Subsistence Strategies and Craft Production at the Ramesside Fort of Zawiyet Umm el-Rakham

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Abstract

This thesis investigates the subsistence strategies and types of craft production conducted by the inhabitants of the Ramesside fort at Zawiyet Umm el-Rakham through a methodical examination of archaeological material from the fort's occupation and industrial zone, Area K. It also aims to re-interpret Egypto-Libyan relations in the area on the basis of this evidence, as well as provide a model for the provisioning and self-sufficiency of contemporary forts in Sinai, Nubia and Libya. Chapters 1 and 2 provide introduction and methodological background. Chapter 3 presents the architectural remains found in Area K, focusing on structures related to the production of food. Chapter 4 discusses relevant small finds related to the working of stone, flax, bone, shell, non-vessel ceramics and metal. Chapters 5-7 provide an overview of respectively the chipped stone assemblage, ceramic corpus and faunal remains from the site. Chapter 8 contains a review of relevant archaeological data from contemporary fortified settlements, which relate to subsistence strategies and craft industries.

In Chapter 9, the study concludes that the settlement at Zawiyet Umm el-Rakham was largely self-sufficient, both with regards to food and materials, such as pottery production and flax linen, which relied mostly on locally available materials and local processing and production. On this basis, the study concludes that the occupants at Zawiyet Umm el-Rakham maintained a close relationship to local Libyan tribesmen who provided access to resources, as well as serving as trade partners. The study also concludes that fortified settlements of the 19th Dynasty in Libya, Sinai and Nubia were largely self-sufficient entities, which depended only to a limited degree on centralized distributions and military supply lines.

Acknowledgements

A great many people have been instrumental in the completion of this research; in particular I would like to thank all of my colleagues and staff at the Department of Archaeology, Classics and Egyptology at the University of Liverpool. I owe a great deal of gratitude in particular to my supervisor Dr Steven Snape for his help and encouragement throughout the project, as well as his patience. I would also like to thank Professor Ian Shaw, and Dr Glenn Godenho who joined the fray in the Eleventh Hour. I would also like to thank Dr Matthew Ponting for sharing his considerable experience with portable X-Ray Fluorescence Units and Dr Susanna Thomas for allowing me to work with material which she excavated. Thanks are also due to Dr Sue Stallibras and Dr Salima Ikram.

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Chapter 1: Introduction

1.1. Aims and Data

The primary aim of this study is to investigate subsistence and craft production strategies employed at the Ramesside fort of Zawiyet Umm el-Rakham located 300km West of Alexandria on the Marmarican Coast (**Fig. 2.1**) using archaeological data from the site's 'Area K'. The focus of the study is in particular the levels of self-sufficiency and reliance on centralised distribution from the Nile Valley to the site. A comparison with similar data from contemporary fortified settlements in Nubia, the Sinai Peninsula and the Western Delta furthermore seeks to determine general characteristics of the provisioning of forts during the early Ramesside period. A final aim of the study is to analyse the impact of the results from Zawiyet Umm el-Rakham on the analysis of Egypto-Libyan relations in the northern Marmarica region during the early 19th Dynasty, hitherto primarily studied on the basis of textual evidence (*cf* Kitchen, 1990 and O'Connor, 1990) due to the lack of archaeological material from Bronze Age Libyan populations in the Western Desert (Carter, 1963 and Hounsell, 2002). The idea for this project arose as a result of discussions with the director of the Zawiyet Umm el-Rakham Project, Dr Steven Snape concerning issues he raised in an earlier article (Snape, 2010). The project methodologies were subsequently refined as a result of my work at the site of Qantir-Piramesses and discussions with colleagues at that site.

Issues of provisioning at ancient Egyptian forts have predominately been studied in relation to the Middle Kingdom fortifications constructed during the reigns of

Senwosret I and Senwosret III (*cf* Kemp, 1986 ; 1989: 176-178), mostly viewed as dependent on centralised supplies from Egypt enabling them in turn to supply military campaigns and mining expeditions (Darnell, 2013: 800-801). The study of provisioning and local craft production at New Kingdom fortified settlements in Nubia, Sinai and Libya has only recently begun to develop as a result of new excavations conducted at sites such as Amara West (Ryan *et al*, 2012 ; see also evidence of grain processing in House E.12.10, Spencer, 2009: 52), Kom Firin (Spencer, 2014: 32-33), Tell Heboua I (el-Maksoud, 1998: 123), Tell Heboua II (el-Ayedi, 2006: 38), Haruba A-289 (Goren *et al*, 1995) and A-345 (Oren, 2006: 282-283), Bir el-Abd (Oren, 1987: 78-84), Tell el-Retaba (Rzepka *et al*, 2009: 257-258 ; Rzepka *et al*, 2011: 148-150) and Tell el-Borg (Hoffmeier *et al*, 2014a: 135). The study will evaluate the data from Zawiyet Umm el-Rakham within this existing scholarly framework to determine the interrelationship between external provisioning and internal production at these sites during the early Ramesside period.

New Kingdom economy has primarily been studied with the aid of textual material (Janssen, 1975 ; 1981 ; and 1982, and Warburton, 1997 and 1998) and certain authors, such as Janssen (1975) and Warburton (1997) have based their analysis partially on existing economic theories, namely those championed by Polanyi (see Halperin, 1984) and in the case of Warburton on Keynesian economic concepts as an opposition to the perceived influence of Polanyi (Warburton, 1997). However, as noted by Kemp (1989: 260) the study of ancient Egyptian economy may be too complex to support the application of any type of unyielding modern economic principle, and while the careful use of modern economic models can in some cases be beneficent, "[…] it also leads to arguments about nothing." (Kemp, 1989: 260).

The common feature shared by the majority of studies on ancient Egyptian economy is the reliance on textual sources. While these sources are patently useful, the role of archaeological data in the discussion of economy, namely production systems and issues of resource management and procurement are under-represented (Werschkun, 2010: 14). In this respect, the work of Gary M. Feinman - which centres on the use of archaeological material as the basis for studying ancient economies and societal organisation in the context of Mesoamerican cultures - provides a useful methodological avenue.

In recent publications, Feinman together with Nichols has argued for a ‘bottom-up’ analysis of socio-economic organisation (2007) and a shift away from the “[…] dichotomous thinking and typological frames […]” (Feinman, 2013: 456) used since Polanyi and towards an acceptance of the flexibility of ancient economies and the variety of transfer types. From an archaeological perspective, this bottom-up approach requires the careful study of subsistence and craft production systems in detail at either a specific site (Feinman, 2004 and Feinman and Nichols, 2007) or an assemblage of similar sites (Golitko and Feinman, 2015). This bottom-up approach, defined recently as a “[…] detailed investigation at the micro-level [which] delinates themes that contribute to the big picture” by Müller (2015: xxvi) is also employed increasingly within the broader investigation of settlement archaeology in Pharaonic Egypt (Moeller, 2015: 458-460).

Type	Description	Chapter
Small finds	197 small finds, primarily tools used in various craft industries.	4
Lithic assemblage	92 chipped stone tools and debitage.	5
Ceramic corpus	493 diagnostic sherds and whole vessels.	6
Faunal assemblage	331 taxonomically identified elements.	7

Table 1.1: Overview of the available data from Zawiyet Umm el-Rakham (author).

Feinman's approach of careful evaluation of archaeological data as a basis for conclusions regarding craft production and resource procurement forms the basis of the methodological strategies used by the current study. The available archaeological data is presented, and the origin (locally produced or likely source of import) of each object type and category is discussed, before a conclusion regarding types of production, its intensity, level of skill and significance, is formulated. These conclusions are then employed as models of production and compared to published data from a series comparable fortress sites located either on, or outside Egypt's borders to highlight similarities and differences in the provisioning of fortified settlements in the early Ramesside period. The data used in this thesis was obtained from excavations in 'Area K' at Zawiyet Umm el-Rakham from 1999-2008 by the University of Liverpool, principally directed by Dr Susanna Thomas. Area K, as the largest excavated section of the fort and also its most likely provisioning area, contained a plethora of relevant architectural structures (which are discussed in

Chapter 3) and a variety of objects, which have been divided into four general categories (**Table 1**) and discussed individually in Chapters 4-7.

Determining the respective levels of self-sufficiency and reliance on centralised distribution from the Nile Valley (as well as import of material from passing Mycenaean merchants (Snape, 2003) and local Libyan tribesmen (Simpson, 2002)) hinges on the ability to clearly suggest the origin of archaeological material, often a somewhat crude visual process (Werschkun, 2010: 17). However the geology and environment around Zawiyet Umm el-Rakham is fortuitously sufficiently alien to the environment in the Nile Valley to make visual classification of origin (often the only method available in the field) both relatively simple and accurate. This is particularly the case with stone objects, as the local limestone is of a highly specific biosparite type (see Section 4.5). The coastal geomorphology also influenced locally produced ceramics making them visually highly different from the Nile silt and Marl clays into which most Egyptian pottery is generally divided (Bourriau *et al*, 2000, see Section 6.3). This difference has also been chemically determined by an analysis of a small sample collection of locally produced pottery with X-Ray Fluorescence. A further aspect which simplifies the classification of objects as locally produced or imported at Zawiyet Umm el-Rakham is the near-complete absence of hard stones such as basalt and quartzite in the Western desert and along the Marmarican coast.

1.2. Data Recording Methodologies

Due to the variety of data types, a series of appropriate methodologies for recording and analysis had to be employed. These are described in detail in the introductions of the relevant chapters (Chapters 4-7, see below). As stated above, the material discussed in this theses (excluding the faunal assemblage, see section 7.1) were found from 1999-2008, but most was not recorded in detail until the summer of 2014. Due to the unsettled situation in Egypt during the six-year hiatus, some material had been mislaid from its storage in the Mersa Matruh magazine. Other artefacts had begun to disintegrate due to unsuitable storage conditions in the magazine (high moisture content in the air, insufficient rodent control etc.). As such, a complete record of all excavated material could not be assembled. The study season in 2014 did however successfully record enough material to provide *representative* samples of all the relevant objects pertaining to craft and subsistence production.

1.3. Craft Production Systems

Several theoretical approaches have in recent years been formulated for the study of craft production and industries (Costin, 1991, 2001, 2004 and 2005 but see in particular Costin, 2001 and 2005 for an analysis of the various approaches and developments and Rice, 1987). Only a few of these have been employed in Egyptology (see Werschun, 2010), primarily for the study of pottery (*cf* Warden, 2013). With regards to Zawiyet Umm el-Rakham, the type of site – a military and state constructed settlement with a limited life-span – complicates the use of many of the categories defined by authors such as Costin (2001), as does its partial excavation.

Instead, a simpler framework has been employed in the relevant chapters (namely Chapters 4, 5 and 6), namely the differentiation between 'household production', 'household industry', 'workshop production', 'nucleated workshop production' and 'attached specialist production' proposed by Rice (1987: 183-191) and in particular the narrowed definition of terms provided by Bourriau *et al* (2000). Rice's theory

(1987) was formulated for the purposes of defining craft production of pottery. However the categories are broad and the basic requirements of most craft industries (access to specific raw materials, to specific tools, specialists and workshops) are similar. As such, the current study has utilised the theory for the study of several types of craft production (stone working, spinning etc.) as well as pottery production. This has been done in order to provide a common vocabulary for the purposes of inter-craft comparison at the site. This reliance on the theories formulated by Rice is by no means to be viewed as a rejection of the validity of other scholars such as Costin and their extensive work in the field, but rather a practical adaptation to the limitations of the available data.

Chapter 2: Archaeological and Scholarly Context

2.1. Zawiyet Umm el-Rakham: Excavations and Previous Research

The initial exploration of Zawiyet Umm el-Rakham was made by archaeologist Alan Rowe in the summer of 1946 (**Fig. 2.1** and **Fig. 2.2**) after being alerted to the presence of inscribed limestone fragments at the site by Sheikh Fayez, a local farmer (Rowe, 1953 and 1954 and Snape and Wilson, 2007: 1). The precise location of Rowe's excavations has not been determined, and the plan which he produced cannot be reconciled with any excavated features discovered either by Labib Habachi in his explorations of the site from 1949 and 1953-1955 or by the University of Liverpool team (Snape and Wilson, 2007: 1). The fort came to greater attention in the wider Egyptological community with the publication of Labib Habachi's seminal article chronicling the results of his personal survey in the Western Delta and along the Marmarican coast, visiting and exploring the sites of Kom Firin, Tell Aqa'in, el-Alamein and Zawiyet Umm el-Rakham (Habachi, 1980). Habachi also published a brief description of his work at the site at an earlier date (Habachi, 1955), as well as a series of summary reports by J. Leclant (1954, 1955 and 1956).

Habachi focused the majority of his 1980 article on his excavations at Zawiyet Umm el-Rakham as well as a detailed overview of Alan Rowe's previous work at the site. While Rowe's finds had primarily consisted of inscriptional evidence (most notably

Fig. 2.1:Plan showing the location of Zawiyet Umm el-Rakham (author).

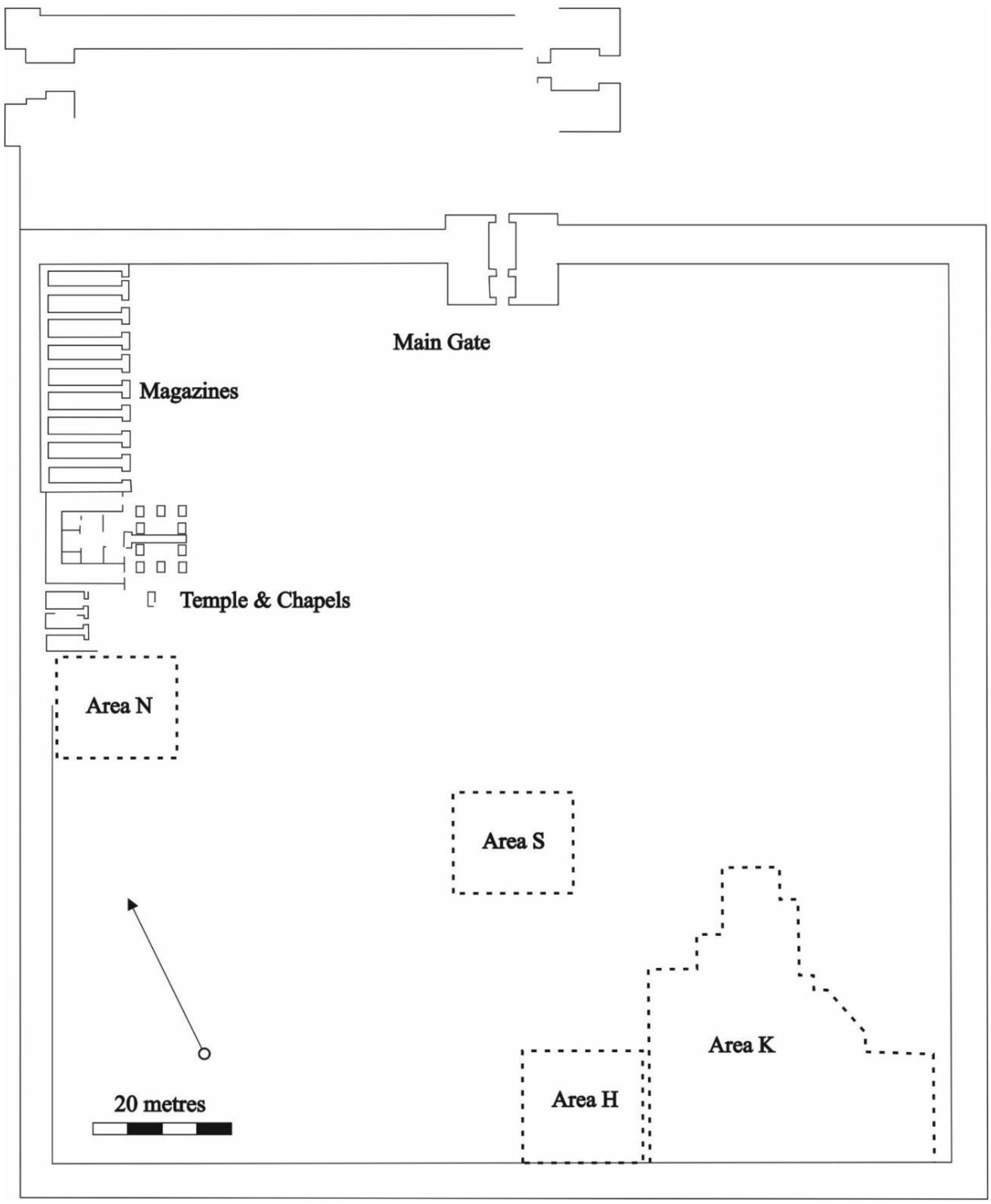


Fig. 2.2: Site plan of Zawiyet Umm el-Rakham (S. Snape and author).

the first evidence of the fort's commander Nebre), Habachi also investigated the architectural remains of the fort, locating a small temple in the North-western corner of the fortress enclosure, a series of private stelae from the same area (Snape and Wilson, 2007: 93-129) and a broad enclosure wall. On the basis of this heavily fortified wall, Habachi suggested an exclusively military function for the installation and in conjunction with Egyptian documentary evidence from the reign of Ramesses II, he proposed that the fortress at Zawiyet Umm el-Rakham had been constructed in response to an encroaching threat from the Sea People (Habachi, 1980: 30).

Significant work at the site was not continued until 1994 when the University of Liverpool resumed excavations at the site. In one of the first preliminary accounts Snape (1998) argues that the fortress of Zawiyet Umm el-Rakham did not exclusively fulfil a military purpose, but more broadly a role as a port of call in a proposed anti-clockwise Mediterranean trade circuit. This claim is supported both by the excavations of Bate's Island, but also by large amounts of imported Mycenaean pottery at the Magazines at Zawiyet Umm el-Rakham. Additionally Snape claims that the fortress may have guarded strategically important water-sources, thereby limiting large population movements (Snape, 1998: 1083-1084). The presence of foreign pottery at the site in large quantities was discussed in greater detail by Susanna Thomas (2000) who highlighted the similarity between the Zawiyet Umm el-Rakham corpus of Mycenaean pottery from Magazine 1 and the ceramic corpus from Kommos in Southern Crete.

Three PhD theses by Thomas (2000), Hounsell (2002) and Simpson (2002) were also submitted to the University of Liverpool. Thomas elaborated on Snape's (1998) preliminary work and discussed the role of Zawiyet Umm el-Rakham in the Eastern Mediterranean trade network during the Late Bronze Age (Thomas, 2000: 318-348) and also the spread of certain technologies in the Eastern Mediterranean such as Egyptian blue pigment. Hounsell and Simpson discussed the issue of Egypto-Libyan relations in the area by employing respectively ground-surveys of Bedouin encampments in the area in an effort to identify Late Bronze Age material, although this method was largely unsuccessful (Hounsell, 2002) and a discussion of non-Egyptian material and architecture found at the site which was convincingly attributed to Libyan squatter activity following the site's abandonment (Simpson, 2002). Surveys in the *wadis* south of the site by the Liverpool team together with Hulin (2001) provided further evidence for cooperation between local Libyans and Egyptians in the form of mixed Libyan and Egyptian sherd scatters dating to the Late Bronze Age.

The strictly military aspects of Zawiyet Umm el-Rakham were further discussed by Snape (2003). Snape initially showed that the Libyans themselves were too technologically unsophisticated to have overwhelmed a garrison inside the walls of Zawiyet Umm el-Rakham, although he also noted that the subsistence strategies of the garrison appeared at least partially dependent on local production of foodstuff and, by extension, on the goodwill of the local Libyan population. Another article by Snape (2004) constitutes a general descriptions of the work carried out since the commencement of excavations.

The two latest publications from the site by Snape (2010 and 2013) are a preliminary discussion of a the issues of self-sufficiency at the site with respect to food production and local industries (Snape, 2010) as well as the possible transit routes along which a supply chain could be maintained from the Nile Valley to Zawiyet Umm el-Rakham by sea and overland (Snape, 2013). The issue of local industries at the site has also been briefly discussed by Hulin (2009), who concluded that metal smelting crucibles associated with Late Bronze Age Libyan squatter activity at the site is a direct argument against the commonly held view of the contemporary Libyans as wholly a-metallic (Hulin, 2009: 19-20, *contra* conclusions reached by Simpson, 2002: 194 and 199). Excavations at the site were interrupted by the outbreak of the 'Arab Spring' and the subsequent unrest in Egypt. Work was resumed in the summer of 2014 with a short study season, which has laid the ground-work for a renewed excavation of the site planned to begin in the spring of 2016.

2.2. Site Overview

While the majority of the data utilised in this study comes from Area K in the southern portion of the fortified enclosure of Zawiyet Umm el-Rakham, references to parallel materials and specific architectural traits of other portions of the fort are nonetheless frequent. This section will therefore detail briefly the primary areas so far excavated as well as the architectural features of and parallels to the site as a whole.

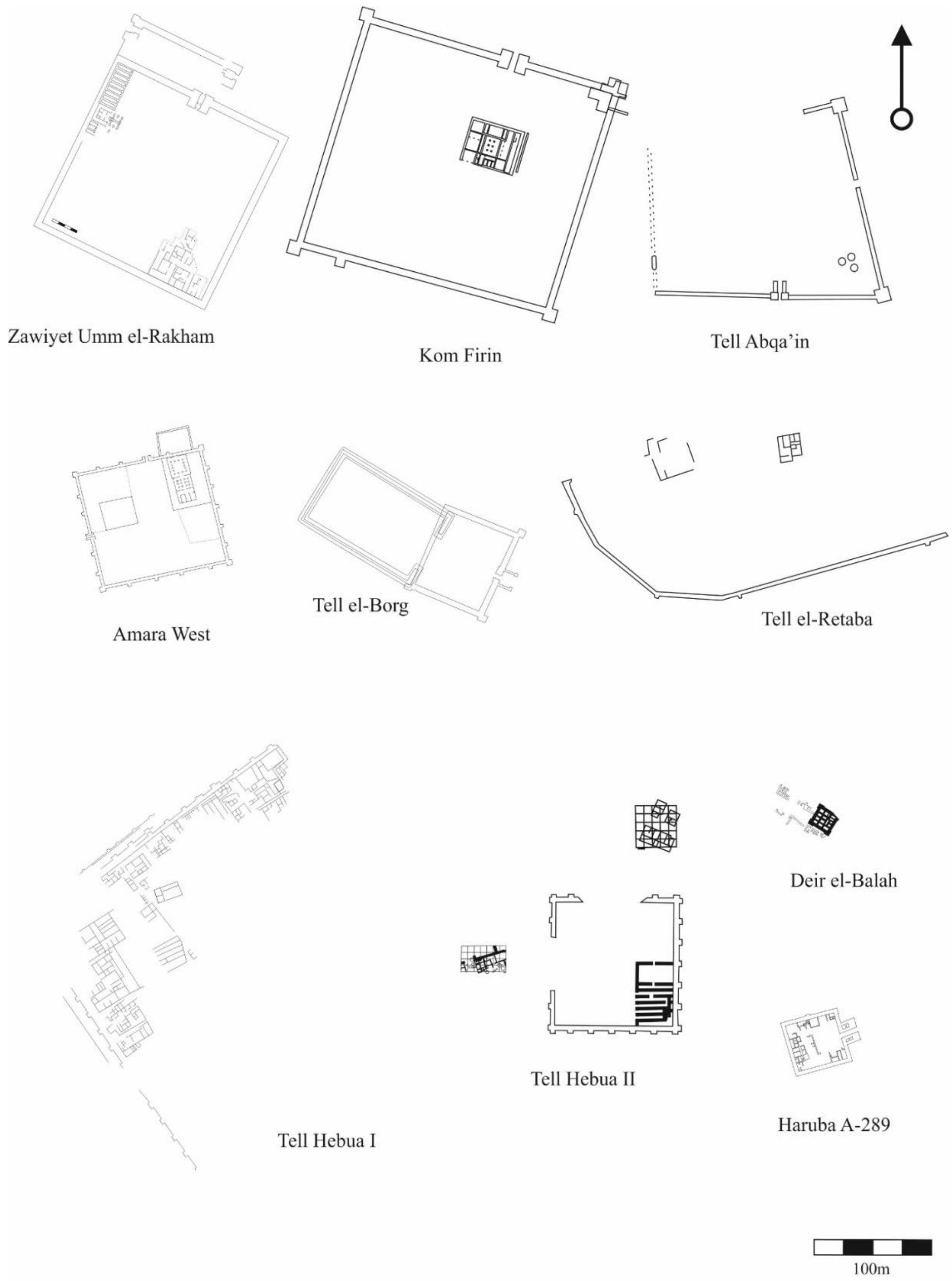


Fig. 2.3: Plan of Zawiyet Umm el-Rakham and contemporary forts (plan by author, based on plans adapted from S. Snape, Spencer, 2014: 7, Thomas, 2011: 521, Spencer *et al*, 2014: back-cover, Hoffmeier *et al*, 2014b: 208, Morris, 2005: 508, el-Maksoud, 1998: 128, el-Ayedi, 2006: Fig. 1, Oren, 1987: 88 and Dothan and Brandl, 2010c: Plan 1).

2.2.1. "*mnnw*-forts upon the foreign land of Tjemeh"

The inscriptional evidence from Zawiyet Umm el-Rakham identifies the structure as one of a series of "[…] *mnnw*-forts upon the foreign land of Tjemeh […]" (Snape, 1995: 171) constructed by Ramesses II. Evidence from the biography of Nebre also label the site as "[…]The Town (*dmiw*) of Ramesses II […]"(Snape and Godenho, in press). These terms are not necessarily conflicting and evidence from the reign of Ramesses III suggests that they were used with some degree of interchangeability (K*RI* V, 14:12-13 and 43:10-12). Zawiyet Umm el-Rakham is one of several fortified structures built, fortified or expanded during the reigns of Seti I and Ramesses II in Sinai, Libya and Nubia (**Fig. 2.3**), and includes the *ḫtm*-forts of Tell el-Retaba and Tell Heboua I, a term defined by Morris (2005: 804-809) as larger forts guarding entry points to the Nile Valley, Tell el-Borg and the *mktr* of Haruba A-289 (Morris, 2005: 512) and Deir el-Balah (Dothan and Brandl, 2010a: 255-256). The term *mktr* has been defined by Morris (2005: 817-820) as smaller fortified structures or midgols exclusively located in North Sinai. The final group of Ramesside settlements under investigation are the the Nubian *mnnw*-forts of Aksha and Amara West and the probable *mnnw*-forts (Spencer, 2014: 33) of Kom Firin and Tell Abqa'in in the Western Delta (Morris, 2005: 809-814) which are architecturally similar to Zawiyet Umm el-Rakham. As discussed by Morris (2005: 627) and Snape (2013: 442) a *mnnw*-fort has been defined as a fortified population centre of some size, although precise size criteria are not clear.

The similarity between the Nubian and Libyan *mnnw*-forts constructed during the early 19th Dynasty are striking, primarily the presence of architecturally similar temples (Snape and Wilson, 2007: 69-92). Tell Abqa'in may also have housed a temple, dedicated to the goddess Anath (Thomas, 2011) but further excavation at the site is needed to confirm its existence. In her publication of New Kingdom fortifications Morris (2005: 809-814) makes an extensive architectural comparison between the Nubian and the Libyan *mnnw*-forts of the early Ramesside period. She postulates that the Libyan *mnnw*-forts were more militaristic in nature than their Nubian counterparts, that they were built to withstand a real threat and that they – like the contemporary fortified installations on the Sinai – were built along a high-way to blockade the advancement of a population group which the Egyptians wished to keep away from their borders (Morris, 2005: 812-813). Inscriptional evidence from the site of Zawiyet Umm el-Rakham (Snape, 1995: 171) however, shows that the site was not located on a high-way leading to potential enemies in a manner reminiscent to the Ways of Horus but was in fact in the middle of a foreign territory. Morris' evidence for the hypothesised increased level of militarism found at Zawiyet Umm el-Rakham and the Libiyan *mnnw*-forts over their Nubian counterparts is the two towers which fortified the gateway at Zawiyet Umm el-Rakham by comparison to the wider gates at sites such as Amara West and Aksha (Morris, 2005: 813), the blockage of stairways to the walls at Nubian forts (Morris, 2005: 813), the presence of a *glacis* outside the walls of Zawiyet Umm el-Rakham and the lack of construction outside the walls of Zawiyet Umm el-Rakham, when construction was evident outside the protection of the enclosure at Amara West (Morris, 2005: 813).

However, from a purely defensive stand-point, the heavily fortified gateway at Zawiyet Umm el-Rakham is merely a single feature. The enclosure wall of Zawiyet Umm el-Rakham for instance lacks the buttresses found at Amara West and Aksha in Nubia (**fig. 1.2**) making it more vulnerable in the case of a siege. The argument that no structures were built outside the walls of Zawiyet Umm el-Rakham and that this is an indicator of a hostile environment is an oversimplification. No structures have so far been found because no one has looked for them. The magnetometric survey of Zawiyet Umm el-Rakham for instance (Snape, 2010: 277) only included the fortress enclosure itself. It can be noted for instance that the digging of a ditch by local farmers to the west of the fort's enclosure wall revealed a great amount of Ramesside pottery immediately beneath the surface (Snape, pers. comm.), which may be indicative of structures outside the walls although further work will be needed to determine their type and extent. Finally, the proposed *glacis* is only partially found at the northern wall (Snape, 2010: 276), and whether its purpose is similar to the 'southern ditch' at the site (to collect flood water and as an area of rubbish deposition) is still unknown (Snape, 2010: 276) and as such considering these ditches as evidence for a raised threat-level is premature.

2.2.2. The Temple and Chapels

The temple in the North-western corner of the site was initially excavated by Labib Habachi in 1954-1955 (Habachi, 1955 ; Leclant, 1956 and Snape and Wilson, 2007: 3). The temple was left partially exposed by Habachi, before being re-cleared by the Egyptian Antiquities Organisation (Snape and Wilson, 2007: 3) and re-excavated during the mid-to-late 1990's by the University of Liverpool team under the auspices of Dr Steven Snape. The temple itself is built on an east-west axis and abuts the external enclosure wall (**Fig. 2.4**). It is similar in general appearance to other early Ramesside temples as Snape has argued such as temples found at Akhsa, Amara West and Gurob (2007: 69-92). The temple is constructed from slabs of the poor

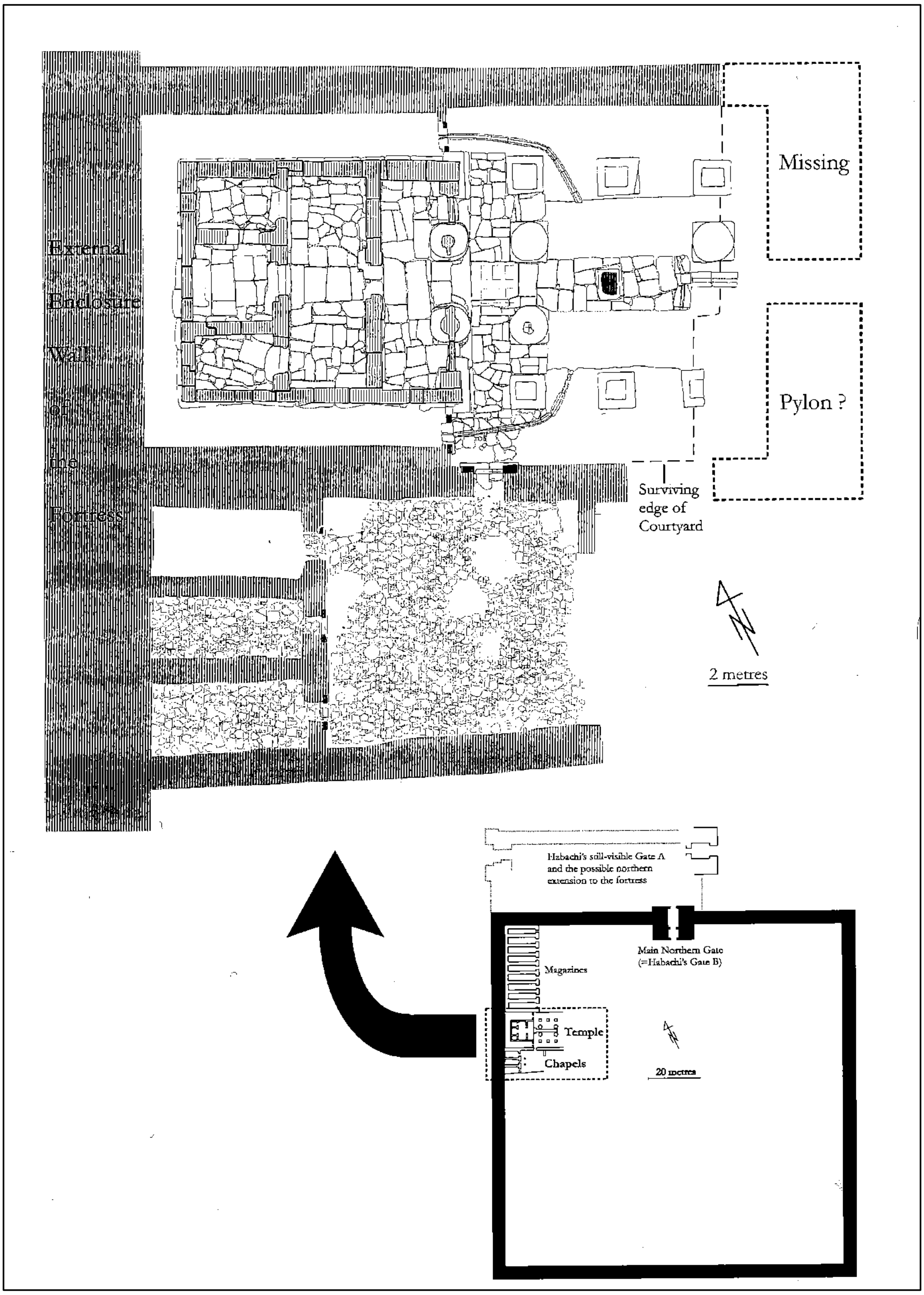


Fig. 2.4: Plan showing location of temple and private chapels with the enclosure at Zawiyet Umm el-Rakham (Snape and Wilson, 2007: 7).

quality local limestone, and includes an external courtyard with a barque shrine and the remains of ten columns, of which only the bases remain.

To the west of this courtyard are two transverse chambers (Outer and Inner Vestibule) and three sanctuaries (Northern, Central and Southern). The rear of the temple stands on a platform, raised in places to a level of 45 cm above the courtyard (Snape and Wilson, 2007: 9-12). No small finds or ceramics were noted in the temple area, most likely due to the repeated excavations and re-excavations in the area since the 1950's. Immediately south of the Temple, the University of Liverpool mission re-excavated three chapels (C1-C3) originally cleared hurriedly by Habachi's workmen in the 1950's (Snape and Wilson, 2007: 33). Clearing the three chapels revealed an assemblage of ceramics, which had been overlooked or ignored by Habachi's workmen, primarily consisting of Egyptian marl-ware vessels and imported materials such as Canaanite storage jars and coarse-ware stirrup jars (Snape and Wilson, 2007: 57-60). A collection of 21 private limestone stela were also recovered from this area by Habachi's excavators and published by Snape and Wilson (2007: 93-129).

2.2.3. Magazines

North of the Temple, the Liverpool team located a series of nine rectangular magazines measuring 16.5 by 3.5 meters (**Fig. 2.5**). Their original roofing had vanished, but in situ limestone door lintels carried the cartouches of Ramesses II as well as in one case, the fortress commander Nebre (Snape, 2004). Eight of the magazines were empty, but Magazine 1 contained a large assemblage of Canaanite storage jars and Mycenaean stirrup-jars. The discovery of this assemblage, published

Fig. 2.5: Magazines at Zawiyet Umm el-Rakham with Magazine 1 in the foreground (S. Snape).

by Thomas (2000) prompted extensive discussions about the role of Zawiyet Umm el-Rakham in the hypothesised counter-clockwise Eastern Mediterranean trade circuit during the Late Bronze Age (Snape, 1998, 2003, 2004 and 2010), especially considering the similarity between the Magazine 1 ceramic assemblage and material uncovered at the Cretan site of Kommos (Thomas, 2000: 528).

2.2.4. Nebre Chapel

The Nebre Chapel is – together with Area N – one component of a hypothetical Governor's Residence, immediately south of the Temple and Chapels. The chapel, which measured 10 by 5 meters was discovered by the Liverpool expedition in 2000, and found to contain a limestone naos (**Fig. 2.6**) dedicated to Ptah and Sekhmet, as well as a 2/3rds life-size statue of Nebre made from fine non-local limestone (**Fig. 2.7**). The entrance to the chapel is fronted by limestone doorjambs dedicated to Ptah and Sekhmet. The full publication of the Nebre chapel has yet to appear, but brief descriptions have appeared in Snape, 2001 and 2004: 151. Excavation in this area is on-going.

2.2.5. Area N

Area N is situated immediately south-east of the chapels and south of the Nebre Chapel. The area was excavated in a single season in 2008 by Glenn Godenho and Steven Snape and measures ten by ten meters. Only two small structures, both seemingly part of a larger complex, were discovered in the area and are architecturally similar to the structures in Area K. Area N may form a small part of a larger complex constituting the headquarters and mansion of the fort's commanders (Snape, pers. comm.).

Fig. 2.6: Limestone naos belonging to Nebre (S. Snape).

Fig. 2.7: Statue of Nebre (S. Snape).

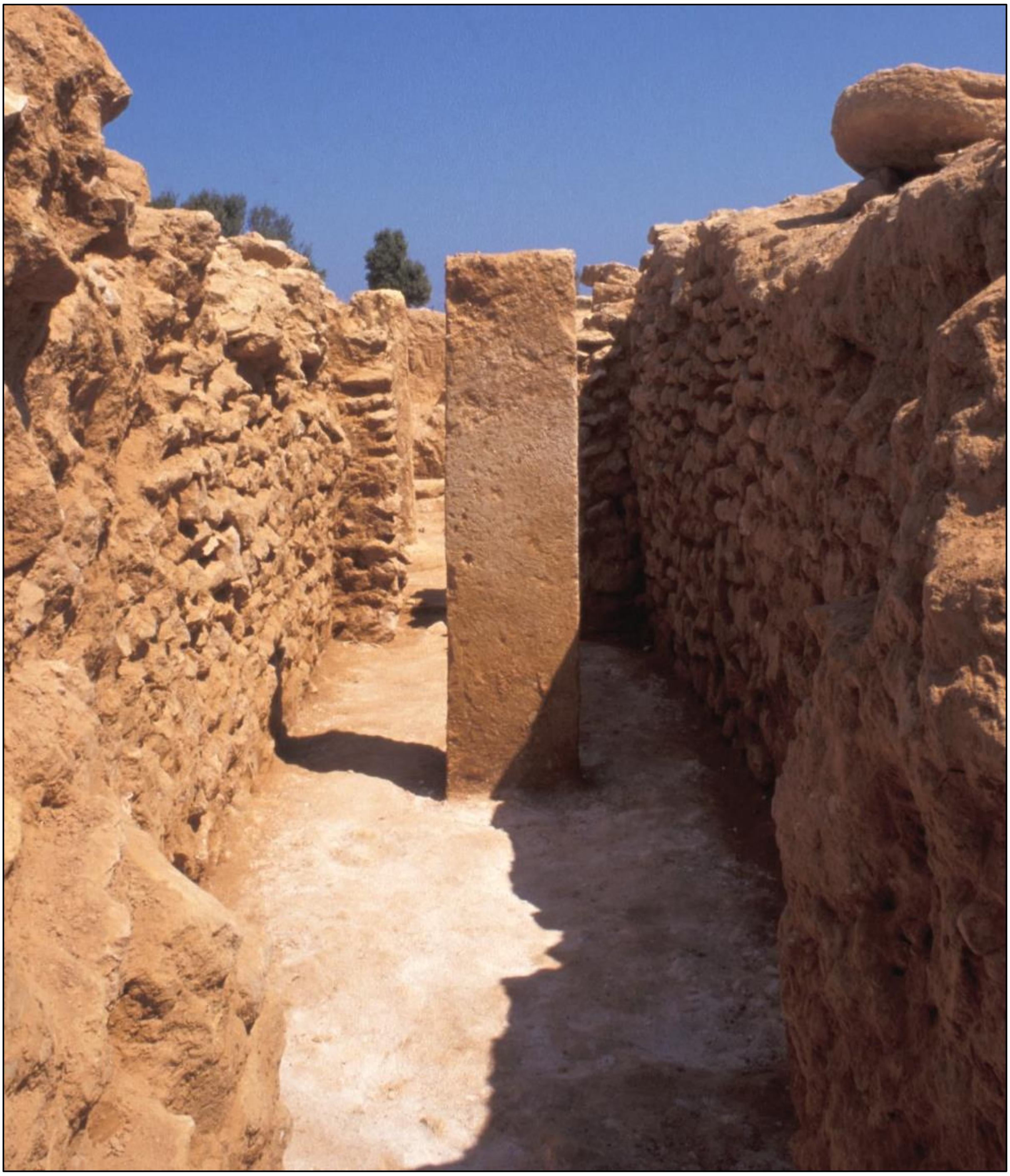


Fig. 2.8: Possible Canaanite shrine in the South Building (Area S) (S. Snape).

2.2.6. The South Building (Area S)

The south building comprises three rooms, the walls of which are built from limestone cobbles held in a mud matrix (similar to the domestic architecture in Areas K and N). The cultic nature of the building has been hypothesised by Snape (2004: 150) on the basis of the presence of large uninscribed limestone monoliths in two of the three rooms (similar to Canaanite massebah shrines, **Fig. 2.8**) and an assemblage of small offering bowls scattered on the floor of the rooms (Snape, 2004: 150). Excavation in the area is on-going.

2.2.7. Granaries H.1-H.3

The three granaries H.1, H.2 and H.3 were uncovered in 2001, and are located immediately west of the domestic Area K (Simpson, 2002: 413 and **Fig. 2.9**). H.1-H.3 are situated along the interior of the south enclosure wall of the fort, and have a diameter of 3.5 meters. They are constructed from limestone cobbles and mud-mortar, and some care has been taken to protect the grain within them, primarily in the form of limestone floor paving and plaster coating of the cobble-stone walls to limit damp and rodent infestation (Simpson, 2002: 413).

At an undefined point during the occupation phase of the site, H.1 was converted from a granary into a baking area; a door was knocked through the outer wall of the granary and two beehive-shaped ovens were placed on the floor paving inside. A door way was also created in H.2 by roughly removing a section of the cobble stone wall, however no material was found in H.2 to indicate bread production (or any production of any type) and the purpose of the reuse of the granary is unknown,

Fig. 2.9: Three granaries located in Area H (S. Snape).

although Simpson speculates that it may have functioned as a wind-break shelter (Simpson, 2002: 413).

2.2.8. The Huts G1-G8 (Area G)

During excavations from 1996-1999, eight circular stone structures were discovered immediately east of the main temple at Zawiyet Umm el-Rakham. These structures were defined by Simpson (2002: 95-184) who convincingly suggested that they had been constructed by local Libyans as shelters shortly after the abandonment of the fort by the Egyptian inhabitants (182-184).

2.2.9. Population Composition

The individuals and groups which constituted the 'elite' at early Ramesside forts are predominately known from inscriptional evidence (stelae, door jambs and statues) found either at the settlements or in associated cemeteries at Zawiyet Umm el-Rakham (Snape and Wilson, 2007), Tell Heboua I (el-Maksoud and Valbelle, 2005), Kom Firin (Spencer, 2014: 27) and Tell el-Borg (Hoffmeier and el-Maksoud, 2003). At Zawiyet Umm el-Rakham private stela set up in a series of chapels located south of the temple complex (Snape and Wilson, 2007) record several Standard-bearers, some of whom are known from monuments elsewhere in Egypt (Snape and Wilson, 2007: 128), as well as two high-ranking officers; a general (*imy-rmš wr*), Panehesy (Snape and Wilson, 2007: 128) and the Troop-commander (*ḥry pḏt*) and Overseer of Foreign Lands (*imi-r ḫ3s*(*w*)*t*) Nebre, who functioned as the fort's commander (Snape and Godenho, in press).

Considering the primarily military elite at the site, it is reasonable to assume that the majority of the common inhabitants at Zawiyet Umm el-Rakham were soldiers. Their ethnicity however, is a more complex issue. The majority of archaeological material from the site is convincingly Egyptian in nature, and parallels most aspects of contemporary Egyptian culture so precisely that it can be assumed that the majority of the occupants at the site were culturally Egyptian. However, other – presumably auxiliary – ethnic groups are also attested at the site (see also Morris, 2005: 633 for further discussion). Textual evidence from the reign of Merenptah attest to the presence of at least two non-Egyptian ethnic groups associated with *mnnw*-forts in Libya (aside from the Medjay, a word which may not at this point in time refer exclusively to an ethnic group), the *ṯktn* and the *n3w* scouts: "The forts [*mnnw*] are left to themselves, the wells (lie) open, accessible? to messengers. The (high)-walled battlements are undisturbed, it is the sunlight that (alone) awakens their guards. The Medjayu-militia [*mḏȝyw*] lie fast asleep, the Niau [*nȝw*] and Tjukten [*ṯktn*] scouts are out in the meadows as they wish." (K*RI* IV, 18:5-18:9 and Sagrillo, 2012: 441). Both groups are poorly represented in contemporary texts, although *ṯktn* most likely refers to Egyptian soldiers of Libyan blood (*Wb* 5, 411.3). A further reference to the cooperation between the *ṯktn* and the Egyptians is the Medinet Habu inscriptions of Ramesses III, which refer to a hostile Libyan chief seeking peace with the Egyptians according to similar terms as those enjoyed by the *ṯktn* (Sagrillo, 2012: 441). The role of these *ṯktn* within Egyptian society and the scholarly debate caused by the geographic origin is also extensively discussed by Sagrillo (2012: 440-445).

At Zawiyet Umm el-Rakham, the *ṯktn* are also directly referenced in the biography of Nebre, the forts commander: "The Town of Ramesses II, the place known to the king, which he built for these Libyan people [*ṯk*[1]], who had been living on the desert like jackals. He made them masters of the town, so that they would plant trees [*dgȝ šn*(*wt*)]; so that they would work many orchards/vinyards [*kȝmw*] in the countryside […]" (Snape and Godenho, in press). This policy of settling Libyans in towns (*dmiw*) bearing the name of Ramesses II is also aluded to in an inscribed block from Suez: "[…] [Resettling the] Libyans in settlements (*dmiw*) bearing his name, Lord of Crowns, Ramesses II […]".(K*RI* II, 406:3).

Archaeological evidence (primarily in the form of ceramics and ostrich egg-shell) also suggests the presence of Libyans at Zawiyet Umm el-Rakham both during and

[1] Following Snape and Godenho (in press), the writing of the population groups as *ṯk* has been assumed as an abbreviated writing of *ṯktn*.

immediately following the Egyptian occupation of the site (discussed by Simpson, 2002: 443-454). Sherd scatters containing a mixture of Egyptian Late Bronze Age shapes and local Marmaric fabric shapes discovered in the *wadis* south of the settlement (Hulin, 2001) further support both the textual evidence and archaeological material from the site. The use of Libyan troops as part of the Egyptian army is also described in the Rhetorical Tanis Stela II: "Libya (*Tehenu*) is cast down under his feet, his slaughtering has prevailed over them. He has captured the country of the West, transformed into soldiery, to serve him." (K*RI* II, 289:18-21).

The possible *massebah* from Area S (Section 2.2.5) viewed in conjunction with locally produced Canaanite objects such as house shrines (Section 4.7.1.2), and a Canaanite stone plate (Section 4.5.4) suggests that a portion of the occupants were Canaanites travelling with the Egyptian army (for a discussion of the use of mercenaries and the problematic nature of the term in the New Kingdom army, see Spalinger, 2005: 7-8). The presence of Canaanites at Zawiyet Umm el-Rakham in Libya can be explained by the practice, alluded to by Ramesses II, of re-settling prisoners-of-war far from their native regions: "[The King] carries off the land of Nubia to the Northland (*or* Delta), and the Asiatics to Nubia; he has placed the Shasu in the Westland, and he has settled the Libyans (*Tjehenu*) on the ridges." (K*RI* II, 206:16-18). So while the majority of the occupants at Zawiyet Umm el-Rakham were most likely from the Nile Valley, it is likely that groupings of both inhabitants from the local area as well as Canaanites constituted a portion of the occupants although their precise role at the settlement is far from precisely defined. The biography of Nebre (Snape and Godenho, in press) however suggests that they assisted the inhabitant's agricultural activities and possibly also served the garrison as scouts.

Only limited information concerning the gender distribution of the occupants at Zawiyet Umm el-Rakham exists. Some evidence in the form of a stela belonging to Nebre and showing him in the company of his wife (Snape and Godenho, in press) may suggest that at least members of the elite within the fort were accompanied by their families. More information may however be inferred from contemporary forts containing nearby cemeteries or human remains, such as Amara West (Binder, Spencer and Millet, 2011) and Tell el-Retaba (Gorka and Rzepka, 2011). The preliminary research into the human and inscriptional remains at Amara West suggests a relatively diverse occupancy during the New Kingdom, with inscriptions testifying the presence of various officials such as messengers, priests and scribes (Binder, Spencer and Millet, 2011: 48), along with the presence of burials of both females and children (Binder, Spencer and Millet, 2011: 52).

Amphora burials containing children, dated to the 19th Dynasty have also been found at Tell el-Retaba (Gorka and Rzepka, 2011) further supporting the notion that family groups were living at the fort contemporarily with the fortification of the site by Ramesses II (Gorka and Rzepka, 2011: 98-99). It is still unknown whether cemeteries existed in the vicinity of Zawiyet Umm el-Rakham although considering the estimated lifespan of the site of 50 years, it is plausible that some may be found during future surveys. The presence of some type of family groupings at contemporary fortress sites in Sinai and Nubia may indicate a similar situation at Zawiyet Umm el-Rakham, although it is problematic to unquestioningly assume similar social situations in the various geographical regions considering the differences in the political and historical context in which the structures existed. However, along with the presence of non-

Egyptian groups at Zawiyet Umm el-Rakham, the possible presence of women and children serve to highlight the potential diversity of a population that cannot be considered as exclusively comprising male members affiliated with the Egyptian military.

2.3. Egypto-Libyan Relations to the early Ramesside Period

The purpose of this section is to describe the state of research and primary sources for Egypt's relationship with various tribal groupings in 'Libya'. The study of Egypto-Libyan relations has been almost exclusively achieved through Egyptian source-material as the ancient inhabitants of the Western Desert have left no textual – and very little archaeological – material behind (*cf* Carter, 1963). Initial studies by Bates (1917) and Holscher (1955) are understandably tainted by contemporary colonial attitudes. Discussions of Egypto-Libyan relations during the Pharaonic period on the basis primarily of textual documentation have been published by Spalinger (1979b), Osing (1980), O'Connor (1990), Kitchen (1990), Snape (2003), Morris (2005: 611-621) and most recently by Garcia (2014).

While Egypt's relationship with its western neighbour was, as Snape (2003: 93-94) states, less developed than the relationship with other foreign territories, evidence for contact nontheless appears already from the early Dynastic period and the 'Libyan Palette' found at Hierakonpolis, which contains an early hieroglyph associated with the word 'Tjehenu' (*ṯhn*(*w*)) used in conjunction with the term 'Tjemeh' (*ṯmḥ*) throughout the Pharaonic period to denote a specific group of nomads or a specific area of land in the Western Desert (Snape, 2003: 97). Evidence from the Old Kingdom is predominately in the form of stylised monumental representations of Tjehenu-

Libyans being dominated by the King (such as the relief of Ne-User-Re (Borchardt, 1907: 47 and pls. 9-10) and Sa-Hu-Re (Borchardt, 1913: 10-5 and pl. 1) and cursory mentions in the biographies of Harkuf (*Urk*. I, 120-31) and Weni (*Urk.* I, 98-110).

A raid by Mentuhotep II recorded at his chapel in Denderra (Habachi, 1963: 21-3 and pl. 5) and also on a fragmented inscription from Gebelein (Habachi, 1963: 39), constitutes the earliest evidence of Middle Kingdom relations with the Tjehenu-Libyans. Another raid by the Egyptians against the Tjehenu is alluded to in the *Tale of Sinuhe* (Sethe, 1929: 3-17) and also on a private stela from the reign of Senwosret I (Stela Berlin Museum 1199). The Tjehenu also appear in the Execration Texts (Posener, 1940: 25), but no information about names of chiefs or toponyms is listed. The inclusion of the Libyans instead appear entirely symbolic, rather than representative of an actual threat, perceived or real. The references to Tjehenu and Tjemeh in the pessimistic literature of the period, such as the *Prophecies of Neferty* (Helck, 1970: 55) and the *Dialogue of Ipuwer and the Lord of All* (Enmarch, 2008: 14.13) similarly provides no detail about Egypto-Libyan relations as such, but present the Libyans as stereotypical enemies of Egypt and harbingers of chaos and disorder.

Slightly more substantial evidence for Egypto-Libyan relations appear during the 18th Dynasty where the Tjehenu-Libyans appear occasionally as minor trading partners on for instance the Karnak Obelisk inscription of Hatshepsut (*Urk*. IV, 373). Considering the typical African goods which the Libyans trade (ivory tusks and panther-skins), Osing (1980: 1021) suggests that the Libyans of the Western Desert functioned occasionally as middle-men handling typically Nubian goods. Some hostility during this period is also suggested by an inscription from Soleb dating to the reign of

Amenhotep III wherein the king claims to have seized Tjehenu Libyans in a raid and used the captives as a labour force (*Urk*. IV, 1656). The Meshwesh (*mšwš*) and possibly also the Rebu (*rbw*) also appear during in the Egyptian records during the later 18th Dynasty (Snape, 2003: 98-99).

By the early 19th Dynasty, further evidence of hostile contact between Libya and Egypt is described in the battle reliefs of Seti I from the Karnak temple (Oriental Institute Epigraphic Survey, 1986 ; K*RI* I, 20:15-24:5), which may depict a battle against Meshwesh, rather than Tjehenu-Libyans (Kitchen, 1990: 17). These have been studied in detail primarily by Murnane (1985: 151-153) and Spalinger (1979a: 34) and also discussed by O'Connor (1990: 87) and Morris (2005: 613-615). Murnane in particular argues that the generic style and lack of any detail in the account of Seti's Libyan campaign may indicate that the campaign – unlike his campaigns in the Near East – served little military purpose (1985: 151-153). Morris (2005: 614) and O'Connor (1990: 87) however argue for an increasingly hostile situation between the Egyptian state and some Libyan groups during the 19th Dynasty, even to the extent of suggesting that the campaigns of Seti I were a response to actual Libyan invasion attempts (Morris, 2005: 813). Morris (2005: 614) cites three sources as support for this hypothesis: a private stela from Wadi es-Sebua recording the use of Tjehenu prisoners-of-war as labourers (K*RI* III, 95:12-14) and the two pieces of royal monumental inscription which detail the settling of Libyans within cities bearing the name of Ramesses II and their use as soldiers (Morris, 2005: 614, see Section 2.2.7 above).

However, the passivity of the Libyans in their reaction to Seti's attack - hiding in the desert rather than face the Egyptians (K*RI* I, 22:5-6) – could be perceived as an argument against any type of decisive pitched battle, which – as Morris (2005: 614) also notes – the Libyan nomads would have no interest in fighting. As Kitchen (1990: 17) suggests, Seti's campaign may have pacified the region and allowed the construction of the line of forts along the Marmarican coast in the reign of Ramesses II. It is unclear however, whether this pacification was the intention of Seti's campaign. By Year 5 of the reign of Metenptah, groups of Libyans, including the Tjehenu, Meshwesh and Libu bolstered by groups associated with the 'Sea People' launch an invasion or migration against Egypt (Snape, 2003: 99 and Manassa, 2003) driven possibly by an environmental disaster in Libya (Kitchen, 1990: 20). This invasion attempt may also have prompted the abandonment of the settlement at Zawiyet Umm el-Rakham as no inscriptional material post-dating Ramesses II has been found.

Chapter 3: Archaeological Context

3.1. Introduction

The purpose of the following chapter is to provide an overview of the structural remains from Area K at Zawiyet Umm el-Rakham (**Fig. 3.1, Pl. I**), so that this might serve as an architectural context with which an analysis of the small finds and ceramic corpus from this area can be combined. It will also discuss building techniques and materials used in the area. Area K is located in the south-western corner of the fortress enclosure and at the present comprises some 410 m^2 of excavation. The nature of the area is wholly domestic, with low rambling cobble stone walls (**Fig. 3.2**) as well as ovens, mortar emplacements (**Fig. 3.3**) and other evidence of food production activities (Snape, 2010). The walls are preserved to a height in places of a metre and more, and their relatively smoothed surfaces have caused speculation that they may have been topped by mud brick courses (Snape, 2010: 278) as is indeed evidenced in one instance [1102] where a substantial mud brick wall is still preserved on top of a foundation of cobble stones held in a silt matrix.

3.2. Excavation Methodology

The excavation was supervised by Dr Steven Snape and Dr Susanna Thomas from 1999 to 2002. Clearing the surface layers using small teams of local workmen supervised by archaeologists from the University of Liverpool, the excavators revealed the tops of the cobble stone walls. In the earliest season (1999), a grid was laid over Building 1 and each grid was excavated in turn to ease the recording of objects. From 2000 onwards, the grid method was abandoned due to the close

Fig. 3.1: Plan of Area K (see also Pl. I) (S. Thomas and author).

Fig. 3.2: Overview of Area K, looking north from Space KH (S. Snape).

Fig. 3.3: Space KG (right) and KS (left) looking north, showing <1066> and an embedded mortar in KS 1100 in the forefront of the picture (S. Snape).

proximity of the remains to the surface (see Section 3.3 below) and each area identified on the surface, was simply named and then cleared. The silty sandy matrix >10 cm above the identified floor level/primary occupation phase of the structures in Area K (1000) was sieved through a 5mm mesh, although the majority of the finds from the area were recovered by hand during excavation from floor level. The excavation was carried out using trowels and small hand-shovels, as well as brushes. Mattocks were exclusively used for removing the topsoil where required and for backfilling.

The matrix between the topsoil (999) and the upper deposit (1000) was found to comprise a mixture of windblown sand, mixed with broken down mud brick dissolved by the frequent winter rains. This homogenous matrix was in some areas interrupted by thin layers evidencing torrential rain or flooding of the site. These generally took the form of strata of silt mixed with largely dissolved mud brick. These deposits were not recorded in detail and no sections were drawn.

No context or feature numbers were assigned during excavation, and only a final plan at the end of the work was completed. The context numbers have instead been assigned to the final top plan by the present author on the basis of notes taken by the original excavators following the example by for instance Harding and Healy (2013: 69). This has been done where possible following the Single Context Recording system developed by Edward C. Harris (1979) wherein a context is defined as a discreet event in time and includes both structural elements, but also deposits, surfaces and cuts, following Spence (1994). The purpose of assigning these numbers for the thesis was predominately for ease of referencing various structures and deposits in-text, although it is of course clear to the present author that a complete list of all possible context numbers cannot be ascribed on the basis of the surviving evidence from the excavation.

As might be expected when excavating a site which was placed on a coastal plain, there are few contours to the landscape. As a result, the floor levels across Area K were largely on a similar level. Levels were taken using a total station with a provisional survey point established in 1999 on a stone block east of the temple (Snape and Wilson, 2007: 32) and given the value of 10m above sea level. Levels taken in Area K during the following excavations were adjusted spot heights taken from this point. Levels were only taken in certain areas of the site in conjunction with finds found on floor level, and in general levels were primarily consistently taken during the later seasons. The levels are noted on Pl. 1.

Finally it should be noted that while the text repeatedly references C. Tietze's typology of 'houses' from Tell el-Amarna (1985) for structural comparanda, the present author avoids the use of the somewhat laden term 'house', opting instead for the more neutral 'building' or 'structure'. As discussed by Spencer (2014: 46), it is problematic to clearly distinguish between terms such as 'house' and 'workshop' as structures fulfilled multiple uses, and some verbal neutrality is therefore prudent.

3.3. Summary of Site Phasing

Phase 1. Natural Topography

The earliest phase in the history of Area K is the natural topography upon which the area was constructed, namely a flat coastal plain roughly half-way between the southern shore of the Mediterranena to the North and the limestone cliffs of the Marmarica formation to the south.

Phase 2. Construction of Building 0a and 0b as well as [1103] and [1188]

During this phase the two structures Building 0a (associated with Areas KM, KN and KQ) and 0b (associated with Areas KA, KB and KAB, see Pl. 1) located in the north and the south-eastern end of the excavated area respectively were constructed. Also, two cobble stone walls [1103] in the south-western corner of the site and [1188] associated with Area KY were constructed, although their relationship to contemporary structures is currently unclear. It is clear however, that B.0a and B.0b predates the primary occupation phase of Area K comprising B.1-B.5 and may represent the first occupation on the site, most likely – due to the fairly small and unimposing size and lay-out of both structures – in the form of dry stone shelters for the labourers occupied with the construction of the fort.

Phase 3.a. Construction of B.1-B.4

Coinciding with the main occupational phase of the fort in the early part of the reign of Ramesses II (Snape, 2003), Buildings 1 to 4 (see Pl. 1) were constructed, in the case of B.4 directly atop the previous shelters found on the site (B.0a). In association with B.1, the wall [1031] which dates to Phase 2 was removed to make room for [1032] and [1033]. The east wall of B.2 seems originally to have been [1080] which was not extended until Phase 3.c. In B.3, the deposit (1122) originally formed part of a wall connecting [1123] and [1124], which pre-date the construction of [1125], as well as [1133] and [1134]. In the northern part of the trench, it seems unlikely that the apparently impromptu shelter of KZ would be constructed simultaneously with B.4, but no evidence suggests later construction.

Phase 3.b. Reconfiguration of B.0b and construction of [1002]

The primary construction during this phase was the reconfiguration of the shelter B.0b. While some features were clearly allowed to remain standing (notably [1003] and most likely [1009]), the majority of the interior walls (*cf* [1004], [1005], [1006] and [1008]) were deliberately collapsed to a much lower level, creating a large open space (KAB), which functioned as an outdoor communal area. The passage between KAB and the large courtyard KL was also blocked with the construction of [1002].

Phase 3.c. Closing access from KL to KG/KW and extension of B.2

This phase seems unlikely to have taken place immediately after the construction of the cluster B.1-B.4, as it effectively seals passage to between the courtyard KL and the well, KG (as well as the surrounding area KW). While another entrance [1056] is available from KS to KG, it is so narrow (>20 cm) as to be largely unusable. The blocking of the passageway between KL and KG/KW was facilitated with the construction of [1079] further narrowing an already constricted passage. Secondly, the passage was obstructed with a fill of cobble stones (1073). Both ends of the passage were then blocked two limestone slabs **1072** and **1074.**

Phase 3.d. Construction of B.5

As the shape of the cobble stone wall [1189] clearly follows the orientation of [1184] associated with Building 4, it can be viewed as evidence that the construction of Building 5 (see Pl. 1) postdates Building 4, and places it at some point after Phase 3.a.

Phase 4. Post-Abandonment Collapse

Rubble from the collapsing cobble stone walls are common deposits across the site, and may be linked to the collapse of the mud brick walls which stood atop them, following the abandonment of the site by the Egyptian garrison and general lack of upkeep. A more precise dating for these collapses has not been possible, although from the location of the rubble either directly on or immediately above the occupation surfaces and debris (such as small finds and ceramics), the collapse most likely took place not long after the abandoning of the site.

Phase 5. Libyan Scavenging Activity

Limited Libyan scavenging of Area K is also evidenced by ZUR/KL/11, a hairpin of Egyptian manufacture, deposited *above* the post-abandonment collapse. This scavenging has been assigned to a single phase as the evidence for its internal chronology is unclear.

Discussion: Construction Phases, Occupation Phases and Ovens

As argued by Snape (2010: 272) on the basis of inscriptional evidence, there seems to be only a single short occupation of the fortress during the early- to mid-19th Dynasty, coinciding with the reign of Ramesses II. Nothing in the archaeological record in Area K suggests major later occupation of the site (Snape, 2010: 272). Some indicators however, suggest minor changes to the site during the Egyptian occupation. The main structural changes to the site have been discussed above, but one further type of feature shows evidence of repeated alteration and reconfiguration, namely the fifteen ovens found in Area K. These domed bread ovens are identical in their construction to contemporary structures found for instance at Deir el-Medina (Bruyère, 1937-1939: 72-74) and the Workman's Village at Tell el-Amarna (Samuel, 1999 and 2000: 566) in the Nile Valley. The archaeological record at Zawiyet Umm el-Rakham suggests that they were not used in synchronisation. Only six were found complete upon excavation, with the remainder showing signs of deliberate attempts at removal (as in the case of [1135] and [1136] of which only the very base of their ceramic shell remain) or even underlying later constructions (such as [1138] which underlies [1137]).

In most cases the reason for the deliberately abandoning of the ovens is most likely a simple necessity due to wear on the oven after repeated use over a period of years. In other cases, such as the construction of [1029], which may post-date the abandonment of [1013] and [1014], the reason may be that surrounding structures were reconfigured: The reconfiguration of B.0b from an enclosed structure to an open space may have made the location more desirable for baking. Together with the many minor structural modifications in Area K, the continued building and abandoning of the ovens in the area combine to show a high degree of activity and a heavy use of the area throughout the occupation of the fort.

3.4. Structures: Buildings

The buildings in Area K are similar to other domestic structures from settlement sites excavated in Egypt in that they comprise a series of rambling and intermingling and interconnected walls forming structures of ascribable and comparable types (Shaw, 1992: 148 ; Tietze, 1985). The buildings differ however in their use of local limestone cobble stone held in a silt matrix rather than the far more common mud brick. This change is clearly an adaptation to the wetter conditions at Zawiyet Umm el-Rakham due to the heavy autumn and winter rains. As Snape (2010: 278) has concluded, the cobble stones either comprised the entire wall, or provided a more sturdy foundation for mud brick walls, with the added benefit of raising the exposed mud brick above the level of potential flooding to which the site was exposed. The utilisation of cobble stone and mortar architecture can therefore be seen as an adaptation to a geo-environmental condition. There are seven buildings identified in total, two dating to Phase 2, four to Phase 3.a and one to Phase 3.d.

Building 0a (Fig. 3.4)

Building 0a corresponds to the earliest construction phase (Phase 2) and underlies rooms KM and KN in B.4. Wall [1178], the longest surviving structural component of this building measures 5.10 meters. Two shorter walls ([1179] and [1182]) originate from [1178] measuring 2.20 and 1.90 meters respectively. A fourth cobble stone wall [1181] may originally have connected the two shorter N-S oriented walls. The four cobble stone walls are all substantially thinner than the later Phase 3 walls related to B.1-5.

From this it is clear that the walls could not have supported a significant structure, and the building most likely represents a temporary shelter (perhaps in combination with lean-tos) similar to those found at the 18th Dynasty fort at Tell el-Borg, where they may have functioned as temporary housing for the men who worked on the construction of the site (Hoffmeier, 2004: 90). The most likely conclusion is that

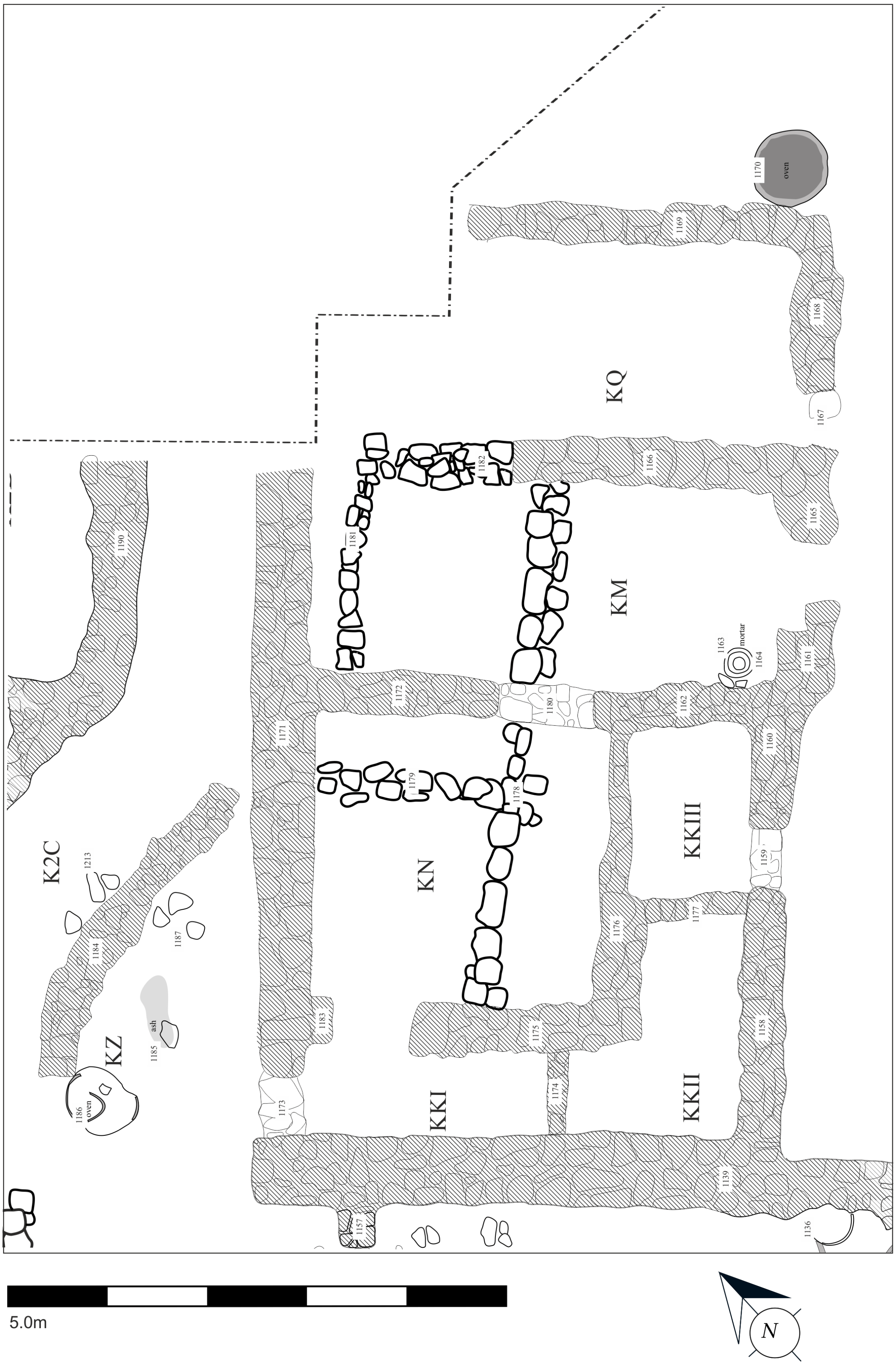


Fig. 3.4: Building 0a (S. Thomas and author).

B.0a originally served as one of multiple temporary shelters used during the construction of the settlement, which were later removed to make room for more substantial and permanent structures in Area K.

Building 0b (Fig. 3.5)

As with B.0a, B.0b comprises a series of thinner cobble stone walls than those used in later construction, and it appears contemporary with B.0a. The structure comprises four low walls which were deliberately removed almost to ground level in order to facilitate passage from KF directly through to KJ and the eastern extent of Area K. The cobble stone wall [1004] (measuring 1.30 meters) underlies the later [1003], probably belonging to Phase 3.b when the area was reconfigured. Walls [1005] (2.60 meters) and [1006] (1.50 meters) were similarly removed to ground level, together with the connecting wall [1008] (3.40 meters) which most likely formed the end wall of B.0b, a structure with an uncertain shape but which may have served in a similar capacity as B.0a.

Building 1 (A, B, C, D, E, KF, KC, KE, KG) (Fig. 3.6)

B.1 and its associated structural components were excavated over an extended period. In the 1999 season, Spaces A-D were uncovered as well as a blocked up passage-way, Space E. In 2001, four further spaces, KC, KE, KF and KG were excavated. While the original structure resembles a typical Egyptian house Type 1b

(Tietze, 1985: 65), the adjoining areas E, KE, KC, KG and KF have been considered part of this structure, as their relationship to any other existing buildings are unclear. The size of the main nucleus of B.1 (Rooms A-D) is 5.0 m x 6.0 m (30 m^2) and with

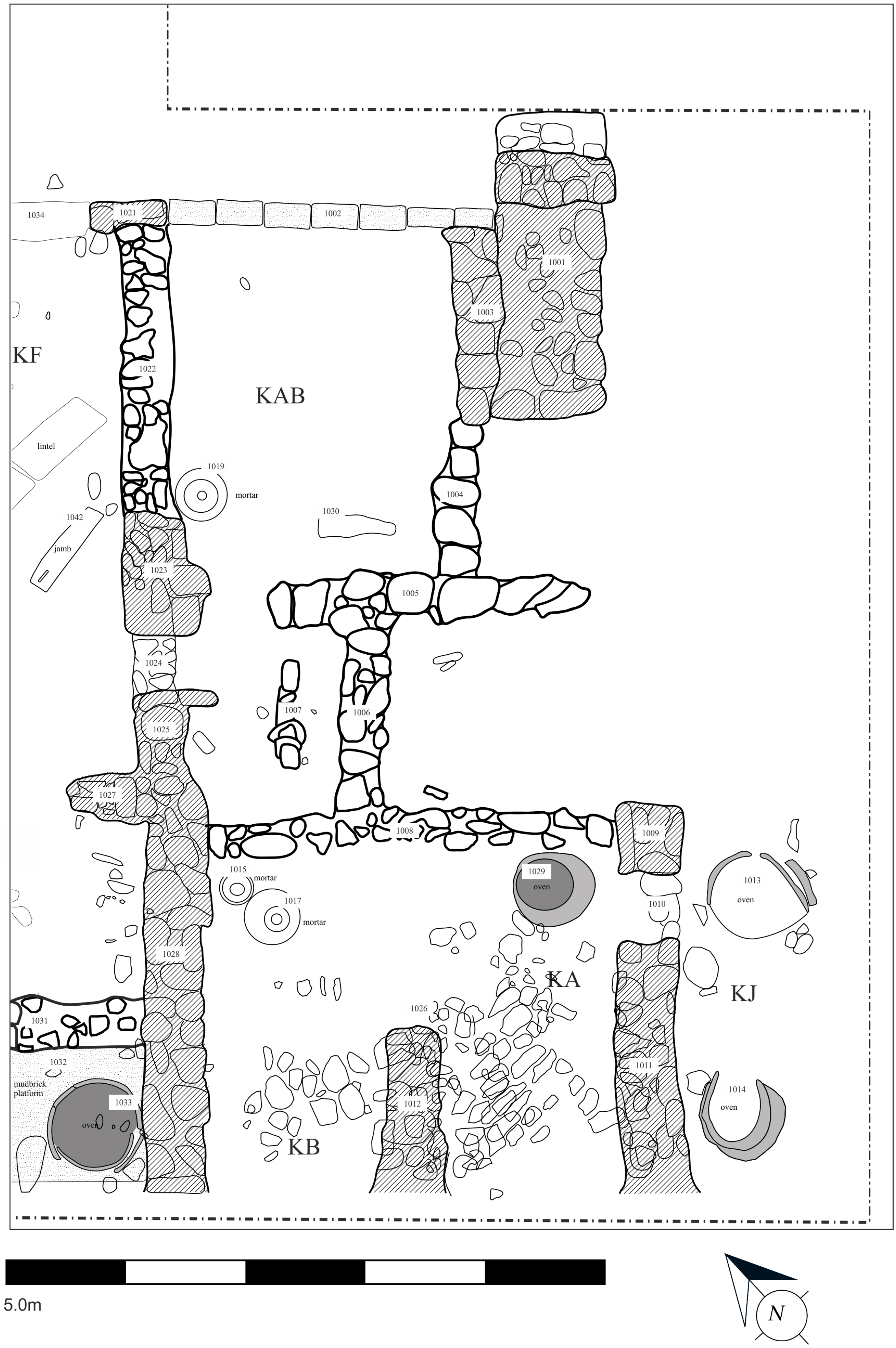


Fig. 3.5: Building 0b (S. Thomas and author).

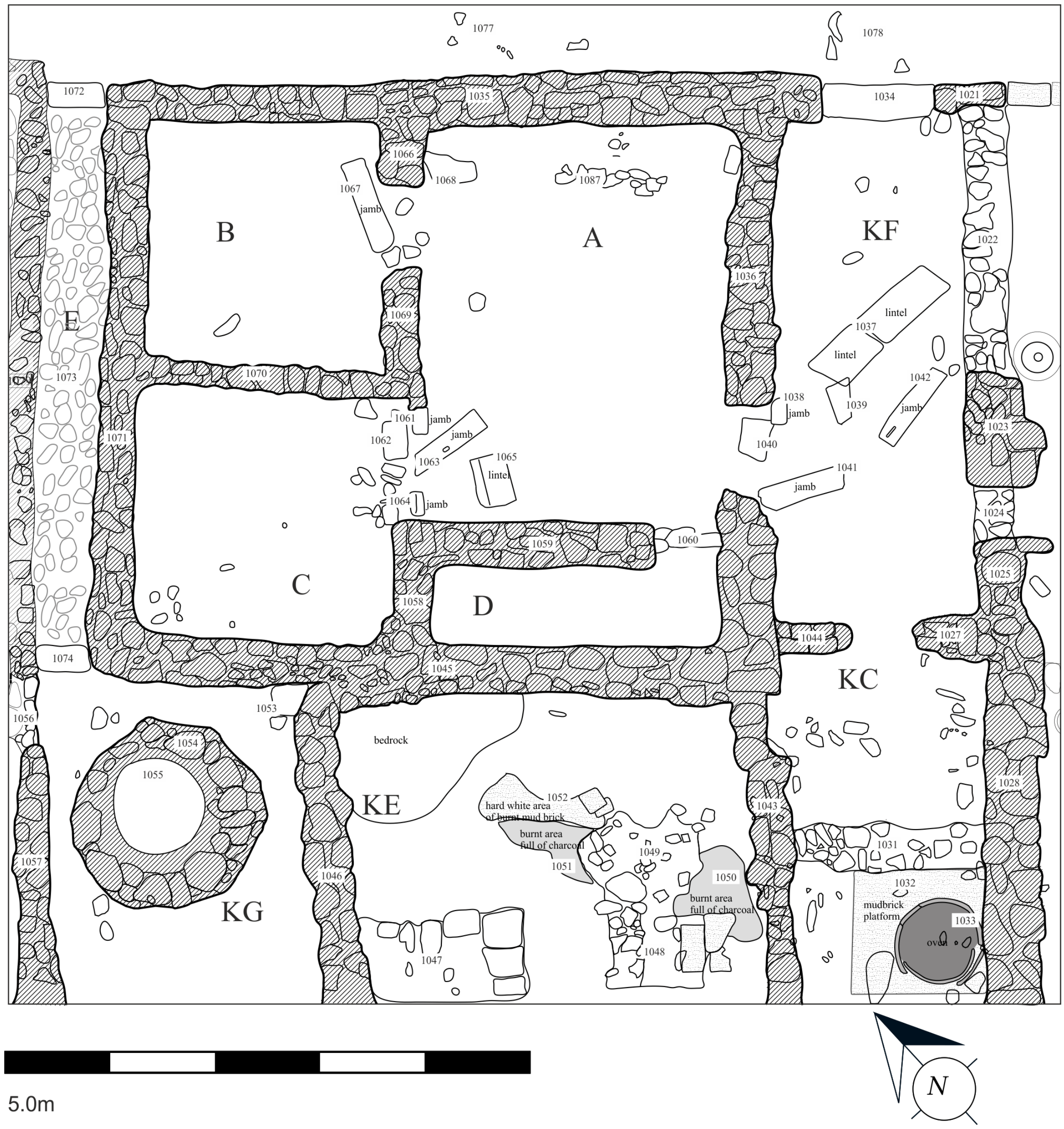


Fig. 3.6: Building 1 (S. Thomas and author).

the addition of the supporting structures listed above, the whole complex is roughly 8.8 m x 8.0 m (70.4 m^2). The exterior and interior dividing walls are uniformly constructed from local limestone rubble (cobble stone) held in a silt matrix, and most door ways are flanked by limestone lintels and door jambs. The structure was floored with densely packed sandy soil except for a small area in Space KE where part of the floor is comprised of exposed bed rock.

