The Necropolis of Dahshur

Seventh Excavation Report Autumn 2009 and Spring 2010
German Archaeological Institute/Free University of Berlin

Nicole Alexanian, Wiebke Bebermeier, Dirk Blaschta, Arne Ramisch, Brigitta Schütt,
Stephan Johannes Seidlmayer

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Abstract

In autumn 2009 and spring 2010 the work of the German Archaeological Institute, Cairo and the Free University of Berlin was continued at Dahshur. The lower causeway of the Bent Pyramid had already been discovered by magnetometric measurements and drillings deep below the present surface in 2008. Now a part of the lower causeway was excavated and it became clear that it consists of two massive lateral mudbrick walls which form a passageway of 2.58 in width. This passage was covered by a mudbrick vault; the walls were plastered. The causeway is preserved to a height of ca. 3 meters and led up to the site of the lower temple in a steep course of 5° inclination.
The causeway was covered by a thick layer of sand. Actually, it is a major insight gained through the geographical work that this wadi changed its shape fundamentally in historic times. Further drillings made clear that the causeway has a total length of 140 m and opens into a huge U-shaped structure which is defined by massive mudbrick walls. This structure might be interpreted as a harbor basin. Furthermore several new limestone relief fragments from the lower temple of the Bent Pyramid were uncovered. To the west of the pyramid of Amenemhet II four shafts of the Middle Kingdom were excavated. One of them opens into a burial chamber from limestone and contained remains of the original burial. Geomorphological mapping identified five quarries in the vicinity of the Bent Pyramid and the pyramid of Amenemhet III.

Introduction

The work of the team of the German Archaeological Institute (Cairo)\(^1\) and the Free University of Berlin at Daushur was continued from September, 27th until November, 18th 2009 and from February, 6th until April, 27th 2010\(^2\).

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Lower Causeway to the Temple of the Bent Pyramid

The lower causeway of the Bent Pyramid was discovered by magnetometric measurements and drillings in the valley to the east of the Bent Pyramid already in 2008\(^3\). The causeway could then be followed into the direction of the valley for a length of about 140 m and it became clear that the high standing mudbrick walls of the accessway are covered by an enormous layer of sand.

In autumn 2009 we began to excavate this causeway and made a large trench measuring 30 x 30 m at a distance of about 100 m from the enclosure wall of the lower temple of the Bent Pyramid. We removed about 3 m of sand until we reached the vaulted roof of the causeway (Pl. 1, Fig. 2).

Pl. 1: Excavation trench showing the roof of the vaulted causeway from mudbrick leading to the temple of the Bent Pyramid in autumn 2009

(Photograph DAIK, D. Härtrich)

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\(^3\) N. Alexanian et al., The Necropolis of Dahshur. Fifth Excavation Report Spring 2008, for *ASAE* in print.
In spring 2010 we continued the excavation and removed the sand until we reached the original floor level (pl. 2). The causeway measures 6.35 m in width and consists of two massive lateral mudbrick walls which form a passageway of 2.58 m in width (8 cubits). This passageway is roofed by a mudbrick vault large parts of which are preserved (Pl. 3). An attempt for a reconstruction could be achieved, however (Fig. 1). The ring vault is formed by two layers of upright and horizontal bricks and is leaning to the east. The inner walls of the passageway are plastered white and yellow. Four phases of the plastering could be distinguished which attest that it was renewed several times. From their state of weathering of the different plaster layers it can be inferred that the causeway was used for a substantial period of time i.e. at least 40 years. Several offering places, beer jars mixed with charcoal, were discovered on the northern outer side of the causeway. The offering arrangements were repeatedly deposited in the sand more than 1 m above the original walking horizon. This makes clear that offerings were made at the outer side of the causeway at a time when the outer walls of the causeway were already covered by sand. The walls are preserved to a height of about 3 m. The inclination of the causeway is very steep (5°). Our drillings proved that the lower causeway has a total length of 140 m and is indeed ending at this point.
Pl. 2 Excavated part of the lower causeway of the Bent Pyramid
(Photograph DAIK, D. Härtrich)

Pl. 3: View into the vaulted inner part of the lower causeway
(Photograph DAIK, D. Härtrich)
To the east of the causeway the magnetogram, our drillings in 2010 and a second excavation trench (measuring 15 x 10 m) in the southern part of the wadi indicate the existence of an U-shaped structure measuring 145 x 90 m which is defined by massive mudbrick walls to the west, south and north. This structure is eventually to be interpreted as a harbor basin like those which are known in front of the valley temples of Unas and Pepi II for example. The important question whether the water of the Nile could ever have reached the basin can not yet be answered. The level of 13.80 m asl for the wadi floor outside the basin, which was reached in our drilling B81 (compare Fig. 2) shows that this might have been at least possible. The floodplain levels in the Memphis-Saqqara region can be reconstructed to a height between 13.00 and 14.00 meters, the medium floodplain level in the memphite region was 12.50 m.  

