The Nile Delta as a centre of cultural interactions between Upper Egypt and the Southern Levant in the 4th millennium BC

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The Nile Delta as a centre of cultural interactions between Upper Egypt and the Southern Levant in the 4th millennium BC

Edited by
Agnieszka Mączyńska

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vol. 12 Agnieszka Mączyńska, *Lower Egyptian Communities and Their Interactions with Southern Levant in the 4th Millennium BC*, Poznań 2013.

LIST OF CONTENT

PREFACE

This volume is part of and concludes the project entitled *The Nile Delta as a centre of cultural interactions between Upper Egypt and the Southern Levant in 4th millennium BC*. It contains a collection of papers by researchers involved in investigating the development of the Nile Delta in the Pre- and Protodynastic Periods. Nearly all of these papers were presented at the same-titled conference held on June 21 and 22, 2013 in the Archeological Museum in Poznań, Poland. Although originally planned as a workshop presenting the results of research carried out as part of the project, the conference eventually evolved into a major event and became an opportunity to meet and talk about the role of Delta communities in the development of the Egyptian civilization in the 4th millennium BC, with particular emphasis on their relations with neighboring areas, *i.e.* the Southern Levant and Upper Egypt. The conference was attended both by project partners and by invited guests whose papers made an excellent addition to the main topic of the event. Most lectures concentrates on sites from Lower Egypt and today's Israel. A notable exception is thus the paper by W. Claes *et al.*, presented at the conference by S. Hendrickx, on the site of Elkab in Upper Egypt. The decision to include this paper in our publication was determined by the fact that the paper presents findings "fresh off the site" and by the scarcity of information from contemporary research in this region. In addition, although S. Hendrickx had not been personally involved in the research in the Delta, he actively participated in heated debates on the issue. Only the paper by Steven Rosen was presented at a workshop *Imports during the Naqada Period: Investigating Two Sides of a Phenomenon* organized in W.F. Albright Institute of Archaeological Research in Jerusalem on November 26, 2012. The main goal of the workshop was to meet Israeli archeologists, who keep finding Egyptian imports on various sites. An important element of the workshop was the opportunity to discuss Egyptian-Levantine relationships not only from the Egyptian, but also from the Levantine perspective. The article by Steven Rosen is a fine example here.

As a project, *The Nile Delta as a centre of cultural interactions between Upper Egypt and the Southern Levant in 4th millennium BC* continued for 3 years, from May 2011 to April 2014. I conceived the project's idea when investigating the Tell el-Farkha site, which year by year provided new evidence confirming the site's importance from the moment of its inhabitation by representatives of the Lower Egyptian culture through to the formation of the Egyptian state, and finally to the Early Dynastic period. This evidence seemed to contradict the prevailing vision of the region, generally seen as a venue for (or background to) changes. In that vision, the Delta communities in the Pre- and Protodynastic Periods did not play any major role in those changes, and finally came to be either replaced or assimilated by Upper Egyptians, who were more developed socially, economically and politically. Meanwhile, findings yielded by excavations in Tell el-Farkha showed that the settlement's residents were actively involved in all processes taking place in the 4th millennium BC, *i.e.* in the exchange of goods with neighboring regions, development of craft specialization and emergence of the Egyptian state (Chłodnicki *et al.* 2012;

Chłodnicki *this volume*). Therefore, the project's main assumption was not only to provide evidence confirming that the Delta and its residents were involved in processes and changes, but also to inspire discussions among researchers. Although the data from Tell el-Farkha were an important element of the project, evidence coming from other sites in the Delta (and their interpretation in the light of studies from Tell el-Farkha) was of equal importance.

Since archeology is hardly a predictable discipline, the original project assumptions had to be modified as excavation works progressed. Furthermore, the project was affected by the political situation in Egypt in 2011 to 2014. As the project's leader I am fully aware that my view of its results is subjective and therefore I leave it to others. However, I do hope that these results can be treated as another step forward in investigating the still mysterious prehistory of the Nile Delta. Quite surely, completion of this project does not close the issue tackled by me in 2011, and ongoing excavations in the Delta will keep providing new important discoveries.

The project included excavations at the Tell el-Farkha site held from 2012 to 2014 and specialized analyses – petrographic pottery analysis by Mary F. Ownby (t*his volume*) and metal ware analysis by Thilo Rehren (Rehren & Pernicka *this volume*). Furthermore, the project gave fruit in the form of 3 publications that may constitute a rich source of information for all researchers investigating the Pre- and Protodynastic Nile Delta. For the first time, a comprehensive report covering materials from Polish explorations of the Tell el-Farkha site was published (Chłodnicki *et al.* 2012). The project also allowed me to amend, update and publish my doctoral dissertation (written nearly 10 years earlier) on the interactions between Lower Egypt and the Southern Levant in the 4th millennium BC (Mączyńska 2013). In its turn, this volume is the third book published as part of the project. I greatly hope that it will be useful for all researchers investigating the area in question. Last but not least, the project allowed me and my colleagues to participate in a number of important conferences, *e.g.* in New York, Cairo, Jerusalem, and Vienna, where we had an opportunity to present the project, its assumptions and results. Throughout the project I was assisted by two archeology students selected in competitions, namely: Jacek Karmowski of Adam Mickiewicz University in Poznań, and Konrad Ziółkowski of the University of Warsaw. In 2012 and 2013 they wrote their MA theses on project-related issues, and received grants from the Foundation. The results of Jacek Karmowski's thesis are incorporated in this volume.

The project *The Nile Delta as a centre of cultural interactions between Upper Egypt and the Southern Levant in 4th millennium BC* was financed by the Foundation for Polish Science as part of the Parent Bridge Programme, addressed at young parents-researchers returning to research work after a parenting break. For many years the Foundation has supported the development of young Polish researchers. This time the Foundation chose to offer assistance to those who suspended their research career and studies and became parents. In many countries (including Poland) young parents-researchers must often choose between research and family, and the choice is by no means easy. A growing family always involves changes and very often makes it difficult or downright impossible for young researcher mothers and fathers to return to work. The Parent Bridge Programme allows young parents-researchers to launch their own projects and thus return to the world of research. Furthermore, by financing the total cost of projects the Foundation gives researchers the comfort of financial and scientific independence.

In the area of *Bio, Info and Techno* disciplines, the Parent Bridge Programme is co-financed with European Union funds as part of the European Regional Development Fund (Innovative Economy Operational Programme). Projects outside the *Bio, Info, Techno* research area are financed with the Foundation's own funds. The last (seventh) call for proposals was launched in 2013. Thus far, a total of 86 *Bio, Info, Techno* projects and 10 projects from other disciplines received financing from the programme.

I personally believe that the idea of the Parent Bridge Programme fully worked for my project and my research career. Although fairly intensive, the last three years allowed me to develop immensely. The project became a kind of a springboard that gave me a kick start in my professional life after a break caused by giving birth to two children.

Acknowledgements

The last three years of my work would not have been possible had it not been for great help from a large group of people who collaborated with me or supported me in my efforts. I would like to thank all project partners: Nathalie Buchez, Eliot Braun, Anat Cohen-Weinberger, Marcin Czarnowicz, Joanna Dębowska-Ludwin, Amir Golani, Mary F. Ownby, Thilo Rehren – for having agreed to participate in the project and for their contribution and feedback. Particular thanks are owed to Thilo Rehren, Director UCL Qatar for his valuable time and immense amount of work for the project. I would also like to thank Marcin Czarnowicz, a doctoral student of the Jagiellonian University in Krakow, Poland, for his enormous involvement in planning and implementing the project, as well as for his friendly support at all stages. Another person I feel compelled to thank is Bearix Midant-Reynes, Director of The French Institute for Oriental Archaeology (IFAO) in Cairo, whose permission authorizing me to use the IFAO laboratory made the project much easier to complete.

The project would not have taken place without the assistance and scientific support of the two heads of the Polish Archaeological Expedition to the Eastern Nile Delta: Marek Chłodnicki and Krzysztof M. Ciałowicz, as well as all team members from the years 2012-2104, including in particular two grant holders of the project: Jacek Karmowski and Konrad Ziółkowski.

Similarly, the project would not have been possible without the support of the Archeological Museum in Poznań, where I normally work. I would like to acknowledge the support offered to me by professor Marzena Szmyt, the Museum's Manager, as well as by the entire Accounting Department who took care of the formal dimension of the project, including in particular the challenging financial aspects.

Great thanks are also due to all members of the Conference (see list below) who agreed to come to Poznań, present their research, participate in discussions and send in their papers for publication.

One person whom I would like to particularly thank is Edwin C.M. van den Brink, who wrote the introductory remarks to this publication despite an injury to his right hand (not to mention his professional duties). Edwin C.M. van den Brink is the editor of two important publications concerning the Delta: *The Archaeology of the Nile Delta. Problems and Priorities* (Amsterdam 1988) and *The Nile Delta in Transition: 4th–3rd Millennium B.C.* (Tel Aviv 1992). Although he is not currently involved in archeological studies in Egypt, I find his comments on changes taking place in this region's archeology to be highly valuable. No book written after 1992 concentrated on the Delta area alone. Thanks to the papers featured in this publication, it may become a rich source of information about the region, just like the two books indicated above.

All of my efforts over the last 3 years would not have been possible without the financial support of the Foundation for Polish Science, whose approach to professional careers of young researchers is remarkable.

Finally, I would like to thank my family: my husband Dominik, and my two children: my son Tymoteusz and my daughter Jowita. Although the arrival of my children caused quite a revolution in my life and slowed down my research activity, it is thanks to them that I had an opportunity to carry out this project. All of you together make my life and work meaningful.

Agnieszka Mączyńska

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INTRODUCTION

Within the framework of the Parent Bridge Programme, the Foundation for Polish Science in 2011 awarded Dr. AGNIESZKA MĄCZYŃSKA a scholarship enabling her to research in depth the role the Nile Delta played in the cultural processes slightly prior to and running up to the formation of a unified, riverine Egyptian state. In this context, Agnieszka organized the international workshop *The Nile Delta as a center of cultural interactions between Upper Egypt and the Southern Levant in the 4th millennium BC* that took place on 20 and 21 of June 2013, in the Poznan Archaeological Museum, the proceedings of which are now in front of you.

The workshop coincided with the 15th anniversary of the start of the still ongoing Polish excavations at Tell el-Farkha. During this period research at this site gradually took center stage in archaeological Delta research, and a new generation of young fieldworkers now spreading their wings was carefully nurtured by excavation directors K.M. CIAŁOWICZ and M. CHŁODNICKI. One notable off-shoot of the Polish fieldwork at Tell el-Farkha is the Northwestern Nile Delta Survey Project that was started in 2008 by members of the Tell el-Farkha team, resulting *i.a.* in new excavations at Tell el-Murra, yet another Predynastic – Old Kingdom Delta locality and possibly a satellite site to Tell el-Farkha itself, while subsequent prospection around Tell el-Murra revealed once again a real embarrass du choix of densily packed Naqada III sites in this part of the Delta, noted already in the 1980-ies during the AUSE geo-archaeological survey for areas slightly more to the east.

The occasion in Poznań was marked by the opening of a photo exhibition in the museum, titled *Tell el-Farkha. Beginnings of the Egyptian State*. The well-organized and invigorating two-day event was concluded by a guided tour in the Archaeological Reserve *Genius Loci*, followed by an endearing reception.

It is a pleasure to open this volume with a very brief synopsis of the workshop's discussions. Fifteen papers were presented (two read *in absentia*)[1] and discussed during the workshop that also included eight, Tell el-Farkha-related poster sessions.[2]

Five papers center around different aspects of the excavations at Tell el-Farkha, including the beer breweries, metal finds, spatial settlement organization, reconstructed settlement architecture in 3D and petrographic analysis of pottery vessels. Two other

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[1] This concerns the paper written by TH. REHREN & E. PERNICKA and presented on their behalf by M. CZARNOWICZ and the paper written by P. WILSON and presented on her behalf by J. ROWLAND. One paper, written by S. ROSEN and included in the present volume, had been presented slightly earlier on *ex cathedra*, in a related, one-day workshop "*Imports during the Naqada Period – Egypt and the Southern Levant: Investigating Two Sides of a Phenomenon*", organized in November 2012 at the Albright Institute in Jerusalem.

[2] These include *Brewing Industry in 3D View* (K. ROSIŃSKA-BALIK), *Tokens from Tell el-Farkha: Facts and Questions* (P. KOŁODZIEJCZYK), *Early Dynastic Pottery in the Nile Delta* (M. JUCHA), *Bone Implements from Tell el-Farkha* (M. KURZYK), *Archaeozoological Study of Mammals from Tell el-Farkha* (R. ABLAMOWICZ), *Stone Working at Tell el-Farkha. Tools and Workshops* (M. JÓRDECZKA & M. MROZEK-WYSOCKA), *Settlement Architecture on the Eastern Kom at Tell el-Farkha, a 3D Reconstruction* (J. KARMOWSKI), and *Function of Ceramic Vessels at Tell el-Farkha* (K. ZIÓŁKOWSKI).

site-related papers concern Kafar Hassan Dawood (focusing on interregional exchange) and Sais (concentrating on temporal and regional connections), located on opposite extremes of the Delta.

Three papers are written from a south Levantine perspective; one is site-specific (Ashqelon) and deals with aspects of late Early Bronze Age I copper production and trade, another compares 4th millennium Levantine flint production with that of contemporary Egypt, while a third paper takes a critical look at what is actually to be understood by an Egyptian colony in the region.

Two additional papers deal with aspects of the other side of the same coin, namely the apparent presence of Late Chalcolithic, Levantine migrants in the Delta in the 4th millennium BC and the presence of a stylistically rather diagnostic, short-lived and therefore highly chrono-sensitive type of Levantine pottery decorative style ("Tel Erani C"; mid-Early Bronze Age I) in Egypt.

Two contributions deal specifically with interpretive reappraisals of the formative processes at work in 4th millennium BC Lower and Upper Egypt leading up to a unified, Early Egyptian state.

As an outlier, without any obvious direct connection to the central theme of the present workshop, a final paper concerns an Upper Egyptian, site-specific excavation report (El Kab). Its nonconformity in the present context is more than compensated for by the first author's (S. Hendrickx) active participation in the discussions during the workshop, and for making available his exhaustive, digitalized data-base of pre-, proto- and early dynastic artefacts that laid the groundwork for a seminal workshop's paper presented by E.Ch. Köhler. That paper is one of several contributions to this proceedings (*e.g.,* Mączyńska's and Dębowska-Ludwin's) touching upon a more general discourse presently going on in late Predynastic-Early Dynastic research in Egypt, fueled by significant increments in the archaeological record over the last thee decades or so, critically reappraising and challenging, and concomitantly refining and gradually modifying one of the late prof. W. Kaiser's basic tenets concerning the very character of his postulated northwards expansion drift of proponents of the Upper Egyptian Naqada culture into the fertile heartland of the Nile Delta, at the time inhabited by exponents of the Lower Egyptian Buto-Maadi culture.

Edwin C.M. van den Brink
Tsfat, February 15, 2014

Brewing technology in Early Egypt. Invention of Upper or Lower Egyptians?

Bartosz Adamski & Karolina Rosińska-Balik
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For centuries beer was for Egyptians the most common and basic of comestible. The oldest record where beer was mentioned is the list of the grave goods offered to Secherchabau in the stele from his tomb at Sakkara dated for the Third Dynasty (Murray 1905: 2-4, pl. 1). Since then beer has being constantly listed among grave offerings just next to bread. Together with bread it was a form of payment for public workers and soldiers. The oldest known brewery, till present, is located at Hierakonpolis HK24A and is linked to the Naqada culture (Geller 1992: 23) but considering the Lower Egyptian culture, the only brewery from this period is up to now known from the Tell el-Farkha site (Fig. 1; Chłodnicki & Ciałowicz 2005: 134).

The occupation of the Western Kom of Tell el-Farkha is surely confirmed from the Lower Egyptian culture (Naqada IIB) until the First Dynasty. The oldest stratum on the Western Kom shows traces of a simple habitation area which quickly transformed for industrial purposes. In this place a sequence of at least five breweries was detected (Chłodnicki & Ciałowicz 2005: 132-134; 2007: 145-146; Ciałowicz 2012a: 149). The first uncovered phase of the brewery was the very badly destroyed by the overlaying layers structure 201A. During its examination only approximately size (2 by 1.5m) and shape were recognized (Cichowski 2008: 39). It seems to consist of 2 rows of joined vats. This phase was dated on Naqada IIB period and it's probably the early stage of the structure W200 (Ciałowicz 2012a: 151). In the next layer the structure W201 appears. This phase was only in a slightly better condition and measured about 6 by 3.4m. It's oriented on the same north-west and south-east axis as previously described structure W201A. At this structure two examples of vats were found *in situ*. This allowed to recognize a method of circular seats construction. Each of them consists of at least two rows of diagonally arranged D-shaped bricks better known as fire-dogs (Cichowski 2008: 38).

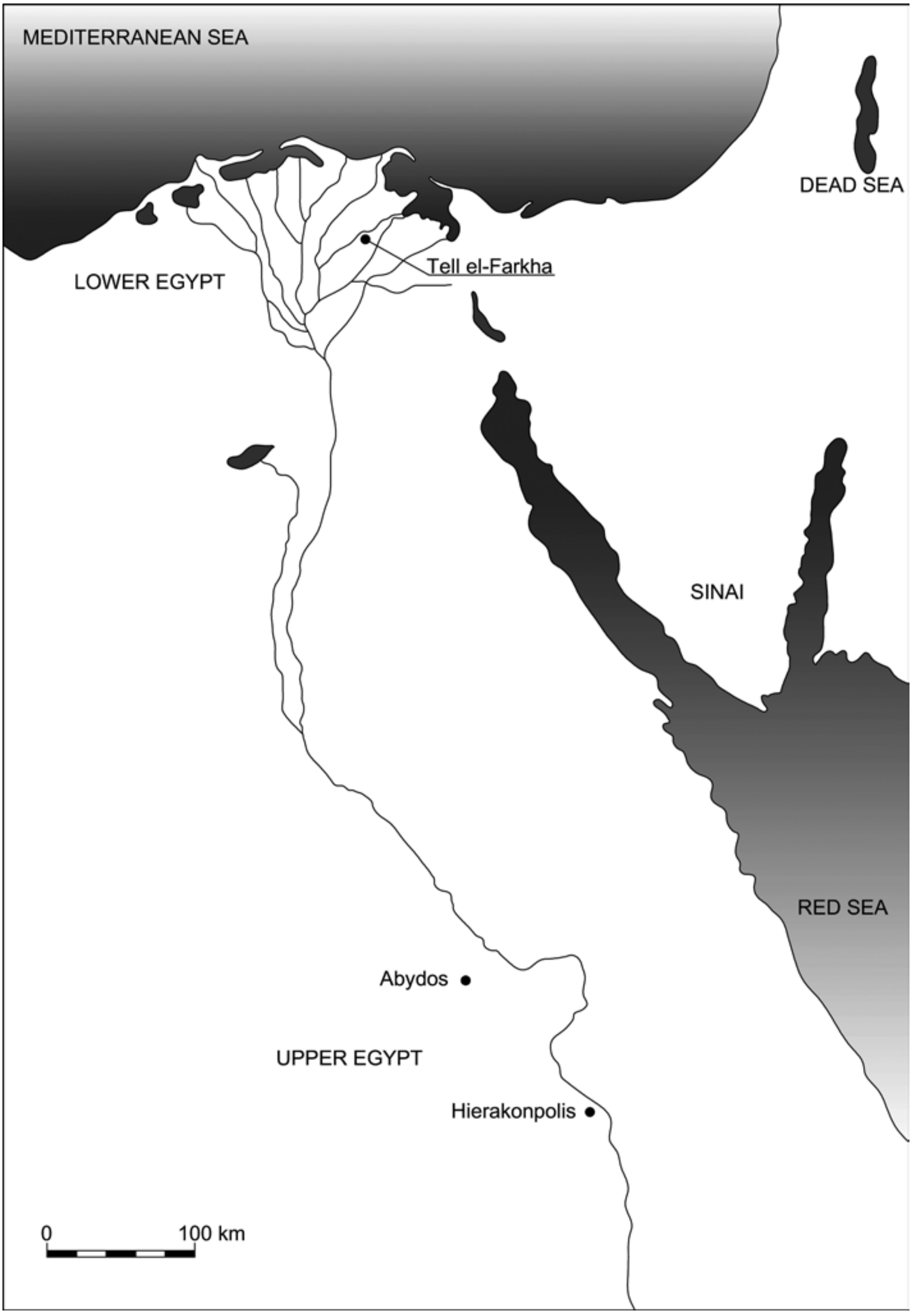


Figure 1. Localization of Lower and Upper Egyptian early breweries
(drawing by K. ROSIŃSKA-BALIK).

The next overlaying structure W200, located to the north from structure W201, is dated to the next Naqada IIC period (CICHOWSKI 2008: 37, 39). As it was mentioned before this was most probably the second stage of W201A and it is the best preserved example of brewery from Tell el-Farkha. Together with its first phase it constructs a L-shaped brewing device with total number of 13 vat seats arranged in two rows. The structure seems to be well planned and organized for the long time before its erection (CIAŁOWICZ 2012a: 151, 155-157). The structure W200 was arranged as a complex of vats with total measurements 9 by 3.4m. In this stage of beer industry complex uncovered examples of vats *in situ* confirmed size of this vats and construction of its seats (Fig. 2). In average this brewery could produce about 200 litres at once (CHŁODNICKI & CIAŁOWICZ 2007: 145-146; CICHOWSKI 2008: 37). This structure was fully covered with thick layer of mud what clearly pointed at occurrence of destructive Nile floods what was frequently recorded on the site (CHŁODNICKI & CIAŁOWICZ 2004: 102; 2007: 147; CIAŁOWICZ 2012a: 149-155, 157-160).

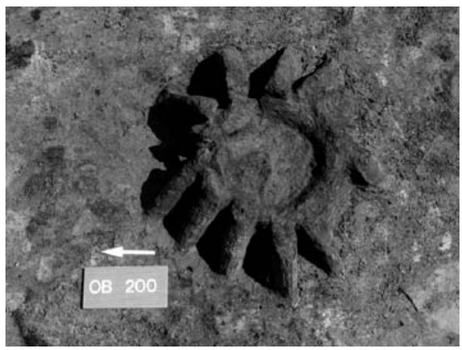


Figure 2. The vat seat *in situ* (photo by R. SŁABOŃSKI).

After this local disaster subsequent brewery was erected almost at the same spot. The structure W192 was the most complicated one. It measured 6 by 5.4m and consists of 11 circular seats for vats. At first only a few of them were build and during exploitation due to a high temperature it begun to be damaged so some new vat seats were added (Fig. 3; CHŁODNICKI & CIAŁOWICZ 2004: 102-103; 2005: 133; CICHOWSKI 2008: 37).

Up to date, the smallest discovered brewery from the Western Kom of Tell el-Farkha is the structure named W47 (CHŁODNICKI & CIAŁOWICZ 2001: 93). However, as we know from the last season of research it was not the youngest. The brewery W47 is dated from Naqada IID1 to the beginning of Naqada IID2. It consisted only on 3 places for vats and measured about 3.4 by 4m. Whole the three-leaf clover shaped structure was surrounded by at least 0,6m high brick wall from 10-30cm thick depending on brick arrangement. The vat seats were also separated from each other by much thinner inner walls. This example of the brewery device revealed some exceptional solution for vat seat construction. In order to stabilized the vat itself a kind of basis was implemented. Basis was additionally encircled with kind of clay band. This type of construction was probably to provide better heat distribution around the vessel (Figs. 4-5; CHŁODNICKI & CIAŁOWICZ 2001: 91- 93; 2002: 70; CICHOWSKI 2008: 34-39). During 2013 season our team discovered another 2 examples of brewery on the Western Kom: W272 and W273. The second one was in such bad condition that it was impossible to distinguish its exact number of vat seats. The brewery W272, however still under examination, revealed up to now 3 vats but

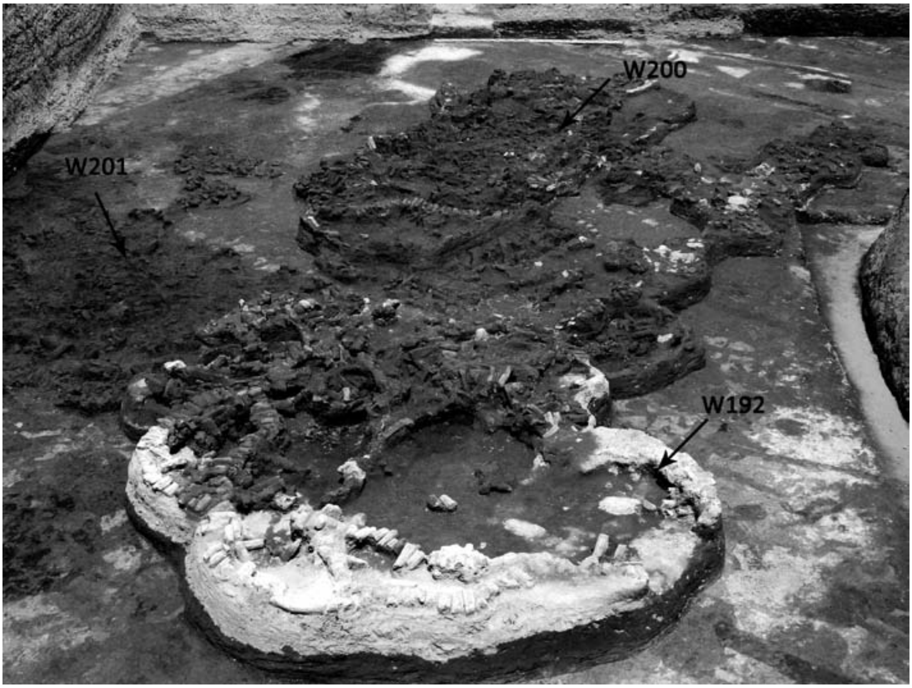


Figure 3. Overlapping breweries W192, W200 and W201 (photo by R. SŁABOŃSKI).

during next year research this number could increase. Two of three discovered vat seats had fragments of vats standing in it. This two brewery devices are the youngest examples et Tell el-Farkha site and are dated on Naqada IIIA period (Fig. 6; CIAŁOWICZ *pers. comm.*) The sequence of brewing devices from the Western Kom: W201, W200 and W192 was most probably connected to the Lower Egyptian residence located on the Central Kom. They were used as a mass production industry not only for the local needs but there is also an assumption of exporting it in exchange for a trade goods. The W47 brewery due to its rather small size and neighbourhood of large sized edifice – newly erected Naqadan residence – is considered to being used only for purposes of its inhabitants (CIAŁOWICZ 2012a: 161-162). The breweries W272 and W273 are chronologically younger than this residence and were erected after its existence. As it was established during previously examined area on Western Kom next to this the administrative and cultic centre had been uncovered and this two installations most probably were used as a source of provision for workers employed to build it (Tab.1; CIAŁOWICZ *pers. comm.*).

All of described devices were located relatively close to habitation area however they were always separated from it with some kind of fencing. At first this border was created by simple fence built with organic material but shortly after it was followed by rather solid mudbrick wall (CIAŁOWICZ 2012a: 157-160).

Beer brewing technology and the beer recipe

Figure 4. The smallest brewery from Tell el-Farkha – W47 (photo by R. Słaboński).

The most important data for Predynastic beer recipe come from Tell el-Farkha, and were obtained after the botanical anylysis of beer remains. Thanks to L. Kubiak-Martens and J. Langer's (2008: 429-431) studies we know that beer from Tell el-Farkha was mostly made of emmer wheat and that it used to be brew in two-part process.

First the whole cereal was divided into two portions, each of them was treated differently. One part of grain was converted into a malt (by sprouting and drying) and then was coarsely ground. Then cold water could have been added. This portion wasn't cooked at all. The other batch (which also could have been sprouted but it wasn't necessary) was at first pounded or ground very well and then well-cooked in certain amount of water. The result of these different treatments of the grain batches, were two different semi-products: uncooked malt on the one hand, and the porridge or gruel-like mass of well cooked grain on the other (Samuel 2000: 553-555; Kubiak-Martens & Langer 2008: 431-435).

Table 1. Chronology of the Tell el-Farkha breweries.

Structure	Period
TF W 201 A	Naqada IIB
TF W 201,TF W 200, TF W 192	Naqada IIC
TF W 47	Naqada IID1/D2
TF W 272, TF W 273	Naqada IIIA

Next, these two portions were mixed together. At that step the starch granules of wheat porridge were easily attacked by the active enzymes (amylase), highly concentrated in the malt. These enzymes were necessary to break down the starch cells into sugars, obtaining of which was essential for the rest of the brewing. Once the two batches blended, sort of filtration was required in order to rid the starch-protein mixture of cereal husks. To obtain a clean liquid, the mixture must have been drawn out of the vat and rinsed with water through a sieve. It is worth to mention that the act of sieving was very often depicted on the walls of the noble's tombs. The result was the sweet and presumably quite cloudy

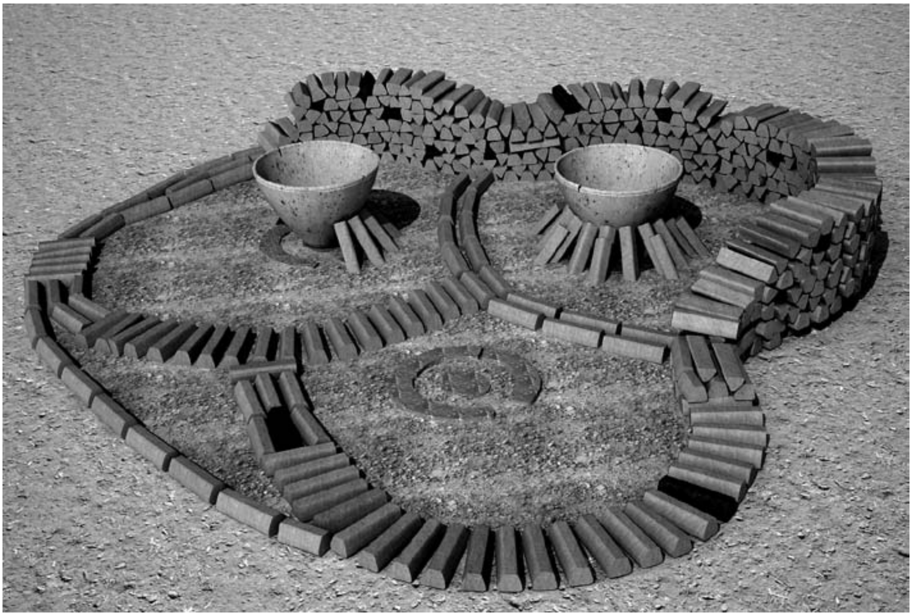


Figure 5. 3D reconstruction of W47 (by K. ROSIŃSKA-BALIK).

liquid, which could be called the wort in modern brewer's nomenclature. This wort was rich in simple sugars (maltose and glucose) which made it available for further fermentation (SAMUEL 2000: 553-555; KUBIAK-MARTENS & LANGER 2008: 435).

Fermentation posed the final step of the whole brewing process. We don't have any data to prove that Egyptians in the Predynastic times knew how to collect yeast. Furthermore, we don't know if they were even aware of its existence and importance for beer production. For sure, yeast could not have come from the skins of fruits because none remains of them have ever been observed in beer residues (KUBIAK-MARTENS & LANGER 2008: 427). The only alternative left was so called spontaneous fermentation, in which the yeast cultures get into the wort from the air. In such a way the first fermentation must have been carried out. For the next times, some amount of previously brewed beer could have been used as a fermentation starter (SAMUEL 2000: 556; KUBIAK-MARTENS & LANGER 2008: 435).

In the term of fermentation, we have to consider the possible location where the process could went on. In one hand fermentation could have been going on inside the brewery kiln itself. In this case the sieving must have been undertaken after the fermentation process. In the other hand the wort could have been transferred into other vessels after the sieving but before the fermentation. And for that we have some indications at Tell el-Farkha site. A few storage pits were found in close proximity to the brewery W192.

Figure 6. The youngest breweries from Tell el-Farkha – W272 and W273 (photo by M. CZARNOWICZ).

The organic material collected from the pottery sherds, connected to these objects, proved to have been beer remains. Moreover, these remains and only these remains contained the 100% sure traces of fermentation process – so called fermentation bubbles. After the fermentation, the final product – the beer was poured into the beer jars and then could have been stored, transported and distributed (CHŁODNICKI & CIAŁOWICZ 2005: 133; CICHOWSKI 2008: 37; KUBIAK-MARTENS & LANGER 2008: 437).

This recipe for Egyptian beer survived at least till the end of the New Kingdom period. We know that because of D. SAMUEL's analysis of *i.e.* Amarna's beer remains (SAMUEL 2000) which proved that the same beer brewing technology as in Tell el-Farkha was still in use after almost 2000 years.

Comparison between the brewing installations used in Tell el-Farkha with those from Hierakonpolis and Abydos

Coming to the most important question posed in this paper, we have to compare the breweries from Tell el-Farkha site with the installations known from Upper Egypt.

In the late Naqada I/early Naqada II the process of so called *First Industrialization* can be observed (WENGROW 2006: 92-98). Many heating installations from this period were found in Hierakonpolis (GELLER 1989: 43; FRIEDMAN & GELLER 2007). Kilns from HK24A, HK24B and HK11C:OpB are believed to be the remains of the breweries but they could have been also used for production of the other cereal food (Shirai & Takamiya 2010: 22). Mentioned ovens differ in size, external shape and the detailed arrangement of the vats seats but the general idea of composing the vats in two-parallel-rows seems to be indicated.

One of these early structures, so called Operation B, is particularly interesting. In the first phase of exploitation this structure was a multifunctional kiln used in the pot and food (in particular beer) production processes (Baba 2008: 18-19). In this food production part, we can see six vats, organized into two parallel rows but with a big gap between them. The structure has got thick external walls with well-visible stoke-holes. The organic material extracted from the vats proved that beer was one of the product of this installation The radiocarbon date for Operation B is 3762-3537 cal BC, which allows one to correlate it to Naqada IC-IIB period (Baba 2007: 27; 2009: 24).

The specially constructed vat seats are one of the characteristics of these early breweries but their construction was completely different than that known from Tell el-Farkha. In Operation B the vat supports are made of big and small pot sherds mixed with mud, sometimes even rocks were in use (Baba 2007: 27; 2008: 18-19; 2009: 24).

The early stage of brewing installations' development represented by kilns: Brewery HK24A, heating installation HK24B and by Operation B has little to do with Tell el-Farkha breweries. The only structural similarities are: the presence of big vats, the presence of specially prepared vat seats and general idea of layout of the kiln. For brewing technology, the late Naqada I/early Naqada II seems to have been the formative period, full of experiments and different solutions. It is worth to mention that such period is lacking in Tell el-Farkha, where breweries seem to be at the fully developed stage since the very beginning of their existence at the site (Ciałowicz 2008: 200-209).

There is one brewery from Hierakonpolis 11C coming from Naqada IIB-C. It's called Operation A. Looking at its plan we can see some important changes or improvements in relation to the earlier brewing installations. First of all we have here very clear composition of two parallel rows of vats. Although one of shorter sides of the structure is missing, it is quite easy to observe that the original general shape of the kiln used to pose an elongated rectangle. Vats are located closer to the external walls, in which many stoke-holes and one probably ventilation-hole are present. The biggest change occurred in the construction of the vat seats. Specially formed mudbrick fire-dogs (mostly D-shaped in cross section) are the supports now, instead of sherd-mud mixture known for example from Operation B. An extraordinary shape of some of these fire-dogs, have no analogy elsewhere (Aoki & Takamiya 2005: 18; Takamiya 2009). The elongated general shape and clear two-parallel-rows-of-vats arrangement are also typical for the earliest breweries from Tell el-Farkha, these dated to the I phase of site's occupation. Unlike to Operation A, Tell el-Farkha breweries have a general shape much more associated to the circular shapes of vats set in their seats (Cichowski 2008: 37-40). This association is visible very well in the younger breweries from Tell el-Farkha site. Last but not least difference which has to be emphasize is the composition of rows of vats.

In Operation A, as in the previously described earlier breweries from Hierakonpolis, the vats are arranged in simple parallel way. On the contrast, in Tell el-Farkha we deal too with two parallel but also overlapping rows. The vats from one row are filling the gaps between the vessels of the other row (Cichowski 2008: 40).

In developed stage the new idea of constructing the vat seats were introduced. This innovation together with well established two vat rows idea seems to be the most important for the further development of breweries. According to that what we know from earlier stage, the Upper Egyptian genesis of this two rows arrangement of the vats seems to be so probable that almost obvious. Case of fire-dogs is not so easy though. The same type of bricks was detected in Upper and in Lower Egypt. Operation A is dated to the same period as the earliest Tell el-Farkha breweries: W201A (joint with the 1 phase of W200), W201, W200 and W192 (Aoki &Takamiya 2005: 18; Cichowski 2008: 40 Takamiya 2009). Is it a simple coincident that so important innovation appears probably at that same time in Upper and Lower Egypt alike?

The youngest breweries coming from Upper Egypt are kiln structures found a hundred years ago in Abydos (Peet & Loat 1913: 1-7; Peet 1914: 7-10). On the plan of so called Brewery from Abydos the influences of both sides – Upper and Lower Egyptian – are easily recognizable: we deal here with the structure of elongated rectangular shape on the one hand and the vats arranged into two parallel but overlapping rows in the other hand (Peet & Loat 1913: 4; Peet 1914: 7).

The way of constructing the vat seats themselves is practically the same like in all Tell el-Farkha breweries and in Operation A from HK11C. It has to be emphasized that vat seats with mudbrick fire-dogs must have very well served its purpose, since they actually didn't change since the Naqada IIB.

In the late stage we can observe mixing of the two, Upper and Lower Egyptian, brewing technology tradition. The date (which is quite late) itself is not the reason or not the only reason of that both sides influences. We cannot avoid the geography, according to which, Abydos lies to the north of Nekhen, so it was always closer to Delta. We cannot forget also about the great importance and political power of the rulers of Abydos in the late Predynastic or Protodynastic times. It's a fact that constructors of brewery and so called D-group kilns (which most probably also were breweries) knew the both traditions mentioned/or rather their local tradition was formed by the mixing ideas from north and south.

Schematic chronological view of brewing devices' development

The large-scale-production (by which we mean the production of goods, which were used not only as a source of supplying the local inhabitants but also could have been served for other purposes) in Egypt started in the transitional late Naqada I/early Naqada II period and it was related to the so called *First Industralization* which occurred at this time and which proves that big socio-economic changes were going on then (Wengrow 2006: 92-98).

So far the formative stage of breweries development is proved only for Upper Egypt – it has been observed at the site of Hierakonpolis. This stage is still lacking in Delta region. Nothing like that has ever been found at Tell el-Farkha, where breweries seems to appeared as the fully developed devices from the very beginning (CIAŁOWICZ 2012a: 151-160, 162; CICHOWSKI 2008: 37-40). That is why the leading hypothesis is that the beer making idea and the special constructional solutions were brought to Tell el-Farkha from somewhere outside. The dating of the brewing installations themselves is telling us something about the time when it must have happened – in Naqada IIB. In that period a crucial improvement in constructing the brewing devices is observed in the south as in the north of Egypt. Operation A from Hierakonpolis detects a very significant similarity to Tell el-Farkha breweries – the introduction of mudbrick fire-dogs (these D-shaped in section) as the vat supports. This innovation was used in all younger breweries. For that reason from that time we are talking about developed stage.

Figure 7. The so called "Olympic Rings" on structure W200 (photo by R. SŁABOŃSKI).

The roots of innovation mentioned above are still unidentified, because, according to the dating, it appeared in Hierakonpolis and Tell el-Farkha in the same time (AOKI & TAKAMIYA 2005: 18; CIAŁOWICZ 2012a: 151-160, 162; CICHOWSKI 2008: 37-40; TAKAMIYA 2009). This solution could have been invented in the previous periods in some other place, from where it could have been brought to both mentioned sites in Naqada IIB. There is also a possibility that it was Hierakonpolis where the innovation was introduced but in that case it must have spread northward very fast.

In the next periods, Naqada IID and Naqada IIIA, the only brewing installations we have are the younger breweries from Tell el-Farkha. Their general layout proves some evolution. The shape of the kilns evolved from elongated to much compact forms of so called three-leaf-clover shape (CHŁODNICKI & CIAŁOWICZ 2001: 93; 2002: 70; 2009: 170-171). The shortening tendency of younger Tell el-Farkha breweries might have been caused by different reasons and for different purposes. Maybe the smaller-sized breweries were more practical to build and maintain. The needs of site's society could have changed. It is a possibility that small breweries were used to producing beer only for some particular small groups of inhabitants like specialized workers or elite from the residency (CIAŁOWICZ 2012b: 163).

Two other important features were observed first or only in Lower Egypt: the two overlapping rows of vats and the general shape of kiln closely associated to the circular shape of vats, so called "Olympic Ring" Pattern (Fig. 7; CICHOWSKI 2008: 37-40). These last solution remained unknown in the south, where the oblong rectangular shape of kilns was dominant.

Finally in the last stage of brewing devices' development the mixing of both Upper and Lower Egyptian traditions can be observed (Tab. 2).

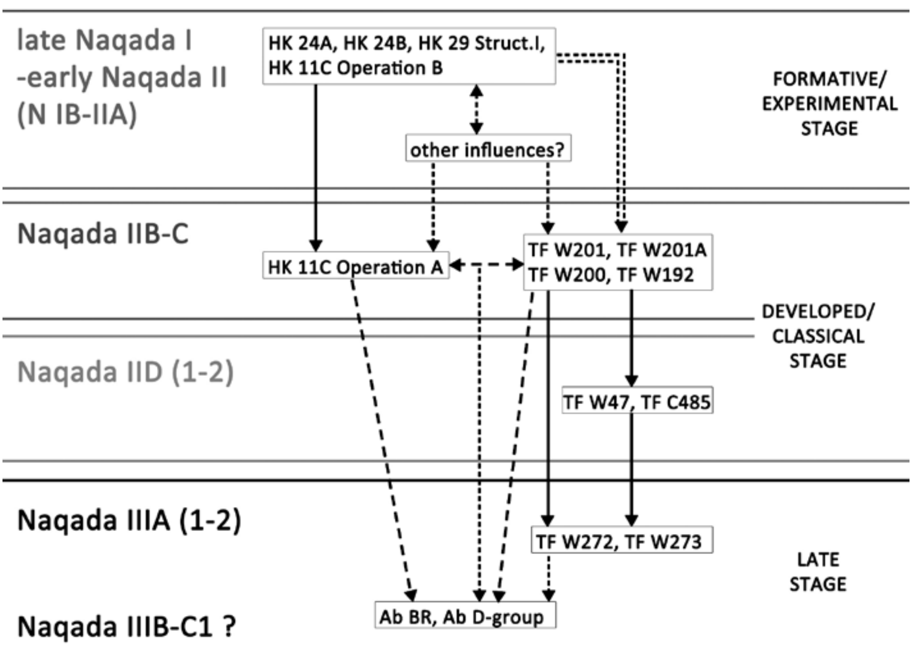
CONCLUSIONS

After the Upper/Lower Egyptian breweries' comparison, we are able to draw some characteristics of both brewing installations' constructing traditions:

1. Upper Egyptian traditions:
   - elongated rectangular shape;
   - two parallel rows of vats;
   - stoke holes.
2. Lower Egyptian traditions:
   - shape strongly related to the circles of the vat seats;
   - overlapping parallel rows of vats.

Using the D-shaped, in cross section, mudbricks as vat supporting fire-dogs were observed in both areas and the roots of this innovation remained unidentified.

Table 2. Chronological development of brewing devices.



The size of earliest breweries proves that beer production in large scale was carried on. Although the oldest devices, dated to Naqada IB, come from Upper Egypt (Hierakonpolis), it doesn't mean that the recipe was invented in that time and place. Since it was relatively easy to brew the beer, we can suspect that the first ideas of beer-making can be older than above mentioned period. The beer recipe could have Naqadan roots but it's also possible that it was invented elsewhere, outside the Upper Egypt. The most important is that the recipe was first used for the large-scale-production in Hierakonpolis and that in Naqada IIB it become common probably in the whole Egypt.

Thanks to breweries-case studies, we can try to tell something more about nature of interactions between Upper and Lower Egyptians in Naqada II period. The simple Naqadans Ride North Model doesn't fit the actual situation, because very intensive contacts between both discussed regions can be observed long before Naqada IID period, which is believed to be the time of Naqadan "expansion". Early date for Tell el-Farkha breweries W201A and W200 – Naqada IIB (Ciałowicz 2012a: 151-160, 162; Cichowski 2008: 37-40) proves that, if beer-making was really a Naqadan concept, it must have spread to Delta rather throughout migration of ideas than the migration of Naqadans themselves. The strong not-Upper Egyptian tradition, which is clearly visible in brewing devices' constructing method in Tell el-Farkha suggests that maybe there was not something like Naqadanization of Lower Egyptian culture or that the acculturation was not as strong as it was previously thought. It must be emphasized that the Upper and Lower Egyptians contacts in Naqada II period were very intensive and that not only Naqadans influenced the north but they were also strongly influenced by the inhabitant of Delta.

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Reflections on the context of a late Dynasty 0 Egyptian Colony in the Southern Levant: interpreting some evidence of Nilotic material culture at select sites in the Southern Levant (ca. 3150 BCE – ca. 2950 BCE)

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Israel

The background

Since the discovery of the first Egyptian *serekh* of Narmer at Tel Erani (Yeivin 1960), scholars have become aware of a significant degree of Nilotic imports and Egyptian-influenced objects, particularly pottery in the Early Bronze Age, primarily in the region of the Gaza Strip and south-central Israel (Fig. 1). While early works were somewhat less than specific as to the time span when the mass of Egyptian-related material appeared in the archaeological record, more recent research (Yekutieli 1991; 2001; Braun & van den Brink 1998) has shown the phenomenon to be associated with late phases of Early Bronze Age I (Regev *et al.* 2012: 526), but mainly at select sites within a limited geographical region.

The appearance and quantification of Egyptian-related artifacts in the Early Bronze Age, as presently understood from the archaeological record, has suggested a four-tiered hierarchy (Braun 2004: 512-514) of Egyptian associations. Tier 1 sites are defined as those likely to have primarily been peopled by Egyptians[1], while sites defined as Tiers 2-4, have yielded, respectively and in descending order, significantly less, very little, or no evidence of Egyptian material culture. All this intensified activity appears, on the basis of a number of *serekhs* found at sites in the southern Levant, to date to the reigns of Ka and Narmer (van den Brink & Braun 2002), sometime at the end of the fourth millennium (Braun & van den Brink 1998; Dee *et al.* 2013) or late Dynasty 0 to early Dynasty 1[2].

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[1] This term (which may probably be characterized as "ethnic"), refers to immigrants from the Nile Valley and its Delta in Egypt, who brought with them a material culture quite distinctive and distinct from that associated with contemporary inhabitants of the southern Levant.

[2] These reigns are considered by different scholars to be either the next to last (Ka) and last reign (Narmer) of Dynasty 0, or alternately the last reign of Dynasty 0 and the first of Dynasty 1.

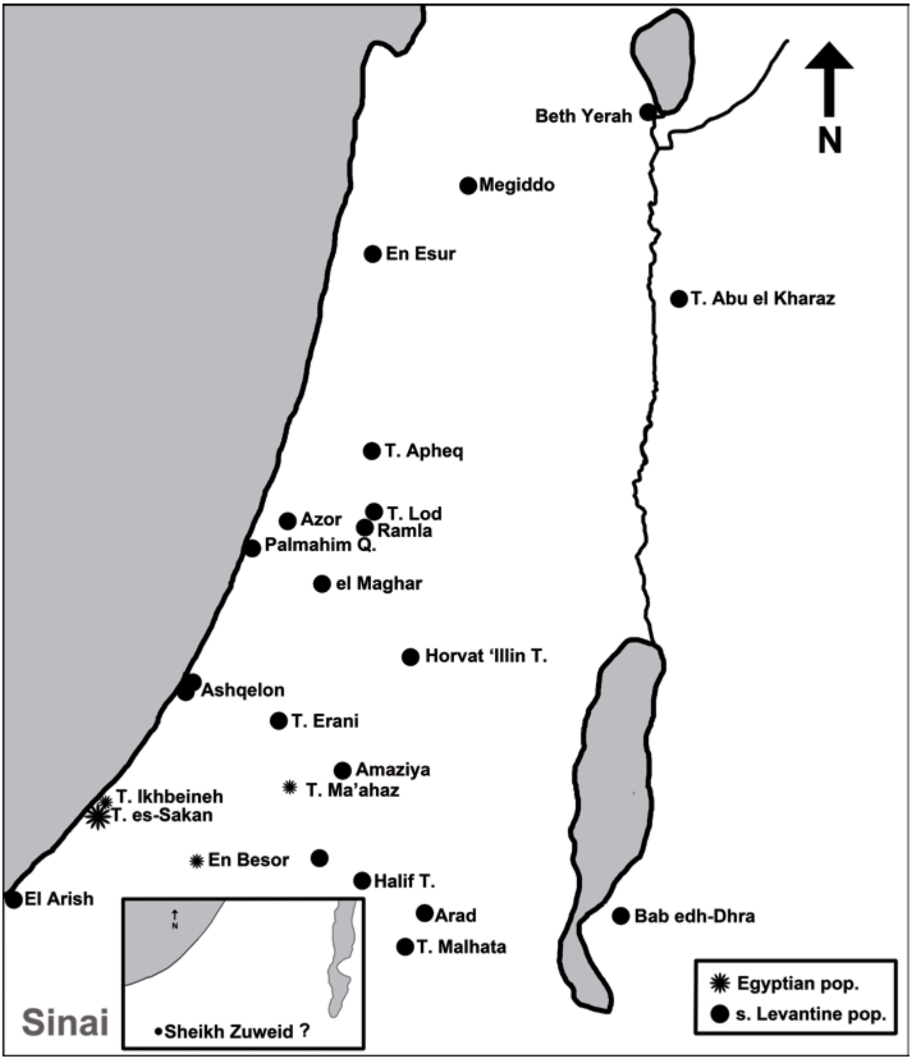

Figure 1. Map of the southern region of the Southern Levant with principal Early Bronze Age I sites cited in the text; most with Egyptian associations. Tier 1 sites with primarily Egyptian populations are marked with an asterisk. Tier 2 sites include Tel Erani, the Halif Terrace and Tel Lod. Tier 3 sites are Amaziya, Horvat 'Illin Tahtit, Arad, Small Tel Malhata, el Maghar, Azor and possibly part of the Afridar complex in the Ashqelon Littoral cluster of late Prehistoric sites. Tier 4 sites are represented by Bab edh Dhra, Tel Apheq, En Esur, Megiddo, Tell abu el Kharaz and Bet Yerah.

Egyptian imports

For purposes of the present discussion I believe that it is vitally important to distinguish between true Egyptian imports, *i.e.* objects transported from the Nile Valley and "Egyptianized" objects, *i.e.* artifacts of recognizably Egyptian mien, but which were fashioned locally

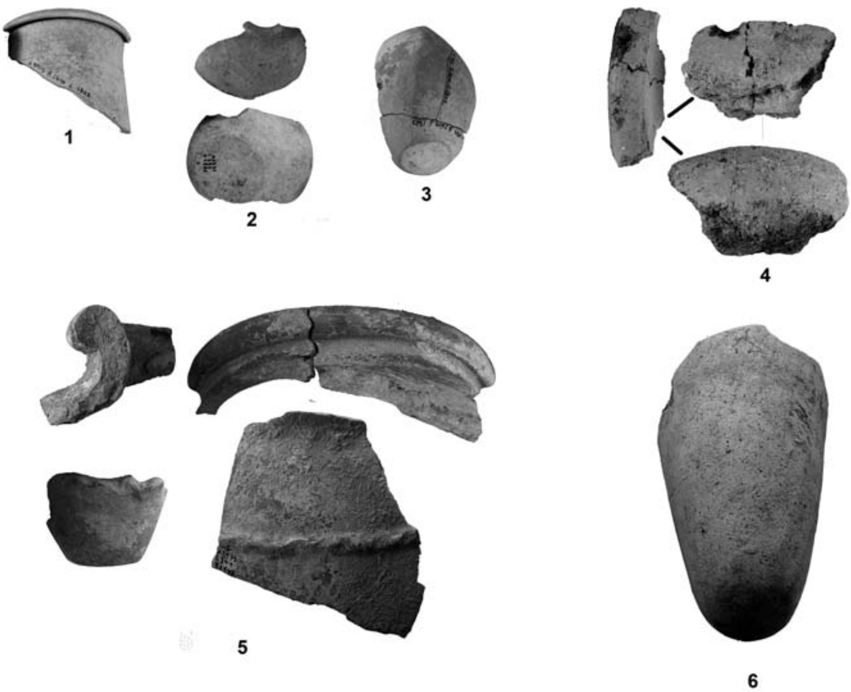

Figure 2. Representative collection of Egyptian and Egyptianized pottery from Amaziya, a Tier 3 site: 1. Cylinder vessel fragment; 2. Fragments of small bottles; 3. Fragment of lentoid bottle; 4. Fragment of baking tray; 5. Fragments of wine jars; 6. Base of small jar.

of indigenous materials (Braun *in press*). That distinction is made because of logistics involved in transporting objects, in particular fragile ceramic vessels (and their contents) from the Nile Valley (Fig. 2) over long distances to sites in the southern Levant in the context of the late 4th millennium BC. Unfortunately, often definitive identifications of the Egyptian origin of such objects are impossible without the help of pure scientifically-based criteria, such as petrographic studies, which, because they are labor intensive and somewhat costly, may only be done on a limited scale.

The nature of egyptian imports

Egyptian imports include prestige items such as specific types of fine ware ceramic bottles and cylinder vessels, stone palettes, a single, exquisitely fashioned ripple-flaked knife and a cylinder seal. Several of these were associated with tombs (*e.g.* Ben-Tor 1975) but numerous additional examples of similar ceramic containers as well as "wine jars" and lentoid-shaped bottles have been found in settlement contexts at Tel Erani (Brandl 1989: fig. 9), En Besor (Gophna 1990: fig. 8:16-17) and Amaziya (Milevski *et al.* 2012: fig. 67:3).

Possibly some calcite mace heads, most of which are probably to be considered prestige objects (Braun 2011a) were also Egyptian in origin. Additional imported objects include a small quantity of imported Egyptian flint objects, knives and arrowheads.

Egyptianized objects

In addition, there are vessels of Egyptian morphology, generally fashioned of extremely coarse fabrics with significant quantities of vegetal inclusions, some of which may have been imported, although most are thought to have been fashioned locally (generally from loessy clays). Such items as baking trays, (aka "bread molds"), "lotus bowls" and granary jars, mostly of extremely coarse fabrics ("rough ware"), found at some locales in great quantities, suggest Nilotic foodways were associated with some elements of the late EB I population in the southern Levant. Egyptian style bullae, clearly administrative paraphernalia, made locally (Schulman 1976; 1980; 1992; Levy *et al.* 1997) and obviously related to goods, presumably foodstuffs, were apparently used by Nilotic peoples sojourning in the southern Levant.

The sum total of documented pre-dynastic and proto-dynastic, Egyptian-associated objects found in the southern Levant to date is truly impressive, with the overwhelming bulk of them dated to late phases of Early Bronze Age I (ca. 3100-3000 BCE; Regev *et al.* 2012)[3]. They are correlated, based on parallels from their homeland and *serekhs* found in the southern Levant (Fig. 3), with the reigns of Ka and Narmer (van den Brink & Braun 2002; Dee *et al.* 2013).

An egyptian colony in a late 4th millennium context

When the mass of Egyptian and Egyptianized finds in late Early Bronze Age I contexts became known, scholars were wont to interpret them as evidence of permanent settlements of Nilotic peoples in the southern Levant, designated as a "colony". Until the discovery of Tell es-Sakan (see below), I (Braun 2002) was somewhat dubious of that characterization, and thought such occupation might have been confined to enclaves of Nilotic peoples within primarily south Levantine population centers. I now fully accept the existence of an Egyptian colony independent of south Levantine communities, albeit with reservations concerning its scope (see below).

Scholars' characterizations tended to "paint pictures" of that colony with very broad brushes and, I believe, to exaggerate the degree and nature of the Egyptian colonial episode. Their interpretations also purportedly indicated quite distinct territorial limits for the colony and even some rather precise descriptions of its socio-political and military activities. Following is a brief review of the more detailed characterizations available in the literature, with my most recent interpretations of available evidence.

[3] Mass importation of Egyptian objects and the appearance of Egyptianized objects seem to begin sometime after the Erani C Phase (Braun 2011a). Egyptian involvement in the southern Levant is emphasized by the appearance of two *serekhs* found on local south Levantine storage jars with Egyptian morphological features (Braun & van den Brink 1998). Rare examples of Egyptian imports during the Erani C Phase are fragments of jars with wavy line decoration of a type found in Tomb U-j at Abydos, Ashqelon, Barnea (Gophna 1974: fig 15:3,4; Golani *this volume*).

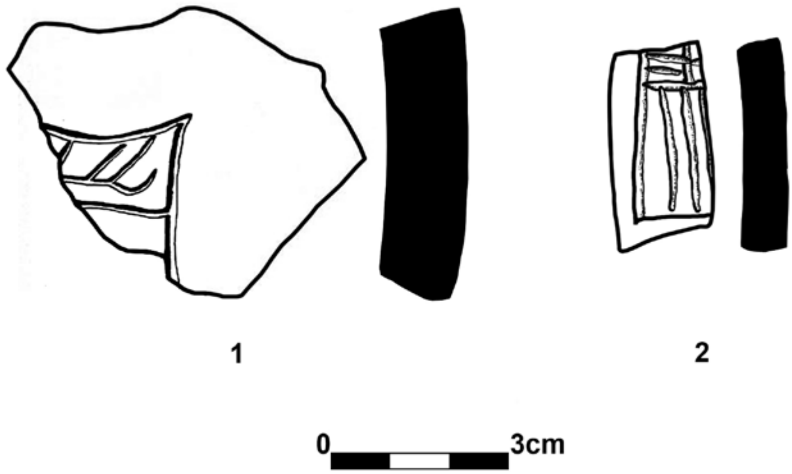

Figure 3. Renderings of two fragmentary *serekhs* from the Early Bronze I site of Tel Lod:
1. *Serekh* with symbol of Ka; 2. *Serekh* with symbol of Narmer.

Tier 1 Sites with Primarily Egyptian-Associated Material Culture

Three, or possibly four sites in the southern Levant, all in the central, southwest fertile zone (the Mediterranean Littoral and the northern extremity of the Negev[4]) seem to have been populated by immigrants from Egypt's Nile Valley. That hypothesis is extrapolated from the evidence of material culture at a handful of sites, which seems to have been predominantly Egyptian-associated, with little evidence of local south Levantine material culture. One site seems to have been central to the Egyptian colonial enterprise, while two or possibly three others were apparently its satellites. There may have also been a fifth site associated with the Egyptian colony, but information on it is equivocal (see below: 5).

1. *Tell es-Sakan*: The discovery of the early levels of Tell es-Sakan (de Miroschedji & Sadeq 2005) with their wealth of Egyptian and Egyptianized material culture that apparently predominated at the site in four of the earliest strata, offers great credence to the idea of a permanent Egyptian community planted in the southern Levant. Strategically placed adjacent to possible anchorages on the Mediterranean coast and not far from the border of the arid, northern Sinai land route (known in historical times as the Way[s] of Horus), Tell es-Sakan was an ideal location for a south Levantine colonial enterprise. The relative size of that occupation, as well as its associated massive fortifications, proclaim it the central site of Egyptian activity in the southern Levant in that time span.

[4] This region of the Negev is on the fertile, generally well-watered verge of a semi-arid zone and should not be confused by some scholars' use of the term "Negev Desert" for the entire region bearing that name.

2. *En Besor*: This diminutive site has been excavated virtually in its entirety. Stratum III, dating to late EB I, has yielded a wealth of Egyptian and Egyptianized material culture[5] (GOPHNA 1995), including scores of bullae fragments. The excavator described the site with its single structure as a small staging post for transference of commodities; a scenario entirely in sync with the evidence. In any hierarchy, Tell es-Sakan would have been the likely administrative center in control of this small site's activities.

3. *Tel Ma'ahaz*: Unfortunately, little is known of the site of Tel Ma'ahaz. Based on extremely limited fieldwork, AMIRAN (1977; AMIRAN & VAN DEN BRINK 2001) suggested the occupation there was in the nature of a campsite. However, the wealth of looted ceramics (BEIT ARIEH & GOPHNA 1999) from the site argues for a more sedentary type of settlement as well as suggesting it too was largely, if not exclusively, populated by Egyptians.

4. *Taur Ikhbeineh*: This site, due to its very close proximity to Tell es-Sakan, seems a likely candidate for a contemporary Egyptian settlement, but unfortunately it too has been only sounded in a very minute area and so little of it is known. It is likely it was some sort of satellite to the larger community occupying the fortified site nearby.

5. *Locale of Sheikh Zuweid, Northern Sinai?* (Fig 1: inset): Five intact Egyptian storage jars (VAN DEN BRINK *pers. comm.*), four of which are published (GOPHNA 1970; VAN DEN BRINK & GOPHNA 2004), purportedly from a locale near Sheikh Zuweid on the Wady el-Arish (located east of el-Arish where they were purchased) in northern Sinai, may, if indeed such a site existed and these vessels derive from it, indicate additional Egyptian activity at the very border of the southern Levant. As these objects were looted in modern times, and acquired on the antiquities market, there is no surety of such an archaeological provenience. If such an Egyptian settlement actually existed there, then that site might have been associated with activity in more eastern regions, perhaps as a way-station on the way to copper sources at Timna and Feinan.[6]

SITES WITH PRIMARILY SOUTH LEVANTINE MATERIAL CULTURE (TIERS 2-4)

Other sites that have yielded significant quantities of Egyptian-associated artifacts seem to have material culture that is predominantly south Levantine (*i.e.* Tier 2 type sites). Tel Erani is the largest of these, and excavation of the late EB I occupation there has yielded significant quantities of Egyptian-associated artifacts as well as much material of local traditions as is known from available literature (YEIVIN 1961; BRANDL 1989; ANDELKOVIĆ 1995: figs. 14-17). Unfortunately, there are no definitive excavation reports available and at present it is difficult to characterize the true nature of the Egyptian complement at the site beyond noting that Egyptian-associated material is abundant in

[5] In addition to published materials there is a wealth of curated objects at the Israel Antiquities Authority's storage facility at Beth Shemesh, making a very sizable Egyptian and Egyptianized complement.

[6] A suggestion by E.C.M. VAN DEN BRINK that these jars, all intact, were looted from a tomb or tombs and hence not from a site of constant human activity, seems unlikely, as one would not expect a mortuary-related locale to be greatly distant from a settlement.

late Early Bronze Age I levels (Braun 2011b). Renewed excavations there by the Institute of Archaeology of Jagiellonian University, Krakow and Ben Gurion University of the Negev will hopefully be able to offer some more detailed information on the Egyptian episode at the site.

Tier 2 type sites are those that have yielded sufficient quantities of Egyptian-associated artifacts to suggest they may have, in addition to their local inhabitants, harbored Nilotic populations as either frequent visitors or long-term residents. That could also explain the presence of Egyptian baking bowls at some sites, which may be viewed as limited evidence for the practice of non-local foodways. By contrast, Tier 3 sites are those that have yielded only minute quantities of Egyptian-associated material culture, while Tier 4 sites are devoid of any such objects.

Scholars' Characterizations of an Egyptian Colony

N. Porat (1986; 1989; 1992), who did the first scientifically based studies on identifying imported Egyptian pottery, used her results to claim that a large portion of the southern Mediterranean Littoral of the Levant, up to the area of Tel Aviv (including the Gaza Strip and a large region in southern Israel), was administratively an integral part of an Egyptian Dynasty 0 polity.[7] In Porat's paradigm Egyptianized bullae from 'En Besor (Schulman 1976; 1980; 1992) were understood as evidence of Egyptian administration and political hegemony.

B. Brandl's (1992) intensive research into Egyptian and Egyptianized objects, stemming from his work on the Egyptian-associated complement of material culture from Tel Erani (Brandl 1989), offered the first major overview of the mass of material derived from the archaeological record on which the colonial model was based. Based on those observations he suggested the presence of an Egyptian colony within a clearly defined region, primarily in the southwestern region of the southern Levant.

The weakness of Brandl's paradigm is in its failure to consider more than a single explanation for the presence of Egyptian associated material culture. His model is primarily based on a single problematic assumption, that the presence of Egyptian and Egyptianized objects, in any quantity at sites in some relative proximity, are evidence for Egyptian political hegemony. Thus, he viewed a map showing the dispersion of such evidence at sites in the southwest region and drew a border of a purported colony around them (Brandl 1992: 444, map) from Rafiah to the Yarqon River.

His model not only failed to take into account quantitative analyses of Egyptian versus local artifacts, but it also ignored the possibility of Egyptianizing objects being other that the products of Nilotic immigrants. The possibilities of imitations made by, and possibly even

7 This interpretation of the archaeological evidence suggests a specific region in the southern Levant had an Egyptian status analogous to that of a pre-independent, French Algeria, which despite its physical separation from European France, was considered to be a *department* of that country on a par with its continental administrative regions. There is, of course, no historical evidence to indicate such a relationship, especially in a relatively early, formative period of the Egyptian state.

for locals, and the development of hybrid types over time, all of which drawn inspiration from Egyptian prototypes, but were not directly associated with Egyptians (BRAUN 2011c; *in press*), was not considered. The idea of local polities within the same region independent of an Egyptian colony was not considered, although with three exceptions all the sites within the area allotted by Brandl to his colony yielded primarily local, south Levantine material culture.

B. ANDELKOVIĆ'S (1995) Egyptian colonial paradigm closely followed BRANDL'S interpretation but further embroidered it. Although the former's work admirably documented virtually every known find of Egyptian association to that time, it did not consider that significant regions of the purported colony were occupied by large aggregations of indigenous peoples clearly identified from the overwhelming mass of associated (*i.e.*, late southern EB I) local material culture. ANDELKOVIĆ'S (2012: 70) more recent work suffers from a severe "Egyptocentric" bias; one that supposes the southern Levant to have been suffering from a "cultural, political and social gap" with Egyptians clearly importing a "superior" and more sophisticated culture. Accordingly, his work greatly exaggerates the importance of Egyptian-related artifacts in south Levantine contexts.

In ANDELKOVIĆ'S paradigms, south Levantines are assumed to have lived in "small" villages and been: "not particularly wealthy native 'customers' (ANDELKOVIĆ 2012: 794). This pejorative approach, in discussing an economic model of interaction, allowed ANDELKOVIĆ to feel justified in suggesting that only a small military complement would have been needed to maintain control over a large region of the southern Levant. In that same work he once again meticulously enumerated, albeit not always with accuracy[8], Egyptian-associated finds, offering them as evidence of Egyptian social control, even when they are only a handful of newly discovered objects at far-flung sites; some well outside the obvious Egyptian sphere of activity.

ANDELKOVIĆ'S overall colonial paradigm, according to whichever of the model's he suggests might depict it, is based on an inaccurate evaluation of south Levantine society at the end of Early Bronze Age I. Suffice it to note here that his descriptions of small, impoverished villages does not do justice to centuries of occupation and development during the Early Bronze Age I and the reality of it during the time span of the Egyptian colonial episode. It does not take into account the fortified sites of Tel Aphek (YADIN & KOCHAVI 2000) and Arad (BRAUN 2011b), a cluster of large settlements at Ashqelon (BRAUN & GOPHNA 2004; GOLANI 1997; 2004; 2008; GOLANI & NAGAR 2011), large villages at Palmahim Quarry (BRAUN 2000), Lod (VAN DEN BRINK & BRAUN 2002), Ptora[9] (MILEVSKI & BAUMGARTEN 2008), Ashqelon (GOLANI & NAGAR 2011) and a large-scale occupation at Tel Erani that could possibly have been urban-like in character (MILEVSKI *et al.* 2012).

[8] His (ANDELKOVIĆ 2012: 791) characterization of the Egyptian-associated assemblage of Lod as "less than 10% greatly inflates the quantity of that material. While that material represents a significant complement in and of itself, it should be noted that in relative terms of the entire assemblage of contemporary objects, it would have to be cited as some fraction of 1%. Thus, the material culture of EB I Lod was overwhelmingly local in nature, albeit with a significant Egyptian element.

[9] This site, ca. 2.5km directly east of Tel Erani, and excavated over a vast area, yielded several strata of the Erani C horizon, but only a single Egyptian object, a fragment of a stone vessel (I. MILEVSKI *pers. comm.*).

Neither does it take into account evidence from regions farther to the north.[10] In addition, something of a less than depressed economic status of the south Levantine inhabitants of the region may be discerned from imports into Egypt found in the royal Tombs U-j and U-k at Abydos (HARTUNG 1993; 1998; 2001), dating prior to the establishment of a colony, as well as the wealth of pottery and other prestige (some Egyptian imports) objects known from numerous Early Bronze I tombs throughout the southern Levant.

C. DE MIROSCHEDJI'S & SADEQ'S (2005) paradigm offers some very specific boundaries for what they consider to have been an Egyptian colony. Their map (*ibid.*: fig. 19.10) indicates a "core" area of Egyptian permanent installation (*i.e.*, a physical extension of "Egypt" into the southern Levant) similar to Porat's characterization, as well as a "colonial" area farther north up to the Yarqon River, and suggestions of "seasonal" activity beyond. The evidence for this last remains to be enumerated, but presumably considers small quantities of Egyptian imports at Assawir and Megiddo (Fig. 1).

D. YEKUTIELI (2004) refined DE MIROSCHEDJI'S and SADEQ'S idea of a core area and suggested the existence of a "contact zone" where Egyptians and south Levantines met. He further argued, on the basis of the fortified occupation at Tell es-Sakan, for a highly developed, even urbanized Egyptian polity operating in the southern Levant under the auspices of the Egyptian State.

Those scholars' interpretations of the archaeological record, either implicitly (*e.g.* BRANDL) or explicitly (ANDELKOVIĆ, DE MIROSCHEDJI & SADEQ, and YEKUTIELI) hypothesize some form of Egyptian settlements and political hegemony over large tracts of the Mediterranean Littoral and the piedmont (Shephela) to the east. I have significant reservations concerning those scholars' hypotheses, based on my understanding of the archaeological record, especially on consideration of the logistics involved in establishment of a colony of types suggested by them.

INTERPRETING THE EVIDENCE

Nearly nine decades of excavation and survey have yielded abundant evidence for scores of late Early Bronze Age I sites contemporary with the Egyptian colony (BRAUN 2011a). They include large and medium-sized agglomerations of populations with stratified social systems that may be termed urbanized or urban-like (BRAUN 2011c; 2013: Chapter 7). Not a few of those settlements are fortified and of those, most are in more northerly regions, well away from the sphere of Egyptian activity and influence. Thus, the Egyptian colony was not planted in an unpopulated wilderness, rather it was located in a region somewhat densely populated by peoples who inhabited large and thriving communities, and who had inherited several millennia of architectural traditions (including mudbrick construction that did not seem to arrive in Egypt until the end of the 4th millennium). They represent continuity in occupation and development of sophisticated social organization that may be termed urban-like. By late Early Bronze I south Levantines had created monumental

[10] While the merits of this argument may be easily dismissed in light of the sophisticated late EB I south Levantine occupations at Megiddo (BRAUN *in press*; especially Chapters 5 and 7) and Bet Yerah (GREENBERG *et al.* 2006), such a discussion lies beyond the scope of this paper.

architecture in free-standing buildings, such as the Megiddo J2-J4 temples (Finkelstein *et al.* 2006), and massive fortification systems such as those at Tel Apheq, Bet Yerah (Getzov 2006) and Jericho (Holland 1986; Parr 2000).

Select communities had large concentrations of populations with highly developed, complex social systems. One of those appears to have been Tel Erani, which if it may be shown to have attained such status in the Erani C phase (Braun & van den Brink 1998; Braun 2012; Milevski *et al.* 2012), would indicate such developments likely occurred prior to major Egyptian activity in the region. If we may extrapolate from knowledge of the massive quality of fortifications at some sites, then we suggest late EB I was a politically unstable time, which may have witnessed some form of internecine warfare that demanded such protection. That is the context in which the Egyptian colony was planted in the southern Levant.

Tell es-Sakan – An Engima

By location and size Tell es-Sakan appears to be the central site in Egypt's earliest attempt at foreign colonization. As such it would also appear to be the key to understanding the nature of Egyptian colonization. According to the excavators there is an overwhelming quantity of Egyptian-associated objects of material culture representing an ethnically Egyptian population. After an initial period of settlement, in its second phase of activity the site was fortified by a sizable mudbrick wall which, in two succeeding strata, was added onto by accretions with the possible association of a tower or bastion.

Was that massive, mudbrick construction, built up over time (during three occupation strata) a response to the bellicosity of south Levantines? Or was it an Egyptian initiative prompted by a desire to imitate local traditions in order to create the perception of power? The evidence strongly suggests that whatever the reason, the idea was borrowed from not so poor indigenous peoples, especially as this fortified site is the earliest evidence in the presently known archaeological records of the Nile Valley and the southern Levant, for "Egyptian" fortifications.

Judging from the size of this massive structure, it must have taken considerable manpower to create. That observation then brings into question the logistics of its construction and the size of the Egyptian ethnic community at the site? Who actually designed the fortifications, made the bricks and laid them in place. Were there enough Egyptians to supply necessary manpower or were locals involved in the construction of the fortifications? Suffice it to note here, that more than one scenario can be used to explain the information available.[11]

How can we understand the role of Tell es-Sakan within its greater, regional context? It is clearly the center for administration of Egyptian colonial activity, with En Besor and probably Tel Ma'ahaz and Taur Ikhbeineh performing supportive functions, some of which are likely related to contacts with south Levantine communities (Milevski *et al.* 2012). Possibly sites such as Lod and Tel Erani had Egyptians in constant contact or even residing within primarily south Levantine populations. However, in the absence

[11] For a more detailed discussion of the logistics involved see Braun *in press*.

of historical documents, we may only surmise the nature of the relationships between these Nilotic immigrants and indigenous peoples. Whether or not south Levantines might have come under the sway or rule of an Egyptian colonial polity probably can never be discerned solely from the archaeological record of mute artifacts. It is valid to offer such scenarios, but I feel that for them to be seriously considered, they require global overviews that especially take into account the state of social and political developments of the indigenous peoples of the southern Levant. Accordingly, such models and scenarios when suggested, should be couched in conditional terms and not, as some scholars' have done, as historical realities.

Understanding the Meaning of Egyptian – Associated Artifacts

At sites where Egyptian and Egyptianized artifacts represent the bulk of material culture it seems clear their populations were primarily immigrants (Fig. 1). However, at sites where such artifacts have been found in much lesser proportions to objects of material culture of local traditions, the presence of Egyptian and Egyptianized artifacts should be understood as evidence of trade (direct or down-the-line) or some alternate mechanism resulting in transfer of exotic artifacts to local communities. Scenarios apart from trade, such as gifting associated with social rituals (*e.g.* dowries, bride prices, visiting, votive offerings, bribery, etc.) and looting, may as well explain the presence of such exotic artifacts at sites peopled primarily or solely by south Levantines. Thus, the presence of such objects does not, then, ipso facto, signify definitive evidence of direct rule or even direct contacts with an Egyptian polity.

The egyptian context for a colony in the southern Levant

Intrinsic to understanding Egyptian ability to establish a colony in the late 4th millennium is comprehension of the nature of social organization in the contemporary Nile Valley. Although the late Dynasty 0 and early Dynasty 1 kings' tombs offer glimpses into developments overtaken Egyptian society, it is only more recent work at such sites as Tell el-Farkha in the Nile Delta (Chłodnicki *this volume*; Czarnowicz *this volume*), where the pulse of development of an Egyptian polity may be measured by evidence for increases in communal social institutions in the archaeological record (*e.g.* Ciałowicz 2004; Buchez & Midant-Reynes 2007; Chłodnicki & Ciałowicz 2008; Köhler 2008).

What appears to be a considerably greater degree of advancement in social organization in the Delta than previously understood, helps in understanding the ability of an Egyptian polity to mount such a considerable colonizing effort in a distant region, Porat's, de Miroschedji's & Sadeq's, and Andelković's interpretations aside. The Delta (and particularly the major site of Tell el-Farkha) is strategically placed to allow relatively easy access to the southern Levant from the Nile Valley, either by the land route of northern Sinai or by sea along the coast. As noted above, Tell es-Sakan would have been a convenient starting point for such a foreign adventure. If the four strata at Tell es-Sakan attributed to this time span are any indication of the duration of this colonial enterprise, then it is likely to have lasted for several generations.

What constitutes an Egyptian colony in the context of the late 4th millennium?

In the absence of historical records, with reliance solely on the archaeological record, the degree to, and manner in which the Egyptian colony was integrated into the economic and social life of the southern Levant, cannot be definitively understood. The evidence is too sparse for such characterizations, especially as it is based solely on artifacts serendipitously unearthed in partial excavations of sites. How may we understand the presence of such objects? Do 20 Egyptian associated ceramic vessels at Amaziya, including fragments of baking trays amongst many hundreds of local vessels imply Egyptians lived there? Is a pot or other type of artifact sufficient evidence to indicate definitively identify political hegemony? In that context, can we unconditionally accept Andelković's militaristic scenario of a small Egyptian force dominating a large region populated by so many south Levantines, especially in light of the number of contemporary, south Levantine fortified sites? Indeed, beyond that scholar's suggestion, is there is any real evidence for such a political reality?

De Miroschedji's and Sadeq's map of an Egyptian colony shows an elongated tract of "permanent Egyptian installation" contiguous with the Nile Delta thrust into the southern region of the southern Levant. In my opinion that depiction offers a somewhat misleading and greatly aggrandized impression as to the size and likely relative importance of Egyptian activity at such a distance from the Nile Valley. Neither does it, I believe, offer any convincing evidence for Egyptian rule over the portions of the southern Levant indicated on it.

