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Watering Deir el-Medina

From Donkeys to the Great Pit



'The waters? What waters? We're in the desert.' (From 'Casablanca', 1942)

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Abstract

The workers who built the tombs in the Valley of the Kings lived for many generations with their families in a village that today we call Deir el-Medina. The families of up to 120 craftsmen lived in the village, before it was abandoned, after the cessation of the construction of new royal tombs in the Valley. Deir el-Medina was built away from the Nile and the cultivation, and out in the desert. Perhaps to be close to their work, perhaps to provide security so outsiders would not be able to locate the royal graves. This paper explores how water would have been supplied to the workers and their families.

Parallels have also been drawn with the workers' village at Amarna, which may have served a similar role and faced similar supply problems.

There were two possibilities for providing water, bringing it in, most conveniently on donkey back, or digging wells. The former has been much discussed, and there is literary evidence. The latter is more controversial, and relies mainly on the archaeology. While most scholars believe the so-called Great Pit never reached water before it was turned into the garbage dump where the ostraca letters of the villagers were uncovered, some do believe water was found.

Recent research has also revealed that a secondary branch of the Nile may have been much closer to Deir el-Medina than previously believed.

Keywords: Deir el-Medina, Amarna, water, donkeys, wells, cistern, Valley of the Kings

Arbetarna som byggde gravarna i Konungarnas dal bodde under många generationer tillsammans med sina familjer i en by som idag heter Deir el-Medina. Så många som 120 hantverkare kan ha bott i byn innan den övergavs, i samband med att man upphörde att bygga de kungliga gravarna på denna plats. Deir el-Medina låg i öknen, en bit bort från Nilen och odlingarna som kantade floden. Kanske berodde läget på att man ville bo nära sin arbetsplats, eller kanske var det en säkerhetsåtgärd för att förhindra utomstående att hitta gravarna. Denna uppsats diskuterar frågor kring vattenförsörjningen för arbetarna och deras familjer.

Jämförelser har gjorts med arbetarnas by i Amarna, där hantverkarna kan ha haft en liknande roll och upplevt likartadeförsörjningsproblem.

Det fanns två sätt att skaffa vatten till byn, dels kunde det forslas in, enklast med hjälp av åsnor, dels kunde man gräva brunnar. Den första metoden har diskuterats grundligt, och där finns textuella källor. Den senare är mer kontroversiell, och förlitar sig mest på arkeologiska fynd. De flesta forskarna tror att den så kallade 'Stora gropen' aldrig nådde ner till vatten innan den började användas som en enorm soptipp, där många av bybornas brev senare hittades. Dock finns det några arkeologer som tror att vatten faktiskt hittades där.

Ny forskning har också visat att Deir el-Medina kan ha varit mycket närmre belägen en av Nilens flodarmar än man har tidigare trott.

Nyckelord: Deir el-Medinah, Amarna, vatten, åsnor, brunnar, cistern, Konungarnas dal

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Abbreviations

BdE	Bibliothèque d'Etude
BIFAO	Bulletin de l'Institut Français d'Archéologie Orientale
FIFAO	Fouilles de l'Institut français d'archéologie orientale
JEA	Journal of Egyptian Archaeology
LRL	Late Ramesside Letters
SAK	Studien zur Altägyptischen Kultur
SAOC	Studies in Ancient Oriental Civilization

Chronology

(Dates ca and BC)

1550	Beginning of Egyptian 18 th Dynasty and New Kingdom Capital returns to Thebes Deir el-Medina probably founded around this time
1525-1504	Reign of Amenhotep I, worshipped as the founder of Deir el-Medina Amenhotep's the first royal tomb in the Valley of the Kings
1504-1492	Reign of Thutmose I, first dateable remains at Deir el-Medina
1352	Akhtenaten becomes pharaoh
1346	Construction begins at Akhtenaten's new capital at Amarna Deir el-Medina abandoned during Amarna period
1336	Akhtenaten dies, Amarna abandoned shortly afterwards Deir el-Medina repopulated
1295–1069	19 th and 20 th Dynasties, Ramesside Period
1187-1157	Reign of Ramses III, during which Draïux believes the Great Pit begun
1158	Deir el-Medina strike, recorded in Turin Strike Papyrus
1143-1136	Reign of Ramses VI Papyrus Turin 1923 records the Great Pit dug to greatest depth
1099-1069	Reign of Ramses XI, last royal tomb in the Valley of the Kings Deir el-Medina abandoned Some residents move to Medinet Habu
1085-1068	Whm-Mswt period of "rebirth"
1069	Death of Ramses XI, capital moves to the Delta, kingdom splits

Sources: Shaw (2000) and Wood (2016)

Introduction

The workers who built the tombs in the Valley of the Kings lived for many generations with their families in a village that today we call Deir el-Medina (*Figure 1*). During the Egyptian New Kingdom, it was called ‘St M3’t’, ‘The Place of Truth’ (Peters 2001: 356). The original village seems to have been abandoned under Akhenaten, when the royal tombs were built near his new capital of Amarna, farther north (Häggman 2002: 60). However, with the end of the Amarna period and the return of the kings to Thebes, the village was reestablished, apparently under Horemheb (Demaree, 2016: 75-77).



Figure 1, Deir el-Medina, Photo: Steve F-E-Cameron/Creative Commons

The families of up to 120 craftsmen lived in Deir el-Medina (Häggman 2002: 61-62, 352), while they dug and decorated the tombs of Egypt’s royalty, hidden in the nearby valleys. The builders were divided into two ‘gangs’ or ‘crews’, those of the left and right, as they divided up their work on those respective sides of the tombs. The task of the village continued for many generations, until the need for its existence was undermined by the depredations of Libyan attackers, and the cessation of the construction of new royal tombs in the Valley, when the 21st Dynasty established its capital at Tanis in the north (Bierbrier 1984: 27-29 and 119). The number of workmen in the village, around 29 during the reign of Ramses X, was down to 16 by year 8 of Ramses XI. But it increased again for a time during the subsequent period of ‘rebirth’ or ‘renaissance’ called the Wḥm-Mswt (Häggman 2002: 352).

We're in the Desert

Perhaps to be close to their work, perhaps to provide security so outsiders would not be able to locate the royal graves, Deir el-Medina was built away from the Nile and the cultivation, and out in the desert (Mertz 2008: 95). Which meant that water had to be supplied to the workers and their families on a regular basis. There were two possibilities for this, bringing in water, most conveniently on donkey back, or by digging wells. There is confirmation of the former, differing opinions about the latter, both of which this paper will explore. There are also parallels with the workers' village at Amarna, which may have performed a similar role as the home of the tomb-builders, during the period when Deir el-Medina was in hiatus (Häggman 2002: 59-60).