Space A

Space A is the central room in B.1, measuring 3.2 m x 4.0 m (12.8 m^2). A significant concentration of fragmented limestone lintels and jambs suggests that all three major passages between rooms (although not the southern doorway leading to Space D) were flanked by these. The main entrance to the room is via Space KF, and is situated in the centre of the south-eastern walls [1036] and [1053]. Two doorways to the north-west of the room provide entrance to Spaces B and C, one between [1066] and [1069] and the other between [1069] and [1058].

Space B and Space C

Space B is the first of two identically sized supporting rooms to Space A. Situated in the north-western corner of the building, Space B measures 2.1 m x 2.2 (4.62 m^2). Space C measures 2.1 m x 2.1 m (4.2 m^2).

Space D

Measuring 3.2 m x 0.8 m (2.56 m^2), Space D may have functioned as an auxiliary storage room for B.1, as it is unlikely that anything other than transitory occupation could be accommodated within the small space. The single entrance to the room passes through a north-eastern entry point. Another possibility is that the room originally contained a staircase, although no archaeological traces of this remain.

Space E

Space E was originally a passage ways which lead from the courtyard KL to Space KG and Well KW. It comprises a deliberately blocked passage, filled with cobble stone rubble (1073) and plugged in either end by limestone slabs [1072] and [1074]. It measures 0.5 m x 5.2 m (2.6 m^2) and is not accessible from any adjoining space.

Space KG

Space KG is a roughtly square room with a well <1055> (also identified as KW) cut into the limestone bed rock in its centre. As such, the well and the surrounding cobble stone pavement [1054] fill most of the available space. The room measures 2.5 m x 3.2 m (8.0 m^2) and following the blocking of the passage-way (Space E), there is no apparent entrance to the room, indicating that the well fell out of use. It is possible that further excavation to the south-west of the room may reveal a secondary point of entry to this section.

Space KE

Following its initial construction in Phase 3.a, the two buttresses [1047] and [1048] collapsed during the area's occupation phase as charcoal deposits (1050) and (1051) from this phase are intermingled with the rubble (1049) originating froim [1048]. KE also contains an area described by the excavators as burnt white mudbrick (1052) and in the north-eastern corner of the room there is a surface of exposed bed-rock. The room measures 2.3 m x 2.8 m (6.44 m^2) and the large ashy deposits may be indicative of an area of refuse burning, or even a dismantled hearth or oven.

Space KC

Space KC functioned as a wind-break and reception room to Building 1 and especially Space A, which it adjoins. The room is narrow and rectangular, measuring 1.0 m x 4.5 m (4.5 m^2).

Space KF

Space KF constitutes the only apparent kitchen area associated with Building 1 where an oven is still intact. The arrangement of oven built atop or next to a mudbrick platform - [1032] and [1033] respectively - is common both in Area K (see for instance Building 2, Space KO), as well as Ramesside sites in general, and parallel structures have been found in Area 1 at Tell el-Retaba (Rzepka, 2009: 254) and Building MS.X at Tell Heboua (Abd el-Maksoud, 1998: 143). A notable feature is the low wall [1031] which pre-dates the construction of both mud brick platform and the oven. This wall may date to Phase 2, and considered contemporary to the nearby B.0b.

Building 2 (KD, KS, KH, KO, KI, KU, KT) (Fig. 3.7)

Building 2 was excavated over two seasons, 2001 and 2002 (2001: KH, KI and KJ ; 2002: KD, KO, KT and KU). Structurally the building is similar to Tietze's house type 1.e (1985: 66) in that it constitutes a single large room (KO) fronted by a long narrow entry way (KD) as well as a small, narrow store-room (KI) and 2-4 anciliary chambers (KU, KT, KH and KS). The structure is square, measuring 8.8 m x 8.8 m (77.4 m^2).The construction of Building 2 is linked to construction phases elsewhere

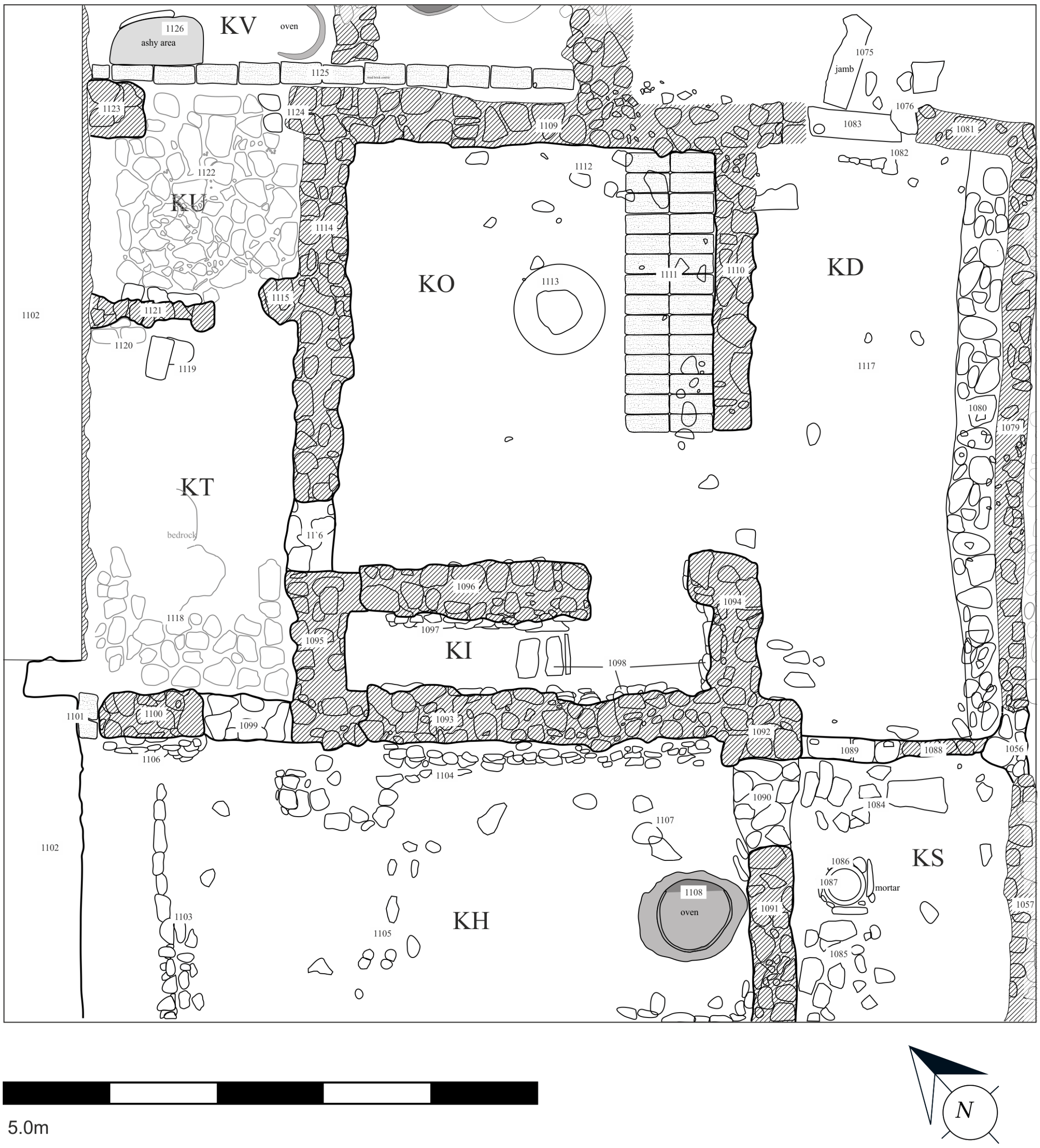


Fig. 3.7: Building 2 (S. Thomas and author).

in Area K. Phase 3.a saw the construction of the building itself, most likely contemporarily with Buildings 1-4. During Phase 3.c the east wall of KD [1080] was widened [1079], most likely to fascilitate the blocking of Space F, which lead to Space KG and the Well KW.

Space KD

This room constitutes the primary entry point to B.2 and measures 2.0 m x 5.5 m (11 m^2). A limestone doorstep **1083** is still in situ in the door way while two broken door jambs **1075** and **1076** lie immediately outside in Space KL. Another point of entry leads from Space KD directly to the main room of B.2, Space KO in between [1094] and [1110].

Space KH

This room is the largest auxiliary chamber to the main area, Space KO. It measures 2.7 m x 6.5 m (17.6 m^2). The remains of an earlier structure, dating to Phase 2 are visible in the form of [1103]. An oven [1122] is situated in the southern corner of the room. The room's western limit does not terminate in a cobble stone wall, but is partially ended by the limit of the excavation, but also by a heavily fragmented wall of mud brick [1102] so damaged as to make excavation impossible. This wall, where the bricks are aligned in a header bond, may indicate the actual terminus of not only B.2, but the entirety of Area K. What structure this wall is a part of, and what may lie beyond it is still unclear. Another notable context is [1101] a small mudbrick plug apparently constructed to join [1102] to [1100].

Space KI

Similarly to Space B in B.1 (which it resembles both in size and lay-out), the purpose of Space KI is most likely as a storage room associated with the main area, KO, although it is also possible as Tietze has suggested (1985: 66) that the room also contained a stair case leading to the roof, although a significant deposit of broken pottery and tools in the room may suggest otherwise. The area measures 0.6 m x 3.2 m (1.92 m^2), compared to 2.56 m^2 for Space B in B.1.

Space KS

This room is another small area located south of Space KD. It has two entry points, one leading to Space KD and one to Space KH. The size of the room is 2.3 m x 2.4 m (5.5 m^2). In the room there are two significant deposits of cobble stone rubble (1084) and (1085), which from their position along [1091] are most likely to have originated from there. A mortar **1086** is also found in this area.

Space KO

This room is the main structural space in B.2; it is not only large (although not the largest room in the structure), but more importantly, it is central with either direct or secondary access to all other areas. It measures 3.6 m x 4 m (14.4 m^2). Primary entrance however is afforded via a doorway between [1110] and [1094], leading from Space KD. The most notable contexts in the room are an oven [1113] and an ajoining mud brick platform [1111], reminiscent in design to the mudbrick platform associated with the oven in Space KC. It is however considerably larger than any of the other similar platforms found at Zawiyet Umm el-Rakham, measuring 0.9 m x 2.6 m (2.34 m^2). It may be considered a *mastaba* type bench, but the location of the oven may instead suggest its use as a shelf or work surface for storing and preparing dough for baking.

Space KT

Space KT is the largest of the two auxiliary chambers of B.2 situated furthest back from the main entrance. The room is rectangular in design, measuring 2.0 m x 3.4 m (6.8 m^2), and has three access points; one which leads across [1116], from the central Space KO, another which provides access acroos [1099] from Space KH and the final which leads to the smaller auxiliary chamber KU. A fill of cobble stone rubble (1118) in the southern end of the room, most likely originating from a partial collapse of [1100] and [1095] is also located in the room.

Space KU

Space KU is the smallest of the two auxiliary chambers situated in the rear of B.2 (KU and KT) measuring 1.4 m x 1.6 m (2.24 m^2). Entrance is afforded by an opening leading from Space KT. Space KU is primarily taken up with a significant fill of cobble stone rubble (1122). The nature of this rubble can be explained if considered in conjunction with mudbrick wall [1125]. Following Phase 3.a, a wall which originally connected [1123] and [1124] collapsed into Space KU, opening a space leading to Space KV in B.3. The lowest level of cobble stone, still bearing some semblance of an orderly placement, is still visible in the gap between [1123] and [1124].

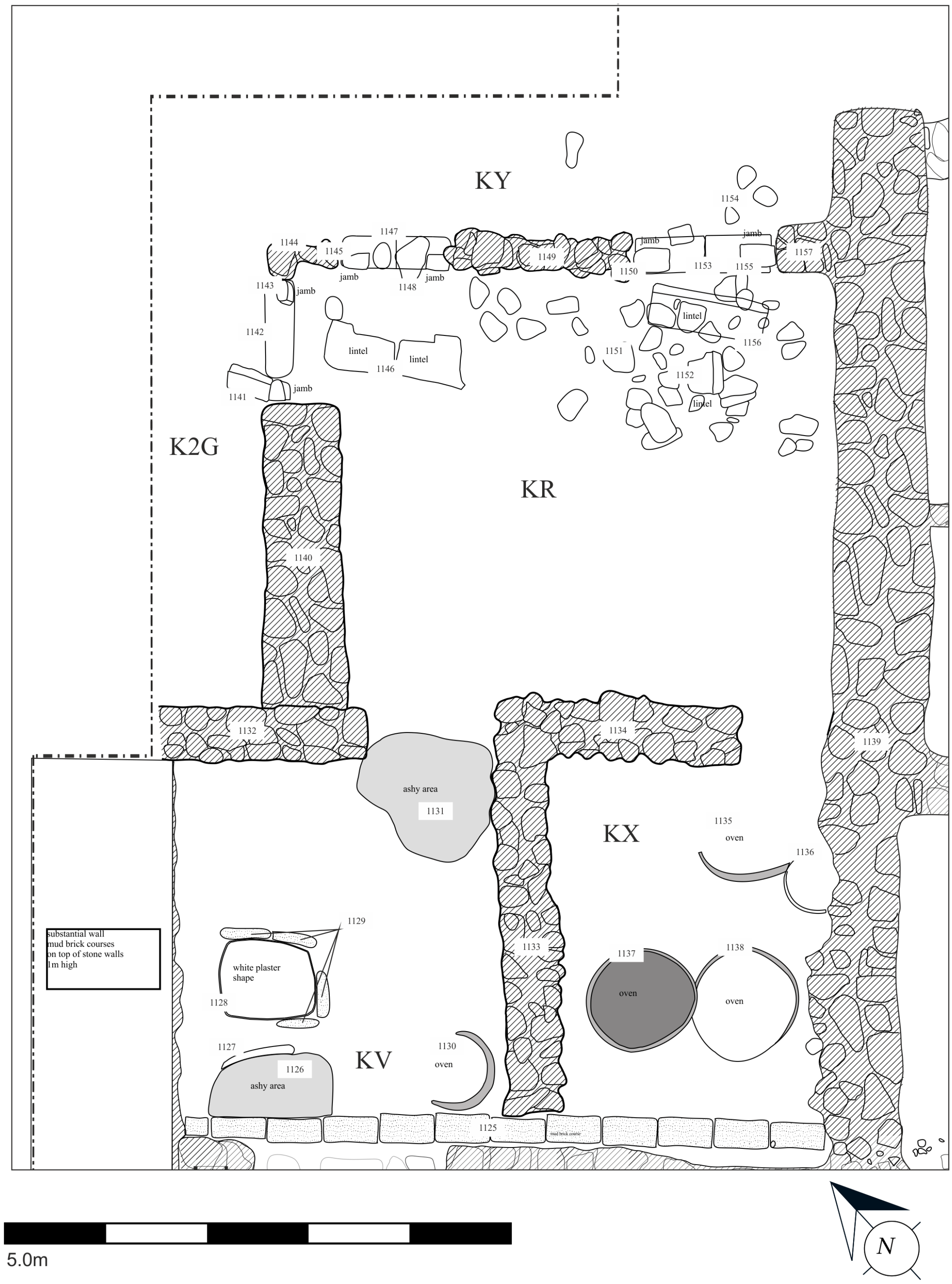


Fig. 3.8: Building 3 (S. Thomas and author).

Building 3 (KR, KV, KX) (Fig. 3.8)

Building 3 is the smallest structure in Area K, and is reminiscent of Tietze's Type 1a (1985: 64) and also MS.XI from Tell Heboua (Abd el-Maksoud, 1998: 143). The structure comprises a main space (KR) with two anxiliary work –and/or storage spaces (KV and KX) in the rear of the building, which measures 4.8 m x 6.5 m (31.2 m^2) with the addition of the slightly larger shape of KV which breaks the rectangular outline of the structure and adds an additional 0.6 m x 2.7 m (1.6 m^2) providing a total sqare area of the building as 32.8 m^2.

A number of contexts within Building 3 suggests several structural alterations. [1139], a long cobble stone wall which is contemporary with [1109] related to Space KO, Building 2 suggests that the two structures were built simultanously. However, following the collapse of the north-eastern cobble stone wall of KU, Building 2 and the addition of mudbrick wall [1125], it seems that a dividing wall [1133] with a buttress [1134] was raised to divide rooms KV and KX, which had up till that point most likely constituted a single space. The later reconfigurations of the internal room structure are apparent, but their precise interrelationship is difficult to determine.

Space KR

This room measures 3.0 m x 3.5 m (10.5 m^2) and comprises the largest space in B.3. Access to the area was facilitated by three door ways, all found with limestone jambs and lintels associated and in some cases *in situ*. Two of the entry points, seperated by [1149] are located in the northern terminus of the room, and the final point of entry between [1140] and [1149] is in the north-eastern corner. Direct access to Rooms KV and KX, which may have served as auxiliary chambers to Space KR was fascilitated through two door ways along the southern wall of the room.

Space KV

Space KV is the first of two smaller auxiliary areas in B.3 and measures 2.3 m x 2.6 m (5.98 m^2). It contains two contexts dating to the primary occupation at the site, (1126) and (1131) located in the north-western corner of the room. A white plaster shape (1128) surrounded by four narrow mud-bricks [1129] which originally comprised part of a now largely destroyed bulwark surrounding the entire shape could be considered a mixing trough, and is most likely related to the baking which took place in the area and the room itself (evidenced by the presence of [1130]). The west wall [1102] of Space KV is not the narrow cobble stone wall, which is common across the site. Instead, it is a substantial brick wall with a thickness of 0.9 m built on top of a cobble stone wall and preserved to a height of one meter. Its exact purpose is unclear. It runs parallel to Rooms KV, KU and KT and is not structurally associated with the fort's main enclosure wall south-west of Area K, and further excavation will need to be conducted on the north-west side of [1102] in order to hypothesise regarding its function.

Space KX

Space KX is the second small auxiliary chamber in B.3, measuring 1.8 m x 2.6 m. The majority of the available space in the room is taken up with four ovens [1135], [1136], [1137] and [1138]. Following the collapse of the cobble stone wall which seperated KV and KU (1122) and the construction of [1125], this mud brick wall was built across the south-western edges of *both* Space KV and Space KX, even

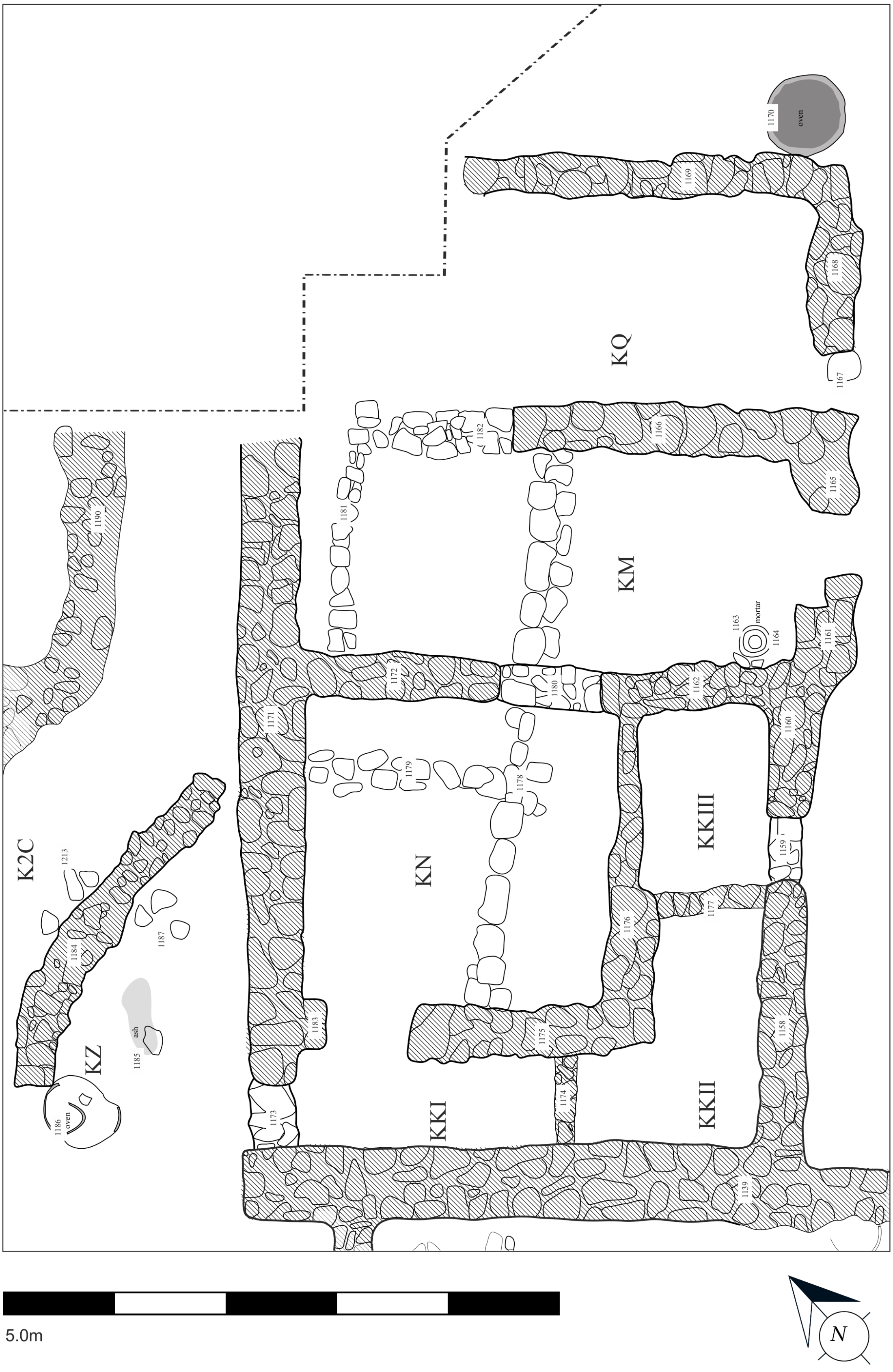


Fig. 3.9: Building 4 (S. Thomas and author).

though the cobble stone wall [1109] which seperated Space KX and Space KO, B.2 was still standing, resulting in the creation of a dual-wall of mud brick and cobble stone between Space KX and KO.

Building 4 (KM, KN, KQ, KZ, KKI, KKII, KKIII) (Fig. 3.9)

B.4 was excavated in 2001 and 2002. The main elements of the structure (Rooms KM, KN, KQ and KK1-3) is similar to Tietze's 1.C (1985: 66), that is to say a main quarter (KN) surrounded by smaller auxiliary chambers (KK1-3) and an entrance room (KM). An additional wind-break [1184] was added which create an outside work area (KZ). The nucleus of the structure (KM, KN, KP and KK1-3) measures 5.0 m x 6.6 m (33 m^2) and with the addition of areas KQ and KZ the total area of Building 5 and its environs is roughly 46.44 m^2. The stratigraphy of the structure is unique, as the walls of an earlier dwelling, B.0a, are visible running through the main area of the structure [1178], [1179] , [1181] and [1182]. These remains are assigned to Phase 2.

Space KM

Space KM is the primary entrance room of B.4 and measures 1.8 m x 4.6 m (8.28 m^2). Access is afforded from the courtyard KL between [1161] and [1163]. Further access to B.4 is across [1180] into the main area, Space KN. As with Space KQ (see below), the floor level in Space KM is more uneven than in the remaining spaces of Area K with a general trend towards a slope falling from the north-western to the south-eastern corners of the space.

Space KN

Space KN constitutes the main space around which the additional rooms in B.4 are constructed. The room measures 2.7 m x 2.8 m (7.56 m^2) and its main contexts are – as with Space KM – the evidence of a prior structure (B.0a) in the form of two cobble stone walls [1178] and [1179]. There are no other obvious structural contexts apparent in the room.

Space KQ

Space KQ most likely functioned as a wind-break and/or workspace associated with B.4 and also the courtyard KL. It is defined with two cobble stone walls [1168] and [1169], and measures 2 m x 3.5 m (7.0 m^2). The floor level of the area is less plain than across the remainder of the site with a significant slope falling 43.00 cm from the southern to the northern edges of the space. An oven [1170] in association with a large amount of small finds related to the processing of grain (see Section 4.2) was found on the eastern side of [1169].

Space KZ

The final area of B.4 is the outside area KZ. It measures 2.94 m^2 and comprises a single cobble stone wall acting as a wind-break [1184]. The most notable contexts of Area KZ is a single oven [1186] along with an ash deposit (1185) which may be related to the cleaning of querns with fire (see Section 4.2).

Space KKI

Space KKI is a small anciliary chamber in the west of B.4. It measures 0.9 m x 2.2 m (1.9 m^2). It has two entry points, an eastern entry leading from Space KN and direct access to the outside area KZ, across [1173].

Space KKII

Space KKII is the largest anciliary chamber in B.4, and it measures roughly 4.5 m^2. It has no obvious entry points, but it seems likely that the thin cobble stone walls [1174] and [1177] were possibly low enough to step across providing access to both KKI and KKIII.

Space KKIII

Space KKIII may have served as a direct passageway between the interior of B.4 and the large courtyard KL across [1181], alhthough a door step or lintel between KN and KKIII was not found during the excavations. The room measures 1.7 m x 1.1 m (1.87 m^2).

Building 5 (K2A, K2B, K2H) (Fig. 3.10)

B.5 comprises a larger domestic structure which is only partially excavated with three areas excavated in the 2002 season (K2A, K2B and K2H). Considering the largely unexcavated state of the building, a type is difficult to ascribe, although the room configuration is suggestive of a larger unit than Buildings 1-4, and on the basis of the three individual chambers on the southern side of the building, and the fact that these clearly continue further north-east, the most likely type is a larger structural hub such as Tietze's Type 2d (1985: 69).

To the south B.5 is bordered by a narrow passageway which separates it from the wind-shelter KZ (K2C). The size of the excavated portion of the building is roughly 27.5 m^2. As discussed above, there is strong evidence that B.5 was constructued after B.4 and it has been relegated to Phase 3.d (see section 3.3 above). While the floor of

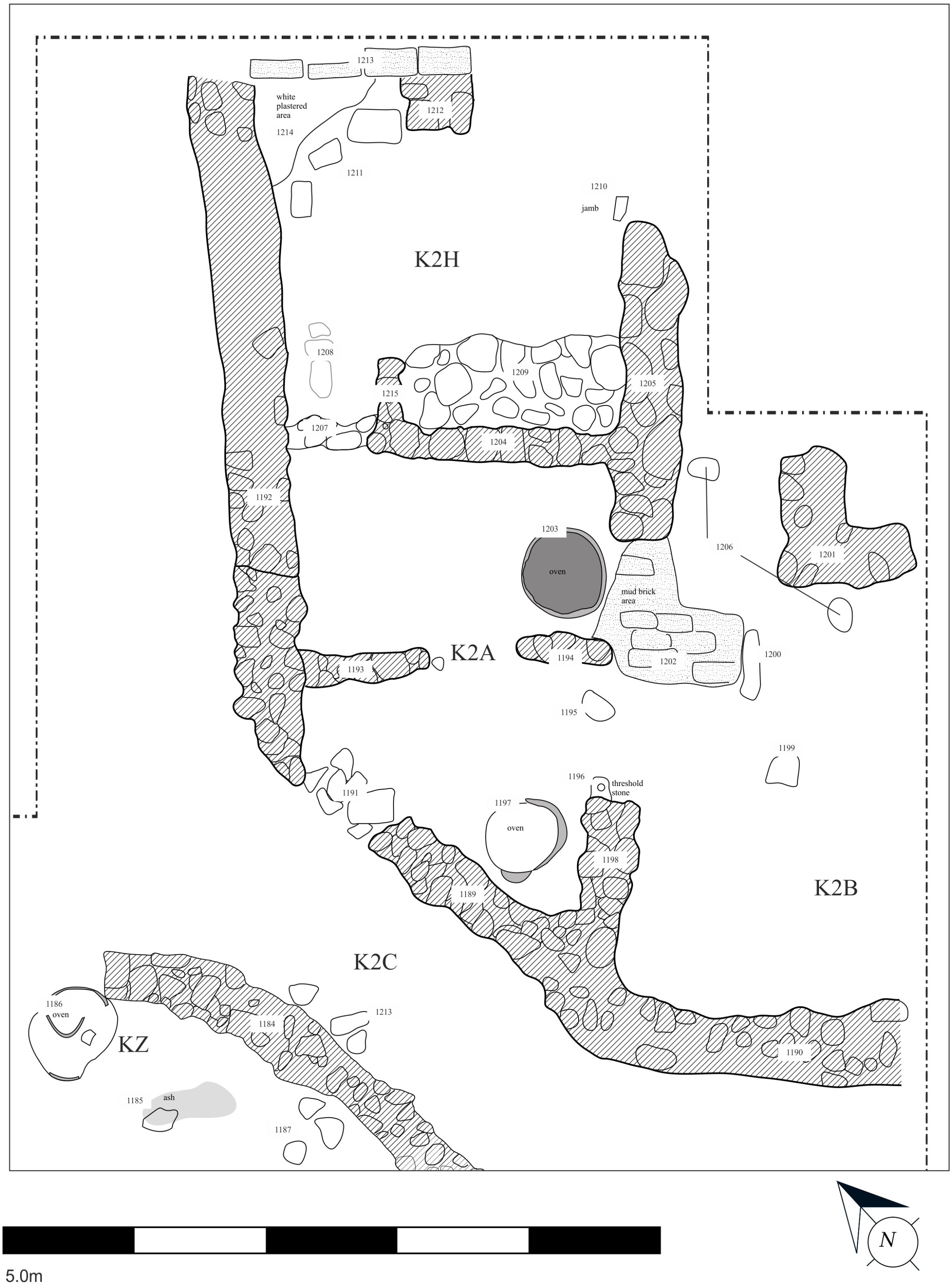


Fig. 3.10: Building 5 (S. Thomas and author).

the building upon excavation was simply packed sandy soil, it can be suggested from (1214) – a plastered surface in K2H that the entire building may have had plaster floors similar to those found at Tell el-Amarna (Kemp and Stevens, 2010a: 208-209).

Space K2A

Space K2A served as supplementary to the main room of B.5 which remains unexcavated. The area measures roughly 8.42 m^2 and is situated in the south-western corner of B.5. There are a series of notable contexts which suggest that the space was modified following its construction. Among these is a mudbrick area [1202] which effectively blocked off the passage created by the two cobble stone walls [1194] and [1205]. This in turn suggests that the oven [1203] was constructed after this passage was blocked. A dismantled oven [1197] is located in the southern corner of K2A and [1203] may have been constructed as its replacement. Entry to K2A was across the doorstep [1191] which leads in from Space K2C, across [1207] to Space K2H or between [1198] and [1202] (where a threshold stone or pivot block **1196** still remains *in situ*) to Space K2B.

Space K2B

Space K2B is only partially excavated and it may become apparent at a later date that it is in fact two distinct rooms, although not enough information is available at this stage to make the distinction. The excavated portion of the room measures 2.4 m x 4.8 m (11.52 m^2) and was situated in the southern part of B.5 and judging by its size, it may have served like K2H and K2A as auxiliary service rooms to the main area of the structure. A curiously isolated cobble stone dividing wall [1201] was found in the northern sector of the room. Its exact purpose is unknown, but may be discovered when more of B.5 is excavated in the future.

Space K2H

K2H is another auxiliary chamber to the only partially excavated B.5 and the excavated portion measures 3.0 m x 2.5 m (7.5 m^2). The main contexts are a white plastered area in the north-western corner of the room (1214). The north wall of the room [1213] is constructed from a single stretcher bond of mud bricks although more courses may be uncovered when excavation is extended further north. Another significant context in the space is a grouping of cobble stone fragments held in a matrix of silt in a southern alcove of the room [1209]. This may be either the bottom step of a stair-case or – considering its size (1.9 m x 0.8 m) – it may be some type of resting platform for visitors and storage. Entrance to the room was either through the north-eastern corner, where an un-inscribed limestone door jamb **1210** was found, or through the southern wall where a narrow passage with a doorstep consisting of a lower course of cobble stone masonry [1207] leads to Space K2A.

3.5. Structures: Courtyards and Streets

A number of outdoor areas such as courtyards and streets which connect the main buildings are clearly identifiable within Area K. Some, such as Courtyard KL were clearly planned early in the construction of the area, as several other structures are built to face it, while others such as Communal Zone 1 are the result of a reconfiguration of an existing building into a far more open space which seems unlikely to have been roofed due to the removal of interior walls which could have acted as supports for a second storey or a roof.

Communal Zone 1: KA, KAB, KB and KJ

The communal zone or outdoor area comprising KA, KAB, KB and KJ is intrinsically linked to the demolished B.0b. This is primarily due to the shared nature of several walls that remain standing (such as [1003] and [1009]) which were clearly part of the original structure of B.0b before its removal. There is a heavy concentration of grain processing implements in the area (three out of five mortar emplacements from Area K are located there), indicating a communal processing of grain prior to baking (similar to the communal zone found at E13.13 at Amara West, Spencer, 2015: 189).

Space KAB

Space KAB is the largest space within the communal area, in essence the area between [1008] and [1002]. To the north the space is enclosed by a finely laid mudbrick wall [1002] while a more confusing and apparently multiperiod series of cobble stone walls ([1001] and [1003]) define its north-eastern perimeter. The majority of the room is influenced by the remains of B.0b in the form of the low remains of cobble stone walls (such as [1005]). A single mortar **1019** is located in this area, as is some debris probably relating to the removal or collapse of B.0b (such as (1007)). The area measures roughly 14 m^2.

Space KB

The room cluster KB, KA and KJ are distinctly different from the more cohesive KAB unit in that these three areas are only partially excavated, and further excavation to the south is needed to identify their southern perimeter. The excavated portion of Space KB measures 1.3 m x 2.8 m (3.5 m^2). Aside from wall [1028] and the large dividing wall/butress [1012] the only notable contexts are a large pile of cobble stone rubble (1026) most likely steming from [1012] scattered across the center of the room and also in Space KA. Also, in the room's northern corner there are a further two mortars – **1015** and **1017**.

Space KA

The excavated portion of this room is 1.3 m x 2.8 m (3.5 m^2), identical in size to Space KB. While Space KB had a minor scatter of rubble, the apparent collapse of [1012] was considerably more wide-spread in KA, where the majority of the floor is covered in cobble stone rubble (1026).

Area KJ

Area KJ may originally have functioned as an outside area for baking related to B.0b evidenced by two disbanded ovens [1013] and [1014]. Following the convertion of B.0b into a more open space, these may have been abandoned in favour of [1029] in Space KA. The excavated portion of Area KJ measures 1.3 m x 2.8 m (3.5 m^2).

Courtyard KL

The courtyard KL is the primary unifying feature of B.1-2 and B.4 in Area K. All these structures have direct points of access to the area. No structural remains which might commonly be found in contemporary courtyards, such as shrines (found for instance in the courtyard of P.24 at Tell el-Amarna (Stevens, 2006: 222-223) or in larger dwellings at the same site (Stevens, 2006: 220-221)) have been located in KL.

Significant portions of the faunal remains recovered from the site (see Chapter 7) were found in four clusters located within the courtyard, along with tools (see Chapter 4). This could signify that the courtyard functioned as a butchering area and/or an area intended for waste disposal. The courtyard is roughly 17 m^2.

Courtyard KY, K2G

KY and K2G may form a part of an open space courtyard, but their relationship and extent will need to be defined by further excavation. Very few finds and only one architectural context has been located, [1188]. Space KY also leads directly to both Space KZ and the 'street' K2C, and as such provided access from B.3 to B.5. The boundaries of the excavated portions of KY and K2G are too uncertain to provide meaningful measurements.

Street K2C

Knowledge of the extent of the elongated space or 'street' K2C, which divides B.4 and B.5, hinges upon further excavation to the east of these structures, but it seems plausible based on observed surface remains that K2C continued eastwards, providing a northern point of access to Space KQ before curving south to join with the Courtyard KL, effectively providing all the excavated structures (as well as further structures located to the west of Area K via Space KY) with access to the main courtyard KL and more easily facilitating movement within and between the somewhat confined architecture of the area. The excavated portion of K2C is roughly 14.5 m^2.

3.6. Discussion

The aim of the chapter was not only to provide a detailed overview of the architectural remains in Area K to serve as a context for the small finds, ceramics and faunal remains found in the area to be discussed the following chapters, but also to provide evidence for a discussion of the form, the function as well as the building techniques and raw materials employed in Area K. As discussed above, the utilisation of cobble stone and mortar architecture served a practical purpose of lessening the impact of a flooding of the site and therefore an adaptation to a geo-environmental condition. Furthermore, with the *Hamada*-type desert widespread on the nearby Marmarica Plateau, limestone cobbles would also be readily available, and the choice to go from the coastal plain up the escarpment to the plateau above and simply collect these stones may have been considered sensible procurement strategy as it in turn reduced the number of mud bricks which had to be created from local silt (such as was done for the enclosure wall).

Whether or not the seeking out of significant raw material on the nearby plateau (or alternatively a smaller amount of suitable stones which may have been washed down from the plateau to the edge of the coastal plain) was a viable exchange for manufacturing fewer mud bricks, the availability of the choice itself is significant. If it is correctly assumed that the earliest structures in Area K (B.0a and B.0b) are roughly contemporary with the early construction phase of the fortress itself, the choice to construct from *Hamada* stones show that even at a relatively early point in the permanent Egyptian military presence, enough control was maintained in the area to make such excursions away from the primary hub of Egyptian activity safe enough to consider. This in turn shows a significant control or pacification of the nearby area and the locals who periodically inhabited it from a relatively early stage in the Egyptian presence in the area of Zawiyet Umm el-Rakham. Even though it seems likely that a smaller fortified structure was erected to protect the builders of the larger fortification (Snape, pers. comm.), who were housed in structures such as B.0a and B.0b, the choice to stray to the edge of the coastal plain and the plateau can still be interpreted as an expression of at least a basic measure of local security.

A noticeable feature which the structures from Zawiyet Umm el-Rakham generally share with most architecture from ancient (and indeed modern) Egypt is a degree of fluidity concerning especially the interior wall arrangements (see an extensive discussion of similar architectural re-configuration of domestic structures at Amara West, Spencer, 2015). In respect to this restructuring of interior and exterior profiles and structures, it is curious to note that while some of these were conducted with a high degree of care an expertise (such as the choice to build [1002] out of bricks of two different sizes in order to achieve a uniform exterior surface), others (such as the decision to leave (1122) scattered across the floor of Space KU following a significant wall collapse and simply re-block the hole with a hastily constructed mud brick wall [1125]) suggest a somewhat more lethargic attitude to structural maintenance. This may be indicative of differing groups of soldiers utilising different skill sets and setting alternating priorities during the occupation of the fortress. It may also evidence a degree of ownership over individual structures, that those occupants – whether a single family unit or several groups – associated with specific structures had a personal choice in their lay-out and architectural modifications.

As for the function of Area K, the architectural lay-out of the structures suggest the housing of people, probably the soldiers of the garrison and possibly also their families, although evidence for the presence of wives and children remain speculative. The concentration of tools and the clear evidence of intense industries conducted in the area might be considered suggestive of a busy multi-craft workshop environment, however as discussed extensively by Spence (2015), craft production was an inherent element of the Egyptian household, although the precise location for such production within the house various (Spence, 2015: 94-96). As Spencer (2014: 46) also notes, there is little actual difference between the modern terms of 'house' and 'workshop' in Pharaonic Egypt and it is entirely likely that portions of the occupants slept, ate and worked within Area K. Further excavation north of the area however, may yet reveal a more ordered occupational zone, such as barracks, similar to those found at Askut (Smith, 2003: 100).

Chapter 4: The Small Finds

4.1. Introduction

The aim of the thesis is to determine the extent and internal mechanisms of subsistence and craft production at Zawiyet Umm el-Rakham, its similarities with contemporary fortified settlements and its implications for the study of Egypto-Libyan relations in the area. This chapter will provide an overview of the major industries (related to either subsistence or craft production) evidenced in Area K by an examination of the small finds related to the primary industries conducted at the site. The relevant material has been divided according to which industry it was associated with.

This material constitutes primarily tools of various types, some locally manufactured and some imported. Investigation of their origin can support an analysis of the interplay between local production and import of material and objects. A secondary aim of the chapter is to place the material discussed into a context of contemporary material from Egyptian settlement sites. The purpose of this is primarily to explore the extent to which any of the locally manufactured material from Zawiyet Umm el-Rakham represents anomalous materials or strategies from those employed in contemporary Egyptian society in the Valley, and secondarily to place it within a cultural context.

4.1.1. Methodology and Sampling

A series of local factors demands a flexible methodological approach to the excavated material. The recording strategies of the site have been discussed in Section 3.1, but they are of secondary importance to later internal re-arrangement of the Mersa Matruh magazine by local officials. As a result of this re-organisation some of the excavated material was unavailable for further examination and documentation. This material is exclusively recorded in the finds register, with only basic information for each find and could not be sampled in 2014. It has however been included in the analysis, for the purposes of spatial analysis and completeness, but it has been clearly marked in the tables below and cannot be discussed in detail, as information regarding its size, shape and in a few cases even material composition could not be ascertained.

Instead, the sampling strategy for this chapter was based on the notion of majority representation. Out of a registered 251 small finds numbers in total from Area K assigned between 1999-2002 (excluding lithic objects, faunal remains and ceramic vessels, discussed separately in Chapters 5, 6 and 7), 197 have been included in the tables below as these were objects that could definitively be identified, and which were relatable to one or more of the eight major industries (production of stone objects, pottery, non-vessel ceramics, bone pins, flax linen, metal, jewellery and lithics) conducted at the site, the remaining material comprising primarily poorly preserved objects of various materials whose function could not be ascertained. Out of these 197, 116 objects or object assemblages (in the case of for instance ZUR/K/385 several objects have been assigned a single number) have been personally examined and documented during the 2014 season. These 116 objects not only represent close to half of the total number of small finds found in Area K (46.26%), they also represent 58.98% of the relevant sub-category of small finds related to subsistence- and craft production in Area K. The sample size can therefore be considered wholly representative, although not exhaustive.

As discussed in Section 1.3 above, the study of craft production requires a clearly developed vocabulary for the definition of models of production (encompassing intensity, specialisation, impact on the local environment, purpose of production etc.). While numerous such models exist (*cf* Costin, 1991 and 2001 ; Peacock, 1981) the most immediately applicable to the Area K assemblage is a slightly modified version of the model proposed by Prudence M. Rice (1987: 183-191) in her seminal study on pottery production. As noted by Bourriau *et al* (2000: 141-142), Rice's categories were often hampered by her use of civilisations which utilised a monetary economy, and as such could be unhelpful in the context of the Pharaonic culture. As a result Bourriau *et al* (2000: 141) proposed five basic modes of production:

- **Household production:** Defined as a low-expertise industry for the use of the producer and his immediate social network (for instance family) and utilising no specialised equipment.
- **Household industry:** Similar in many respects to Household production, but with the addition of some limited specialised equipment. This mode of production may also be orientated towards producing slightly more than is required for the producers and their immediate network, with the aim of for instance barter trade.
- **Individual workshop:** A non-domestic, full-time activity in which a group of specialists use specialist equipment and produce a significant quantity of material vital to their local environment.
- **Nucleated workshop:** An industrial complex comprised of several individual workshops, producing high-quality products with highly specialised equipment.

- **'Attached' specialist producers:** A term initially coined by Earle (1981: 230) and defined as a group of specialist producers working for elite interest groups (such as state authority) who are in direct control of supply and demand.

These rigid constructs require further slight modification to be useful for the study of Pharaonic society. Most significantly is the distinction between "Mode of production" and "Scale of production" (Bourriau *et al*, 2000: 141). The *mode* of craft production production at individual elite estates at Tell el-Amarna could for instance be defined as 'attached specialist producers', as the specialists worked directly for the estate's owner who had complete control over their manufacture, however, the *scale* of production within this estate might be an individual workshop environment (Bourriau *et al*, 2000: 141). At a military site such as Zawiyet Umm el-Rakham it might be suspected that most of the major types of craft production were conducted by attached specialist producers, as the local elite may have had more direct control over resources due to the site's geographical isolation, but the scale of this production nonetheless varies considerably. With the constant awareness of the duality of the production (between *modes* and *scale* of production) Rice's (1987: 184-186) categories are nonetheless useful in providing a shared and defined vocabulary across the various types of industry within Area K. This methodological framework has been used exclusively to define *craft industries* and has such been excluded from the discussion of food production (sections 4.2, 4.3 and Chp. 7).

4.2. Grain Processing, Baking and Brewing

Grain Processing, Baking and Brewing Objects				
Finds No.	**Context**	**Material**	**Description**	**Figure**
1017*	KB	Limestone	Mortar	
1021*	KB	Limestone	Mortar	
1025*	KAB	Limestone	Mortar	
1098*	KS	Limestone	Mortar	
1185*	KM	Limestone	Mortar	
ZUR/K/32*	K0,8	Basalt	Hand stone	
ZUR/K/113	Surface	Limestone	Hand stone	4.1
ZUR/K/233*	K1,4	Hard stone (?)	Hand stone	
ZUR/K/276	K1,6	Quartzite	Hand stone	4.2
ZUR/K/297	K4,5	Limestone	Hand stone	4.3
ZUR/KB/55*	KB	Hard stone (?)	Hand stone	
ZUR/KAB/44*	KAB	Hard stone (?)	Hand stone	
ZUR/KD/16	KD	Quartzite	Hand stone	4.4
ZUR/K2A/15	K2A	Quartzite	Hand stone	4.5
ZUR/KKIII/3*	KKIII	Hard stone (?)	Hand stone	
ZUR/KM/2	KM	Hard stone (?)	Hand stone	
ZUR/KM/5	KM	Hard stone (?)	Hand stone	
ZUR/KM/7	KM	Hard stone (?)	Hand stone	
ZUR/KM/15	KM	Hard stone (?)	Hand stone	
ZUR/KM/16	KM	Hard stone (?)	Hand stone	
ZUR/KQ/11	KQ	Granite	Hand stone	4.6
ZUR/KQ/12	KQ	Limestone	Hand stone	4.7
ZUR/KQ/13	KQ	Quartzite	Hand stone	4.8
ZUR/KQ/14	KQ	Limestone	Hand stone	4.9
ZUR/KQ/16	KQ	Granite	Hand stone	4.10
ZUR/KO/4*	KO	Hard stone (?)	Hand stone	
ZUR/KZ/6	KZ	Hard stone (?)	Hand stone	
ZUR/K/4*	Surface	Limestone	Quern	
ZUR/K/5*	Surface	Limestone	Quern	

Finds No.	**Context**	**Material**	**Description**	**Figure**
ZUR/K/76*	K0,7	Limestone	Quern	
ZUR/K/77*	K0,7	Limestone	Quern	
ZUR/K/176a+b	K1,4	Limestone	Quern	4.11
ZUR/K/177a+b	K1,4	Limestone	Quern	4.12
ZUR/K/205*	K1,4	Limestone	Quern	
ZUR/K/208*	K0,4	Limestone	Quern	
ZUR/K/209*	K1,4	Limestone	Quern	
ZUR/K/210*	K0,4	Limestone	Quern	
ZUR/K/212	K1,4	Limestone	Quern	4.13
ZUR/K/213	K1,4	Limestone	Quern	4.14
ZUR/K/235*	K0,4	Limestone	Quern	
ZUR/K/255*	K0,4	Limestone	Quern	
ZUR/K/373*	K2,7	Limestone	Quern	
ZUR/K/374*	K5,7	Limestone	Quern	
ZUR/K/375*	Surface	Limestone	Quern	
ZUR/K/376*	K45,6	Limestone	Quern	
ZUR/KA/10*	KAB	Limestone	Quern	
ZUR/KB/54*	KB	Limestone	Quern	
ZUR/KE/3*	KE	Limestone	Quern	
ZUR/KE/4*	KE	Limestone	Quern	
ZUR/KF/4a-b*	KF	Limestone	Quern	
ZUR/KN/38*	KN	Limestone	Quern	
ZUR/KN/39*	KN	Limestone	Quern	
ZUR/KU/2*	KU	Limestone	Quern	
ZUR/KM/11*	KM	Limestone	Quern	
ZUR/KZ/1*	KZ	Limestone	Quern	
ZUR/KZ/2*	KZ	Limestone	Quern	
ZUR/KC/8*	KC	Limestone	Quern	
ZUR/KC/9*	KC	Limestone	Quern	
ZUR/KD/55*/**	KD	Limestone	Quern	
ZUR/KD/56*/**	KD	Limestone	Quern	
ZUR/K/372*	Surface	Limestone	Basin	

Finds No.	**Context**	**Material**	**Description**	**Figure**
ZUR/K/377*	K0,7	Limestone	Basin	
ZUR/K2A/1*	K2A	Limestone	Basin	
ZUR/KD/57*	KD	Limestone	Basin	
ZUR/KAB/20	KAB	ZUR B	Sieve	4.15

Table 4.1: Objects related to grain production and processing.

* Not available in magazine. Registered in Finds Register but not drawn/photographed.

** Quern reused around a mortar emplacement.

4.2.1. State of Scholarship

Bread and beer were staples of both Egyptian daily life and a primary component in the Egyptian offering cult throughout the Pharaonic Period (Helck, 1971 ; Peters-Desteract, 2005 ; Samuel, 2000 ; Verhoeven, 1984), and as a result cereal agriculture was a cornerstone of Egyptian society, expressed especially in the frequent use of grain as a principal trading commodity in an otherwise cashless economy, and the payment of grain as salaries and rations (Janssen, 1975, 2004 ; Murray, 2000: 508 ; Spalinger, 1987). It is therefore unsurprising that the most well documented subsistence industry conducted in Area K is related to cereal processing, baking and brewing. The significance of this topic has also resulted in a vast amount of scholarly literature on the issue, necessitating the following assessment on the state of current scholarship utilizing the most significant publications within the field. Following the seminal studies of respectively Murray (2000) and Samuel (2000), this assessment of scholarship has been divided into two components, grain processing and baking and brewing respectively.

Fig. 4.1: Handstone ZUR/K/113 (S. Snape).

Fig. 4.2: Handstone ZUR/K/276 (S. Snape).

Fig. 4.3: Handstone ZUR/K/297 (S. Snape).

Fig. 4.4: Handstone ZUR/KD/16 (S. Snape).

Fig. 4.5: Handstone ZUR/K2A/15 (S. Snape).

Fig. 4.6: Handstone ZUR/KQ/11 (S. Snape)

Fig. 4.7: Handstone ZUR/KQ/12 (S. Snape).

Fig. 4.8: Handstone ZUR/KQ/13 (S. Snape).

Fig. 4.9: Handstone ZUR/KQ/14 (S. Snape).

Fig. 4.10: Handstone ZUR/KQ/16 (S. Snape).

Fig. 4.11:Quern ZUR/K/176a+b (S. Snape).

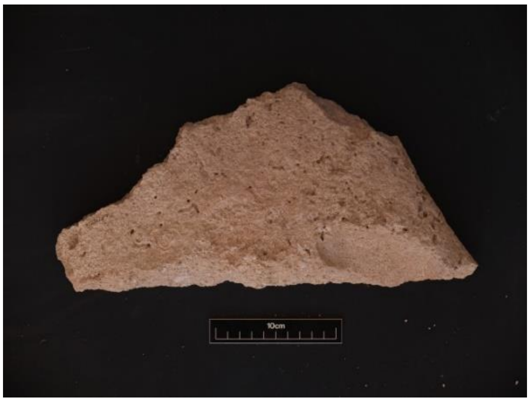


Fig. 4.12: Quern ZUR/K/177a+b (S. Snape).

Fig. 4.13: Quern ZUR/K/212 (S. Snape).

Fig. 4.14: Quern ZUR/K/213 (S. Snape).

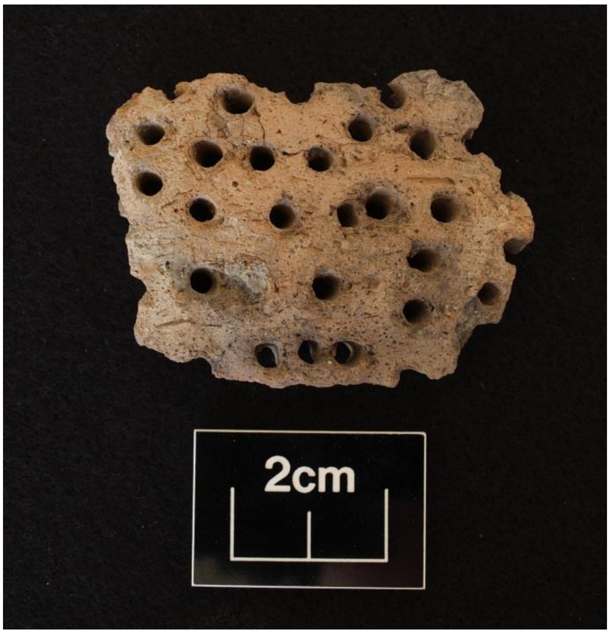


Fig. 4.15: Sieve ZUR/KAB/20 (S. Snape).

4.2.1.1. Cereal Production and Processing

Cereal production and processing has been defined by Murray (2000: 506) as the processes spanning "[…] the initial land preparation prior to sowing, to the storage of the cereals in granaries." Firstly it must however be noted that agriculture at Zawiyet Umm el-Rakham was by its basic nature highly different from cereal agriculture as conducted in the Valley, due to the absence of the River Nile and its annual Inundation. Zawiyet Umm el-Rakham is located between the escarpment cliffs of the Marmarica formation and the Mediterranean Sea. Overlaying the Marmarica Limestone Formation is the littoral zone or coastal belt, composed primarily of sedimentary loamy soil and clays, described in some detail by the traveller and scholar Oric Bates in the early 19th Century (Bates, 1914: 2-8). The fortress of Zawiyet Umm el-Rakham is situated roughly half-way between the tide-line and the foot of the southern escarpment, meaning that all major land-use by the occupants was confined to the coastal belt, and therefore heavily influenced by two significant factors: (a) what vegetation could be supported by the area and (b) the availability of water.

Due to a relatively high annual rainfall, the wild flora of the littoral zone is both extensive and varied, more so than elsewhere in Egypt (Zahran and Willis, 1992: 21-22), and domestic plants such as emmer wheat and barley have historically been grown successfully in the area (Royal Geographical Society, 1916: 133). More modern studies, such as that conducted among Cyrenaica and Marmarican Bedouin by Roy Behnke (1980) found that while agriculture in these envoironments always exists on slim margins, several areas – the bottom of *wadis* even on the dry steppes, the crestline and plateau of the Jebel Akhdar and most notably the fertile strips of clayey soil along the coast – can provide a moderate yield of grain, usually utilized as supplements to the primary pastoral subsistence strategy employed by the Bedouin (Behnke, 1980: 9-25).

A 1966 UNESCO survey of the entire Qattata Littoral Zone found the area useful both for grazing of domestic animals, as well crop growth, made possible both by the winter rainfalls, and the use of wells and cisterns. The modern re-introduction of non-cereal crops such as grapes and olives has also been successful, as has the continuing exploitation of pre-Roman and Roman desert cisterns (Meigs, 1966: 85). As such, cereal agriculture was an available subsistence strategy to the inhabitants of Zawiyet Umm el-Rakham, although most effectively conducted in the relatively fertile *wadi* floors. No evidence of New Kingdom cisterns or similar attempts at water storage has been found at, or near, the site.

As discussed by Murray (2000: 507-508) earlier Egyptological studies related to agrarian practices tended towards a focus on tomb depictions within general introductions to Egyptian daily life (such as Erman, 1894), disregarding the inherent complications of relying on depictions governed to some extent by a stylistic repertoire. Textual sources have also been employed especially in the analysis of grain transport (Janssen, 2004) and the role of both grain and land within the Egyptian economy (*cf* the Deir el-Medina ostraca, Cerny, 1954 or the Heqanakhte Letters, Baer, 1963 and Allen, 2002).

Ethnographic studies have further added to this scholarship through the study of the pre-mechanised Egyptian agricultural practices (Foaden and Fletcher, 1908 ; Murray, 2000: 508). The introduction of archaeobotanical research practices using flotation added a further dimension to this field of research with pioneering studies at settlement sites such as Kom el-Hisn (Moens and Wetterstrom, 1980) and Tell Ibrahim Awad (Roller, 1992) as opposed to the primary analysis of plant remains from tomb assemblages (Murray, 2000: 509). Archaeological finds have also aided the interpretation of grain storage, notably Middle Kingdom granaries discovered at Kahun and the Middle Kingdom forts in Nubia (Kemp, 1986). Other archaeological evidence such as hoes and sickle blades has also been found at Egyptian settlements (*cf* Petrie, 1917: 46 and 54-55).

4.2.1.2. Baking and Brewing

As with grain production and processing, investigations of ancient Egyptian baking and brewing initially had a strong focus on textual remains (such as Eisenlohr, 1897) which to some extent continues to modern times (*cf* Spalinger, 1986). However, the discovery of installations such as ovens related to baking, notably from Tell el-Amarna and Deir el-Medina (Samuel, 2000: 542) have added archaeological evidence to the existing textual corpus.

Samuel herself has been perhaps the most prolific scholar studying the production of bread and beer in ancient Egypt (Samuel, 1989, 1992 and 2000) pioneering an interdisciplinary approach utilizing biological science and techniques, for instance residue analysis and correlative microscopy (Samuel, 1996) and experimental archaeology in order to learn the precise application of various tools from the archaeological record including hand stones and querns (Kemp *et al*, 1994: 143-166 and Samuel, 2000: 561-563 and 2009) as well as using anthropological theories to investigate social relationships and their significance for food production in small communities such as the Deir el-Medina workmen's village (Samuel, 1999). As such, Samuel's collected bibliography contains both the most modern and simultaneously one of the most far-reaching investigations into the techniques related to ancient Egyptian baking and brewing.

4.2.2. Grain Storage[2]

Depictions of grain storage in the form of tomb paintings (Tylor and Griffith, 1894: Pl. III and Badawy, 1954: Fig. 81) and tomb models, such as those from the Middle Kingdom tomb of Meketre (Winlock, 1954), show that the grain – in the case of emmer wheat – was most likely stored in the form of emmer spikelets rather than clean grain (Murray, 2000: 527). Excavations at settlement sites such as Tell el-Amarna (Peet and Woolley, 1923: Pl. VII), Abydos (Wegner, 1998: 9, 15 and 21-22), Tell Edfu (Moeller, 2010: 89-100), Lahun and the Middle Kingdom Second Cataract Forts (Kemp, 1986) as well as Tell Heboua (Abd el-Maksoud, 1998: 137) have identified circular or rectangular granary structures where this storage was conducted.

In 2001, a series of circular structures (see also Section 2.2.7) were identified immediately west of Area K at Zawiyet Umm el-Rakham (Area H). When excavated, it became clear that the structures constituted a series of three (H1, H2 and H3) granaries constructed from the same limestone cobbles and silt-mortar as the walls of the Area K buildings. These structures have been discussed in-depth by Simpson (2002: 401-416) who demonstrated both the primary use of the granaries, as well as the secondary use of one of them as an enclosed structure for baking (with the addition

[2] For discussion of the tools involved in the harvest at Zawiyet Umm el-Rakham, please see Section 5.5.3.1.

of ovens), and furthermore demonstrated their typical Egyptian appearance. The evidence of grain storage by no means evidences cereal production, but taken together with the evidence in the form of sickle blades found at the site – many with evidence of sickle sheen (see Chp. 5) - some local production of grain can be suggested, most likely in the fertile *wadi* strips in the litoral zone (see 4.2.1.1 above).

4.2.3. Mortars and Pestles

As discussed by Samuel (2000: 559-560) with reference to ethnographic parallels for instance from Turkey (Hillman, 1984: 129-13), the first step in flour production was the pounding of the emmer spikelets in mortars using wooden pestles under a covering of water (Samuel, 2000: 560) to produce a mixture of bran and damp grain to be dried in the sun before a secondary winnowing process to remove the broken husks from the cleaned grain. The primary tools surviving in the archaeological record to evidence this process are limestone mortars and pestles (Samuel, 1999: 124), although no wooden pestles have been found at the site, most likely due to the poor preservation of wood in the high-saline ground. Five mortars (see Chp. 3) were found during the excavation of Area K, all of which were produced from local limestone and of a shape similar to contemporary objects found at Memphis (Giddy, 1999: Pl. 61.28). The mortars were placed in a depression and surrounded by an emplacement of mud brick, stone cobbles and plaster, similar to arrangements found at the Tell el-Amarna Workmen's Village (Samuel, 2000: 561, fig. 22.11) and in the city itself (Kemp and Stevens, 2010b: 420).

4.2.4. Querns and Hand Stones

The milling of the grain was primarily conducted in ancient Egypt with saddle-querns and hand stones/grinders (Samuel, 2000: 560). A great number of querns and quern fragments have been found in Area K, all made from local limestone. However, most of these were mislaid in the Marsa Matruh magazine and only four could be investigated in detail. ZUR/K/176a+b comprise two pieces of a saddle quern of which some 50% is preserved. ZUR/K/177a+b comprise another two pieces of a different saddle quern made from a much poorer quality of the local limestone, which appear highly porous and fragile. ZUR/K/212 is one end of a saddle-quern of which some 30% is preserved, while ZUR/K/213 is the best preserved saddle quern in the assemblage, being largely complete with only minor chips broken off from one end of the object.

The seven hand stones or rubbing stones/grinders found in the area are all made from imported harder stones, of similar types to the contemporary assemblage from Tell el-Amarna (Kemp and Stevens, 2010b: 423-437). Four are made from Quartzite, quarried most likely in Lower Egypt from Gebel Ahmar (Aston *et al*, 2000: 12) and brought to the site from the Valley, one is made from basalt, quarried from the region around Cairo and the Fayum (Aston *et al*, 2000: 23-24) and two are made from dark granite, either from the Eastern desert or from Aswan (Aston *et al*, 2000: 35-36). The import of these hard-stone hand-stones may imply that the Egyptian occupants were aware at an early stage that there were no sources of hard rocks available in the local area, and that while workable querns could be made from local limestone, the local environment necessitated import of hard stone hand stones from the Nile Valley.

4.2.5. Mixing Troughs

Baking scenes from the New Kingdom, such as one from the 18th Dynasty tomb of Nebamun at Thebes (Samuel, 2000: fig. 22.14) show figures mixing dough in large bowls with round or flattened bases. Several ceramic types from Area K were ideally suited to the large-scale mixing of dough, in particular two large vessels made from the ceramic fabric Nile C (see Chp. 6). However, a large trough (ZUR/KD/57), produced from local limestone and measuring 1.00m x 0.30m and found in Space KD could also have been effectively used. While no direct evidence was found in the form of residue within the trough, its proximity to both a mortar installation in the neighbouring Space KS, a quern stone in the neighbouring Space KG, a hand stone in Space KD itself, an oven in the neighbouring space Space KH and a water source in the form of the nearby well KW, it nonetheless was eminently suited for mixing large quantities of dough in a self-contained operation situated in these three rooms in Building 2.

4.2.6. Sieves

As discussed by Samuel (2000: 554), one step in the brewing process was to filter or sieve a mixture of cooked grain and uncooked malt through a sieve using water. Only a single example of such as object has survived from Area K. ZUR/KAB/20 is a fragment of a slightly curved sieve, most likely curved to fit more securely over the neck of a larger vessel. The irregular holes in the sieve were pierced prior to firing. The large quantity of black particles within the ceramic matrix suggests that the sieve was locally produced from the ZUR B fabric. In itself ZUR/KAB/20 does not provide much evidence for the production of beer at the site, although it remains the only tangible proof for such procedure in the archaeological record.

4.2.7. Discussion: Baking and Brewing at Zawiyet Umm el-Rakham

A significant grain processing industry was evidently functioning in Area K. The majority of the tools used in the industry are also of local manufacture, in particular the mortars and quern stones. The only imported element of the production are the hard-stone hand stones, most likely brought to the site due to a known lack of suitable stones in the area. This suggests either a caution on the part of the initial garrisons, or perhaps a basic knowledge of the local geology. The role of the grain processing in Area K and the details of its function however can be most profitably studied through the dual investigation of its spatial arrangement within the site, and extrapolation of information regarding grain processing from contemporary texts.

4.2.7.1. Spatial Arrangement

The study of social interactions in the context of grain processing, baking and brewing has primarily been investigated by Samuel (1999). Samuel's conclusions regarding the self-sufficiency of individual households in the production of bread (1999: 139-140) are however potentially unhelpful for the site of Zawiyet Umm el-Rakham. While the Workmen's Village at Tell el-Amarna was a similarly state-sponsored settlement, it nonetheless contained individual households, whereas most of the available evidence from Zawiyet Umm el-Rakham suggests rather a predominately military settlement with less differentiation on the basis of households (Snape, pers. comm.), although the presence of families or other groupings associated with individual structures within Area K cannot be entirely excluded. It is for instance noticeable that each individual structure is associated with at least one oven, although the presence of only a single water source (KW) may reinforce the notion also suggested by Spencer (2015: 189) on the basis of evidence from Amara West, that baking and brewing was a largely communal affair, possibly regardless of the nature of occupants within a structural enclave.

The spatial arrangement of tools and installations related to grain processing, baking and brewing in Area K (**Fig. 4.16**) does indeed show a preference for working in the outside/communal areas, such as Space KL and Spaces KA, KB and KAB. Aside from in Buildings 3 and 5, ovens were generally located in front-rooms of buildings or in outside communal areas, possible to avoid smoky and cramped conditions inside the structures. The tools related to baking, querns, hand stones and mortars, are likewise generally grouped around these exterior ovens. This is particularly noticeable in Space KL and KQ where a majority of all discovered hand stones and querns were located in a close spatial arrangement around an outside oven. Another outside work area, Space KZ, also has two querns associated with an oven. A pile of ash found associated with the two quern stones may suggest the process of controlled burning of the quern surfaces for hygienic purposes described by Samuel (2000: 561).

No individual saddle quern emplacements have been found in Area K (see Samuel, 2000: 551-654), although it is possible that the large mud brick platform in Space KO in Building 2 served as a large emplacement intended for several querns at once. The need for a structure to house multiple querns operated simultaneously, as opposed to the smaller individual one-quern emplacements found in Tell el-Amarna (Kemp *et al*, 1994: 160) might be explained by the requirement for much larger quantities of food to feed the entire garrison of 500 men, rather than merely a household.

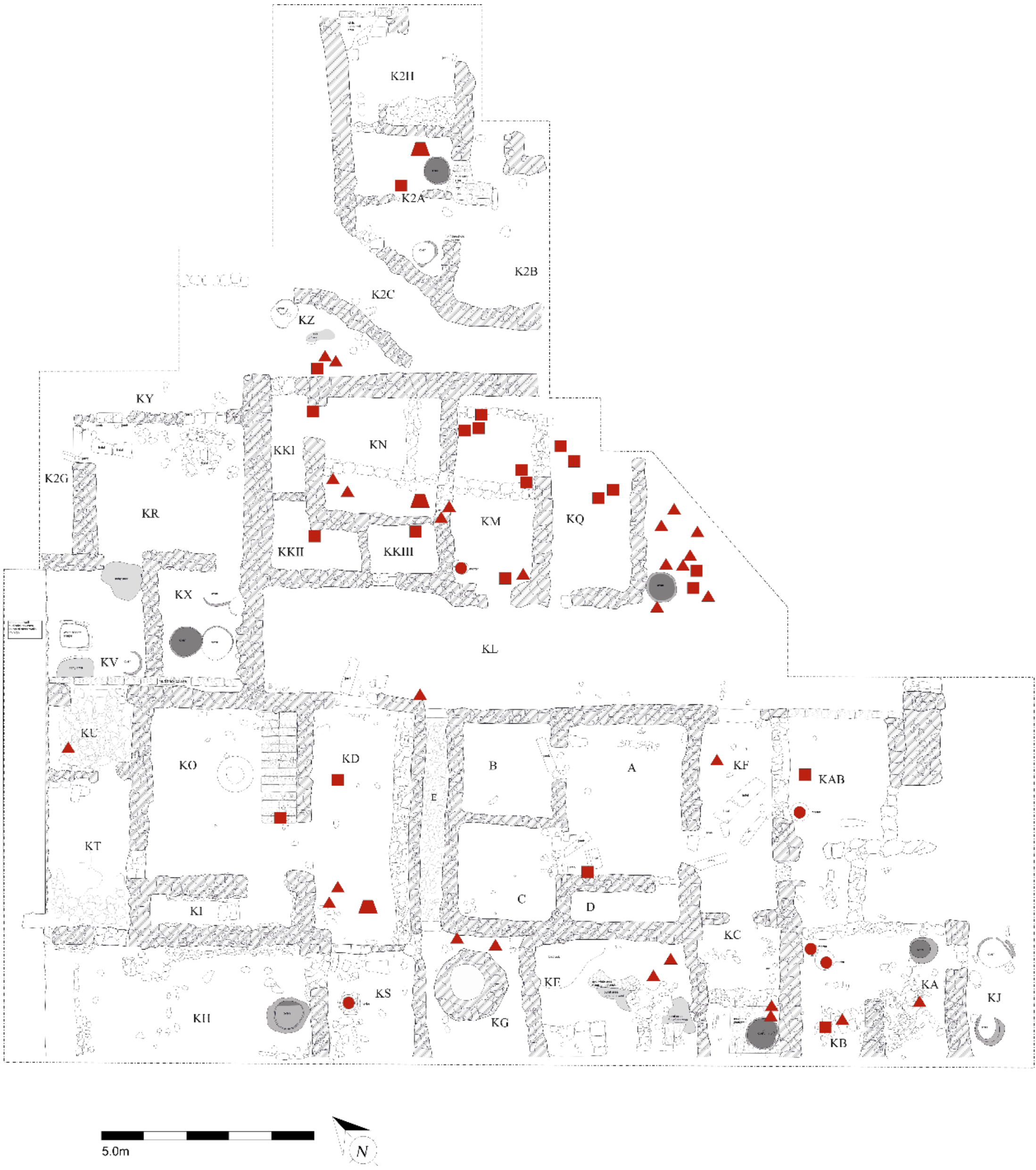


Fig. 4.16: Spatial overview of tools related to grain processing (circle: mortar ; rectangle: hand stone ; triangle: quern ; rhomboid: basin) (S. Thomas and author).

The lack of any significant concentration of implements related to the processing of grain in the western portion of the area, in particular in Building 3 is problematic considering the large quantity of ovens located within this structure. However, most of these ovens had been effectively dismantled prior to the abandonment of the site, and were preserved only as lenses of ashy deposit surrounded by the low base of their ceramic shell. The lack of tools in the area then further suggests that the focus of activity had shifted away from this portion of the area to the eastern side, although the reason for the modification remains unclear.

4.2.7.2. Contextual Quantification of Grain Cultivation

Population Size

Discussions of the type and significance of grain cultivation to the economic life of the occupants at Zawiyet Umm el-Rakham requires quantification. In order to define the amount of grain required to sustain the site and by extension the amount of arable land needed for cultivation, the demography of the site must be discussed. Attempts to identify population size at ancient settlements have as Mueller (2006: 94) argues been fraught with uncertainty. Among the most common method has been the multiplication of the physical size of a settlement with a constant of inhabitants per hectare. As shown by Zorn (1994: 34) these constants have fluctuated from 100 inhabitants to 1000 inhabitants.

A more recent method championed by Mueller and Lee (2005 and Mueller, 2006: 95-104) has been the dual use of settlement size distribution (that is identifying the size of a settlement by investigation of the size of another known regional settlement and determining their respective size within a settlement hierarchy wherein all settlements are ranked by descending population size) and multi-linear regression (whereby population size is calculated on the basis of the presence or absence of specific facilities). Both methods have failings; determining population size by ranking regional settlements on the basis of the rank-size rule (Mueller, 2006: 94) requires both the presence of a group of regional settlements and also that the population size of at least one is known in order to determine the size of other settlements in the grouping. The multi-linear regression method requires either considerable archaeological data or – more commonly – textual data (Mueller, 2006: 101) in order to determine which facilities were present within a settlement. Neither method is applicable to Zawiyet Umm el-Rakham as a relatively isolated and also partially excavated settlement.

Attempts to determine the population size at Zawiyet Umm el-Rakham has been directed towards identifying military officials associated to the site and extrapolating amounts of troop under their command with reference to their titles (Snape and Wilson, 2007: 128). Stela 6 found by Habachi standing against the south wall of the temple at Zawiyet Umm el-Rakham (Snape and Wilson, 2007: 108) preserves two possibly different standard bearers. On the basis of research conducted by Schulman (1964: 69), that a standard bearer (*ṯ3i sryt*) commanded a company (*s3*) of either 200 (Faulkner, 1953: 32-47) or 250 (Schulman, 1964: 26-32) men, Snape and Wilson (2007: 128) conclude that the standing garrison at Zawiyet Umm el-Rakham was between 400 and 500 men.

Similar calculations have also been done by Raedler (2003: 157) who asserts that between 800 and 1000 men were stationed at Wadi es-Sebua during the reign of Ramesses II on the basis of four different standard bearers listed on stela from the temple at this site (see also Exell, 2009: 116). However, a further three stelae from Zawiyet Umm el-Rakham (Stela 4, 9 and 17, Snape and Wilson, 2007: 104-105, 112-113 and 119-121) also preserve images of standard bearers, which might following this argumentation increase the garrison estimates to between 1000 and 1250 men. Furthermore, the location of both stela 6 and 17 stacked in between a mud brick wall and the south-western corner of the temple might also suggest a secondary storage facility for stela taken from their original context by the Egyptian inhabitants (Snape and Wilson, 2007: 94), possibly because their dedicators were no longer associated with the fort, having either died or left.

A further issue with the use of military titles to estimate population size in this manner is the assumption that the occupants were exclusively male soldiery and therefore quantifiable as a 'company'. The lack of any evidence of centralised food production in Area K (as is seen for instance at the industrial bakeries at Kom el Nana (Kemp, 1995: 433-8)) taken together with the commonly gendered tasks of for instance grinding grain (see especially Samuel, 2009 and Robins, 1993: 102) suggests a domestic setting which would likely involve both women and children (also evidenced at other fortress sites from the 19th Dynasty in the form of female and child burials at Amara West, Binder, Spencer and Millet, 2011: 52, and infant burials at Tell el-Retaba, Gorka and Rzepka, 2011: 98-99). Due to this presence of an unspecified number of 'civilian' occupants at the site, the purely military estimation of population size by presence of commanding officers cannot be wholly reliable.

Another possible strategy for establishing the approximate size of the population at Zawiyet Umm el-Rakham is a dwellings-based estimate following Zorn (1994: 32). Using this method the amount of domestic structures or dwellings within the excavated portion of the site is scaled up to include the known extent of the site. Taken together, the temple, chapels, magazines as well as Areas N, G, S and K comprise roughly 2360m^2 or 16.39% of the fortress enclosure of 14,400m^2 (measuring 120m on a side). Within this area, five contemporary domestic units have been identified within Area K (see Chp. 3 above) with a further 2-3 smaller domestic units identified within Area N (Snape, pers. comm.). Following the advice of Zorn (1994: 33) and considering 5 occupants per dwelling, this provides a conservative estimate of between 35 and 40 occupants within the excavated area. Scaling this number up to encompass the entire known area of the settlement by multiplying it with a factor of 6.101 suggests between 214 and 245 occupants (230 on average) at the site. This number is of course biased by the lack of investigation of possible structures outside the enclosure walls which could conceivably have provided shelter for more occupants. Similarly, it assumes an even distribution of domestic units across the unexcavated areas of the site.

Water Management, Agricultural Yield and Crop Types in the Eastern Marmarica Region

Herodotus' claim that the "eastern region of Libya, which the nomads inhabit, is low-lying and sandy as far as the Triton river" (Herodotus IV: 191) and that as a result the nomadic occupants of Eastern Libya were sustained exclusively by milk and the flesh of their animals (Herodotus IV: 186) has in recent years been challenged by surveys of the eastern Marmarica region between Mersa Matrouh and Zawiyet Umm el-Rakham (White, 1999: 932, Hulin, 2001: 74, Rieger et al, 2012, Vetter et al, 2014, Vetter et al, 2009 and Vetter et al, 2013), which has helped to create a more nuanced picture of the agricultural potential of in particular the coastal zone and the many wadis which bisect the area. Pap. Vatican II dating to the 2nd Century AD from the Marmarica region which lists barley, but also some wheat and beans as well as vines, olives, figs and dates as the primary crops grown in the area in Classical antiquity (Johnson, 1959: 58-62). Complimenting this textual evidence are a series of Ptolemaic settlements identified in the area south of Zawiyet Umm el-Rakham at Wadi Umm el-Ashtan (Rieger et al, 2012: 166-168), Wadi Qasaba and Wadi Magid (Vetter et al, 2014: 50-53) as well as a widespread network of cisterns, embanked fields and other evidence of 'water harvesting' dating primarily to Classical antiquity spread throughout the surveyed area (Vetter et al, 2013: Fig. 13).