While Egyptians may have maintained control over the northern Sinai land route, the large tract along the Sinai coast should not be considered as an area of "permanent installation", if by permanent, is meant sedentary occupation. The archaeological record of that region has yielded mostly evidence for campsites in the relevant period and no indication of permanent structures (Oren 1989; Yekutieli 1998: I-XXIII). Thus, the Sinai "extension" on de Miroschedji's and Sadeq's map, a relatively barren region, was interpreted in such a way as to allow Tell es-Sakan to be considered integrally contiguous with the Nile Delta; in essence, a part of Egypt itself. In fact it is physically separated from true permanent Egyptian settlements and it is an integral part the southern Levant.

That interpretation further allowed de Miroschedji and Sadeq to interpret a well-defined area to the north of Tell es-Sakan (including a swath of the Mediterranean Littoral and the Shephela {piedmont}) as part of an Egyptian colony. However, only one Egyptian site, Tel Ma'ahaz, is located there, while most sites are Tier 2 and 3 (Fig. 1), which have yielded evidence of predominantly south Levantine material culture. Regions to the north as far as Megiddo, and to the east as far as Jericho on that map are depicted as areas of "Egyptian seasonal expansion", all presumably on the basis of small quantities of Egyptian associated artifacts found at En Esur (Yannai & Braun 2001) and Megiddo (Braun 2013: pl. 64).

By contrast, YEKUTIELI's (2004) characterization of the Egyptian colony sees Tell es-Sakan as the central site, with other related sites within a 40km radius, seems more grounded in available information and less speculative as to the meaning of artifacts. He understands the episode as part of the lengthy and continuing process of Egyptian unification. I am in basic agreement with his evaluation, which suggests much greater limitations on the information derived from Egyptian and Egyptian-associated artifacts found in late EB I contexts.

The egyptian colony in context

The Egyptian settlements were planted within a limited region, the southwestern portion of the southern Levant) which had been previously settled by indigenous peoples at sites such as Tel Erani, Amaziya, Lachish, Ptora, Ashqelon, Taur Ikhbeineh (OREN & YEKUTIELI 1992). However, the Egyptians appear to have, at least at Tell es-Sakan, founded their settlement on virgin soil. Once founded and apparently prospering over several generations, the Egyptians may have enlarged the sphere of their activity, perhaps creating satellites and even establishing communities within south Levantine settlements.

The *raison d'être* for this colonial episode, which appears to have been royally sanctioned, if not directly instigated by the nascent Egyptian state, seems, on the basis of the archaeological record, to have been economic. Possibly Egyptians were seeking commodities to import into the Nile Valley, wine, grain, pulses, olive oil, asphalt, resins, wood, cattle and caprines, copper, and perhaps even human labor (slaves).

Unfortunately, it is impossible to ascertain the nature of relations between the Egyptians in the colony and locals at different sites, but judging by the differentiation in quantities of imported and Egyptianized a rtifacts, it seems likely that there may well have been relations of different degrees with local communities. Trade may have been on equal and/or unequal bases and direct, or down the line.[12] Other types of relations might have involved tribute or plunder, but once again the archaeological record cannot, presently, supply sufficient information to ascertain the validity of such paradigms. Hopefully further investigation will yield answers to some of the questions on what is the nature of an Egyptian colony in the southern Levant in late phases of the Early Bronze I.

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[12] A likely example of this type of activity is found in three Egyptian vessels in large assemblage of local pottery in an Early Bronze Age I cemetery at Ramla (AVRUTIS 2012: 116, 117, figs. 4.29-4.31).

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Tell el-Farkha. The changes in spatial organisation of the settlement – from the Predynastic to the Early Dynastic periods

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After 15 seasons of research at Tell-el Farkha we can discuss in some detail the problem of spatial organisation of the site and the changes taking place in about a thousand-year history of the settlement. The remains of architecture, from the Lower Egyptian Culture to the beginnings of the Old Kingdom times, show characteristics of considerable dynamics. In this paper we want to focus only on crucial changes, which resulted from functional changes of whole parts the settlement. We can distinguish five main phases in the organisation of the site: early Lower Egyptian, late Lower Egyptian, Naqadian, Late Protodynastic – Early Dynastic and late Early Dynastic – early Old Kingdom. Although only a small percent of Tell el-Farkha has been investigated so far, we can formulate some preliminary conclusions.

Tell el-Farkha seem to have fitted perfectly into the urbanisation processes taking place in ancient Egypt. Probably from its very beginnings the settlement met the criteria of the definition of urban center as a "geographical and cultural central place exercising regional political control, with a relatively large and dense population, a complex division of labour and internal social stratification" (Hoffman *et al.* 1986: 175; Wilkinson 1999: 324).

According to a widely held theory the urbanisation processes took place first in Upper Egypt, where the formation of the Egyptian state was initiated. Settlements, which had been built initially with the use of organic materials such as wood and reed, evolved relatively fast into "urban" organisms with mudbrick architecture, additionally surrounded by defensive walls. Similar urbanisation processes occurred in the Nile Delta. According to the current state of knowledge mudbrick architecture was known in Upper and Lower Egypt at the same time (Naqada IIC). However, only from Naqada IIIA period, in which the use of mud bricks for the construction of residential buildings

Figure 1. Extent of the settlement in the early Lower Egyptian phase (S – settlement).

became common in the Delta, the development of Upper and Lower Egypt proceeded probably in a similar way, definitely with the influence of local factors (Kemp 1995: 687; Wilkinson 1999: 325). The evidence of that is provided, among others, by Tell el-Farkha.

One of the most important characteristics indicating the advanced stage of urbanisation of a given site is the existence of a dense residential area additionally surrounded by a wall. The features we should take into consideration while investigating the problem of urbanisation involve: the size of the settlement, its functional differentiation, and the density of residential area.

Urbanisation processes can be influenced by various factors; usually there are at least a few, depending on local conditions. It is often believed that in the Predynastic period this process may have been affected by defensive reasons or by state authorities exercising control over local communities (Trigger 1984: 103; Seidelmayer 1996: 113). There is no doubt that urbanisation processes reflect social processes taking place in a given period. One of the conditions that had an impact on urbanisation was undoubtedly an increase in social stratification associated with the production of food surpluses and their redistribution by local elites, which led to the separation from the society of a group of people who were not engaged in agriculture. The emergence of specialized crafts on the one hand, and the development of a class of scribes employed in the administration on the other, allowed a more efficient management of agricultural products. Another important urbanisation aspect was the appearance of cult centres (Trigger 1972: 590-591; Bietak 1979: 103; Hoffman 1980: 307-308; Wilkinson 1999: 324).

Among the factors that influenced the location of sites in the eastern Nile Delta was undoubtedly the existence of large sandy mounds (gezira, turtle-back), which were not inundated by the periodic flooding of the Nile. Furthermore, the situation of settlements on long-distance trade routes allowed their inhabitants to exercise control over trade. Such settlements often played the role of economic centres of a larger area. Additionally, they were ideal places for the redistribution of wealth. The next important location factor was the availability of agricultural areas, including cultivable alluvial soils or lands suitable for animal husbandry. At this point it should be noted that the exploitation of marshland was of great economic significance in the beginning of the Egyptian state (Herb 2007: 96-97).

Centralizing tendencies that can be observed already in the early Egyptian state, particularly redistributive economy, had a strong impact on the urbanisation process and the nature of early towns (Wilkinson 1999: 326). The function of redistribution of goods, so characteristic for the organisational system of the Egyptian state, must have resulted in the building of protected centralised storage facilities, in which the products were kept before their further redistribution or transfer. These regional urban centres were in fact a kind of state foundations inhabited by officials employed in administration, craftsmen working in the royal's workshops, or priests (Wilkinson 1999: 327). Settlements located in strategic places could evolve into logistic centres, often described by Egyptologists as „domains". These were small urban organisms with streets and buildings, specialised workshops, bakeries, breweries, granaries and storage facilities (Jacquet-Gordon 1962).

First question we should to answer is whether Tell el-Farkha could function as an important economic and administrative centre in this part of the Delta? The settlement is located on a vast gezira that was not flooded during periodic inundations of the Nile (except for disastrous floods). The area was characterised by the availability of cultivable land, and we have evidence for the exploitation of water environment. At the same time, raw stone material for the production of various items had to be imported, as it did not occur in the Delta. We also have a significant body of evidence for the existence of a long-distance trade both with Upper Egypt and the Levant (Mączyńska 2007; Chłodnicki 2008; Czarnowicz 2012). It seems that the settlement may have functioned as a place of redistribution of goods both at a local and at a long distance level.

If Tell el-Farkha was a logistic centre, could it serve the function of a domain or a small urban organism, with the seat of local administration, specialised workshops, and perhaps also a place of cult, and in later stages of its existence, a kind of a state foundation? The answer to this question can be provided by the spatial analysis of the settlement, which involves identifying potential areas of various functions (public places,

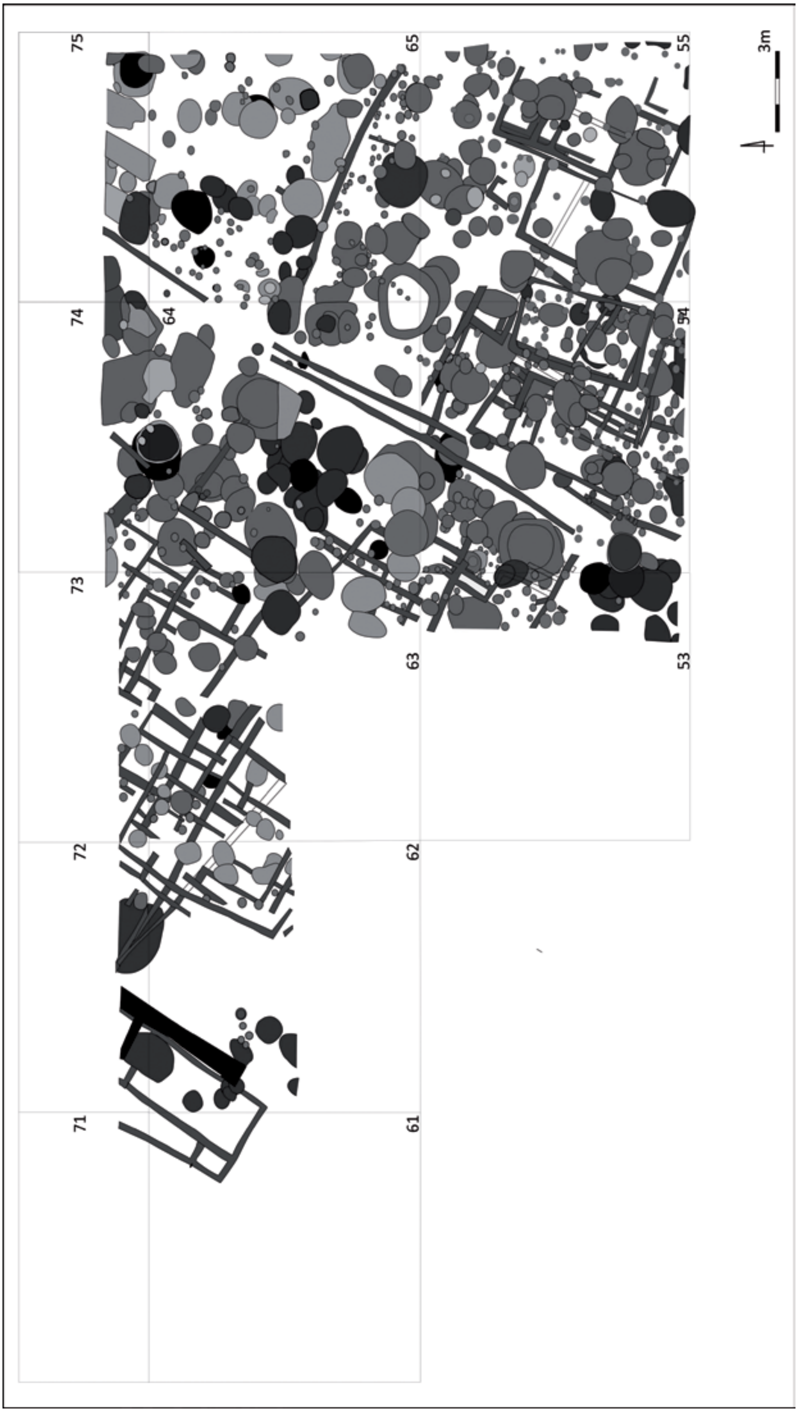

Figure 2. Central Kom. Plan of the constructions of the early phase of Lower Egyptian settlement.

built-up residential areas, and a separate economic zone) and may give us the information on whether the changes in spatial organisation were associated with the changing role of the settlement.

The question for which we cannot find an answer now is whether the settlement had defensive walls. This difficulty is caused by the fact that most of the edges of the tell are damaged. In the south and east, the destruction was caused by the modern day village Ghazala, and in the west by cultivation fields. In the north and north-west we are able to record only the extent of the Lower Egyptian settlement. Probably at the end of the Early Dynastic Period this part of the site had been destroyed by a flood, and the present shape of the tell in this place was formed in the Old Kingdom. Also the area between the Eastern and Western Koms has been transformed substantially in the modern times.

The only remains of supposed external strengthening structures are situated on the watercourse-side. However, they may have served as the protection of the river bank as well. These structures, associated with the Lower Egyptian phase of the site, are placed immediately to the west of a so called Lower Egyptian residence (Chłodnicki & Ciałowicz 2012: 145). It should be noted, however, that these walls, over 1 meter thick, protected the access to all economically important parts of the settlement (Chłodnicki & Geming 2012: 96).

The results of previous studies do not allow for a clear determination of the degree of settlement organisation at the beginning of its existence. It seems that the settlement covered mostly the area of the culmination of the gezira and its north-western slope which led to the river (Fig. 1). Communities of the Lower Egyptian culture built their houses applying traditional techniques, with the use of wood and reed. If not immediately, certainly very early the settlement was divided into zones, which can be observed in the western part of the tell (Central and Western Koms). At the edge of the settlement, by the water, a so called Lower Egyptian residence was erected; it was a large internally complex residential structure surrounded by a wooden defensive wall (Chłodnicki & Geming 2012: 91-95). It needs to be added that due to the direct access to water and the winds blowing in the area it was the most privileged part of the settlement. Most likely, the residence was the seat of a local chieftain. To the south and west of it, there was a residential area with densely situated small buildings (Fig. 2; Chłodnicki 2010; Chłodnicki & Geming 2012: fig. 7). At that time, most likely the entire western part of the Central Kom served to provide economic base for the settlement.

During the development of the Lower Egyptian culture some changes in the organisation of the site can be observed. An important one was the use of mud brick to erect thick walls within the settlement (Fig. 3; Chłodnicki 2011: 45-46; Chłodnicki & Geming 2012: 95-96; *in press*). The project of encircling the residence with a large brick wall is a clear indicator of economic efficiency and a proof of the society having surpluses that allowed for the employment of people to do the task. A similar wall surrounded the brewery centre. Houses situated in the vicinity of the residence were moved to another area, and in their place a small brewery was erected. At the Western Kom, in turn, a large brewery centre was built (Cichowski 2007; 2008; Ciałowicz 2012a).

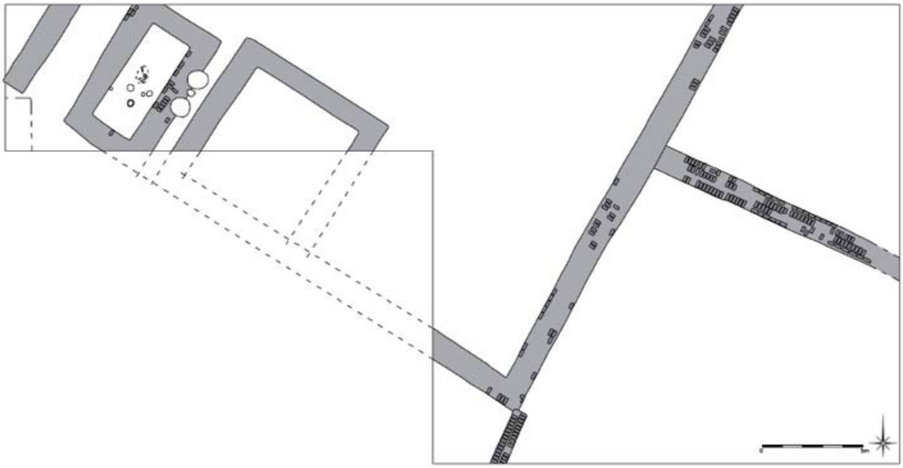

Figure 3. Central Kom. Plan of the early mudbrick construction.

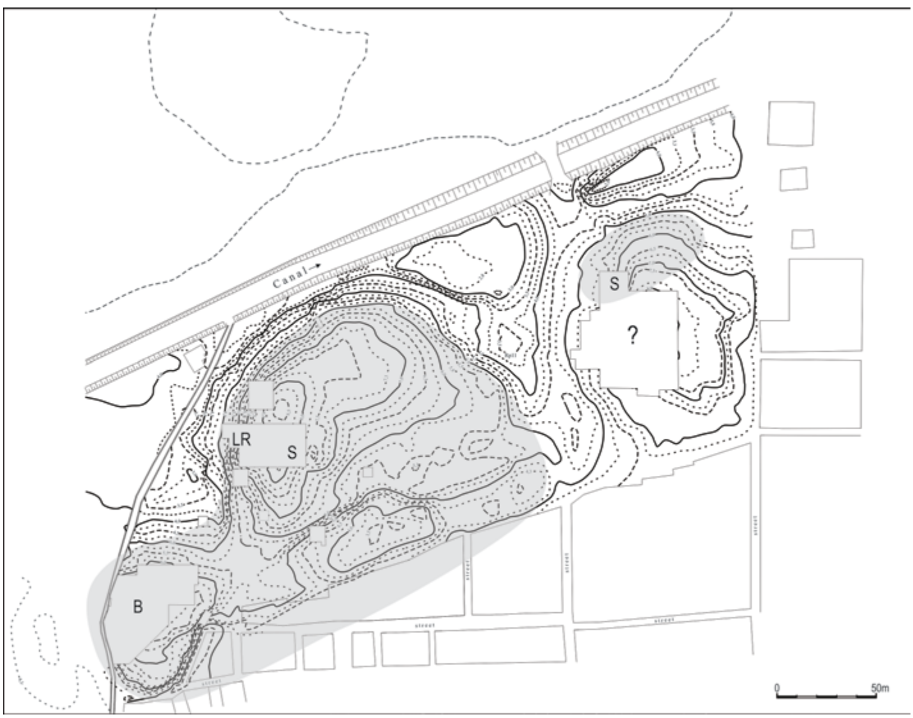

Figure 4. Extent of the settlement in the late Lower Egyptian phase
(S – settlement, LR – Lower Egyptian residence, B – brewery).

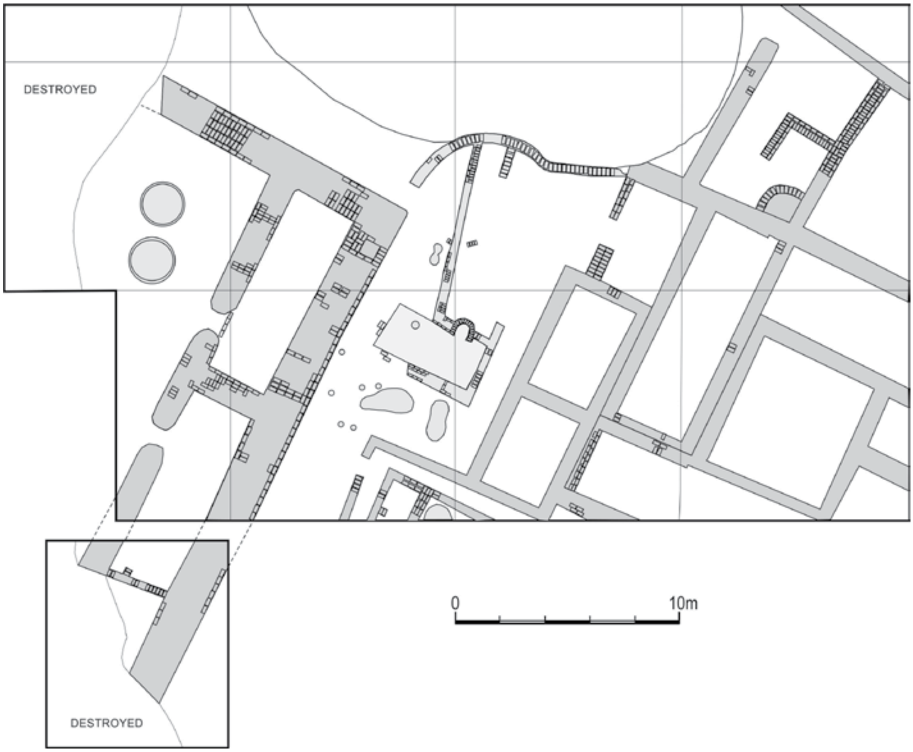

Figure 5. Central Kom. Plan of the Naqadian constructions.

Most likely around the same time, people started to settle in the northern part of the Eastern Kom. The settlement covered only the northern edge of the gezira. Perhaps this was associated with the need to move people to the expanding economic zone in the western part of the gezira (Fig. 4). At that time the houses were still built in a traditional way with the use of wood and reed. Excavations in the southern part of the Kom have not confirmed the existence of Lower Egyptian architecture (Chłodnicki 2012a: 19-21).

We have no information about the location of the cemetery in that period but it cannot be excluded, that it had been situated in the southern part of the Eastern Kom, which was the place used as a burial ground in subsequent periods (Dębowska-Ludwin 2012).

In the third phase of Tell el-Farkha, along with the appearance of the Naqadian settlers, fundamental changes occurred in the spatial organisation of the site. Then, in place of the breweries a residence with thick walls and additional storage rooms was built. It became an administrative seat of the settlement – the seat of a governor or important person of local elite (Ciałowicz 2012b: 163-170).

At the same time the Lower Egyptian residence on the Central Kom ceased to exist. However, it remained a public area, and in place of the residence a large building was erected with thick walls and elongated rooms which could be entered through narrow

Figure 6. Extent of the settlement during the Naqadian phase
(S – settlement, NR – Naqadian residence, M – mastaba).

entrances leading from the courtyard situated in front of them. Unfortunately due to the fact that the building was destroyed from the side of the tell's edge, we know its structure only partially. This building could play the role of a protected storage facility connected with the residence on the Western Kom.

At that period the rest of the settlement buildings located in the vicinity of the abovementioned structure were moved to another area. Bigger houses of the settlement, much larger than in the Lower Egyptian culture, were characterised by rooms arranged around rectangular courtyards (Fig. 5). Also the settlement complex seems to have been slightly larger than in the previous time (Fig. 6).

From the end of this phase we know the oldest traces of a cemetery on the Eastern Kom. This is a large mastaba built together with a burial complex surrounding it from the north (Ciałowicz 2007; 2011b). Notably, the buildings located to the north of that complex were oriented according to the points of compass, in N-S and E-W direction (Chłodnicki 2012a: 21), while all the other structures of the settlement in NE-SW direction. The latter way of orientation was typical at the site from the Lower Egyptian culture occupation until the end of existence of the settlement.

Figure 7. Extent of the settlement during the Early Dynastic times
(S – settlement, AC – administrative and cultic center, C – cemetery).

Burials dated from the Naqada IIIB to the Early Dynastic period were placed on the mastaba and to the south and east of it (Dębowska-Ludwin 2012). To the north of the cemetery, by the canal bank, functioned a settlement (Chłodnicki 2012a: 21-26). In late Early Dynastic burial activity was interrupted at that place and the settlement extended to the south and later again retreated northward (Ciałowicz 2008: 511).

At the Western Kom important changes occurred at the end of the Protodynastic and in the Early Dynastic periods. In place of the burnt Naqadian residence a complex of buildings was erected. They were arranged around a large courtyard, which is thought to have been an administrative-cultic centre (Ciałowicz 2011a; 2012b: 171-180).

At the same time on the Central Kom dwellings and workshops were built. In the houses rooms were situated around small courtyards, as had been the case during the Naqadian period (Chłodnicki 2011: 48; 2012b). The settlement expanded and houses were built also in place of previous storage facilities. The area on the western edge of the Central Kom lost the distinct role it had played in the Lower Egyptian and Naqadian times. The buildings dated to that phase are very well visible on the geophysical map on the southern slope of the Central Kom (Herbich 2012: fig. 3). Probably the settlement was of the same size as in the earlier, Nagadian times (Fig. 7).

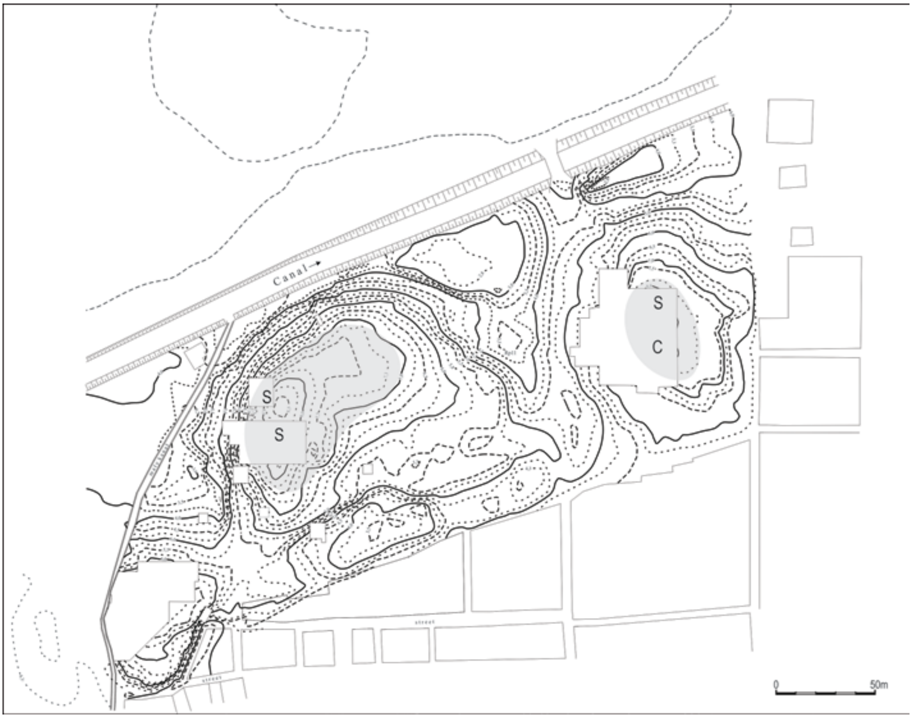

Figure 8. Extent of the settlement during early late Early Dynastic/early Old Kingdom times (S – settlement, C – cemetery).

Other major changes took place in the middle of Dynasty I. The administrative-cultic centre ceased to exist and the eastern part of the settlement was abandoned. The settlement sill existed in the area of the Central Kom, as well as in the northern part of the Eastern Kom (Fig. 8). The architecture was much more modest than before, with circular silos being its important elements.

At the end of the Early Dynastic period Tell el-Farkha lost its importance and became an impoverished village functioning only on the Central and Eastern Koms. At that time a huge circular building with a double, 2m thick wall, was erected at the settlements' edge (Fig. 9). What was the reason for building such a huge structure at the settlement, in which the majority of the buildings were silos or storage rooms? The building stood alone and it had no connection to other walls. The existence of structure of this size would have had a reasonable explanation only if it had been an element of a royal domain associated with the provincial administration referred to in the texts as *hwt* (Moreno Garcia 1999).

The oldest texts concerning provincial administration seem to indicate that in the Early Dynastic Period in the Delta functioned an administrative structure called *hwt*, which allowed the royal court to exercise direct control over local agricultural resources. In the

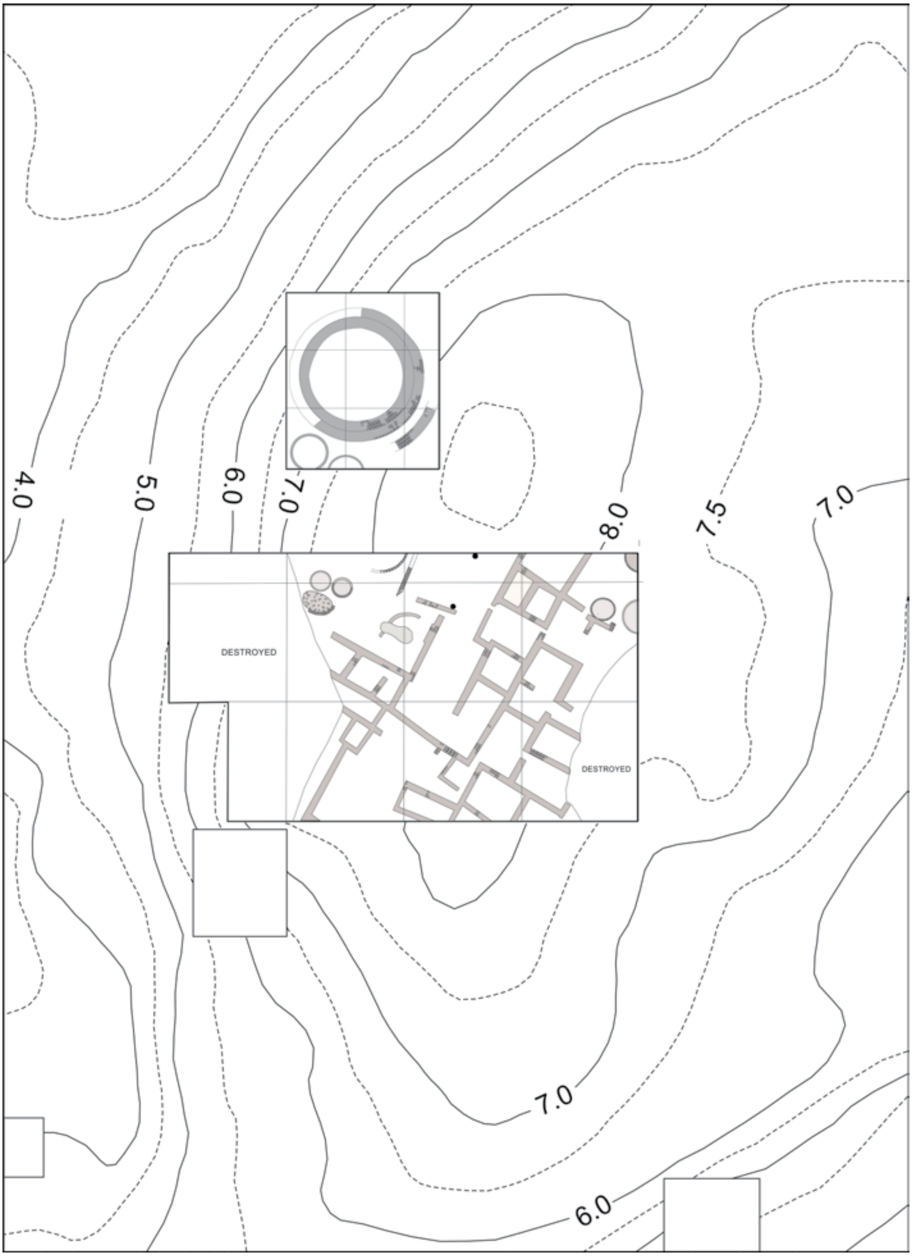

Figure 9. Central Kom. Plan of the late Early Dynastic/early Old Kingdom constructions.

beginnings of Dynasty I the term *hwt* was used almost exclusively for the sites located in the western Delta, where the majority of royal estates were situated. At that time, the eastern part of the Delta, which had been more developed during the Predynastic period, with its own elite and the advanced economic system, was not a favourable place to locate a royal estate (Wilkinson 1996: 96; Moreno Garcia 1999). This also applied to Tell el-Farkha, which had been of great importance from before the time of its incorporating into the system of the unified Egyptian state until the middle of Dynasty I. However, at that very time, when this administrative-cultic centre abandoned by the local elites ceased to exist, the conditions may have been created for the royal court to exercise the direct control over the settlement. A large part of Tell el-Farkha, particularly on the Eastern Kom, was covered at this time only by silo buildings.

At the beginning of Dynasty III the huge rounded building, and soon the whole settlement ceased to exist. The role of Tell el-Farkha decreased along with the changes in the course of trade routes. Mendes, situated on one of the main arms of the Nile, just a few kilometres westward, dominated already then over the whole this Delta region. Perhaps economic pressures caused the last residents of Tell el-Farkha to move to another location. It is also possible that the end of the settlement was more dramatic. The youngest graves – associated with the last phase of the settlement – the beginnings of the Old Kingdom – are very shallow and do not contain any equipment. Interesting in this context are also scattered human bones recorded within the cultural layer on the culmination of the Central Kom, among the remains of the Old Kingdom settlement.

Although a large part of the settlement has not been investigated yet, it seems that the most important elements of its spatial structure have been captured. For a complete recognition of the problem it is still necessary to open the trenches in the eastern part of the Central Kom and in the northern part of the Eastern Kom. Undoubtedly, as indicated in the previous research at Tell el-Farkha, the site was urban in character from its beginnings to the middle of Dynasty I and played a vital role as a centre of power and trade, as well as a place of cult. In later periods it lost its significance and became probably only an agriculture domain.

Tell el-Farkha was an important element of a relatively dense network of the settlements located in the Eastern Nile Delta. The processes of development of this settlement show the same patterns as the majority of sites excavated in the Nile Delta, including Buto, Tell el-Iswid, Tell Ibrahim Awad and Tell el-Murra (van den Brink 1992; 1993: 291-299; van Haarlem 2000; Hartung 2008; Jucha 2010; Tristant *et al.* 2011). Our knowledge about spatial organisation of the early settlements is still limited because most of the sites are excavated only in small parts. We can distinguish their dwelling areas, storage places and dumping spaces. Sectors for specialized craft activities (breweries) have also been recognized (Tristant 2004: 125-128).

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From the early Old Kingdom to the Badarian. Preliminary report on the 2012 excavation campaign in the settlement area of Elkab

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Introduction

Since 2009, the Belgian Archaeological Mission to Elkab from the Royal Museums of Art and History (Brussels) has shifted its attention from the rock necropolis to the settlement area of the Upper Egyptian pharaonic town site of Elkab. Two excavation seasons in 2009 and 2010 revealed the presence of a vast habitation area dating to the late Early Dynastic Period and the early Old Kingdom, situated within the Late Period 'Great Walls' of Elkab and immediately west of the temple area.

A 2 by 2 meter test pit was excavated in this area in 2009-2010, to a depth of almost 4 meters below the actual surface. The results indicated that the habitation dates back to Predynastic times and may even have originated in the Badarian period, suggesting that the site of Elkab was continuously inhabited for over 1500 years during late prehistoric and early historic times.

The 2012 excavation campaign aimed to expand exploration and understanding of the Predynastic occupation at Elkab. This contribution presents the preliminary results of that field season.

History of research

Descriptions, sketches and drawings by early travellers and Egyptologists indicate that an impressive tell, about 30 meters high, existed at Elkab (Fig. 1) at least until the middle of the 19th century. This tell was probably very similar to the partially preserved tells at, for example, Edfu and Kom Ombo. Unfortunately, the Elkab tell was dug away by the *sebakhin* and had entirely disappeared by the end of the 19th century. Based on 19th century

Figure 1. The tell of Elkab, drawn by Nestor L'Hôte in 1828-1830
(Harlé & Lefebvre 1993: 243).

sources, the settlement area covered by the tell can be reconstructed as more or less oval in shape, measuring about 300 by 170 meters. The northeastern to northwestern border of that area is defined by the so-called 'Double Walls' of Elkab, which date back to the late Old Kingdom (Hendrickx & Huyge 1989: n° 17; Hendrickx *et al.* 2010: 160-164). The enormous quantity of sherds left on the site by the *sebakhin* was largely removed for the construction of the Luxor-Aswan railroad in 1898 (Somers Clarke 1921: 59). The remaining large depression immediately west of the temple area looked rather more like a lunar landscape than a settlement area (Hendrickx & Huyge 1989: n° 18). Considering the extreme disturbances and destruction in this area, it is not surprising that this portion of the settlement did not attract the attention of many archaeologists during the 20th century.

However, a number of early archaeological finds attest to the presence of both Old Kingdom and Predynastic settlement remains. Small scale test excavations in this area, carried out in 1902 by Green (1905: 262-264) and in 1904 by Somers Clarke (1905: 270-271), demonstrated the existence of Old Kingdom and possibly older archaeological material up to a depth of almost 4 meters below the actual surface. In 1938, Capart unearthed a number of 'archaic' granaries below the temple of Nekhbet and at the northwestern corner of the temple enclosure (Hendrickx & Eyckerman 2009: 2-3). Moreover, at the same time, a significant number of seal impressions from the late 2nd/early 3rd Dynasty were found (Regulski 2009). However, research in this area was not continued until 1955. During the 1955 excavations, an early Old Kingdom storage site was discovered on which only a brief preliminary report was published (Gilbert 1958). The limited information available from the old excavation notes has recently been reanalysed, but this only revealed a very general interpretation of the site (Hendrickx & Eyckerman 2009). Part of the area excavated in 1955 was reinvestigated in 1968-1969 by Vermeersch, but this did not result in a better understanding of the chronology (Demuynck & Vermeersch 1978). However, Vermeersch (1978: pl. VI) noticed the occurrence of Black-topped and rippled sherds. The latter indicate the presence of the Badarian at Elkab, which is also confirmed by a typical Badarian greywacke cosmetic palette that was found reused in the early Old Kingdom storage site (Hendrickx & Eyckerman 2009: fig. 14). A Naqada I or early Naqada II occupation of the site is in evidence through Nile silt sherds with vegetal temper, Petrie's (1921) Rough ware, and a few reused Predynastic palettes also discovered within the early Old Kingdom storage site (Hendrickx & Eyckerman 2009: figs. 15, 24). Black-topped sherds of similar age, among them sherds with modelled rims, have occasionally been observed within the temple area.

These various finds, clearly indicating a Predynastic presence and suggesting a possible Predynastic habitation at Elkab, are not at all unexpected. The abundance of Predynastic rock art in the desert hinterland of Elkab (Hendrickx & Huyge 1989; Huyge 2002) and the important Naqada III cemetery that was excavated in 1968-1980 (Hendrickx 1994) have made it amply clear that the Elkab area was intensively frequented during Predynastic times.

2009 and 2010 campaigns, test pit 1 (TP 1)

The excavation campaigns in 2009 and 2010 focused almost exclusively on the late Early Dynastic and early Old Kingdom settlement (Rowland *et al.* 2009; Hendrickx *et al. in press*) (trenches T 1, T 2B and T 3A-D indicated in Fig. 2). Part of the area excavated in 1955 was once more investigated in 2009 (T 1), which confirmed the interpretation of the locality as a storage zone and its dating to the early Old Kingdom (Rowland *et al.* 2009: 24-26). Directly south of the storage site, within the confines of T 1, a 2 by 2 meter test pit, TP 1, was opened in 2009 (Fig. 2); its excavation was not completed until 2010 (Fig. 3). Worked flints, stones, bones and ceramics were discovered within a yellowish brown aeolian sand deposit, situated directly below the early Old Kingdom level. This material is clearly Predynastic in nature and was dispersed over a depth of almost 2.50 meters. On the basis of the ceramics present, several chronologically distinct Predynastic occupation horizons have been distinguished[1]. Moreover, at different levels, several hearths and burnt spots were identified.

The first upper Predynastic layer within TP 1 is characterised by fragments of storage jars with very wide apertures made with Nile C fabric (Nordström & Bourriau 1993: 173-174). They belong to Petrie's types R81-R84[2] (Petrie 1921: pl. XLI-XLIII) (Fig. 4) and are most characteristic for the Naqada IIC-D period. They were found in connection with a number of Marl A1 sherds of Petrie's Late class, which confirms a Naqada IIC-D

[1] It is to be noted that the limited number of diagnostic sherds from the test pits on occasion hampers the attribution of the archaeological material to the relative chronological phases of the Naqada culture as defined on the basis of seriation and horizontal distribution studies of cemeteries (Hendrickx 2006). The attributions in the present article are therefore to be considered preliminary.

[2] The rim diameter of R84 is considerably smaller than that of R81 but the rims of these jars are generally irregular. It is therefore hardly possible to differentiate the two types on the basis of rim sherds.

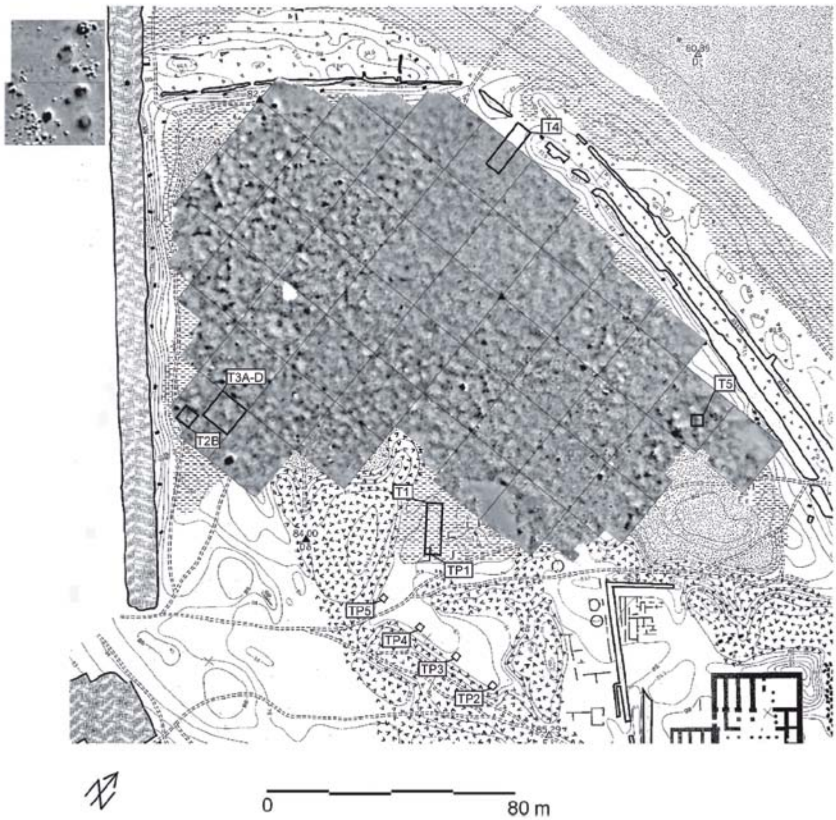

Figure 2. Map of the Elkab settlement area indicating the location of test pits TP 1 (excavated 2009-2010) and TP 2, 3, 4 and 5 (excavated 2012).

date (see HENDRICKX 2006: 78-81). Furthermore, this layer also contained a large hearth of more than 0.90 meters wide and 0.25 meters thick. Charcoal from this feature was sampled and radiocarbon dated to 4685±35 BP (Tab. 1), which perfectly corroborates the Naqada IIC-D age indicated by the pottery assemblage from this layer.

The pottery most frequently found in the layer below are Nile C sherds from storage jars. Although similar to those from the previous level, they were not found in combination with Marl A1 sherds, but with fine Nile wares and a few shale tempered sherds. Unfortunately, no characteristic vessel shapes could be identified, but this layer most likely dates to the early Naqada II period.

The third layer is dominated by shale fabric sherds (30 sherds) and contains only one Nile C sherd. The shale fabric is not entirely uniform and, in some cases, the random position of the shale particles indicates that they were added as temper to a Nile silt matrix. In other cases, the shale seems to have been a natural inclusion in the silt. Although

Table 1. AMS [14]C age determinations from test pits in the settlement area of Elkab. BP, radiocarbon years before present; σ, standard deviation; cal BC, calibrated calendar years before Christ (calibration using OxCal Version 3.10; Bronk Ramsey 1995).

Provenance of sample	Height a.s.l.	Lab no.	BP	σ	cal BC	
					68.2% probability	95.4% probability
TP 1	81.47 m	KIA-44326	4685	35	3520 (15.1%) 3490 3470 (53.1%) 3370	3630 (9.8%) 3590 3530 (85.6%) 3360
TP 3	80.18 m	RICH-20414	5446	31	4340 (27.8%) 4315 4295 (40.4%) 4260	4350 (95.4%) 4240

no distinct shapes could be recognized, the sherds seem to be fragments of large cooking vessels (see Midant-Reynes & Buchez 2002: 262, fig. 2.14). Other sherds from this layer belong to the Black-topped and Polished-red categories. A date in the Naqada I period is proposed for this layer.

The fourth layer, at a depth of ca. 2.70 meters below the surface, contained only a few sherds. Judging from the extremely limited information available, the amount of shale tempered pottery is less frequent than in the previous layer. Furthermore, a rippled sherd was found in this layer, which should date to the Badarian or the early Naqada I period. Based on the significant difference in depth from the previous layer, the Badarian, however, seems to be the most likely option. A single shale tempered sherd was found associated with a concentration of cobbles, small flint flakes and chips at the base of the aeolian sand and on top of a clayey deposit, indicating the lowest level of this layer. These artefacts were situated within a small depression that was covered by a thin layer of coarse sand. The presence of a single hammer stone, with a diameter of ca. 8cm, suggests that this feature can be identified as a stone knapping area. However, no tools or larger fragments of flint were discovered in the immediate vicinity.

The stratigraphically intact occupation levels in TP 1 clearly suggest that the site of Elkab was continuously inhabited from the early Naqada I or, even more probably, the Badarian period, straight through into the Old Kingdom.

2012 campaign, test pits 2-5 (TP 2-5)

The main aim of the 2012 season at Elkab was to explore the Predynastic occupation of the site further.[3] For that purpose, four additional test pits (TP 2, 3, 4, and 5), each measuring 2 by 2 meters, were opened about 10 meters south of TP 1, in an area that was

[3] Fieldwork started on February 21, 2012 and ended on March 15, 2012. The team consisted of Dirk Huyge (director), Wouter Claes (field director), Morgan De Dapper (geomorphologist), Stan Hendrickx (ceramicist), Salima Ikram (archaeozoologist), Anne Devillers, Elizabeth Hart and Karin Kindermann (archaeologists), and Geertrui Storms and Carla Swerts (draughtswomen). Funding for the 2012 campaign was provided by the William K. and Marilyn M. Simpson Endowment for Egyptology of the Department of Near Eastern Languages and Civilizations, Yale University (New Haven). In addition, the Netherlands-Flemish Institute in Cairo (NVIC) and Vodafone Egypt offered administrative and logistical support.

Figure 3. South profile of TP 1 showing the thick aeolian sand deposit (light grey) beneath the Old Kingdom level (dark grey). At the base of the sequence are the alluvial silt (floodplain) deposits.

not covered by the spoil heaps of the 1937-1938 temple excavations (Fig. 2). The objective was twofold: to gain a better insight into the stratigraphy of the area and to document the extent and nature of the Predynastic habitation at Elkab.[4] The line of test pits runs from east (TP 2) to west (TP 5) with an interval of 13 meter between them; they were laid out in accordance with the general topographic grid positioned at Elkab in the late 1960's (Depuydt 1989). All four test pits were excavated to a depth of over 3 meters, at which level sterile Nile alluvium was reached in all pits. The strata, identified as, grouped or subdivided in loci (Lc), could be relatively easily distinguished in the different pits, and although most layers occurred in all four pits, some stratigraphical differences could also be observed (Fig. 5).

All four test pits were overlain by a dense surface layer of mixed ceramics (0.10 to 1.00 meter thick), dating to every possible chronological phase between the Old Kingdom and Roman periods, which resulted from 19th century *sebakhin* disturbance and/or was composed of spoil of the 1937-1938 temple excavations (Lc 1 in Fig. 5). Below this surface layer, several intact archaeological horizons were found attesting to different phases of occupation. The most recent ones date to the early Old Kingdom, but they are not of equal importance in all the test pits. The pits to the west (TP 4 and 5) revealed several successive early Old Kingdom floor levels that can be associated with a number of mud-brick walls from several construction episodes. Given the limited size of the test pits, it is unclear for the time being what the precise lay-out or function of these constructions was, but they represent an archaeological context that is comparable to the situation in the trenches that were excavated in 2009 and 2010. The two test pits to the east (TP 2 and 3) contained only one early Old Kingdom horizon (Lc 2 in Fig. 5), suggesting that they are probably situated on the outskirts of the early Old Kingdom settlement. Although we will not discuss the early Old Kingdom finds in detail, it is nevertheless worth

[4] The results and interpretations presented below should be considered preliminary because part of the excavated material has not yet been studied in detail.

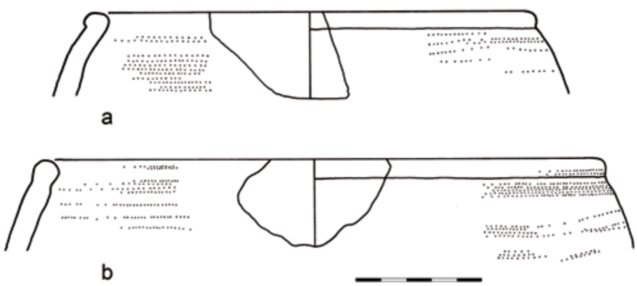

Figure 4. Rim sherds of large jars with very wide aperture, Nile C fabric: a) E09/T1/C15/02 (Nile C, rim diam. 18.0cm); b) E09/T1/C15/05 (Nile C, rim diam. 22.7cm).

mentioning that two superimposed *in situ* cooking installations were found in TP 4 (Fig. 6). The upper one was located inside a room formed by two perpendicular mud-brick walls, running northwest-southeast and southwest-northeast. Close to the southwest-northeast wall, a large ovoid jar was found, positioned inside a large fireplace. The upper level of the fireplace ashes match a burnt area on the surface of the vessel. Although obviously a cooking installation, a copper chisel was placed inside the jar. A bifacially retouched flint knife with a handle was also found lying against the same wall and close to the jar. The second cooking installation was excavated only some 0.2 meters west of the first one, but at a slightly lower level. In this fireplace, which also consisted of large quantities of ash, a bowl was placed upside down. In TP 3, a heavily damaged greywacke palette, possibly in the shape of a fish, was found in the early Old Kingdom level, providing additional evidence for, and confirming, the reuse of Predynastic palettes in an Old Kingdom context, as was previously mentioned with regard to the storage site excavated in 1955.

These early Old Kingdom layer(s) rest on a layer of aeolian sand that ranges in thickness from 1.50 to 2.00 meters and seems to gradually decrease in thickness towards the west. Archaeological material was scarce in the upper levels of this layer, possibly indicating that this part of the site was only lightly occupied for some time. Two fragments of marl ware Decorated vessels (Fig. 7) are among the few archaeological materials that were excavated from the upper part of the sand layer (Lc 4) in TP 3 (Fig. 5). They are decorated with groups of three short vertical strokes in the characteristic purple-black colour of Decorated pottery. Both fragments can be compared with Petrie's type D26g, characteristic for Naqada IIIA1-A2.[5] The presence of this Naqada phase at Elkab is no surprise. As has been mentioned above, an important Naqada III cemetery was excavated only 300 meters east of the settlement area (Hendrickx 1994).

[5] For type D26g several examples are known from cemeteries: Naqada tomb 666 (Baumgartel 1970: pl. XXVI), Mesaeed tomb 230 (Reisner 1936: 374, fig. 181), Elkab tombs 5 and 9 (Hendrickx 1994: pl. XXXII-XXXIII), Adaïma tomb 664 (Buchez 2007), Abu Zeidan (Needler 1984: 127, n° 50) and Deir Tasa (Gabra 1930: pl. IV.29). Furthermore, two examples from Abu Umuri are on display in the Cairo Museum. For the shape of the jars, the undecorated type L53k is very similar. Most examples can be dated to Naqada IIIA1-A2.

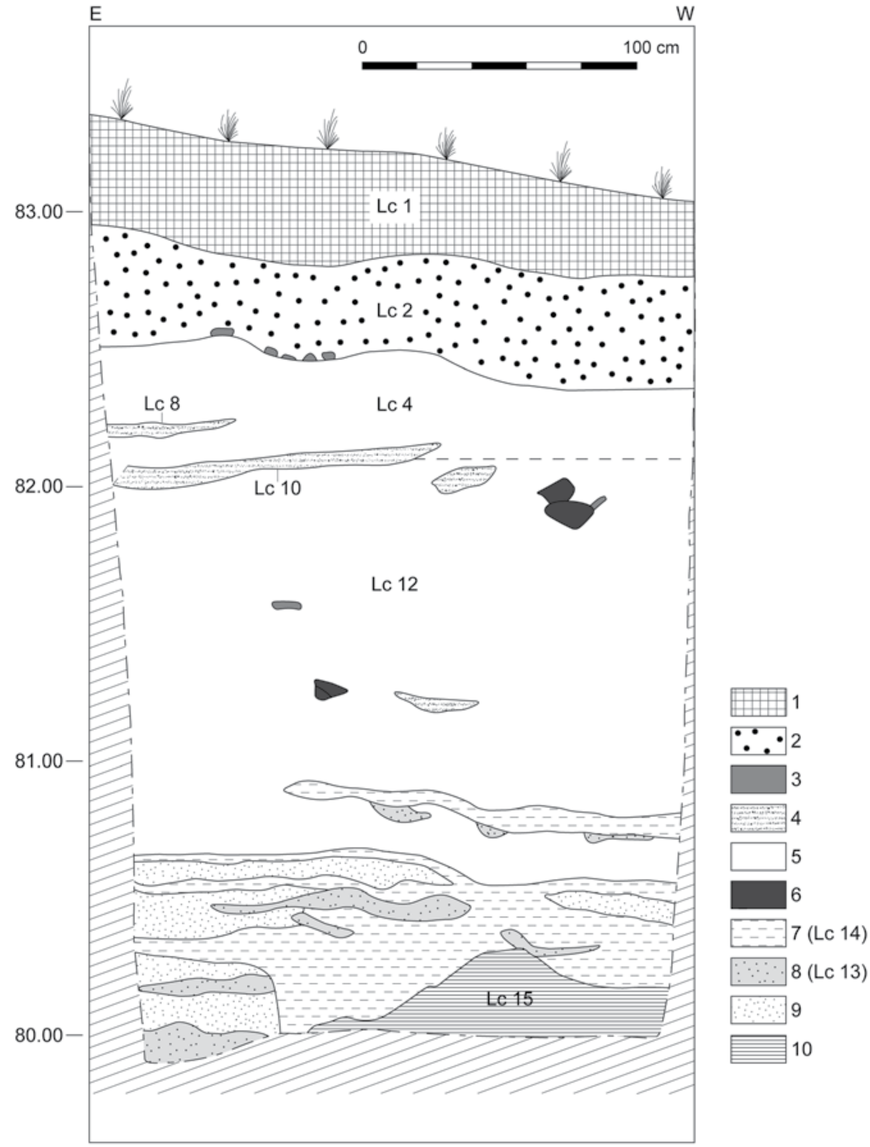

Figure 5. Drawing of the south profile of TP 3.
1: surface layer, 2: dark brown sand, 3: ceramic, 4: hearth, 5: yellowish brown aeolian sand,
6: stone, 7: clayey sand, 8: coarse sand, 9: fine sand, 10: Nile alluvium.

Figure 6. Cooking installations with *in situ* vessels in TP 4.

At a lower level in the aeolian sand, the same occupation phases were found in all four test pits, although the archaeological material was far more dense in the two easternmost ones (TP 2 and 3). In TP 3, a series of discontinuous patches of prepared mud flooring (Lc 9) were exposed at a height of ca. 82.10 meter. This flooring consists of a fine layer of hardened grey sandy silt, containing lots of small white inclusions, gravel and charcoal fragments. Sherds, worked flints (mainly chips) and a small fragment of red ochre were found on top of this floor level, all lying in a horizontal position. Despite the fact that this layer was only 2cm thick, it contained 94 sherds, with a total weight of 1.4kg. Moreover, two small hearths (Lc 10-11) seem to be associated with this floor level. The ceramic assemblage is strongly dominated by Nile C fabric (Tab. 2, Lc 6-9). Furthermore, a limited number of Black-topped and Polished-red sherds are present, together with an occasional marl ware sherd. The most frequently occurring types of vessel in this level, both in TP 2 and 3, are the large Nile C fabric jars with very wide aperture (PETRIE's R81-R84), also already mentioned with regard to TP 1 (Fig. 8). A few large rim sherds confirm the presence of R81. These jars occur frequently both in settlement sites and in cemeteries (see HENDRICKX 1996: 45, tab. 3) and, although they have a long chronological range, they are most characteristic for Naqada IIC. They were found in association

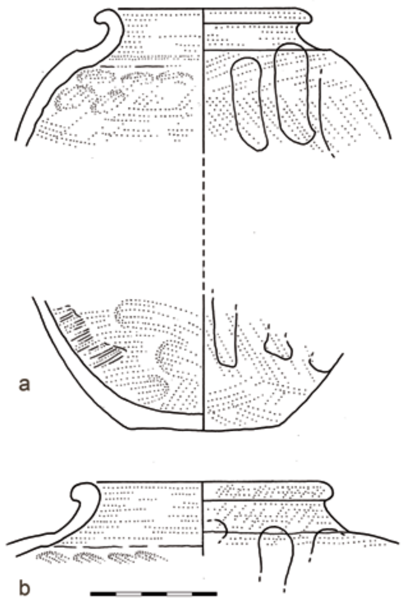

Figure 7. Pottery: a) E12/TP3/06/01 (Marl A1, rim diam. 8.6cm); b) E12/TP3/06/02 (Marl A1, rim diam. 10.4cm).

with a few fragments of bottles with rounded/pointed base (PETRIE's R91a-c), manufactured with the same fabric (Fig. 8). Such bottles are characteristic for Naqada IIB-C (HENDRICKX 1989, vol. 2: 98; BUCHEZ 2011: fig. 2), which confirms the proposed date for this level in the Naqada IIB-C period.

About 0.50 meter below this Naqada IIB-C level, the density of the archaeological material increased considerably in TP 2 and TP 3. Black-topped pottery becomes more common, while the presence of Polished-red pottery remains limited (Tab. 2, Lc 12/34-46). Most importantly, a shale tempered fabric appears in the ceramic assemblage and becomes increasingly frequent. Among the pottery types are Black-topped jars and large beakers with flaring rim (PETRIE's B18-B22) (Fig. 9). Modelled rims, however, are exceptional. Furthermore, Polished-red bowls (PETRIE's P22a) occur regularly. They are all made of Nile silt (Nile A-B1) and are, in most cases, carefully slipped and polished both on the inside as well as on the outside. A cup with a flaring rim from the same level in TP 4 is slipped on the inside only and polished on the upper few centimetres (Fig. 9a). This type of finish treatment is found on many White Cross-lined cups. It seems to have disappeared together with this type of pottery, meaning that it no longer occurs from Naqada IIB onwards. Based on the ceramic evidence, a date in the late Naqada I/early Naqada II period should be accepted as most plausible.

Predynastic shale tempered ware seems to have had a limited geographical distribution in the Nile Valley. It occurs mainly in southern Upper Egypt and, based on our current knowledge, especially in the wider Hierakonpolis area. It has been described for Hierakonpolis (FRIEDMAN 1994: 154), Adaïma (MIDANT-REYNES & BUCHEZ 2002: 175-176) and Naq' el-Qarmila (GATTO *et al.* 2009: 195-201).[6] Vessels made from shale tempered pottery are characterised by simple shapes, without necks or modelled rims (MIDANT-REYNES & BUCHEZ 2002: 233-235). The fabric was especially favoured for cooking vessels, probably because of its heat transfer properties. At Hierakonpolis, shale tempered pottery seems to have disappeared during the early Naqada II period (FRIEDMAN

[6] See also GATTO 2013.

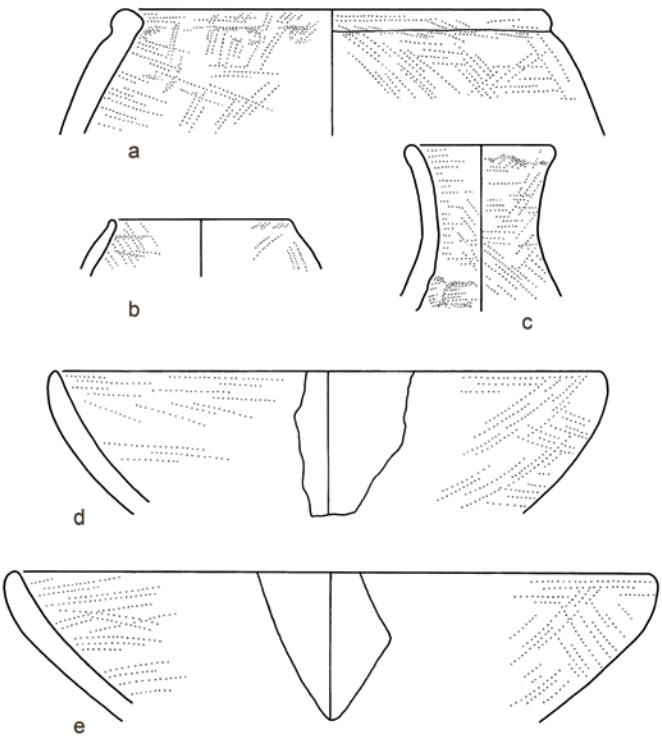

Figure 8. Pottery: a) E12/TP2/28/28 (Nile C, rim diam. 17.5cm); b) E12/TP3/25/3 (Black-topped, Nile A, rim diam. 7.2cm); c) E12/TP2/25/2 (Nile B2, rim diam. 6.0cm); d) E12/TP2/28/2 (Polished-red, Nile A, diam. 22.3cm); e) E12/TP2/28/1 (Polished-red, Nile A, diam. 25.2cm).

1994: 735-736), while in the Adaïma settlement, it is characteristic for Naqada IC-IIB, taking into consideration that earlier periods are not represented at Adaïma (Midant-Reynes & Buchez 2002: 234).

At the lowest level of TP 3 (Lc 13-14), which represents the base of the aeolian sand and the contact zone with the sterile alluvial deposits (Lc 15), a number of pottery fragments were found which can readily be distinguished from those in the overlying level. Most sherds are shale tempered and both shape and surface treatment can be determined from a few large fragments. Two large, deep, restricted bowls can be identified as cooking vessels because of the fire stains visible on their outer walls (Fig. 10). Their surface has been compacted, showing clear marks and traces of fingers and scraping, as well as a number of short and long burnishing strokes. The latter are not characteristic

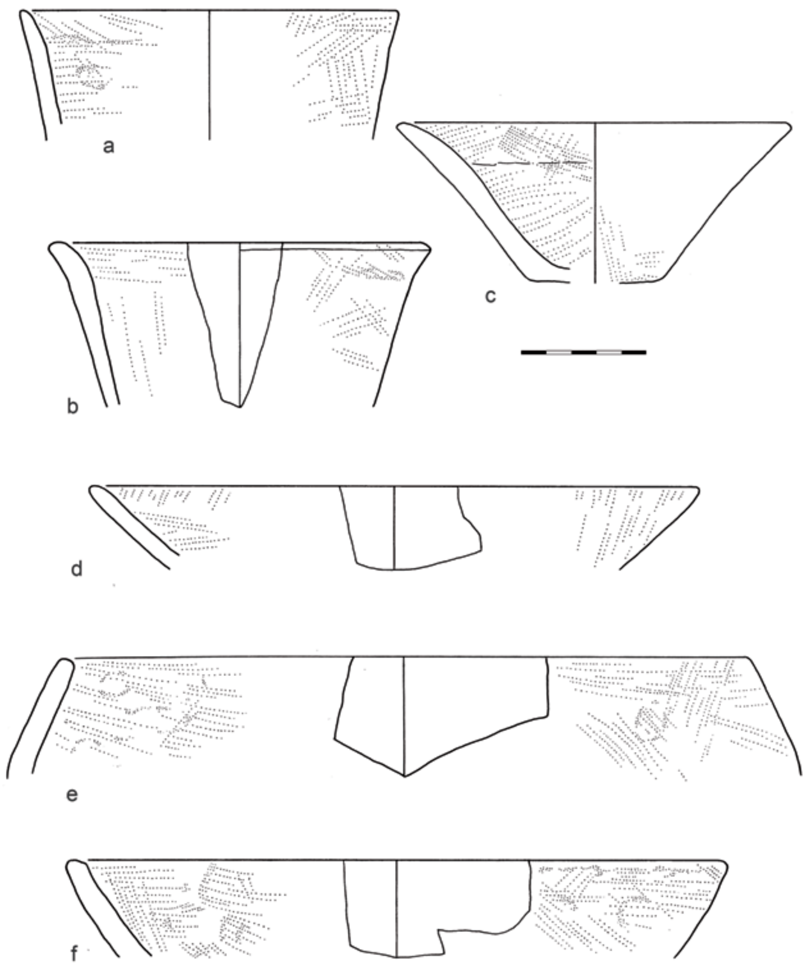

Figure 9. Pottery: a) E12/TP3/46/1 (Black-topped, Nile A, diam. 15.0cm); b) E12/TP4/74/02 (Polished-red, Nile B1, diam. 15.7cm); c) E12/TP3/43/2 (Polished-red, Nile B1, diam. 15.2cm); d) E12/TP3/43/3 (Polished-red, Nile A, diam. 24.2cm); e) E12/TP3/43/17 (Nile C, rim diam. 27.8cm); f) E12/TP3/43/18 (shale tempered, diam. 26.2cm).

at all for Naqada I ceramics, but can frequently be found on Badarian pottery. A single radiocarbon date from charcoal that is associated with the context in which these shale tempered sherds were found (at height of 80.18 meter), provides an age of 5446±31 BP (Tab. 1), which confirms the attribution to the Badarian period. Most recently, the Badarian has been radiocarbon dated between 4350 and 3750 BC (Dee *et al.* 2013), its ending date being more recent than previously accepted. The single date from Elkab, however, clearly situates the occupation within the early phase of the Badarian.

Table. 2. Fabric distribution for TP 3. # = number of sherds. Lc 6-9: Naqada IIB-C level. Lc 12: late Naqada I/early Naqada II level.

Lc/ Lot	Nile BT		Nile RP		Nile A-B1		Nile B2		Nile C		Shale		Marl		Total	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
6/14									7	100,0					7	100,0
7/16									2	100,0					2	100,0
8/21	1	5,0	1	5,0					17	85,0			1	5,0	20	100,0
9/25	2	2,1	5	5,3					87	92,6					94	100,0
12/34	4	1,9	3	1,4	2	1,0	2	1,0	196	93,8	2	1,0			209	100,0
12/37	19	9,6							163	82,7	14	7,1	1	0,5	197	100,0
12/40	29	8,4	10	2,9	23	6,6	4	1,2	242	69,9	37	10,7	1	0,3	346	100,0
12/43	43	10,8	9	2,3	13	3,3	2	0,5	203	51,1	127	32,0			397	100,0
12/46	38	27,7	2	1,5	18	13,1	11	8,0	29	21,2	37	27,0	2	1,5	137	100,0

Lithic analysis

Although the analysis of the lithic material from TP 1-5 is far from complete, a number of preliminary observations can be made. The majority of the recovered stone artefacts are manufactured from local flint, which was readily available in the gravel deposits of the Wadi Hilal, situated immediately east of the settlement area in the desert hinterland of Elkab. For the production of exceptional artefacts (*e.g.* bifacially retouched knives), a more homogeneous type of flint was used, which provides possible indications of wider regional contacts.

The early Old Kingdom layers in TP 1-5 comprise characteristic stone artefacts of this period, such as bifacially retouched knives and numerous regular sickle blades, often bearing sickle gloss. The Predynastic layers below are essentially characterised by side-scrapers, end-scrapers, and a substantial number of burins. The high amount of more than 28 burins and about 70 burin spalls that were found in the late Naqada I/early Naqada II horizon (Lc 12) of TP 3 could indicate a specialized workshop in proximity to the test pit. The practice of harvesting is also clearly attested by the presence of a large fragment of a bifacial sickle with clear sickle gloss that was recovered from the late Naqada I/early Naqada II horizon in TP 2. The same horizon also revealed some other remarkable finds. In Lc 12 of TP 3, a hollow-based flint arrowhead and a fragment of an obsidian flake were found. For the obsidian flake, which was recovered from the upper part of Lc 12, a date in the early Naqada II period seems likely. Obsidian is extremely exceptional in Predynastic contexts and all examples of which the provenance has been investigated, originate from the African Rift volcanic system, either from Ethiopia or the southern part of the Arabian Peninsula (Bavay *et al.* 2000). The flake from Elkab constitutes one of the earliest examples of the use of obsidian in Egypt (Zarins 1989). In Upper Egypt, obsidian has also been found in an early Naqada II context at Hierakonpolis (R. Friedman *pers. comm.*; Friedman 2004).

Faunal analysis

All the faunal material from TP 2-5 was analysed. The animal bones, the majority of which were recovered from the early Old Kingdom levels, were collected by hand and, in the case of TP 3, also recovered by sieving through a 5mm mesh sieve. A total of 370 specimens were collected and examined. Discounting the specimens that could not be identified to species (*i.e.* small, medium, and large mammal, large fish, fish, and bird), the most plentiful species were ovis/capra (sheep and goat, 75 bones), closely followed by different types of fish (72 bones), and finally cattle (15 bones) and pig (14 bones).

In general terms, it would seem that the animal economy at Elkab during the Predynastic and the early Old Kingdom was based on easily managed small ruminants (ovicaprids) and, unsurprisingly, fishing, due to the proximity of the Nile. The diet was augmented by cattle and pigs, and very rarely, hunted animals, as indicated by the one gazelle bone that was identified. The presence of Nile turtle (8 fragments of a single carapace), Nile oyster (10 fragments), freshwater mussel (10 fragments) and ostrich eggshell (4 fragments) does not necessarily indicate the consumption of these animals; these materials may have been used for a variety of other purposes, as well as for food.

Geomorphology

In addition to the archaeological excavations, a geomorphological study of the larger settlement area was initiated. The aim was to gain better insight into the landscape formation and the natural environment in which the habitation at Elkab developed during the Predynastic period and the Old Kingdom.

A total of 27 manual drill core samples were taken, and they confirmed the hypothesis that the Predynastic settlement initially developed on top of a large sand dune that slopes down towards the Nile. The start of the accumulation of this thick aeolian deposit seems to coincide with the increasing aridification in Egypt during the early mid-Holocene, which is believed to start between about 7000 and 6000 BP. The radiocarbon date of 5446±31 BP that was obtained from the lowest archaeological level of TP 3 (Tab. 1) corroborates the onset of this important climatological shift. The formation of the dune at this particular location can be explained by the presence of a Pleistocene wadi gravel terrace that served as a natural barrier against which the aeolian sand, transported by the dominating northern winds, accumulated.

It can be speculated that the late Early Dynastic or early Old Kingdom settlement was initially built on top of the Predynastic habitation, and extended, in a later phase, further down into the floodplain. The so-called 'Double Walls' (or an earlier similar wall) were probably constructed to protect the expanded settlement during the time of the inundation. Drillings have indeed shown that the floodplain is situated at a considerably higher level outside the 'Double Walls' than inside, suggesting that this wall, probably purposefully, served as a dam against the annual flooding.

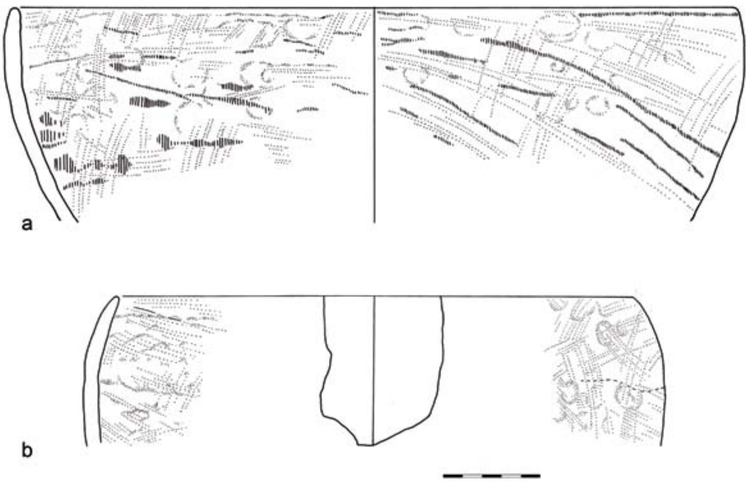

Figure 10. Pottery: a) E12/TP3/53/01 (shale tempered, max. diam. 38.4 cm), b) E12/TP3/53/02 (shale tempered, max. diam. 30.0 cm).

CONCLUSIONS

Although a rather long list of Predynastic settlements is known for Upper Egypt (HENDRICKX & VAN DEN BRINK 2002; TRISTANT 2004), most of these are of limited size and generally hardly investigated. The main exceptions are, from south to north, Naq' el-Qarmilla (GATTO *et al.* 2009), Hierakonpolis (HOFFMAN 1982; FRIEDMAN 1994), Adaïma (MIDANT-REYNES & BUCHEZ 2002), the Naqada region (VERMEERSCH *et al.* 2004), el-Amra (HILL & HERBICH 2011) and Mahasna (ANDERSON 2006; 2011). Stratified habitation sequences running over several meters are even more exceptional. The best example is the 'town site' of Nekhen at Hierakonpolis, where HOFFMAN revealed the presence of up to 4 meters of stratified Predynastic occupation. Because of the groundwater table, the deepest occupation levels could only be investigated in a limited manner by coring (HOFFMAN *et al.* 1986). The lowest level was identified as Badarian, although a detailed argumentation for this attribution has never been published. Although the location of the settlement may have shifted over time, the Elkab finds now confirm that at least some Upper Egyptian sites have been inhabited permanently over a very long period of time, *i.e.* from early Predynastic times onwards. It is likely that this was the case for a good number of Upper Egyptian sites, but most of their early occupation layers are situated well below the groundwater table and covered up by thick layers of alluvium, later pharaonic settlements and/or modern towns and cities. This seems, for example, to be the case at Tell Edfu, for which early Predynastic finds (*e.g.* WEIGALL 1907) and a possible Tasian beaker (LUGN 1931) have been reported. Moreover, Naqada III tombs were found in an area that was previously covered by the tell (LECLANT & CLERC 1994: 427).

The recent discoveries at Elkab also confirm the presence of the Badarian culture far south of the Badari region. Given the already mentioned isolated Badarian artefacts that were found at Elkab prior to the recent excavations, this comes as no surprise. Moreover, other Badarian and Tasian sites have been discovered during the last decades both in the Nile Valley (Hendrickx *et al.* 2001) and the adjoining deserts (Friedman & Hobbs 2002; Kobusiewicz *et al.* 2010; Briois *et al.* 2012). However, finds within the Nile Valley itself remain exceptional because of the above-mentioned practical difficulties. Furthermore, most, if not all, Badarian settlement sites were temporary installations, related to specific economic activities, such as fishing during the period of the low Nile (Hendrickx *et al.* 2001). At Elkab, however, the situation may be different. Although, at present, it cannot yet be demonstrated beyond doubt, there is a very good chance that the Predynastic settlement at Elkab was permanently occupied, perhaps from Badarian times onwards. The existence of permanently occupied Badarian settlements has always been assumed, but it has never been proven. Elkab may offer tangible evidence for this, but given the depth at which the Badarian layer(s) is located, extracting the evidence will be a difficult and long term undertaking. Nevertheless, the newly revealed early occupation horizons and the seemingly uninterrupted early human presence at Elkab for at least 1500 years offer outstanding research opportunities. Egyptian prehistoric settlement patterns, organisation, and transformation are still very poorly documented and our understanding of these phenomena is extremely limited and biased. As such, Elkab presents a unique research case for the study of both a Predynastic settlement and an early pharaonic town. Even more importantly, it may clarify how the prehistoric settlements of Upper Egypt gradually evolved and transformed into the fully urbanized society of historic times.

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Erani C pottery in Egypt

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One of the most important aspects connected with the socio-political development of Egypt are the relations with its neighbors, especially with the Near Eastern area. From the very beginning of its history, Egypt explored the Sinai and Levant in search for natural resources and luxurious goods, which were demanded by local Egyptian elites. This was the situation in the Pre- and Early Dynastic periods, when settlement network oriented to support trade exchange on the line Upper Egypt-Near East was developing in the Eastern Nile Delta. One of the crucial points on the route was certainly Tell el-Farkha (Czarnowicz 2011). Local economy of the site was – among others – based on trade, which was controlled and coordinated by an administrative-cultic centre localized at the Western Kom (Czarnowicz 2012b: 263-264). Beginnings of the relations in Tell el-Farkha reach the foundation period of the settlement, when its first inhabitants, who represented the Lower Egyptian culture, were engaged in long-distance trade (Czarnowicz 2011; Czarnowicz 2012ab).

At present, relations connecting Egypt and the Near East in the Pre- and Early Dynastic periods can be traced thanks to imported objects found in both areas. The definition of "imports" is highly imprecise and in the majority of cases it is used to name not the actual objects of trade exchange but only pottery containers, in which the traded goods were transported from their producer to receiver. A deeper analysis of the items produces numerous interesting evidence, as recognition of the place of the goods' origin (see Ownby *this volume*) or enables to establish chronological correlation of both areas. However, in the last case the situation is not so obvious. The majority of Egyptian vessels discovered in the Levant is limited to the reigns of rulers from late Dynasty 0 and early Dynasty 1, what gives no larger possibility to develop the chronological correlation backwards. Levantine pottery found in Egypt usually represents vessels types used for storage and transport of wine (Dreyer 1992: 297; Murray 2009: 577) or olive oil

(Gophna & Liphschitz 1996: 147-151; Serpico & White 2009: 399). Their shape is little characteristic and thus, has no larger chronological significance (*cf.* Czarnowicz 2012b: 245-246). To compare here Naqadan and Levantine pottery it must be admitted that items originating from the Near East are far less diversified, what makes, in general, interpretation difficulties, especially at the field of chronology (*cf.* Yekutieli 2000). There are, however, a few pottery groups with very characteristic decoration or surface treatment, which may serve as good dating markers and elements useful as a base for chronological correlation of different areas of the ancient world. Undoubtedly, into these groups may be counted Erani C pottery. It can be found both in Southern Levantine site as well as at least at a few sites in Egypt. The possibility to correlate the areas on the basis of Erani C pottery was underlined by Braun and van den Brink (1998).

