Hunter-Gatherers and Early Food Producing Societies in Northeastern Africa

Edited by
Jacek Kabaciński, Marek Chłodnicki
and Michał Kobusiewicz



POZNAŃ ARCHAEOLOGICAL MUSEUM

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Prehistoric rock art discovered in the central area of the Dakhleh Oasis (Egypt). Photo. P. Polkowski

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The Symposium 2011 (photo 1)



The Symposium 2011 (photo 2)

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Hassan Hussein Idris Ahmed

Seventy years of prehistoric work in Sudan (1940-2010)

Sudan is not only the biggest country in Africa, but also one of the richest countries in cultural heritage. With its unique location and cultural and ethical diversity represents a harmonic meeting between Africa and other parts of the world, have played a very important role of communication. The Sudan Government has become more aware of the role that ancient Sudanese culture might play in the flow and richness of human civilization. The ministry of Antiquates Tourism & Wild life has a fundamental commitment to the preservation and presentation of the cultural heritage through temporary exhibitions that strengthen the cooperation with archaeological missions working in the Sudan. The scientific archaeological research to reveal the importance of the archeological sites in a country as big as Sudan as well as its protection are the main aims of the National Corporation for Antiquities & Museums.

Most of the archaeological research in Sudan have focuses on prehistory, Kushite kingdoms (Kerma, Napata, Meroe), Christian and Islamic kingdoms. It is the policy of NCAM according to its law which issued in 2003, and 1999 Antiquities Protection Ordinance to preserve the cultural Heritage of the Sudan, and develop the scientific research and to rescue the endangered areas.

The prehistoric cultural sequence of the Khartoum Province was the earliest, among the Saharan and sub- Saharan regions, to be broadly defined. The oldest traces of early humans - Homo erectus - in Sudan were discovered by A. J. Arkell (1949) in Khor Abu Anga in Omdurman. The same scholar also carried excava-

tions at Khartoum Hospital (1940), which revealed a non–producing civilization using pottery which he called the Khartoum Mesolithic. He continued on a more recent site at Shaheinab, which gave him the possibility to define a Neolithic culture published in 1953 as esh-Shaheinab were soon followed by accurate interdisciplinary investigations conducted by him.

The combined data brought to light the Mesolithic culture, defined "Khartoum Hospital", followed by a Neolithic and later by a Pre- Dynastic culture. His last contribution from the field work was published in 1964 (An archaeological reconnaissance in the South – West Libyan Desert).

Except the attempts made by Arkell, only few works occur in prehistory before the Nubian Campaign, just to remember the works of Myers at Abka and the survey of Butana by the Humboldt University with the discovery of a cave at Shaqadud site which was latter excavated by Marks and Abbas and published in 1991, as the Late Prehistory of the eastern Sahel–the Mesolithic and Neolithic of Shaquaud.

The Nubian Salvage Campaign can be considered the most important enterprise ever made in the field of archaeology. The task of the Campaign was to save and document works of art and monuments of history and science belonging to Sudan and Egypt. A Combined Prehistoric Expedition including specialists in different fields of several nationalities (Americans, Poles, Belgium's, French's, & British') directed by Fred Wendorf, and Romuald Schild participated in the Nubian Campaign. It is in charge with prehistoric occupations in the whole area, excepted for the concessions attributed to the Joint Scandinavian Expeditions and the University of Colorado, which started their researches before. In 1966 the part of the Combined Prehistoric Expedition, directed by J. L. Shiner conducted archaeological survey and excavations between Debba and Korti, which resulted in the discovery of about 90 prehistoric sites.

No account of the Polish contribution to the archaeology of the Sudan would be complete without reference to the work of the Polish scholars in the Combined Prehistoric Expedition. The expedition undertook the most extensive prehistoric work during the Nubian Campaign (W. Chmielewski, M. Chmielewska, R. Schild) and also carried out further research in the Dongola Reach (W. Chmielewski, H. Więckowska, M. Kobusiewicz).

The contribution of the Polish scholars for studying the prehistory was not confined to northern areas only. In winter 1967/1968 the group of Polish archaeologists from the Institute of Archaeology and Ethnology, Polish Academy of Sciences (W. Chmielewski, H. Więckowska and M. Kobusiewicz) took part in the extensive archaeological investigations conducted by the Combined Prehistoric

Expedition, led by J. Shiner in the vicinity of Khashm El Girba. A number of rich sites dated to the Old Stone Age and the Neolithic were discovered and examined.

In 1972, Lech Krzyżaniak, director of the Poznań Archaeological Museum, conducted the archaeological survey between Khartoum and the Sixth Cataract and located a number of prehistoric sites. Since that date Prof. Krzyżaniak started the excavation of the Neolithic site of Kadero. This campaigns lasted seventeen seasons and brought the important discoveries throwing light on the way of life of the first cattle-keepers and early farmers dwelling in Central Sudan in the V-th century B.C. (L. Krzyżaniak, M. Kobusiewicz, M. Chłodnicki, T. Dzierżykray-Rogalski, M. Kaczmarek, K.M. Ciałowicz, W. Stankowski, J. Kabaciński and a number of other scientists and students from Poland and from other countries).

In 1983 the Poles L. Krzyżaniak and M. Kobusiewicz carried the survey along the western bank of the Blue Nile from Sennar to Roseires. It resulted by the discovery of rich sites from the Old Stone Age and Neolithic. Some of them were excavated in 1984 (L. Krzyżaniak, W. Chmielewski and S. K. Kozłowski)

Puglisi and I. Caneva worked at el-Geili and R. Haaland investigating on the Atbara area. The French Unit conducted a systematic survey south Dal Cataract and a rescue survey and excavation at Shendi Reach, at el-Kadada and el-Ghaba (F. Geus, J. Reinold). In the 80th the Kassala and Khashm el-Girba were surveyed by a joint expedition with A. Marks, K. Sadr and R. Fattovich, after this preliminary study, Fattovich conducted excavations around Kassala, and Marks and Sadr at Shaqadud. During this periods, also begin the work of the Germans (with R. Kuper and B. Kedding) in the Wadi Howar, Gilf El Kebir and other areas which show a dense human occupation related to the river and decreasing with the climatic changed conducting to the use of wells as the only possibility for water.

In 1989 when the Sudan Government decided to build a new Dam at Merowe (4th Cataract area) a plan was put by NCAM to rescue the area endangered by the Dam. In 1980 the University of Rome, led by S. Donadoni and I. Caneva, conducted a preliminary inspection of the area situated immediately up-stream. Between 1990-91 NCAM undertook preliminary archaeological survey recording more than 700 sites. The results of the previous reconnaissance to the 4th cataract area, shows that a systematic archaeological survey on both banks of the Nile to about 170 km is essential. From these surveys a framework for the archaeological rescue excavation and a comprehensive field strategy for the endangered area has been developed.

Later on, during the six seasons (2005-2009) of the rescue company Polish archaeologists from the Poznań Archaeological Museum (M. Chłodnicki, M. Lemiesz and a large number of other specialists and students) as well as the scientists

from the Gdańsk Archaeological Museum (H. Paner) carried intensive works on the area of the IVth Cataract as well as along the Nile north of Khartoum bringing to light and saving numerous monuments from different periods of the Sudanese prehistory and early history.

In 1993-94 researchers from the Institute of Archaeology and Ethnology, Polish Academy of Sciences (M. Kobusiewicz, J. Kabaciński) and the Poznań Archaeological Museum (M. Chłodnicki) conducted archaeological survey and excavations at a number of Old Stone Age and Neolithic sites near Letti Basin and Ghaddar.

Another project carried by the Polish Academy of Sciences Expedition (B. Żurawski) conducted archaeological survey between Old Dongola and El Zouma settlements and cemeteries of various ages were located.

Quite lately, in 2010, the team of Polish archaeologists from the Polish Academy of Sciences and Poznań Archaeological Museum (P. Bobrowski, M. Kobusiewicz, M. Chłodnicki, K. Pluskota and M. Jórdeczka) started the investigations of an extremely rich concentration of prehistoric rock art discovered in 1999 by K. Pluskota. This site is located by the Bir Nurayet in the northern section of the Red Sea mountains. The rock art is accompanied by other evidence mainly concerning the prehistoric cult of fertility.

The future of prehistoric study in Sudan is quite fascinating, as the areas already under survey give us data which show variations from a common trunk. Of course a country as big as the Sudan must have seen different answers for the settling of the population due to the variety of local conditions. The Archaeological Survey and excavation work will continue so as to complete the archaeological map of Sudan. Creating public awareness of Sudan cultural heritage and the necessity of studying and safe-guarding is an ongoing activity of NCAM in collaboration with national and foreign archaeological missions between protection, conservation, sustainability and development.

However, the Sudan Government has shown its indebtedness to all foreign archaeological missions working in the Sudan during the last century. We do hope that the opening of the Sudan to the outside world through scientific research, traveling exhibitions, will result in contact with other people in all over the world. Finally, I would like to express my sincere gratitude to the Poznań Archaeological Museum and the Poznań Branch of the Institute of Archaeology and Ethnology, Polish Academy of Sciences for organizing this Conference. In particular, I would like to express our gratitude and indebtedness to Dr. Marek Chłodnicki and to all who have contributed to the organization of the conference.

I

The Nile Valley

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Annett Dittrich

Dating the Neolithisation process in the Middle Nile valley: a critical approach

Introduction

The early to mid-Holocene prehistory of the Middle Nile valley has been the subject of several summaries that concurrently offered thoughts about supraregional chronologies (Arkell and Ucko 1965; Wendorf 1968; Mohammed-Ali 1982; Mohammed-Ali and Khabir 2003; Sadig 2010). Parallely, the significance of a growing number of radiocarbon dates was acknowledged by transforming them into ordered lists or graphical schemes in order to visualise chronology (Green 1975; Hassan 1986). The 1970s saw the formulation of seemingly timeless pan-African concepts like the 'Aqualithic' of Sutton (1977) related to the spread of fishing and pottery production during the early Holocene, or the Khartoum Horizon Style related to the wide diffusion of 'Wavy-line' pottery decorations (Hays 1974). This was followed by the New Archaeology in the 1980s that has always been more interested in socio-economical issues (*cf.* Haaland 1996) than in the answer of historio-chronological questions. This unintentionally added to the impression that the early to mid-Holocene prehistory of the Middle Nile valley was mainly characterised by continuity with few changes, or slow shifts from one subsistence strategy to the other. Mostly this assumption of a gradual shift was based on the omnipresent admixtures of different ceramic decorations, especially in the Khartoum region, leading to the impression of their long parallel use (Caneva 1985; Mohammed-Ali 1991; Mohammed-Ali and Khabir 2003). The past decade has witnessed strong efforts dedicated to the refinement of pottery chronology for

individual regions (Keding 2000; Jesse 2003; Gatto 2006a; 2006b; Fernández *et al.* 2003; Raher 2005; Garcea and Hildebrand 2009; Salvatori *et al.* 2011). At the same time, efforts of establishing an agreed lithic typochronology, especially for Nubia, have been dismissed (with only few exceptions, *cf.* Usai 2005). Replacing the fast progress done in the late 1960s (Wendorf 1968; Marks 1970), this deceleration is probably a late outcome of the early criticism of culture definitions based on lithics (Haaland 1977) as well as the unfortunate redating of the underlying Nile silt chronology (Wendorf *et al.* 1979) reminding of the pitfalls of radiocarbon dating. As a result, it has become extraordinarily difficult to link chronological concepts for Nubia with that of Central Sudan (Fig. 1) in order to unfold an all-embracing picture of the dynamics of change that affected both regions in the course of the 7th to 5th millennium BC (*cf.* Sadig 2010; Dittrich 2011).