Of particular interest to the current study are a series of water harvesting structures discovered at Wadi Magid, located 8 km south-east of Zawiyet Umm el-Rakham. The survey in the area identified lateral terraces constructed to exploit hilltop run-off before the water ran onto the *wadi* floor during the winter rains in the area (Vetter et al, 2014: 51-52). Analysis of soil samples associated with the terraces at Wadi Magid using optically stimulated luminescence (OSL) provided absolute dates for the construction of the two structures at respectively 1193 BC and 1153 BC and placing them within the Egyptian New Kingdom (or, including potential error, dating between the early New Kingdom and the Third Intermediate Period) (Rieger et al, 2012: 167). Similar dating of embanked fields at Wadi Umm el-Ashtan (located 2 km south of Zawiyet Umm el-Rakham) provided a range of dates from the 1st Intermediate Period through to the Ptolemaic Period (Rieger et al, 2012: 167).

Ceramic surveys by Linda Hulin revealed concentrations of Egyptian and Egyptian style local pottery in the *wadis* south of Zawiyet Umm el-Rakham, close to the areas discussed above (Hulin, 2001: 68). Considering the presence of Egyptian material and chronologically contemporary water harvesting structures south of fortress, it is likely that the Egyptian occupants of Zawiyet Umm el-Rakham exploited these fertile areas for agricultural purposes. However, it is more questionable how Egyptians, raised in the Nile Valley with an Inundation based agriculture, had the technological expertise and local knowledge of the hydrological conditions to effectively irrigate the soil. On the basis of OSL dates provided by Rieger et al (2012: 167-168) it is however clear that farming in this area pre-dates the Egyptian occupation by several hundred years, at least from the Middle Kingdom onwards. Ethnographic evidence from the Cyrenaica region of Libya highlight the seasonal agriculture conducted by nomadic tribes (Behnke, 1980: 40-48). A similar situation is also described by travellers in the region in pre-industrial times (Lyon, 1821: 44).

It is likely that a similar opportunistic agriculture was conducted by the Libyan nomads in Pharaonic times as a means of supplementing a diet based around their animals. Such agricultural pursuits would have required a knowledge of the hydrological conditions in the eastern Marmarica region described above and it is therefore a likely hypothesis that the Egyptian occupants at Zawiyet Umm el-Rakham relied on information and help from local Libyans familiar with this type of agriculture in order to farm in the *wadis* south of the site. It is in this context that the following quote from the biography of the fortress commander Nebre should be viewed:

> "The Town of Ramesses II, the place known to the king, which he built for these Libyan people [*ṯk*], who had been living on the desert like jackals. He made them masters of the town, so that they would plant trees [*dgꜣ šn*(*wt*)]; so that they would work many orchards/vinyards [*kꜣmw*] in the countryside […]" (Snape and Godenho, in press)

The lack of significant non-Egyptian material within the enclosure at Zawiyet Umm el-Rakham make it uncertain if large groups of Libyan nomads stayed permanently within the fort, but the reference to the local nomadic population working on agricultural pursuits in the countryside surrounding the fort is highly pertinent considering the archaeological and ethnographic evidence discussed above.

Calorific and Acreage Requirements for the Occupants at Zawiyet Umm el-Rakham

On the basis of an extensive ground and satellite survey of a 30km east-west by 15km north-south area of land south-west of Mersa Matrouh Vetter et al (2009: 20) concluded that roughly 9% (40.5km^2) of this area consisted of arable land, located primarily in the bottom of *wadis* or consisting of embanked fields on the *wadi* slopes. At maximum, this would provide 4050 ha of arable land within the investigated area. The authors (Vetter et al, 2009: 20) utilised a barley yield of 1 t/ha to calculate that the area could potentially feed 22.000 people. However, ethnographic data from similar environments in the Levant (Padgham, 2014: 132) suggests that a lower yield averaging 646.7 kg/ha is a more realistic figure. According to figures from Pap. Vatican II (Applebaum, 1979: 99-100) an average annual barley yield in the area of Marmarica in the 2nd Century BC was on average 9.5 hectolitre, or 570 kg/ha and an annual emmer wheat yield of 7.25 hectolitre, or 521 kg/ha. Recalculating the total yield of the arable land suggested by Vetter et al (2009: 20) this suggests that 2.308.500 kg of barley could be grown annually, assuming that no other crops were grown.

However, the ancient diet at Zawiyet Umm el-Rakham was more varied. While barley is a more reliable crop in the area than emmer wheat, and remains the predominant cereal crop grown even into modern times, other potential crops cultivated in the area in antiquity includes pulses, vines, olives, figs and dates (Johnson, 1959: 58-62). The lack of archaeobotanical analysis at Zawiyet Umm el-Rakham precludes firm conclusions regarding diet, but considering the evidence of large-scale imports of oils and wine to the site (Thomas, 2000 and Gasperini, in press) the significance of locally grown olives and vines was lessened. Pulses as well as figs and dates may have provided the remainder of required calories (el-Barasi and Saaed, 2013: 50) supplemented by protein in the form of caprine meat and ostrich eggs (see Chp. 7). Padgham (2014: 21) estimates that cereals (barley and emmer wheat) provided 72.7% of the annual calorific intake of New Kingdom Egyptians with a further 14.4% provided by animal products (meat, dairy and fats) and the last 12.9% provided by fruits, pulses and honey. Given this distribution it is evident that the majority of the available arable land would be dedicated to cereal growth.

At the average population estimate calculated above of 230 occupants and following the percentage mix of food types calculated by Padgham (2014: 21) the garrison would require 230 kg/yr of barley for bread and beer and an additional 56 kg/year of emmer wheat per person or respectively 52.900 kg/year of barley and 12.880 kg of emmer wheat. Following Padgham (2014: 30) an additional 10% seed corn for both types and 15% loss from wastage produces a final requirement of 66.125 kg/yr of barley and 16.100 kg/yr of wheat required for the maintenance of the settlement at Zawiyet Umm el-Rakham. Considering the yield rates provided by Pap. Vatican II (Applebaum, 1979: 99-100) of 570 kg/ha for barley and 521 kg/ha for emmer wheat, a combined 147 ha of land would need to be cultivated annually

Food type	Amount of arable land (ha)	% of arable land (Vetter et al, 2009: 20)
Barley **Wheat**	116 31	3.63
Pulses	42	1.04
Fruits (fig)	5	0.13
Flax	1	0.03
Total	195	4.71

Table 4.2: Amount of arable land required to sustain 230 occupants at Zawiyet Umm el-Rakham (author)

to provide the basic cereal requirement for the settlement. On the basis of the conclusions presented by Vetter et al (2009: 20) these 147 ha constitute 3.63% of the total amount of potentially arable land within the surveyed area south of Mersa Matrouh.

Pap. Vatican II does not contain information regarding the yield rates of pulses or fruits, so the yield rates for area around Tel Gezer (Webley, 1972: 173 and 175) of 595 kg/ha have been used as this area similarly relies of rain-fed rather than basin agriculture and has a comparable barley yield to the one found in Marmarica. With a required 85 kg/yr of pulses per person and a total population size of 230, 19.550 kg of pulses would be required at Zawiyet Umm el-Rakham annually. At the yield rate suggested for Tel Gezer of 595 kg/ha, this would have required the cultivation of 33 ha, and with the addition of 10% kept for seed and an additional 15% loss this would require an additional 42 ha of land.

It is uncertain what fruits, if any, were grown locally to supplement the diet of the inhabitants although traditionally figs have been grown and continue to be grown in the Marmarica region succesfully (Johnson, 1959: 58-62 and Mansour, 1995: 14). Data from 1993 suggests a yield rate for figs of roughly 13 t/ha or 30-40 kg per tree with between 400 and 1111 trees per ha (Mansour, 1995: 14). It is likely that ancient yield rates were considerably lower, but even considering a 50% reduction of the lowest estimate of 400 trees

Food type	**Amount of arable land (ha)**	**% of arable land (Vetter et al, 2009: 20)**
Barley Wheat	320	7.90
Pulses	91	2.25
Fruits (fig)	11	0.27
Flax	3	0.07
Total	425	10.49

Table 4.3: Amount of arable land required to sustain 500 occupants at Zawiyet Umm el-Rakham (author).

per ha, each ha could nonetheless potentially provide 6000 kg of figs per year with the average yield of 30 kg per tree (Mansour, 1995: 14). With a yearly requirement of 125 kg of fruits and vegetables on average per person (Padgham, 2014: 21), 28.750 kg of figs would be required to satisfy the requirements of the estimated 230 occupants of Zawiyet Umm el-Rakham. This would require a further 5 ha of arable soil dedicated to the cultivation of fig trees. It should be noted however, that unlike grain, the cultivation of fig trees would require a waiting period of several seasons before the trees became sufficiently mature to bear crop (**Table 4.2**).

Considering the inherent uncertainty in calculating population size, a similar calculation for the garrison size of 500 (**Table 4.3**) suggested by Snape and Wilson (2007: 128). The acreage calculations presented show that the occupants of Zawiyet Umm el-Rakham had ample arable land located at a maximum distance of 15-20km and that they could – in particular by utilising the fertile *wadis* south of the fort such as Wadi Umm el-Ashtan (Rieger et al, 2012: 166-168) Wadi Magid (Vetter et al, 2014: 50-53) – grow both the required variety and quantity of crops to sustain life. The predominant cash crop grown on the site was, as discussed in Chp. 4, flax used to produce linen. By adjusting the estimated requirements of dry flax fibre (in kg) for a group 100.000 Egyptians spread across five socio-economic groupings (Padgham, 2014: 64) and assuming a similarly stratified society at Zawiyet Umm el-Rakham, 254.2 kg of dry flax fibre would be needed annually for a population of 230 and 552.5 kg for a population of 500. Considering the possible utilisation of linen as a trade commodity, these figures have been adjusted up by a factor of 20% to respectively 305 kg and 662.9 kg required annually. The acreage requirements to provide for this quantity of flax fibre has been calculated by using an estimated yield of 335 kg/ha of dry fibre from Mesopotamia (Padgham, 2014: 65). Considering the poorer conditions of irrigation and the poorer soil quality in the Marmarica region, a 25% loss has been estimated giving a yield of 251.25 kg/ha. Considering the requirements suggested above, a population of 230 would require 1-2 ha of land dedicated to flax cultivation while a larger population of 500 would require at most 2-3 ha of land.

Labour Requirements for Agricultural Production at Zawiyet Umm el-Rakham

The dryland agriculture, reliant primarily on the c. 150mm average rainfall in the eastern Marmarica region (Vetter et al, 2009: 9) naturally differs from the inundation based agriculture conducted in the Nile Valley. The calculation of labour requirement can nevertheless effectively utilise the recent methodology provided by Padgham (2014: 32-51) of calculating the labour rates (in man-days/ha) of individual agricultural activities and using these to determine the manpower requirements both for each individual step and the overall agricultural production.

Ethnographic evidence (Lyon, 1821: 44) suggests that local bedouin prepare embanked fields similar to those found dating to the New Kingdom from Wadi Umm el-Ashtan (Rieger et al, 2012: 166-168) by ploughing using a wooden hoe, rather than an ard plough yoked to oxen. It is not clear whether the Egyptian occupants at Zawiyet Umm el-Rakham would have utilised this method, but considering the clear evidence of nomad agriculture in the area prior to the construction of Zawiyet Umm el-Rakham (Rieger, 2012: 167-168) this may suggest that the occupants relied on local knowledge of agricultural processes and adapted their methods to these. As Padgham (2014: 34) suggests, the exclusive use of hoes might also have been preferable to prepare smaller and dispersed tracts of land, such as the multiple embanked fields found in the region which were generally found to be between 0.1 and 0.4 ha in size (Vetter et al, 2009: 12). In a study of the effectiveness of land preparation in Mexico, Lewis (1951: 154-147, Table 38) on shrub-covered, rocky land unsuitable for ploughing, suggested a labour rate of 60 man-days/ha using steel-bladed hoes.

Following Padgham (2014: 36) ten man-days/ha have been added due to the lessened efficiency of using wooden or bronze-tipped hoes. 20 man-days/ha have then been subtracted due to the lack of semi-decidous shrub forest in the investigated region, which characterised the area of Lewis' study (Padgham, 2014: 36) and would have complicated the preparation of the land. As such, the labour rate for the preparation of the land for sowing using hoes on previously fallow land in eastern Marmarica has been calculated as 50 man-days/ha. The process of hoeing was due to its physical intensity most likely conducted exclusively by males, and a competency index of 1.17 (Padgham, 2014: 32-33) has been assumed. This provides the following calculation for 195 ha of land for cereals, fruits, pulses and flax feeding 230 occupants at Zawiyet Umm el-Rakham: 195 ha x 50 man-days/ha = 9750 x 1.17 / 314 work-days (following Padgham, 2014: 32) = 36 workers.

Sowing was most likely done by broadcasting, following trampling of the seeds into the ground by leading flocks of sheep or goat across the fields. Referring to studies by Russell (1988: 115), Padgham (2014: 35) suggests an average labour rate for sowing of 0.37 man-days/ha. To this has been added the estimated 0.9 man-days/ha required to plough in seeds suggested by Padgham (2014: 36) to account for the added time it would take to lead herd animals across the newly sown fields. No direct ethnographic evidence exists for weeding of crops in the eastern Marmarica region so without more specific data the labour rate has been estimated at 34.2 man-day/ha combined for three weeding cycles on the basis of ethnographic studies of weeding using hoes in Zimbabwe (Padgham, 2014: 37).

The labour rate for irrigation is more problematic to estimate. Due to the low annual rainfall, considerable effort would need to be expended in the construction of embanked fields, cisterns and other hydrological structures. A running maintenance would also be required to prevent these from falling into disrepair and wasting valuable water resources. At 100-150mm annually, the rainfall in Marmarica is considerably lower than other agricultural communities in the eastern Mediterranean (Padgham, 2014: 39). Given this increased need for irrigation and management of hydrological structures, the labour rate of Cyprus (with an average of 350-400mm annual rainfall) of 13.2 man-days/ha has been tripled to 39.9 man-days/ha to account for lower annual rainfall and resultant increased labour requirements.

Using studies conducted by Steensberg (1943: 23) and Korobkova (1981: 340) of the effectiveness of reaping of cereals using flint sickle blades can establish the labour rate at 24.6 man-days/ha (Padgham, 2014: 39). Depictions in the Tomb of Unsu from Thebes (Louvre Museum N1431, Potvin and Pierrat-Bonnefois, 2002: 24-25) suggests that both men and women took part in the reaping of cereals and a competency index of 1.3 has therefore been assumed for this calculation. For the reaping of pulses and flax by pulling the stalks by hand, the labour rate of 10 man-days/ha suggested by Halstead and Jones (1997: 279).

Transport of the harvested material is a problematic calculation in the case of Zawiyet Umm el-Rakham. While it is clear that the dispersed nature of available arable land would have necessitated that the occupants exploited several of the fertile *wadis* south of the fort, as well as fertile strips on the litoral zone closer to the fort, the precise location of these fields cannot be determined, aside from the limited evidence at Wadi Umm el-Ashtan, located 2-5km south of the fort and Wadi Magid, located 8km south-east of the fort. The maximum extent of the surveyed area (Vetter et al, 2009) is roughly 15km from the fort. However, given the lack of any further information, no certain labour rate can be determined. It is a reasonable assumption however, that the labour rate would be comparable to that calculated by Padgham (2014: 40) for Egypt considering the dispersed areas of arable land at Zawiyet

Activity	Estimated labour rate (man-days/ha)	Competency index	People required (230 person estimate)	People required (500 person estimate)
Hoeing	50	Male - 1.17	36	77
Sowing and ploughing in seed	1.27	Male - 1.17	1	2
Weeding	34.2	Male -1.17	25	53
Irrigation	39.9	Male - 1.17	29	62
Reaping (grain)	24.6	Male/Female - 1.3	15	42
Harvesting (pulses and flax)	10	Male/Female - 1.3	2	4
Transport	31.7	Male/Female - 1.3	25	54
Threshing and winnowing	8.05	Female - 1.46	8	16
Tending fig trees	297	Male - 1.17	6	13
Total required	495.82	N/a	146	336

Table 4.4: Labour requirements for agricultural production at Zawiyet Umm el-Rakham (author)

Umm el-Rakham. As such, this labour rate of 31.7 man-days/ha has been retained. The labour rates for threshing and winnowing estimated by Padgham (2014: 42-43) have been retained for this study considering the similarity of this process in the Nile Valley and at Zawiyet Umm el-Rakham as both areas were occupied by Egyptians. As such, the labour rate for grain is 5.55 man-days/ha and for pulses 2.5 man-days/ha (Padgham, 2014: 42-43). Similarly, the proposed labour rate of 297 man-days/ha for the tending of fruit trees suggested by Padgham (2014: 46) has been retained (**Table 4.4**).

Discussion

The calculations of manpower requirements for the maintenance of the agricultural economy at Zawiyet Umm el-Rakham has highlighted that, even if assuming that different people were involved in each identified step of the agrarian work, the necersary product could be produced using between 62.2% and 67.2% of the occupants at the site. It is however more reasonable to assume that certain individuals were involved in multiple processes (such as a single individual participating both in hoeing, sowing and weeding for instance) which would considerably reduce the labour requirements of the population. The work required to process the harvested and winnowed cereal as well as prepare and weave the harvested flax fibres represents an additional labour requirement, but one which – certainly in the case of baking and brewing – was a less seasonal activity and most likely represented part of the daily life for those occupants not occupied with agricultural labour. This chapter has shown that despite the marginal location of Zawiyet Umm el-Rakham, it is reasonable to assume that the settlement had the necessary environmental and manpower requirements to be largely self-sustaining, an interpretation also strongly suggested by the evidence of local craft production discussed elsewhere in this thesis (Chp. 4 and 6).

4.3. Fishing and hunting

Fishing and Hunting				
Finds No.	**Context**	**Material**	**Description**	**Figures**
ZUR/K/21	K0,7	Copper-alloy	Fishing Hook	4.17
ZUR/KZ/11	KZ	Copper-alloy	Fishing Hook	4.18
ZUR/K2H/3*	K2H	Copper-alloy	Fishing Hook	
ZUR/K/156	K3,4	Chert	Arrowhead	4.19
ZUR/K/67	K1,8	Copper-alloy	Arrowhead	4.20
ZUR/G4E/10	G4E	Ceramic	Net-sinkers	4.21

* Not available in magazine. Registered in Finds Register but not drawn/photographed.

Table 4.5: Objects related to fishing and hunting.

4.3.1. Hunting

As discussed below in Chapter 7, few remains of wild game have been found in the Area K faunal assemblage, an interpretation which in agreement with research conducted recently by Linseele and Van Neer (2010: 71), which states that though remains of wild game are often present at settlement sites throughout the Dynastic period, they are rarely found in significant enough quantities to suggest heavy reliance on hunting as a method of subsistence. Caprines, cattle and pigs allowed the Egyptians to rely on a more stable source of protein in the form of their domesticated animals. To the inhabitants of Zawiyet Umm el-Rakham, living in relatively unfamiliar territory, the near-complete reliance on caprine remains as a primary source of protein may reflect an unwillingness to risk relying on hunting in an alien environment.

Despite the absence of much faunal evidence for hunting and fishing, a limited number of small finds nonetheless suggests at least limited exploitation of game

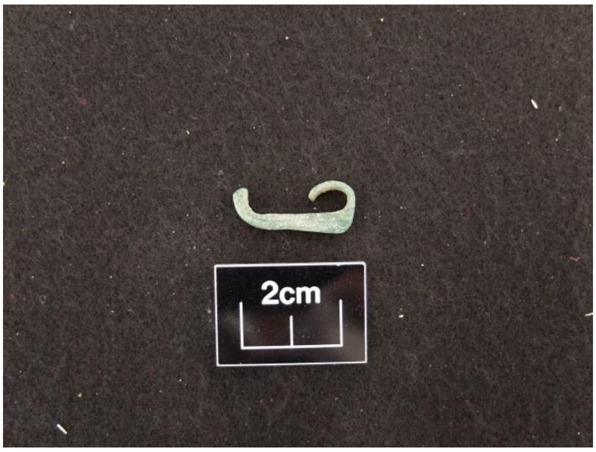


Fig. 4.17: Fish hook ZUR/K/21 (S. Snape).

Fig. 4.18: Fish hook ZUR/KZ/11 (S. Snape).

Fig. 4.19: Arrowhead ZUR/K/156 (S. Snape).

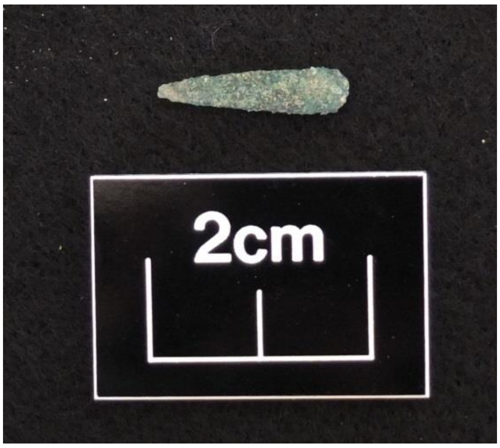


Fig. 4.20: Arrowhead ZUR/K/67 (S. Snape).

Fig. 4.21: Netsinkers ZUR/G4E/10 (S. Snape).

animals and fish. Two arrow-heads were found in Area K, an unsurprising discovery considering the clear military character of the settlement. In fact, the paucity of weapons found throughout the site may show that the final garrison took care to bring their weapons with them when leaving the settlement. The salinity in the ground has also negatively impacted the preservation of metallic artefacts.

ZUR/K/156 is an arrowhead chipped from a dull, light-brown chert and it was discovered in the area of Building 1 in the 1999 season. The shape of the arrowhead is typical of the New Kingdom and Late Period (Hikade, 2001: 124), with two barbs and a broad stem or tang for insertion into the shaft. After initial shaping, the object has been finely retouched along both cutting edges and along the tangs. ZUR/K/67 is a metallic arrowhead, the only one discovered at the site. Its shape is unusual with little evidence of a defined tang, although the shape is not unattested in the New Kingdom (Huret, 1990: Fig. 7.63).

Overall, there is an extreme paucity of evidence of hunting from Zawiyet Umm el-Rakham. As stated above, it is likely that weapons also used for hunting – such as arrowheads – were collected by the final inhabitants before abandoning the site, but the lack of any significant assemblages of wild game within the faunal record clearly shows that hunting for the purposes of securing protein in the form of meat, as well as hide, bone and sinew for use as tools or raw material, was rare, although further excavation in different areas of the fort may in future lead to a re-evaluation of this interpretation. However, the relatively exposed situation in which the inhabitants of Zawiyet Umm el-Rakham found themselves, located in largely unfamiliar territory, appears to have been conducive to a more reliable food supply in the form of domesticated animals.

4.3.2. Fishing

The significance of fish as part of the diet in Ramesside Egypt is undeniable (Loredana, 1988: 74-75). Janssen's (1997: 37-54) thorough investigation of fish and fishermen at the contemporary site of Deir el-Medina showed that specific fishermen were attached full-time to the village to maintain a steady supply. In the light of this prevalence of a piscine diet at contemporary sites in the Nile Valley, the rarity of piscine remains in Area K is curious. Only 12 vertebrae were found and considering their proximity within the same context, and similarity in size, they may have belonged to the same fish. The reason for this scarcity could be due to the decision of the excavators to sieve only some of the excavated matrix, potentially missing smaller faunal remains such as fish bones and additional vertebrae. Another possibility is that – like hunting – fishing was too uncertain a strategy to employ for basic subsistence and it was set aside in favour of domesticated animals.

A parallel to this preference for domesticated over wild animals is found at the contemporary mining camp at Timna on the Sinai Peninsula. The site is similar in its peripheral location to Zawiyet Umm el-Rakham, as is the reliance on caprine meat over fish – even though the Red Sea is within reach of the Timna encampment. Only 92 piscine remains were identified at Timna by comparison to 3146 bones and bone fragments, belonging to caprines (Lernau, 1988: 245-246). Furthermore, the majority of the piscine remains from the site belong to fish imported either from fresh water sources, or from the Mediterranean (Lernau, 1988: 245) most likely in North Sinai.

The closest source of fish at Zawiyet Umm el-Rakham was the Mediterranean Sea, whose south coast lies only 1.5 km north of the site. The bay north of the fort is however not conducive to fishing, as the sea floor is comprised exclusively of sand, with no rock formations or reefs to attract sea life. Rather, the larger shoals of seawater fish are found north-east of the site, some 2 kilometres along the coast where a series of rocky islands jut into the water from the Marmarican plateau. A strong undercurrent goes from west to east, from the headland of Ras Abu Laho towards these rocky outcrops, making it difficult to manoeuvre small craft and the prevalent head-wind and accompanying heavy surf makes launching craft from the beach or even wading into the water problematic.

ZUR/K/21 and ZUR/KZ/11 represent the only fish hooks discovered in Area K and Zawiyet Umm el-Rakham as a whole. They are both made from a copper-alloy and as a result of the high saline content in the ground, both are poorly preserved. They appear unlike the typical New Kingdom fish hooks, recognisable by clearly defined flanges and barbs (Brewer and Friedman, 1989: 29), although this may simply be due to the heavy corrosion of the artefacts. Line fishing is evidenced in the pictorial record from funerary contexts in Egypt although it is less well-represented in tomb depictions than net fishing (Brewer and Friedman, 1989: 29-30). By the New Kingdom, line fishing in tomb art is primarily conducted by the tomb owner within the confines of a garden, as opposed to in the Nile. In the context of Zawiyet Umm el-Rakham, line fishing may have represented the most practicable method for fishing around the rocky islands north-west of the site, where the jagged rocks and reefs immediately beneath the surface would snag nets.

ZUR/G4E/10 represents an assemblage of 65 pierced ceramic barrel-shaped objects found within a locally manufactured beer jar (ZUR B, see Chp. 6). The ceramic objects were also manufactured locally from the ZUR B fabric, and they were initially described as beads (Simpson, 2002: 190-192). However, further investigation has shown that the objects should instead be considered net sinkers. Used primarily for round cast-nets, net sinkers were secured around the circumference of the netting. When the net is thrown, the weights pull the edges down, trapping the prey. A thin cord around the circumference can then be used to close the net and a centrally placed thicker cord to pull the net and catch on land (Brewer and Friedman, 1989: 40-41).

A class of objects discovered in large quantities by Petrie at Tell el-Retaba were initially argued by him to be loom weights (Petrie and Duncan, 1906, pl. XXXVIC.44-46), an interpretation also followed by the modern excavators at the site, where further examples of this object type have been recovered (Rzepka *et al*, 2009: 265). However, Petrie's initial interpretation was challenged by Oric Bates in his seminal article on ancient Egyptian fishing (Bates, 1917: 258, Pl. XXII.193-199), where the objects were designated as net sinkers, rather than loom weights. A close parallel to this assemblage was also found at Kom Firin (Spencer, 2014: Pl. 182) where they are described as "net-floats". In the case of the ceramic beads from Zawiyet Umm el-Rakham, their function as net sinkers, as opposed to beads or loom weights, can be argued on the basis of an intact cast-net in the Louvre Museum (E.286) which is complete with ceramic net sinkers of similar size, shape and material as the artefacts discovered at Zawiyet Umm el-Rakham. As such, it can be argued that the inhabitants of the settlement at least attempted to use cast-nets in the nearby waters of the Mediterranean Sea.

4.3.3. Discussion

Both the small finds attesting hunting and fishing, as well as the faunal evidence for wild game and fish (see Chp. 7 for further discussion) show that these strategies were rarely used at Zawiyet Umm el-Rakham, and that wild game in general contributed very little to the sustenance of the settlement's inhabitants. In general, the occasional results from fishing or hunting may have represented a diversion from a monotonous diet rather than a significant and long-term economic strategy at the site.

4.4. Textile Production

Textile Production				
Finds No.	**Context**	**Material**	**Description**	**Figure**
ZUR/K/107	K0,8	Ceramic	Spinning bowl	4.22
ZUR/K/232	K0,7	Ceramic	Spinning bowl	4.23
ZUR/2014(K)/1	KE	Ceramic	Spinning bowl	4.24
ZUR/KE/10*	KE	Ceramic	Spinning bowl	
ZUR/KC/14	KC	Limestone	Spinning bowl	4.25
ZUR/KE/5*	KH	Ceramic	Spinning bowl	
ZUR/KW/3*	KW	Ceramic	Spinning bowl	
ZUR/KAB/57	KAB	Ceramic	Spinning bowl	4.26
ZUR/K2A/29	K2A	Ceramic	Spinning bowl	4.27
ZUR/K2H/15	K2H	Ceramic	Spinning bowl	4.28
ZUR/K/101	K0,7	Limestone	Loomweight	4.29
ZUR/KB/5	KB	Limestone	Loomweight	4.30
ZUR/KB/6	KB	Limestone	Loomweight	4.31
ZUR/KN/12	KN	Limestone	Loomweight	4.32
ZUR/KKII/15	KKII	Limestone	Loomweight	4.33
ZUR/K/12	K2,8	Ceramic	Spindle Whorl	4.34
ZUR/KB/62	KB	Limestone	Spindle Whorl	4.35
ZUR/KH/8	KH	Limestone	Spindle Whorl	4.36

* Not available in magazine. Registered in Finds Register but not drawn/photographed.

Table 4.6: Objects related to textile production.

The use of the flax plant (*Linum usitatissimum*) for the manufacture of linen cloth in Pharaonic Egypt is evidenced from the Predynastic Period in the Fayum (Brunton and Caton-Thompson, 1928: 63-64) onwards. The state of research into manufacturing methods and processes within Egyptology is well-advanced, in recent years primarily through the publications by Gilliam Vogelsang-Eastwood (1992) and

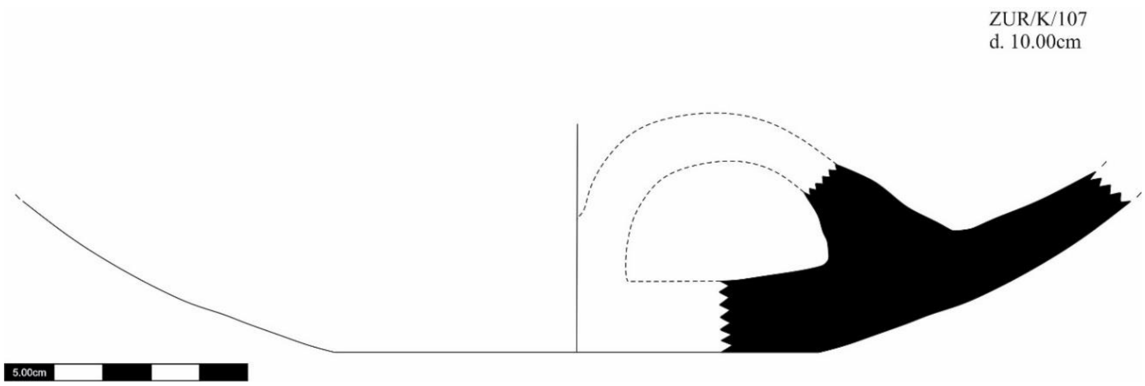


Fig. 4.22: Spinning bowl ZUR/K/107 (author).

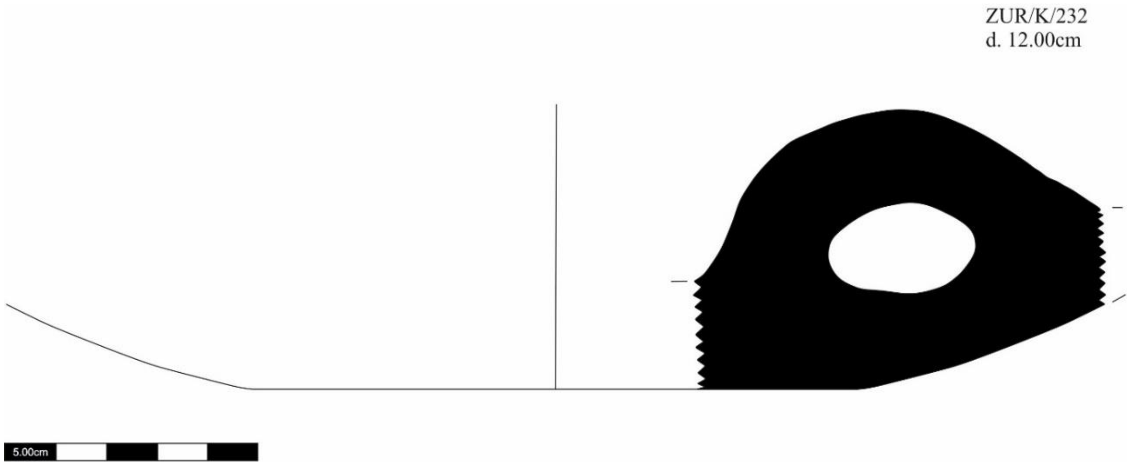


Fig. 4.23: Spinning bowl ZUR/K/232 (author).

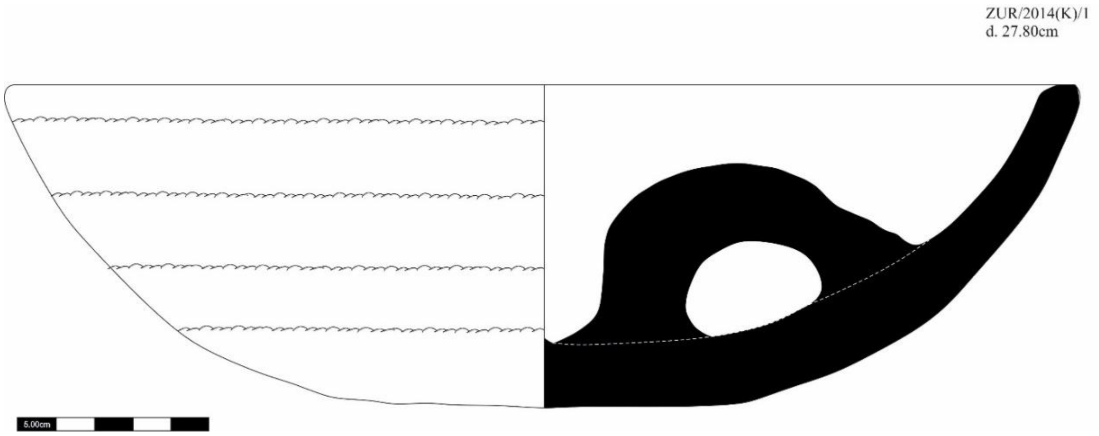


Fig. 4.24: Spinning bowl ZUR/2014(K)/1 (author).

Fig. 4.25: Spinning bowl ZUR/KC/14 (S. Snape).

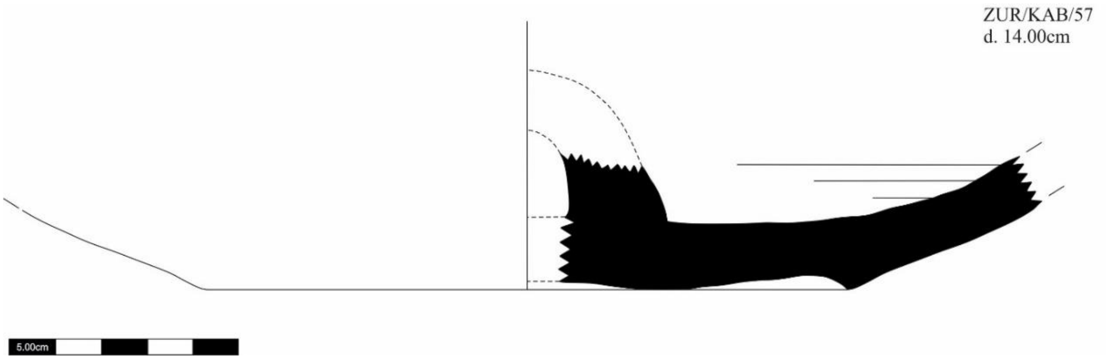


Fig. 4.26: Spinning bowl ZUR/KAB/57 (author).

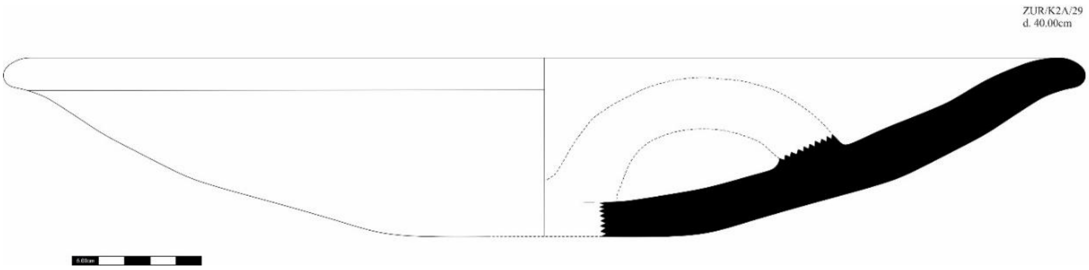


Fig. 4.27: Spinning bowl ZUR/K2A/29 (author).

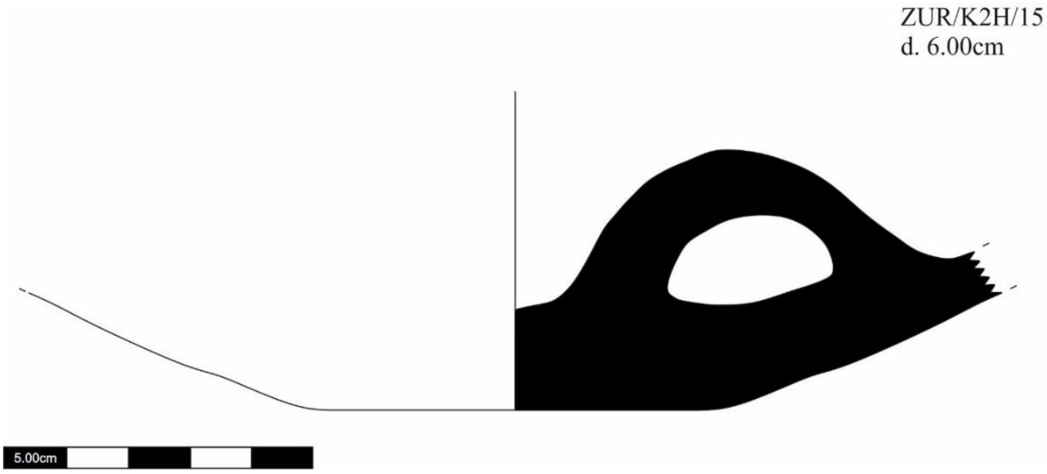


Fig. 4.28: Spinning bowl ZUR/K2H/15 (author).

Fig. 4.29: Loomweight ZUR/K/101 (S. Snape)

Fig. 4.30: Loomweight ZUR/KB/5 (S. Snape).

Fig. 4.31: Loomweight ZUR/KB/6 (S. Snape).

Fig. 4.32: Loomweight ZUR/KN/12. (S. Snape).

Fig. 4.33: Loomweight ZUR/KKII/15 (S. Snape).

Fig. 4.34: Spindle whorl ZUR/K/12 (S. Snape).

Fig. 4.35: Spindle whorl ZUR/KB/62 (S. Snape).

Fig. 4.36: Spindle whorl ZUR/KH/8 (S. Snape).

Kemp and Vogelsang-Eastwood (2001) as well as publications regarding specific tools involved in the linen production such as spinning bowls (Allen, 1997).

4.4.1. Environmental Conditions for Flax Agriculture

As discussed by Kemp and Vogelsang-Eastwood (2001: 27), *Linum usitatissimum* grows best in fertile silt loam, with good drainage. In this respect, the *wadis* located to the south of Zawiyet Umm el-Rakham are ideal growing areas. The bottom of the *wadis* is covered by thick layers of silt loam, with occasional clay deposits, and during the annual winter rains, the *wadis* are generally flooded and new fertile sediment deposited. The relatively high salinity in the ground due to the proximity of the sea can hinder certain types of plant growth, although as demonstrated in experiments in the 1940's, while flax is moderately sensitive to high salinity, successful growth is still possible (Hayward and Spurr, 1944).

The steps involved in the sowing, harvesting and processing of the flax have been extensively described by Vogelsang-Eastwood, particularly in the two general introductions to the topic she has published (1992 and 2000), and a further summary would not advance the purposes of this chapter. Instead the relevant steps which relate to the tools discovered in Area K will be discussed in the sub-sections below where relevant. However, it should be noted that the complex process, especially concerning the retting of the flax, and the problematic situation which arises if the flax is allowed to dry, make it very unlikely that flax fibres or the flax plant could be transported over significant distances without suffering harm. As the multiple spinning bowls at Zawiyet Umm el-Rakham provides evidence for one of the earliest manufacturing steps, namely the spinning of the fibres into thread, it is unlikely that the flax was not grown at the site, or that manufactured thread was imported for weaving. The tools and the environmental conditions both serve to show that the flax plant was grown close to the site (although with some accepted loss of yield due to the ground salinity) and that the linen production was subsequently carried out by its inhabitants.

4.4.2. Spinning bowls

The colloquial term 'spinning bowl' describes a stone or ceramic vessel with a series of internal handles. The vessels were used to spin the wetted flax fibre together into thread onto a spindle whorl, either directly, as depicted in Middle Kingdom funerary art (such as in the Tomb of Djehutihotep, Newberry, 1895: Pl. XXVI) or, by the New Kingdom, with the use of a wooden beam and a series of pulleys (Tomb of Djehutinefer, Davies, 1929: Fig. 1A, also evidenced in the archaeological record at Ballas, Schwartzer, 1990: 6-8, as discussed by Allen, 1997: 26-27). No such pulley arrangement has survived in Area K, although this may be due to the generally poor preservation of any wooden artefacts from the site.

The spinning bowls from Area K are primarily manufactured from ceramic, both Nile silts, Nile B2 (3), Nile D (1) and local fabric, ZUR B (2). Three further ceramic spinning bowls were found during the excavations, but were missing from the magazine and could therefore not be fabric classified or drawn. They have been included in the list above, but excluded from this discussion. A large stone spinning bowl was also found, made from poor quality local limestone with a high quantity of microfossils and shell material imbedded in the stone. All the vessels contained two internal loops, similar to contemporary examples found at Tell el-Amarna (Kemp and Vogelsang-Eastwood, 2001: 291-306, see also Rose, 2007: fig. 148-149) and also from the site of Deir el-Medina (Deir el-Medina, Nagel, 1938: pl. XI: Type XVI) and Deir el-Ballas (Schwartzer, 1990: 6-8). The two spinning bowls with preserved rims lack the folded rims of the contemporary examples from Tell el-Amarna (Kemp and Vogelsang-Eastwood, 2001: 292). Instead, they have either direct or slightly modelled rims. The vessels all have either flat bases (five examples) or – more unusually – a ring-shaped base (ZUR/KAB/57), somewhat similar to a contemporary example found at Tell Heboua (Maksoud, 1998: 216).

4.4.3. Spindle whorls

The spindle whorl is the portion of the weighted spindle used in the spinning of flax fibres, which commonly survives in the archaeological record. Kemp and Vogelsang (2001: 265-267) have written extensively on the precise usage of this tool, and have highlighted the presence of two basic shapes of spindle whorl; a flat disc-shape – usually made from wood or ceramic – and the domed whorl – made from limestone (Kemp and Vogelsang, 2001: 266). Both types are represented in the corpus from Area K. ZUR/K/12, one of the first finds from the courtyard KL in the centre of Area K was a flat, disc-shaped whorl made from local ceramic (suggested by the presence of significant quantities of marine shell temper in the clay). It is most likely the flat base of a vessel which has been 'chipped' into a secondary shape, as the hole in the centre of the whorl was clearly made post-firing. Some attempt was made to ensure that the outer walls of the whorl were flattened, qualifying the objects as a spindle whorl under the considerations raised by Kemp and Vogelsang-Eastwod (2001: 277) and also demonstrated by a further example found at the contemporary site of Tell Heboua (el-Maksoud, 1998: 255). This is contrary to the position adopted by Simpson (2002: 209-

212) who considered this and similar objects found in the Western desert to be pottery lids or loom-weights.

ZUR/KB/62 is of the more easily recognisable domed type and manufactured from local limestone. Its shape and the six incisions on its obverse side compares well to examples found at Tell el-Amarna (Kemp and Vogelsang-Eastwood, 2001: 287) and also from Tell Heboua (el-Maksoud, 1998: 255), from Kom Firin (Spencer, 2014: Pl. 262) and from Lisht-North (Metropolitan Museum of Art, 15.3.691). The final example, ZUR/KH/8 is heavily fragmented, but appears to be a similar type as ZUR/KB/62, a domed limestone loom weight. However, the limestone chosen for this object was of inferior quality and the object split in half during manufacture and was abandoned.

4.4.4. Loom weights

So-called 'loom weights' from ancient Egyptian sites have provoked debate since the early 20th Century (Petrie and Duncan, 1906, contra Bates, 1917, see also recent discussion in Giddy, 1999: 193-195). The pear-shaped loom-weights with string-marks on their surface, described by Kemp as having a "parcel-effect" (Kemp and Vogelsang-Eastwood, 2001: 394, similar to those described by Petrie and Duncan 1906, pl. XXXVIC.44-46, and from Tell el-Retaba, Rzepka *et al*, 2009: 265, Tell Heboua, el-Maksoud, 1998: 254 and 256-57), have not been found in Area K. In their place are a series of roughly oblong perforated limestone weights, similar in appearance to contemporary discoveries from Kom Rabi'a (Giddy, 1999: Pl. 41.2709).

As discussed by Giddy (1999: 193-195), the issue with this type of weight, is that while weights were certainly of use in the upright warp-weighted loom (similar to the one constructed by the Tell el-Amarna team, Kemp and Vogelsang-Eastwood, 2001: 409), they could also have been employed in other industries. However, in the context of Area K, it is interesting to note that all five loom-weights were found in clusters either in Space KN, KKII or KB surrounded by other tools related to weaving and spinning, such as spindle-whorls and spinning bowls (**Fig. 4.37**). The context may then provide at least tentative evidence for their function as loom weights, even if they may also have served other purposes. ZUR/K/101 is roughly oblong, manufactured from local limestone. ZUR/KB/5 and ZUR/KB/6 are of a similar shape and found next to a domed limestone spindle whorl, although they had not yet been perforated. ZUR/KKII/15 has been partially perforated, showing that the industry of linen production did not only involve the spinning of flax, but relied on the working of local limestone into loom weights. The final loom-weight, ZUR/KN/12 is roughly oblong and, as ZUR/K/101, it has been wholly perforated.

4.4.5. An Area K Loom in Area G?

During the excavations of G6, one of the stone circles evidencing Libyan squatter occupation following the abandonment of the fort (Simpson, 2002: 201-202), a roughly square limestone block was uncovered (**Fig. 4.38**), which Simpson interprets as a grinding stone due to a central depression (Simpson, 2002: 201). However, further examination of the object (ZUR/G6E/5) shows that the object’s original shape is dissimilar to the mortars and querns found elsewhere in the fort.

The object is roughly square with a square 'socket' chiselled out of its centre, and is identical to a class of objects found at other New Kingdom sites such as Tell el-Amarna (Kemp and Vogelsang-Eastwood, 2001: 373-381), known as 'socket blocks' (see in particular Kemp and Vogelsang-Eastwood, 2001: Fig. 9.54 for parallel objects), which may have functioned as supports for upright looms. The slight depression in the centre of ZUR/G6E/5 is a secondary addition, which can most likely be attributed to the Libyan squatters who reused the object as an impromptu quern or grinding stone as Simpson (2002: 201) suggests. The object may originally have been placed in Area G by the Egyptian occupants (as it was found next to a possible emplacement, Simpson, 2002: 201-202) although the possibility that the object was moved from Area K to Area G by the Libyan squatters cannot be discounted, especially considering the prevalence of evidence for weaving in Area K and the notable absence of any socket blocks.

4.4.6. Iconographic and Textual Evidence for Libyan cloth

The first objective of the linen production at Zawiyet Umm el-Rakham must have been achieving self-sufficiency in the manufacture of clothes for its inhabitants. A secondary concern is one raised by Kemp and Vogelsang-Eastwood (2001: 436-437), namely that of trade. As O'Connor noted in his assessment of the Libyan society on the basis of the Egyptian iconographic record (1996: 63), the local Libyans wore what can be interpreted as raw-hide cloaks and kilts, with a much smaller proportion of the population wearing linen made from either wool or flax.

Fig. 4.37: Spatial overview of tools related to textile production (triangle: spinning bowls ; circle: spindle whorl ; square: loom weight) (S. Thomas and author).

Fig. 4.38: Possible loom support found in Area G, scale bar in picture is 15.0cm (S. Snape).

This has also been noted by both Holscher (1955: 32-33) and Bates (1914: 121-122), although the former's assessment of the Libyan dress is somewhat marred by the attempts to demonstrate the use of leather as evidence of un-civilised or under-developed behaviour by contrast to the assumed civilisation of the linen-wearing Egyptians. As O'Connor notes, the tendency towards favouring hide over linen changes during the New Kingdom when Libyans begin appearing clothed in linen and also that linen begin comprising significant portions of the spoils taken from the Libyans during warfare (O'Connor, 1990: 63).

Considering that very little material from Bronze Age Libya has been excavated, it would be incautious to suggest sweeping interpretations; however it can be tentatively suggested that cloth made from either wool or flax, was not as widespread among the Libyan population around Zawiyet Umm el-Rakham as with the Egyptian population within. Considering the value of Egyptian linen as a trade commodity in the Near East (Kemp and Vogelsang-Eastwood, 2001: 436-437) and in particular the value of linen cloth within Egyptian society (see especially the prices for various items of clothing in Pap. Cairo 65739, Gardiner, 1935), it is likely that excess linen manufactured at Zawiyet Umm el-Rakham could be bartered to the local population, possibly in exchange for raw materials such as meat and ostrich eggs (see Chp. 6 below) or simply presented as gifts to ensure local good-will.

4.4.7. Discussion

The most notable feature of the assemblage of material related to linen production from Area K is its spatial arrangement (**Fig. 4.37**). Aside from three of the spinning bowls, badly broken and clearly deposited in areas of garbage disposal (Space KE and KG), the remaining material can largely be classified into four groups, Group 1, found in Space KKII and KN and comprising loom-weights and spinning bowls, and Group 2 found in Space KC, KB and KAB and comprising spinning bowls, loom-weights and a spindle-whorl. A spinning bowl found next to a second loom-weight can also be found in Space KH (Group 3). Two spinning bowls were also found in Building 5 (Group 4). The groups of material may denote areas where weaving was conducted, although, considering the unfinished state of several of the loom-weights, it may simply be areas of manufacture (spinning and stone-working) overlapping.

Most of the tools involved in this industry are locally produced, aside from a small amount of spinning bowls brought from Egypt. The local pottery production (see Chp. 6) helped to either replace broken examples or expand the production by producing more vessels made locally; similarly an attempt was clearly made to make a more durable spinning bowl from local limestone. The local limestone was also used in the production of the loom-weights and two of the spindle-whorls. As such, two local industries – pottery manufacture and stone-working – directly contributed to a third, the local production of cloth. The basic raw material (flax) was locally grown. Textile production was clearly conducted at the site, and it seems likely that its primary function was to achieve self-sufficiency in cloth and secondarily, to produce a small surplus intended as high-value barter goods for trade with local Libyan tribesmen.

4.5. Stone-working and Import of Stone Objects

Stone Working and Imported Stone Objects				
Finds No.	**Context**	**Material**	**Description**	**Figures**
ZUR/K/103*	K0,7	Unknown	Pounder/Hammer stone	
ZUR/K/119*	K1,4	Unknown	Pounder/Hammer stone	
ZUR/K/192*	K2,7	Unknown	Pounder/Hammer stone	
ZUR/K/288*	K4,10	Unknown	Pounder/Hammer stone	
ZUR/K/290*	K0,4	Unknown	Pounder/Hammer stone	
ZUR/K/319*	K2,7	Unknown	Pounder/Hammer stone	
ZUR/K/338	K1,4	Limestone	Pounder/Hammer stone	4.39
ZUR/KM/2	KM	Diorite	Pounder/Hammer stone	4.40
ZUR/KM/5*	KM	Unknown	Pounder/Hammer stone	
ZUR/KM/15*	KM	Unknown	Pounder/Hammer stone	
ZUR/KM/16*	KM	Unknown	Pounder/Hammer stone	
ZUR/KQ/5	KQ	Diorite	Pounder/Hammer stone	4.41
ZUR/KZ/6*	KZ	Unknown	Pounder/Hammer stone	
ZUR/KZ/16*	KZ	Unknown	Pounder/Hammer stone	
ZUR/KAB/57a	KAB	Quartzite	Pounder/Hammer stone	4.42
ZUR/KAB/57b	KAB	Quartzite	Pounder/Hammer stone	4.43
ZUR/KAB/57c	KAB	Quartzite	Pounder/Hammer stone	4.44
ZUR/KAB/57d	KAB	Quartzite	Pounder/Hammer stone	4.45
ZUR/KAB/57e	KAB	Quartzite	Pounder/Hammer stone	4.46
ZUR/KAB/57f	KAB	Quartzite	Pounder/Hammer stone	4.47
ZUR/KKIII/7	KKIII	Quartzite	Pounder/Hammer stone	4.48
ZUR/K2G/4	K2G	Quartzite	Pounder/Hammer stone	4.49
ZUR/K2G/5*	K2G	Unknown	Pounder/Hammer stone	
ZUR/KD/54*	KD	Limestone	Table	
ZUR/KL/6*	KL	Limestone	Table	
ZUR/KN/53*	KN	Limestone	Table	
ZUR/KN/54*	KN	Limestone	Table	
ZUR/KO/1*	KO	Limestone	Table	

Finds No.	Context	Material	Description	Figures
ZUR/KX/8*	KX	Limestone	Table	
ZUR/KF/6	KF	Limestone	Chair/Stool	4.50
ZUR/KQ/8*	KQ	Limestone	Chair/Stool	
ZUR/KZ/2	KZ	Limestone	Headrest	4.51
ZUR/KZ/3	KZ	Limestone	Headrest	4.52
ZUR/K/30	K0,8	Limestone	Stone plate	4.53
ZUR/KC/13	KC	Limestone	Stone bowl	4.54
ZUR/KKIII/6a	KKIII	Calcite-Alabaster	Lug/knob	4.55
ZUR/KKIII/6b	KKIII	Calcite-Alabaster	Lug/knob	4.55
ZUR/KKIII/6c	KKIII	Calcite-Alabaster	Lug/knob	4.55
ZUR/KM/24	KM	Calcite-Alabaster	Lug/knob	4.56
ZUR/KT/17	KT	Calcite-Alabaster	Lug/knob	4.56
ZUR/KT/23	KT	Calcite-Alabaster	Lug/knob	4.56

* Not available in magazine. Registered in Finds Register but not drawn/photographed.

Locally manufactured stone objects discussed in Section 4.2, 4.4 and 4.9 have not been included

Table 4.7: Objects related to stone-working and imported stone objects.

4.5.1. Description of Local Materials

The geology at Zawiyet Umm el-Rakham and its environs is defined by the steep escarpment cliffs affiliated with the Marmarica Plateau or Formation, an extensive stretch of limestone and dolostones with a maximum thickness of 150 meters at the coast (Aref, el-Khoriby and Hamdan, 2002: 182 ; el-Shahat, 1993: 75). The formation consists of permeable limestone overlaying harder granite bedrock (Ezzat, 1982: 305). The limestone itself is overwhelmingly a mixture of reefal (Abdallah, 1966) and fossiliferious components (Abdallah, 1965).

Fig. 4.39: Hammerstone ZUR/K/338 (S. Snape).

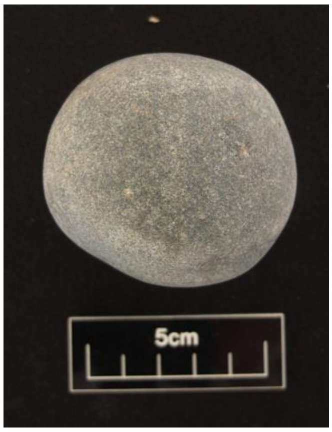


Fig. 4.40: Hammerstone ZUR/KM/2 (S. Snape).

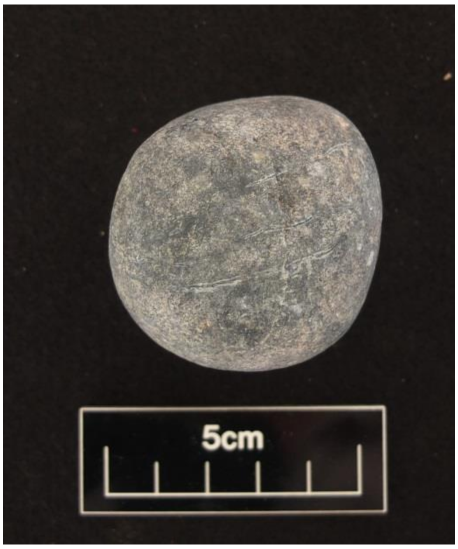


Fig. 4.41: Hammerstone ZUR/KQ/5 (S. Snape).

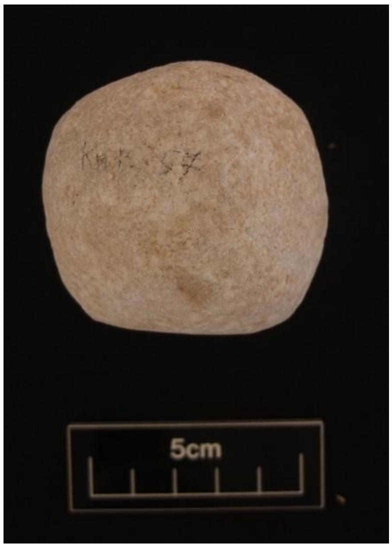


Fig. 4.42: Hammerstone ZUR/KAB/57a (S. Snape).

Fig. 4.43: Hammerstone ZUR/KAB/57b (S. Snape).

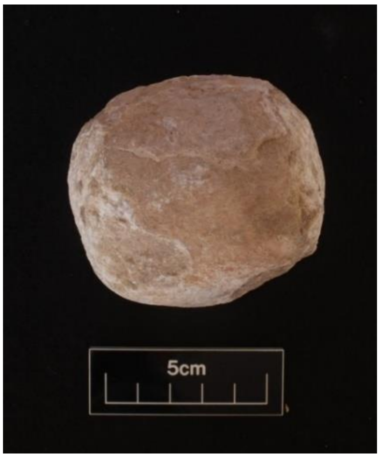


Fig. 4.44: Hammerstone ZUR/KAB/57c (S. Snape).

Fig. 4.45: Hammerstone ZUR/KAB/57d (S. Snape).

Fig. 4.46: Hammerstone ZUR/KAB/57e. (S. Snape).

Fig. 4.47: Hammerstone ZUR/KAB/57f (S. Snape).

Fig. 4.48: Hammerstone ZUR/KKIII/7 (S. Snape).

Fig. 4.49: Hammerstone ZUR/K2G/4 (S. Snape).

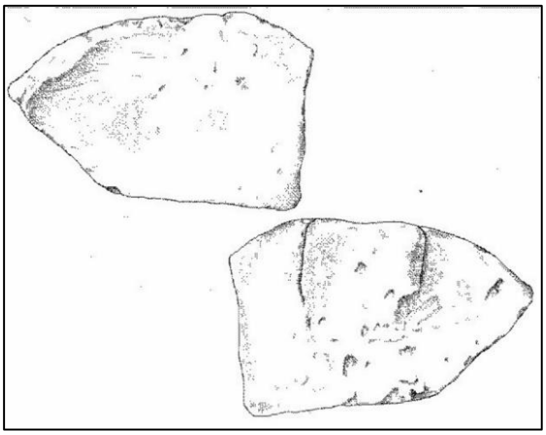


Fig. 4.50: Chair/stool ZUR/KF/6 (J. Heath).

Fig. 4.51: Headrest ZUR/KZ/2 (S. Snape).

Fig. 4.52: Headrest ZUR/KZ/3 (S. Snape).

Fig. 4.53: Stone plate ZUR/K/30 (S. Snape).

Fig. 4.54: Stone bowl ZUR/KC/13 (S. Snape).

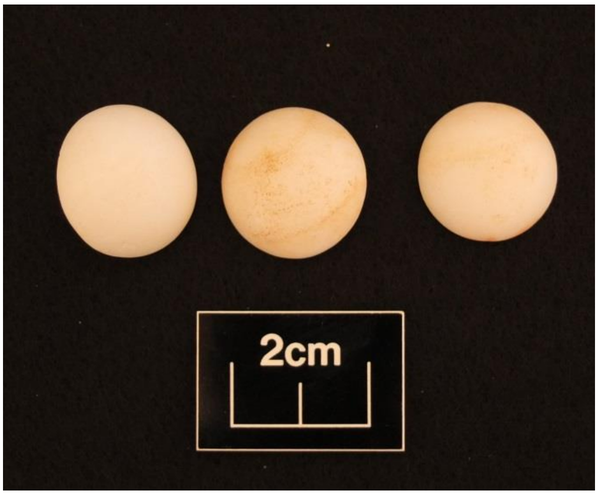


Fig. 4.55: Lugs/knobs ZUR/KKIII/6a-c (S. Snape).

Fig. 4.56: Lugs/knobs ZUR/KM/24 – ZUR/KT/17 – ZUR/KT/23 (S. Snape).

The primary allochem component is fossil material. The ortchochem component of the material is in the form of sparite, meaning visible crystals of calcite spar (Trudgill, 1985: 10- 11). Robert Folk (1965: 166) suggests that the term for the local limestone should be 'biosparite', meaning a sparite-based limestone with a high content of biological (fossil) inclusions (Trudgill, 1985: 10-11). The biosparite limestone in the area surrounding Zawiyet Umm el-Rakham is sub-mature, in that wave action and time has not yet rounded the fossils making the material mature or supermature (Folk, 1965: 166-167). For practical purposes, the high content of fossil inclusions and its crystalline structure weakens the limestone considerably, and as such the basic stone material available to the occupants was highly crumbly and friable.

Unlike the Eastern Desert or southern Egypt, no significant quantities of hard stones (such as granite, quartzite or basalt) are located in the vicinity of Zawiyet Umm el-Rakham or throughout the Marmarican formation and the Qatara Depression, with the exception of a basalt source located near the Bahariya oasis (Rizk and Davis, 1991: 233). As such, hard stone objects and soft stone objects not made from limestone (for instance objects made from calcite-alabaster, which does not occur locally) most likely originated in Egypt and were either brought fully formed or as raw material to Zawiyet Umm el-Rakham.

4.5.2. Tools: Pounders/Hammer stones

The pounders from Area K are manufactured from three materials: local biosparite limestone (1), diorite (2) and quartzite (8). The remaining 12 pounders which could not be inspected in the magazine are of unknown material. The pounders from the area are uniformly spherical, rather than the greater range of shapes displayed at contemporary sites such as Kom Rabi'a (Giddy, 1999: 212-214). Quartzite is sufficiently hard to be easily used as hammer stones, as is evidenced at contemporary sites in Egypt (Kemp and Stevens, 2010b: 409-411) however, the purpose of the single pounder made from local limestone is unknown; its friability would limit its uses greatly. The use of diorite in pounders is equally well attested at other sites, such as Kom Rabi'a (Giddy, 1999: 211).

The publication of pounders from Egyptian New Kingdom sites is as noted by Giddy (1999: 211-212) generally poor, with only a few published examples at the time of Giddy's publication (*cf* Boyce, 1995: 98-104 ; Schneider, 1996: 52), to which can be added later corpora from Tell el-Amarna (Kemp and Stevens, 2010b: 402-411) and a series of pounders from Kom Firin (Spencer, 2014: 153-155). There is also a further series of unpublished pounders found at Tell el-Amarna, including a spherical basalt pounder currently in the Petrie Museum of Archaeology (UC236), as well as a spherical granite pounder from a New Kingdom context at Gebel Barkal in the Boston Museum of Fine Arts (16-4-18c.1).

Only a single copper chisel was found at Zawiyet Umm el-Rakham associated with the later Libyan squatter occupation although most likely of Egyptian manufacture (Simpson, 2002: 193-194). This lack can most readily be explained by the apparent concerted Egyptian effort to empty the site of metallic artefacts upon its abandonment (see Section 4.8 below). The deposition of the chisel within the later squatter occupation would seem to confirm the view of the final garrison that later local occupants salvaged metal objects from the site. The chisel may as such originally have been used in Area K or Area N (see Section 4.5.6) where evidence of stone working has been found, although this cannot be definitively proven.

4.5.3. Products: Furniture and Architectural Elements

Inscribed architectural fragments from domestic housing of the New Kingdom are commonly found in published corpus (*cf* Budka, 2001 ; Gabolde and Fahid, 2003 ; Giddy, 1999: 301-302 ; Kitchen, 1993b; Peet and Woolley, 1923: 37), whereas uninscribed door jambs and lintels are characterised by their near-absence (Giddy, 1999: 304). By contrast to the contemporary situation in Tell el-Amarna, where the non-elite housing utilised wood- and brick jambs and lintels rather than limestone (Kemp and Stevens, 2010a: 354-361), the occupants of Zawiyet Umm el-Rakham used local limestone in most of the structures in Area K, most likely due to the prevalence of the material. These architectural elements were not photographed but recorded on the Area K plan (see **Pl. I**). For a complete list of lintels, jambs and thresholds, please consult the Area K Context List in Appendix I.

4.5.3.1. Lintels

Five complete or fragmentary lintels were discovered during the excavation of Area K, associated with two structures, Building 1 and Building 3. In Building 1, **1037+1039** (two broken halves of the same object) is associated – not with the main entrance – but with the entrance to the central area of the building (Space A). **1065** in the same structure is associated with the entrance from the central area to one of the auxiliary chambers (Space C), although its fragmentary state and the lack of any surrounding pieces which can be associated with it, might also suggest that it originated elsewhere at the site and was taken to Area K to be reworked. The additional complete lintels from the area (**1146** and **1156**) were associated with two of the three external entrance points leading from respectively Space KY and K2G to the central room in Building 3, Space KR. Another highly fragmentary lintel **1152** may have been associated with the final door way. The lintels are generally rectangular with four worked surfaces and their general lack of polishing and basic symmetry suggests that they were roughly made, with chisel marks indicating the use of metal tools.

4.5.3.2. Door jambs

Thirteen whole or fragmented door jambs were excavated from Area K, and unlike their contemporaries from Tell el-Amarna (Kemp and Stevens, 2010a: 354) they were exclusively made from local limestone rather than wood or mud brick. As with the lintels, the jambs are primarily associated with doorways in Building 1 and Building 3. **1038** and **1041-1042** (two broken halves of the same jamb) were associated with the entrance from Space KF to the central room A, while **1061** and **1064** (and their associated upper halves, **1062** and **1063**) were found in the door way between Space A and Space C. The largest concentration of jambs was found associated with the three doorways connecting Spaces K2G and KY with Space KR in Building 3. Out of the six door jambs, all were found still standing *in situ* with one, **1141** broken in half, its upper portion lying in Space K2G. The shape of the jambs is generally rectangular and similarly rectangular in section with four worked edges and smoothed corners. The exceptions are **1141** and **1143** which are more irregular in section, and appear to have been only roughly shaped to a respectively triangular and oval shape.

4.5.3.3. Thresholds

Unlike the domestic housing units at Tell el-Amarna (Kemp and Stevens, 2010a: 354), the structures in Area K generally had cobble-stone thresholds, made from multiple small cobbles of local limestone held in a silt-matrix. The exception are whole slabs of roughly shaped rectangular limestone in the doorways between Space KL and Space KF in Building 1 (**1034**), possibly between Space KF and A (**1040**) between Space KL and Space KD in Building 2 (**1983**) and a series of three thresholds (**1142, 1147** and **1153**) in the doorways between respectively Space K2G and Space KR in Building 3 and Space KY and Space KR in Building 3. In general the solid limestone thresholds are associated with buildings that are fitted with external or internal lintels and door jambs. Similarly, the thresholds are exclusively found in doorways that connect from the interior environment to an exterior/public space (Space KL and Space K2G/KY/KZ). This indicates that the thresholds were used as markers between interior and exterior domains.

A curious aspect is the sheer quantity of lintels, jambs and thresholds found at Zawiyet Umm el-Rakham. As remarked by Giddy (1999: 302) quantities at contemporary domestic sites such as Kom Rabi'a were much smaller, most likely due to a constant recycling of stone (Giddy, 1999: 302). A notable exception noted by Giddy (1999: 302) is the New Kingdom Nubian fort of Buhen (Smith, 1976: 94-156) where a great amount of inscribed lintels were found. Taken together with recent evidence of lintels and door jambs from religious structures at Kom Firin (Spencer, 2008: Pl. 138-150), this suggests that when certain sites were abandoned their remote location secured them against the recycling evident at Kom Rabi'a.

4.5.3.4. Tables and Chairs

Six fragments of rectangular tables (similar to Kemp and Stevens, 2010b: 10) and two fragments of stools were found in Area K. All were made from local limestone, although only a single object was illustrated (a stool fragment, ZUR/KF/6). The remaining objects were not available for recording during the 2014 season, and further details regarding their shape and manufacture is therefore unknown. ZUR/KF/6 is the corner fragment of a low stool, similar in appearance 37170 from Tell el-Amarna (Kemp and Stevens, 2010b: 14 and 17), although with shorter legs.

4.5.3.5. Headrests

Two headrests manufactured in local limestone and identical in shape were recovered from the same context (Space KZ) during the excavations of Area K. ZUR/KZ/2 is complete, while ZUR/KZ/3 is partially fragmented. The purpose of these two headrests in an auxiliary and most likely outdoors setting seemingly associated with bread baking (the presence of ovens and ash) is uncertain, although their discovery in association with two pounders (ZUR/KZ/6 and ZUR/KZ/16) may indicate that the objects were being manufactured in this area. The shape is unusual, being carved initially into a solid trapezoid shape, with a deep concave curve on the upper surface to accommodate the head. Following this initial shaping, two roughly oval portions of stone was removed on either side of the central line of the object leaving a thick central support with two thinner supports slanting slightly inwards on either side.

Parallels are uncommon, although one is published by Petrie (1927: 35, pl. XXXI.18, currently held in the Petrie Museum of Archaeology, UC18145, originally described by Brunton, 1927: 62, Pl. XLI.28) who dates the object to the Old Kingdom, although considering the context of the object at Qau, and the prevalence of New Kingdom reuse of earlier tombs in that cemetery (*cf* Brunton, 1927: 15, pl. XXIII), this date cannot be definitively confirmed. Brunton does not provide any details regarding the tomb in which the headrest was discovered, or with what additional objects it was deposited.

4.5.4. Products: Stone Vessels

Two stone vessels were discovered in Area K (aside from the one stone spinning bowl and the four limestone basins discussed above in Section 4.2 and 4.4), both heavily fragmented, ZUR/K/30, a plate with rim base, broken in half and ZUR/KC/13, a diagnostic sherd from a thick-walled bowl. Both objects were locally manufactured from biosparite limestone. The forms of the two stone vessels are unusual, although not unattested. Both types were discovered at the site of Deir el-Balah, namely a flat plate with a raised lip and a ring base (Klein, 2010: Fig. 25.3.14) and a thick-walled bowl (most likely similar to Klein, 2010: Fig. 25.3.16) and the plate in particular is of typical Canaanite manufacture (Sparks, 2007: 126-7). The limited use of stone vessels may have been in part due to the poor quality of the local limestone. The numerous fossiliferous inclusions make the stone permeable, and seepage would have been an issue. With a functioning local production of pottery vessels the production of stone vessels may simply have been considered less significant.

4.5.5. Imported Calcite-Alabaster Lugs/knobs

Six objects in the small finds corpus from Areas K have been identified as knobs or lugs. The objects are roughly hemispherical with protruding tangs, which are either hollow (such as ZUR/KM/24 and ZUR/KKIII/6b) or solid (e.g. ZUR/KT/17, ZUR/KT/23, ZUR/KKIII/6a and ZUR/KKIII/6c). The rarity of this object type within the corpus and the resultant small data set makes conclusions regarding their function and importance within the site ambiguous although the close proximity of four out of six of the objects with Building 4 and the remaining two within the same room in Building 3, makes it possible that they were used together, rather than individually.

The objects share similarities in their material composition, being carved from calcite-alabaster, and polished. The objects are sufficiently delicate and finely shaped to suggest a high level of craftsmanship employed in their creation. With the quarrying of calcite-alabaster during the Ramesside Period centered in Middle Egypt at sites such as Hatnub (Shaw, 2010), El Saweita and El Qawatir (Aston, Harrel and Shaw, 2000: 14 and Klemm and Klemm, 2007: 152), and the lack of any significant evidence of the manufacture of calcite-alabaster objects anywhere at Zawiyet Umm el-Rakham (aside from a single unworked fragment of alabaster found in the later Libyan squatter occupation in Area G (ZUR/G6E/17), Simpson, 2002: 227), this suggests that the six knobs were imported to the site from the Nile Valley.

The spread of such objects via Egyptian supply lines to fairly distant outposts of the Egyptian empire during the New Kingdom is not un-known in the archaeological record. A convincing parallel object comes from Locus 1055 at the Late Bronze Age site of Deir el-Balah (Dothan and Nahmias-Lotan, 2010: 183-4) and from the Egyptian garrison town at Beth Shan (James and McGovern, 1993a: 187 and James and McGovern, 1993b: Pl.114.13). From the Nile Valley, a (broken) parallel was found at Kom Rabi’a (Giddy, 1999: 153 and Pl.30.151). Finally, the most convincing series of parallel objects both with regards to shape and material (calcite-alabaster) were identified as ear studs and published by Flinders Petrie in the 1920s (1927: 22 and Pl. XVII.38). A more convincing suggestion for the function of similar knobs than personal adornment comes from Dothan and Nahmias-Lotan (2010:183-4), who noted that similar knobs are commonly found on wooden boxes and from the New Kingdom (Davies, 1982: 200-3), and on this basis suggested that they served as closing and locking mechanisms, as previously also argued by Kenyon (1960: Fig. 230).

So while similar looking objects may have functioned as some type of ear ornament (which is seemingly suggested by the discovery of two such objects fitted together in an 18th Dynasty grave in Riqqeh (Engelbach, 1915: Pl. 44, Grave 113)) the objects clearly had multiple functions, although given the weight of evidence in the form of preserved chests with knobs of similar shape and material, this function may have been the predominant. It is on this basis that these objects have been classified as furniture fittings, rather than personal adornment in this chapter.

4.5.6. A Stela Workshop in Area N?

This portion of the thesis would be incomplete without a brief discussion on the most notable stone objects found within the fortress, namely the private stela published by Snape and Wilson (2007: 93-129). The limestone used to manufacture these objects has similar fossiliferious content to the local material described above, and initial indications suggest that the objects were made at the site. Direct evidence for this manufacture was discovered in 2004 during the brief excavation of Area N, the possible residence of the fort's commander (see Chp. 1). A small workshop was initially discovered by the excavators, although further work is needed to extend the boundaries of the excavation and get a fuller picture of the production conducted within the area.

The excavators did find – aside from three pounders (ZUR/N34/1-3) and a basalt rubber (ZUR/N32/1) – a blank limestone stela (ZUR/N32/2, **Fig. 4.57**) and debris indicating stone carving. The stela had been shaped and polished within Area N, and was – at the time of the fort's abandonment – awaiting inscription. It is possible that further excavation of both Area K and Area N will reveal further evidence of stela manufacture, although the blank stela from Area N is a cogent argument in favour of a sophisticated local stone production which flourished, despite the poor quality of material available.

4.5.7. Discussion

The most significant conclusions regarding stone working and import is the heavy reliance of the inhabitants at Zawiyet Umm el-Rakham on the locally available limestone – despite natural limitations. The frequent use of lintels, door jamb and thresholds in stone is in direct contrast to contemporary sites in Egypt, which may in part be explained by the lack of any later occupation to reuse the material, although the prevalence of the local limestone as the chief construction material in Area K is also undeniable. As discussed in Chp. 3, the walls of the buildings in the area are almost exclusively built from limestone cobbles rather than wholly from mud brick, which clearly demonstrate the availability of the material. As such, the large quantity of tools relating to stone working (mostly pounders) is unsurprising, and even with the inherent bias against metal artefacts from the site (see Section 4.8 below), it is clear that stone working in various forms was crucial not just for the purposes of local

Fig. 4.57: Unfinished limestone stela ZUR/N32/2 (S. Snape).

Fig. 4.58: Spatial overview of tools and products related to stone-working (square: pounders ; circle: tables ; triangle: chairs ; rhomboid: head rests ; open cirlces: stone vessels) (S. Thomas and author).

industries, but also for the construction and repair of houses, both in the wallsthemselves, but also through architectural components, such as lintels and jambs and items of furniture.

The prevalence of stone working tools can also be explained through the interconnectivity of many of the local industries and their reliance on locally manufactured stone goods or local stone in itself as a basic requirement. This is especially true of the food production which relied exclusively on locally produced quern-stones and mortars, but also the production of textile, in the form of spinning bowls and spindle whorls. Imported stone objects are considerably rarer, and primarily in the form of luxury items and items of personal adornment such as lugs for wooden furniture, ear- or hair rings (see section 4.9) and stone beads or hard stone tools.

The spatial arrangement of – in particular – the pounders shows the prevalence of stone working (**Fig. 4.58**). There are few clusters of tools (aside from one in KAB and another centred around KM). Instead, these tools are found in nearly every building throughout the area.

