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Basket use, raw materials and arguments on early and Middle Holocene mobility in the Fayum, Egypt

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ABSTRACT

The Fayum Neolithic is well-known because the earliest evidence to date for domesticated wheat and barley in Egypt is found in the Fayum depression, north of present day Lake Qarun. Here, in 1924 and 1925, Gertrud Caton-Thompson and Elinor Gardner identified two Neolithic settlements, which they named Kom K and Kom W. The evidence for early agriculture did not derive from these two settlements, however, but from a series of storage pits which Gardner found quite by accident on a high ridge, north of Kom K. What is less well-known is that apart from domesticated wheat and barley this area also yielded evidence for a well-developed basketry technology. Recent fieldwork by the URU Fayum Project (University of California, Los Angeles; Rijksuniversiteit Groningen; University of Auckland) has provided a wealth of new information on the material remains of the Fayum Neolithic including the plant fibre objects. While animal bones and ostrich egg shell have been preserved both on the surface and in stratified deposits, no animal fibre was found. The well-preserved basketry lined storage pits and their content have been used to argue that the Middle Holocene occupation in the Fayum was characterized by a sedentary society. Recent field work has shown that the basket-lined pits were sealed off in a manner that could have enabled long-term caching. This, as well as more recent insights that long term storage does not equal sedentism, leaves the question open the nature of mobility in which Fayum Neolithic society was involved. The question whether the type of materials, basketry techniques and employment can be used as indicators of a way of life, is addressed in conjunction with the results of the interdisciplinary research team as a whole.

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1. Introduction

Archaeology rarely makes headlines, but in 1925 the discovery in Egypt of well-preserved domesticated cereals certainly did. These "lowly forms of their kind", as the excavator, Gertrude Caton-Thompson, drily accounted in her memoires (1983, 102), were desiccated emmer wheat (*Triticum turgidum* ssp. dicoccon) and 6-row hulled barley (*Hordeum vulgare* ssp. vulgare) (Cappers, 2013). The place of discovery was the Fayum North Shore, a desert region in the north of the Fayum Basin, which is a depression in the Western Desert of Egypt, fed by a branch of the Nile. Throughout its history the Fayum has been a swamp-like area, with the lake in the lowest, northern, part of the basin (Fig. 1), the level of which varied over time. At present the lake surface is 44 m below sea level, but in the early Holocene the lake was approximately 40–50 m higher and consequently covered a large area of the basin (Phillipps et al., 2016). The domesticated wheat and barley were found thanks to Elinor Gardner, who was a geologist by training. While excavations were going on in an area now known as Kom K, she explored a ridge at an elevation of 32 m, which she named K-ridge. After removing the desert pavement, Gardner not only found the surface of the ridge (mostly indurated tertiary clay and shale, capped by silty sandstone) but to her surprise also regular round shapes with a diameter of approximately 1 m, dug into the surface. These turned out to be storage pits, in total 67, many of them lined with coiled basketry. A second area, dubbed the Lower K Pits, was less well-preserved, and had remains of 109 pits, of which 38 had evidence of reed or straw matting. The remaining 78 pits were comparable in size to those with evidence of matting and were therefore also considered storage pits (Caton-Thompson and Gardner, 1934, 45–54).

In 2004 the URU Fayum Project set out to re-investigate the

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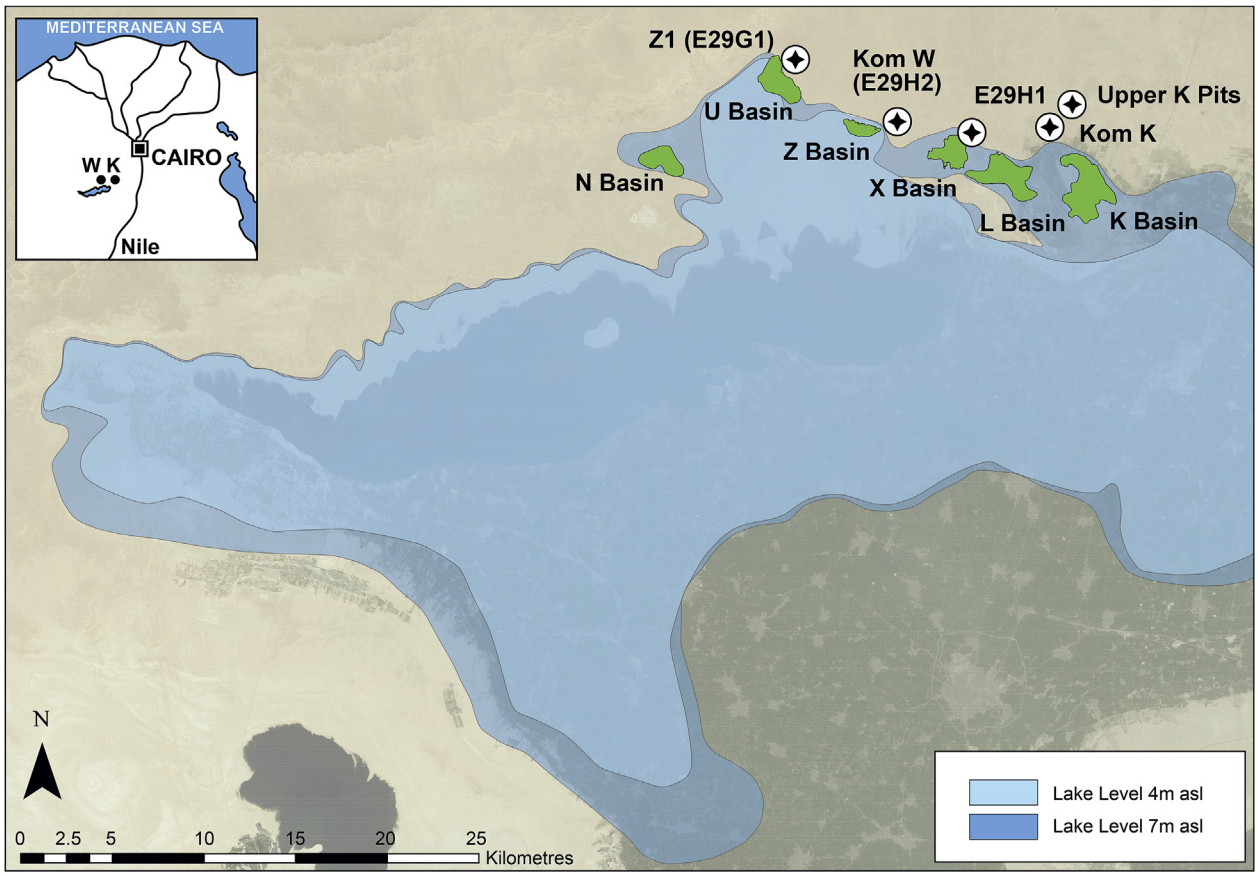