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Fig. 2: Wadi temple of the Bent Pyramid, lower causeway of the Bent Pyramid and U-shaped structure (basin) in front of the lower causeway (plan and magnetogram).

The excavated parts of the causeway and the basin are indicated in green, the hypothetical parts are marked in pink. The excavation trenches 1 and 2 are shown. Levels are given for the temple floor (30 m asl), for the floor inside the causeway in the excavation trench (21.20 m asl) and for the level of the wadi ground in drilling B81 (13.80 m asl) and show the substantial differences in level.

(N. Alexanian, H. Becker, D. Blaschta, T. Gutmann)

The causeway was covered by at least 3 m of sand. Actually, it is a major insight gained through the geographical work that this wadi changed its shape fundamentally in historic times. Analysing the profiles in the wadi trenches it became clear that the sand which is covering the mudbrick causeway accumulated mostly by fluvial (by water) but also by aeolian (by wind) dynamics. From the analysis of the pottery sequence we assume, that the sand accumulated in the wadi in the period between the end of the Old Kingdom and the New Kingdom. We hope to verify this hypothesis in the future by an OSL analysis (optically stimulated luminescence dating) of the sand.

We furthermore excavated a sledge-way built from limestone blocks, which is situated a
little south of the mudbrick causeway but which—in contrast to this original causeway—is lying directly under the surface (Pl. 4). This sledgeway, built probably in the New Kingdom, most probably during the Ramesside period, served to transport large blocks when the lower temple was dismantled⁶.

Pl. 4: Transportation road from reused limestone blocks. The reliefs were found here. (Photograph: DAIK, D. Härtrich)

The limestone blocks were crudely arranged in three layers and taffla mortar was filled between the stones. The stones were reused and originally belonged to the lower temple of the Bent Pyramid. About 50 of them show relief decoration. Many other fragments can be assigned to specific parts of the building, like wall tops etc. These fragments form a valuable addition to those found by Ahmed Fakhry and will form the basis for a fresh attempt at reconstructing the architecture and decoration

⁶ Ahmed Fakhry, Monuments of Sneferu at Dahshur II. The Valley Temple, 1. The Temple Reliefs (Cairo, 1961) 6-9.
of this unique monument\textsuperscript{7}. The largest relief block represents a fecundity figure presenting a papyrus bundle (Pl. 5)\textsuperscript{8}. The red paint on the body of the personification is still well preserved. Another relief shows a part of the atef-crown and the head of large scaled representation of King Snefru (Pl. 6)\textsuperscript{9}. Further fragments show parts of King Snefru with sceptres or staffs in his hands. One block belongs to the corner of a pillar and shows the cartouche of King Snefru. We also found a block showing two female personifications of estates with a so far unidentified emblem of a Lower Egyptian nome in front of them and a relief fragment showing the king in a Heb-sed kiosk.

\textbf{Pl. 5: Fecundity figure presenting a papyrus bundle}

\textbf{Pl. 6: Part of the atef-crown and head of King Snefru}

\textit{(Photographs DAIK, A. Paasch)}

\textsuperscript{7} Ahmed Fakhry, Monuments of Sneferu at Dahshur II. The Valley Temple, I. The Temple Reliefs (Cairo, 1961).

\textsuperscript{8} A fragment with two figures of the Nile was already found by Ahmed Fakhry and formed in his reconstruction the lower part of a pillar (Ahmed Fakhry, Monuments of Sneferu at Dahshur II. The Valley Temple, I. The Temple Reliefs (Cairo, 1961) 101, Fig. 110, Pl. 26 a).

\textsuperscript{9} Compare Ahmed Fakhry, Monuments of Sneferu at Dahshur II. The Valley Temple, I. The Temple Reliefs (Cairo, 1961) 125-128.
Additionally fragments from stelae which attest a the later use of the temple during the Middle and New Kingdoms were uncovered (Pl. 7)\textsuperscript{10}.

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{stela.png}
\caption{Pl. 7: Fragments of a stela from the New Kingdom (Photograph DAIK, P. Windszus)}
\end{figure}

\textit{The Reconstruction of the Ancient Landscape in and around the Wadi of the Bent Pyramid - Geographical Field Work at Dahshur}

The geographical fieldwork took place from September 27th until October, 15th and was focussed

on the following research topics.