The term of Erani C defines vessels with very characteristic decoration, which are known from the Levantine area in the period of EB IB1 (Yekutieli 2000: 130, 150; 2006: 229, tab. 1). The style was named after phase C from the site of Tel Erani, where researchers form Ben Gurion University of the Negev in Beer-sheva, that is A. Kempinski and I. Gilead (Kempinski & Gilead 1991; Yekutieli 2006: 225-226), found vessels of the type for the first time. Yekutieli (2000: 150; 2006: 233) in his description focuses on local character of the pottery group and defines typical forms made in the tradition. Braun (2012: 11-12) characterizes in detail decorative motives typical of Erani C. The scholar distinguishes two subgroups thanks to different ornamentation. Group I consists of white-slipped vessels with painted decoration in the form of horizontal stripes made with dark brown or red paint. This type of ornamental motif occurs later in the Levant *e.g.* on the Pijama Ware pottery (*cf.* Braun 2012: 15), however, it is distinguishable from the Erani C style by a series of incisions of punctuations located below the rim (Braun 2012: 12). Moreover, storage vessels have atypical ledge handles with heavily curved edges (Kempinski & Gilead 1991: fig. 11:4; Braun & van den Brink 1998: 74). Group II is composed of vessels with handles decorated with a series of horizontal or vertical incisions and/or clay rollers creating a ring around the handle or a spout (Braun 2012: 12). Moreover, these ornaments can be met on specific types of vessels, *e.g.* painted and incised decoration was most often used on small and medium-sized jars (storage vessels), while plastic decoration and incised handles appear on small forms, such as spouted juglets or amforiskos (Braun 2012: 12). Interestingly, there is no pitoi nor vessels without a neck, so characteristic of EB I, which were decorated in the style (Yekutieli 2006: 233). The presence of Erani C pottery is restricted to the areas of the central and southern part of present Israel (Yekutieli 2006: 238; Braun 2012: 12) and can be met at such sites as Jericho (Kenyon 1960: figs. 13:30, 14:3), Azor (Ben-Tor 1975) or Site H, Wady Ghazzeh/Nahal Besor (Macdonald 1932: pl. XXXVII), Amatzia (Milevsky *et al.* 2012: fig 6.2), Hartuv 2 (Mazar & de Miroschedji 1996: 18, fig. 18:5,8) or Ashkelon Afridar (Gophna 2002: fig. 4:1). Yekutieli (2000: 150) states, on the basis of the research by Goren (Kempinski & Gilead 1991: 179), that Erani C pottery was produced locally from local clay by a local workshop.

Table 1. Correlation of the chronology between Egypt and the Levant.

Phase (TF)	Period		Datable imports
	Egypt	Levant	
1	NIIB-IIC	EB IA2	Folded ledge handle
2	NIID1	EB IA2/IB(?)	
3	NIID2-IIIA1	EB IB (Erani C)	Erani C
4	NIIIA	EB IB (Erani C)	Erani C
	NIIIB	EB IB	
5	NIIIB-C1	EB IB (terminal)	

Erani C pottery is known from four sites in Egypt. It is also present at the Sinai, where a trade route from the Delta to the Levant was crossing. Two tombs from cemetery U in Abydos revealed imported pottery with features characteristic of the Erani C style. These are complexes U-j and U-k (Braun & van den Brink 1998: 74, Dreyer 1992: 295-299). Tomb U-j is the largest structure localized at Umm el-Qaab. C14 dates from wooden beams found there point to the period between 3200 and 3150 BC as for the time of its construction (Dreyer *et al.* 1993: 35). The relative dates were established on the basis of pottery preserved in the grave as for the period of Naqada IIIA2 (Braun & van den Brink 1998: 73; Dreyer 2011: 128). The structure has an almost square shape and is divided into 12 chambers. Dreyer (2011: 129-131, fig. 14.3) points that grave offerings were deposited according to a specific order. The most precious objects were found just by the deceased and the farther items were localized from the burial chamber, the smaller was their value. It is worth to stress here that objects imported from the Near Eastern area were found only in chambers localized in the eastern part of the tomb. The number of vessels offered to the deceased is almost inconceivable. Researchers claim that the structure could comprise even 700 jars (Dreyer 2011: 131-132). Laboratory analyses show the vessels comprised wine (Dreyer 2011: 132). Among the published imported jars, one bears decoration typical of group I Erani C (U-j 10/93) in the form of paintings and rows of incisions visible on the neck (Hartung 1993: Abb. 64: 10/93). Two objects have handles characteristic of the group (Hartung 1993: Abb. 64; Braun & van den Brink 1998: 74). Very interesting is also one more decorative motif, which can be found at vessels from tomb U-j, however, it cannot be explicitly connected with Erani C, because until very recently it was not observed on a single example from the group. The quoted motif is a plastic band imitating a rope present at the upper part of the body. At least three vessels imported from the Levant and found at tomb U-j bear this type of decoration. Apart from the above mentioned jar with typical Erani C ornaments, these are objects labelled with nos 7/50 (Hartung 1993: Abb.61: 7/50) and 11/17 (Hartung 1993: Abb.70: 11/17). All three are quite typical storage jars with ledge handles. Until recently they had no good analogies from the Levantine area, although petrographic analyses conducted on object 11/17 showed it was made of loess clay (Porat & Goren 2001: 408). The material is known *e.g.* from the neighborhood of Tel Erani (Brandl 1989) in the area where the Negev turns into the Coastal Plain. Recently a mission of the Israel Antiquities Authority has started rescue excavations at a site localized 2km south-east from Tel Erani, where it found remains of settlement from the period of EB IB1. The only object, which might be an Egyptian import there, is a stone bowl the earliest dated to the late Gerzean period (Braun *in press*). The place name is Ptora (Milevski & Baumgarten 2008). Among pottery material a ledge handles storage jar with deep incisions and painted stripes similar to other Erani C vessels was found. In addition, the object was plastically decorated in the same way as it was observed at the vessels from tomb U-j (Milevski & Baumgarten 2008: fig. 7:11). Taking into consideration far advanced local diversity of Levantine pottery from the period of EB I, the case can be interpreted as a decoration motif of the Ptora type. Apart from tomb U-j and the above mentioned Near Eastern site, similar applications were discovered on vessels from such sites as Abusir el-Meleq, Minshat Abu Omar or Naqada. The first who noticed the similarity of jars from Ptora to imported Levantine objects discovered in Egypt was E. Braun (*pers. comm.*).

Tomb U-k is not much older than U-j. Its relative dates belong also to the period of Naqada IIIA2. It is not, however, such an impressive structure as U-j, although, also there some vessels imported from the Levant were discovered. One of them is a jar with more spender body than its counterpart from tomb U-j but with the same decorative elements as the quoted analogy. The vessel has no plastic decoration of the Ptora type (Dreyer 1992: 295-299).

A jar of a different type, bearing vertical loop handles with vertical long incision, was found at the cemetery in Gerzeh in grave 185 (Petrie *et al.* 1912: pl. 11/2c). The drawing, which presents the vessel, does not show any traces of painting. There are, however, two short applications on the body interpreted as remains of ledge handles. The grave, where the above mentioned jar comes from, is dated to the period of Naqada IIcd (Anđelković 1995: 60).

A vessel of similar type, though smaller, was found at the site of Minshat Abu Omar in grave 115 (799) (Kroeper & Wildung 2000: 1). It was a little juglet with two vertical handles and a longitudinal incision. The vessel had also applications in the Ptora style attached to the upper part of the body. The structure belongs to group I of graves from MAO. Although recently have aroused many questions around the dates and division into groups proposed by the German researchers (see Mączyńska *this volume*), it seems that the date of grave 799 estimated as for the period of Naqada IIcd (Kroeper & Wildung 2000: 1) is correct. In the particular case, the presence in the grave vessels W73 next to a well worked out juglet with an oval bottom, neck and rim might point, in particular, to the period of Naqada IId2 as to the time of the structure foundation. From the same site

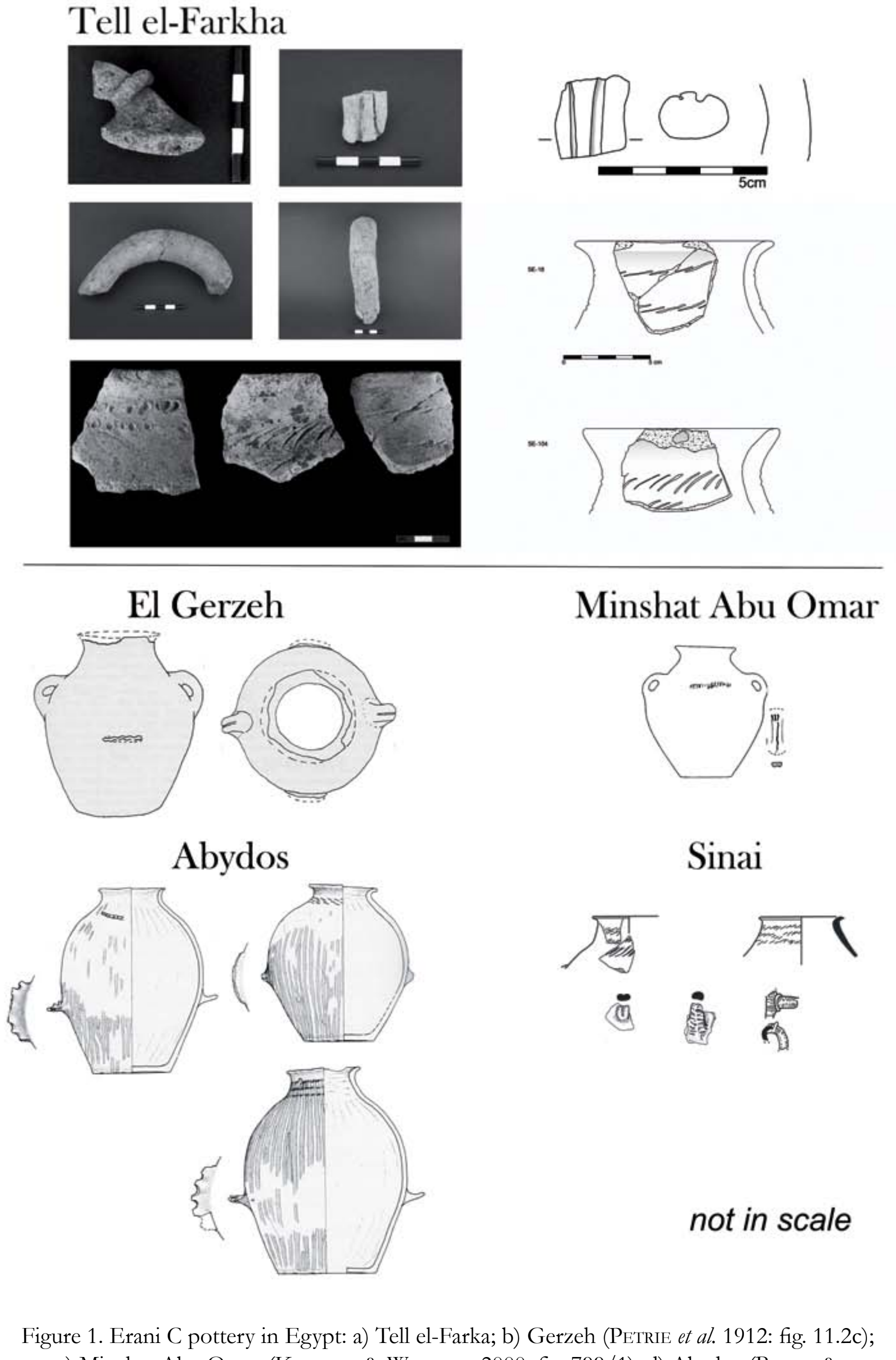

Figure 1. Erani C pottery in Egypt: a) Tell el-Farka; b) Gerzeh (PETRIE *et al.* 1912: fig. 11.2c); c) Minshat Abu Omar (KROEPER & WILDUNG 2000: fig. 799/1); d) Abydos (BRAUN & VAN DEN BRINK 1998: fig. 1); e) Sinai (BRAUN 2011: fig. 12.11).

comes one more imported jar with the Ptora type decoration. It is a storage vessel with ledge handles. On its surface, remains of red paint can be seen. The interesting, in the case, application covers the upper part of the body. The vessel was found in grave 316 (Braun & van den Brink 1998: fig. 2:A).

The majority of the above mentioned examples of Erani C vessels or dated to the same period objects with application of the Ptora type was found at cemeteries of the Naqada culture. Moreover, these jars belonged mostly to group I. The situation is different at Tell el-Farkha. Up till now, researchers there have discovered not a single example of imported Levantine vessels in the funerary context. All known Levantine objects were discovered at the settlement or in the context of public buildings like the Lower Egyptian residence, Naqadan residence or the administrative-cultic centre at the Western Kom. What is interesting, most of storage pottery comes from the centres of early administration (Czarnowicz 2012b: 261-264). Group II of Erani C pottery is represented at the site by a vertical handle with two incisions (Czarnowicz 2012b: 274, figs. 2.2, 11.3), as well as another handle with a single vertical and a few horizontal incisions (Czarnowicz 2012b: 274, fig. 11.2), both found in the context of Phase 3. Petrographic analyses have shown that in the second case we deal, most probably, with an imitation of a Levantine vessel, because the handle was made of Nile clay (Ownby *this volume*). The find is dated to Phase 4. From the site comes also an example of a handle with a pottery ring, which was discovered in the course of works conducted at the Western Kom in layers dated to the turn of Phases 3 and 4. Another five examples of vessels with decoration typical of group I Erani C were also found at the site. These are fragments with very clear incised decoration in the form of dots placed on a vessel's neck (a single example) (Czarnowicz 2012b: 248, fig. 11.1) or in the form of various incisions (Czarnowicz 2012b: 248, fig. 8, 11.1). Two vessels with ornaments of the type were indentified during the last season of fieldworks. Pottery of group I is known from many parts of the settlement, starting from the very beginning of Phase 3 till the middle Phase 4. It is worth to stress that remains of this type of pottery were discovered also inside an enigmatic structure discovered at the Eastern Kom. It is assumed that it might have served as a cenotaph, a large construction of symbolic grave significance, predating tomb U-j but very similar to its architectural form (*cf.* Ciałowicz 2006: 92-94; Dębowska-Ludwin 2013: 38-39). It remains uncertain if a vessel found in the Naqadan residence at the Western Kom is connected to Erani C. Although it presents a chronologically uncharacteristic shape, it bears some analogies to vessels from Ptora. It may be presumably associated with phase EB IB1 (Czarnowicz 2012b: 245-246). Basing on small objects, chronology of the jar can be established to the period of Naqada IID (Czarnowicz 2012b: 246). On account of that it may be stated that in Tell el-Farkha imported vessels connected with Erani C are present from the period of Naqada IID to IIIA1 (Czarnowicz 2012b: tab. 1).

Pieces of Levantine vessels, which belong to the group of Erani C, were discovered also during surveys in the northern Sinai. These are two storage jars with decoration typical of group I preserved as fragments of their body, neck and rim (Oren 1989: fig. 9:14-15), with clearly visible three rows of oblique incisions. Also three handles were discovered, one of them has a single vertical incision (OREN 1989: fig. 8:6), the second – a single vertical and a series of horizontal incisions (OREN 1989: fig. 8:5) and the last one bears two colons of short horizontal incised lines (OREN 1989: fig. 8:7). A painted vessel is also known with dark color stripes running vertically and Ptora type applications (OREN 1989: fig. 9:16).

The significance of discoveries of Erani C pottery as well as those decorated with Ptora type applications is very large. Firstly, it enables to establish closer chronology of both regions. Secondly, it points to the trade route with the stress to the meaning of the Delta as an exchange centre.

As it was stated before, Erani C pottery does not go beyond the period of EB IB1. In Egypt, the discovered fragments come from layers dated from the period of Naqada IID till Naqada IIIA2. The beginnings of the phenomenon can be established more precisely to the turn of Naqada IID1 and D2. The terminal date is based on the youngest examples of Erani C pottery discovered in tomb U-j, that is to the period of Naqada IIIA2. It should be stated in this place that building more detailed chronology will be possible after deep analyses of stone bowl from Ptora are made. In can be indisputably said that EB IB1 corresponds to the middle of Naqada IID and continues to the end of Naqada IIIA2[1]. It stands in contradiction to the correlation presented by BRAUN (2011: 122). The period cannot be restricted only to the period of Naqada IIIA as it is certified by a number of objects discovered at Egyptian sites.

Local character of pottery production in the Early Bronze Levant, as well as geological differentiation of the area, which enables to conduct very detailed petrographic analyses, give the possibility to recreate trade routes, along which exchange of goods was lead in the period of EB IB1. One of them must have started at Wadi Lachish and, passing through Ptora and Tel Erani, then through the strip of coastal lowlands and the northern Sinai (the Way of Horus), it reached the Delta, which was at the time an important centre of imported goods redistribution. In a unanimous opinion of scholars, one of the most important places on the route in the Delta was Tell el-Farkha. The settlement was the point from which caravans was setting off on the way both to the east and to Upper Egypt, carrying previously bought in the Levant goods like *e.g.* wine, copper or metal tools (CZARNOWICZ 2011; 2012ab). Thanks to the system it became possible to satisfy the needs for luxurious goods of the emerging Egyptian state elites. Distribution analysis of imported examples of Erani C pottery corroborates the general thesis on the shape and way of trade leading in the period of Naqada II/III. Similar arguments were brought by petrography research made on other fragments of imported vessels found at Tell el-Farkha, as well as copper objects discovered at the site (CZARNOWICZ 2012b; OWNBY *this volume*; REHREN & PERNICKA *this volume*).

[1] It is the place to admit that into the correlation table published in Tell el-Farkha I (CZARNOWICZ 2012b: tab.1) crept an error. At the position 4 it should be Naqada IIIA2.

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The picture of Naqadan-Lower Egyptian transition reconstructed on the basis of sepulchral data

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The issue of the Naqadan-Lower Egyptian transition is widely discussed by various specialists. The most recent research, like excavations at Tell el-Farkha and Kom el-Khilgan, or reevaluation of older thoroughly published and well known works (*e.g.* Minshat Abu Omar) throw new light on the case. According to our present knowledge earlier theories, which attempted to explain this interesting change in Egyptian history as a result of a conquest, failed. Actually proposed theories – depending on the point of view, that is usually the site from which the situation is interpreted – are more North or South oriented. The most convincing seem to be those accenting assimilation (Buchez & Midant-Reynes 2011) and integration (Mączyńska 2011), which point to the fact that the contact of North-expanding Naqadans and resident Lower Egyptians brought to creation of a new cultural value. Many of these disagreements come from overestimation of the leading Naqadan role and, at the same time, underestimation of the Lower Egyptian cultural unit complexity (see also Köhler 2008; *in press*; Mączyńska *in press* c).

1. The Lower Egyptian culture burial customs

The Lower Egyptian culture, also from historic reasons called the Buto-Maadi complex, is the first unit known in the history of Northern Egypt, which was recognized at as many as 24 sites, spread over such a wide area. It evolved, expanded and maintained active trade contacts with the Levant and Upper Egypt being a real partner in the exchange. According to recent proposals the Lower Egyptian culture should be dated to the period between 3900-3300/3200 BC and it is divided into three chronological phases (Mączyńska 2011: tab. 2; 2013): early – Naqada I-IIAB, middle – Naqada IIC-IID1 and transitional – Naqada IID2-early IIIA1. The level of social complexity of the Lower Egyptian culture is currently widely discussed and new discoveries suggest significant advancement in building technologies and high density housing planning (Mączyńska *in press* a). Good examples come from Tell el-Farkha from the Central (a Lower Egyptian residence – see CHŁODNICKI & GEMING 2012) and Western Koms (a brewery complex and early Naqadan residence – see CIAŁOWICZ 2012ab), where clear organization of the settlement pattern and very early application of mud bricks show that the Lower Egyptian society was much more organized than it was supposed.

In comparison to information gathered thanks to settlements relevant cemetery data present a surprisingly poor picture. Burial customs of the Lower Egyptian culture appear to be simple, only creating its clear rules which were never fully followed. There is a bunch of such "rules" like: structurally simple pit inhumations of insignificant size (with a slight tendency toward growing in time) with bottoms inlayed with mats as the maximum of care; the obvious preference for the extra-mural burial custom; the preferable contracted body position on its right side with its head mostly oriented southwards.

Grave offerings were a practice known by the people of the Lower Egyptian culture but not always present. Generally, only ca. a half of the culture burials was equipped with any object, however, there is an observed tendency toward increasing popularity of the tradition together with the whole unit development. Apart from that, rich offerings seem to be a practice borrowed from other areas since it appeared as late as in the period of intensified Lower Egyptian-Naqadan contacts. Before, typical offerings had comprised a single pottery vessel from the commonly attested functional repertoire, frequently severely worn out. Objects of other categories also appeared in graves sporadically, however, they constituted rare discoveries, moreover, they were rarely of any significant value. A general rule seems to be local origin of all items accompanying burials. Studies by N. BUCHEZ and B. MIDANT-REYNES (2011) suggest that among the rather narrow repertoire of local pottery registered in Lower Egyptian graves especially characteristic lemon-shaped jars deserve special attention and thanks to their distinctive form and popularity they are even seen as cultural markers (*cf.* KÖHLER *this volume*). Also large Nile mollusks shells, which were probably used as containers, may have similar significance. The small number of grave goods does not allow to capture social stratification and is sometimes interpreted as a proof that the society functioned according to simple rules, without division into material groups. However, the picture looks much more complicated when compared with the data collected in the settlement in Tell el-Farkha (CHŁODNICKI & CIAŁOWICZ 2002: 60-70; 2004: 50; MĄCZYŃSKA *in press* ac), which strongly suggest the beginning of social differentiation with the moment when mud brick structures were introduced. As burial customs are popularly regarded as very conservative and change-proof, the evolution of social situation could not find its reflection in the grave tradition.

The archaeological sepulchral material does not reveal any particular care of the afterlife. Neither sophisticated architectural constructions nor significant number of grave goods were registered. The dead were buried directly in ground pits without care of any protection or tight body cover. Still, some issues are far from being explained, which may add some individual colour to the uncomplicated burial customs. One of these unanswered questions is the tradition of animal burials. Similarly obscure remains the purpose of the so-called pottery pits which were attested in cemeteries but cannot be directly attributed to any of the surrounding graves and therefore they are treated as independent structures. Presumably, both animal burials and loose human bones registered in settlement strata (*e.g.* on the top of a mound of ashes in Maadi), the so-called pottery pits and the presence of hearths in cemeteries compose particular elements of the Lower Egyptian tradition and enriched the burial customs as a whole. However, the actual importance of these elements is presently undefined and we must await future discoveries before they are eventually explained. It is likely that intensification of field research in previously archaeologically untouched areas would bring new comparative material.

2. Cemeteries in Northern Egypt from the period of Naqada IID2

In the period of Naqada IID2, that is with the terminal phase of the Lower Egyptian unit, the northern cultural picture was no longer as homogenous as before. Apart from settlement remains of the mature Lower Egyptian culture, in the archaeological material registered in the area appeared also Naqadan elements (Fig 1). However, the problem of the developed Naqada culture arrival in Northern Egypt and the process of the local unit supplanting or evolving into another cultural quality, is still far from being explained. The cultural situation in the Late Predynastic period is difficult to be properly assessed, because in the Delta only two cemeteries were precisely dated: Kafr Hassan Dawood (Tassie & van Wetering 2003: 502; Tucker 2003: 532) and Minshat Abu Omar (Kroeper & Wildung 1985; 1994; 2000). The case of Kom el-Khilgan (Midant-Reynes *et al.* 2003; 2004; Buchez & Midant-Reynes 2011) remains unclear since no burials were attributed to the particular period, although the cemetery was used during Naqada IIC and IIIA without undisputable hiatus period. The possible explanation may be the fact that at the rather poor necropolis all burials from the transitional phase were indistinctive because they contained no datable offering material. Another two well dated sites come from the distant Fayum area, that is Gerzeh (Petrie *et al.* 1912) and Abusir el-Meleq (Möller 1926; Scharff 1926).

Besides the above mentioned sites, a group of partially published cemeteries was registered in the area of Northern Egypt. Some of them were also imprecisely dated (in the Delta: Minshat Ezzat – El-Baghdadi 1999; 2003; el-Huseiniya – Krzyżaniak 1989: 271; Mostafa 1988ab; and Beni Amir – El-Hagg Ragab 1992; El-Moneim 1996), others merely general (et-Tibbin – Leclant 1973: 404; Gurob – Loat 1905: 2; Brunton & Engelbach 1927; and el-Bashkatib near Lahun – Petrie *et al.* 1923: 21-22 – outside the Delta), or even unreliable as Gezira Sangaha and Tell el-Ginn (Krzyżaniak 1989: 271). In addition, the material collected at the sites is mostly uncharacteristic – simple pit burials in a contracted side position, with bodies sometimes wrapped in leather and devoid of offerings – that is why it could probably date to some earlier or later periods and, thus, its cultural affiliation remains unclear. Nevertheless, the sites' presence itself proves that the cultural process was in progress, however, it does not provide information about its relation to the previously popular local cultural unit.

3. Focus on the Lower Egyptian sepulchral tradition in the late phase

Burial customs of the late phase of the Lower Egyptian culture are hardly recognized, although the phase is well attested at numerous settlement sites, where slowly but gradually local Lower Egyptian traditions were blurred and melted into the new cultural picture of the Delta in the period of Naqada IIIA. The only cemetery site attributed to the phase is Minshat Abu Omar Ib and, very tentatively, also II.[1] As MAO Ib is generally dated to Naqada IID, only a part of these burials (ca. 56% of early graves at the site) actually represents the late phase of the Lower Egyptian culture (see also Mączyńska *in press* b; *this volume*). Unfortunately, to precisely mark them off more studies have to be completed. The situation does not become clearer when the presence of other neighbouring cemeteries is considered.

Typical graves discovered in MAO Ib followed the same rules that existed in its previous phase – MAO Ia – that is contracted right side position of the deceased, with their heads turned northwards. The offerings were composed mostly of locally made pottery and some imported Upper Egyptian and Levantine wares, as well as limestone and travertine vessels, flints, cosmetic pallets, beads, bone spoons, harpoons and other, though not numerous, objects of bone and copper. Burials were deposited in simple oval or rectangular (1-1.5m in average length) and rather deep (from 0.6 to 3.2m) pits, described even as "shaft pits" (Kroeper 1988: 14).

It remains obscure, though, how far the Minshat Abu Omar data may be representative of the whole cultural unit since the site is the only (as it is presently accepted) Lower Egyptian cemetery dated to the late phase and the only one whose use was incessantly continued in the following period. It should also be considered that MAO II represents the actual cultural transition with continuation of major Lower Egyptian burial traditions and typically Naqadan pottery grave offerings.

4. The mysterious site of Kafr Hassan Dawood

The cemetery in Kafr Hassan Dawood is rather well known (Hassan 2000; Rowland & Hassan 2003; Tassie & van Wetering 2003; Tucker 2003; see also Rowland *this volume*), although still not entirely published. The deceased there were buried in simple oval and small pits dug in a sandy ground. The average grave dimensions were: 1-1.5 x 0.8m. The grave walls were only rarely plastered with mud. The fact that all these graves were simple in their form and infants were continuously interred in pots without offerings or any differentiation do not point to a complicated social structure of the community. The preferable body position was the contracted left side one with heads southwards. The offerings repertoire was rather limited and a set of typical grave goods was composed of a single pottery vessel and, much less frequently, of some other categories of items like cosmetic objects (among them simple stone palettes), personal ornaments or bone spoons.

[1] MAO II is hardly recognized (only ca. 2% of early graves at the site) and the major argument in favour of the suggestion is the continuing tradition of unchanged burials' form and bodies' position in comparison to MAO I.

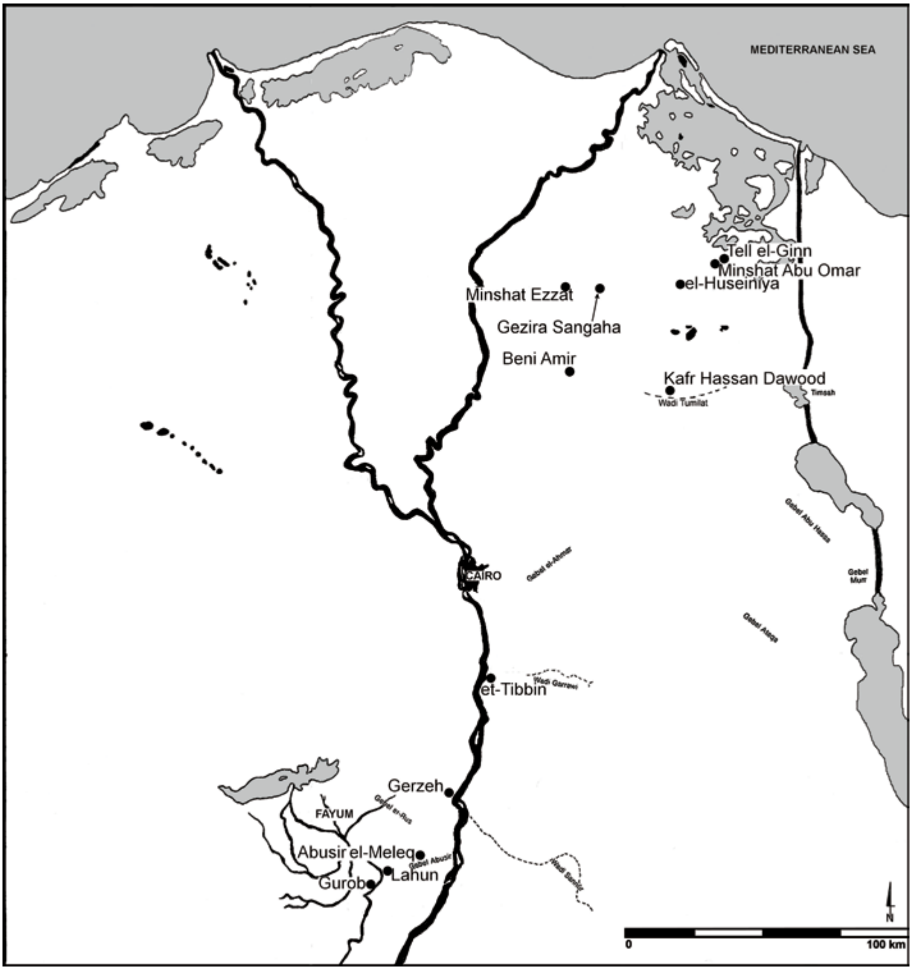

Figure 1. Northern Egyptian cemeteries in the period of Naqada IID2.

Data collected from the early phase of the site were usually supplemented by scarce observation made at other surrounding sites (such as: similar northward body orientation in Minshat Ezzat and opposite southward in Beni Amir) and together interpreted as examples of early Naqadan presence in the Delta. But, taking into consideration the fact that at the beginning of Dynasty 1 in Kafr Hassan Dawood were built large and richly equipped tombs for local elites (*e.g.* tomb no. 970 – Hassan 2000: 39; see also Rowland *this volume*) but without application of a single mud brick, the obvious scarcity of grave goods in the period of Naqada IID2 may also be seen as a manifestation of sticking to simple Lower Egyptian burial traditions. Then, it is possible that the upset of the rules illustrates the accommodation process of the incoming people to new conditions or the last expression of the stepping away native cultural unit, however, with the reservation that this is hardly sufficient material for such a discussion. In the light the phenomenon of surprising burials and offerings simplicity in comparison to the South can be explained in two ways. By continuation of local customs or the possibility that the early Naqadan settlers, who certainly were not conquerors, did not represent the elites of their culture and at the time were not wealthy or influential but rather immigrants in unfavourable position, thus in both cases, simple burials were the most suitable solution. The heralded by G.J. Tassie (*pers. comm.*) reinterpretation of the earliest materials from Kafr Hassan Dawood as of Lower Egyptian characteristics seem to perfectly suit the picture and can be very helpful for understanding of the complicated situation.

5. Early Naqadan presence in Northern Egypt

The earliest Naqadan cemetery in Northern Egypt is commonly accepted to be the eponymy site of Gerzeh (Petrie *et al.* 1912: 1-24). Although there are some discrepancies among scholars in the understanding of the site (see Buchez & Midant-Reynes 2011), it is generally believed the cemetery does not display features that could link it to any older type of human activity in the area of the Fayum oasis, so it is regarded (Wenke 1999: 316) as an early Naqadan intruder in the region.

All graves registered in the cemetery of Gerzeh represented the simple pit type – large and oblong or small and oval. All of them had been dug in sandy ground to the level of hard gravel which formed bottoms of the deepest burial pits, reaching up to 0.75m of depth. No remains of any actual grave roofing or strengthening other than mud plaster were registered. The deceased were eventually secured with a kind of coffin which was plastered with mud and filled in with earth and then covered with another layer of mud.

Every burial but three belonged to a single deceased, the exceptions were adults buried with infants and one grave with three adult skeletons. G.A. Wainwright (Petrie *et al.* 1912: 5) suggested in the final publication of the site that the majority of these cases had been mothers with their offspring, however, no detailed studies on the bone material were undertaken, therefore the sex of the deceased was left undetermined. Moreover, there are also doubts concerning age distinction, most probably done on the ground of simplistic size criteria of skeletal remains. We should keep in mind that if the term "infant" is fairly clear, more problematic is talking about "children". The beginning of childhood does not need explaining but its end is dependent on cultural phenomena. That is why we can only tentatively accept the number of 51 as burials belonging to small children. Even in such a case, G.A. Wainwright's assessment of infant mortality rate was surprisingly low. It has been estimated (Stevenson 2006: 14) that the typical childhood mortality rate was ca. 50%, that is much higher than 20.5% of burials from Gerzeh. Children were interred in pottery jars, in most cases devoid of offerings. There are, however, exceptions from the rule as grave no. 70 comprised a tiny child buried in a large pit furnished with 11 pottery jars, one stone vessel and a shell pendant. To explain the differences and the significantly low number of child graves, a selective burial practice is proposed (Stevenson 2006: 15).

Adults were buried in the contracted mostly left-sided position, the head turned northwards (of course, numerous exceptions were present) while for children the preferable position was also the left-sided one, however their heads were pointing South and North with almost the same frequency. A practice which was quite common was wrapping bodies in reed mats or eventually in cloths, no leather in this function was recorded. Wood was rarely preserved, in majority as a single stick placed along walls of a grave pit or beneath the deceased.

Among objects registered in graves of Gerzeh were: pottery vessels; stone vessels made of colour limestone, colour granite and basalt, porphyry, brown alabaster/travertine and dark serpentine; model vessels made of stone and pottery; beads and pendants from necklaces made of meteoric iron (Rehren *et al.* 2013), gold, carnelian, agate, chalcedony, sard, steatite, calcite, limestone, lapis lazuli, turquoise and onyx; zoomorphic, shield-shaped and round cosmetic palettes sometimes decorated as it was with the so-called "Hathor-palette" (see Stevenson 2006: 41-42); very few flint knives also ripple-flaked and a single fish-tail; ivory spoons and pins; a pottery cow horn model, stone balls (so-called "marbles", which may possibly be tokens used as elements of an early counting system) of granite and limestone; a copper bowl and finally a pottery rattle. Green ore malachite probably used as green dye was also quite popular in the Gerzeh graves, other colours obtained thanks to galena and kohl were registered in a part of richer burials, therefore it seems possible they might have been regarded as having underlined some specific status. The richest grave (no. 67) in the cemetery belonged to a young individual who was equipped with unique iron beads, the only registered pieces of weapon (a pear-shaped mace head of limestone and a copper harpoon), one cosmetic palette of greywacke and the only ivory vessel known from the site (Petrie *et al.* 1912: 5).

281 graves from the site comprise material wide enough to preserve some ritual activity remains. The most imagination firing are those examples associated with body mutilation practices (Stevenson 2006: 58-63). In the above-mentioned grave labeled no. 67, the deceased's head had been parted from the rest of the body and left on its base, while quite an impressive necklace with golden beads was found still on the neck. Grave no. 251 belonged to an adult devoid of the head and offerings. The owner of grave no. 260 had been buried on the back, but the head was lying face down to the ground. In graves nos 123, 137, 138, 142, 187 and 284 absence or rearrangement of some body parts as feet, hands or pelvis was noted. Finally, in grave no. 206 adult bones had been piled in the centre of the pit. The first three examples are most likely to be interpreted as some ritual body mutilation practices, the latter example can be easily explained as a secondary burial, while the remaining ones may be incomplete well due to post-depositional intrusions.

A somehow reverse phenomenon, but still related to unexplained practices of body treatment, are graves where only fragments of skeletons (according to G.A. Wainwright's disputable identification) were registered. These are the cases of graves nos 40, 61, 71, 95 and 281. There, pieces of skulls and phalanges were discovered in pots that had been meant as funerary goods of the main grave occupant (Stevenson 2006: 23). In the context, a unique structure, labeled as grave no. 108 (Petrie *et al.* 1912: 8), is also worth mentioning. There, the only discovered human bones were a few phalanges, while the whole pit was full of ashes and charcoal. The structure could have possibly played the function of a hearth related to burial custom rituals, which are presently undefined and obscure, however, since we have no more data, the actual function and significance of the structure remain unknown.

Ritual related activity may also be reflected by observations made in graves nos 11 and 263. In the former, some linen had been wrapped around bones of a young individual, while in the latter an adult body was found with thick pads of fabric that covered his/her hands and pelvis. These two examples are sometimes quoted as the beginnings of mummification (Stevenson 2006: 19), tentatively comparable with discoveries made at Hierakonpolis (Jones 2002).

Thus, Gerzeh appears to be a site composed of structurally simple graves but, what is interesting, rather wealthily equipped with a relatively wide range of functional objects, including those of personal use, frequently made of precious material. And although some pottery types are similar to those known from the native Delta context, the general abundance of diversified offerings, as well as remains of some ritual activity point to another, not Lower Egyptian, tradition.

6. Abusir el-Meleq – a perfect Lower Egyptian-Naqadan coexistence?

In the period when the presence of the first Naqadan settlers was gradually becoming a normal element of the Delta cultural picture, that is NIID2, ca. 300km south, in the Fayum oasis area a cemetery in Abusir el-Meleq (Möller 1926; Scharff 1926) was founded. Except for Gerzeh (at the end of its occupation), small Gurob and a single, uncharacteristic and very widely dated burial from el-Bashkatib near Lahun (Petrie *et al.* 1923: 24), no other traces of burial practices were registered in the region. It is surprising that the burial customs from Abusir el-Meleq seem very homogenous. The total number of graves registered at the site reached at least 850, which forms quite reliable material for statistical analyses.

With only a few exceptions a consequent preference towards the contracted left-sided position (99%) with heads turned southwards (98.75%) and facing west (98.45%) was observed. The majority of identified bones belonged to infants and small children (40%), and the remaining 35% and 16% were males and females, respectively (Castillos 1982: 155). Pottery coffins were found in four graves, three of which contained child burials. In addition, only a single wooden coffin was registered at the site (Seeher 1999: 92). Graves were simple pit burials, oval or round in their shape, sometimes partially or thoroughly plastered with mud; however, the more structurally sophisticated type of rectangular pits lined with mud brick predominated. Few graves of the latter construction type were divided into two chambers – an actual burial one and the other of storage function (Scharff 1926: 108-165). The average depth of burials in Abusir el-Meleq was 0.8-1.2m and total dimensions of majority of them were 0.7-2.26m of length and 0.45-1.3m of width. The largest structures were 3.19m long and 1.7m wide. Remains of wood and mats were interpreted as internal wall lining and ceiling constructions. 15 graves clustered in the northern part of the site comprised a sort of mud brier where the dead with grave goods had been placed.

As far as it can be estimated in the situation when numerous burials were robbed in the antiquity, jars representing the wavy-handled type usually stood near the deceased heads while large storage vessels near the feet. Animal bones registered within graves were interpreted as food offerings. The most precious objects were usually found close to the deceased hands or over the body. Vessels and large flint knives were often broken before they were interred.

Grave goods were diversified and composed mainly of pottery and stone vessels. The remaining articles were: miniature vessels of ivory, shell, horn, faïence and copper; personal adornments, such as beads, pins, bracelets (one with relief decoration representing a serpent, others with crocodiles) and cosmetic objects like spoons, sticks, combs – frequently made of bone and decorated. Also the majority of cosmetic palettes were decorated examples. Among other objects copper tools, six pear-shaped mace heads and animal figurines should be mentioned. Grave no. 1035 revealed a cylindrical seal made of ivory and decorated with three rows of animals (Scharff 1926: 65-70; Seeher 1999: 92-93).

In general, the cemetery in Abusir el-Meleq is wealthier than the ones already mentioned, however, it should not be disregarded that the site was also a bit younger and the more affluent furnishing practice might result from the difference in dating and reflect the general development direction of burial customs registered in the Delta.

As the archaeological material suggests, the considerably far distance of Abusir el-Meleq from the Delta did not have any influence on the differences that arose between these two regions. And thus, a conclusion can be drawn that the cultural picture registered in the eastern Delta was not of local character and should be regarded as the actual view of the general situation of the period. The Abusir el-Meleq publication proposes that people buried in the cemetery represented two different types which should belong to descendants of the local Lower Egyptian cultural unit and more robust Naqadan newcomers. At present, the problem is that the anthropological examination was done at the beginning of the 20th century and therefore, the data is not fully reliable, now, on the other hand there is not enough comparative material for such a study. From the physical anthropological point of view the question remains unsolved, however, if the two distinct groups of people really existed it would perfectly suit the theory about mutual merging of the outgoing Lower Egyptian culture and the North expanding Naqadan formation.

There exists a general agreement that the transitional phase of the Lower Egyptian culture is of key importance for the proper understanding of the process of Egyptian cultural unification. It is also clear that our present knowledge is far from satisfying, but field research of last 20 years bring more and more elements of the puzzle. Sepulchral material is burden with conservatism, packed with attachment to ancestors' traditions, however, when changes can be finally seen – and the discussed material shows they are slight, prolonged and discreet, but visible – at the same moment they mark deep cultural evolution of a society and its people way of thinking. Analyzing burial traditions of Northern Egypt, we find another proof for the importance of the native local culture with its wide range, openness to other people and probably also high tolerance and acceptance of their otherness. The reevaluation of Minshat Abu Omar, which for many years was treated as a bright example of originally Naqadan presence in the far Eastern Delta, shows that the formerly admired Naqadan conqueror might have been in fact conquered by the peasants and tradesmen from the Delta, who largely contributed to the Egyptian culture.

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Ashqelon during the EB I period – a centre for copper processing and trade

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Ashqelon is found on the eastern Mediterranean seashore, on the southern coast of Israel (Fig. 1). The Early Bronze Age I (henceforth EB I) site comprises to date one of the largest and most intensively excavated EB I occupations in the southern Levant. Accelerated development in the Ashqelon region, conducted primarily since the early 90's and until today, has brought about numerous rescue excavations at the site, the majority of which have been undertaken by the Israel Antiquities Authority (Baumgarten 2004; 2006; Brandl & Gophna 1993; Braun & Gophna 2004; Gophna 2004; Golani 2004; 2005; 2007; 2008A; 2008B; Golani *in press*; Golani & Paran *in press*; Haimi 2009; Khalaily 2004). These excavations have uncovered remains of a large and sporadic settlement of the EB I period that is spread out in a wide swath, at least one kilometer wide, parallel and adjacent to the coastline, from Tel Ashqelon in the south to at least five kilometers northwards parallel to the coast (Fig. 2).

Although the ancient topography of the site has undergone tremendous changes due to a thick overburden of sand dunes and modern development, the EB I settlement was apparently situated within a natural geographical 'trough', a shallow and elongated depression formed between two parallel inland kurkar stone ridges that run parallel to the coastline. Within this area, a distinct ecological niche was found wherein fertile soils, a high water table and varied flora and fauna, created a self-contained 'subsistence area' of distinctive character where a specific pattern of agricultural subsistence was exploited throughout the EB I (Gophna 1997).

The site is composed of several non-nucleated patches (Fig. 2) whose chronological range spans the entire EB I period of the southern Levant, contemporaneous with the beginning of the Egyptian middle Predynastic or Naqada I period, to the end of the Protodynastic period. The numerous excavations conducted to date have revealed a wealth of information. Part of this data includes a large assemblage of radiocarbon

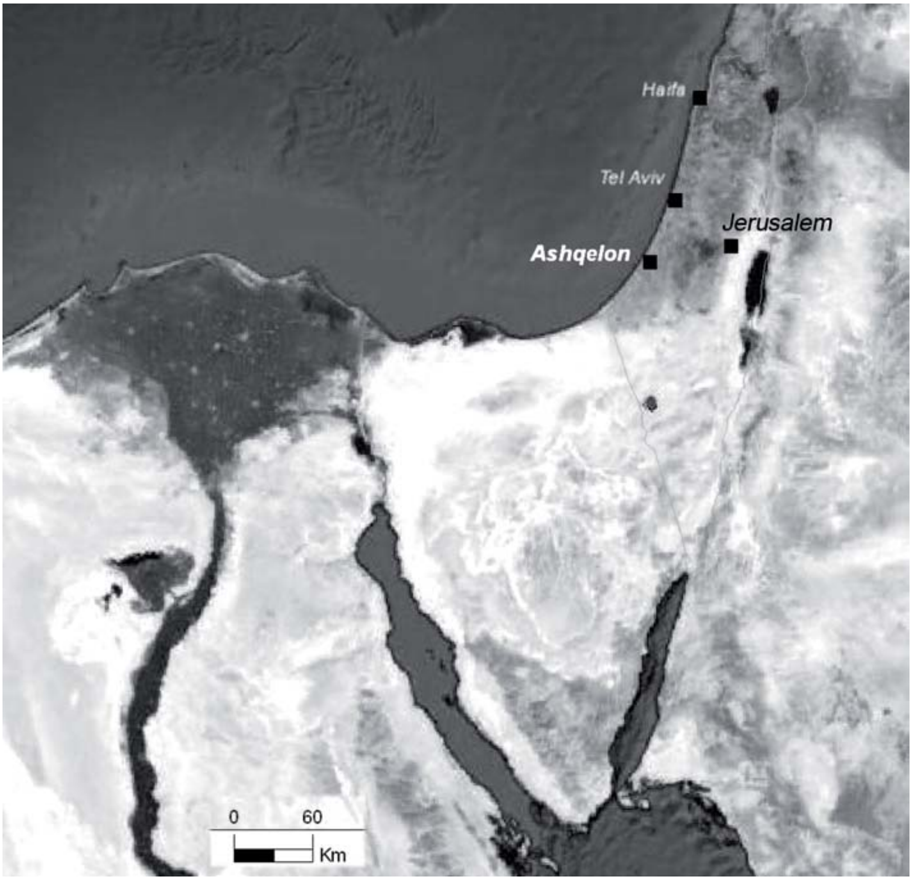

Figure 1. Location of Ashqelon.

dates from various excavation areas (Fig. 3) that show a continuous occupational sequence spanning nearly a thousand years, from the earliest stages of the EB I period in the first quarter of the fourth millennium BCE, all the way to its very end at the beginning of the third millennium BCE, when the site was abandoned. These dates, along with the material cultural remains that are characteristic of the EB I in southern Canaan (Golani & Segal 2002), posit Ashqelon as one of the earliest and longest-lived EB I occupations in this region (Golani 2013). The period in question, contemporaneous to much of the Naqada period in Egypt, is important as it marks not only the development of trade and cultural contacts with neighboring Egypt, but in its later portion, also includes the transition from a village-based to an urban-centered society in the southern Levant.

The reason for the intensive EB I occupation at Ashqelon is two-fold: 1) a high groundwater table that is easily accessible through digging of shallow wells (Gophna & Liphschitz 1996: 145; Nir 2008) and 2) the position of Ashqelon on the western side of

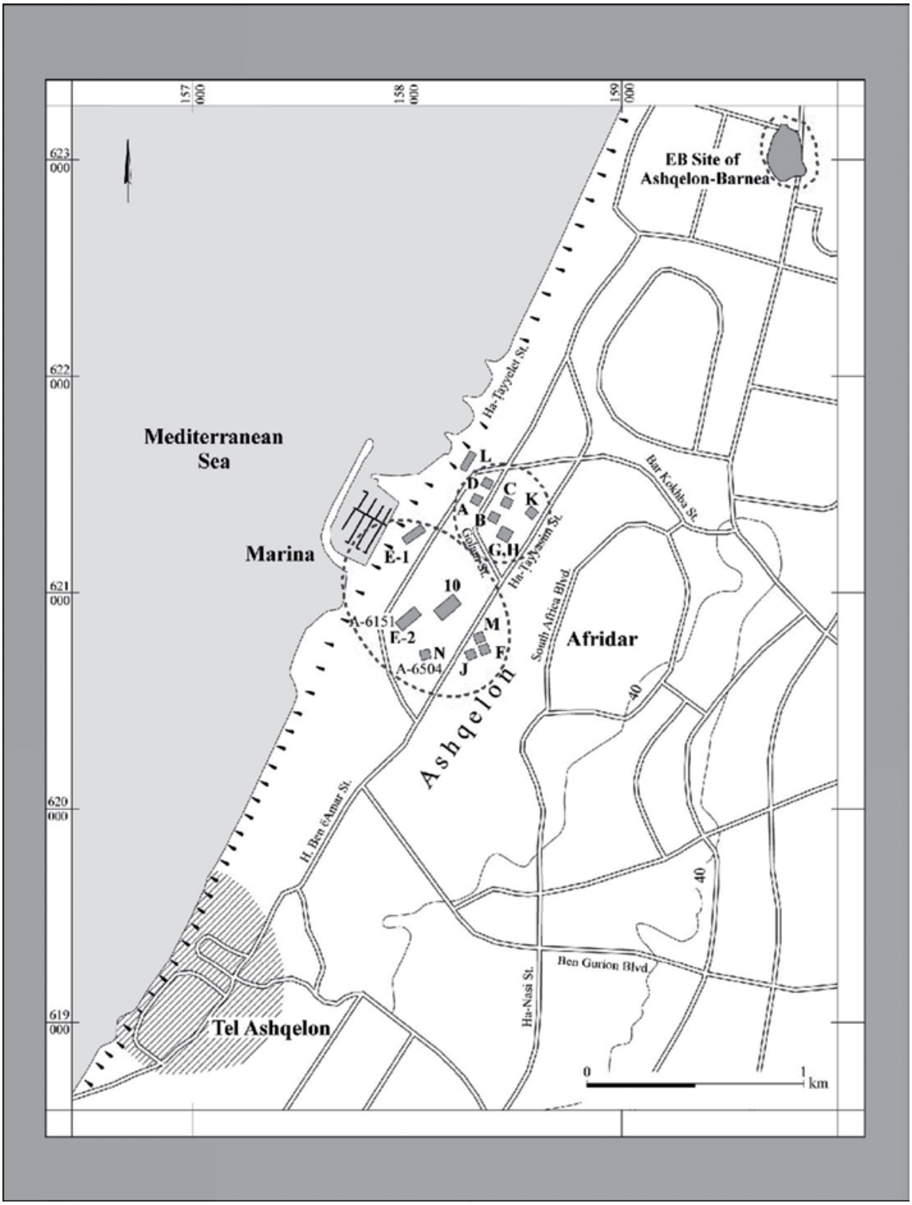

Figure 2. Location of EB I excavation areas at Ashqelon and habitational ‚patches'.

a break in the sand dunes that constrict this area to the east, allowing easy access from the inland regions to Ashqelon on the coast. The direct access to the coast apparently made Ashqelon an important entrepôt for maritime and land trade throughout the

EB I (GOPHNA 2002). Increased precipitation, rising groundwater and the formation of marshlands due to inadequate drainage apparently caused this region, as well as much of the coastal plain in Israel, to be largely abandoned from the onset of the EB II period at around 2900 BCE (FAUST & ASHKENAZY 2007).

The extensive excavations at Ashqelon revealed architectural remains of the EB I period that included numerous examples of building units typical of the southern Levant during this period (BRAUN 1989; GOLANI 1999; GOLANI & YANNAI *in press*). Curvilinear architecture of stone, yet more commonly of mudbrick, is present from the earliest phases of occupation at the site. The scale of the excavations enabled large lateral exposures that showed many of these buildings to have been incorporated within walled compounds that also included circular storage structures (GOLANI 2005; 2007; 2008a; GOLANI & YANNAI *in press*). The compounds were separated by alleyways and open spaces. This form of spatial organisation in which domestic and storage structures are found surrounded by an enclosure wall is also present at the earliest stages of settlement at the site.

The excavations produced an abundant ceramic repertoire of the EB I period (*cf.* YEKUTIELI 2000) that also included imported Egyptian pottery as well as locally-made ceramic vessels made in the Egyptian tradition. In addition, the excavations produced numerous flint tools, some of which also appear to have been imported from Egypt, as well as a wealth of groundstone vessels, the majority of which were made of basalt that was imported to the site as finished vessels. The fact that at least during the later stages of settlement at the site, over 50% of the groundstone vessels were made of imported basalt stone is a clear indication of the volume of trade in which Ashqelon was involved and the relative wealth of it's inhabitants (ROSENBERG & GOLANI 2012).

Numerous infant burials were also revealed during excavations as well as secondary burials of adults in attached stone cists, a relatively rare mortuary custom (GOLANI & NAGAR 2011). The faunal remains from the excavations also comprise one of the largest assemblages of this period excavated to date. The assemblage typically includes sheep/goat, cattle and pigs, yet has also revealed an unusually large percentage of domesticated donkeys that are evidence for increased use of these pack animals for overland trade (HIZMI 2004). The excavations also produced a large assemblage of molluscs and fish remains, some of which, such as *Chambardia rubens* and Nile perch (*Lates niloticus*) were also apparently imported from Egypt (LERNAU 2004).

THE METALLURGICAL INDUSTRY AT ASHQELON AND THE MANNER OF ITS ORGANIZATION

One of the most intriguing aspects of the large EB I settlement at Ashqelon is the abundant evidence of a metallurgical industry that apparently processed semi-refined copper into tools. In nearly all the areas excavated to date were found small rounded fire-pits, often lined with small stones (Fig. 4). Such pits were found in concentrations or as singular installations in open areas and adjacent to domestic buildings. The earth

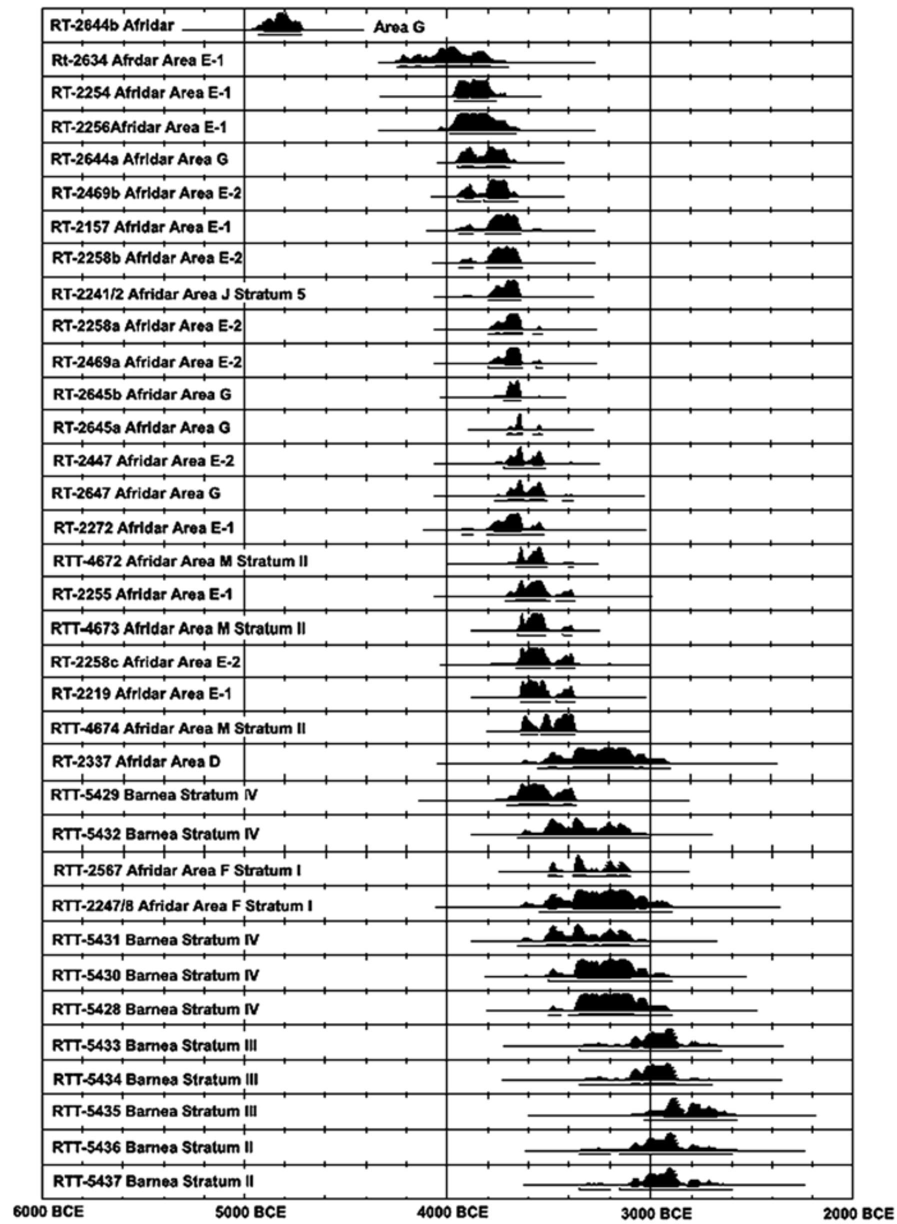

Figure 3. Radiocarbon Dates from EB I excavation areas at Ashqelon.

around these fire-pits was often found to have been baked by heat and within these small pits, a white-coloured ash was revealed that originated from burned plant matter (Shalev 2003). Adjacent to these small fire-pits, large flat stones were often found (Fig. 4) that may have been used for grinding and pulverising, while in addition, large amounts of burnt mudbrick material were found in the immediate vicinity. Notable is the total lack of copper ore itself, such as malachite, not found in any of the excavations at Ashqelon or on any of the stones from the site supposedly used for grinding or crushing.

The connection of the fire-pits to a metallurgical industry was provided by large amounts of copper slags, copper lumps and droplets, as well as fragments of broken clay crucibles along with burnt ash and mudbricks that were found strewn on the ground or dumped within other, larger storage pits of cup- or bell-shaped form that were dug into the ground in the immediate vicinity that were re-used as refuse pits. These items all appear to have been the waste products of an intensive copper production process.

The manner in which the fire-pit installations functioned may be reconstructed as follows: a shallow circular cup-shaped pit was dug into the earth and lined with small stones on the inside. Around the pit, a low circular wall of mudbrick was formed, creating a small circular chamber that was open at the top and partially submerged into the ground. At the bottom of the pit-chamber was placed a crucible, consisting of a small roughly-formed hemispherical clay bowl that was filled with refined/semi-refined copper. The chamber was then filled with hot coals atop the crucible that were then heated using air blown in through *tuyeres* fashioned from reeds and clay. The intense heat caused the copper to melt and sink to the bottom of the crucible, while other minerals were left at the top, often spilling over the top of the crucible. The latter were recovered as slag. The entire apparatus was then left to cool off, after which it was broken up and dismantled, the crucible was broken, and the copper at its bottom was removed for further processing. No exit hole for excess slag was found within these installations. The slag, which apparently remained within the installation, was removed at the end of the process. Similar smelting installations are common during the Chalcolithic period (Golden 1998: fig. 8.20). This was a primitive though effective process that also produced large amounts of industrial waste which was very apparent in the excavations.

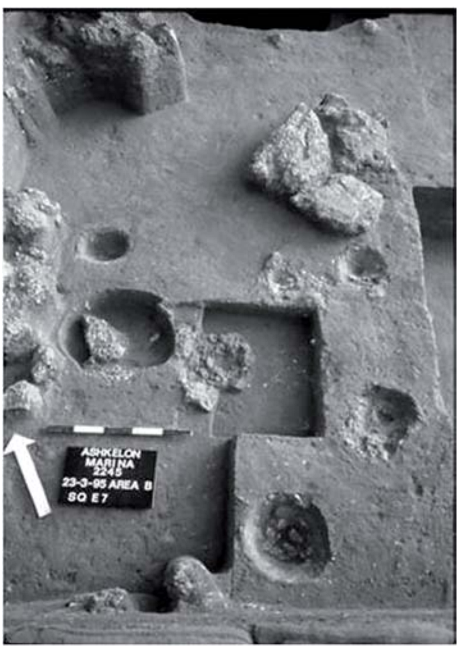

Figure 4. A concentration of fire pits uncovered in Area E-2.

Such installations, all apparently connected to the processing of copper, were found already in the earliest stages of the site's occupational history beginning around 3800-3700 BCE and continued to have been in use until its end. At a somewhat later stage, after 3500 BCE, the metallurgical activity was also found concentrated within walled compounds positioned alongside of other, domestic compounds and separated from them by alleyways. The industrial compounds were identified as such because of the large amounts of industrial waste and metallurgical installations found within them and their lack of domestic buildings and circular storage structures that were typical of domestic compounds that were also revealed at the site. This concentration of industrial activity in walled compounds is significant as it marks a distinct change from a localised or individual ‚cottage industry' copper production that is characteristic of the Chalcolithic period to a more concentrated and focused production mode (Shalev 2003: 322) that was possibly controlled by a strong kinship group or corporate administration within the site that wished to separate its activities from those of others.

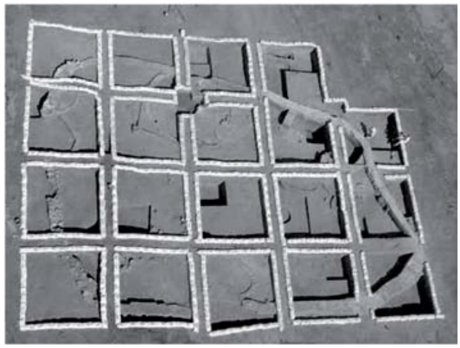
Figure 5. An industrial compound from Ashqelon Barnea

One of these industrial compounds was completely excavated, revealing an irregularly-shaped area surrounded by a mudbrick wall encompassing 270m^2 (Fig. 5). Two entranceways screened off with mudbrick partitions were revealed in the south and east. To the west and facing the sea was an area where intensive burning took place while the remains of more melting installations were found scattered within the compound. In and around this region were found numerous burned mudbrick fragments and ash, copper slags, prills and crucible fragments.

The products of all this metallurgical activity were numerous yet limited in variety. They consisted primarily of various awls, pins and needles in addition to axes and occasional knives or dagger blades and copper strips of unclear function (Figs. 6-7). Most of these are utilitarian tools typical of the EB I period. Completely lacking in the repertoire of products were various metal objects of cultic nature such as maceheads, crowns and sceptres that are well-known in the copper industry of the preceding Chalcolithic period. Though Chalcolithic metal technology continued into the EB I period (Shalev 1994), one of the major differences between the two periods is a clear shift towards the production of utilitarian tools and the virtual lack of cultic metal objects. This appears to reflect one of the major changes that characterise the EB I as opposed to the Chalcolithic period; namely, the transition to a market or trade-oriented economy.

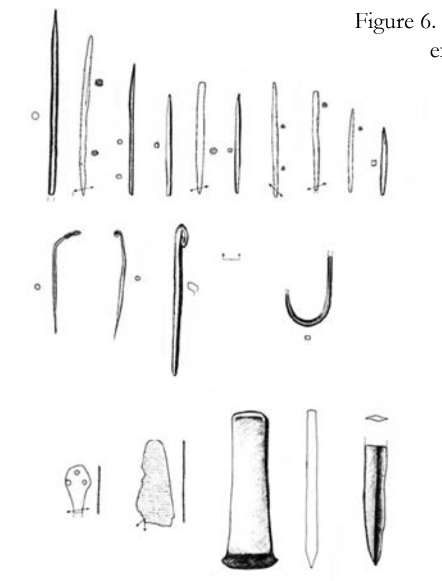

Figure 6. Various copper tools recovered from excavations at EB I Ashqelon.

Figure 7. Copper awls from EB I Ashqelon.

These same types of utilitarian products are known from contemporaneous sites in pre-dynastic lower Egypt as well. At Tell el-Farkha and Ma'adi, knives, axes, awls and distinctive loop-ended pins, identical to those found at Ashqelon, were found as well (Czarnowicz 2012a: figs. 1: 2, 4; 2: 1, 5; 4: 1-4; Rizkana & Seeher 1989: pls. 3: 10-23, 4: 6). This of course raises the question of whether these items from lower Egypt were Levantine imports or whether they were Egyptian products, possibly paralleled in the Levant at the same time.

Metallographic analysis on some of the Ashqelon items was undertaken by the Israel Geological Survey (Segal *et al.* 2004). However, this was only done on a very limited amount of copper items from the very early phases of the copper industry at the site (Areas E and G at Ashqelon Afridar). The analysis showed a very limited use of the lost wax method that was well-known in the Chalcolithic period. Most of the tools, such as awls and axes may have been made by pouring the molten metal into open moulds, then further working by hot or cold forging processes into finished tools. Though assumed, at present, none of these supposed moulds has yet been found at Ashqelon. These may have been made of clay that had disintegrated. Some of the tools, such as the awls, could also have been made by cutting a chunk of copper and working it into the desired shape by hot or cold forging. Square-sectioned and round-sectioned awls were found made by two slightly different methods; after open casting, the square-sectioned awls and an axe were found to have undergone a stage of incomplete hot mechanical forging and a further stage of mechanical cold forging which gave them a greater hardness than round-sectioned awls. After open casting, the round-sectioned awls underwent only incomplete hot forging, which made them less durable than square-sectioned awls. Square and round-sectioned awls were once thought to be indicative of the EB I and the Chalcolithic periods respectively (Sebbane & Ilan 1989) but at Ashqelon they are found together in the same occupational strata and appear to have been produced in different levels of hardness, possibly for different functions.

The sources of Ashqelon's copper

On these same items, metallurgical analysis of lead isotope ratios and their comparison to those known from the copper ores of Feinan in southern Jordan, Timna in southern Israel and those of Sinai (Fig. 8) has shown greater similarity to the ores and slags from Feinan and Timna, positing these regions as a likely source for the copper industry at Ashqelon. However, these analyses were done on only a very small selection of objects dating to the very initial stages of settlement at Ashqelon and further testing of objects from later stages of settlement should be done to gain a more complete picture.

The region of the Arava between the Dead Sea and the Red Sea has been extensively investigated and is well-known for its rich copper deposits that have been mined for copper since the Chalcolithic period or even earlier (Rothenberg 1999). Copper mining and smelting during the Late Chalcolithic and the beginning of the EB I period is known primarily from the region of Feinan region, also known as Wadi Fidan (Adams & Genz 1995) and from the region of Aqaba on the Red Sea, near to which are the sites of Timna (Rothenberg & Glass 1992), Tall Hujayrāt al-Ghuzlān and Tall al-Magass (Eichmann *et al.* 2009; Khalil 2009; *cf.* Shalev 1994: 633-636 for summary and references). During the second half of the fourth millennium BCE and nearing the end of the EB I period, remains of mining settlements are known from the sites of Feinan 17 (Hauptman & Weisgerber 1992) and Feinan 100 (Wright *et al.* 1998). The latter site also produced remains of open casting moulds as well as crucibles. In the regions of Timna and Feinan, numerous mines have been identified associated to copper working installations and quantities of slag bear witness to copper smelting near the mining sites themselves. These, however are often difficult to date as the mining technology itself was essentially the same in both the Chalcolithic and the Early Bronze Age and datable remains at the mining sites are extremely meager. However, Shalev (1994) has suggested that as copper production in the Chalcolithic period is typified by a distinct structure of craft specialisation at all stages of production, probably by the same people who mined and then smelted the copper ore after transporting it to the village production sites; that of the EB I period is marked by specialisation at each stage of the production process wherein initial smelting of the copper ore was carried out near its source. Golden (2002) has also noted that the transition from the Chalcolithic to the Early Bronze Age is marked by a reconfiguration of production locales; initial smelting during the EB being carried out in the mining area itself.

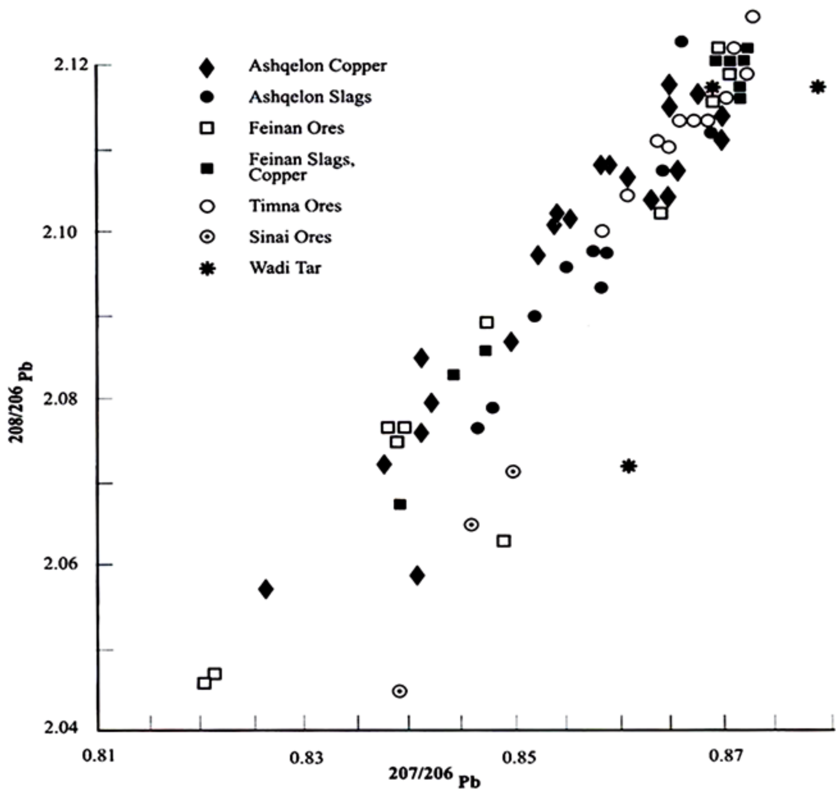

Figure 8. Lead isotope analysis of selected copper objects from Areas E and G at EB I Ashqelon, Afridar.

Moving the goods: Ashqelon and copper trade during the EB I

At Ashqelon, no remains of copper ore were found in any of the excavations. Furthermore, analysis of the copper slags from Ashqelon revealed a very high copper content (Segal *et al.* 2004), much higher than would be expected if the copper was initially refined from ore itself. Transporting semi-refined copper is more economical than transporting a much larger amount of raw ore over long distances. In addition, working the copper ore into finished copper tools would have required a large amount of fuel for burning, and the Feinan and Timna regions have only sparse vegetation. The conclusion, in line with Shalev's analysis, is that copper ore was probably smelted near the mining areas, and was then transported overland to Ashqelon as ‚black copper' or as copper ingots that were then further refined at the site to remove the remaining impurities and then cast and worked into tools (Fig. 9). This clear division of labour and specialisation posits the mining and refining sites as the first station in a developed network.

Two sites in the Timna region, Tall Hujayrāt al-Ghuzlān and Tall al-Magass in Jordan, may be excellent examples of mining settlements dated to the earliest stages of the EB I period, or the second quarter of the fourth millennium BCE (Klimscha 2009: figs. 1-4). The excavators have determined that the sites could have supported several hundred people a year, while the various finds clearly indicate that the inhabitants were involved primarily with copper mining and smelting during the first half of the 4th millennium BCE (Eichmann *et al.* 2009; Hauptmann *et al.* 2009; Khalil 2009). It is notable that both sites have produced copper ingots and ingot moulds, conclusive evidence of on-site copper production, yet no ingots or ingot moulds have been found to date at Ashqelon. This is further indication that at Ashqelon, copper processing into tools was probably done from complete ingots of pre-smelted copper or from semi-refined copper. Examples of such ingots are also known from Ma'adi already during the early stages of the EB I (Rizkana & Seeher 1989: pl. 4: 9-11, I: 9-11), suggesting that they may have been imported to the site as valued raw material.

Mining and initial processing of copper ore in southern Jordan and Timna may have been just the initial stage of a developed copper industry and trade network that moved semi-refined copper and or copper ingots from the south to Ashqelon for final production into tools or further distribution of the ingots as raw materials. This could have been done by overland donkey caravans and during the EB I, numerous ceramic figurines of domesticated donkeys attest to their intensive use as pack-animals for transport (Hizmi 2004). The remains of numerous sites of the EB I along a land route running through northern Sinai certainly indicate overland traffic between Egypt and the southern Levant (Oren 1973; Yekutieli 1998). The faunal assemblage at Ashqelon revealed an exceptionally large amount of donkeys, up to 20% of all the fauna in some of the excavated areas, and this evidence suggests Ashqelon as a terminal point for donkey caravans during the EB I. Ashqelon could have functioned as a staging area for such caravans coming to the site laden with copper and leaving with copper and copper tools towards Egypt via northern Sinai or by ship as well.

At Ashqelon, the identification of industrial compounds devoted to processing and refinement of copper, alongside of domestic compounds, now enables a better understanding of metallurgical activities alongside of domestic ones. As of now, these industrial compounds appear to have been a phenomenon of the later portion of the EB I period only. In general, the study of spatial organisation is often difficult due to the small scale of most excavations. However, in the present case, the large-scale lateral exposures at Ashqelon now make this a possibility. What is clearly apparent is that the metallurgical industry at Ashqelon during the EB I was certainly not a small-scale ‚cottage industry' devoted primarily to the fabrication of tools and various prestige items as known during the Chalcolithic period, but during the late EB I at Ashqelon, was a well-organised large-scale industry geared towards the production of utilitarian items for redistribution and sale. The metallurgical industry at Ashqelon was probably able to produce above and beyond the needs of the local population of the site, suggesting that it was primarily export-oriented. This goes hand in hand with our present understanding of the late EB I period in the southern Levant as one of expanding trade contacts and the creation of an economic bureaucracy leading to the rise of an urbanised society.

Ashqelon, Egypt and the copper trade

Much has been written about the nature of Egyptian-Canaanean relations during the late EB I. The presence of Egyptian artefacts such as imported ceramics, flint tools and molluscs, pottery made in the Egyptian tradition, ceramics such as bread-moulds that also indicate Egyptian-style food production probably by Egyptians, various *serekhs* and architecture made in the Egyptian tradition all appear to show clear Egyptian contacts if not an actual Egyptian presence. As is generally agreed, this could have taken the form of exploitive colonisation or even outright conquest, yet the presence of Canaanean products in Egypt at the same time also indicates that these were bi-lateral relations. As the list of clearly imported Egyptian items found in southern Canaan is a limited one, we may ask what were the Egyptians receiving from Canaan?

Just as a clear Egyptian presence is found in southern Canaan, the Canaanite presence in Egypt is also clear. The presence of Canaanites in the Nile Delta can probably be documented at Ma'adi (Watrin & Blin 2003) with the appearance of typically Levantine curvilinear architecture with clear parallels in Canaan during the EB I (Golani 1999) as well as with Levantine pottery, such as that found at Tell el-Farkha (Czarnowicz 2012b). In addition, curvilinear architecture is also known from Tell el-Farkha during the predynastic period (Chłodnicki 2012: figs. 16, 19; Ciałowicz 2012: fig. 5) at the same time when it was most common in the southern Levant during the EB I, suggesting shared use of Levantine architectural traditions.

Imported Canaanean jars, such as the hundreds of such vessels found at Tomb U-j (Dreyer 2011) and their clear association with wine is generally considered one of the main parameters for what was moving from Canaan to Egypt, yet the wine, and most probably the jars as well, appear to have been restricted to the Egyptian elites. Conclusive evidence of any other types of produce is difficult to pinpoint and even the Egyptian predilection for beer making, as has been uncovered at Tell el-Farkha (Chłodnicki *et al.* 2012), does not appear to have been an export to the southern Levant, as the Canaanites may have preferred their own wine to imported beer. I suggest that one of the main articles being traded to Egypt from the southern Levant was copper and copper tools.

This suggestion opens up interesting avenues for future research. As metallurgical analysis of copper tools from Ashqelon has so far been carried out only on a small selection of items that are all associated to the very early stages of the EB I settlement, other metal artefacts from later occupational stages at the site should be tested to see if they also originated in southern Jordan and if there were other sources as well. This

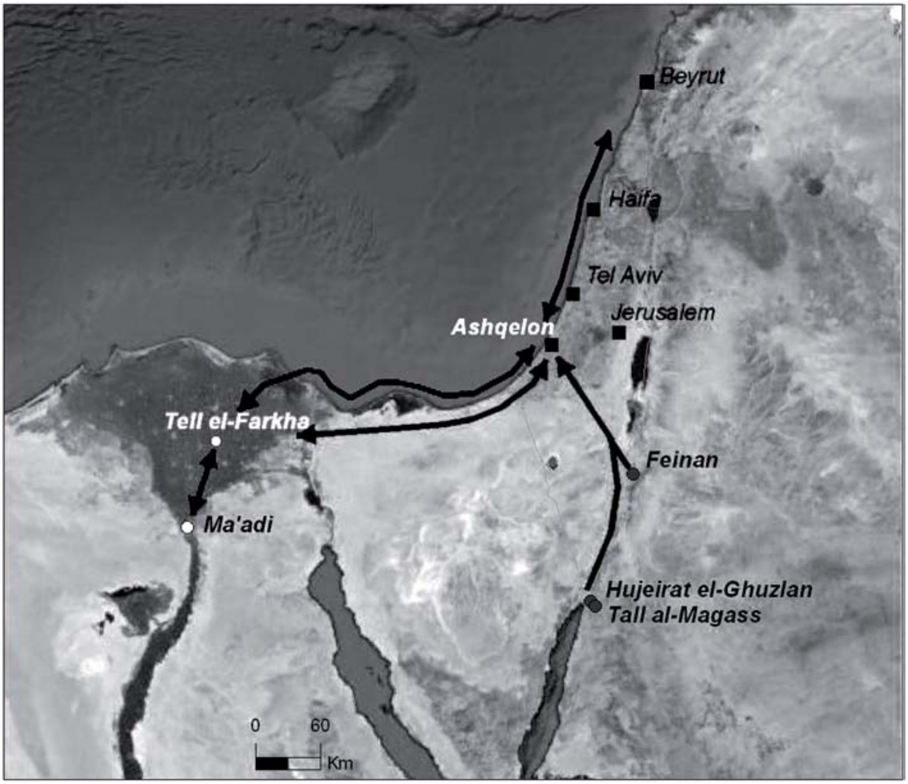

Figure 9. Suggested overland route of copper from the Arabah to Ashqelon and beyond.

is important in anchoring the suggested trade network that apparently existed between southern Jordan and Ashqelon during the EB I period and in exploring the connection of Ashqelon with other mining centres and trade routes as well. Recent research on a selection of copper tools from Tell el-Farkha has indicated the source of the copper to be found in Feinan and southern Sinai (see Rehren & Pernicka *this volume*). While copper from Feinan could probably have arrived to Egypt via Ashqelon, that from Sinai suggests a different trade route from the south, originating from Sinai and leading to the Nile delta via the gulf of Aqaba or the Egyptian eastern desert.