It's difficult to ascertain how typical a village Deir el-Medina was, as remnants of Ancient Egyptian villages are uncommon. Barry Kemp (2004: 255) points out it was unusual in two respects: it was in close contact with the elite who lived affluent lives which may have affected the residents, and its needs (including water) were supplied by the state. As Deir el-Medina is a rich source of letters and drawings by the workers, who were unusually literate, it has been extensively studied, including the question of its water. This paper will attempt to survey and discuss some of this literature. While the scope of this paper is of necessity limited, there are a number of fascinating articles exploring the issue, both concerning the water-carriers and their donkeys, as well as whether or not the so-called 'Great Pit' was ever used as a well.

One unfortunate limitation however, may be my only superficial knowledge of reading academic French and German. However, I have tried to overcome this by using online translation software, subsequently adjusting for its eccentricities. One drawback to this approach, though, is that it makes it difficult to provide exact page numbers in references.

The Research

The subject breaks down into two elements, water-carriers and wells. Concerning the latter, Jac Janssen (1979) has explored an ostrakon in Stockholm's Museum of Mediterranean and Near Eastern Antiquities, which uniquely seems to list delivery allocations of water. The famous 'Turin Strike Papyrus' lists two separate groups of water-carriers, which raises issues of whether these represented rotating shifts or assignments to the two crews. Janssen (2005) has also explored the costs the water-carriers paid to rent their donkeys, which seemingly would have taken all of their wages. The question of who was responsible for paying the water-carriers, the village community or the state administration, has also been raised. The recent discovery of a New Kingdom branch of the Nile (Graham et al 2015; Toonen et al 2017) only a few hundred meters from the village has cast new light on where their water may have originated.

Parallels have been drawn with the workers' village at Amarna, which may have served a similar role to Deir el-Medina, and there definitely seem to be parallels concerning wells and water delivery. Most scholars (for example, Bruyère 1952 and Ventura 1987) are convinced Deir el-Medina's 'Great Pit' was dug as an attempted well, without success, and subsequently used as a garbage pit (in which many of the ostraca letters and drawings on potsherds and limestone chips made by the inhabitants of Deir el-Medina have been found) (Bierbrier 1984:141, 144). Delphine Driaux (2011: 129-141; 2016: 56) is of a differing opinion, and offers evidence why the well could have provided at least some of the village's water. Henning Franzmeier (2007; 2008; 2016) has written several articles about the use of wells and cisterns in ancient Egypt.

Donkeys and Water Carriers

Two of the best-known surveys of Deir el-Medina only briefly take up the issue of water. Morris Bierbrier (1984: 39-42) notes that the village was supplied by 'servants of the tomb' ('*smdt*') who included wood-cutters, fishermen, gardeners, washermen, and sometimes potters, as well as water-carriers. They were not members of the village community, but lived instead near the river, where the supplies were located. Disruptions in these deliveries led on several occasions to strikes (Bierbrier 1984: 41) (one is described extensively in the 'Turin Strike Papyrus', *figure 2* and below). Bierbrier (1984: 39-42) also notes that some village workmen owned donkeys, which they sometimes rented out, but does not mention that this was in fact where the 'servants of the tomb' apparently obtained the donkeys to transport water (see below).

In his classic discussion of the 'community of workmen', Jaroslav Černý refers to the 'servants of the tomb' as 'serfs'. While Bierbrier writes that the 'servants' could become full-fledged members of the village, both he and Černý say a number of the 'serfs' were former workmen who lost their position when the number of members of 'the gang' was found to be excessive and reduced (Bierbrier 1984: 39; Černý 2004: 185). Černý (echoed by Haggman 2002: 1049 quotes Ostrakon Berlin 12654:

'So says the vizier: Leave these sixty men here in the gang, any you choose, and send the surplus outside. Give the order that they should become the serfs (smdt) who carry for you.'

Černý (2004: 184-190) goes on to note the nature of the 'carrying' was made clear in the Turin Strike Papyrus, (from year 29 of Ramses III) which lists the names of five water-carriers (*inw-mw*), led by a chief water-carrier (*hry inw-mw*), four who carry vegetables, a gardener and his assistant, four fishermen, three wood-cutters, one man who makes gypsum, a doorkeeper, and three washermen. The papyrus contains a second list, which is similar, but with different names, which leads him to suggest they were two shifts, rotating by fortnight, month, or four-month season. Following events of the strike papyrus, more carriers were taken on, including 12 carriers for the gang of the right, and 12 more for the gang of the left. He notes that a later list from years 8 and 9 of Ramses XI of 'serfs from the outside' lists no water-carriers, which can be explained by the workmen having moved from the by then-abandoned Deir el-Medina to the temple complex of Medinet Habu, where water was available from a well.

In her dissertation on Deir el-Medina, Sofia Häggman (2002: 66, 320) disagrees somewhat, pointing out that there are no indications the entire crew was resettled at the temple complex, but that moving closer to the river would have made water-carrying unnecessary. Supporting Häggman's position, in LRL 12, dated by Wente to year 2 of the *Whm-Mswt*, the scribe Dhutmose writes to Hori, Deputy of the Estate of Amun-Re in Eastern Thebes, asking that the 'boys of the tomb' now living there be sent back to the west bank to report for duty to Dhutmose's son, the scribe Butehamun (Wente 1967: 44; Černý 2004: 370).

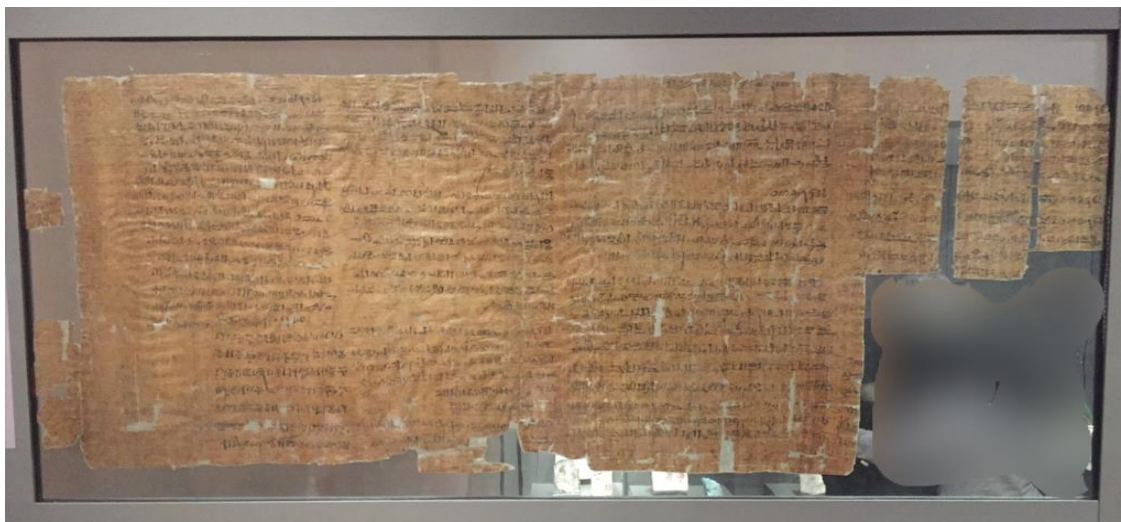


Figure 2, Turin Strike Papyrus, Egyptian Museum in Turin, Photo: George Wood

Häggman (2002: 94-96) also goes into greater detail about the 'servants of the tomb'. Noting the two lists in the Turin Strike Papyrus which Černý attributed to rotating shifts, she quotes a 2002 oral paper by Janssen suggesting instead the two groups worked for the crews of the right and left separately. But this seems unlikely, as goods were supplied to the village collectively, at an 'enclosure' outside the village wall (Häggman 2002: 70-72) and not directly to the crews. On the other hand, there were the 12 new water-carriers for the crew of the right, and 12 more for the crew of the left, cited by Černý above (2000: 188-189).