Conduction of a west–east drilling transect in the floodplain of the river Nile to locate former fringes of the Western Desert e. g. during the Old Kingdom.

mapping the present geomorphology as one basic parameter for the reconstruction of the ancient relief to gain information about the geomorphological processes triggering relief changes (for example: aeolian and fluvial dynamics represented by sand sheets in the wadi beds or alluvial deposits in the floodplain of the river Nile).

Conduction of trenches in the quarry east of the Bent Pyramid to answer the question to which depth suitable building material bottoms out.

Drillings in the floodplain of the River Nile

Comparing aerial photographs of the 1920s and recent remote sensing data and analysing drillings conducted in spring 2009 it is evident that the desert margin has shifted since the Old Kingdom in a westerly direction. The localisation of the fringe of the Western Desert during the Old Kingdom was one goal of the field work conducted in October 2009. A west-east transect of three hand auger-drillings (B39 – B41) was carried out in the floodplain of the river Nile, east of the Canal Dahshur (Pl. 8).
The drillings B39 and B40 bottom out on the taffla bedrock at a depth of 7.46 m (B39) and 8.82 m (B40) (Fig. 3). On top of the bedrock layer in sondage B39 varying facies of fine sand and coarser sand indicate that this area was almost a desert area. In sondage B40 the bedrock is covered by a layer of dark greyish clay, with a high content of organic material intercalated with charcoal, limestone detrials and brick fragments. On top of this layer alternation facies of a yellowish sandy loam with brick fragments and yellowish sand were found. The layer of sandy loam indicates that the area was reached by single Nile flood events in former times. The basal layer of sondage B40 consists of yellowish sand. On top of this layer a 2.30 m thick cultural deposit of dark grey silty clay, intercalated with weathered brick fragments and sherds as well as charcoal fragments < 0.5 cm was found. Directly overlying the cultural layer, we found a comparable sequence as in sondage B40: first a layer of sandy loam and on top of this layer a 2 m thick sheet of yellowish aeolian sand.
To summarize the results of the drilling transect we conclude the following:

In none of the drillings a thick layer of alluvial deposits was found. This indicates that the border of the desert area and the former floodplain of the river Nile was not detected and it must be assumed that it lies further to the east.

A dating of the cultural layers in sondages B39 and B40 was not possible due to the absence of sufficient sherds. From this follows that a parallelisation between the drillings is difficult because we have no information about the completeness of the sedimentological record.

Geomorphological mapping

The geomorphological map of the study site shows that extensive areas of the necropolis were directly or indirectly influenced by human impact. Five depressions were identified as quarries due to following characteristics: missing in- or outflow, limestone debris up to 5 cm covering the
bottom of the depressions, gentle sloped steplike levels with sharp edges, that were interpreted as mining levels.

During a former archaeological survey small mining spots were identified in the area between the Bent Pyramid and the floodplain of the river Nile\textsuperscript{11}. During the geomorphological mapping it became evident, that the bottom of this area is covered with limestone debris, comparable to the material on the bottom of the quarries. In addition we analysed the geometry of the valleys\textsuperscript{12}. Summarizing all results it is evident that the relief can be hardly explained considering only fluvial processes or processes like gully or soil erosion. For the area of the pyramid plateau a direct anthropogenic relief forming influence (e.g. through mining) has to be considered. A first rough calculation of the mined limestone using ArcGIS 9.3 leads to the result, that the volume was sufficient to build the Bent Pyramid nearly twice. This calculation does not take into account that the mining techniques used in ancient time caused a significant loss of building material by cutting the stone out of the bedrock.

**Tab. 1: Volume of mined limestone**

<table>
<thead>
<tr>
<th>Geology</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quarry I</td>
<td>Limestone 463,800</td>
</tr>
<tr>
<td>Quarry II</td>
<td>Limestone 347,400</td>
</tr>
<tr>
<td>Quarry III</td>
<td>Limestone 1,405,300</td>
</tr>
<tr>
<td>Sum</td>
<td>2,216,500</td>
</tr>
</tbody>
</table>


\textsuperscript{12} N. Alexanian et al., "The Necropolis of Dahshur, Sixth Excavation Report Spring 2009, German Archaeological Institute and Free University of Berlin", for *ASAE*, in print.
Conduction of Trenches in the Quarry to the east of the Bent Pyramid

Trench 1, located at the eastern border of the quarry in a heap east of the Bent Pyramid bottoms out at the tafla bedrock. On top of the tafla limestone crops out, that is intercalated with a thin layer of tafla (Pl. 9a). The slope of the quarry shows clearly characteristics of sculpturing: the vertical backside of the bedrock is followed by a nearly right-angled step. At the bottom of the trench, pottery, probably dating to the period of the Old Kingdom, was found. The debris at both sides of the trench consists of thin layers of sandy, partly cross-bedded material and layers of limestone detritals < 1 cm. Roots in the upper 100 cm might indicate humid climatic conditions or point to an irrigation of the heap in ancient times.