Fig. 1. The Fayum Basin, with the region rich in Early Holocene cultural deposits north of present day Lake Qarun.

region, including the Upper and Lower K Pits (Holdaway and Wendrich, 2017; Wendrich and Cappers, 2005). Workers of a governmental land reclamation company set out in the 1990s to cultivate over 2000 ha of desert, right in the K Pits area. They dug a large canal system, and built roads and pumping stations. By 2004 the infrastructure was ready, but the canals were dry. In 2014 the situation was still the same, the development had halted because of a lack of available water. The area of the Lower K Pits was, however, completely destroyed by two large canals and an asphalt road. The area of the Upper K Pits was cut through by a large north-south running canal and covered by adjacent dykes. Reinvestigation of the Upper K Pits area resulted in the discovery of six additional storage pits and seven "preparation areas" in which a mixture of materials were found similar to indurated pit covers. This discovery was part of a much broader research endeavor which studied the Fayum north shore as an ongoing cultural landscape, rather than a number of "settlements" and "activity areas" (Holdaway and Wendrich, 2017).

2. Material and methods

After relocating the area of the Upper K Pits, surface indentations were mapped with a total station, the locations incorporated in a GIS, and these compared to a map published in 1934 (Caton-Thompson and Gardner, XXIV). Excavation of the pits was done in a 5 × 5 m grid, following a method of stratigraphic excavation, adapted from the manual of the Museum of London, Archaeological Service (MoLAS, 1994). This included removal by brush and trowel of stratigraphic layers throughout the entire square. An indurated layer that covered several of the pits was sectioned using chisels and an angle grinder to section the cover. The pit contents, which in most cases were quite uniform, were excavated in layers of 10 cm and recorded and screened separately. Botanical, zooarchaeological, as well as other finds were hand collected and all soil was dry-screened through a 2 mm^2 mesh. The same methods were used to excavate two stratified sites, named Kom K and Kom W by Caton-Thompson. These stratified deposits and the Lower and Upper K Pits form only a small part of the Fayum north shore archaeological record. The majority of this record consists of surface scatters of stone artefacts, ceramics, faunal material, and the remains of heat retainer hearths. A multi-scalar approach was used to investigate this surface record combining transects orientated north-south reaching into the Fayum Basin as well as survey areas consisting of two perpendicular strips of 10 m wide and 100 m long. Areas of modern day disturbance were excluded but all remaining areas were surveyed for hearths and grindstones by foot with 10 m spacing. A detailed description of the sample and recording method is found in (Holdaway and Wendrich, 2017). Detailed studies of the north shore topography were conducted (Phillipps et al., 2016) combined with analysis of the character of sediments (Koopman et al., 2016). Intensive recording was conducted at and around the site identified as E29H1 by Wendorf and Schild (1976) demonstrating a more extensive spatial record than was previously identified.

3. Results

A total number of 129 pits were recorded in the Upper K Pits area, 62 more than should have been visible based on the Caton-Thompson and Gardner map. We estimate that the land

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development destroyed approximately 15 of the pits that were excavated by Caton-Thompson and Gardner. Based on comparing the location on the 1934 map, it became clear that shallow surface indentations were formed by the 1934 excavations (numbered 1–67) and the deeper, most pronounced ones were created by later activity, presumably by the local population testing the ground following the work of the archaeologists (Fig. 2). The URU Fayum team negotiated with the land reclamation company to fence off the area and was allowed to do so at the east side of the canal, but not at the west side, where excavation became a priority.

In 2004 and 2005 a total number of 13 additional "pits" were found at the highest point west of the canal (numbers 68–80). They were dug into a natural tertiary clay layer that was covered with a 10–20 cm thick layer of silty sand and a top layer of desert pavement (a deflated layer of pebbles, underneath which a thin layer of fine sand had built). Six of these additional pits were probably used for storage, while the seven others were characterized by remainders of a hardened mixture, very similar to indurated lids that covered Pits 68, 69, 71, and 73. These seven shallow depressions, in several cases merely natural crevices in the rock underlying the desert pavement, were mixing pits to create a mud mortar of *tafl* (natural desert clay), water, crushed shells, and sand or small pebbles. The lids covering the storage pits had low calcium carbonate content, with a mass percent between 2.5% (Pit 71) and 5% (Pit 73). All four lids had secondary gypsum deposits and a recrystallized salt bloom on the exterior. The lid of Pit 68 was sectioned and showed that it was created by pouring a thick mortar over the pit contents. The rim of the basket on the west side was pushed in under the weight of the mortar and the slurry was embedded in the basket. On the north and east side, the rim protruded from the concreted lid. The cross section of the lid showed evidence of two air pockets that were solidified into two indentations in the lid. Although the lids had hardened to the point that they could only be removed with chisels and an angle grinder, they dissolved when put in water. Together with the preparation pits and the structure of the lid in Pit 68, this forms a strong argument for multiple use.

The desert pavement that formed the surface of the Upper K Pits area, protected the underlying features. The top of the basket rim that protruded from the lid of Pit 68 showed wear, but the pit had not been truncated, and maintained its original depth of 60 cm (Fig. 3). The diameter of the pit, and the basket within was 90 cm. The Upper K Pits area was virtually devoid of surface remains, with the exception of one serrated flint sickle blade. This contrasted with the dense surface cover of some of the other Fayum North Shore deposits. Even considering that the 1925 operations would have removed many of the recognizable bi-facial retouched tools, the majority of the artefact deposits consist of flakes, which were largely ignored by the earlier researchers. In addition, the area north of the Upper K Pits contained only a few lithics and no hearths (Holdaway and Wendrich, 2017).

Not all of the storage pits had basketry lining. Some, such as Pits 1 and 6, had a coiled lid placed over the contents and under the mortar lid. In addition three smaller, finely made baskets were found inside or near the pits, two of these were decorated with coloured winders and were finely coiled, while the third, with a bag shape was found in Pit 56. This basket is presently in the Petrie Museum in London and has degraded to the point that its greatly reduced size makes it impossible to see what technique was used, or to identify the material it was made of. From the description of Caton-Thompson and Gardner this may actually have been a twined bag, a technique for which we have ample evidence in the slightly later Predynastic period (Wendrich, 1991, 1999). An overview of all basketry found in the Upper K Pits area is given in Table 1. The measurements of the basketry in Pits 1–67, excavated in the 1920s, are estimates based on photographs.