4.6. Pins and Needles: Bone Pin Production

Bone Pin Production				
Finds No.	**Context**	**Material**	**Description**	**Figure**
ZUR/K/7	K1,9	Bone	Hair pin	4.59
ZUR/K/105	K0,7	Bone	Hair pin	4.60
ZUR/K/123	K3,6	Bone	Hair pin	4.61
ZUR/K/135	K4,4	Bone	Hair pin	4.62
ZUR/K/158	K1,4	Bone	Hair pin	4.63
ZUR/K/170*	K2,8	Bone	Hair pin	
ZUR/K/178	K2,8	Bone	Hair pin	4.64
ZUR/K/197	K4,6	Bone	Hair pin	4.65
ZUR/K/206	K1,7	Bone	Hair pin	4.66
ZUR/K/228	K4,6	Bone	Hair pin	4.67
ZUR/K/230	K0,7	Bone	Hair pin	4.68
ZUR/KA/7	KA	Bone	Hair pin	4.69
ZUR/KAB/6	KAB	Bone	Hair pin	4.70
ZUR/KG/5	KG	Bone	Hair pin	4.71
ZUR/KKI/3*	KKI	Bone	Hair pin	
ZUR/KKI/5*	KKI	Bone	Hair pin	
ZUR/KKIII/4	KKIII	Bone	Hair pin	4.72
ZUR/KKIII/5	KKIII	Bone	Hair pin	4.73
ZUR/KL/11*	KL	Bone	Hair pin	
ZUR/KT/8	KT	Bone	Hair pin	4.74
ZUR/KT/9*	KT	Bone	Hair pin	
ZUR/KT/20*	KT	Bone	Hair pin	
ZUR/KT/21*	KT	Bone	Hair pin	
ZUR/KL/1*	KL	Bone	Hair pin	
ZUR/KL/4*	KL	Bone	Hair pin	
ZUR/KL/7*	KL	Bone	Hair pin	
ZUR/KL/8*	KL	Bone	Hair pin	
ZUR/KM/1	KM	Bone	Hair pin	4.75
ZUR/KM/18	KM	Bone	Hair pin	4.76

Finds No.	Context	Material	Description	Figure
ZUR/KM/23*	KM	Bone	Hair pin	
ZUR/KM/25	KM	Bone	Hair pin	4.77
ZUR/KM/26	KM	Bone	Hair pin	4.78
ZUR/KQ/1	KQ	Bone	Hair pin	4.79
ZUR/KQ/2*	KQ	Bone	Hair pin	
ZUR/KJ2/40	KJ2	Bone	Hair pin	4.80
ZUR/KO/2*	KO	Bone	Hair pin	
ZUR/KZ/5	KZ	Bone	Hair pin	4.81
ZUR/KZ/7*	KZ	Bone	Hair pin	
ZUR/KN/40	KN	Bone	Needle	4.82

* Not available in magazine. Registered in Finds Register but not drawn/photographed.

Table 4.8: Objects related to bone-working.

4.6.1. Introduction: Bone Pins in New Kingdom Egypt

Long, tubular bone, wood or metal pins with blunt edges and sometimes with decorated handles appear frequently associated with hairdressing and personal adornment in the ancient Egyptian pictorial record (such as depictions of hair-dressers using such implements to fix wigs in place in reliefs from the First Intermediate Period, Riefstahl, 1956: Pl. IX and XIII). These hairpins have also been found associated with hair in the archaeological record, such as in a tomb from Abadiya which contained several bone hairpins still placed in the surviving tresses of hair (Tassie, 2008: 132, see Ashmolean Museum, E1035).

An assemblage of several bone hair pins from a New Kingdom context at Gurob were also published by Petrie (1927: 24-25 and Pl. XIX.11-16, see also Thomas, 1981: 61-62 and Pl. 17.416-19) and a similar assemblage from a wider selection of

Fig. 4.59: Hairpin ZUR/K/7 (S. Snape).

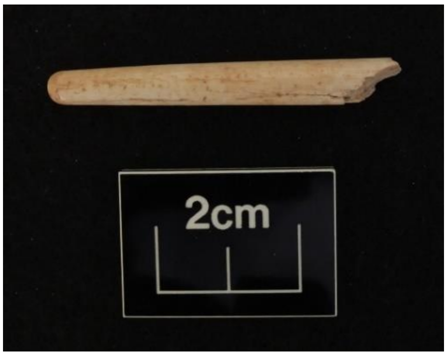


Fig. 4.60: Hairpin ZUR/K/105 (S. Snape).

Fig. 4.61: Hairpinr ZUR/K/123 (S. Snape).

Fig. 4.62: Hairpin ZUR/K/135 (S. Snape).

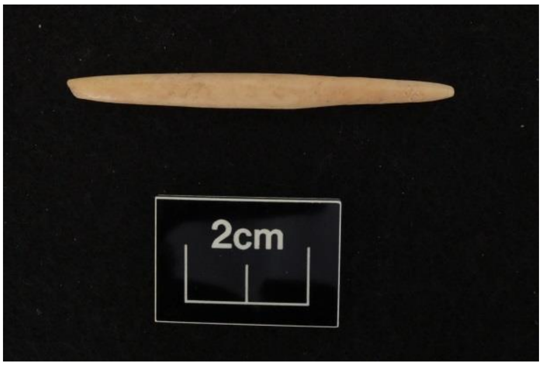


Fig. 4.63: Hairpin ZUR/K/158 (S. Snape).

Fig. 4.64: Hairpin ZUR/K/178 (S. Snape).

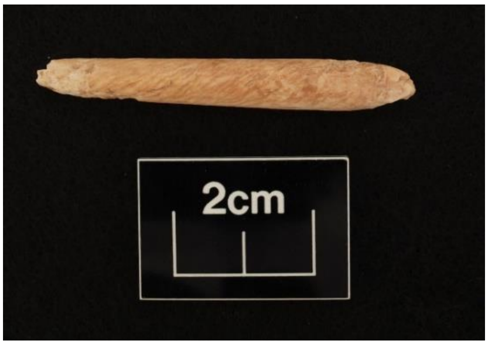


Fig. 4.65: Hairpin ZUR/K/197 (S. Snape).

Fig. 4.66: Hairpin ZUR/K/206 (S. Snape).

Fig. 4.67: Hairpin ZUR/K/228 (S. Snape).

Fig. 4.68: Hairpin ZUR/K/230 (S. Snape).

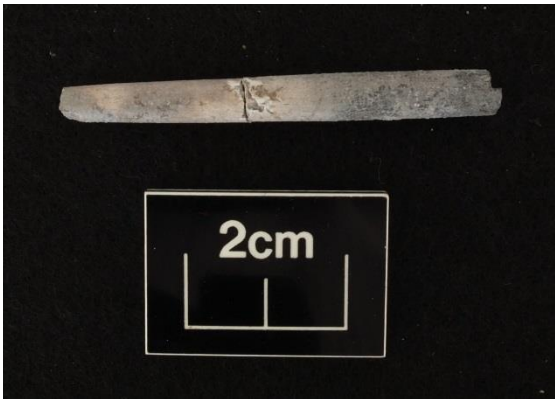


Fig. 4.69: Hairpin ZUR/KA/7 (S. Snape).

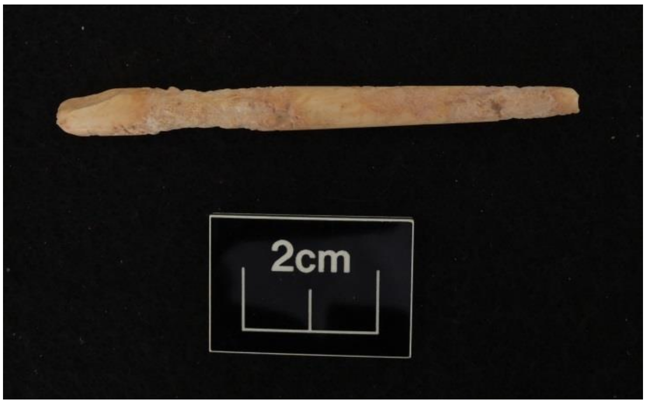


Fig. 4.70: Hairpin ZUR/KAB/6 (S. Snape).

Fig. 4.71: Hairpin ZUR/KG/5 (S. Snape).

Fig. 4.72: Hairpin ZUR/KKIII/4 (S. Snape).

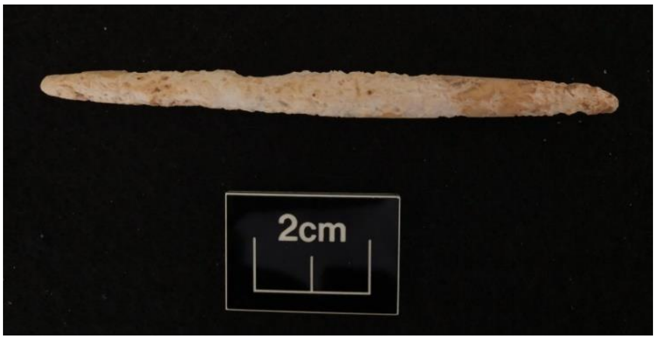


Fig. 4.73: Hairpin ZUR/KKIII/5 (S. Snape).

Fig. 4.74: Hairpin ZUR/KT/8 (S. Snape).

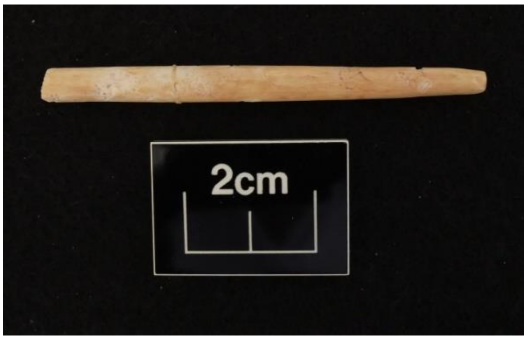


Fig. 4.75: Hairpin ZUR/KM/1 (S. Snape).

Fig. 4.76: Hairpin ZUR/KM/18 (S. Snape).

Fig. 4.77: Hairpin ZUR/KM/25 (S. Snape).

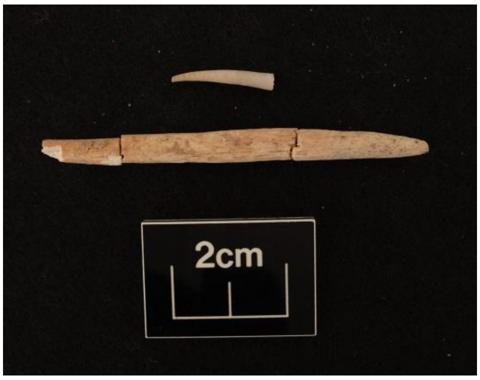


Fig. 4.78: Hairpin ZUR/KM/26 (S. Snape).

Fig. 4.79: Hairpin ZUR/KQ/1 (S. Snape).

Fig. 4.80: Hairpin ZUR/KJ2/40 (S. Snape).

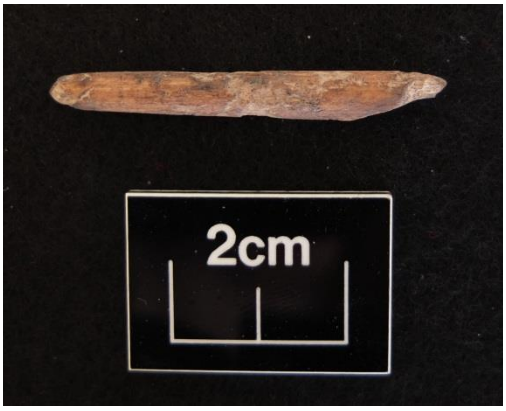


Fig. 4.81: Hairpin ZUR/KZ/5 (S. Snape).

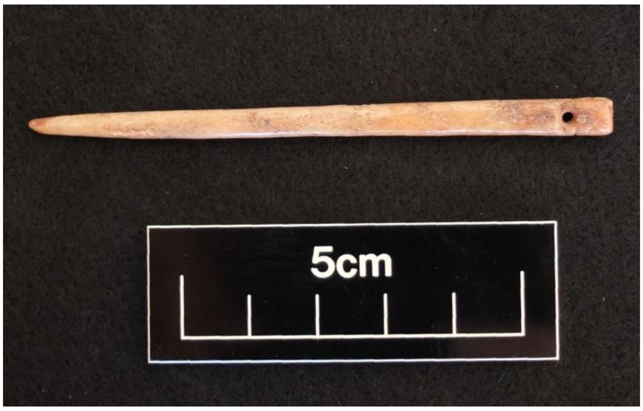


Fig. 4.82: Needle ZUR/KN/40 (S. Snape).

sites currently held in the Louvre Museum were published by Vandier (1972: 152-154). Further examples have also been more recently excavated from the Egypt Exploration Society's work at Memphis (Giddy, 1999: 170 and Pl. 36.2140 and 2876). Examples of very similar appearance have also been found at Tell el-Retaba dating to the Third Intermediate Period (Braulinska, 2012: Fig. 10-16), although Braulinska interprets the objects as either arrow-heads or pegs, despite their clear similarity to the more crude contemporary hairpins.

Braulinska argues that their breadth (generally under 1.00 cm) suggests that they could not be hairpins which she describes as "[…] slenderer in proportions and with a smaller transverse diameter." (Braulinska, 2012: 11). While this may be true of certain examples, the sheer variety of shapes and sizes presented by for instance Petrie (1927: Pl. XIX) show that there was no 'ideal' breadth for these objects. The interpretation of the objects as arrowheads is similarly unlikely, as bone arrowheads were largely supplanted by copper arrowheads by the end of the Early Dynastic period, a point Braulinska herself raises (2012: 12).

4.6.2. Bone Pins and Needles from Zawiyet Umm el-Rakham

39 whole or fragmented tubular bone pins and needles were found during the excavation of Area K. Fifteen of these were unavailable for further examination during the 2014 season, and no pictorial record of them exists. They have therefore been excluded from the following discussion although they are included in the spatial analysis in 4.6.4. The assemblage of 24 bone objects from Area K can be subdivided into four categories: 1) Locally produced 'crude' hairpins, 2) Imported hairpins, 3) Needles or Awls and 4) Possible pin-beaters.

The locally produced hairpins are by far the largest group, representing 21 of the objects. In general, the state of preservation of these objects is poor. In section they are roughly circular and one (ZUR/K/123) shows some crude decoration in the form of parallel incisions on the handle of the pin, most likely made using a notched flake. The objects are made from long-bones, most likely of the dominant caprine species found at the site.

ZUR/KKIII/4 is the only obviously imported hairpin in the assemblage. It is not only made with more skill than the others, with a delicately carved head and a polished surface, it was also manufactured from ivory rather than long-bone. No other ivory objects have been found at the site, nor has any evidence of ivory manufacture. It is possible that future excavation may locate such evidence, but at the present, it is more prudent to interpret ZUR/KKIII/4 as an import from the Nile Valley.

ZUR/KN/40 represents the only needle or awl discovered at the site. It is well-preserved with the remains of decoration around its perforation in the form of geometric incisions. While the body of the needle is round, its head is square, possibly to make the perforation easier. Bone needles have been found in Egypt since the Predynastic (see for example an example from the site of Badari, Petrie Museum of Egyptology UC9053), and while metal needles are more commonly found in the New Kingdom (such as twelve examples from Kom Rabi'a, Giddy, 1999: 178 and Pl. 39 and from Tell el-Amarna, Kemp and Stevens, 2010b: 348 and Fig. 20.3), bone needles were evidently still in use (see for instance an 18th Dynasty example from Tell el-Amarna, British Museum 1921,1008.22).

ZUR/K2J/40 is the only pin or pin-like object not made from a long bone. Instead, it was manufactured by polishing the edges of the rib from a caprine (the curve and shortness of the bone rules out a larger animal, such as cattle). It is roughly circular in section, and is generally dissimilar to the other hairpins in the assemblage. It is possible that this object should be interepreted as a ‘pin beater’, generally found in association with linen production (Kemp and Vogelsang-Eastwood, 2001: 358-373, see also Bralinska, 2012: Fig. 3-8 for similar objects from Tell el-Retaba). However while the curve of ZUR/K2J/40 is reminiscent of the pin-beaters, its general shape is not. The pin-beaters are exclusively flat objects, much thinner than they are wide (Kemp and Vogelsang-Eastwood, 2001: 368-369). It is possible that the object was only half-finished and that the maker intended to flatten the object by carving or polishing away the excess bone, but this interpretation is uncertain.

4.6.3. Method of Manufacture

Giddy describes briefly the potential methods of manufacture for the bone hairpins found at Kom Rabi’a (1999: 170), noting in particular the “lightly incised line” (Giddy, 1999: 170) which runs down the length of the object. Similar sets of parallel lightly incised lines are apparent on some of the hairpins from Area K. Others, such as ZUR/K/123 have small incisions reminiscent of the “[…] fine cross-hatched lines […]” (Giddy, 1999: 169) described by Giddy on the material from Kom Rabi’a. In the case of the hairpins from Area K, these cross-hatchings have often been nearly erased by subsequent polishing of the object, especially noticeable on ZUR/KQ/1.

On this basis it is possible to suggest that the manufacturing process consisted of two stages; a rough shaping of the objects by whittling or carving the bone, most likely using notched or straight blade, which created a series of incisions perpendicularly across the pin's body. The second stage involved polishing and while this may have been achieved with a number of the polishing stones found at the site, or simply with sand, a discovery in Area N suggests a specific method.

When excavating Space N34, the excavators noted that one of the blocks (ZUR/N34/8, **Fig. 4.83**) made from local limestone and used to construct the walls of this small residential area was covered in a series of grooves or striations. The block was lifted free of the wall and examined. Six grooves were found on one surface, between 6.00 and 11.00 cm in length and with an average breadth of 1.00 cm. The shape of the grooves suggests that thin objects were pressed towards the surface and pulled or pushed across it. The differing depth of the grooves (deeper in the middle, shallower towards each end) suggests that the maximum amount of downwards force was employed towards the middle of the grove, consistent with a person pulling a long, thin object across the surface.

The block is too large and heavy to have been used as a hand-held polisher, but the grooves are identical in appearance to grooves found on sanders from Tell el-Amarna (Kemp and Stevens, 2010b: 439-440). It seems likely that the block ZUR/N/34.8 was used as a stationary sander and once it became problematic to fit more groves onto its surface, it was removed and used in the construction of Area N (parts of which post-date parts of Area K, Snape, pers. comm.). This block then accounts for the second step of the process, the use of local limestone blocks (or

Fig. 4.83: Polishing stone ZUR/N34/8 (S. Snape).

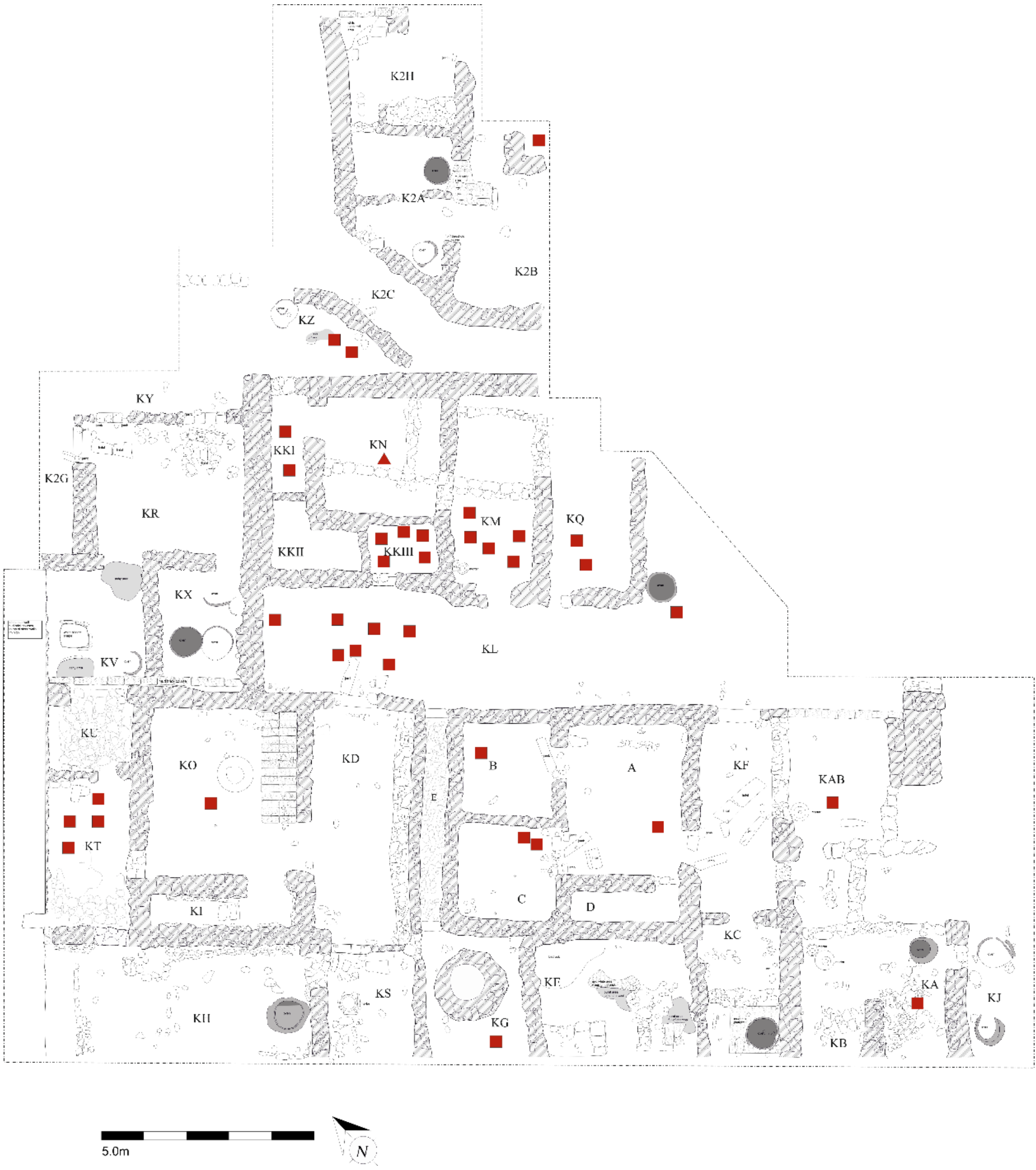


Fig. 4.84: Spatial arrangement of locally produced bone pins (S. Thomas and author).

alternatively hand-held cobbles, although none have been found with similar grooves) as sanders to polish the object following the initial shaping.

4.6.4. Discussion: A Circular Trade?

The most notable feature of the assemblage of hairpins and needles from Area K is the sheer quantity of the locally produced bone examples. The amount far outweighs the amount discovered at contemporary settlement sites such as Kom Rabi'a (Giddy, 1999: 170) and suggests a well-developed and extensive production. The spatial arrangement of the objects shows significant clusters around Spaces KM, KL and KKIII (**Fig. 4.84**), suggesting a possible area of manufacture. The objects are however commonly found throughout the area.

The most pressing question is naturally the reason for this extensive manufacture. Soldiers during the New Kingdom are generally thought to have been shaved, or at least have short hair (see for instance depictions in the tomb of Userkaf, Hodel-Hoenes, 2000: 73). As such, it is unclear whether the garrison would have required hair pins, although it is possible that some of the soldiers brought their wives with them or had relations with local women, and inscriptional evidence suggests that Nebre, the fort's commandant lived at the fort with his wife (Snape and Godenho, in press). This may in part explain the production, although another possibility also presents itself:

ZUR/KL/11 is a bone hairpin similar in manufacturing technique and shape to the others found at the site, and almost certainly the product of local manufacture. However, it was deposited in the fill of Space KL, *after* the site had been abandoned by the Egyptian garrison and possibly even somewhat later than the brief Libyan squatter occupation which followed the fort's abandonment. It is likely therefore that the object was dropped by the Libyan squatters, possibly indicating that they had the object before the site was abandoned. Depictions of contemporary Libyan tribesmen with intricate hairstyles are common in the Egyptian pictorial record (Bates, 1914: 134-137). The hairpins could as such tentatively be considered as objects which the Egyptian inhabitants of Zawiyet Umm el-Rakham manufactured as possible trade objects for the local Libyans, most likely representing a less formalised and organised barter trade than the possible linen trade discussed above.

4.7. Miscellaneous Non-Vessel Ceramics

Miscellaneous Non-Vessel Ceramics				
Finds No.	**Context**	**Material**	**Description**	**Figure**
ZUR/KN/3	KN	Ceramic	Figurine	4.85
ZUR/KN/15	KN	Ceramic	Figurine	4.86
ZUR/KZ/9	KZ	Ceramic	Figurine	4.87
ZUR/K2G/2	K2G	Ceramic	Figurine	4.88
ZUR/KN/1a	KN	Ceramic	House shrine	4.89
ZUR/KN/1b	KN	Ceramic	House shrine	4.90
ZUR/K/186	K2,8	Ceramic	Recut sherd	4.91
ZUR/K/190a	K3,6	Ceramic	Recut sherd	4.92
ZUR/K/190b	K3,6	Ceramic	Recut sherd	4.93
ZUR/K/277	K0,7	Ceramic	Recut sherd	4.94
ZUR/K/287	K1,2	Ceramic	Recut sherd	4.95
ZUR/KH/45	KH	Ceramic	Recut sherd	4.96
ZUR/KJ/8	KJ	Ceramic	Recut sherd	4.97
ZUR/KJ/10	KJ	Ceramic	Recut sherd	4.98

Table 4.9: Objects related to the production of non-vessel ceramics.

4.7.1. Ritual Objects

During the early University of Liverpool excavations at Zawiyet Umm el-Rakham, a series of structures were uncovered along the west-wall of the fortress enclosure. These structures predominately relate to the ritual/religious life of the occupants, and comprised a temple and a series of private chapels, most likely used by the officers (Snape and Wilson, 2007: 33-68). Further excavation revealed a private chapel belonging to the fort’s commander Nebre (Snape, 2004: 160, see also an extensive discussion of private chapels and shrines in the contemporary archaeological record from Egypt and Nubia in Stevens, 2006: 253). The chapels – and their stela invoking the king and his relationship to major gods, such as Amun represent aspects of the

Fig. 4.85: Figurine ZUR/KN/3 (S. Snape).

Fig. 4.86: Figurine ZUR/KN/15 (S. Snape).

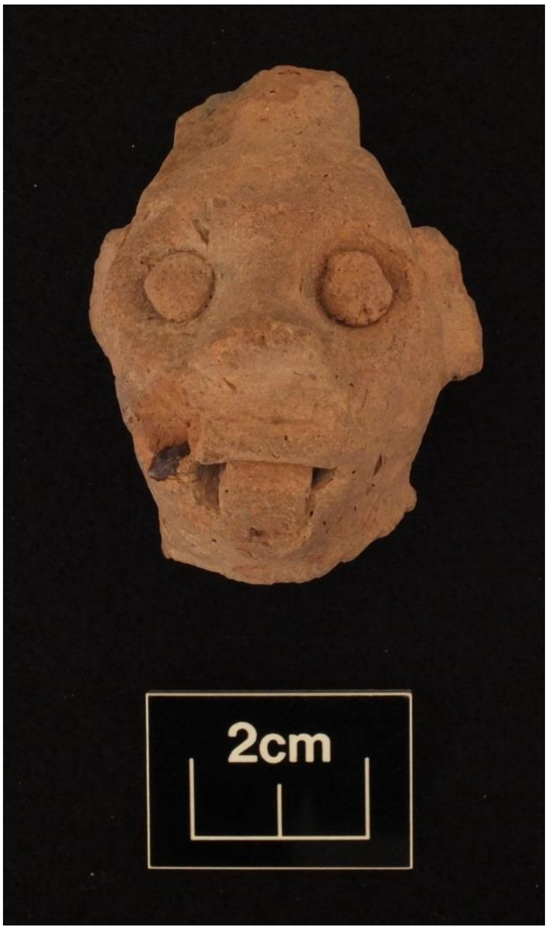


Fig. 4.88: Figurine ZUR/K2G/2 (S. Snape).

Fig. 4.87: Figurine ZUR/KZ/9 (S. Snape).

Fig. 4.89: House shrine ZUR/KN/1a (S. Snape).

Fig. 4.90: House shrine ZUR/KN/1b (S. Snape).

Fig. 4.91: Recut sherd ZUR/K/186 (S. Snape).

Fig. 4.92: Recut sherd ZUR/K/190a (S. Snape).

Fig. 4.93: Recut sherdZUR/K/190b (S. Snape).

Fig. 4.94: Recut sherd ZUR/K/277 (S. Snape).

Fig. 4.95: Recut sherd ZUR/K/287 (S. Snape).

Fig. 4.96: Recut sherd ZUR/KH/45 (S. Snape).

Fig. 4.97: Recut sherd ZUR/KJ/8 (S. Snape).

Fig. 4.98: Recut sherd ZUR/KJ/10 (S. Snape).

archaeological traces of ritual by the elite members of the population at Zawiyet Umm el-Rakham in the intermediate realm between state- and private religion (Stevens, 2006: 19-20), whereas the temple – decorated as it is with the cartouches of the fort's builder, Ramesses II (Snape and Wilson, 2007: 28) – is thoroughly representative of state religion.

Along with the standard appearance of the temple, and its typicality of the early Ramesside period (Snape and Wilson, 2007: 91), the temple at Zawiyet Umm el-Rakham was also central to the cultic life at the site. This is evidenced archaeologically by the presence of a heavily denuded barque shrine in the temple courtyard (Snape and Wilson, 2007: 2007: 26 and fig. 2.26). As has been briefly discussed by Snape and Wilson (2007: 91), the most pertinent analogy for the ritual life at Zawiyet Umm el-Rakham is the contemporary settlement of Deir el-Medina. Both are small, segregated communities, populated primarily with citizens directly involved with the service of the centralised state.

Both communities were serviced by temples with a strong link to the state (such as temples dedicated to Hathor and Amun at Deir el-Medina, Sadek, 1981: 64-65), and both communities engaged in public rituals, such as processions, evidenced by the barque shrine at Zawiyet Umm el-Rakham and by depictions such as those found in the tomb of Nakht-Amun at Deir el-Medina (Friedman, 1994: 125). Both communities also contained a series of private chapels (Snape and Wilson, 2007: 33-68 and Bomann, 1991: 39). It is uncertain whether the duality found at Deir el-Medina where workmen occasionally served in religious roles (*cf* O.Cairo J. 59464, Cerny, 1935: 43) was also commonly practiced at Zawiyet Umm el-Rakham. A small amount of ritual objects have also been found in Area K, all of which were locally manufactured.

4.7.1.1. Figurines

Four fragments of clay figurines were recovered from Area K. Two of these, a head and a torso were both from Space KN although it is unlikely that they were part of the same figurine. Another head, similar in general appearance to ZUR/KN/3 was found in Space KZ and the foot or base of a further figurine was found during the final stages of the excavation in the small Space K2G. Overall, the figurines are crudely executed using local silt-clay and all have been fired unevenly and poorly, possibly suggesting the use of a simple bonfire or oven rather than an updraft kiln.

ZUR/KN/3 and ZUR/KZ/9, the two fragmented heads, should be considered similar objects. Both are made by hand-moulding the basic shape of a human head with a broad, upturned nose. Two depressions were made to indicate the eyes, and two smaller balls of clay set into the depressions. A break around the mouth of ZUR/KN/3 suggests that the figurine was originally depicted with its tongue hanging out, and indeed ZUR/KZ/9 is sufficiently preserved to show the same pose. The most likely explanation for the nose and the lolling tongue is that the figurines were crude depictions of the god, Bes. During the New Kingdom, Bes is frequently depicted with a protruding tongue on a variety of objects, such as head-rests (*cf* E 4231 and E 4293 in the Louvre Museum, see Perraud, 1998) and amulets (such as E.68.1937 in the Fitzwilliam Museum, Cambridge). The flattened nose on both figures could be interpreted as a (poor) attempt to model the animal-like snout Bes is often depicted with. Bes figurines of various designs are commonly found in contemporary assemblages, such as Kom Rabi'a (Giddy, 1999: 45) and Tell el-Amarna (Stevens, 2006: 79-81).

The remaining two fragments of statue, the torso (ZUR/KN/15) and the base or foot (ZUR/K2G/2) are too poorly preserved to attribute to a specific type or motif, although ZUR/K2G/2 is similar in appearance to an unidentified figurine fragment found at Tell el-Amarna (Kemp and Stevens, 2010b: 229). ZUR/KN/15 is crudely modelled into the approximate form of a torso. Two breaks show the original presence of two arms. The upper portion of the torso narrows to another break where the head originally sat, and the lower portion extends into the approximate shape of a figure wearing a typical long Ramesside kilt, similar to the kilt worn by the fort's commander Nebre in his limestone statue (Snape, 2004: 160). Even though this torso was found in the same context as ZUR/KN/3 it is unlikely that they come from the same statue, as Bes is never shown in the form of a normally proportioned human without apparent supernatural attributes.

4.7.1.2. House shrines

Two of the most problematic finds from Area K are two ceramic objects ZUR/KN/1a-b. ZUR/KN/1a is barrel-shaped with a flat base, a pointed top and roughly modelled protrusions above and beneath the body. A rectangular hole has been cut into the vessel before firing, and a grove on one side may have been intended to fit a small wooden door onto. ZUR/KN/1b is similar in appearance although more squat. This appearance suggests an interpretation of the object as a model granary or beehive pot similar to E.4292 in the Garstang Museum of Archaeology, University of Liverpool (Tooley, 1995: fig. 38). However, these beehive pots are generally dome-shaped in order to mimic the shape of granaries and lack the protrusions of ZUR/KN/1a.

Another interpretation is that ZUR/KN/1a-b served as a small house-shrine although the contemporary Egyptian corpus lacks suitably similar parallels. The closest parallel is found outside Egypt. From the Middle Bronze Age through to the Iron Age, small ceramic model shrines or house shrines are commonly deposited across Canaanite sites, such as Tel Rehov (Mazar and Panitz-Cohen, 2007: 210-211 and Mazar and Panitz-Cohen, 2008: 41) and Tel Kinrot (Nissinen and Munger, 2009).

The house shrines presented by Nissinen and Munger (2009: 135), and in particular the house shrine from Tel Rehov (Mazar and Panitz-Cohen, 2007: 210-211) bears a striking resemblance to ZUR/KN/1a-b, in particular the small incision by the side of the model door on ZUR/KN/1a is identical to one found on the model shrine from Tel Rehov. The pointed top and flat base along with the fenestrations above and below the door in the side of the vessel is also highly similar to contemporary Canaanite material from Tel Dan and Tel Hazor (Nissinen and Munger, 2009: 135). The discovery of a potential Canaanite shrine in Area S in the early 2000's (Snape, 2004: 150-151) lends further weight to this interpretation. It is highly likely that a portion of the inhabitants of Zawiyet Umm el-Rakham were Canaanites and it is within this context that ZUR/KN/1a+b should be viewed, as locally manufactured cultic objects of Canaanite form (see also section 2.2.9).

4.7.2. Recut Potsherds

An assemblage of eight circular re-cut potsherds has been found from Area K. All are made from locally produced vessels, the circular form achieved by hitting small fragments of the sherd's edge off or simply breaking the relatively soft pottery without the need for tools. As noted by Giddy (1999: 325, see also parallels from Deir el-Ballah, Brandl, 2010: Fig. 22.2 and from Tell el-Amarna, Stevens, 2012: 297-315) parallel recut sherds are generally absent from the published record, although they are commonly found on settlement sites of the New Kingdom. Their precise function is unknown, it has been speculated that they served as gaming pieces (Giddy, 1999: 325) or as lids and- or jar-stoppers (which is indeed what the original excavators classified these objects as). However, the generally small size of the Area K examples makes their use as lids unlikely. It is possible that they were used as scrapers; the secondary use of pottery as scrapers has been well-documented in recent years (Radler, 2007). However, the shape of the recut sherds makes them poorly suited for scrapers. The lack of any secondary use of sherds as scrapers within Area K may be due to the lithic industry based in Zawiyet Umm el-Rakham which fabricated lithic scrapers which may have been preferred (see Chp. 5). ZUR/K/190b is the only example which has been made from the base of a vessel. It is more symmetrical than similar objects in the assemblage because the walls of the vessel have simply been chipped or broken away. The remaining recut potsherds are made from the walls of closed, wheel-made vessels.

4.7.3. Discussion

As discussed in the introduction, the cultic life at Zawiyet Umm el-Rakham is in some ways analogous with the contemporary settlement of Deir el-Medina. The above discussion of the crude clay figurines, helps to enforce this point, with the manufacture of Bes figurines, a god heavily associated with domestic life in Deir el-Medina (McDowell, 1999: 102-104) in Area K. The presence of a model shrine of Canaanite form further enforces the point that the fortress may have played host to a detachment of Canaanites.

4.8. Metal Objects and Production

Metal Objects and Production Debris				
Finds No.	**Context**	**Material**	**Description**	**Figure**
ZUR/K/21	K2,6	Copper-alloy	Fishing Hook	*4.17*
ZUR/K/35	K2,6	Copper-alloy	Pin	4.99
ZUR/K/52*	K4,9	Copper-alloy	Unidentified	
ZUR/K/53	K4,8	Copper-alloy	Unidentified	4.100
ZUR/K/67	K0,7	Copper-alloy	Arrowhead	*4.19*
ZUR/K/196	K0,4	Copper-alloy	Unidentified	4.101
ZUR/K/227*	K4,6	Copper-alloy	Spear point	
ZUR/K/272*	K2,8	Copper-alloy	Unidentified	
ZUR/KH/3*	KH	Copper-alloy	Unidentified	
ZUR/KN/51*	KN	Copper-alloy	Unidentified	
ZUR/KN/52*	KN	Copper-alloy	Unidentified	
ZIR/KT/1*	KT	Copper-alloy	Earring (?)	
ZUR/K2H/3*	K2H	Copper-alloy	Fishing Hook	
ZUR/K2G/7*	K2G	Copper-alloy	Unidentified	
ZUR/KM/1	KM	Copper-alloy	Dagger	4.102
ZUR/KQ/3*	KQ	Copper-alloy	Pin/Rod	
ZUR/KQ/10*	KQ	Copper-alloy	Unidentified	
ZUR/KZ/11	KZ	Copper-alloy	Fishing Hook	*4.18*
ZUR/K/36	K2,10	Ceramics	Crucible fragment	4.103
ZUR/KM/28*	KM	Ceramics	Crucible fragment	
ZUR/K/12*	K2,8	Slag	Slag	
ZUR/K/20*	K1,10	Slag	Slag	
ZUR/K/66*	K1,8	Slag	Slag	

* Not available in magazine. Registered in Finds Register but not drawn/photographed.

Table 4.10: Objects related to metal-working and imported metal objects.

4.8.1. Contemporary Metal-working in Marmarica

David O'Connor's complex article (1990) concerning Libyan society and relationship with its surrounding environment during the Late Bronze Age holds that

Fig. 4.99: Pin ZUR/K/35 (S. Snape).

Fig. 4.100: Unidentified metal piece ZUR/K/53 (S. Snape).

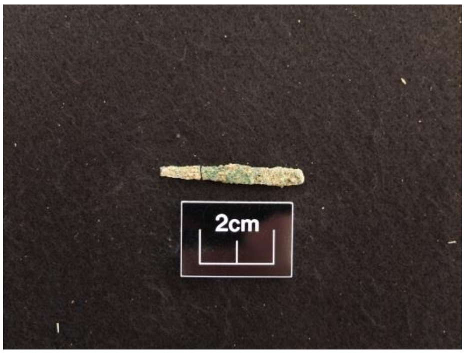


Fig. 4.101: Unidentified metal piece ZUR/K/196 (S. Snape).

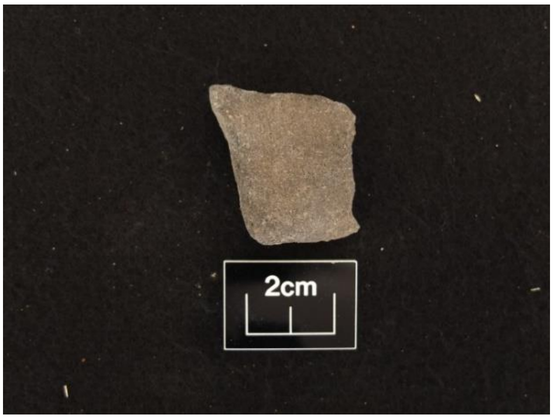


Fig. 4.103: Crucible fragment ZUR/K/36 (S. Snape).

Fig. 4.102: Dagger ZUR/KM/1 (S. Snape).

the Libyan tribes living West of Egypt were largely a-metallic due to lack of metal ore in the Western Desert (O'Connor, 1990: 61–62). Hulin, in her recent article (2009: 19) argues alongside White (1986: 83-84) that portions of the Libyan society during the Late Bronze Age were "metal-hungry" (White, 1986: 83-84) prompting them to increase trade relations with the outside world, in particular the Aegean (Crespo, 2001) and with the increase in wealth and interrelations creating a tribal hierarchy of chiefdoms as argued by O'Connor (1990: 61-62).

Iconographic and textual evidence suggests a marked increase in the amounts and types of metal work held by portions of the Libyan society. The battle reliefs of Seti I show Libyans carrying metal vessels, and the Meshwesh of the 20th Dynasty carry Aegaean swords (Hulin, 2009: 19 ; Richardson, 1999). Textual evidence from the 19th Dynasty supports the notion of increased metal-ownership by Libyan tribesmen, notably the booty lists in the account of the Year Five Libyan War of Merenptah in Karnak (Manassa, 2003: 56). Archaeologically however, the evidence for actual manufacture or repair of metal artefacts by Bronze Age Libyans is scarce. A very limited metal production using crucible technology was functioning in Area S119 at Bate's Island immediately prior to the occupation of the fort at Zawiyet Umm el-Rakham (White, 2002: 77-78 and White *et al*, 2002: 187-190), a production which was initially explained as small scale production and repair of minor metal artefacts by Aegean traders with the intension of trading these to local Libyans (White, 1999: 931-936, see also Hulin, 2009: note 21 for a full review of literature supporting this notion).

Hulin (2009: 19-20) however interprets the crucibles as evidencing pragmatic exploitation of a new technology by local Libyans, not by sophisticated production, but for the purposes of carrying out repairs on metal objects acquired by trade. Crucibles were also found in the Libyan squatter area of Zawiyet Umm el-Rakham, which have been interpreted by Simpson (2002: 194 and 199) as wholly unsuccessful on the basis of the porosity of the locally manufactured crucibles, a view challenged by Hulin (2009: 19-20) who holds that – as with the evidence of metal-working from Bate's Island – the crucibles from the post-Egyptian squatter occupation represents an effective, if unsophisticated, Libyan metallurgy. Aside from these already discussed crucibles from the squatter area of Zawiyet Umm el-Rakham, a further three crucible fragments have been found in Area K, along with fragments of slag and small amounts of copper-alloy artefacts, all of which date to the period of Egyptian occupation.

4.8.2. Metal Objects

Four types of metal objects have been found in Area K, namely 1) weaponry, 2) pins, 3) fishing hooks and 4) objects unidentifiable due to poor preservation, but most likely thin strips of metal wire or pins. This assemblage is highly similar to near-contemporary assemblages of metals found on Bate's Island from the Late Bronze Age (White, 2002: 47-50) and may indicate a continuation of the strategies potentially employed by the inhabitants of Bate's Island, namely somewhat restricted metallurgical processes primarily aimed at repairing imported metal objects, or melting and re-casting smaller implements such as pins or fishing hooks once broken (White, 2002: 47-48), as opposed to the large-scale smelting operations conducted in Ramesside centres such as Qantir and Thebes (Pusch, 1990 and 1994).

A further similarity shared with the Bate's Island corpus, is the meagre range of implements found in Area K (White, 2002: 47), a paucity not entirely explainable merely due to natural processes, the high ground salinity and the resultant poor preservation of metal artefacts in the area. Instead, the most likely explanation for the near-complete lack of weapons considering the military nature of the settlement is that weapons were stored in a central and as-of-yet unexcavated portion of the site. Another possibility is that metallic objects, in particular weaponry, were deliberately removed from the fortress by the final inhabitants. As speculated by Snape (2010: 272) the final stages of occupation of Zawiyet Umm el-Rakham may have been in the shadow of increasing tensions within Libyan society and between the Egyptians and the local inhabitants leading to the Libyan invasion of Egypt early in the reign of Merenptah (Manassa, 2003). It is likely that the final inhabitants took any weaponry with them, to prevent it falling into the hands of later squatters, who did indeed utilise the fort shortly after it was abandoned as discussed above.

The metal weaponry abandoned in Area K comprises a single arrowhead (ZUR/K/67) discussed above in section 4.3.1, a spearhead (ZUR/K/227), which has not been photographed/illustrated and which was unavailable for further examination during the 2014 study season and a dagger blade (ZUR/KM/1) broken into four fragments and most likely placed in Area K awaiting re-smelting. Typologically the dagger-blade is similar in shape and dimensions to a contemporary example (FZN 84/0640) from Qantir (Petschel, 2011: 472-473) and is of Type VII as identified in Petschel's (2011) seminal study on daggers from the Dynastic period.

4.8.3. Crucibles and Slag

Two fragments of ceramic crucible were found in Area K at floor-level and contemporary with the Egyptian occupation of the area, rather than the later squatter occupation (where evidence of crucibles and metal-working was also found (Simpson, 2002: 194 and 199 and Hulin, 2009: 19-20)). ZUR/K/36 is a body sherd from a ceramic crucible. It is manufactured from a very hard-fired local clay, most likely ZUR B and the original shape of the crucible is difficult to determine. The second fragment, ZUR/KM/28 was found with pieces of copper still adhering to the interior surface. Little can be said about the precise function and shape of either crucible due to the poor preservation of the material. Three fragments of metallic slag were also found in Area K, but none were photographed or recorded. Upon further inspection in the Matruh Magazine, the objects could not be found.

4.8.4. Discussion

Taken together, the evidence from Area K does not support any notion of an extensive metallurgical production at Zawiyet Umm el-Rakham, but rather small-scale repairs and possible recasting of minor objects of daily use such as pins and fish hooks. The magnetometry survey conducted at the site (Snape, 2010: 277) also supports this notion as no major accretions of vitrified material inside or in the vicinity of the enclosure have been identified, although it is possible that – as with the local production of pottery, see below – a larger production facility existed outside the walls of the enclosure. Furthermore, the scarcity of weaponry found inside this military installation most likely suggests a deliberate removal of both the vast majority of weapons and larger pieces of metal, most likely due to rising tensions with the local Libyans or newly arrived Libyan tribes from the west. However, due to the inherent uncertainty with portions of the site yet to be excavated, the notion that a large cache of weapons might be found in another section of the fort cannot be entirely dismissed. The general rarity of metallic weapons – and the complete absence of certain weapon types such as metal axe heads – in any excavated portion of the site however, does make this notion somewhat unlikely.

4.9. Jewellery Production and Import

Jewellery Production and Import				
Finds No.	**Context**	**Material**	**Description**	**Figure**
ZUR/K/229	K4,6	Ceramic	Animal-shaped bead	4.104
ZUR/K/241	K4,6	Ceramic	Cylindrical bead	4.105
ZUR/K/242*	K4,6	Ceramic	Bead	
ZUR/K/254*	K0,4	Ceramic	Bead	
ZUR/K/385	K1,4 (?)	Ceramic	22 Beads	4.106
ZUR/K/386	K1,4 (?)	Ceramic/Stone	27 Beads	4.107
ZUR/KKI/8	KKI	Limestone	Circular Bead	4.108
ZUR/KN/10*	KN	Ceramic	Bead	
ZUR/K2H/8	K2H	Ceramic	Circular Bead	4.109
ZUR/K2H/9	K2H	Ceramic	Circular Bead	4.109
ZUR/K2A/10*	K2A	Ceramic	Circular Bead	
ZUR/KM/27	KM	Carnelian	Circular Bead	4.110
ZUR/KQ/4	KQ	Ceramic	Circular Bead	4.111
ZUR/K/189	K2,8	Cockle Shell	Pierced shell	4.112
ZUR/K2H/11	K2H	Cockle Shell	Pierced shell	4.113
ZUR/K/100	K0,7	Calcite-Alabaster	Ear- or Hair ring	4.114
ZUR/K/179	K1,8	Calcite-Alabaster	Ear- or Hair ring	4.115
ZUR/KM/6	KM	Calcite-Alabaster	Ear- or Hair ring	4.116

* Not available in magazine. Registered in Finds Register but not drawn/photographed.

Table 4.11: Object related to jewellery production and import.

4.9.1. Beads

57 beads of varying shape and material have been found during the excavations of Area K. The purpose of this chapter is to discuss the primary materials from which these beads were manufactured, and to attempt to determine likely provenances for the material along with the few other examples of jewellery found at the site, namely two pierced cockle shells (ZUR/K/189 and ZUR/K2H/11) and three hair- or earrings

Fig. 4.104: Animal-shaped bead ZUR/K/229 (S. Snape).

Fig. 4.105: Cylindrical bead ZUR/K/241 (S. Snape).

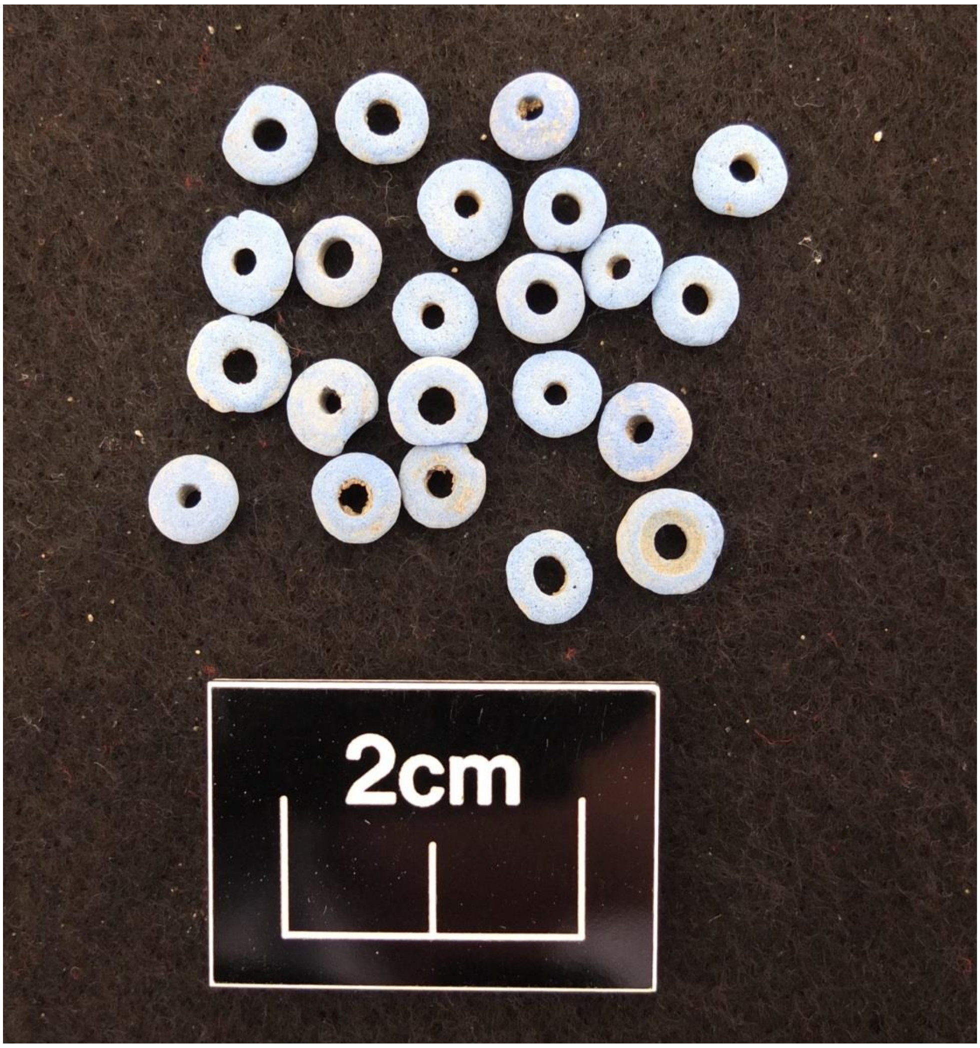


Fig. 4.106: 22 faience beads ZUR/K/385 (S. Snape).

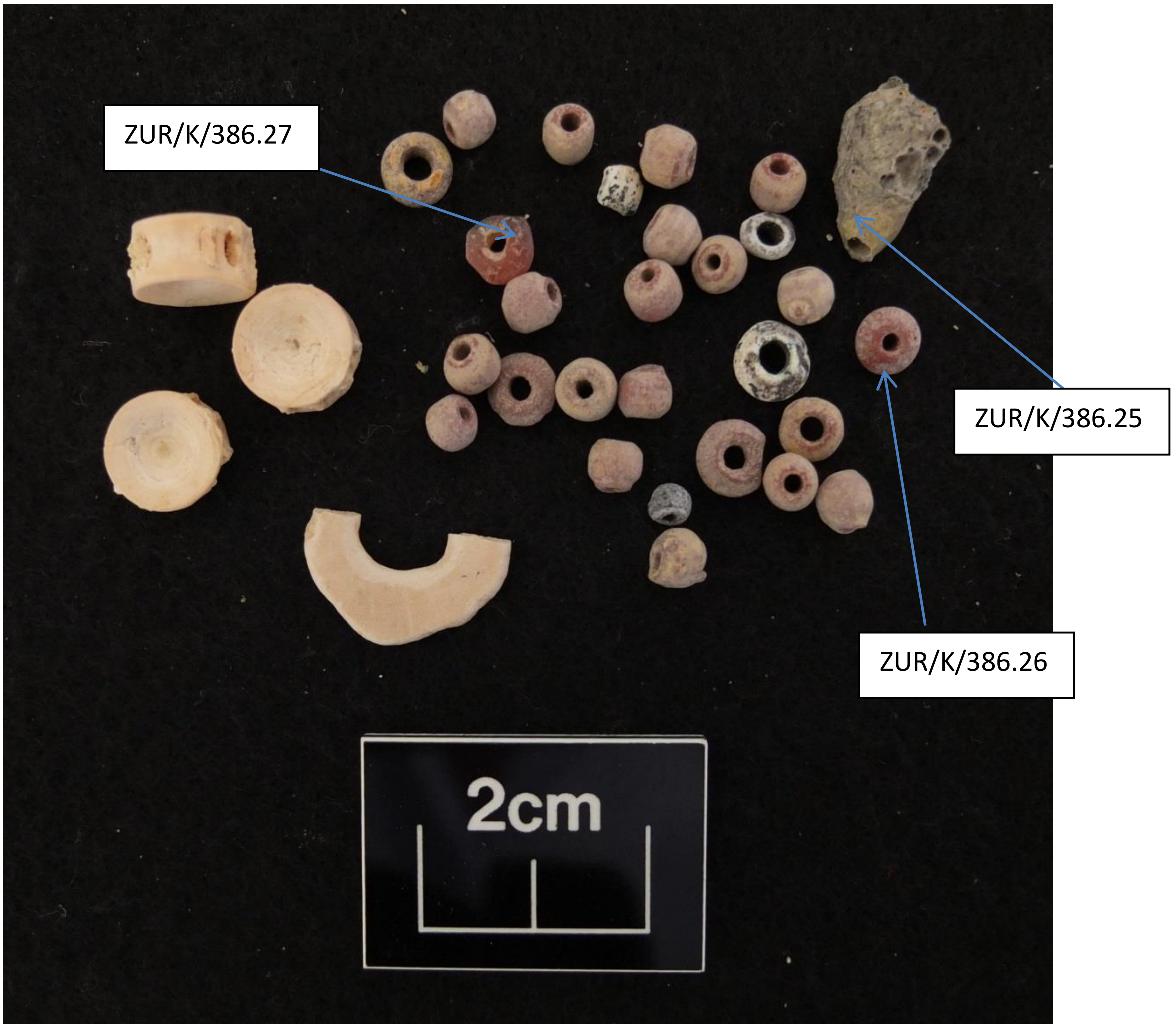
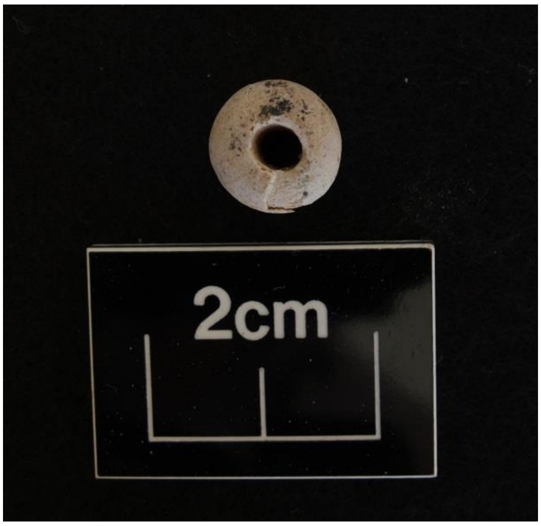


Fig. 4.107: Assemblage of beads ZUR/K/386 (S. Snape).



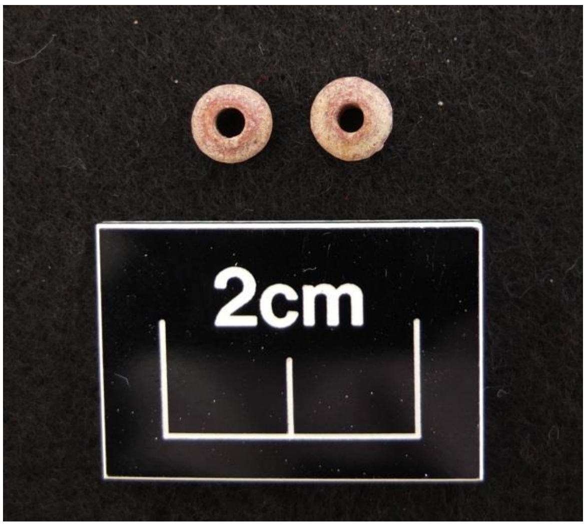


Fig. 4.108: Bead ZUR/KKI/8 (S. Snape).

Fig. 4.109: Bead ZUR/K2H/8-9 (S. Snape).

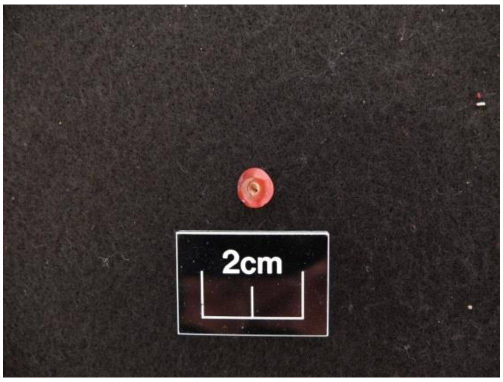


Fig. 4.110: Bead ZUR/KM/27 (S. Snape).

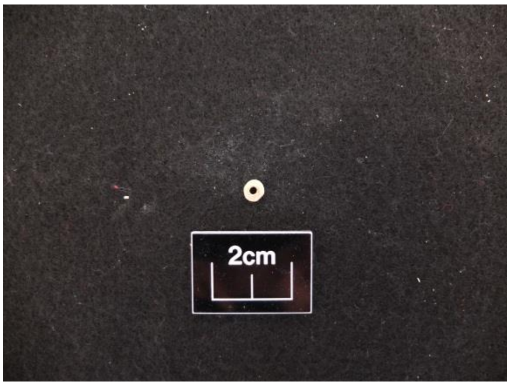


Fig. 4.111: Bead ZUR/KQ/4 (S. Snape).

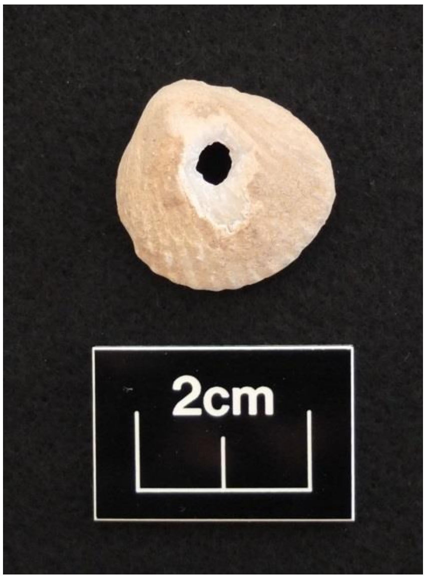


Fig. 4.112: Pierced shell ZUR/K/189 (S. Snape).

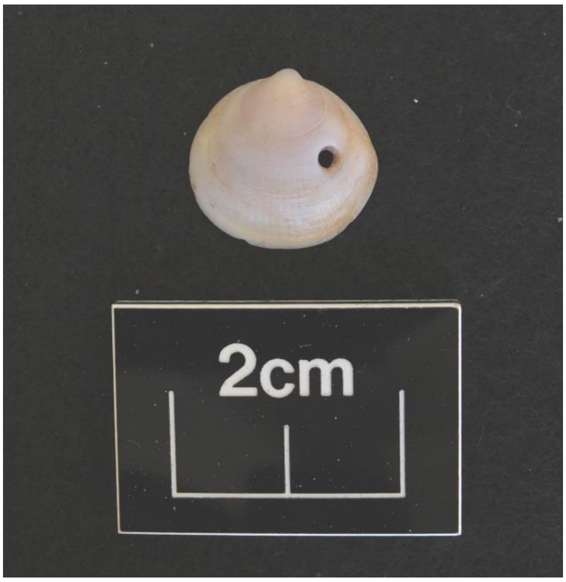


Fig. 4.113: Pierced shell ZUR/K2H/11 (S. Snape).

Fig. 4.114: Ear- or hair ring ZUR/K/100 (S. Snape).

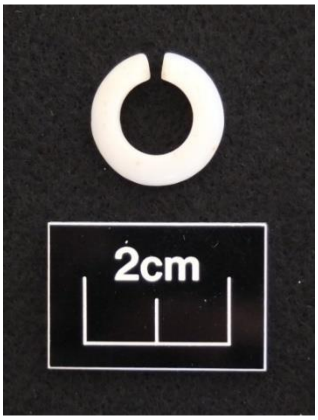


Fig. 4.115: Ear- or hair ring ZUR/K/179 (S. Snape).

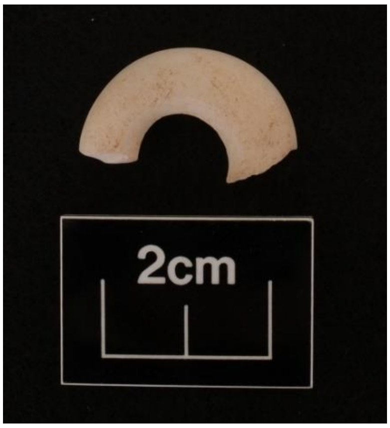


Fig. 4.116: Ear- or hair ring ZUR/KM/6 (S. Snape).

manufactured from calcite-alabaster (ZUR/K/100, ZUR/K/179 and ZUR/KM/6).

4.9.1.1. Ceramic Beads

The most significant corpus of ceramic beads are ZUR/K/385, comprising 22 beads coloured blue by the addition of blue frit, and ZUR/K/386 which comprises 27 primarily red ceramic beads. The 22 blue frit beads are generally of a simple circular shape similar to Type X.1.h as defined by Xia (2014: Pl. X). The beads are made from a pale-beige clay, finely levigated and with poorly applied faience glazing. The glazing is thin and has peeled off around all the beads leaving sections of the underlying ceramic exposed. It is uncertain whether this faience manufacture was conducted on the site; there are no other faience objects, no evidence of faience production in the excavated portions and no evidence of kiln structures in and around the fort (see Chp. 6) although the materials for producing faience, such as pigment of Egyptian blue (Thomas, 2000: 23-38) were present at the site. On balance, the more likely explanation is that the beads were brought to the fort from an external source, either Egypt, or from the Eastern Mediterranean merchants who visited the fortress (Snape, 1998).

ZUR/K/386 is more varied. 27 (ZUR/K/286) ceramic beads, 22 of which are made from a reddish-clay and left undecorated with shapes ranging from the disc-shaped circular Type X.1.h (Xia, 2014: Pl. X) – seven in total – to the slightly broader Type X.9.i (Xia, 2014: Pl. X) – accounting for the remaining fifteen beads. The provenance of these beads is simpler to establish, the clay which has naturally fired to a deep red evidently has a higher concentration of Iron in its chemical make-up, an indicator that the material is not local (see section 6.3.3). The shape and the material, as well as parallels from Egypt make it more likely that the beads were manufactured in the Nile Valley. Two sea shells (one pierced and broken in half and one unpierced) as well as three fish vertebrae were also found in this context, although their purpose is unclear. It is possible that they were originally hung on the same necklace as additional decoration.

The remaining two beads are made from greyish, crumbly clay. Their shape is similar to the remaining 22 ceramic beads from the context discussed above (Type X.1.h) and the difference in fabric is likely to indicate poor firing, as the crumbly material seems to have been fired at too-high temperatures. ZUR/K/254, ZUR/K2H/8, ZUR/K2H/9 and ZUR/KQ/4 are all similar circular beads, undecorated and made from a reddish ceramic. The shape of all four beads is similar to type X.1.h (Xia, 2014: Pl. X). ZUR/K/241 is a locally produced cylindrical tapered bead (evidenced by the greyish-beige material and the presence of shell-temper in the fabric) of Type X.17.s (Xia, 2014: Pl. X, see also Kemp and Stevens, 2010b: Fig. 10.10.35578), which has been left undecorated. ZUR/K/229 is an animal-shaped bead, most likely depicting a cow (Andrews, 1994: 61-62) although the object is too poorly preserved for any precise parallels to be found. It is manufactured from the same reddish clay as the 22 disc-shaped beads (ZUR/K/386) discussed above.

4.9.1.2. Stone Beads

Two stone beads from the assemblage ZUR/K/386 (ZUR/K/386.25 and ZUR/K/386.26, note arrows) were identified. The shape of ZUR/K/386.25 is similar to Type V.5r (Xia, 2014: Pl. V) while ZUR/K/386.26 is more rounded (similar to Type

V.9k (Xia, 2014: Pl. V)) and they were both manufactured from a granite-like hard stone which may be speckled diorite. ZUR/K/386.27 (note arrow) and ZUR/KM/27 are the only beads in the assemblage made from carnelian. Both are roughly disc-shaped (Type V.1p, Xia, 2014: Pl. V). As none of these minerals are available in the Western desert and no evidence of hard stone working and stone bead manufacture (such as drills) have been found at Zawiyet Umm el-Rakham, and given their small amount, it seems likely that they were imported from Egypt in their manufactured form rather than manufactured from imported raw material.

4.9.2. Cockle Shell Pendants

Two common cockle-shells (ZUR/K/189 and ZUR/K2H/11) both with a single perforation were found in Area K. This type of shell is evidenced in abundance in the Area H of the fort (Simpson, 2002: 218) where it was most likely used as a food source for the Libyan squatters in the area. Simpson (2002: 218) argues that the cockles are from the nearby Marsa Matruh lagoon, close to Bate's Island where large quantities of this type of shell were also found (White, 1986: 103-104). There are no other cockle shells in Area K, and its status as the primary provisioning area of the fort makes it unlikely that cockles were collected as a food source. As Simpson (2002: 219) argues, foraging for shell-fish is a subsistence strategy more suitable to nomadic people, rather than a sedentary Egyptian population. The two cockle shells from Area K were evidently used simply as decorative items.

4.9.3. Stone hair- or earrings

One complete (ZUR/K/100) and two fragmented (ZUR/K/179 and ZUR/KM/6) ear- or hair-rings were found in Area K. All three are manufactured from calcite-alabaster and similar in shape to contemporary examples from Tell el-Amarna (Kemp and Stevens, 2010b: 133-134). Calcite-alabaster does not occur naturally in the environs of the fort, and it seems likely that the objects were manufactured in Egypt and brought to the fort with members of the garrison as private adornment.

4.9.4. Discussion

The most varied corpus of jewellery from Area K is undoubtedly the assemblage of ceramic and stone beads. The variety and the fact that the majority of the beads are unlikely to have been manufactured at the site raise the question of their provenance. All are typically Egyptian in shape and material, and as such one explanation is that the inhabitants of Zawiyet Umm el-Rakham brought them to the fort, either for personal use, or perhaps as trade goods to the local Libyans. However, another explanation is also possible; the large quantity of Egyptian faience, glass and stone beads found on the Uluburrun shipwreck (Pulak, 1998: 206) make it possible that these beads came to the site via the intermediary of the Mycenaean and Cypriot merchants who also left a significant quantity and variety of pottery at the site (Thomas, 2000 and Gasperini, in press). It is not possible to determine which of these interpretations are correct, but it is certain that the majority of the beads found in Area K, were not manufactured at the fort. Neither was in all likelihood the three calcite-alabaster hair- or earrings also discovered in the area. The only definitively local jewellery type seems to be the cockle shell pendants, manufactured from shells collected from the area around Bate's Island, west of the fort.

4.10. The Detritus of Administration: Jar stoppers and stamp seals

Objects related to Administration				
Finds No.	**Context**	**Material**	**Description**	**Figure**
ZUR/KZ/8*	KZ	Plaster	Jar stopper	
ZUR/KZ/12*	KZ	Plaster	Jar stopper	
ZUR/KKIII/8	KKIII	Plaster	Jar stopper	4.117-4.118
ZUR/K2G/1	K2G	Ceramic	Stamp seal	4.119-4.120

* Not available in magazine. Registered in Finds Register but not drawn/photographed.

Table 4.12: Objects related to internal administration at Zawiyet Umm el-Rakham.

4.10.1. Jar stoppers

Three fragments of jar stoppers[3] have been found from Area K, although only a single example could be located for closer examination during the 2014 season in Mersa Matruh. Uninscribed clay stoppers have been found across several New Kingdom settlement sites (notably Tell el-Amarna, Kemp and Stevens, 2010: 25-34, Kom Rabi'a, Giddy, 1999: 276-281, Deir el-Medina, Nagel, 1938: 29, no. 64, and Malkata, Hope, 1978). As discussed by Kemp and Stevens (2010: 25) earlier publications tended to ignore those stoppers which did not carry inscriptions usually labelling the content of the vessels they closed (Kemp and Stevens, 2010b: 25, for an example of this practice, see for instance Hayes, 1951).

[3] A small discussion on terminology before the main body of the discussion is required. Two components are usually used in the sealing of a jar; a primary seal (usually made from reed or straw) followed by a larger seal which closes across the primary seal and ensures an airtight seal to the vessel. Hope (1978) refers to the primary seal as a 'stopper' and the secondary as a 'sealing'. In more recent publications, such as Giddy (1999) and Kemp and Stevens (2010b), the secondary seal is described as a 'stopper'. Kemp and Stevens (2010b: 28) furthermore refer to the primary (usually straw) seal as a 'bung'. For the purposes of this discussion the present author has applied the terminology utilised by Kemp and Stevens (2010b) throughout.

Fig. 4.117: Jar stopper ZUR/KKIII/8 (S. Snape).

Fig. 4.118: Jar stopper ZUR/KKIII/8 (S. Snape).

Fig. 4.119: Stamp seal ZUR/K2G/1 (S. Snape).

Fig. 4.120: Stamp seal ZUR/K2G/1 (S. Snape).

As such, the study of uninscribed stoppers has primarily begun in recent decades, most notably with the seminal work by Colin Hope (1978) on three-hundred jar sealings/stoppers from the 18th Dynasty palace site of Malkata. While Hope does discuss inscribed examples (1978: Fig. 3), his study also includes an extensive discussion on the precise purpose and manufacture of jar sealings and their appearance in contemporary tomb decorations (Hope, 1978: 35-36). While Hope discusses both hand-made and mould-made jar sealings (1978: 35), the examples from Kom Rabi'a presented by Giddy (1999: 277) are predominately hand-made, in a similar fashion to ZUR/KKIII/8. This manufacturing method is far simpler than the moulded technique. The material is shaped into a rough disc and forced over the neck of the vessel, smoothed and left to dry naturally. In some cases, the stopper is placed over a bung made from reed or other materials (Hope, 1978: 6). The material used for this object type is usually clay of various types and compositions (Kemp and Stevens, 2010b: 25-34, Giddy, 1999: 276-281, Hope, 1978: 10).

ZUR/KKIII/8 is made from light-brown silt and traces of gypsum plaster survive on several surfaces (reminiscent of 34496 from Tell el-Amarna, Kemp and Stevens, 2010b: 28). The underside of the object contains a series of deep grooves from the straw bung in a star pattern, suggesting that the bung was in the shape 3a as defined by Hope (1978: Pl. I-II). While the object is not wholly preserved, it is nonetheless possible to see in profile both the impression of the vessel's lip on its underside, and the overhanging seal which covered the neck of the vessel. The diameter of the vessel's lip is roughly 9.00cm as measured from the jar stopper itself. The shape of the jar stopper is best described as 'flattened' (following Hope, 1978: Fig. 6).

4.10.2. Stamp seals

Unlike similar stamp seals from the New Kingdom, such as a limestone stamp seal from Tell el-Amarna published by Frankfort (1927: Pl. L.1, 3), the stamp seal from Area K does not imitate faience or metal rings of the period. Instead the shape of the stamp's handle is a more simplistic conical shape. The design on the face of the stamp is a figure of the god Ptah in mummiform and executed in raised relief. Ptah is shown holding the *w3s*-scepter in his hands (although there is no attempt made to differentiate the two arms of the figure), and a single deep incision beneath the figure's feet indicate a plinth or raised platform. The figure originally had a straight beard, which has broken away. The fabric is similar to the local material ZUR A with multiple small limestone inclusions and shell-temper. The object was poorly fired in a bonfire.

The workmanship is poor in its execution, in that the deep incised guiding lines indicating the shape of the figure were only cursorily followed by the craftsman who – prior to firing the object – removed sections between the figure and the *w3s*-scepter. As for parallels, the most obvious example comes from Locus 521-522 at Deir el-Ballah where an almost identical Ptah stamp seal (although more finely executed) was found (Brandl, 2010: 216-17). As opposed to the proposed function for the stamp seal found at Deir el-Ballah – as a "[…] master-seal for preparing moulds for faience plaque amulets" (Brandl, 2010: 217) – the most likely function of the stamp seal from Zawiyet Umm el-Rakham was to mark either mud bricks or jar stoppers, as no evidence of any kind of faience manufacture has been found at Zawiyet Umm el-Rakham.

A possible interpretation of the stamp seal is as a component in a partially temple-based economy operating at the site. As discussed extensively by Snape (2004) and Snape and Wilson (2007), the poor preservation of the temple makes it impossible to establish to which deity it was dedicated. However, considering the definite Memphite character of the site as a whole, visible in particular on the monuments related to the fort's commander, Nebre (Snape and Godenho, in press and Snape, 2004: 160), it is likely that the temple was dedicated either to Ptah or to the Memphite Triad.

As excavations of the temple by the University of Liverpool in the 1990's demonstrated, the temple was associated with large storage magazines (Snape, 2004: 150) as well as a barque shrine (Snape and Wilson, 2007: 26 and fig. 2.26) suggesting that the temple formed an integrated part of life at the site. As such, the stamp was most likely used to mark jar stoppers on object destined for use by either the temple priesthood or for use in temple rituals.

4.10.3. Discussion

Very little material related to the internal administration of the site of Zawiyet Umm el-Rakham has survived in the archaeological record. This includes many of the objects traditionally used to establish internal administration on sites, such as ostraca (especially at Deir el-Medina). As such, the primary conclusions to be drawn from the three un-marked jar stoppers and the stamp-seal found in Area K are that they represent facets of an internal administration whose precise components and operations are largely unknown. However, placed in the context of other object types relating to production at the site, they can nonetheless add a small but significant level of complexity to the overall interpretation, namely in that they evidence that certain goods were not only produced as and when required, but were also intended for storage and possibly for a network of internal distribution.

4.11. Discussion

As stated in the introduction, this chapter had two aims: firstly, it aimed to provide an overview of the types and extent of industries undertaken in Area K for the purposes of food production and the manufacture of objects and tools for local use/consumption and/or barter-trade with local tribesmen. Secondly, the chapter aimed to place the material into a contemporary context of material from other Egyptian settlements in the Nile Valley and occasionally in other areas of Egyptian occupation during the Late Bronze Age such as Canaan and Nubia, in order to determine whether the industries and strategies employed at Zawiyet Umm el-Rakham represented typical Egyptian manufacturing types and techniques, or anomalous strategies employed in response to local factors. The types of production are divisible into subsistence strategies undertaken to secure a supply of food and craft production. As discussed in section 4.1.1 the latter of these will be evaluated partially on the basis of the framework for modes and scales of production proposed by Rice (1987: 183-191).

4.11.1: Subsistence Strategies: Grain and Wild Game

As should be expected from a New Kingdom Pharaonic site, the production and processing of grain was of paramount importance. The material evidence is not only varied (including querns, hand-stones, sieves and various types of mixing troughs and ovens) but also prevailing within Area K. The estimated quantities show that the granaries in Area H could potentially have stored sufficient grain to feed the garrison for at least a single year. Considering that the harvest in the area depends, not on the

Nile Inundation, but on the annual winter rains along the coast, this indicates that the settlement relied on long-term storage of grain. Taken together with the evidence for harvesting of grain (see Chapter 5 below), this is strongly indicative of a level partial or complete self-sufficiency.

Notably, no grain bins or smaller granaries were found within Area K, all grain was stored centrally in the major granaries of Area H indicating complete centralised control of grain rations. This is reminiscent of the centrally organised Ramesside bakeries described in Pap. Paris BN 204-208 (K*RI* I, 241:11-243:1) This is hardly surprising, even with a successful agricultural industry, the site is nonetheless heavily isolated and aid in case of failed harvests or simple mismanagement of supplies would almost certainly have been slow and problematic due to the distances involved.

Exploitation of the natural landscape for game animals and sea food is extremely poorly evidenced. The material evidence discussed in this chapter suggests, at most, little to no hunting and sporadic use of the resources provided in the nearby Mediterranean Sea. Some fishing was undoubtedly attempted both with lines and nets, but as is also clear from the faunal assemblage discussed below in Chapter 7, reliance on domesticated species was greatly preferred, with game animals, fish, tortoises and ostrich eggs providing occasional variety rather than a solid subsistence strategy. The reason for this preference was that domesticated species as the primary avenue of securing protein provided a safer and more predictable alternative to foraging, hunting and fishing. Along with the centrally organised production and processing of grain in the area this shows clearly that the garrison's self-reliance came as a result of a heavily controlled organisation of food supplies.

	Household production	Household industry	Individual workshop	Nucleated workshop	Attached specialist producers
Textile Production			(S)		(M)
Stone-working				(S)	(M)
Bone-working		(M) / (S)			
Non-vessel ceramics production	(M) / (S)				
Metal-working		(M) / (S)			
Jewellery production	(M) / (S)				

Table 4.13: Types of Craft Production in Area K listing mode (M) and scale (S) of production (adapted from Rice, 1987: 183-191).