Another question concerns where the copper tools were exported to. Future research on metallurgical remains in pre-dynastic Egypt as well as contemporaneous sites in northern Israel and Lebanon should examine the source of the copper tools and the manufacturing methods in order to pinpoint production centers or conversely, to examine if different technological industries or manufacturing centres existed at the same time. Remains of metallurgical activities at the Halif Terrace, not far from Ashqelon, and Tell es-Shuna in Jordan suggest that centralized copper processing was being carried out at these sites as well during the EB I (*cf.* GOLDEN 2002; REHREN *et al.* 1997). If direct trade of copper and copper tools can be established between the southern Levant and Egypt, it may be worthwhile to examine what was its scope and nature; what could have been traded in return and if this was this a maritime or an overland route (possibly both). At present, copper production does not appear to have been a major component in Egypt during the pre-dynastic period and Egypt does not appear to have had significant copper deposits that were ever mined. Though the excavators of Ma'adi do report the presence of copper ore at the site, they also state that this was ore with low copper content that they assumed was only used for pigmentation (RIZKANA & SEEHER 1989: 17). Remains of copper processing in Egypt are more likely representative of working processed copper into tools, as suggested by the presence of copper ingots at Ma'adi and by the presence of typically Egyptian copper tools, such as broad and rounded small knife blades (CZARNOWICZ 2012a: 351-352, figs. 1:3, 3:11-12) that are not found in the southern Levant.

In summary, at this stage it is clear that the EB I occupation at Ashqelon represented a community that among other things, apparently specialised in copper working. The position of Ashqelon on the seashore and at the terminal end of an overland trade route was key to its success in copper working and its export outside the southern Levant. Predynastic Egypt stands out as the likeliest candidate for copper imports from the southern Levant and the nature and scope of this trade should be further examined in the future.

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Settlement architecture on the Eastern Kom at Tell el-Farkha. A 3D reconstruction.

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Introduction

Modern archeology is able to gain, interpret and present more information than it was in the first two centuries of the history of this science. In recent times, the three-dimensional computer reconstruction – one of the newest methods – has become more and more popular. In this paper I will present the reconstruction of Predynastic settlement architecture from Eastern Kom at Tell el- Farkha in Egypt. The reconstruction has been done within the framework of the project *The Nile Delta as a center of cultural interactions between Upper Egypt and the Southern Levant in the 4th millennium BC* conducted by Agnieszka Mączyńska from the Poznań Archaeological Museum. The project was financed from the funds of the Foundation for Polish Science in 2011-2014 .

Three-dimensional reconstruction in archeology is a method of visualizing the archaeological concepts using graphics programs which allow to modeling in 3D. The final result of the reconstruction process should be virtual model of the reconstructed structures or archaeological artifacts. Complete model should reflect the data obtained in the analysis of archaeological material and references and should also help to imagine how different structures from the past may look like (Forte 2006: 339-351).

This method provides access to architectural structures and monuments that no longer exist or for various reasons are not made available to the public. This makes it very attractive method, allowing to share the results of archaeological research to a wider audience in a form which is accessible to all, especially to those outside from the scientific community interested in a particular subject of research. However, despite the obvious advantages of the method in the dissemination of research results, it may be also a very useful research tool which enable us to answer questions raised during the process of archaeological reconstruction.

The site of Tell el-Farkha in Egypt is located in the eastern Nile Delta about 23 km east of the modern town Simbillawin and about 120 km to the north-east from Cairo. It sits right between the southern bank of the Ghazala village irrigation drain and northern border of modern buildings of mentioned village. The site covers an area of approximately 4.5 hectares and consists of three tells (koms) arising as a result of accumulation of archaeological layers containing traces of ancient settlement activity, including the numerous remains of mudbrick architecture (Chłodnicki 2012a: 9).

All three tells are located at the southern edge of the above-mentioned irrigation channel and due to its location have been given names: Western Kom, Central Kom and Eastern Kom. The position at the highest point rises to a height of about 5m asl. (Chłodnicki 2012a: 9).

Based on research conducted by the Italian expedition (1987-1990) and following Polish expedition, which have worked there since 1998, the site chronology was established, ranging from Predynastic Period, including the Lower Egyptian culture and Naqada culture phase II/III to the Old Kingdom, Dynasties III-IV (Jucha 2005: 19; Chłodnicki 2012a: 13, tab.1).

Past function of area located now at Eastern Kom seems to be the most enigmatic. In this place we have to deal both with the remains of settlement construction, (which reconstruction is the subject of this paper) as well as the grave structures. Among funerary structures we should mention a large mud brick mastaba from Nagada III period which is one of the earliest structures of this type in ancient Egypt. Studies conducted so far at this area have revealed also traces of Lower Egyptian culture. However, these remains are later than the earliest phases of this culture, recorded at two other tells (Chłodnicki 2012b: 19-21).

Data acquisition

The process of archaeological reconstruction begins with obtaining the relevant data during excavations. At the site of Tell el-Farkha, archeological excavation are conducted by digging ten-centimeters mechanical layers. After the removal of each layer and cleaning the level the photographic and drawing documentation are produced. With this method, numerous plans of stratigraphic situation are recorded every 10cm. After plan is done, the contents of each shall be interpreted and described to date in order to avoid loss of information related to the seizure of objects caused by ground drying and sand.

Drawings are drawn up on the basis of the coordinates reported with an electronic total station, at a time. Then the data are recorded in order to use it for further editing in a graphics program. It should be noted that the method of creating drawing based on observations obtained through total station has a significant advantage. It allows reduction of the so-called human error, which may occur with the traditional method of documentation.

Development of data

The files saved on total station in local x, y, z coordinates system are imported to a computer with a graphical CAD software. The data are in form of points that reflect the authentic locations of where the measurements were taken. Coordinates presented in the graphical software should be connected together according to information from earlier paper plan. This work is needed to refer to either an existing paper documentation and photographs, due to give maximum effect and prevent loss of data.

The next step is to give the appropriate characteristics to objects located on the currently drawn up plan. In many graphic programs, such as CAD type programs, giving characteristics to each object on drawing is possible by using the tool calls „layers". It is one of the main tools on the basis of which many graphics programs are working. Although we need to know that "layer" in graphical programs has nothing to do with the archeological layer. It is a kind of defining characteristic of the object selected by the drawer, made of group of elements that consist series of vectors (lines, polylines, hatches etc.) which make up the picture of each object. In this way, a graphic layer is subordinated to the color, thickness, line and character name. For the preparation of computer drawings from Eastern Kom at Tell el-Farkha the graphical layers determinates objects such as: mudbricks with admixture of sand and silt, kilns, pits, pottery artifacts, remains of reed mats, stones and others archeological features. In the next step each of the layers gets suitable color and character of the line. Tool „layers" also allows to manipulate the objects created in this way. There is possibility to hiding and displaying them, which is important to the interpretation. As in the previous phase of creating the computer drawing also at this stage it is very important to refer both to the photographic documentation and the paper drawings bearing a precise description of archeological features. Only with this information it is possible to make correct documentation.

Each of those prepared computer drawings are then added to the so-called "main drawing", which shows all documented exploration layers to date (Fig. 1). With this solution, in the main drawing (by using tool „layers") we can freely manipulate the data by displaying different levels of exploratory drawings and objects within them. As already mentioned, it is important to interpretation process, because overlapping drawings of different exploration levels is much easier way to show us continuity of stratification of individual archaeological features. This seems to be very useful in case of analyzing specific architectural remains of mud brick buildings. Later, on the basis of this observations, the three-dimensional reconstruction is made.

Data integration

At this stage of reconstruction we should again compare different types of documentation in areas which for some reason (for example due to the high density of archaeological features) is needed to be look a little closer. In the presented project, a photographic documentation was combined with computer drawing using free and available via internet program Airphoto, which normally is used for the rectification of aerial photographs. This application is typically used to develop photographs taken from a large

Figure 1. An example of so-called main drawing which shows all documented exploration layers to date.

distance, but in this case it was used to insert photography documentation from excavation site into computer drawn plans. With tools that allow the incorporation and mixing the two forms of documentation we can obtain better view of archaeological features that occur at a particular exploration level. We can use a tool to create a "negative effect" in the pictures, which in some cases has revealed a slightly different boundary of archeological objects that drawer who making records could not see due to the light conditions prevailing in the field. These differences very often are not visible in the documentation pictures before color modification made in graphic programs (Fig. 2).

3D MODEL AND VISUALIZATION

Creating of three-dimensional model was began by prepare a base-drawing (a base for future 3D model) which presents the plans of buildings developed from the documentation presented above. The next step was using the right tools to create 3D features consisting of all elements of buildings and its companioning elements. At this stage of reconstruction is needed to refer to architectural traditions of ancient Egypt and different types of analogies that allow us to recreate the appearance of the reconstructed buildings. This is very important because the model characterize the appearance of entire reconstruction.

At this point we should create the characteristic elements of architecture, giving specific dimensions and appearance to elements like: doors, windows, roofing and walls. Also, fixing the appropriate height of buildings and other values of all the parameters that cannot be directly defined only on the basis of architectural remains discovered during archaeological excavations. In addition to the reconstructed architecture at this stage, the author may add some aesthetic elements of the model, such as vegetation or other accompanying features like reconstructed ceramic pots and hearths. Additives of this type are designed to improve the visual effect of the final reconstruction. Although they are purely aesthetic elements of reconstruction, they allows us to understand more easily the final image.

After creating a 3D model based on the different types of analogies and the data obtained during the measurements and the excavations, next step was to give the textures. This is done by assigning appropriate textures and colors to specific objects present in the model. This process is time-consuming and requires patience. After this we have fully color and textured model ready for rendering. During process of rendering software creates a series of virtual photos of the model. Before that we need to set specific parameters such as: light intensity, angle and distance of visualization. To achieve the best final picture is need to create a lot of visualization with different parameters settings. This is another time-consuming process requiring multiple trial and error.

Analogies

As we mentioned before, the reconstruction described in this article is based on a number of analogies, which can be divided into three main groups: the analogies to clay models of architecture from the Predynastic Period, analogies of transpositions of perishable materials in the stone architecture in the Old Kingdom and ethnographic analogies refers to modern mud brick architecture from Egypt.

Clay models created in times of Predynastic and Early Dynastic periods are perhaps the best material allows us to reconstruct the appearance and ways of constructing buildings from this periods. However, examples of such artifacts are very few, and even fewer of them show the settlement architecture in the strict sense. The most valuable clay models of homes are so-called „houses of souls" which sometimes were put in graves. The aim of putting this models to graves was to provide deceased with a home in his afterlife (Petrie 1907: 113-114). However, we need to keep in mind that these items were probably made in a very schematic way, showing only the most characteristic aspects of architecture occurring in that period.

The best example of these is the clay model of house from el-Amra. This model was discovered in the tomb no. a4 at el-Amra in Upper Egypt by D. Randall-MacIver and is dated to Naqada IId period. Today the artifact is located in London's British Museum in Room 64 (Badawy 1954: 23). A clay model shows a rectangular house with a pair of doors located on one of the two shorter walls of a building and two windows located on the opposite wall. Its dimensions are: 24.2cm high, 38cm long and 26.7cm wide (Vandier 1952: 499). Both windows are relatively small and are located in the upper part of the wall.

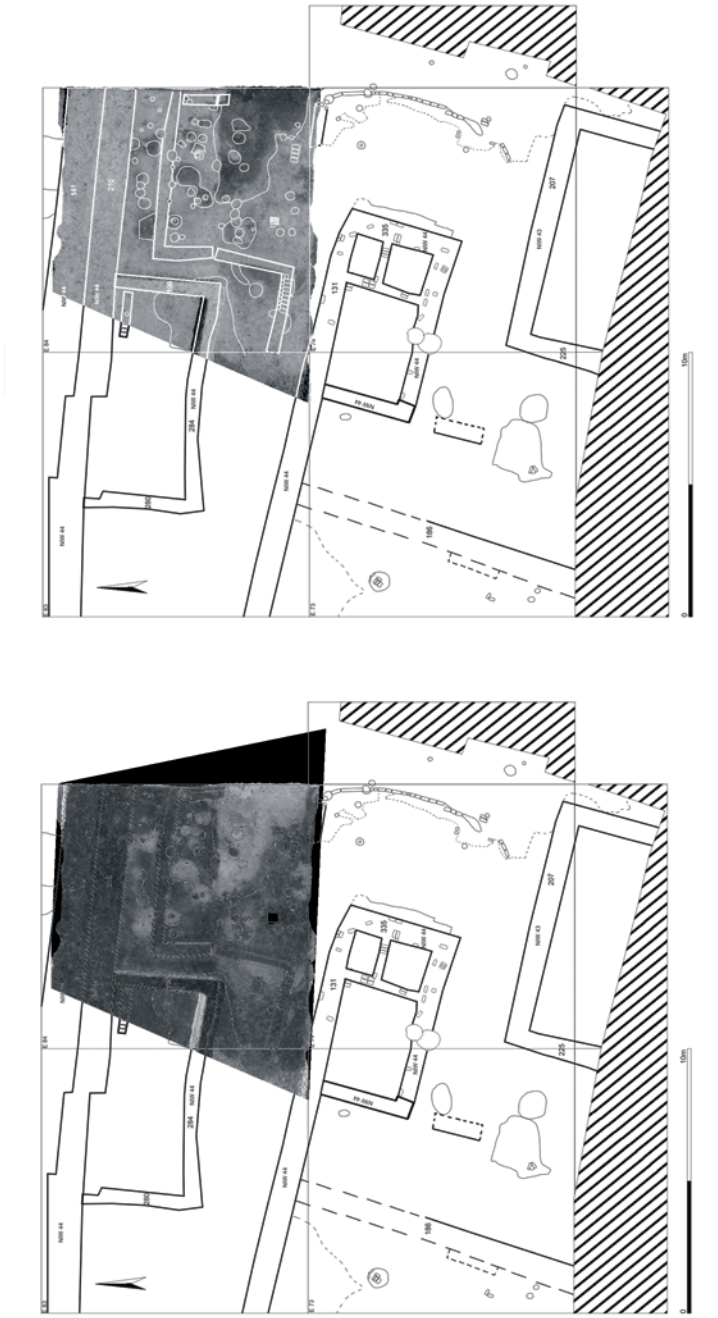

Figure 2. Examples of mixed-up field plans with photography. On the left – photography with negative effect.

This position is likely to protect the interior of house from unwanted intruders, such as scorpions and snakes. On the other hand, a small window allowed for admitting only the necessary amount of light into the homes, so that the interior there was no getting too heated by sunlight. This treatment is also evident in the modern residential buildings in Egypt (not just in the mudbrick architecture). The windows depicted in the model that have also two protective bars on top and bottom of each window. Square shaped beams were roughly three times longer than the edge of the window, which reinforced. It seems that the purpose of these beams was to provide protection against damage associated with the erosion of mudbricks and support wall construction above an empty space in a place where there was a window. Doors that are shown on the opposite wall also have a massive part, interpreted as a wooden door frame elements. Doors hole was consisted of a vertical jambs and massive lintel in the form of a beam having a square cross-section and located above the upper edge of the door, as in the case of the previously described beams over the windows. A common feature of both: the door lintel beams and door beams located above the windows are the proportions. Door lintels beams, just like window lintels beams are much longer than the door hole, which was secured by them. Both wood jambs and lintels act as strain relief. Their task was to relieve the empty space created in the place of the door hole and to protect mudbricks against erosion and abrasion. The upper part of the doors also has an additional element similar to circular in cross section and positioned slightly below the upper lintel, between two jambs. This element is interpreted as a depiction of rolled-up reed mat, sometimes called in the literature *drum* (Arnold 2003: 77). From the one hand this door mat allowed to the closure of the home space and reduce the darkness inside, but on the other hand it also allowed the free flow of air. Moreover, the empty space created between the upper edge of the reed mat and door lintel, formed space providing additional access of light when the door mat remained lowered. As can be seen from the analogy with ethnographic and archaeological documentation, the lower part of the door was equipped with a threshold likely placed just above the ground level. This type of solution may supported the need of protection against water and moisture remaining after a temporary inundation. Door thresholds are also used today in residential construction in the Nile Delta. The high threshold made of mudbricks or pisé was supposedly protected by another massive wooden beam which protect threshold bricks from mechanical damage caused by passing inmates.

Another type of analogy is example of transposition of perishable materials in the stone architecture of the Old Kingdom. Most of the stone buildings which mimic the structure of perishable materials over time have entered the canon of architectural forms of ancient Egypt. In addition, many forms of sacral architecture (and such forms were constructed mainly of stone) reached its proper and culturally recognizable shape long before the introduction of stone material into Egyptian architecture. Therefore, these forms often retain the appearance of characteristic structures made of perishable materials. In the case of stone buildings those elements became only parts of the decorative function

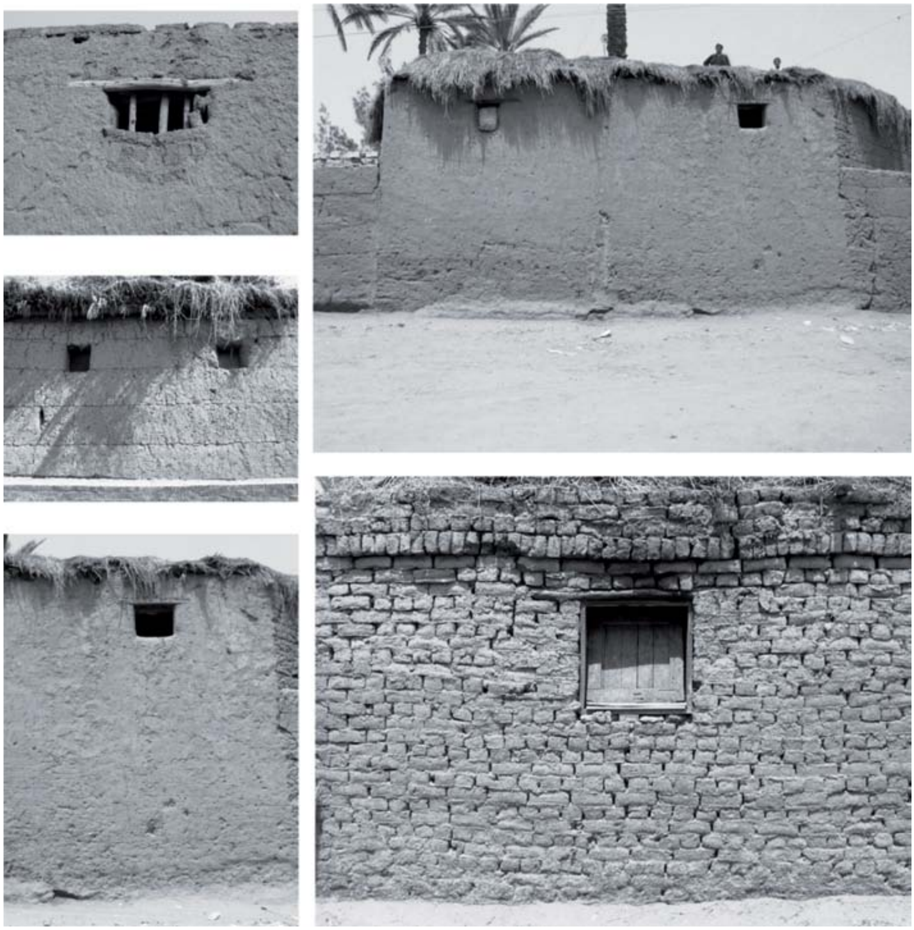

Figure 3. Examples of windows in modern mudbrick architecture in Egypt (photo by L. Szumlas).

by which the architectural form was recognizable. Numerous forms of imitation materials such as wood, mudbrick and reed mats can be found in the Step Pyramid complex at Saqqara.

Visible transpositions of traditional construction forms have numerous examples in the underground part of the complex (Lauer 1939: 13-14). Lining of faience tiles located in the chambers of so-called South Tomb and in some rooms under the pyramid was likely to imitate plait. Also, the lintels in the doors holes are likely to mimic the rolled up reed mat (*the drum*). They were also reflected in faience plates (Lauer 1936: 34-37). As we mentioned above, this element can be also seen in the model from el-Amra. On the base of this example we can see evident identity of architectural elements existing both in sacral architecture of Old Kingdom and settlement architecture from Predynastic period. And this may indicate the efficacy of such analogies. Please remember that from the earliest times mortuary architecture tries to imitate the construction of a settlement because, in the ideology of ancient Egyptians, tomb was the future house of deceased in afterlife.

A very valuable source of information on possible appearance of the Predynastic architecture can also be found in the ethnographic analogies. Modern mudbrick houses in Egypt contain many specific elements that we can also see in archaeological documentation as well as in the analogies presented above. The windows in the modern mudbrick houses, as we can see it on the model from el-Amra, are always located in the upper part of the wall and usually have a small size. They are also equipped with safety wooden beams (or planks) located on top edge of the window hole. These elements are designed to carry the weight of the wall above the empty space which was formed by each window located in the wall (Fig. 3). It is a very valuable analogy, because the archaeological layers remains almost only the lower parts of the walls, what makes the identification and placement of windows impossible when you need to base only on archeological data. In the twentieth century mudbrick architecture doors are usually located slightly above the level of the foundation. The reason for this location is the fear of water from river floods, which in the case of threshold placed at ground level could break into the interior of the building (a similar method for protecting the homes we can see also in the local Egyptian architecture build from modern construction materials). In modern mudbrick architecture, the wooden jambs are also similar to those depicted on the model from el-Amra. We can also see strengthening of mud brick threshold with wooden planks or beams. In modern mudbrick houses wooden plank or beam above threshold (which is often one of the four elements of a solid wooden door frame) effectively protects it from erosion and mechanical damage.

The way of closing the door with a rolled-up mat, which is shown by the example of the el-Amra house and the doors in the underground part of the Step Pyramid Complex, can be also seen in nowadays contemporary mudbrick architecture. It is clearly visible on an example of one of the shed located on the outskirts of the village Ghazala (Fig. 4). In the picture we can see described solution, but in this case instead of mats the carpet was used. Roofs that can be observed in contemporary examples of mud brick constructions, like windows and doors are a very valuable kind of analogy because of the inability to restore the roof only on the basis of the excavation data. Roofing is usually created from lightweight materials such as pieces of tree trunks, branches of smaller trees or reeds. All this is supported by wooden beams (mostly the trunks of palm trees). Roof beams often extend beyond the front wall on which they rest, so it is easy to observe their irregular thickness and size. In addition to the mudbrick buildings in the Nile Delta villages we noted a number of other accompanying settlement constructions which have its parallels in the archaeological data. This examples include various types of fences from plant materials and fencing walls of mud brick or pisé. Structures of this type, which were not walls of particular building and serves only to separate some spaces, are also known

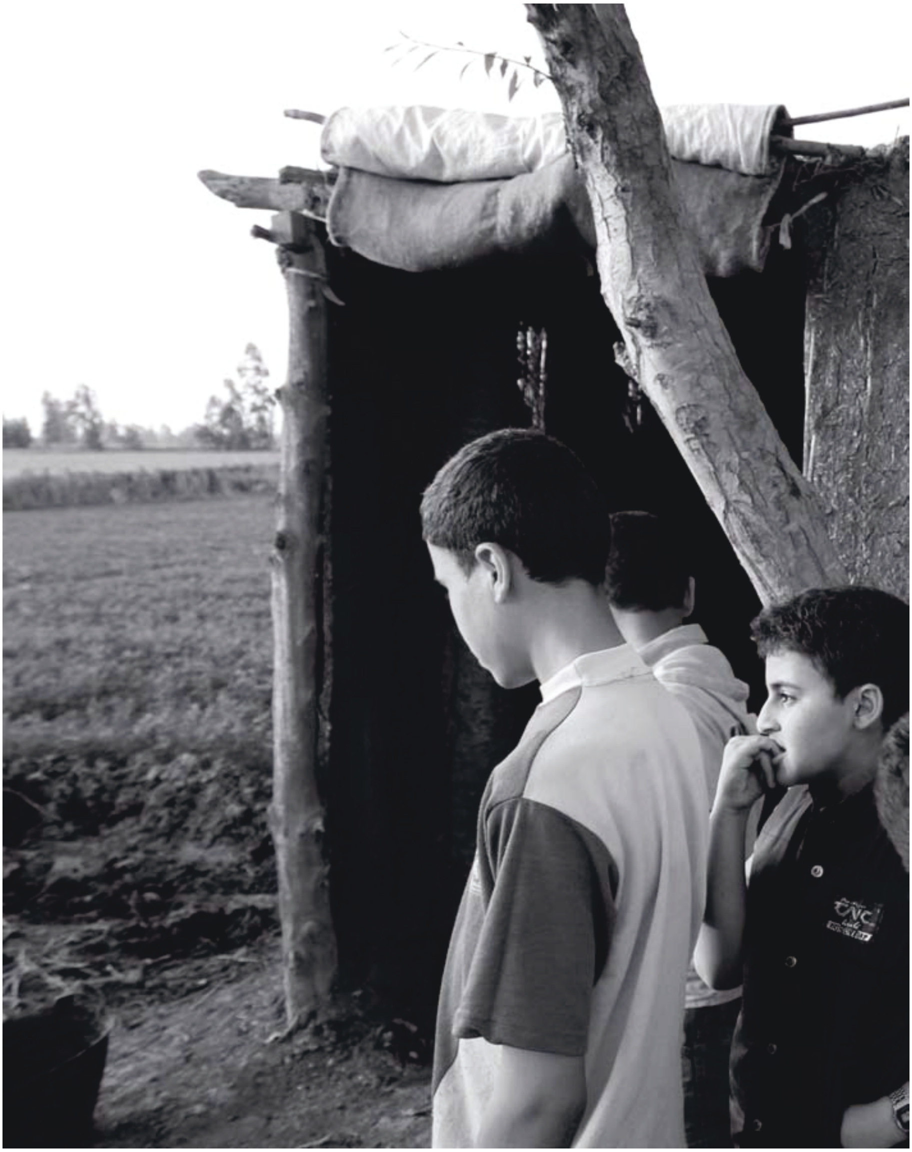

Figure 4. A rolled-up carpet above doors of the shed in Ghazala village reminding of so-called drum (photo by J. Karmowski).

from archaeological layers at Eastern Kom in Tell el-Farkha. Fences made of perishable materials can be reconstructed on the basis of regular arrangement of postholes, which are a remnant of the vertical fence supports. A similar feature can be also seen in the Step Pyramid Complex, where stone wall of one of the shrines located in the *Heb-Sed* courtyard, has relief representation of this kind of structure (Fig. 5).

Figure 5. A stone fence depicted in relief (from Step Pyramid Complex in Sakkara) and a modern fence made of palm leaves and reed (photo by J. Karmowski and L. Szumlas).

Reconstruction of the settlement arrangement at Eastern Kom in Tell el-Farkha

Remains of the settlement arrangement that has been subjected to a three-dimensional reconstruction were excavated in the northern part of the Eastern Kom. This area includes trenches EN: 64, 73, 74, 75, 83 and 84. A 3D reconstruction was split into three distinctive zones, which were combined into a single model: the first covering trench EN75 , the second zone including trenches EN: 73, 74, 64 and the third zone comprising trenches EN: 83 and 84.

In the first zone, we can see three-dimensional visualization of buildings from trench EN75 with a wall separating them from the second zone. At levels from 43 to 48 it can be noted a two buildings located there. It is needed to add that one of the buildings is located in the northern part of this trench which has not been fully excavated to date. Its reconstruction is therefore only a suggestion based on the current state of research (in the future when new data will be acquired, its reconstruction should be updated). The second reconstructed building was discovered in a much greater part and it was divided into two rooms. Larger located in the north and smaller in the south. In a smaller room at few different layers numerous traces of burning and regular outline of the oven were discovered. This feature has been taken into account during making the visualization and the room was presented as a kind of annexe covered by lightweight roof (Fig. 6). Above the place where was a regular outline of kiln, on the roof in reconstruction was placed a skylight which may provide a proper air circulation. We can see similar skylights in the reconstruction of the remaining zones. In all cases they were located above areas where in the archaeological documentation was recorded regular traces of kilns located in the inner parts of buildings. Reconstruction of the location of the doors and windows in all zones is based upon analysis of the building arrangement. Unfortunately none of the described architectural remains reveals even the possible location of the windows and doors. In the reconstruction many windows were placed on the northern and southern walls. This arrangement allows to illuminate the interior of the houses without letting in the direct sun rays from eastern or western directions. It is needed to add that certainly in predynastic architecture there were solutions to cover and uncover the windows, so in presented reconstruction widows not always have been placed only on the northern and southern walls. Considering this point, in visualization some of the windows appear on the other then northern and southern walls (especially when it was dictated by the building arrangement). However, windows are small in size and are placed on top of the walls.

In the visualization wall EN308 (which separating zones 1 and 2) was reconstructed as adjacent to the wall EN336. Together they form a thicker part of the wall located in front of the reconstructed building from trench EN75. In addition, the visualization shows the lower wall that can be seen at the level 43 (3.80m asl). The lower wall is joining previously described building from trench EN75 with wall EN308.

In zone 2, on the basis of the reviewed data, we can see a dense buildings located mostly on trenches EN74 and 73. It is included a one-room building which is located in the southern part of the trench EN73 and northern part of trench EN64, a long house with room EN213, and complex of buildings placed at the eastern part of zone 2 which together have one common wall EN131. This wall is also separating zones 2 and 3.

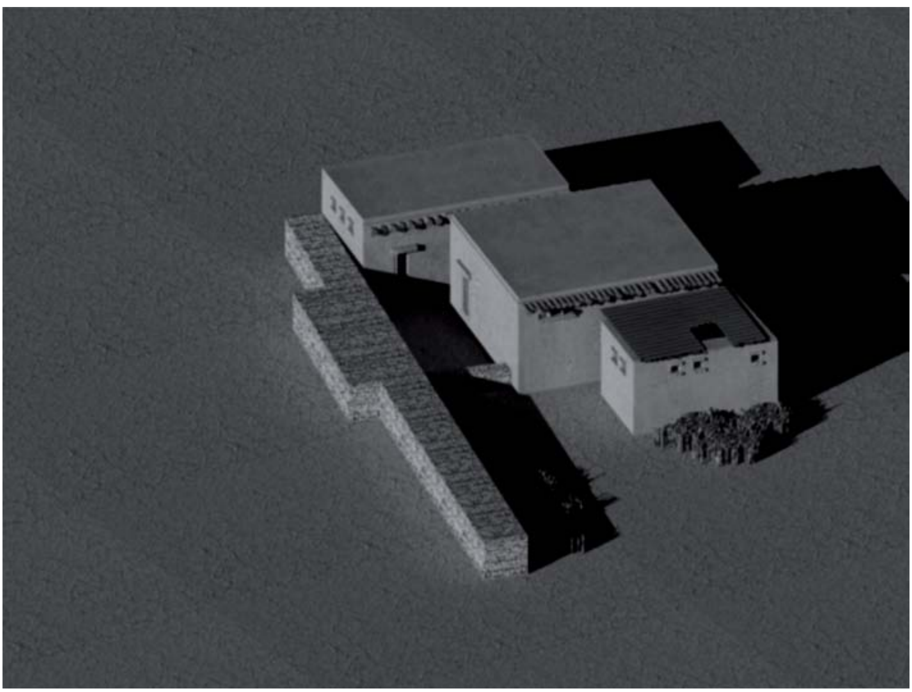

Figure 6. A 3D reconstruction of settlement architecture from zone 1. Trench E75.

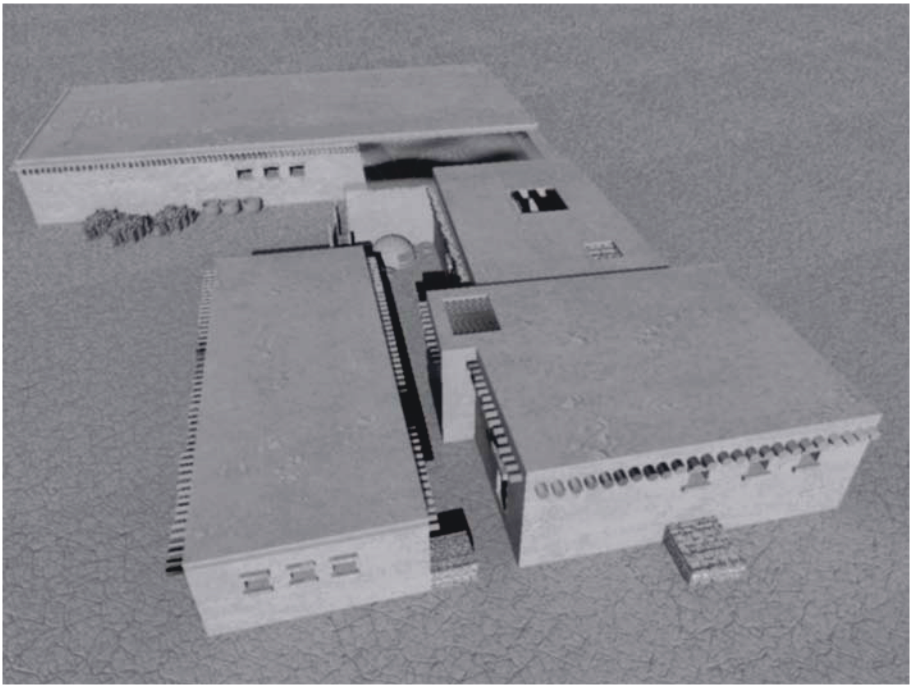

Figure. 7. A 3D reconstruction of settlement architecture from zone 2. Trenches E73, 74, 64.

Reconstruction of the second zone has shown dense arrangement of reconstructed buildings. In the northern part of the zone a massive wall (EN131) is clearly visible. This wall constituting a common wall for at least two adjacent buildings and it is possible that in the past they were connected internally to form a larger system. Between the western boundary of this buildings and eastern wall of the long building with room EN213, there is more open space. On the reconstruction it was covered by lightweight roof structure based on the wall EN149 on one side and on the other site it is based on eastern wall of the long building (wall EN186). This has created a sort of covered space leading to the wall separating the zone 2 and 3 (Fig. 7).

By the wall EN149 a kind of reed mat fence was reconstructed. The four vertical supports were reconstructed based on the distribution of postholes discovered in that place. In the reconstruction behind the fence another kiln was located on the basis of regularly reported traces of burning. It is worth to note that many traces of kilns and hearths have a rather temporary character and often appear in various locations throughout the study area. Therefore, in visualization are presented merely some of the locations of such objects.

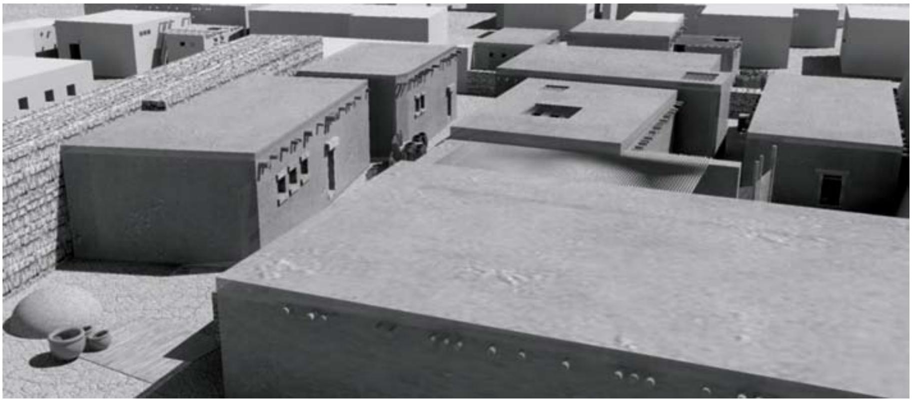

Figure 8. A 3D reconstruction of settlement architecture from zone 2 (visible on the left side) and zone 3. Trenches E73, 74, 83, 84.

The presented visualization of zone 2 shows also the reconstruction of a long house with room EN213. The building clearly dominates above the rest of the building arrangement in this area. Looking to the northern direction from it, we can see the wall EN283. This wall forms the border of very narrow street, just north of the zone 2.

The visualization of zone 3 shows two reconstructed buildings adjacent to the monumental wall located in the northern part of the zone (wall EN210/141). Apart from these, the kiln located in the eastern part of the zone 3 is shown and a small walled structure in front of the buildings was reconstructed on the south side (Fig. 8).

Described part of the study area caused many problems in case of interpretation. In subsequent layers only one building with room EN279 and a monumental wall EN210/141 were clearly visible. The second building, located to the east of the zone was manifested in the different levels of exploration. Thanks to overlaying several plans of different levels it was also possible to reconstruct his general arrangement. The most difficult was the interpretation of a small semi-circular structure and walls located in front of described buildings. In the visualization, it has been presented as a kind of fence with elements made from perishable materials.

The part located to the west of the buildings in the visualization is presented as a area of workplace nature. During the excavations in that place many traces of more or less regular objects with traces of burning was noted. In the visualization another kiln was reconstructed there.

The reconstruction clearly shows how little open space was located between zone 2 and 3. This impression is further increased by the presence of the wall EN283 and unstable structures located south of the buildings in this area.

Conclusions

To summarize, we can say that the architecture of the Eastern Kom at Tell el-Farkha was probably characterized by a very dense building arrangement with only a few open spaces left between some of the buildings. All buildings were mostly built on a rectangular plan, although there are also examples of the walls with a high degree of curvature. However most of the curve walls have not substantial thickness and probably did not belong to the structure of houses.

On the basis of the archeological material we can also make an assumption that in the construction of residential buildings, wood and other raw materials of plant origin were used. Although these elements do not remain to this day. It can be suggested that their use was common in Predynastic settlement architecture also on the Eastern Kom at Tell el-Farkha. We can deduce that from examples like clay model from el-Amra where wooden elements are depicted as well as from data gained during excavations which reveal numerous traces of organic material among stratification layers.

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Of pots and myths – attempting a comparative study of funerary pottery assemblages in the Egyptian Nile Valley during the late 4th millennium BC.[1]

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1. Introduction: questions and hypotheses

The Upper Egyptian Naqada culture is best defined by its material remains found in the graves of the 4th Millennium BC., and in particular by the pottery deposited therein. Already Flinders Petrie used the various ceramic wares and their typological developments as a guide for his Sequence Dates upon which the relative chronology of that period was founded. This funerary pottery was also key to understanding the overall character and distribution of this culture along the Nile Valley in time and over time. Although not without early criticism (*e.g.* Scharff 1926: 71-78), it had been suggested that this culture exhibited a remarkable uniformity over a stretch of hundreds of kilometres (Kaiser 1957: 74; Rizkana & Seeher 1987: 67; Hendrickx 1996: 63). Any observable changes in the ceramic assemblages were not only considered indicative of the progress of time, but also of more far-reaching cultural and social processes such as ethnic migrations or invasions (*e.g.* Petrie & Quibell 1896; Petrie 1920; Kaiser 1957). These concepts dominated the scholarly discourse of almost the entire 20th century. Only the last two decades of that century also saw the introduction of a more nuanced discussion when new and ever growing archaeological evidence, especially from the Nile Delta, started to cast shadows on these concepts, exposed their shortcomings and caused scholars to rethink traditional approaches. This paper will pursue a number of these more recent thoughts, engage in an attempt at comparing and re-interpreting various pottery assemblages and thereby potentially challenge existing paradigms. It will focus on the funerary pottery assemblages of the late 4th Millennium BC. which correspond to the relative chronological stages of

[1] This paper is dedicated, with respect and gratitude, to the memory of Werner Kaiser without whose work and initiatives research on early Egypt would not be where it is today. The writer would also like to thank the organizers of this conference for the invitation to contribute.

late Naqada II and early III. These assemblages arose out of a Neolithic ceramic tradition (= Badarian/early Naqada I) that itself was the result of a variety of nomad, hunter, herder, farmer and settler cultures from the areas in and around the Egyptian Nile Valley and that eventually developed into a well-formed Chalcolithic culture. Like other crafts, such as metallurgy, stone vessel manufacture, flint knapping and textile weaving, pottery production had now developed into a specialized industry in the more populated parts of the valley, where access to resources was favourable and where early commercial centres allowed for the infrastructure and created sufficient consumer demand for the specialized production of ceramic wares. Although domestic pottery had up to this point been largely made in household production, changing burial customs in the southern Nile Valley increased the demand for pottery and thereby stimulated the growing industrialization of its manufacture. Some wares, *e.g.* Black-Topped vessels, were mainly exchanged in regional market networks, whereas others, such as Decorated Marl clay jars, experienced a very wide distribution at hundreds of kilometres distance from their place of manufacture. It has been acknowledged for some time now that Chalcolithic pottery production of the lower Nile Valley was a rather diverse industry which operated in different places at different levels and in different scales of production (Friedman 1994; Köhler 1997; 1998).

On the other hand, regional differences in the pottery assemblages have also been attributed to political, ethnic or cultural boundaries, especially when comparing the two geographic ends of the Egyptian Nile Valley: Upper and Lower Egypt. One of the most recurrent and crucial questions raised in these discussions is therefore just how different the regional assemblages really are from each other. After all, the postulated uniformity of the pottery in southern Egypt has been interpreted as a sign of cultural or ethnic identity and conversely, variation between the assemblages has therefore been read as evidence for cultural or ethnic difference. And yet, most scholars of today would agree that when considering the domestic contexts there is far greater homogeneity in the material culture of north and south than in the funerary sphere (in summary Köhler 2008; Mączyńska 2011), in particular with regard to the pottery of the time. But most comparisons have been largely reduced to an apparent contrast of north and south, and what has been rarely questioned with sufficient scrutiny in recent times is just how homogeneous or heterogeneous southern funerary assemblages really are[1] and if a simple comparison between north and south may actually lead to a viable result. In an attempt at addressing these questions, a number of funerary pottery assemblages from different sites of the late Naqada II period will be examined. It will be proposed that there is significant variation between the region of southern Upper Egypt in comparison to northern Upper Egypt, between northern Upper Egypt and Middle Egypt, and between Middle Egypt and the Fayum Region. Consequently, this paper will question just how homogeneous the Naqada culture really is, based on funerary pottery assemblages of the late Naqada II period.

[1] Exceptions being Scharff (1926) and Mortensen (1991: 15). Also Hendrickx (1996: 61-63) suggested that regional variation may have been obscured by Petrie's method of classification.

Further, following decades of archaeological excavations in the Nile Delta, it has also been suggested that as a result of the apparent northward expansion of the Naqada culture material remains of the Naqada III period had become so homogeneous in the entire Nile Valley and Delta that the term ‚cultural unification' was introduced. This has caused some archaeologists at northern sites to even label archaeological strata or phases of an advanced date ‚Naqadan' in contrast to an earlier ‚Buto-Maadi' or ‚Lower Egyptian' phase (*e.g.* von der Way 1991-1997). In consequence of the problematic notion of an apparent homogeneity of the Naqada culture, this paper will also examine how ‚unified' the funerary material culture in early Naqada III really was, whether or not regionalism persisted for longer than previously assumed; and call into question the validity of the term ‚cultural unification'.

2. Regional comparisons

In order to examine regional pottery assemblages, it is unfortunately still necessary to work with cemetery data from the late 1890s and early 1900s which were classified with Petrie's two pottery corpora (Petrie 1921; 1953). This old database has significant limitations given a) the lack of scientific control and documentation of the excavations that Petrie and his contemporaries conducted, b) the summary and incomplete publication of most of the sites they excavated and c) the built-in methodical problems with Petrie's classification system, that reduced tens of thousands of hand-made pottery vessels to less than a dozen classes and some 1500 outline type drawings, and d) its subsequent arbitrary and often subjective application (these issues are also acknowledged and discussed in detail by Hendrickx 1996: 44). More recent excavation projects have started to employ modern typological classification systems that also involve accurate technical drawings of all vessels encountered plus descriptions of their manufacture, clay fabrics and surface treatments. But many of these are not yet fully published and others still adhere to Petrie's system for better comparability. And considering the thousands of tombs already excavated from the periods under study and the large number of vessels that have been registered, classified and thankfully entered into a database of more than 35000 entries by Stan Hendrickx[2], there is at least the possibility to engage in a simple presence/absence statistic that only involves the major types *e.g.* R26, and not also the subtypes, *e.g.* R26E, in order to avoid arbitrary or erroneous type assignments and to remain within broader type groups.[3] Even with this restriction, there remains the major task for the analyst to manage thousands of data sets, which would certainly warrant a longer dissertation project than what can be offered here.

[2] I am grateful to Stan Hendrickx for allowing me to use this database and for making useful suggestions on this paper. It is important to particularly mention his comment that our use of the word ‚type' is highly problematic in this context given that many of the vessels Petrie published were only recorded once. Given that typologies are yet to be established for so many vessel groups, it might be more appropriate to refer to forms instead of types. The writer would also like to thank Rita Hartmann and Christian Knoblauch for providing thoughts and feedback on this paper.

[3] Even this broad approach is not without problems as for example type 54 in Petrie's *Proto-Dynastic Corpus* demonstrates. This type number comprises a variety of open and closed vessel shapes and should not be considered a ‚type' at all (Petrie 1953: pl. X).

This is why this study will focus on a selection of sites and on dated graves only, *i.e.* graves that have received a date according to the KAISER/HENDRICKX Naqada Stufen system. The datasets were extracted from HENDRICKX's database for a representative number of tombs and from various sites in different parts of Egypt primarily dating to Naqada IICD and Naqada IIIAB. Two separate analytical series were established which list the various corpus forms registered for each site in order to arrive at a presence/absence correlation.[4] The individual sites were then grouped in broad geographically defined regions. In some cases, certain diagnostic ceramic forms were identified in order to investigate the implications of these analyses in more detail. It would have been useful, too, to compare the combination of types, *i.e.* grave assemblages, with each other and across regions, but given the space restrictions this would be difficult to accommodate in this study. Hence, although the sheer quantity of data may be able to compensate for errors and omissions in the old tomb registers, the results achieved here always have to be taken *cum grano salis*.

2.1. Comparison of funerary pottery assemblages across the regions in late Naqada II

According to W. KAISER, cemetery sites in the Egyptian Nile Valley between Hierakonpolis and Girza of Naqada phase IIC onwards are thought to belong to the Naqada culture following this culture's earlier expansion from a core area between Naqada and Abydos. This conclusion was drawn from the observation of an increasingly wider distribution of typical Naqada culture ceramic types that resulted in further homogenization of material culture beyond the original core area (KAISER 1957: 75). Indeed, J. SEEHER stated in 1987 that 'as early as Naqada I a stretch of over 400km along the Nile, from Assiut to Aswan, was settled by people with identical pottery' (RIZKANA & SEEHER 1987: 67). With that premise, it should be expected that the funerary assemblages of the cemeteries along this stretch of the Nile exhibit the same, or at least a very similar range of ceramic forms.

The data used for the comparison of funerary assemblages dating Naqada IICD between Girza and Hierakonpolis derive from a total of 1047 tombs at 12 sites distributed over the four regions of the Fayum area, around Badari, near Abydos, and in southern Upper Egypt (Tab. 1). In these regions, variable numbers of forms were recorded, the lowest number (N=129) was registered in the Fayum area, the highest in southern Upper Egypt (N=213), which is in part explained by the fact that Naqada was one of the sites upon which PETRIE's *Prehistoric Corpus* was founded. This site alone contributes 186 forms to this count (but see below).

Table 2 shows the result of a comparison of 755 tombs from the stretch of Nile between Middle and Upper Egypt (Assiut to Aswan). In total 267 different forms were registered over 10 sites, but only 90 forms, 33% occur in both regions[5] (Fig. 1A) and even

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[4] For the purpose of correlation, it was also necessary to only include those vessel numbers that occurred more than once.

[5] Although a different method was employed, this result is very comparable with HENDRICKX's evaluation of the same area which concluded that *‚out of 339 types, 103 occur in all four regions* [Badari, Abydos, Naqada, Armant = 30,4% correspondence] (HENDRICKX 1996: 63).

Table 1. Regional funerary assemblages of Naqada IICD used.

REGION	FAYUM	BADARI	ABYDOS	SOUTHERN UPPER EGYPT
Sites included	Girza, Haraga	Matmar, Mostagedda, Badari, Qaw	Mahasna, Salamani, Amra	Naqada, Armant, Hierakonpolis
Number of tombs included	292	226	153	376
Number of Prehistoric Pottery Corpus forms registered	129	151	162	213

less, *i.e.* 5 forms or 1,9% at all these sites. The types that the two regions have in common derive from seven pottery classes, the majority of which made of Nile silt and belonging to the Black Topped, Polished Red and Rough categories. This is significant because many of these are likely to have been produced locally. On the other hand, the common types also include 16 forms of the Decorated and Wavy Handle classes, which are pottery vessels made of Marl clays, produced in highly specialized workshops and traded over long distances for the sake of their contents. Some of the Late vessels, in particular L36-59, may also fall under this group. Although such trade commodities should not be discounted altogether, they only indicate that the regions were in commercial contact with each other. Considering that such vessels were also found in Nubia as well as in the southern Levant, they certainly cannot count as signs of cultural identity. At 33% correspondence, the ceramic assemblages of the two larger regions of Upper and Middle Egypt should not be considered identical or homogeneous and SEEHER's generalizing statement, cited above, cannot be supported unless it could be demonstrated that correlations were greater in Naqada I than later.

However, when comparing sites at a more restricted regional level, such as southern Upper Egypt compared with northern Upper Egypt, *i.e.* the region around Abydos, the statistic looks slightly different. An analysis of 529 dated tombs from six sites can draw from a total of 229 forms (Tab. 3). 50% of forms (N=120) are shared between both regions and only 12 forms, 5,2%, occur at all six sites. However, this result also includes 27 vessel forms of the Decorated and Wavy Handle classes. Were these to be excluded, the correspondence would amount to only 41% for much of the core region of the Naqada culture. The regions of Abydos and Badari share 45% of forms, including 19 forms of the Decorated and Wavy Handle classes (Tab. 4), but only 3,8% of forms occur at all 7 sites analyzed.

Finally, the region of Badari has been compared with the sites of Girza and Haraga in the Fayum area (Tab. 5). They only have 38% of forms in common, including 15 Decorated and Wavy Handle forms, although this time, 5,1% of forms occur at all six sites in this dataset. When looking at the correlation of the four regions across the Nile Valley, the correspondences decrease in northward direction from 50% to 38% (Fig. 1B).[6]

[6] It would have been helpful to also include cemeteries from the Nile Delta in this evaluation, but unfortunately, there are only very few contemporary cemeteries of this period and even fewer that have been published to a satisfactory level allowing for an inclusion.

Table 2. Comparison Middle – Upper Egypt Regions.

Number of tombs used in both regions	Number of forms recorded in either or both regions	Prehistoric Pottery Corpus forms recorded in both regions		Prehistoric Pottery Corpus forms recorded at all 10 sites	
755	267	Black Topped:	B1, B11, B27, B35, B36, B38, B39, B42, B47, B53, B57, B58, B62, B66, B74, B76	Polished Red:	P40
		Decorated:	D1, D8, D10, D31, D41, D43, D50, D61, D63, D67, D68	Rough:	R69, R76, R81
		Fancy:	F15, F31, F80	Wavy Handle:	W43
		Late:	L7, L12, L16, L19, L30, L33, L36, L53, L59		
		Polished Red:	P11, P14, P21, P22, P23, P24, P26, P38, P40, P41, P45, P46, P57, P81, P82, P84, P85, P93, P95, P98		
		Rough:	R1, R3, R22, R23, R24, R26, R34, R38, R44, R65, R66, R67, R68, R69, R74, R75, R76, R81, R82, R83, R84, R85, R86, R91, R92, R94		
		Wavy Handle:	W3, W19, W41, W43, W47		
Correlation:		90 forms = 33%		5 forms = 1,9%	

Table 3. Comparison Abydos – Southern Upper Egypt Regions.

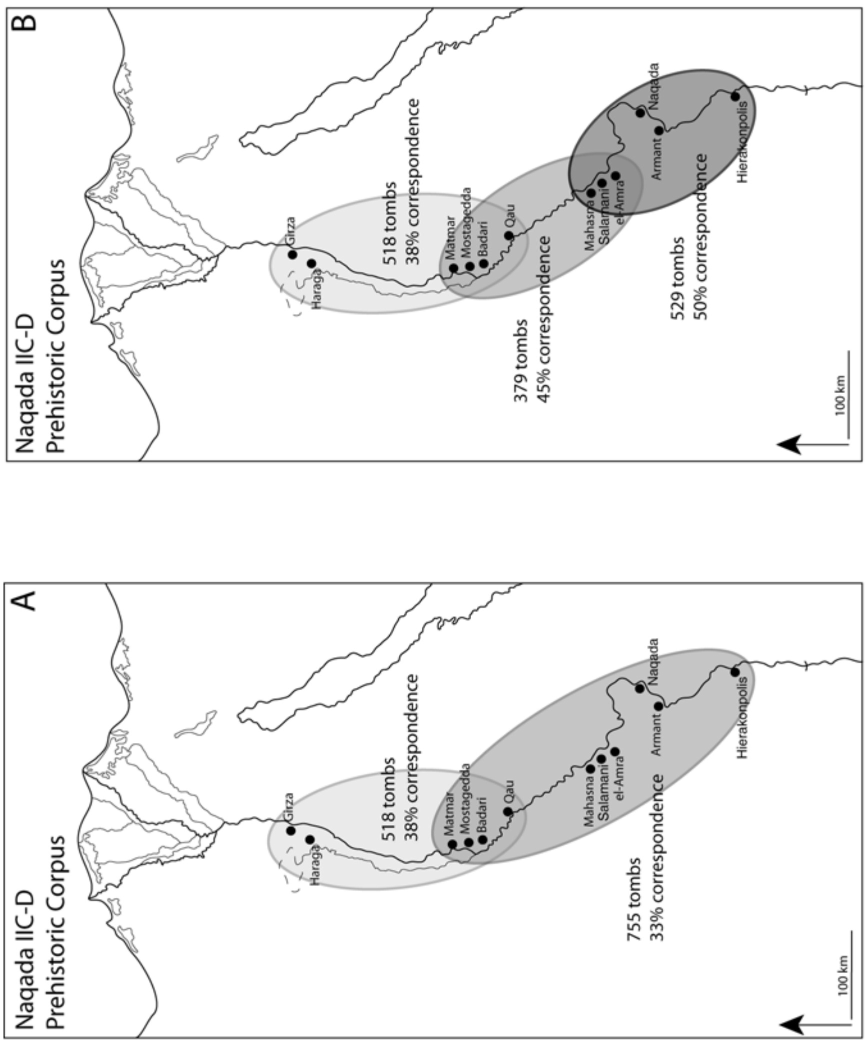
Number of tombs used in both regions	Number of forms recorded in either or both regions	Prehistoric Pottery Corpus forms recorded in both regions		Prehistoric Pottery Corpus forms recorded at all 6 sites	
529	229	Black Topped:	B1, B2, B11, B24, B25, B27, B29, B35, B36, B37, B38, B39, B42, B47, B50, B53, B57, B58, B62, B66, B72, B74, B76	Late:	L7, L16, L53
		Decorated:	D1, D2, D8, D9, D10, D13, D14, D31, D33, D35, D36, D41, D43, D47, D50, D61, D63, D67, D68	Polished Red:	P40, P93
		Fancy:	F15, F31, F58, F80	Rough:	R26, R65, R69, R76, R81, R85
		Late:	L7, L12, L16, L17, L20, L21, L30, L33, L36, L40, L53, L59	Wavy Handle:	W43
		Polished Red:	P11, P14, P16, P21, P22, P23, P24, P26, P38, P40, P41, P42, P43, P45, P46, P47, P57, P81, P82, P85, P93, P95, P98		
		Rough:	R1, R3, R16, R21, R22, R23, R24, R26, R34, R38, R42, R44, R57, R65, R66, R67, R68, R69, R74, R75, R76, R81, R82, R83, R84, R85, R86, R91, R92, R93, R94		
		Wavy Handle:	W3, W14, W25, W19, W41, W42, W43, W47		
Correlation:		120 forms = 50%		12 forms = 5,2%	

Table 4. Comparison Badari – Abydos Regions.

Number of tombs used in both regions	Number of forms recorded in either or both regions	Prehistoric Pottery Corpus forms recorded in both regions		Prehistoric Pottery Corpus forms recorded at all 7 sites	
379	207	Black Topped:	B1, B11, B27, B36, B38, B39, B42, B47, B53, B57, B58, B62, B66, B68, B74, B76	Black Topped:	B53
		Decorated:	D1, D8, D10, D31, D41, D43, D50, D61, D62, D63, D67, D68	Late:	L12
		Fancy:	F15, F31, F80	Polished Red:	P40
		Late:	L7, L12, L16, L30, L33, L36, L53, L59	Rough:	R69, R76, R81, R85
		Polished Red:	P11, P14, P21, P22, P23, P24, P26, P38, P40, P41, P45, P46, P57, P81, P82, P85, P93, P95, P98	Wavy Handle:	W43
		Rough:	R1, R3, R17, R22, R23, R24, R26, R34, R38, R44, R65, R66, R67, R68, R69, R71, R74, R75, R76, R81, R82, R83, R84, R85, R86, R90, R91, R92, R94		
		Wavy Handle:	W3, W19, W23, W41, W43, W44, W47		
Correlation:		94 forms = 45%		8 forms = 3,8%	

Table 5. Comparison Fayum - Badari Regions

Number of tombs used in both regions	Number of forms recorded in either or both regions	Prehistoric Pottery Corpus forms recorded in both regions		Prehistoric Pottery Corpus forms recorded at all 6 sites	
518	197	Black Topped:	B38, B39, B47, B53, B57, B76	Polished Red:	P24, P40
		Decorated:	D10, D11, D20, D34, D41, D43, D59, D60, D61, D62, D63, D67, D68	Rough:	R66, R69, R74, R75, R76, R81, R84, R94
		Fancy:	F31, F58, F80, F83, F85		
		Late:	L7, L12, L19, L53, L59		
		Polished Red:	P11, P14, P22, P23, P24, P38, P40, P41, P45, P46, P75, P81, P82, P84, P85, P93, P95, P96, P98		
		Rough:	R23, R24, R26, R33, R34, R44, R45, R61, R62, R63, R65, R66, R67, R68, R69, R71, R74, R75, R76, R81, R84, R85, R90, R91, R94		
		Wavy Handle:	W19, W23		
Correlation:		75 forms = 38%		10 forms = 5,1%	


B
Naqada IIC-D
Prehistoric Corpus
Girza
Haraga
Matmar
Mostagedda
Badari
Qau
518 tombs
38% correspondence
379 tombs
45% correspondence
Mahasna
Salamani
el-Amra
Armant
Naqada
Hierakonpolis
529 tombs
50% correspondence
100 km
A
Naqada IIC-D
Prehistoric Corpus
Girza
Haraga
Matmar
Mostagedda
Badari
Qau
518 tombs
38% correspondence
Mahasna
Salamani
el-Amra
Armant
Naqada
Hierakonpolis
755 tombs
33% correspondence
100 km

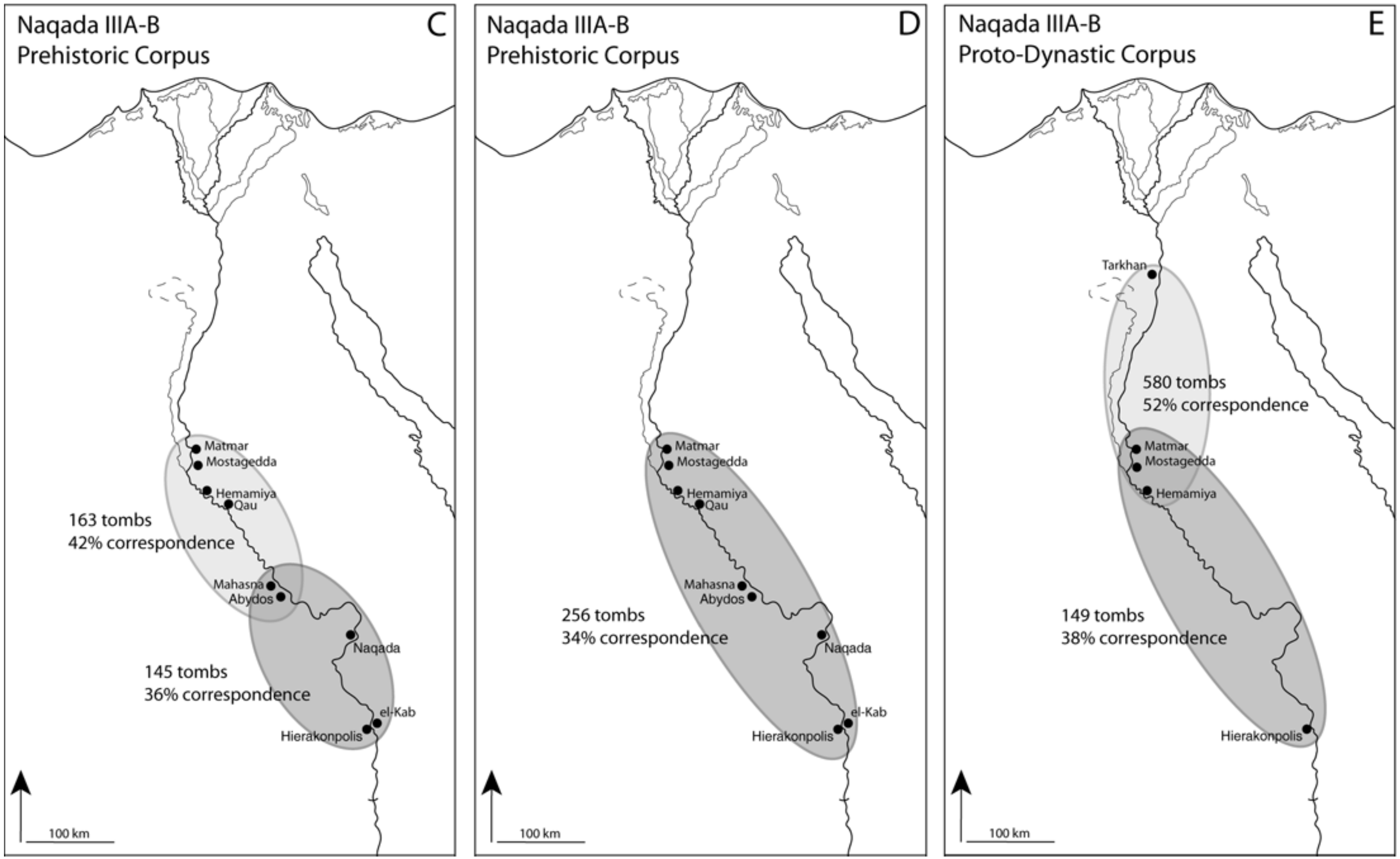
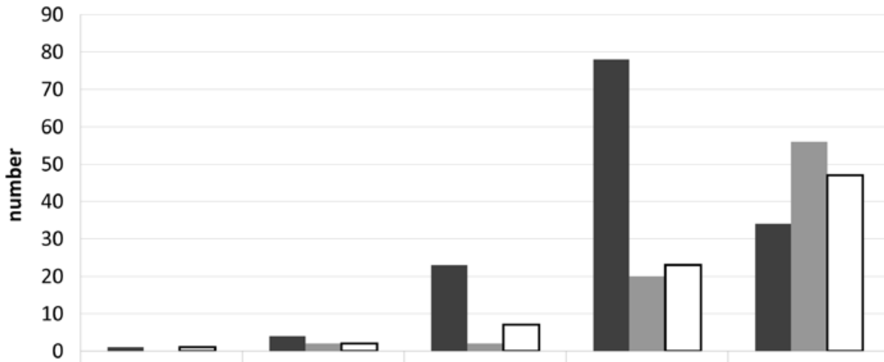


Figure 1. Correlation between regional funerary pottery assemblages based on PETRIE's Corpus of Prehistoric Pottery and Corpus of Proto-Dynastic Pottery and HENDRICKX's database.



	IC	IIA	IIB	IIC	IID
■ R69	1	4	23	78	34
■ R65		2	2	20	56
□ R66	1	2	7	23	47

Figure 2. Distribution of R69, R65 and R66 according to date (N=300).

In conclusion, these evaluations have one clear result, namely that funerary ceramic assemblages of the late Naqada II period in adjacent regions of the Egyptian Nile Valley never share more than half of the pottery forms registered. Although there are a few types that are consistently used across those regions, in particular P40, R69, R76 and R81, the different regions employed a varying spectrum of locally made ceramic types (especially Rough, Black Topped and Polished Red types) in addition to pottery vessels exchanged over longer distances (Decorated, Wavy Handle and some Late types). This is broadly consistent with Friedman's definition of regional pot-making traditions observed in Upper Egyptian settlements (FRIEDMAN 1994: 862) and forces us to reconsider the postulated homogeneity of the Naqada culture and the implications this result has for the wider questions surrounding the apparent cultural difference between northern and southern Egypt.

The implications can be illustrated with an interesting detail that arose from the same statistical analyses. Among the most frequently occurring ceramic forms are small vessels of Nile silt with restricted necks and globular or ovoid bodies, PETRIE's R65, R66, R67, R68 and R69. This writer has noted previously[7] that their consistent appearance in settlements and cemeteries of the Nile Delta, prior to the postulated arrival of the ‚Naqadans', indicated that sites such as Minshat Abu Omar should not be interpreted as trading posts or pioneer colonies of the Naqada culture (KAISER 1987: 124), but should be understood within their regional Lower Egyptian context. This thought was further pursued by N. BUCHEZ and B. MIDANT-REYNES when they discussed those vessels from Kom el-Khilgan in the Nile

[7] At the Toulouse Origins conference of 2005 (*cf.* KÖHLER 2008). See also MĄCZYŃSKA *in press*.

Delta and proposed that they actually represented a cultural marker of Lower Egyptian culture (Buchez & Midant-Reynes 2007; 2011). This conclusion was primarily based on the observation that the earlier variant R69 (also known as ‚lemon-shaped' vessels) probably developed from comparable vessel forms in the Maadi/Wadi Digla assemblages and also occurred in much lower numbers in the south. In view of our analyses, both points can be supported in principle, but they may also require a more nuanced interpretation. In Buchez and Midant-Reynes' analysis of the Haraga cemeteries the vessels under discussion were divided into type R69, being more elongated in shape, and the more globular types R65-66, and the authors suggested that R69 was the earlier and R65-66 the later variants, which generally can be confirmed. For this study, dated tombs containing these forms have been extracted from Hendrickx's database and plotted according to date. The graph in Figure 2 shows that R69 increases in number and dominates during early Naqada II, whereas R65 and R66 increase slightly later until they outnumber R69 in Naqada IID. Importantly, however, one type does not replace the other, but there is a gradual shift from one more common form to the other over time.

These vessels can all be described as being of small size (usually c. 10-15cm, rarely over 20cm height, Fig. 3), hand-made from a coarse mixture of Nile silt, tempered with straw and sand and fired at medium-low temperatures. Their surface is wet smoothed and rough, frequently coated with a thin colourless, micaceous slip.[8] Importantly, they occur in settlements as well as in cemetery contexts, although there does not seem to be agreement on just how common they are. Buchez and Midant-Reynes observed at Adaima that fragments of such vessels were poorly represented in the settlement sector (Buchez & Midant-Reynes 2011: 840), whereas R. Friedman, who classed them under Type 2d, noted that they were common to all settlement sites in the Badari, Naqada and Hierakonpolis regions (Friedman 1994: 908).

For broader comparative purposes it will be necessary to also include R67 and R68 because they not only share the same characteristics but are also easily confused with R65, 66 and 69. Together, Petrie's R65, R66, R67, R68 and R69 comprise 23 sub-forms (Petrie 1921: pl. XL).[9] It has been suggested that the elongated, lemon-shaped varieties are not only earlier, but also that their origin may be sought in the Maadi/Wadi Digla assemblages (Buchez & Midant-Reynes 2007; 2011). This is very possible but requires closer examination. If this sequence were to be established with certainty, it would then probably describe a gradual development from the more elongated shapes with slightly polished or wet smoothed surface (Maadi Type 3a; Fig. 3: 1-2) to a reduction in size, quality and volume of the shorter, more globular type (Fig. 3: 7, 12). The numerous variations along the way (Fig. 3: 3-6, 8-11) and their chronological overlap, however, undermine any attempt at separating them as distinct types. Because of the aforementioned chronological development as well as their general morphological

[8] Of all the specimens this writer has seen so far, this detail of the micaceous slip is common in both Lower and Upper Egypt.

[9] It is possible that R70 and R90 also belong to this group of vessels.

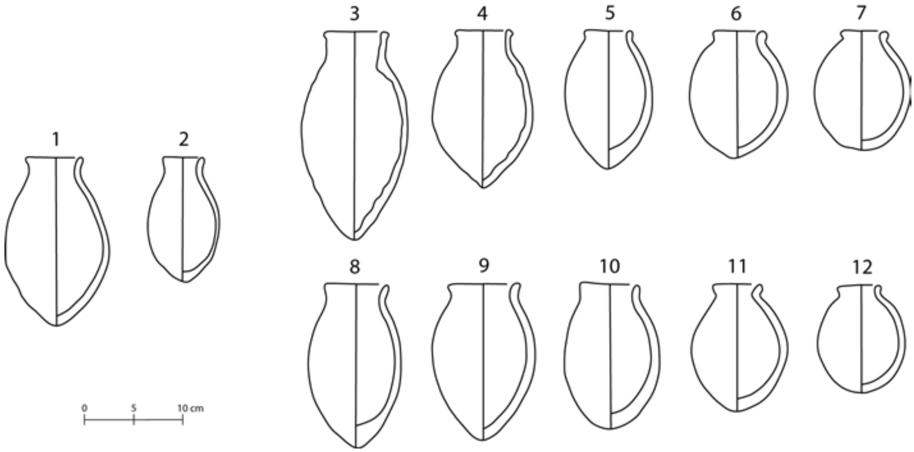
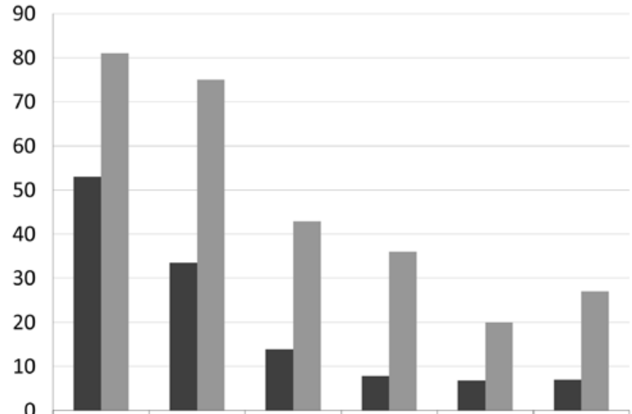


Figure 3. Possible typological sequence of Type 3a at Maadi and R69-65 (nos. 1-2: Maadi, Nos. 3-4 Kom el-Khilgan, nos. 5-12 Salamani. Based on Rizkana & Seeher 1987; El Sayed 1979; Buchez & Midant-Reynes 2007).

and technological similarities, these vessels will be considered as one type group here in order to examine their geographical distribution. To this end, Hendrickx's database, which is largely based on cemeteries south of Maadi, and other published data[10] was consulted resulting in a data set of over 1600 dated graves from 14 sites of the Naqada II period. These produced 1144 specimens of R65-69 from a total of 7231 registered pottery vessels. On average, they make up 15,8% of the entire ceramic assemblage of dated Naqada II tombs across the Egyptian Nile Valley. Because there are so few early cemeteries in the north that have also been classified with Petrie's corpus, and in order to enhance the statistical comparability across the Nile Valley, it will be necessary to focus on the graves from the late Naqada II period (Fig. 4).

In agreement with Buchez and Midant-Reynes, the data show that the further south a site is located, the less is the quantity these vessels take within the overall ceramic assemblage (Fig. 4: dark grey columns) and one is tempted to conclude that a presence of less than 10%, such as across Upper Egypt, would indicate that these vessels played only a marginal role in southern assemblages. Conversely, northern sites exhibit far greater numbers. For example at Minshat Abu Omar (MAO), these vessels make up more than 50% of the pottery assemblage in the early graves and it would be appropriate to conclude that they are indeed more common in the north. On the other hand, this study also examined the context occurrence, *i.e.* the number of tombs where such vessels occurred (Fig. 4: light grey columns), which additionally allows for a more comprehensive picture. In the north such vessels feature in more than 80% of tombs whereas in the

[10] In particular from the more recent publications on Minshat Abu Omar as well as Girza.



	MAO	Fayum Region	Badari Region	Abydos Region	Naqada Region	HK
percent of R65-69 of all pots	53	33,5	13,9	7,8	6,8	7
percent of tombs with R65-69	81	75	42,9	36	20	27

Figure 4. Distribution of R65-69 across different sites and regions in late Naqada II.

regions south of the Nile Delta, this number gradually drops to 20%.[11] But it is also important to look at these vessels' distribution at a regional level. For example in the region of Abydos, comprising the sites of Mahasna, Salamani, Abydos and el-Amra, there is great variance between 21% of tombs at Salamani and 59% of tombs at el-Amra containing such vessels. This is significant when more than half of the tombs at el-Amra contained these vessels, the majority being the lemon-shaped form R69, which have recently been labelled a cultural marker of the north. If that thought were to be followed in its consequence, one would have to ask if the owners of such tombs with R69 were northerners and if southern cemeteries with a high percentage of tombs containing R69 were mixed cemeteries.[12] Further, some of the more poorly equipped tombs in the south, such as Badari 9303[13] or Hierakonpolis HK27/93[14], to mention but two, not only contain this form, but generally also pottery assemblages that are very comparable to northern assemblages at Haraga and Girza as well as at Minshat. In other cases, such as tomb 22 at Salamani, tomb 1563 at Armant as well as tombs 364 and 823 at Naqada, these vessels

[11] The figures from Naqada are to be treated with great caution because vessels of the Rough class seem to be underrepresented in the tomb registers, where more than 60% of tombs of Naqada IICD date did not contain any such vessels. The percentage of tombs containing no Rough pottery at other sites in the south is between 10% and 25% and the low occurrence at Naqada is therefore most unusual. It is not clear if this is due to incomplete recording or indeed reflects reality (see also Hendrickx 1996: 63).

[12] As has been suggested for Girza and Haraga where the combination of southern and northern traits has been equally interpreted as evidence for a mixture of two cultures or ethnies; but see below.

[13] Containing only forms R65, R68, R69 and R94.

[14] Containing only forms R69 (3x) and R76.

represent the only ceramic grave goods recorded, rendering the pottery from these tombs indistinguishable from certain Lower Egyptian graves.[15] The notion of the lemon-shaped vessels being a cultural marker of the north would therefore be difficult to sustain.

When considering this type group's chronological development over a period of some four hundred years between their first appearance in late Naqada I[16]/Maadi/Wadi Digla and their latest occurrence in early Naqada III as well as their wide geographical distribution and morphological variability, it would be reasonable to suggest that, although they may have a northern ancestry, their further typological development occurred contiguously in the different regions.[17] This can be argued especially because of their small volume and poor quality, which would not support the notion of them being manufactured as a specialized trade commodity in one area and then continuously exported over long distances and over such a long period of time.

These figures bring home two very important points; one being that using these vessels as an indication of cultural identity is not advisable (*cf.* also STEVENSON 2009). The other point confirms the general observation about the variability of ceramic assemblages in the area traditionally assigned to the Naqada culture, considering that the occurrence of such vessels ranges between 75% and 20% in just that area. Although the presentation of data here is highly abbreviated and would deserve far more in-depth analysis and interpretation, the examples used and results achieved raise a number of questions surrounding the notion of the Naqada culture as a concept of cultural or ethnic identity. These statistics indicate that late Naqada II funerary ceramic assemblages between the area of the Fayum and southern Upper Egypt exhibit a high level of regional variation, which is in accordance with observations made for the settlements. Although these regions were clearly in contact with each other, as suggested by traded commodities such as Decorated and Wavy Handle pottery and other goods, the spectrum of ceramics likely produced at a regional level (the Rough class as well as Polished Red and Black Topped pottery) varies so significantly that it would be difficult to still argue in favour of overall homogeneity.

2.2. Comparison of funerary pottery assemblages across the regions in early Naqada III

The more excavations at sites in the Nile Delta started to yield material evidence relevant to the question about the roles of Upper and Lower Egypt in the emergence of the early Egyptian territorial state, the more solidified became doubts about the notion of a conquest, invasion or violent takeover of the North by the South as is opaquely suggested by later

[15] It has been emphasized as a significant northern detail by BUCHEZ and MIDANT-REYNES that some graves at Kom el-Khilgan as well as at Haraga only contained the lemon shaped vessels.

[16] According to HENDRICKX' database the earliest occurrence of R69 seems to be in Armant, tomb 1417 dating Naqada IC; R66 occurs first at Salamani tomb 66, also in Naqada IC. The other types of this group appear during Naqada II. However, the author is grateful to RITA HARTMAN for pointing out that the early date of just those two tombs at Armant and Salamani may need to be corrected.

[17] It is possible that the more necked varieties are more typical for the north, although such vessels have also been recorded in the south, *e.g.* at Armant (*cf.* MOND & MYERS 1937: pl. XXVI). PETRIE's type R90 could also be a candidate for such a necked form.