All the basketry lining found in 1925 was listed as made of straw, while the material excavated in 2005 was identified as straw of Emmer wheat (Fig. 4). The coiling technique used for the pit lining basketry found in 2005 is different from that used for the finely coiled baskets, where the bundle and winder consist of two separate systems, even though they consist of the same type of material. This is the usual employment of raw materials in ancient Egyptian coiled basketry (Wendrich, 1991, 1999). The Upper K Pits basketry lining, however, is made from a coiled coarse bundle of straw with a diameter of approximately 4–4.5 cm. The bundle is fastened to the previous coil with a few straw culms, which are approximately 30 mm wide, forming part of the bundle material, but split off to form the winder (Fig. 5). There were eight to nine rows of coiling in the base, which was 96 cm in diameter. The bundles of straw, which were coiled from the centre to the rim in a G-direction (i.e. clockwise), were 4 cm wide near the centre, and 8 cm wide towards the edge of the base, where the coil gradually transitioned to the straight sides with nine coils and a height of 48 cm under the lid. The space between the winders varied from stitches that were close together, to irregular gaps between the stitches. The average coil diameter in the side of the basket was 5–6 cm.

Pit 75, once had a basketry lining, evidenced by straw fibres embedded in the fill. The only other pit with basketry lining was Pit 71. The basketry in this shallow pit was in such poor condition that no winders could be seen, but it was possible to make out that the base of the basket consisted of five rows of coiling with straw, while the sides had nine extant rows. The basket tapered out from a round bottom (36 cm in diameter) to an oval rim (65 × 50 cm), over a height of only 26 cm.

Just outside Pit 69 and lying on the surface but covered by the desert pavement, a large fragment of a very fine coiled basket was found, with traces of coloured winders along the rim and barely visible, triangular decorations from the rim towards the centre (Figs. 6 and 7). It is unclear what the pattern represented, but the decoration method is comparable to that of the oval basket found in 1926 in Pit 55, which is now in the British Museum. The size of the fragment found in 2005 is 27 cm × 20 cm with a depth of 7 cm. The side of the basket had 11 extant rows of coiling and the bundle size was 9 mm, and slightly flattened in places. The very narrow winders were between 1.5 and 2 mm, with four winders per 10 mm. The winders were stitched mostly in between those of the previous coil, picking up just a tiny bit of the bundle material. In general, this is the preferred technique for fine coiled basketry because a stitch through the winders or deep into the bundle material of the previous coil creates larger gaps in the pattern of the winders. The winders are straight on the outside of the basket, but slightly slanted in a Z-direction on the inside. The bundle material was inserted gradually, while the ends of the winders were worked into the coil, which is a technique used throughout Egyptian history until today (Wendrich, 1991, 1999). Approximately half of this basket is extant and the frayed and bleached areas show that it has been partly exposed to the elements before being completely buried.

The material of which this basket was made could not be determined with certainty. Macroscopically, both leaf and stem structures were visible in the bundle material, but the epidermis had deteriorated to such an extent that no identification could be made. Even though the preservation of the active winders, which form the outside of the coils differs from the passive bundle material that is completely covered and protected by the narrowly spaced winders, the condition of neither allowed a more precise identification. Microscopically, both seem to be made of the same plant material, which cannot be identified any further than establishing that it is a grass and very different from the wheat straw

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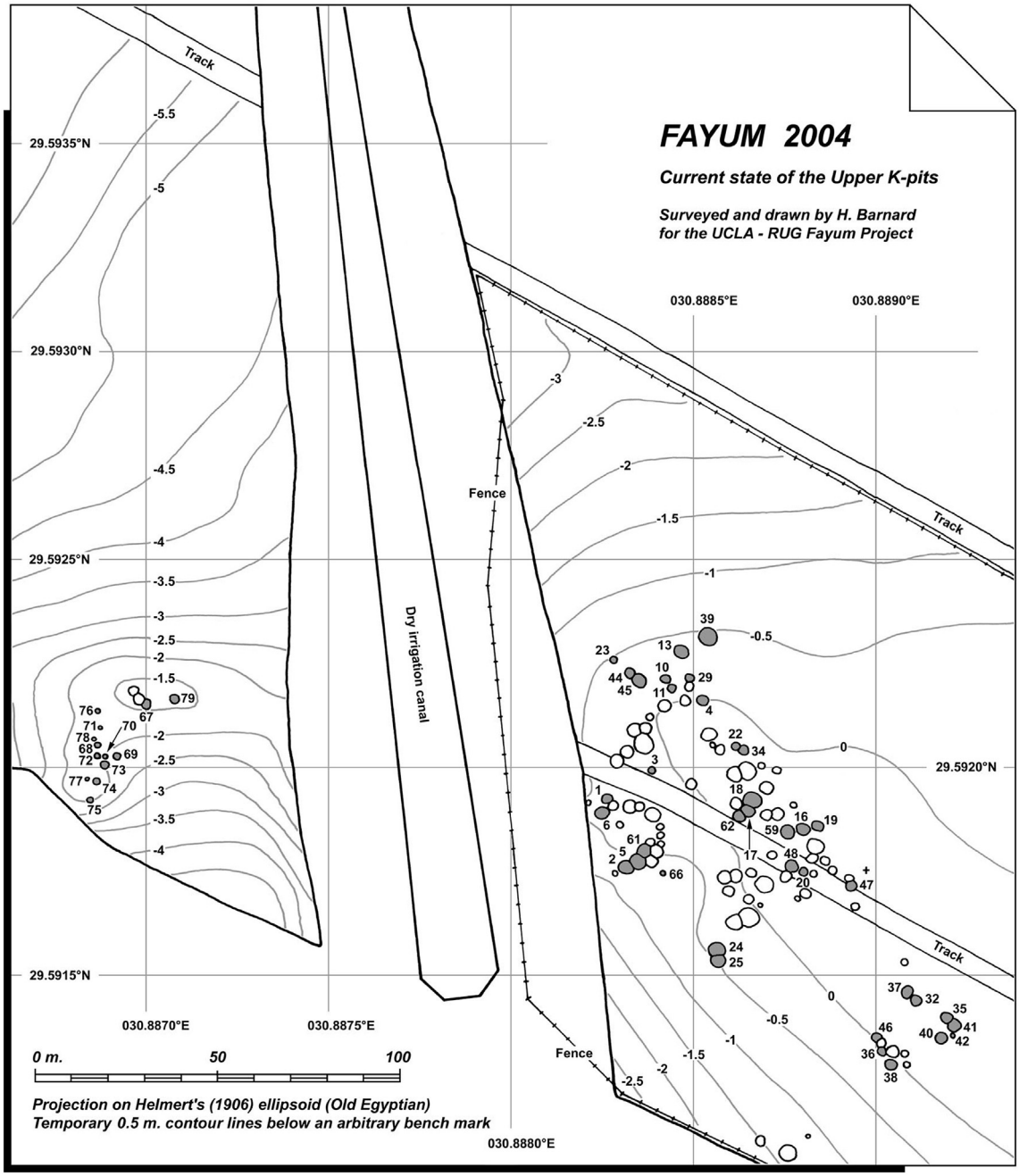

Fig. 2. The Upper K Pits area in 2004, with the outline of the fenced eastern part, the identification of the silos excavated by Caton-Thompson and Gardner in grey, and the later robber pits in white. To the west (right) of the canal are the storage and preparation pits identified by the URU Fayum Project.

used for the coarse basketry (Holdaway and Wendrich, 2017). The tight coiling, light weight, and the round, shallow shape of this basket would have made it a suitable tool for winnowing. The other finely coiled basket was found in 1925 in a storage pit and had an oval shape with a length of 42 cm, a width of 25 cm, and a rim height of 15 cm. This basket would presumably have served a different purpose, for instance as scoop, or to transport content from the silo to another place.