Accessing the temporal structure of Holocene deposits

If neolithisation is studied in terms of a historical process, both different temporalities as well as diverging dynamics of sub-processes need to be considered (*cf.* Dittrich 2013). Hence, the chronological framework should be capable to reflect shifts within a period of time without fully collapsing if any element later turns out to be of a different age than previously thought. Radiocarbon dating is a very sensitive procedure in this respect. As radiocarbon dates for the Middle Nile valley and adjacent regions (Fig. 2) are commonly meant to act as chronological evidence, they have been the subject of a critical discussion of the dated materials, their origins and their association to individual deposits or events within the scope of a detailed study (Dittrich 2011). It seemed useful to assess the chronological information of 60 catalogued early to mid-Holocene sites (*ibid.*) for which sufficient information had been published by three methodological categories:

1. Site formation (in order to understand processes of sedimentation and transformation)
2. Radiocarbon dating (evaluation and standardised calibration of individual dates)
3. Typochronology of artefacts (in order to emphasise technological traits of pottery manufacture and lithic tool production)

The evaluation of radiocarbon could not be completed without the in-depth study of the two other issues. Especially the issue of site formation is an important methodological approach to highlight the qualities of a site as an 'archive' including

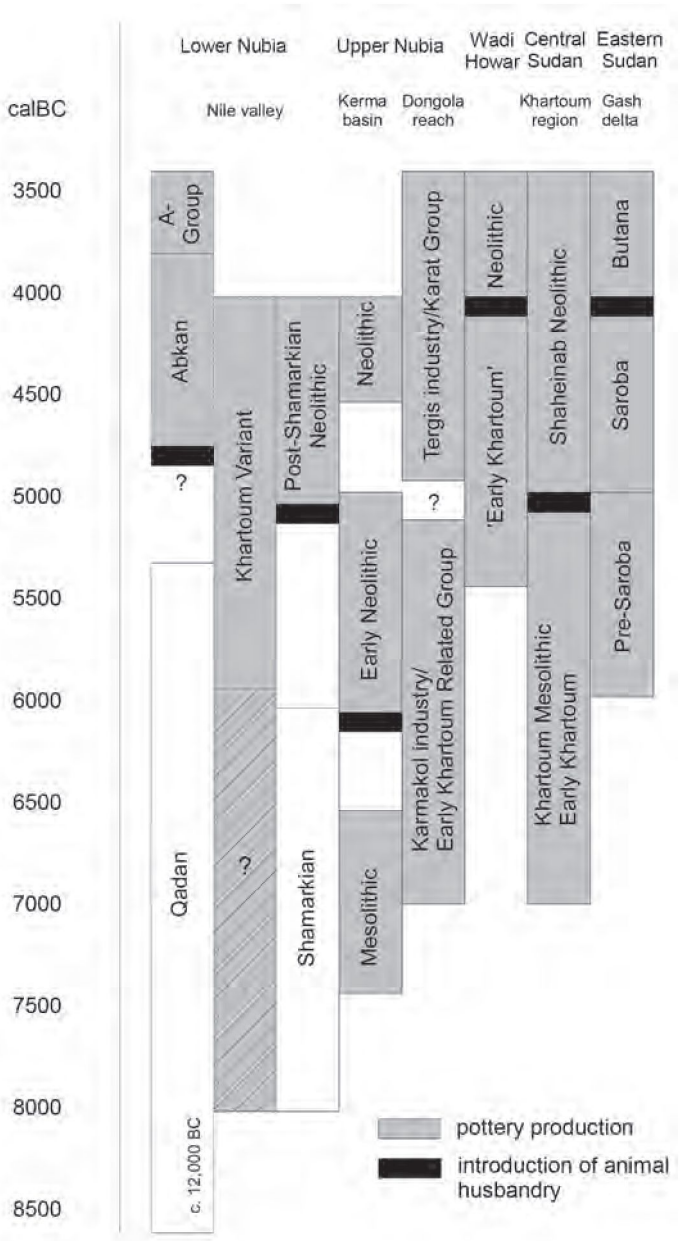


Fig. 1. Overview of chronological developments as seen from various regional perspectives therefore representing research history rather than Holocene cultural history (after Schild *et al.* 1968; Shiner 1968a; 1968b; 1968c; 1971; Marks *et al.* 1968; Arkell 1977; Hassan 1986; Honegger 2003; 2005; Jesse 2003; Usai 2005; Gatto 2006a)

various sequences of 'writing' and 'erasing' information that became later subjected to fragmentation, distortion and illegibility (Bailey 2007; Holdaway and Wandsnider 2008). In fact, stratigraphies are not to be viewed as containers of cultural history but as geological entities that may or may not preserve indices of different events such as landslides, erosion, deposition, burrowing, flooding, or previous excavating. Since the archaeological information is always part of the geological reality, such events are not easily to be separated by natural or cultural causes.

Case studies from stratigraphies in North America have especially revealed the geological nature of Holocene deposits in which the scheme of artefact distribution follows that of other sediment particles. As lithic artefacts could be refitted over long vertical distances that were equated with a long-term sedimentation (Hofman 1986), the results questioned the common practice of reading statistics as culture-chronological history. "There is, however, increasing evidence that vertical movement of buried particles, including artifacts, within and between stratigraphic units not only is common but in some sites may be pervasive" (Hofmann 1986: 163). In another case study from an early Holocene site in Colorado the absence or presence of significant artefacts could not be used as stratigraphical markers since they were widely dispersed above and below former surfaces (Surovell *et al.* 2005).

As early as in the late 1950s O. H. Myers had discussed such analytical problems for Lower Nubia while drawing on his experiences gained during the excavation of the site named Abka-9: "When a site is re-occupied sherds of the previous occupants will be lying about on the surface and these will be clearly be incorporated into the lowest level of the new occupiers… Some of these will again be moved into the level above by normal disturbance during occupation. In addition to this factor we must remember that there is always a certain amount of digging and scratching in an occupied site and this helps to account for the downward movement as well as the upward" (Myers 1958: 138f.). As humans act as sedimentological agents in geological terms (Stein 2001), also every surface site, especially in the desert regions, has been exposed to continued visitation and manipulation. Case studies from other arid zones in the world like Australia show that commonly known patterns of grouped archaeological features such as fireplaces or concentrations of lithics emerge only from the long-term (Holdaway *et al.* 2008). The chronological fixation of such sites can become extraordinarily difficult since the temporal range of reoccurring visits could be made of several thousand years (cf. the example of the Egyptian Western desert given in Dittrich 2013: fig. 1). In this respect, almost no site is to be related to just one single pe-

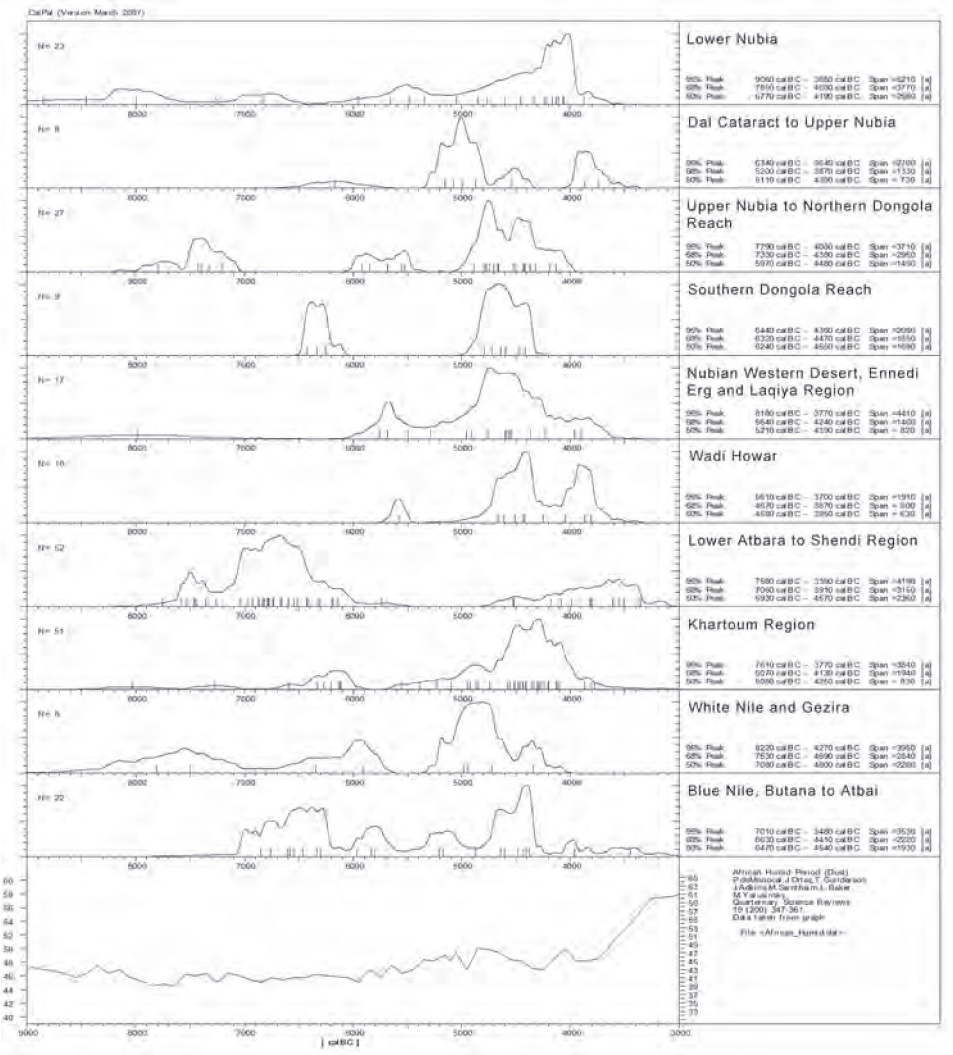


Fig. 2. Sum calibration for radiocarbon dates between 10,000 and 5000 bp for the Middle Nile valley and adjacent regions (after Dittrich 2011: fig. 3.9, list 1)

riod. Rather, a site constitutes an index to several events that vary in their temporal structure. The concept of 'palimpsest' imposed on archaeological contexts or landscapes is reconsidering such 'archival' modes of 'erasing' or eroding of information as well as 'rewriting' or redepositing of information (Bailey 2007; Holdaway and Wandsnider 2008; Olivier 2011). However, also the establishing of a chronology by relating to just one site should be viewed with caution. As each

palimpsest/site has got its own temporal structure, respectively its own admixture of different traces, chronology should rather be based on multiple indexes from several localities that can be brought into a logical congruence.

Gaining stratigraphical order by Gaussian curves

As a consequence, stratigraphies have to be considered as palimpsests where the exact temporal relation between the components is not clear. Structural information might be missing, and artefacts deposited during different periods might be mixed. Chronologically, palimpsests constitute containers of disordered elements that need to be sorted by every single component unless a former systemic context of a couple of them can be verified, for instance by refitting lithic artefacts (*cf.* Hofman 1986). In this respect, it is not appropriate to state in culture-historical terms that within a given stratigraphy certain decoration types 'decrease' over time while others 'increase' in popularity though this rhetoric is frequently found throughout the cited literature.