Table 6. Regional funerary assemblages of Naqada IIIAB (Prehistoric Corpus).

Region	Badari	Abydos	Southern Upper Egypt
Sites included	Matmar, Mostagedda, Hemamiya, Qaw	Mahasna, Abydos*	Naqada, El-Kab, Hierakonpolis
Number of tombs included	111	52	93
Number of forms registered	51	67	91

Table 7. Regional funerary assemblages of Naqada IIIAB (Proto-Dynastic Corpus).

Region	Fayum	Middle Egypt	Upper Egypt
Sites included	Tarkhan	Matmar, Mostagedda, Hemamiya	Hierakonpolis
Number of tombs included	473	149	42
Number of forms registered	68	42	20

Pharaonic mythology.[18] Because this notion of conflict could not be substantiated with material evidence, the idea of a cultural process, the ‚cultural unification' of Egypt, was proposed during the early 1990s and pursued ever since, although an ethnic dimension was never fully abandoned. This concept takes the continuous expansion of the Naqada culture from its core zone between Abydos and Naqada as the point of departure and eventually culminates in this culture encompassing also the region around Memphis and the inner Nile Delta by early Naqada III, thereby resulting in only one culture of Upper and Lower Egypt (von der Way 1991-1997; Kaiser 1957-1995). The assumed ‚arrival of the Naqadans' has since been examined in a number of studies and various scenarios of interaction have been added to the discussion, including small-scale migration, acculturation and integration. Although these are acknowledged to be a matter of interpretation, the notion of one material culture of Naqada III, with a ‚registre commun'[19] as a homogeneous entity, was seen in extension of this culture's previous expansion and has long persisted.

The task is to test if the pottery assemblages of this stage exhibit a greater degree of uniformity than previously, although it must be remembered that such uniformity could actually not be established for the south in the first place. This exercise, however, has one great hindrance because some tombs of early Naqada III were classified with Petrie's *Prehistoric*, others with the *Protodynastic Corpus* and again others with entirely different classification systems. It will therefore be necessary to treat such sites separately, which

18 W. Kaiser pondered such doubts already in his early work, *e.g.* 1957: 75; 1964: 114, but continuously returned to his more favored hypothesis of ethnic migration and conquest as that seemed to better reflect the iconography of the time (*e.g.* Kaiser 1990; 1995). The iconography, however, is also not without ambiguities, especially in this context (*cf.* Köhler 2002).

19 Buchez and Midant-Reynes recently explained this expansion by a process of acculturation, but an expansion from south to north explicitly remains as the underlying premise in their model (*cf.* Buchez & Midant-Reynes 2007).

also reduces the level of interregional comparability as the number of tombs in different regions of the same date, which have been classified according to the same system, is now very small. The number of tombs used between Matmar and Hierakonpolis dating Naqada IIIAB and classified by the *Prehistoric Corpus* is 256, whereas the number of tombs used between Tarkhan and Hierakonpolis classified by the *Proto-Dynastic Corpus* is 622 (Tabs. 6-7). Particularly problematic with the *Proto-Dynastic* comparison is that there is only Hierakonpolis in all of Upper Egypt that fulfils the above mentioned criteria, but this site is represented with only 42 graves, which stands in contrast with Tarkhan that features 473 dated tombs. It will therefore be necessary to consider the comparisons of both corpora in order to balance out this statistical unevenness (Fig. 1: C-D).

The greatest consistency arises from the comparison of Tarkhan in the Fayum area with three sites in the region of Badari exhibiting 52% correspondence of types (Tab. 8), which does represent an increase from Naqada II. Although it is more difficult to identify ceramic vessels, which were obviously manufactured for interregional exchange in the *Proto-Dynastic Corpus*, forms 43, 46, 47, 60, 74 and 81, in particular the typological descendents of Wavy Handle and certain Late vessels, are likely candidates. For example form 46, also comprising cylindrical vessels with wavy relief decoration and painted net-designs, is usually made of a very distinct pink Marl clay which probably has its source in Upper Egypt. Vessels like these occur at almost all early Naqada III sites, even at archaeological sites in the Nile Delta, but were in all probability produced in specialized manufacturing centres in the south and traded with other regions.

Comparing the region of Badari with Abydos (Tab. 9) the correspondence in the *Prehistoric Corpus* is 42%, and Northern and Southern Upper Egypt combined show 36% correlation (Tab. 10). When collating the data from both corpora for all of Middle and Upper Egypt, the correspondences are 34% and 38%, respectively (Tabs. 11-12), again with numerous vessel types probably being trade goods. What is very interesting in comparison to the previous Naqada II period, where the degree of correspondence increased in southward direction from 38% to 50%, it is the exact opposite with 52% to 36% in early Naqada III. Also, correlations across Middle and Upper Egypt never exceed 40% in either period and either corpus.

Again, this analysis causes us to seek the postulated uniformity of assemblages in Naqada IIIAB, but when the greatest degree of correlation is at 52%, *i.e.* only 2 percentage points up from the greatest value in Naqada IICD, it may ultimately be a question of semantics and definitions: what makes homogeneity? Is it justified to speak of homogeneous ceramic assemblages when less than half of the forms are undoubtedly manufactured in local ceramic workshops and for local consumption? Is it possible that this oft-cited, yet unconvincing Naqada III uniformity rather represents an extension from equally unfounded concepts of cultural identity in Naqada II that were ultimately the result of ill-conceived projections from ancient Egyptian mythology and state ideology? The answer may come from later periods of Pharaonic material culture and its development over time.

Table 8. Comparison Fayum – Middle Egypt Region (Proto-Dynastic Corpus).

Number of tombs used in both regions	Number of forms recorded in either or both regions	Proto-Dynastic Pottery Corpus forms recorded in both regions	Forms recorded at all 4 sites
580	69	1, 2, 12, 13, 14, 16, 17, 18, 19, 20, 25, 27, 36, 43, 46, 47, 54*, 55, 56, 60, 63, 65, 67, 70, 73, 74, 81, 86, 87, 88, 89, 90, 91, 92, 94, 95	46, 47, 60, 87, 88
Correlation:		36 forms = 52%	5 forms = 7,2%

* Form 54 comprises a very heterogeneous group of open and closed vessel shapes and should therefore be disregarded

Table 9. Comparison Middle Egypt and Abydos Region (Prehistoric Corpus).

Number of tombs used in both regions	Number of forms recorded in either or both regions	Prehistoric Pottery Corpus forms recorded in both regions		Forms recorded at all 6 sites	
163	80	Decorated:	D21, D24, D66	Late:	L36, L53
		Late:	L12, L16, L17, L30, L31, L33, L36, L42, L43, L44, L47, L53, L58		
		Polished Red:	P23, P40		
		Rough:	R1, R22, R23, R24, R26, R36		
		Wavy Handle:	W49, W50, W51, W55, W58, W60, W61, W62, W71, W80		
Correlation:		34 forms = 42%		2 forms = 2,5%	

Table 10. Comparison Abydos – Southern Upper Egypt Region (Prehistoric Corpus).

Number of tombs used in both regions	Number of forms recorded in either or both regions	Prehistoric Pottery Corpus forms recorded in both regions		Forms recorded at all 5 sites	
145	111	Decorated:	D21, D24, D66	Late:	L17, L30, L33, L36, L43, L53
		Late:	L12, L16, L17, L30, L31, L33, L36, L42, L43, L44, L47, L53, L58, L59	Rough:	R26
		Polished Red:	P23, P40	Wavy Handle:	W51, W62
		Rough:	R22, R23, R24, R26, R36, R57, R65, R81, R84		
		Wavy Handle:	W47, W49, W50, W51, W55, W56, W58, W60, W61, W62, W71, W80, W85		
Correlation:		40 forms = 36%		9 forms = 8,1%	

Table 11. Comparison Badari – Upper Egypt Region (Prehistoric Corpus).

Number of tombs used in both regions	Number of forms recorded in either or both regions	Prehistoric Pottery Corpus forms recorded in both regions		Forms recorded at all 9 sites	
256	120	Decorated:	D20, D21, D24, D66	Late:	L36, L53
		Rough:	R1, R22, R23, R24, R26, R28, R36, R88		
		Wavy Handle:	W43, W49, W50, W51, W55, W58, W60, W61, W62, W71, W80		
Correlation:		41 forms = 34%		2 forms = 1,7%	

Table 12. Comparison Middle – Upper Egypt Region (Proto-Dynastic Corpus).

Number of tombs used in both regions	Number of forms recorded in either or both regions	Proto-Dynastic Pottery Corpus forms recorded in both regions	Forms recorded at all 4 sites
149	42	1, 3, 16, 46, 56, 60, 63, 65, 70, 73, 81, 87, 90, 92, 94, 95	46, 60, 87
Correlation:		16 forms = 38%	3 forms = 7%

3. Comparison of early Naqada III with later periods preceding and following political unification

Pharaonic history can be characterized by an alternating rhythm of periods with strong, centralized political and economic control (as during certain dynasties of the Old, Middle and New Kingdoms) and periods of decentralization and political fragmentation of the country (during the three so-called Intermediate Periods[20]). Although the specific historical circumstances for each period differ greatly each time, these phases have a number of general traits. The periods of decentralized governments and regional kingdoms saw a degree of regional autonomy; they could last for more than 300 years with relatively long periods of political stability and prolific interregional exchange. Later, the rulers of new, increasingly dominant dynasties aimed to unify the country under their political power and to reintegrate the other territories into a centralized economic system. The latter however, was not immediately achieved as soon as the country was unified under one dynasty's rule; the process of economic and administrative reintegration of all towns and villages along the river often took a long time and involved the new foundation or deliberate re-establishment of old primary centres (*e.g.* Itj-Tawi, Memphis, Thebes) and dependent secondary centres in order to respond to economic and administrative demands. Hence, when regarding *la longue durée* of almost 3000 years of Pharaonic history, periods of continuously strong political and economic control, as probably during the 4th, 5th, 6th, 12th, 18th, 19th and early 20th Dynasties, are actually the exception, rather than the rule, and burn down to about a third of this time. Unsurprisingly, the development of industries and of material culture followed these dynamics and any delays in economic integration are well-visible in the pottery assemblages of the time. For example, in his comprehensive analysis of the cemeteries from the Old to the Middle Kingdoms, S. Seidlmayer observed that during the First Intermediate Period the ceramic assemblages developed along different regional patterns in Lower and Upper Egypt. The material culture of the provincial sites adhered to these regional traditions until well into the 12th Dynasty, *i.e.* for about 150 years after the point of political unification by king Menthuhotep II of the 11th Dynasty and the historical end of the First Intermediate Period (Seidlmayer 1990). Similarly, archaeologists in the eastern Nile Delta (Tell el-Daba) have observed strong continuity in the composition of ceramic assemblages from the Second Intermediate Period onwards, *i.e.* until about 100-130 after the re-unification of the country by the Theban kings of the 18th Dynasty. The fact that the ceramics hardly changed initially resulted in an incorrect dating of archaeological layers (Bietak *et al.* 1994; Aston 2007). And again, D. Aston observed a time lag of about 100 years after the historical end of the Third Intermediate Period before increased uniformity of ceramic assemblages was again achieved under the rule of the late 26th Dynasty (Aston 1996).

[20] The term ‚Intermediate Period' and the traditionally negative associations with these phases of Egyptian history have been under sound review in modern Egyptology and are no longer considered periods of social or cultural decline, but rather of stronger regional character.

These delays can be easily explained through the locally dominant roles that the political centres of the various regions and provinces played during the Intermediate Periods, which resulted in a regional pottery manufacture that mainly catered for local consumption. It was only in times of strong political control, such as during the later 12th Dynasty when potters' workshops were fully established in the new capital city Itj-Tawi that such economic patterns could be changed and that the workshops of the primary centre again catered for interregional demand and thereby also set the standards for the provinces causing increased homogeneity of material culture. It therefore would be useful to compare the situation of Predynastic and Proto-Dynastic Egypt with those periods of political and economic fragmentation and to use these as analogues for the time before and after the first political unification of the country.

4. Interpretation

This paper has tried to examine the validity of certain archaeological concepts surrounding the interpretation of material culture in early Egypt. Certainly, terms such as ‚culture', ‚identity', ‚ethnicity', ‚acculturation', ‚integration', ‚diffusion', ‚exchange' and the like offer possibilities to explain material difference and change. But it is necessary to use caution and to be sure about each concept's criteria of definition as well as their implications. To this writer, the uncritical use and mixture of such concepts in the past has caused a series of misunderstandings and problematic interpretations that are unhelpful in furthering our learning about early Egypt. And one of these is the linking of pottery assemblages to cultural, ethnic or political identity. This simple equation has been well deconstructed in different parts of the world of archaeology over the past 20 years (*e.g.* Renfrew 1993; Jones 1997; Sherratt 2005 and in particular Hall 1997-2009) and it is opportune that Egyptian archaeology also embrace this awareness. The questions pertinent to the topic of these proceedings, and especially to this paper, are if it is still appropriate to apply early 20th century definitions and distinctions to the cultures of Predynastic Egypt and if any observed variances in material remains are indicative of discrete cultures or ethnic groups.

The issues raised in this paper are very significant because they are generally considered to be at the core of the discourse on the emergence of the ancient Egyptian territorial state. This writer and many others have repeatedly pointed out that one would be ill-advised to employ ancient ideologies and mythologies of Pharaonic kingship and power as a historical source to interpret archaeological evidence. Although this retrospective approach is no longer considered appropriate by most scholars, the consequences of its past application are still present and influential on archaeological interpretations, if perhaps only unintentionally. This is especially relevant to studies on the Nile Delta in Predynastic times since the role of Lower Egypt in the traditional scholarly narratives is one of receiving cultural input, rather than actively contributing to the process of state formation in early Egypt (*e.g.* Seeher 1990; 1991; 1992; but see also Köhler *in press*).

The results of the data analysis comparing funerary pottery assemblages of late Naqada II have one clear outcome: the locally manufactured funerary assemblages across the Nile Valley and Delta share certain characteristics, in particular those types that occur at most sites considered (*i.e.* P40, R65, R69, R74, R75, R76, R81, R84 and R85), which correspond well to types also shared in the domestic sphere, thus supporting the notion of certain common economic and behavioural patterns and, to a degree, of underlying cultural consistency which includes the Nile Delta. However, the correspondences cannot be regarded sufficient to speak of overall uniformity, especially in Middle and Upper Egypt, where such homogeneity had been postulated for a long time. The degree by which the assemblages of the regions in the south increasingly differ from one another in northward direction is very indicative. One could say that the characteristics commonly ascribed to the Naqada culture decrease continuously as one travels down the Nile river and the further north a site is located the less commonalities it has with the south. In consequence, the funerary pottery assemblages of the Nile Delta should be regarded as a continuation of this trend of regional variation and should not be interpreted as representing a different cultural entity, unless a case be made that also the southern regions each represented a different culture, which would also be difficult to sustain. The assemblages at Girza and Haraga have long been acknowledged to be of a mixed character (Kaiser 1990; von der Way 1993: 91; Stevenson 2009; Buchez & Midant-Reynes 2007; 2011). But this detail does not necessarily bear witness to a mixture of two cultures or ethnic groups, but rather to an organic blending of material traits of neighbouring regions in the north and south. Material culture in the Fayum area is as much extracted from and has correlations with Lower Egyptian as with Middle Egyptian assemblages.

Conversely, there is an insufficient degree of increased homogeneity in the locally produced assemblages of early Naqada III in comparison to Naqada II to suggest that the entire Egyptian Nile Valley and Delta now formed part one cultural entity in the sense of ‚cultural unification'. Overall, the degree of uniformity has only increased by a small percentage and the regions continue to manufacture much of their own pottery according to their local demands and resources. This time, however, the correspondences of regional assemblages decrease in a southward direction. In contrast to Naqada II, the larger production centres of Naqada III no longer seem to be located mainly in the south, but also concentrate around the area of later Memphis from where increased standardization can be detected as time goes by. In both periods, certain ceramic types are produced in centralized, specialized workshops which also cater for interregional trade. This flourishing exchange of commodities, which is not reduced to pottery, but also comprises secondary products stored therein, as well as tools, stone vessels and cosmetic utensils etc. is the material evidence for close interregional contacts, which were certainly mediated by people who engaged in such trade and exchange. A similar case could be made with Levantine merchants who may have settled in Maadi and Buto to facilitate interregional trade between the Nile Valley and the Levant in the early 4th Millennium BC, causing a degree of influence on the character of material culture, including house structures, ceramics and lithics. However, no modern archaeologist would want to propose that there was a substantive Levantine migration to or conquest of Egypt. Furthermore, there is no evidence to suggest that larger groups of Upper Egyptians left their homeland and took with them their entire, or even partial set of material culture, technologies and ideologies which they then transplanted in the new area they decided to settle in and control, which is the reasoning behind the concept of Naqada culture expansion. Even if most modern archaeologists would no longer speak of large scale migrations and would rather consider concepts such as acculturation, they still work with the premise of a cultural expansion of the Naqada culture from south to north. For this premise, however, there is simply no evidence, given that what is considered as typical Naqada material culture not only thins out from south to north, but also that northern elements equally spread to the south.

This exchange of material culture is evidence for well established channels of contact along the Nile river which were the actual means of transport through which not only material values, but also ideological and religious concepts were conveyed over long distances with the effect that the regions eventually adopted ideas and customs of their neighbours. It is very possible that one region was the source of inspiration for certain concepts or innovations at a certain time, but such stimulation never remained unidirectional. Instead, there was a continuous and dynamic flow of ideas from different directions; cultural cross-pollination involving north, middle and south as well as areas adjacent to the Nile Valley. It is probably not a coincidence that just at the time when this interregional exchange was at its most active, boat representations became one of the most frequent motifs in two-dimensional art (especially painted media, such as pottery, textile and wall painting, as well as rock art).

We have noted above that despite the observed regional variations in Naqada II there is a degree of consistency in material culture from the Nile Delta to the very south of Egypt, which applies to both the settlements as well as the cemeteries, and importantly, to the locally manufactured material. This observation is perhaps far more important than the regional differences, because it can assist in understanding a significant notion that has been rarely appreciated in the modern literature on the subject. It has been observed previously that the ceramic and lithic assemblages of the Neolithic and early Chalcolithic stages already indicate a degree of material consistency, although to a lesser degree than later. This can be explained, at least in part, because also other key aspects, such as comparable economic and ecological conditions may have resulted in common behavioural patterns already at this early stage. Across the Nile Valley in Predynastic times, the villages' subsistence primarily depended on the growing of crops, such as emmer wheat and barley, as well as the breeding of farm animals, in particular sheep, goats and cattle, although the domesticated pig seemed to be better adapted to the more humid climate of the north (Abd El Karem 2013). This subsistence basis represents the essential foundation upon and around which the lives of Nile Valley inhabitants were centred, and which structured the distribution of labour and overall economic management. Whether they lived in the

Delta or in Upper Egypt, they were equally dependent on the annual river floods, built and organized their dwellings accordingly and subscribed to the same annual plantation and harvest cycles, although it has been suggested that pastoralism of a Saharo-Sudanese character played a greater role in the south in the earlier periods (WENGROW 2006: 45). But ever since the transition to these Neolithic subsistence strategies had been accomplished, the village communities were mostly concerned with the demands of their day-to-day subsistence economy, which was very comparable across the Egyptian Nile Valley, and distinct from neighboring regions, which possibly contributed to forging comparable ideas of land ownership, belonging and identity. Although there was a high degree of mobility in early prehistoric times, Pre- and Protodynastic farmers were probably very much bound to their land and their crops; there was also no cause for mobility at that time. This is supported by regional studies in Predynastic settlement patterns, especially in the Abydos area (PATCH 2004: 914-916), which demonstrate that population was relatively low at all times and that there is no indication of a variation in population density as a result of population shifts from south to north.

Similarly, it is today recognized that earlier suggestions of an unequal social development in north and south are unfounded. Although north and south may have expressed certain ideologies as well as social and economic differentiation differently, as can be measured for example by the effort some southern communities invested in their funerary culture, they both exhibit a comparable overall level of social complexity in Pre- and Proto-Dynastic times (KÖHLER 2008; *in press*). This is not to say that, apart from featuring contracted burials in pit tombs furnished with grave goods, Maadian burial customs are in any way comparable to elite burial customs at Hierakonpolis, especially when considering HK6 with its unusual architecture and numerous animal burials. But neither can the latter in any way be compared to those at Naqada or elsewhere. It is of utmost importance to avoid such simple contrasts between north and south, because also burial customs in the south, and how they potentially reflect their performers' social or economic complexity, are not homogeneous. Importantly, they also continue to differ in later, Pharaonic periods.

We can therefore conclude that despite the acknowledged differences in material culture, which persist well into the Naqada III period, north and south shared a degree of cultural, social and economic complexity which further increased over time. Now these factors are the very foundation, upon which modern archaeology builds its definition of early civilizations (in summary: TRIGGER 2003: 43-52), and it is just these defining criteria that are becoming increasingly evident during the later 4th Millennium BC. Ultimately, they set down the parameters from which early Egyptian civilization could emerge as '*the larger social order and set of shared values*' (YOFFEE 2005: 17) in which the Proto-Dynastic regional kingdoms were culturally embedded and upon which the first territorial state of Egypt was founded. Finally, the absence of uniformity in the material assemblages before the 1st Dynasty, *i.e.* prior to political and economic integration, is not a question of lacking cultural identity, but of lacking centralized economic control in a political landscape of numerous regional polities and kingdoms.

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Some remarks on the visitors in the Nile Delta in the 4th millennium BC

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1. Introduction

In the 4th millennium BC the Nile Delta was settled by a group of people described by archaeologists as the Lower Egyptian culture. Most of the sites belonging to this cultural unit have been recorded in the central and eastern part of northern Egypt (Fig. 1). The western and northern parts of this region is still poorly recognized, however, the occupation of the Lower Egyptian culture has been already attested at some sites, *e.g.* Buto and Sais (von der Way 1997; Köhler 1993; 1998: Wilson 2006; *this volume*).

The origins of the Lower Egyptian culture are not clearly known, but they should be linked probably with the first agricultural communities inhabiting the region, *i.e.* Merimde and el-Omari cultures (Levy & van den Brink 2002: 10; Midant-Reynes 1992: 206; 2003: 53).

The Lower Egyptian culture was the first fully agricultural community in Egypt. In the 4th millennium BC northern Egypt in general and the Nile Delta in particular offered very favourable conditions for farming and animal breeding. Periodic inundations of the Nile irrigated and fertilized the soil, while warm and humid climate was conducive to vegetation. Agriculture and herding were the basic forms of food production in the region. Hunting and gathering seem to have been of lesser importance as compared to the earlier times (Mączyńska 2013: 101-106).

The production of tools and other items in Lower Egypt relied mostly on locally available material (clay, flint, stone, bone), and it did not involve any sophisticated techniques. The resources were obtained from the Delta area and possibly from its direct vicinity. The dominant group of Lower Egyptian artefacts consists of strictly practical household items. Specialisation in Lower Egypt can be observed only with regard to selected areas

Figure 1. The most important sites of the Lower Egyptian culture.

of manufacturing where particular skills were required (*e.g.* stone vessel production; beer production), whereas simple objects and implements were made on a household basis (MĄCZYŃSKA 2013: 112-178; *in press* a).

The Lower Egyptian culture was not an isolated society. The communities inhabiting northern Egypt maintained contacts with Naqadans from the south and the Late Chalcolithic/Early Bronze I societies from the east. Upper Egyptian and Southern Levantine imports registered at Lower Egyptian sites clearly attest the exchange of goods and information between the regions in question (MĄCZYŃSKA 2004: 435-437; 2006: 945-957; 2008: 761-779; 2013).

2. Interactions between the Southern Levant and the Nile Delta

The small distance between the Nile Delta and the Southern Levant was probably one of the factors that influenced the character of contacts between the two regions (Hayes 1965: 122; Wetterstrom 1993: 200). The early traces of these relations can be found in the early Neolithic material recorded at the sites of Lower Egypt, *i.e.* Fayum, Merimde and Wadi Hof; however, these finds are not easy to interpret (Mączyńska 2008: 765-766; Shirai 2010). In the beginning of the 4th millennium BC the Lower Egyptian and the Late Chalcolithic Southern Levantine communities entered probably a new phase of contacts. The Lower Egyptian culture was perhaps the first one with such a significant number of Southern Levantine imports recorded at its sites. The quantity of Lower Egyptian items from this period found in the Southern Levant, however, is not so considerable (Braun & van den Brink 2008; Mączyńska 2008: 769-770; 2013: 181-200).

Due to the scarcity of records, the early relations between the Nile Delta and the Southern Levant are hardly discussed by scholars. The interpretations concerning this problem are often limited to the notions about the sporadic character of contacts. However, most authors are of the opinion that the early relations between both the regions involved the exchange of goods and ideas (Levy & van den Brink 2002: 18-19; de Miroschedji 2002: 39-40; Braun & van den Brink 2008: 644-650; Guyot 2008: 709-714; Braun 2011: 107-108). According to P. de Miroschedji (2002: 39-40) and F. Guyot (2008: 714) the party in charge of organising this exchange were the Southern Levantines. In P. de Miroschedji's view the first Southern Levantines appeared in Lower Egypt in order to recognise the resources occurring in this region. In the opinion of F. Guyot (2008: 714) the Lower and Upper Egyptian societies took part in the exchange rather than organised it. However, some changes in the character of contacts can be observed in the middle of Naqada II period. In the opinion of the author at that time the local societies not only took part in, but probably also organised the exchange of goods and ideas in an active way. Moreover, they benefited from these contacts, adopted new techniques and raw materials, *i.e.* mudbrick architecture, beer production, the use of copper (Mączyńska *in press* e).

Although the organisation of exchange itself is still a subject of discussion, we cannot exclude that the inhabitants of the Southern Levant came to Lower Egypt. Since the character of contacts between the two regions involved mostly trade activities, the visitors were probably in large part traders or intermediaries.

2.1. Archaeological evidence

Archaeological evidence for the interaction between the societies of the Nile Delta and the Southern Levant consists mostly of imports and imitations registered at Lower Egyptian sites, including pottery, flints, stone and copper items. Additionally, special attention should be paid to the material recorded at 3 sites: Maadi, Buto and Minshat Abu Omar, indicating the presence of Southern Levantines in the region (Rizkana & Seeher 1987; 1989: 49-55; Watrin 2000; Faltings 2002; Hartung *et al.* 2003).

2.1.1. Maadi

According to I. Rizkana and J. Seeher (1987: 31) Southern Levantine pottery makes up less than 3% of the material recorded at Maadi settlement. Its eastern origin has been confirmed by petrographic analyses carried out by N. Porat (Porat & Seeher 1988: 215-228). The dominant form of the Levantine pottery recorded at Maadi is represented by round jars with wide, flat bases, high and well discernible shoulders, and roughly distinguished tabular or conical necks constituting approx. 1/3 of the vessel's height. The bottom part of the vessel is usually V-shaped, and the largest diameter is immediately under the neck. Jars of this kind were most probably used for storing goods brought in from the Southern Levant. Nearly all imported jars had lug or ledge handles (Rizkana & Seeher 1987: 53, pls. 72-77). Plastic knobs were fitted to jar handles as decoration. The imported pottery recorded at Maadi includes also a fragment of a jar decorated with rows of short, incised strokes and a fragment with a roughly vertical, parallel painted lines (Rizkana & Seeher 1987: 52-54, pls. 39:2, 77:5,7; Tutundžić 1993: 33-55; Watrin 1999).

Flint tools assemblage registered at Maadi includes items showing close links to the Southern Levantine tradition, such as tabular scrapers and Canaanean sickle blades (Rizkana & Seeher 1985: figs. 7, 10). Both kinds of tools were made of high quality flint, probably in specialized workshops. The origin of the raw material can be identified only in the case of scrapers. It appears that they were made from flint extracted in the western part of the Negev Desert. Analogous scarpers were quite common in the Levant. The manufacturing technology of Canaanean blades, on the other hand, was much more widespread in terms of territorial range. They have been found not only at the Early Bronze sites in the Southern Levant and Lebanon, but also in Syria, Iraq and Kazakhstan (Rizkana & Seeher 1985: 237-254).

The most remarkable stone items imported from Canaan to Maadi include basalt discs (Rizkana & Seeher 1985: fig. 11; 1988: pl. 95). According to N. Porat, who carried out a petrographic analysis of these items, the raw material bears characteristics of basalt extracted at the Negev Desert, and used in the Chalcolithic and the Early Bronze I in the Southern Levant. However, the scholar noticed that similar resource occurs also in the area of the Golan Heights, in Galilee and in Jordan, and it is thus possible that the material came from one of those locations.

Cedar wood artefacts are yet another group of items most likely imported from the east. The objects found at Maadi include a cedar vessel lid and several small cedar sticks, probably used as incense. It has not been determined whether they were manufactured locally or imported to the Delta as ready-made products (Rizkana & Seeher 1989: 25). Among other objects of the Southern Levantine origin are nine bone spatulas found in a cache (Rizkana & Seeher 1989: 22, pl. 8:4-15). Similar spatulas made of calf ribs are known from Chalcolithic sites such as Teleilat Ghassul, where they were commonly used as weaving tools (Mallon *et al.* 1934: 77). Imports from the Levant include also giant shells of *Tridacna maxima* and *Tridacna squamos*, native to the Bay of Suez and the Red

Sea (Rizkana & Seeher 1989: 21), which were used at Maadi as a kind of containers. A turquoise bead recorded at the site is another artefact considered to have been of eastern origin. The raw material in this case could have been mined in the southern Sinai (Rizkana & Seeher 1989: 109).

Important material of eastern origin recorded at Maadi was undoubtedly copper. At the site it occurs in a variety of forms, including finished tools, semi-finished products and ore (Rizkana & Seeher 1989: pls. 3-4). However, no metallurgical workshop was recorded at the site. The description of such a workshop had been included in a report from excavation works carried out in Egypt, published in 1936 by K.H. Dittman, who referred to oral information by M. Amer (Dittmann 1936: 158), but this mention was probably a preliminary interpretation that was subsequently abandoned and removed from the final research report. Mineralogical analysis of the raw material have indicated that copper recorded at Maadi was obtained from deposits located in Timna and Feinan in the Sinai (Rizkana & Seeher 1989: 78-79).

The presence of imports at Maadi clearly points towards the existence of interactions between the Lower Egyptians and Southern Levantines. Some of the foreign items appeared probably at Maadi in effect of trade exchange (*e.g.* copper, or vessels used as containers). Some others, however, may have been personal equipment of traders or intermediaries from the east (*e.g.* flint implements or bone spatulas).

A significant evidence attesting the presence of the Levantines at Maadi are oval subterranean dwellings unearthed in the northern part of the explored area, which differ from the well-known, traditional above-ground structures registered commonly at the site (Rizkana & Seeher 1989: figs. 15-18). I. Rizkana and J. Seeher (1989: 55) have concluded that these oval dwellings were analogous in terms of construction to the subterranean structures recorded at the Beersheba Valley. The researchers have interpreted this similarity as the evidence for the presence of the Levantine traders or metallurgists at Maadi. This assertion is further supported by the discovery of a cluster of pit houses, isolated from the remaining buildings, in the northern part of the settlement (Rizkana & Seeher 1989: 80; Faltings 1998: 374; Watrin 1998: 1218). In the 1990s the expedition from the El-Azhar University headed by F.A. Badawi unearthed a pit house differing from the earlier ones by the use of stone (Watrin 2000: fig. 6). In the years 1999-2002, the German Archaeological Institute (DAI) carried out an excavation project at Maadi, during which another subterranean dwelling was discovered, similar to those known from the publication of I. Rizkana and J. Seeher (Hartung 2004).

In the recent years the existence of clear connection between Maadi and Bersheeba dwellings has been questioned by some scholars (Commenge & Alon 2002: note 14). E. Braun and E.C.M. van den Brink (2008: 649-650) suggest even that the chronology of Maadi structures is later (EB I). According to U. Hartung (2004), all known subterranean structures recorded at Maadi indicate the gradual development of the settlement's architecture, associated with increasingly vast experience of builders and the use of a new building material (stone) in constructing residential structures. This could point towards the longer presence of the visitors from the east at the site, or their regular visits at Maadi.

Maadi cemetery, unlike Maadi settlement, did not contain vessels either linked to Southern Levantine traditions or imported from the Southern Levant (RIZKANA & SEEHER 1990: 26). The graves of another necropolis at which Maadians probably buried their dead, *i.e.* Wadi Digla, contained vessels whose decorations or fabric only followed the eastern traditions. Such vessels were found in graves from the younger stage of the cemetery. The paste used for manufacturing those pottery items was tempered with crushed limestone, in some cases added in great amounts. However, petrographic analyses have shown that the key component of the paste was local Nile clay.

Wadi Digla vessels bearing the Levantine characteristics include three red burnished jars with lug-handles on the neck (RIZKANA & SEEHER 1990: pls. 4; 34, 47). According to I. RIZKANA and J. SEEHER (1990: 87), they most probably imitate stone vessels that were fairly common in the Southern Levant. Another group of finds of the Levantine origin consists of five jars not covered with a red slip, with high amount of crushed stone temper, three of which had knobs and impressed dots.

Flint items are very uncommon for the cemeteries of the Lower Egyptian culture and they are rarely found in its graves. A single tabular scraper recorded at Wadi Digla (grave WD401) in terms of material and form resembles scrapers well known from Maadi, where they are interpreted as Canaanite imports or their imitations (RIZKANA & SEEHER 1990: 90).

Almost complete absence of imports in the graves of Maadi cemetery may have resulted from the lack of tradition of equipping the dead in a large quantity of valuable offerings in this early period. Despite the fact that the inhabitants of the settlement at Maadi possessed objects of special character, including imports from the east, they equipped burials mostly with one or two locally made ceramic vessels, sometimes imitating the imported jars.

2.1.2. Buto

Southern Levantine pottery is present in Buto inventories from phases I and II. In phase I, pottery similar to Chalcolithic vessels makes up approx. 30% of the entire material (FALTINGS 1998: 367; FALTINGS 2002). Vessels from phase Ia are characterised by a typically Southern Levantine fabric, form and decorations, while in phases Ib and IIa there appear vessels made of local material, whose forms and decoration types are linked to the Levantine pottery. According to E.CH. KÖHLER (1993) and D. FALTINGS (2002), the changes in the features of pottery were associated with the presence at the site of a group of immigrants from Canaan who must have assimilated into the local community, adopting local cultural traditions including pottery production. This merger of the Levantine and local ceramic styles resulted in the production of so-called hybrid vessels. Over time, technological innovations introduced by the immigrants from the Southern Levant (such as the use of the turning device), were discarded, possibly due to the lack of specialized pottery workshops and the prevailing household mode of production.

Vessels similar to the Chalcolithic Levantine pottery are represented by V-shaped bowls with a painted rim decoration of white stripes, vessels with a pie-crust rim and fenestrated bowl-stands. This group includes also holemouth jars (fairly numerous in Buto) and large storage jars with white painted bands on the shoulder or a white strip applied on the upper part (FALTINGS 1998: 367; 2002: 165-168; FALTINGS *et al.* 2000: 135-136). Additionally, on the basis of fragments of bases, bodies and rims, T. VON DER WAY (1997: 106-107, Taf. 44:16) reconstructed a Levantine jar with a cylindrical neck, simple rim and oval body, with a characteristic cream-colored surface. The petrographic analysis has shown that this vessel was made of typical Canaanite marl clay, characteristic for EB I, found *e.g.* at Azor site. In terms of morphology the reconstructed jar resembles Maadi jars, classified by I. RIZKANA and J. SEEHER (1987: 73) as the Southern Levantine imports. Foreign origin is also attributed to two fragments of flat bases made of ceramic paste tempered with crushed bones. Other Southern Levantine elements include characteristic handles, knobs and a fragment of a churn or a bird vessel, again similar to a piece found at Maadi (VON DER WAY 1997: 106; FALTINGS 1998: 367; FALTINGS *et al.* 2000: 135-136).

Imitations of imported vessels such as V-shaped bowls and holemouth jars appeared at Buto first in phase Ib. Although vessel shapes remained unchanged, their manufacturing technology was gradually adapted to local conditions. Potters began to use locally available clay and replace mineral temper with increasing amounts of straw and chaff.

V-shaped bowls with spiral reserved decoration form another group of artefacts useful for investigating the contacts of Buto inhabitants with Canaan. They include 13 fragments of at least 10 different bowls. Although a controversial hypothesis on their Mesopotamian origin had once been presented, the said fragments eventually came to be considered as imports from the Chalcolithic Southern Levant, where they are found quite commonly, for instance in the vicinity of Beersheba and the northern Sinai (FALTINGS 1998: 367-371). Also clay nails recorded at Buto should be linked probably with characteristic ceramic forms, *i.e.* cornets, known from nearly all Beersheba sites (FALTINGS 1998: 374-375).

The presence of the Levantine pottery imports at Buto was confirmed by petrographic and chemical analyses. In the result of the research by N. PORAT (1997), only five samples are classified as Canaanite imports. It turned out that the pottery was made of calcareous clay tempered with well sorted sand and quartz, and in some cases with calcite. Precise identification of the origin of this clay proved impossible, because sources of calcareous clay can be found all over Canaan. Similar petrographic and chemical features have been observed *e.g.* in the pottery from Azor. According to N. PORAT (1997: 231), it goes beyond reasonable doubt that the analysed samples came from vessels manufactured in the Southern Levant.

Moreover, the petrographic analysis has proved that clay of local ceramics showing typological similarities to the Levantine vessels was tempered with phosphorite and had high concentrations of P and Ca. This type of pottery was unknown in the early and middle Predynastic period either in Egypt or in the area of today's Israel. Buto was thus the only place where this technology was used. According to N. PORAT (1997: 229), phosphorites could have been added to clay in order to preserve the the bright surface colour. As a result, vessels resembled Levantine pottery not only in terms of shape, but also in terms of colour. The fact that on the basis of analysis Buto pottery was classified as the Levantine one shows that the local potters had been quite successful.

As far as flint inventories are concerned, the links between Buto and the Southern Levant are rather unimpressive. K. SCHMIDT (1987: 253, Abb. 5:6-7, 10-11) mentions two bifacial sickle blades with flat surface retouch. He sees their origins in the Chalcolithic Canaan, where such artefacts are fairly common. Another findings associated with the Chalcolithic period in Canaan are microlithic endscrapers from Buto, with distinctive little retouch on their working edges (SCHMIDT 1986: 204; 1993: 275). Eastern origin can also be attributed to flat tabular scrapers made of characteristic flat flint nodules. The scrapers were oval and had cortex on the dorsal surface. According to K. SCHMIDT (1988: 297-306, Abb. 9.1-3; 1996: 270), they should be considered as imports from the Levant, where their manufacturing traditions are dated from the Chalcolithic to EB III (ROSEN 1983: 79-86; 1997: 75; *this volume*). In the light of recent analyses, there is no doubt that the obsidian recorded at Buto was also of eastern origin (BAVAY *et al.* 2004).

Apart from ceramic vessels and flint implements, imports recorded at Buto include items made of other kinds of material. In the assemblage of basalt vessels T. VON DER WAY (1997: 109, Taf. 48-51, 54) identified a fragment of a bowl with a characteristic swelling of the walls between the rim and the base. The origin of the basalt material has not been fully confirmed in this case, even after petrographic analyses. In terms of shape the bowl resembles the vessels found in EB I contexts in the Southern Levant (VON DER WAY 1997: 110, footnote 623). The artefacts of the Lower Egyptian culture found at Buto include also three copper artefacts: a fishing hook, a wire and a piece of unknown function. Just like copper items found at Maadi, these objects were made of the raw material that came from the area of Feinan and Timna in the Sinai (PERNICKA & SCHLEITER 1997: 219-222).

To sum up, the archaeological data recorded at Buto indicate that the majority of imports dated to phase Buto I, including pottery vessels, flint implements and stone vessels may have appeared at the site together with a group of foreigners from the east as their equipment. In later periods, after the assimilation of immigrants with local communities, the imports could have reached the site in the effect of trade exchange with the east.

2.1.3. Minshat Abu Omar

Grave offerings from the necropolis at Minshat Abu Omar include 20 Southern Levantine vessels. Most of them were found in the oldest graves, dated to Naqada IIc-d (KROEPER 1989). One of the most intriguing artefacts is a jar with ledge handles used as a coffin for a fetal burial (grave 316). The jar was made of yellowish clay with ceramic and mineral temper. It had a flat bottom, wide body, rounded shoulders, concave neck and rounded, overhanging rim. Its surface shows traces of red paint and also a diagonal strip decorated in a rope-like pattern. Vessels similar in terms of form and fabric are known from Maadi (Kroeper 1989: 407-410, fig. 2a). In grave 840 the bottom part of a similar vessel with ledge handles was found; however, in this case, a fragment of a loop handle was preserved in the upper part of its body. Due to the vessel's incompleteness, one cannot preclude that on its opposite side there was another loop handle (Kroeper 1989: 410, fig. 3). Loop handles are also present on a fully preserved vessel from grave 799, which is additionally characterised by a horizontal strip of clay between the handles, deeply scored vertically (see also Czarnowicz *this volume*). Both vessels represent one of the most frequent vessel types known from EB I sites in the Southern Levant, *e.g.* in Arad, Ai and Jericho (Kroeper 1989: 411).

Another interesting group of vessels consists of 2 spouted jars. The first of them, found in grave 303, have a broad, flat base, a round body and probably a conical neck. The spout was located in the upper part of the vessel, at the body-to-neck transition. At the same height two loop handles were attached. The other jar was smaller, had a round body, a very short neck and a simple, slightly everted rim. The spout was located in the upper part of the body. K. Kroeper (1989: 416) mentions the Southern Levantine parallels from Fâr'ah and Jericho for both of those jars.

Vessels known as churns come from graves 787 and 313. The first one is a small oval vessel with a spout at the top, flanked by two upright loop handles. The other vessel had an oval body and an asymmetrical spout flanked by two loop handles. Its top was decorated with impressed parallel rows of small circles. Both vessels are charecterised by a remarkable – brittle and flaky – fabric (Kroeper 1989: 416-417, figs. 8a, 9a). Churns similar to vessels from Minshat Abu Omar have been found in the Southern Levant, but even there they are considered rare. Thus far, 11 such specimens have been collected, *e.g.* in Azor, Gezer, Jericho, Palmahim Quarry, Tel Erani and Horvat Ilin Tahtit (Braun & van den Brink 1998: 82; Czarnowicz 2012b: 248-249). Other eastern imports recorded at Minshat Abu Omar include a small jar with two lugs found the grave 221 (Kroeper 1989: 412, fig. 5a).

All the vessels presented above were classified as imports by K. Kroeper (1989). However, detailed studies showed that in the case of two ones, *i.e.* the keg or churn-type vessel from grave 313 and the ledge handles jar from grave 840, clay bears rather local Egyptian than Canaanite characteristics. According to J. Riederer (1992) the calcite temper present in these two vessels came from the Eocene Theban formation extending between Cairo and Esna. In the opinion of K. Kroeper (1992: 30) both vessels could be made locally, but by means of a new technology involving the use of crushed limestone and calcite as tempers. The scholar claims that this new technology may have been shown to the local population by foreign potters, but did not gain popularity due to the low firing temperature required for the process.

Copper items were found in several of the oldest graves of the necropolis. Noteworthy is a harpoon with a single barb (grave 761) and a bracelet made of thin twisted copper wire (grave 806) (Kroeper & Wildung 1994: 151, Taf. 41; 2000: 30). Copper beads were found in two graves: grave 755, containing 2 cylindrical beads made of copper sheet, and grave 663, containing a small round bead (Kroeper & Wildung 1994: 49, Taf. 8:17). Graves 224, 231 and 323 comprised strongly corroded needle or needle-shaped objects. Thus far no information has been published about the origin of copper material used to manufacture the items from Minshat Abu Omar. Due to the vicinity of the necropolis to the Sinai it is reasonable to assume that copper came from the deposits occurring in this region. In some graves malachite was found, the resource whose origin could be strongly linked to copper.

The imports from the east recorded at Minshat Abu Omar together with local ceramics attest the existence of trade relations between the Southern Levantines and the communities inhabiting the settlement located in the vicinity of Minshat Abu Omar cemetery. This settlement was probably situated on trade routes and its location in the eastern Nile Delta facilitated the transfer of goods further to the east and south. Imports recorded in graves of Minshat Abu Omar do not point directly towards the presence of foreigners from the east. However, due to specific location of the site such a possibility cannot be excluded. Puzzling in this case is the temper of Egyptian origin in two vessels indentified as imports. According to excavators, they may be the evidence of the presence of foreign potters at the site.

2.1.4. Other sites

At other sites of the Lower Egyptian culture the number of imports from the east is not so considerable. At the cemetery of Heliopolis, which is partly contemporary to Maadi settlement, only three jars were probably of the Southern Levantine origin. According to F. Debono and B. Mortensen (1988: 30-31), they are similar in terms of fabric to the vessels from the Southern Levant recorded at Maadi. Most likely they were made of calcareous clay with numerous limestone inclusions becoming cream or pink after firing. Occasional red or reddish-to-brown inclusions had the same structure as the paste and could have been fine fragments of either pottery or ochre.

In terms of shape, there is not much differentiation among Heliopolis vessels. One of the jars has a round body, a wide and high conical neck with a straight rim and a wide, flat base (Debono & Mortensen 1988: pl. 8/13:1). Similar Levantine vessels are known from Maadi, however, their necks are longer. In addition, jars of this kind have lug handles or knobs. The other jar is incomplete – only the base part has been preserved. It is characterised by a knob typical for Canaanite pottery. The third vessel of probably the Southern Levantine origin found at Heliopolis is a round jar with a wide base, a high neck and a straight rim. Similar jars with handles are known from Maadi. F. Debono and B. Mortensen (1988: 34) are of the opinion that although the Southern Levantine vessels from Heliopolis are dated to the beginning of EB IA, they show more similarity to the Chalcolithic, rather than to EB I pottery.

The trait of pottery recorded at Heliopolis that may point towards the eastern influence is the coating of light, beige or cream wash, which was possibly applied in order to make local vessels similar to the Southern Levantine cream ware (Debono &

Mortensen 1988: 34). Apart from pottery, unidentified copper items, a single fragment of a copper bracelet (grave 34) and small fragments of malachite were found at Heliopolis (Debono & Mortensen 1988: 16, 36).

At younger Lower Egyptian sites the quantity of imports is higher, but still relatively small as compared to the inventories of Maadi and Buto. However, it should be emphasized that some of those sites are still excavated and new discoveries can change our view in this matter.

In the case of Tell el-Farkha, thus far the exploration of Lower Egyptian layers has yielded only a handful of the Levantine imports, mostly vessel fragments with characteristic ledge handles. This type of handles, commonly referred to as "folded" ledge handles, first appeared in the Southern Levant in EB IA (Braun 1996: 93; Czarnowicz 2012b; Mączyńska 2013: pl. 10). Handles of this kind are well known from numerous locations at Site H (Roschwalb 1981: fig. H.7:5) Taur Ikhbeineh III-IV (Oren & Yekutieli 1992: 337, fig. 12:11) and Azor (Golani & van den Brink 1999: fig. 12.9).

Pottery imported from the Levant was recorded also during explorations of earlier layers at Tell el-Farkha. Noteworthy is a large jar, almost completely preserved, made of light, creamy clay with coarse mineral temper making the walls rough. In terms of form (a broad, oval body, narrow, slightly everted rim, two ledge handles in the lower part of the body and a narrow base) it resembles jars known from EB I sites in the southern Israel, such as Site H, Afridar Quarter of Ashqelon (Mączyńska 2003; 2013: pls. 22-23; Czarnowicz 2012b: 246-247).

Other finds recorded at Tell el-Farkha include a partially preserved copper knife (triangular, rounded-tip blade) found in the Lower Egyptian residence (Chłodnicki & Geming 2012: 98; Mączyńska 2013: pl. 17). No analogous findings from other Lower Egyptian sites are known. Similar artefacts were recorded at Ashqelon site in Israel dated to the EB IA2 period, corresponding to the period in which Tell el-Farkha's Lower Egyptian residence had been developed (Czarnowicz 2012a: 351; see also for Ashqelon Golani *this volume*). The analysis of chemical composition has confirmed that the knife was made of copper derived from the Sinai (for details see Rehren & Pernicka *this volume*).

Lower Egyptian layers at Tell el-Iswid yielded 95 fragments of vessels believed to have been imported from the Southern Levant and Upper Egypt. However, no detailed information about those imports is available (van den Brink 1989: 67, note 14). Similarly, no details have been published so far about pottery imported from Canaan, found in phase 7 layers at the site of Tell Ibrahim Awad (van den Brink 1988: 65-84; 1992: 43-68).

It is worth to mention here that the excavations carried out at Tell el-Iswid by the French Institute of Oriental Archaeology (IFAO) in Cairo revealed fragments of the Southern Levantine vessels. They were made of loess clay tempered with coarse quartz and sand mixed with crushed calcite. Due to their bad state of preservation the identification of vessels forms is in most cases impossible. Only in one instance a ledge could be identified (Guyot *in press*: 2-3, 17, fig. 11.5)

Flint inventory from Tell el-Iswid and Tell el-Farkha bears all the characteristics of the Lower Egyptian culture. Traces of contacts with the east are very scarce. The only foreign, eastern find in this assemblage is obsidian of Anatolian origin (Pernicka 1996: 286). At both the sites obsidian knifes made according to the technology characteristic of Upper Egypt were recorded. It is likely that the material reached southern Egypt via the colonies of the Uruk culture in northern Syria, and subsequently via the Levant and Lower Egypt. In the form of a finished product it was traded between the Naqada culture centers and the northern settlements (Schmidt 1989: 90-91; 1992: 34).

In the case of Tell el-Farkha and Tell el-Iswid archaeological evidence indicates clearly the existence of trade relations/contacts with Canaan. However, the data we have do not allow us to either attest or exclude the presence of visitors from the east at those sites.

2.2. Summary

Imports recorded at Lower Egyptian sites can be divided into two groups (Tab. 1). The first one includes items that attest the presence of the Levantine people in Lower Egypt, and the other comprises finds which, although not precluding the presence of foreigners, are clear evidence of trade exchange between the two regions. To the first group belongs the material found at Buto, where apart from local communities, a group of foreigners was settled. Initially the migrants maintained their cultural identity, but over time they assimilated into regional conditions and culture. These people brought with them their own equipment, including pottery or flint implements, which differed from locally manufactured objects. The second group consists of artefacts that appeared in Lower Egypt in the result of trade exchange. They were probably exchange goods, and possibly in part also personal equipment of traders/foreigners. The example in this case is the site at Maadi, which was visited by traders from the east. The presence of typical eastern subterranean building structures at the site points towards long and probably frequent stays of the traders at the settlement. Some imports, *e.g.* spatulas, tabular scrapers or Caananean blades may have been their personal equipment.

The chronology of analysed artefacts of both groups indicates that foreigners from the east came first to Buto in the late Chalcolitic period, which was contemporary to Naqada I, the time of crucial cultural changes in the Southern Levant. Imports from other sites are dated already to EB I and they are associated with the intensification of trade exchange between the regions in this period. Even the suggested presence of foreign potters at Minshat Abu Omar would have been related to the location of the site on trade routes connecting the Southern Levant with Lower and Upper Egypt, and to trade activities taking place at the settlement.

Interesting finds are the local imitations of eastern products. They also can be divided into two groups. The first one includes all the artefacts that were manufactured at Buto by the migrants with the use of local recources. These items were made probably as the „expression of identity" (*cf.* Bauer 2008: 90). It is worth noting that not only forms,

Table 1. Southern Levantine imports and imitations on the Lower Egyptian sites.

Character of finds	Description of finds	Maadi	Maadi cemetery	Wadi Digla	Heliopolis	Buto	MAO	Tell el-Farkha	Tell el-Iswid	Tell Ibrahim Awad
Imports	equipment of foreigners	x				x				
	exchange items	x			x	x	x	x	x	x
	flow of ideas	x								
Imitations	made by foreigners					x	?			
	made by locals	x		x	x	x				

but to some extent also the technology of the foreign items was copied. For instance, adding a large amount of phosphorites gave the pottery vessels bright colour, making them similar to imported ceramics.

The second group of imitations consists of objects, which were manufactured by Lower Egyptians, and bore characteristics of foreign items in terms of technology, forms and/or decorations. The reasons for producing such items is difficult to explain, since they may have been associated with some factors elusive today for archaeologists. Possibly the imitations of this kind were manufactured due to high value of original imports, their limited accessibility or some local conditions. In the assemblage of Lower Egyptian imitations very difficult to classify are two vessels found in graves 312 i 840 at Minshat Abu Omar. Made probably in Egypt, they imitated Southern Levantine technologies and forms. According to K. Kroeper they were manufactured by foreign potters in Egypt. However, the reason for producing such items is not clear. At present it is not possible to determine whether these vessels were the „expression of identity" of potters, or whether they were made at the site in response to high demand. Minshat Abu Omar, located on a trade route leading from the east to south, was probably a place of intensive trade exchange.

3. Upper Egyptians in the Nile Delta

The relations between the Nile Delta and Upper Egypt prior to Naqada IIC period seem to have been sporadic. The distance between these two regions certainly did not facilitate the contacts. It is believed that the Naqadans began to take more interest in the north at the end of Naqada I, the period of social changes in the south. Social differentiation process fuelled the demand for prestigious items that denoted special status of their owners. And this, in turn, must have led to the intensification of interregional contacts (Köhler 2010: 39-40). Lower Egypt was one of the areas were the sought-after items were available. Typical Lower Egyptian objects were innumerous at southern sites, as the Naqadans were probably interested mostly in items imported by the local communities from the Southern

Levant. Naqada I and the first part of Naqada II were the periods in which the demand for prestigious objects had just emerged, and hence the scale of exchange was not large, which can be attested by a small number of imports recorded in the materials from Upper and Middle Egypt dated to these times (*cf.* WATRIN 2003: 568-570). In return for the eastern goods Lower Egyptians could obtain Upper Egyptian items.

The second half of Naqada II period witnessed more intensive contacts between the societies of Lower and Upper Egypt. The number of Upper Egyptian imports, especially pottery, increased in the Nile Delta, *e.g.* at Tell el-Farkha and Buto (MĄCZYŃSKA 2004: 435, 438-439; JUCHA 2005: 55-56). This period, referred to as the Lower Egyptian-Naqadian transition, was the time in which the Lower Egyptian and the Naqada culture underwent changes. The middle of Naqada II period is often associated with one more term, *i.e.* Naqada expansion. The most important reasons for the suggested expansion are attributed to the Naqadans' desire for Lower Egypt wealth and control over trade with Southern Levant (SIEGEMUND 1999; WILKINSON 1999: 311; BARD 2000: 58; CIAŁOWICZ 2001; CAMPAGNO 2004). The majority of authors who use this term assume that there must have been a movement of people and an arrival of Upper Egyptians to Lower Egypt (*e.g.* KAISER 1964; 1985; 1987; 1990; WILKINSON 1999: 17; CIAŁOWICZ 2001: 209–210; MIDANT-REYNES 2003: 45; KEMP 2006: 88). Since the Naqadans are seen as the dominant party in this process, their culture is believed to have influenced or even replaced the local one (*e.g.* BARD 2000: 58–59; BUCHEZ & MIDANT-REYNES 2007; 2011). Although the data obtained in the excavations carried out in recent years have called into question the Naqadian expansion to the north, the problem is still widely discussed (KÖHLER 2008; *this volume*; BUCHEZ & MIDANT-REYNES 2007; 2011; MĄCZYŃSKA 2011; *in press* c).

3.1. ARCHAEOLOGICAL EVIDENCE

Imports from Upper Egypt are not numerous at the sites in the Nile Delta. They are comparable in terms of quantity to imports from the Southern Levant, and include mostly pottery, flint tools, stone items. It is also believed that the use of mudbrick and beer production were ideas taken from Upper Egypt.

3.1.1. Maadi

Maadi is a site with the highest number of Upper Egyptian items dated to Naqada I and the first part of Naqada II periods found in the north.

Interesting group of imports recorded only at Maadi includes pottery with a characteristic black rim zone. In Upper Egypt blacktopped vessels make up over 50% of pottery assemblages in Naqada I period (HENDRICKX 2006: 71). At Maadi a total of 12 fragments of imported vessels was registered. They were made of Nile clay with mineral temper of sand and crushed stone. Vessel surface was covered with slip, either dark red, plum or red brown. The rim zone was colored black, both inside and outside.

Break color in the rim zone is also black, and it changes to red brown with a black core in the other parts of the vessel. The entire surface was polished very well, either vertically or diagonally, with a hard object[1].

Blacktopped ware of Maadi includes jars, beakers and bowls (Rizkana & Seeher 1987: pls. 68-71). The majority of jars are quite small, and the most characteristic ones have a squat body and a straight ogival rim. S-profile beakers constitute a fairly homogenous group. One of the forms is characterized by a diameter increasing gradually from base to rim, giving the vessel a tulip-like profile. The relative small number of bowls as compared to jars and beakers is in line with the general scarcity of these forms at the entire site (Rizkana & Seeher 1987: 5).

In Upper Egypt blacktopped pottery was usually deposited as grave offerings. However it seems that in the north the function of such vessels was different. No graves containing vessels of this kind were found at the contemporary cemeteries of Maadi or Wadi Digla. It seems that such vessels were used by the inhabitants of the settlement, rather than offered as grave goods.

Additionally, Maadi settlement contained local imitations of blacktopped vessels. Small quantity of these items may suggest their high value and probably some limits in their accessibility. Local imitations of blacktopped ware differ from imported originals by the presence of organic temper, and by the character of the black rim zone. In vessels manufactured locally only the outer surface is black, while break color is light brown or red brown. Furthermore, only the outer surface of the vessel is covered with slip. Imitations of blacktopped ware are not crafted as carefully as originals, but in terms of form they resemble the foreign original items.

The inhabitants of Maadi possessed also vessels made of other kinds of material. Interesting finds are 3 ostrich shell vessel fragments (Rizkana & Seeher 1989: pl. 5), which were used probably only for specific purposes. They are decorated with engraved ornamentation inlaid with black pigment. The main decoration motif is a row of alternating hatched triangles. In addition, the base of one of the shells features an engraved circle with two zigzag lines inside. Similar decorated shells are known from Predynastic assemblages of Upper Egypt, *e.g.* from Naqada cemetery (grave 1480), where an ostrich shell with two engraved deer was substituted for the skull of a deceased (Petrie & Quibell 1896: 28). A geometric decoration motif of hatched triangles and zigzag lines can also be observed on Upper Egyptian wooden ostrich shell model of unknown chronology, on one of clay ostrich shell models from Abadiyeh – grave B101 – SD 34 (Petrie 1901: 33, pl. V), and on the Naqadian pottery (Petrie 1921: pls. XXIII 74; XXIV 32; XXVI 32; XXVII 67). Shell vessels may be considered as imports from the south.

Also the assemblage of flint tools registered at Maadi includes imports from the south. Two knives are particularly remarkable, as they are distinct from local items by the form and manner of manufacturing. One of them is finished with a fish tail edge, and

[1] For more details about the methodology of obtaining black rims of this kind see Rizkana & Seeher 1987: 27; Lucas & Harris 1962: 380; Davies 1962; Hendrickx *et al.* 2000: 171-187; Baba & Saito 2004..

the edge of the other knife is pointed. Both knives are treated as Upper Egyptian imports characteristic of the southern flint tradition of Naqada I and II periods (Rizkana & Seeher 1985: 238, fig. 8:1-2).

Other remarkable objects recorded at Maadi, important in the context of Lower Egyptian-Naqadian relations, include carefully crafted slate rhomboidal palettes with polishing on both surfaces. More than a dozen items, preserved mostly in fragments, were unearthed at the site. They should be considered as imports from the south, as palettes of this kind were very characteristic finds at the sites of Naqada I culture (Rizkana & Seeher 1984: 244).

Other Upper Egyptian imports recorded at Maadi, mentioned by I. Rizkana and J. Seeher (1984), include 4 two sided square combs (3 made of horn and one of bone) and 6 disc maceheads. In the case of stone vessels the identification of imports is difficult. In the opinion of I. Rizkana and J. Seeher (1984: 244) the majority of vessels of this kind recorded at Maadi, particularly basalt ones, were produced in the south. However, according to the present state of knowledge they are considered to have been produced in specialised workshops in the north (Mallory 2000; Mallory-Greenough 2002; Köhler *in press*; Mączyńska *in press* a).

In contrast to Maadi settlement, Maadi and Heliopolis cemeteries do not contain any Upper Egyptian imports. Among grave offerings at Wadi Digla burial ground, at which the inhabitants of Maadi buried their dead, only a fine specimen of a rhomboid slate palette was registered (Rizkana & Seeher 1984: 251).

3.1.2. Minshat Abu Omar

Minshat Abu Omar is another important site for the study of contacts between Upper and Lower Egypt. The oldest graves (group I) have long been treated by scholars as burials of a Naqadian cemetery, and consequently presented as the evidence for the Naqadian expansion in the north (*i.e.* Ciałowicz 2001: 92; Kaiser 1985; 1987; Midant-Reynes 1992: 178, 206; 2003: 163; Wengrow 2006: 84). Burial customs identified at the site were interpreted for many years as ones of a typically Upper Egyptian character. This view was largely influenced by the observable resemblance between the oldest graves from Minshat Abu Omar and the graves from cemeteries regarded as the most northern Naqadian sites, *i.e.* Gerzeh and Harageh, and also by the fact that most scholars emphasised the differences in equipment between the graves of groups I and II and ones from other Lower Egyptian cemeteries, *i.e.* Maadi, Wadi Digla and Heliopolis.

The cultural identification of the oldest graves from Minshat Abu Omar was first questioned by E. Ch. Köhler (2008: 528). The scholar indicated that ca. 55% of vessels found in graves dated to MAO I can be classified as Petrie's type R65-69 (*i.e.* lemon and bag shaped jars). She also attested the presence of fibrous temper in some Red polished jars that she investigated in the collection of the Munich Museum. All the above information has led her to conclude that the graves of group I from Minshat Abu Omar are entirely Lower Egyptian in character. Moreover, Köhler's view is followed by the author (Mączyńska *in press* d). The archaeological evidence represented by ceramic assemblages and burial custom points to a local character of burials. The graves of group I from Minshat Abu Omar should no longer be treated as the Naqadian ones (see also Dębowska-Ludwin *this volume*).

Offerings recorded in the oldest graves of group I include, beside local pottery, also Upper Egyptian D-ware and W-ware. Group I includes 5 graves containing D-ware and 14 graves containing Wavy handles vessels. In the case of D-ware noteworthy are 4 small, squat, lug handles jars corresponding to Petrie's D9c type. 2 of them are painted with a dark red spiral motif. The decoration of other vessels consists of wavy, parallel, horizontal lines; additionally, in one case wavy lines on the body are interrupted by a line of horizontally arranged 'ZZ' pattern. Particularly interesting is an oval, lug-handles jar showing the representation of 2 painted boats with 2 cabins in the middle. Between the ships, immediately below them, are placed 2 trees and a mountain's cape made up of 5 triangles. Additionally, between the trees there are 2 rows of 'S' lines. All of D-ware vessels from the cemetery are dated to Naqada IIc-d period (Kroeper 1985: 12-14, figs. 1-4; 1986/87: figs. 3-5; 1988: figs. 23-25, 57-61).

Wavy handles jars were identified by K. Kroeper in 33 graves, of which only 14 belong to group I. All W-ware vessels from Minshat have been divided into 4 groups, representing chronological sequence of the development of this form during Naqada IIc-d2 (Hendrickx 2006: 78-80) . The first group includes the oldest vessels, characteristic of protruding, well modeled wavy handles. The two most numerous groups contain smaller and slimmer jars with two handles, and slimmer jars with continuous wavy bands around the shoulder. The last group consists of almost cylindrical jars decorated with continuous wavy band typical for younger graves of the site. According to K. Kroeper (1986/87: 74) the majority of Upper Egyptian pottery items were made of marl clay fabric A1 according to the Vienna system.

Apart from D-ware and W-ware ceramics, graves of group I include also other vessels of Upper Egyptian origin, made both of marl and Nile clay. Among the items made of marl clay were: a squat jar found in grave 148, similar in shape to Petrie's D9c type without painted decoration, a small jar from grave 194, resembling bag shaped jars, and a jar found in grave 175, with one preserved lug handle similar in shape to vessels of Petrie's D7-8 type. As far as pottery finds made of Nile clay are concerned, some of them might have been imports from the south or local imitations of the Upper Egyptian forms. Grave 123 contained a Red polished jar with an oval body, everted rim, concave base and two lug handles. In terms of shape the jar resembles stone vessels known from the graves of group I. In grave 341 a smaller jar with lug handles was recorded, made of fine Nile clay (NIB2). In grave 865 a small jar was found made of fabric NIB1, similar in shape to Petrie's types D20 or D26-27.

Grave offerings of group I at Minshat Abu Omar include also items made of other kinds of material. Small part of them are imports from the Naqada culture, similarly as in the case of pottery. They include: a flint knife (grave 224) with one surface characterised by ripple flaking retouch, 3 slate palettes (graves 63, 305, 816), each of a different shape: a crescent, a fish and a bird's head, and a pear-shaped macehead of red breccia (grave 224).

3.1.3. Other sites

Although imports from the south have been recorded also at other sites of the Lower Egyptian culture, *i.e.* Buto, Tell el-Farkha or Tell el-Iswid, they were much less numerous as in the case of Maadi and Minshat Abu Omar. Sherds of D-ware jars with painted decoration, as well as W-ware jars were found at all those sites. However, their number is relatively small in comparison to local ceramics assemblages.

At Buto, imported pottery registered in the strata of phases 2 makes up between 0.6 and 2.3% of all ceramic items (Köhler 1992a: tab. 1, fig. 9). These are mostly sherds of D-ware and fragments of fine marl vessels. Pottery fragments with painted decoration recorded at the site characterised by spiral and wavy lines motifs (Köhler 1992a: fig. 6:3-6; von der Way 1997: 106, Taf. 49). Particularly noteworthy is a deposit of 5-7 jars with wavy handles of Petrie's type W22 and W24 made of marl clay (von der Way 1997: 104; Taf. 45-46). In ceramics of Naqada culture T. von der Way (1997: 105; Taf. 4:7-15) identified also 5 vessels of W-ware class, with symbolically marked handles on their shoulders. Jars of Petries's R76 made of Nile clay are considered to have been imports. However, their origin is not clear. It cannot be determined whether they were produced in the north or were brought to Buto as containers for imported commodities from the south. In phase Buto IIIa a higher quantity of imports can be observed. Sherds of marl clay make up ca. 2,7% of all pottery fragments (Köhler 1992a: fig. 9; 1992b: 10-13). They are represented mostly by closed vessels, which served probably as containers.

At Tell el-Farkha, similarly as in the case of Buto, imports from the south include mainly fragments of D-ware,W-ware, and other jars made of marl clay. In phases 1 and 2 on all koms painted pottery was recorded with spiral, „ss", an aloe and wavy lines patterns (Mączyńska 2004; 2013: fig. 15:1-5,10, pls. 18-19; Jucha 2005: 65-66; Sobas 2012). However, the number of imported pottery is small in comparison to locally produced ceramics, as it makes up ca. 1% of all the registered material (Jucha 2005: 30, fig. 20; Mączyńska 2011; *in press* b).

Excavations of the French Institute of Oriental Archaeology (IFAO) at Tell el-Iswid attested the presence of imports from the south at this site. Pottery made of marl clay makes up 1,6% of all the registered sherds, and consists mostly of jars with short necks and rims in the shape of a lip. Fragments of D-ware were found at the site as well (Guyot *in press*: fig. 11).

In flint assemblages from Buto, Tell el-Farkha and Tell el-Iswid, apart from items manufactured locally or imported from the Levant, a small number of bifacial tools of southern origin were registered. Among them noteworthy is a fragment of a ripple-flake knife found at Buto in the deposit of Upper Egyptian vessels with wavy handles (Schmidt

1992: 33-34; 1987: 253). Flint imports recorded at Tell el-Farkha include: a fragment of an obsidian knife probably of southern origin (Kabaciński 2003: fig. 26), and a fragment of Upper Egyptian ripple flake knife found in the Lower Egyptian residence (Chłodnicki & Geming 2012: 98, fig. 17). At Tell el-Iswid, in the layers of Phase A, two knives with bifacial surface retouch were discovered. According to K. Schmidt (1989: 88-91), one of them has analogies with Upper Egyptian knives with ripple flaking retouch, and is similar to a bifacial knife found in phase II of Buto. Interesting is also the other knife from Tell el-Iswid, made of obsidian (van den Brink 1989: fig. 15:11). In terms of technology, it resembles Gebel el-Arak type knives with their characteristic ripple flaking retouch. In the opinion of K. Schmidt (1989: 90-91; 1992: 34), the knife should be considered as an import from Upper Egypt.

The raw material for manufacturing obsidian knives does not occur naturally in Egypt. The analysis carried out by E. Pernicka (1996: 286) showed that the obsidian recorded at Tell el-Iswid came either from Anatolian or Ethiopian deposits. Eastern origin was attested for the obsidian from Buto. Analysis made by L. Bavay *et al.* (2004) indicated the Nemrut Dag volcano as a place of origin of the raw material. K. Schmidt believes that obsidian reached the south via Uruk culture colonies in the northern Syria, Levant and the Delta. The finished products could have been subsequently exchanged between the Naqadans and Lower Egyptians.

At the site of Tell el-Farkha, among other southern imports, two fragmentarily preserved tags have been recorded. Both have deep undercuts, and their surface is smooth and polished (Ciałowicz 2012b: 237, fig. 40). Probably also golden beads and two pear shaped maceheads made of basalt and bone found at Tell el-Farkha were imported from the south (Chłodnicki & Geming 2012: fig. 13) .

Contacts between Lower and Upper Egypt involved not only exchange of goods, but also the exchange of information. Probably the production of beer was adopted by the Lower Egyptian communities via Upper Egypt. The earliest structure associated with beer production in the north was discovered at Tell el-Farkha in layers dated to NIIB period. Exploration of the site revealed that the breweries were built slightly later than appeared the first settlers who built the earliest structures from organic materials directly on a gezira. So far, 7 breweries on the Western and Central Koms have been discovered (Adamski & Rosińska-Balik *this volume*). All of them seem to have been very well planned structures that enabled the brewing of beer just after the completion of construction works (Ciałowicz 2012a). The oldest breweries in Egypt dated to NIB-IIA had been recorded in the south, at the sites which are considered the most important centres of the Naqada culture, *i.e.* Mahasna, Abydos and Hierakonpolis (Peet & Loat 1913: 3-4; Geller 1992; Takamiya 2008). The breweries at Tell el-Farkha were built later. Their complex structure and organisation indicate that the idea of beer production had been copied from the region of its origin, *i.e.* Upper Egypt (for details see Adamczyk & Rosińska-Balik *this volume*).

Beer production required the use of some special vessels: big vats used in bonfires and vessels for beer storage. According to S. Hendrickx *et al.* (2002: 293-294) the early beer jars are represented by Petrie's jars R81, R84 and later L30, which were quite common in Upper Egypt in Naqada II and appeared at Lower Egyptian sites towards the end of this period. The only exception is the site at Tell el-Farkha, where jars R81 and R84 were recorded in the material dated to Naqada IIC, contemporary to the breweries (Mączyńska 2011: 890; *in press* c). Their early appearance at the site could be explained by their function. If the idea of beer production originated in the south, the idea of its storage could also have come from the same region (Mączyńska *in press* e).

Upper Egyptian origin is attributed also to the idea of erecting walls from mudbricks (*cf.* von der Way 1992: 3; Wilkinson 1996: 95; Wengrow 2006: 82). One of the oldest mudbrick walls in Egypt, dated to the end of NIIC period, was recorded on the Central Kom at Tell el-Farkha. It was a part of a big structure referred to as the Lower Egyptian residence, situated in a well organised area divided into zones of different functions. Initially the residence was surrounded by a double fence made of wood, but later the wooden fence was replaced by a mudbrick wall, 1.6m thick at the base and 1.2-1.3m at the top, with slightly oblique sides (Chłodnicki & Geming 2012: 92-97, figs. 8-10; Chłodnicki *this volume*, figs. 2-4). A similar wall surrounding the brewery center was registered on the Western Kom (Ciałowicz 2012a: 161). The discoveries in Lower Egypt have shown that the use of mudbrick was known the earliest in Lower Egypt, at the sites of Maadi (Rizkana & Seeher 1989: 55-56) and Tell el-Farkha (Chłodnicki & Geming 2012). According to some authors, this is the reason why it is more reasonable to link the appearance of the mudbrick technique in Lower Egypt with the influences from the Levant rather than from Upper Egypt (Tristant 2004: 120; Sievertsen 2008: 794). The idea of erecting mudbrick walls could have expanded southwards from Lower Egypt, in the same way as the flint tradition (Buchez & Midant-Reynes 2007; 2011).

3.2. Summary

Analysing imports from Upper Egypt one can observe that they are quite uniform as compared to imports from Canaan. The majority of these items appeared in Lower Egypt in the result of trade exchange (Tab. 2). Some of them may have also been personal equipment of traders/intermediaries who came from the south to the place of exchange. Furthermore, it seems that also the representatives of other professions visited the Delta region. Although we are lacking direct archaeological evidence, we can assume that Tell el-Farkha may have been visited by specialists from the south, who passed on their knowledge of beer production to local communities.

Imports from the south did not serve a typically utilitarian function, and they were not indispensable in household activities. They include mostly items distinguished in terms of form, decoration, and quality, such as pottery vessels with painted decoration, sophisticated flint knives or unique shell vessels. Their relatively small number suggests that they were in the possession of a small group of people. On the basis of archaeological

Table 2. Upper Egyptian imports and imitations on the Lower Egyptian sites.

Character of finds	Description of finds	Maadi	Maadi cemetery	Wadi Digla	Heliopolis	Buto	MAO	Tell el-Farkha	Tell el-Iswid	Tell Ibrahim Awad
Imports	equipment of traders/visitors									
	exchange items	x		x		x	x	x	x	x
	flow of ideas							x		
Imitations	made by visitors									
	made by locals	x					?			

material we are not able to determine what rules regulated the access to the imports. Limited availability of foreign items can be attested in the case of Minshat Abu Omar, the cemetery at which objects of this kind were placed as offerings only in a small number of the richest graves.

In the opinion of the author there is no doubt that the available data do not indicate the presence in the north of a large number of visitors from Upper Egypt that would suggest the Naqadian expansion. More probably, Naqadans visited Lower Egypt repeatedly for trade-related purposes. In the material recorded in the south, *e.g.* at Hierakonpolis or Adaima, we can observe only a limited number of Lower Egyptian imports (Adams & Friedman 1992: 322-325; Friedman 1994; Buchez 2007a: 123-124; 130, 132; 2007b: fig. 3/96:1). Hence, it seems that the underlying reason of the relations with Lower Egypt was the Upper Egyptians' desire for Southern Levantine items or products. In return, Naqadian items were offered to the local society.

In the case of imitations of Naqadian objects we can distinguish only those items, which were made by Lower Egyptians. Good examples here are blacktopped vessels recorded at Maadi. Although Maadians used vessels imported from the south and imitated them, they did not adopt the southern idea of their use as grave goods. No grave at Maadi or Wadi Digla contained blacktopped vessels, as those items were probably used only at the settlement (Mączyńska *in press* d). Interesting object is a stone imitation of a bone vessel found at Tell el-Farkha (Pryc 2012). Although in the south the original items of this kind were produced from the material that was easy to process, the vessel found at Tell el-Farkha was made from basalt, the material which requires extensive working skills. Taking into account that the production of stone vessels was a specialised craft in the north, we can assume that this vessel was produced by a local specialist, who imitated a foreign specimen in local raw material (Mallory 2000; Mallory-Greenough 2002). Important in this case is the context of discovery of this vessel. It was unearthed within the Lower Egyptian residence, together with several items of foreign origin, namely the fragments of the Naqadian and Levantine pottery, pear-shaped maceheads, stone and golden beads and a copper knife. Since the function of the residence was probably associated with exchange, the presence of imports or imitations in this place should not be surprising.

Focusing on the Lower-Upper Egyptian relations we cannot forget about the certain common features of the flint industry observable along the entire Nile Valley in the said period. According to K. Schmidt (1996: 279), one such feature is the technology of manufacturing twisted blades, shared by the north and the south of Egypt towards the end of Naqada I and in the beginning of Naqada II. K. Schmidt view is based on the assumptions of D.L. Holmes (1992: 313), who proposed that this peculiar blade manufacturing technique involved heat treatment, leaving a trace in the form of glossy surface. Blades with traces of heat treatment are found in large quantities on Middle and Upper Egyptian sites, *e.g.* in Mostagedda. According to D.L. Holmes, who had an opportunity to personally examine flints from Maadi, the numerous twisted blades were removed from heat treated cores. Both K. Schmidt and D.L. Holmes agree that the twisted blades industry is a common feature across the entire early Predynastic Egypt. D.L. Holmes believes that most similarities exist between inventories of the Lower Egyptian culture and those from Mostagedda in Middle Egypt. She even assumes that flint knappers from Mostagedda adopted certain technical solutions from their northern neighbors from Maadi. In his turn, K. Schmidt (1996: 280) refers to the inventory from Mostegedda as the southern counterpart of the Lower Egyptian industry. In his opinion, flint industry producing twisted blades with traces of heat treatment was common in NI and in early NII. Subsequently, in late Naqada II it disappeared altogether, both in Lower and Upper Egypt. The common features of Maadi and Mostagedda are visible also among Hemamija B knives. In the south, knives of this type were found on sites dated to Naqada II in Hemamija, Mostagedda, Badari and Naqada. K. Schmidt is of the opinion that the tradition of making these knives originated in Lower Egypt and then spread along the entire Nile Delta in Naqada II. The same situation occurred in the case of Badari knives, found in the south in Predynastic layers dated to early Naqada I to Naqada II. According to K. Schmidt, Badari knives in the south are a counterpart of Hemamija knives from Lower Egypt.

