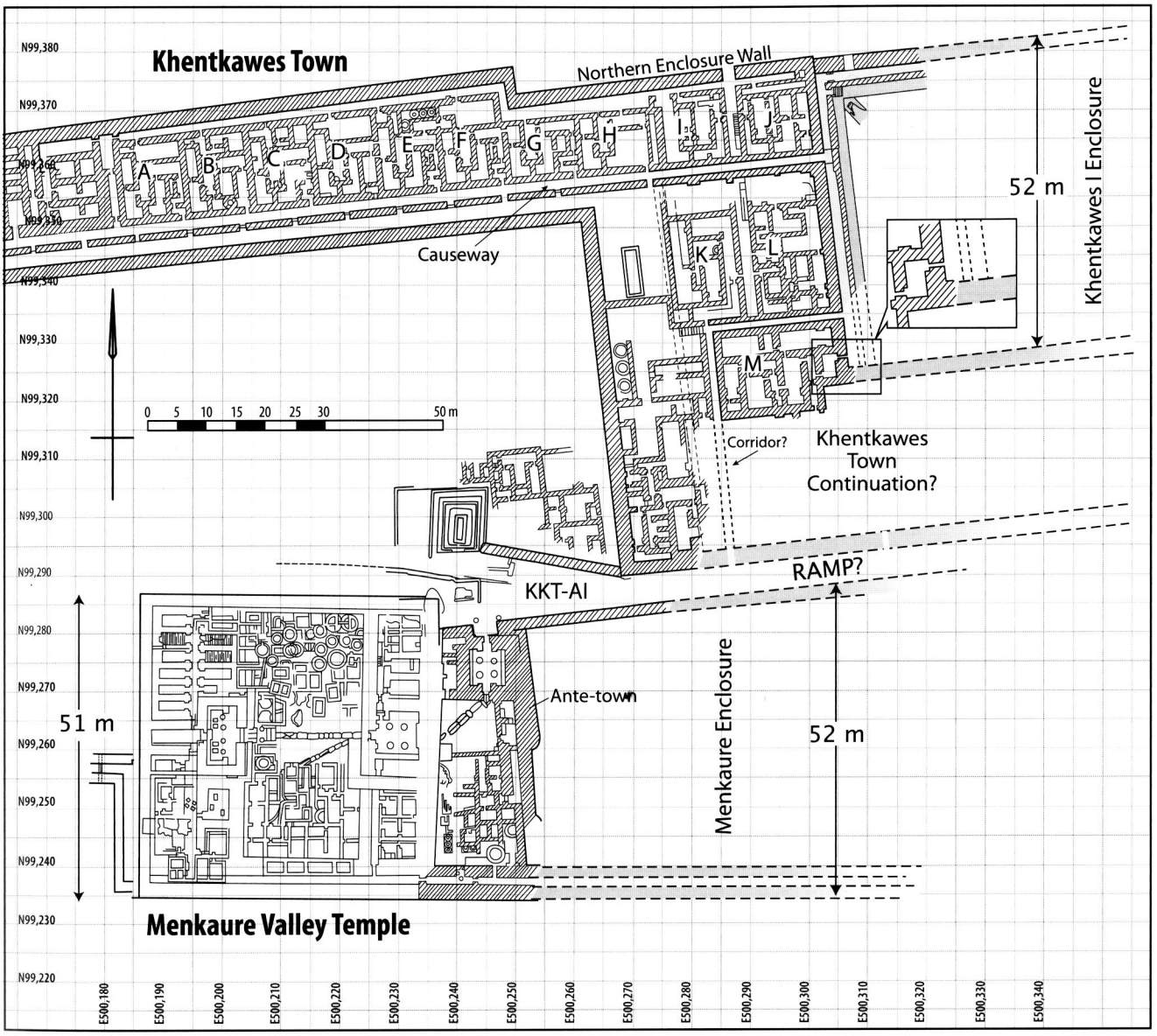


*Fig. 25: Map of the KKT and MVT, with projections of walls suggesting lower enclosures, possibly for harbours, and the broad ramp in area KKT-AI*

22), Mike House found that the northern shoulder wall is simply a moulding in the top of the limestone debris that makes up the massive foundation of the Ramp. In Trench E, which Hanan Mahmoud excavated across the ramp, she found, under the later roadbed, an earlier northern shoulder wall, 1.02 to 1.48 m south, indicating the ramp was once narrower, but already the builders basically moulded the low wall in the debris of the foundation.[166]