This can be illustrated by the example of the former difficulties with pottery decorations like 'incised wavy-line' and 'dotted wavy-line' (as defined after Arkell 1949; Caneva 1987) occurring with differing proportions at a number of Mesolithic sites in the Khartoum region. Only recently, it was stated that "the chronological index of the wavy line and dotted wavy line pottery has not as yet been fully deciphered. The archaeological evidence from the Central Nile Valley indicates that both types were present at Khartoum district sites in all layers from the beginning of the occupations" (Mohammed-Ali and Khabir 2003: 51). Fernández et al. (2003: fig. 46 and 47) even assumed that the percentages of both decorations tell about the chronological status of a whole site's inventory indicating that a high amount of 'incised wavy-line' fragments points to an earlier dating than a high amount of 'dotted wavy-line' fragments. In the following section it will be shown, however, that this parallel presence of two or more different decoration types is not a significant chronological pattern but a result of site formation. This is based on the assumption that a site has to be considered not as a container of a specific cultural order but as an archive open to anyone at any time but indexing, storing, and preserving different things differently. Furthermore it has been the common use of the insufficient method of percentage counts for pottery fragments that very much eluded their actual absolute frequencies. According to their conviction, Elamin and Mohammed-Ali (2004) presented the site of Umm Marrahi as a single phase unit whose statistics showed "a minor decrease of ca. 9% in the popularity of wavy line partly alternating with an increase of ca. 5 % in dotted wavy line" both of which observations were suggested to be negligible by

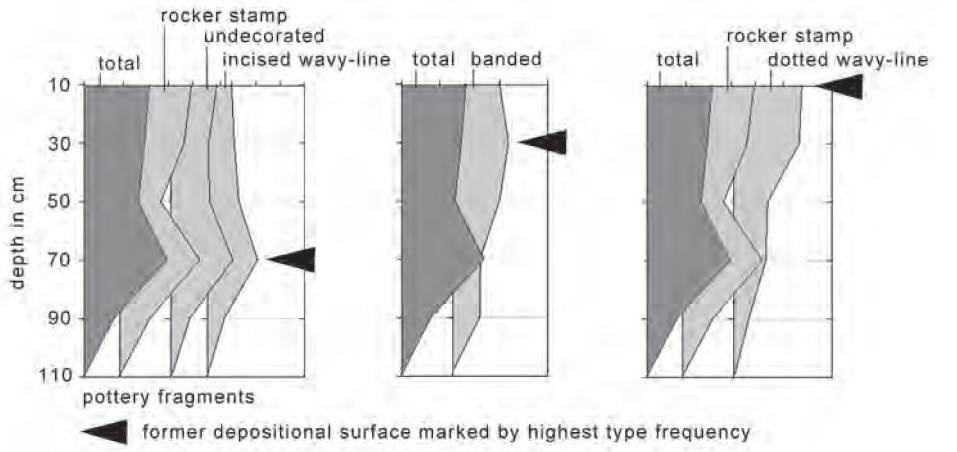


Fig. 3. Umm Marrahi. Modelling vertical frequencies of pottery decoration types out of absolute counts for levels combined to vertical ranges of 20 cm (absolute counts after Elamin and Mohammed-Ali 2004: tab. 5)

the authors. But this 'popularity' is nothing else than the distributional pattern of artefact types in a geological structure. Being originally deposited at a certain depth marked by their highest frequency, artefacts and ecofacts later spread to levels above and below by processes of transformation such as trampling, human digging, animal burrowing, water activity from inundation or rains, relocation through desiccation cracks and gravity (*cf.* Schiffer 1987; Hofman 1986).

A statistics using percentages of different types found together in artificially defined *horizontal* layers has no chronological meaning since the total of included artefacts of different age have never been used together in a single systemic context to be subsumed as a hundred percent.[1] Rather, it has to be assumed that a hundred percent of one type have been used in the same period so that the *vertical* spread of this type tells much more about the formation and subsequent transformation of the stratigraphy. Following the principles of sedimentological analysis, the vertical frequencies of every single artefact type have to be studied while switching the percentage or absolute counts from the *horizontal* to the *vertical* axis. Since Elamin and Mohammed-Ali (2004: tab. 5) have published also absolute pottery fragment counts, it is possible to model at least three depositional surfaces that are connected to different ceramic phases out of these data (Fig. 3). When Myers (1958) discussed

[1] This is one of the few points that have already been missed by Myers (1958). Percentages given for horizontal layers are still the publication standard (*cf.* Caneva 1983b; Caneva and Marks 1990; Caneva *et al.* 1993; Haaland 1995; Elamin and Mohammedi-Ali 2004; Fernández *et al.* 2003; Gatto 2006a; Salvatori *et al.* 2011)

similar observations for the stratigraphy of Abka-9 for the first time, he found it "far more interesting, indeed astonishing, …that sherds in stratified levels show a distribution curve vertically through different strata, even when the latter are well defined" (Myers 1958: 138). But, as later also Hofman (1986) and Surovell et al. (2005) observed for Holocene sediments in North America, such distributional curves of artefacts do not respect limits of layers as commonly defined in archaeology. Furthermore, Myers recognised the close relation of patterns of artefact distribution to normal (Gaussian) distribution curves: "Experiments showed that if a pot be broken on a hard even surface the sherds will be found laterally more or less according to a normal distribution curve…" (Myers 1958: 138).

The results presented here for Umm Marrahi (Fig. 3) are equally based on the Gaussian distribution (probability calculation) because statistically they can be further condensed to show that in Umm Marrahi 65.1 percent of 'incised wavy-line' were deposited in a depth between 50 to 110 cm, while 62.4 percent of 'dotted wavy-line' were deposited in a depth of 10 to 50 cm. The remaining 34.9 percent respectively 37.6 percent were relocated from the original surfaces (*cf.* full discussion in Dittrich 2011: 119ff.). This approach aims therefore mainly at the differentiation of re-located and admixed artefacts (~31.8 percent) opposing the number of artefacts still in a more or less original position (~68.2 percent) which is the ideal proportion of a Gaussian curve. This proportion can be visualized by using distributional graphs whose peaks mark the highest artefact density and therefore the level of the former depositional surface (Fig. 3). By using this procedure, different ceramic depositional phases are clearly outlined by different curves. Not necessarily is there a close connection between these curves/phases which could be interpreted in terms of a continuous occupation of the site. A partial overlap of two curves in the graph, respectively of two different decoration types, means in this respect probably nothing else than an artefact admixture, but surely not contemporaneity of both types. None of these curves shows a development from one decoration type to the other as this cultural process will not be captured by soil formation.

At this point it seems already justified to argue that the site of Umm Marrahi actually provided a rather clear sequence of two main pottery decoration concepts and that it partly solved the puzzle of their questionable chronological order. If we further state that artefacts have been spread from a former given surface than for the purpose of analysis, "it is justifiable to collapse the materials back to a single depositional surface" (Hofman 1986: 167). Therefore we can assume that the former or at least the ideal distribution pattern is a clear Gaussian curved

outline for one single depositional phase. Later in this paper, three stratigraphical case studies will be used to investigate in greater detail if and how such patterns are preserved and if the Umm Marrahi sequence (Fig. 3) holds a pattern that could be generalised for the Khartoum region.

A re-examination of radiocarbon dates

The evaluation of approximately 270 radiocarbon dates between 7500 and 4000 calBC from altogether 91 individual sites in Northern and Central Sudan (Dittrich 2011: lists 1A and 2) was accomplished according to the following checklist:

1. Consistency of publication (typing or citing errors, redatings)
2. Discussion of sample material and its specific properties
3. Standardised calibration using the Intcal04 calibration curve (Fig. 2)[2]
4. Discussion of archaeological contexts and sample context
5. Primary contextual association by excavators and revised associations
6. General discussion of associated archaeological finds (Dittrich 2011: catalogue).

The last point included also a revision of the site's full spectrum of archaeological finds such as pottery, lithics, small finds, and organic remains with respect to the question if the temporalities represented by artefacts and ecofacts do find sufficient equivalence with the radiocarbon dates. As a result, for almost all of the sites it can be stated that they contained remains of more than one period though most researchers aimed at placing the whole site within a specific period. However, a site to be equated with a specific period in time is not even an exemption, for hermeneutic reasons it simply does not exist. Therefore, the temporal correlation between cultural remains and dated (organic) samples of a given site does not automatically exist but has to be established by means of scientifically agreed methods.

While discussing the quality of radiocarbon dates, the full array of possible uncertainties has to be taken into account (cf. also Hedges 1992):

1. Physical properties of sample material: isotopic fractionation, hard water effect
2. Availability of sample material during specific periods: e.g. of fresh contemporary wood in desert areas, possible modes of use or discard (e.g. old wood effect; collection of fossilised shells), possible modes of natural/geo-

[2] Calibration was done using Calib 5.0 (Stuiver *et al.* 2005) for single and CalPal (Weninger *et al.* 2006) for sum calbrations. The calibration is quoted according to the range of the 1st sigma rounded to the next 50 radiocarbon years. All dates mentioned in the text are cited from Dittrich (2011: lists 2 and 1A, cf. catalogue for raw dates and full quotations).

logical deposition through bush fires, high floods (e.g. mollusk shell deposits, driftwood), incorporation of small particles from older sediments such as seeds or charcoal of species pointing to former (extinct) habitats

3. Possibility of admixtures of traces of different events through geological processes or human/animal activities such as digging and trampling, digging of soils for the construction of tumuli, processing of raw materials among them older artefacts/ecofacts, modern construction work

The secondary carbon intake of organisms such as seeds, mollusks, ostrich eggshells (Vogel et al. 2001), or bones is widely known and can be partly controlled by specific procedures of corrections that belong to the laboratory standard today.[3] Concerning the questionable suitability of composite materials like pottery (Gabasio *et al.* 1986), or sediments (Geyh *et al.* 1983) specific studies exist. As other dating materials might be often not available at least the production and publication of such dates needs a full discussion of related problems (but is regrettably missing e.g. in Gatto 2006b). In some publications the standardised quotation of radiocarbon dates as sensitive data sources and even basic information as to the dated materials and contexts are conspicuously missing (*cf.* Honegger 2003; 2005; Honegger and Jakob 2009; Reinold 2006). This practice significantly hinders the comprehension of forwarded chronological arguments, especially when these are largely drawn on radiocarbon dates and not otherwise verifiable. However, also the dating of charcoal is not without problems. Although the laboratory standard is based on charcoal and only few corrections are necessary, it is mainly the frequency of charcoal and its occurrence in stratigraphical layers that have to be questioned. Schiffer (1987) stated that charcoal as a reliable dating material becomes available from the moment when pressure is imposed on wood through wood cutting for construction work, intensified firing, or slash-and-burn practices. Presently, the origins of charcoals as found in early Holocene sediments throughout Northeastern Africa as either indices of foragers' strong impact on landscapes, or of natural agents such as bushfires and driftwood is not fully understood. Furthermore, as charcoal of recent fireplaces can be observed to be blown out or washed out within hours and secondarily deposited elsewhere, single fragments of charcoal from Holocene sediments do not constitute reliable dating samples, at least not, when viewed as evidence for contemporary human occupation.