4.11.2: Craft Production: Modes and Scale of Production

Six distinct material assemblages have been defined as evidencing six craft industries undertaken at the site: Textile Production, stone-working, bone-working, non-vessel ceramics production, metal-working and jewellery production. Two further craft industries, lithic manufacture (Chapter 5) and pottery production (Chapter 6) are associated with significantly larger quantities of material and have been discussed separately below. As discussed in Section 4.1.1, a common vocabulary is useful for inter-craft comparisons, and as a result the framework provided by Rice (1987: 183-191) has been utilised for this discussion. As also discussed above, with certain industries there is a difference in the definition of 'modes of production' (M) and 'scale of production' (S) (see **Table 4.13**), with the latter in some cases being decided by evidence of centralised oversight, rather than by intensity or environment of production (Bourriau *et al*, 2000: 141). In other cases, both the modes and scales of a craft production can be considered similar. See also further discussion of these terms in **Section 4.1.1**.

4.11.2.1. Textile Production

The mode of textile production within Area K must be viewed in the context of the post-harvest processes used for flax (Vogelsang-Eastwood, 1992 and 2000). It is unlikely that such a relatively delicate process could be conducted entirely sporadically without some type of centralised oversight. The Biography of Nebre furthermore states that: "The storerooms (*wḏ3*(*w*)) are full of cloth (*ḥbs*) […]" (Snape and Godenho, in press), indicating that the produce of the weaving industry was centrally stored and as such that the industry itself was most likely similarly under elite oversight. Groups of inhabitants were used to harvest the flax when required and – most likely under some type of concerted supervision – take part in the post-harvesting processes, which should be considered an 'attached specialist production', justified by the involvement of the local elite in the oversight of the production. The weaving itself was conducted in specific areas with some expertise, most likely by part-time workers who had some previous experience of spinning and weaving. Taken in context with a possible use on the linen as a trade good and also the involvement of other industries (pottery and stone manufacture) in the production, the most likely scale was that of a small workshop environment.

4.11.2.2. Stone-working

Stone-working is by far the most extensively evidenced industry conducted within Area K and probably Zawiyet Umm el-Rakham as a whole. Stone-working of varying degrees of expertise was required both to build and maintain structures, to manufacture tools for use by other industries, and to directly service the elite by carving stela and the inscriptions found in the temple (Snape and Wilson, 2007). As such, the mode of production is evidently one of attached specialist producers, most likely specialised stone masons who lived at the site and engaged in their craft full-time. The scale of production was most likely a nucleated workshop environment, evidenced by the wide scatter of tools and manufacturing sites across several areas (Area K and Area N), where different specialists manufactured different objects decided by their skill-level and engaged in near-constant maintenance of the structures at the site. A portion of such a workshop has also been located in Area N (see Section 4.5.6) where stone masons engaged in the production of private stela on behalf of the elite members of the society at Zawiyet Umm el-Rakham.

4.11.2.3. Bone-working

Despite the large quantity of locally manufactured bone pins, the industry itself was most likely among the less significant in terms of the settlement's survival. The industry functioned with little or no centralised oversight, required limited skills and limited tools and almost certainly conducted only on a part-time basis. It is possible that the pins may have been used as informal trade objects by members of the garrison, possibly in exchange for ostrich eggs or similar objects from local Libyans or simply given as presents. As such, both the mode and scale of this production can be clearly defined as a 'household industry'.

4.11.2.4. Non-Vessel Ceramics Production

In the context of Rice's (1987: 183-191) categories of craft production, the manufacture of non-vessel ceramic objects in Area K is in all ways a 'household production'. The objects were made with limited skill, limited equipment (in particular the figurines) and are unlikely to have been used in any type of trade. They were personal objects made by an individual for their own use, or for their immediate network and any kind of centralised oversight is unlikely.

4.11.2.5. Metal-working

The evidence from Area K suggests that metal working at the site was aimed at repair and small-scale recasting using simple tools (locally made crucibles). It is possible that some of the smaller metal objects were either repaired for local Libyans as payment or traded to them in a manner reminiscent of the trade suggested by White (1999: 931-936) at Bate's Island. As such, both the mode and scale of the production can be considered a household industry, as it most likely involved producers with limited skill working part-time and most likely not under the direct management of the central hierarchy. The apparent effort by the Egyptians to remove metal objects from the site creates a bias in the data set, but taken together with the lack of significant evidence of vitrification within and around the enclosure (Snape, pers. comm.), the lack of slag and other detritus of metal production and the limited amount of crucibles, there is no evidence to suggest that large-scale metal production or weapons manufacture was conducted at the site.

4.11.2.6. Jewellery Production

The production of jewellery at the site was extremely limited and both its mode and scale should be considered a 'household production', signifying an individual's production of a material primarily for their own use. The evidence in no way supports any type of large-scale production for the purposes of providing material either as trade goods or for the garrison as a whole.

4.11.2.7. Conclusion

Out of the six industries discussed in this chapter, the majority are either relatively minor and involve part-time producers with little to medium experience working within an informal environment rather than a more clearly defined workshop. The exceptions to this rule are linen production, which required a degree of oversight and specialisation most likely due to the relatively complicated process of preparing the harvested flax, and stone-working which is the most dominant industry in terms of produced material and tools. The prevalence of stone working is explained by its involvement in other industries undertaken at the site (such as weaving and grain production) and also in the spiritual life of the settlement's elite as well as the continuous upkeep of the site itself.

There is no evidence of brick making, aside from the bricks themselves, but it is probable that the stone masons worked in concert with brick makers on this upkeep. Stone working and weaving are also the only craft industries that show direct involvement by the centralised administration of the settlement (in a similar manner to the production and processing of grain). The reason for this is most likely that the results of these industries were crucial to the continued survival of the garrison (manufacture of quern stones for grain processing for instance), the servicing of the spiritual life of the elite (the manufacture of stela) and as an element in trade or gift-giving to the local tribesmen (linen cloth).

The remaining industries, such as bone-working, may also evidence trade with local Libyans, but most likely of a less formalised type. Two industries, the manufacture of non-vessel ceramics such as small cultic figurines and house shrines, as well as the limited production of shell jewellery at the site, were the least significant to the overall economic life of the settlement, and were most likely conducted by single individuals for their own benefit. The following three chapters will examine three further assemblages (lithics, ceramics and faunal remains) which each concern a specific industry or food source undertaken or utilised by the inhabitants, and can be added to the conclusions reached in this chapter to provide a fuller overview of the subsistence strategies and craft production undertaken in Area K.

Chapter 5: The Chipped Stone Assemblage

5.1. Introduction and Methodology

An assemblage of 103 chipped stone tools, debitage and cores was recovered from Area K in 1999-2001. The small size of this assemblage is both the most immediately noticeable but also most readily explainable. By contrast 125 flint tools and 2565 cortical and non-cortical debitage pieces (Simpson, 2002: 239 and 284) were found in the squatter area, Area H in the north-western corner of the fortress at Zawiyet Umm el-Rakham and 10.402 chipped stone pieces were found at the Early Dynastic site of Helwan (Hikade, 1999: 49), with another 11.311 pieces from the Old Kingdom site of Ayn-Asil (Midant-Reynes, 1998: 1). However, as discussed by Simpson (2002: 355-356) the vast majority of the material from Area H seems not Libyan, but Egyptian in form and its presence in the later squatter occupation is most likely due to a deliberate effort by the Libyan squatters to find useful tools left elsewhere at the site and re-use or re-work them in Area H. As discussed in Chapter 4 (Section 4.4.5), some tools used in Area K were transported to Area H to be used in the original – or in an alternate – role. It seems likely that the flint assemblage recovered from Area K therefore, constitutes those tools and pieces of debitage which were either not found, or deliberately not collected, by later Libyan squatters at the site.

The aim of this chapter is to present an overview of this assemblage and discuss its purpose within Area K. As such, the chapter will address (a) the primary types of debitage, cores and tools within a context of contemporary material from Egypt, (b) the degree to which the tools were manufactured at the site or brought completed from Egypt, (c) the similarity between the Area K and Area H assemblages and (d) which local sources of flint were utilised in the manufacture of the tools. As such, the chapter attempts to answer another facet of the overall research question of this thesis by discussing the level of self-sufficiency in the manufacture of chipped stone tools commanded by the occupants at Zawiyet Umm el-Rakham.

The methodology of this study is contingent (like Chapters 4, 6 and 7) on the collection of raw archaeological data. 103 pieces of worked flint were individually numbered during excavations (1999-2002), the majority of these were discovered by the excavators while a smaller amount were recovered as a result of selective sieving of the area (see Rossen, 1997: 37-38 for a description of the two collection strategies). During the 2014 season only 92 of these chipped stone objects were available for examination in the Mersa Matruh magazine. Each object was examined, measured and photographed. As limited illustration or photography of the remaining 11 objects was conducted during the earlier seasons, the 92 objects examined during the summer of 2014 therefore represent the primary corpus studied in this chapter. As such, this physical limitation in object availability created a slight bias in the overall data assemblage, although sample of 92 out of 103 objects (86.32%) can still be considered a representative sample collection.

Considering that one of the aims of this chapter is to study the assemblage in the context of contemporary material in Egypt, the following sub-chapter will detail the current state of scholarship of chipped stone industries in New Kingdom Egypt. Furthermore, as discussed above, other scholars – namely Simpson (2002) – has already conducted intensive research on the chipped stone assemblage from Area H at Zawiyet Umm el-Rakham, and considering the probable connections between the

Area K and Area H assemblage, the chapter also contains a discussion of the research so far conducted into local sources of flint and flint-working in general at Zawiyet Umm el-Rakham. As the chapter furthermore aims to determine the precise nature of the connection between the Area K and Area H chipped stone assemblages, Simpson's study and results (2002) also significantly impact the methodology of this chapter. For instance, the local material types determined by Simpson (2002: 359-394) following two field surveys in the area surrounding Zawiyet Umm el-Rakham have been integrated directly into this study, as the objects from Area K are made from identical material types (see Section 5.4 below).

5.2. State of Scholarship: Chipped Stone Industries in New Kingdom Egypt

The available literature concerning the study of Egyptian New Kingdom lithic assemblages primarily concern four sites: The primary site is Tell el-Amarna. Study of specific categories of chipped stone tools began with the initial exploration of the site by Flinders Petrie in the form of brief descriptions of assemblages by Spurrel (1894: 37-38). In-depth studies were conducted by the modern excavators of the material from the Workmen's Village (Miller, 1987) and the Central City (Graves-Brown, 2010).

The discovery of piles of flakes and flint chisels in the Valley of the Kings prompted further research into the use of chipped stone tools by the workmen from Deir el-Medina in connection with the construction of royal tombs (Seton-Karr, 1905: 176-187), and also additional tools found at the site of Deir el-Medina such as sickle blades (Bruyère, 1937-1939: Pl. XLII) as well as more general introductions to various tool types found utilised in the village (Debono, 1971: 43-44). Contemporary 19th dynasty material has also been discovered at Kom Rabi'a (Jeffreys and Giddy, 1993 and Giddy, 1999: 226-243) and more recently, significant research into Ramesside chipped stone tools have been conducted at Qantir-Piramesses by Andreas Tillmann (1986 and 2006) including the use of chemical testing on sickle blades in order to determine with which materials they were hafted to wooden sickles (Endlicher and Tillmann, 1997) as well as a comprehensive corpus of all chipped stone material from the excavated portions of Qantir-Piramesses (Tillmann, 2007). Aside from the research conducted at these major settlement sites within Egypt, smaller assemblages of chipped stone tools have also been published from East Karnak (Miller, 1983) as well as a series of sites outside – or on the border of - the Nile Valley with Egyptian occupation such as Tell Heboua (Caneva, 1992), Deir el-Balah (Rosen and Goring-Morris, 2010) and Beth Shan (James and McGovern, 1993a: 197).

Finally, specific types and sub-types of chipped stone tools and weapons of the New Kingdom have also been separately discussed, including for instance lithic arrow-heads (Hikade, 2001). However, aside from brief general remarks such as those by Aston *et al* (2000: 28-29) and more in-depth studies of the cultic significance of flint in Ancient Egypt (Graves-Brown, 2010) there are no publications which attempt to unify or categorise the study of chipped stone tools in Ancient Egypt, in a similar manner to what the study by Rossen (1997) does for tools from the Near East. In the absence of such a publication, the following chapter adheres to Rossen's terminology where suitable.

Group	Type	Description	Debitage % in Magazine 6	Amount tools	Amount cores	Proposed origin
1	**A**	Pale pink to dark pink ; polished appearance and texture.	50.4	16	0	Egypt/Dakhla
	B	Pink-brown-white flint ; pale brown, weathered cortext.	10.25	19	0	Not known
	C	Grainy opaque pale red.	1.62	6	2	Not known
	D	Dark red ; possibly identifcal to Type A.	0.21	9	0	Not known
2	**E**	Pale grey/green ; smooth, glassy texture ; thin weathered brown cortex (smaller quantities show white, clean cortext).	20.7	8	1	Egypt/Dakhla
	F	Pinkish-white type ; cortext varies from grey to reddish-brown.	0.85	11	1	Not known
	G	Brownish-yellow translucent.	0.56	5	0	Not known
3	**H**	Brownish-grey with a grainy texture/	5.3	1	1	Not known
	I	Opaque pale-brown ; grainy surface ; dense texture.	0.3	7	0	Not known
4	**J**	Smooth white-grey flint ; light brown cortex.	4.9	7	0	Not known
5	**K**	Smooth brown flint with white patches.	1.5	3	0	Not known
	L	Dark brown with a smoothe texture ; white patches.	1.26	1	0	Not known
6	**M**	Smooth white flint ; pale brown cortext.	1.4	3	0	Not known
	N	Pale yellow.	0	1	0	Egypt
7	**P**	Opaque black flint ; smooth, polished surface.	0.21	0	0	Not known
8	**Q**	Dusky red ; grainy texure.	0.56	2	0	Not known
9	**R**	Dark grey opaque flint.	0	6	0	Egypt
10	**S**	Opaque mid-brown flint ; matt surface ; probably chert rather than flint.	0	2	0	Egypt
11	**FDS2/2**	Greeny-grey type ; smooth, polished surface ; cortex weathered reddish-brown ; similar to Type E.	0	1	0	Local
	FDS2/3	Reddish-brown weathered cortex ; ranges from orangey red to matt browny red.	0.2	1	0	Local
	FDS2/5	Opaque to semi-translucent ; light brown to pink ; matt surface with fossil inclusions.	0.06	0	0	Local

Table 5.1: Types of lithic material found in Magazine Six (adapted from Simpson, 2002: 367-382).

5.3. Previous Research on the Lithic Industry at Zawiyet Umm el-Rakham

During the 1997 excavation of Magazine 6, evidence of later squatter activity inside the magazine was uncovered by excavators (Simpson, 2002: 231). In conjunction with a hearth area, excavators catalogued 2690 pieces of flint, the vast majority consisting of debitage. Within this assemblage 125 tools were registered, including 77 sickle blades (Simpson, 2002: 239). An extensive debitage analysis prompted Simpson (2002: 285) to suggest that while some material was worked from pebble flint of Types E and H (see below), in part due to the discovery of two such types of flint core found in the area, the majority of the material was the result of re-working of tools or debitage collected from elsewhere. Simpson (2002: 287) furthermore concluded that while the production in the magazine indicates squatter activity by local Libyans, the occupation was most likely short and that it is unlikely that the majority of the tools present (notably the sickle blades) were manufactured by the squatters, but rather that they were moved to the area from elsewhere. Considering the presence of only 30 pieces of debitage, 53 tools and 9 cores (mostly exhausted) in the Area K assemblage, by comparison to 2565 pieces of debitage, 125 tools and only two cores (partially exhausted) in Magazine 6, it may be suggested that the majority of the material found in Magazine 6, was originally deposited in Area K but was moved following the Egyptian abandonment of the site and re-used, and to a more limited degree, reworked, by Libyan squatters.

In 2000, two desert surveys were conducted by Simpson (2002: 360-366), the first along a limestone ridge south of Zawiyet Umm el-Rakham (2002: 361-362) which proved unsuccessful in locating any sources of flint, and a second in an area some

20km east of the site in the only area where the local Bedouin consulted were aware of flint sources (Simpson, 2002: 364). In this area, five types of flint FDS2/1-5 were identified, mostly in the form of weathered surface pebbles of relatively low quality. Three of these types (FDS2/2-3 and 5) were identified within Magazine 6, showing that some local material was worked in the area, although its use was limited (see **Table 5.3**).

5.4. Material Types, Availability and Provenance

The majority of material types within the assemblage classified by Simpson (2002: 382-390) could not be ascribed to a specific geographical origin (**Table 5.1**). The mined flint (Type A and E) most likely originated from the area of the Nile Valley and was brought either as tools or as cores to the site and worked on-site (Simpson, 2002: 385). Additional flint in the form of pebble flint from the Western Desert and from the source located 20km east of Zawiyet Umm el-Rakham contributed additional material. This suggests either trade with the Libyans for raw flint or expeditions sent from the site to retrieve it (Simpson, 2002: 387).

The Area K flint was divided into Simpson's (2002: 367-382) existing material categories (**Table 5.2**). No flints from Area K appeared dissimilar to the existing categories, which provides further evidence to suggest that the Area K assemblage constitutes the few remains which were not moved by squatters from Area K to Magazine 6 following the site's abandonment. The Area K assemblage confirms Simpson's (2002: 385) hypothesis that the mined flint type E arrived at the site most likely in the form of cores. Five of the nine cores found in Area K are of this material. Furthermore, four of these cores were partially exhausted (**Fig. 5.1**), and

	Debitage	Cores	Blade blanks	Borers	Notched blades	Points	Scrapers	Sickle blades	Total
Type A*					2				2
Type B*	3	3	1	1					8
Type C									
Type D									
Type E*	2	5		3			2	9	21
Type F									
Type G				1					1
Type H		1			8		4		13
Type I									
Type J	2		6	1		3		1	14
Type K									
Type L	5								5
Type M									
Type N*								1	1
Type O									
Type P									
Type Q									
Type R*	3							4	7
Type S						1		2	3
FDS2/2	15			1					16
FDS2/3							1		2
FDS2/5									
Total	30	9	7	7	10	4	7	17	**92**

Table 5.2: Area K assemblage divided by material type (see Simpson, 2002: 367-382).

	No.	%
Sickle Blades	17	32.07
Notched Blades	10	18.87
Blade Blanks	8	15.09
Scrapers	7	13.21
Borers	7	13.21
Points	4	7.55
Total	53	

Table 5.3: Quantities of tools in the Area K assemblage (author).

Fig. 5.1: Exhausted flint core ZUR/K/98 (S. Snape).

only one (ZUR/K2A/11) was still relatively complete and unworked. The largest proportion of material within Area K is Type E, although the majority of the remaining material is in form of pebble flint brought from the Western Desert, including some of the locally collected poor quality flint FDS2/2 and FDS2/3.

5.5. The Assemblage

The assemblage of lithics from Area K is composed of three types of material: pieces of debitage (32.61%), cores (9.78%) and tools (57.61%). As noted above, the large quantity of partially or wholly exhausted cores as well as the large amounts of tools by contrast to the amount of debitage, suggests that the area was partially exploited after the fort's abandonment by Libyan squatters who moved tools, whole cores and debitage to Magazine 6, which they then subsequently re-worked or continued to use. As such, the Area K assemblage is in truth only a small portion of a much larger assemblage (from Magazine 6) and it should be viewed within this context.

5.5.1. Debitage

The debitage from Area K is primarily comprised of FDS2/2. This is a bias created by a single context (ZUR/KM/28) which included 11 small pieces of FDS2/2 debitage, most likely from the same pebble which shattered into small cortical and non-cortical pieces during work, most likely due to the poor quality and friability of this flint. Fourteen out of the fifteen debitage pieces ascribed to FDS2/2 were cortical debitage, with only a single non-cortical piece. This suggests that the pebbles used were relatively small with little useful flint by comparison to the amount of cortex in each pebble, something also noted by Simpson (2002: 364). The remaining fifteen pieces of debitage (encompassing Types B, E, J, L and R) included nine cortical (including the five pieces of Type L which were mainly cortex with very little flint) and six non-cortical pieces. Taken together with the much greater quantity of debitage from Magazine 6, the debitage is evidence of a relatively large scale production of flint by the Egyptian garrison utilising both material from Egypt, and a variety of pebble flint from the Western Desert even supplemented by smaller quantities of the poor quality local flint (FDS2/2).

5.5.2. Cores

Nine cores were found in Area K. Two of the three Type B cores were wholly exhausted, with the last core being only partially exhausted. By contrast, the five cores of Type E included only a single wholly exhausted cores, three partially exhausted and one complete and largely unworked core. The single core of Type H was also unworked. Taken together with the two cores found in Magazine 6, they indicate that raw flint, mainly in the form of flint pebbles, were brought to the site and worked. Together with the reworking of tools and debitage, this indicates an extensive flint industry at the site. After the site's abandonment, the exhausted or partially exhausted cores were evidently ignored by the squatters who took only two cores from Area K which they subsequently worked in Magazine 6. It is possible that their choice to leave the remaining cores in Area K was due to the majority of these being already partially exhausted or simply that the occupation was not of sufficient duration for the squatters to need all available cores.

5.5.3. Tools (Fig. 5.2 and Table 15)

The tool assemblage from Area K consists of 53 tools, of similar categories to those found in Magazine 6. The most prevalent types are sickle blades (most either heavily used or with evidence of sickle sheen) accounting for a quarter of the tools found. Aside from the more common tools, such as scrapers and notched blades, a small assemblage of lance points were also located at the site. The small amount of these weapons may indicate either that they were taken away from the site by squatters or – like the metal weapons discussed in section 4.8 above – that the last garrison took care to bring their weapons with them when abandoning the site.

5.5.3.1. Sickle Blades

Out of the seventeen sickle blades found in Area K, twelve show evidence of gloss or microwear and can then be qualified as true sickle blades following Rossen's definition (1997: 57), although the remaining five blades will also be discussed in this section as they are morphologically similar to typical Egyptian sickle blades, although they lack micro-wear or sheen and may as such have been in the final stages of manufacture and as yet unused when the site was abandoned. Seven of the sickle blades showing signs of sheen or microwear are terminal blades, with the remaining five being middle blades. Of the non-glossy sickle blades, three are terminal and two are middle blades. As a single terminal blade is generally required per sickle bow, there are sufficient terminal blades to equip seven sickle bows (ten if the non-glossy sickle blades are counted).

However, as with the sickle blades in Magazine 6 (Simpson, 2002: 326-327) there is a discrepancy in the ratio between terminal and middle blades. With eight terminal to only six middle blades overall, there are too few middle blades to equip eight sickle bows, which would each have required between eight and ten middle blades (Simpson, 2002: 326). This, as Simpson (2002: 326) has suggested, may indicate

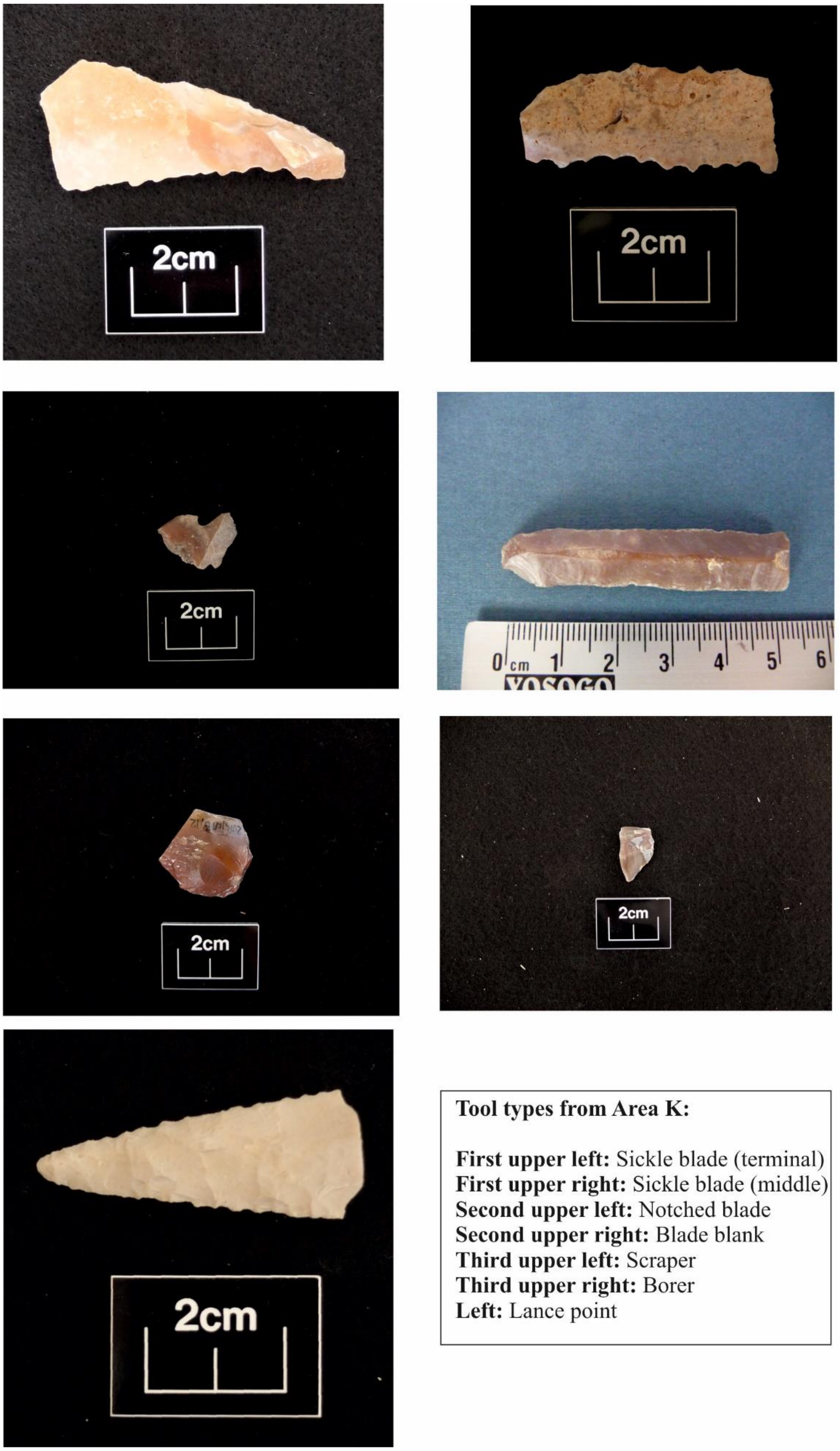


Fig. 5.2: Tool types found in the Area K assemblage (S. Snape and author).

that Libyan squatters collected blades at random from various points at the site, or brought certain blades away with them or that a larger amount of terminal blades were manufactured and stored as replacements.

The disturbed nature of the context caused by the deliberate removal of material from Area K makes it therefore problematic to make any certain conclusions about the precise quantities and ratios of sickle blades and the amount of bows which were stored in the area. The sickle blades, taken together with those moved to Magazine 6 (Simpson, 2002: 310-338) which are arguably of a typical Egyptian types and like the Area K material clearly date to the Egyptian occupation of the site, evidence an intense grain production at the site as is also suggested by the evidence presented above in Section 4.2.

5.5.3.2. Notched Blades

Notched blades are relatively crude implements, consisting of a flake or blade with either one or multiple man-made notches along the cutting edge. These notches are occasionally retouched around the edge to make them sharper. Notched blades and flakes were also found in Magazine 6 (Simpson, 2002: 338-342). Simpson (2002: 339-340) notes that while they could have had multiple uses, one possibility is that the examples found in Magazine 6 were of Libyan manufacture and possibly used as crude sickle blades (based on a hypothesis suggested by Caton Thompson, 1952: 41).

However, considering the presence of similar notches blades during the Egyptian occupation and the prevalence of actual sickle blades, this interpretation is unlikely. A more likely use for the notched blades within Area K is as the preliminary manufacturing tool in the process of bone pin manufacture (discussed in section 4.6.3 above). The striations going across the length of the several of the bone pins indicate that a sharp implement was used to ‘shave’ out their preliminary form before a polishing stone was used to finish the object. The notched blades were most likely used for this purpose.

5.5.3.3. Blade Blanks

Eight blade blanks were found in the Area K assemblage. As a type of object, these are problematic. Three of them are small, fragmented pieces which may have originally been middle section sickle blades although they are too poorly preserved to determine this accurately. The remaining five blades are longer and slimmer and most likely had multiple uses as cutting implements.

5.5.3.4. Scrapers

Seven small scrapers were found in the Area K assemblage. In appearance they are similar to the eleven scrapers found in Magazine 6 (Simpson, 2002: 342-346). Their appearance is curious; unlike the remaining flint tools, they are distinctly non-Egyptian in appearance and as discussed by Simpson (2002: 344-346) they are more similar to probable Libyan scrapers found on Bate’s Island. If these scrapers are indeed Libyan, and not simply crude tools made quickly by a member of the Egyptian garrison, they may indicate the presence of at least a small group of Libyans working within Area K simultaneously with the Egyptian occupation.

5.5.3.5. Borers

Seven borers were found in the Area K assemblage. As with the scrapers, these are simple, low-expertise objects, most likely held directly in the hand rather than attached to a haft. As discussed by Simpson (2002: 346-353) is similar to material from other sites in the Western desert (Midant-Reyes, 1998: 18 and pl. 8), but near-identical objects also appear across the Near East (Rossen, 1997: 68-71) and as such it is problematic to determine their precise origin. As with the blade blanks and notched blades, they had multiple uses, including the working of leather and sewing of clothes, which is also evidenced at Area K by the presence of a bone needle or awl (see Section 4.6.2).

5.5.3.6. Lance Points

Aside from the two flint arrowheads already discussed above in Section 4.3.1, two lance heads were also found in Area K. Both are similar in shape to weapons found in Middle Kingdom-Early New Kingdom layers at Mirgissa (Dunham, 1967: Pl. XCII), although with a distinctly more pronounced serration on both edges of the blade. Both lance heads are broken, which may explain why they were left behind when the fort was abandoned, as the general paucity of weapons indicates that the final garrison brought their weapons with them. Both lances are made from Type J, a good-quality material possibly stemming from a flint mine rather than collected as pebble flint. It is possible that they weapons were manufactured in the Nile Valley and brought to the site by members of the garrison rather than being manufactured locally.

5.6. Conclusion

The chipped stone assemblage from Area K is in many ways a fragmentary corpus. The scavenging activity by Libyan squatters following the site's abandonment and their targeting of flint objects above other object types have created an unfortunate bias due to disturbance of the original context, as well as the re-working of objects and the potential introduction of new flint materials into the assemblage in Magazine 6. However, despite these hinderances, the corpus nonetheless clearly shows some production of certain types of tools (including sickle blades) was conducted at the site. While some of these tools were brought finished to the site from elsewhere, the presence of exhausted cores within the Egyptian occupational phases clearly show that manufacture at the site was also conducted. While some of these tools required well-developed skill, others, such as the scrapers and notched blades, are indicative of a more low-expertise industry. It seems likely that craftsmen with varying skills worked within the same areas making a variety of objects, mostly for use as tools in other industries.

Some of the material from the site, notably that stemming from the Western Desert and oases, furthermore indicates a potential trade with local Libyans, or at least enough local good-will to allow members of the garrison to travel great distances from the fort to obtain raw materials. Considering the possible Libyan nature of certain of the tool types, especially the scrapers, it is possible that local Libyans engaged directly in the local chipped stone industry, both by providing material, but also by manufacturing tools within the Egyptian fortification. This, along with the availability of local resources located a great distance from the fort within Libyan territory, is another indication of relatively peaceful, possibly even cooperative conditions between the Egyptian garrison and the local Libyan tribes in the area.

5.6.1. Mode and Scale of Production

The chipped stone assemblage can be placed in the methodological framework for determining the mode and scale of production provided by Rice (1987: 183-191). The transfer of material from Area K to Magazine 6 naturally biases this interpretation, as some of the debitage in Magazine 6 are resultant from later Libyan re-working, while other debitage most likely originated in Area K and was moved to the magazine to be re-worked into new tools. However, the prevalence of Egyptian-style sickle blades, both imported, re-worked and locally made, considered in conjunction with the evident importance of local production of grain (Section 4.2) indicates that flint-knappers with some degree of specialism were required to provide and maintain these tools, crucial to the survival of the garrison.

Sickle blades are however, a seasonal tool, and along with the varying degree of skill exhibited in the manufacture of the different types of tools, this indicates a less formal organisation than an actual workshop. The scale of the industry should instead be considered a large ‘household industry’, working part-time with producers of varying skills, primarily engaged in producing tools for their own use, or for the use of other crafts undertaken within the fort. Considering the amount of material which was most likely traded to the garrison by local Libyans, or alternatively required expeditions to be despatched to obtain it, the mode of production was however most likely under some centralised management. Before and during the harvest, the manufacture and maintenance of sickle blades would also have been a crucial task to undertake, and considering the tight administrative control of grain production and processing (see Section 4.2), it is likely that auxiliary industries, such as chipped stone production, was under a similar level of centralised control.

As such, the mode of production can be described as a group of ‘attached specialist producers’ under centralised control for at least a portion of the year, although the variance in skill also indicates that some degree of autonomy was probably maintained within this industry. It seems likely for instance, that an inhabitant, who aimed to manufacture a bone pin, would either be able to himself produce - or alternatively organise the manufacture of - a notched blade without the involvement of the centralised administration at the site.

Chapter 6: The Ceramic Corpus

6.1. Introduction

The aim of this chapter is to investigate the corpus of utilitarian pottery found in Area K – its origin, its manufacturers, the scale of the local production and the degree to which the ceramic corpus shares characteristics with contemporary material with the Nile Valley – and to classify the type of production according to the categories set forth by Rice (1987) and Bourriau *et al* (2000) and utilised in Chapters 4 and 5. This assemblage represents an opportunity to quantify the amount of material imported from the Nile Valley to the site (by quantifying the material made from either Nile silt fabric or known types of desert marls) and – in the absence of any direct structural evidence of pottery production, such as a kiln – visual and chemical analysis using portable X-Ray Fluorescence (pXRF) can also determine what fabric types were most likely the product of local manufacture. The prevalent forms made on the site or imported from the Nile Valley and their interrelationship will similarly be used to determine patterns of production and import.

Ceramic material, mainly in the form of either whole vessels or diagnostic sherds represent the largest corpus of finds related to subsistence and craft production from Area K and Zawiyet Umm el-Rakham as a whole. The analysis is by no means comprehensive, as comprehensive analysis would be incompatible with the scope of the thesis. Rather, the analysis is representative and based on 493 whole vessels or diagnostic sherds belonging to Ramesside Egyptian shapes representing ~50% of the estimated ceramic material excavated from Area K (Snape, pers. comm.) and as Area K represents in itself the largest and most ceramic-rich excavated portion of the site, the material here analysed can be considered a representative sample of the ceramic corpus excavated from the site as a whole, although future excavations will bring further variety and detail to this initial study.

6.2. Methodology of Typological Classification

As discussed by Aston in the introduction to his seminal work on Ramesside pottery from Area QI at Qantir (1998: 7) ceramic studies within the field of Egyptology have been in a lamentable state due to the plain wares favoured by the Egyptians and by the unmanageable quantities of sherds, which are generally omnipresent at Egyptian settlement sites. Although the situation has improved since Aston's publication, it is nonetheless worth clearly defining the methodological considerations which have been employed in order to correctly present, and gain information from the recorded material.

6.2.1. Field Recording and Sampling Process

During the excavation of Area K, the recording of small finds was done by designated team members using a 'finds book' where the context and object type was noted and the object number assigned. Diagnostic ceramics (rims, bases, handles, whole vessels) were recorded in a similar manner, and no distinction was made between non-ceramic small finds and ceramics. Due to time restraints no attempt was made to quantify body sherds. These were discarded thus creating an unfortunate but unavoidable bias in the ceramic record, which cannot now – 12 years later – be rectified.

Inspection of the pile of body sherds, which is situated in an area south of the site, by the current author in June and July of 2014 revealed that the sorting process had been efficient; few diagnostics had been accidentally discarded with the body sherds, and the few examples were clear cases of human error, which can influence any sampling strategy. However, the pile itself has now been so thoroughly mixed with piles from other sections of the fort, that any attempt to deduce the original context of the sherds is impossible and was not attempted. Instead, the selection process for a representative sample was focused on the material already stored in the Mersa Matruh Magazine.

Recording of this material was conducted during a three-week season in June-July 2014 by the author (while Dr Valentina Gasperini recorded imported Levantine and Aegean examples[4]) under the auspices of the field-director Dr Steven Snape. The recording process was based broadly on the strategies currently employed at the contemporary site of Qantir-Piramesses. Diagnostic material was selected for illustration and visual classification if more than 10% of the rim or base was preserved. This was done in order to ensure accurate measurements of both the diameter and also the angle of the sherd. The sampling strategy was formulated before work in the magazine was conducted and based around the premise that between 45% and 55% (estimated to be between 465 to 516 diagnostic sherds) of the material from Area K was to be visually fabric classified and illustrated from as broad a variety of contexts as possible. This strategy was moderated slightly upon arrival in the magazine, when it became clear that the long-term storage of the objects had led to the destruction of certain object labels and finds bags, and that the magazine inspectors had moved – and subsequently misplaced – some of the material.

[4] The few sherds of Levantine, Cypriot or Mycenaean origin found in Area K are not presented in this chapter as these have already been preliminarily discussed in particular in Thomas (2003) and will be extensively presented by Gasperini (in press).

The primary sampling criteria of choosing only diagnostics with >10% of the vessels diameter preserved was maintained and despite the unfortunate bias created by the magazine officials, samples were nonetheless obtained from the majority of excavated contexts, ensuring that the sample is generally representative of the excavated material from Area K, and by extension, a useful representative sample of the ceramics from the site as a whole.

6.2.2. Classification of Fabrics and Forms

Since the 1980's, the Vienna System has remained a corner stone of ancient Egyptian ceramics analysis. Based on the system published by Arnold and Bourriau (1993), further investigations have tended to confirm its basic accuracy (Aston, 1998: 38), although excavations at some sites such as Qantir, have underlined that the basic categories within the Vienna system are too broad and that – over time – several sub-categories have been established (Aston, 1998). The decision was made prior to the 2014 study season in discussions between the current author, the site director Dr Steven Snape and Dr Valentina Gasperini to classify the material following the basic Vienna system, and investigations on the ground revealed that the Nile silt and marl fabrics from Area K are far less varied than at larger settlement sites in Egypt such as Qantir, Amarna or Memphis, making further large-scale sub-division of fabrics unnecessary.

For the visual classification, steel clippers were used to break the sherd and the revealed section was examined in direct sun-light, if required with the assistance of a hand lens of either x10 or x20 magnification to detetermine types and quantities of inclusions in the fabric. Following the classification of a diagnostic sherd's fabric, the sherd was drawn following the standard conventions employed in the illustration of pottery (explained in great detail by Aston, 1998: 13-26) using a hard lead pencil (H2) and acetate paper.

Confronted with nearly 500 diagnostic sherds, a method was devised to typologically arrange them in a way which followed accepted conventions of Egyptian pottery forms, but could also be used to extract the most pertinent data for further analysis and finally would also be easily manoeuvrable by the reader. Arranging the material on a hierarchical basis also makes further extensions to the corpus as more material is uncovered and recorded from the site more manageable. This type of corpus is suitable for incorporating new information regarding shapes and fabrics without requiring the entire system to be dismantled and reconstructed. The typology was considered as a hierarchical structure visualised with a hierarchy diagram (**Fig. 6.1-6.3**) in which the material was sub-divided initially into three major categories based on their form, namely Type I, denoting open vessels, Type II, denoting closed vessels and Type III denoting other non-vessel types such as ring stands. For a complete typology of forms, please see Appendix II.

The prevalent types of open vessel – plates, dishes and bowls – were categorised initially by mathematical formula (Aston (1998: 43-44 ; Holthoer, 1977 and Traunecker, 1981). The formula for sub-dividing open vessels is calculated by

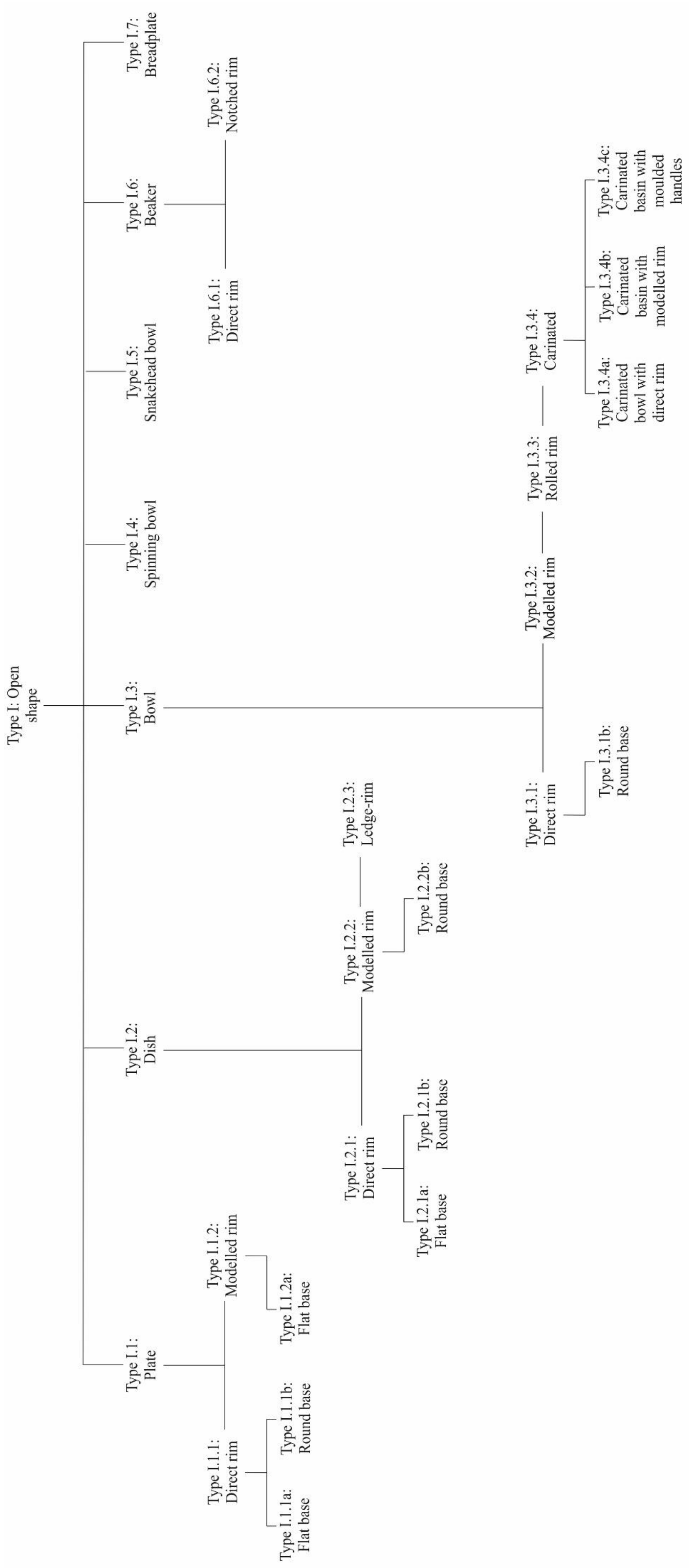


Fig. 6.1: Open shapes in the Area K pottery corpus (author).

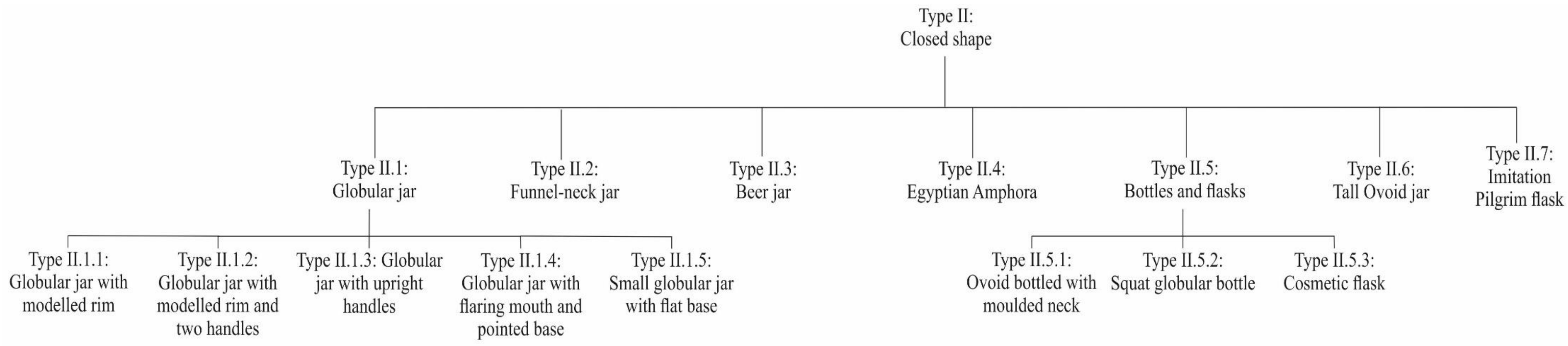


Fig. 6.2: Closed shapes in the Area K pottery corpus (author).

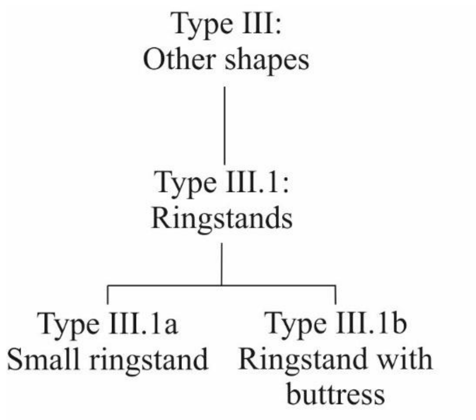


Fig. 6.3: Other shapes in the Area K pottery corpus (author).

dividing the MBD (Maximum Body Diameter) by the height of the vessel (H) and multiplying by 100, giving a value denoted as VI. Aston (1998: 43) suggested that if VI is less than 125, the vessel is a beaker, if it is between 125 and 275, the vessel is a bowl, if it is between 275 and 500, the vessel is a dish and if it is above 500, the vessel is a plate. In many cases, the height could only be ascertained by reconstructing the vessel following the curve of the preserved rim portion and some uncertainty always exists in these cases, an uncertainty which was limited by the introduction of parallel vessels from other corpuses such as those published by Aston (1998) and Bourriau (2010) to aid in the reconstruction and increase its accuracy. Aston also sub-classified the open vessels from Area QI, Qantir by diameter size (1998: 43). This was not attempted on the Area K corpus. This sub-division is employed at Qantir primarily due to great quantities of ceramic material, which exceed that recorded in Area K.

Such division on the Area K material would simply confuse the typology by introducing a slew of sub-categories. Instead, the diameters and heights (where applicable) of all 493 vessels and diagnostic sherds is provided in Appendix II.

Further sub-division of the three prevalent open shapes was conducted according to the shape of their rims (direct or modelled) and finally by their bases where applicable (either flat or round, excluding the category of 'flattened' bases which were generally not present at the site, see Aston, 1998: 49-51). While it was mostly possible to estimate the approximate height of the vessel based on reconstruction for the purposes of sub-dividing the vessel mathematically (see above), the precise form of the base is often open to interpretation and so only the whole vessels or vessels with a clearly definable base-type were further sub-divided. The closed vessels were more easily categorised based on parallel examples found in a series of pottery corpuses, both belonging to older (*cf* Petrie, 1890 and Brunton and Engelbach, 1927) and newer excavations (*cf* Aston, 1998 and Bourriau, 2010).

6.3. Fabrics

6.3.1. Access to Resources: Clay, Water, Fuel and Firing Installations

In Egypt, a distinction in clay types is made between Nile silts, found throughout the length of the Nile Valley and comprising sedimentary deposits left at any point between the Upper Pleistocene Period and the date of the pottery manufacture (Bourriau *et al*, 2000: 121) and the far more calcium-rich Marl clays formed due to the decomposition of calcareous layers located predominately along the limestone outcrops between Esna and Cairo and in Wadi Qena (Bourriau *et al*, 2000: 121). Few studies have been made regarding the local clay types found along the Marmarican coast, and a comprehensive ceramics survey of the area was not conducted until 2011 by Rieger and Möller (2011), who distinguished two clay types predominant in the area; marl clays created by the decomposition of the Marmarican limestone plateau and available in *wadi* beds located close to the fortress of Zawiyet Umm el-Rakham, and a silt clay comprised of sediment deposits caused by annual runoff events (Rieger and Möller, 2011: 160). These were the primary sources of clay available to the inhabitants in Area K, although this availability was most likely seasonal as the *wadis* would have been flooded and largely inaccessible for several months during the winter due to heavy winter rains and sporadic flash floods in the area.

As discussed extensively by Snape (2010), there is some evidence suggesting that the fort and its garrison had ample supplies of water through wells sunk to the high water table. As such, it is possible that this water was used not only for survival and baking/brewing but also in the manufacture of pottery. Depending on the location of the kiln, wells could also have been sunk near this hypothetical kiln structure to ease transport. Finally, the use of salt water must also be considered, although considering the most likely location of the kilns – to the south of the fort due to the prevailing wind direction (coming from the North), using sea water would mean a 1.5 kilometer walk across deep sand and uneven rocky terrain transporting heavy water jars, and this strategy may have been considered too time consuming and difficult by comparison to sinking a sufficient quantity of wells, or alternatively collecting water from the annual floods in cisterns closer to the *wadi* mouthes.

Vegetation in the form of usable trees for burning are scarce in the region surrounding Zawiyet Umm el-Rakham where the dominant native plant growth is camel thorn and similar shrubs, which could provide a source of fuel albeit less likely to provide the more intense heat of charcoal. The by-products of cereal processing, such as straw, may have been used in combination with native plant growth as fuel. Animal dung may have supplemented these materials as it is likely that the Egyptian garrison maintained a herd of sheep, goats and cattle (see Chapter 7). Considering the difficulties in procuring fuel due to the local environment it is likely that any avenue was exploited in order to gather sufficient resources and that all possible supply strategies were utilised in unison.

Concerning firing structures, the uniformity with which the Egyptian pottery from Zawiyet Umm el-Rakham has been fired excludes the possibility that it was fired in a camp fire. No kilns have been identified within the enclosure wall and no areas of vitrification were noted on the magnetometric scan of the site. It is possible that extending the range of the survey to cover the *wadi* mouths south of the fort may locate a detached kiln complex similar to the one located at Haruba A-345 (Oren, 1987: 97-104) and Tell Heboua II (al-Ayedi, 2006: 38).

6.3.2. Macroscopic Classification of Non-Nilotic Fabric Types from Area K

Prior to the 2014 season in Mersa Matruh it was suspected – despite no kiln being uncovered at the site – that some fabric types found at Zawiyet Umm el-Rakham were non-Nilotic in origin (Snape, 2010: 285). Macroscopic examination conducted by the author in 2014 revealed that 44.94% of the registered sherd material was made from three fabrics, which did not conform to the standard categories used in the Vienna system, either as Nile silts or marls (Arnold and Bourriau, 1993). The three types were provisionally labelled ZUR A (14.23% of corpus), ZUR B (26.63% of corpus) and ZUR C (4.27% of corpus). The macroscopic classification was conducted according to the methods described in Section 6.1.1 above. ZUR A (**Fig. 6.4**) was found to be tempered with large quantities of fine white limestone along with smaller quantities of crushed shells and the occasionally small fragments of microfossil. The fabric is orange-brown throughout (5 YR 7/5) without any notable difference between the oxidised surface and the reduced section.

ZUR B (**Fig. 6.5**) is more porous than ZUR A and tempered primarily with large quantities of rough, burnt sand as well as smaller amounts of straw and limestone. Its firing colour is similar, although not completely identical, to ZUR A (5 YR 6/5). ZUR C (**Fig. 6.6**) is the least prevalent local fabric. It is primarily tempered with small quantities of straw and appears to have been levigated prior to firing leaving very few inclusions and also making the finished sherds more friable and fragile than sherds made from ZUR A and B, possibly explaining the limited quantities of this fabric in the assemblage. It fires uniformly a light beige-brown colour throughout the section and on uncoated interior and exterior surfaces (5 YR 7/3). All three fabric types were used to manufacture utilitarian pottery most commonly fabricated from Nile silt in the Nile Valley, and all three appear to have physical characteristics which suggest their origin as silt clay – rather than marl. All three are relatively soft and when broken or crushed they are easily reduced to a light silty dust. The macroscopic identification can therefore suggest that ZUR A-C are silt clays, but unlike in appearance to known the sedimentary silts from the Nile Valley.

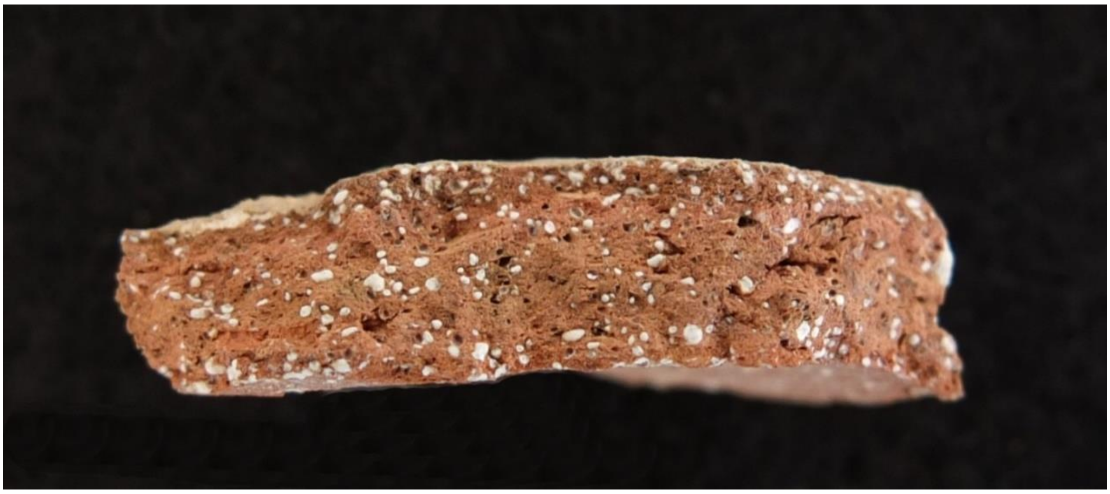


Fig. 6.4: Zawiyet Umm el-Rakham Local Fabric A (ZUR-A) (S. Snape).

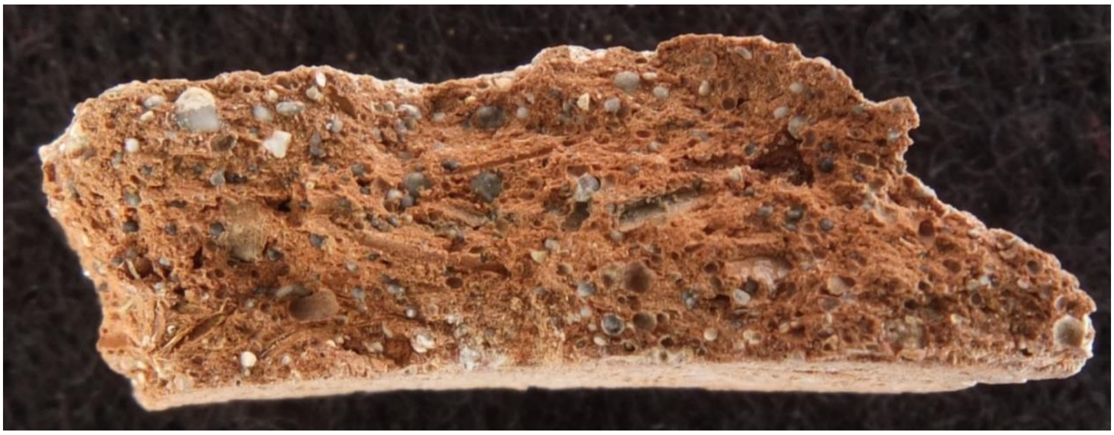


Fig. 6.5: Zawiyet Umm el-Rakham Local Fabric B (ZUR-B) (S. Snape).

Fig. 6.6: Zawiyet Umm el-Rakham Local Fabric C (ZUR-C) (S. Snape).

6.3.3. X-Ray Fluorescence Analysis and Provenance Study:

A limited-scale chemical analysis of selected samples of ZUR A-C were undertaken in order to verify the results of the macroscopic categorisation using a portable NITON XLt-793W portable EDXRF (Energy Dispersive X-ray Fluorescence) spectrometer. PXRF has been successfully used in the field and in museums to determine mineral composition classifications and origin of clay deposits both in Egypt by Morgenstein and Redmount (2005) at el-Hibeh and Ownby (2006) on material from Kahun, as well as and in other parts of the Eastern Mediterranean (*cf* Forster *et al,* 2011 ; Frankel and Webb, 2012). The spectrometer fires X-Rays of a known energy into a sample, which causes the atoms in the material to emit fluorescent X-Rays at energies characteristic of their elemental composition (Goren *et al*, 2011). These energies can be measured, and a chemical composition of the material determined. Readings were taken from small powdered samples of the relevant sherd material to avoid potential contamination from slips and other surface treatments and/or accretions resulting from deposition by measuring directly on the sherd surface.

Twelve sherds, four belonging to each of the three fabric categories, were selected among the typical Egyptian utilitarian ware for the pXRF analysis (**Table 6.1**). Only diagnostic sherds from known contexts were selected. The spectrometer was calibrated to measure a suite of eighteen elements, although only eight of these (Zr, Rb, Zn, Fe, Mn, Ti, Ca and K) provided consistent results above the instrument's detection level (both with the samples under analysis and the Standard Reference Materials, 'Lefkandi Brick' and 'Soil 7') and only these have been included in the

No.	Type	Reg. No.	Locus	Macroscopic Classification	
1	Beer jar	ZUR/KE/28	KE	ZUR A	
2	Bowl with direct rim	ZUR/K/140a	K1,4	ZUR A	
3	Globular jar (body-sherd)	ZUR/KB/22	KB	ZUR A	
4	Funnel-neck jar	ZUR/KZ/23	KZ	ZUR A	
5	Globular jar	ZUR/KB/73	KB	ZUR B	
6	Plate with direct rim	ZUR/KB/39	KB	ZUR B	
7	Plate with modelled rim	ZUR/KZ/16a	KZ	ZUR B	
8	Globular jar	ZUR/KE/19	KE	ZUR B	
9	Dish with direct rim	ZUR/K/346q	K5,7	ZUR C	
10	Plate with modelled rim	ZUR/K/336x	K1,2	ZUR C	
11	Carinated bowl	ZUR/KZ/24	KZ	ZUR C	
12	Plate with direct rim	ZUR/K/111b	K0,7	ZUR C	

Table 6.1: Samples selected for pXRF analysis (author).

discussion below. As discussed by Bourriau *et al* (2006: 262) and also by Yellin and Killebrew (2010: 61) establishing the provenance of a fabric by comparing the firedceramic to natural clay beds is a problematical process. The firing of the vessel and the human interaction with the raw clay (the addition of organic and inorganic tempers) manipulates the clay's chemical composition and can make direct comparisons uncertain. As such, the methodology of provenance determination follows the guidelines suggested by Yellin and Killebrew (2010: 61) of comparing instead with fired samples from known provenances. For the purposes of verifying the hypothesis proposed on the basis of the macroscopic classification it suffices to demonstrate that ZUR A, B and C are not only dissimilar in physical appearance from contemporary Nile fabrics, but also unalike in their chemical composition.

6.3.3.1. Internal Comparison

The internal variance in the chemical composition of ZUR A-C is remarkably limited (**Table 6.2**). In particular the trace elements of rubidium (varying 8.57%) and zinc (varying 5.51%) as well as iron (varying 9.95%) are present in nearly identical quantities in all samples. Other trace elements such as zirconium (varying 22.69%) and manganese (varying 36.30%) are less similar, although the fluctuations are expected, considering the minute quantities in which they are present. Even the fluctuation of the major elements of titanium (varying 15.15%) and potassium (varying 18.42%) is still limited. Combined, these close readings strongly suggest a common origin of all three fabrics, their differences in appearance and texture most likely caused by human manipulation.

One such manipulation is measurably present in the sample, namely the compositional proportion of calcium (varying 58.13%). This variance can be explained with reference to the types of temper added to the raw clay. In ZUR A, the added limestone, marine shell and microfossils are all substances which are chemically classified as calcium; therefore the proportion of calcium in ZUR A is comparatively high. In ZUR B, little to no limestone appears to be added as temper – although some small pieces are naturally present in the clay. ZUR C was levigated and any larger pieces of limestone were removed prior to firing, thus accounting for the very low quantity of calcium in the samples. ZUR B, which appears to have no limestone added or taken away from its matrix, may register the amount of calcium closest to that which naturally occurred in the clay. It appears from the internal comparison of ZUR A-C that all three fabrics may share a common origin and that

Element	ZUR A		ZUR B		ZUR C	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Zr (ppm)	305.32	10.24	321.54	10.6	394.92	10.31
Rb (ppm)	45.52	4.43	42.65	4.42	46.65	4.27
Zn (ppm)	73.6	12.33	76.53	12.52	77.89	12.21
Fe (%)	3.38	0.03	3.72	0.03	3.35	0.03
Mn (ppm)	236.2	71.23	286.59	74.69	370.79	75.53
Ti (%)	0.56	0.01	0.66	0.01	0.61	0.01
Ca (%)	9.84	0.06	6.14	0.05	4.12	0.04
K (%)	1.86	0.04	2.28	0.04	2.24	0.04

Table 6.2: Chemical composition of ZUR A-C (author).

major differences in their chemical composition were caused by human agents prior to firing.

Research conducted on contemporary material from sites in Canaan with Egyptian occupation such as Aphek (Martin, 2004: 276-277, see also Martin, 2007 ; Martin 2008 and Martin and Ben-Dov, 2008) has demonstrated that Egyptian potters at these sites who manufactured common Egyptian shapes would deliberately chose a the local clay source most similar in appearance and qualities to Nile silt and add specific inclusions in imitation of Nile silt fabrics. It is likely that similar strategies were employed at Zawiyet Umm el-Rakham, although there is no local clay source which is greatly similar to Nile silt due to the difference in geo-environment. As such, the primary similarity is in the types and quantities of inclusions. ZUR A, with its multiple inclusions of limestone is reminiscent of Nile D. ZUR B with its inclusions of sand and chaff is more similar to Nile B2, while the relatively friable and levigated ZUR C is more similar in appearance to Nile B1. This indicates that the potters at the fort were most likely Egyptians who had sufficient experience as craftsmen to prefer specific inclusion types – most probably determined by the ‘feel’ of the clay – in informal ratios.

6.3.3.2. External Comparison

A number of chemical analyses of Egyptian silt and silt clays have been conducted by authors such Maureen F. Kaplan (1980) and Artzy and Asaro (1977) during their study of Tell el-Yahudiya ware in Cyprus, both utilising Neutron Activation Analysis. However the most recent analysis which also analysed for elements measured by the current investigation is the work done by Janine Bourriau along with Bellido, Bryan and Robinson (2006) analysing 150 Nile silt sherds and 193 marl sherds using Neutron Activation Analysis at the University of Manchester. As the most extensive and also the most recent analysis of fired ceramics (as opposed to samples of raw clay or silt) this corpus forms the basis of the external comparison between ZUR A-C and typical Nile silts (**Table 6.3**).

While the study of elemental composition of Nile silt and fired fabrics is still limited, a general characteristic noted in the results of both Kaplan (1980), Artzy and Asaro (1977) as well as the more recent studies of Bourriau *et al* (2000 and 2006), the quantities of iron in Nile silt is generally high, while the quantity of calcium is generally present at around 3% (Bourriau, 2006: 264, referring also to the work of Fitton *et al*, 1998: 123). By contrast the quantity of calcium in ZUR A-C is far higher than what is common for Nile silt fabrics and also fluctuates more unpredictably, a result of human interaction with the raw clay. The quantity of iron is more consistent in ZUR A-C and is far lower than iron quantities measured by Bourriau *et al* (2006: 264).

Element	ZUR A		ZUR B		ZUR C		Bourriau *et al*, 2006: 264	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Zr (ppm)	305.32	10.24	321.54	10.6	394.92	10.31		
Rb (ppm)	45.52	4.43	42.65	4.42	46.65	4.27	45.3	14
Zn (ppm)	73.6	12.33	76.53	12.52	77.89	12.21		
Fe (%)	3.38	0.03	3.72	0.03	3.35	0.03	6.43	0.89
Mn (ppm)	236.2	71.23	286.59	74.69	370.79	75.53	1214	660
Ti (%)	0.56	0.01	0.66	0.01	0.61	0.01	0.87	0.16
Ca (%)	9.84	0.06	6.14	0.05	4.12	0.04	3.84	2.3
K (%)	1.86	0.04	2.28	0.04	2.24	0.04		

Table 6.3: Chemical composition of ZUR A-C and measured samples of Nile silt (adapted from Bourriau *et al*, 2006: 264).

The ratio between calcium and iron in ZUR A-C is in fact inverted by comparison to contemporary Nile silt fabrics strongly indicating that ZUR A-C is non-Nilotic in origin. The large difference in relative quantities of manganese between Nile silt fabrics and ZUR A-C also support this notion. Furthermore, the quantity of manganese in ZUR A-C is also lower by nearly half in comparison to contemporary Egyptian marl clays (Bourriau *et al*, 2006: 265) further supporting the hypothesis that ZUR A-C are neither Nile silt nor marl clay fabrics.

6.3.3.3. Conclusion

Without locating a kiln in or nearby the site of Zawiyet Umm el-Rakham it is problematic to conclude with complete certainty that local manufacture of pottery was conducted by the fort’s inhabitants. However, the macroscopic and chemical analysis have demonstrated clearly that ZUR A-C are non-Nilotic in origin, are not marl clays and considering the use of marine shells and microfossils in the temper of ZUR A (see

Section 4.5.1 for a description of the geology at Zawiyet Umm el-Rakham), are most likely the products of local manufacture.

6.3.4. Egyptian Fabrics in Area K (Fig. 6.7):

Nile B1

Nile B1 is a fabric most commonly associated with the Old Kingdom to the early New Kingdom, and is not normally found in Ramesside contexts (Aston, 1998: 39). However, a small number of vessels – exclusively open shapes – have been found in contexts dated to the early 19th Dynasty (Aston, 1998: nos. 112-113). The fabric is more finely levigated than Nile B2, but still contains inclusions of sand and chaff. Its surface colour is red and the examples found in Area K have been uniformly fired. Two sherds (0.40% of corpus) in the assemblage were made from Nile B1.

Nile B2

Nile B2 shares many inclusions with Nile B1, primarily the presence of mica and round sand-grains. The fabric is also characterised by a large amount of added chaff, although still considerably less than the more porous Nile C. The surface of the fabric is usually reddish-brown while the break is grey or greyish-black. The material is the most common material found in Memphis (Bourriau, 2010: 23-24) and south of the Delta during the New Kingdom (Aston, 1998: 39). 132 sherds (26.83%) in the assemblage were made from Nile B2.

Nile C

Nile C is uncommon in the ceramic corpus from Area K, with three diagnostic sherds (0.61% of the assemblage) made from this fabric. Nile C is commonly used in contemporary contexts to manufacture large basin-like troughs, large bowls or crude bread platters (Aston, 1998: nos. 134-145). All three diagnostic Nile C sherds from Area K come from large (+50cm) diameter bowls. The general absence of this material type from most of the corpus is readily explainable; many of the vessel types commonly manufactured from Nile C fabric would be difficult to transport over large distances. The material is highly porous due to a large amount of roughly chopped chaff inclusions within the silt-matrix visible as voids left during the firing process.

Nile D

The fabric contains similar organic inclusions to Nile B2, but can be clearly distinguished due to the presence of small limestone fragments, visible in the break of the sherd. Also similar to Nile B2, the surface is generally reddish-brown and the break is usually grey to black. 114 sherds (23.17%) in the assemblage were made from Nile D.

Marl D

Marl D is the most common imported Marl found in Area K with 22 sherds (4.47%) and whole vessels made from this material. The fabric is hard and contains a regular matrix of small, rounded limestone inclusions. Straw and organic temper is never found in the fabric. Most readily distinguishable is the thick pale greenish-white slip which always accompanies this fabric type.

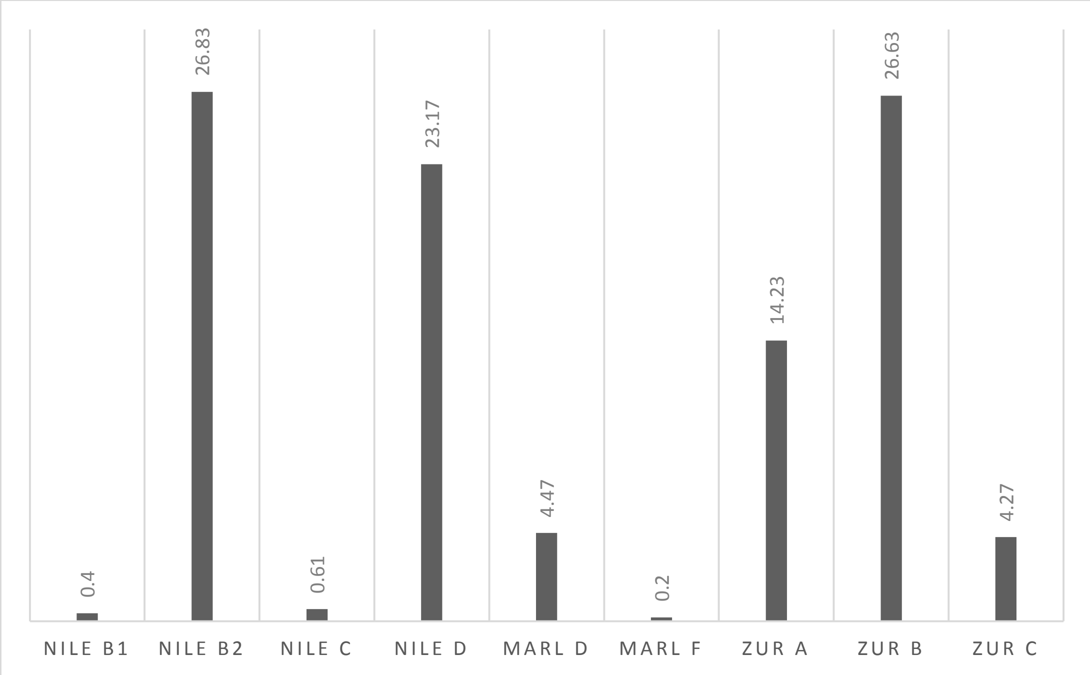


Fig. 6.7: Chart showing the division of the Area K assemblage by percentage of fabric type (author)

Marl F

Marl F is not originally a fabric considered a part of the Vienna System. Its existence was proposed by Bourriau and Nicholson (1992: 51) and Aston (1998: 66-67). This marl clay is rougher and less well-levigated than Marl D and contains significant inclusions of sand and limestone in a much less orderly matrix than Nile D. The material is brittle, vessels made from it tend to be thin-walled and it is often found without any surface treatment making it easily distinguishable from the harder slip-coated Marl D (Aston, 1998: 67). Curiously, the material seems to be utilised primarily in the Eastern Delta and while examples have been found in Memphis it may have originated in this geographical region (Aston, 1998: 66). Only one vessel (0.20%) in the assemblage was made from Marl F.

6.4. Forms of Egyptian and Egyptian-Style Pottery (Fig. 6.8-6.12)

The aims of this portion of the chapter are three-fold. Firstly, it aims to provide a comprehensive overview of the various categories of vessels recorded in Area K based on their form. Secondly, it will place these shapes and forms within a contemporary context with examples from a variety of sites across Egypt, Canaan and Nubia. Finally, it will investigate the extent to which there are significant differences in the types of vessels manufactured in the Nile Valley and those produced locally with the aim establishing the degree to which the potters at Zawiyet Umm el-Rakham were working within an established ceramic tradition.

I.1. Plates

While not as common across New Kingdom sites as dishes and bowls, plates are nonetheless found at a series of New Kingdom sites, such as Qantir (Aston, 1998: no. 15-16. 116 and 2473), Memphis (Bourriau, 2010: Fig. 60/1.8.4), Saqqara (Bourriau *et al*, 2005: 24-25), Thebes (Dziobek, 1992: Pl. 68.11/15) and in Nubia (Williams, 1993: Fig. 129b). At Area K group I.1 (including its sub-groups, see above) represent the third most common type of open vessel following I.2 Dishes and I.3 Bowls. The plates with direct rims (I.1.1) have where possible been divided into two categories according to the shape of their base (I.1.1a and I.1.1b). As Aston (1998: 148) notes, Type I.1.1a was not commonly found at the 19th Dynasty site of Qantir, but was well-represented at the 18th Dynasty site of Tell el-Amarna. Despite this rarity, the vessel types are nonetheless represented at contemporary sites in the Nile Valley, such as examples of Type I.1.1a found both in Memphis (Bourriau, 2010: Pl. 213, 1.1.1), Thebes (Dziobek, 1992: Pl. 68.11/18), Deir el-Medina (Nagel,

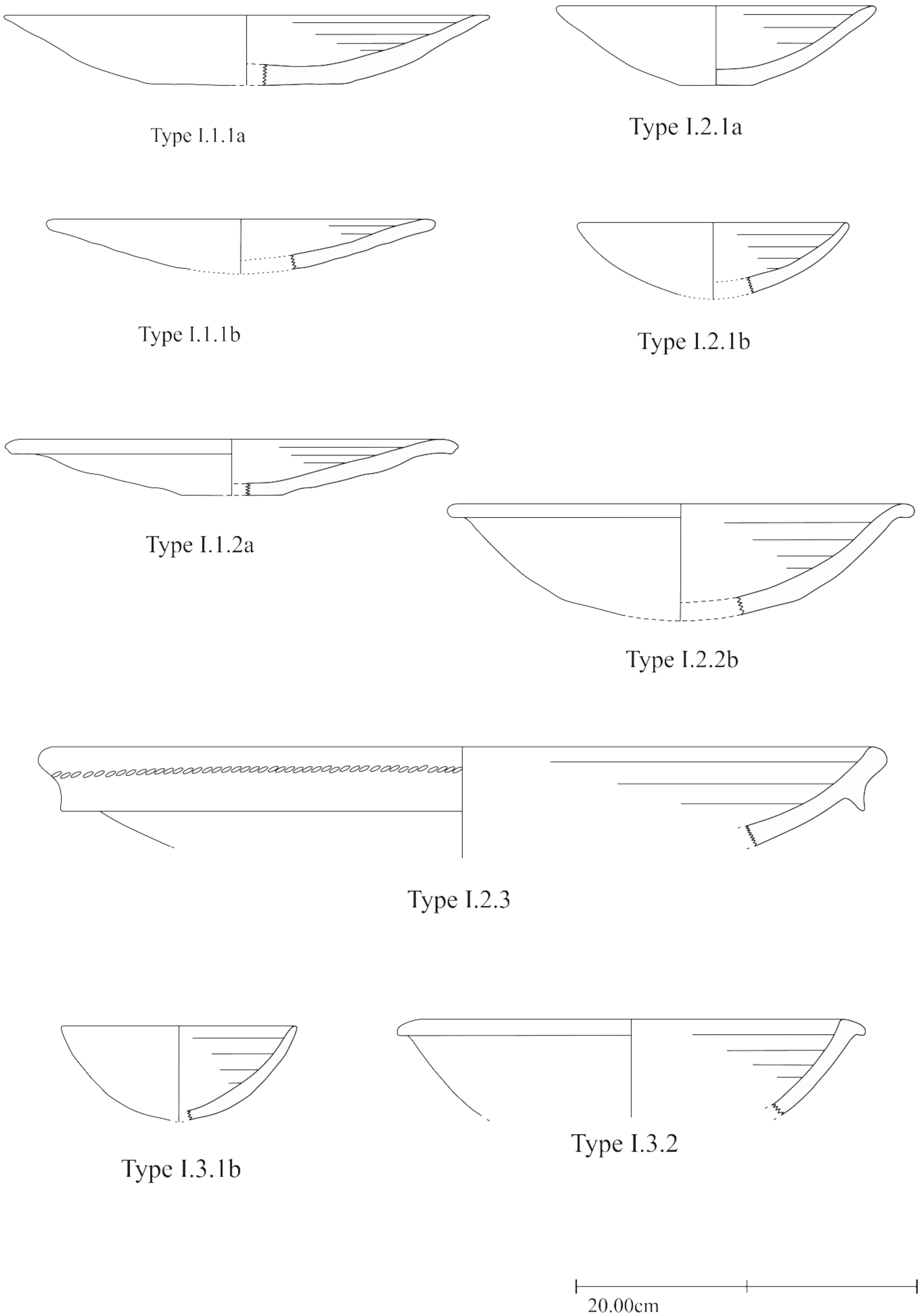


Fig. 6.8: Pottery type I.1.1a-I.3.2 (author).