In contrast, in 2009 where Hanan Mahmoud sunk a deep probe at the southern end of Trench E, she found that the southern wall of the ramp, more than 1.55 m thick, is founded at elevation 15.92 m asl, 1.94 m deeper than the roadbed of the ramp, while the northern face is rendered with marl plaster for a depth of only 55 cm. This great depth indicates the wall, built of alluvial mud-bricks, served from the beginning of the earliest phase of the ramp as a retaining wall for the limestone debris of the ramp foundation. The southern wall spans the height between a lower basin or enclosure and terrace east of the MVT, making a corner with the eastern wall and 'glacis' of the ante-town (Fig. 22, Fig. 23).[167]

[166] Lehner, in Lehner (ed.), GOP 5, 77–79, 85–88, Figs. 8.38–39.

[167] Lehner, Kamal and Tavares, GOP 1, 16; Lehner, Kamal and Tavares, in Lehner, Kamal and Tavares (eds), GOP 4, 21, fig. 13; Lehner, in Lehner (ed.), GOP 5, 64, 88.

Ashraf Abd el-Aziz has compiled over several years a typology and database of his measurements and descriptions of mud-bricks at a number of sites in Egypt and at Giza, including the HeG and KKT sites. He sees his Nile Clay Brick-A as common to the Shepseskaf brickwork on the Menkaure complex and in the KKT:

> Nile Clay Brick-A: This type is an alluvial brick but it stands out from the other mudbricks because of its very dense, black, alluvial clay ... It is the main brick type used to build the enclosure walls of the tomb complex of Khentkawes, the enclosure walls of the valley temple of Menkaure and it was one of the main brick types in the funerary temple of Menkaure and Khentkawes Town. Perhaps most of this work relates to the Shepseskaf period ... The brick size varies from 36–38 cm long × 16–19 cm wide × 10–12 cm thick, to 40–42 cm long × 20–23 cm wide × 12–13 cm thick.[162]

This point needs further investigation. The similarity may be especially strong between the Shepseskaf brickwork and the enclosure wall around the KKT and around the Khentkaues monument. Again, we have the impression that major mud-brick works in both the KKT and the MVT followed after the cessation of major stone-working, witnessed by the fact, among others, that the enclosure wall around the Khentkaues monument, like that around the town, is composed of these large mud-bricks except for a stretch formed in reserved bedrock along the eastern side of the monument. We have to consider that two such large-scale mud-brick building projects next to one another are bound to produce bricks of similar size within a four- or five-year period, when builders may well have used the same moulds, supply lines from the valley floor and brick-making yards.

However, two aspects give the MVT and the KKT the appearance of conjoined, but separate, layouts. First, on the overall map it is striking how the MVT (like the pyramids and their upper temples) aligns to the cardinal directions (Fig. 3). In contrast, the colossal Khentkaues monument itself, the broad bedrock plane running 150 m east, the vertical bedrock drop in level between the KKT and the KKT-E, and the ramps, walls, corridors and lower terrace in the KKT-E are all orientated markedly west of true north by about 6° (like the whole HeG site and the Wall of the Crow). We should note that phase 4 Buildings I, J, K and L shared this west of north orientation (of quarries and vernacular structures?), which was maintained through all subsequent phases of the KKT.

The different orientations probably result from the surveyors projecting building lines off datum lines from two different stone data, the foundations and beginning of the core walls in megalithic masonry for the MVT, and the quarry channels that separated large blocks of bedrock in the case of the Khentkaues tomb and town.

Second, as of now, we see no direct, formal passage north to south between the KKT and the MVT. However, the broad ramp in the interface between the KKT and MVT may provide an indirect link from the east.

*The link of the interface ramp*

It is the broad ramp in the interface between the KKT and MVT (our Area KKT-AI) that links together the two layouts with their different orientations (Fig. 22, Fig. 23). Specifically, the southern wall of the ramp is orientated slightly south-west to north-east, about 7° south of due west, an orientation shared with the northern face of the ante-town and the portico entrance into the second vestibule (Fig. 3, Fig. 4). The southern wall of the ramp is therefore very close to perpendicular to the KKT western enclosure wall, which runs about 6° west of north. This may be an indication that the KKT and the ante-town terrace were planned and built together. The southern wall of the ramp and the KKT were laid out on the same grid.