Häggman (2002: 98-99) also notes references to the water-carriers delivering other things than water, such as wood, copper, cloth, and food. Janssen (2005: 97-99) mentions this as well, citing official 'water-carriers' who also carried wood, which he suggests might have been an after-hours job helping colleagues. The *smdt* and the workers living in the village were both paid in grain, and Häggman says some documents indicate this was from the same source. The grain distribution list of Ostrakon DM 149, dated to the mid-20th Dynasty, after recording the grain paid to the village workmen, the doorkeepers, and a doctor, ends with a reference to 20 bags of grain paid to the water-carriers. (For a discussion of Deir el-Medina, Egypt's non-money economy, and the relationship of *deben* to *khar*, see Kemp 2004: 248-251). Since it is not known how many water-carriers there were at that time, it is impossible to know how many bags were paid to each. She notes, however, that this might be an extraordinary occasion. Papyrus Turin 2003, from the reign of Ramses IX, records the payment of goods, valued in copper *deben*, from the village scribe Dhutmose to the water-carrier Pakhor. This, and other journal entries, would indicate that the water-carriers, and possibly other *smdt*, were

directly employed by the crew of workmen, although it may be that during some periods they, just as the crew, were paid by external institutions. Reflected as well in the system of donkey rental, water-carriers and other *smdt* were paid on a periodic basis for up to 21 months, and not per delivery (Häggman 2002: 99-106; Janssen 2005: 97). There are also a number of ostraca concerning disputes when water-carriers did not return an animal in time or when it died while in his care (Janssen 1979: 12).

Häggman is puzzled by the location of the village, at some distance from the river and cultivation, but still so far from the Valley of the Kings that the workers had to live in huts near the tombs during their working periods. She accepts that the seclusion may have been for security, keeping outsiders ignorant of the location of the current tombs under construction. But she says that by the Ramesside period there would have been frequent contact with the outside world, including the ‘outsiders’ who delivered water through what she describes as an ‘intricate supply system’, without further elaboration (Häggman 2002: 67-75).

The donkeys (used to carry the water) are the subject of Janssen’s 2005 book. He notes that it has been suggested that the wild ass was originally domesticated in Egypt, and that it was the primary beast of burden in Antiquity. The Egyptian word for ‘donkey’ was (*i*)’3, which would have been pronounced ‘ee-aw’. ‘3 was also used as a loose indication of a quantity of water or other heavy or bulky goods, apparently meaning a ‘donkey-load’ (Janssen 2005: 69-71).

After an extensive review of the ostraca and papyri mentioning donkeys, Janssen concludes that water-carriers and woodcutters did indeed have to rent the donkeys they used, as they were too poor to own any (the price of a donkey averaging around 30 *deben*). Kemp (2004: 255) agrees with this assessment, citing Janssen (1979). Most of the donkeys were owned by village workmen, a few by scribes or police officers. The cost of renting an animal was between $\frac{1}{5}$ and $\frac{1}{2}$ *oipe* a day (an *oipe* being half a *deben*), with an average of around 10 *oipe* a month. The latter is the equivalent of $2\frac{1}{2}$ *khar* a month, the *khar* being a volume of grain which Janssen (1979: 12) says in the New Kingdom was 76.88 liters. But the wages of the *smdt*, he says, were around $\frac{3}{4}$ to 1 *khar* a month. Even if this was doubled to 2 *khar* a month, Janssen points out, a water-carrier would not be able to afford paying $2\frac{1}{2}$ *khar* a month for a donkey. And while a woodcutter may not have needed to rent a donkey daily, water was required every day. Janssen wonders if the water-carriers somehow were not required to work every day, so they could have had other employment. He concludes that it is possible there was another source of donkeys available to the water-carriers, and points to a unique papyrus reference to ‘six donkeys of the Tomb’ (Janssen 2005: 82, 87-89, 99, 109-110). Janssen does point to some sources that may reflect ownership of donkeys by water-carriers, but concludes they are not convincing (Janssen 2005: 99-100).

Turning to articles specifically looking at water and Deir el-Medina, Delphine Driaux (2016) contrasts that village with the workmen’s village at Amarna, located just over 1 km east of the main royal city, at the desert’s edge. Like Deir el-Medina, a mudbrick wall surrounded its 72 houses, of which 50 are estimated to have been occupied at any one time. The water table being too deep for a well, water was brought to the village, courtesy of the royal administration, from one of several wells (specifically that next to the house labelled Q48.4) at the edge of the main city. Potsherds around the well and along the route showed that a

particular kind of Canaanite amphora, imported or locally copied, was used, which could easily be carried on donkey back.

Excavator Colin Renfrew (1987: 87-102) concluded that the water was then unloaded at a site named by excavators X2, some 200 meters from the village, as indicated by an abundance of broken amphora there, and then carried to a place (called by excavators the ‘*zir*-area’), just outside the village. Driaux (2016: 51) cites Barry Kemp (2013: 194), who called this commodity delivery area ‘an interchange place’ intended to discourage the water-carriers from entering the village. The water was poured into around 50 large water jars (*zir* in Arabic), apparently one for every occupied house, from which they could be taken by the villagers as needed. Driaux concludes the village seemed to have consumed around 1750 liters of water a day, from which she estimates that if one donkey could carry two water jars, 46 donkey journeys a day were required (Driaux 2016: 47-52; Kemp, 1984; Kemp 2013: 194, 244). However, this is based on the assumption that each jar was filled once a day. They could have been refilled more often, and in his report from the 1934-35 season, Deir el-Medina excavator Bernard Bruyère suggests several trips a day to the cistern there (Bruyère 1939: 34).

Driaux (2016: 452) says Deir el-Medina shows a similar organization. Unlike the Amarna village, though, she says there is little archaeological evidence for the logistics of the water supply, other than the plentiful ostraca recovered. She follows Černý in believing that the *smdt*, including the water-carriers, were a lower class living outside the village. The exact source of the water they brought to the village is unknown, she says, but was probably a canal or well located on royal property on the flood plain.