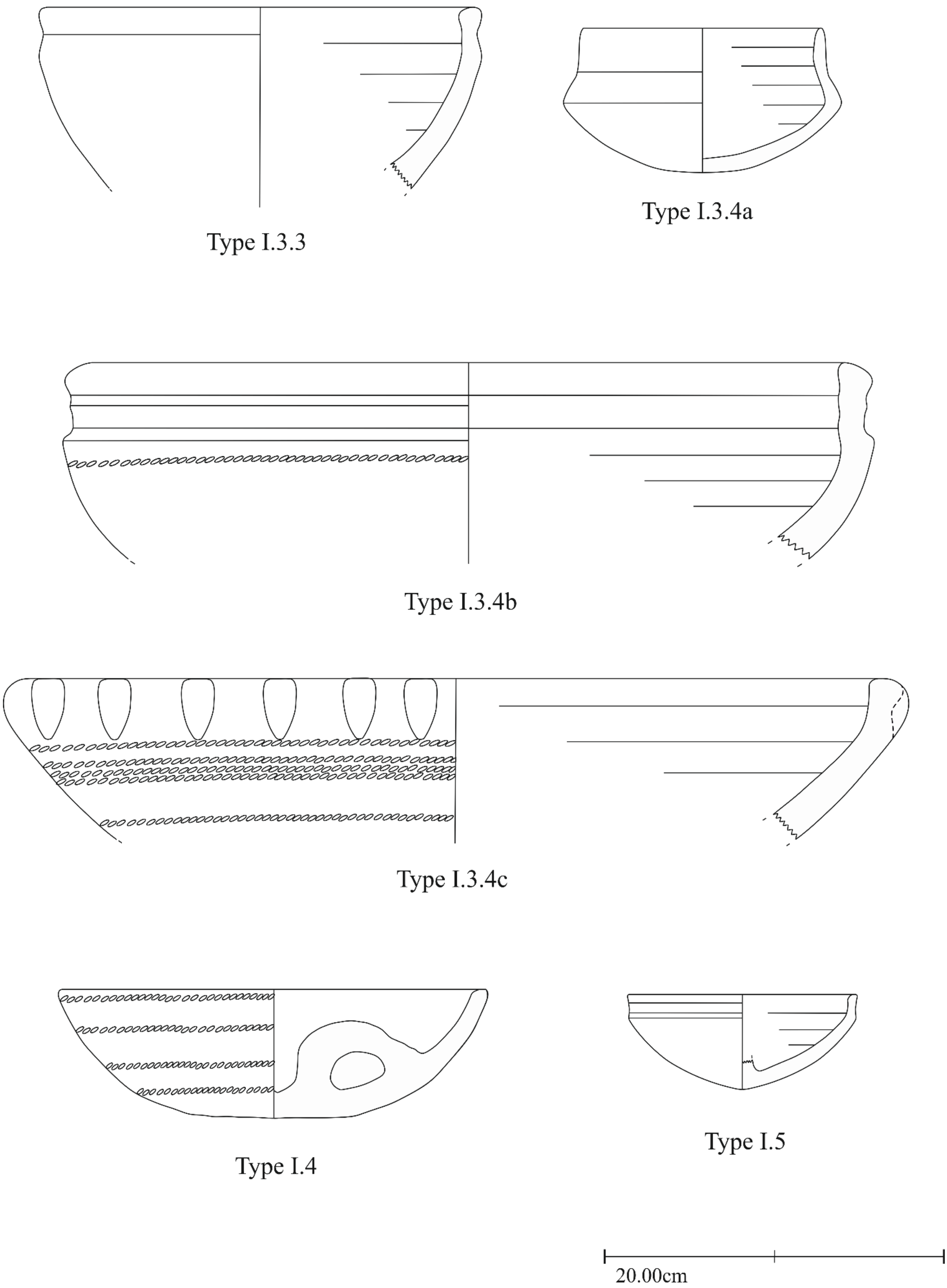


Fig. 6.9: Pottery type I.3.3-I.5 (author).

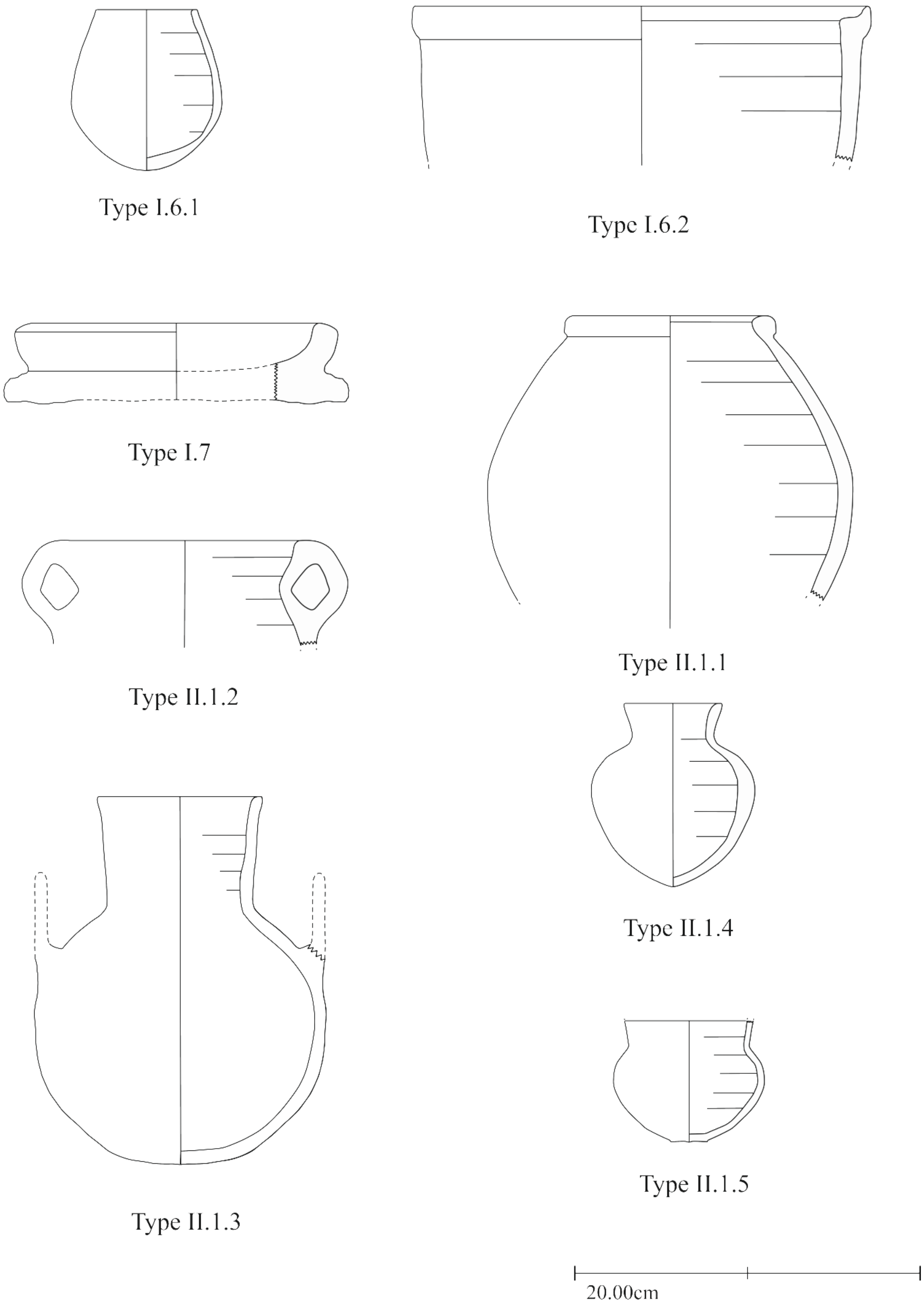


Fig. 6.10: Pottery type I.6.1-II.1.5 (author).

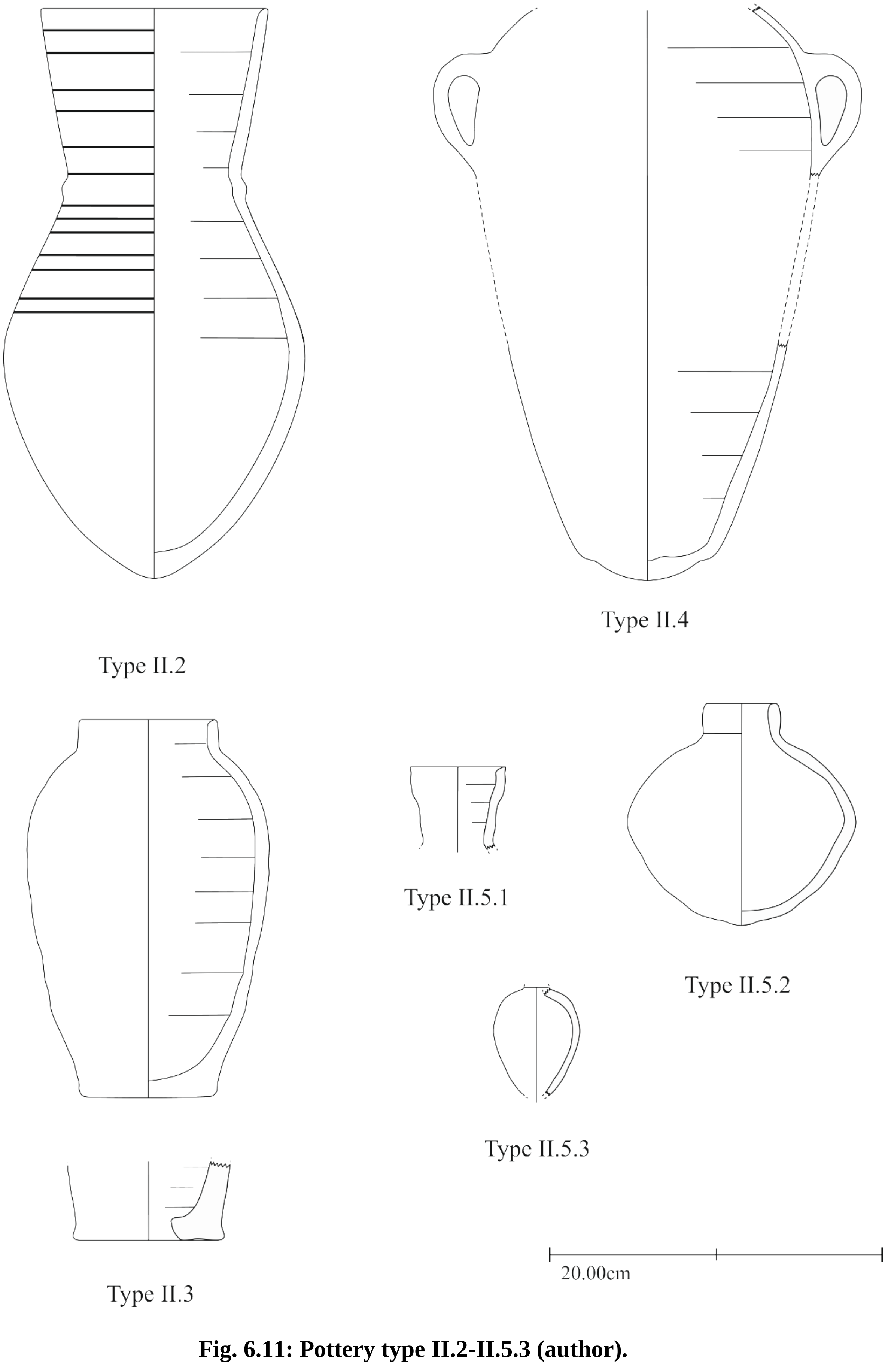


Fig. 6.11: Pottery type II.2-II.5.3 (author).

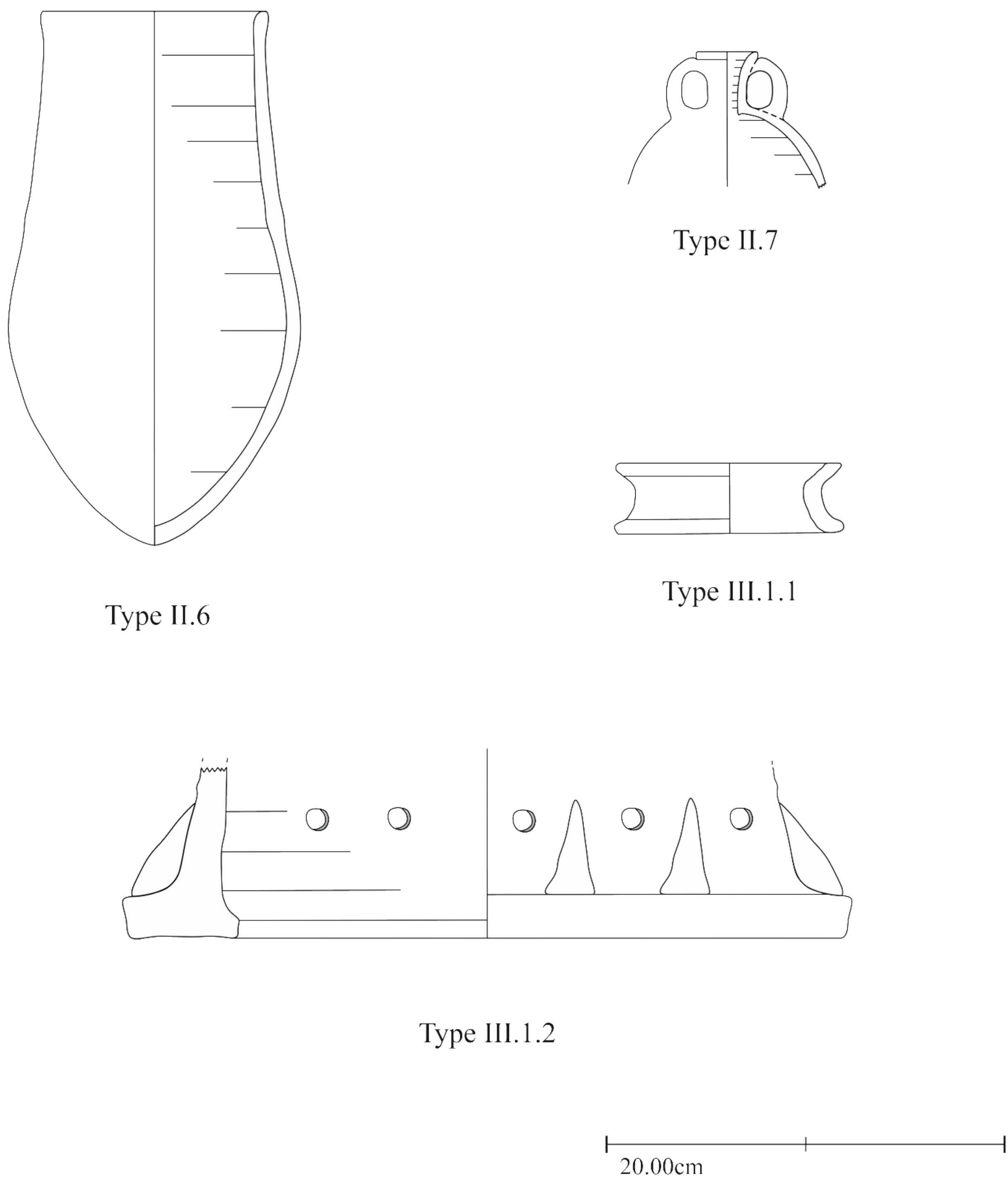


Fig. 6.12: Pottery type II.6-III.1.2 (author).

1938: Pl. IX.1164.54), Tell el-Borg (Hummel, 2014: Pl. 213/1.1.1) and in Nubia (Williams, 1993: Fig. 115.b-c).

Type I.1.1b, plates with direct rims and rounded bases, represent a total of 13 diagnostic sherds and whole vessels. This type is usually crudely manufactured on a wheel, and the walls are generally thick and occasionally asymmetrical. Parallels for this type are common within the corpus of Ramesside pottery both in Egypt – such as at Qantir (Aston, 1998: nos. 687-689 and 1108), Deir el-Medina (Nagel, 1938: Pl. VII, K.2.137), Thebes (Dziobek, 1992: Pl. 67.11/9), Memphis (Bourriau, 2010: Pl. 60, 1.2.4) – but also at Egyptian settlements in Nubia (*cf* Williams, 1993: Fig. 101m) and the Levant (Gould, 2010: Fig. 2.1.10).

Type I.1.2a is generally rare at contemporary sites such as Qantir (Aston, 1998: 148), a rarity reflected in Area K where it is represented by only four diagnostic sherds. It is not however without parallels in Egypt despite its rarity (*cf* Aston, 1998: nos. 722-27, 1166 and 2405, Bourriau, 2010: Fig. 60, 1.8.4 and Nagel, 1938: Pl. VI, 1142.8). Plates with modelled rim and round bases (see also Martin, 2008: 249 for a discussion of the prevalence of plates, dishes and bowls with round bases over flat bases during the Ramesside period) was not found at Area K although examples have been found at Qantir (Aston, 1998: no. 368) and at most New Kingdom sites in Egypt – such as Gurob (Petrie, 1890: pl xx.4, Brunton and Engelbach, 1927: pl. xxxiii.2), Deir el-Medina (Nagel, 1938: Pl.VII, 1176.14, 1922.94 and 1176.12), Memphis (Bourriau, 2010: Fig. 60, 1.8.5) and Saqqara (Aston, 1991: pl. 47.3-6). 63.16% of Type I.1 vessels are made from one of the three local clay sources, ZUR A-B (most commonly ZUR B) as opposed to Nile Silt or Marl clays. All the examples within this type are wheel-made and are mostly crudely manufactured with thick walls and decoration limited to red slips and occasionally string-line markings around the body of the vessel.

I.2. Dishes

Along with plates and bowls, dishes of various designs are a main-stay of all Ramesside sites. Various forms of dishes were found both broken and complete during the excavations of Area K. The type falls easily into the predetermined typology for plates and bowls (see above) although with a minor addendum, I.2.3. ledge-rim dishes. Type I.2.1a, dishes with direct rims and flat bases are widely attested in the published corpus from Ramesside settlement sites (Qantir, Aston, 1998: nos. 421-426 and 783-790, Memphis, Bourriau, 2010: fig. 60, 3.2.1 and Deir el-Medina, Nagel, 1938: Pl. IX, 1927.86) as well as cemeteries (Saqqara, Bourriau *et al*, 2005: 35-36 and Thebes, Dziobek, 1992: pl. 67, 11/10) in Egypt and also from foreign territory under Egyptian influence, such as Nubia (Holthoer, 1977: Pl. 25, Type IR/0/f-g and Williams, 1993: fig. 116e). Type I.2.1b is even more commonly associated with Ramesside remains at sites such as Qantir (Aston, 1998: nos. 334-342), Memphis (Bourriau, 2010: fig. 60, 3.1.8), Deir el-Medina (Nagel, 1938: pl. I, type II), Gurob (Brunton and Engelbach, 1927: pl. xxxiii.7), Saqqara (Bourriau and Aston, 1985: pl. 35.1-2 and Bourriau *et al*, 2005: fig. 21:10b) and various locations in Nubia (Holthoer, 1977: pl. 25, type IR/0/d-e and Williams, 1993: fig. 105f) and Canaan (*cf* Deir el-Balah, Gould, 2010: fig. 2.1.1).

Dishes with modelled rims and flat bases – such as those found at Qantir (Aston,1998: 408-415) and Deir el-Medina (Nagel, 1938: pl. X, 1169.129) – were not found in Area K. Type I.2.2b, dishes with modelled rims and round bases were common at the site, the modelled rim found in two distinct incarnations: the more traditional out-turned modelling achieved when the potter pulls the rim of the vessel downwards before removing it from the wheel (paralleled both at Qantier, Aston, 1998: nos. 367-384, Deir el-Medina, Nagel, 1938: pl. viii, type X and Deir el-Balah, Gould, 2010: fig. 2.1.4) and the more atypical ‘flanged’ modelling achieved by pressing the rim into a more angular shape (defined by Aston, 1998: nos. 416-419, but also found at Tell el-Amarna, Peet and Wolley, 1923: pl. xlvi, IV/7, and Deir el-Medina, Nagel, pl. viii, type XI).

The final type of dish-shape is the ledge-rim dish, so named for the characteristic ledge which has been added underneath the vessel’s lip, and which most likely served a pragmatic purpose, easing the lifting of the vessel. This particular type of vessel is commonly found at Qantir in a number of incarnations, especially the angle of the lip above the ledge is prone to variety (Aston, 1998: nos. 832-836) but it is also attested at other contemporary sites, such as Memphis (Bourriau, 2010: fig. 68, 3.10.8).

The dishes recorded at Area K are most commonly manufactured from Nile Silts (B2 and D), these two fabrics representing some 51.00% of the 100 diagnostics and whole vessels of this type recovered. However, the most common material used to manufacture dishes as a whole is the local fabric, ZUR B, representing 33% of the corpus.

I.3. Bowls

Bowls represent the most varied sub-type of the open forms in the Area K corpus, even though they are less numerically prevalent than dishes. The most common type is I.3.1b (the hypothetical type I.3.1a, bowls with direct rims and flat bases are entirely absent) denoting smaller bowls with direct rims and round bases. These vessels, described as drinking cups or goblets by Holthoer (1977: pl. 26, type GO1 – IR/0/c-d), are represented across a wide array of contemporary Ramesside sites, such as Qantir (Aston, 1998: nos. 448-451), Saqqara (Bourriau and Aston, 1985: pl. 35.17), Deir el-Medina (Nagel, 1938: pl. ii, Type IV), Deir el-Balah (Gould, 2010: fig. 2.1.2) and Memphis (Bourriau, 2010: fig. 62, 4.1.5). No bowls with modelled rims (I.3.2) were found in a sufficient state of completeness to reconstruct their bases, so these have not been subdivided further. The closest parallels to similar bowls with modelled rims at from the contemporary settlement site of Kom Firin (no. C714, Smolarikova, 2014: 125).

Type I.3.3, bowls with the characteristic ‘rolled’ rims, created by the potter outwardly rolling the edge of the vessel prior to firing is also found in the Area K corpus in significant quantities (17 diagnostics of this type), although the particular shape is poorly represented in the published corpus, possibly due to the lack of section-drawings of vessels in earlier publications making it difficult to distinguish between vessels with modelled and rolled rims. However, parallels for the Area K vessels of this form have been found at Kom Firin (no. C801, Smolarikova, 2014: 126). Type I.3.4a carinated bowls with direct rims are also commonly found at New Kingdom contexts, such as Qantir (Aston, 1998: nos. 457 and 851-2), Tell el-Borg (Hummel, 2014: Pl. 7.4) and Memphis (Bourriau, 2010: fig. 62, 4.5.2), while the less common I.3.4b carinated basins with modelled rims are paralleled by contemporary material from Gurob (GU07/F18A/142/P, Valentina Gasperini, pers. comm). Type I.3.4c, a carinated basin with a series of moulded handles around the rim, were only evidenced by two diagnostic sherds from Area K. Possible parallel vessels were also found at Qantir (Aston, 1998: no. 2144) and Memphis (Bourriau, 2010: Pl. 68/4.11.18).

I.4. Spinning Bowls

Ceramic spinning bowls are well-represented at Area K (see section 4.4 above). A ‘spinning bowl’ – a somewhat broad term in common usage – has been defined as any open vessel which has a series of loops attached to the interior floor of the vessel regardless of whether the vessel is mathematically to be considered a plate, dish or bowl. The six ceramic examples found are made respectively of Nile B2 (3), Nile D (1) and ZUR B (2). All examples – both the single complete example (ZUR/K(2014)/1) and the various fragments of vessel bases showing either complete loops or evidence of broken loops in the form of scars in the ceramics – were double-looped (similar to those found at Tell el-Amarna, Kemp and Vogelsang-Eastwood, 2001: 291-306, see also Rose, 2007: fig. 148-149). Aside from Tell el-Amarna, this particular type of vessel is found at other contemporary settlement sites both in Egypt (such as Deir el-Medina, Nagel, 1938: pl. XI: Type XVI and Kom Firin, no. C815, Smolarikova, 2014: 133) as well as Canaan (Gould, 2010: 42-45, fig. 2.1-10), an understandable spread considering the prevalence of linen manufacture and the value of linen garments during the Ramesside period (Pap. Cairo 65739, see Gardiner, 1935).

I.5. Snake-head Bowls

Crudely manufactured ceramic cobra figurines are commonly found at New Kingdom settlement sites, such as Kom Rabi’a (Giddy, 1999: 13-28), Tell el-Amarna (Peet and Woolley, 1923: pl. xxiii), Beth Shan (James and McGovern, 1993b: pl. 83-85), Kom

Firin (Spencer, 2014: 145) and Qantir (Aston, 1998: nos. 1423-1428). Commonly associated with bowls or household shrines, the purpose of these figurines were most likely protection of the owner and/or household by 'sympathetic magic' (Giddy, 1999: 18-19) and their crude manufacture also testifies their place within the magico-mythical beliefs of the populace as a whole. Although no such cobra heads were found in Area K, the complete profile of a snake-head bowl (ZUR/KKI/10) made from local fabric (ZUR B) was recovered. The shape of the vessel is identical to an example found at the New Kingdom site of Kamid el-Loz in Canaan (Echt, 1982: 37, pl. 12.2).

I.6. Beakers

Two types of vessels most likely to be considered as beakers have been identified in the Area K corpus. The first, I.6.1 is a typical round-based cup-like vessel with a restricted incurving direct rim defined as a 'wine goblet' by Holthoer (1977: Pl. 68.2) with parallels also found at Tell el-Amarna (Rose, 2007: fig. 306). A similar vessel though with a slightly modelled rim was also found at the contemporary site of Qantir (Aston, 1998: no. 275). The second type of beaker (I.6.2) is distinguishable primarily by the internal grove or 'notch' along the rim which facilitates the securing of a lid, with parallels from Qantir (Aston, 1998: nos. 160-163), Tell el-Amarna (Hope, 1991: fig. 3c) and Gurob (Brunton and Engelbach, 1927: Pl. xxxvii.67E). As with type I.3.3 the vessel may be underrepresented in much of the early literature due to the lack of section drawings in many of these publications.

I.7. Bread-plates

The colloquial term for this vessel type – which designates a flat hand-moulded 'platter' with a distinctive carination under the rim – was coined due to the similarity between this vessel type and modern *dokkas*, a type of platter commonly used in Egypt in the baking of *'eish shams* (Aston, 1998: no. 134). The vessel – unlike the majority of the Ramesside ceramic corpus – is entirely hand-moulded by the pressing of a lump of clay into a rough circle on a flat surface and the addition of rims by coiling (Aston, 1998: no. 134). Commonly found across Ramesside settlement sites such as Qantir (Aston, 1998: nos. 279-282), Memphis (Bourriau, 2010: fig. 68, 17.1.9), Tell el-Amarna (Peet and Woolley, 1923, pl. xlvi) and Deir el-Medina (Nagel, 1938: pl. I, Type I), the very small amount of such vessels found at Zawiyet Umm el-Rakham (only a single diagnostic sherd of this type) is peculiar and may suggest that other types of vessels, such as dishes or plates were utilised in the baking process in lieu of the bread plates. The only example of this vessel was manufactured from Nile silt (Nile B2) and is therefore not locally produced.

II.1. Globular Jars

Jars with globular bodies and modelled rims (II.1.1) are among the most prevalent closed vessels found in in Area K (14.63%) and are also common at contemporary sites in Egypt (Bourriau, 2010: Pl. 67/11.15.13 ; Holthoer, 1977: Pl. 35 Type VP/0/f-g ; Laemmel, 2008: Pl. 2:2 and 2:3 and Nagel, 1938: Pl. 81.4) where it bears some resemblance to the colloquially named 'meat jars' fabricated in Marl D (Aston, 1998: no. 478 and Laemmel, 2008: Pl. 2:4). 66.13% of the globular jars from Area K are made from Nile silt imported from Egypt (predominately Nile D at 33.87%), with a the remainder being locally produced, most commonly (25.81%) with ZUR B fabric.

The less common types of globular jars are: Type II.1.2, a globular jar with two vertical handles, and similar to examples found at Tell el-Amarna (Rose, 2007: Fig.

495). Type II.1.3 is a globular jar with a round base and two horizontal handles, similar to a type found at Qantir (Aston, 1998: no. 512) and Tell el-Amarna (Rose, 2007: Figs. 620-621). Type II.1.4 has a flaring mouth and pointed base and is similarly attested at Tell el-Amarna (Rose, 2007: Fig. 484) and Qantir (Laemmel, 2008: Fig. 4:5). Type II.1.5, a small globular jar with a flat base, is rarely found at Zawiyet Umm el-Rakham and only one whole vessel and one diagnostic rim sherd of this type were found in Area K, although it is paralleled at the contemporary site of Qantir (Aston, 1998: no. 1971).

II.2. Funnel-neck Jars

Funnel-neck jars are also among the most common closed vessel types found in Area K and at Zawiyet Umm el-Rakham as a whole, representing 14.63% of all diagnostic sherds and whole vessels recorded from Area K. As discussed by Aston (1998: 188), this storage jar with an ovoid body, round base and flaring or divergent neck is exceedingly common across all 18th and 19th Dynasty sites (after which the vessel shape becomes less prevalent, Aston, 1998: 188) both in Egypt at sites such as Qantir (Aston, 1998: nos. 549-576), Saqqara (Bourriau and Aston, 1985: pl. 36.61-2 and Bourriau *et al*, 2005: fig. 7.44), Gurob (Petrie, 1890: pl. xx.II), Deir el-Medina (Nagel, 1938: 82.10) and Memphis (Bourriau, 2010: fig. 65, 10.4.16) as well as sites in Canaan, such as Deir el-Balah (Gould, 2010: fig. 2.4.4-8) and Nubia (Holthoer, 1977: pl. 33, Type FU1). The vessel is made in several parts; the diverging neck is separately thrown and then attached to the ovoid body and in some cases the base also shows the distinctive thickness by comparison to the walls of the main body of the vessel, which indicates separate manufacture. This tripartite manufacturing process is also seen on comparable material from the contemporary site of Qantir (Aston, 1998: 188). As with the majority of the closed and restricted vessels, the funnel-neck jars from Area K were more commonly manufactured in Egypt and transported to Zawiyet Umm el-Rakham, with 55.71% of the funnel neck jars being made from the two major Nile silts represented in the corpus, Nile B2 and Nile D. However, as with Type II.1.1, a significant minority in the form of 22.86% of all funnel-neck jars are nonetheless made from the local ZUR B fabric.

II.3. Beer Jars

As with Types II.1 and II.2, the flat-based crudely manufactured beer jars are characteristic of all New Kingdom sites across Egypt and at sites with a strong Egyptian influence in Canaan and Nubia (Aston, 1998: nos. 523-548; Bourriau, 2010: fig. 65, 10.8.32 ; Gould, 2010: 31-38, fig. 2.5.4-10; Holthoer, 1977: pl. 18, type BB4 ; Nagel, 1938: 20.19; Petrie, 1890: pl. xx.21 and Rose, 2007: fig. 410). The vessels were usually wheel-made but with a hand-moulded base often preserving the finger prints of the potters who made them. The versatility of this vessel type – despite its somewhat limiting colloquial name – is remarked upon by Gould *et al* (2010: 31-38) and this versatility is also manifested at Zawiyet Umm el-Rakham where one example (ZUR/G4E/10) found in Area G was filled with ceramic net sinkers (see section 4.3 above). The use of this vessel type for temporary storage of a wide variety of materials can also be seen in Area QV at Qantir where a complete beer jar (2000/0342A) in locus PQ b/9 was found to contain broken calcite-alabaster inlays and other industrial waste evidently destined to be reduced to a powder and used to insulate crucibles for glass production (Pusch and Rehren, 2007: 45-46).

Unlike the majority of closed vessels from Area K, the beer jars found at the site were primarily locally produced (62.50%). Even though some examples were imported from Egypt, the choice to primarily produce this vessel type locally is readily explainable; beer jars are generally undecorated without any surface treatment; taken together with their rough manufacture they are unsuitable for long-term storage of liquids, and rather than being designated as storage vessels for a specific type of objects or foodstuffs, they seem to have been multi-functional. Considering the low level of expertise and time required to manufacture these vessels, it was certainly more beneficial to simply manufacture them locally when needed as opposed to wait for shipments of goods transported in this vessel type to arrive from the Nile Valley. A notable aspect of the corpus of beer jars as a whole are two examples found with perforated bases, similar to examples uncovered at Ashkelon (Martin, 2008: 252-255) where they may have been used in the fermentation process of beer (Homan, 2004: 89), a function they most likely fulfilled at Zawiyet Umm el-Rakham as well.

II.4. Egyptian Amphora

The classical Ramesside Egyptian amphora with two vertical handles and a straight modelled neck is poorly represented in Area K, with only 11 diagnostic sherds. Commonly (although not exclusively) made from Marl D, and usually covered with a thick cream-white slip, the vessel type is commonly found in across New Kingdom Egyptian sites, such as Qantir (Aston, 1998: nos. 1763-1798), Tell el-Amarna (Hope, 1989: fig. 2-3), Deir el-Medina (Nagel, 1938: 83.11-12) and Deir el-Balah (Gould, 2010: fig. 2.6.1). Clear parallels for the amphora shape illustrated in **Fig. 6.10** were also found at Memphis and in the Tomb of Horemheb (see Bourriau, 2010: Pl. 58.e-f for comparative illustrations). Unusually, three of the eleven examples found in Area

K are made from Nile silt, as opposed to marl, two from Nile B2 and one from Nile D. It is rare to see Egyptian amphora made from silt ware, although as Aston notes (1998: 196) not unattested, indeed two examples of such silt-ware amphora were found in Area QI at Qantir (Aston, 1998: nos. 584-585).

II.5. Bottles and Flasks

Bottles and flasks (II.5) have been categorised into three sub-types within the Area K corpus. Type II.5.1 was most likely an ovoid bottle with a neck protrusion caused by the application of force to the top of the vessel prior to firing and which may have helped secure a string around the neck for carrying (Nielsen, 2014) and only a single diagnostic sherd of this type has so far been recorded. Type II.5.2 is a squat globular bottle with a short modelled neck, and is comparable to examples found at Qantir (Aston, 1998: 962) although – as Aston states – they do not appear elsewhere in the corpuses of Ramesside pottery. Type II.5.3 is a small hand-moulded "cosmetic" flask made from Marl D, which is similar to a recently published example from Kom Firin (Smoláriková, 2014: 128) though the example from Area K is distinctly narrower and the base more rounded.

II.6. Tall Ovoid Jars

Tall ovoid jars, usually thrown in two pieces (base and body) with the joint clearly discernible by a thickening in the wall towards the base are fairly common during the 18th and 19th Dynasty, although as Aston has noted (1998: 344) they are primarily found with a blue-painted surface decoration. This is not always the case and indeed the majority of these vessel types from Area K are undecorated and their basic shape and the lack of decoration is paralleled at a variety of contemporary sites such as Qantir

(Aston, 1998: nos. 1185-1186), Gurob (Petrie, 1890: pl. xxi.46) and across Nubia (Holthoer, 1977: pl. 38, type IR/0/e-h). The decorated variety of this vessel type – usually painted with bands of Egyptian blue and/or lines of red dots – is also widely evidenced from funerary sites such as Saqqara (Bourriau and Aston, 1985: pl. 35.41-44 and Takamiya, 2007: 1761) as well as settlement sites (Aston, 1998: nos. 1312-1320; Bourriau, 2010: pl. 64, 9.6.5 and Hope, 1991: 31-46). In Area K the tall ovoid vessels are primarily made in the two predominant Nile silt clays, Nile B2 and Nile D, which combined account for eleven out of the fifteen whole vessels and diagnostic sherds of this type recorded. Five of the ten imported vessels are decorated with blue and red paint (see section 6.5.5 below), whereas the four examples of this vessel type made from local silt ware (ZUR A) are all undecorated.

II.7. Imitation Pilgrim Flasks

The colloquial term ‘pilgrim flask’ has been accepted within the Egyptian ceramic corpus to describe a lentoid vessel with a single spout and two loop handles due to its similarity in appearance to the Medieval ‘costrel’ flask used by Pilgrims as water carriers during the European Middle Ages (Aston, 1998: 44). Unknown in Egypt before the 18th Dynasty, the vessel type may have originated on Crete during the Middle Minoan II/IIIA periods and on the Mycenaean mainland during Mycenaean IIIA (Killebrew, 2010: 96) before finally arriving in Canaan (Killebrew, 2010: 96) and Egypt, most likely due to increased contacts within the Eastern Mediterranean (Aston, 1998: 44, for an overview of early examples of this flask in Egypt and its general history of usage see both Holthoer, 1977: 99-100 and Gould, 2010: 49-52). Egyptian imitation vessels of this type were commonly manufactured from Marl D and usually covered in a thick cream-white slip (Aston, 1998: nos. 1691-1695 and 1944-1946, Brunton and Engelbach, 1927: pl. xxxix.93b, Frankfort and Pendlebury, 1933: pl. liii.XVII.8 and Nagel, 1938: fig. 35.6). Out of the ten examples of Egyptian-made pilgrim flasks, nine are made from Marl D with a thick cream slip, while a single example is made from Marl F and left uncoated. Though rarer, this is not a unique occurrence (see for instance Aston, 1998: nos. 2046-48).

III.1. Ceramic Ring stands

The ceramic ring stands, can be defined as open-ended 'vessels' with a mouth both at their rim and base. Two types of ring stands were found in Area K; the first and most common (III.1.1) is a narrow, squat ring stand usually with a smaller diameter (<20cm) which has been commonly found throughout contemporary Egyptian sites (Aston, 1998: nos. 511-512 and Peet and Woolley, 1923: pl. xlvi I/43) and also at Egyptian sites in Canaan such as Deir el-Balah (Gould, 2010: fig. 2.8.4). The second, less common, type (III.1.2) constitutes a much larger ring stand with added 'buttresses', which Aston (1998: 180) has speculated may have added additional support to the entire object, but also a series of holes cut through the walls of the vessel during its leather-hard stage (Aston, 1998: nos. 900-901). This particular type of ring stand has been found both at Qantir (Aston, 1998: no. 513) and Tell el-Amarna (Peet and Woolley, 1923: pl. xlvi I/1019) although only with added buttresses; examples with *both* buttresses and perforated holes have so far not been published from contemporary sites.

6.4.1. Vessel Forms and Fabric Types

Like most contemporary assemblages, the Area K corpus is heavily dominated by a large variety of open utilitarian shapes, such as plates, dishes and bowls, as well as a limited variety of closed shapes, primarily globular jars and funnel neck jars (**Fig.**

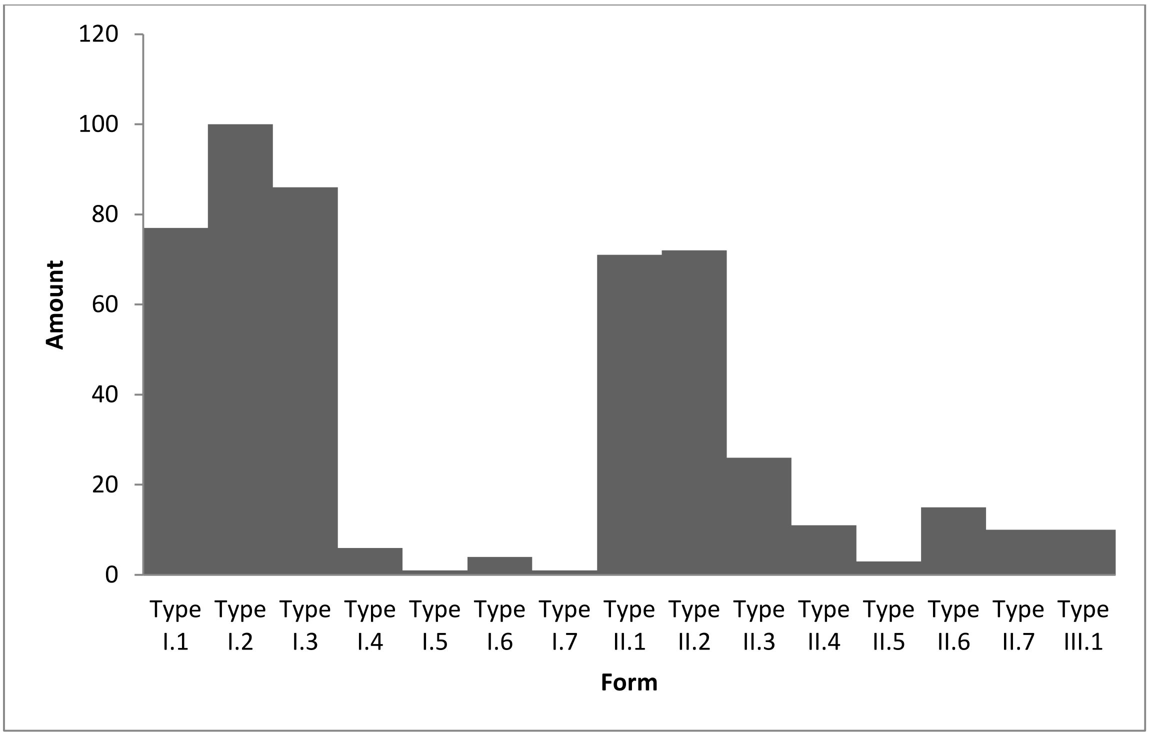


Fig. 6.13: Division of Area K corpus by major shape categories (author).

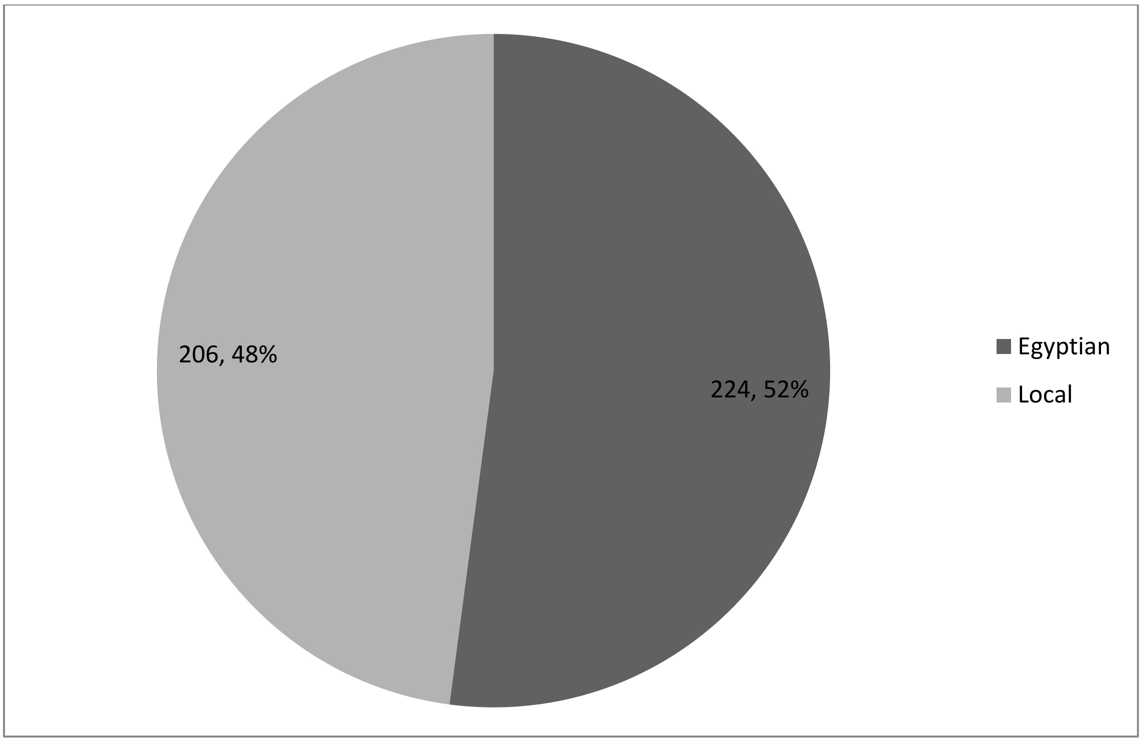


Fig. 6.14: Division of Area K corpus by origin (author).

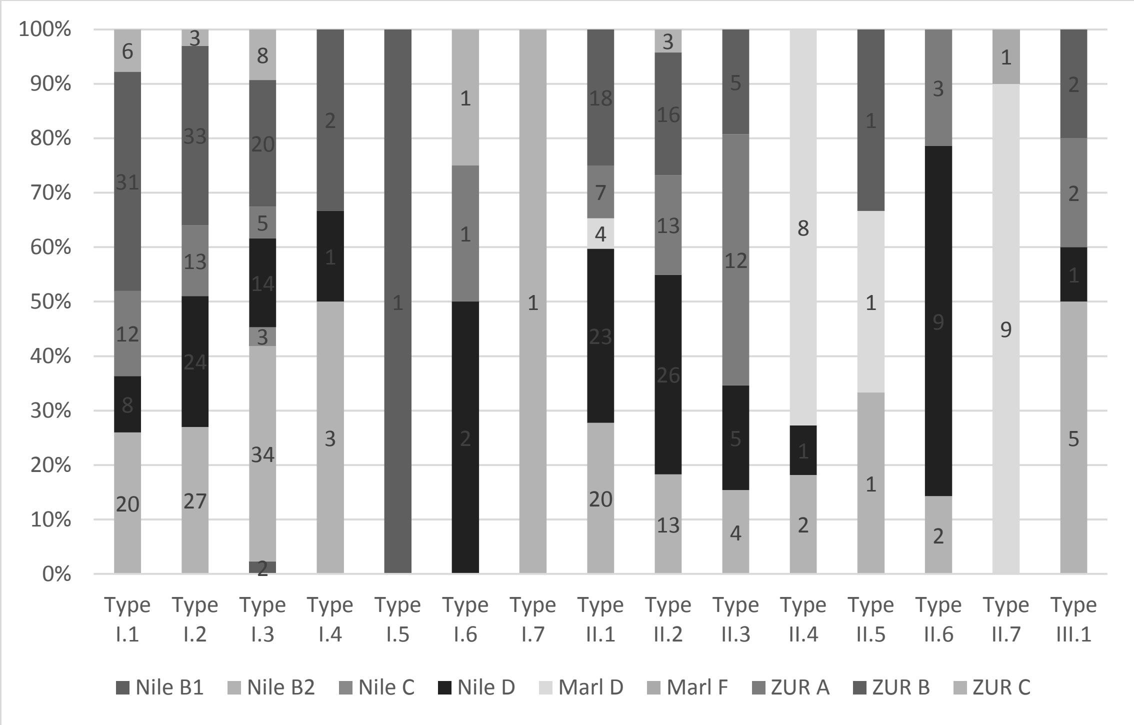
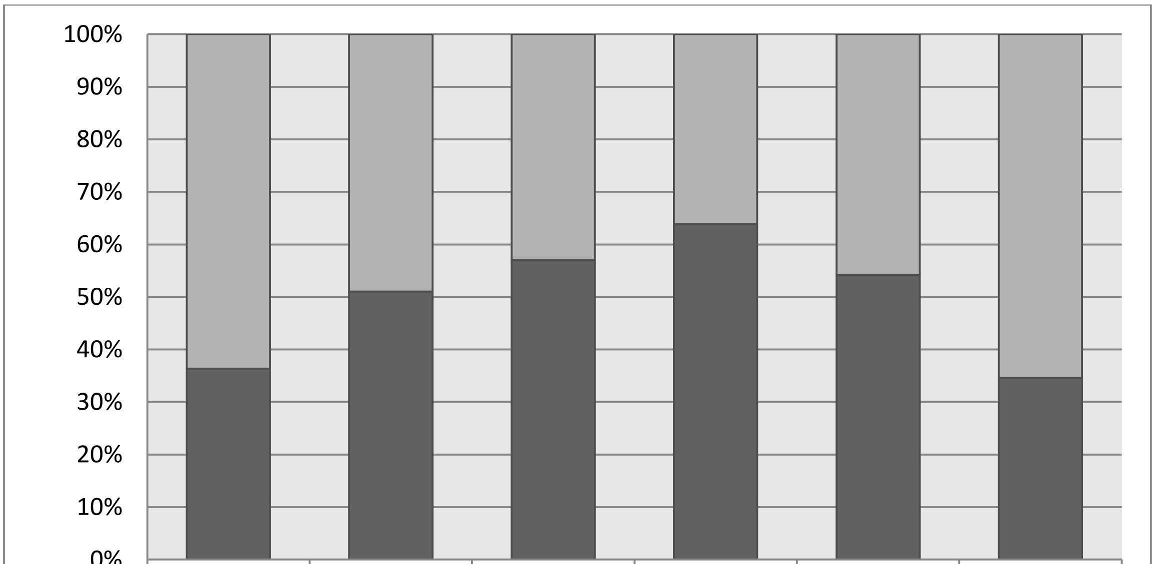


Fig. 6.15: Types within the Area K corpus divided by fabric (author).



	Plates	Dishes	Bowls	Globular Jars	Funnel-neck Jars	Beer Jars
Local	49	49	37	26	33	17
Egypt	28	51	49	46	39	9

Fig. 6.16: Division of major open and closed forms by origin (author).

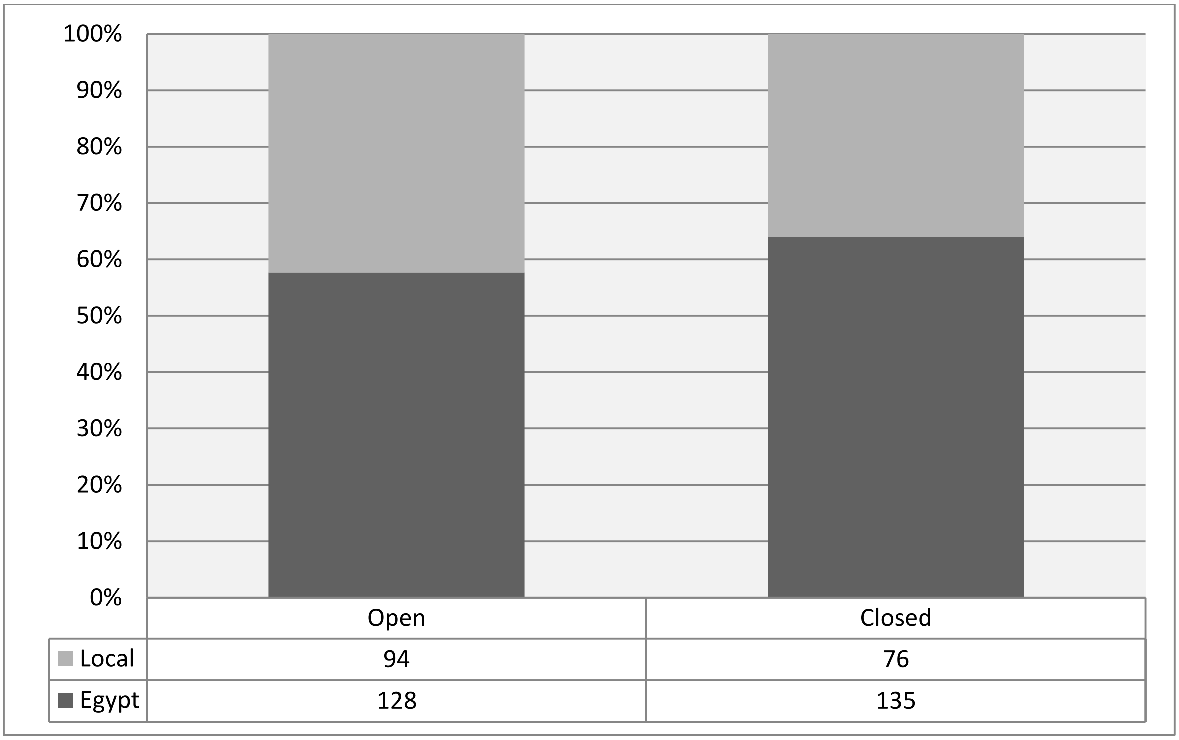


Fig. 6.17: Division of major open and closed forms by origin (author).

6.13). The corpus illustrates a dual purpose of Area K: The storage vessels are smaller and were most likely intended for short- to medium term storage. The open forms are unsuitable for storage, but would have been utilised for the preparation and consumption of food. Similarly, a quantity of the sherd material was most likely deposited as garbage in sections of the area. This interpretation shares manycharacteristics with the use of Area K as a butchering, deposit, cooking, baking and consumption zone for meat and grain products. The simplest open shape, the plates, are primarily of local manufacture. By contrast, most of the predominant closed shapes (globular and funnel-neck jars), were manufactured in Egypt. The division of fabric types between open and closed forms (**Fig. 6.14-6.17**) is a useful indicator of the scale and aim of the local pottery production. The majority of the plates, half of the dishes and a majority of the beer jars were locally manufactured. This may be due to the low level of skill and limited time required to manufacture these vessel types and their unsuitability as long-range storage containers. In shapes and types the local corpus is similar to the imported material, and the combined assemblage is highly typical of contemporary settlement sites in Egypt as well as area of Egyptian occupation or influence in Nubia, the Sinai and Canaan.

This indicates a great degree of familiarity with Egyptian material and suggests that the manufacturers of the locally produced vessels were either Egyptian or at least under heavy Egyptian supervision. An argument in favour of the former interpretation is the similarity between the local fabric types and the most common imported Nile silts. Nile B2 with inclusions of sand, Mica and smaller quantities of chaff is visually similar to the local ZUR B with which it also shares properties such as relative hardness for silt-ware. Nile D with inclusions of limestone and sand is similarly near-identical to the local ZUR A (see also research conducted by Martin, 2004: 276-277, see also Martin, 2007 ; Martin 2008 and Martin and Ben-Dov, 2008 on a similar issue at Canaanite sites with Egyptian occupation). However, even if the potters at Zawiyet Umm el-Rakham were working within a common Egyptian tradition, the issue of the large amount of imported Nile silt ware at this relatively remote location still remains. In order to resolve this, the provisioning of the Egyptian army itself must be examined.

6.4.2. Potters on the March: The Provisioning of an Expeditionary Force

It is unlikely that shipments of empty ceramic vessels would be despatched from the Nile Valley to Zawiyet Umm el-Rakham. The local production of pottery, accounting for nearly half of the recorded vessels was capable of supplying the basic needs of the fort's occupants. Closed vessels from Egypt could have been used to send required supplies, but the presence of open vessels – unsuitable for long-range transport - made

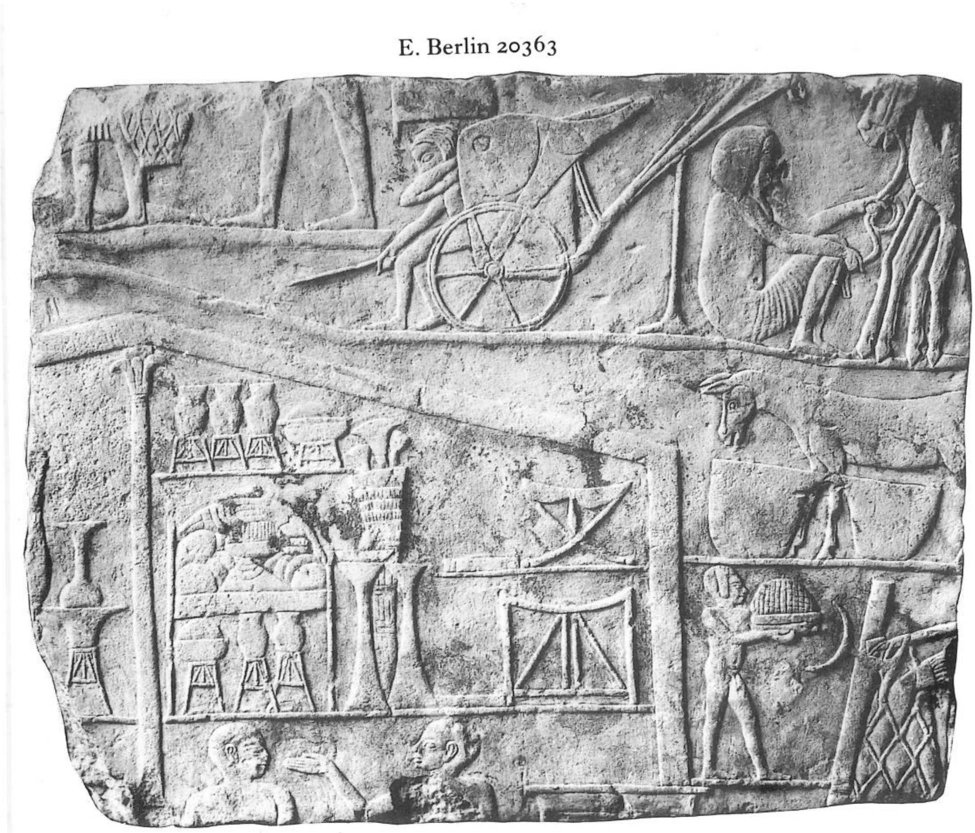


Fig. 6.18: E. Berlin 20363 (Martin, 1989: Pl. 28).

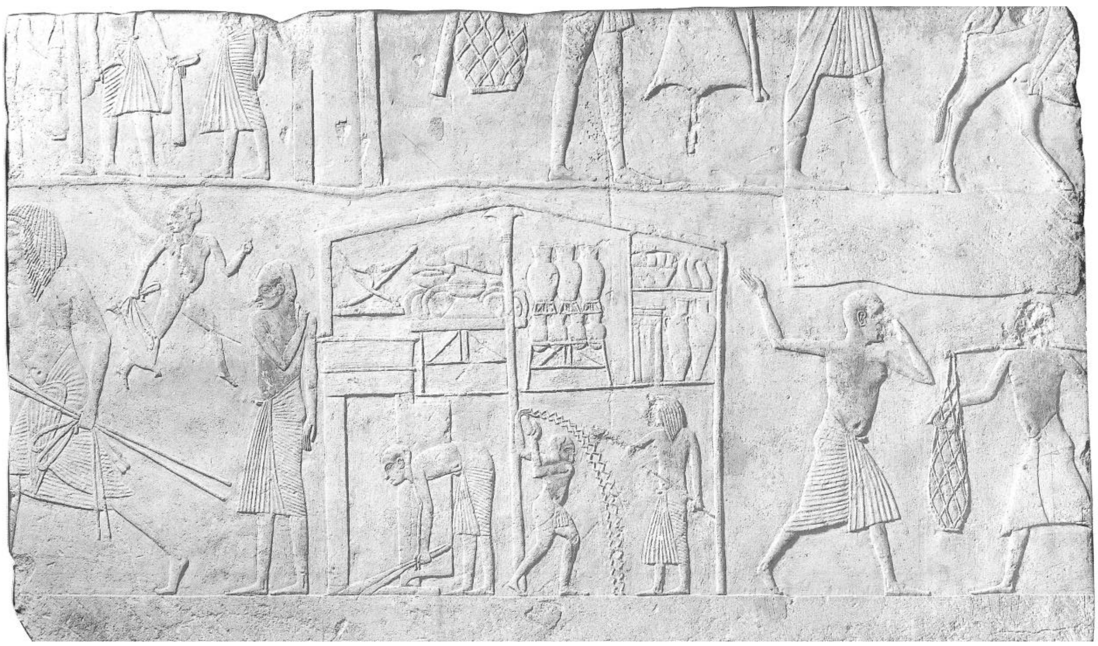


Fig. 6.19: Bologna 1888 (Martin, 1989: Pl. 29).

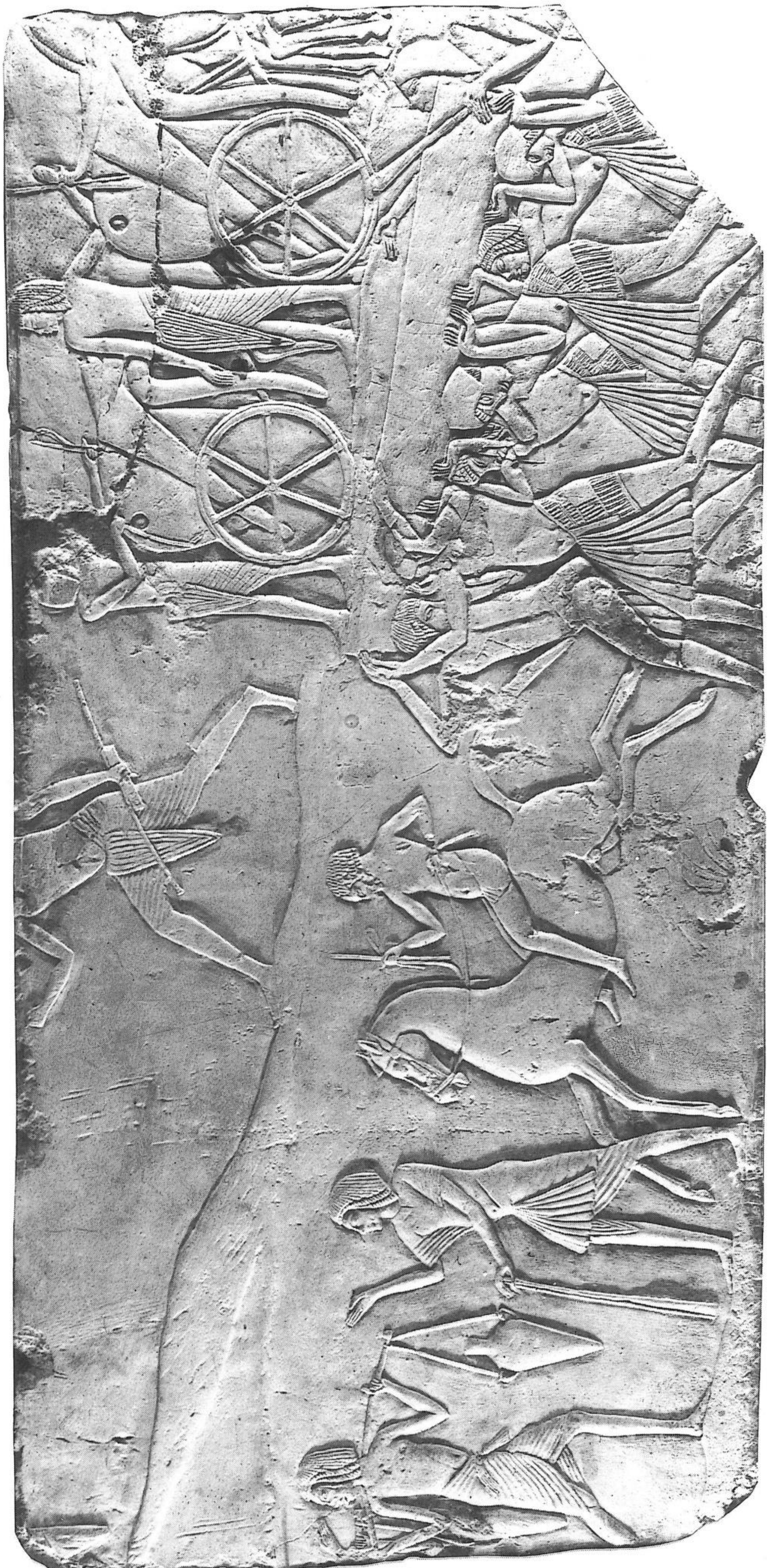


Fig. 6.20: Bologna 1889 (Martin, 1989: Pl. 32).

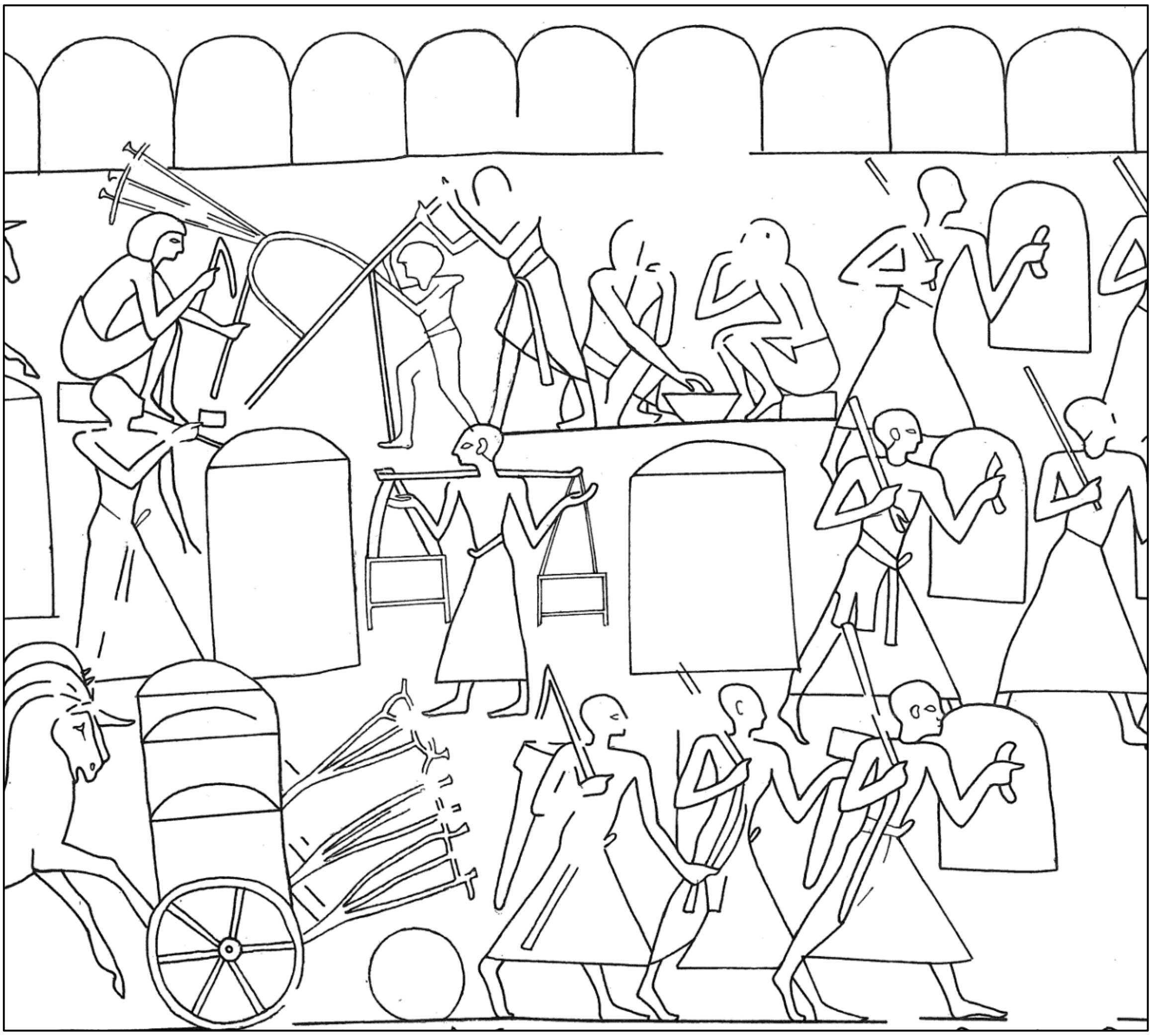


Fig. 6.21: The camp at Qadesh containing depiction of soldiers eating a meal from a flat-bottomed bowl (Desroches Noblecourt *et al*, 1971: Pl. I).

from Nile silt can most easily be explained by discussing the provisioning of expeditionary forces and the army in general (see also Heagren, 2007: 142-143 for a discussion of ceramic materials brought with campaigning armies).

The 18th Dynasty tomb of Horemheb from Saqqara contains several depictions of a military force in camp (E. Berlin 20363 as well as Bologna 1888 in Martin, 1989: Pl. 28-29). E. Berlin 20363 (**Fig. 6.18**) shows the upper right-hand corner of a structure, interpreted by Martin as a command tent (1989: 36 and pl. 28-29). Inside the tent is a small assemblage of ceramic vessels, two types of which are found in the Area K corpus, funnel-neck jars and two round-based dishes placed in pot-stands. The command tent shown on Bologna 1888 (Martin, 1989: 36 and pl. 28-29, **Fig. 6.19**) contains similar material, although a pair of two-handled Egyptian amphora are also shown leaning against the wall of the structure. Immediately above them is a flat-based bowl with a direct rim filled with food-stuffs. To the right of the command tent, a soldier is hurrying forward carrying a yoke across his shoulders. From the yoke are two nets one of which holds a tall ovoid jar. Above the tent, another carrying net is shown containing what may be interpreted as a flat-based jar.

The two blocks show that ceramic vessels of types similar to material found in Area K were found in military encampments, in this case probably serving as storage receptacles and eating utensils for the supplies of an officer, but they also elucidate a method for the transportation of closed vessels – by utilising a similar yoke system found on Bologna 1888. A similar system is also seen on a continuation of the scene on Bologna 1889 (**Fig. 6.20**), where a soldier is transporting two Egyptian amphora secured to the yoke by strings pulled through their handles (Martin, 1989: Pl. 32).

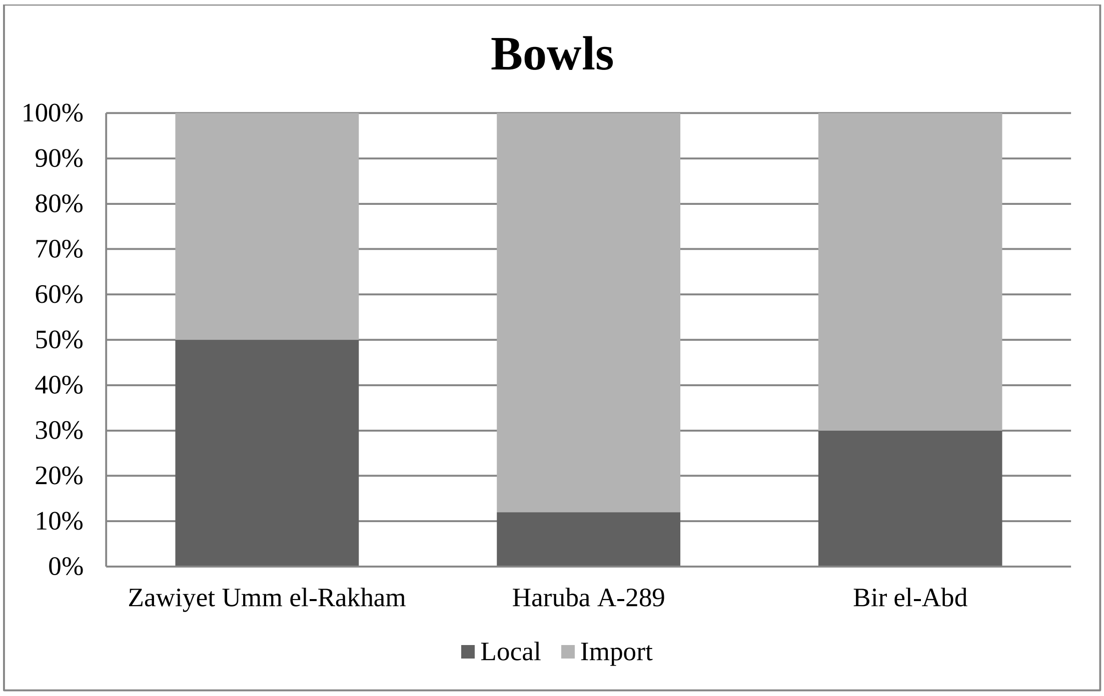


Fig. 6.22: Division of bowls by place of manufacture (adapted from Goren *et al*, 1995: 114).

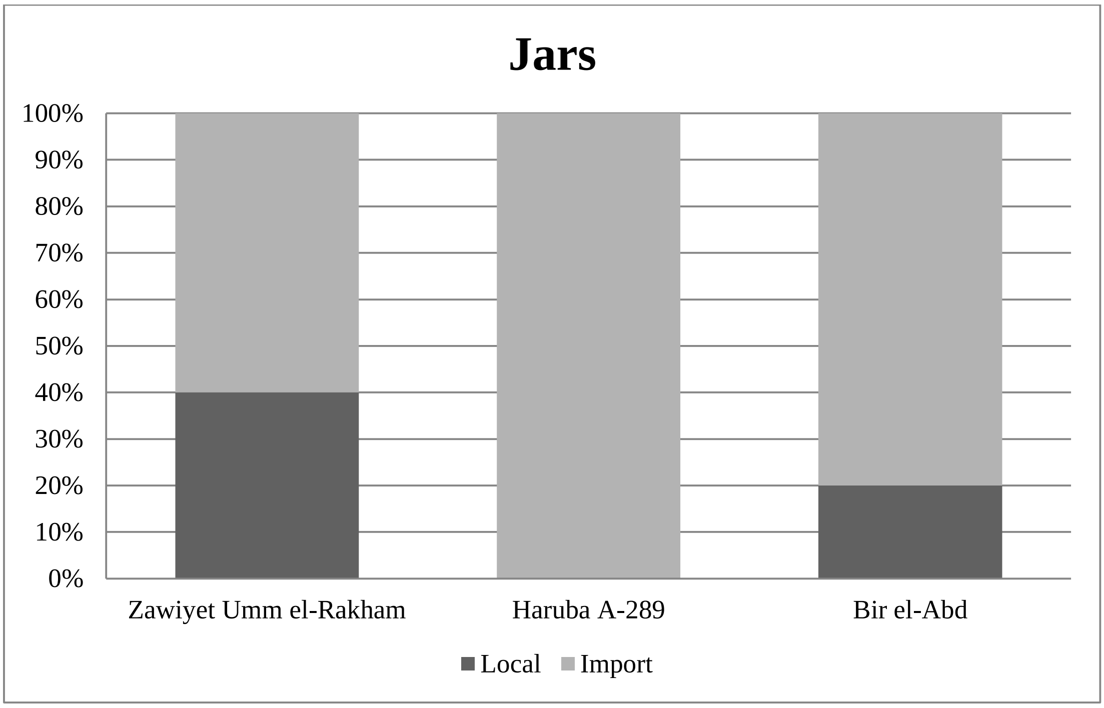


Fig. 6.23: Division of jars by place of manufacture (adapted from Goren *et al*, 1995: 114).

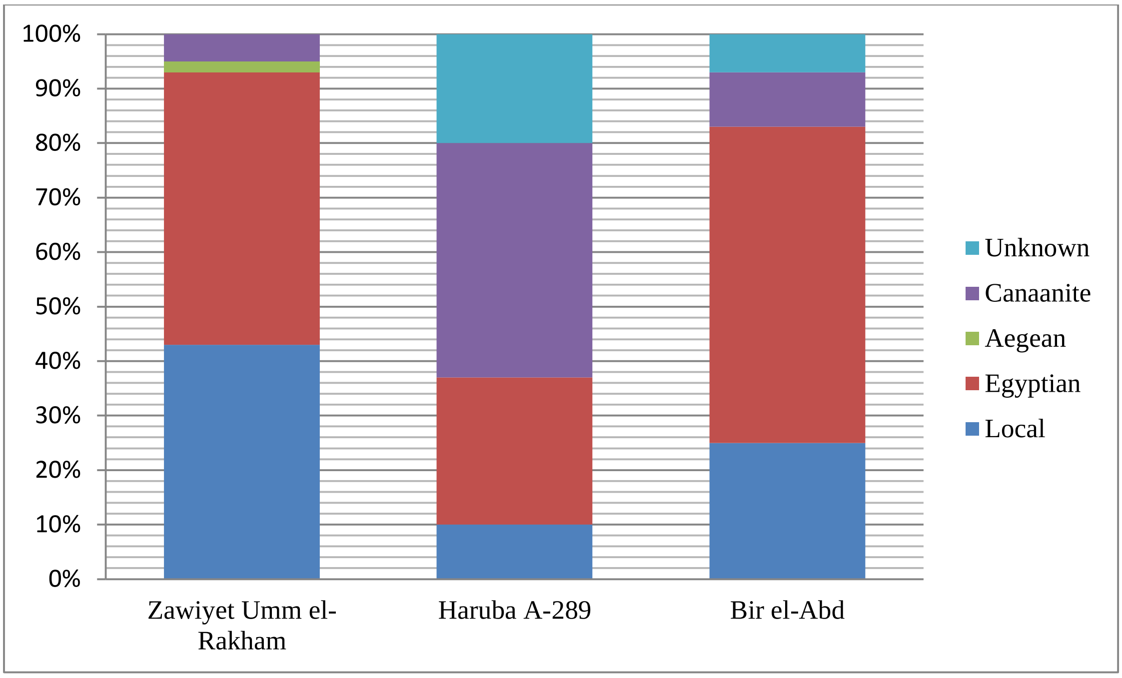


Fig. 6.24: Ceramic material from Zawiyet Umm el-Rakham, Haruba A-289 and Bir el-Abd divided by place of manufacture (adapted from Goren *et al*, 1995: 113).

Depictions of the royal camp at Qadesh from Luxor and Abu Simbel provide further evidence (Kuentz, 1928: Pl. XXXIV and Desroches Noblecourt *et al*, 1971: Pl. I). In the upper-right hand corner of the camp in both depictions, two soldiers can be seen sitting next to a round bottomed bowl and engaged in a meal (**Fig. 6.21**). In the lower left-hand corner of the encampment in both depictions are a series of storage vessels secured to yokes similar to those depicted in the Horemheb encampment. The iconographic evidence supports the notion that ceramic material was brought into the field by commanders, both finer material such as marl amphorae for wine, as well as more common open forms (such as round-bottomed bowls) which functioned as ration bowls for the soldiery. This is also evidenced at Haruba and Bir el-Abd where both open (**Fig. 6.22**) and closed forms (**Fig. 6.23**) made from Nile silt and local marls were recorded (Goren *et al*, 1995, see also **Fig. 6.24**).

It could be noted that ceramic evidence from New Kingdom military sites in Canaan such as Aphek (Martin, 2004) argues against this interpretation; at many of these sites, there is little or no imported Egyptian silt-ware. However, Zawiyet Umm el-Rakham and other peripheral forts cannot be readily compared to Egyptian military structures built within fully functioning Canaanite settlements. No permanent cities existed on the Marmarican coast during the Late Bronze Age, nor did major trade routes such as the *Via Maris* pass close to the fort. As such, both the builders and initial garrisons arriving in the area either from Egypt, or from the nearby forts in the Western Delta would have been necessitated by this isolation to bring whatever utensils they required with them, until initial industries (such as pottery kilns) could be constructed and suitable sources of raw materials (fuel, water and clay) could be secured.

The short life span of the fort makes it likely that some of this material would have been in use for almost the entire occupation of the structure. Similarly, once broken, it is likely that at least some of the material was deposited within Area K. It is unknown whether any kind of rotation system functioned at Zawiyet Umm el-Rakham in order to relieve troop detatchments, although some rotation of troops would further explain the presence of the open vessels made from Nile silt; as it is likely that each rotation would bring more ceramic material with them. Taken together with the material brought to the area by the forts' builders and original garrison and deposited once broken within Area K, this explains the presence of Nile silt ware in the area. The local production of pottery was most likely established as a way of supplementing an already existing corpus of both closed and open shapes part of which was subsequently partially deposited within Area K providing the significant division between Nile and local silt-ware.

While the division of Nile silt and local manufacture can thus be explained, it nonetheless leaves the question of the nature of the manufacturers. It is clear that they were trained potters, rather than untrained men engaging in a household-type production. Without any kind of kiln installation the intensity of the production is difficult to gauge, and this intensity – along with skill level and familiarity with established shapes and fabrics – is an important factor in determining whether these manufacturers were dedicated specialists who were brought to the fort with the express purpose of functioning full-time as potters, or whether they were a part-time work force chosen from among the inhabitants and soldiers, who were soldiers first and potters, second. The most profitable way of investigating this issue is by a discussion of the primary methods of manufacture and decoration within the corpus, its level of complexity and similarity to contemporary ceramic traditions from the Nile Valley.