At its western end, the southern wall of the ramp merges with the mass of mud-brick forming the eastern wall of the ante-town and its possible accretions. It looks like the southern ramp wall abuts the eastern ante-town wall, but we have not yet carefully examined the brick patterns to ascertain this relationship.

Let us remember that the narrow terrace (18.5 to 12 m wide), and the ramp ascending to it must have been required from the beginning of the MVT. Menkaure's workmen probably brought in the limestone blocks for the foundation and walls from local quarries to the west,[163] but they would have eventually needed materials from the east, and they certainly need Nile alluvial silt during Shepseskaf's mud-brick building phase. A ramp was required then, and also after Shepseskaf's workers finished, because they erected the temple on that high foundation platform, after they filled in the interstices and augmented it with limestone debris.[164] They extended the platform east of the MVT as a terrace. At the eastern edge of this terrace the surface drops 2 m (possibly as a glacis) directly below the enclosure wall of the later annex (Fig. 22, Fig. 23). While we cannot say where the raised, southern external corridor debouches further east, this ramp must have been required on the north side from the time of the first MVT.

We have reason to believe that the northern and southern walls of the ramp rose only half a metre or so from the latest roadbed.[165] In Trench A, through the fill of the erosion channel and perpendicular to the northern side of the ramp (Fig.

[162] A. Abd el-Aziz, 'KKT Brick Preliminary Report', 2; 'Quick notes about KKT Bricks', 1 (Ancient Egypt Research Associates, Inc. reports on file; Boston 2008). In contrast, most of the bricks in the HeG settlement are lighter, grey in colour, sandier in composition and smaller in size.

[163] Reisner, *Mycerinus*, 9, 74.

[164] Reisner, *Mycerinus*, 39.

[165] Lehner, in Lehner (ed.), GOP 5, 64.

Mike House, Kate Liska and James Taylor excavated 'Trench' C at the exact southern corner of the KKT enclosure wall, where the northern wall of the ramp could have met the enclosure wall if the erosion channel, the 'Cut', had not truncated it (Fig. 22).[168] The section given by the Cut shows that the builders laid down silty floor layers (31,020 and 31,022) upon a limestone debris layer (32,026) that is probably the same layer as the foundation of the ramp on the other side of the erosion channel. Here this limestone debris forms the foundation for a buttress-like projection built against the southern face of the southern KKT enclosure wall, which the excavators could free for only 1.50 m to the east.[169] The main part of the KKT enclosure wall is founded lower. We need to excavate further to ascertain whether the builders simply moulded the debris at different elevations for the wall and the ramp foundation, as indicated in Trench A, that is to say, whether the ramp and the KKT enclosure wall were part of the same debris-moulding mud-brick construction process.

To summarise:

- the northern wall of the ramp in the interface between the KKT and MVT was built to the same orientation as the enclosure wall of the southern foot of the KKT;
- the ramp was required to ascend to the terrace along the façade of the MVT in its earliest phase, and so was part of that building phase;
- Shepseskaf's workers must have built the ramp as they completed the MVT (phase II.1), perhaps modifying an earlier construction ramp;
- a workforce must have built the KKT to its final dimensions (expanding the phase 4 layout) at about the same time, or very close in time (phase 5).

*Harbour dyad: two enclosures?*

The ramp between them notwithstanding, what we see so far of the footprint of the KKT and the MVT shows no formal passage north to south between the two layouts. The floor level along the outside of the KKT western enclosure wall is about half a metre higher than the roadbed of the ramp at its easternmost extent, where the erosion channel (the 'Cut') truncates it (Fig. 22). Because of this truncation, we do not know if any access existed here onto the ramp, which would have to have been a step down or over a low shoulder wall or banister (Fig. 23). We are missing the southern end of the town where a corridor starting to the west of Building M might have communicated with the broad ramp (Fig. 7, Fig. 25). This corridor is a continuation, after a 90° turn, of the corridor running west along the northern side of Building M. The eastern end of this corridor opens onto the corridor at the bottom of the SLR in the KKT-E (Fig. 4, Fig. 25).