Pit 68, similar to some of the silos excavated in 1925, contained two tamarisk sticks, and a large fresh water bivalve, a species of *Chambardia* (Musselp, 2015). Caton-Thompson identified similar large freshwater mussels as "Spatha shells", a term has been replaced by the group of *Iridinidae*, which includes *Chambardia* sp., *Mutela* sp. and *Aspatharia* sp. The large *Chambardia* shell found in Pit 68 shows wear marks at the edges, indicating that it was used as a scoop. The wheat and barley found in the 2004 and 2005 excavations were mostly remains of the fill, tucked in the fabric of the basketry lining, or in the form of chaff mixed in with the mortar of the lids or preparation areas. Prior to the application of the mortar lid, Pit 68 was filled with sand, which covered the two wooden sticks and the shell scoop found towards the bottom of the sand fill, just above the basket. In Pit 52 Caton-Thompson found a wooden handle for holding serrated sickle blades and several of the silos contained small ceramic vessels, while large storage vessels were set in separate pits (Caton-Thompson and Gardner, 1934).

The straw of two of the pit linings provided radiocarbon dates of

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Fig. 3. Basketry lined storage pit 68, with sectioned lid.

4295 ± 45 BCE (Pit 75) and 4467 ± 45 BCE (Pit 68) (Holdaway and Wendrich, 2017; Wendrich et al., 2010). These two dates clarify that the silos are largely contemporaneous with the hearths in Kom K and Kom W, but they do not shed light on whether the silos were all used at the same time.

The word *kom* in Arabic denotes a mound and even today Kom K and Kom W stand out as a slight rise in the landscape. Kom K (excavated by the URU Fayum Project in 2006 and 2007) has been under agriculture since the 1960s. Repeated plowing and irrigation has removed the surface traces of the early 20th century excavations, with the exception of a scatter of pot sherds and lithics on the surface. Caton-Thompson's method was to excavate the entire site in strips 30 feet (approximately 9 m) wide. Starting on the east side of the mound with Trench A, she threw the backfill of the next trench in the previous strip. In the 1934 publication it is said that she excavated to bedrock, but a magnetic survey and subsequent excavation showed that she stopped her excavations when she hit a thick layer of sand. Below this sand layer, there was an earlier occupation, which demonstrated a continuation of intense hearth use and yielded an unfired clay vessel in situ. Carbonized wheat and barley kernels, as well as burnt goat dung were found at this deeper level (Holdaway and Wendrich, 2017).

At Kom W (studied by the URU Fayum team in 2006, 2008, 2009, and 2010) the excavations of almost a century ago left a clear trace, in the form of 9 m wide ridges that denote the original 30 ft wide trenches. Because Caton-Thompson claimed to have excavated the entire site, Wendorf and Schild (1976) dug a trench at the edge of the site. A magnetic survey and subsequent excavation in 2005 revealed that Caton-Thompson had left 0.30 m (1 ft) baulks between the trenches, as well as sealed hearths in layers below the area she excavated. This enabled excavation of a number of hearths which provided much-needed dating information. Kom W showed a similar lay-out of stratified hearths (called “fire holes” by Caton-Thompson and Gardner), but is larger than Kom K. The ceramics showed a greater number of large storage vessels than in Kom K (Emmitt, 2011). No storage pits were discovered in the vicinity of Kom W, even though the desert to the north of Kom K slopes up to almost the elevation of the K-ridge (32 m asl).

The two Koms are formed by layer upon layer of hearths, consisting of a slight hollow outlined in fire-reddened silty sand. Often there are multiple hearths of different sizes in the same area, each excavated into an older, previously used hearth. Some of these have heat retainers in the form of chunks of local sandy fossiliferous lime-stone. In Kom K we have discerned and recorded “clean” and “dirty” areas. The former are sandy areas without many finds, the latter contain hearths, and an abundance of ashy sands between the fire pits. In some places higher concentrations of animal bones were found. In the entire area there is a dearth of other organic materials, but in contrast with the excavations of the 1920's we found evidence of carbonized domesticated wheat in several of the hearths in Kom K. As outlined above, excavation of these hearths also yielded burnt goat dung that evidently had been used as fuel. The eroded surface and stratified hearths had small quantities of badly preserved charcoal, mostly tiny powdery fragments that were caught under heat retainers.

4. Discussion

The Fayum Neolithic has long been considered as the first evidence for agriculture and a settled society in ancient Egypt. In their publications, Caton-Thompson and Gardner (1934) regularly use the term “village” for the stratified remains at Kom K and Kom W, and these two “settlements” were seen as separate from the “surface sites”, the term they used for the ongoing cultural landscape with dense scatters of lithics, animal bone, grinding stones, and occasional concentrations of pottery and ostrich egg shell. In contrast, the URU Fayum team considers the landscape as a whole. In a region of approximately 60 × 10 km the Fayum North Shore has an extensive ongoing area of hearth activity in a deflated desert landscape. The two Koms and a few other areas are stratified hearth concentrations and in effect quite similar to the rest of this landscape. As a result of Caton-Thompson's designation of the two stratified areas, the terms “village” and even “urbanization” occur regularly in relation to the Fayum in the Middle Holocene in the literature (e.g. Morris, 2013), even though it is clear from the early as well as recent excavations that there is no evidence for dwellings. Re-investigation of the desert area from 2003 to 2013 has confirmed that there are no mud-brick building remains, no excavated dwelling pits, no post holes, nor impressions of matting that may indicate shelters.

5. Upper K Pits basketry in context

The central question in this contribution is how we should interpret the basketry of the K Pits in relation to evidence for the Early and Middle-Holocene human habitation on the Fayum North Shore. It has been documented and argued convincingly that storage of domesticated crops does not equal sedentism (Ingold, 1985; Testart, 1982; di Lernia, N'siala, and Mercuri, 2012). Elsewhere we have argued that we should move away from considering particular objects and materials, such as domesticated wheat and barley, bifacial tools, ceramics, and the occurrence of pig as indicative of sedentism on their own. Instead we need to consider the entire assemblage of inorganic and organic remains in their specific contexts, find different measures to weigh the degree of mobility, and understand that domesticates were used opportunistically and in addition to or as part of hunter gatherer life ways (Holdaway and Wendrich, 2017). The taphonomic and preservation circumstances in our research area differ considerably, which becomes apparent if we consider the organic materials found in the stratified and unstratified sites, as well as the K Pits. From Table 2 it is apparent that the latter are an outlier, characterized by excellent preservation. Basketry and textiles are not found in the rest of the region, even in the areas that can be dated to the same period. It is impossible to demonstrate, but quite likely, that the sophisticated basketry technology found at the K-Pits existed in the Middle Holocene areas of Kom K and Kom W and may reflect a tradition that goes back to the Early Holocene. The unique situation of the K Pits should not be considered in isolation, however, and we need to discuss the function of the K-Pits in the broader landscape.