6.5. Manufacture and Decoration

6.5.1. Wheel-made Pottery

The majority of the Area K pottery – both the vessels imported from Egypt and those locally produced – are wheel-made. Distinguishing this manufacturing technique in the field is aided by the parallel lines or groves visible on the interior surfaces and created by the potter manipulating the clay while it is rotated. While several types of wheel manufacture were used throughout Pharaonic history, the fast wheel was most commonly used during the New Kingdom, and it is most likely that this was also the case for the Area K pottery (Aston, 1998: 29).

6.5.2. Hand-made Pottery

While not as common as wheel-thrown pottery certain vessel types within the Area K corpus are clearly hand-made. This is most noticeable in the case of Type I.7, the bread plates which are manufactured simply by pressing a lump of clay in a flat circular shape and the pinching and pushing the edges upwards leaving a carination beneath the rim which can often be observed to contain the potter's finger-prints, or alternatively using a coil technique. Another wholly handmade vessel is the small marl clay cosmetic flask (Type II.5.3), attested by its unevenness and lack of any evidence of wheel-throwing in the form of wheel-marks.

6.5.3. Composite Manufacture

While simpler forms such as plates, dishes and bowls can easily be made using a single manufacturing technique, more complex vessel shapes required several. This is especially the case with beer jars, where the base is often hand-made from a roughly shaped lump and the body is always wheel-thrown. Another example is the Egyptian pilgrim flasks which are made from two wheel-thrown dishes placed together before a handmade spout and handles are added. Several manufacturing techniques were also employed in the making of handled jars.

6.5.4. Slips

A slip has been described by Aston (1998: 30) as consisting of "[…] pigment (paint) + water + clay […]". Discoveries of nuggets of blue, white, yellow and red pigments in the Temple Magazines (Thomas, 2000: 20-38) at Zawiyet Umm el-Rakham shows that the local potters had access to all three materials. The Area K corpus silt ware show great similarity in its choice of slips with contemporary material from the Nile

Valley, primarily in the form of the heavy reliance on red (or reddish-orange) and cream slips covering either interior, exterior or both surface or applied in bands. In most cases, it appears that the slips were applied with a brush or by hand, rather than by dipping or pouring prior to firing (Aston, 1998: 29). Eight distinct types of slip were distinguished within the Area K corpus:

Type 1: Red slipped on interior surface

This surface treatment is present on 3.87% of the entire corpus, and found both on the silt ware imported from the Nile Valley (47.36%) but is slightly more commonly found on the locally produced material (52.63%). The style is exclusively found on open vessels.

Type 2: Red slipped on exterior surface

This types of decoration is present on 5.70% of the Area K corpus. The treatment is found on open vessels, on closed vessels, and also on both the imported Nile silt ware (60.71%) and the locally manufactured ceramics (39.29%).

Type 3: Red slipped on interior and exterior surfaces

This treatment was the most popular type within the repertoire of slips, both for imported Nile silts (49.32%) and locally produced material (50.68%). This style of decoration is found exclusively on open vessels, most commonly on the plates, dishes and bowls.

Type 4: Cream slip on exterior surface

Primarily closed vessel types within the Area K corpus were treated with cream slips on their exterior surface, comprising 12.58% of the corpus – imported and local. Out of the 62 diagnostics and whole vessels decorated with a Type 4 slip, 74.19% are imported Nile Silt (primarily Nile D), whereas the local silt wares are much less commonly decorated in this way (25.81%).

Type 5: Cream slip on interior and exterior surface

As with Type 4, Type 5 is almost exclusively found on imported Nile silt vessels (88.00%) as opposed to the locally manufactured examples (22.00%). Overall, this particular style of slip is uncommon at the site representing only 5.33% of the silt vessels in total.

Type 6: Band of red slip on interior surface

This type is only found on two vessels in the entire Area K corpus, one made from Nile D, and a locally produced example made from ZUR A fabric. Both are open shapes.

Type 7: Band of red slip on exterior surface

As with Type 6, Type 7 is only found on two vessels from the Area K corpus, both made from Nile silt (Nile B2 and Nile D). Both vessels are open shapes.

Prevalence of slips

Slips of the various types listed above are common both on the imported silt wares and the locally produced pottery in Area K. Similar styles are represented in both the imported Nile silt ware and the locally produced material, and even though there is more prevalent use of cream slips in the imported material, the style is nonetheless represented in the locally produced pottery from the site and the preference for red over cream slip by the local potters may be due to the firing colour of the local fabrics which naturally fire cream- to light brown as opposed to the greyish-black and brownish-red firing colour of Nile silts. It may have been viewed as unnecessary to place a cream-coloured slip on an already cream coloured vessel. Another possibility is made clear by the overall prevalence of slipped vessels; 53.39% of the imported Nile silt vessels are slipped, whereas only 35.78% of the local vessels are. This may reflect a lack of resources (primarily pigments) to produce the slips at Zawiyet Umm el-Rakham due to its relative isolation.

6.5.5. Polychrome Decoration

During the excavations of Area K, fifteen rim- and body-sherds of polychrome – or blue-painted – pottery were discovered. Corpuses of Ramesside blue-painted pottery are rare, the most extensive being material published by Aston (1998) and Bell (1987) compared to more diverse material from the 18th Dynasty from Tell el-Amarna and Saqqara published predominately by Hope (1991 ; 1997 ; 2011) and Takamiya (2007). Significant differences between the 18th and the 19th Dynasty corpuses, increasingly simplistic decorative schemes and use of Nile silt clays over marls during the Ramesside period (Aston, 1998: 57 and Takamiya, 2007: 1767) are also noticeable in the Zawiyet Umm el-Rakham corpus. All fifteen blue-painted sherds are made from Nile Silts (Nile B2 (4) and Nile D (11)).

Despite the presence of materials required for the manufacture of blue-painted pottery at the site, such as cakes of Egyptian blue pigment found in the temple magazines (Thomas, 2000: 20-38), no locally manufactured material has so far been located. Instead, this particular sub-group of material seems wholly imported from the Valley, most likely from the region around Memphis where Nile B2 and Nile D are the most common material types (Bourriau, 2010: 23-24). This is in agreement with the hypothesis proposed by Aston (1998: 56) that blue-painted pottery production was primarily centered in major settlements with royal residences within Egypt such as Memphis and Qantir although it should be noted that this hypothesis has been partially challenged by the discovery of locally manufactured blue-painted pottery from the relatively isolated site of Deir el-Balah (Yellin and Killebrew, 2010: 73). The decorative scheme is primarily geometric with lines of blue and red colouring with two types of lotus-blossom decoration and a single example of figurative decoration, namely a duck found on ZUR/KM/13 (**Fig. 6.25**).

6.5.6. Incised and Applied Decorations

While by no means as common as slips, 'string-line' decoration is found in a small amount of open shapes, exclusively plates, dishes and bowls. This decorative style is achieved by looping and pressing a twisted coil of string into the vessel during its leather-hard stage, creating a series of impressions running the entire circumference of the vessel. In many cases, such as the spinning bowl ZUR/2014(K)/1, multiple parallel lines of decoration are present (*cf* Aston, 1998: nos. 328-329 for examples of this decorative style). This style of decoration is found both on vessels manufactured locally and those imported from the Nile Valley. Applied decorations – that is the

Fig. 6.25: Dish with polychrome decoration showing a duck in a lotus pond, ZUR/KM/13 (author).

application of extra pieces of clay to serve an aesthetic or functional purpose – are less common and are primarily found in Area K in Type I.3.4c and Type III.1.2.

6.5.7. Pot Marks

Few examples from the Area K corpus have pot-marks, a term which encompasses geometric or – more rarely – hieroglyphic marks on the surface of the pottery, either incised into the vessel after firing, cut into the vessel prior to firing or drawn with a finger or a tool in the slip of the vessel prior to firing (Aston, 1998: 33 ; see also Ditze, 2007: 275-281 for a comprehensive overview of types of pot marks used during the Ramesside period and potential interpretations). Three types of pot marks have been found on the Area K pottery, two geometrical and one hieroglyphic

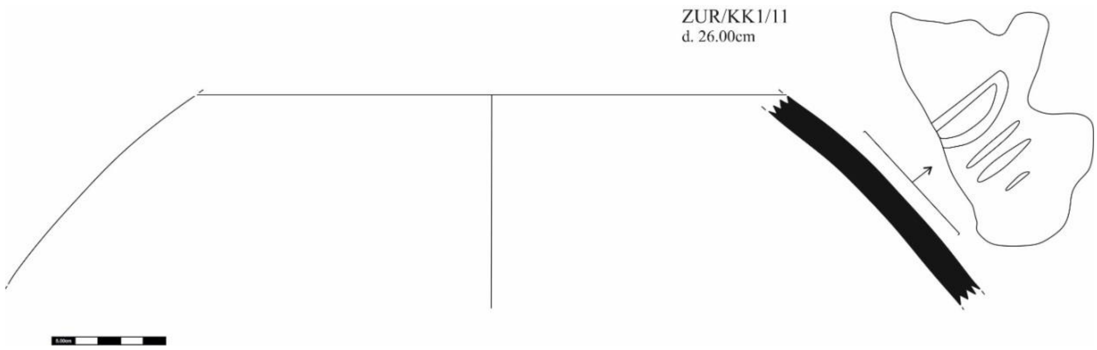


Fig. 6.26: Locally produced jar with an incised pot mark reading "*nb tꜣwy*", ZUR/KKI/11 (author).

Vessel ZUR/K2A/21 is a body sherd from an Egyptian amphora made from Marl D and covered with a thick white slip on its exterior surface. The pot mark comprises a post-fired geometric design consisting of a single line and a round 'loop' made by moving a finger in a semi-circular motion on the wet slip. The design is a composite of two common designs found in contemporary corpuses, namely that of a single line (Ditze, 2007: 290, Group A01) and the 'U-shape' or loop (Ditze, 2007: 290, Group C02).

ZUR/K2H/19 is a locally produced (ZUR B) funnel neck jar with a line- or crescent shaped pre-fire pot mark on its external surface. The mark is too poorly preserved for a definitive interpretation although it is most likely similar to Ditze's category A01 (2007: 290). The only hieroglyphic pot mark is found on ZUR/KKI/11 (**Fig. 6.26**), a body sherd from a locally produced (ZUR A) globular storage jar in the form of the incised phrase *nb tꜣwy* ("Lord of the Two Lands") on its external surface. This type is generally rare and is only paralleled by a single example from the contemporary Qantir corpus (Ditze, 2007: 435, Group G05).

6.5.8. Discussion

The aim of this discussion was to demonstrate the level of skill displayed by the potters at Zawiyet Umm el-Rakham with the aim of determining their precise identity at the fort, whether they were full-time specialists or soldiers who had a dual-function. The lack of any locally manufactured polychrome pottery and the smaller proportion of slips on the local material can be seen as indicators of a lower skill level than at larger contemporary sites, although this lack may also be due to the partial excavation of the site or a more limited access to specific resources. The manufacture and similarity in pot marks underlines the notion that the potters were familiar with multiple aspects of the contemporary pottery production in Ramesside Egypt. As such, the most likely interpretation is that these potters were full-time specialists whose primary function at the fort was the maintenance of the production of pottery.

6.6. Conclusion

The investigation of the form and decoration of the Area K corpus show that the manufacturers were familiar with a wide range of shapes and types of decoration. Along with their attempt to imitate common Egyptian fabric types this shows that they were most likely culturally Egyptian and also indicates a level of training and expertise. The absence of advanced decorative styles (such as polychrome painting) in the locally manufactured corpus, either indicates some limitation in their skills although it is more likely that this lack simply reflects limited access to resources.

The origin of the pottery corpus from Area K could not be determined archaeologically by the discovery of kiln installations or similar evidence of workshops or industrial production. Instead, the local origin of a portion of the corpus was determined using chemical analysis. An analysis of twelve sherds, four from each of the macroscopically determined local fabric groups ZUR A, ZUR B and ZUR C, was conducted using X-Ray Flouresence Analysis. The dissimilarity between the local groups and the Nilotic reference material make it clear that they are distinct entities, although it is probable that all three came from the same clay source and that their limited internal difference was due to the addition of specific inclusions by the potters. The presence of microfossils and marine shells as temper in ZUR A further supports the notion that these fabrics originate locally in one of the *wadi* beds which cut into the Marmarican plateau.

6.6.1. Mode and Scale of Production

The location of the primary clay deposits within *wadi* beds would have made the pottery production seasonal as access to clay would have been problematic during the final months of winter due to heavy winter rains and flash floods. Viewed in context with the presence of considerable quantities of Nile silt ware brought to the site by changing military garrisons and commanders, as well as material brought by the original occupants and discarded when broken, the pottery production was most likely aimed towards supplementing a pre-existing corpus brought to the site. The level of skill both in manufacture of typical Egyptian forms and decoration (notably slips and pot marks) as well as the prevalence of wheel thrown vessels suggest that the manufacture was conducted within a workshop environment by a group of dedicated specialists, highly familiar with established fabrics, forms and decorative styles used at contemporary Egyptian sites in the Nile Valley.

While no direct evidence exists to prove that the manufacture of pottery was under the control of the central administration at the site, the location of most of the raw materials outside the immediate area of the settlement, nonetheless suggests that expeditions for raw materials may have required central organisation and planning. Secondly, pottery, as an integral part of both subsistence strategies (for storage of food stuffs and cooking) as well as various craft industries, would have been a significant component in the successful maintenance of the site economy. For these reasons it is reasonable to assume that some degree of centralised oversight of the production was maintained. As such, the mode of production was most likely one of attached specialist producers working full-time for the majority of the year (excluding the months of winter), within a workshop environment (scale of production) to produce sufficient material to supplement the existing pottery corpus at the site, and to provide material for both the subsistence strategies and various craft productions undertaken at Zawiyet Umm el-Rakham.

Chapter 7: The Faunal Remains

7.1. Introduction and Methodology

The purpose of this chapter is to reinvestigate the faunal remains recorded during the 1999 season in Area K. Initial classification of this material was conducted by Louise Bertini and Salima Ikram (2004) who categorised the assemblage of 613 elements according to taxonomy (if possible), element, portion, side, sex and age (if possible) as well as noting secondary processes visible on the samples, such as butchery marks, gnawing and burning. The aged material initially formed a small portion of Bertini's Master's thesis (Bertini, 2007) submitted to the University of Liverpool. These investigations form the basis of the discussion in this thesis of the implications of these identifications for a broader study of subsistence at Zawiyet Umm el-Rakham. The assemblage itself has degraded to a great extent in storage, and combined with time pressures caused by the unsettled situation in Egypt and limited access, a full re-investigation was not possible.

While the majority of the 613 elements could be taxonomically identified (**Table 7.1**), a smaller subset (*N*=282) could only be identified according to size (**Table 7.2**), such as large mammals (most likely horses or cattle), medium-large mammals (most likely donkeys, pigs or juvenile cattle), medium mammals (most likely sheep, goat) and small mammals (rodents, hares etc.). Due to this uncertainty, they have not been included in the analysis below. The faunal assemblage is generally poorly preserved due to the high ground moisture and salinity. Animal bones during the excavation were recovered by hand by the excavators, and primarily found in four clusters

Animal size	**Amount**
Small mammal	3
Medium mammal	239
Medium-Large mammal	17
Large mammal	12
Small bird	4
Medium bird	1
Large bird	1
Unidentified bird	2
Unidentified shellfish	3
Total	282

Table 7.1: Count of unidentified mammalian, avian and mollusc elements; the two former classified by size, the latter unidentifiable due to poor preservation (author).

Species	**Amount**	**% identified**	**M. Ind. Identified**	**% M. Ind. Identified**
Bos Taurus	12	3.6	3	10.3
Canis Familiaris	92	27.8	1	3.5
Capra Hircus	22	6.7	3	10.3
Ovis Aries	38	11.5	5	17.2
Ovis/Capra	115	34.8	9	31
Equus Asinus	2	0.6	1	3.5
Gazella	1	0.3	1	3.5
Sus Scofa	2	0.6	1	3.5
Tortoise	36	10.9	5	17.2
Oyster	11	3.3		
Total	331		29	

Table 7.2: Taxonomical classification for the Area K faunal assemblage (author).

within Area K. The most prominent of these is ZUR/K0,4 and ZUR/K1,4 (referring to the grid system utilised in the 1999 excavations) denoting a northern area of the courtyard KL against the wall of Space KQ in Building 4. The faunal cluster in this area was found around an oven which also contained the complete skeleton of a dog (Bertini, 2007: 9, who interpreted the area as a room, although later excavations disproved this interpretation, Snape, pers. comm.). This cluster contains 308 of the elements analysed in this chapter.

A second cluster containing 160 elements was located in ZUR/K2,6 and ZUR/K2,7 constituting the south of the courtyard KL, lying against the northern wall of Building 1 and around the entrance to Building 2. A further 115 elements were found in grid square ZUR/K0,7, inside Space KKIII in Building 4. A final smaller cluster containing 29 elements were located in ZUR/K5,6 spread across Space KE and Space KG. All of these clusters were either located in communal areas, in rooms directly abutting communal areas or – in the case of the smallest assemblage – in two spaces which had seemingly been blocked off. Deposits of ash and general collapse in Space KE may also indicate the purpose of the area for refuse deposit and explain the presence of the faunal elements as garbage.

Butchery marks were identified on only eleven elements (though their precise type and direction was not noted), but the majority of the elements were either gnawed or burnt. The most likely explanation, in conjunction with the deposition of the material in communal areas, is that the assemblage constitutes a mixture of the material immediately discarded during the butchering of an animal (such as phalanges and possibly skulls, see below) and the material which had been cooked and eaten (long bones, ribs etc). Space KL may then have been employed as a combined butchering/refuse disposal area and the assemblage thus constitute the material associated with the final meals of the occupants before the site's abandonment.

292 of the 613 faunal elements recovered from Area K (47.5%) have gnawing marks. While some of these may indicate the consumption of the meat directly off the bone by the human inhabitants of the fort, the majority reflect the disturbed nature of the deposit. Rodent bones (two femurs) found within the assemblage, along with a complete dog skeleton (see below) testify the presence of various scavengers co-habiting with the Ramesside occupants and also disturbing the assemblage following the site's abandonment. This disturbance must be borne in mind, as it may have caused minor biases in the data, for instance by the removal or destruction of specific skeletal elements by larger scavengers.

Two methods are generally employed in the statistical analysis of faunal data from archaeological sites in Egypt; Minimum Number of Individuals (MNI or M. Ind. Identified, *cf* Legge, 2008 and 2012) or Number of Identified Specimens (NISP, *cf* Bertini, 2007 and 2014). While MNI relies on the identification of the smallest possible number of individual animals identified in an assemblage based on the complete faunal record, NISP calculates the maximum possible number of individuals. Both of these methods have obvious failings, in that one *underestimates* the actual number of individuals and create inter-species ratios which do not take bone preservation into account. The other *overestimates* the amount and often the importance of a specific species by ignoring the tendency of some skeletal components to fragment more easily than others, creating a larger assemblage and a large NISP count (see Werschum, 2010: 25-26 and Grayson, 1984: 94-96 for a criticism of both methods). Following the extensive work conducted by Anthony Legge on the faunal assemblages from the Main City and Grid 12 at Tell el-Amarna, as well as the nearby Stone Village (Legge, 2008 and 2012) this study utilises MNI. A primary issue with MNI, its tendency to create a bias when calculating inter-species ratios, is less significant in the Area K assemblage due to the dominance of caprine elements at the expense of both pigs and cattle, creating a far less varied assemblage than at contemporary sites, and downgrading the significance of calculating inter-species ratios to determine relative importance.

7.2. Mammals

The taxonomically classified mammalian remains constitute 284 elements. Among these, the most significant are *ovis/capra* representing 53.0%. A slight statistical bias can be attributed to the complete skeleton of a dog (*Canis Familaris*) found inside the oven [1170] situated on the corner of [1168] and [1169]. The influence of this complete skeleton on the overall percentile proportion of taxonomical categories is unfortunate but can be effectively combatted by considering the Minimum Individual Identified (% M.Ind Identified) which raises the caprine proportion to 58.5% of the mammalian remains (**Table 7.2**).

7.2.1. Cattle

Only 12 elements (3.6%) of the identified assemblage belong to *Bos Taurus* or common cattle from Area K. However, as noted above the minimum number of identified individuals is consistent with at least three animals (10.3%) represented in the assemblage. All 12 elements of cattle are directly related to its skull, four are mandibles (three are left and one is unclear), a single fragment of hyoid and seven teeth (four molars, two pre-molars and one unclear). As noted by Legge, a small proportion of cattle remains by comparison to smaller animals such as pigs and *ovis/capra* does not necessarily equate to a smaller significance of cattle in the diet (such as proposed by Bertini and Linseele, 2011: 280), as their bulk make it possible for fewer individuals to contribute just as significantly to the local diet as a much larger group of smaller animals (Legge, 2008: 448). The very specific elements surviving in the Area K assemblage does suggest that cattle were not unimportant at the site by comparison to smaller domestic animals. However, it is clear that only very specific elements of the cattle were deposited in Area K, namely the animals' heads.

A possible explanation for this selective deposition may be that Area K only served as a butchering area for cattle. The butchering of cattle comprised the slitting of the animal's throat and possibly the deliberate pumping of the blood by applying pressure to the foreleg before the joints on the legs were removed either for consumption or preservation (Ikram, 1995: 44-52). At some point in the process the animal's head would most likely be entirely severed from the body (Ikram, 1995: 48-49 ; Luff, 1994: 166) and the usable parts such as horns, tongue and cheeks either removed or entirely discarded. As depicted on the butcher scenes from the Medinet Habu mortuary temple of Ramesses III (Epigraphic Survey, 1934: Pl. 173-174) the head was deliberately removed from slaughtered bullocks and brought as offerings before the god.

The more desirable cuts associated in particular with the long bones were then removed from Area K entirely, and it is possible that these were taken to the quarters of the elite at the site who from their position at the top of the hierarchy were more likely to have received the better cuts of meat. The remains were then deposited elsewhere in a hitherto unexcavated portion of the site. Another possibility as noted by Legge (2008: 447) is the significance of the hind quarters and forelegs of cattle in religious depictions, and it is easy to envisage that a significant portion of these high quality cuts were involved with the cultic activities conducted at the temple at Zawiyet Umm el-Rakham. The lack of animal bones in association with the temple itself or the adjoining temple magazines, make it impossible to ascertain whether these institutions participated in either storage and/or distribution of the most desirable cuts of beef at the site. Further investigation of Area N, which has been speculated to house the residence of the fortress commander Nebre, may further elucidate this point. However, at the present stage, it can only be concluded that the cattle remains at Area K do not represent complete or even partially complete animals, and that the preponderance of cranial elements most likely indicates the use of Area K as a butchering area, but not a disposal site, for cattle at Zawiyet Umm el-Rakham.

A further point is the origin of the cattle found in Area K. In her recent analysis of material from Kom Firin, Louise Bertini states that: "[…] cattle remains would be expected to be far more common than pig remains at a site that would have been supported by the central administration, where cattle parts would have been supplied to inhabitants." (Bertini, 2014: 308). Taken in conjunction with a previous statement regarding state provisioning: "[…] New Kingdom fort sites seem of have been provisioned by the state as seen at sites such as Tell Borg (Bertini, in press) and Zawiyet Umm el-Rakham (Bertini and Ikram, in press)" (Bertini, 2014: 306) Bertini argues that cattle were dispatched to fortress sites such as Kom Firin and Zawiyet Umm el-Rakham by the central administration, either as living herds or as preserved cuts of meat. The evidence from Area K clearly argues in favour of living animals being brought to the area to be slaughtered, in particular the presence of manidibles, teeth and other parts associated with largely inedible portions of the animal. The evidence clearly suggests that a herd was maintained at the site, either initially brought from Egypt or acquired from surrounding Libyan pastoralists.

Textual evidence from the Aswan/Philae stela of Thutmosis II also suggests that herds of domesticated animals were maintained by the garrisons at certain New Kingdom forts: "[…] Wretched Kush was rising in rebellion (*bšṯ*), those who were subjects (*nḏt*) of the Lord of the Two Lands planning a plot (*kꜣt*) […] to steal (*ẖnp*) the cattle (*mnmnt*) from behind (*ḥr sꜣ*) the fort (*mnnw*) […]" (*Urk* IV, 139.12-16, see also Lorton, 1990: 671). Two potential situations can be extrapolated from the text; firstly, *ẖnp* may not simply indicate the theft of the cattle for the reward of the theft in itself, but also as a potential way of starving the Egyptian garrison within the fort, which the Nubians may have been unable to physically conquer with a siege. Secondly, the reference to the rebels as "those who were subjects" to Egypt suggests a similar situation as that in effect at Zawiyet Umm el-Rakham between the Egyptian garrison and the local Libyans who may have functioned in a supporting role to the Egyptian inhabitants (see Section 2.2.9). Cattle grazing freely near *mnnw*-forts in Libya are also mentioned on the Israel Stela of Merenptah (K*RI* IV, 18.10-11). As such, a herd of cattle were most likely maintained at Zawiyet Umm el-Rakham, although it is not possible to determine from where the original animals came. They may have been driven from fort to fort along the Marmarican coast or alternatively obtained by either trade or raiding from surrounding Libyans. The most likely scenario is perhaps that a herd of cattle was brought with the initial occupants of the fort and then allowed to breed freely thereby limiting the involvement of the central administration and making the site essentially self-sufficient.

7.2.2. Sheep and goat

By contrast to the cattle elements found in Area K, the caprine elements more clearly represent whole animals. As with the cattle, the area was most likely used as a primary butchering area and immediate disposal site for horncores, phalanges and other inedible portions of the animal. Following consumption of the meat on the relevant elements (such as long bones and ribs) these were then added to the disposal pile. While the majority of the *ovis/capra* elements could not be sub-classified, Bertini (2007: 11-12) was able to determine a sheep to goat ratio of 5/3 using the minimum individuals identified above, although the sample is too small to support generalisations regarding the ratio of the entire assemblage. Although, Bertini (2007: 11-12) noted that the higher proportion of sheep over goats could be viewed as evidence of a wool industry at the site, she also suggested that the kill off patterns (see section 7.6 below) did not support this notion as the sheep were generally killed young (<1.3 years) while the goats were noticeably older (3 years). The slight preference for sheep over goats is both too uncertain and unclear to extrapolate on without a larger assemblage from the site.

However, it is clear that in comparison with contemporary material from the New Kingdom settlement site of Tell el-Amarna displayed in **Table 7.3** and **Fig. 7.1** (Grid 12 and Workmen’s Village: Legge, 2008: 446 and the Stone Village: Legge, 2012: 10), Kom Rabi’a (Jeffreys *et al*, 1986: 8), Kom Firin (Bertini, 2014: 307) and Sais (Bertini and Linseele, 2011: 283) the proportion of *ovis/capra* is far more significantly represented at Zawiyet Umm el- Rakham, while pigs are almost absent and even cattle (*Bos Taurus*) has a far less significant representation. As with cattle, the type of remains found at the site show that living animals were butchered in Area K, rather than cuts of preserved meat arriving at the site from the Nile Valley. It is possible therefore that the Egyptian occupants also maintained a herd of sheep and goats, similarly to their Libyan pastoralist neighbours. Another possibility, considering the relatively young age at which the caprines were slaughtered may be that the animals were obtained alive from surrounding Libyans. This suggests either some level of Libyan acceptance of Egyptian animals grazing outside the walls of the fort or alternatively an actual trade relationship based on the animals.

7.2.3. Dog

A single complete dog (*Canis Familiaris*) skeleton was found inside oven [1170]. Its deposition mixed with the fill from this oven suggests that it died contemporarily with the Egyptian occupation at the site, although the role of the animal at the site and whether it was wild or domesticated cannot be determined at this stage due to the degeneration of the skeletal elements. Neither can its species be identified. No other dog bones were found elsewhere at Zawiyet Umm el-Rakham.

7.2.4. Donkey

Only two elements belonging to *Equus asinus* was identified in Area K, both metacarpals. One was found in ZUR/K0,7 and the second in ZUR/K1,4. As stated in section 7.1 above, the assemblage itself has been disturbed by scavengers and rodents and this may account for the lack of other equid elements found at the site. The use by the Egyptian army of donkeys as pack animals is substantiated by depictions in the

% identified bones	Equid	Cattle	Pig	Caprine	Total
Area K	4.6	13.6	4.6	77.3	191
Grid 12, Amarna	1.8	18.2	45	35	407
Workmen's Village, Amarna	1	19.7	47.9	31.4	1725
Stone Village, Amarna	0	36.9	20.9	40.4	331
Kom Rabia'a 1984	0	26.4	46.5	27.1	156
Kom Firin	2.3	9.3	67.9	20.5	1054
Kom Rebwa, Sais (Phase II-V)	4.2	10.8	35.3	49.7	167

Table 7.3: The Area K faunal assemblage in comparison with contemporary material from sites in the Nile Valley (data adapted from: Bertini and Linseele, 2011: 283 and Bertini, 2014: 307 ; Jeffreys *et al*, 1986: 8 ; Legge, 2008: 446 and 2012: 10).

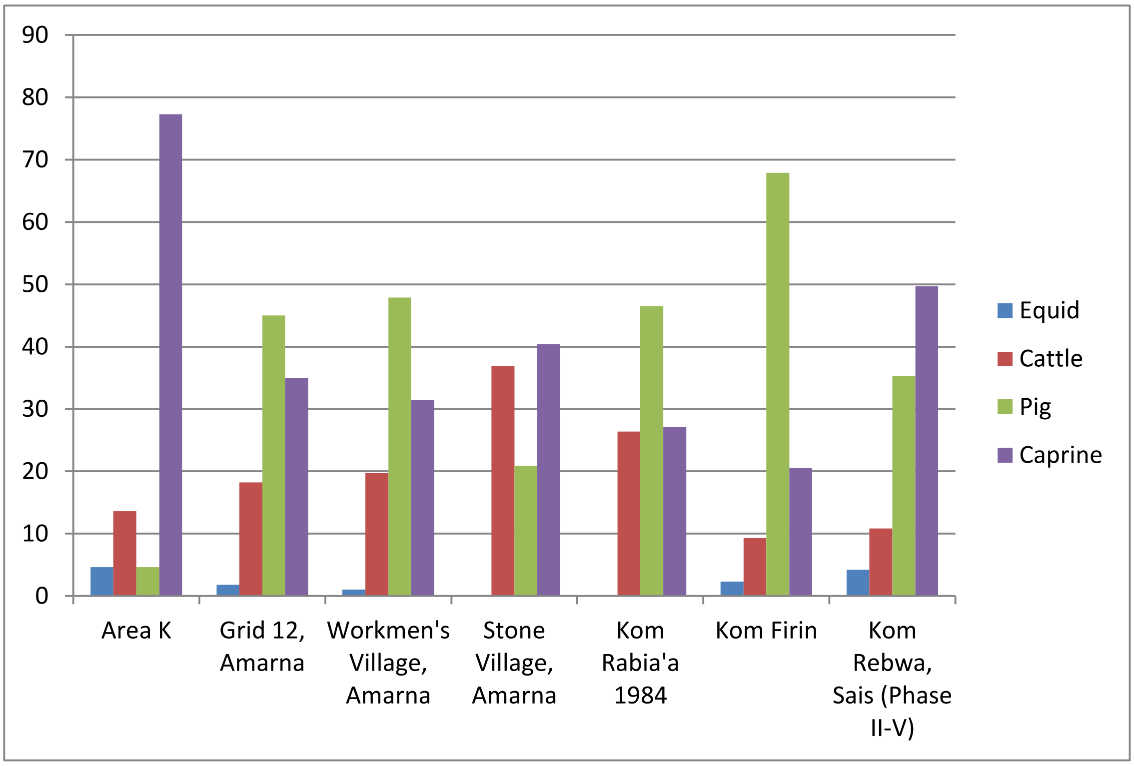


Fig. 7.1: The Area K faunal assemblage in comparison with contemporary material from sites in the Nile Valley (data adapted from: Bertini and Linseele, 2011: 283 and Bertini, 2014: 307 ; Jeffreys *et al*, 1986: 8 ; Legge, 2008: 446 and 2012: 10).

Qadesh reliefs from Abu Simbel (Kuentz, 1928: Pl. XXXIV and Deroches Noblecourt, 1971: Pl. I) and the Memphite tomb of Horemheb (Martin, 1989: Pl. 29, E. Berlin 20363).

7.2.5. Gazelle

Only a single element from a gazelle (either *Gazella Dorcas* or *Gazella gazella*) was found in Area K. This element is a horncore found in ZUR/K1,4. While it is possible that the garrison hunted local fauna such as gazelles (see Section 4.3 above) it is more likely that the horncore may have been scavenged by a patrol from a deceased carcass, possibly with the intention of using the horn to fashion a tool or decorative object. Combined with an evident preference for domesticated caprines as a primary source of protein, this may explain the lack of wild fauna (or other gazelle elements) in the assemblage.

7.2.6. Pig

As shown in **Table 7.2** above, pigs (*sus scofa*) are very scantily represented at Zawiyet Umm el-Rakham. Only two elements were identified, namely an orbit and a 3rd incisor both found in the ZUR/K0,7 cluster. As both these elements are associated with the skull, and considering their close deposition it is tempting to interpret this as a originating from the same animal. There is at least no evidence to suspect more than a single pig in the assemblage.

As Legge (2008: 452) has noted, the Egyptian pig is generally prone to heat stroke and requires good access to mud and water in which to wallow. With the heavy winter rains and a more moderate climate than that experienced at Tell el-Amarna during the summer, Zawiyet Umm el-Rakham would be a far more ideal location in which to maintain pigs. A possible explanation is that pigs are more difficult to transport than both cattle and caprines, which can be driven more easily. Another possibility is that the occupants of Zawiyet Umm el-Rakham largely maintained their herds via cooperation and trade with the local Libyan pastoralists who herded exclusively caprines and cattle and as such that pigs were simply unavailable for them to obtain.

7.3. Tortoises

Thirty-six elements belonging to tortoises were found in Area K. The predominant element is carapace fragments, numbering thirty-two. When assembled, the fragments could be fitted to five individual specimens (Bertini, 2007: 8). Unlike the contemporary assemblage of tortoise elements from Kom Firin (Bertini, 2014: 309-310) the assemblage from Area K does not exclusively contain carapace fragments (although these are clearly predominant) but also two unidentified long bones and two ribs. The small representation of other elements of the animal may be explained by an Egyptian unwillingness to eat tortoises as discussed extensively by Fischer (1968). As Bertini (2014: 310) notes, the carapace itself could be also have been reworked into shields.

However, another explanation is that secondary scavenging influenced the distribution of elements: the carapace is solid and wholly inedible whereas scavengers might have taken and carried away or crushed elements such as long bones and ribs for the marrow or alternatively because fragments of meat were still adhering to their surface. Five of the carapace fragments show signs of burning on their exterior surface which may either be from secondary burning of the disposal site for hygienic reasons, or indicate that the tortoises were cooked whole in their shells or alternatively that the shells were used as impromptu cooking vessels. It is however unlikely that the tortoises represented anything other than an opportunistic meal to the Egyptian occupants as their quantity is too small to have had a significant impact on the diet of the inhabitants of the fort.

7.4. Avians

Only eight elements belonging to birds were found in the Area K assemblage and all were too poorly preserved to taxonomically classify. Only half could be anatomically classified. Four of the elements belong to small birds, two long bones, a femur and a humerus. A further humerus could be classified as belonging to a medium bird, while a single fragment of femur most likely came from a large bird. Two long bone fragments could only be determined to have come from a bird, although their state of preservation made it impossible to classify either the anatomical element, the size of the bird or its taxonomy. The small amount of surviving material may be in part due to the relatively fragile nature of light-weight hollow bird bones and the clear evidence of scavenger activity at the site.

7.4.1. Ostrich Egg-shell

Large quantities of ostrich egg-shall were found in Area K, mostly associated with burnt deposits near ovens and ashy accretions. Fiona Simpson in her study of Libyan presence at Zawiyet Umm el-Rakham during the Late Bronze Age, conducted a comprehensive study into the significance of ostrich egg-shell to the Libyan nomads, and its role as a valuable trade commodity (Simpson, 2002: 416-441). As Simpson concluded, the lack of decoration on any of the dozen of fragmented ostrich eggs found at the site make it unlikely that they served a decorative purpose (like the incised ostrich egg shells found at Haua Fteah, Simpson, 2002: 438), but rather that they represented a further source of protein and nourishment to the Egyptian garrison (Simpson, 2002: 441). It is unlikely that the Egyptians themselves would venture far south in the search for ostrich eggs, instead, the eggs were most likely traded to the Egyptians by local Libyan tribesmen in exchange for metals and luxury objects (Simpson, 2002: 442) or potentially linen and bone pins (see Sections 4.4.6 and 4.6.4).

7.5. Fish and Molluscs

Piscine remains are generally rare at the site, with only 12 unidentifiable vertebrae. A possible explanation for this curious lack – considering the proximity of the Mediterranean Sea – could be the excavation process itself, which did not prioritise the collection of smaller organic samples by for instance flotation, residue analysis and only sporadic sieving of the excavated matrix. A further possibility (discussed further in Section 4.3.2) is the problematic ocean current immediately off the coast of Zawiyet Umm el-Rakham which would have made fishing in smaller boats close to impossible.

Another explanation could be found by considering the contemporary peripheral mining encampment at Timna (Lernau, 1988: 245-246). The faunal assemblage from the small Hathor temple and the encampments at the site comprise some 700 mammalian bones – overwhelmingly caprine – and only 23 piscine remains, all of which belong to imported non-local species such as *Sciaenids* and *Silurids*, which were most likely brought to the site preserved. The primary mollusc elements found in Area K were fragments of oyster shells, although whether their purpose was as a

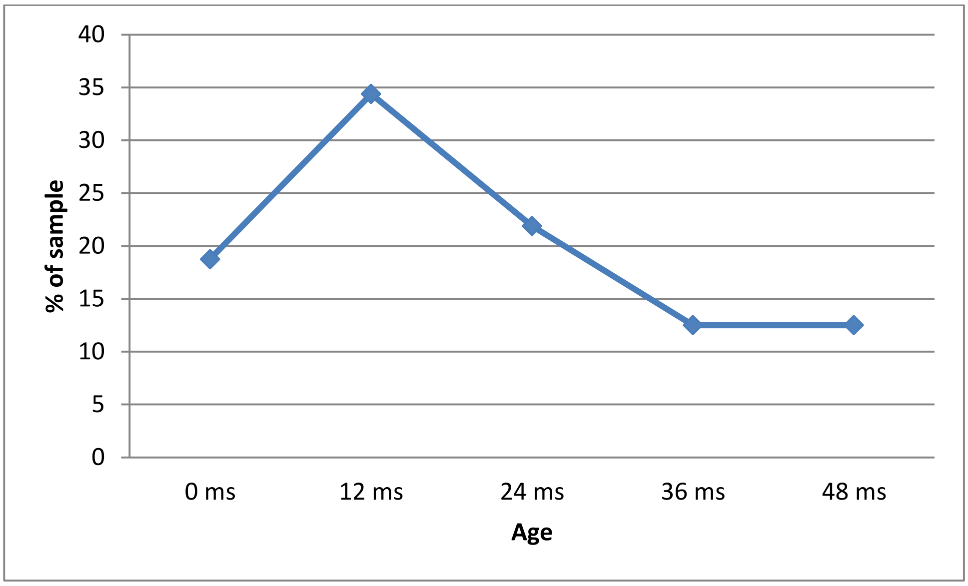


Fig. 7.2: The kill age of caprines from Area K (author).

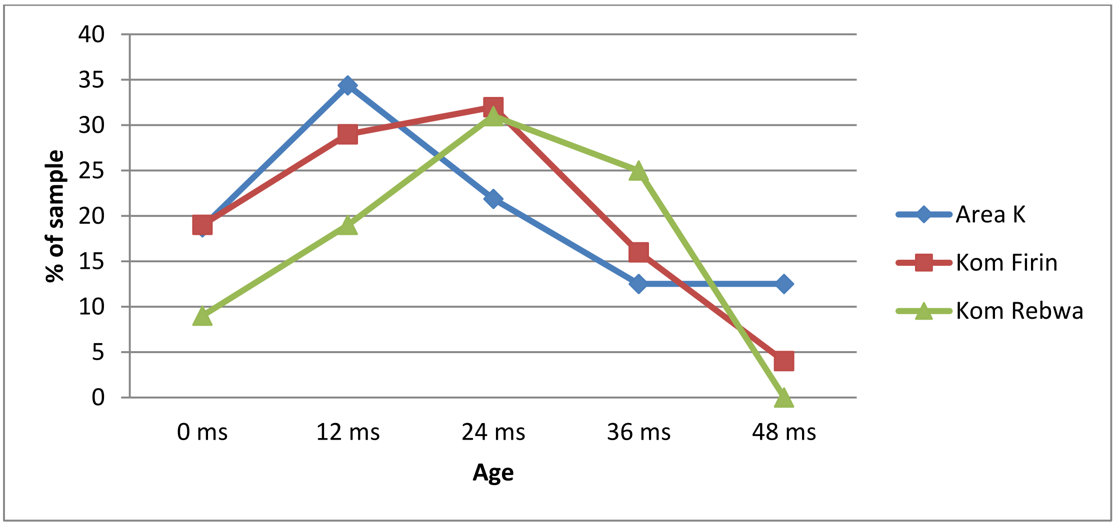


Fig. 7.3: The kill age of the caprine assemblage from Area K in comparison with contemporary material from Kom Firin and Kom Rebwa (data adapted from Bertini and Linseele, 2011: 283 and Bertini, 2014: 307).

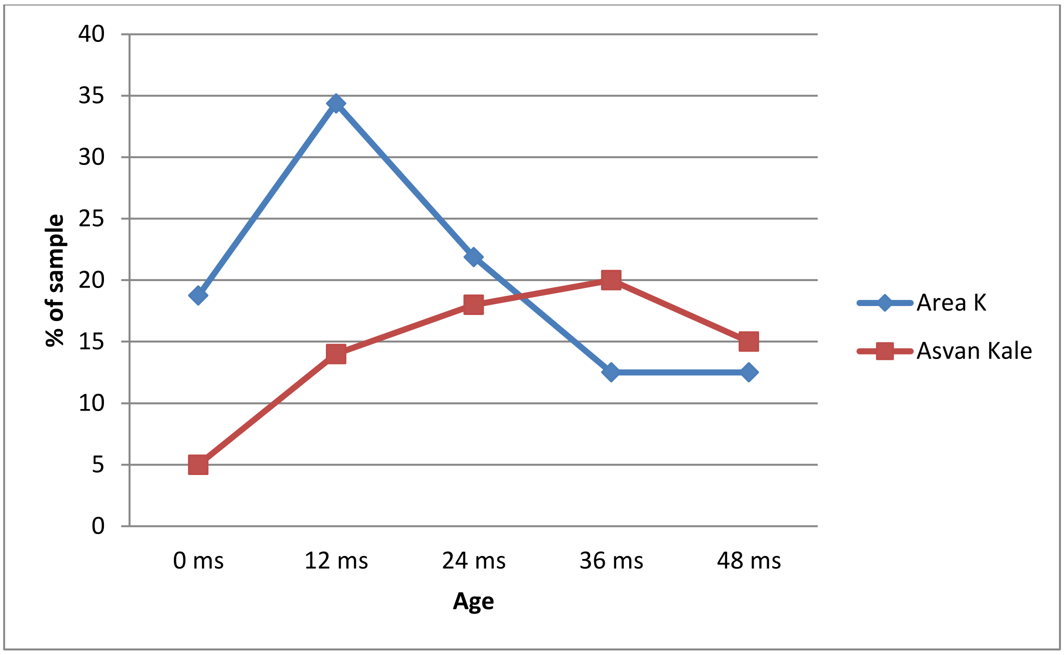


Fig. 7.4: The kill age of the caprine assemblage from Area K in comparison with Hellenistic material from the Turkish site of Asvan Kale (data adapted from Payne, 1973: 281).

food-stuff or merely raw material for jewellery production (see for instance the pierced cockle shells ZUR/K/189 and ZUR/K2H/11, Section 4.9.2) is not clear.

7.6. Age of *Ovis/Capra* Sample

A small sample of the caprine elements were aged by Bertini (2007) using a variety of methods, such as epiphyseal fusion rates and dental eruption/wear. In order to facilitate comparison with the most chronologically relevant assemblages (Kom Firin and Kom Rebwa) the epiphyseal fusion results (following Silver, 1969) will be included here (*N*=32).

The caprine survivorship is strongly related to what usage the animals were put on the site (Payne, 1973). The caprines at Zawiyet Umm el-Rakham could potentially have served three primary purposes: (1) Meat, (2) Wool (*Ovis aries*) and (3) Dairy products. If meat was the primary desired product obtained from the herd, juvenile males would be the most easily expendable (Payne, 1973: 281) with only a few males being kept alive for the purposes of breeding. Wool production would shift the emphasis and kill-age towards older animals nearing the end of their life cycle when wool production falls in quality (Payne, 1973: 281). A focus on dairy production manifest as a tendency towards slaughtering primarily very young animals, to maximise available milk, or older animals no longer capable of breeding. As with a meat-centered production, juvenile males as a dual drain on available milk and only required in small numbers for continued breeding would be the most expendable animal group (Payne, 1973: 281).

The question of wool production and usage in Egypt, where flax was used extensively, has been the subject of intense debate (Kemp and Vogelsang-Eastwood, 2001: 53-5) although it seems certain that while some wool production is clear at New Kingdom settlements such as Amarna (Kemp and Vogelsang-Eastwood, 2001: 34-55), it was nonetheless a secondary product by comparison to the more extensive production of flax-based linen. While no substantial amounts of textile material – either wool or flax – have been found at Zawiyet Umm el-Rakham (and is unlikely to be so due to the environment at the site), there is evidence of an extensive production of flax-based linen (see section 4.4 below). The generally younger kill-age of sheep over goats noted by Bertini (2007: 11-12) taken in conjunction with the functioning flax industry, make it unlikely that a significant wool production was conducted at the site.

The survivorship of the caprine shown in **Fig. 7.2** show a distinct peak around 12 months for both sheep and goats, with a high proportion of new-born and juvenile/young adults (0-6 months and 18-24 months) with a distinct levelling occurring around between the age of 36 and 48 months. No remains of animals older than 48 months have been identified at the site. As demonstrated by Payne using data from the Hellenistic site of Asvan Kale (Payne, 1973), a site where herds were maintained for both meat, wool and dairy products produce a softer curve covering the entire life span of the average animal from 0-8 years (**Fig. 7.3**).

In comparison the caprine survivorship at both Zawiyet Umm el-Rakham, Kom Firin and Kom Rebwa (**Fig. 7.4**) show similar peaks (12 months at Zaiywet Umm el-Rakham and 24 months at Kom Firin and Kom Rebwa) although the latter two examples lack the distinct plateau found between 36 and 48 months in the Zaiywet Umm el-Rakham assemblage. However all three sites share the lack of any animals aged older than four years. This is a clear indication that the complementary industries conducted at Asvan Kale, utilising the herd for all three secondary products, were of less concern to the Ramesside inhabitants. Wool and milk may have been utilised to a lesser extent (Bertini, 2014: 308), although a decided wool- or dairy industry at the site is not supported by the data. Instead, the evidence suggests a heavy reliance on the herd as a source of meat, and as a result a significant spike in the kill-off pattern for juvenile (most likely male) individuals.

7.7. Conclusion

Caprines were by far the most common animals in the Area K faunal assemblage and most likely played the most significant role in provisioning the garrison with meat. The presence of cattle mandibles but no elements from the body of the animals suggests the presence of an as-yet undiscovered second disposal site for faunal remains, and it may also suggest the presence of a hierarchical structure in the types, rather than cuts, of meat eaten at the fort; the officers and officials subsisting on beef, the soldiery and ordinary citizens on sheep and goat.

Pigs are almost entirely absent from the assemblage, probably due to the complications inherent in transporting flocks of pigs over large distances by boat or by foot from the Nile Valley. Similarly, very few wild animal species (such as gazelle) were utilised by the garrison, although it is possible that tortoise was eaten, or alternatively, that its carapace was utilised for tools, shields or as a vessel. Similarly, very little evidence suggests an extensive fishing industry at the site, most likely due to unfavourable coastal currents near the fort. Overall, the assemblage shows a heavy reliance on domesticated animals, probably due to their reliability as a food source over the chance successes and failures inherent in hunting wild game.

The skeletal components in Area K both from cattle and caprines, such as horn cores, mandibles and phalanges show clearly that the animals were brought to the area alive, and most likely butchered, jointed, consumed and then deposited in the area which became part-butchery zone, part disposal site. Considering the textual evidence provided by the Aswan-Philae Stela of Thutmosis II (*Urk* IV, 139.12-16) and the Israel Stela of Merenptah (K*RI* IV, 18.10-11), the most likely hypothesis is that the inhabitants of Zawiyet Umm el-Rakham maintained a herd of cattle and caprines at the site, although the origin of these herds remains speculative. However, faunal evidence from the Late Roman period area of Abar el-Kanayis located south of Zawiyet Umm el-Rakham and serving as a road-house for nomads travelling between the Siwa Oasis and the coast (Pollath and Rieger, 2011: 167) show a striking similarity with the faunal remains from Area K, namely a near-complete dominance of caprine elements at the expense of cattle and pigs. This similarity may support the notion that the majority of the consumed meat from Zawiyet Umm el-Rakham came from the herds of the neighbouring nomadic communities and that this reliance on locally available animals explain the absence of pigs. The cattle found at the site may, by contrast, have been driven to the site from the Nile Valley and maintained as a herd in the area of the fort.

Chapter 8: Subsistence and Craft Production at Early Ramesside Fortified Settlements

8.1. Selected Sites: Fortified Settlements in the Early 19th Dynasty

In his recent publication of the British Museum excavations at the Ramesside settlement of Kom Firin, Neal Spencer posed the question: "Was Kom Firin a fort?" (Spencer, 2014: 33). As Spencer argues, the term 'fort' is inherently biased towards understanding a structure which has either an exclusive or at least primarily military function. There are several ancient Egyptian terms denoting fortified settlements which might be considered 'forts' (*mnnw, ḫtm, mktr* in particular, but also *nḫtw, sgr, bḫn* and *dmỉ*, Morris, 2005: 463-466). One of the aims stated in the introduction to this thesis was to place the evidence for subsistence strategies and craft production at Zawiyet Umm el-Rakham within a context of similar material from contemporary fortified settlements in Nubia, the Sinai Peninsula and the Western Delta in order to determine characteristics of provisioning and local production at these sites. The multiplicity of terms used by the ancient Egyptians to denote fortified settlements/forts necessitate a careful selection of sites in order to ensure against potential biases in the discussion.

The first determinant must naturally be one of chronology. As such, only settlements which were either constructed or substantially altered during the reigns of Seti I or Ramesses II have been included, and only settlements with substantial military architecture (enclosure walls, buttresses, gate towers etc.) located on the borders of Egypt or within foreign territory in Nubia or Libya have been included. Egyptian administrative headquarters in Canaan, such as bases at Askod or Beth Shan (Morris, 2005: 527-610) have not been included as these lack the fortified enclosures that define their contemporary structures on the Sinai, Nubia and Libya. Certain settlements, such as Aksha, have also been excluded from the analysis because insufficient material pertaining to provisioning or production has been published, in favour of a focus on inscriptional evidence (Fuscaldo, 1992 and 1994).

The selected group comprises nine fortified settlements, one in Nubia (Amara West), two located in the Western Delta, near or in Libya (Kom Firin and Tell Abqa'in) and six settlements located either on the borders of Egypt or on the Sinai Peninsula (Tell Heboua I, Tell Heboua II, Tell el-Borg, Tell el-Retaba, Haruba A-289/Bir el-Abd and Deir el-Balah, **Fig. 8.1**). Architecturally (following Morris, 2005) the selected settlements fall into three categories (see also **Fig. 2.3**). The first are the *mnnw*-forts, comprising Amara West, Kom Firin and most likely Tell Abqa'in. The second, the *ḫtm*-forts, comprise Tell Heboua I and II, as well as Tell el-Retaba and Tell el-Borg. The term *ḫtm* denotes border forts, and due to their internal proximity and proximity to Egypt's border with Sinai, this is the most reasonable heading to place them under. The final group, the *mktr*-forts, comprise only Haruba A-289/Bir el-Abd and Deir el-Balah, both located along the Ways of Horus on the Sinai Peninsula and both significantly smaller than any of the other forts.

The aim of the chapter is to discuss the evidence for a series of subsistence strategies (Sections 8.2-8.4) as well as a series of craft industries (Sections 8.5-8.8) commonly

Fig. 8.1: Map showing the location of sites discussed in Chapter 8 (author).

evidenced at contemporary Egyptian sites (and all evidenced at Zawiyet Umm el-Rakham). The evidence from each site will be combined in order to determine what subsistence strategies were generally employed, which materials were produced at the site, as opposed to dispatched from a centralised source within Egypt or from other nearby settlements, and finally what general models for the strategies of provisioning and self-sufficiency can be established for fortified settlements during the early Ramesside Period, notably whether – by their different architecture and geographical environments – there are noticeable differences between the groups of forts or the fronts upon which they were built. A similar discussion was included in his study of Kom Firin by Spencer (2014: 30-34) although as this study – while excellent – is preliminary in character, a more detailed discussion is nonetheless merited.

8.2. Grain Production and Processing

The clearest evidence of grain production at a given site is the presence of the sturdiest tools involved in the harvest, sickle blades with sheen or gloss, or alternatively archaeobotanical evidence of processing waste. Evidence from the site of Kom Firin in the Northwestern Delta is in the form of assemblages of sickle blades (Spencer, 2014: 56 and Figs. 269, 272 and 274) from the Ramesside enclosure, although the presence of sheen or gloss is difficult to determine from the available photographic material. A contemporary assemblage of lithic tools from Tell Heboua I were published by Caneva (1992) who interpreted 86% of the assemblage as sickle blades and noted evidence of lustre and sheen on many of the blades, evidencing use. Much of the assemblage however was obtained from surface collection and as such a precise date was problematic to achieve for all examples in the assemblage (Caneva, 1992).

Another contemporary assemblage of sickle blades the majority of which displayed lustre was collected at the site of Deir el-Balah and dated to the 14^{th}-13^{th} Century B.C. (Rosen and Goring-Morris, 2010, see also Morris, 2005: 518-519). The presence of sickle blades at these sites in the Western Delta and the Sinai Peninsula indicates that local production of grain was undertaken, similarly to Zawiyet Umm el-Rakham, by the military garrison although its extent is uncertain and it is possible that the production was merely intended to supplement centrally distributed supplies, in particular at the larger sites such as Tell Heboua I, which may have served as a grain reserve and arsenal for Egyptian armies crossing into Canaan and would therefore require considerably more grain than would be needed to merely feed its garrison (Morris, 2005: 711).

Archaeobotanical analysis conducted with bucket flotation has produced a series of preliminary results regarding plant use at the site of Tell el-Retaba (Rzepka *et al*, 2013). The chronologically relevant samples were obtained from Area 3, including a large mudbrick wall from the reign of Ramesses II (Rzepka *et al*, 2013: 84) and Area 9, a series of three "barracks" (Rzepka *et al*, 2013: 87-89) datable to the reign of Ramesses II. Emmer wheat and barley dominates the assemblage with additional weed species most likely employed for fuel, although this usage is less marked in the 19^{th} Dynasty assemblage than in earlier 18^{th} Dynasty samples from a settlement underlying the later fortress (Rzepka *et al*, 2013: 91). The 19^{th} Dynasty material constitutes primarily the remains of cereal processing waste (Rzepka *et al*, 2013: 92) indicative of local production. Supporting the notion of local grain production is also the discovery of an assemblage of typical New Kingdom sickle blades found in the area of an 18^{th} Dynasty settlement and the 19^{th} Dynasty fortress (Rzepka *et al*, 2012-2013:

267-269). The use of locally grown grain as well as various fruits is also evidenced at the *mnnw*-fort at Amara West (Ryan *et al*, 2012: 105-106).

Grain processing in the form of ovens, quern stones, mortars and hand-stones are nearly universally found at all the relevant sites (Tell Heboua I: el-Maksoud, 1998: 72, Tell Heboua II: al-Ayedi, 2006: 37, Tell el-Retaba: Rzepka *et al*, 2011: 148-150 and 163-164, Deir el-Balah: Klein, 2010: 280-287, Kom Firin: Spencer, 2014: 56, Tell Abqa'in: Thomas, 2011: 523 and Amara West: Spencer, 2009: 53). The hierarchy under which the grain was processed differs from site to site. At Zawiyet Umm el-Rakham (see Section 4.2), as well as Tell Heboua II (al-Ayedi, 2006: 37) and Tell Heboua I (el-Maksoud, 1998: 72) there are no smaller granaries located within or in conjunction with the domestic units wherein the grain processing was conducted. By contrast, smaller granaries or grain bins were found in conjunction with domestic architecture at Tell el-Retaba (Rzepka *et al*, 2009: 253-255) and Amara West (Spencer, 2009: 53). The former strategy, of requiring the producers to obtain the required grain from centralised storage facilities, as opposed to maintaining a small stock within domestic units, indicates a higher level of centralised control over grain processing. This may also be the case at Kom Firin where the uncovered granaries could potentially hold far more grain than a single household would require (Spencer, 2014: 32, see also an extensive discussion of storage fascilities found at contemporary fortified settlements in Spencer, 2014: 31-32).

8.3. Domesticated Animals

Analysis of faunal remains from the Ramesside enclosure at Kom Firin (Bertini, 2014) revealed that the inhabitants at the site relied predominately on pigs maintained locally, with a much more limited representation of cattle and caprines on the site (Bertini, 2014: 310). The primary publication of the faunal material from Tell el-Borg (Bertini, in press) has yet to be made available, however, some material has been published by Bertini (2013) within her PhD thesis. The evidence from the site suggests a heavy reliance on cattle, rather than pig, which makes up only 5% of the assemblage (Bertini, 2013: 109) and caprines, which constitute just over 20% (Bertini, 2013: 210).

The presence of several ceramic scrapers inside the magazine-turned-workshop of Ramesses II in Area 9 at Tell el-Retaba(Rzepka *et al*, 2011: 148-150) suggests that tanning and curing of animal hides was conducted at the fortress as well. By extension, this industry suggests that butchery was conducted at the site, which in turn suggests some level of self-sufficiency and possibly the maintaining of a local herd of animals. Data from additional fortified settlements, notably at Amara West and the final publication on material from Tell el-Borg, would help to further elucidate this issue. However, the existing data, alongside textual evidence discussed elsewhere in this thesis (see Section 7.7, *Urk* IV, 139.12-16 and K*RI* IV, 18.10-11), strongly suggests that rather than relying on centralised distribution of preserved meat, early Ramesside fortified settlements maintained herds of caprines and cattle, in some cases in conjunction with pigs when the environment was found to be suitable such as it was at Kom Firin (Bertini, 2014: 310).

8.4. Fishing and Hunting

The most extensively published corpus relevant to this category comes from Kom Firin. Within the Ramesside levels, a small proportion of fish (primarily cat fish) as well as ducks and molluscs were identified (Bertini, 2014: 307). There are no wild mammals such as gazelle represented within the assemblage. As such, the primary non-domesticated source of meat at the site came from fish most likely caught in the nearby river or estuary (Bertini, 2014: 310). Fish bones were also found within the Ramesside enclosure at Tell el-Borg, although these may predate the Ramesside occupation (Hoffmeier *et al*, 2014b: 213). However, taken in conjunction with the discovery of net sinkers at the site (Moshier, 2014: 75), it is indicative that while great reliance was placed on domesticated animals, primarily cattle, some foraging strategies were also employed, mainly in the form of fishing in order to supplement the food stores of the settlement.

8.5. Pottery Production

Extensive evidence for local pottery production was discovered in the 1980's in conjunction with the North Sinai Survey at Haruba A-289, A-345 and Bir el-Abd (Oren, 1987 and Goren *et al*, 1995). Thin-sections were collected from four-hundred sherds from the major sites excavated by Oren and his team and used to investigate the amount of locally produced material (primarily of two types, Haruba Marl and Bir el-Abd Marl) in comparison with imported Nile silts and marls and materials imported from southern Canaan (Goren *et al*, 1995: 110). An intense study of these sites show that they were most likely part of a nucleated workshop environment (Oren, 1987: 103), producing both open and closed vessels for several sites in North Sinai, not merely the closest settlements.

Concerning this internal distribution within the Ways of Horus, Tell el-Borg provides further evidence. An extensive corpus of pottery from the site has been produced by Hummel (2014) and while the majority of the vessels from the 19th Dynasty were produced from Nile silts or are in the form of imported Marl amphora, a smaller number were produced in Northern Sinai, from Bir el-Abd and Haruba marl (Goren *et al*, 1995: 110 and Hummel, 2014: 368) and provides evidence for Oren's interpretation of the nucleated pottery workshops at Haruba A-345 in particular as providing pottery to other sites on the Sinai Peninsula (Oren, 1987: 103). Further petrographic analysis of the Tell el-Borg pottery to determine possible sources of the clay and distinguish which portions of the corpus were locally manufactured, if any, has not so far been attempted and no local clay sources or kilns have been identified near Tell el-Borg (Hummel, 2014: 368).

An administrative quarter located outside the walls of Tell Heboua II in conjunction with a group of nine "furnaces" (al-Ayedi, 2006: 38) or kilns bears some architectural similarity to the rambling administrative unit and potter's workshop found at Haruba A-345 (Oren, 1987: 98-106) which included both granaries (Oren, 1987: 98-99 and al-Ayedi, 2006: 38) as well as a complex of kilns for the manufacture of pottery (Oren, 1987: 98-106). Considering the description provided by al-Ayedi (2006: 38) that "Large quantities of pottery sherds were found" in the area of the nine furnaces, and given the striking architectural similarity with contemporary structures at Haruba A-345, it is a reasonable assumption that production of pottery was conducted in the area.

Instrumental Neutron Activation Analysis (INAA) was also conducted on a sample of Egyptian-style ceramics from Deir el-Balah (Yellin and Killebrew, 2010b). The investigation demonstrated that the majority of ceramics found at the site were locally manufactured, a fact also confirmed by the discovery of a Canaanite-style kiln (Dothan and Brandl, 2010a: 282-283) associated with the 13th Dynasty B.C. occupation at the site. Only specific types of vessels (notably storage jars and white-slipped flasks, Yellin and Killebrew, 2010: 73) were imported to the site from Egypt. A more recent study of selected ceramics from Amara West (Spataro *et al*, 2014) using Scanning Electron Microscopy-Energy Dispersive X-Ray Spectrometry (SEM-EDX) similarly determined that the majority of Egyptian-style pottery at the site was locally manufactured, most likely in the same workshops as Nubian pottery of the same period, despite the differences in manufacturing techniques (wheel-made and hand-moulded), an interpretation also supported by the discovery of a single pottery kiln at the site (Spataro *et al*, 2014).

8.6. Stone-Working

As demonstrated by Spencer (2014: 5) many fortified settlements during the New Kingdom were equipped with stone temples. Along with the maintenance of the temple, the manufacture of tools required for grain processing, weaving and other industries, stone-working might be envisaged as a corner-stone industry within these settlements, required both for the manufacture of buildings and architectural elements which glorified elements of the state and the King, and also for maintenance and everyday objects. Evidence for stone working is primarily the results of the process; objects manufactured from local stone, inscriptions and buildings, but also the tools used by stone masons, such pounders and metal chisels (although the latter category tends to survive poorly or simply have been moved deliberately once a site was abandoned due to the value of the copper).

A great deal of inscribed material has been uncovered from the site of Tell Heboua I (presented by el-Maksoud and Valbelle, 2005). Some evidence from MS. XI indicates some degree of stone working at the site, mainly the presence of several hard stone pounders (described by el-Maksoud, 1998: 418-419 and 426 as weights, although considering their similarity to contemporary examples of pounders from Zawiyet Umm el-Rakham and Tell el-Retaba, and lack of any piercing make this interpretation unlikely). Due to the sporadic publication of material from the site, no evidence of further stone working has been so far presented, but considering the lack of flint working at the site (see Section 8.8 below), it is tempting to interpret these pounders as primarily engaged within a stone-working industry whose precise limit and intensity remains unknown.

The most persuasive evidence for stone working at the contemporary site of Tell el-Retaba is a series of spherical stones made predominately from quartzite but also from flint and limestone (Rzepka *et al*, 2009: 257-258). Rzepka's (2009: 257) interpretation of these objects is that they were most likely sling shots. However, an overview of contemporary sling shots from the Eastern Mediterranean, as well as earlier examples, (Vutiropulos, 1991) show that the average weight of a sling-shot was around 30.00 gr. The weight of the 19 spherical stones found at Tell el-Retaba range from 125.00 gr to 300.00 gr (Rzepka *et al*, 2009: 257). It seems unlikely that Egyptian sling shot would be between four and ten times heavier than contemporary material from other cultures, especially considering the pressure it would place on a leather sling to fire a 300.00 gr projectile and the strength required to hurl it any distance at all. The material, size and appearance of the spherical stones are instead identical to the collection of pounders and hammer stones from Zawiyet Umm el-Rakham (section 4.5.2) and the 18th Dynasty assemblage of pounders from Tell el-Amarna (Kemp and Stevens, 2010b: 409-411) and Memphis (Giddy, 1999: 212-214).

The construction of the Temple of Atum by Ramesses II on the site (Rzepka *et al*, 2009: 153) would have required a large contingent of stone masons to carve the limestone blocks, much like the probable Ptah Temple at Zawiyet Umm el-Rakham, although a small amount of more specialised sculptural material was most likely imported to the site (such as a granite dyad statue and a granite stela of Ramesses II, Petrie and Duncan, 1906: XXXII), much like the statue of Nebre from Zawiyet Umm el-Rakham which was most likely only inscribed at the site but carved near the Tura quarries in Memphis (Snape and Godenho, in press). The presence of lower-quality limestone stela most likely belonging to elite members of the fortress (Fuller, Retaba 1978) along with the pounders indicates a similar craft production of stone as at Area K, namely that a group of specialist masons were attached to the site where they both provided objects for the state and the elite (such as temple carving and private stela) and most likely also aided other crafts at the site for instance by manufacturing stone tools needed for grain processing and weaving.

At Deir el-Balah, the majority of stone-objects related to daily life at the site, notably quern stones, were locally manufactured (Klein, 2010: 280) although, as at both Tell el-Retaba and Tell Heboua I, the tools utilised by the stone masons, such as pounders and chisels were primarily manufactured from imported hard stone such as basalt (Klein, 2010: 286-288). An assemblage of stone working tools such as pounders, hammerstones, grinders and rubbers were also found at Kom Firin (Spencer, 2014: 56), primarily manufactured from limestone, quartzite and granodiorite.

8.7. Flax-Linen Production

The most convincing assemblage of data from Tell Heboua I evidencing the existence of not only flax cultivation, but also most of the final steps of the process of spinning and weaving is a series of three loom weights, three spindle whorls and a spinning bowl all found in close proximity to each other within MS. X (el-Maksoud, 1998: 255). Another double-looped spinning bowl was also found in BAT. II, a Ramesside administrative and industrial building (el-Maksoud, 1998: 215). The evidence from the contemporary site of Tell el-Retaba is more problematic: Flax-linen production was conducted certainly during the 18th Dynasty occupation of the site as evidenced by a spindle whorl found in the area of an 18-19th Dynasty settlement as well as several typical New Kingdom spindle whorls and loom weights found at the site by Petrie and Duncan (1906: Pl. XXXVIc). One in particular (Petrie and Duncan, 1906: Pl. XXXVIc.32) even bears identical decoration to the complete limestone spindle whorl ZUR/KB/62 (**Fig. 4.35**) found in Area K. It is possible that this production may have continued during the 19th Dynasty.

A large collection of typical Egyptian ‘double-looped’ spinning bowls were also found at Deir el-Balah (Gould, 2010: 42-47). While these were absent from the Seti I fortress foundation strati (Strata VII), they were nontheless present during the occupation of the fort contemporary with Ramesses II (Gould, 2010: 46). The vessels were locally manufactured and Gould argues (2010: 47) that they may have been primarily involved in the manufacture of linen for use in the nearby cemeteries, as well as for the use of the site’s living inhabitants. Several ceramic spindle whorls (Spencer, 2014: 55) and one example made from limestone (Spencer, 2014: Pl. 262) as well as possible loom weights (such as Spencer, 2014: Pl. 213, Pl. 223 and Pl.231) have been found along with spinning bowls (Smolarikova, 2014: Fig. 63, No. C815) at Kom Firin. Flax linen production is also evidenced at the site of Tell Abqa'in by the discovery of a single spinning bowl (Thomas, 2011: 528 and Fig. 10).

8.8. Chipped-Stone Production

As described in Section 8.2 above, a catalogue of lithic tools found during field walks in the area surrounding Tell Heboua I, and the satellite sites of II, III and IV were presented by Caneva (1992). Caneva concluded that the assemblage was mostly fashioned from non-local material, an interpretation also supported by the lack of any cores found at any of the relevant sites. As such, it seems likely that very little chipped-stone production took place, and that any production was mainly focused on modification and tool-repair rather than a large-scale industry.

A similar situation was in effect at the site of Deir el-Balah (Rosen and Goring-Morris, 2010: 273-277). Within the assemblage of 658 recovered flints dating primarily to the 14th and 13th centuries B.C. are 107 pieces of debitage, as well as a series of smaller blade cores (Rosen and Goring-Morris, 2010: 275). As none of these cores were of a sufficient size or type to have produced the prevalent sickle blades found in the assemblage, Rosen and Goring-Morris (2010: 275) concluded that these tools were brought finished to the site. Tool manufacture at the site itself was primarily limited to the manufacture of a smaller amount of simple tools (such as blades and notches) with more complex tools (such as sickles) imported finished from another site or possibly from Egypt.

8.9. Conclusion

This chapter was intended to provide a review of the available archaeological data related to subsistence strategies and craft production industries at fortified settlements in Nubia, Libya and Sinai constructed or occupied during the early Ramesside Period. The intention was to investigate the degree to which these structures were dependent on centralised distribution of materials and secondly, whether significant differences in strategies existed between individual sites.

The immediately notable feature is the degree of reliance on local resources and the local landscape at the majority of the sites investigated. Several are dependent on locally grown crops, both cereal crops, but also fruits and even flax as the basis of a linen manufacturing industry conducted within several of the settlements. The prevalence of local pottery manufacture, and the complex internal distribution system evident in North Sinai and possibly also Nubia, indicates great familiarity with the local landscape and also an ability to construct and successfully run manufacturing architecture (such as kiln structures) outside the immediate control of the fortifications themselves (such as at Deir el-Balah and Haruba A-345).

The omnipresence of stone masons and the reliance on local stones suggests a relatively good working knowledge of local geology (evidenced by the deliberate import of hard stone tools when none were locally available for instance) and also the ability to mine resource in the settlement’s hinterland, outside the immediate protection of the fortifications. Other industries are less well-evidenced, primarily chipped stone manufacture, which relied primarily on imported tools, and was to a great extent confined to modification and repair of existing tools rather than large-scale production. Similarly, metal working is almost entirely absent from the archaeological record at these sites, and when present is primarily in the form of limited crucible-based repair and re-casting of smaller objects (such as at Kom Firin, Spencer, 2014: 58). This agrees with the evidence of large-scale state-controlled industrial manufactures of metal objects, especially weapons, within larger settlements in the Nile Valley such as Pi-Ramesses and Thebes (Pusch, 1990 and 1994).

Aside from at least a partial reliance on locally grown grain, the maintenance of herds of domesticated animals (cattle, caprines and pigs primarily) further suggests that stable conditions in the hinterland of the settlements were required for the survival of the inhabitants. The forts contain evidence for a partly autonomous economic system whose expression differs little from site to site, despite their geographical and architectural differences. Well-developed subsistence strategies - focused on the control of domesticated species with a smaller addition of ‘safe’ foraging, such as fishing, alongside local grain production - was the foundation of survival at most of the relevant settlements. Craft industries were reflections of major industries conducted at any population hub in the Nile Valley, such as Qantir, Memphis and Tell el-Amarna (Spencer, 2014: 33).

Chapter 9: Conclusions

In the introduction to this study three aims were identified. The primary of these was the investigation of the subsistence strategies utilised, and craft production industries engaged in, by the inhabitants of the 19th Dynasty *mnnw*-fort of Zawiyet Umm el-Rakham. The methodology was an in-depth exploration of all available archaeological data from the fort's domestic and provisioning area, Area K. Two further research questions follow on from this primary aim. Firstly, the data from Zawiyet Umm el-Rakham will be used in a re-interpretation of Egypto-Libyan relations in eastern Libya and the Marmaric Coast in particular during the 19th Dynasty and a re-interpretation of the purpose and objectives behind the construction of the fort at Zawiyet Umm el-Rakham. The final aim was the creation of a model for the provisioning and self-suffiency at contemporary fortified settlements in Libya, Nubia and Sinai. The methodology for this final aim was a review of the existing archaeological data from relevant sites (Chapter 8), which will be discussed in conjunction with the data from Zawiyet Umm el-Rakham presented in this thesis. Due to the plurality of aims in the study, this conclusion has likewise been organised in three components, each of which resolves a relevant research objective.

9.1. Subsistence and Craft Production at Zawiyet Umm el-Rakham

Subsistence strategies employed at Zawiyet Umm el-Rakham reflect an adaptation to the natural environment, and also an awareness of the precarious position of the settlement's inhabitants. Protein in the form of animal meat was almost exclusively obtained from a domesticated herd, a sedentary strategy which would have occurred naturally to New Kingdom Egyptians who came from towns and villages where the security of domesticated animals was generally preferred over foraging strategies (Linseele and Van Neer, 2010: 71). While some limited foraging (primarily evidenced by the presence of tortoise remains) was undertaken at the site, this was clearly of secondary importance. Further protein in the form of ostrich eggs was procured from Libyan tribesmen, most likely in exchange for linen cloth, various manufactured goods, grain or metal objects. The mammalian remains at the site (caprine and cattle) show that the animals were butchered at the site, and as such came from a living herd, most likely kept grazing in the relatively fertile *wadis* south of the fort.

The production of grain, as the basic ingredient in the staples of bread and beer was conducted at the site. All the available evidence suggests a strong centralised control of all grain supplies (primarily the granaries in Area H), shown by the lack of smaller ‘domestic’ granaries or grain bins in relation to the structures in Area K. Instead, the inhabitants engaged in baking were issued a specific ration on a daily basis from the centralised granaries. The extensive storage facilities at the site, and the large quantity of sickle blades located both in Area K and in the later Libyan squatter occupation, suggest that the settlement may have been self-sufficient and not reliant on grain ships despatched from Egypt.

With a locally maintained herd and self-sufficiency in grain, the garrison at Zawiyet Umm el-Rakham was remarkably independent of the centralised administration in the Nile Valley, and presented little burden to it. It is unlikely that significant supplies, other than few luxury objects or foodstuffs which could not be obtained from passing merchants, were despatched for the benefit of the site’s elite members. This contradicts the royal boasts by Ramesses II who claims to have provided the *mnnw*-forts in Libya with all things they required so that they could serve as temporary rest stops to royal messengers (K*RI* II, 292:8-9). While it is possibly that forts such as Zawiyet Umm el-Rakham occasionally lodged royal envoys on official business, the archaeological evidence demonstrates that the forts were not, as Morris (2005: 628) claims, royally supplied due to perceived difficulties in securing local food and available fresh water (which in fact is remarkably available considering the high water-table, see Section 6.3.1).

The available archaeological data shows the presence of at least eight industries, most of which overlap and which represent the manufacture of both basic necessities such as vessels and tools, as well as objects which were required for the purposes of trade and to increase the prosperity and/or security of the settlement, such as linen and bone pins. There are also objects of personal use, such as crude ceramic figurines and shell jewellery. The final evaluation of the various modes and scales of production presented in **Table 9.1** shows two distinct types of production conducted within the site. The major productions are those which were most likely under some level of control by the site's elite. This control may have been exhibited directly, as was the case with the stone working at the site which often provided material directly for the private use of elite members of the garrison (such as stela) or alternatively worked on state-supported projects, such as the on-site temple.

In some instances, the control may have been due to the perceived value of the produced materials. This is most likely the case with the manufacture of cloth. The preparatory stages of flax spinning and weaving would have required centralised oversight, and the products themselves were most likely centrally stored in the site

	Household production	**Household industry**	**Individual workshop**	**Nucleated workshop**	**Attached specialist producers**
Textile Production			(S)		(M)
Stone-working				(S)	(M)
Bone-working		(M) / (S)			
Non-vessel ceramics production	(M) / (S)				
Metal-working		(M) / (S)			
Jewellery production	(M) / (S)				
Pottery production			(S)		(M)
Chipped stone production		(M)/(S)			(M)

Table 9.1: Types of Craft Production in Area K listing modes (M) and scale (S) of production (adapted from Rice, 1987: 183-191).

magazines (as is directly stated in the biography of Nebre, Snape and Godenho, in press). The need for centralised oversight of pottery and chipped stone production was most likely due to the location of raw materials a relative distance from the fort itself, and despite the possibly peaceful relations in the area, it is likely that long-distance excursions from the site required the involvement of representatives of the site's elite. Both industries were also crucial to the manufacture of food and the harvesting of grain and as such, both were most likely underlain the same level of official control as the storage and processing of cereal products.

The second type of production comprises four industries; the manufacture of bone pins, non-vessel ceramics of various types, metal-working and jewellery manufacture. The bone pins may constitute a non-regulated barter trade in which ordinary inhabitants at Zawiyet Umm el-Rakham could engage with Libyan tribesmen, possibly in exchange for ostrich eggs or similar exotica. The production utilises only basic raw materials (caprine bones), readily available inside the fort's enclosure and only basic tools (crudely made notched blades and rubbing stones made from local limestone). The lack of decoration and the limited skill displayed in this manufacture further indicates that it was undertaken by non-specialists, most likely in a very informal environment.

The limited manufacture of jewellery (primarily in the form of pierced shells) and non-vessel ceramics represent a wholly personal industry undertaken by an individual most likely without any explicit official control exclusively for private reasons. This is especially the case with the crude ceramic figurines or the poorly manufactured house shrines. While the figurines are typically Egyptian, the house shrines are Canaanite and may as such represent a private expression of devotion by members of the garrison who were ethnically different from the Egyptian elite. The formalisation of Canaanite religious beliefs may by contrast have been expressed by the construction of a possible Canaanite shrine in Area S, although this conclusion is uncertain. The limited jewellery manufactured at the site is similarly produced with very limited skill and no sophisticated tools. The small quantity of such objects furthermore argues against any notion of a regimented production at the site.