Here, in the missing south-eastern low area, a passage or common access might have existed into the KKT-E from the south, and onto the ramp ascending west to the north-eastern corner of the MVT. However, just here one small but potentially significant detail from Selim Hassan's plan suggests the possibility of a southern side to the KKT-E lower complex and its basin. In Hassan's plan[170] the KKT eastern enclosure wall, where it forms the eastern wall of Building M, shows a 90° turn to the east, about 35 m south of the causeway threshold (Fig. 7, Fig. 25). The distance from this turn to the northern side of the northern enclosure wall in the KKT-E measures 52 m, 100 ancient Egyptian royal cubits. If the eastern enclosure wall does turn to run east as a southern boundary of the KKT-E lower area, the two walls would contain a rectangular space 100 cubits wide.

The MVT is a little less than 52 m wide. The ante-town addition onto the front is narrower north to south, about 47.5 m wide. Its northern wall continues east as the southern wall of the very broad ramp. The angle of this wall would place its northern face 52 m (100 cubits) from the southern wall of the MVT, if both walls are projected about 50 m east, roughly on line with the eastern wall of the KKT foot (Fig. 25).

A turn to the east of the thick enclosure wall at the south-eastern corner of Building M and a continuation of the southern enclosure wall of the KKT foot might suggest that the KKT itself continued east in a strip about 32 m wide between the KKT-E basin on the north, and the broad ramp and enclosure east of the MVT on the south. Selim Hassan checked for a continuation of the settlement directly east of Building M by excavating trenches inside the modern cemetery. After finding mud-brick walls and settlement material, he concluded: 'These tests afforded clear proof of the presence of ancient buildings for a considerable distance below the Moslem cemetery'.[171]

If the eastern enclosure wall turns as indicated, the wall blocks off the southern end of the corridor running south from the bottom of the SLR on the lower terrace in the KKT-E. Of course, it is possible that this corridor turns east, and that it or some other passage then ran south, across an extension of the KKT, or via a general open area, to communicate with the enclosure east of the MVT. Unfortunately, the issue can only be resolved with evidence in the still-buried, inaccessible low south-eastern part of the site.

*Conjoined memorial foundations?*

The Khentkaues Town provides a very intimate connection in space and time between Menkaure and Khentkaues I.

[168] Lehner, *AERAGRAM* 11/1 (2010), 8–9; Lehner, in Lehner (ed.), GOP 5, 72–77.

[169] Lehner, in Lehner (ed.), GOP 5, 82–84.

[170] Hassan. *Giza* IV, fig. 1.

[171] Hassan, *Giza* IV, 41.

Seeing the KKT as the pyramid town of both Menkaure and Khentkaues would be a hypothesis worthy of further research, with both monuments coming into being as part of the same large-scale quarrying and stone-working. The subsequent mud-brick works, completed within or, in the case of the KKT very close to, the four or five year reign of Shepseskaf, effectively closed off the delivery of thousands of tons of granite and Tura limestone through the northern shoulder of the main wadi between the Moqattam and Maadi Formation outcrops.

The differing orientations of these layouts, and the lack of a passage communicating between them, as we know them so far, leave us less than convinced that this is a unified complex, pending anything we might learn about connections in the low east/south-eastern part of the site. But the KKT does provide an intimate connection between the MVT and the Khentkaues funerary monument, which without the causeway town and its perpendicular foot, would be somewhat isolated as well as anomalous in size, shape and position,[172] and in having odd features, including several that are usual in memorial complexes of kings but not those of queens: the causeway, a valley complex and perhaps the town itself.[173]

We imagine that the close association between Menkaure and Khentkaues I, which we read into their architectures, is not so intimate as that between Menkaure and the queens buried in the subsidiary pyramids, GIII-a, b, c. The impression is one of two separate estates conjoined by their side-by-side valley entrances, and by a settlement that may have served to administer, and possibly feed, both.

We have to leave for further discussion the implications of our results for the 'Khentkaues problem' and for the transition from the fourth to the fifth dynasty.

*Principal abbreviations*

AERA: Ancient Egypt Research Associates
DSR: Data Structure Report
GOP: Giza Occasional Papers

HeG: Heit el-Ghurab (Wall of the Crow, and site to the south)
KKT: Khentkaues Town
KKT-E: Khentkaues Town East
KKT-AI: Khentkaues Town Interface (with the MVT)
MVT: Menkaure Valley Temple
NLR: Northern Lateral Ramp
SLR: Southern Lateral Ramp

[172] Jánosi, *Die Pyramidenanlagen,* 73, n. 517: 'sondern liegt im Central Field wie die Privatgräber anderer Königinnen und der Beamter'.