[3] Since the correction for isotopic fractionation was not common before 1977 six radiocarbon dates had additionally to be corrected by using the data provided with Cailb 5.0 (Stuiver *et al.* 2005; cf. Dittrich 2011: list 3).

The great number of available calibrated dates could be used for the statistical refinement of sub-phases. Based on mean standard deviation, a sequence of so-called wiggle spaces has been established (Fig. 4). This sequence illustrates that dating precision for the study area of the Middle Nile valley ranges within a time-span of 150 to 400 radiocarbon years due to the relatively high standard deviations of conventional dates. Nevertheless, wiggle spaces offer a useful framework for discussing whole clusters of dates that fall into the same wiggle such as 4350-4050 calBC. Wiggles are to be preferred to the sometimes questionable validity or even overrated precision of individual dates. In a next step, they could be turned into temporal sequences ideally to be linked to chronologically significant types of artefacts or archaeological features. As a conclusion, chronology is not so much developed from the potentially complex geological archive of a single site but from the database of temporally related traces spread over a larger region as a chronological horizon. Therefore, one could talk about the specific wiggle space of 4350-4050 calBC almost of a period of intensified human depositional activity because it is frequently matched by radiocarbon dates deriving from Neolithic settlement and burial sites. But simultaneously it reminds us of a period for which typologies for establishing chronology by other means than radiocarbon dating are largely missing.

Radiocarbon dates as evidence for cultural history?

This example leads to the discussion of the quality and significance of radiocarbon dates that is commonly missed in literature on the Middle Nile valley. In view of all available radiocarbon dates one could gain the impression that the number of dated archaeological features like fireplaces and pits, including grave pits, significantly increases only after 5050 calBC. Between 7050 calBC and 5050 calBC the repeatedly stressed association of artefacts or ecofacts to grave contexts has to be regarded with great caution because grave good rites are virtually absent during that time.

In some cases, radiocarbon dates are indicators of the long-term record of environmental changes. For instance, in Geili the peaks of high inundations are indirectly dated to 7600–7400 calBC and 6100–5750 calBC respectively by shells of *Bellamia* sp. deriving from sterile silt layers from below the Neolithic settlement (Marcolongo and Palmieri 1988; Dittrich 2011: cat. 19). Such dates are most important as they fill in gaps that are not otherwise represented by dates associated with archaeological remains in the vicinity of the Nile valley.

Discontinuities in the former availability and usage of particular resources are best encountered by the use of diverse dating materials marking as many differ-

ent events as possible. It is obvious that by this methodology a specific question related to cultural history cannot be directly addressed. This multitude dating approach adds mainly to the perspective of a more general landscape archaeology that reveals its strength only by focusing on long-term changes. In this respect, there is also temporal variation in the quality of radiocarbon dates. In the present study up to 76 percent of the Mesolithic dates had to be omitted from further chronological discussion due to the uncertain status of their contextual association, while this number decreased to 12 percent for the Neolithic dates (Fig. 5; Dittrich 2011: tab. 3.13). This variation is mainly due to greater fluvial activity during earlier Holocene periods which kept the Nile valley in an unstable state of sedimentation, and a cultural shift that favoured the creation of preserving contexts such as human burials during the mid-Holocene. Presently, there is no agreed concept to consider such qualitative differences since as a rule all radiocarbon dates – while few being entirely omitted – are treated on equal terms.

The heterogenic pattern of the temporal availability or temporal absence of samples to be employed for radiocarbon dating has been interpreted in terms of continuity or discontinuity of the human occupation in specific regions of Northeastern Africa. However, is it justified to relate the absence of radiocarbon dated sequences with a supposed absence or marginalisation of human occupation? Probably not, if the dates pertain exclusively to non-human organic remains subjected to specific discontinuities of preservation as discussed above. The reconstruction of social decision-making processes is not a paramount task of radiometric dating, and there is no direct link between the manifestations each of them is based on. Therefore, the sum calibration of radiocarbon dates is not to be translated in an outline of cultural history. The same holds true when radiocarbon dates are spatially mapped as evidences of occupation. A map published by Kuper and Kröpelin (2006: fig. 3) claims that the Nile valley north of the Khartoum region has been virtually unsettled between 8500 and 5300 calBC, however, the authors did not take into account the full range of published but yet undated sites.[4] The latter prove that during the period in question the Mid-

[4] For Lower Nubia see the work in the Abka region (Myers 1958), of the Scandinavian Joint Expedition (Nordström 1972), the Combined Prehistoric Expedition (Shiner 1968a; 1968b; 1968c; Schild *et al.* 1968; Wendorf 1968), or the finds at Catfish Cave (Wendt 1966), for Upper Nubia see the work of the University of Colorado (Hewes 1966), the sites from the area of the Dal-Katarakt such as Khor Kageras (Fairbridge 1963) and Sonki East (Rudin 1980), the sites at Sai Island (Geus 2002) or in the Kerma basin (Honegger 2003), the work in the Dongola region (Shiner 1971; Marks *et al.* 1968; Reinold 2001) and in the Letti basin (Usai 1998), the sites at the Atbara confluence (Haaland and Magid 1995), or the recent work in the Fourth cataract area (e.g. Dittrich et al. 2007). *Cf.* also the summaries given by Geus (1992), Sadig (2010), and Dittrich (2011: 15-32).

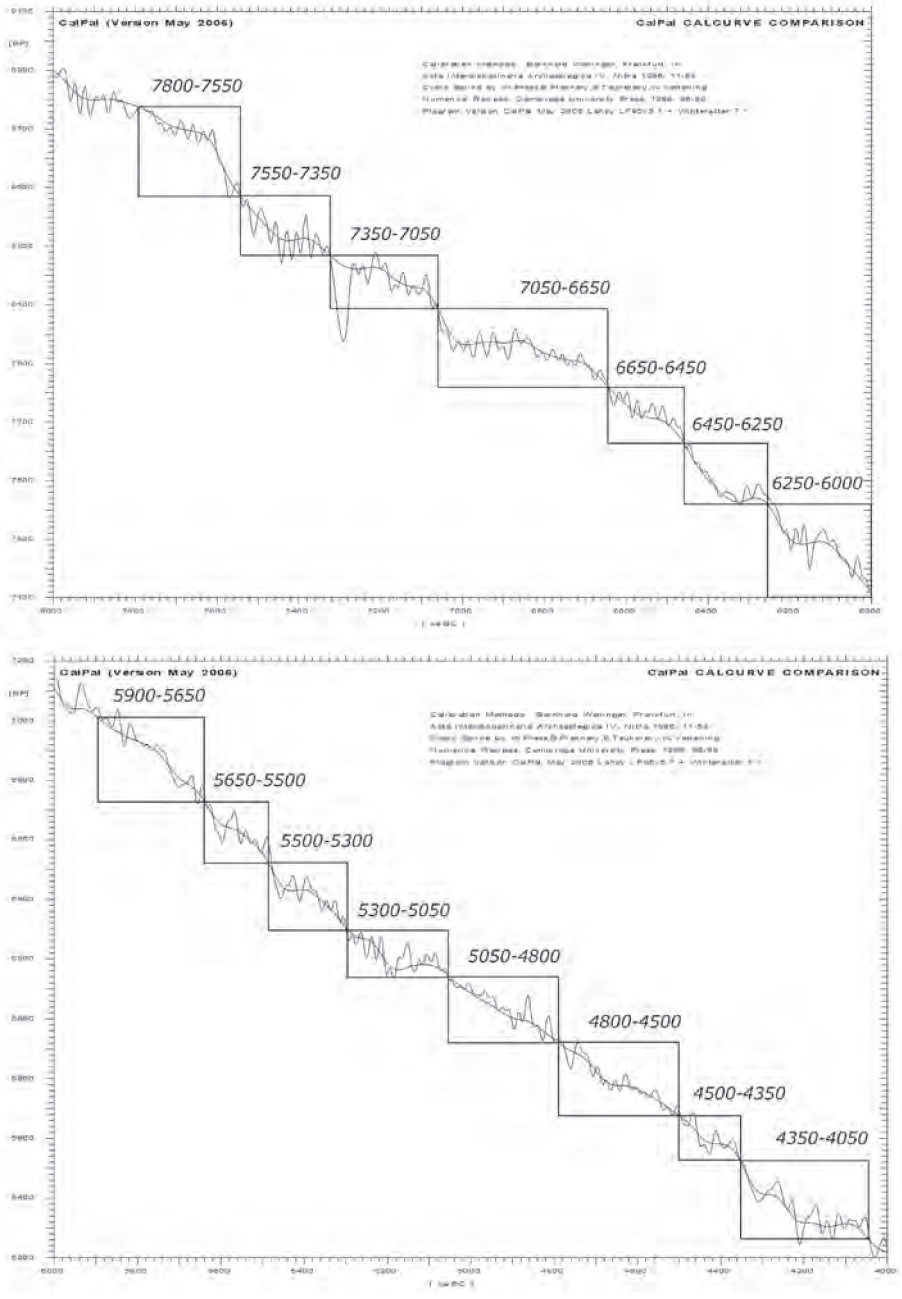


Fig. 4. Frequently matched wiggle spaces between 8000 and 4050 calBC based on IntCal curves 1998 and 2004

dle Nile valley has been constantly revisited and settled by humans. In fact, since every given point in the past is imaginable on a timescale, radiocarbon dating is not a validation if this point or a temporally related event really existed. It is just a method to fix at least a coarse-grained grid depending on the specific properties and availabilities of dating materials. For the interpretation of the cited map that shows a virtually unsettled Nile valley before the onset of the Neolithic this has serious consequences: The neolithisation of the Middle Nile valley cannot be solely thought as an eastward movement out of the deserts, a scenario favoured by Kuper and Kröpelin (2006), because such movements within the West-East oriented ecological corridors have been dictating the modes of life of forager groups well before. Furthermore, this assumption neglects that rather the neolithisation of the Middle Nile valley is both (1) an inner transformation of Mesolithic societies, and (2) a spread of ideas and domesticates along major traffic corridors such as the Nile valley and other North-South oriented routes.

In fact, the general chronological frame-working of neolithisation is made up of few indicators. Dates from 7050 calBC onwards are related to the onset of a distinctive Early Mesolithic occupation phase (Fig. 5). The statistics indicate a possible temporal break marked by the absence of dated grave contexts between 5500-4850 calBC (Fig. 5). If this is not to be attributed to the absence of datable grave goods it could indicate a period of much shorter and dispersed occupation events that are amalgamated to other more dominant palimpsests and therefore escape the archaeological attention. The beginning of the Neolithic period in the Middle Nile valley is to be fixed around 5050-4850 calBC (Rabak, Kawa R12; *cf.* Dittrich 2011: cat. 39, 28) while a dense cluster of dates around 4500-4050 calBC defines the core area of the Middle Neolithic.