What stands out in Table 2 is that the Upper K Pits are not only different from other recorded areas on the Fayum North Shore

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Table 1
Overview of coiled basketry and matting in the Upper K Pits.

Pit	Basket diameter in cm	Basket height in cm	Bundle in cm	Winder in cm	Material	Description
1	118	79			straw	Pit lining
1	115	5	5	2	straw	Coiled matting, perhaps different from pit lining, because it seems to have separate materials used for bundle and winder (only photo available).
2	103	69			straw	Pit lining
4	105	61			straw	Pit lining
5	53	Min. 25			straw	Pit lining
6	41	2	2	1	grass	Platter or lid in woven grass: fine coiled mat, approximately 20 rows of coiling, bundle size, smaller in the centre. Egyptian Museum in Cairo.
7	46	23			straw	Pit lining
8	91	7	7		straw	Pit lining, coiled, approximately 12 rows of coiling in base. Newcastle Museum?
9	96	53			straw	Pit lining
10	127	89			straw	Pit lining. Tapering coiled basket, from 1.27 to 0.91 m in diameter.
11	61				straw	Pit lining
12	112	51	4		straw	Pit lining. Coiled basketry, approximately 12 rows of coiling in the side. Hull Museum?
13	130	51			straw	Pit lining
14	74	23			straw	Pit lining
15	47	23			straw	Pit lining
16a	160	81	7		straw	Pit lining. Coiled basketry, approximately 11 rows of coiling in the side.
16b	61	30			straw	Pit lining. Coiled basketry, the number of rows and size of bundle cannot be determined from 1926 photograph.
17	81	48			straw	Pit lining
18	102	51	4.5		straw	Pit lining. Coiled basketry, approximately 11 rows of coiling in the side. Egyptian Museum in Cairo.
19	76	46	6		straw	Pit lining. Coiled basket, approximately eight rows of coiling. Ashmolean Museum.
20	117	33			straw	Pit lining
21	132	66				Pit lining, impression only
25	61				straw	Platter underneath coarse pot, probably coiled, but not visible on the 1926 photo. Petrie Museum?
28	23	1.5	1.5	0.7	grass	Platter or lid in woven grass. Fine coiled mat, approximately 16 rows of coiling. Manchester Museum?
29	91	56			straw	Pit lining
30	50.7	21	4.3		straw	Pit lining. Coiled basket, 0.043 m thick walls, made of coarse straw coils, five rows of coiling in the side. British Museum EA58695
31	74	53			straw	Pit lining
32	102	33			straw	Pit lining
33	100	46			straw	Pit lining
35	33	30			straw	Pit lining
36	90	25	4		straw	Pit lining. Coiled basket, coarse straw coils, similar to pit 68. Approximately six rows of coiling in the side.
37	99	64			straw	Pit lining
39						Pit lining (only mentioned in text)
40	96	25			straw	Pit lining
41	56	36				Pit lining, impression
42	86	20				Pit lining, impression
43	122	76				Pit lining, impression
47	104	53				Pit lining base
48	109	90				Pit lining
51	86	43	4		straw	Pit lining. Coiled basket, approximately 10 rows of coiling in the side.
52	60	23				Pit lining
54	69	2			straw	Mat or lining
55	74	5			straw	Pit lining. Coiled basket, coarse straw coils, similar to pit 68.
55	42 × 15	13	0.55	0.1	grass	Fine coiled basket, oval. Approximately seven rows of coiling in the base and 23 rows in the side, decoration with coloured winders. British Museum EA58696
56	10	15	0.3	0.2	grass	Small bag-shaped basket, described by Caton-Thompson as “a minute plaited straw basket”. Now only the base and part of the sides are left (approximately 0.04 m in height). Twined? Petrie Museum UC2941
58	30	1	1	0.5		Platter or lid in “woven grass” forming a round coiled mat.
59	53	30				Pit lining
61	46	76				Platter or lid in woven grass forming a round coiled mat.
62	53	76				Pit lining
63	69	41				Pit lining
64	90	60				Pit lining
66	76	20				Pit lining
68	90	60	4.5	3	wheat straw	Pit lining, coiled basketry, straw bundle with winders taken from the bundle. Base had eight and side had nine rows of coiling. The winders are closely spaced.
69	27 × 20	7	0.9	0.1	Grass	Fine coiled basket with coloured winders, found immediately outside Pit 69. No evidence for pit lining was found.
71	65 × 60 to 36 × 36	26	4.5	3	wheat straw	Pit lining, coiled basketry, straw bundle with winders taken from the bundle. Base had eight and side had nine rows of coiling. The winders are closely spaced.
75	100 × 90	35	3	–	wheat straw	Straw inclusions suggest this pit was originally lined with basketry

because of the preservation of plant materials, with evidence for basketry and textiles, as well as flax seeds, and desiccated wheat and barley (mostly in the form of husks), but also because of a complete dearth of animal remains. Wheat and barley kernels were not reported by Caton Thompson and Gardner from Kom K, but were found in 2007 as charred remains in hearths, together with

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Fig. 4. Wheat straw coiled basket lining of pit 68.

Fig. 6. Finely coiled grass basket, in situ on the surface next to Pit 69, found just underneath the desert pavement.

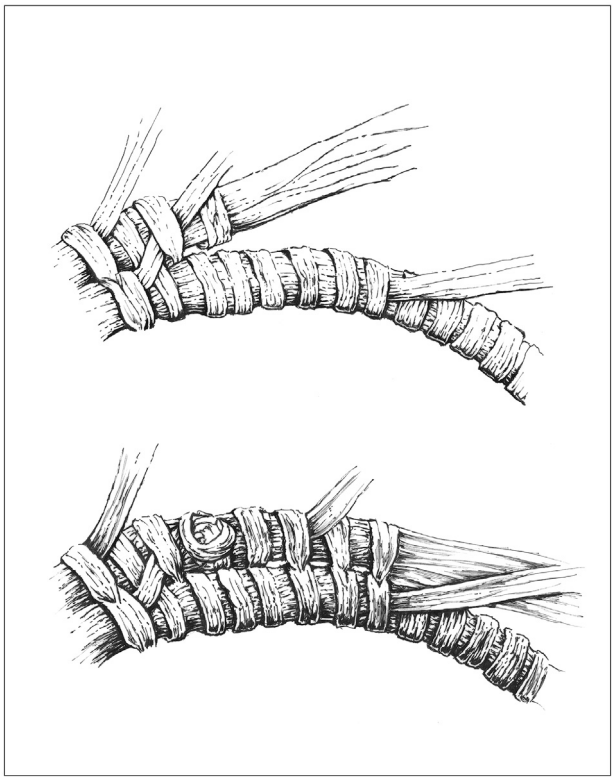

Fig. 5. Coiling technique of the Upper K Pits basketry lining: a few culms of the bundle material are taken up and form the winder to stich the bundle to the previous coil.