[173] It is a point of contention whether what we have called the Khentkaues causeway fulfilled a significance and function like the causeways connecting upper and lower pyramid temples. Maragioglio and Rinaldi, *Piramidi Menfite VI,* 190, called the KKT, 'the only royal feature of the [Khentkawes] complex'. We have just considered the hypothesis the town functioned with the Menkaure complex as well as the Khentkaues memorial.

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Recent research on all aspects of the Old Kingdom in Egypt is presented in this volume, ranging through the Pyramid Texts, tomb architecture, ceramics, scene choice and layout, field reports, cemetery layout, tomb and temple statuary. The contributions also show how Egyptology is not stuck in its venerable traditions but that newer forms of technology are being used to great effect by Egyptologists. For example, two papers show how GIS technology can shed light on cemetery arrangement and how 3D scanners can be employed in the process of producing facsimile drawings of reliefs and inscriptions.

The authors cover a wide range of sites and monuments. A large part of the work presented deals with material from the great cemeteries of Saqqara and Giza of the Old Kingdom capital city of Memphis but all the smaller sites are discussed. The book also includes a paper on the architecture of mastabas from the lesser-known site of Abu Roasch. The provinces are by no means overlooked, with articles on material from Deir el-Bersha, el-Sheikh Said and Akhmim. Between them, the authors discuss material from the milieu of the king right down to that which concerned the tomb workmen and those who supplied their basic needs, such as bakers, brewers and potters.

Containing papers presented at a conference at the Fitzwilliam Museum, Cambridge in May 2009, this book continues a series of publications of the latest research presented at previous meetings in Paris, Berlin and Prague.

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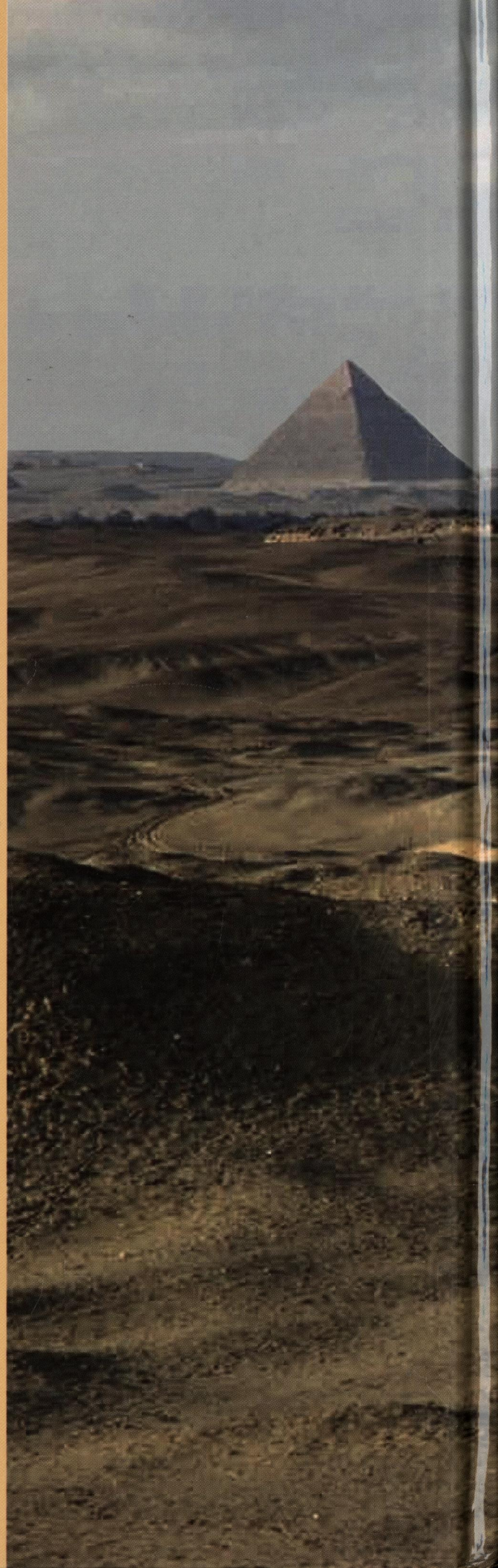
Helen Strudwick currently works at the Fitzwilliam Museum, Cambridge; Nigel Strudwick has worked at the British Museum and is presently teaching at the University of Memphis. They have carried out fieldwork together at Luxor since 1984 and are the authors of *Thebes in Egypt*.



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