Stratigraphic case study 1: Shaqadud Midden

The 3.15 m thick stratigraphy of Shaqadud-Midden has been located in a small valley in the Butana steppe leading us about 40 kilometres away from the Nile, in the vicinity of a former Holocene water pond probably once fed by a small waterfall (Fig. 6). In this micro-ecological niche the preservation of a considerable soil formation of the 6th millennium calBC provided a sufficient stratigraphical distinction between early and mid-Holocene deposits, respectively the Mesolithic and Neolithic periods. The subsequent covering of older occupational remains was explained by reoccurring landslides originating from the nearby slopes and forming a palaeosoil due to increased humidity during the mid-Holocene (Marks 1991a: 44). Two main occupational 'events' are out-

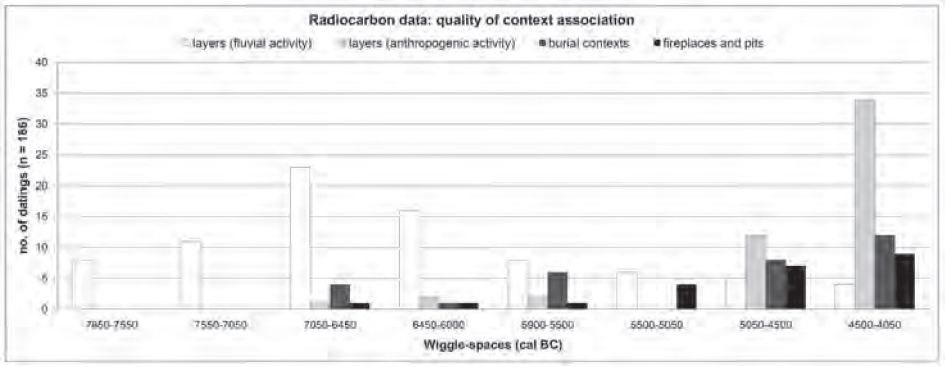


Fig. 5. Correlation between context types and radiocarbon dates for the Middle Nile valley and adjacent regions illustrating different qualities and problems of precise association

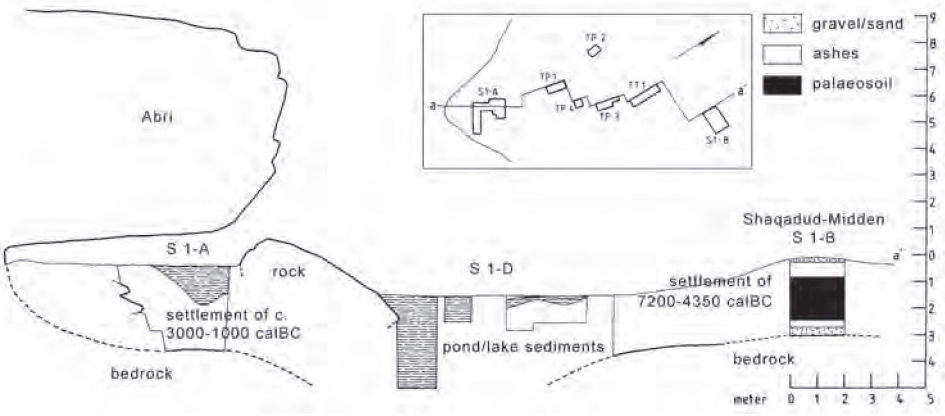


Fig. 6. Shaqadud. Schematic section through the valley and the sites S 1-A (Midden), S 1-C and S 1-D (after Marks 1991a: fig. 4-11, 4-20)

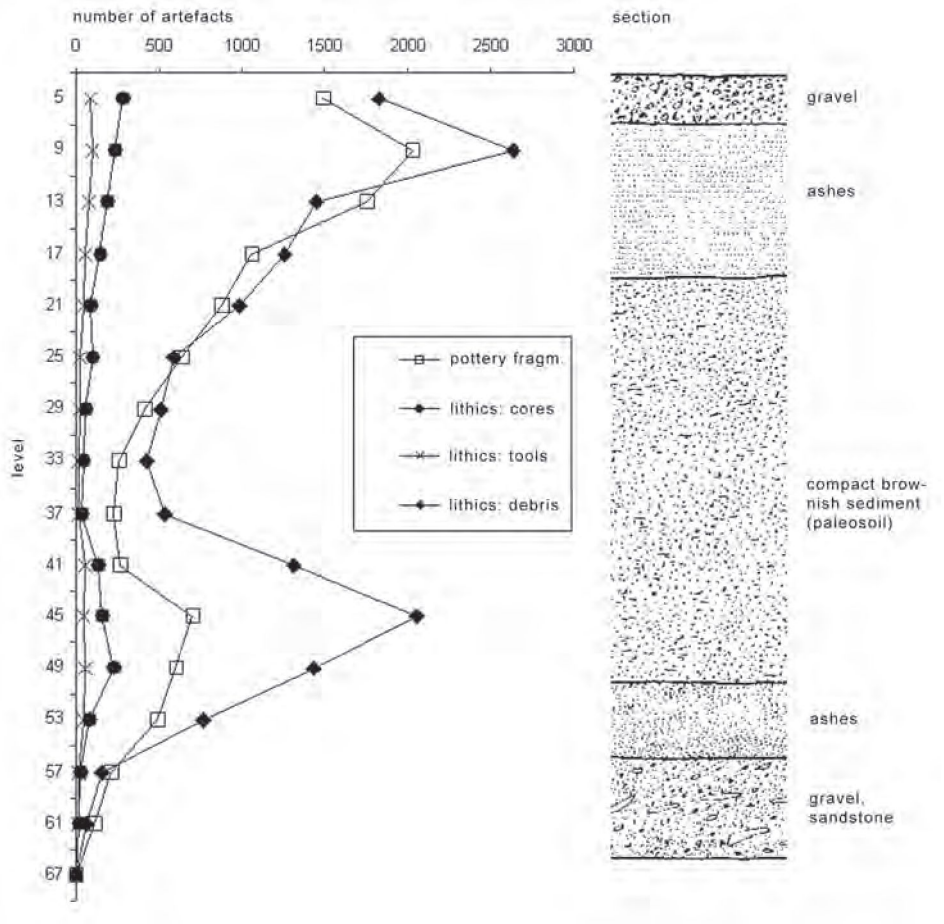


Fig. 7. Shaqadud-Midden. Vertical frequencies of pottery fragments and lithics artefacts such as cores, tools and debris (absolute counts after Mohammed-Ali 1991 and Marks 1991b; section after Marks 1991a: fig. 4-11)

lined by two peaks of high artefact frequencies corresponding more or less with two *in situ* ash layers (Fig. 7). Although these two different 'events' of intensified deposition could be roughly equated with the Mesolithic and the Neolithic occupation of the site, they constitute two palimpsests that can actually be dissolved into at least six 'events' of deposition (Fig. 8).

The conventional analysis of the ceramic material using percentages for horizontal layers did not show marked breaks over the whole sequence but one rather 'continuous' phase with seemingly gradual and slight changes (Caneva and Marks 1990; Mohammed-Ali 1991). Caneva and Marks (1990: 21) concluded that "a number

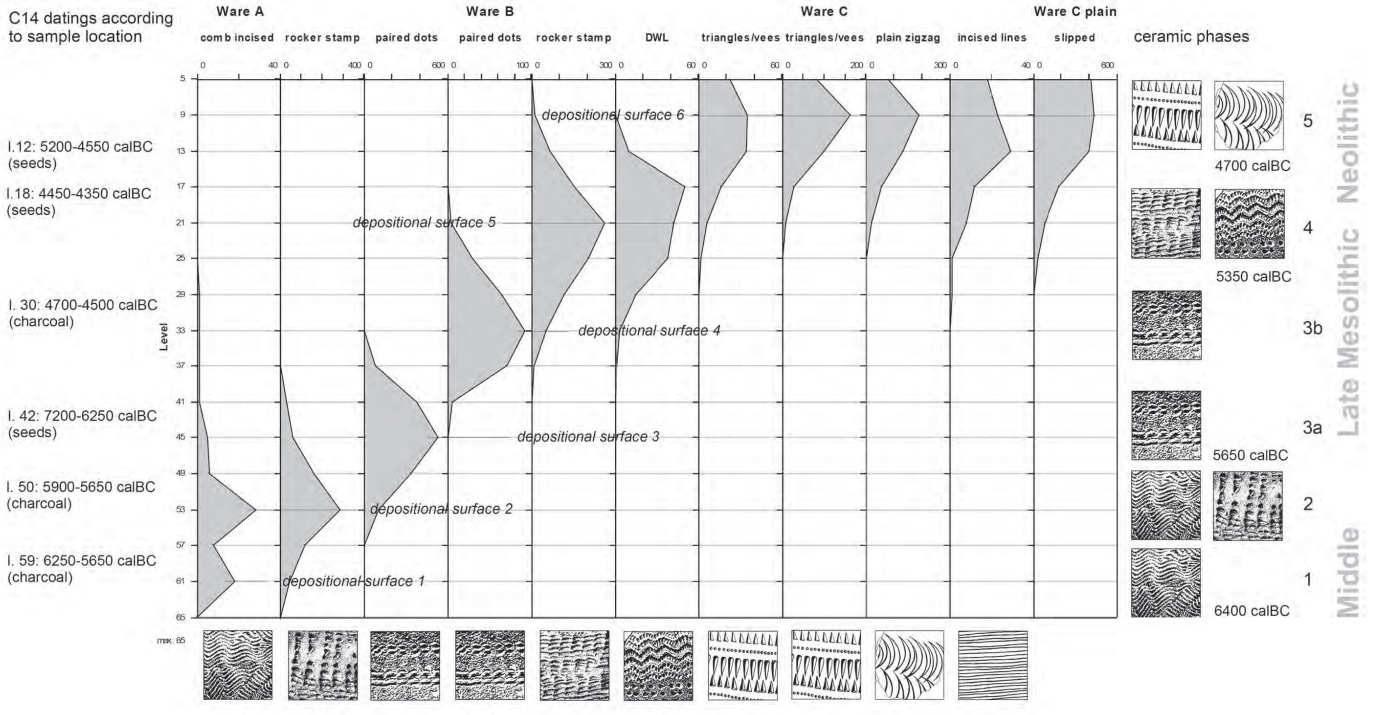


Fig. 8. Shaqadud-Midden. Stratigraphic frequencies of pottery decoration types according to ware groups and resulting Holocene ceramic sequence for the Khartoum-Butana region (absolute counts after Mohammed-Ali 1991)

of quite distinct modal ceramic assemblages can be recognized, forming ‚phases'. These however have no sharp beginnings and ends, since each develops directly out of the preceding and into the following one". However, there was no discussion of how such 'sharp beginnings' and 'ends' should look like in a soil formation subjected to geological rather than cultural processes. Accordingly, the Neolithisation of the region was seen as a gradual and slow shift from one subsistence form to the other, under the questionable premise that this supposed inert decision-making process had been captured proportionally by the rate of sedimentation.

By using the interpretation of Gaussian probability calculations, several different ceramic depositional phases are clearly outlined by different curves (Fig. 8). As mentioned above, there is no indication to interpret the partial overlapping of individual curves in terms of a continuous occupation. This overlapping is the result of soil formation and not of the supposed contemporaneity of different pottery decoration concepts. Therefore, the differently marked depositional surfaces/pottery decoration phases of Shaqadud can be seen as discrete chronological phases interrupted by distinctive discontinuities. The stratigraphy tells nothing about the exact nature of those discontinuities but it is known from comparable sites that domesticates and other Neolithic elements were common during phase 5, while the faunal remains entirely belonged to wild species during phase 4.