Fig. 7. Finely coiled grass basket, note the deterioration of the fiber which shows that before getting buried the basket was exposed to considerable weathering.

charred goat pellets (presumably used as fuel). The only other vegetal remains are small quantities of charcoal, found in hearths throughout the entire survey area and dating to both the Early and Middle Holocene. Studying and comparing the vegetal materials from all sites from a perspective of raw material procurement, potentially contributes to information on landscape, climate, preferences, and activities.

The basketry raw material for the silo linings, wheat straw, is a useful material that remains after the harvest. The length and appearance of the culms used in the baskets seems to indicate that wheat was harvested at the top of the culm with hafted stone sickle blades, such as the example found in one of the silos. Wheat and barley require a limited amount of water and could grow in the Fayum because of different climatic circumstances from today. Previous studies have projected back the Pharaonic *décrue* system onto early agriculture in the Fayum. This would mean that the Fayum Neolithic growers used lake-shore based agriculture following the recession of the Nile flood, similar to the well-known, but later attested agricultural system (Wenke and Casini, 1989, 147–148, Wenke et al., 1988; Caton-Thompson and Gardner, 1934). Alternatively the cereals could have been grown in the Wadis north of the lake dependent on local rainfall. The climate of the Fayum in the Middle Holocene possibly saw an increase in winter rain, under influence of a southern shift of the Mediterranean rain belt, which enabled a form of agriculture similar to that of the Levant (Phillipps et al., 2012). This could have been the impetus to adopt the Levantine cereal domesticates only at this late date.

The straw basket lining would have had multiple functions, among which the most important is that it forms a buffer between the surrounding soil and the contents. By storing wheat and barley kernels in a basket the material is kept clean. The straw may also have formed a protection against moist and now that we know that the lid of the pits was made of a sand-based mortar mixed with water the importance of basketry lids found in some of the pits becomes evident as a separation of the mortar from the lids from the basket contents.

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Table 2
Overview of organic materials found by the URU Fayum Project.

	1	2	3	4	5	6
coiled coarse basketry	x					
fine coiled basketry	x					
linen textile	x					
flax seeds	x					
wheat	x	x				
barley	x	x				
sticks (tamarisk)	x					
charcoal (tamarisk)	x	x	x	x	x	x
freshwater bivalves	x	x	x			
goat/sheep bones		x	x	x	x	x
goat/sheep dung pellets		x				
pig bones		x	x			
cattle		x	x			
small bovid bones/teeth		x	x	x		
water fowl		x	x	x		
clariid cat fish		x	x	x	x	x
bagrid cat fish		x	x	x	x	x
synodontis cat fish		x	x	x	x	x
Nile perch		x	x	x	x	x
tilapia		x	x	x	x	x
ostrich egg shell		x	x	x		

1 = Upper K pits (ca. 4450-4150 Cal. BCE).
2 = Kom K (ca. 4500-4400 Cal. BCE).
3 = Kom W (ca. 4500-4100 Cal. BCE).
4 = E29H1 (ca. 7200-5800 Cal. BCE).
5 = Hearths near Kom K (ca. 5680-4440 Cal. BCE).
6 = Hearths near Kom W (ca. 5200-5000 Cal. BCE).

The unidentified grass used for the fine coiled basketry does not provide us with much information regarding the landscape and climatic situation. In later times sturdy grasses such as *Desmostachya bipinnata* and *Imperata cylindrica* were used extensively for basketry and cordage, often in combination with doam palm leaf (*Hyphaene thebaica*) (Wendrich, 1999). The use of grass as bundle material was common, but for winders there was a strong preference for palm leaf, or the culm of cyperaceae (such as *Cyperus papyrus*). This is not the case for the Upper K Pits baskets where bundle and winders are made of the same material. A grass that would be suitable, but has not been positively identified is *Typha,* a species that would have thrived at the edge of the lake basins.

From Table 2 it is apparent that large animal bone survives much better in arid desert circumstances than vegetal materials, with the exception of charcoal. The zoological species recorded from deflated or stratified sites differs, with the stratified sites providing a fuller scope of the animal proteins available to the Fayum Neolithic inhabitants. This is mostly, if not wholly attributable to taphonomic processes, with only the sturdier bones of the larger species being preserved on the deflated surface (Linseele et al., 2014; Brewer, 1989). Most variation is found in Kom K and Kom W (column 2 and 3 in Table 2), the stratified sites.

The identification and interpretation of the charcoal provides information on wood fuel use as well as woodland ecology. Most of the charcoal in the Koms as well as E29H1 was tamarisk, which is a high quality fuel and a tree that thrives at the edge of fresh water bodies, such as the lake. The Middle Holocene samples (columns 2–5 in Table 2) were mere specks of charcoal, which points at the use of dry deadwood and small branches. In contrast, the Early Holocene hearths at E29H1 provided evidence for tamarisk from large branches. The use of this high quality fire wood suggests a greater abundance of wood resources. In addition, both at Early Holocene E29H1 and Middle Holocene Kom W a chenopodiaceous wood, likely *Haloxylon salicornicum*, was used. This wood would have been gathered further inland in more arid regions.

Considering the elevations of the landscape north of the lake, it should be noted that the various sites under discussion are not so much at the edge of a uniform lake, but near coastal basins (Z, X, L, and K in Fig. 1), which have different elevations, as well as different slopes. A change in lake level is much more invasive along a shallow basin edge (K), than along a steeply shored basin (Z). This has not been taken into account sufficiently in previous work, which tended to focus on lake level variation in more generalized terms (Phillipps et al., 2016). The different natural circumstances in these basins resulted in local variation of lacustrine resources such as reeds and fish species living or spawning in shallow water, as well as the ease of access to these.

6. Comparing Kom K and Kom W

Only a few carbon 14 dates are available from the Upper K Pits and none from the Lower K Pits. It is therefore impossible to say what the time span was that these storage pits were in use. Caton-Thompson also describes a Site K, which mainly consisted of surface material and was closer to the Upper K Pits than Kom K (Caton-Thompson and Gardner, 1934, 72). The Upper K Pits, Kom K, and Kom W are similar in age, while many of the hearths around Kom K and Kom W are earlier in the Middle Holocene sequence. The Early Holocene is represented by E29H1 (see Table 2). There are, however, differences between the two Middle Holocene stratified sites. The Upper K Pits, dug into a compact silty sandstone that caps the tertiary clay layers from which the K-ridge is built up, are sometimes lined with basketry, sometimes not. Some of the smaller pits contain large ceramic vessels. Inside the storage pits, a few small vessels were found, which, much like the *Chambardia* shells would have been used as scoop or measuring containers. The pits were also used to store agricultural tools, such as sickle blades and digging sticks.