In 2006 N. Buchez and B. Midant-Reynes (2007; 2011) concluded the earlier discussions on the flint tradition of the Upper and Lower Egypt in the 4th millennium BC. According to the researchers, the Nile Valley in the 4th millennium BC saw two flint traditions: the northern one in the Maadi-Delta region with strong Levantine influences, characterized by the presence of twisted blades and heat treatment of cores, and the southern one exemplified by the assemblages of el-Tarif and Maghar-Dendera based on flakes and some bifacial pieces of outstanding quality. During Naqada IIB-IIC/D the northern tradition reached Middle Egypt, followed by Upper Egypt, as proven by flint inventories from Adaima and Hierakonpolis. Another change occurred in early Naqada III, when assemblages with regular standardized blades replaced those with twisted blades in the entire Nile Valley.

4. Conclusion

Imports from the Southern Levant and Upper Egypt indicate the existence of rather complex relationships between Lower Egypt and those regions in the 4th millenium BC. In the first place they involved trade contacts associated with exchange of goods and information. Archaeological evidence shows that Lower Egypt, particularly the Delta, was the place of trade exchange. The majority of scholars are of the opinion that until the middle of Naqada II period this exchange was sporadic in character. On the other hand, Maadi settlement, dated to Naqada I and the first half of Naqada II, is characterised by a relatively large number of imports from the east and south (as compared to other sites from the duration period of the Lower Egyptian culture). Maadi seems to have been a settlement visited by traders from both the south and east. This must have been an important place for the traders/visitors from the east, as they built there their own subterrenean structures. In the case of Upper Egyptians we do not have such direct evidence of their stay at the site.

Currently it is difficult to determine exactly what goods were exchanged. It is believed that Upper Egyptians were interested in luxury items of the eastern origin. However, the archaeological data from the south and Canaan reveal only a limited number of imports that may have been the subject of exchange. In Naqada I and II imports in graves are relatively rare, with their slight increase in the second half of Naqada II (Anđelković 1995; Hendrickx & Bavay 2002). Likewise, in the Southern Levant Naqadian objects are scarce in this period (Anđelković 1995; Braun & van den Brink 2008; Mączyńska 2013: 181-200).

Resources that reached the south from the east included probably: copper, obsidian, turquoise and lapis lazuli (Hendrickx & Bavay 2002: 72). Also the goods that did not preserve in archaeological material, such as food or organic items, may have been exchanged. The exchange of goods was accompanied by the exchange of information and skills (processing of copper and flint, or beer production). Undoubtedly the flow of ideas took place in both directions. From the north to south came the idea of the production of twisted blades (Holmes 1992; Schmid 1996; Buchez & Midant-Reynes 2007; 2011). Due to the exchange with the north the Naqadans knew the vessels with wavy handles, which they subsequently began to produce.

There is no doubt that trade exchange that took place in the Delta, including Maadi, involved the engagement of local community. High value of objects from the Southern Levant and Upper Egypt that reached the north encouraged local craftsmen to produce copies of these items. Imports and their imitations were in the hands of a limited number of people, and access to them may have been regulated by the rules, which are elusive for archaeologists.

We cannot forget at the same time the representatives of the Chalcolitic culture from the Southern Levant appeared in the northern Delta and settled at Buto, within the settlement inhabited by members of the Lower Egyptian culture. Initially the foreigners maintained their cultural identity, producing items (including pottery) from local material according to their own traditions, thereby expressing their identity. Over time, they adapted completely to the local culture and conditions.

According to the view widely accepted by scholars the middle of Naqada II period witnessed the revival of contacts with the south and east, and the intensification of exchange between these regions. This was to be reflected by the growing number of imports from both the regions. However, in the opinion of the author the quantity of imports in the north in this period was similar and sometimes even lower than in the earlier times. On the other hand, there is no doubt that the number of sites with imports is higher than before. In Naqada I and the beginnings of Naqada II imports are present at Maadi, Buto, and in small numbers also in the graves of Wadi Digla and Heliopolis. In the second half of Naqada II items of foreign origin are still found at Buto, but they appear also at other sites, namely Tell el-Farkha, Tell el-Iswid and Minshat Abu Omar. The location of the last three sites in the eastern Nile Delta is not irrelevant in this context. They were probably situated on trade routes and served as the places facilitating the exchange.

The organisation of exchange itself remains unclear. Traders came to Lower Egypt probably through all the duration period of the Lower Egyptian culture. The sites located in the eastern Nile Delta could have been meeting places for trade partners of different origins, such as Southern Levantines and Egyptians. Initially the exchange may have been a „private" activity of a single settlement centre, *e.g.* Maadi. In the second half of Naqada II, when in the eastern Delta existed several settlements engaged in the exchange, the situation may have changed; particularly if we assume that some of the settlements were specialised in the production of specific goods, *e.g.* pork meat and beer at Tell el-Farkha. The logistics of exchange, including transport, may have been carried out jointly by several settlements/parties. The local societies took part in, and probably organised the exchange of goods and ideas in an active way. Moreover, they benefited from these contacts.

In the result of trade northern communities possessed items distinct in terms of material, shape and decoration, whose value was probably much higher than that of local objects. In most cases imports from Canaan were placed in graves containing several offerings, interpreted as richer ones. These may have been burials of people engaged in trade or persons of a special social status (Mączyńska *in press* c). The concentration of imports within and in the vicinity of the Lower Egyptian residence at Tell el-Farkha may have also been the evidence of a limited access to imports.

According to some scholars the end of Naqada II period was the time of a so called Naqadian expansion, the term associated with the domination of the Naqada culture in the north that led to the assimilation and, finally, the decline of the Lower Egyptian culture. One unit, the Naqada culture, appeared along the Nile. Interestingly, archaeological material recorded at the sites in the Nile Delta does not show any cultural change in this period. At Buto or Tell el-Farkha sites we cannot observe any evidence of the Naqadans exercising authority over these settlements or any other traces of their dominance at the sites in this early period. On the contrary, the continuation of occupation and production can be observed (Köhler 2008; Mączyńska 2011: 897; *in press* cde). Undoubtedly this was the period of cultural change encompassing not only the north, but all the Nile Valley. Currently we can observe a growing number of opinions questioning the homogeneity of the Naqada culture and indicating its large internal differentiation (*cf.* Friedman 1994; Köhler 2008; *this volume*).

The beginning of Naqada II was not only the period of changes in the relations between Lower and Upper Egypt. Also the character of contacts between Egypt and the Southern Levant became different at that time. According to P. de Miroschedji (2002: 41-42) in EBI B contemporary to Naqada IIIA1 and Buto III "a massive expansion of Egypt to the east" and even "colonization of east-western Canaan" by Egyptians can be observed. However in the opinion of E. Braun (2002: 181-183; *this volume*) archaeological records are not sufficient to permit a hypothesis on Egyptian presence in the Southern Levant. The scholar also underlines the fact that the nature of interactions between Egyptians and Southern Levantines was complex and their intensity changed over time. Nonetheless, there is no doubt that relations between both the regions were much more intensive than before and they were additionally associated with the Egyptian presence in the Levant.

The relations between Upper Egypt, the Delta and the Southern Levant in the 4th millenium BC appear to be a complex problem. Our knowledge is often based on hypotheses developed dozens years ago with the use of a limited data. However, comparing the archaeological evidence on the relations between Lower and Upper Egyptians (Tab. 2) with the evidence concerning the contacts of the Lower Egyptians with the Levantines (Tab. 1), it is difficult to observe the differences that would justify the interpretations indicating the expansion of foreign culture in the former case, and only trade exchange in the latter one. At this point it is important to note that while we have data indicating the presence of the Levantines in the north, we are lacking such evidence in the case of the Naqadans.

The problem of relations between Upper Egypt, the Delta and the Southern Levant requires further research. Our knowledge is expanding due to current excavation works carried out at the northern and southern sites. Each year they provide new data (including imports and imitations), which often allow for redefining the way we understand this complex issue.

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Petrographic analysis of pottery from Tell el-Farkha

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Introduction

The petrographic analysis of Predynastic samples from Tell el-Farkha aimed to acquire information on how the various pastes were prepared for the vessels and other aspects of their production. While this applied to all of the fabrics, particularly for the Nile clay vessels, it was important to understand how different tempering materials were being used. For the Marl clay fabrics it was essential to establish their variability to see if many different sources were being used to make pottery that would have been brought to the site, as Marl clay is not locally available. However, Marl clay pottery cannot be precisely provenance as it is present on the edge of the Delta and down both sides of the Nile, and includes a number of different limestone formations as the source (Nördstrom & Bourriau 1993: 160). Finally, analysis of non-Egyptian fabrics could provide information on the interconnections Tell el-Farkha had with areas of the Levant, both direct and likely indirect. This would supplement the work of Czarnowicz (2011; 2012) on the vessel forms. The interconnections between these regions were long and most certainly began during this period based on the presence of Levantine artifacts and architecture in the Delta, and Egyptian artifacts and architecture in the southern Levant. Ceramic evidence is vital for further clarifying this early contact and more precisely locating where foreign vessels were produced that were found in the Delta. Overall, the petrographic analysis was able to provide data on the clay and inclusions utilized to make the pottery paste, a general assessment of firing temperature, and in some cases, a potential provenance.

Methods

Forty-nine samples of pottery were selected from Tell el-Farkha (Tab. 1). These were chosen by Agnieszka Mączyńska, Michał Rozwadowski, Mariusz Jucha, Marcin Czarnowicz, and Magdalena Sobas from several areas of the kom in order to investigate atypical Egyptian and non-Egyptian fabrics. Thus, samples of the well-known fabrics were not examined. The analyses were carried out at the Institut Francais d'Archéologie Orientale in Cairo in 2011 and 2012[1].

The petrographic analysis of pottery utilizes a special microscope with polarizing light to examine the clay and inclusions in a sample (Reedy 2008). The sample is glued to a slide and thinned to 30 microns to enable light to pass through the matrix and inclusions. The specific way in which the mineral and rock fragments interact with the light and appear in thin section allows them to be identified. Once the types of minerals and rock fragments are known, this information is related to geologic maps to locate areas where such inclusions would be available as pottery making material. This applies to the clay as well, as different clay types can be seen microscopically and related to soil maps showing their distribution. The combination of location information for the clay and inclusions suggests areas where the pottery was made as typically potters do not travel great distances to acquire their raw materials (Arnold 1985: 50). Further, comparison can be made to other petrographic studies of local pottery from specific areas. This is because local raw material resources do not change over extended periods of time. Technological information can also be acquire through petrographic analysis, which can reveal if several clays were mixed together, the types of material used as temper and give an idea of the general firing temperature of the sample.

A full petrographic description of each sample was made and these are reported in the individual reports produced for the Tell el-Farkha project. For this article, Appendix I provides a representative sample description and images (macroscopic and microscopic) for each petrographic group. The thin sections were produced in the standard way utilizing the cross section of the sherd. Petrographic analysis was carried out using typical descriptors (Whitbread 1989; Ownby 2009). This includes the colour of the thin section in plane (PPL) and cross polarized light (XPL). The frequency of inclusions is given as a general percentage estimate and is based on the presence of grains medium-sized to larger, both quartz and limestone, and plant remains. Sorting is based on the consistent presence of grains of similar size (well-sorted) to the presence of grains of many sizes from fine to coarse in size (poorly sorted). Size range is based on the Wentworth scale: very fine (0.0625-0.125mm), fine (0.125-0.25mm), medium (0.25-0.5mm), coarse (0.5-1mm), and very coarse (1-2mm). Grain shape is based on Power's scale of roundness and goes from very angular to well-rounded. Only a single shape range is given for quartz and limestone inclusions, when present; the grains were not separated into those with high sphericity (tend to be more round) and those with low sphericity (tend to be more angular). The inclusions in the paste are divided into those that are common (*i.e.* main inclusions), and those that are less common (*i.e.* additional inclusions). For some of the additional inclusions the exact mineral type could not be specified, typically because the grain is too small, or is not exhibiting enough characteristic features for identification.

[1] Under the ANR Gezira Project and the Parent-Bridge Program Project "The Nile Delta as a centre of cultural interactions between the Upper Egypt and the Southern Levant in the 4th millennium BC".

Table 1. Samples

Sample number	Vessel Type	References to Czarnowicz 2012: fig.	Petrographic Group
#P4	a non-diagnostic sherd		4
#P6	a non-diagnostic sherd		4
#P14	a rim of a bowl		4
#P20	a fragment of a small bowl		1
#P22	a non-diagnostic sherd		5
#P25	undefined		3
#P48	cylindrical jar		4
#P50	cylindrical jar		2
#P52	cylindrical jar		4
#P54	hes-jar		4
#P74	a non-diagnostic sherd		4
#P75	a non-diagnostic sherd		4
#P76	a non-diagnostic sherd		6
#P91	a non-diagnostic sherd		7
#P96	a non-diagnostic sherd		4
#P106	a non-diagnostic sherd		1
#P107	a non-diagnostic sherd		5
#P108	a non-diagnostic sherd		4
#P109	a non-diagnostic sherd		1
#P110	a non-diagnostic sherd		5
#P111	a non-diagnostic sherd		1
#P112	a flat base of a jar(?)		5
#P135	a spout	12.5	1
#P136	a spout	1.4, 12,3	2
#P137	part of keg	2.1, 12.1	5
#P138	a ledge handle	2.4, 8.1	10
#P139	a rim of hole mouth jar	9.4	6
#P140	a ledge handle		8
#P141	a ledge handle	3.1, 8.2	10
#P142	a ledge handle	4.2, 8.3	9
#P143	a ledge handle		9
#P144	w		5
#P145	a ledge handle		1
#P146	a body sherd (jar)	5.1, 13.3	4
#P147	Erani C handle imitation	11.2	1
#P148	a handle	2.2, 11.3	5
#P149	a lug handle	2.5, 13.5	1
#P150	a pillar spout	1.3, 12.2	1
#P151	a ledge handle		10
#P152	storage ledge handle vessel	1.1, 7	10
#P153	a broken ledge handle		10
#P154	buff color sherd with the knob		5
#P155	storage vessel rim		5
#P156	Pijama style vessel body sherd	13.2	1
#P157	a non-diagnostic sherd		1
#P158	a non-diagnostic sherd		1
#P159	a non-diagnostic sherd		1
#P160	ledge handle		8
#P161	large storage vessel painted body sherd	13.4	6

Rock fragments, particularly in Nile clay, are often very small and only in rare cases can a specific type of rock be identified. Rather, they can be categorized as volcanic, plutonic, or metamorphic and the individual minerals in the rock listed.

The results of the current study identified ten petrographic groups, that is sets of samples produced with similar clay and inclusions. A summary of parts of the *chaîne opératoire* for each sample are described as best as possible. Often even in thin section it is difficult to determine what was added by the potter and what might be natural to the clay. Uncertainty is stated clearly when the exact procedures are difficult to discern. Firing temperature estimates are based on several factors, the presence of silica from plant remains indicative of a lower temperature, decomposed limestone suggestive of a temperature closer to 850°C, and the optical activity of the clay matrix, which becomes inactive also near 850°C. These are very general estimates as the chemistry of the clay can affect the temperature at which vitrification occurs. Other factors during the firing such as duration and atmosphere can affect the appearance of the sample. The criteria utilized to give a temperature estimate are given.

Results

Egyptian Petrographic Groups

Nile clay with plant remains (Group 1)

The first group comprises thirteen samples produced with Nile clay and some plant remains. The mineral inclusions were all typical for Nile clay, *i.e.* quartz, feldspars, muscovite, biotite, pyroxene, and amphibole. The amount and size of the plant remains could vary. Some of the samples may have added sand temper due to the presence of coarse-sized quartz and feldspar grains. Determining which components are natural and which are added can be difficult as the coarseness of Nile clay depends on where along the river or a canal the clay was collected. There always remains the possibility that the potters would have selected a Nile clay that had natural coarse-sized grains and only in cases where these grains were very common could the addition of sand be inferred with confidence. For most samples, the firing temperature was probably below 800°C as the silica from the plant remains is present and the matrix is optically active. However, some were likely fired above 800°C as the matrix was less optically active.

Nile clay with plant remains and limestone (Group 2)

Two samples were made with Nile clay and plant remains, plus limestone, which was likely added due to its high amount. The other inclusions were typical for Nile clay being mostly silt-sized to fine-sand sized quartz, feldspars, muscovite, biotite, pyroxene, and amphibole. Both were probably fired to around 800°C as the silica is gone from the plant remains, the limestone is partially decomposed, and the clay matrix is slightly active.

Limestone-rich clay with Nile clay (Group 3)

This group contains a single sample. The fabric appears to be a limestone-rich clay with Nile clay as well. The limestone clay undoubtedly weathered from one of the many limestone outcrops along the Nile or at the edge of the Delta. The Nile clay could have been naturally mixed with the limestone-rich clay, perhaps where a wadi meets the Nile. Alternatively, the Nile clay could have been intentionally added. The medium-sized sand grains and few large-sized grains may indicate sand was utilized as temper. The vessel was fired below 800°C as the limestone is intact and the matrix is optically active.

Nile clay and Marl clay (Group 4)

Eleven samples were a mix of Nile and Marl clays. The Marl clay has a pinkish color and in most cases the Nile clay appears to be a less than 50 percent of the paste. Some samples had different appearances that suggested various Marl clays were utilized. Whether the Nile clay was naturally present or intentionally added is difficult to determine. As with Group 3, areas near wadis where Nile and Marl clays could naturally mix may have provided the raw materials. Alternatively, there is a long history of potters adding Nile clay to Marl clay to make the latter more workable (Redmount 2003: 213-263). Some of the samples had sand that was likely added due to its size, while others had added plant remains and sand temper, and still others just plant remains as temper. The firing temperature for the majority of the samples was probably between 800°C and 850°C as the matrix is optically inactive. Temperatures below this may have been achieved for a few samples, while a single sample exhibited a scum surface in thin section (Ownby & Griffiths 2009). Macroscopically most of the samples appeared to have a scum surface.

Marl clay (Group 5)

Group 5 comprises nine samples produced with pure Marl clay. In thin section some of these resembled the more pink marls while others had a more yellow color to them. This can be seen in the sherd as well, but the origin of the different colored clays is not known. Importantly, none of these samples were similar to the clays used for the Group 4 samples. Some of the samples appeared to have some added sand, while others had infrequent remains from plants. For all of the samples, the firing temperature was probably between 800°C and 850°C as the matrix is optically inactive.

Shale clay (Group 6)

Three analyzed samples were made from a clay derived from eroding shale. There are several shale outcrops in Egypt, but perhaps the best known is the Esna shale of Paleocene date, which is found along the Nile from Esna in the south to Cairo in the north (Said 1962). Other shale formations are known in the Western Desert oases. One of the samples had added sand and the other two had a small amount of plant remains. The firing temperature for all appeared to be around 800°C as the matrix is optically active.

Marl clay with volcanic rock fragments (Group 7)
One unusual sample consisted of a yellow marl clay with large fragments of volcanic rocks that ranged from dolerite to basalt, which are likely temper. The optically inactive matrix suggests the firing temperature was probably around 800°C due to the presence of calcium carbonate. The origin of this sample is uncertain. The clay is similar to Egyptian marls, but there are marl clays in the Levant as well. The type of dolerite to basalt fragments also exists in both places, along the Red Sea Coast east of Luxor and as small outcrops throughout Egypt and in the area to the southwest of Lake Kinneret in Palestine (Bartov 1994; Said 1962). This latter area has eroding Pliocene marls and outcrops of Miocene dolerite and basalt, though the basalt is dominant. Pottery from this area has been noted by Cohen-Weinberger and Goren (2004) for the site of Tell el-Dab'a dated to the Middle Bronze Age, although their description is not exactly the same as the sample seen here. However, the presence of large chert fragments is similar to previous analyses of Levantine samples suggesting that the area remains a possibility (Ownby 2010). A petrographic analysis of a marl New Kingdom spinning bowl from Karnak identified fresh fragments of basalt similar to those in this sample also as temper (Mallory-Greenough *et al.* 1998). Further analysis through microprobe suggested the basalt originated in the Cairo area. However, this sample included fragments of metamorphic and granitoid rocks which are lacking in the Tell el-Farkha sample. Comparative analysis to these samples and other information are necessary to give a more specific provenance.

Levantine Petrographic Groups

Foraminiferous Marl (Group 8)
This group comprises two samples made from a foraminiferous marl clay; that is one with common foraminifera or microfossils. The large, likely natural inclusions, consist of limestone, chert, chalcedony, and iron-rich ooliths. The samples were both fired up to 800°C due to the optical activity of the matrix. While foraminiferous clay is common throughout the Levant, the presence of chert and chalcedony suggest Lebanon as a likely production location. Here the Upper Cretaceous (Senonian) formation has chert and chalcedony (Beydoun 1977: 322, 329, 332-333). The iron-rich ooliths are also a possible indicator for Lebanon as they are known from the Lower Cretaceous shale unit in this same area (Dubertret 1962). In fact, this group utilizes similar raw materials to the Early Bronze II and III pottery analyzed petrographically from Tell Fadous-Kfarabida, a site located north of Byblos (Badreshany & Genz 2009). Here the ceramics were made from a ferruginous and foraminiferous marl with variation in the amounts of quartz, limestone, and iron-rich argillaceous inclusions and globules. The appearance of the Tell el-Farkha samples suggests similar materials, but in a location with a greater contribution of chert and iron-rich ooliths. Thus, an area where foraminiferous marl clay, possibly the Chekka foraminiferous marls of Senonian-Eocene date, is present along with the Lower Cretaceous unit is the probably place where these samples were produced. Such an area

is along the coast of Lebanon around Beirut, but is found further inland to the north as far as Tripoli. Further comparison to material from this area is necessary to confirm the exact provenance.

Dolomite Moza(?) Formation (Group 9)

The second Levantine petrographic group also has a calcareous clay but in this case, along with limestone and microfossils, are common inclusions of angular and rhombohedral dolomite[2]. As these inclusions are all of similar size, they have been suggested to indicate the addition of a dolomite sand (Goren 1996: 38, 51). The firing temperature is suggested to have been around 850°C. The presence of dolomitic sand indicates the provenance could be in Palestine. The samples resemble[3] Early Bronze IV pottery produced in the Judean area of Palestine from Moza Formation clay with the addition of a dolomitic sand (Goren 1996: 38, 51). Though these comparative samples are dated to the Early Bronze IV period, Porat (1989: 47-48) noted the use of Moza formation clay and dolomite sand in analyzed Early Bronze I material from sites in central Israel, such as Aphek, that do show some evidence for Egyptian contact. Thus, while archaeologically there is little evidence for an Egyptian connection to the Judean area directly, such vessels may have come to Egypt via other sites that had contact with Egypt. Interestingly, this pottery fabric was not seen in vessels from Early Bronze II or III sites, a time when Egypt's involvement in the southern Levant was much reduced. Direct comparison between these samples and those of Moza clay mentioned above would be desirable to confirm this assessment.

Marl clay with crushed calcite (Group 10)

While the previous petrographic group could be fairly easily related to an existing ceramic paste used in Palestine during the Early Bronze Age, the five samples in this group are more difficult to interpret. The marl clay appears similar to the Group 9 samples, but the dolomite sand is not present and foraminifera are less common. Instead, some samples have some large inclusions of dolomite and calcite, while other samples have very few. Along with the dolomite/calcite are fragments of limestone and foraminifera as seen in the other imported groups. Another unique feature of this group is that the appearance of some samples suggests the firing temperature reached 850°C. The use of the foraminiferous Taqiya marl is a possibility for this group (Goren 1996: 48, 52), but as previously stated foraminiferous marls are also present in Lebanon. In southern Palestine, Taqiya marl used for pottery production has been attested in the Negev during Early Bronze II and Early Bronze IV, and the Coastal Plain during Early Bronze IV. Further, the use of crushed calcite is well-known for Early Bronze Age Palestine. The petrographic work on pottery from Tell Fadous-Kfarabida suggests foraminiferous marl

[2] At temperatures above 500°C dolomite alters to calcite. However, the likely original composition is being referred to here and for the next group.

[3] Anat Cohen-Weinberger examined images of these samples and confirmed their similarity to Moza formation clay and dolomitic sand samples from EBA Palestine.

with angular calcite is also know there for pottery probably produced in the vicinity (Badreshany & Genz 2009: 70-72). Therefore, it is likely these samples are imports, but without further petrographic comparison, an exact provenance cannot be given.

Discussion

The results of the petrographic analysis revealed a wide range of recipes utilized for producing pottery in the Predynastic Period found at Tell el-Farkha. Nile clay could be utilized without the addition of other materials or with sand, plant remains, and/or limestone added. It is likely differences in firing temperature resulted in the various appearances of these Nile clay sherds. Very few of the sherds appeared to have sand added; rather a more sandy naturally occurring Nile clay was probably used. Several varieties of Marl clay ceramics appear to have come to the site, some with added sand and/or plant remains. In cases where the clay appears to be mostly a Marl clay with a minor amount of Nile clay, this could have been a natural mix or the potter may have added the Nile clay to the Marl clay to make it more workable. The variety in the Marl clay samples analyzed may represent various production locations or the utilization of several different clay bed within the same area. Once again, the lack of information on Marl clay sources in general and their weathering behavior prohibits a better understanding of the raw materials used to produce these vessels. The unusual combination of Nile clay with a limestone-rich clay requires further study but hints at the utilization of a broad range of raw materials. This is also suggested by the production of vessels from a clay weathering from a shale outcrop, possibly from the common outcrops in the oases or from southern Egypt were the Esna shale formation crops out in a few places. The single sample of a Marl clay with volcanic rock fragments, which could be Egyptian, may also signify the use of many different clay resources.

The variety of choices noted for these samples makes clear that the Predynastic potters produced their pastes based on where the vessel was made, its form and its intended function. However, it is likely there were no strict recipes that were adhered to and production was probably based on necessity rather than as an industry. Technologically, the estimated firing temperatures suggest most vessels were probably fired between 750°C and 850°C in keeping with early pyrotechnology.

While, the provenance for theses samples cannot be refined beyond a location in Egypt, their consistent low firing temperature and variety provides insight into the development of ceramic technology and contacts within Egypt in the Delta at this time. Although the Nile clay vessels could be local to Tell el-Farkah, most of the other Egyptian vessels were probably not produced at the site. The Marl clay vessels in particular are likely to have been brought to the site from a number of different locations. The lack of information on the variety of Marl clays, which likely vary in terms of geologic age and constituents, prohibits assigning any of them to specific sources. Additionally, there is a strong likelihood that natural mixes of Marl and Nile clays exist. The sources of these clays and their natural constituents are unknown. Such information is necessary for a better understanding of Egyptian pottery in general.

All of the analyzed Egyptian samples were similar to those from previous work and further illustrate the variety of raw materials employed for Egyptian pottery production and the lack of standardization for this period. In comparison with the nearby site of Tell Iswid, also dated to the Predynastic period, the Egyptian samples are quite similar (Ownby 2012). The Tell el-Iswid Nile clay ceramics were made with the addition of plant remains and limestone, while one fabric consisted of a combination of Nile clay and a foraminifera-rich calcareous clay. The Tell el-Iswid Marl clay samples showed a similar variety to the Tell el-Farkha samples with pink and yellow varieties, some of which contained sand and plant remains. Firing temperatures were also around 800°C.

A petrographic study of Predynastic pottery from the site of Douch in Kharga Oasis revealed many samples produced from a shale clay that could have been acquired locally (Ownby *in press*). Nile clay vessels at the site had inclusions of plant remains and limestone, while a Marl clay sample had sand temper. The firing temperatures were the same as for the other samples discussed. Comparison to the petrographic descriptions of Predynastic pottery from Maadi also reveals the common utilization of Nile clay with or without plant remains and occasional limestone (Porat & Seeher 1988: 222-223). The firing temperatures were estimated to be low, 650°C to 700°C, except for a group of D-ware and black-topped vessels believed to derive from Upper Egypt where the temperature likely reached 800°C and plant remains were absent.

The macroscopic and petrographic analysis of Predynastic pottery from Hierakonpolis, Naqada and Hemamieh revealed a similar range of fabrics (Friedman 1994: 137-160). Nile clay could be utilized without temper, or include the addition of sand, plant remains and/or limestone. A few Marl clay fabrics were noted from these sites, including mixed Nile and Marl clay fabrics, while some contained sand temper. Pottery produced with shale temper was noted, but may represent a shale clay with remaining pieces of unweathered shale. A similar fabric appears to be common for pottery from Dakhla Oasis dated to the Predynastic period (Edwards & Hope 1989). Thus, the results of this petrographic study and others have revealed important information on the technology of pottery production during the late Predynastic period and the ubiquity of some of these fabrics at sites throughout the Nile Valley and beyond.

Beyond Egypt, the interregional contacts that the inhabitants of Tell el-Farkha may have had can be seen in the several imported fabrics analyzed. Along with the study of vessel forms, it seems clear that pottery from Palestine was reaching Tell el-Farkha, specifically ledge handled storage jars (Jucha 2008; Czarnowicz 2011; 2012). It seems likely that pottery produced in the Judean area from Moza clay was brought indirectly to Egypt. Such indirect movement of vessels may also explain the presence of pottery that is suggested to derive from Lebanon. Although archaeological evidence for contact between Egypt and Lebanon is scare at this time, there is some indication cedar may have been acquired along with other goods, particularly at the site of Maadi (Prag 1986; Rizkana & Seeher 1989). In fact, analysis of pottery from this site has identified calcareous fabrics with dolomite, crushed calcite temper, and foraminiferous fabrics

(PORAT & SEEHER 1988: 224-225). Notably, various firing temperatures were proposed, similar to the variability in the Tell el-Farkha samples, and most were suggested to derive from Palestine. A few samples contained iron-rich fragments and chert that could indicate Lebanese fabrics (PORAT 1989). Such imports from Lebanon may have come to Egypt indirectly through the areas of Palestine where Egyptian influence is known. Such hypotheses and the provenance assignments for these vessels require further study to confirm. Finally, while the sherds classified as imports petrographically came from non-Egyptian vessel forms, several samples believed to be Palestinian in origin were identified as made of Nile clay. This refers specifically to samples placed in Group 1 and suggests the possibility of local Egyptian copying of foreign vessel shapes. Such imitation was identified at Maadi (PORAT & SEEHER 1988: 225) suggesting a precedent for this behavior.

CONCLUSIONS

The goal of this study was to highlight the variety of processes to produce pottery found at Tell el-Farkha. Thus, the many petrographic groups are not surprising and have provided additional information on how clay resources were utilized in the Predynastic period. Undoubtedly, this was a time when potters were exploiting different resources and learning what materials worked best for particular purposes. The variety seen also suggests, particularly for the Marl vessels, that pottery at Tell el-Farkha may have come to the site from a number of production locations near limestone outcrops producing Marl clays. Unfortunately, only through further research on the various Marl clay resources in Egypt can more specific information on provenance be provided. The geological prevalence of limestone outcrops in Egypt makes this an especially challenging task. On the other hand, petrographic analysis of the imported samples found at Tell el-Farkha revealed likely production areas in Lebanon and Palestine confirming the impression that the site had interregional as well as regional contacts.

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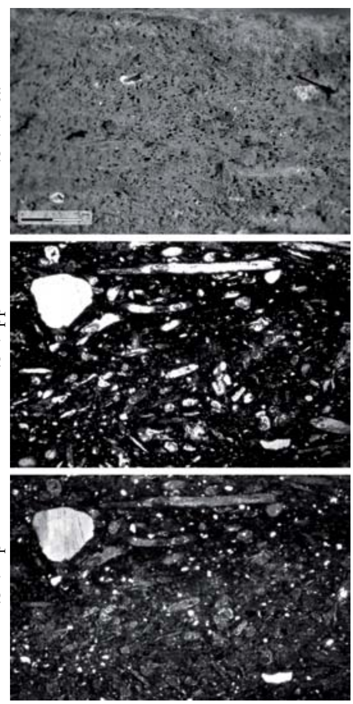
APPENDIX I

Images and descriptions for petrographic groups

This appendix provides a petrographic description and images from a sample representative of each petrographic group. The images begin with a macroscopic view of the fabric at the top, then a plane polarized image of the thin section in the middle, followed by a cross polarized image of the thin section at the bottom.

Group 1: Nile clay with plant remains
(Sample #P159)
Colour PPL: red
Colour XPL: red
Frequency of Inclusions (estimated): 20% (quartz and OPL[1])
Sorting: fair
Size Range: very fine to medium
Shape Range: angular to subrounded
Main Inclusions: quartz, K-feldspar, plagioclase, muscovite, biotite, iron oxides, opaques, pyroxene, amphibole, OPL
Additional Inclusions: polycrystalline quartz, serpentine, quartzite?, limestone?, zoisite?, grog?, VRF[2]?, MRF?
Comments: Nile clay with OPL, low firing temperature



4329 break

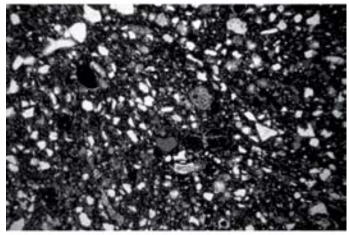
4329 ppl

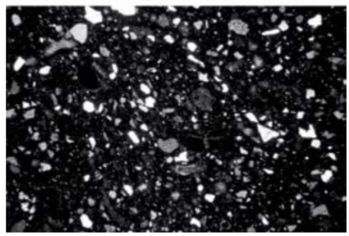
4329 xpl

[1] OPL=Organic plant remains.
[2] VRF=volcanic rock fragments; MRF=metamorphic rock fragments

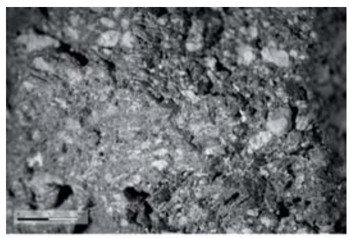
Group 2: **Nile clay with plant remains and limestone** (Sample #P136)
Colour PPL: reddish brown
Colour XPL: reddish brown
Frequency of Inclusions (estimated): 15%
Sorting: fair
Size Range: very fine to medium
Shape Range: angular to subrounded
Main Inclusions: quartz, K-feldspar, plagioclase, muscovite, biotite, limestone (decomposed), iron oxides, opaques, pyroxene, amphibole
Additional Inclusions: polycrystalline quartz, OPL, serpentine, VRF, garnet?, zircon?, gneiss?
Comments: probably a Nile clay with limestone; medium firing temperature (limestone is decomposed)

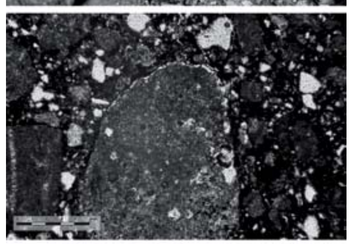

4306 break

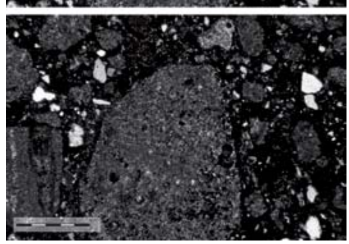

4306 ppl


4306 xpl

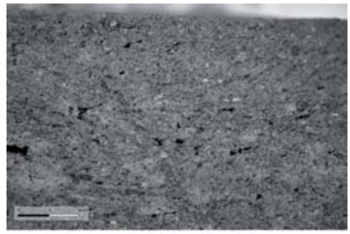
Group 3: **Nile clay with limestone-rich clay** (Sample #P25)
Colour PPL: medium brownish tan
Colour XPL: medium brownish tan
Frequency of Inclusions (estimated): 30%
Sorting: poor
Size Range: very fine to medium (quartz); very fine to very coarse (limestone)
Shape Range: angular to subrounded (quartz); subangular to rounded (limestone)
Main Inclusions: quartz, K-feldspar, plagioclase, limestone (micritic and sparry), calcite, iron oxides, opaques, pyroxene
Additional Inclusions: polycrystalline quartz, biotite, muscovite, chert, chalcedony, chlorite, clay pellets (Nile), quartzite, plant remains
Comments: clay from an eroding limestone and probably some Nile clay and a few plant remains; low firing temperature


2911 break


2911 ppl


2911 xpl

Group 4: Nile clay and marl clay
(Sample #P146)
Colour PPL: reddish brown
Colour XPL: grayish red
Frequency of Inclusions (estimated): 30%
Sorting: fair
Size Range: very fine to medium
Shape Range: angular to subrounded
Main Inclusions: quartz, plagioclase, K-feldspar, muscovite, biotite, limestone (decomposed), iron oxides, opaques, pyroxene, amphibole
Additional Inclusions: polycrystalline quartz, chert, serpentine, shale fragments, iron-filled microfossils, sandstone fragments, VRF, OPL, garnet?, gneiss fragment?
Comments: marl clay with sand and probably some Nile addition; high firing since limestone decomposed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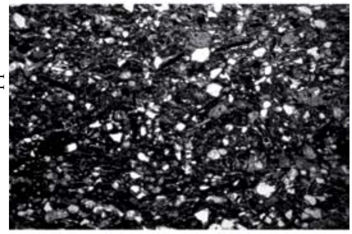
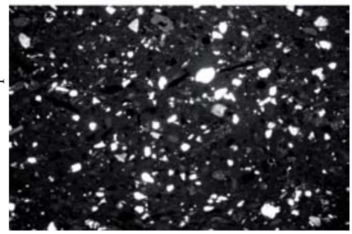
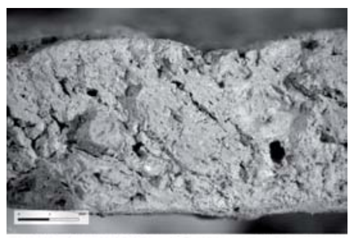
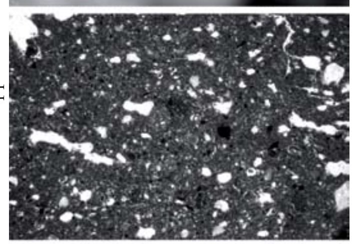
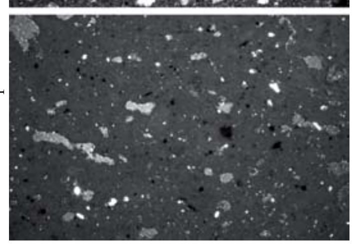

4316 ppl


4316 xpl

Group 5: Marl clay (Sample #P154)
Colour PPL: light brown
Colour XPL: grayish brown
Frequency of Inclusions (estimated): 5%
Sorting: good
Size Range: very fine to fine
Shape Range: subangular to subrounded
Main Inclusions: quartz, iron oxides
Additional Inclusions: plagioclase, K-feldspar, biotite, muscovite, chert, opaques, serpentine, amphibole, pyroxene?, amphibole?, OPL?
Comments: calcareous clay with no added inclusions; medium firing temperature


4324 break

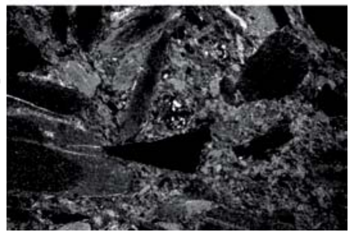

4324 ppl


4324 xpl

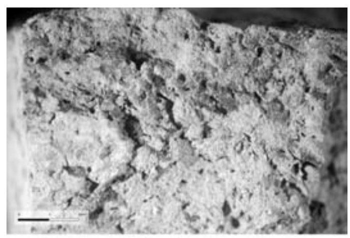
Group 6: Shale clay (Sample #P139)
Colour PPL: tan
Colour XPL: reddish tan
Frequency of Inclusions (estimated): 1%
Sorting: good
Size Range: very fine to medium
Shape Range: angular to subrounded
Main Inclusions: quartz, iron oxides, opaques
Additional Inclusions: plagioclase, biotite, serpentine, OPL, pyroxene?
Comments: shale-derived clay; low firing temperature (optically active)

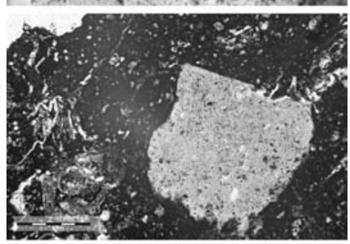
4309 break

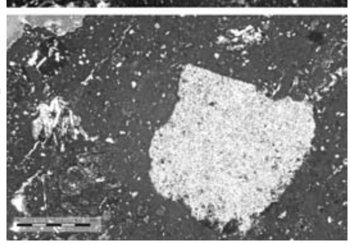

4309 ppl


4309 xpl


Group 7: Marl clay with volcanic rock fragments (Sample #P91)
Colour PPL: medium grayish tan
Colour XPL: dark grayish tan
Frequency of Inclusions (estimated): 10%
Sorting: poor
Size Range: very fine to medium (quartz); fine to very coarse (chert); fine to coarse (VRF)
Shape Range: angular to subrounded (quartz); very angular to subangular (chert); subangular to rounded (VRF)
Main Inclusions: quartz, plagioclase, limestone (micritic, some w/chert), iron oxides, opaques, pyroxene, chert (some coarse-sized), VRF
Additional Inclusions: K-feldspar, amphibole, olivine
Comments: Marl clay with large VRF (dolerite to basalt, few with olivine which is now iddingsite, ortho and clinopyroxene, mostly tholeiitic in composition, some are holocrystalline and some are hypocrystalline, some are devitrifed and weathered); medium firing temperature (limestone decomposed)

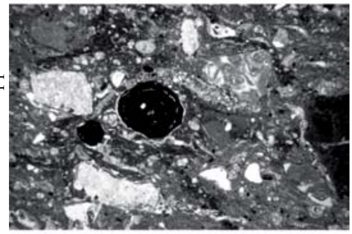
2977 break


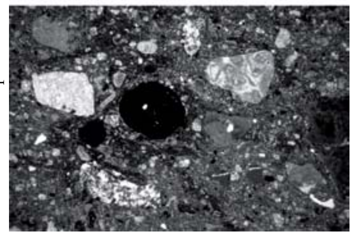
2977 ppl


2977 xpl


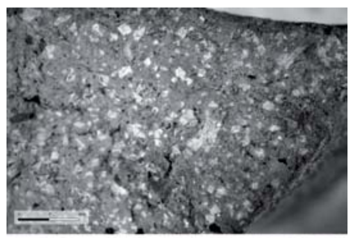
Group 8: Foraminiferous Marl
(Sample #P140)
Colour PPL: tan
Colour XPL: tan
Frequency of Inclusions (estimated): 40%
Sorting: poor
Size Range: very fine to very coarse
Shape Range: subangular to well rounded
Main Inclusions: quartz, limestone (micritic and sparry), calcite, microfossils (globigerinoids, globigerina, orbulina), chert
Additional Inclusions: chalcedony, opaques, iron oxides, plagioclase, serpentine, amphibole?, pyroxene?, volcanic glass?
Comments: marl clay with natural inclusions of quartz, limestone, calcite, and microfossils. The chert and chalcedony are also likely natural. A few iron-rich ooliths. Low firing temperature.

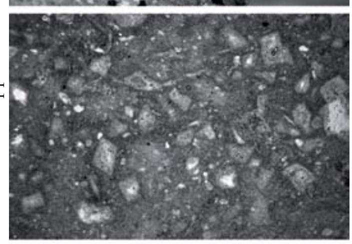

4310 break

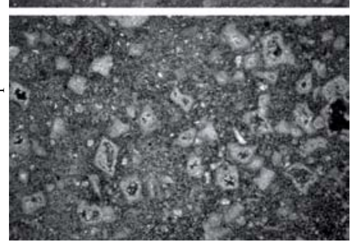

4310 ppl


4310 xpl

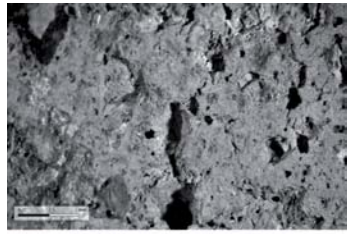
Group 9: Dolomite Moza(?) Formation
(Sample #P143)
Colour PPL: tan
Colour XPL: dark tan
Frequency of Inclusions (estimated): 35%
Sorting: poor
Size Range: very fine to very coarse
Shape Range: angular to subrounded
Main Inclusions: dolomite, limestone (sparry and micritic, decomposed), microfossils (globigerina, globigerinoids, orbulina)
Additional Inclusions: calcite, quartz, plagioclase, iron oxides, pyroxene?, amphibole?
Comments: calcareous clay with natural inclusions of dolomite and some microfossils, decomposing so medium firing temperature

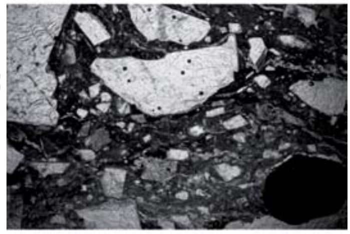

4313 break


4313 ppl


4313 xpl

Group 10: Marl clay with crushed calcite
(Sample #P153)
Colour PPL: tan
Colour XPL: tan
Frequency of Inclusions (estimated): 40%
Sorting: poor
Size Range: very fine to very coarse
Shape Range: very angular to subrounded
Main Inclusions: limestone (micritic and sparry), calcite, microfossils (globigerinoids, globigerina, orbulina)
Additional Inclusions: quartz, dolomite, iron oxides, serpentine, iron oxide nodule
Comments: a dolomitic derived clay, no temper added; low firing temperature

4323 break


4323 ppl


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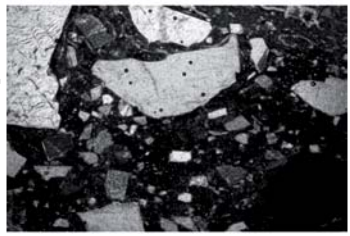

First data on the nature and origin of the metalwork from Tell el-Farkha

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[1] UCL Qatar, [2] Mannheim/Heidelberg, Germany

Introduction

The metalwork from Tell el-Farkha is a major assemblage of late 4th millennium utilitarian copper artefacts, presented in detail by Czarnowicz (2012). More than 30 objects were found during excavations in the settlement, with a further seven finds from the cemetery. Fish hooks, harpoons (Fig. 1) and knifes dominate, but also several awls, pins with loops (Fig. 2) and fragments of bracelets (Fig. 3) were found as well as small unidentified pieces, and working debris such as a casting prill and a plain rod. This progress report focuses on three main aspects of the assemblage of metal finds from Tell el-Farkha, namely their microstructure, their chemical composition, and their isotopic composition. This links back to three different choices that the early metal smiths may or may not have taken: how to work the metal, whether they selected or influenced the metal for particular properties determined by its composition, and where they may have obtained the metal from.

The first choice provides some insight into how skilled the metal smiths were who produced these artefacts. There are different ways how to shape metal artefacts, and some of the properties of metal depend on how it is being worked. Objects can be cast into shape, and then further treated by hammering, either to complete the forming process, or to improve the hardness of the metal, or both. If metal is worked or hammered too much it can become brittle, and annealing, that is re-heating to about half the melting temperature would be necessary to make it soft again and facilitating further deformation through hammering. The microstructure of the metal would show whether it is in its original as-cast state, or whether it has been subsequently deformed through hammering, and/or annealed (*e.g.* Scott 1991). Casting and hammering would be relatively basic methods of metal working, while evidence for annealing, which also leaves very characteristic microstructures, would indicate an advanced level of knowledge and experience.

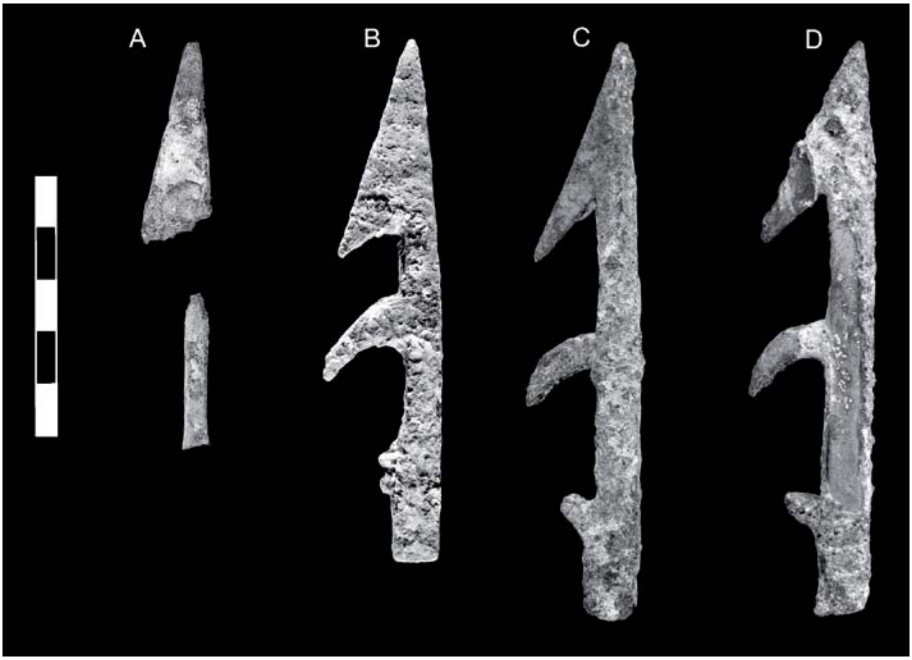

Figure 1. Four harpoons from Tell el-Farkha. Scale in cm (photo by M. CZARNOWICZ).

Secondly, it is interesting to find out whether there is a relationship between the type or function of certain objects and the metal from which they are made. In this early period, one would expect that either copper or copper-arsenic alloys were used, while further to the east more complex alloys rich in antimony and arsenic were also used (*e.g.* the famous metalwork from Nahal Mishmar, TADMOR *et al.* 1995). The alloys are typically harder than pure copper, melt at lower temperatures, and have a lighter colour. So both for functional objects such as knifes and other tools, and for decorative items such as jewellery one could expect to see a preferred use of alloyed copper. For wires, in contrast, one would probably expect to see the softer and less brittle pure copper being used.

The third question concerns the geological origin of this metal. There are no copper ores in the Nile Delta and no copper slags known from Tell el-Farkha. Thus, the metal itself may well have been smelted elsewhere even though at least one casting drop was found indicating the presence of a local metal workshop. Substantial long-distance trade took place already in this early period, for instance with lapis lazuli from Afghanistan reaching Egypt. There are several large copper sources with known or suspected 4th millennium mining evidence in the wider vicinity of Tell el-Farkha that could have supplied this metal, such as Feinan or Timna in current-day Jordan and southern Israel (HAUPTMANN 2000, and references therein), or the Sinai Peninsula (ABDEL MOTELIB *et al.* 2012), or smaller deposits in Egypt and Saudi Arabia along the Red Sea coast. Even Anatolia or Iran cannot *a priori* be excluded as potential source areas, given the evidence for lapis lazuli from Central Asia being found in Egypt.

Figure 2. Collection of pins with loop from Tell el-Farkha; object marked D is C719. Scale in cm (photo by M. Czarnowicz).

Methodology

All available metal finds were analysed in April 2012 on site in Tell el-Farkha using portable equipment, including 13 registered artefacts and those more recent finds still under study in the site base (find numbers are preceded in the table by W, C, EN and ES for West, Central, East North and East South to indicate the Kom where they were found). The purpose of the study was firstly to properly identify and characterise the metal, and secondly to try and relate the metal compositionally to other analysed artefacts from the wider region, complementing the typological study based on visual examination and comparison to finds from elsewhere, published recently by Czarnowicz (2012).

Figure 3. Bracelet C263. Maximum width circa 6cm (photo by R. Słaboński).

Figure 4. Analysis of a stone tool using pXRF at Tell el-Farkha (photo by M. Jórdeczka).

The analytical work used first an optical microscope to inspect the corrosion state of the metal and to identify the most suitable areas for analysis by portable X-ray Fluorescence. The analytical instrument, an InnovX Delta Plus, was used in its Alloy Plus and Mining modes respectively, analysing each artefact at least twice and with both modes to obtain a range of analytical data (Fig. 4). The fundamental and unavoidable limitations of this type of analysis are by now well known and need only briefly repeated here. The calibration is set up using a large number of certified reference materials with ideal surfaces: clean, homogenous material with a flat surface at a well-defined narrow distance to the detector window of the instrument. Under such conditions, relatively good levels of analytical precision and accuracy can be obtained for base metal concentrations above circa half of one percent, or even less, depending on the elements in question. The actual measurements of the archaeological artefacts, in contrast, were done on irregularly curved and rough surfaces of heavily corroded and heterogeneous material, often at a somewhat larger distance from the window and/or on small fragments resulting in insufficient coverage of the area irradiated by the primary beam. Even with clean and homogenous metal surfaces such morphological deviations from the ideal flat surface are known to result in strong discrepancies between the certified and the measured composition, severely limiting the quality of the data in the field. A further massive distortion of the original composition would occur through the effects of corrosion, as discussed in more detail below.

To partially mitigate the effects of surface condition and shape, the interior of several artefacts was exposed using a small diamond-coated cutting wheel (Fig. 5). The exposed fresh metal was then re-analysed using a small-spot XRF mode (Fig. 6). Only the data from these samples are reported as numerical values in the table below, while the surface analyses are only discussed qualitatively. The cut pieces were then mounted in resin and polished to a mirror-like finish using standard metallographic procedures for study by optical microscopy, and the debris from the sampling and preparation used for lead isotope analysis using the method detailed in Niederschlag *et al.* (2003).

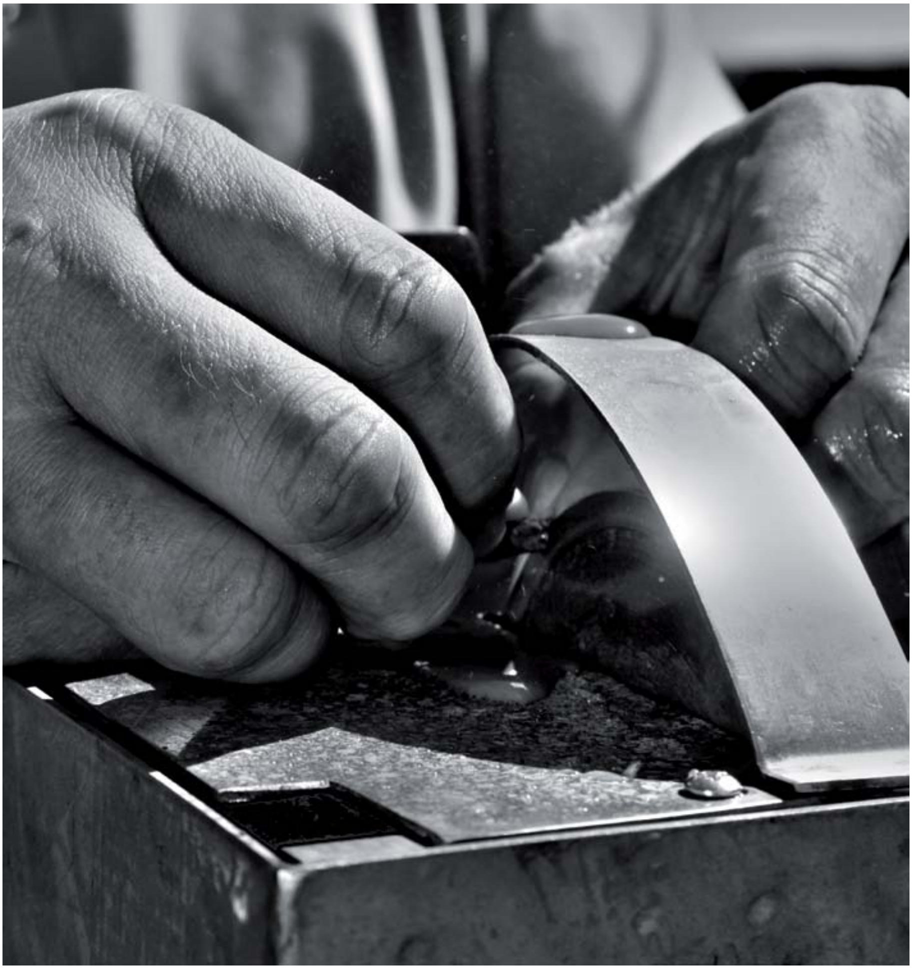

Figure 5. Cutting of finds at Tell el-Farkha to reveal fresh metal surfaces (photo by M. Jórdeczka).

Macroscopic inspection

Optical inspection of the artefacts confirmed the expected corrosion pattern for such archaeological finds, typically consisting of a layered structure of different mineralogical and chemical composition. Starting from the outside, this sequence begins with a mostly green surface or growth corrosion dominated by copper hydro-carbonates and possibly chlorides, and incorporating various amounts of soil particles; depending on the state of cleaning and conservation treatment applied to each artefact, this layer is not always preserved. Beneath this is a dark red layer of predominantly cuprite, which is assumed to indicate the position of the original surface of the artefact, but also to extend into its body as corrosion progresses (Scott 2002).

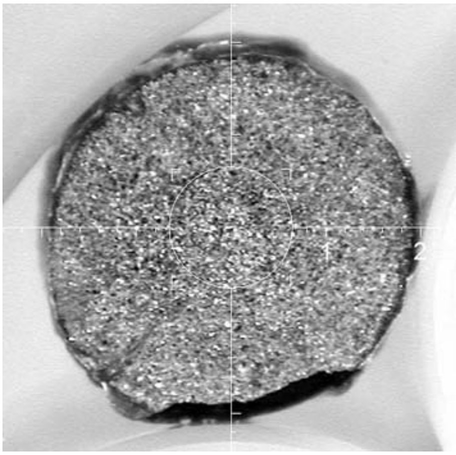

Figure 6. Bracelet C263 as seen through the camera of the XRF instrument. Diameter of cross section 4mm.

For most objects from Tell el-Farkha studied here the transition between the green and the red layer is irregular, resulting in a pitted surface for the cuprite layer after cleaning. Most artefacts analysed in this study have been cleaned to this surface, although several have still a prominent green surface layer, either because they are still awaiting conservation treatment, or because they were so thin as to have been completely mineralised and not preserving even the cuprite layer. A few of the larger artefacts show a fresh localised layer of powdery greenish material on top of the cleaned surfaces, indicating ongoing corrosion processes, possibly akin to bronze disease. In some cases beneath the cuprite layer some metal is preserved. Where visible, this preserved metal appears very granular and brittle, indicating an advanced state of intergranular corrosion.

Apart from the implications for conservation treatment, an understanding of the different corrosion layers is of relevance for the interpretation of the chemical results obtained by surface analysis. Due to the non-invasive nature of the pXRF analysis and its limited penetration depth of only a few tens of microns any analysis will be specific not for the whole artefact, but for the particular layer analysed. Since the corrosion processes which formed these layers affect different elements in different ways, the various layers of a single artefact often differ fundamentally in their composition from each other, and from the original metal core.

Metalworking techniques

As already seen macroscopically, most of the cut artefacts were severely corroded, often to the extent that no traces of the original microstructures remained. Others, however, have sound metal surviving as well as transitional areas of partial corrosion, providing good insight into the metalworking techniques employed in the manufacture of the artefacts analysed. In all cases where sufficient material is preserved to recognise it, it is an as-cast structure. This is particularly apparent in samples that are highly alloyed, such as the metal prill EN359, the rod EN554, and the bracelet C263.

The metal prill has two metallic phases, a dendritic copper-coloured alpha phase and a whiter interstitial phase on grain boundaries and triple points (Fig. 7a, b). The only other sample with substantially preserved metal, the harpoon E/12/10, has only about 2 wt% arsenic in the copper (see below), but still enough to show an as-cast structure. An as-cast structure is also preserved in the fully corroded sample from the harpoon

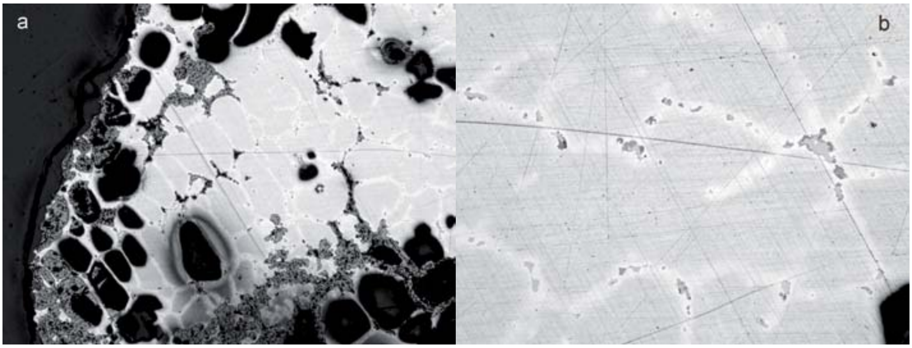

Figure 7a, b. Polished section of the metal prill EN359, showing a well-developed as-cast texture with dendritic alpha phase surrounded by a lighter network of metal enriched in arsenic, and the formation of intermetallic copper-arsenic compounds in the grain bound-aries and triple points (b). Note the selective corrosion of the more copper-rich alpha phase, leaving voids (black) in their shape (a).

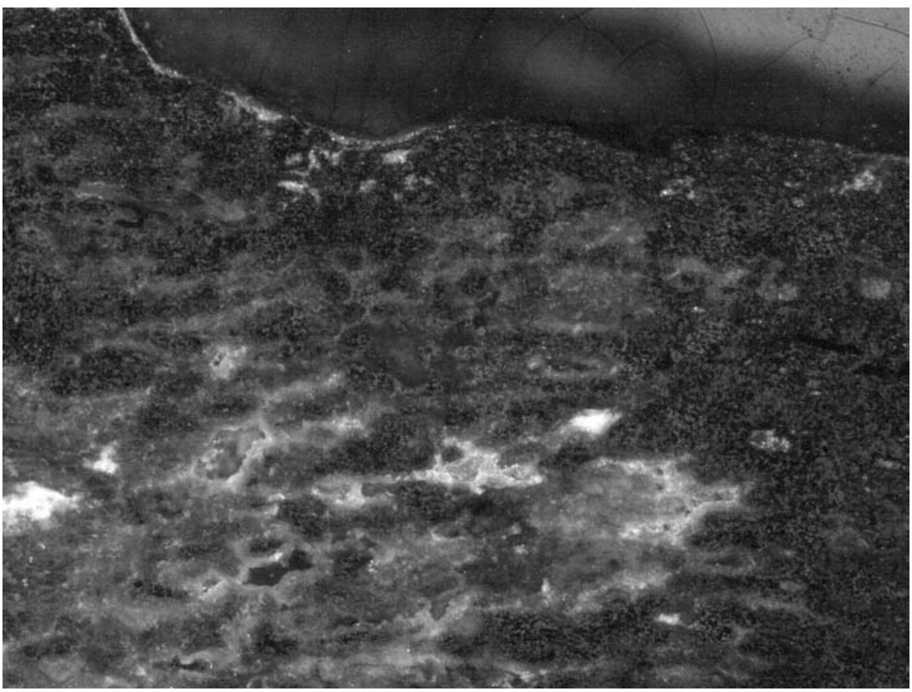

Figure 8. Polished section of a fully corroded part of the harpoon EN180, showing a slightly deformed as-cast texture with dendritic alpha phase preserved as 'ghost' structure in the corrosion products.

EN180. This sample may have some indication of a small degree of deformation, indicated by the sub-parallel orientation of the dendritic structure as it appears in the corrosion products (Fig. 8).

None of the wire or pin samples contain sufficient metal or residual structures in the corrosion products to determine their manufacturing mode; they are too thoroughly corroded. Whether this is due to the small size of these objects, or due to induced stress as a result of hammering, is impossible to say at this stage of our research.

Several fragments of bracelets were analysed (C263, C264; EN01/2), all three showing a rather unusual microstructure (Fig. 9). While clearly still based on copper as the main component, they are very rich in sulphide inclusions. C263 and C264 are also rich in corroded lead metal. Only the fragment C263 has sound metal exposed in the cut surface, while C264 and EN01/2 are fully corroded, but still show the characteristic sulphide inclusions preserved in the corrosion products.

So far, we have only seen as-cast structures in all of the objects, with no indication for any working through hammering. However, the cross sections of some of the wires are angular and may have been formed by hammering a rolled-up thin sheet into a square

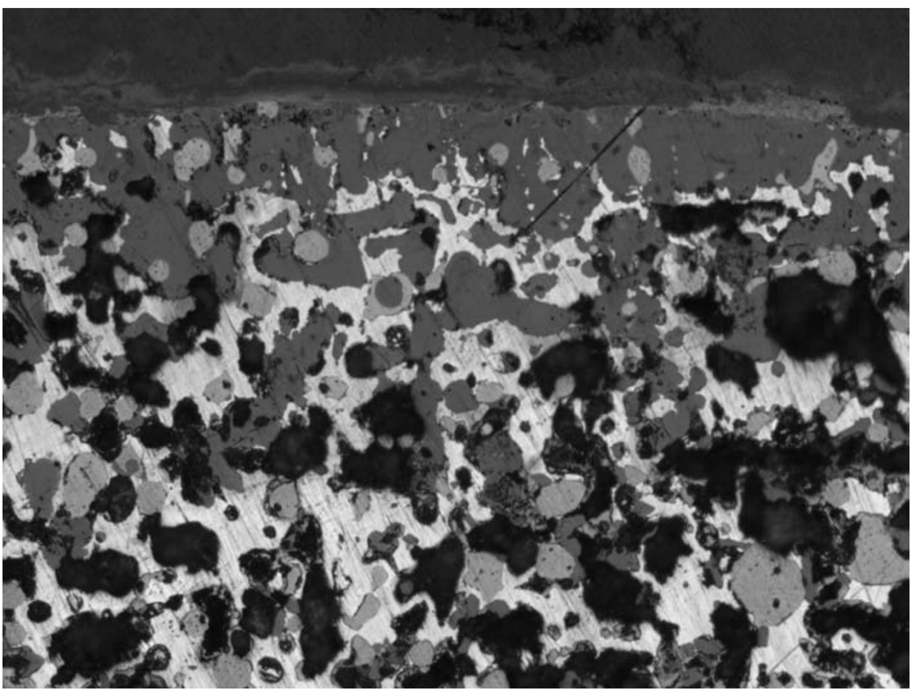

Figure 9. Polished section of the bracelet C263, showing a well-developed as-cast texture with dendritic alpha phase of copper together with numerous round sulphide inclusions and various corrosion products (different grey shades). Width of image circa 0.2mm.

Table 1. Indicative XRF analyses (in wt%) on cut metal surfaces exposing the less corroded core, using a small collimator. Measurement time 300 to 600 seconds, in air. Sulphur not sought, oxygen not measured; data normalised to 100 wt% metal. Fe, Co, Zn and Sn searched for but not found, with assumed detection limits in the order of 0.02 to 0.05 wt%. Cells with '-' indicate that the element was not found. The column As* reports pXRF analyses of the surfaces of the objects; note that the pXRF values are typically only about 1/3 of the values found in the core, except for the bracelets where they are significantly higher, possibly indicating a surface enrichment in arsenic for these particular samples.

		Cl	Ni	Cu	As	As*	Ag	Sb	Au	Pb	Bi
harpoon	E/12/10	-	-	97.2	2.8	0.5	-	-	-	-	-
harpoon	EN180	-	0.02	98.3	1.6	-	-	-	0.1	-	0.1
fish hook	C814	-	-	98.3	1.7	0.5	-	-	-	-	-
wire	W01 24	-	0.02	97.6	2.4	0.8	-	-	-	-	-
wire	C734	-	0.06	92.3	-	0.1	5.1	-	2.6	-	-
wire?	C566	-	-	100.0	-	0.2	-	-	-	-	-
pin w loop	C719 b	-	0.05	94.0	-	-	4.3	-	0.4	1.3	-
bracelet	C264	-	-	93.9	1.2	9.9	-	0.04	-	4.8	-
bracelet	C263	12.3	0.03	81.3	2.0	1.7	-	0.09	-	4.4	-
bracelet	EN/01/2	-	-	99.5	0.5	2.7	-	-	-	-	-
Rod	EN554	-	0.55	65.6	0.3	0.5	13.9	-	19.7	-	-
Prill	EN359	-	-	96.6	3.4	0.6	-	-	-	-	-

mould; unfortunately, none of the structures of these samples reveal anything diagnostic regarding their manufacturing. The corrosion of the artefacts varies from heavy to complete, and this affects particularly the smaller artefacts, such as wires and pins, but also the thin blades of knifes. These are all completely corroded, and we were unable to see any positive residual textures. This may indicate that these were hammered into shape, which would have destroyed the original texture and added a lot of stress into the metal – which in turn would have made it corrode more and faster than the as-cast objects. Some shapes, such as the end of some of the pins with loops that are rolled back onto themselves, are clearly hammered into their final shape.

Chemical composition

Only about a third of all artefacts were analysed on freshly-cut inner surfaces, while all finds were analysed non-invasively on their outer preserved surfaces. Table 1 reports the analytical data obtained on metallic cores of cut samples; it has to be borne in mind though that even these freshly-cut surfaces include deep-rooted corrosion areas. This, and the field character of the analyses, prevents us from claiming that the reported data is quantitative; however, clear patterns do emerge and can be reliably interpreted.

The data indicates that most artefacts were made from arsenical copper, with arsenic concentrations in the order of half a percent to three percent by weight. Eight of the twelve analysed artefacts have more than half a percent arsenic. A similar picture emerges from the surface analysis of the entire assemblage; here, overall arsenic levels appear to be significantly lower, on average only giving one third of the readings found within the artefacts' cores, which may reflect a depletion effect of the corrosion processes. Only the three bracelets show significantly higher arsenic readings on their surface compared to the core analyses. Overall, 14 of the surface analyses show 0.2 wt% arsenic or more, a further nine show a clear arsenic peak which may represent a concentration in the order of 0.1 wt%, while only four artefacts gave no good arsenic signal.

Half of the cut analysed artefacts gave nickel signals; one in the order of one half of one percent, the others much lower, but still clearly visible. There does not seem to be a positive correlation of nickel and arsenic; the objects with the highest arsenic values have low or no nickel, while high nickel values are found in low-arsenic artefacts.

Remarkable and unexpected is the presence in three artefacts of gold and silver in significant quantities. The pin with lop C719 has about 4 wt% silver and nearly half a percent by weight gold, the small wire C734 has 5 wt% silver and two and a half percent gold, while the rod EN554 has around 14 wt% silver and nearly 20 wt% gold. These concentrations are well above normal trace element levels in copper, rarely exceeding 0.1 wt% for silver and 0.01 wt% for gold. However, they are also far too low to have a noticeable effect on the colour of the alloy, or its properties other than making it generally somewhat harder than pure copper would be. It may be significant that the pin and the wire both are among the arsenic-free finds, while the rod has only a very small amount of arsenic.

The two bracelet fragments C263 and C264, finally, both have around four to five weight percent lead, one to two percent arsenic, and are the only finds with noticeable antimony contents. From their composition, they may well come from the same object, as is also indicated by the similar microstructure with the unusual high sulphur content (not analysed). The third bracelet fragment, EN/01/2, is rather pure copper with just a small amount of arsenic and no other metals found in the analysis. The microstructure of this sample, although completely corroded, does show a high sulphur content, indicating that there is a degree of similarity among all three bracelet fragments which is not shared with any of the other analysed objects. It had been mentioned earlier that the three bracelet fragments are the only pieces which showed much higher arsenic values during pXRF analysis of their surface compared to the point-mode XRF of the interior metal exposed through a clean cut; all other artefacts showed the opposite phenomenon, much lower arsenic concentrations on the surface compared to the core. It is tempting to think that this is due to the presence of an arsenic-rich layer at the surface of these bracelets, either through inverse segregation of arsenic during the slow solidification of the cast, or through a specific surface treatment. In both cases this would have resulted in the formation of a more silvery surface, most likely a desirable colour effect (Smith 1973). However, one would need to do a more detailed metallographic study of the bracelet fragments to investigate this idea further.

On the basis of the existing data there does not seem to be a clear pattern of correlation between function and composition, apart from the three bracelet fragments. The amount of alloying components lies in the low percentage range for most artefacts, with emphasis on arsenic as the main alloying element. However, the harpoons are not more alloyed than the wires, which could suggest that there was no selection yet for hardness (harpoons) or ductility (wires) when picking a piece of metal in order to produce a specific object. The largest effect from alloying component would have come from the four to five percent of lead in the two bracelets C263 and C264, and the high sulphur content in all three bracelet fragments. These would have given the metal a much higher fluidity and longer cooling range than the normal low-alloy arsenical copper would have had. This might have been a noticeable property which the metal founders exploited when casting the bracelets with their fine surface detail. Interesting in this respect is also that at this early period, copper smelting is supposed to be based almost entirely on the exploitation of oxidic ores such as malachite; the smelting of sulphidic ores was not yet common practice. Much later, from Hellenistic times in the eastern Mediterranean and in Zhou period and later China, people would add lead to bronze specifically for complex castings to improve the metal's fluidity. It seems that this effect of lead was already empirically known to the metal smiths of the late forth millennium BC, even though this is most likely the selection of a naturally fluid alloy rather than the conscious addition of lead and sulphur to copper.

Geological origin – Lead Isotope Analyses

Lead is a relatively common trace element in most natural rocks. It occurs in nature in four stable isotopes, that is in four different varieties which all have the same chemical behaviour, but slightly different mass. Three of these isotopes form continuously through the slow but persistent radioactive decay of uranium and thorium, two other trace elements present in most rocks. Through this process the relative proportion of the four lead isotopes changes over time as the three radiogenic isotopes increase in quantity, at different speeds, while the fourth one remains unchanged, therefore over time relatively decreasing in abundance. This process happens in a predictable manner, depending in detail on the relative proportions of the three elements lead, uranium and thorium in the rock. During ore formation, the lead is removed from the parental rock and concentrated together with other metals such as copper or silver, but typically separated from uranium and thorium; at this stage, the lead isotope abundance ratio in the ore is therefore effectively fixed, while the lead isotope ratio in the surrounding rocks continues to evolve due to their remaining content in uranium and thorium. Measuring the lead isotope abundance ratios in ore deposits therefore provides a measure for the

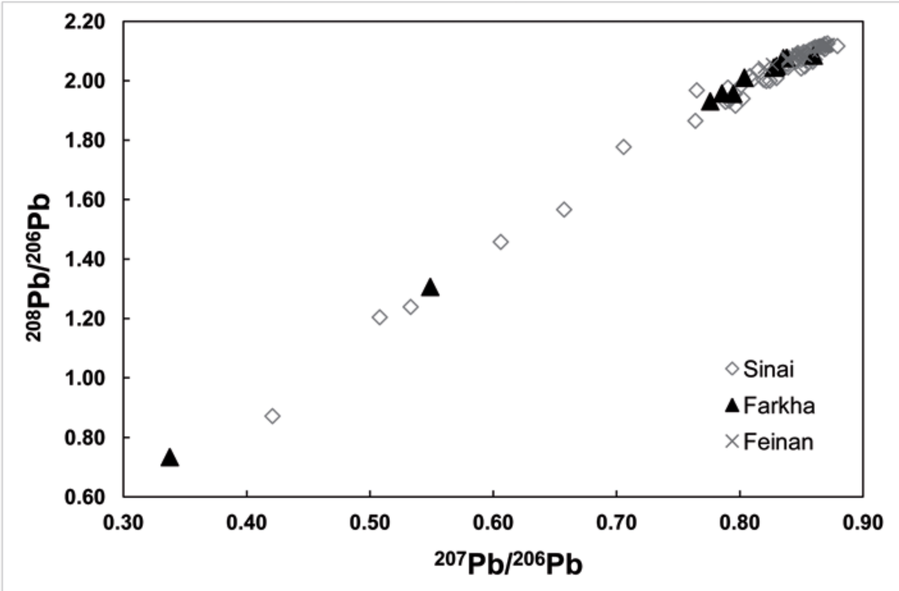

Figure 10. Lead isotope abundance ratios for 13 Tell el-Farkha objects (triangles) compared to data for copper and copper ore from Feinan in Jordan (x, data from Hauptmann *et al.* 1992) and the Sinai (chevrons, data from Abdel-Motelib *et al.* 2012). Note the long tail of LIA data to the lower left-hand corner of the diagram, indicating a very radiogenic signature of the metal.

geological age of the formation of the ore deposit. During smelting, this isotope ratio is transferred without change into the metal, where lead occurs again as a trace or minor element in the copper, so that the lead isotope ratio of a copper artefact represents the lead isotope ratio of the ore deposit from which it was smelted. Different ore deposits form at different geological times and in different geological environments which enables one to distinguish between metal that was made from ores from different deposits, through the analysis of the lead isotope ratios in these metals. However, ore formation is a ubiquitous process, and can happen at the same time in different parts of the world, leading to geographically unrelated ore deposits which have the same lead isotope signature. Depending on the specific formation processes long drawn-out ranges of isotope ratios within single deposits can occur, which are then not very specific. Finally, there are copper ore deposits which are relatively poor in lead but contain relatively high concentrations of uranium and thorium which can lead to a highly variable lead isotope signature. Such lead is usually called radiogenic.

An initial assessment of the 13 Tell el-Farkha samples shows that they extend over a very drawn-out range, as is typical for highly radiogenic lead (Fig. 10). Comparing this to the possible copper ore sources briefly mentioned above shows that the Tell el-Farkha metal has the same lead isotope signature as the Sinai ores; that it extends further down is not really a problem. This does not prove that the metal is from the Sinai, but it is

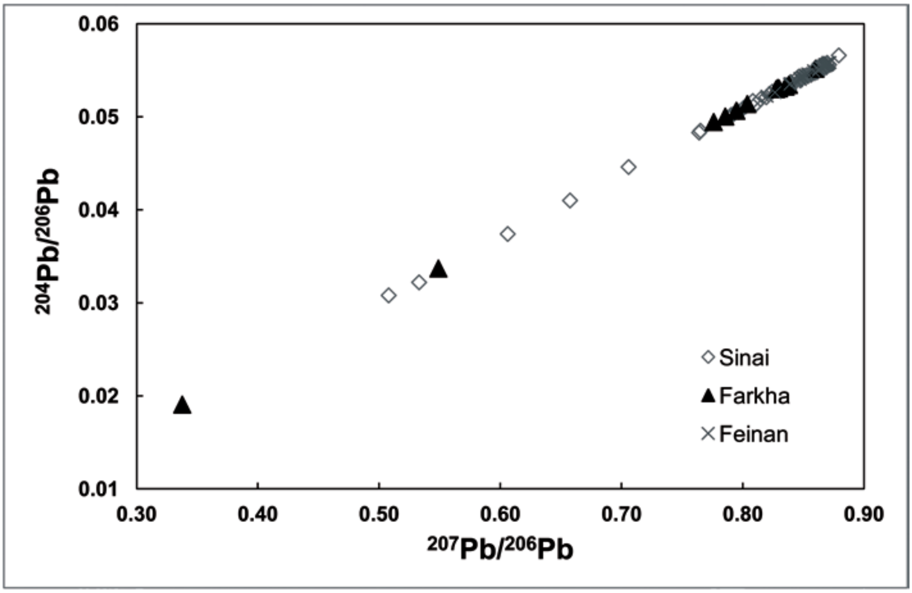

Figure 11. Alternative representation of the lead isotope abundance ratios for 13 Tell el-Farkha objects (triangles) compared to data for copper and copper ore from Jordan (x) and the Sinai (chevrons). There is less scatter along the regression line, because only the U/Pb ratios in the ore deposits are involved while in Figure 10 the values also depend on the Th/Pb ratios.

a distinct possibility. However, it is virtually impossible to distinguish between copper ores from the Sinai and from Feinan in the Arabah valley in the upper right corner of the diagram. Also the alternative isotope plot including ^{204}Pb (Fig. 11) does not provide a clear discrimination.