There is a clear chronological sequence of 'incised wavy-line', 'banded' (paired dots), 'dotted wavy-line' and Neolithic decorations. Since the 'incised wavy-line' distribution has got two different vertical peaks (Fig. 8: depositional surfaces 1 and 2), it seems probable that different sub-types have been lumped together under this concept by Mohammed-Ali (1991) and that there is indeed an older phase without a parallel occurrence of rocker stamp decoration. This is also indicated by the more precise definition of Caneva and Marks (1990: tab. 2) according to which the more recent type 'incised arches' which can be combined with rocker stamp (*cf.* Caneva 1983b) occurred from level 58 upwards but not earlier. On the other hand, it was only Mohammed-Ali (1991) who studied the ware groups for different decorations which in retrospect assured an even more plausible sequencing. In fact, the more independent technologies are statistically combined the more depositional events could be made visible. Interestingly, phases 3a and 3b (Fig. 8: depositional surfaces 3 and 4) would not have been separable on the basis of similar decorations before. But given the presence of different ware groups and significant stratigraphic frequencies, this horizon of banded decorations emerges clearly as a pronounced phase. In former studies being focussed on the supposed succession of wavy-line decoration types only, this horizon has

been fully neglected and even suspended from analysis (*cf.* Jesse 2003: fig. 46). However, the occurrence of banded decorations such as paired dots (using a double pronged tool) or rocker stamp bands enclosing undecorated zones is part of a widespread horizon of the 6th millennium BC, and its stratigraphical bracketing in Shaqadud (Fig. 8) constitutes a major reference for its overall chronological position. It is the location of Shaqadud in a small valley in the Butana which led to these extraordinary conditions of preservation due to moist conditions, especially when compared to the inner Nile valley where high floods of the 6th millennium BC have transformed the remains of the banded horizon into disordered and marginal stratigraphic contexts (cf. below, Khartoum-Hospital).

Despite the presence of seven radiocarbon dates, however, the chronology of the individual phases could not be developed on the basis of their partly reversed stratigraphic order (Fig. 8). Fostered by the small size of the sample materials they had been subjected to considerable vertical movements. The dates give the range for a time average (7200-4350 calBC) in which their exact association is not known (Dittrich 2011: cat. 47). However, none of them should be excluded as suggested by the excavators (Marks 1991a) because such an exclusion unless done by the laboratory often follows subjective rather than methodological considerations. This problem was solved by using comparable dates from rather single-phase find complexes documented elsewhere in the Khartoum-Butana region (Dittrich 2011: 133f.). The dates whose samples originate from levels 12, 18 and 30 pertain mainly to the Neolithic occupation after 5000 calBC, while two other dates indicate Mesolithic date ranges around 6000–5650 calBC (level 50, 59) and before 6250 calBC. The oldest date range of 7200-6250 calBC (level 42) is confirmed by a further date of Shaqadud S 21 (6350-6250 calBC; *cf.* Dittrich 2011, cat. 46) and recent datings from Mesolithic sites in the vicinity of the White Nile (sites 16-D-4 and 16-D-5; cf. Salvatori *et al.* 2011, tab. 1, 2)[5]. Depositional surface 1 of Shaqadud-Midden might be equated with a date around 6500 calBC whereas the rocker stamping technique (Fig. 8: depositional surface 2) seems to appear only towards 6200/6000 calBC. For the dating of the depositional surface 5 the site Kabbashi A produced a comparable pure 'dotted wavy-line' inventory and a date of 5350-5000 calBC (Caneva *et al.* 1993; Dittrich 2011: cat. 24). As a most important result, phases 3a and 3b (Fig. 8) are bracketed between radiocarbon dates of 5650 and 5300 calBC placing the banded horizon chronologically in the mid of the 6th millennium BC. It is argued here that this dating is of supraregional relevance.

[5] As these dates fall in the large wiggle of 7050-6650/6450 calBC (*cf.* fig. 4), an actual date around 6700/6500 calBC seems most probable.

Despite the encouraging results for the frequencies of pottery decorations, the low statistical frequency of lithic tools, however, seemed to prevent the outline of an adequate distributional pattern of types and phases (Dittrich 2011: fig. 5.13). It was merely by the visualisation of the frequency of different core types as defined by Marks (1991b) such as single platform, unfaceted (SPUF), single platform, faceted (SPF), cortex platform (SPC), as well as discoid, flat (DF) that a stratigraphical pattern could be proven. While cores of type SPUF and SPF which are used to obtain blades and flakes were especially frequent in the range between levels 49–52, the other two types SPC and DF dominated in the range between levels 9–12. Cortex platform cores (SPC) which have no prepared platform at all are typical indicators that the so-called slicing technology has been used. The slicing technology remains one of the most distinctive Neolithic techniques in the Middle Nile valley (Kobusiewicz 1996; Dittrich 2011: 109f., fig. 4.40). According to the statistics as given by Marks (1991b, tab. 6-5), additionally five bipolar blade cores were found in the utmost levels 53 to 65. This stratigraphical pattern represents a clear shift from a blade(let) or blade-like flake oriented production requiring platform preparation to a much more careless knapping of thick segmented flakes. According to the sequenced pattern of changes in ceramic decoration and ware groups, this has probably not been a slow and gradual shift but the consequence of rather abrupt losses of older traditions.

Stratigraphic case study 2: Khartoum-Hospital and Al Qoz

Unlike Shaqadud, the early Holocene sites in the Nile valley have not been subjected to more or less continuous sedimentation, but to significant alteration between accumulation and subsequent deflation of topsoils. Additionally, sites have been frequently reoccupied or reused as is the case with Khartoum-Hospital from where burials of different periods such as early Holocene, late Prehistory to late Antiquity were reported (Arkell 1949). The 'early Holocene site' of Khartoum-Hospital was situated at the bank of the Blue Nile consisting of fluvial silts and sands above the sands and silts of the so-called late Pleistocene/early Holocene Gezira formation (Fig. 9: lower layers). As occupational debris had been discarded downward the slope according to Arkell (1947), he assumed a much higher level for the original settlement, well above the assumed high flood level (Arkell 1947: 173). However, desiccation cracks and calcification crusts which have been observed all over the excavated area including the early Holocene skeletal remains, hint to several events of flooding followed by rapid dry spells during the mid-Holocene.

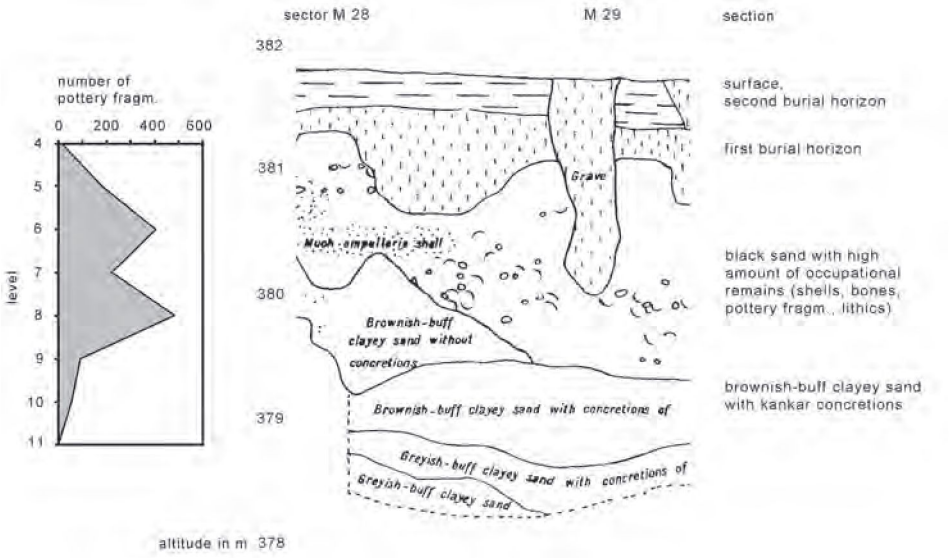


Fig. 9. Khartoum-Hospital. Vertical frequencies of pottery fragments according to the stratigraphical section in sector M28 (absolute counts and section after Arkell 1949: 96f.)

Arkell concluded that several factors of distortion had prevailed to such an extent that a chronological interpretation of his stratigraphical observations would not be possible: "It was always grey sand of varying firmness, with varying distributions of sherds, stone and shell fragments, etc., completely unstratified" (Arkell 1949: 4). Despite expressing such doubts, Arkell was trying to fix his former impression gained during excavation that at the 'discarding area' some of the debris "was undoubtedly *in situ*, as thrown on the river bank" (Arkell 1947, 172). He not only introduced the term 'Early ware' in opposition to supposedly later ceramic ware groups but also published absolute counts of potsherds according to their ware groups and stratigraphical positions. These tables have often been cited as evidence for the 'contemporaneity' of most of the ware groups as – although in varying frequencies – they mostly occurred together in the same layers (cf. Mohammed-Ali and Khabir 2003).

In the present study, the absolute counts given by Arkell (1949: 96f.) are used for re-analysis aiming at the stratigraphical separation of different ware group/decoration combinations for Arkell's sectors M26 to M30 (Dittrich 2011: 136ff.). It is of specific interest that the total amount of pottery fragments shows two different stratigraphic peaks indicating at least two different phases of deposition (Fig. 9). While using Arkell's pottery classification it was not possible, however,

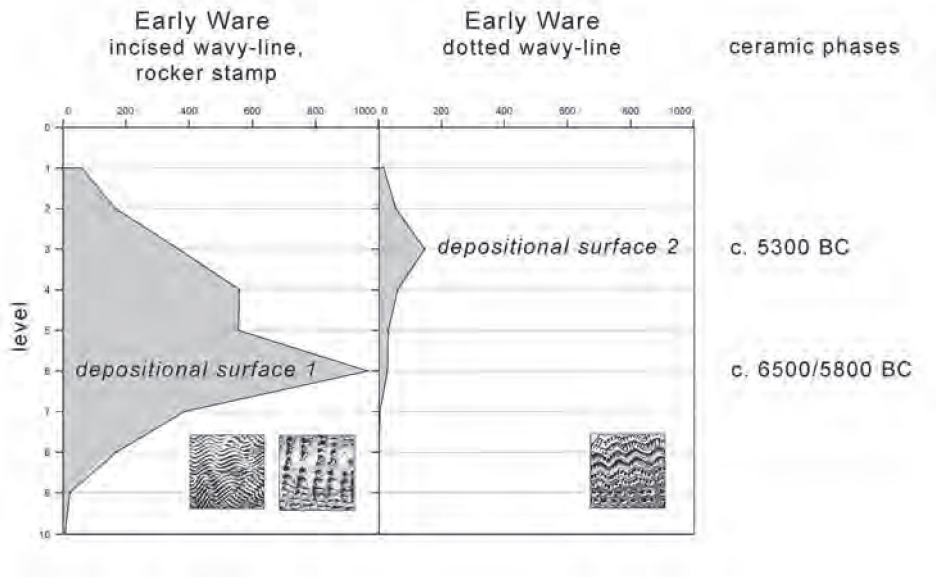


Fig. 10. Khartoum-Hospital. Cumulated vertical frequencies of pottery decoration types 'incised wavy-line/rocker stamp' and 'dotted wavy-line' for sectors M26 to M30 (levels corrected for slope, absolute counts of fragments after Arkell 1949: 96f.)