However, recent research using borehole data and electrical resistivity tomography has revealed that during the New Kingdom a minor branch of the river lay much closer to Deir el-Medina than was previously believed (see *figure 3*). Graham et al (2015) and Toonen et al (2017) believe this was a secondary branch of the river, rather than a shift of the main channel. Up to 250 meters wide and running as near as 160 meters to the Ramesseum and close to the temples of Amenhotep III and Thutmose III, as well as the administrative complex of Medinet Habu, and Birket Habu, believed to have been the harbor of Amenhotep III’s ceremonial lake, it would have played a significant role in the local cultural and ritual landscape, as well as for the transport of building materials.

Graham *et al.* (2015) and Toonen *et al.* (2017) conclude the waterway was probably natural, and judging from ceramic deposits, with an uncertain origin before the New Kingdom, and gradually silting up (apparently in part due to refuse dumped from the temples) in the later New Kingdom. This silting, they believe, was not the major cause of the end of temple building in western Thebes (and thus with it the eventual closure of Deir el-Medina), which they attribute as more likely due to the instability of the period, with accompanying devolution and cultural changes.

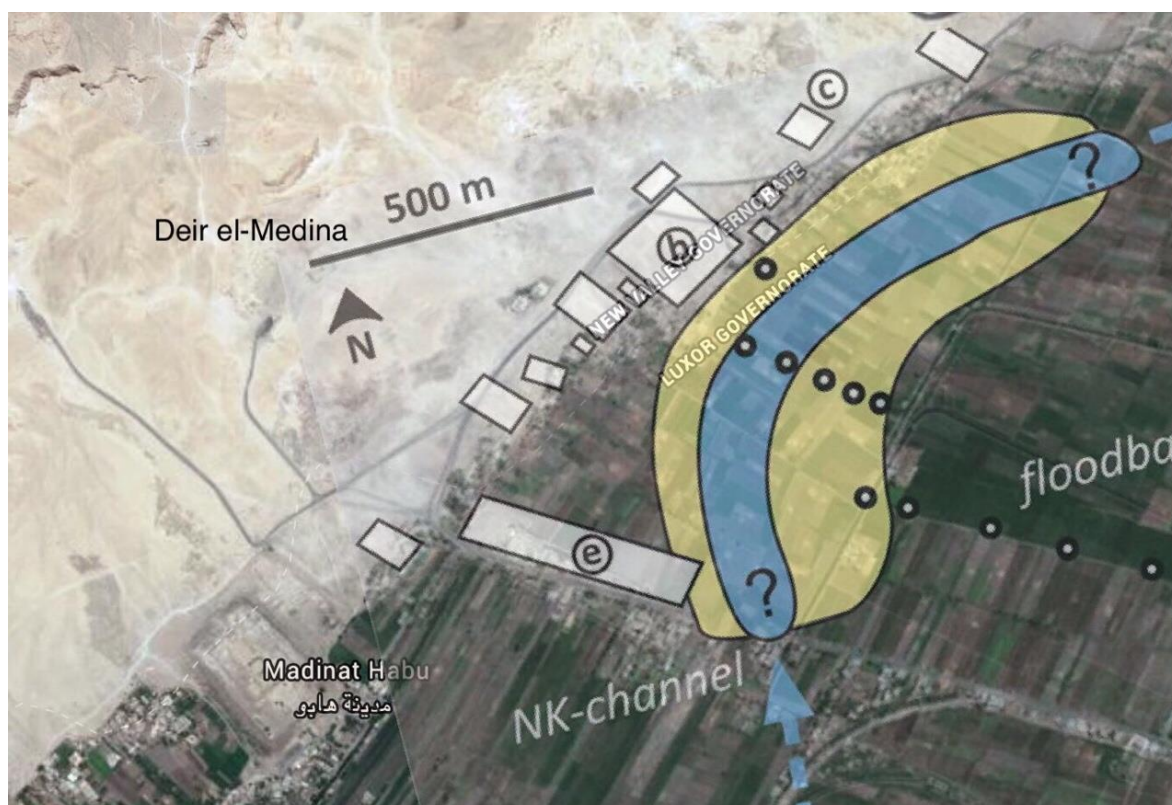


Figure 3, The proximity of Deir el-Medina to the suggested section of a New Kingdom secondary arm of the Nile, possibly the closest source of water to the village. (b) Temple of Thutmose III, (c) Temple of Amenhotep III, (e) Birket Habu. Blue is the proposed river channel, yellow the width of sandy deposits. Composite of Google Earth and figure 3 from Toonen et al (2017)

Like the Amarna village, the villagers collected their water from outside the village wall, but instead of an individual *zir* for each household, there was a communal cistern just outside the gate (Driaux 2016: 52). Bruyère (1939: 34) writes the cistern, two meters in diameter and funnel-shaped, was in the middle of the square just outside the main village gate to the north. Bruyère adds that there was a guard hut next to the cistern for security. Janssen (1979: 14-15) also says the cistern was in the middle of the small square just outside the village gate, and he notes that the water from the cistern was intended for drinking, preparing food, washing dishes, and personal hygiene. Water-intensive activities like washing clothes and pottery-making would not have been carried out in Deir el-Medina, but rather by the community's special washermen and potters, who worked elsewhere, probably closer to the river. Unfortunately, his photo (*figure 4*), with the caption 'A view of Deir el-Medina with round cistern in front of the gate' leaves the exact identification of the cistern a bit ambiguous. The arrow (which I have added) indicates the presumed location, which would also agree with Bruyère's description.

That this same feature is labelled 'well' in a map (*figure 5*) in Bierbrier (1984: 66-67) probably confirms that this is the cistern, as in his text Bierbrier (1984: 65) says this 'well' outside the north gate was filled by the water-carriers (which would make it a cistern and not a well). In his paper on Deir el-Medina presented to a 1992 conference on aspects of water in ancient Egypt (Vleeming 1998: 505, 507), Schafik Allam (1998: 3) calls the cistern "un poste d'eau plus important" two meters in diameter, in a square a few meters outside the northern gate:

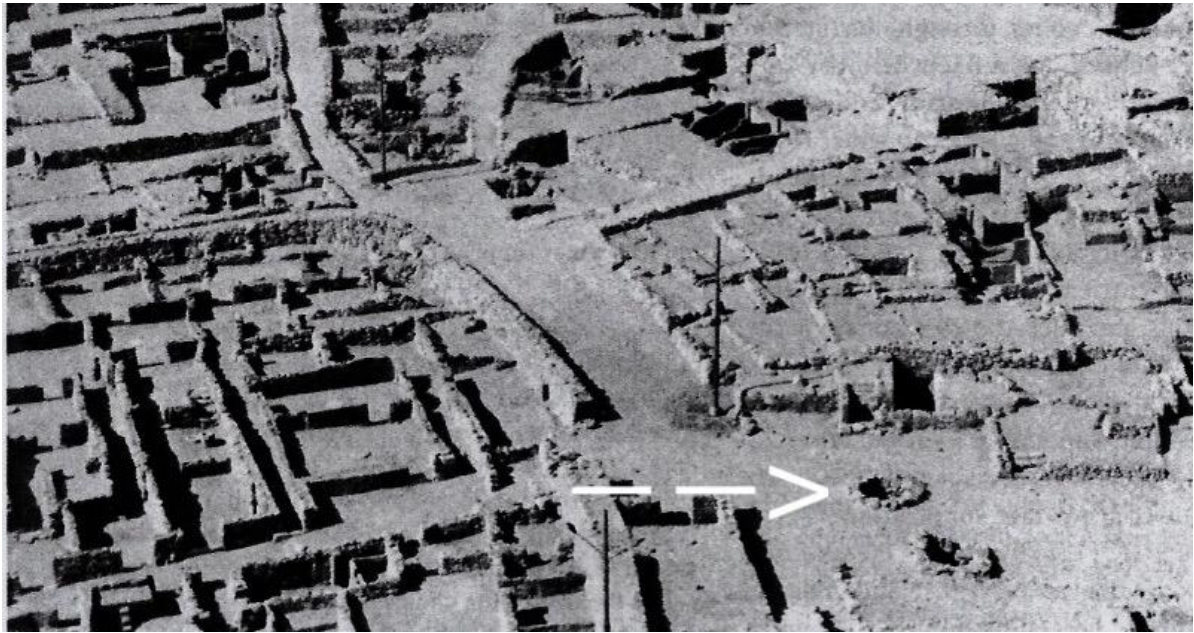


Figure 4, A view of Deir el-Medina from Janssen 1979 with an arrow added to indicate the presumed cistern

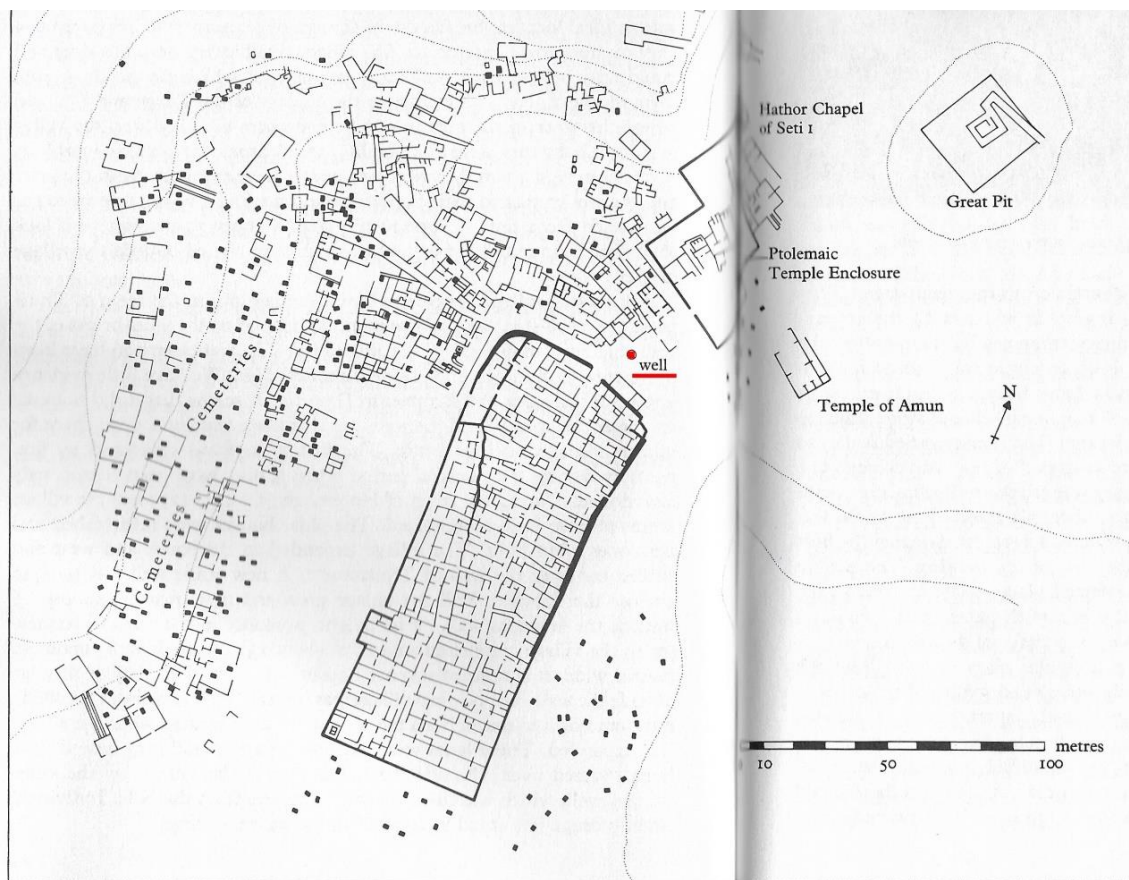


Figure 5, Map of Deir el-Medina from Bierbrier (1984: 66-67), with the location of the 'well' highlighted in red. Note also the location of the 'Great Pit' at the upper right. The Ptolemaic temple in between did not exist during the heyday of Deir el-Medina.

Sur une sorte de place, on a découvert, dans le sol, la cavité en entonnoir, bordée d'une margelle de pierre, dans laquelle se dressait un vaste cratère de 2 m de diamètre. Il est probable que les porteurs d'eau y venaient vider leurs charges.

Bierbrier (1984: 66-67) and Allam (1998: 3) echo Bruyère's comment (1939: 34) that individual water jars stood in front of the private houses inside the village, with Allam commenting these ranged in thickness between 2 and 5 cm, were nearly 2 meters high, and 1.5 meters wide in the middle. Allam says some, bearing the names of rulers like Thutmose III, Hapchepsut or Amenhotep II, may have served a votive purpose.

One important source of information about Deir el-Medina and its water is in Stockholm's Museum of Mediterranean and Near Eastern Antiquities, a piece of limestone called Ostrakon MM 14126. It contains two columns of 14 names each on one side, along the lines of:

(House of) Nedbamente	$\frac{1}{4}$ <i>khar</i>
House of Amennakhte, son of Dydy	$\frac{1}{2}$ <i>khar</i>
House of Mose	$\frac{1}{2}$ <i>khar</i>
House of Pshedu, son of Harmose	$\frac{1}{2}$ <i>khar</i>
...	