Trench 2 was carried out at the western edge of the quarry east of the Bent Pyramid, the bedrock was not reached. The slope debris consists of coarser unweathered sharp-edged limestone detritus, intercalated with layers of silty limestone. Several quarry marks, wood, sherds (dating to the Old Kingdom) were found. Altogether, this leads us to the conclusion that the deposition of the debris can be dated to the building period of the Bent Pyramid (Pl. 9b).

Excavations in the Cemetery of the Middle Kingdom to the West of the Pyramid of Amenemhet II

The excavation in the cemetery of the Middle Kingdom to the west of the pyramid of Amenemhet II was continued. This cemetery was discovered in 2007 and is organized in two shaft rows parallel

and perpendicular to the pyramid of Amenemhet II. The cemetery was planned in direct chronological relation to the pyramid complex. In addition four larger shafts are situated closer to the pyramid. In 2009 and 2010 two of these huge shafts (8P5-1 and 7P16-1) were excavated. The northernmost shaft 8P5-1 measures 1.84 x 1.38 m and has a depth of 9.20 m (Pl. 10). The burial chamber (length: 3.02 x width: 1.55 x height: 1.52 m) is built from limestone blocks and is situated to the south of the shaft (Pl. 11). There is a canopic niche (length: 0.64, width: 0.68 x height: 0.84 m) in the middle of the western wall. A small loculus (length:1.53 x width: 1.48 m) with a pottery ensemble *in situ* is situated to the north of the shaft. The shaft and the burial chamber were robbed but we found a fragment of the wooden coffin inscribed with religious texts, a small genre figurine (Pl. 12) from limestone, an eye-inlay from a mummy mask, about 500 beads from a necklace, mostly from fayence and one from carneol, fragments from a wooden ship model, pottery and bones of the burial.

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Institute and Free University of Berlin", for *ASAE*, in print.
Pl. 10: Shaft 8P 5-1 from the East (Photograph DAIK, D. Härtrich)

Pl. 11: View into the Burial Chamber of Shaft 8P5-1 (Photograph DAIK, D. Härtrich)
The other shaft 7P16-1 was quite huge (3.26 x 1.86 m) and 9.55 m deep. Due to problems during the construction, the burial chamber (length: 5.72/6.35 x width: 2.58 m x height: 1.24/1.95 m) was never finished and was apparently not used. A later mudbrick shaft with an unusual round ground plan (7P16-2) was built to the south of the main shaft.

Further to the west two smaller shafts 5P12-2 and 7O2-1 were excavated. Shaft 7O2-1 (2.50 x 2.50 m) has a depth of 5.30 m and a small burial chamber (2.70 x 1.51 m) to the south. A well preserved mummified burial and remains of the wooden coffin were found. Shaft 5P12-2 (2.25 m (NS) x 2.10 m (EW)) has a depth of 6.78 m and a small burial chamber (2.46 x 1.05 m) to the south. Some bones of the burial, parts of a wooden coffin and fragments from wooden models were found. In both shafts remains of pottery ensembles in the north eastern corners of the burial chambers were left by the tomb robbers. To the east of shaft 5P12-2 an additional burial 5P12-3 in a small wooden coffin with a burial was excavated directly under the surface (Pl. 13).
Work at the Enclosure Wall of the Pyramid Precinct of Amenemhet II

Furthermore we began to clean the enclosure wall of the pyramid complex of Amenemhet II in order to obtain more precise data on the topographical relationship between the pyramid complex and the shaft tomb cemetery. It is well known that the plan published by de Morgan\textsuperscript{14} does not conform to modern standards. The work at the pyramid complex of Amenemhet II resulted in the excavation of the southwestern (Pl. 14) and northwestern corner of the enclosure wall. Furthermore we were able to identify the northern and southern mudbrick enclosure wall of the pyramid precinct at several points. The pyramid enclosure measures 95.50 m in width (north-south).

\textsuperscript{14} J. de Morgan, Fouilles à Dahchour en 1894-1895 (Vienne, 1903) pl. 2.
Pl. 14: Southwestern corner of the mudbrick enclosure wall of the pyramid complex of Amenemhet II. The pyramid of Amenemhet II can be seen in the background.

(Photograph DAIK, D. Härtich)