to reach a finer resolution of more than these two depositional surfaces (Dittrich 2011: fig. 5.17-18). Many inconsistencies visible in the resulting plots can be attributed to Arkell's imprecise classification scheme lumping 'incised wavy-line', 'rocker stamp', 'dotted wavy-line' and other decorations such as finger nail impressions together in just one group named 'Early ware' as well as to omnipresent disturbances by the later digging of grave pits. However, as the vertical stratigraphic frequency method as outlined above takes into account the translocation and reworking of a certain amount of material (up to roughly 31.8 percent), the two main vertical peaks have to be considered as a significant pattern. These peaks are even more pronounced when the decoration types 'Early ware: incised wavy-line/rocker stamp' and 'Early ware: dotted wavy-line' are plotted (Fig. 10). In sector M26 the first corresponds to a depth of 120 to 140 cm (depositional surface 1) while the second occurs primarily at a lower depth of 60 to 80 cm (depositional surface 2). The interim space of roughly 40 to 60 cm of silt deposition due to repeated inundations is marking the discontinuity between the two main phases (Fig. 11). Assuming a sedimentation rate of 0.5 mm per annum (Marcolongo and Palmieri 1988, 45), a period of 800 to 1200 years would separate both of

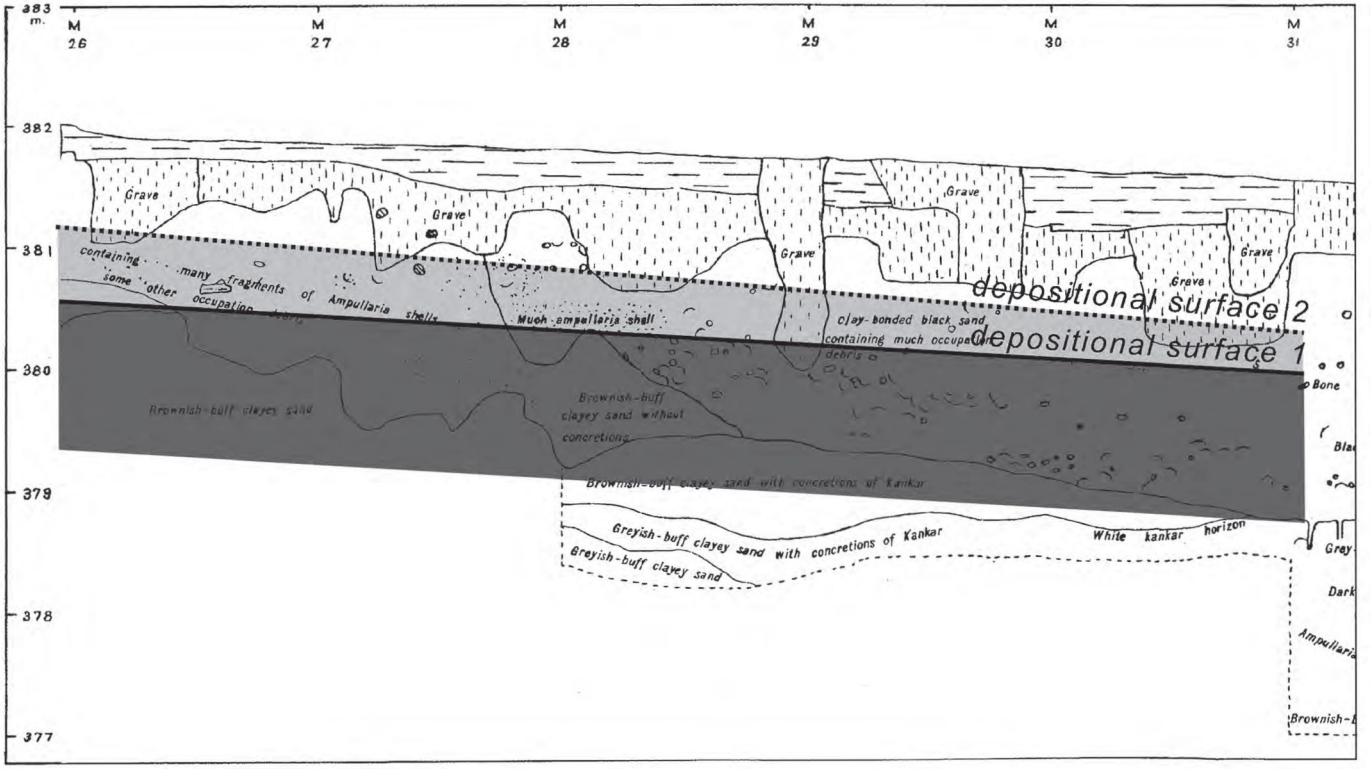


Fig. 11. Khartoum-Hospital. Projection of the highest frequencies of pottery decoration types 'incised wavy-line/rocker stamp' (depositional surface 1, continuous line) and 'dotted wavy-line' (depositional surface 2, dotted line) onto the section indicating at least two separate phases of deposition (section after Arkell 1949, 96f.)

the former depositional surfaces. As the 'dotted wavy-line' horizon (depositional surface 2) has been chronologically fixed to 5300-5000 calBC by the dating of Kabbashi A (Caneva et al. 1993), this would roughly indicate a time-span of 6550-5800 calBC for the older depositional surface 1 (Fig. 10, 11).

Due to low frequencies the exact position of Arkell's 'brown ware' with banded decorations and his 'imitation basketwork ware' decorated with both rocker stamp arranged to bands as well as 'dotted wavy-line' type B is not clear but has most probably to be located between the two main peaks. However, the more recent depositional peak of 'dotted wavy-line patterns' is further matched by a frequency peak of 'crude black fracture ware' (Dittrich 2011: fig. 5.17 and 5.18), a chaff-tempered ware to be associated with 'dotted wavy-line' type C and cord-impressed or cord-roulette patterns. In such an admixed stratigraphy like Khartoum-Hospital it is the single object that forms the smallest systemic context in the sense of an archaeological context indicating contemporaneity. Arkell was aware of this fact while stating that "no single sherd was found with both the [Incised] Wavy Line and this imitation basketwork decoration on it. It would appear therefore that these decorations were not used at the same time" (Arkell 1949: 88).

As a conclusion it can be stated that the stratigraphy of Khartoum-Hospital bore a similar chronological sequence as Shaqadud-Midden but was much more compressed due to heavy deflation and truncation of silts during the course of the 6th millennium BC. The differing history of geological site formation can therefore not act as evidence for a differing cultural sequence.

Also the site of Al Qoz showed traces of disturbance due to the construction of postmeroitic tumuli and later road construction work (Arkell 1953: 97). As a surprise the silts and sands must have contained the sought-after Mesolithic-Neolithic sequence which had become clear from the presence of at least two respective ceramic traditions. Despite the great expectations, such a sequence could not be developed from the mixed occurrences of the types throughout the section. Arkell again tried to describe his impression in stating that „the maximum of the Gouge Culture sherds occurs above the maximum of the Wavy Line sherds, with the maximum of Dotted Wavy Line sherds between them" (Arkell 1953: 101). Using again the Gaussian probability statistics, this impression is only partly right regarding the clear sequential spacing between the highest frequencies of the Mesolithic 'Wavy-Line' and the Neolithic 'Gouge Culture' (Fig. 12). However, the 'dotted wavy-line' peak occurs at the same level as the Neolithic decorations' peak indicating that at the find spot no substantial soil formation took place between the Late Mesolithic and the Neolithic period. Both depositional surfaces must

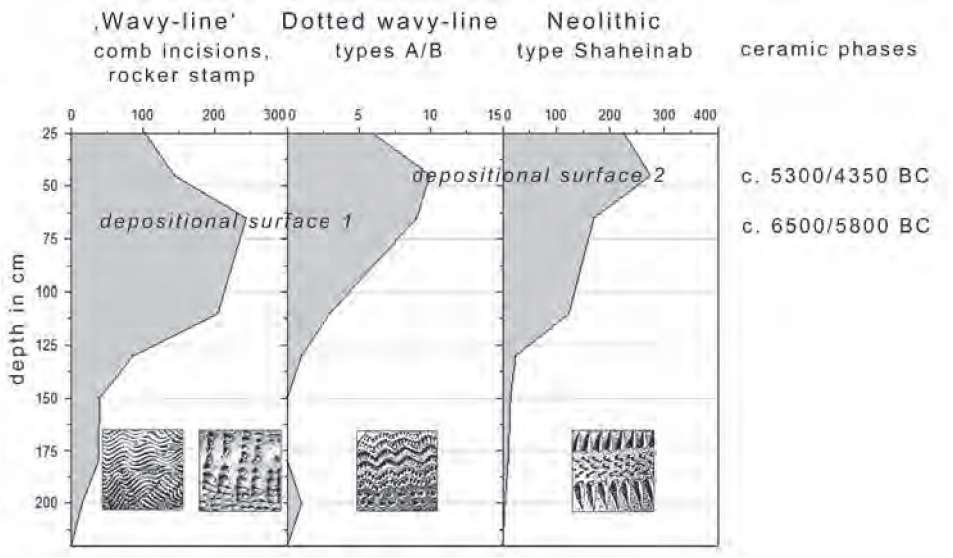


Fig. 12. Al Qoz. Vertical frequencies of pottery decoration types 'incised wavy-line/rocker stamp', 'dotted wavy-line' and Shaheinab Neolithic types for sector P40 (absolute counts after Arkell 1953, 98; level 85 omitted)

have collapsed back to the same level. Nevertheless, the stratigraphy of Al Qoz confirms the considerable distance between 'incised wavy-line' and 'dotted wavy-line' patterns as it has been also demonstrated for Umm Marrahi, Shaqadud-Midden, and Khartoum-Hospital before (see above, fig. 3, 8, 10).

Stratigraphic case study 3: Saggai-1

As a third example, the stratigraphy of Saggai-1 is discussed here because it exposes one of the major problems Holocene archaeology in the Nile valley has to deal with. The sedimentological analysis confirmed the observation that the site was located partly within a gravel accumulation (Fig. 13) that had been formed by a wadi fan discharging into the main Nile (Palmieri 1983). Gravel reached large proportions of up to 35 percent (in a depth of 20 to 30 cm) and 75 percent (in a depth of 70 to 80 cm) in sector F 6 (16). Most of the pebble stones originated from the hinterlands and had been washed down by the wadi (Palmieri 1983).

The number of artefacts excavated from the site was unusually high, amounting to several thousand pottery fragments per 20 x 20 m sector (Caneva 1983b). While Mesolithic finds were covered by calcified crusts due to desiccation processes the so-called 'intrusions' (mainly unstudied Late Neolithic material) could be distinguished by their fresh appearance (Caneva 1983b). The latter made up

large proportions of 20 to 30 percent. However, since the results of the sedimentological study (Palmieri 1983) and of the statistical analysis of artefacts (Caneva 1983b; Caneva and Zarattini 1983) have not been properly brought together, the stratigraphy was continued to be viewed archaeologically as a sequence of culture-historical significance (Caneva 1983a).

The vertical artefact frequency method has been applied here to illustrate the almost complete absence of stratigraphy (Fig. 14; *cf.* Dittrich 2011: 145ff.). One of the main arguments for this view is that the 'intrusions' of later date showed their highest frequency at the same level as any Mesolithic decoration type. Also the total amount of pottery fragments marked only one single peak (Fig. 13). Furthermore, unclassified pottery fragments, including rolled or worn pieces, amounted to more than 50 percent per layer indicating that the finds were not in their original position. As the upper layers contained a marked fluvial gravel accumulation, a contemporary occupational event seems not very probable. Rather, most of the finds seem to be relocated and deposited due to fluvial activity as were the pebbles for which a secondary deposit was already assumed by Palmieri (1983). Concerning the 'Mesolithic' lithics studied according to the sequence, there is no mention how they were distinguished from the Late Neolithic ones during analysis (Caneva and Zarattini 1983) which does not qualify them in sum as representative for the Mesolithic period.