A closer look at the group of lead isotope data near the top right hand end of the graph confirms that the match to the Sinai ores is still clear and the problem of discrimination with copper ores from Feinan persists (Figs. 12 and 13). However, copper ores with relatively high concentrations of arsenic and lead do exist in Sinai while they are absent in Feinan (Hauptmann *et al.* 1992). If one disregards the gold and silver contents then it would again appear that on balance it is more likely that also these samples are from the Sinai. It is as yet unknown whether the copper ores from Sinai contain also gold, but if the silver content of EN554 is taken at face value it rather seems to be an addition than an impurity from the ore. Indeed, copper-silver alloys are known from the fourth millennium BC, *e.g.* at Ur (Müller-Karpe 1990), Arslantepe in eastern Anatolia (Palmieri *et al.* 1998) and recently also at Çukuriçi Höyük near Ephesos at the Aegean coast (Horejs *et al.* 2010). Similarly, gold-silver alloys with varying copper contents are also known from Predynastic Egypt (Gale & Stos-Gale 1981) and the Levant (Rehren *et al.* 1996, and references therein). The origins of these less common alloys, whether they are natural or intentional alloys, remain mostly unknown.

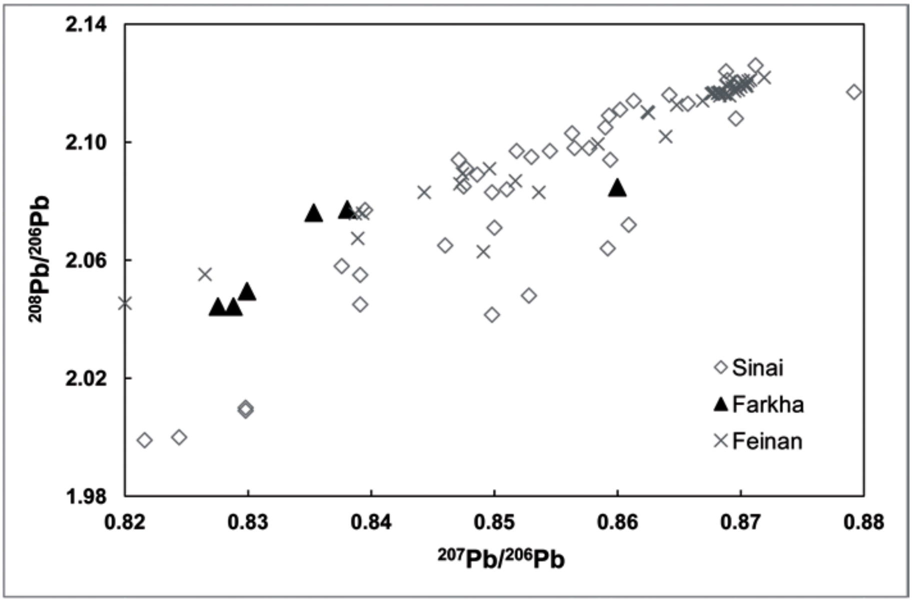

Figure 12. Detail of Figure 10, showing lead isotope abundance ratios for 6 of the 13 Tell el-Farkha objects (triangles) compared to data for copper and copper ore from Jordan (x) and the Sinai (chevrons). There is no clear discrimination between the two ore regions.

On balance, it seems safe to assume that the majority, if not all of the metal from Tell el-Farkha comes from the Sinai where there is archaeological evidence for early metal production, including for the production of arsenical copper.

Conclusions

The metal from Tell el-Farkha is predominantly arsenical copper, as one would expect at that period in time. There is no indication among the tools that the metal smiths selected more arsenic-rich alloys for artefacts with a particular function. However, there is a clear link between the bracelets and a very intriguing lead- and sulphur-rich alloy which would have been highly fluid when molten, and therefore ideal to cast, and possibly therefore selected for producing jewellery. This alloy is also likely to have been somewhat more silvery in colour than the normal copper, and this may have contributed to the appeal and selection of this metal; the surface colour effect would have been much more pronounced if there would have been a surface-enrichment in arsenic, as indicated by the pXRF analyses reported above (As* in Tab. 1).

It is reasonable to assume that the Tell el-Farkha metal comes most likely from the Sinai. That is true for all the arsenical copper artefacts, and the sulphur- and lead-rich bracelets, and the gold-silver rich copper. Feinan is possible as an additional source of copper, but it does not to seem very likely based on their trace element contents.

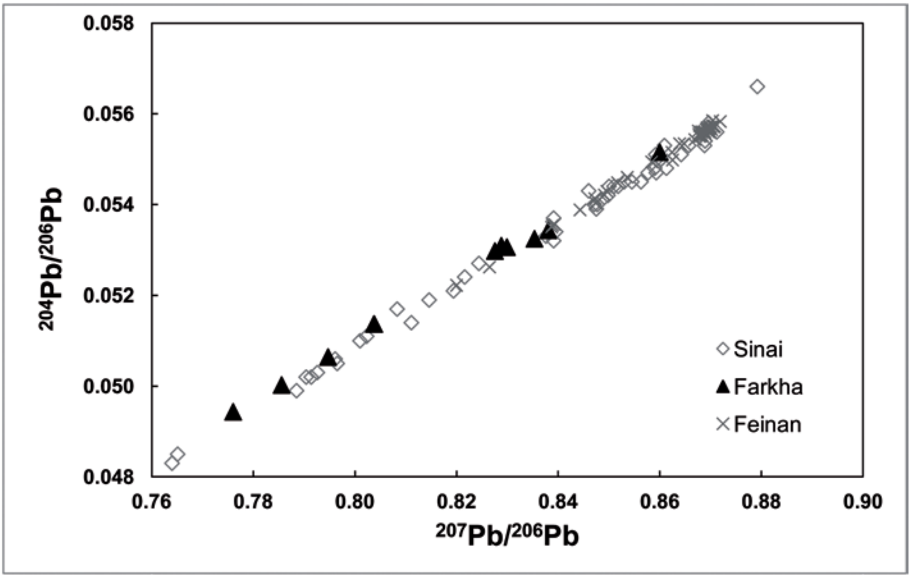

Figure 13. Detail of Figure 11, showing lead isotope abundance ratios for 10 of the 13 Tell el-Farkha objects (triangles) compared to data for copper and copper ore from Jordan (x) and the Sinai (chevrons). There is no clear discrimination between the two ore regions, except for the shorter range of data from Jordan which do not have $^{207}Pb/^{206}Pb$ values lower than 0.82, while both Sinai ores and the Farkha metal extend to much lower values.

Finally, all artefacts where the texture is preserved are in their as-cast state; there is no evidence for hammering and annealing to modify the metal properties. However, for thin objects such as the blades of knives or thin wires, and clearly the pins with loop, we may reasonably expect that they were hammered – and this may well have contributed to their bad corrosion state, particularly if they were not annealed after hammering, but left in a work-hardened state. This would have made sense for both the knives and the pins, so one can assume it – but not prove it.

Acknowledgements

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Lithic systems of the 4th millennium BC: A brief comparison between the industries of Egypt and the Southern Levant

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Introduction

The 4th millennium BC in the Near East is a period of momentous social change. In both Mesopotamia and Egypt state societies based on new political structures developed and expanded concomitant with a large set of associated social, economic and cultural features. The complexity of these new structures is well reflected in the full range of the archaeological record; however, this record has been exploited unevenly and many archaeological data sets have not been fully integrated into the narratives and explanations of the rise of social complexity.

Comparison of the lithic industries of the 4th millennium BC in Egypt and the southern Levant reveals marked contrasts across a range of attributes and features including typology, technology, utilitarian function, degrees of specialization, patterns of raw material exploitation, role in ritual, and structure of chronological change (*cf.* Rosen 1997a for the southern Levant). Analysis of these contrasts suggests that minimally three distinct but interacting regional industries may be defined, those deriving from the Nile Valley, the Mediterranean Levant, and the desert zones of the Negev and Sinai. Additional industrial distinctions, such as between Upper and Lower Egypt (*e.g.* Holmes 1989), or between the Nile and oasis basins such as the Fayum (*e.g.* Holdaway *et al.* 2010), may also be possible, but are beyond the scope of this paper.

Besides the obvious conclusion that the lithics, along with other archaeological remains, reflect different culture areas, at one level definable as ethnicities, these contrasts indicate basic differences in the structure of these different societies. They offer a means for better understanding the nature of the Egyptian presence in Canaan, and indeed, the Canaanite material culture in Egypt; they also offer insights into the structure of economies and social hierarchies.

Problems of methods

Lithic analysis can be conducted at a range of scales (*cf.* Andrefsky 1998; Odell 2004), from the microscopic analysis of wear and damage patterns (*e.g.* Keeley 1980; Odell 2004) through large mass debitage analysis (*e.g.* Sullivan & Rozen 1985). Each of these offers insights into aspects of lithic archaeology, and each demands a specific set of protocols for retrieval and analysis. Needless to say, for rigorous comparative study, it is preferable that the protocols for the comparative sets be similar; unfortunately, in the case of lithic assemblages this is rarely the case. Regional archaeological traditions have developed along different trajectories, and emphases in terms of field collection, documentation, and analysis vary from area to area, from site to site, and most certainly from archaeological generation to archaeological generation.

Thus, the first task of synthesis is to make some accounting of the potential biases deriving from differences in archaeological practice. From this perspective, in comparing Egyptian and Levantine lithic assemblages, two pitfalls are evident:

1. contrasts in collection methods and
2. major differences in archaeological contexts.

The problem of collection methods and selected assemblages (Rosen 1997a: 34-38) is primarily one of the history of research. Earlier generations of archaeologists did not recognize the significance of debitage and waste flint, and consequently the entire class of *ad hoc* tools also went unrecognized. This picture has changed in the past 25 years, primarily the result of the influence of the methods of prehistoric archaeology on that of later periods. In turn, this has resulted in a relative abundance of reasonably collected lithic assemblages in the Mediterranean Levant and the desert zones (Rosen 1997a). In Egypt, the number of comparable collections has been more limited, not necessarily due to a lesser rigor in collection, but simply due to a lesser intensity of exploration (at least partially attributable to the difficulties of finding and excavating habitation sites in the Nile Delta area; lithics have certainly been a focus in the desert depressions). Thus, whereas it is possible to obtain a picture of the Levantine assemblages without resorting to assemblages collected prior to the 1970s, in Egypt, the selected and biased assemblages collected in the first half of the 20th century (especially Petrie 1902, 1904; Petrie *et al.* 1913) must still play a major role in our understanding Egyptian lithic assemblages, of course tempered by the few well collected assemblages of more recent times (*e.g.* Rizkana & Seeher 1985; Schmidt 1992ab; Holmes 1989; Kabaciński 2012; Thomalsky 2012).

The problem of context complements that of collection. If in the Levant, archaeological investigation has focused very much on various kinds of habitation sites (tells, village sites, campsites in the desert) as well as tombs (which in fact rarely contained lithics), in Egypt, especially in the earlier history of research, exploration focused much more on burial contexts and large ritual sites. Thus, the bulk of Egyptian lithics derive from contexts with few parallels in the Levantine record. The combination of selective collection with the focus on special contexts renders comparison of assemblages complex. Nevertheless, comparisons can be drawn, with interesting and important results.

The Mediterranean Levantine record

I have synthesized the general framework of Early Bronze Age lithic industries of the Levantine Mediterranean zone several times (Rosen 1989; 1997a; 2011ab). It is beyond the scope of this paper to describe these industries in depth, but it is worth reiterating the salient characteristics and trends.

Lithic industries in the 4th and 3rd millennia BC (Fig. 1) in the Mediterranean Levant are not monolithic entities or traditions. They derive from distinct processes, reflecting different functions, technologies, raw material sources, degrees of production specialization, and segments of society (Rosen 1989; 1997a). Briefly stated, the following sub-industries may be isolated:

1. Canaanean blade technology (Fig. 1: 5-6), producing special long prismatic blades, reflects specialized production of bulk materials and local distribution systems (Rosen 1983a; Otte *et al.* 1990; Shimelmitz *et al.* 2000; Shimelmitz 2009). This technology required special skills and knowledge, and utilized specific, if not especially rare raw materials. It is pan-Near Eastern in distribution. Functionally, the blades were almost exclusively used for sickle segments (claims for threshing teeth notwithstanding, *e.g.* Anderson *et al.* 2004).
2. Tabular scrapers (Fig. 1: 4, 7) were produced on large primary flakes whose cortex was deliberately retained, contrasting greatly in all particulars with Canaanean technology (Rosen 1983b; 1997a: 46-49). Quarry sites for these implements have been found exclusively in the peripheral desert zones (Fujii 1998; 1999; Rosen 1997a: 75; Quintero *et al.* 2002); the pieces were transported to the Mediterranean zone, apparently in a variant of down-the-line exchange. Functionally, Mcconaughy (1979; 1980) has suggested that tabular scrapers were in fact knives used in ritual activities. Shoh Yamada (*pers. comm.*) has noted that fracture patterns indicate intentional breakage, also in ritual contexts. The presence of incised symbols and special caches and find contexts for many of these pieces supports the hypothesis of a primarily ritual function (Rosen 1997a: 74-75). Suggestions that the pieces were used as sheep shears, based on informal experiment and analysis of wear patterns (*e.g.* Bennett *et al.* 1989; Barket & Bell 2011) ignore both the contexts of the finds and alternative explanations of the wear.
3. *Ad hoc* tools (Fig. 1: 1-3) comprise the dominant technological mode of the Levantine lithic systems of the 4th and 3rd millennia BC (Rosen 1997a: 106, 110, 111, 112, 115, 158-9). Unlike the previous two tool classes, each reflecting one form or another of specialized manufacture and exchange, *ad hoc* tools were produced on-site by the consumer and discarded quickly. The technology reflects no standardization and little investment in core preparation or rejuvenation. Raw materials are local, unless imported tools were recycled. These tools cover a wide range of domestic functions including cutting, scraping, whittling, and piercing, on a range of materials, and they therefore include a range of informal tool types (Mcconaughy 1979; 1980).

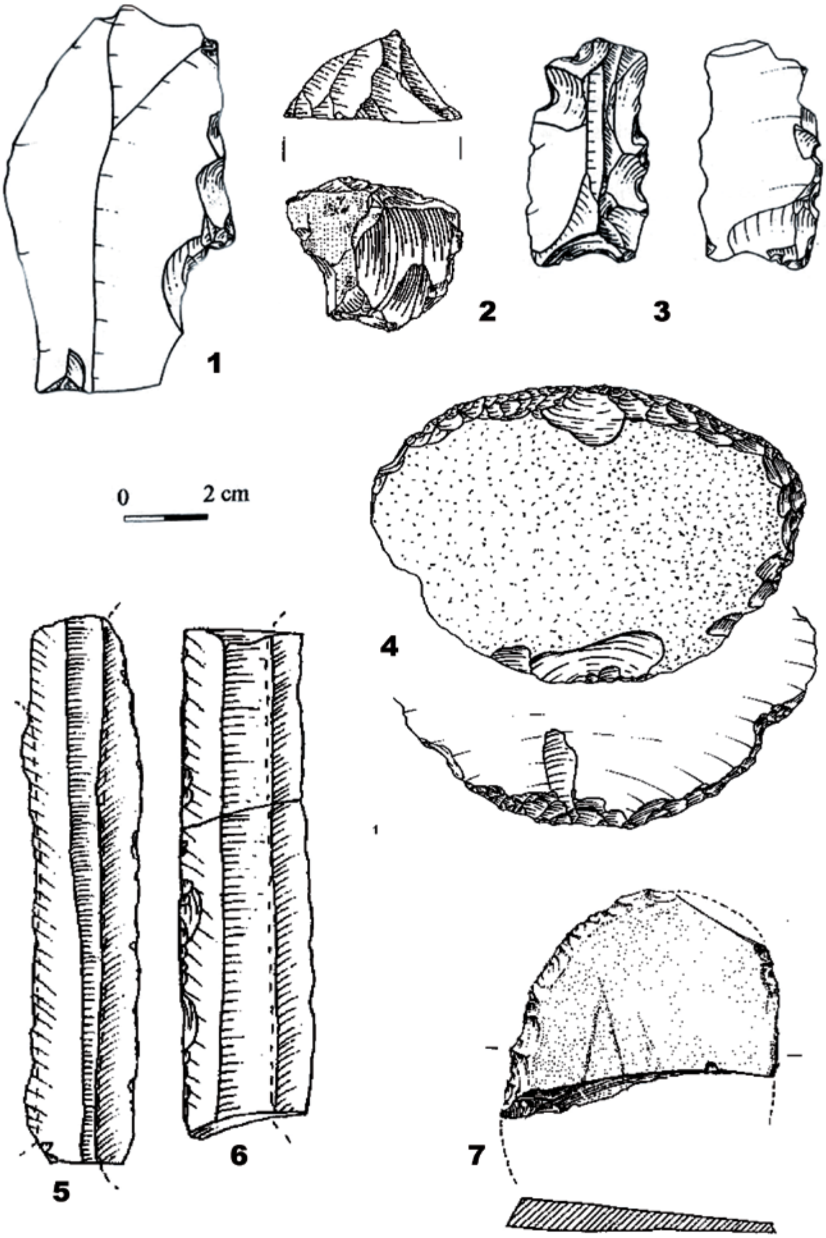

Figure 1. The Mediterranean Lithic Complex: 1-3 *ad hoc* tools; 4,7 tabular scrapers; 5-6 Canaanean blades.

The Desert Zone Industry

The lithic industry of the desert zones (Fig. 2) in this general period (Rosen 2011ab; and especially Hermon *et al.* 2011 for the early 3rd millennium BC in the Negev; Henry 1995 and Henry & Turnbull 1985 for Jordan; Bar-Yosef *et al.* 1986 for South Sinai) contrasts with that of the Mediterranean zone in the absence of specialized production of chipped stone tools, in the scarcity of sickle blades (except in special microenvironments), in the continued use of arrowheads, in the presence of microlithic drills for bead manufacture, and in typological contrasts in shared tools. Technologically the industry is dominated by small flakes. Small blades and bladelets were manufactured as variants of the basic flake industry, as indicated in the absence of dedicated blade and bladelet cores, and the presence of cores showing a mixture of flake, blade and bladelet scar patterns in addition to the flake cores. That is, unlike the Mediterranean zone and Egyptian assemblages, no sub-industries can be defined in the desert zone. Types all derive from essentially the same system.

In somewhat more detail, with the exception of tabular scrapers, produced in the desert but at quarry sites (*e.g.* Rosen 1997a: 75; Fujii 1998; 1999; Quintero *et al.* 2002), lithic assemblages in the desert show a full range of debitage, indicating production of all types on site. Raw materials for lithic manufacture are local, again with the exception of the tabular scrapers.

Functionally, the consistent presence of transverse arrowheads (Fig. 2: 3-5) (typologically following a chronological sequence from triangular to trapezoid to lunate; Rosen 2011b) in sites with reasonable collection procedures comprises a distinct contrast with the settled zone, where chipped stone arrowheads disappeared from the lithic repertoire at the end of the 6th millennium BC. In fact, the use of transverse arrowheads is known from contemporary times in Egypt (especially Clark *et al.* 1974; Clark 1975-77) and constitutes one of the few clear parallels with Egyptian materials.

Microlithic drills (Fig. 2: 7-8) for bead production are found in many Timnian sites, manufactured on small flakes or bladelets (*e.g.* Rosen 1997b), technologically similar to the transverse arrowheads. These seem to disappear from the Mediterranean repertoire by the beginning of the Early Bronze Age, ca. 3700 BC, thus constituting another functional difference between the desert zone and the north.

Sickle segments are scarce in desert sites, reflecting the general absence of systematic agriculture in the region, obviously the consequence of the environmental constraints on agriculture in the arid zone. However, in those microenvironments where agriculture could be practiced, such as the Aqaba area and the Uvda Valley (Rosen 1997a: 128, 141; Herling 2002ab), the sickle segments were made on simple backed blades and arched backed blades (Fig. 2: 9-11), the blades themselves little standardized. These thus contrast technologically and typologically with both the Egyptian and Canaanean types.

Tabular scrapers (Fig. 2: 12-13) are found in all Timnian sites, and have been recovered from caches in tumuli. As indicated above, quarry sites for these pieces are located exclusively

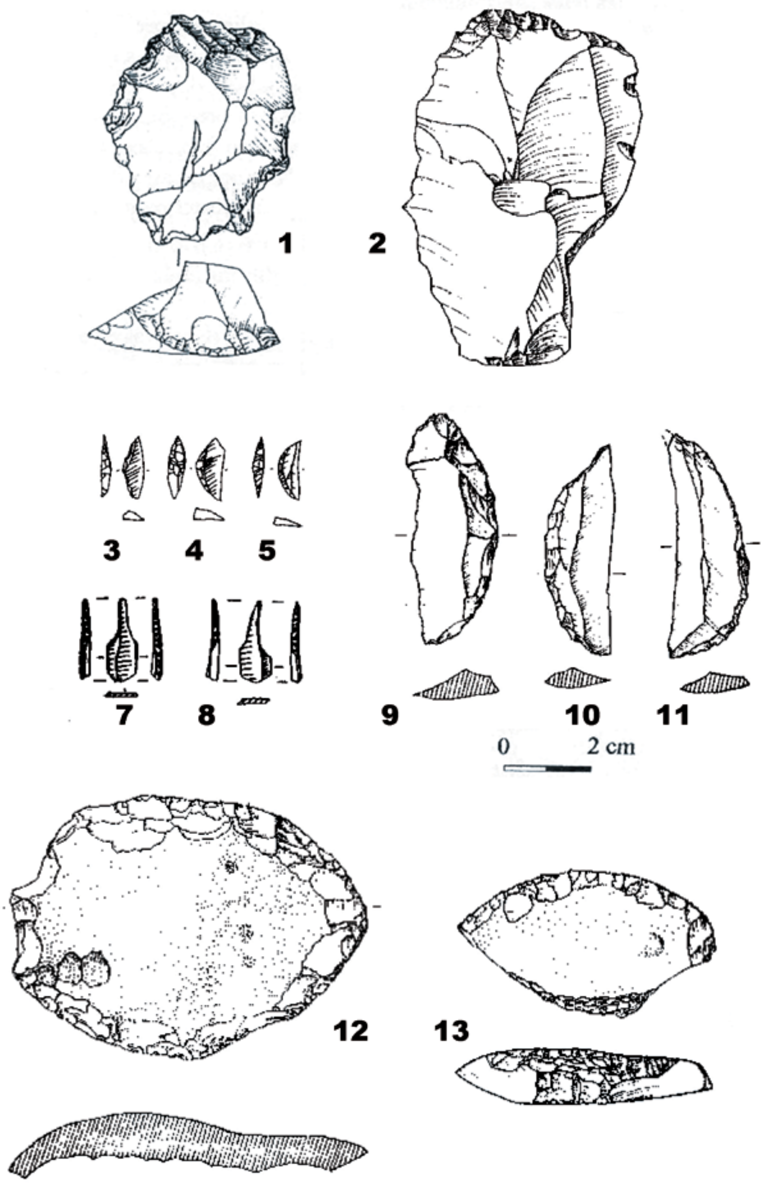

Figure 2. The Desert Lithic Complex: 1-2 *ad hoc* flake tools; 3-5 lunates (tranverse arrowheads); 9-11 blade tools; 12-13 tabular scrapers.

in the desert zone. Functionally, although cult use is clearly indicated in the caches and other ritual settings, their presence in domestic sites with little evidence for cultic context suggests domestic functions, perhaps re-use within the general *ad hoc* tool set.

In addition to these more standardized types, *ad hoc* tools (Fig. 2: 1-2) including retouched flakes and blades, notched and denticulated pieces, various kinds of pointed pieces which probably served as awls or gravers, and various kinds of scrapers in fact numerically dominate most desert lithic assemblages. The basic technology underlying these pieces is shared with the more formal tools.

The Egyptian assemblages

As per the Mediterranean zone assemblages, the Egyptian assemblages (Fig. 3) may be divided into techno-typological components produced in distinct *chaînes opératoires*. A detailed study of Egyptian Predynastic and early Dynastic lithic industries is beyond the scope of this work and this review will focus on general structures which can be compared and contrasted to those of the southern Levant.

Egyptian lithic industries in the Predynastic and Early Dynastic periods comprise several discrete technologies, probably organized in different lithic production systems. These include:

1. The large family of bifacial knives (Fig. 3:7). There was a wide range of elaborate and beautiful bifacial knives, including ripple knives, produced in this period (*e.g.* Keltenborn 1984; Stocks 2003; Kabaciński 2012; Petrie 1902: pls. XIV-XIX; 1904: pl. VII:3, 5-9; Petrie *et al.* 1913: pl. VII: 2,5,6,10; Rizkana & Seeher 1985: fig. 8:1-2; Schmidt 1992ab). The set of these types clearly evolves typologically and technologically over time. Crucial to our understanding of the type is the great skill and effort required to produce these tools, even the less elaborate ones, and the special raw materials required (Keltenborn 1984; Kabaciński 2012). It is likely that many of these, especially the larger ones, were essentially ritual in function (Graves-Brown 2010). This is supported by the high number recovered in mortuary contexts. Thus, these tools represent a specialized production, requiring significant apprenticeship, devoted primarily to the production of elite ritual items.
2. Arrowheads. Two types of arrowheads can be defined, the transverse types and the bifacially worked fishtails and concave base types (*e.g.* Clark *et al.* 1974; Clark 1974; Seeher 1990). Although these appear to converge functionally, they clearly represent distinct systems, one requiring skills akin to those for producing bifacial knives and the second working microliths into appropriate small pieces for hafting at the end of arrow shafts.
3. Eccentrics. Egyptian lithic assemblages also include delicate and sophisticated chipped stone figures of various kinds (*e.g.* Hoffman 1979: 112). The skills required for the manufacture of these figures are akin to those required for the finely made bifacial knives. Functionally, these were clearly primarily symbolic. Notably, they are probably too fragile to have served as toys.

4. Blade tools (Fig. 3:3-4). This group includes backed and truncated or merely truncated blades (*e.g.* Schmidt 1992ab; Seeher 1990; Petrie 1902: pl. XV; 1904: pl. VII: 4, 8, 18-19, 23-24, 28; Klasens 1961: fig. 12:6). Some of these were clearly sickle inserts (to judge from the glossy edges), although they differ from the bifacially worked and denticulated sickle blades which are perhaps better classified with the other bifacially worked pieces. These blades are short and prismatic. The general absence of blade cores indicates specialized production.
5. Bladelets and bladelet tools (Fig. 3:1-2) include twisted bladelets and various nibbled bladelets (Rizkana & Seeher 1985; Baumgartel 1970: 490). Microlithic drills (Kabaciński 2012; also see Stocks 1989; for example at Hierakonpolis, Hoffman 1979: 154) can also be included in this category. These all appear to have been the products of some kind of specialized manufacturing system.
6. Scrapers and what have been called razors are standardized tools on wide blades or elongate flakes with either rounded (scraper) or square (razors) retouched ends (Fig. 3:5-6) (*e.g.* Schmidt 1992ab; Rizkana & Seeher 1985; Seeher 1990; Petrie 1902: pl. XIV; Reisner 1908: pl. 40c). The apparent standardization suggests some kind of specialized production, but this is difficult to evaluate in the absence of better contexts.
7. Imported pieces include tabular scrapers and Canaanean blades, but these are relatively rare (*e.g.* Rizkana & Seeher 1985).

Significantly missing in this repertoire is the set of *ad hoc* tools so dominant in the Levantine assemblages. While this may partially be the result of a general scarcity of flint in the Delta area, and in the Fayum *ad hoc* tools are evident (Holdaway *et al.* 2010; Phillipps 2006), it also indicates that other materials must have been used in lieu of simple flakes and flake tools. That is, an entire functional realm of the lithic repertoire, *ad hoc* domestic tasks, seems to be missing from the Egyptian lithic system, at least in some areas.

Discussion and conclusions

Given the above summaries, the typological and technological contrasts between the three regions should be evident. In previous studies comparing only the Egyptian materials from Canaan to the local industries (Rosen 1988; 2011a), I suggested that these contrasts ultimately reflected the intersection, at the end of the 4th millennium BC, of three distinct ethnic groups, each with its own lithic organization, *chaînes opératoires*, and lithic functions, and that in circumstances of geographic or chronological cusp we can identify and interpret ethnic relations based on lithic analyses. Thus, crucially, there is was actually little interplay between the Egyptian and Mediterranean zone lithic systems. Egyptians do not seem to have adopted Levantine lithic techniques or types, and vice versa. There was thus little or no interaction between the knappers of the two systems, and functionally the Egyptian colony, *sensu lato*, in the southwestern Levant (Brandl 1989; Porat 1989; Gophna 1990; Gophna & Friedmann 1993) did not rely on local lithic

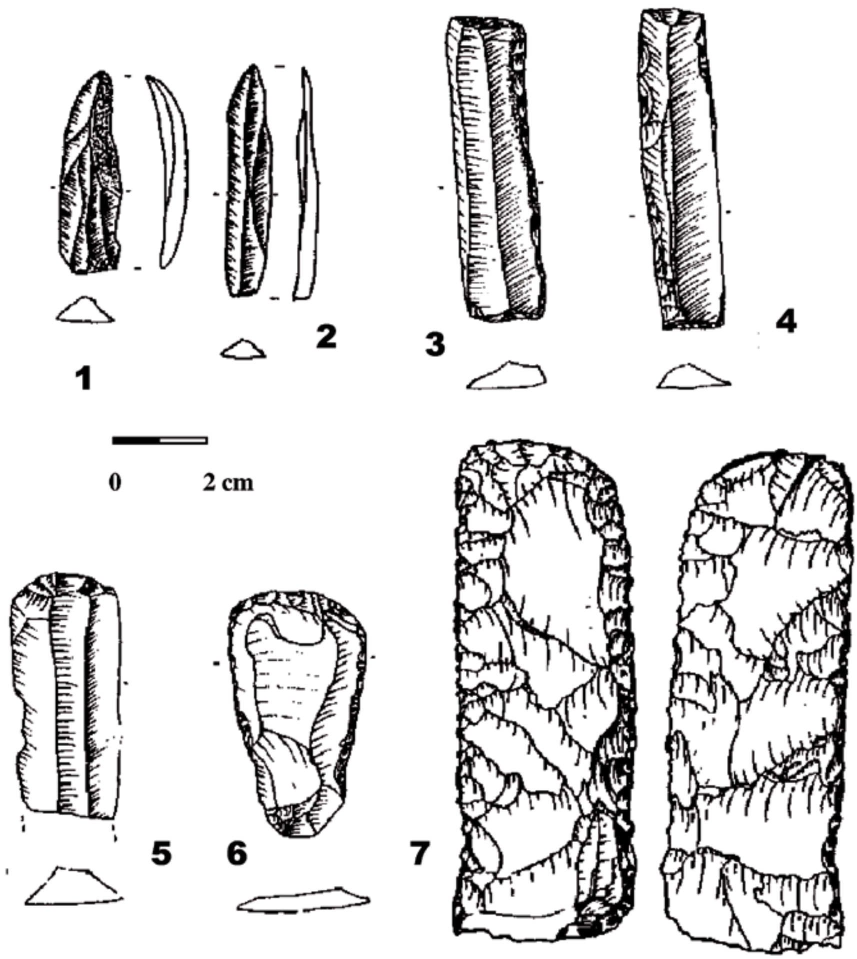

Figure 3. The Egyptian Complex (as represented by materials from Palestine): 1-2 bladelets and bladelet tools; 3-4 blade tools; 5-6 scrapers; 7; bifacial knife.

production. Similarly, lithic production in the desert zone was autonomous, showing few direct linkages with the lithic systems of other regions, the tabular scraper exchange and microlithic lunates excepted.

From a larger perspective, beyond the relationships between ethnic groups, the lithic systems reflect fundamental differences in the organization of their respective societies. It is undoubtedly trivial to note that Egyptian society was a deeply hierarchical early state at the end of the 4th millennium BC, that Levantine Early Bronze Age societies in this period were only emerging into complexity, and that Timnian society in the desert was tribal. More importantly, the lithic systems offer detailed reflections of these different levels of political organization; they represent the actualization of the political organization on the respective economies, at least insofar as they impacted on lithic technological systems. Thus, the lithic systems here offer a case study in comparative political economy.

Two specific themes can be examined, the organization of production and the functional roles of the lithics. The organization of production incorporates such issues as specialization in production and exchange; the functional roles of lithic systems covers the specific uses of different chipped stone tools in the different societies.

Comparing production, the three lithic regions contrast in degrees of specialization and expertise involved in lithic production. In the desert regions, lithic production specialization is limited to the manufacture of tabular scrapers, and this seems to be primarily a regional specialization rather than a division of labor internal to the society. In fact, the skill set required for the production of tabular scrapers is a relatively simple one. With respect to the rest of the desert lithic system, with the likely exception of age and gender divisions of labor, for example as in the production of microlithic drills for bead production or arrowheads, there is no evidence for specialized lithic production in the desert societies. In this context, it is important here to note that the Timnian culture supplied specialized goods to the sedentary Mediterranean zone, for example copper goods, milling stones, beads, and sea shells; however, production seems to have been by and large extensive, a form of cottage production at the household or clan level, and not specialized in the craft specialization sense (Rosen 2009).

As reviewed above, in the sedentary Mediterranean zone three basic lithic systems can be defined. The Canaanean system, producing Canaanean blades for insertion into sickle hafts, is clearly a specialized system; the blades were produced by specialists and distributed to consumers, apparently in a cellular network of sub-regional production and supply zones. The production of these blades required expertise and some degree of apprenticeship, but it was undoubtedly a seasonal enterprise, coinciding with the seasonal need for sickle segments. Further, given the caches of unused blades, specialization was restricted to the production of the raw blades, and not to the finished product, the composite sickle. Significantly, sickle blade segments are a bulk item, probably produced in the thousands or more each season, and they are utilitarian in function. Excepting the choice of the specific technology (*e.g.* Sackett 1990), there is little style or symbol in these tools; furthermore, there is no evidence for elite involvement in their production or distribution.

The other two lithic systems of the sedentary Mediterranean zone, those of tabular scrapers and *ad hoc* tools, show no evidence for specialized manufacture. The first is imported into the region from the desert zones and the second is clearly a product of expedient household production.

The Egyptian systems contrast. The bifacial tools, including the bifacial knives, the arrowheads, and the eccentrics, comprise a general *chaîne opératoire* more complex and a skill set more demanding (*e.g.* KELTERBORN 1984) than anything seen in Levantine industries. Apprenticeship for these knappers must have considerably exceeded those of the specialized Levantine knappers. Furthermore, unlike Canaanean blades, produced in bulk in the thousands or tens of thousands, or tabular scrapers, also produced in large numbers (QUINTERO *et al.* 2002), each bifacial must have been crafted individually. These are not utilitarian goods. The combination of stylistic function and the great investment in terms of apprenticeship and production time and effort for a relatively limited number of pieces strongly suggests elite sponsorship.

Other formal types in the overall Egyptian system, the bladelet and blade tools, the various scrapers (and 'razors') and perhaps the transverse arrowheads, are less complex technologically. They also seem to have been produced in greater numbers than the bifacials, and to reflect a standardization and specialization roughly equivalent to that of the Canaanean system in the Levant.

Finally, the *ad hoc* production system so numerically dominant in the Levant seems much less so in Egypt. It is difficult to ascertain the reasons for this. Certainly, early excavations discarded lithic waste and *ad hoc* tools, similar to the rest of the Near East (ROSEN 1997a). However, recent excavations in Egypt certainly collect all materials, yet *ad hoc* tools seem rare. In the Delta, this may be a consequence of the relative rarity of chippable stone, perhaps accessible only to specialists. Alternatively, it is also possible that flakes and other lithic products were utilized in Egypt without the intermediary stage of edge modification (*e.g.* HOLDAWAY *et al.* 2010), the primary attribute defining *ad hoc* tools in the Levant. If so, even if *ad hoc* tools thus exist, they reflect a different sense of production in Egypt compared to the Levant.

Lithic functions in the three regions tie directly to production systems, but are worth brief separate review and summary. All three regions share basic domestic functions, scraping, cutting, piercing, whittling, even when the lithics themselves may not be the product of household production, as in the case of Egypt. Reaping, as represented by sickle segments, is present in all three lithic systems, but trivially is rare in the desert system, restricted to special microenvironments where agriculture was possible. Arrowheads, reflecting either hunting or warfare, are present in Timnian and Egyptian assemblages, but are noticeably absent from 5th-3rd millennia BC assemblages in the Mediterranean southern Levant and seem to decline in numbers in Egypt in this period as well (*e.g.* SCHMIDT 1992ab). Notably, the transverse points used in 4th and early 3rd millennium Egypt are typologically similar to those in the Negev and Sinai, and may reflect cultural contact. However, the absence of any chipped stone points in the Early Bronze Age Levant points to a basic techno-functional divergence between Egypt and the Levant.

The most striking functional difference between the various regions is found in the deep investment in chipped stone tools for ritual purposes in Egypt, and its virtual absence, excepting tabular scrapers, in the Levant. This difference is seen on several levels.

Thus, although tabular scrapers have been found in burial contexts, in tumuli, in the Sinai, lithics play virtually no role in mortuary offerings in the settled zone; in contrast, they are often found in such contexts in Egypt. Similarly, whereas tabular scrapers are traded into the settled zone in the Levant, the apparent product of a rather non-intensive peripheral zone down-the-line trade, in Egypt bifacial knives must be the product of an organized and specialized industry, an entire system focused on the production of ritual goods. The key point is that this level of investment in lithics for ideological purposes must be a reflection of the hierarchical structure of the early Egyptian state (Graves-Brown 2010), and it has no parallel in the Levant, indeed in any technological system.

In conclusion, beyond the details of the different lithic systems and the implications their analyses may have for understanding the respective societies from which they derive, the comparative method offers some perspective on the scale of the features reflected in the material culture. While detailed focus on a particular system is necessary for it full comprehension, the comparative context offers a crucial complement to that depth.

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Interregional exchange: the evidence from Kafr Hassan Dawood, East Delta

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Introduction

With the focus of the Poznan meeting on the Nile Delta as a centre for cultural interactions, this presented the opportunity to review the evidence from Kafr Hassan Dawood (KHD) for imported materials at the site (in worked form), which might suggest that KHD was involved in regional as well as interregional exchange. This contribution therefore focuses on two types of evidence – objects of stone and of copper – materials that are not local to the Wadi Tumilat, but which are prevalent in the cemetery. There is no settlement evidence to allow for much more than pure speculation as to whether or not these materials could have arrived in their raw form at the site and been worked there, although this is considered. Therefore, what follows focuses predominantly on presenting the types and quantities of stone and copper objects known from the KHD burial assemblages and taking into consideration changes in their distribution over time. It will also look at some of the comparative evidence from other sites, and will consider, finally, how the distribution of the stone and copper objects can contribute towards an understanding as to the reasons for founding the site in this particular location, and the role that the community played within the exchange and movement of materials in between the Nile Valley and the Delta, within the Delta and between the Delta and the Southern Levant. The ideas and discussions are preliminary, ahead of a re-evaluation of the data (Rowland *in press*).

The Wadi Tumilat (Tassie & van Wetering 2013: fig. 1) is considered as an important communications, exchange and trade route throughout the Pharaonic era; however, the archaeological evidence suggests that it might have been regularly traversed at a much earlier date. The cemetery at KHD, situated on the southern bank of the Wadi, was in use from at least the Late Predynastic period onwards to the late 1st-early 2nd dynasty, based on the ceramic chronology, which will be presented in ROWLAND (*in press*) and HASSAN *et al.* (*in press*) (TASSIE *et al.* 2008: 202). Not completely excavated until present, KHD is the largest Predynastic-Early Dynastic cemetery thus far located in the Delta. There are 752 Predynastic-Early Dynastic burials at KHD, with a tentative earliest dating of Naqada IID1 (KHD IIa) through until the end of Naqada IIID (KHD VII).[1] Only 233 graves have been dated up until now, and the process continues as the archival data from the earlier SCA investigations is revisited. Of the 752 graves, only 11 graves are considered to pre-date Naqada IIIB (KHD IV) and only four are believed to post-date the beginning of Naqada IIID (KHD VI). The main phases in which burials are clustered are: KHD IV (Naqada IIIB) with 54 graves, KHD Va (Naqada IIIC1) with 59 graves, KHD Vb (Naqada IIIC2) with 68, and KHD VI (Naqada IIIC3-D) with 37 burials. As will be seen below, it is between KHD IV-VI that the highest numbers of stone and copper objects cluster. The results discussed are still preliminary, although the broad patterns that will be seen are very much present. At the time of writing, a review of the data has been started by the author, and this will be presented in the coming year together with a more comprehensive analysis of the mortuary evidence from KHD as well as a view of the community within its intraregional and interregional contexts (ROWLAND *in press*).

It would not be surprising if the Wadi Tumilat had been a well-used route within communications and exchange networks from the time of the inhabitation of the Maadi settlement, albeit not in its later form as the 'Canal of the Pharaohs' (REDMOUNT 1995). It also has to be considered that KHD was not the only site along the Wadi Tumilat at this time, and other sites have yielded some evidence for early occupation: Tell el-Niweiri (possibly Neolithic/Lower Egyptian cultural complex), Tell Nishabe (Predynastic-Protodynastic), Shaqafiya (Protodynastic-Early Dynastic) and Tell Samud (Early Dynastic) (SCHOTT *et al.* 1932; TASSIE & VAN WETERING 2013). One of the reasons for considering the Wadi Tumilat as an active route from the Predynastic period onwards is due to the involvement of individuals and groups from Maadi within the exchange networks that leave the well-known evidence for copper at Maadi, as well as sites across and up to the Southern Levant (RIZKANA & SEEHER 1989: 13-17; PFEIFFER 2009). At certain times of year, this route might have been a quicker and more preferable way to travel between the various sites involved within the networks, both possibly to the actual mining areas, as well as to other sites where the evidence suggests processes within the chaîne opératoire from mining through to the final object (PFEIFFER 2009: tab. 2). It is by Naqada IIIB (c. 3200 BC), at least some 200 years after the habitation at Maadi (RIZKANA & SEEHER 1989: 80-85) appears to cease, that copper is in evidence in considerable quantities within burials in the KHD cemetery, at least relatively when considered alongside the amount from other sites known currently, as discussed during the meeting

[1] The northern part of the site has not been fully excavated, although test trenches carried out in 1999 located the floodplain and the northern extent of the site, including ceramic vessels (left *in situ*) that were thought to date to Naqada IIB/C (G.J. TASSIE *pers. comm.*). Within Naqada IIID, there is an earlier part represented at KHD that is KHD phase IV and a later, phase V. For a discussion of the possibilities of internal division within Naqada IIID at specific sites, see KÖHLER 2004.

in Poznan in June 2013. In addition to frequent copper objects, stone objects are found distributed throughout burials at KHD over a comparable time period, primarily from Naqada IIIB-IIID, c. 3200 until the time of the last burials in the cemetery. There is no strict temporal-spatial trend in the placement of burials at KHD. The locations of earlier burials (mid-northern areas of the site) are re-visited and additional areas come into use over time. Through test trenches, there appear to be no further burials to the area south of the excavations, but an area with additional burials has been identified directly north of the excavated area. The latest date for the site would currently appear to be the end of Naqada IIID, but it is not currently possible to confirm the date of the earliest burials (Hassan *et al.* 2003: 44). It will, therefore, be interesting if the possibility arises for future excavation at KHD, to ascertain whether the site is founded at around the time that Maadi appears to have fallen out of use, and if so, whether there will be evidence for copper this early (Rowland *in press*). Unfortunately the location where the settlement is thought to be (as explored through coring), is under a lake, which is growing as the cultivation in the area expands (Hamden & Hassan 2003; Hassan *et al.* 2003: 28).

Therefore, some of the key questions of interest here include whether imported materials increased or decreased, or even remained at an even amount over time, or whether the specific material types change. Was KHD founded specifically to take advantage of links with the exchange routes through the Delta, up to the Southern Levant and upstream through the Nile Valley, while being in an agriculturally productive landscape, and how was the site integrated within regional and wider exchange and communications networks, and in what directions did these communications flow? Given that KHD has such a comparatively large distribution of copper objects, the question of where these were made, as well as the original source of the raw copper is of importance. If the settlement at KHD were to be excavated, it is of course not impossible that the objects were made locally, but as this cannot (at least yet) be substantiated, it will remain but one of many possibilities.

Chronological note

The Naqada cultural phases are referred to in the following article to facilitate comparison of the data between sites throughout Egypt, given that this terminology is still used widely; no material culture of the, or rather one of the, Lower Egyptian Cultural Complexes (Maadi-Buto/Buto-Maadi) has been found thus far at KHD. It is recognised that the Naqada terminology is not wholly appropriate and that to better understand the sequence of events occurring at sites throughout Egypt and the wider Near East, the use of chronometric dates is far preferable. Given that there are, however, still significantly fewer dates for Lower Egyptian than there are for Upper Egyptian contexts, this remains problematic; it is nonetheless hoped that this situation stands to be rectified in future years. A recently completed project (Dee *et al.* 2013) was unable to add new chronometric dates from Delta contexts for the Predynastic-Early Dynastic period, although it was successful in adding seven new chronometric dates for Tell es-Sakan in the Southern

Levant, which is a positive move in terms of working towards an absolute chronology that will help inform regarding the timing of interregional relations. There are also other series of dates available for the Southern Levant, including Tall Hujayrāt al-Ghuzlān (KLIMSCHA 2009; PFEIFFER 2009). The reliance on a ceramic chronology regardless of

Table 1. A Provisional New Chronology for KHD (prepared by G.J. TASSIE).

Period	Date	Upper Egypt	Lower Egypt
Early Dynastic Period	**3,050 – 2,613 BC**		
Dynasty III *Early Bronze Age III*	2,686–2,613		Buto VI, Mendes Unit 1, Tell el-Farkha VII, Tell Ibrahim Awad 3
Dynasty II *Early Bronze Age II*	2,800–2,686	Naqada IIID	Buto V, KHD VII, MAO IV, Mendes Unit 1, Tell el-Farkha VI, Tell el-Iswid (Phase C), Tell Ibrahim Awad 4
Dynasty I	3,060-2,800		Buto IV, KHD VI, MAO IV, Mendes
Late Semerkhet to Qa'a		Naqada IIIC$_3$/D	Unit 1, Tell el-Farkha VI, Tell el-Iswid (Phase C), Tell Ibrahim Awad 5a
Middle Den to Anedjib		Naqada IIIC$_2$	Buto IV, KHD Va-b, MAO IIIc, Mendes Unit 1, Saïs III, Tell el-Farkha
Early Narmer to Merneith/Den		Naqada IIIC$_1$	V-VI, Tell el-Iswid (Phase C), Tell Ibrahim Awad 5b
Protodynastic Period	**3,300 – 3,060 BC**		
Early Bronze Age 1	3,200–3,060	Naqada IIIB/C$_1$	
		Naqada IIIB	Buto IIIf, KeK 3, KHD IV, MAO IIIb, Mendes Unit 2, Saïs III, Tell el-Farkha IV-V, Tell el-Iswid (Phase B), Tell Ibrahim Awad 6
	3,300–3,200	Naqada IIIA$_1$-A$_2$	Buto IIIb-e, KHD III, MAO IIIa, Mendes Unit 2, Saïs III, Tell el-Farkha III-IV, Tell el-Iswid strata VII (Phase B), Tell Ibrahim Awad 6
Predynastic Period	**3,900 – 3,300 BC**		
Late Chalcolithic	3,350–3,300	Naqada IID$_2$	Buto IIIa, KHD IIb, MAO II, Mendes Unit 3, Saïs III, Tell el-Farkha II
	3,400–3,350	Naqada IID$_1$	Buto IIIa, KHD IIa, MAO Ib, Saïs III, Tell el-Farkha I, Tell el-Iswid strata IV-VI (Phase A)
	3,500-3,400	Naqada IIC	Buto IIb, KeK 2, KHD I?, MAO Ia, Saïs III, Tell el-Farkha I, Tell el-Iswid strata I-III (Phase A), Tell Ibrahim Awad 7
	3,600–3,500	Naqada IIB	Buto IIa, Saïs III
Early Chalcolithic	3,700–3,600	Naqada IIA	Late Maadi, Buto I-IIa, Digla II, Heliopolis, Kek 1, Saïs III
	3,800-3,700	Naqada IC Naqada IB	Early Maadi, Buto Ib, Digla I
	3,900–3,800	Naqada IA	Buto Ia

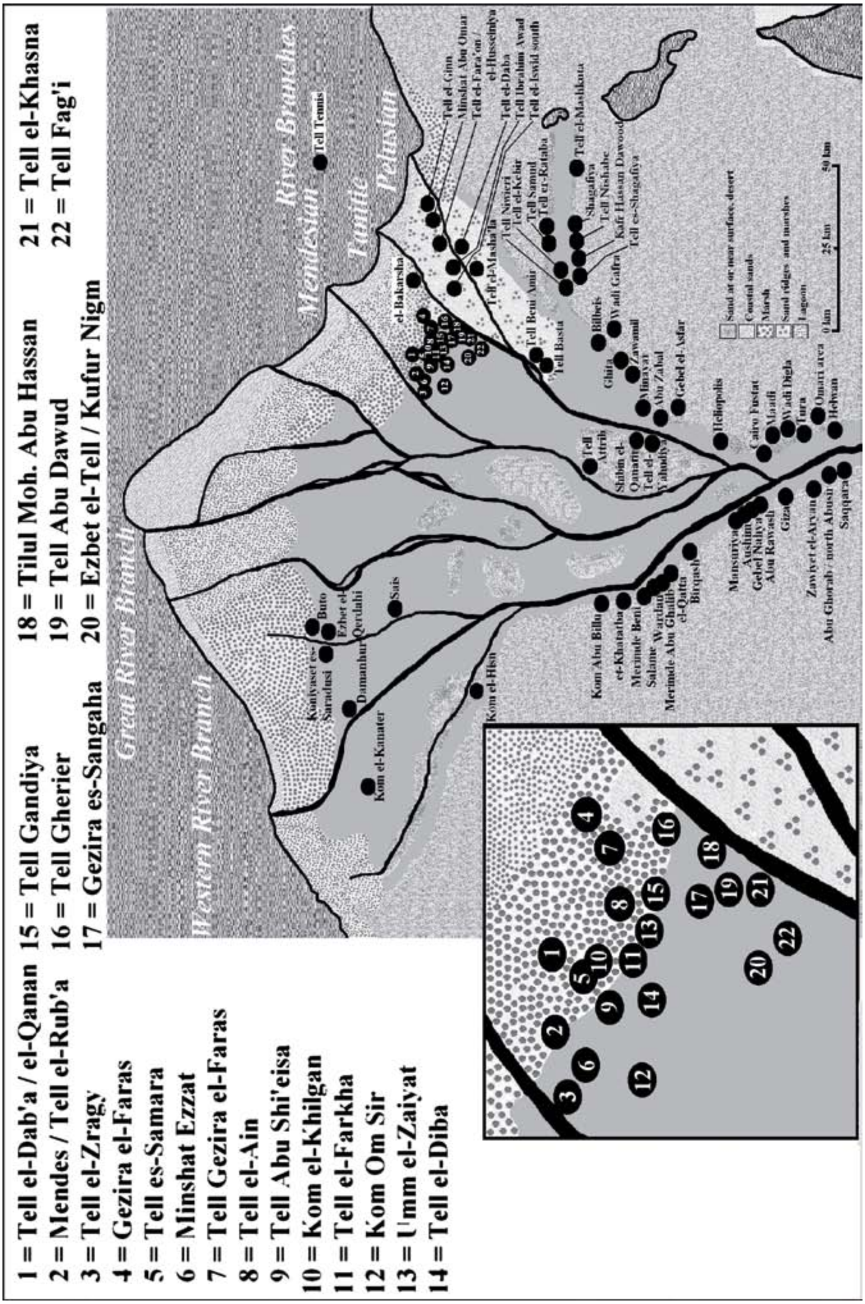

Figure 1. The sites of Lower Egypt (van Wetering & Tassie 2006).

location whether in southern or northern Egypt, or the Southern Levant, is problematic, especially when those chronometric dates for Delta contexts have very infrequently been taken on short-lived plant remains (ROWLAND 2009; 2013: 239-240). For the present, Table 1 serves to estimate the relative chronological phasing of KHD alongside a number of sites within the Delta during the Predynastic and Early Dynastic. For the purpose of this contribution, the date has been assigned on the basis of the ceramics from KHD[2], compared with the evidence from other sites in the Delta and the Nile Valley (PETRIE 1901; 1920; 1921; WILKINSON 1996; KÖHLER & SMYTHE 2004; JUCHA 2005).

LOCATION AND ANCIENT ENVIRONMENT

As the crow flies, the sites of the northeastern and eastern Delta (Fig. 1; VAN WETERING & TASSIE 2006) appear relatively close together geographically. Crucial to their foundation, however, and also amongst the reasons for their later abandonment, was their location in relation to local waterways, and also with access to high land, *e.g.* the geziras, in addition to their relative proximity to neighbouring sites (BUTZER 1960; 1976; ANDRES & WUNDERLICH 1991; 1992; KROEPER & WILDUNG 1994: XIV; KROEPER 1996: 70; HASSAN *et al.* 2003: 38, 40; PAWLIKOWSKI & WASILEWSKI 2012). It might be considered that smaller clusters of these sites were part of discrete regional pockets/networks, that might be expected to exhibit quite different characteristics through the material culture, due to sites and groups being to greater and lesser degrees, connected with different groups of sites in the Delta, Nile Valley and further afield. KHD is in quite a different regional pocket to large numbers of the sites in the north-eastern Delta. Previous and ongoing research by the author (ROWLAND 2003; 2005a; 2005b; 2006; 2007; *in press*) has already highlighted a number of apparently distinct mortuary traits at KHD when compared with other sites, including Kufur Nigm (KN), Minshat Abu Omar (MAO) and Tell Ibrahim Awad (TIA). Dissimilarities include the complete absence of mud-brick architecture in the burials at KHD, architecture that is found at MAO (KROEPER 1992), TIA (VAN DEN BRINK 1992: 50-55; VAN HAARLEM 1998), at KN (BAKR 1988; 1993; 2003) and at Tell el-Farkha (TF; DĘBOWSKA-LUDWIN 2012). Considering that the youngest burials at KHD are considered to have been located, it is unlikely that mud-brick tombs are yet to be uncovered. Also dissimilar to other Delta sites, including TF, Tell el-Murra[3], MAO and TIA are the oval and round ceramic coffins that are found in burials at KHD (Fig. 2; HASSAN *et al.* 2003: fig. 5). It is, therefore, not just differences between the Nile Valley and Delta that should be commented upon, but regional differences within all areas. Recent research by scholars, notably KÖHLER (2008; *this volume*) has shown that there was both a far greater similarity in terms of some types of ceramics, including coarse wares, than previously acknowledged, as well as a larger degree of heterogeneity within regions, suggesting that former theories as to the spread of the material culture, and by association, peoples, need to be re-assessed (*e.g.* KAISER 1964; 1987; 1990).

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[2] Analysed thus far by G.J. TASSIE, ASHRAF EL-SENUSSI, and the author.

[3] *Pers. comm.* MARIUSZ JUCHA; the only ceramic coffin types at Tell el-Murra are rectangular and rectangular with rounded corners and those that can be dated are Naqada III.

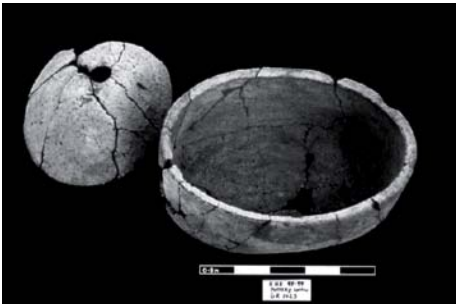

Figure 2. KHD-502 The pottery coffin from Grave 1025 (photo by Ken Walton; courtesy of the MSA/UCL KHD mission).

There are, of course, also similarities in terms of the majority of what might be regarded as common (non-elite) burials between KHD and other cemeteries in the area, in that most of the burials are interred in simple oval pits in a flexed position, with few or no grave goods; these are mainly (although not exclusively) ceramics where they occur (Rowland 2003; 2005a; 2005b; 2006; 2007). Another area in which similarities across the region are detected is in the use and type of potmarks (Tassie *et al.* 2008).

The evidence from the cemetery

The focus of this contribution is upon materials located in the burials at KHD that do not come from local sources, as a means by which to think about how the community at KHD might have interacted with other Delta communities as well as those in the Nile Valley, and across to the wider Near East. The focal date range is from Naqada IIIA, although predominantly from Naqada IIIB-IIID, the period over which non-local stone and copper materials are found within burials. There are only six recorded imported ceramic vessels, which will not be discussed here.

Stone: materials and objects

Firstly, to look at the different types of stones represented in the burial assemblages at KHD over time. The stone objects/fragments are of a variety of types of stone: Egyptian alabaster, siltstone, porphyry, basalt, metasediment, metaconglomerate, carnelian, diorite, limonite, granite, andesite porphyry, red jasper, agate, sandstone, quartzite, garnet, and other unspecified semi-precious stones. They have their origins at various locations, as close as modern day Cairo, the Faiyum, the Eastern Desert and various locations along the Nile Valley, with some material types needing to be actively quarried, whereas other types could be collected from surface deposits. The stone types and issues with their terminology will be addressed in a forthcoming volume (Rowland *in press*). There are also stone tools, including pressure-flaked knives of chert within the burials, however, these are not discussed further here (Rowland 2007).

The most common stone object types found within burials throughout Egypt during the Predynastic and Early Dynastic include: vessels, palettes, bangles and beads. Some of the stone types listed above are only represented as stone sherds at KHD, including a single incidence of basalt that is, unfortunately, contextually unsound.

The vessel types represented at KHD are: beakers (tall cylindrical, short cylindrical, convex-sided, with recurved sides), bowls (convex-sided, convex to straight sided, small convex-sided flat-bottomed, straight sided, small straight-sided flat bottomed, incurved with rounded projecting rim, restricted deep, small round flat-bottomed), dishes (straight-sided, convex-sided flat-bottomed, animal-shaped), plates (round-bottomed, large round-bottomed, convex-sided, straight-sided), and jars (globular to squat shouldered, globular to squat-shouldered in two halves, symmetrical squat hanging, tall shouldered, footed shouldered). In the instances of two vessels which are made of diorite and Egyptian alabaster and of diorite and siltstone, these have been counted once under each material type, which slightly inflates the number of vessels, but the initial examination of stone types presented here is focussed on what material types are, or are not, used at certain times.

Beads are the most common object type made of stone, apart from stone vessels. The stone types used are: agate, carnelian, diorite, garnet, haematite, limestone, siltstone, steatite and other unspecified semi-precious stones. There are also bracelets of siltstone and schist. Other objects include siltstone palettes, and one example in granite, and a quartzite grindstone fragment and a sandstone quern fragment. For statistical purposes in this article, beads are not counted individually for a single context, but rather just counted as 'one' to suggest a complete object. However, for the purposes of the analysis carried out here relating to stone types over time, where beads of different stone types are found together, they have been counted as one for each stone type to allow for the occurrence of all different stone types to be represented.

Copper objects

The copper objects present at KHD are predominantly tools/utilitarian objects: adzes, awls, chisels, fishhooks, harpoons, knives and spears. There is also an amulet, bangle, bowl, dishes, a mirror, rods and wire. In order to try to provenance copper, scientific analysis needs to be carried out. Certain amounts of information can be obtained through use of an XRF, but for more precise analysis Neutron Activation Analysis would be preferred. This can have a great application for use on museum objects, but if not possible to obtain samples, an XRF, or handheld (portable) XRF can obtain data. The possible sources of ore are discussed by Golden (2002: 232-234), and will be addressed again in Rowland (*in press*). It is possible to say, however, of the copper at KHD, that at least one example includes arsenical copper.[4]

Analyses

For the analyses herein, the presence of certain material types over time is the focus, and not the individual presence of objects and material types within specific graves for purposes of trying to ascertain possible social status, as attempted elsewhere (Rowland 2003; 2005a; 2005b; 2006; 2007). The distribution of the typology of the vessels through time is also not under discussion; these aspects will be revisited in Rowland (*in press*).

[4] *Pers. comm.* Thilo Rehren and Ernst Pernicka.

The interest here is with the changing material types over time, and general observations regarding the broader categories of objects. There follows analysis on four key groups: stone vessels, other stone objects, all stone objects together, and finally copper objects. For each group, the bullet points list the frequency distributions that have been examined, of which only a selection of charts are shown here. Some comparisons in terms of distribution will be drawn from the analysis carried out by Kopp, who investigates stone vessels from Naqada, Matmar, Mostagedda, Hierakonpolis, Tarkhan, Elkab and Tura (Kopp 2007: 197, tab. 1).

1) Stone vessel material types
   a. Grouped for all periods
   b. Material types over time
      i. Grouped by time
      ii. Grouped by material

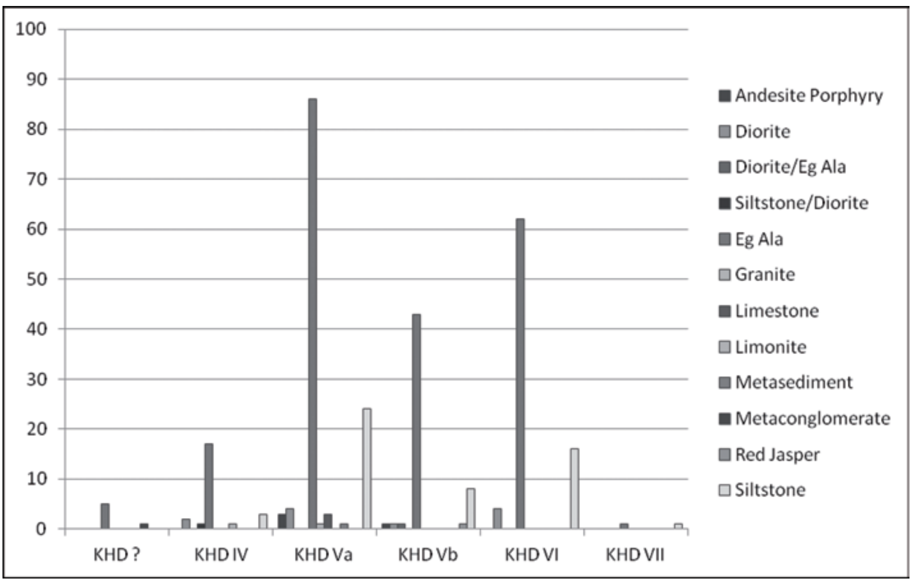

Figure 3. (1bi) Frequency distribution showing stone types used for vessels, organised by time phases.

Figure 3 (1bi) illustrates the distribution of stone types used specifically for different varieties of vessels over time. In total there are 288 complete stone vessels that have been found in the cemetery at KHD. Of the vessels, 214 are Egyptian alabaster vessels and only 13 of these are in undated graves. There is a marked increase in Egyptian alabaster vessels between phases KHD IV and KHD Va and a reduction only after KHD VI. Kopp (2007: 209) records that between Naqada IIIC1 and 2 there is a jump from 500 vessels to 1608 vessels made of ‘Calcite-Alabaster’, although he notes that this period also shows the start of a decline in the percentage of Egyptian alabaster when related to other stones used in vessel production. This pattern is likewise seen when we look at the stone vessels at KHD, although other stone types start, albeit in small quantities, to appear in burials from KHD IV onwards. In terms, therefore, of the general distribution of stone vessel finds, the pattern seems similar at KHD. However, does there seem to be more accessibility to stone in general through time? KOPP (2007) notes that from Naqada IIIB and later, there are higher amounts of vessels within individual elite tombs, rather than the increase in Egyptian alabaster vessels reflecting a general increase in accessibility/ distribution of a) the material and b) the finished product. When looking by comparison at TF, for example, it is notable that the majority of the hard stone vessels were found on the Western and Central Koms, but that those found in graves were of softer stones: travertine, limestone and sandstone, in addition to instances of agate and also basalt (PRYC 2012: 297, 299). Some burials of Naqada IIIB-IIIC1 date contain stone vessels at TF, but in Naqada IIIC2-IIID there is an increase which coincides with the occurrence of wealthier tombs at the site (PRYC 2012: 299-303). This rise roughly corresponds with KHD, although there are only a very few burials dating to Naqada IIID at KHD.

When turning to look at the other stone types, KOPP (2007: tab. 3) notes the percentages as well as numbers of vessels. During Naqada IIIC2 Egyptian alabaster vessels account for some 68.2% overall, and the only other stone type that has more than 3% of the overall total is listed as siltstone/greywacke with 19% (KOPP 2007: tab. 3). Dolomite has 3% and white limestone 2%, but all other stones only 1% or fewer (KOPP 2007: tab. 3). It is only from Naqada IIIA2 onwards that Egyptian alabaster appear to be the most common overall stone type in the cemeteries discussed by KOPP, and only in Naqada IIIC1 that the range of stone types broadens (KOPP 2007: tab. 3).

Unsurprisingly, Egyptian alabaster is most strongly represented over time, with the peak for the highest number of vessels during KHD Va (Naqada IIIC1). There is a different pattern suggested by the group of sites examined by KOPP (2007), whose data shows the peak during Naqada IIIC2. Siltstone vessels are the second most commonly featured, although in minimal quantities before Naqada IIIC1. Furthermore, in KOPP's overview of the siltstone vessels, only 32 are shown for Naqada IIIC1, whereas at KHD alone there are 23 at that time (KOPP 2007: tab. 3). In general, it is during KHD Va that other stone types are best represented, although these are always in low numbers. Stone vessels are found in large graves, for example 913 and 970, which will be discussed again below, and also smaller tombs; for example 873 with three different types of stone vessels, Egyptian alabaster, siltstone and diorite, six vessels in total.

2) Other objects fashioned from stone
   a. Grouped for all periods
   b. Object/materials over time
      i. All stone objects (not including vessels)
      ii. Stone beads and bracelets (adornment items)
      iii. Stone palettes

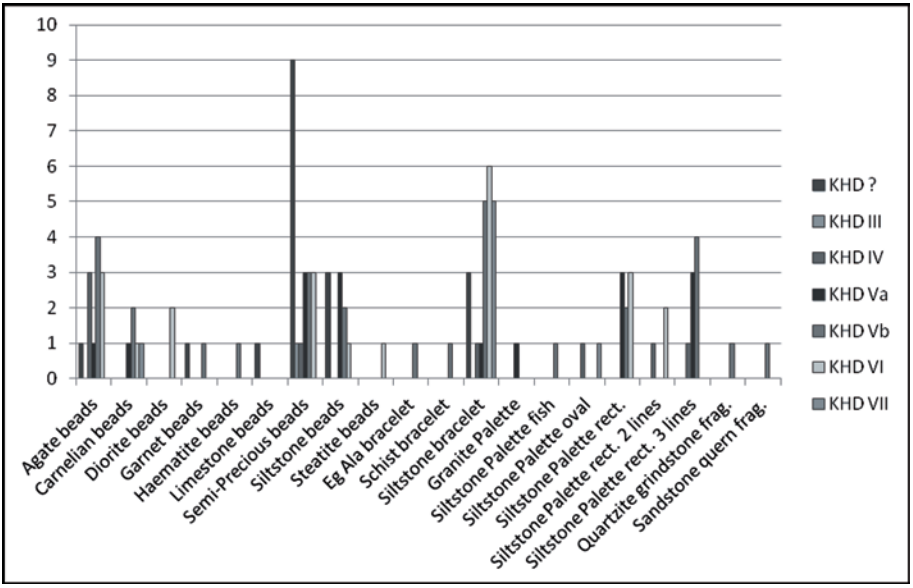

Figure 4. (2a) Frequency distribution of stone artefact types (less stone vessels) grouped by object type.

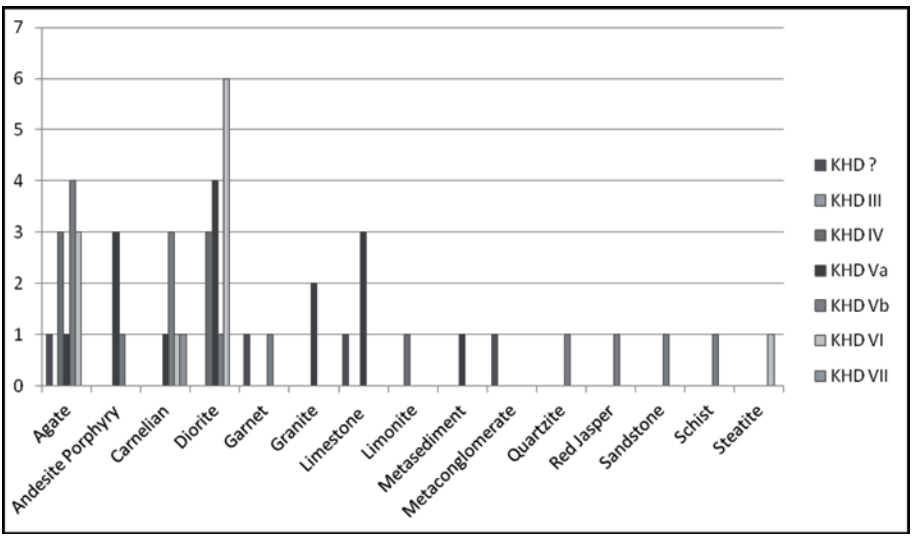

Figure 5. (3b) Frequency of stone types excluding Egyptian alabaster and Siltstone (vessels/all objects), with changing distribution by time grouped by material/object type.

We can also look to the use of stone for other groups of stone objects over time (Fig. 4). The highest distribution shown in Figure 4 is perhaps misleading, given that these are beads of 'other', currently unidentified, semi-precious stones. It is interesting that carnelian is not the most commonly found bead stone type at KHD, but rather agate, and siltstone; for bracelets, however, presumably due to the properties of the stone, including simple practical issues, such as obtaining larger pieces of this type of stone, siltstone is best represented. Finally, to look at the distribution of stone palettes, all but one of the palettes at KHD is made of siltstone (as is most common in general at this time), the remaining one being made of granite (Fig. 5). The plain rectangular palettes and those with three incised lines are jointly most common overall at KHD, however, the former do not appear before Naqada IIIC1/KHD Va. Interestingly, in KHD IV and VII there are two oval palettes – the only known ones at KHD (SD79, Petrie 1921: pl. LIX 99H), there are also rectangular palettes with incised lines (two or three) around the edges, of SD78-81 (Petrie 1921: pl. LIX 96-97). The plain palette corresponds to SD80 (Petrie 1921: pl. LIX 94-95).

3) All stone objects (including vessels) over time
   a. Including Egyptian alabaster
   b. Excluding Egyptian alabaster

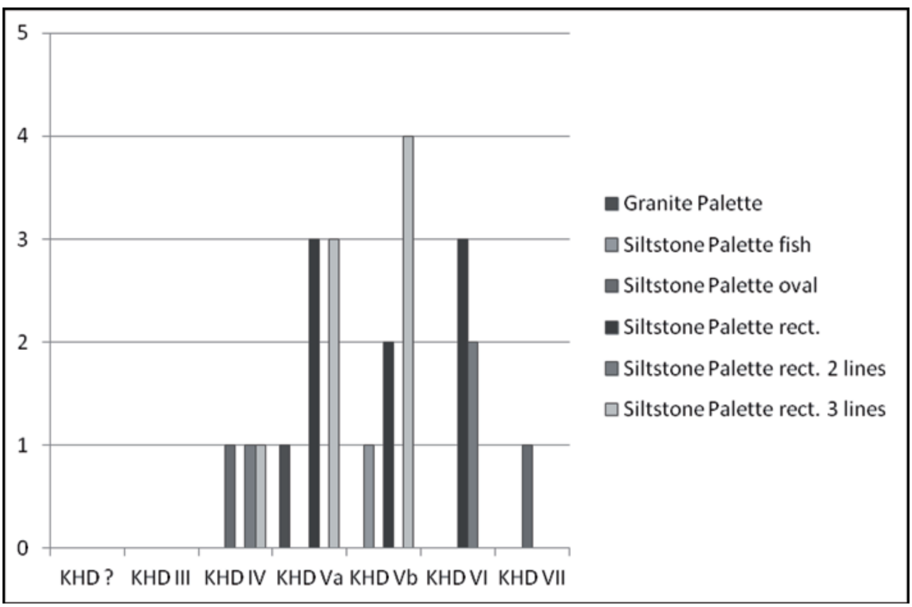

Figure 6. (2biii) Frequency of palettes grouped by time periods.

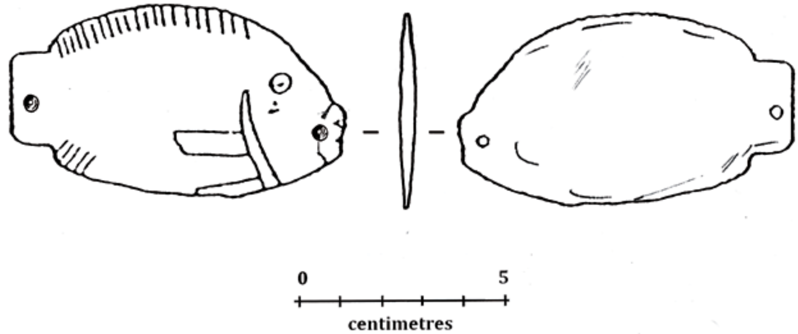

Figure 7. KHD3099 A siltstone fish palette from Grave 705 KHD Vb (drawn by Subhadra Das; courtesy of the MSA/UCL KHD mission).

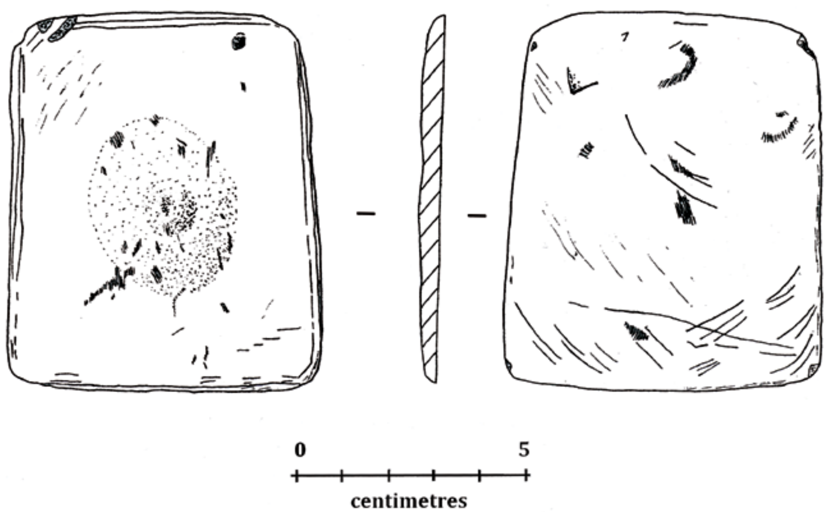

Figure 8. KHD3002 siltstone make-up palette with incised lines from Grave 1008 KHD IV (drawn by Aloisia De Trafford; courtesy of the MSA/UCL KHD mission).

It is also possible to look at stone objects, including vessels, grouped all together over time to consider whether in general there seems to be less or more access to certain material types. There might be different patterns clear for vessels, or for beads, for example. When all stone objects, regardless of type of object are grouped by period, the pattern already seen in the first group of analyses, for stone vessels, is clearly represented again. It is perhaps clearer to temporarily omit Egyptian alabaster objects in order to get a better idea of how the other stone types are represented by time, as seen in Figure 6.

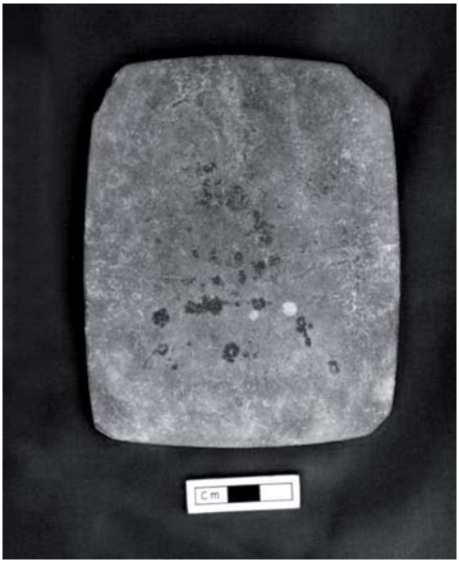

Figure 9. KHD3068 A siltstone palette from Grave 1037 KHD VI (photo by Ken Walton; courtesy of the MSA/UCL KHD mission).