The ceramics in Kom K varied in size, but compared to Kom W, included only a limited number of storage vessels (Emmitt, 2011). One unfired vessel found in Kom K in 2007, may have been used to store dry goods. In contrast, the ceramics at Kom W were characterized by large storage vessels placed in depressions. Furthermore, no domesticated wheat and barley were found in Kom W, neither desiccated nor carbonized. No comparable region with storage at higher ground has been found near Kom W, even though the landscape north of Kom W slopes up to a desert-pavement-covered area at an elevation close to the 32 m asl height of the K-Ridge.

The proportions of zooarchaeological remains in Kom K and Kom W were similar: some domesticates (sheep, goat, pig, bovines), very few hunted species such as duck, coot, and gazelle, and an abundance of fish species, with an emphasis on cat-fish (Linseele et al., 2016; Linseele et al., 2014).

Another difference between the two stratified sites is that in Kom W arid wood taxa were used as fire wood, while these did not occur at Kom W. This suggests that the Kom W inhabitants frequented dryer landscapes (possibly the region further north of the lake zone) more often than those of Kom K. Procuring raw material for lithic production would be a reason to venture north and away from the lake. As stressed above, it is very important to consider the topography of the lake basins. The different shape, structure and depth of the basins may have had considerable localized influence, creating different plant resources around Kom K (near K-Basin) and around Kom W (between Z and X Basin).

7. Conclusion

The discovery of well-preserved basketry lined storage pits, the occurrence of domesticated wheat, barley, goat, sheep, bovines, and pig, have been the base for arguments that the Fayum Neolithic in Egypt was a sedentary society. It is now clear that the basket-lined

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pits were sealed off repeatedly in a manner that could have enabled annual or long-term caching in an area where there were no other traces of occupation (such as grinding stones or hearths). The question of what was stored and for what purpose is difficult to answer. It is possible that the storage pits were linked to an annual activity, where seed grain was taken out, tools for harvesting were cached, and the new harvest was saved for sowing the next year. The pits could have been a way to safeguard a quantity of food for a group that would once in a while return to the same area. Hiding an important resource on a high ridge, away from other areas of use could be a safeguard against moisture or theft. However, the presence of agriculture and storage does not provide evidence for sedentism and leaves open the question of the degree of mobility that characterized Fayum Middle Holocene society at different times.

What has been indicated here as Middle and Early Holocene human activity in the Fayum, was characterized by Caton-Thompson and Gardner as "Fayum A" and "Fayum B". Because the Fayum B remains occurred at lower elevations in the landscape than Fayum A, and because Caton-Thompson presumed that the lake continually shrunk, she dated the Fayum B later than the Fayum A culture. The "primitive" aspects of the Fayum B culture represented in her mind a cultural regression (Caton-Thompson and Gardner, 1934, 1). Making use of carbon 14 dates, Wendorf and Schild in 1969 reversed the order of these two cultures. The Epi-palaeolithic (Fayum B) predated the Neolithic (Fayum A). Its material remains were found at lower elevations than the Neolithic remains (characterized by bifacial tools and crude pottery), because after the Epi-palaeolithic the lake level rose from approximately 4 to 12 and ultimately to 20 m asl (Wendorf and Schild, 1976). For the last 40 years the Epi-palaeolithic was thought to range from ca. 9000 to 8800 bp, the Neolithic from 7200 to 6200 bp. The timespan, which was based on very few dates, showed a gap of approximately 1000 year during which the Fayum was thought to have been abandoned. The later occupants of the region brought in the Neolithic package of domesticates and led a lifestyle that was very different to that during the Epi-palaeolithic one.

Our recent research, which included detailed mapping of surface deposits, showed that Neolithic remains are found at lower elevations than previously thought. By dating hearths in different parts of the landscape the previously reported gap between the Epi-palaeolithic and Neolithic is no longer apparent. Approximate dates for the Early Holocene occupation can be set at ca. 9300-8000 bp, the Middle Holocene occupation from 7500 to 6000 bp, with a date of ca. 6570-6300 cal BP for Kom K and 6560-6405 cal BP for Kom W (Wendrich et al., 2010). Studied closely, the way of living between the two periods shows both similarities and differences, while there are also differences within the Middle Holocene occupation as found in the deflated hearths and the two stratified sites.

The continuous factor is the importance of fish in the diet of inhabitants during both periods. Abundant grinding stones make it likely that during the Early Holocene wild grasses were consumed, while hunting was not a regular contributor to the diet. The same protein sources are found in the entire region bordering the lake basins K, L, X, and Z (see Fig. 1) during the Middle Holocene, with the addition of domesticates (sheep, goat, cattle, pig). The domesticates did not, however, play a very important role in the diet. The occurrence of arid shrubs (*Haloxylon salicornicum*) for fire wood in E29H1 and Kom W shows another similarity over time, and forms a contrast with Kom K, where tamarisk is the only fire wood that could be identified. The question is, whether this allows an interpretation that the occupants of Kom W, where no wheat and barley were found, lived a life that was similar to the earlier occupation and presumably were a mobile population, while Kom K represented a more settled agricultural community.

Such an interpretation shows the danger of leaning too much on the research results and interpretation of a few specialists. A proxy for mobility of people is the mobility of lithics. By analyzing large quantities of flakes and cores, measuring the surface area and volume on lithic artefacts and raw material, it is possible to reconstruct whether the added up core surface is consistent with the core volume (Phillipps and Holdaway, 2016). This analysis has shown that cores were removed from Kom K and Kom W and other Middle Holocene locations, while the Early Holocene (E29H1) has flakes, rather than cores removed. The latter points to a higher mobility of lithics (and by proxy people) in the Early Holocene and a decrease or change of mobility in the Middle Holocene. Thus it seems that Kom K and Kom W had a population that engaged in many of the same activities as the earlier occupants of the Fayum north shore, but in addition they were probably less mobile, they created ceramics, and bifacials in addition to the daily-use of flakes (Holdaway et al., 2015). The lithic analysis does point towards some degree of Neolithic mobility, as does the lack of evidence for dwellings and burials in the region. From the point of view of resource availability the lake and its shallow basins could in principle provide sustenance year-round, but the question remains whether that was actually the habitation pattern.