Metal production at the site is also poorly evidenced. It might be expected that a military installation would have a large-scale production of weapons and constant maintenance and repair. The evidence however suggests relatively crude, limited metal working at the site by contrast to large-scale ‘factories’. Weapons were undoubtedly present at the site, but it is likely that these were removed by the final inhabitants to prevent them falling into enemy hands. Significant repair may also not have been required. If the weapons were centrally distributed closer to the Nile Valley to troops before leaving for their postings, it is possible that a rotation system would have ensured that new soldiers with recently manufactured weapons arrived at regular intervals thus eliminating the need for a significant repair industry. It is however, likely that metal objects of some type were involved in Egypto-Libyan trade in the area, considering the ‘metal hungry’ nature of Libyan society (Hulin, 2009) and as such metal production may have been conducted for the purposes of low-level barter trade.

The imported objects to the site primarily fall into two categories: tools or luxury objects. The luxury objects are either in the form of specific high value food stuffs (most likely wine and oil) transported in Mycenaean, Cypriot and Canaanite vessels as well as Egyptian Marl D amphora. The Marl D amphorae are likely to have been despatched from settlements in the Nile Valley whereas the other vessel types may also have come from passing merchants (Snape, 1998 and 2003). Roughly half of the domestic pottery from Area K is similarly manufactured in the Nile Valley and brought to the site. Other imports are jewellery, in particular the calcite-alabaster hair rings found at the site. The other group of imports, tools, are primarily in the form of hard stone pounders and sickle blades, imported out of necessity due to a lack of required raw materials in the area. Mined flint of good quality was also imported to the site.

However, the methods of import are important to note. As discussed above in Chapter 6, it is unlikely that shiploads of empty open pottery plates and dishes were shipped to the site, and similarly it is difficult to imagine that limited quantities of tools and a few objects of adornment were shipped on behalf of the state to the fort. Instead, it should be envisaged that these objects were transported to the site by the inhabitants themselves. Some of the objects undoubtedly arrived with the founders of the settlement (due to its short occupational history), but – as stated above – rotations of soldiers sent out to the site would undoubtedly have brought various provisions and objects with them as well. As a result, there is very little direct evidence to suggest that constant supply lines were maintained between the Nile Valley and Zawiyet Umm el-Rakham and it is difficult to argue that these would have been required considering the relative variety of local industries and quantity of locally manufactured objects.

As with subsistence strategies, the primary focus of the craft industries undertaken at Zawiyet Umm el-Rakham was one of self-sufficiency. This was expressed by a series of relatively controlled major industries whose successful outcome directly contributed to the survival and potential prosperity of the site, in the same manner as the centrally governed production and processing of grain ensured the settlement's survival. However as with the occasional scavenging conducted as a secondary subsistence strategy, certain craft industries were most likely conducted outside the direct control of centralised oversight and primarily for the benefit of the individual, such as the manufacture of crude adornments and small cultic items. The self-reliance of the occupants on their geo-environment is however certain. The archaeological data from Area K shows clearly that the settlement at Zawiyet Umm el-Rakham functioned with very limited reliance on centrally distributed goods, to such a degree that it can be assumed that this self-reliance was no coincidence but a direct reflection of the Egyptian state's reluctance to undertake the economically significant and laborious task of directly maintaining and providing for a settlement located at the very end of its sphere of influence.

9.2. Egypto-Libyan Relations at Zawiyet Umm el-Rakham

As discussed in Section 2.3, the interpretation of Egypto-Libyan relations has been built primarily on textual data (*cf* Garcia 2014 ; Kitchen, 1990 ; Osing, 1980 ; O'Connor, 1990 ; and Spalinger, 1979b) due to the absence of relevant archaeological material. While the finds from Area K (and Zawiyet Umm el-Rakham as a whole) are almost exclusively Egyptian in nature, certain points regarding Egypto-Libyan relations can nonetheless be inferred from the primary subsistence strategies and craft industries conducted at the site. Considering the claims of several authors (O'Connor, 1990 and Morris, 2005) that Libya became increasingly belligerent and hostile towards Egypt during the 19th Dynasty, it might be expected that the settlement at Zawiyet Umm el-Rakham was maintained in a state of readiness as a look-out post for potential Libyan invasions (Kitchen, 1990: 18-19) or a defensive structure to block armies moving from the West towards the Delta (O'Connor, 1990: 87-88).

The notion of Zawiyet Umm el-Rakham as both a look-out post and a structural bottle-neck fails to account for specific architectural and geo-environmental conditions. Firstly, Zawiyet Umm el-Rakham is far larger than contemporary forts on the Ways of Horus at Haruba or Deir el-Balah (see **Fig. 1.3)**, larger than would be required to act as a warning post. While the fort is located half-way between the escarpment cliffs and the Mediterranean Sea, the distance is still too great to stop an advancing army without leaving the safety of the fortifications, potentially being outnumbered and overrun (Snape, 1998). Assumptions made most recently by Richardson (1999) and Garcia (2014) that Zawiyet Umm el-Rakham functioned primarily as a trade post also fails to take into account the lack of evidence for any significant large-scale trade between Egyptians and local Libyans.

The archaeological evidence from Zawiyet Umm el-Rakham suggests that friendly relations existed between local Libyan tribes and the Egyptian occupants. Not only were Libyan tribesmen directly involved in the work of the military garrison, patrolling *wadis* south of the fortress (see Section 2.2.9) but crucially they provided the required access to resources such as fertile land, clay beds and pebble flint, which were crucial to the continuing maintenance of the garrison. The settlement's inhabitants by relying primarily on locally produced cereal crops and by maintaining a herd outside the walls of the fort placed themselves willingly in a potentially vulnerable position. A Libyan army moving west would not have needed to conquer the fort. They could have dispersed the herds belonging to the settlement and burnt the fields immediately before the harvest when the garrison's rations were at their lowest and it would have been entirely possible to starve out the inhabitants of the fort; a technique used by the Libyans during the reign of Merenptah (K*RI* IV, 18:1-19).

To accept that Zawiyet Umm el-Rakham was constructed primarily as a reaction to a perceived increased hostility in Libya, which would not manifest for half a century, requires a belief that the Egyptian state would have been capable of forseeing such a drastic event long before it was evident. This interpretation could arguably be highlighted as an example of Historian's Fallacy (Fischer, 1970: 209-213). If the Egyptian state had foreseen precisely how volatile and potentially dangerous the situation in Libya would become during the reign of Merenptah, it is unlikely that they would have required their furthest Libyan outpost to be directly reliant on local goodwill for the production and management of both their primary food sources (grain and meat), their supplementary food source (ostrich eggs) as well as their major industries (pottery production, stone working, chipped stone and flax linen production).

To interpret the site as primarily a trade outpost (such as Garcia, 2014 and Richardson, 1999) requires an overestimation of the material goods held by the Tjehenu-Libyans during the Late Bronze Age. The archaeological data from Zawiyet Umm el-Rakham suggests a middle way. The fortress at Zawiyet Umm el-Rakham should be viewed as an attempt by the Egyptian state to normalise relations between Egypt and the Tjehenu Libyans, not out of a desire for material goods (such as the Egyptian state received from Nubia and Western Asia, Kemp, 1978), but out of a desire to extend Egyptian control and create a buffer-zone between Western Libya and the Western Nile Delta, not in the form of bottlenecks, but in the form of functioning fortress towns, which integrated a multiplicity of ethnicities and most likely benefitted local Libyans who worked for the fort, worked as scouts for the garrison or simply partook in barter trade.

To conclude, the archaeological evidence from Area K does not necersarily contribute greatly to the understanding of the material culture of the Libyan tribesmen living in the Marmarica region during the Late Bronze Age; it was never likely to do so. The procurement strategies inherent in both the production of food and goods at the site however, show clearly that the prevalent assumption that Zawiyet Umm el-Rakham and the Marmarican forts were direct results of increased unrest in the region (*cf* Morris, 2005 ; Kitchen, 1990) are too rigid. While increased tension between Libyan tribes (*cf* K*RI* IV, 4:1) may have occurred during this period, before finally flaring into open war during the reign of Merenptah, the self-reliance and far-reaching control of their local environment demonstrated by the occupants at Zawiyet Umm el-Rakham suggests that the local nomadic populations, far from being potential enemies, were crucial partners in the continuing existence of the settlement. This interpretation also more accurately reflects contemporary textual sources of Ramesses II (Snape and Godenho, in press and K*RI* II, 406: 33), which talk of housing the Tjehenu Libyans, not fighting them.

9.3. A Model for Subsistence and Craft Production at Early Ramesside Fortified Settlements

The final aim of this thesis was to place the data from Zawiyet Umm el-Rakham into a context of contemporary fortified settlements in Libya, Nubia and Sinai in order to investigate uniform strategies of subsistence and craft production functioning across several geographical environments. The sites selected are by no means uniform. While Amara West and Kom Firin were most likely *mnnw*-forts similar to Zawiyet Umm el-Rakham, the remaining structures fall into two further sub-categories: *ẖtm*- and *mktr*-forts. As such, this study in no way suggests that all fortified structures were architecturally similar or constructed for similar purposes. The differences in purpose and architecture proposed by Morris (2005: 804-827) have been accepted as accurate, however, the dedicated investigation of production vs. reliance on military supply lines nonetheless highlights a degree of similarity across several different structural categories.

The review of the published evidence for grain production suggests that similar to Zawiyet Umm el-Rakham, sites such as Kom Firin, Tell Heboua I, Deir el-Balah and Amara West were partially or wholly self-reliant. In the case of larger structures which also served as arsenals and grain stores for armies moving into Canaan such as Tell Heboua I, this self-reliance may only have extended to the permanent occupants of the fort, and combined with centralised distribution to ensure the larger quantities of provisions required. Similar to Zawiyet Umm el-Rakham was also the reliance on a living herd of animals maintained at the site both at Kom Firin in the Western Delta, as well as Tell el-Retaba and Tell el-Borg on the Sinai Peninsula.

The major industries conducted at Zawiyet Umm el-Rakham were also evidenced at the majority of comparable sites, and combine to suggest that rather than relying on state distribution of goods and provision along military supply lines, the forts of the early Ramesside period were surprisingly self-sufficient entities. This interpretation has far-reaching consequences in particular on the study of the economic benefits and drawbacks of the Egyptian New Kingdom Empire. It suggests that while the construction of fortified structures along Egypt's borders and in foreign territory may have been costly in terms of labour and resources, their actual maintenance was inexpensive for the state. Certain goods, notably pottery and weapons, were transported by the garrisons themselves to the site. Some sites, such as Tell Heboua I may additionally have maintained an arsenal of weapons to equip campaigning armies. The evidence does not however suggest that there was a need for equipment or goods to be despatched independently from the central administration aside from the goods traveling with the occupants themselves when they were despatched to the investigated settlements.

These sites were clearly military in nature, their fortifications, location and inscriptional evidence proves this. Despite this military character, they were settlements like any other in the Nile Valley, with identical requirements. Survival was largely in the hands of the settlements' elite themselves, rather than being centrally supported. The forts were not simply abstract expressions of the Egyptian state's foreign policy, but functioned on a level similar to that of later medieval castles suggested by Creighton and Liddiard (2008), as centres for economic and political management, locked in a close relationship with their surrounding landscape, in a manner reminiscent of most settlements in the Nile Valley during the early Ramesside period.

The evidence presented in this thesis has demonstrated how a bottom-up approach based around the careful examination of archaeological data from single and multiple contemporary sites can be used to infer conclusions regarding the socio-economic life of specific settlement categories. It can also provide the basis for more nuanced interpretations of political relationships, such as the Egypto-Libyan relations during the early Ramesside period. Further work in this field is needed. The study of New Kingdom fortified structures on the borders, and outside of Egypt proper requires a continuation of archaeological exploration. In particular, a focus on structural remains outside the enclosure walls of these structures, further investigation of local procurement of food and production of goods and analysis of population composition and evidence of cooperation and trade with local people can all be combined to further extend the state of knowledge of the socio-economic organisation of Egypt's New Kingdom Empire, and the interplay between centralised distribution and self-sufficiency.

Abbreviations

Ä&L	*Ägypten & Levante*
AJA	*American Journal of Archaeology*
ASAE	*Annales du Service des Antiquités de l'Égypte*
BACE	*Bulletin of the Australian Centre for Egyptology*
BAR	*Biblical Archaeology Review*
BASOR	*Bulletin of the American Schools of Oriental Research*
BIFAO	*Bulletin de l'Institut Français d'Archéologie Orientale*
BSA	*Bulletin on Sumerian Agriculture*
CAJ	*Cambridge Archaeological Journal*
CCE	*Cahier de la Céramique Égyptienne*
CdE	*Chronique d'Égypte*
CRIPEL	*Cahier de Recherches de l'Institut de Papyrologie et d'Égyptologie de Lille*
GM	*Göttinger Miszellen*
JAEI	*Journal of Ancient Egyptian Interconnections*
JARCE	*Journal of the American Research Centre in Cairo*
JEA	*Journal of Egyptian Archaeology*
JNES	*Journal of Near Eastern Studies*
JSSEA	*Journal of the Society of the Study of Egyptian Antiquities*
LibStud	*Libyan Studies*
MDAIK	*Mitteilungen des Deutschen Archäologischen Instituts, Abteilung Kairo*
MMS	*Metropolitan Museum Studies*
NEA	*Near Eastern Archaeology*
REE	*Revista de Estudios de Egiptologia*
SAK	*Studien zur Altägyptischen Kultur*
ZÄS	*Zeitschrift für ägyptische Sprache und Altertumskunde*
JAS	*Journal of Archaeological Science*
IJNA	*International Journal of Nautical Archaeology*
JAMT	*Journal of Archaeological Methods and Theory*
JASA	*The Journal of the American Society of Agronomy*

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Appendix I: Area K Context List

Context	Description	Type
999	Topsoil	Deposit
1000	Sandy deposit >10 cm above occupation surfaces	Deposit
1001	Cobble stone wall (N-S)	Structure
1002	Mudbrick wall (E-W)	Structure
1003	Cobble stone wall (N-S)	Structure
1004	Cobble stone wall (N-S)	Structure
1005	Cobble stone wall (E-W)	Structure
1006	Cobble stone wall (N-S)	Structure
1007	Cobble stone rubble	Deposit
1008	Cobble stone wall (E-W)	Structure
1009	Cobble stone buttress	Structure
1010	Cobble stone doorstep	Structure
1011	Cobble stone wall (N-S)	Structure
1012	Cobble stone wall (N-S)	Structure
1013	Oven	Structure
1014	Oven	Structure
1015	Mortar	Structure
1016	Mortar emplacement	Structure
1017	Mortar	Structure
1018	Mortar emplacement	Structure
1019	Mortar	Structure
1020	Mortar emplacement	Structure
1021	Cobble stone buttress	Structure
1022	Cobble stone wall (N-S)	Structure
1023	Cobble stone buttress	Structure
1024	Cobble stone doorstep	Structure
1025	Cobble stone buttress	Structure
1026	Cobble stone rubble	Deposit
1027	Cobble stone buttress	Structure
1028	Cobble stone wall (N-S)	Structure
1029	Oven	Structure
1030	Stone slab	Object
1031	Cobble stone wall (E-W)	Structure
1032	Mudbrick platform	Structure
1033	Oven	Structure

Context	Description	Type
1034	Limestone doorstep	Object
1035	Cobble stone wall (E-W)	Structure
1036	Cobble stone wall (N-S)	Structure
1037	Lintel	Object
1038	Door jamb	Object
1039	Door jamb	Object
1040	Door jamb	Object
1041	Door jamb	Object
1042	Door jamb	Object
1043	Cobble stone wall (N-S) (Also defines Area A and D)	Structure
1044	Cobble stone buttress	Structure
1045	Cobble stone wall (E-W)	Structure
1046	Cobble stone wall (N-S)	Structure
1047	Cobble stone wall (E-W)	Structure
1048	Cobble stone wall (E-W)	Structure
1049	Cobble stone rubble (collapse from wall [1048])	Deposit
1050	Charcoal deposit	Deposit
1051	Charcoal deposit	Deposit
1052	Sand mixed with burnt mudbrick	Deposit
1053	Cobble stone rubble	Deposit
1054	Cobble stone bulwark for <1055>	Structure
1055	Well	Cut
1056	Cobble stone doorstep	Structure
1057	Cobble stone wall (N-S)	Structure
1058	Cobble stone wall (N-S)	Structure
1059	Cobble stone wall (E-W)	Structure
1060	Cobble stone doorstep	Structure
1061	Door jamb	Object
1062	Door jamb	Object
1063	Door jamb	Object
1064	Door jamb	Object
1065	Lintel	Object
1066	Cobble stone buttress	Structure
1067	Door jamb	Object
1068	Cobble stone rubble	Deposit
1069	Cobble stone wall (N-S)	Structure
1070	Cobble stone wall (E-W)	Structure
1071	Cobble stone wall (N-S)	Structure
1072	Limestone plug	Structure

Context	**Description**	**Type**
1073	Cobble stone fill	Deposit
1074	Limestone plug	Structure
1075	Door jamb	Object
1076	Door jamb	Object
1077	Cobble stone rubble	Deposit
1078	Cobble stone rubble	Deposit
1079	Cobble stone wall (N-S)	Structure
1080	Cobble stone wall (N-S)	Structure
1081	Cobble stone wall (E-W)	Structure
1082	Cobble stone rubble	Deposit
1083	Limestone doorstep	Object
1084	Cobble stone rubble	Deposit
1085	Cobble stone rubble	Deposit
1086	Mortar	Structure
1087	Mortar emplacement	Structure
1088	Cobble stone wall (E-W)	Structure
1089	Limestone doorstep	Object
1090	Cobble stone doorstep	Structure
1091	Cobble stone wall (N-S)	Structure
1092	Cobble stone buttress	Structure
1093	Cobble stone wall (E-W)	Structure
1094	Cobble stone wall (N-S)	Structure
1095	Cobble stone wall (N-S)	Structure
1096	Cobble stone wall (E-W)	Structure
1097	Cobble stone rubble (collapse from wall [1096])	Deposit
1098	Cobble stone rubble (collapse from walls [1093], [1094] and [1096]	Deposit
1099	Cobble stone doorstep	Structure
1100	Cobble stone buttress	Structure
1101	Two mudbricks	Structure
1102	Substantial wall of mudbrick laid on top of cobble stone wall (N-S)	Structure
1103	Cobble stone wall (heavily damaged) (N-S)	Structure
1104	Cobble stone rubble (collapse from wall [1093])	Deposit
1105	Cobble stone rubble	Deposit
1106	Cobble stone rubble (collapse from buttress [1100])	Deposit
1107	Cobble stone rubble	Deposit

Context	Description	Type
1108	Oven	Structure
1109	Cobble stone wall (E-W)	Structure
1110	Cobble stone wall (N-S)	Structure
1111	Rectangular mudbrick platform	Structure
1112	Cobble stone rubble	Deposit
1113	Oven	Structure
1114	Cobble stone wall (N-S)	Structure
1115	Cobble stone buttress	Structure
1116	Cobble stone doorstep	Structure
1117	Cobble stone rubble	Deposit
1118	Cobble stone rubble	Deposit
1119	Cobble stone rubble	Deposit
1120	Cobble stone rubble	Deposit
1121	Cobble stone wall (E-W)	Structure
1122	Cobble stone rubble	Deposit
1123	Cobble stone buttress	Structure
1124	Cobble stone buttress	Structure
1125	Mudbrick course	Structure
1126	Ashy deposit	Deposit
1127	Stone adjoining ashy deposit	Object
1128	Plaster layer	Deposit
1129	Four mudbricks marking out 1128	Structure
1130	Oven	Structure
1131	Ashy deposit	Deposit
1132	Cobble stone wall (E-W)	Structure
1133	Cobble stone wall (N-S)	Structure
1134	Cobble stone wall (E-W)	Structure
1135	Oven	Structure
1136	Oven	Structure
1137	Oven	Structure
1138	Oven	Structure
1139	Cobble stone wall (N-S)	Structure
1140	Cobble stone wall (N-S)	Structure
1141	Door jamb	Object
1142	Limestone doorstep	Object
1143	Door jamb	Object
1144	Cobble stone buttress	Structure
1145	Door jamb	Object
1146	Lintel	Object
1147	Limestone doorstep	Object

Context	Description	Type
1148	Door jamb	Object
1149	Cobble stone wall (E-W)	Structure
1150	Door jamb	Object
1151	Cobble stone rubble	Deposit
1152	Lintel	Structure
1153	Limestone doorstep	Object
1154	Cobble stone rubble	Deposit
1155	Door jamb	Object
1156	Lintel	Object
1157	Cobble stone buttress	Structure
1158	Cobble stone wall (E-W)	Structure
1159	Cobble stone doorstep	Structure
1160	Cobble stone wall (E-W)	Structure
1161	Cobble stone buttress	Structure
1162	Cobble stone wall (N-S)	Structure
1163	Mortar	Structure
1164	Mortar emplacement	Structure
1165	Cobble stone buttress	Structure
1166	Cobble stone wall (N-S)	Structure
1167	Cobble stone rubble	Deposit
1168	Cobble stone wall (E-W)	Structure
1169	Cobble stone wall (N-S)	Structure
1170	Oven	Structure
1171	Cobble stone wall (E-W)	Structure
1172	Cobble stone wall (N-S)	Structure
1173	Cobble stone doorstep	Structure
1174	Cobble stone wall (E-W)	Structure
1175	Cobble stone wall (N-S)	Structure
1176	Cobble stone wall (E-W)	Structure
1177	Cobble stone wall (N-S)	Structure
1178	Cobble stone wall (E-W)	Structure
1179	Cobble stone wall (N-S)	Structure
1180	Cobble stone doorstep	Structure
1181	Cobble stone wall (E-W)	Structure
1182	Cobble stone wall (N-S)	Structure
1183	Cobble stone buttress	Structure
1184	Cobble stone wall (NW-SE)	Structure
1185	Ashy deposit	Deposit
1186	Oven	Structure
1187	Cobble stone rubble	Deposit

Context	Description	Type
1188	Cobble stone wall (E-W)	Structure
1189	Cobble stone wall (NW-SE)	Structure
1190	Cobble stone wall (E-W)	Structure
1191	Cobble stone doorstep	Structure
1192	Cobble stone wall (N-S)	Structure
1193	Cobble stone buttress	Structure
1194	Cobble stone buttress	Structure
1195	Cobble stone rubble	Deposit
1196	Threshold stone	Object
1197	Oven	Structure
1198	Cobble stone buttress	Structure
1199	Cobble stone rubble	Structure
1200	Stone slab	Object
1201	Cobble stone buttress	Structure
1202	Mudbrick buttress	Structure
1203	Oven	Structure
1204	Cobble stone wall (E-W)	Structure
1205	Cobble stone wall (N-S)	Structure
1206	Cobble stone rubble	Deposit
1207	Cobble stone doorstep	Structure
1208	Cobble stone rubble	Deposit
1209	Cobble stone *mastaba*	Structure
1210	Door jamb	Object
1211	Three stone slabs	Object
1212	Cobble stone buttress	Structure
1213	Four mudbricks	Structure
1214	Plaster layer	Deposit

Appendix II: Ceramic Typology

Type I.1.1: Plate with direct rim

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/16b	K1,8	Nile B2	Red slip on internal surface.	Wheel-made	23.00		
ZUR/K/140k	K1,4	Nile B2	Red slip on internal surface.	Wheel-made	28.00		
ZUR/K/344l	K4,5	Nile B2	None	Wheel-made	41.00		
ZUR/K/336m	K1,2	Nile D	None	Wheel-made	26.00		
ZUR/K/161	K4,4	ZUR A	None	Wheel-made	17.00		
ZUR/K/134e	K0,5	ZUR B	Red slip on internal and external surface.	Wheel-made	38.00		
ZUR/K/189t	K0,8	ZUR B	Red slip on internal and external surface.	Wheel-made	18.00		
ZUR/K/116d	K1,4	ZUR B	Red slip on internal surface.	Wheel-made	34.00		
ZUR/K/16s	K1,8	ZUR B	One band of stringline decoration on external surface.	Wheel-made	23.00		
ZUR/K/345(1)e	K5,6	ZUR B	None	Wheel-made	24.00		
ZUR/K/344m	K4,5	ZUR B	None	Wheel-made	13.00		
ZUR/K/289p	K0,8	ZUR C	Red slip on internal and external surfaces	Wheel-made	16.00		
ZUR/K/111b	K0,7	ZUR C	None	Wheel-made	40.00		

Type I.1.1a: Plate with direct rim and flat base

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/116f	K1,4	Nile B2	Red slip on internal surface.	Wheel-made	44.00	3.50	
ZUR/K/345d	K5,6	Nile B2	Red slip on internal and external surface.	Wheel-made	25.00	3.50	
ZUR/K/108c	K0,7	ZUR A	None	Wheel-made	62.00	6.10	
ZUR/K/134c	K0,5	ZUR A	None	Wheel-made	34.00	3.30	
ZUR/K/289y	K0,8	ZUR A	None	Wheel-made	26.00	3.20	
ZUR/KA/30	KA	ZUR B	Red slip on internal and external surface.	Wheel-made	26.00	5.10	
ZUR/KAB/34	KAB	ZUR B	None	Wheel-made	28.00	4.20	
ZUR/K/278a	K0,8	ZUR C	None	Wheel-made	20.00	2.50	

Type I.1.1b: Plate with direct rim and round base

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/16t	K1,8	Nile D	None	Wheel-made	23.00	3.20	
ZUR/K/278c	K1,8	Nile D	None	Wheel-made	38.00	5.20	
ZUR/K/215g	K0,4	ZUR A	None	Wheel-made	22.00	4.20	
ZUR/K/320i	K4,0	ZUR A	None	Wheel-made	23.00	3.30	Burning on interior surface.
ZUR/K/320j	K4,0	ZUR A	None	Wheel-made	17.00	3.10	Burning on exterior surface.
ZUR/KE/31	KE	ZUR A	None	Wheel-made	24.00	3.70	

Type I.1.1b: Plate with direct rim and round base

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/140aa	K1,4	ZUR B	Red slip on internal and external surface.	Wheel-made	28.00	3.50	
ZUR/K/289u	K0,8	ZUR B	Red slip on internal and external surface.	Wheel-made	22.00	3.80	
ZUR/K/215c	K0,4	ZUR B	Red slip on internal surface.	Wheel-made	30.00	2.20	
ZUR/K/194f	K1,4	ZUR B	Band of red slip on internal and external lip.	Wheel-made	34.00	4.00	
ZUR/K/336u	K1,2	ZUR B	None	Wheel-made	30.00	2.50	
ZUR/KB/39	KB	ZUR B	None	Wheel-made	40.00	3.20	
ZUR/KB/67	KB	ZUR B	None	Wheel-made	40.00	5.80	

Type I.1.2: Plate with modelled rim

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/49a	K4,4	Nile B2	Cream slip on internal and external surface. Two bands of string line decoration	Wheel-made	44.00		
ZUR/K/116m	K1,4	Nile B2	Red slip on internal and external surface.	Wheel-made	28.00		
ZUR/K/289s	K0,8	Nile B2	Red slip on internal and external surface.	Wheel-made	22.00		
ZUR/K/336p	K1,2	Nile B2	Red slip on internal surface and external lip	Wheel-made	26.00		
ZUR/K/339a	K1,4	Nile B2	Cream slip on internal surface and band of red slip on external lip	Wheel-made	34.00		
ZUR/K/344i	K4,5	Nile B2	None	Wheel-made	29.00		
ZUR/K/346e	K5,7	Nile D	None	Wheel-made	47.00		
ZUR/K/346g	K5,7	Nile D	None	Wheel-made	26.00		
ZUR/K/215d	K0,4	ZUR B	Red slip on internal and external surface.	Wheel-made	50.00		
ZUR/KB/70	KB	ZUR B	Red slip on internal and external surface.	Wheel-made	32.00		
ZUR/K/16j	K1,8	ZUR B	None	Wheel-made	19.00		
ZUR/K/16k	K1,8	ZUR B	None	Wheel-made	23.00		
ZUR/K/108j	K0,7	ZUR B	None	Wheel-made	26.00		
ZUR/KB/20	KB	ZUR B	None	Wheel-made	18.00		
ZUR/K/336x	K1,2	ZUR C	Red slip on internal and external surfaces	Wheel-made	24.00		

Type I.1.2a: Plate with modelled rim and flat base

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/345a	K5,6	Nile B2	Red slip on internal and external surface.	Wheel-made	24.00	3.20	
ZUR/K2H/25	K2H	Nile B2	Red slip on internal and external surface.	Wheel-made	28.00	4.50	
ZUR/K2H/35	K2H	Nile B2	Red slip on internal and external surface.	Wheel-made	30.00	4.50	
ZUR/KX/4	KX	Nile B2	None	Wheel-made	32.00	4.50	
ZUR/K/108d	K0,7	Nile D	Red slip on internal and external surface.	Wheel-made	26.00	3.20	

Type I.1.2a: Plate with modelled rim and flat base

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/119a	K1,4	ZUR B	Red slip on internal and external surface.	Wheel-made	27.00	4.50	
ZUR/KE/27	KE	ZUR B	None	Wheel-made	22.00	3.40	
ZUR/K/336i	K1,2	ZUR C	Band of red slip along internal rim.	Wheel-made	30.00	4.30	

Type I.1.2b: Plate with modelled rim and round base

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/116k	K1,4	Nile B2	Red slip on internal and external surface.	Wheel-made	22.00	4.10	
ZUR/K/140ad	K1,4	Nile B2	Red slip on internal surface. Two bands of string line decoration.	Wheel-made	30.00	5.30	
ZUR/K/289v	K0,8	Nile B2	None	Wheel-made	26.00	4.80	
ZUR/K/346b	K5,7	Nile B2	None	Wheel-made	45.00	5.80	
ZUR/KE/17	KE	Nile B2	None	Wheel-made	60.00	5.20	
ZUR/K/294f	K0,6	Nile D	None	Wheel-made	38.00	4.60	
ZUR/K/346j	K5,7	Nile D	None	Wheel-made	23.00	4.50	
ZUR/K/346n	K5,7	ZUR A	Red slip on external surface.	Wheel-made	40.00	6.20	
ZUR/K/134b	K0,5	ZUR A	Band of orange slip along interior rim.	Wheel-made	32.00	4.20	
ZUR/K/16ad	K1,8	ZUR A	None	Wheel-made	31.00	4.50	
ZUR/K/215f	K0,4	ZUR A	None	Wheel-made	46.00	7.10	
ZUR/K/261a	K1,5	ZUR B	Red slip on internal and external surface.	Wheel-made	36.00	3.80	
ZUR/K/16c	K1,8	ZUR B	Red slip on internal surface.	Wheel-made	26.00	1.80	
ZUR/K/344k	K4,5	ZUR B	Red slip on internal surface.	Wheel-made	27.00	3.30	
ZUR/K/263c	K1,2	ZUR B	Two bands of stringline decoration on external surface.	Wheel-made	38.00	4.50	
ZUR/K/336o	K1,2	ZUR B	One band of stringline decoration on external surface.	Wheel-made	40.00	5.50	
ZUR/K/289i	K0,8	ZUR B	None	Wheel-made	32.00	4.20	
ZUR/K/346b	K5,7	ZUR B	None	Wheel-made	45.00	6.30	
ZUR/KZ/16a	KZ	ZUR B	None	Wheel-made	38.00	5.50	
ZUR/K/336v	K1,2	ZUR C	None	Wheel-made	28.00	5.00	

Type I.2.1: Dish with direct rim

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/339b	K1,4	Nile B2	Red slip on internal and external surface	Wheel-made	22.00		
ZUR/K/345e	K5,6	Nile B2	Red slip on internal and external surface	Wheel-made	26.00		
ZUR/K2H/36	K2H	Nile B2	Red slip on internal surface.	Wheel-made	20.00		
ZUR/K/16q	K1,8	Nile B2	None	Wheel-made	35.00		
ZUR/K/336h	K1,2	Nile B2	None	Wheel-made	26.00		

Type I.2.1: Dish with direct rim

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/336q	K1,2	Nile D	Band of red slip on external lip	Wheel-made	36.00		
ZUR/K/16u	K1,8	Nile D	One band of string line decoration.	Wheel-made	39.00		
ZUR/K/61d	K0,7	Nile D	Cream slip on internal and external surface.	Wheel-made	26.00		
ZUR/K/108i	K0,7	Nile D	Cream slip on internal and external surface.	Wheel-made	20.00		
ZUR/K/261b	K1,5	Nile D	Cream slip on internal and external surface.	Wheel-made	42.00		
ZUR/K/336f	K1,2	Nile D	Red slip on internal surface.	Wheel-made	28.00		
ZUR/K/278b	K1,8	Nile D	Red slip on internal and external surface.	Wheel-made	22.00		
ZUR/K/278e	K1,8	Nile D	Red slip on internal and external surface.	Wheel-made	24.00		
ZUR/K/289b	K0,8	Nile D	Red slip on internal and external surface.	Wheel-made	26.00		
ZUR/K/336n	K1,2	Nile D	Red slip on internal and external surface.	Wheel-made	26.00		
ZUR/K/16r	K1,8	Nile D	None	Wheel-made	24.00		
ZUR/K/16aa	K1,8	Nile D	None	Wheel-made	28.00		
ZUR/K/16ae	K1,8	Nile D	None	Wheel-made	19.00		
ZUR/K/140d	K1,4	Nile D	None	Wheel-made	12.00		
ZUR/K/140u	K1,5	Nile D	None	Wheel-made	22.00		
ZUR/K/346a	K5,7	Nile D	None	Wheel-made	23.00		
ZUR/K/140n	K1,4	ZUR A	None	Wheel-made	24.00		
ZUR/K/320c	K4,0	ZUR A	None	Wheel-made	21.00		
ZUR/K/346a	K5,7	ZUR A	None	Wheel-made	23.00		
ZUR/K/111c	K0,7	ZUR B	Red slip on internal and external surface.	Wheel-made	16.00		
ZUR/K/140o	K1,4	ZUR B	Red slip on internal and external surface.	Wheel-made	20.00		
ZUR/K/183a	K2,8	ZUR B	Red slip on internal and external surface.	Wheel-made	28.00		
ZUR/K/194e	K1,4	ZUR B	Red slip on internal and external surface.	Wheel-made	42.00		
ZUR/K/215h	K0,4	ZUR B	Red slip on internal and external surface.	Wheel-made	20.00		
ZUR/K/215j	K0,4	ZUR B	Red slip on internal and external surface.	Wheel-made	26.00		
ZUR/K/215k	K0,4	ZUR B	Red slip on internal and external surface.	Wheel-made	29.00		
ZUR/K/336y	K1,2	ZUR B	Red slip on internal and external surface.	Wheel-made	30.00		
ZUR/K/346s	K5,7	ZUR B	Red slip on internal and external surface.	Wheel-made	26.00		
ZUR/K/320h	K4,0	ZUR B	Red slip on internal surface.	Wheel-made	23.00		
ZUR/K/320f	K4,0	ZUR B	Red slip on external surface.	Wheel-made	25.00		

Type I.2.1: Dish with direct rim

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/215e	K0,4	ZUR B	Band of red slip on internal rim and external surface.	Wheel-made	30.00		
ZUR/K/140q	K1,4	ZUR B	Band of red slip on internal rim.	Wheel-made	20.00		
ZUR/K/320e	K4,0	ZUR B	None	Wheel-made	29.00		
ZUR/K/320l	K4,0	ZUR B	None	Wheel-made	19.00		
ZUR/K/335g	K1,2	ZUR B	None	Wheel-made	36.00		
ZUR/K/336r	K1,2	ZUR B	None	Wheel-made	28.00		
ZUR/K/289e	K0,8	ZUR C	Red slip on internal and external surfaces	Wheel-made	20.00		
ZUR/K/346q	K5,7	ZUR C	Red slip on internal and external surfaces	Wheel-made	24.00		
ZUR/K/336l	K1,2	ZUR C	None	Wheel-made	20.00		

Type I.2.1a: Dish with direct rim and flat base

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/61b	K0,7	Nile B2	Cream slip on inernal and external surface	Wheel-made	16.00	5.00	
ZUR/2014(K)/6	None given	Nile B2	Red slip on internal and external surface	Wheel-made	26.00	8.00	
ZUR/KB/66	KB	Nile B2	Red slip on internal and external surface.	Wheel-made	20.00	5.40	
ZUR/KI/16	KI	Nile B2	Red slip on internal and external surface.	Wheel-made	22.50	5.80	
ZUR/K/194h	K1,4	Nile B2	Red slip on internal and external surface. String line decoration on external surface	Wheel-made	46.00	9.50	
ZUR/KR/3	KR	ZUR A	Red slip on external surface.	Wheel-made	15.00	4.10	
ZUR/KI/3	KI	ZUR B	Red slip on internal and external surface.	Wheel-made	32.00	6.80	

Type I.2.1b: Dish with direct rim and round base

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/134d	K3,6	Nile B2	Red slip on internal and external surface	Wheel-made	28.00	5.80	
ZUR/K/345f	K5,6	Nile B2	Red slip on internal and external surface	Wheel-made	25.00	6.60	
ZUR/K/346o	K5,7	Nile B2	Red slip on internal and external surface	Wheel-made	26.00	7.60	
ZUR/K/364a	K4,6	Nile B2	Red slip on internal and external surface	Wheel-made	26.00	7.50	
ZUR/K/183d	K3,5	Nile B2	Red slip on internal and external surface.	Wheel-made	21.00	5.50	
ZUR/KE/16	KE	Nile B2	Red slip on internal and external surface.	Wheel-made	16.00	5.40	
ZUR/K/16f	K1,8	Nile B2	No slip. String line decoration on exterior surface	Wheel-made	35.00	7.00	
ZUR/K/16ac	K1,8	Nile B2	None	Wheel-made	28.00	7.50	

Type I.2.1b: Dish with direct rim and round base

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/KM/13	KM	Nile B2	Polychrome decoration on light orange slip.	Wheel-made	16.00	5.00	
ZUR/KAB/43	KAB	Nile D	Cream slip on internal and external surface and band of red slip on internal and external lip	Wheel-made	24.00	6.80	
ZUR/KE/12	KE	Nile D	Cream slip on internal and external surface.	Wheel-made	26.00	8.20	
ZUR/KZ/38	KZ	Nile D	Cream slip on internal and external surface.	Wheel-made	16.00	4.80	
ZUR/K/108l	K0,7	ZUR A	Red slip on internal and external surface.	Wheel-made	24.00	7.10	
ZUR/K/119b	K1,4	ZUR A	Red slip on internal and external surface.	Wheel-made	37.00	9.60	
ZUR/KV/10	KV	ZUR A	Red slip on internal and external surface.	Wheel-made	28.00	5.60	
ZUR/KZ/25	KZ	ZUR A	Red slip on internal and external surface.	Wheel-made	26.00	9.00	
ZUR/K/108e	K0,7	ZUR A	Cream slip on external surface.	Wheel-made	22.00	6.20	
ZUR/K/16m	K1,8	ZUR A	None	Wheel-made	25.00	5.10	
ZUR/K2H/20	K2H	ZUR A	None	Wheel-made	24.00	7.80	
ZUR/K/16x	K1,8	ZUR B	Red slip on internal and external surface.	Wheel-made	22.00	5.80	
ZUR/K/168c	K3,4	ZUR B	Red slip on internal and external surface.	Wheel-made	16.00	4.60	
ZUR/K2H/24	K2H	ZUR B	Red slip on internal and external surface.	Wheel-made	26.00	9.10	
ZUR/K2H/32	K2H	ZUR B	Red slip on internal and external surface.	Wheel-made	14.00	3.80	
ZUR/KZ/15	KZ	ZUR B	Three incised bands on external surface.	Wheel-made	74.00	15.00	
ZUR/K/108n	K0,7	ZUR B	None	Wheel-made	24.00	8.00	
ZUR/K/111a	K0,7	ZUR B	None	Wheel-made	16.00	4.40	
ZUR/K/116g	K1,4	ZUR B	None	Wheel-made	13.00	4.30	
ZUR/KZ/38	KZ	ZUR B	None	Wheel-made	16.00	4.80	
ZUR/K2H/22	K2H	ZUR B	None	Wheel-made	16.00	3.50	Burning on internal and external rim.
ZUR/K2H/29	K2H	ZUR B	None	Wheel-made	16.00	5.20	Burning on internal and external rim.
ZUR/K2H/38	K2H	ZUR B	None	Wheel-made	24.00	6.80	
ZUR/K/294e	K0,6	ZUR B	Red slip on internal and external surface.	Wheel-made	26.00	7.60	

Type I.2.2: Dish with modelled rim

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/289a	K0,8	Nile B2	None	Wheel-made	34.00		
ZUR/K/322d	K1,2	Nile D	Cream slip on internal and external surface.	Wheel-made	44.00		
ZUR/K/108f	K0,7	Nile D	None	Wheel-made	30.00		

Type I.2.2: Dish with modelled rim

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/346p	K5,7	Nile D	None	Wheel-made	38.00		
ZUR/K2H/18	K2H	Nile D	None	Wheel-made	30.00		
ZUR/KE/13	KE	ZUR B	Red slip on internal and external surface.	Wheel-made	28.00		

Type I.2.2a: Dish with modelled rim and flat base

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K2A//19	K2A	ZUR B	Orange-red slip and three bands of stringline decoration on external surface	Wheel-made	34.00	9.40	Flat

Type I.2.2b: Dish with modelled rim and round base

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/183c	K3,5	Nile B2	Red slip on internal and external surface.	Wheel-made	26.00	7.00	
ZUR/K/16ab	K0,7	Nile B2	None	Wheel-made	47.00	13.00	
ZUR/K/339c	K1,4	Nile B2	None	Wheel-made	29.00	8.00	
ZUR/KM/2	KM	Nile B2	None	Wheel-made	17.50	6.00	

Type I.2.3: Ledge-rim dish

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/168a	K3,4	Nile B2	Cream slip on internal and external surface. Three bands of string-line decoration.	Wheel-made	38.00		
ZUR/KV/6	KV	Nile B2	Cream slip on internal and external surface. Four bands of string line decoration.	Wheel-made	58.00		
ZUR/K/322e	K1,2	Nile B2	None	Wheel-made	48.00		
ZUR/K2H/17	K2H	Nile D	None	Wheel-made	32.00		
ZUR/K/345g	K5,6	ZUR A	Cream slip on internal and external surface.	Wheel-made	49.00		
ZUR/K/134a	K0,5	ZUR A	Cream slip on external surface.	Wheel-made	62.00		

Type I.3.1: Bowl with direct rim

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K2H/28	K2H	Nile B2	Cream slip on inernal and external surface	Wheel-made	24.00		
ZUR/K/61a	K0,7	Nile B2	Red slip on external surface	Wheel-made	20.00		
ZUR/K/140x	K1,4	Nile B2	Red slip on external surface	Wheel-made	30.00		
ZUR/K/289h	K0,8	Nile B2	Red slip on external surface	Wheel-made	30.00		
ZUR/K/116h	K1,4	Nile B2	Red slip on internal and external surface	Wheel-made	26.00		
ZUR/K/289aa	K0,8	Nile B2	Red slip on internal and external surface	Wheel-made	38.00		
ZUR/K/346u	K5,7	Nile B2	Red slip on internal and external surface	Wheel-made	24.00		
ZUR/K/16n	K1,8	Nile B2	None	Wheel-made	22.00		

Type I.3.1: Bowl with direct rim

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/108g	K0,7	Nile B2	None	Wheel-made	22.00		
ZUR/K/140p	K1,4	Nile B2	None	Wheel-made	24.00		
ZUR/K/140s	K1,4	Nile B2	None	Wheel-made	16.00		
ZUR/K/261c	K1,5	Nile B2	None	Wheel-made	28.00		
ZUR/K/289g	K0,8	Nile B2	None	Wheel-made	24.00		
ZUR/K/336e	K1,2	Nile B2	None	Wheel-made	14.00		
ZUR/K/346t	K5,7	Nile B2	None	Wheel-made	28.00		
ZUR/K/134f	K0,5	Nile B2	None	Wheel-made	52.00		
ZUR/K/345(1)f	K5,6	Nile D	None	Wheel-made	18.00		
ZUR/K/346f	K5,7	Nile D	None	Wheel-made	20.00		
ZUR/K/346r	K5,7	Nile D	None	Wheel-made	28.00		
ZUR/K/140ag	K1,4	Nile D	Band of red slip on internal lip.	Wheel-made	22.00		
ZUR/K/289n	K0,8	Nile D	Red slip on internal and external surface.	Wheel-made	26.00		
ZUR/KAB/63	KAB	Nile D	Red slip on internal and external surface.	Wheel-made	26.00		
ZUR/KAB/42	KAB	ZUR A	Red slip on internal and external surface.	Wheel-made	16.00		
ZUR/K/344g	K4,5	ZUR A	Red slip on external surface.	Wheel-made	20.00		
ZUR/K/140a	K1,4	ZUR A	One band of stringline decoration on external surface.	Wheel-made	34.00		
ZUR/K/140f	K1,4	ZUR A	One band of stringline decoration on external surface.	Wheel-made	32.00		
ZUR/K/16i	K1,8	ZUR B	Red slip on internal and external surface.	Wheel-made	14.00		
ZUR/K/116c	K1,4	ZUR B	Red slip on internal and external surface.	Wheel-made	20.00		
ZUR/K/278f	K1,8	ZUR B	Red slip on internal and external surface.	Wheel-made	20.00		
ZUR/K/108h	K0,7	ZUR B	Cream slip on internal and external surface.	Wheel-made	20.00		
ZUR/K/344h	K4,5	ZUR B	Red slip on internal surface.	Wheel-made	9.00		
ZUR/K/346x	K5,7	ZUR B	Red slip on internal and external lip.	Wheel-made	14.00		
ZUR/K/108o	K0,7	ZUR B	Two bands of stringline decoration on external surface.	Wheel-made	32.00		
ZUR/K/140r	K1,4	ZUR B	None	Wheel-made	20.00		
ZUR/K/320g	K4,0	ZUR B	None	Wheel-made	20.00		
ZUR/K/346c	K5,7	ZUR B	None	Wheel-made	30.00		
ZUR/KE/23	KE	ZUR B	None	Wheel-made	28.00		
ZUR/K/140g	K1,4	ZUR C	Red slip on internal surface	Wheel-made	20.00		
ZUR/K/140j	K1,4	ZUR C	None	Wheel-made	16.00		

Type I.3.1: Bowl with direct rim

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/289j	K0,8	ZUR C	None	Wheel-made	22.00		
ZUR/KE/30	KE	ZUR C	None	Wheel-made	22.00		
ZUR/K/140c	K1,4	Nile B1	None	Wheel-made	20.00		

Type I.3.1b: Bowl with direct rim and round base

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/108k	K0,7	Nile B2	Cream slip on inernal and external surface	Wheel-made	28.00	9.20	
ZUR/K/140i	K1,4	Nile B2	Red slip on internal and external surface	Wheel-made	22.00	6.00	Burning on exterior lip of vessel
ZUR/K/320k	K4,0	Nile B2	Red slip on internal and external surface	Wheel-made	22.00	6.50	
ZUR/KE/15	KE	Nile B2	Red slip on internal and external surface	Wheel-made	20.00	8.20	
ZUR/K/336c	K1,2	Nile B2	Red slip on internal and external surface and band of cream slip on external lip	Wheel-made	26.00	11.00	
ZUR/KE/34	KE	Nile D	Cream slip on internal and external surface.	Wheel-made	20.00	9.50	
ZUR/K/346v	K5,7	Nile D	Red slip on internal surface.	Wheel-made	22.00	8.10	
ZUR/K/140ae	K1,4	ZUR A	None	Wheel-made	18.00	7.90	
ZUR/K2A/23	K2A	ZUR B	Cream slip on internal and external surface.	Wheel-made	12.00	5.20	
ZUR/K/61c	K0,7	ZUR B	Red slip on internal surface.	Wheel-made	14.00	6.00	
ZUR/K/346c	K5,7	ZUR C	Red slip on external surface	Wheel-made	30.00	10.00	
ZUR/KKI/4	KKI	ZUR C	None	Wheel-made	14.00	5.20	
ZUR/KZ/28	KZ	Nile B1	None	Hand-moulded	12.00	5.00	

Type I.3.2: Bowl with modelled rim

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/215i	K0,4	Nile B2	Red slip on internal and external surface.	Wheel-made	42.00		
ZUR/K/344e	K4,5	Nile B2	Red slip on internal and external surface.	Wheel-made	47.00		
ZUR/K/49b	K4,4	Nile B2	Cream slip on internal and external surface.	Wheel-made	20.00		
ZUR/K2A/27	K2A	Nile B2	None	Wheel-made	52.00		
ZUR/KE/33	KE	Nile D	None	Wheel-made	24.00		
ZUR/KB/76	KB	ZUR B	One band of stringline decoration on external surface.	Wheel-made	26.00		
ZUR/K/289x	K0,8	ZUR B	None	Wheel-made	32.00		

Type I.3.2b: Bowl with modelled rim and round base

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/336d	K1,2	ZUR B	None	Wheel-made	24.00	9.00	

Type I.3.3: Bowl with outwardly rolled rim

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/KAB/46	KAB	Nile B2	Cream slip on external surface. Three bands of stringline decoration	Wheel-made	54.00		
ZUR/KAB/53	KAB	Nile B2	Cream slip on external surface	Wheel-made	22.00		
ZUR/KZ/19	KZ	Nile B2	Cream slip on external surface	Wheel-made	26.00		
ZUR/KZ/31	KZ	Nile B2	Cream slip on external surface	Wheel-made	26.00		
ZUR/K/344f	K4,5	Nile B2	None	Wheel-made	37.00		
ZUR/K/346d	K5,7	Nile B2	None	Wheel-made	28.00		
ZUR?K/346y	K5,7	Nile B2	None	Wheel-made	44.00		
ZUR/K/262	K1,2	Nile B2	None	Wheel-made	58.00		
ZUR/K2A/17	K2A	Nile D	Cream slip on external surface.	Wheel-made	28.00		
ZUR/K/344a	K4,5	Nile D	None	Wheel-made	35.00		
ZUR/K/346d	K5,7	Nile D	None	Wheel-made	28.00		
ZUR/KAB/46	KAB	ZUR B	Cream slip on external surface.	Wheel-made	22.00		
ZUR/KB/44	KB	ZUR B	None	Wheel-made	24.00		
ZUR/KE/35	KE	ZUR B	None	Wheel-made	30.00		
ZUR/KAB/45	KAB	ZUR C	Cream slip on external surface.	Wheel-made	20.00		
ZUR/K2H/14	K2H	Nile C	Five bands of stringline decoration on external surface.	Wheel-made	62.00		
ZUR/K/140z	K1,4	Nile C	None	Wheel-made	65.00		

Type I.3.4a: Carinated bowl with direct rim

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K2A/20	K2A	Nile B2	Single band of red slip on external lip	Wheel-made	24.00		
ZUR/K2A/2	K2A	ZUR B	None	Wheel-made	15.5	8.5	
ZUR/KZ/24	KZ	ZUR C	3 bands of string-line decoration on external surface.	Wheel-made	20.00	7.50	

Type I.3.4b: Carinated bowl with modelled rim

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/345b	K5,6	Nile C	Cream slip on internal and external surface. One band of stringline decoration on external surface.	Wheel-made	45.00		

Type I.3.4c: Carinated bowl with modelled handles

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/KD/15	KD	Nile D	Cream slip on internal and external surface. Five bands of string-line decoration on external surface.	Wheel-made	52.00		

Type I.3.4c: Carinated bowl with modelled handles

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/KD/19	KD	Nile D	Cream slip on internal and external surface.	Wheel-made	60.00		

Type I.4: Spinning bowl

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/KAB/57	KAB	Nile B2	Cream slip on internal and external surface	Combined	14.00		
ZUR/K2A/29	K2A	Nile B2	Cream slip on internal and external surface	Combined	40.00		
ZUR/K2H/15	K2H	Nile B2	None	Combined	17.00		
ZUR/K/232	K5,7	Nile D	Cream slip on internal and external surface.	Wheel-made	12.00*		
ZUR/K/107	K0,7	ZUR B	None	Combined	10.00*		
ZUR/2014(K)/1	None given	ZUR B	Four bands of stringline decoration on external surface.	Combined	27.80	8.50	

Type I.5: 'Snake-head bowl'

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/KKI/10	KKI	ZUR B	Red slip on internal surface.	Combined	14.00	6.90	

Type I.6.1: Beaker

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/140m	K1,4	Nile D	None	Wheel-made	12.00		
ZUR/K/147	K3,6	ZUR A	None	Wheel-made	6.00	9.80	
ZUR/K/2	Surface	ZUR C	None	Wheel-made	5.00	8.00	

Type I.6.2: Beaker with notched rim

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K2H/26	K2H	Nile D	Cream slip on external surface.	Wheel-made	28.00		

Type I.7: Bread plate

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/KN/53	KN	Nile B2	None	Hand-modelled	18.00	5.50	

Type II.1.1: Globular jar with modelled neck

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/108a	K0,7	Nile B2	Red slip on external surface	Wheel-made	28.00		
ZUR/K/116a	K1,4	Nile B2	Red slip on external surface	Wheel-made	20.00		
ZUR/K/289c	K0,8	Nile B2	Red slip on external surface	Wheel-made	26.00		
ZUR/K/289l	K0,8	Nile B2	Red slip on external surface	Wheel-made	27.00		
ZUR/K2H/33	K2H	Nile B2	Red slip on external surface	Wheel-made	12.00		
ZUR/K2H/34	K2H	Nile B2	Red slip on external surface	Wheel-made	18.00		
ZUR/K/263a	K1,2	Nile B2	Cream slip on external surface	Wheel-made	30.00		
ZUR/KAB/38	KAB	Nile B2	Cream slip on external surface	Wheel-made	18.00		

Type II.1.1: Globular jar with modelled neck

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K2H/39	K2H	Nile B2	Cream slip on external surface	Wheel-made	28.00		
ZUR/K/140b	K1,4	Nile B2	None	Wheel-made	30.00		
ZUR/K/140af	K1,4	Nile B2	None	Wheel-made	24.00		
ZUR/K/278g	K1,8	Nile B2	None	Wheel-made	22.00		
ZUR/K/336s	K1,2	Nile B2	None	Wheel-made	20.00		
ZUR/K/345(1)b	K5,6	Nile B2	None	Wheel-made	18.00		
ZUR/K/364b	K4,6	Nile B2	None	Wheel-made	20.00		
ZUR/KB/36	KB	Nile B2	None	Wheel-made	24.00		
ZUR/KE/6	KE	Nile B2	None	Wheel-made	20.00		
ZUR/KZ/17	KZ	Nile B2	None	Wheel-made	26.00		
ZUR/K2A/9	K2A	Nile B2	None	Wheel-made	12.00		
ZUR/K2A/28	K2A	Nile B2	None	Wheel-made	12.00		
ZUR/K/345h	K5,6	Nile D	Cream slip on external surface and internal lip.	Wheel-made	18.00		
ZUR/K/116b	K1,4	Nile D	Cream slip on external surface.	Wheel-made	22.00		
ZUR/K/294b	K0,6	Nile D	Cream slip on external surface.	Wheel-made	11.00		
ZUR/K/294d	K0,6	Nile D	Cream slip on external surface.	Wheel-made	20.00		
ZUR/KE/20	KE	Nile D	Cream slip on external surface.	Wheel-made	24.00		
ZUR/KZ/18	KZ	Nile D	Cream slip on external surface.	Wheel-made	13.00		
ZUR/KZ/26	KZ	Nile D	Cream slip on external surface.	Wheel-made	18.00		
ZUR/KZ/37	KZ	Nile D	Cream slip on external surface.	Wheel-made	18.00		
ZUR/K2A/22	K2A	Nile D	Cream slip on external surface.	Wheel-made	30.00		
ZUR/KZ/34	KZ	Nile D	Cream-pink slip on external surface.	Wheel-made	12.00		
ZUR/K2H/30	K2H	Nile D	Red slip on external surface.	Wheel-made	14.00		
ZUR/K/140ab	K1,4	Nile D	None	Wheel-made	24.00		
ZUR/K/203	K1,4	Nile D	None	Wheel-made	17.00		
ZUR/K/322a	K1,2	Nile D	None	Wheel-made	28.00		
ZUR/K/346a	K5,7	Nile D	None	Wheel-made	20.00		
ZUR/KAB/38	KAB	Nile D	None	Wheel-made	18.00		
ZUR/KAB/67	KAB	Nile D	None	Wheel-made	12.00*		
ZUR/KB/19	KB	Nile D	None	Wheel-made	26.00		
ZUR/KI/14	KI	Nile D	None	Wheel-made	24.00		
ZUR/KS/1	KS	Nile D	None	Wheel-made	12.00		
ZUR/KZ/22	KZ	Nile D	None	Wheel-made	20.00		
ZUR/K/345(1)c	K5,6	ZUR A	None	Wheel-made	32.00		
ZUR/KB/22	KB	ZUR A	None	Wheel-made	28.00		
ZUR/KB/25	KB	ZUR A	None	Wheel-made	16.00		

Type II.1.1: Globular jar with modelled neck

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/KB/27	KB	ZUR A	None	Wheel-made	32.00		
ZUR/KB/78	KB	ZUR A	None	Wheel-made	20.00		
ZUR/KKI/11	KKI	ZUR A	None	Wheel-made	26.00*		Incised pot-mark on external surface reading *nb twy*
ZUR/KE/32	KE	ZUR B	Cream slip on external surface.	Wheel-made	16.00		
ZUR/KS/2	KS	ZUR B	Cream slip on external surface.	Wheel-made	14.00		
ZUR/K2A/18	K2A	ZUR B	Red slip on external surface.	Wheel-made	10.00		
ZUR/K/16e	K1,8	ZUR B	None	Wheel-made	45.00		
ZUR/K/117	K1,4	ZUR B	None	Wheel-made	18.00*		
ZUR/K/168b	K3,4	ZUR B	None	Wheel-made	20.00		
ZUR/K/183b	K3,5	ZUR B	None	Wheel-made	17.00		
ZUR/K/320a	K4,0	ZUR B	None	Wheel-made	22.00		
ZUR/K/320d	K4,0	ZUR B	None	Wheel-made	23.00		
ZUR/K/344j	K4,5	ZUR B	None	Wheel-made	16.00		
ZUR/K/345(1)d	K5,6	ZUR B	None	Wheel-made	20.00		
ZUR/2014(K)/7	None given	ZUR B	None	Wheel-made	26.00*		
ZUR/KB/16	KB	ZUR B	None	Wheel-made	40.00		
ZUR/KB/73	KB	ZUR B	None	Wheel-made	24.00		
ZUR/KE/19	KE	ZUR B	None	Wheel-made	28.00		
ZUR/K2A/26	K2A	ZUR B	None	Wheel-made	22.00		

Type II.1.2: Globular jar with modelled rim and two handles

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/KAB/41	KAB	ZUR A	None	Combined	14.00		
ZUR/K2A/4	K2A	Nile D	Red slip on external surface.	Wheel-made	16.00		

Type II.1.3: Globular jar with upright handles

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/88	K0,7	Nile D	Cream slip on external surface.	Wheel-made	10.00	25.00	
ZUR/2014(K)/3	None given	Marl D	Thick white slip on exterior surface	Wheel-made	13.00	15.00	
ZUR/KY/11	KY	Marl D	Thick white slip on exterior surface	Wheel-made	3.00		

Type II.1.4: Globular jar with flaring mouth and pointed base

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/140ac	K1,4	ZUR B	None	Wheel-made	10.00		
ZUR/K/165	K1,4	ZUR B	None	Wheel-made	6.00	10.70	

Type II.1.5: Small globular jar with flat base

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/6	K1,8	Marl D	Thick white slip on exterior surface	Wheel-made	8.00		

Type II.1.5: Small globular jar with flat base

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/284	K6,5	Marl D	Thick orange-cream slip on exterior surface	Hand moulded	16.00		

Type II.2: Funnel-neck jar

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/140v	K1,4	Nile B2	Red slip on external surface	Wheel-made	12.00		
ZUR/KS/4	KS	Nile B2	Red slip on external surface	Wheel-made	18.00		
ZUR/K2A/25	K2A	Nile B2	Red slip on external surface	Wheel-made	14.00		
ZUR/K/226	K0,4	Nile B2	Cream slip and polychrome paint on external surface	Wheel-made	24.00		
ZUR/KN/44	KN	Nile B2	Cream slip and polychrome paint on external surface	Wheel-made	12.00		
ZUR/KN/45+46	KN	Nile B2	Cream slip and polychrome paint on external surface	Wheel-made	12.00		
ZUR/K/116n	K1,4	Nile B2	Cream slip on external surface	Wheel-made	16.00		
ZUR/KZ/33	KZ	Nile B2	Cream slip on external surface	Wheel-made	16.00		
ZUR/K2A/16	K2A	Nile B2	Cream slip on external surface	Wheel-made	12.00		
ZUR/K/345(1)g	K5,6	Nile B2	None	Wheel-made	14.00		
ZUR/KE/21	KE	Nile B2	None	Wheel-made	12.00		Burning on internal and external surface of lip
ZUR/KZ/32	KZ	Nile B2	None	Wheel-made	11.00		
ZUR/Agiba/2	Wadi Agiba Surface Find	Nile B2	None	Wheel-made	22.00		
ZUR/K/108b	K0,7	Nile D	Cream slip on external surface.	Wheel-made	19.00*		
ZUR/K/259	K0,9	Nile D	Cream slip on external surface.	Wheel-made	24.00		
ZUR/KAB/48	KAB	Nile D	Cream slip on external surface.	Wheel-made	28.00	76.00	
ZUR/KE/18	KE	Nile D	Cream slip on external surface.	Wheel-made	16.00		
ZUR/KN/34+35	KN	Nile D	Cream slip on exterior surface.	Wheel-made	17.00cm		
ZUR/KZ/20	KZ	Nile D	Cream slip on external surface.	Wheel-made	16.00		
ZUR/K/16p	K1,8	Nile D	Cream slip on internal lip.	Wheel-made	14.00	26.20	
ZUR/KE/24	KE	Nile D	Incised line around rim.	Wheel-made	16.00		
ZUR/KG/6	KG	Nile D	Polychrome decoration on cream slip on exterior surface.	Wheel-made	24.00*		

Type II.2: Funnel-neck jar

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/KG/7	KG	Nile D	Polychrome decoration on cream slip on exterior surface.	Wheel-made	14.00*		
ZUR/KN/25	KN	Nile D	Polychrome decoration on cream slip on exterior surface.	Wheel-made	14.00*		
ZUR/KG/3a	KG	Nile D	Polychrome decoration on un-slipped surface.	Wheel-made	11.00*		
ZUR/KG/3b	KG	Nile D	Polychrome decoration on un-slipped surface.	Wheel-made	12.00*		
ZUR/KG/8	KG	Nile D	Polychrome decoration on un-slipped surface.	Wheel-made	16.00*		
ZUR/KN/29	KN	Nile D	Polychrome decoration on un-slipped surface.	Wheel-made	8.00*		
ZUR/K/1	Well (surface find)	Nile D	Red slip on external surface and monochrome decoration.	Wheel-made	14.50	36.00	
ZUR/K/194b	K1,4	Nile D	Red slip on external surface.	Wheel-made	10.00		
ZUR/K/345i	K5,6	Nile D	Red slip on external surface.	Wheel-made	14.00		
ZUR/K/140t	K1,5	Nile D	Red slip on internal lip.	Wheel-made	14.00		
ZUR/K/16d	K1,8	Nile D	None	Wheel-made	10.00		
ZUR/K/16z	K1,8	Nile D	None	Wheel-made	20.00		
ZUR/K/89	K0,7	Nile D	None	Wheel-made	12.20		
ZUR/K/336k	K1,2	Nile D	None	Wheel-made	14.00		
ZUR/K/346i	K5,7	Nile D	None	Wheel-made	15.00		
ZUR/K/346k	K5,7	Nile D	None	Wheel-made	22.00		
ZUR/2014(K)/8	None given	Nile D	None	Wheel-made	12.00		
ZUR/K/289o	K0,8	ZUR A	Red slip on external surface.	Wheel-made	14.00		
ZUR/K/16v	K1,8	ZUR A	Cream slip on external surface.	Wheel-made	15.00		
ZUR/K/194c	K1,4	ZUR A	Cream slip on external surface.	Wheel-made	22.00		
ZUR/KE/25	KE	ZUR A	Cream slip on external surface.	Wheel-made	12.00		
ZUR/KAB/40	KAB	ZUR A	None	Wheel-made	32.00		
ZUR/2014(K)/5	None given	ZUR A	None	Wheel-made	14.00		
ZUR/K/140y	K1,4	ZUR A	None	Wheel-made	22.00		
ZUR/K/215a+b	K0,4	ZUR A	None	Wheel-made	12.00		
ZUR/K/231a	K1,4	ZUR A	None	Wheel-made	12.00		
ZUR/K/278d	K1,8	ZUR A	None	Wheel-made	14.00		
ZUR/K/289f	K0,8	ZUR A	None	Wheel-made	10.00		
ZUR/K/344c	K4,5	ZUR A	None	Wheel-made	47.00*		
ZUR/KZ/23	KZ	ZUR A	None	Wheel-made	16.00		
ZUR/K/345j	K5,6	ZUR B	Cream slip on external surface.	Wheel-made	13.00		

Type II.2: Funnel-neck jar

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/KA/9	KA	ZUR B	Cream slip on external surface.	Wheel-made	16.00		
ZUR/KY/6	KY	ZUR B	Cream slip on external surface.	Wheel-made	13.00		
ZUR/K2H/19	K2H	ZUR B	Cream slip on external surface.	Wheel-made	18.00		Crescent-shaped pre-fire potmark on external surface.
ZUR/K2H/37	K2H	ZUR B	Cream slip on external surface.	Wheel-made	16.00		
ZUR/KZ/21	KZ	ZUR B	Cream slip on external surface.	Wheel-made	24.00		
ZUR/K/140	K1,4	ZUR B	None	Wheel-made	16.00		
ZUR/K/194d	K1,4	ZUR B	None	Wheel-made	14.00		
ZUR/K/320m	K4,0	ZUR B	None	Wheel-made	14.00		
ZUR/K/108m	K0,7	ZUR B	None	Wheel-made	18.00		
ZUR/K/116l	K1,4	ZUR B	None	Wheel-made	14.00		
ZUR/K/344b	K4,5	ZUR B	None	Wheel-made	29.00		
ZUR/K2H/23	K2H	ZUR B	None	Wheel-made	22.00		
ZUR/KB/4	KB	ZUR B	None	Wheel-made	12.00		
ZUR/K2A/24	K2A	ZUR B	None	Wheel-made	18.00		
ZUR/K2H/6	K2H	ZUR B	None	Wheel-made	10.00		
ZUR/K/140l	K1,4	ZUR C	None	Wheel-made	12.00		
ZUR/K/336t	K5,7	ZUR C	None	Wheel-made	14.00		
ZUR/KV/9	KV	ZUR C	None	Wheel-made	12.00		

Type II.3: Flat-based beer jar

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/16a	K1,8	Nile B2	None	Combined	10.00		
ZUR/K/345c	K5,6	Nile B2	None	Combined	7.50		
ZUR/KH/10	KH	Nile B2	None	Combined	9.00	25.50	
ZUR/Agiba/1	Wadi Agiba	Nile B2	None	Combined	8.00		
ZUR/K/289r	K0,8	Nile D	None	Wheel-made	10.00		
ZUR/K/336j	K1,2	Nile D	None	Wheel-made	12.00		
ZUR/K/346m	K5,7	Nile D	None	Wheel-made	12.00		
ZUR/KE/11	KE	Nile D	None	Wheel-made	10.00		
ZUR/KI/15	KI	Nile D	None	Wheel-made	9.50	24.40	
ZUR/K/15	K0,7	ZUR A	None	Wheel-made	9.00	23.50	
ZUR/K/140h	K1,4	ZUR A	None	Wheel-made	8.00		
ZUR/K/194a	K1,4	ZUR A	None	Wheel-made	10.00		
ZUR/K/322b	K1,2	ZUR A	None	Wheel-made	12.00		
ZUR/K/322c	K1,2	ZUR A	None	Wheel-made	10.00		
ZUR/KE/7	KE	ZUR A	None	Wheel-made	9.00	24.50	
ZUR/KE/28	KE	ZUR A	None	Wheel-made	10.00		
ZUR/KE/29	KE	ZUR A	None	Wheel-made	9.00		
ZUR/KI/4	KI	ZUR A	None	Wheel-made	10.00		

Type II.3: Flat-based beer jar

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/KY/4	KY	ZUR A	None	Wheel-made	10.00	25.00	
ZUR/K2H/31	K2H	ZUR A	None	Wheel-made	10.00		
ZUR/K/344d	K4,5	ZUR B	None	Combined	10.00		
ZUR/2014(K)/4	None given	ZUR B	None	Combined	9.50		
ZUR/KAB/68	KAB	ZUR B	None	Combined	9.00		
ZUR/KZ/30	KZ	ZUR B	None	Combined	11.00		
ZUR/K/16g	K1,8	ZUR A	None	Wheel-made	9.00		Pierced base
ZUR/KH/12	KH	ZUR B	None	Combined	8.00*		Pierced base

Type II.4: Amphora

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/KZ/36	KZ	Nile B2	Cream slip on external surface	Wheel-made	22.00		
ZUR/K/294b	K0,6	Nile B2	Cream slip on external surface	Wheel-made	11.00		
ZUR/K/13b	K1,7	Nile D	Cream slip on external surface.	Wheel-made	26.00		
ZUR/K/13a	K1,7	Marl D	Thick white slip on exterior surface	Wheel-made	12.00		
ZUR/K/116j	K1,4	Marl D	Thick white slip on exterior surface	Wheel-made	12.00		
ZUR/K/116o	K1,4	Marl D	Thick white slip on exterior surface	Wheel-made	28.00		
ZUR/K/280	K1,8	Marl D	Thick white slip on exterior surface	Wheel-made	14.00		
ZUR/K2A/21	K2A	Marl D	Thick white slip on exterior surface	Wheel-made	22.00		Pot-mark on exterior surface
ZUR/K2H/16	K2H	Marl D	Thick white slip on exterior surface	Wheel-made	12.00		
ZUR/K/336b	K1,2	Marl D	Thick white slip on exterior surface	Wheel-made	8.00		
ZUR/K2H/27	K2H	Marl D	Thick white slip on exterior surface	Wheel-made	4.80		

Type II.5.1: Ovoid flask with moulded neck

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/294a	K0,6	Nile B2	None	Wheel-made	6.00		

Type II.5.2: Squat globular bottle with modelled neck

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/157	K0,7	ZUR B	None	Wheel-made	4.40	13.80	

Type II.5.3: Cosmetic flask

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/KN/49	KN	Marl D	Thick white slip on exterior surface	Hand moulded	1.60	8.00	

Type II.6: Tall Ovoid Jars

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/KY/2	KY	Nile B2	Cream slip on external surface	Wheel-made	11.00		Burning on exterior surface in patches

Type II.6: Tall Ovoid Jars

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/KZ/27	KZ	Nile B2	Cream slip on external surface and along interior surface of lip	Wheel-made	16.00		
ZUR/KN/19+20	KN	Nile D	Polychrome decoration on thin red slip on exterior surface.	Wheel-made	12.00*		
ZUR/KN/24	KN	Nile D	Polychrome decoration on cream slip on exterior surface.	Wheel-made	10.00*		
ZUR/KN/31	KN	Nile D	Polychrome decoration on cream slip on exterior surface.	Wheel-made	12.00*		
ZUR/KN/41	KN	Nile D	Polychrome decoration on cream slip on exterior surface.	Wheel-made	8.00*		
ZUR/K/260	K4,6	Nile D	Cream slip on external surface.	Wheel-made	13.00*		
ZUR/K/263b	K1,2	Nile D	None	Wheel-made	20.00		
ZUR/K/289m	K0,8	Nile D	None	Wheel-made	18.00		
ZUR/K/346h	K5,7	Nile D	None	Wheel-made	13.00		
ZUR/KE/14	KE	Nile D	Cream slip on external surface.	Wheel-made	14.00		
ZUR/2014(K)/2	None given	ZUR A	None	Wheel-made	12.00	27.80	
ZUR/KZ/27	KZ	ZUR A	Cream slip on external surface.	Wheel-made	16.00		
ZUR/K/215l	K0,4	ZUR A	None	Wheel-made	14.00		
ZUR/K/289k	K0,8	ZUR A	None	Wheel-made	10.00		

Type II.7: Imitation pilgrim flask

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/285	K1,2	Marl D	Thick white slip on exterior surface	Combined	5.20		
ZUR/K/343	K5,6	Marl D	Thick white slip on exterior surface	Combined	6.00		
ZUR/KAB/19	KAB	Marl D	Thick white slip on exterior surface	Combined	3.20		
ZUR/KH/11	KH	Marl D	None present	Combined	5.00		
ZUR/KI/5	KI	Marl D	None present	Combined	6.00		
ZUR/KKI/14	KKI	Marl D	Thick white slip on exterior surface	Combined	5.50		
ZUR/KN/42	KN	Marl D	Thick white slip on exterior surface	Combined	3.00		
ZUR/KN/43	KN	Marl D	None present	Combined	4.00		
ZUR/KN/47	KN	Marl D	Thick white slip on exterior surface	Combined	4.00		
ZUR/KKII/15	KKII	Marl F	None present	Combined	5.00		

Type III.1.1: Small ring stand

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/K/16h	K1,8	Nile B2	None	Wheel-made	10.00		
ZUR/K/116e	K1,4	Nile B2	None	Wheel-made	16.00		

Type III.1.1: Small ring stand

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/KAB/61	KAB	Nile B2	None	Wheel-made	26.00		
ZUR/KZ/35	KZ	Nile B2	None	Wheel-made	32.00		
ZUR/K/130	K3,6	Nile D	None	Wheel-made	20.50	19.00	
ZUR/KM/19	KM	ZUR A	None	Wheel-made	12.00	3.80	
ZUR/KM/20	KM	ZUR A	None	Wheel-made	13.50	4.60	
ZUR/K/16o	K1,8	ZUR B	None	Wheel-made	20.00		
ZUR/KR/1	KR	ZUR B	None	Wheel-made	9.00		

Type III.1.2: Ring stand with buttresses

Finds No.	Locus	Fabric	Surface Treatment	Manufacture	D.	H.	Notes
ZUR/KJ/14	KJ	Nile B2	Cream slip on external surface	Combined	38.00		A series of carrying holes in-between modelled handles.

*** refers to a measurement taken on the base or the body of the sherd, rather than along the rim.**

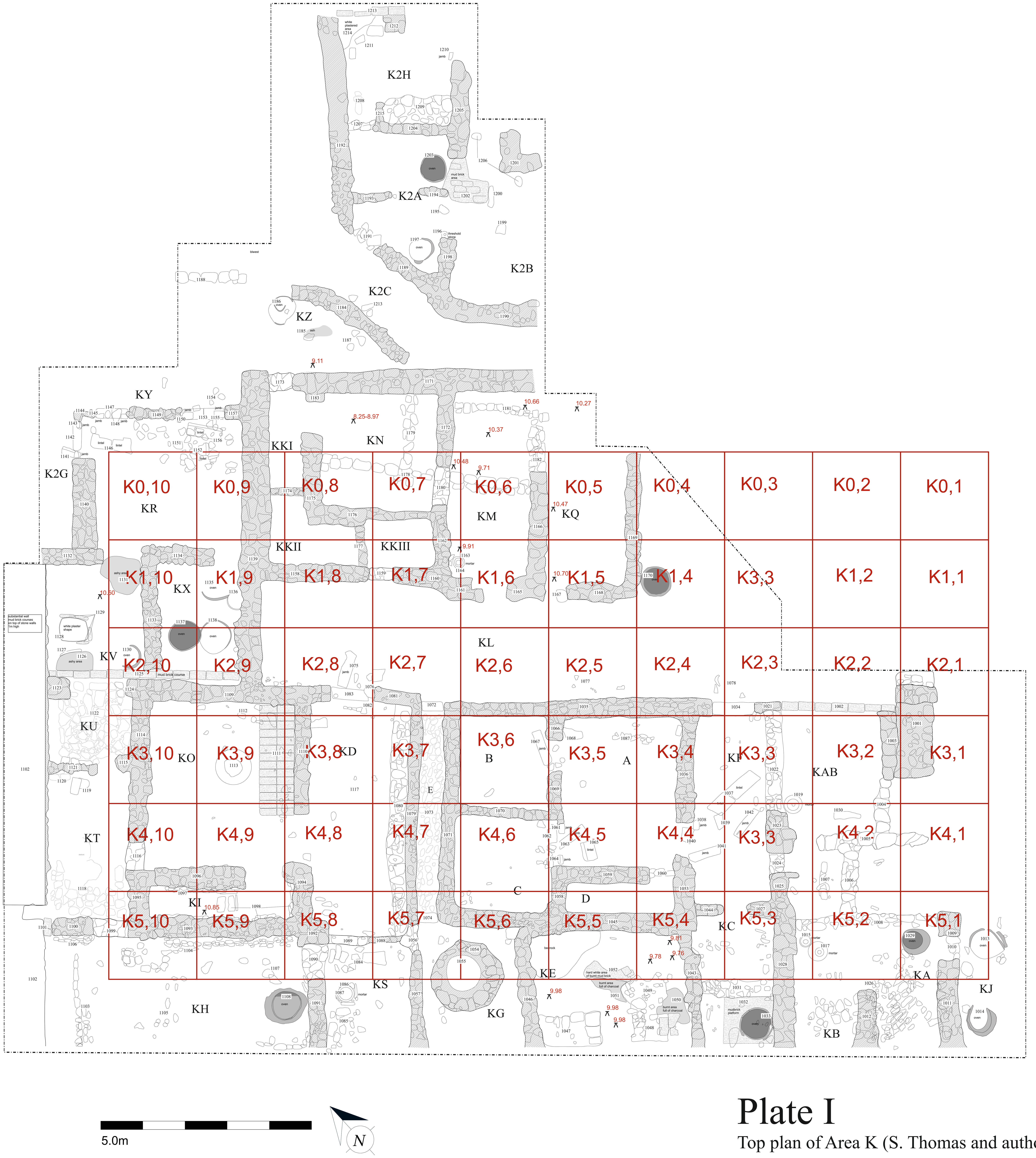

Plate I

Top plan of Area K (S. Thomas and author)