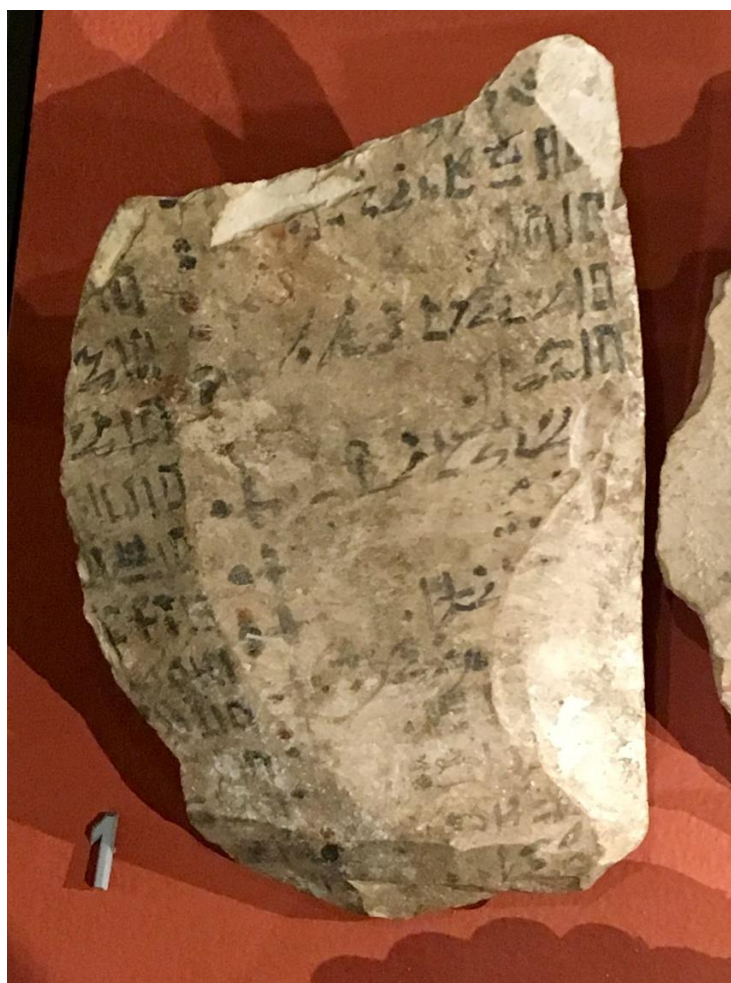


Figure 6, Ostrakon MM 14126, Photo: George Wood

Writing in the museum's Bulletin, Janssen (1979) says that while a *khar* was usually a measure of grain, this was usually allocated to individual workers, and not to their houses. Gypsum, also measured in *khar*, would not have been delivered in such quantities at one time. He concludes this is a list of water deliveries for the houses of Deir el-Medina. Based on the names, most of which are well-known from the village, Janssen dates the list to the later reigns of the 19th Dynasty. However, he does not envisage a water-carrier with donkey wending their way through the far too narrow streets of Deir el-Medina, and the order of names does not correspond to the known arrangement of the houses belonging to those workmen, so it apparently doesn't reflect a delivery route. Instead, Janssen says this is a list of the water due or drawn for each of these houses, which would have been taken from the communal cistern outside the gate. (According to Janssen, $\frac{1}{2}$ *khar* during the New Kingdom would have been 38.44 liters.) (Janssen 1979).

The Great Pit

Wells seem to have been late developments in Egypt, with the first attested wells in the Nile Valley itself (after earlier experiments out in the desert) in Amarna during the New Kingdom (Franzmeier 2007: 5; 2008: 45; 2016: 39, 41). Kemp (2013: 50; 2004: 291), who has excavated at Amarna, says this reflects a limited ability to raise water from the Nile, and that some of the wells were more than 1 km from the river. Franzmeier (2016: 39, 41-43), who has written extensively on wells and cisterns, disagrees. Pointing out what he considers the closeness of the Nile, he says the wells might reflect a desire for easier access among upper class residents, as well as issues with the quality of Nile water at Amarna. Citing Joanne Morris' article in *Ancient Egypt* magazine (6:1 2005), Franzmeier had previously (2007; 2008), raised questions about the quality of Nile water, pointing out that by the Ramesside period, the ancient Egyptians were aware of easy and effective ways to prevent the contamination of the water. This might also be supported by Kemp's observation (2004: 291) that some of the Amarna wells lay only 350 meters from the likely ancient bank of the river.

Despite the abundance of wells serving the elite, either serving the larger houses or in public places supplying groups of houses around them, there are none at the workmen's village at Amarna. Instead, as reported in the excavators' 'Amarna Reports', the well mentioned above, next to the house labelled Q48.4, was used to fill jars for transport to the village (Galal 1989: 1-14; Kemp 2013: 51, 244). This well was around 15 meters in diameter. It and the other Amarna wells were dug down to a depth of 5 to 9 meters, and featured a ramp or staircase leading to a platform, with a narrow shaft down to the groundwater. A few, like the well serving the workmen's village had ramps leading all the way down to the water. All were unlined, which led to the walls collapsing on a regular basis (Galal 1989: 1-14; Kemp 2013: 51-52; Franzmeier 2016: 41-43).

Kemp (2013: 159, 191) draws parallels between the workmen's village at Amarna and Deir el-Medina as isolated communities with a special calling. There was never a well at the workers' village in Amarna, but at Deir el-Medina apparently, the villagers or the state sought an alternative to replace or complement the water brought on donkeys. Today referred to as 'The

Great Pit' this was located a few hundred meters north of the village (*see figure 3*). Bruyère (1952: 129-130), who excavated the pit, believed it to have been dug during the Ptolemaic period, centuries after the end of Deir el-Medina.

Later scholars have not shared that assessment. Driaux (2016: 52, 56) argues that around 100 years before the abandonment of the settlement, during the reign of Ramses III (1187-1157 BC), a first attempt at the building of a well, probably ordered by the state, was recorded on Ostrakon DeM 92, dated to year 15 of Ramses III. Driaux believes the effort was prompted by changes in the village, such as an increase in population or disruptions in water supply.

Measuring more than 50 meters in diameter, it is generally believed the pit never served as a well, and eventually the villagers used it to dump their garbage. This was the source of so much of the ostraca that tells us of village life (Bierbrier 1984:141, 144; Deirelmedina.com). Raphael Ventura (1987: 151, 154-160) shares the belief the well was never active. He looks at two key sources that he concludes describe the work on the Pit (as there is nowhere else near Deir el-Medina that corresponds to the work described). Ostrakon DeM 92, as noted above, records that a well was dug in two stages to a total depth of 43 cubits (22.4 meters), without finding water. Papyrus Turin 1923 (plus fragments), from the reign of Ramses VI, describes the bringing in of the 'master builder of the estate of Amon' to calculate the depth of the water table at 65 cubits, 5 palms, and the digging of a further 22 cubits, 5 palms to that depth. Ventura points out that in fact the Great Pit was dug to a depth of 52 meters, which is around 100 cubits. His argument for the presumed failure to find water was the master builder's erroneous assumption that the water table at Deir el-Medina was the same as that at the Ramesseum, and that the diggers kept digging when no water appeared at that level, until they finally gave up, leaving the bottom of the pit unfinished (Deirelmedina.com).

But looking at the same two sources, and the original excavation notes by Bruyère, Driaux (2011: 130-141) draws a completely different conclusion. She supports Ventura's conclusion that the two documents describe the Great Pit, but believes the well-diggers did strike water. She points to a Coptic period well close by, dug to a depth of 55 meters, which reached moisture. She also takes up the notebook entry from Bruyère (who, as mentioned above, believed the pit was Ptolemaic) that he did in fact find abundant water when he reached the limestone at the bottom of the pit, something she says was not included in his published report. She says the construction of the Great Pit is very similar to that of the well at Q48.4 near the Amarna village. However, she concludes that we do not know if the quantity of water found would have been sufficient for the local population.