As outlined above, the baskets in the Upper K Pits could be interpreted in several ways and do not in themselves support arguments for or against year-round settlement in the region. The fluke of preservation of a very sophisticated basketry tradition does provide important insights however. It gives a different flavour to a period in which, when just considering the inorganic materials, very little decorative material is produced. The majority of the lithic toolkit consist of flakes and cores, with a relatively small percentage of bifacial tools including the very distinctive Fayum arrow heads. The ceramics are crude, coarse, and likely utilitarian. The one fragment of woven linen, found in a pot from the Upper K Pits, is a simple, irregular, and quite coarse tabby weave. Together with flax seeds found in the same area, it forms nevertheless the earliest evidence for woven textile in Egypt.

Both the coarse basketry pit-lining and the very fine, decorated baskets found near or inside some of the pits demonstrate that there was a basketry tradition, with objects made from readily available local materials. These early daily use objects are more sophisticated than what we encounter in high status tombs dating to the Pharaonic period. The Fayum Neolithic basketry seems to be part of an existing and probably long-lived tradition that most probably goes back to the early Holocene and continued throughout the Predynastic period. Studying these objects in detail enables us to appreciate the attention and care of ancient producers and gives a deeper understanding of the Middle Holocene culture in Egypt, but also of the earlier periods for which we do not have similar well-preserved materials.

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References

Brewer, Douglas J., 1989. Fishermen, Hunters and Herders: Zooarchaeology in the Fayum, Egypt (ca.8200-5000bp), vol. 478. British Archaeological Reports, Oxford.

Cappers, René.T.J., 2013. Modelling cereal selection in Neolithic Egypt: an evaluation of economic criteria. In: Noriyuki Shirai (Ed.), Neolithisation of Northeastern Africa. Ex Oriente, Berlin, pp. 109–120.

Caton-Thompson, Gertrude, 1983. Mixed Memoirs. Gateshead. Paradigm Press, Tyne & Ware.

Caton-Thompson, Gertrude, Gardner, Elinor Wight, 1934. The Desert Fayum, 2 vols. The Royal anthropological institute of Great Britain and Ireland, London.

di Lernia, Savino, N'siala, Isabella Massamba, Mercuri, Anna Maria, 2012. Saharan prehistoric basketry. Archaeological and archaeobotanical analysis of the early-middle Holocene assemblage from Takorkori (Acacus Mts., SW Libya). J. Archaeol. Sci. 39, 1837–1853.

Emmitt, J.J., 2011. Investigating Ceramics from the Neolithic Occupation of Kom W, Fayum, Egypt. Department of Anthropology, University of Auckland. Unpublished MA Thesis.

Holdaway, S., Phillipps, R., Emmitt, J., Wendrich, W., 2015. The Fayum revisited: reconsidering the role of the neolithic package, Fayum north shore, Egypt. Quat. Int. Online 1–8 before print.

Holdaway, Simon, Wendrich, Willeke (Eds.), 2017. The Desert Fayum Reinvestigated, Monumenta Archaeologica. Cotsen Institute of Archaeology Press, Los Angeles.

Ingold, Timothy, 1985. The significance of storage in hunting societies. In: Marceau Gast, Sigaut, François, Beutler, Corinne (Eds.), Les Techniques de conservation des grains à long terme: Leur rôle dans la dynamique des systèmes de cultures et des sociétés. Éditions du Centre National de la Recherche Scientifique, Paris, pp. 33–45.

Koopman, A., Kluiving, S., Holdaway, S.J., Wendrich, W., 2016. The effects of Holocene landscape changes on the formation of the archaeological record in the Fayum basin, Egypt. Geoarchaeology 31 (1), 17–33.

Linseele, V., Holdaway, S.J., Wendrich, W., 2016. The earliest phase of introduction of Southwest Asian domesticated animals into Africa. New evidence from the Fayum Oasis in Egypt and its implications. Quat. Int. http://dx.doi.org/10.1016/j.quaint.2015.12.028.

Linseele, Veerle, Van Neer, Wim, Thys, Sofie, Cappers, Rene, Wendrich, Willeke, Holdaway, Simon, 2014. New archaeozoological data from the Fayum "neolithic" with a critical asessment of the evidence for early stock keeping in Egypt. PLoS One. http://dx.doi.org/10.1371/journal.pone.0108517.

MoLAS, 1994. Museum of London Archaeological Service (MoLAS) Archaeological Site Manual. Museum of London, London.

Morris, A.E.J., 2013. History of Urban Form before the Industrial Revolution, third ed. Routledge, New York.

Musselp. 2015. doi: http://mussel-project.uwsp.edu/db/db.php?p=div&h=b&l=spec&n=15471.

Phillipps, R., Holdaway, S., Ramsay, R., Emmitt, J., Wendrich, W., Linseele, V., 2016. Lake level Changes, lake edge basins and the paleoenvironment of the Fayum north shore, Egypt, during the early to Mid-Holocene. Open Quat. 2 (2), 1–12. http://dx.doi.org/10.5334/oq.19.

Phillipps, R., Holdaway, S.J., 2016. Estimating core number in assemblages: core movement and mobility in the Fayum, Egypt. J. Archaeol. Method Theory 23, 520–540.

Phillipps, R.P.H., Holdaway, S.J., Wendrich, W., Cappers, R.T.J., 2012. Mid-holocene occupation of Egypt and global climatic change. Quat. Int. 251, 64–76. http://dx.doi.org/10.1016/j.quaint.2011.04.00.

Testart, A., 1982. The significance of food storage among hunter-gatherers: residence patterns, population densities and social inequalities. Curr. Anthropol. 23, 523–537.

Wendorf, Fred, Schild, Romuald, 1976. Prehistory of the Nile Valley. Academic Press, New York.

Wendrich, W., Taylor, R., Southon, J., 2010. Dating stratified settlement sites at Kom K and Kom W: fifth millennium BCE radiocarbon ages for the Fayum Neolithic. In: Nuclear Instruments and Methods in Physics Research Section B: Beam Interactions with Materials and Atoms, vol. 268, pp. 999–1002.

Wendrich, Willeke, 1999. The World According to Basketry : an Ethno-archaeological Interpretation of Basketry Production in Egypt. Research School of Asian African and Amerindian Studies (CNWS), Leiden.

Wendrich, Willemina, 1991. Who Is Afraid of Basketry : a Guide to Recording Basketry and Cordage for Archaeologists and Ethnographers, CNWS Publications No. 6. Centre for Non-Western Studies Leiden University, Leiden, The Netherlands.

Wendrich, Willeke, Cappers, René, 2005. Egypt's earliest granaries: evidence from the Fayum. Egypt. Archaeol. 27 (Autumn), 12–15.

Wenke, R.J., Casini, M., 1989. The epipaleolithic-neolithic transition in Egypt's Fayum depression. In: Krzyzaniak, L., Kobusiewicz, M. (Eds.), Late Prehistory of the Nile Basin and the Sahara. Poznan Archaeological Museum, Poznan, pp. 139–155.

Wenke, R.J., Long, J., Buck, P., 1988. Epipaleolithic and neolithic subsistence and settlement in the Fayyum oasis of Egypt. J. Field Archaeol. 15, 29–51.

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