It is interesting to consider KHD in comparison with TF, given that the stone vessels present in the cemetery at TF are predominantly made of travertine (not Egyptian alabaster), limestone and sandstone, whereas for KHD it is predominantly Egyptian alabaster, followed by siltstone (Pryc 2012: 297). Looking at other stone objects, for example the palettes (Figs. 7-9), some comparisons can be made with other sites in the north-eastern Delta. At MAO, for example, 37 palettes, or fragments thereof, were found in the cemetery, a cemetery which probably slightly predates the main occupation at KHD as well as being contemporary with it during MAO phases III and IV. The zoomorphic palettes from MAO are all assigned to MAO I burials, and these number five; by comparison there is only one fish palette at KHD (Fig. 7), which is in a burial assigned to KHD Vb (Naqada IIIC2), which is very similar to the Naqada III fish palette from the recent 'Dawn of Egyptian Art' Exhibition at the Metropolitan Museum of Art in New York (Cat. 9, New York, Rogers Fund 1935 35.71; Patch 2011: 25-6). All of the zoomorphic palettes at TF are dated from layers of Naqada IIIA, although the contexts are not secure, so this might put them partly alongside the MAO I (Naqada IIC-D) evidence and the date could be Naqada IID for TF (Buszek 2012: 315). Otherwise, there are two oval palettes at KHD, of which one is KHD IV (Naqada IIIB) and the other KHD VII, the latest phase of the site at Naqada IIID. The KHD incised line palettes (*e.g.* Fig. 8) are of the type most commonly represented at MAO in MAO III (Kroeper 1996: fig. 8). The rectangular palettes at MAO are predominantly MAO IV, when they occur without incised lines, with the exception of one example in MAO III (Kroeper 1996: fig. 8). The rectangular palettes correspond for MAO IV with Hendrickx's Naqada IIIC1-2, whereas the MAO III examples are Naqada IIIA1-IIIB. At KHD these are KHD Va-VI which corresponds with Naqada IIIC1-early IIID (Fig. 9). The single compartment palette from KHD dates to KHD VI, which is Naqada IIIC3-early IIID, and is similar in style to the example with four compartments from MAO IV (Kroeper 1996). Kroeper (1996: 81) interestingly notes that the highest number of palettes for MAO is during MAO III, a period at which she notes that palettes are, in more general terms, declining in numbers. It is also noteworthy that the MAO palettes, as with the KHD examples, are all found in graves, but not so at TF (Buszek 2012: 315-7). At TF, the rectangular, or 'geometric' palettes first date to Naqada IID contexts, but mainly in Naqada III, and these include oval 'geometric' palettes as well (Buszek 2012: 318-21). In terms of the material type at TF, Buszek (2012: 315) comments on the use at TF of greywacke and also slate.

4) Copper objects
   a. Grouped for all periods
   b. Object types over time
   c. Object types within time phases

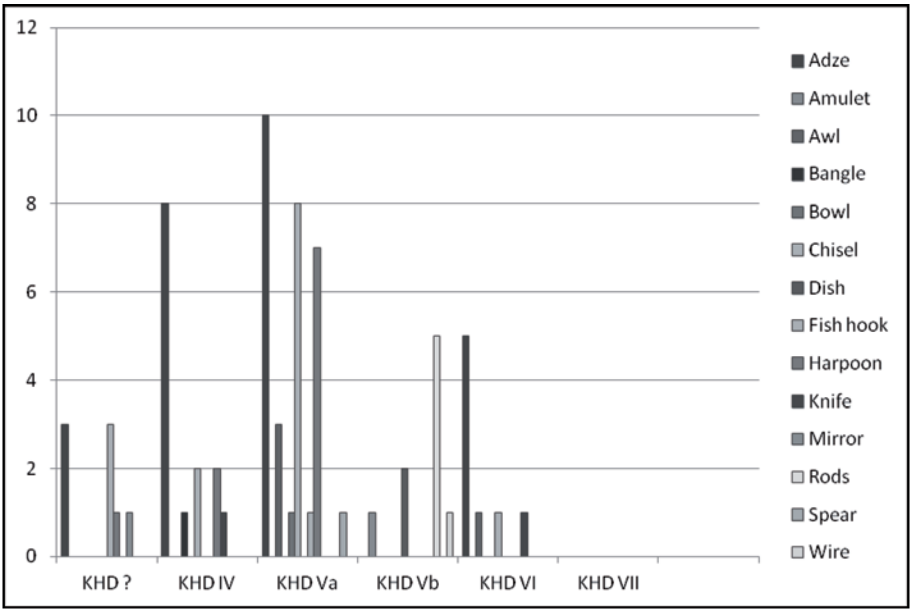

Figure 10. (4c) Frequency of copper objects shown divided into time phases at KHD.

The earliest types of copper objects represented at KHD, in phase IV, are adzes (the most common copper object overall), a bangle, chisels, harpoons and a knife (Figs. 10-15). It is during KHD Va, however, that we see the densest distribution of copper objects, dominated by working tools: adzes, chisels and harpoons. Although KHD Va produces the most copper objects in the archaeological record, there are tools and objects of other types present from KHD IV until VI, with adzes in all phases except for KHD Vb. Where are these objects coming from? Are they manufactured at the site, or are they just a selection of some of the types of object being imported from the Sinai/Southern Levant and en route to other sites in the Nile Valley, and possibly also the Delta, via KHD? There is not really an increase at a certain point, with copper objects present from KHD IV onwards until the end of VI. The peak of copper objects is also, as for stone vessels, in KHD Va. The chart (Fig. 10) illustrates that the most common items over

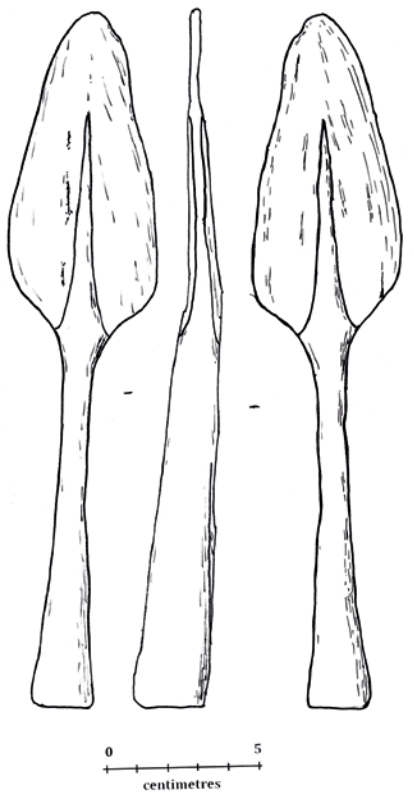

Figure 11. KHD3122 A copper alloy spearhead from Grave 371 KHD Va (drawn by SUBHADRA DAS; courtesy of the MSA/UCL KHD mission).

time are adzes, chisels and harpoons; it could be that these tools related to the professions of the deceased, but there is no particular evidence that can take this argument further at present. However, what is an interesting phenomenon, and what also happens with flint knives at Naga ed-Deir, for example (SAVAGE 2000: 64), is that there are a number of incidences of broken copper adzes being found, that have been quite neatly, lain together, for example graves 1008 and 1041 (only the occlusal end remaining, Fig. 13) at KHD (ROWLAND 2007: 1637).

Mostly, only single copper objects are found in burials, but there are some multiple occurrences of objects, with up to 20 objects in one single grave at KHD (Grave 371); there is no copper that can be securely dated prior to KHD IV. There is a notable difference in the overall quantities of copper in the burials at KHD and at other sites in the Delta and elsewhere. In order to get a better idea as to the relationship/contact between sites and also technology, it is useful to look at similarities and differences that can be detected between specific types of objects, for example the harpoons and also the adzes. For the adzes, one of the earliest examples from the site is an example from Grave 523 (KHD IV), which has a flared tip, suggesting that it has been worked, rather than the tip of the adze being shaped originally in a particular style (A. SCHLICKMANN *pers. comm.*). Another similarly worked example is shown in Figure 13 from Grave 1041 (KHD Va). It is important to remember that these adzes would have been hafted. There are a wide range of copper adzes at KHD, 26 in total, and there are comparisons with sites in Egypt and elsewhere to be made. Comparisons can be made with Beth Yerah (with KHD3223 in Grave 371, KHD Va) and Tell el-Hesy (with KHD3142 in Grave 300, KHD Va) (c. 3700-3100 BCE), both from earlier and contemporary periods (MIRON 1992: pl. 3.41 and 5.73). There are also comparisons to be drawn with adzes from the excavations of SAAD at Helwan (KHD3225 in Grave 547, KHD IV) (SAAD 1969: pl. 38) and, looking to Upper Egypt, Abydos Cemetery B

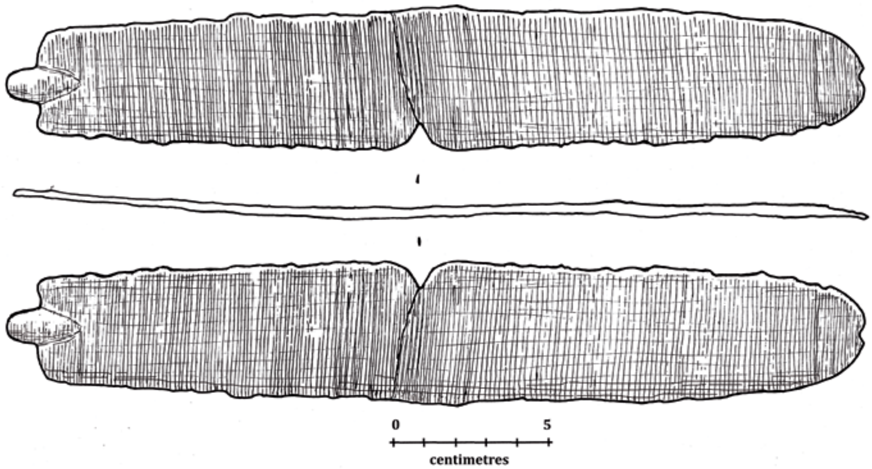

Figure 12. KHD3139 Copper alloy knife from Grave 834 KHD VI (drawn by Subhadra Das; courtesy of the MSA/UCL KHD mission).

Grave O31-4 (c. 3100 BCE; KHD3140 in Grave 834, KHD VI) and Grave M13 (c. 3100-2900 BCE; KHD3117 in Grave 823, KHD VI) (Petrie 1902: pl. L.M13; Spencer 1980: pl. 70.622). Interestingly, there are no copper adzes in association with the largest burials at KHD, although that in Grave 1041, already mentioned, is curiously located in an older part of the cemetery (maybe this location was chosen to reinforce a link with ancestors/early settlers at KHD) (Rowland 2007: 1641).

In terms of the harpoons, similarities can be detected with MAO, Grave 173 (126) within MAO III, which can be compared to KHD III-IV (Naqada IIIA1-C1; Kroeper & Wildung 2000: 119 Object 126/21, 126/22) and also at TF Grave 55 (Naqada IIIC2-D; Czarnowicz 2012: fig. 3:8-9). The MAO example has notches and two small barbs at the bottom of the shaft, as do the two examples shown in Figure 14 from KHD, although notably the shape of KHD3124 (Grave 828 KHD Va), dating to Naqada IIIC1 is more similar to the MAO example dated to phase MAO III (Naqada IIIa-c1), especially the

Figure 13. KHD3076 The occlusal end of a broken adze from Grave 1041 KHD Va (photo by Ken Walton; courtesy of the MSA/UCL KHD mission).

barb. The other KHD harpoon shown here (KHD3125 Grave 298 KHD IV) dates to Naqada IIIB. The examples in TF Grave 55, also have two barbs, but only single small barbs at the base of the shaft, although the barb at the head of TF No. 9 is similar to KHD3125 (Czarnowicz 2012: fig. 3:8-9).

What might the original context of the use of the tools – if used at KHD – have been? One possibility may have been for stone working, as discussed in relation to TF (Czarnowicz 2012: 347, 354; Jórdeczka & Mrozek-Wysocka 2012: 291), but also they could have been used for wood-working, given that the Delta would have had a very different environment during the time at which KHD was occu-pied. There are multiple

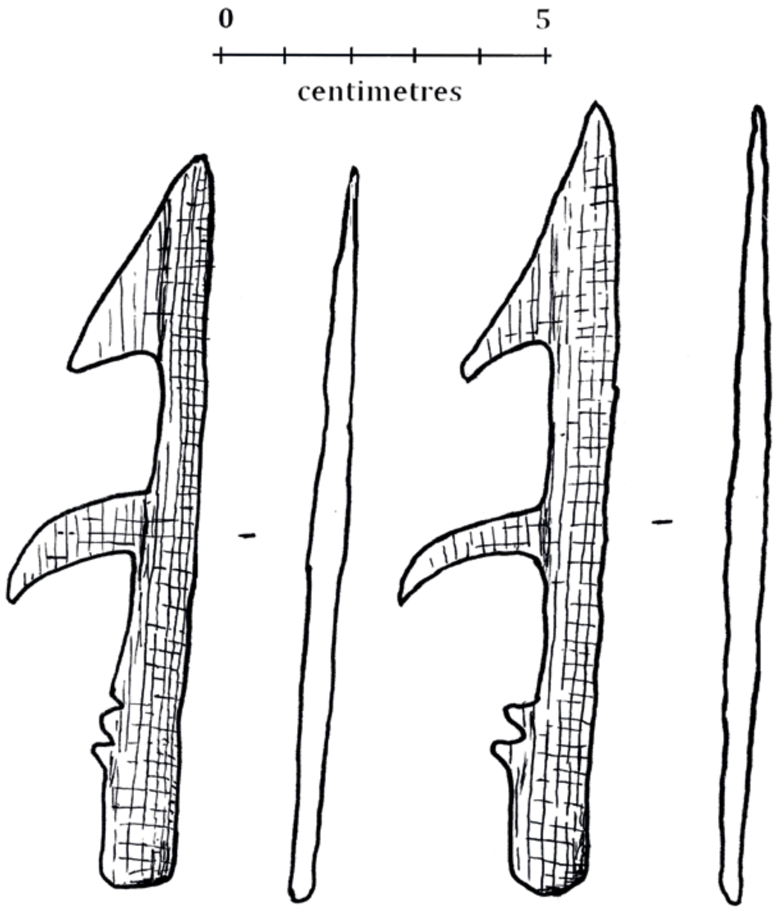

Figure 14. Copper alloy harpoons, KHD3124 from Grave 828 KHD Va and KHD3125 from Grave 298 KHD IV (drawn by Subhadra Das; courtesy of the MSA/UCL KHD mission).

Figure 15. KHD 3089-91 A copper adze, knife and a chisel under a bowl in Grave 142 KHD IV (courtesy of the MSA/UCL KHD mission).

occurrences of working tools within nine burials, such as Grave 142 (Fig. 15), and the 10 harpoons at KHD are distributed between just four burials. The analysis of the human skeletal remains excavated between 1995-2000 by T.L. Tucker confirmed that the burials that she analysed had been individuals who had eaten a protein rich diet (Hassan *et al.* 2003: 44-5). The number of potmarks showing fish might refer to Delta communities, and could also express the importance of fishing to meet dietary requirements, and/or for export (Kroeper 2000; 188, 208-9; Tassie *et al.* 2008: 210-11). The copper rods in Grave 1027 were possibly used as tattooing needles, as discussed by Tassie (2003).

Discussion

What does this information and analysis bring, however, to the wider understanding of the communities involved in exchange in the late 4th and early 3rd millennium BC, and also to the individuals who lived in the vicinity of KHD from possibly as early as the middle of the 4th millennium BC until the end of the 1st/beginning of the 2nd dynasty? As far as can be ascertained from former analysis, the population reaches its greatest density between Naqada IIIB-IIID and from the burials found to date, it is therefore possibly a maximum of c. 700 people who are represented for this total time period. This will naturally only be a percentage of the overall individuals who originally lived and worked in the community (see a suggested higher estimate of 1300 in Tassie *et al.* 2008: 202).

By comparison with other sites, KHD is certainly not under-represented in terms of the presence of stone objects, nor copper. In fact, in the arena of the Poznan meeting in June 2013, it was realised that KHD (albeit only currently represented by a cemetery) has a greater number of copper objects (primarily reflected through working tools) than other sites in the Delta and also a number in the Southern Levant (see Golani *this volume*).

As has been seen, there is currently very sparse evidence for the earliest periods during the use of the cemetery at KHD, but from the burials dating to KHD IV onwards (Naqada IIIB), it is possible to witness an increase in the range of types of materials present. From a socio-economic as well as ideological study of the site (Rowland 2003; 2005a; 2005b; 2007; *in press*), there appears to be increasing cohesion in terms of burial practices at KHD through time, as well as an increase in the range of burial goods and sizes. It is obvious that the individuals who were in graves 913 and 970 were buried in such large and well provisioned tombs for some particular reason. As has been discussed, it is possible that the evidence indicates individuals of high status who were either brought into the site to exploit its access to resources and/or control (to an extent) of exchange and communications coming and going between sites, or these individuals might have been indigenous to KHD and buried in this manner in order to emphasise their status to other communities away from KHD, or even possibly other groups within the community at KHD; certainly a burial mound would have been visible over grave 970 (Hassan *et al.* 2003: 40). Were the wine jars and stone vessels really solely to meet the rising demands of the elite segment within the population? Or, is it more realistic to consider that they are a reflection of the community's involvement in wider world exchange networks, and that as these diverse objects/materials arrived at the site, a small proportion were retained for the growing elite, with the majority passing through to other sites in the Nile Valley, Delta, the wider Near East and Mediterranean?

What commodities were involved in these exchanges? One example is copper, either as ingots, ore or as finished objects possibly coming in from the Sinai and Southern Levant, and one of the objects with which it is being exchanged may be the stone objects coming up from the Nile Valley, Faiyum region and the Eastern Desert. Other more perishable commodities include agricultural produce from the fertile lands around the Wadi Tumilat, and also fish, and possibly wine from Delta vineyards (Tassie *et al.* 2008: 205, 212). At KHD, there are very few ceramic imports to testify to contents coming through from the southern Levant and wider Near East, however, there may have been considerably more in the settlement, or it may also be the case that commodities within vessels are also passing through the site and therefore far less visible within the archaeological record. From the diversity in terms of materials and objects, not only at KHD, but in the wider Delta, Nile Valley and across to the Sinai and Near East, there is much evidence to support the existence of exchange networks, which may be variably organised or opportunistic, depending on their context in space and time, but they are probably not what would be regarded as trade in modern terms, as discussed by

Hendrickx & Bavay (2002: 75-6) who are strongly against the indiscriminate use of the term 'trade' to describe the patterns of exchange that characterised especially, they note, the late EB I.

On the subject of visibility of imports and exports, here in the case of Maadi, Holmes (1992: 310) comments on the uncertainly as to what was exported out of Lower Egypt. In respect of evidence relating to other types of interaction, Holmes (1992) comments on the lithic traditions and similarities with some objects from Mostagedda, and also the transmission of technology, which is problematic in terms of directionality; she suggests the possibility of technological knowledge coming from the Southern Levant, via Maadi and then down to the Nile Valley. Adams & Friedman (1992: 321) observed that some of the imports of ceramics from the Southern Levant to Hierakonpolis are similar to those found at Maadi. Furthermore, they note that in both the cemeteries and settlements dating from Naqada IIC-D, there are Palestinian ceramics, which they believed to suggest that there were more direct means of accessing the resources/finished goods from the east, maybe because Maadi had gone out of use (Adams & Friedman 1992: 335), whereas, other evidence points to the possibility of KHD being administered centrally – if not originally then later by Naqada IIIC-2. This is taking into consideration with regards the large tombs 913 and 970, including the presence of a *serekh* of Narmer on a vessel in the former (Tassie *et al.* 2008: 205). The individuals for whom these tombs were built may well have commanded some influence both at the site and possibly in/between other regions, but the presence of a *serekh* cannot be assumed to mean any direct contact between the individual and a royal house, even if the produce within the vessel might have come from royal agricultural land (Tassie *et al.* 2008: 206).

Turning again specifically to the community at KHD, and in particular to the presence of copper objects, it can at least be suggested that due to the high number of copper implements within the burials at KHD, it is not impossible that some of the stages of copper production, even if only the final casting of the object, might have been carried out at the site. However, given that there is currently no evidence from the settlement, it might also have been the case that copper objects were brought in from another site, and that the inhabitants of KHD were working with the tools, for example for woodworking, rather than manufacturing the tools; although if individuals were working continuously with copper tools, then presumably there would be some relatively local source of manufacture or at least of re-working these objects when they became worn down. Bearing in mind that the excavations at TF have yielded 38 copper objects from across domestic and mortuary contexts (Czarnowicz 2012: 354), the cemetery alone at KHD – albeit the largest of its kind excavated in the Delta thus far (and not completely so until now) – has yielded 70 copper objects. TF has, however, yielded at least one piece of copper that comes from the Central Kom and which may possibly be waste from copper casting and provide evidence for a copper workshop (Czarnowicz 2012: 353-5). Czarnowicz (2012: 354-55) notes that the copper objects from TF, with the exception of a single knife dating to TF 1, are from phases 3-6, which correspond with KHD IIb-VII, although notably 23 of the 38 copper objects can be dated to phases 4 and or 5, which correspond with KHD III-Vb. Only seven of the copper objects from TF come from burials and, although it is not prudent to try to compare cemetery and settlement contexts directly, there is a predominance of fishing tools at TF from settlement contexts (three fishhooks and three harpoons and possibly more if the copper pins are also for working with fish nets), and two harpoons in a single grave, with four fishhooks and ten harpoons in the cemetery at KHD; at TF there are far fewer adzes/chisels than are found at KHD (CZARNOWICZ 2012: 354-5). As to these chisels and adzes at TF, there is evidence for a stone workshop at the site (JÓRDECZKA & MROZEK-WYSOCKA 2012; CZARNOWICZ 2012: 354) and it is also noted that the increase of copper and stone vessels (especially of hard stones) in Naqada II suggests that the use of copper tools allows for progress with regards working with hard stone vessels in particular. That there is copper within burials at KHD and also at TF and MAO, but not in Maadi, may also indicate, in line with (JÓRDECZKA & MROZEK-WYSOCKA 2012), that there was an increase in what seems to be the availability of copper and stone and that it was no longer so scarce; it may also relate more directly to changing attitudes towards burial and to increasing social diversity.

GOLDEN (2002: 234-5), in his discussion of the origins of what he calls the 'trade' in metals, notes the rarity of copper in Upper Egyptian burials, and also considers in what form copper reached sites in the southern Egyptian Nile Valley. He supposes that ingots could have been transported and tools made locally, and also directs the reader to HOFFMAN'S (1980: 207) comments concerning Maadi, as a community re-investing its surplus for the benefit of its involvement within networks of exchange, rather than conspicuously showing its wealth through the medium of burials, as HOFFMAN suggested their 'Upper Egyptian neighbors' did (GOLDEN 2002: 234-5). Research that has taken place largely since HOFFMAN wrote, suggests that certain individuals within communities throughout Egypt, regardless of geographical location, were given more conspicuously wealthy burials than others, and furthermore that sites in the Delta display, on the one hand, evidence for working with materials such as stone, and possibly copper, but also increasing wealth over time being invested in the burials of at least a few, however archaeologists choose to interpret this. GOLDEN (2002: 235) comments on the increasing demand for copper over time and also on the need to recycle, particularly when supply did not equal demand; for what has always be considered to be a primarily non-elite community at KHD, it remains surprising that so many copper objects would, therefore, have been deposited within burials.

Finally, to return to chronology, and copper production, it is possible to look at the example of the excavations at Tall Hujayrāt al-Ghuzlān one of the sites at which there is evidence for all steps within the chaîne opératoire of copper object production (less the actual mining of copper ore itself), and a site in use at the same time as Maadi (KLIMSCHA 2009; PFEIFFER 2009: tab. 2). Radiocarbon measurements for contexts at Tall Hujarat al-Ghuzlan range in between 4340-3340 BC, whereas for Maadi the ^{14}C measurements range from 3960-3370 BC, with some measurements taken from plant remains, including short-lived samples (Rizkana & Seeher 1989: 82, Klimscha 2009: 392, 398, tab. 1; Pfeiffer 2009). The dates for Maadi, however, mainly fall between c. 3900-3400 BC (Klimscha 2009: 392). Interestingly, the radiocarbon measurements for Serabit el-Khadim are suggested by Klimscha (2009: 390) as indicating that the site was in use between 4240-3960 BC and Tall Hujarat al-Ghuzlan is suggested as being founded probably between c. 4100-3900 BC with the settlement ceasing in c. 3700-3600 BC (Klimscha 2009: 391-2). In his conclusion, Klimscha (2009: 394-5) comments on the fact that the sites in the area of Ghassul-Beersheba variably go out of use between 4100-3950 BC and then a new series of settlements are founded in the Southern Levant, which then go out of use at c. 3600-3500 BC. This is very interesting, because Klimscha (2009: 395) goes on to suggest the revival of communications between the Southern Levant and Egypt by c. 3400-3300 BC which ties in with the time around which KHD might have been settled, although ongoing ceramic analysis and also further excavations will have to confirm or refute this.

Summary

As a result of this initial analysis, there remain a number of key questions for examination as part of ongoing research:

- Is there a general increase in the flow of copper through KHD from Naqada IIIC1 onwards, or does it reflect the increase in other kinds of production within the settlement – *e.g.* woodworking, stone-working?
- Did individuals (or a group?) not originally from KHD arrive in Naqada IIIC1 possibly to exert control over/benefit from/organise the flow of imported objects/materials?
- Did these individuals act for the centralised administration?

or,

- Does the increase in the size of these graves coupled with the high number of prestigious objects suggest a need for 'original' inhabitants of KHD to ostentatiously display the importance of the heads of their community to other local/non-local/competing groups?

Further consideration of these issues, in the context of a re-examination of the cemetery at KHD, its burials, architecture, grave goods and spatial organisation, within a now more defined chronological structure, will hopefully allow for a clearer understanding of these, as well as the many other points raised here.

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The prehistoric sequence at Sais: temporal and regional connections

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Introduction

In 2005, Excavation 8 at Sais (Sa el-Hagar, Western Delta, Egypt) focussed on the Prehistoric area of the site and preliminary results of the work were presented in Poznan in 2007 (Wilson & Gilbert 2012). The final publication, Sais II: The Prehistoric Period, will be completed by 2014.[1] This paper will present results from the analysis of the material found, including a discussion of the taphonomy of the Delta floodplain site and prospects for future work in such environments. In addition, the wider connections of this site will be explored through the evidence of the pottery assemblages.

Site stratigraphy: temporal and environmental (Figs. 1-2)

The site comprised a 10mx10m trench on the western edge of the Great Pit at Sa el-Hagar. Using a non-stop dewatering system the excavation reached a maximum depth of 3m below the ground surface. The upper layers consisted of smashed and pulverised Saite period material from Dynasty 26 in massive pits and dumps, which then gave way to:

• Sais III: a Buto-Maadi period mud structure, covered by a deflated pottery and small find mass (contexts [8008], [8009], [8014]);
• an alluvial layer up to 1m thick in places, effectively forming a permeable seal between Sais II and Sais III (context [8012]);

[1] The following team members were responsible for specialist studies: Gregory Gilbert (chipped stone tools), Geoffrey Tassie (chipped/unchipped and ground stone tools and small-find artefacts), Penelope Wilson (pottery), Veerle Linseele (fish-bones), Louise Bertini and Salima Ikram (animal bones), Alan Clapham (botanical material). I am also grateful to Joanne Rowland, Said El Assal, Emad el Shennawi, Mohamed Abd El Aziz, Mohamed Osman, Ibrahim Desouqi, Ahmed Bilal and Chief Inspectors Said Mitwally and Fatma Rageb for their assistance, as well as the large local workforce from Sa el-Hagar and supervisors from Qift led by Reis Ali El Mahadras. Thanks to Agnieszka Mączyńska for the organisation of the conference.

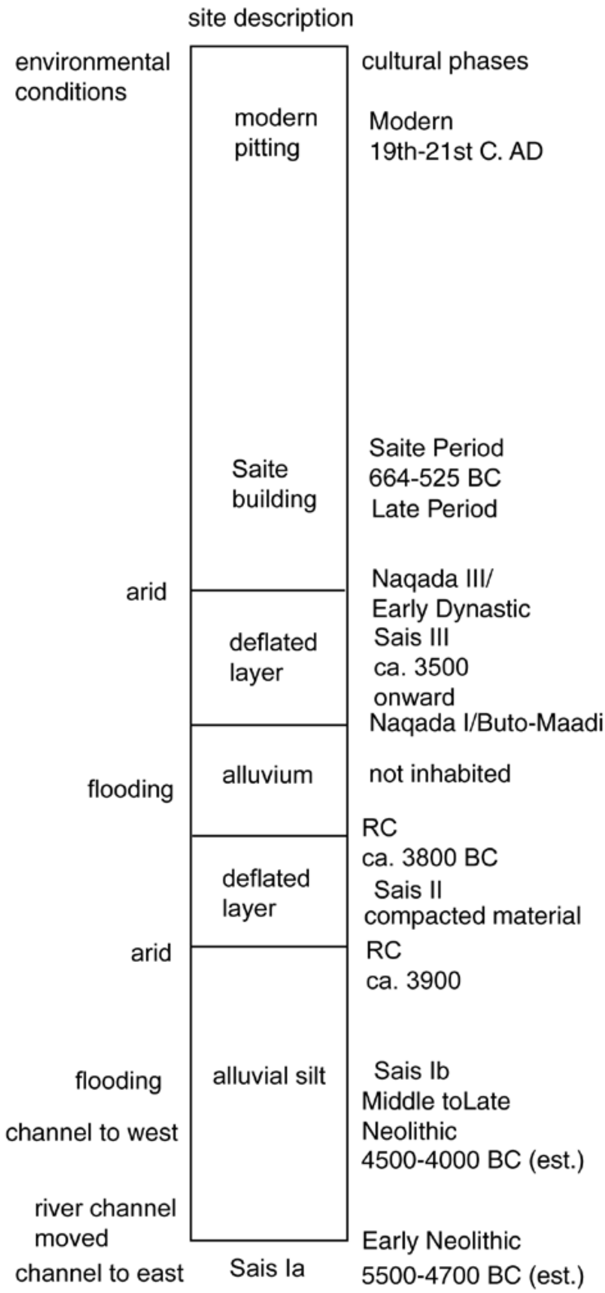

Figure 1. Temporal and environmental chart showing a schematic impression of the site through time. The height of the column is representative only.

• Sais II: a layer of mixed, deflated and perhaps disturbed Neolithic material (context [8013] and including pit fills [8016], [8019], [8018]);
• Sais I an undeflated and relatively intact settlement area (Sais Ib, contexts [8021] to [8030]), lying upon an earlier Neolithic fish processing midden (Sais Ia, contexts [8032] and [8033]).

Sais I: Neolithic

The lower stratum of Sais I comprised a thick layer of burnt material including thousands of fish bones, a few chipped stone tools and pottery fragments. This highly distinctive stratum was re-designated as Sais Ia and can be identified as a fish processing midden relating to the capture, killing and preparation of fish for consumption, storage and, perhaps, onward shipment elsewhere. The fish bones were found in small fragments, which were often burnt white or grey and difficult to identify.

Table 1. Fish bone analysis from Excavation 8 phases (by V. Linseele).

	Saïs II - hand	Saïs II - float	Saïs II - sieve	**Saïs II - all**	Saïs I - mid. - hand	Saïs I - mid. - float	Saïs I - mid. - sieve	Saïs I - mid. -all	Saïs I - other -hand	**Saïs I - all**	**TOTAL - n**	**TOTAL - %**
Polypterus sp.	-	-	4	**4**	8	31	8	47	1	**48**	**52**	**1,03**
Hyperopisus bebe	-	-	-	**0**	1	-		1	-	**1**	**1**	**0,02**
Mormyridae (elephant-snout fish)	-	-	-	**0**	19	5	9	33	1	**0**	**34**	**0,67**
Mugilidae (mullet)	1	-	-	**1**	-	-		-	-	**0**	**1**	**0,02**
Alestes sp.	-	-	-	**0**	-	2		2	-	**2**	**2**	**0,04**
Hydrocynus sp. (tigerfish)	-	-	-	**0**	4	-		4	-	**4**	**4**	**0,08**
Cyprinidae (barbel family)	-	1	-	**1**	-	4	2	6	-	**6**	**7**	**0,14**
Clarias gariepinus (clariid catfish)	-	-	-	**-**	17	-		17	-	**17**	**17**	
Clarias sp. (clariid catfish)	3	1	1	**5**	59	6	16	81	1	**82**	**87**	
Clariidae (clariid catfish)	72	5	20	**97**	2573	290	445	3308	33	**3341**	**3438**	**70, 19**
Schilbe sp. (catfish)	-	-	-	**0**	4	-		4	-	**4**	**4**	**0,08**
Bagrus sp. (bagrid catfish)	4	-	3	**7**	216	1		217	5	**222**	**252**	**5,11**
Synodontis schall (Synodontis catfish)	-	-	-	**0**	2	-		2	-	**2**	**2**	**-**
Synodontis sp. (Synodontis catfish)	2	1	1	**4**	35	1	23	59	-	**59**	**51**	**1,05**
Lates niloticus (Nile perch)	9	-	-	**9**	82	1		83	12	**95**	**108**	**2,14**
tilapia (Tilapiini)	11	3	13	**27**	535	110	11	656	3	**659**	**980**	**19,42**
Identified fish	102	11	42	**155**	3561	451	4	4016	56	**4072**	**5046**	**100,00**
Unidentified fish	83	509	-	**592**	2541	5139	305	7985	51	**8036**	**10612**	
Total fish	287	531	84	**747**	6102	5590	823	12515	107	**12622**	**15658**	

Overall, around a third of the 15,000 bones in the sample were identified to species level by Linseele and, of these, most common were clariid catfish, which represent 70% of the identified fish remains (Tab. 1). It should be noted that the bony skull bones of catfish survive well, so this may have skewed the overall percentages of fish within the sample. Tilapia is the second most important species, with 19% of the identified remains, followed, in order of importance by bagrid catfish, Nile perch, Synodontis catfish and *Polypterus* sp.

Minor faunal elements (less than 1% of the identified remains) are elephant-snout fish, cyprinidae, tigerfish, *Alestes* sp., *Hyperopisus bebe* and *Schilbe* sp. (also a catfish). Clariid catfish are usually common at Holocene sites in the Egyptian Nile Valley, but their proportion at Sais is extremely high. By comparison, at Kom K and Kom W in the Fayum, tilapia is the most common taxon, followed by clariid catfish. The Sais sample also contains a great number of young fish of all kinds, suggesting that they were caught *en masse*, perhaps by net fishing, at the beginning of the inundation as well as the receding floods. During low water level, the deep water species were also caught, perhaps by harpooning or in cover-pots or by hand. The fish were then processed, perhaps by the removal of heads, fins and vertebrae and these elements could have been used as fuel, resulting in their burnt appearance. The fish meat could have been smoke-cured, salted or boiled. A possible hearth structure with a large vessel next to it was found in the area, suggesting that some types of fish could have been heat processed, such as by boiling.

The pottery in this layer consisted of ovoid, red and black polished vessels, some with fish-bone motifs and it seems likely that the fish were packed into these vessels. Those marked with the fish-bone motif may have included bones, while other unmarked pots could have suggested a de-boned product. The fish could have been stored in the vessels for consumption during the year, or perhaps transported elsewhere. The fact that the vessels resemble those from Merimde Ursicht I (Eiwanger 1984: 19-20, Taf. 18-21, 70) may suggest at least a cultural, if not a production link. For some reason, perhaps because of the river position and the marshiness of the land to the north, the Sais area represented a premium fish catching place. Merimde, upon the desert edge, may have been less a place where fishing was done as where some processed material was taken, hence the 'small-scale' of the site.

The few stone tools in Sais Ia included bladelet and blade tools and small points, most of which were burnt. There were also hammer axes and a lower grinder, the latter suggesting some other processing of the fish material or perhaps other food processing. The fish midden seems to have been on the edge of a river bank as it dived steeply down to the east of the trench. Traces of the fish midden have been found in drill core augers to the south as far away as the new Police Station, approximately 400m to the south-east, suggesting that there had been intensive activity here – but whether these deposits were the result of seasonal visits or of a more permanent settlement is not clear. The date of the Sais Ia phase can be established only by comparison with Merimde I, dated to between 4830 and 4540 BC (Wilson 2006: 100) according to radiocarbon dates, and perhaps earlier, according to Eiwanger's reconstruction of the Neolithic period, into the sixth millennium (Hendrickx 1999: 18). It would seem safe to designate Sais Ia as an Early Neolithic phase, from the fifth millennium BC, but to bear in mind the possibility of an Epipalaeolithic phase such as that documented in the Fayum, for the Qarunian, ending around 6000 BC (Shirai 2010: 52).

At some time, there seems to have been a change in the local environmental conditions at Sais and perhaps a change in the river orientation. Palaeoenvironmental reconstruction by Zeinab Lotfi from Mansoura University showed a series of sand banks upon which the fish-Neolithic of Sais Ia was established, with the river flowing between an area of high

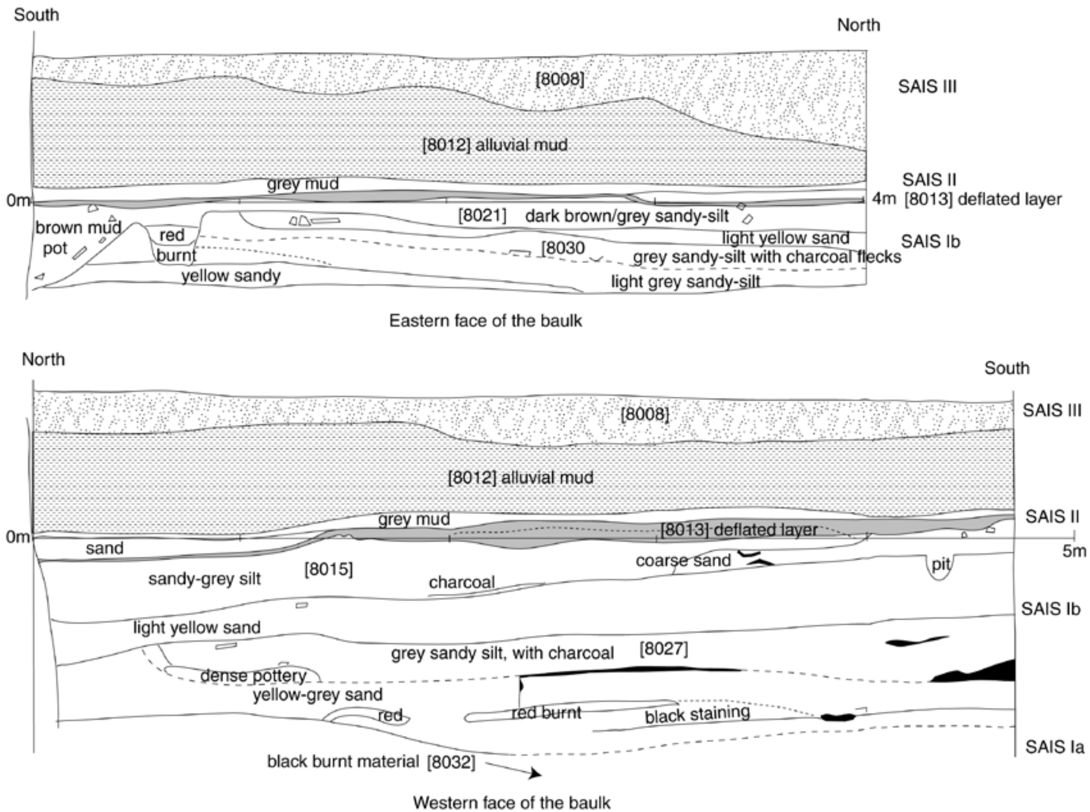

Figure 2. Eastern and western faces of the baulk left through Excavation 8, showing the phases and layers. Sais III is represented by [8008], as [8009] lay to the west of it.

sand to the west and another sand hill further to the north-east. The river shifted, perhaps to the west of the site, and caused a reorganisation of the human exploitation of the area (El-Shahat *et al.* 2005: fig. 4). A settlement was established inside the river bend, most likely on the east bank of a main river branch and this stratum was re-designated as Sais Ib, from the Middle to Late Neolithic Period. There is likely to have been a time gap between Sais Ia and Ib and once the area was flooded and sediments deposited upon the former river bank, settlement could have begun relatively soon after. This hiatus between Sais Ia and Sais Ib could be mirrored by an apparent distinction at Merimde between the Ursicht I phase and the later strata (Eiwanger 1984: 59). The time between the two phases at Sais is not known, but there was a clear functional and cultural shift as the fish midden site gave way to an area of settlement of Neolithic character, incorporating aspects of hunter-gatherer exploitation as well as evidence of the domestication of crops and animals and thus being more redolent of Merimde Level II onwards.

The fragile traces of the later settlement Sais Ib (Late Neolithic) were preserved as colour changes in the sandy-alluvial matrix as red-black patterns with 'negative' yellow, sandy areas where organics or solid objects had once stood. There were darker areas, some deep pits (which may have been dug down from later layers) and small-scale pitting in the south-west corner of the trench. More precise radiocarbon dates from this stratum than have previously been published (Wilson & Gilbert 2012; Wilson *et al. in press*: Appendix 7, tab. 2):

Table 2. Radiocarbon dates from Sais Ib (BetaAnalytic).

Context	Calibrated radiocarbon dates
[8022] pitted area	Cal BC 3960 to 3770
[8024]	Cal BC 3970 to 3710
[8023]	Cal BC 4230 to 3980

It is likely that people's activities in the settlement changed throughout the year or, perhaps, different parts of the community were organised to carry out different agricultural tasks resulting in specialist agriculturalists, with particular people in the community designated to 'organise' them. The stone tool repertoire from Sais Ib reflects a range of activities, with a sophisticated chipped stone blade and bladelet industry, a large amount of debitage and a few cores suggesting that the material was worked and reworked at the site. The cutting blades may be mostly for use in preparing animal carcasses – that is skinning, defleshing, hide scraping – or for cutting and whittling reeds and branches, pointed tools could have been used for piercing skins or matting, while the sickle stones (bifacial example [8021], L367) suggest that cutting of grasses or cereals was also undertaken. Upper and lower stone grinders, handaxes, hammerstones and also a fragment of a saddle quern in the south-east quadrant of the trench suggest particular areas set aside for specific tasks – in this case, the processing of food or other raw materials.

Figure 3. Wild bull rib from [8021] (bottom), compared with modern domesticated cow rib (top) (photo by L. Bertini and S. Ikram).

Although organic material was very poorly preserved in general in Excavation 8, a small number of poorly preserved hulled 6-row barley grains (*Hordeum vulgare*) were identified from [8017] and [8030] as well as some likely emmer wheat glume bases (*Triticum dicoccum*). Silicified wheat (*Triticum* sp.) awns were also present: the silicification is a result of burning cereal chaff. The other crop remains recovered from the Neolithic contexts was of a pea (*Pisum sativum*). The greatest proportion of the prehistoric charred plant assemblages were of weed seeds. These included docks (*Rumex* sp.), nettle-leaved goosefoot (*Chenopodium murale*), vetch/vetchling (*Vicia/Lathyrus* sp.), cleavers (*Galium* sp.), darnel (*Lolium temulentum*), oat/brome (*Avena/Bromus* sp.), canary grass (*Phalaris* sp.), possible wild barley (*cf Hordeum murinum*) and grass seeds. Grass stems were also identified. These weed seeds may have been associated with the gathering of cereal crops, but also could be fodder kept for the feeding of animals or use within the settlements as fuel and in constructions.

Animal bones in the Neolithic contexts also reflect the relative importance of types of domestic versus wild animals. A *Bos primigenius* (auroch) rib (Fig. 3) was found in the Sais Ib phase as well as bones from domesticated cattle, a few sheep/goat, but the most frequent domesticated animal was the pig. The pigs seem to have been bred until between 12-15 months old, then killed and were probably used for meat primarily, as well as skin, fat and bone material. It is not clear whether they too were packed into pots and preserved, but the meat and fat may also have required some processing such as rendering and boiling down. The large storage jars and deep vats in the pottery repertoire may have been well suited for this purpose. By this period there was already a well-established pig husbandry regime, which continued into the Predynastic period. A harpoon and hippopotamus skull fragment also suggest that riverine hunting was still undertaken, as might be expected.

The development of activity from fish processing to a settled hunting and agricultural area may be due to gradual changes in climatic conditions from 4600 BC onwards, with the onset of the Middle Holocene Moist phase (Tassie *in press*: 191-194). If there were people moving into the Delta area, then there may be preferred locations where Neolithic settlements could be found. In addition, concomitant socio-economic changes had an impact on both the agricultural potential of the Delta and upon Egyptian 'culture' as a whole throughout the flooded lands of the Nile. This particular moment, when Delta people were able to exploit their environment to the maximum using both hunting and domestication of crops and animals, may represent an ideal, but short-lived, phenomenon in Neolithic Egypt.

Sais II: transitional or mixed?

The Sais II phase containing the bulk of the artefactual and pottery material – some 80000 sherds and 4076 stone tools – is confusing as it contains material that can be directly related to the late Predynastic-Early Dynastic material as well as to the Neolithic tradition. Overall, however, the chipped stone tools, with examples of bifacial arrow-heads, knives and sickle blades are more indicative of the Late Neolithic technologies and more representative of the earlier phases of the site. The real problem is that the layer [8013] seems to be the deflated remains of substantial, thick settlement debris, which was then covered by alluvial mud all over the site. The east section of the excavation shows a layer of just over a metre in depth of alluvium between the base of the Sais Phase III sands and the deflated Sais Phase II pottery 'carpet', similar to the situation apparent in the north and west section. A further complication was that a trench had been cut through the southern part of the area during the Saite period, and removed all of the upper layers as far as the deflated Phase II. It is not clear how there could be such mixing of sherd material from the Neolithic and Buto-Maadi periods when, apparently, there was a seal between the two phases. The explanation may be that, although the mud acted as a barrier, there may have been thinner areas of coverage or later pits dug through the alluvial layer, which allowed pottery and other material to 'move' due to bioturbation in waterlogged conditions. That is to say that, within the floodplain regime, when the silts are covered by water, the substrata turn into a mass of liquid mud. Due to currents and water pressure, movement is possible for pottery and stone material, which can sink through the liquid until it is blocked and thus settles. The deflated Neolithic layer could have provided that block and, therefore, material from the upper Buto-Maadi layers settled there. Very little archaeological material was found in the alluvial mud layer itself, suggesting that it was an archaeologically neutral zone.

A second possibility is that the alluvial mud was deposited after some Predynastic settlement had begun directly on top of the late Neolithic layers. This would then imply that there was a transition between the Neolithic and Predynastic material with a short time interval between them. It would represent a very fast cultural change or displacement, however, which seems unfeasible and so and the first possibility of mixing due to taphonomic processes is the most likely scenario to explain the character of the Sais II phase.

Although Sais II provided the most numerous examples of types of pottery vessels, all of this material should be regarded as, more or less, without context. This can be demonstrated by the analysis of the decorated pottery fragments: within Sais II there were pottery sherds in straw-tempered fabric, decorated with impressed dots in V-designs and finger-nail impressions, typical of the earliest levels at Buto (von der Way 1997: Taf. 39) and highly polished pottery with fish-bone incised decoration, typical of Merimde Ursicht Phase I. A ledge-handle from a Levantine import-type jar also suggested the later phases of the site. The stone tools also include some tabular flints, which Gilbert suggests may have come through contacts with the Levant during the period when the Neolithic 'package' of grain and animal domestication first arrived in Egypt. The route by which this transfer occurred is debatable, although a combination of sea and land-route over Sinai to Maadi is possible. The tools, otherwise, belong to the bifacial Late Neolithic tradition of Merimde and the Fayum. Animal bone from Sais II was again highly fragmentary and difficult to identify but there continued to be quantities of pig, cattle and sheep/goat bones suggesting that domesticated herds were present in the Late Neolithic phase.

Overall, the material was indicative of the deflated Neolithic strata with some contamination from layers above, caused by bioturbation through thinner mud deposits and pitting from above. Although the phase produced much material, it was very eroded and fragmentary and without firm context, so can only be used within these limitations.

Sais III: Buto-Maadi period

The layer Sais III was originally thought to be a Buto-Maadi phase and thus dated to around 3500 BC, but the pottery may be a little more diverse in date range after comparison with other published material, particularly that from Buto (Köhler 1998) and Tell el-Farkha (Jucha 2005), as well as examples from Adaïma in Upper Egypt (Buchez 2002). The deposition of the pottery has to be firstly understood before an attempt at reconciling the various dates for it can be made.

Firstly, there seemed to be some kind of mud structure, [8014], in the Predynastic layer and the pottery was associated with it. The structure survived only as the last few courses of mud and could not certainly be described as mud brick. During the excavation it seemed possible that the structure either had rounded corners or a niched façade. When compared with the Tell el-Farkha range of niched tombs and rounded (Chłodnicki & Ciałowicz 2001: 89) structural features on a range of buildings, this seems a more than likely suggestion. The Saite structure had been truncated above and at the southern end and the northern extent was not apparent in the Excavation 8 trench. Pottery was deposited at the edge of the structure, but was perhaps the remnant of a greater pottery mass washed down from somewhere else. The mass was quite compacted and perhaps sunk into hollows, suggesting that some of it had also been affected by water erosion and deflation. The pottery was excavated in non-defined layers labelled A-G, but it was noted that there were concentrations in depressions of pits. When these are mapped from the

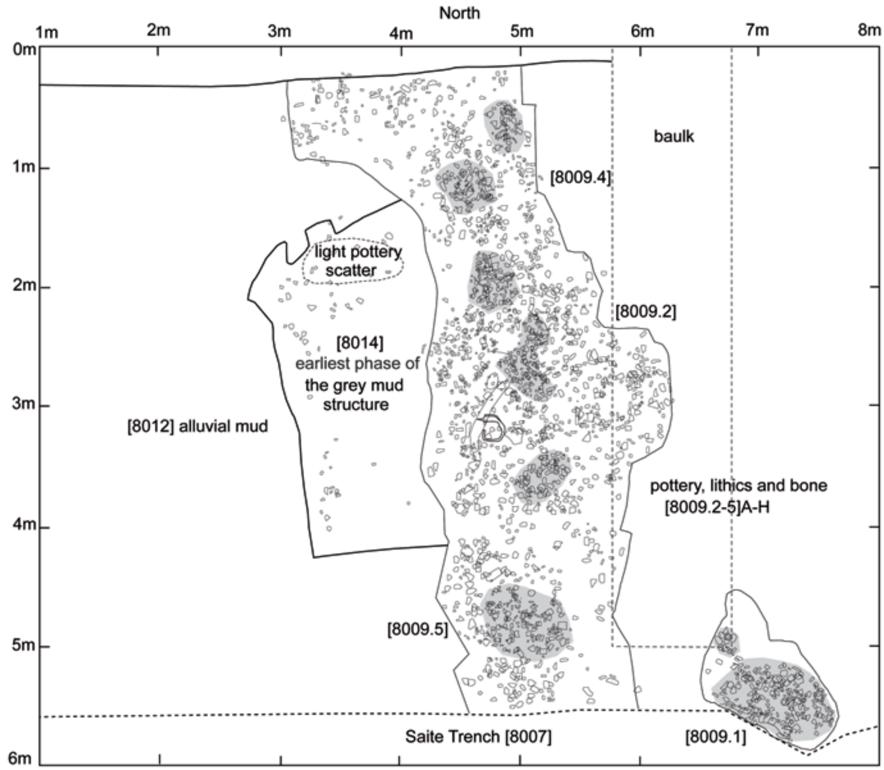

Figure 4. Plan of [8009] and [8014] showing the concentrated locations of material caught in pits or depressions (grey).

overlaid plans it seems there may have been a series of postholes or deposit pits around the edge of the structure (Fig. 4). The types of vessels suggest the wide range of activities that may be connected with the mud structure and the deposited pottery (Fig. 5). There are large pot-stands which could have been used to hold some of the larger storage vessels, including jars with restricted necks in a variety of shapes and degrees of roundedness. Some vessels had straight necks, which may imply that they were deliberately suited to pouring; while the rolled rim vessels were designed for sealing with a cloth/leather or a plate and then decanting. Large storage jars suggest the presence of solid as well as liquid goods. Small pointed-based bag-jars ("lemon pots") as well as traditional bag-shaped jars suggest drinking cups perhaps for something in smaller quantities such as sieved beer. The local beer would have more like a porridge and perhaps was sieved and poured into the small bag shaped jars so that it could be consumed more easily. The pointed base jars could also have been used for drinking a milk product, hence the udder-like shape of the vessel, but some kind of residue analysis would need to be carried out on better preserved examples. There were also bread plates made of coarseware alongside very fine fragments of beautiful red

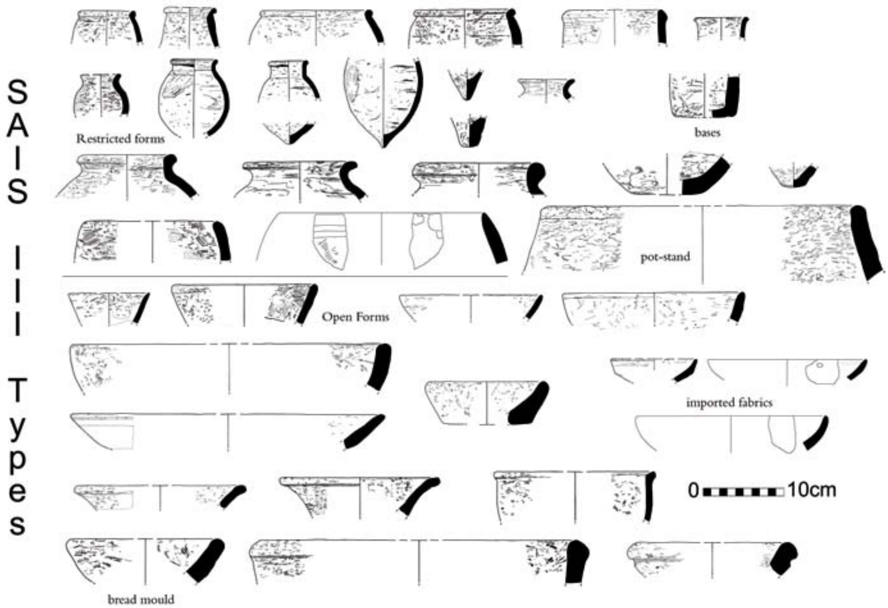

Figure 5. Phase Sais III, Buto-Maadi period types of pottery.

or black polished cups. Some of these may be imports from Upper Egypt. There were also some sherds from Levantine vessels including small bowls, necked jars, painted sherds and wavy-handled storage jars.

In addition, a significant number of fibrous-sherds ("Fasernware", KÖHLER 1998: 10-11) have also been identified[2] (Tab. 3).

Table 3. Pottery from the Sais III phase, by ware type.

TYPE	SMOOTH	POLISH	NO SLIP	RED	BLACK	BROWN	NO SURFACE	TOTAL
TEMPERED (NO FIBRES)	8631 66.8%	426 3.3%	10 2.3%	30 7%	179 42%	207 48.6%	3863 29.8%	12920 *71.5%*
UNTEMPERED (NO FIBRES)	1813 51.4%	532 15%	3 0.6%	63 11.8%	173 32.5%	293 55%	1180 33.5%	3525 *19.5%*
FIBROUS	203 20.8%	774 79%	81 11%	112 15.2%	272 36.8%	274 37%	36 3.7%	978 *5.4%*
V. FINE UNTEMPERED								59 *0.33%*
COARSE								316 *1.7%*
IMPORT								57 *0.3%*
MARL								204 *1.1%*
TOTAL								**18059**

[2] Thanks are due to KARL G. LORENZ, Shippensburg University of Pennsylvania.

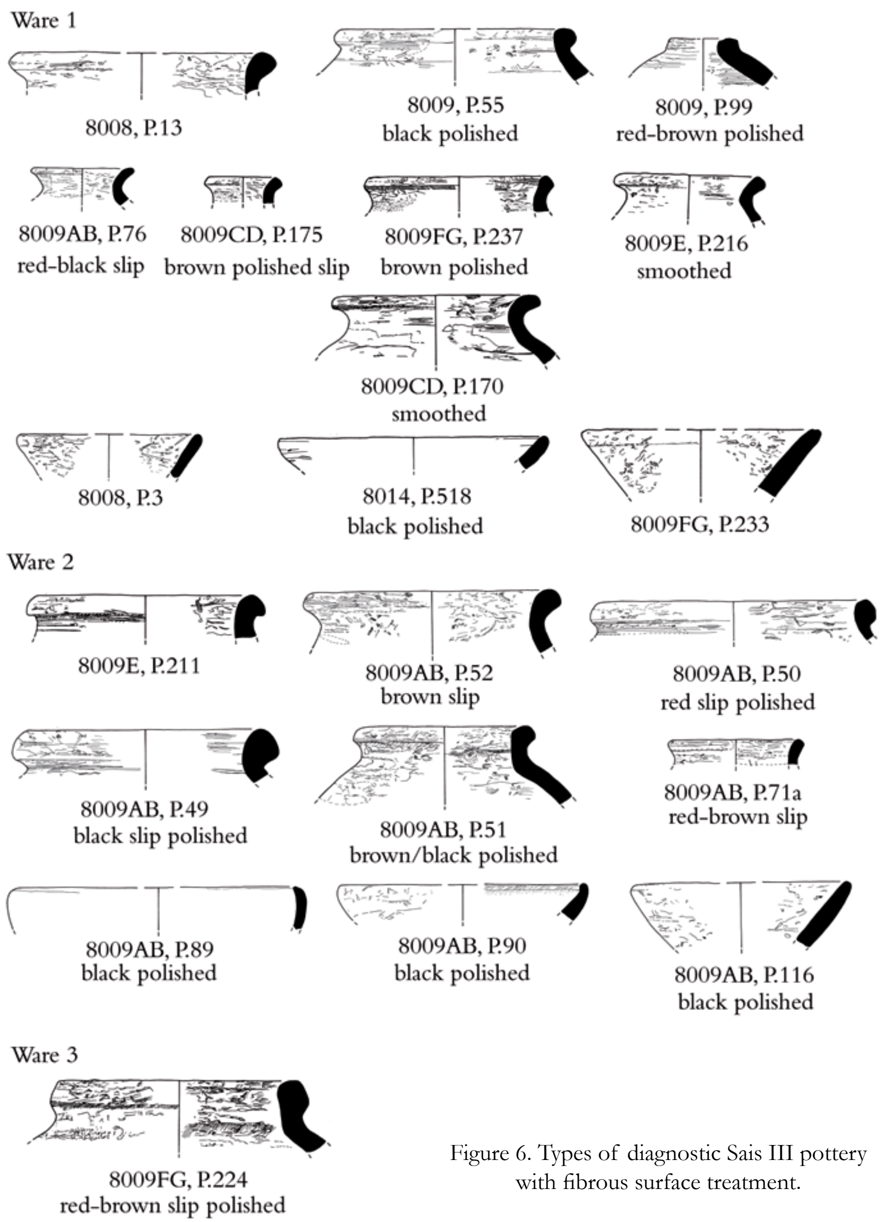

Figure 6. Types of diagnostic Sais III pottery with fibrous surface treatment.

The fibrous pottery was primarily identified from the surfaces of sherds, particularly where they had been slipped, then either smoothed or polished. In total, 978 sherds were identified out of 18059 sherds with fibrous surface treatment, that is 5.4% constituting examples of both untempered and chaff/grit tempered wares. As tempered ware was most numerous in this phase (71.5%), so most of the sherds were classified as belonging to this category. Of the fibrous pottery 79% were polished and of those about one third (37%) were black and brown each; with red slipped at 15.2% and 11% were not slipped at all. The remaining 20.8% of the fibrous pottery was smoothed, as far as could be determined from the condition of the material. From the diagnostic sherds (Fig. 6), large storage jars as well as bowls had this surface treatment, and the interior surfaces of some of the sherds also suggested that they had been brushed (Figs. 7-8). As has been suggested by Köhler, the kind of fibres used may be something like flax fibres, which are extremely fine, but also strong and may have been used to give the fabric of the pottery extra malleability or strength. The fibres were extremely difficult to see by visual examination, even with a hand lens and it is possible that much of the pottery from this phase could also have contained this temper, but that it went unrecognised. The identification of both the impressed V-decoration and the fibrous pottery in material from Upper (Adaïma; Buchez 2002: 217) as well as Lower Egypt now makes it likely that this was not a Lower Egyptian cultural trait, but rather that there was already an underlying 'Egyptian' cultural system in the Nile Valley and Delta, with some regional adaptations depending upon the local conditions and specific nature of the sites (Köhler 2008).

Figure 7. Black slipped sherd, outside, burnished in horizontal lines.

Figure 8. Red slipped sherd, inside, with brush marks.

Overall, the wide range of types, forms and wares of the pottery immediately suggests a deflated deposition, as does the date range from the Naqada II period into the Late Predynastic or even Early Dynastic period (after comparison with the Tell el-Farkha sequence, Jucha 2005). This would accord well with the traditional assumption that Sais was an important centre in the late Predynastic to Early Dynastic period. The presence of a predictable waterway running past the site, a link with Buto and perhaps an older original settlement here strengthen the rationale for the presence of the site.

The problems of this floodplain environment in creating peculiar taphonomic processes then serve as a useful warning for the quality of contextualised material in future floodplain excavation. To complicate things further, however, it is also clear that in the Sais III layer people were digging down into the earlier Phases. Pits in several places, including one deep pit [8030].2 in the south-east of the trench with groups of small pointed-base jars at the bottom of it are suggestive of some kind of intentional deposition at the bottom of a pit. Although pottery vessels were sometimes placed at the bottom of post-holes to prevent the wooden posts from becoming rotten too quickly, the material is likely to have broken into pieces, whereas the material in [8030].2 remained reasonably intact. The pottery may then have been structured deposition within a post-hole pit, with 'offerings' at the base; or perhaps even a gift for those ancestors in the earlier layers. GILBERT has suggested that some of the flint material in the Buto-Maadi layer was reworked from the Neolithic material, so the later settlers could have been mining for raw chert and stone and perhaps pottery (for pigment) as well as other materials. Such a connection with the earlier layers suggests that the people living at Sais in Predynastic times had a sense of the past and an interest in it. The contact with past communities may have been a purely material one, however, in that chert, quartzite and some limestone was easily available by digging pits downward instead of having to rely on supply lines from the desert areas. It would perhaps have shown that this was a kind of ancestral land and given some sense of a link with past people, if not an idea of ancestral possession. This might explain, partially, the way in which the Predynastic people came to be settled in this area. Was there some retained memory of a previous settlement? Or was it simply that with changing river patterns this area once again became a habitable bankside perhaps linked to Buto to the north by a waterway and thus it had a clear strategic value?

Figure 9. Pot mark, [8009], P.196.

One sherd ([8009], P.196) seems to preserve the remains of what may be a deliberate pot marking or even sign (Fig. 9). The sherd is broken through the pot mark, but appears to show an oval with pointed ends which has been incised along one edge into the clay and 'shaved' or worked into the clay along the other edge. Furthermore, after a gap at the other side of the sherd there is a raised moulding, perhaps from the end of a second mark, with a slightly forked or bipartite end. This tantalising glimpse of a marked vessel may suggest part of the wider redistribution network to which Sais belonged.

A comparison of the main types of pottery from all of the phases show the increase in variety of vessels in Sais III (Figs. 10-11). In particular, the ovoid-jars and steep sided bowls of the Neolithic give way to a host of necked and restricted shapes that suggest

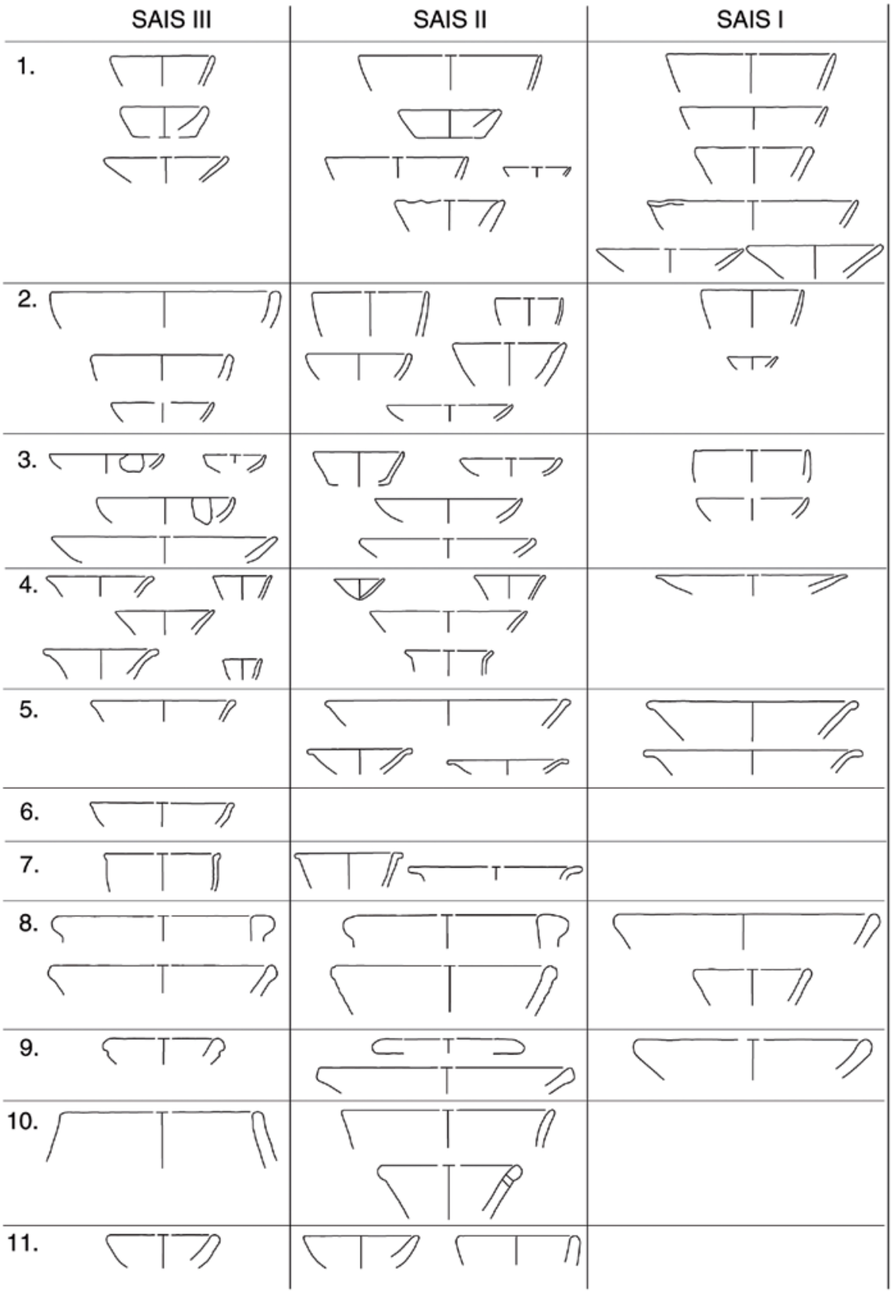

Figure 10. Open pottery types compared across Prehistoric phases. 1. Straight sided bowls; 2. Incurved bowls; 3. Shallow, carinated bowls; 4. Slightly everted rim vessels; 5. Modelled, everted rim bowls; 6. Shouldered bowls; 7. Ledged rim bowls; 8. Vats and large bowls; 9. Trays and platters; 10. Pot-stands; 11. Bread moulds.

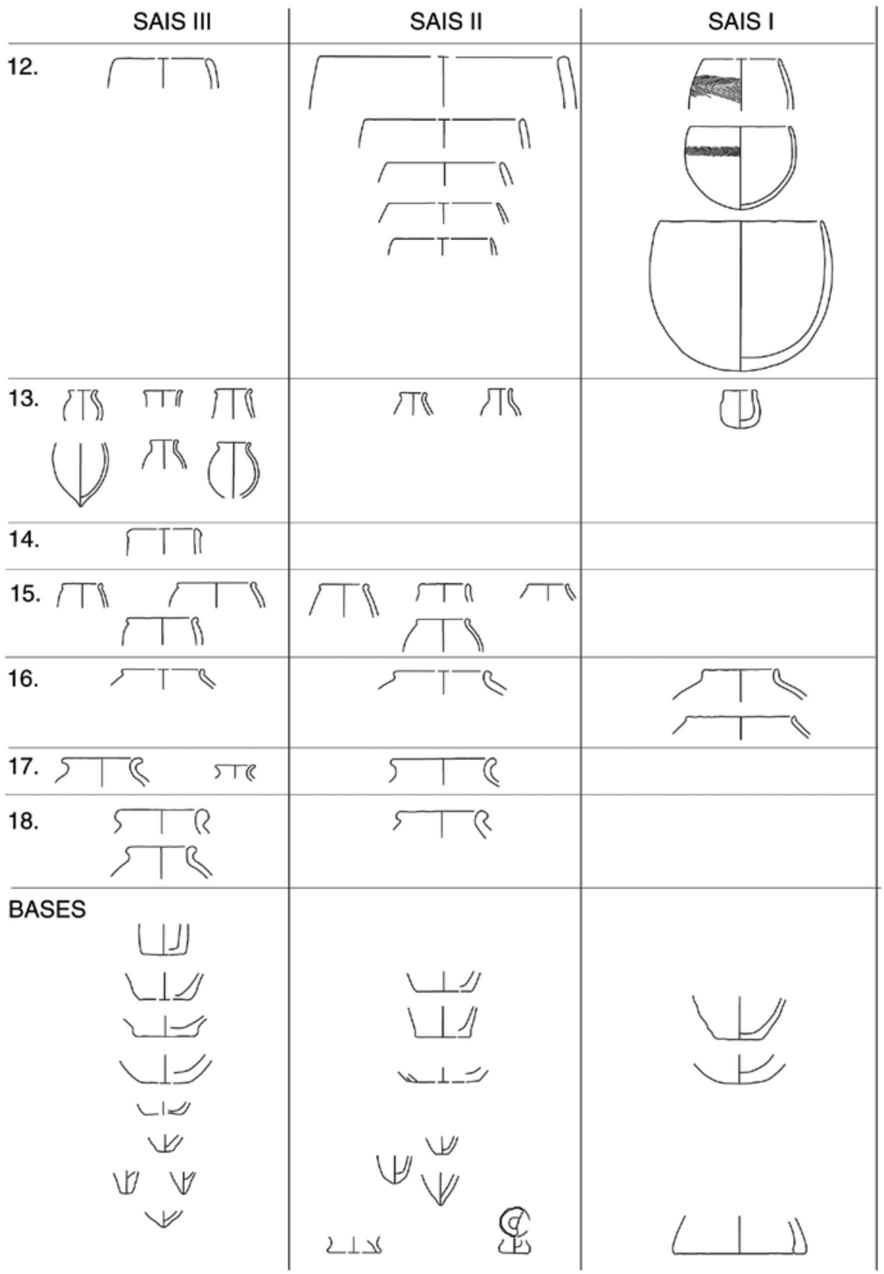

Figure 11. Restricted pottery types compared across phases. 12. 'Hole-mouth' and ovoid jars, inturned bowls; 13. Small, necked beakers; 14. Cylinder jars; 15. Narrow jars; 16. Broad jars; 17. Everted neck jars; 18. Large jars, modelled rims; Bases.

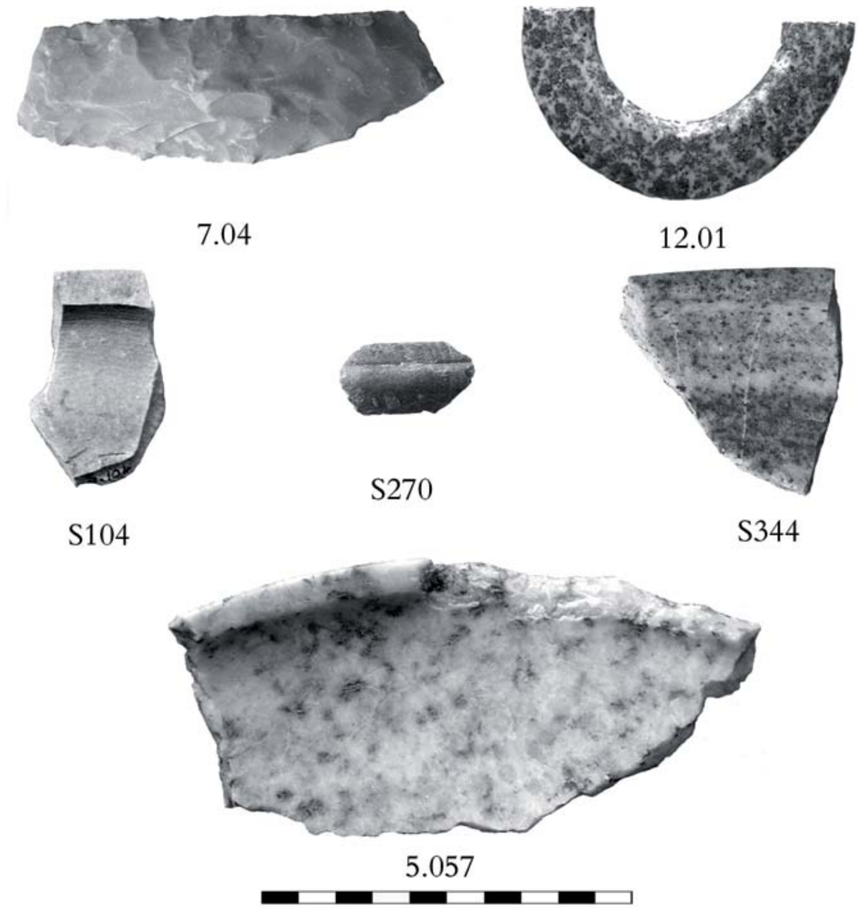

Figure 12. Early Dynastic material from excavations in the Northern Enclosure.

an increase in storage and transportation. The smaller vessels may also suggest more focus on individualised portions of food, drink or other consumables and thus an increase in social hierarchy or at least an interest in serving food, fat and unguents in individual portions. In turn, vessels designed specially for feasting, and vessels marked with signs imply a more organised and hierarchical social structure. The arrival of bread and beer manufacture can also be seen in the pottery technology, again suggesting a real difference between the Neolithic and Predynastic communities (Wengrow 2006: 87-89, 92-98). If the pottery suggests increased storage facilities, the stone tools are rather more prosaic in their functionality. Cores, sickle blades and bladelets suggest a dependence upon stone for fine cutting and piercing, but the smaller number of such tools in Sais III suggests that perhaps copper was an important part of tool making at this time. It has not survived, however, in any state.

This area may not have been the only zone of the Predynastic settlement in the area. In excavations in the Northern Enclosure area of the site a small but exquisite collection of Early Dynastic material (Fig. 12) has been found from later contexts as residual or reused artefacts. Fragments of stone bowls made of "Chephren diorite" suggest links with funerary material from other Early Dynastic cemeteries and in the excavation of a Late Ramesside storage magazine (Excavation 12), half of a diorite disk was found. It had been used as a pot-stand. Parallels to this material are known from Abydos and Saqqara Early Dynastic tombs. This material may suggest that there was an Early Dynastic cemetery approximately half a kilometre to the north-east of a slightly older Predynastic area, something also suggested at Buto with the link between the early Buto-Maadi material at El-Qerdawi and the later Early Dynastic material at Tell Fara'in.

Summary

While engaged with the publication of the Sais material from the Prehistoric phases, a number of unexpected issues have arisen which require clarification. Firstly, the impact of the floodplain environment on the taphonomic sequences of the site and the consequences for understanding the interrelations of the archaeological phases. It seems that the Sais II pottery carpet, context [8013], must be excluded from the archaeological discussion and can only be used to provide exemplars of specific types of stone tool or pottery vessel. Even the [8009] Buto-Maadi period and late Predynastic period material layer seems to be deflated and rather devoid of context, with its relationship to the mud feature unclear and affected by later digging through the site.

Secondly, there has been the difficulty of differentiating between taphonomic processes and the real physical links between the Early Dynastic people and the underlying Neolithic layers. Can the pits dug into the early layers, through the alluvial mud be attributed to curiosity, interest in the past, a real family connection and remembrance of 'ancestors'? Or was it just a case of accidental findings of 'stuff' at the bottom of holes which led to the wider exploitation of relatively easily accessible quarries of stone, chert and pot-pigments? On the other hand, water erosion may have created the pits and concentrations of anthropogenic material.

Thirdly, the dating of the Phase III Buto-Maadi material, in particular the pottery, is heavily dependent upon comparisons from other sites which have not proven to be completely satisfactory. The broad range for the material is from Nagada IIc through to the beginning of Dynasty I (that is Phases 1 to 5 of Tell el-Farkha and covering Schicht III at Buto), but it is not possible at Sais to create a more refined phasing or differentiation in use of the site because of the deflation of Phase III. The approximate 'real' chronology is thus from 3500 to around 3100 BC, a period of four hundred years. It seems most unlikely that the [8009] context took such a long time to form and, therefore, once again the taphonomic conditions hinder a real understanding of the nature and dated phases of the site. If these conditions prevail elsewhere in the floodplain, it seems that excavations in such areas may be hindered in understanding finer stratigraphical sequences because of the conditions. An archaeological explanation for the Buto-Maadi material could be that the mud(brick) structure was built and filled with vessels of the earlier date; it was emptied later and reused; the later material was then dumped out of it at another date. Subsequent water logging created a dense compaction of the material resulting in the context [8009]. Without further evidence, however, it is not possible to be certain about the exact nature of such deposits.

On the one hand, then the discoveries at Sais suggest a great potential for evidence of the earliest phases of the Delta development, but the pristine layers here are deep down in the earliest Neolithic period where there is a very specific function of the site. For Sais itself, the story of this early fishing community deserves some further exploration and the tantalising hint of more extensive early Dynastic activity both in the southern and northern zones suggests an early bi-focal centre at Sais, perhaps linked with Memphis – or its forerunner which must lie in this area but is not yet discovered – as a 'daughter' settlement. While the eastern delta provided the resources of copper and contacts to the Levantine littoral, Sais offered access to the heartland of the Delta with its papyrus, linen, pigs and fish – commodities it could supply in great quantities to the centre. Evidence of connections both geographically (horizontally) and temporally (vertically) very much suggest that no site can be seen in isolation and that only by combining our efforts can the wider understanding of early Egyptian complex culture as a whole continue to advance.

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