Figure 7, The Great Pit at Deir el-Medina, Photo: Troels Myrup/Creative Commons

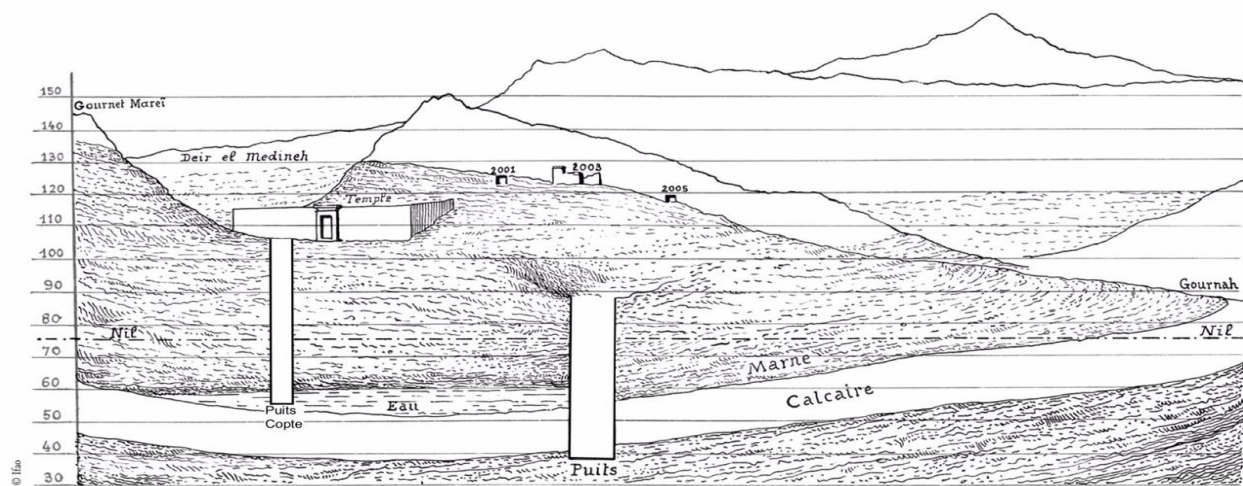


FIG. 1. Coupe géologique du site du Grand Puits, d'après B. Bruyère, *FIFAO* 26, 1953, pl. II.

Figure 8, Drawing of the Great Pit at Deir el-Medina and the local water table from Driaux (2011: fig. 1), showing the well should have reached ground water

Writing about the Ramesside well at Samana, Franzmeier (2007: 3-4; 2008: 49). points out that by this time the Egyptians had solved the problem of poor linings, which necessitated frequent rebuilding of the Amarna wells. However, Driaux (2011) writes that the Great Pit at

Deir el-Medina suffered from the same lack of lining as at Q48.4 in Amarna, which might offer another explanation for the abandonment of what she believes was a viable well.

Despite her belief that the Great Pit did serve as a well, Driaux (2016: 56) admits the supply by donkeys continued, the state maintaining a simple approach that had worked for generations.

The only reference to a well in the Late Ramesside Letters seems to be LRL 5, from Dhutmose to Butehamun and the chantress of Amun, Shedemdua, which includes the line:

“...And you shall clear the trees beginning from the district of Pre, down to the well of the district.”

As this is dated by Wente to year 6 of the *Wḥm-Mswt* or later (Wente 1967: 16, 28) by which time Deir el-Medina would have been abandoned, it most likely refers to a well in Medinet Habu, which was closer to the river and more likely to have trees, and not to a well at Deir el-Medina.

Questions and Conclusions

Our knowledge of anything from ancient Egypt is always skewed by the uneven preservation of the finds, both archaeological and textual. It's interesting that while there is archaeological evidence for the carrying of water to the Amarna workers' village, but nothing textual, the situation is the reverse at Deir el-Medina. Many questions remain about the supply of water to the village. Most scholars agree the water-carriers were too poor to own their own donkeys and would have rented them from village workmen. The existence of disputes over the return of donkeys in time would support this. Yet the available information about the cost of rental and the apparent wages paid to the *smdt* do not fit. Either the water-carriers were paid much more than the other *smdt* or they had other sources of income, or perhaps prices fluctuated wildly over time. Possibly, as Janssen suggests concerning 'the donkeys of the tomb', in general donkeys were provided free to the carriers and the rentals were for exceptional situations. Or possibly the calculations of the cost of donkey rental and water-carriers' wages are just incorrect.

The Great Pit represents another unsolved puzzle. If there was water there, why was it used as a rubbish pit? Did it dry up, or was the water, as Franzmeier proposes was the case at Amarna, of too poor quality, or, as Driaux suggests, just not sufficient for the purpose? Perhaps the issue was seasonal, with the well only providing water at some periods during the year, as the water table might vary according to the annual inundation. Possibly the well water table varied from year to year, if it was linked to the annual inundation, and not to fossil water.

A key question is when did rubbish start being dumped into the pit, which would certainly mark the end of use as a well? Obviously, this had to be after Papyrus Turin 1923 during the reign of Ramses VI, when the pit was apparently dug to its final depth. Presumably this might be established by the earliest dated objects among the rubbish, but this seems unexplored.

Porter and Moss do not list any of the ostraca found in the Great Pit, only statues (going back to Thutmose IV), stelae (including those of Amenhotep I and from the 19th Dynasty), reliefs (Amenhotep I, Ramses II, and 19th Dynasty), and various items including jar-sealings with cartouches of Seti I, Ramses II, and Ramses III) (Porter and Moss 1964: 691-692). All of these actually predate the pit, but it would not be unusual to dump bulky old things lying around or breaking down into a new dump.

This could also obscure the dump dates of small items like old ostraca and papyrus, previously dumped elsewhere, although perhaps they would be more likely to be left in old rubbish heaps? A study of the dates of the oldest ostraca in the pit might help to date when rubbish began to be thrown into the pit, especially if they reveal concentrations from relatively homogenous dates. I have been unable to find this information, and Federico Poole of the Egyptian Museum in Turin, the home of many finds from Deir el-Medina, tells me he is unaware of any studies into when the earliest rubbish was dumped into the Great Pit (pers. comm., November 2, 2017).

Possibly more useful might be the dating of any sherds found around the outside of the pit. Broken amphora along the route and around the *zir*-area and X2 in Amarna reflected breakage while water was being carried there. An end date for sherds outside the pit might reflect when water stopped being collected, and when rubbish started being thrown in instead (if the residents didn't dump all those possible earlier sherds in as well). A lack of amphora sherds might reflect the pit was not used as a well.

This might be a fruitful area for future study. There might also be much of interest in the area between Deir el-Medina and the Great Pit, but sadly this has largely been covered by the later Ptolemaic temple. Perhaps refined scanning techniques in the future will allow for the non-destructive investigation of the area under the temple.

Image credits

Frontispiece: Workers drawing water from a reservoir, from TT 100, the tomb of Rekhmire, Image: Osirisnet

Figure 1, Deir el-Medina, Photo: Steve F-E-Cameron/Creative Commons

Figure 2, Turin Strike Papyrus, Egyptian Museum in Turin, Photo: George Wood

Figure 3, The proximity of Deir el-Medina to the suggested section of a New Kingdom secondary arm of the Nile. possibly the closest source of water to the village. (b) Temple of Thutmose III, (c) Temple of Amenhotep III, (e) Birket Habu. Blue is the proposed river channel, yellow the width of sandy deposits. Composite of Google Earth and figure 3 from Toonen et al (2017)

Figure 4, A view of Deir el-Medina from Janssen (1979: 13) with an arrow added to indicate the presumed cistern

Figure 5, Map of Deir el-Medina from Bierbrier (1984: 66-67), with the location of the “well” highlighted in red. The ‘Great Pit’ is at the upper right.

Figure 6, Ostrakon MM 14126, Photo: George Wood

Figure 7, The Great Pit at Deir el-Medina, Photo: Troels Myrup/Creative Commons

Figure 8, Drawing of the Great Pit at Deir el-Medina and the local water table from Driaux 2011

Bibliography

- Allam, S. 1994. A propos de l'approvisionnement en eau de la colonie ouvrière de Deir el-Medineh". *Les problèmes institutionnels de l'eau en Egypte ancienne et dans l'Antiquité méditerranéenne*. B. Menu (ed.). BdE 110: 1-14.
- Bierbrier, M. 1984. *The Tomb-builders of the Pharaohs*. Charles Scriber's Sons. New York.
- Bruyère, B. 1939. Rapport sur les fouilles de Deir El Médineh (Années 1934 à 1935). *FIFAO* 16.
- Bruyère, B. 1952. Rapport sur les fouilles de Deir El Médineh (Années 1948 à 1951). *FIFAO* 26.
- Černý, J. 2004. *A Community of Workmen at Thebes in the Ramesside Period*. BIFAO. Cairo. (Third edition, originally published in 1973).
- Deirelmedina.com, 'The Great Pit' <http://www.deirelmedina.com/lenka/Greatpit.html> (accessed November 1, 2017).
- Demaree, R. 2016. The Royal Necropolis Workmen of Deir el-Medina. *The Oxford Handbook of the Valley of the Kings*. Wilkinson, R.H. and Weeks, K. (eds). Oxford University Press. Oxford: 75-77.
- Driaux, D. 2011. Le Grand Puits de Deir el-Medina et la question de l'eau: nouvelles perspectives. *Bulletin de l'Institut Français d'Archéologie Orientale* 3: 129-141.
- Driaux, D. 2016. Water supply of ancient Egyptian Settlements: the role of the state. Overview of a relatively equitable scheme from the Old to the New Kingdom (ca. 2543-1077 BC), *Water History* 8 (1): 43-58.
- Franzmeier, H. 2007. A Ramesside Well at Samana near Qantir – A New Insight into the Hydrological Technology of Pharaonic Egypt, *Proceedings of the Fourth Central European Conference of Young Egyptologists, Studia Aegyptiaca XVIII*: 121-132.
- Franzmeier, H. 2008. Sherds, Clay and Clean Water, *Ancient Egypt* Vol. 8 (6): 45-49.
- Franzmeier, H. 2016. Wells and Cisterns in Pharaonic Egypt: The Development of a Technology as a Progress of Adaption to Environmental Situations and Consumers' Demands, *Current Research in Egyptology* 8 (2007): 37-51.
- Galal, A. 1989. Report on the 1987 Excavations A Large Well Beside Building Q48.4. *Amarna Reports V*, Kemp, B.J. (ed). Egypt Exploration Society: London: 1-14.
- Graham, A., Strutt, K.D., Toonen, W.H.J., Pennington, B.T., Löwenborg, D., Masson-Berghoff, A., Emery, V.L., Barker, D.S., Hunter, M.A., Lindholm, K.-J., Johansson, C. 2015. Theban Harbours and Waterscapes Survey, 2015. *JEA* 101: 37-49.

Häggman, S. 2002. *Directing Deir el-Medina: The External Administration of the Necropolis*. Uppsala University. Uppsala.

Janssen, J. 1979. The Water Supply of a Desert Village, *Medelhavsmuseet Bulletin 14*.

Janssen, J., 2005. *Donkeys at Deir el-Medina*. Nederlands Instituut voor het Nabije Oosten. Leiden.

Kemp, B.J. 2004. *Ancient Egypt: Anatomy of a Civilization*. Routledge. New York.

Kemp, B.J. 2013. *The City of Aktenaten and Nefertiti: Amarna and Its People*. Thames and Hudson. London.

Mertz, B. 2008. *Red Land, Black Land*. William Morrow. New York.

Peters, E. 2001. *Lord of the Silent*. William Morrow. New York.

Porter, B. and Moss, R. 1964. *Topographical Bibliography of Ancient Egyptian Hieroglyphic Texts, Reliefs, and Paintings*, I. 'The Theban Necropolis, Part 2. Royal Tombs and Smaller Cemeteries'. Griffith Institute, Ashmolean Museum. Oxford.

Renfrew, A.C. 1987. Report on the 1986 Excavations and Survey: The Survey of Site X2. *Amarna Reports IV*. Kemp, B.J. (ed). Egypt Exploration Society. London: 87-102.

Shaw, I. (ed.) 2000. *The Oxford History of Ancient Egypt*. Oxford University Press. Oxford

Toonen, W.H.J., Graham, A., Pennington, B.T, Hunter, M.A., Strutt, K.D., Barker, D.S., Masson-Berghoff, A., Emery, V.L. 2017. Holocene fluvial history of the Nile's west bank at ancient Thebes, Luxor, Egypt, and its relation with cultural dynamics and basin-wide hydroclimatic variability. *Geoarchaeology*. DOI:10.1002/gea.21631.

Ventura, R. 1987. On the Location of the Administrative Outpost of the Community of Workmen in Western Thebes. *JEA* 73: 149-160.

Vleeming, S.P. 1998. Review of B. Menu, "Les problèmes institutionnels de l'eau en Egypte ancienne et dans l'Antiquité méditerranéenne" *Journal of the Economic and Social History of the Orient*. 41(4): 505-508.

Wente, E. 1967. *Late Ramesside Letters*. Oriental Institute. SAOC 33: Chicago.

Wood, G. 2016. Finding Butehamun – Scribe of Deir el-Medina. B.A. Thesis in Egyptology, Uppsala University. Uppsala. (http://uu.diva-portal.org/smash/record.jsf?aq2=%5B%5B%5D%5D&c=1&af=%5B%5D&searchType=SIMPLE&query=butehamun&language=en&pid=diva2%3A934117&aq=%5B%5B%5D%5D&sf=all&aq=%5B%5D&sortOrder=author_sort_asc&onlyFullText=false&noOfRows=50&dswid=3688)