It was only in a depth of 70 cm in sector F6 (16) that intact Mesolithic burials have been found and that an original surface could be located (Caneva 1983a). Although the four radiocarbon dates which give a range of 6400-6000 calBC might be linked to the burial phase, very few artefacts originated from these lower layers (Fig. 13). Therefore, it cannot be excluded that the dated *Pila* sp. shells, especially those from the upper layers, have been part of the secondary deposit. If the major events that led to the formation of the site are reconstructed, a picture emerges in which flooding, human occupation, and wadi activity form several discontinuous strands (Table 1). The time periods of artefact use and of artefact (re)deposition are diverging to a great extent. This reveals another problem of our present understanding of a site: It is no more appropriate to call Saggai-1 a Mesolithic site because at the same moment it is also a palaeo-environmental, a Late Neolithic, and a Meroitic site, and the Mesolithic components have been transformed and relocated differently in every subsequent period. It is crucial to understand such processes of formation and transformation before artefacts can be interpreted chronologically. The example of Saggai-1 shows that these processes are not only to be considered theoretically or discussed in a geological chapter but to be included in the finds' analysis and considered by methodological approaches.

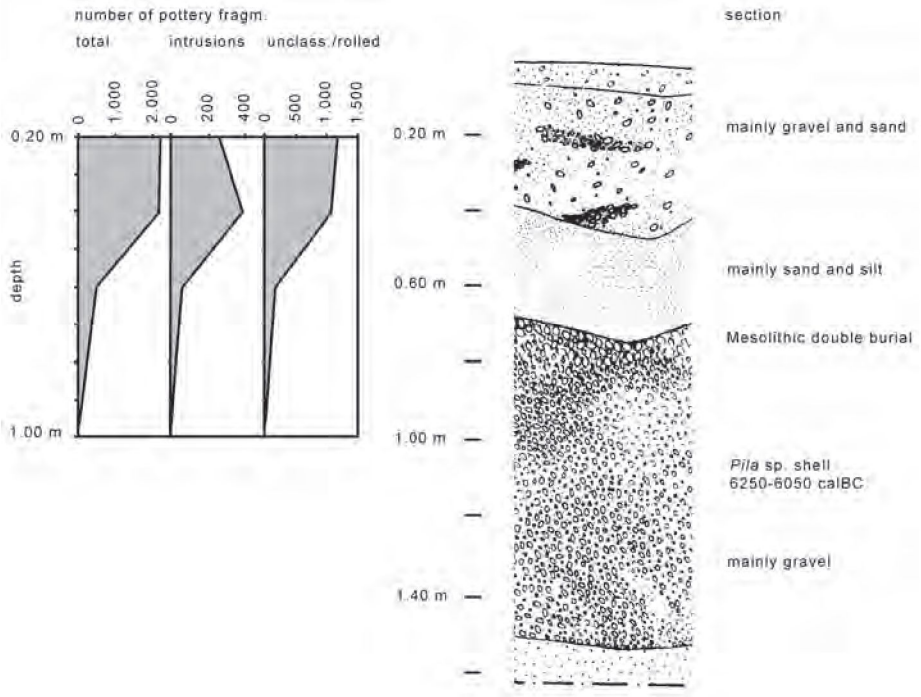


Fig. 13. Saggai 1. Vertical frequencies of pottery fragments according to the stratigraphical section in sector F6 (16) (absolute counts and section after Caneva 1983a, fig. 6; Caneva 1983b, tab. 1)

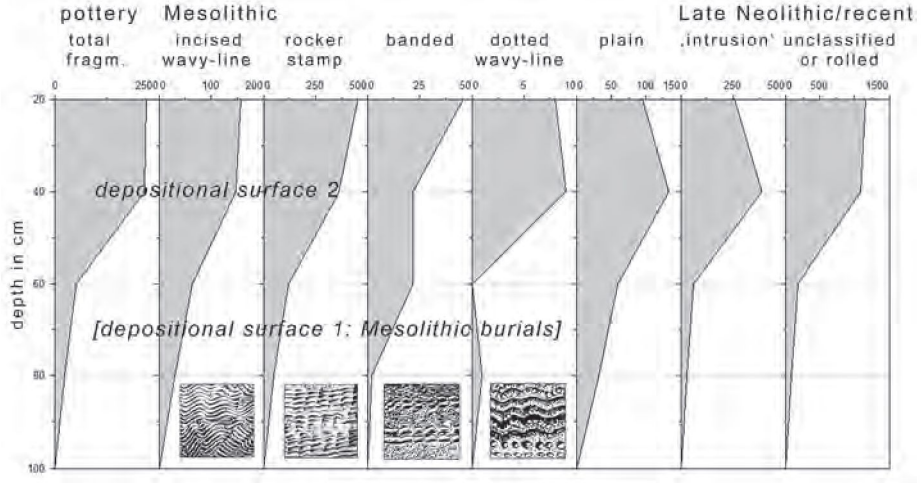


Fig. 14. Saggai 1. Vertical frequencies of pottery decoration types 'incised wavy-line', 'rocker stamp', 'banded' and 'dotted wavy-line' compared to that of 'intrusive' and 'unclassified/rolled' fragments indicating the absence of a sufficient stratigraphy (absolute counts after Caneva 1983b, tab. 1)

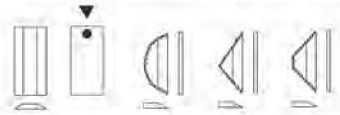
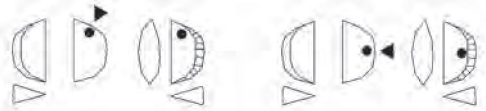
A similar phenomenon that was not fully addressed by the excavators before could be demonstrated for the sites of Sarurab-I (Mohammed-Ali 1982; Dittrich 2011: 144f.) as well as of Mahalab (Fernández et al. 2003; Dittrich 2011: 153ff.). In Sarurab-I all Holocene depositional phases had been later collapsed back to one level. This was mainly due to erosional processes or perhaps to the formation of a secondary deposit through a nearby wadi. The temporal relations of different pottery decoration types in terms of contemporaneity or sequencing could not be established by the documentary of this site. Furthermore for the adjacent site Sarurab-II no material has been published that would match the two charcoal dates of 8800-8450 calBC from the same site. In contrast to the opinion expressed by the excavators (Khabir 1987), most probably a natural cause for the embedding of charcoal has to be considered. This and a further shell date of 8300-7800 calBC originating from the stratigraphy of Umm Marrahi (Elamin and Mohammed-Ali 2004) should not be quoted anymore in connection to the 'Early Khartoum' complex. It would be of interest indeed if these dates could be once connected to a previously overlooked Epipalaeolithic tradition.

The site of Mahalab producing three radiocarbon dates between 6700-5750 calBC was situated at the fringe of a Wadi. Therefore, the sediments contained large amounts of sand and gravel reaching together nearly 85 percent (Lario *et al.* 1997; Fernández *et al.* 2003: 208). As had to be assumed for Saggai-1, especially the large amounts of gravel indicate that every artefact and ecofact of the same size and weight as the gravel particles could have been brought to the site and deposited there the same way as the gravel. According to Surovell *et al.* (2005), artefact analysis should include artefact size, weight, orientation, matched refittings, and degrees of abrasion to be plotted with increasing or decreasing values against the level of the former depositional surface. For the above mentioned sites, the quotation of just the radiocarbon dates would completely ignore the absence of former surfaces and the doubtful presence of secondary artefact deposits.

Redefining typochronology: from lunates to segments

As a counterpoint to the radiocarbon dating method, again more use might be made of the typological method. Mixed inventories deriving from palimpsests should be temporally accessible solely on the basis of significant techniques used for manufacturing stone tools and/or decorating pottery (*chaîne opératoire*). For establishing chronological horizons for the Middle Nile valley it seems not appropriate to separate the two main material sources, pottery and lithics, from each other for analysis. Though the technologies of both might not

Table 1. Saggai 1. Typochronological scheme for the production of lunate-shaped insertion tools (after Dittrich 2011: fig. 4.32)

group	blank product and tool shaping techniques	tool typology	related tools
1	 blade/bladelet, breaking/notching techniques, back retouch	thin-necked elongated backed points (also bipointed bladelets, arch-backed points)	truncations, backed points, scalene triangles
2	 bladelet, breaking/notching techniques, back retouch	thin-necked lunates (variant: reshaped lunate with burin blow)	truncations, isosceles triangles and trapezes
3	 flake with thick (cortex) back, struck from single platform core, back retouch (variant: partly backed)	thick-necked lunate (variants: s-shaped lunate, partly backed lunate)	
4	 segmented flake with cortex back, struck from cortex platform core (variants: side-blow segmented flake, macrolithic segment), back retouch	thick-necked segment (also crescent flake, 'orange wedge')	borers made from segmented flakes, large backed knives (Neolithic), side-blow flakes

seem to be related in any respect, it is only the combination of several chronologically significant types that ascertain the temporal status of archaeological contexts under discussion here.

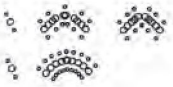
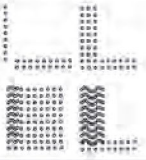
While the study of ceramics receives much of the attention attributed to the study area of the Middle Nile valley, the exact temporal relation to certain types of lithic tools or production modes remains often unknown. There are some studies where the corresponding lithics are not even considered for chronological discussion (Honegger 2003; 2005; Gatto 2006a; 2006b; Garcea and Hildebrand 2009) adding to the paradox that some of the supposed early Holocene 'ceramic cultures' have to get by without the presence of an early Holocene lithic production scheme. However, while such schemes had been thoroughly

studied for Nubia before (Schild *et al.* 1968; Shiner 1968a; 1968b; 1968c; Marks 1970; Nordström 1972), their application has later been questioned. Namely Haaland criticised that the members of the Combined Prehistory Expedition had tried to "reconstruct culture history in terms of migration, diffusion or invention" on the basis of lithic analysis (Haaland 1977: 1). On the contrary, she came to the conclusion that geographical patterns of the spread of lithic tools have not so much to do with the (ethnic) identity of people who used them. The differences "in occurrence …should rather be sought in differences in the activities carried out by the people…" (Haaland 1977: 15). Therefore, the idea has to be abandoned that single tools or tools' percentages could act as chrono-cultural evidence. This is of even more true when it is considered that the composition of lithic inventories is subjected to the geological reality as outlined above. Concurrently, the large amount of debris should begin to form a class of artefacts worth of study because it consists of numerous traits for different practices of stone knapping and use. In this respect, the shape of tools is still significant if the shaping is investigated as a specific mode of production and if tool shapes had also emblematic meanings among the prehistoric communities. As with pottery decorations it is rather their actual making (*chaîne opératoire*) that is bound to specific chrono-cultural traditions.

For prehistoric research done in the Middle Nile valley it is striking that the large group of insertion tools has received so little attention as to their precise definition.[6] A great corpus of labels pertaining to the lunular shape such as microliths, lunates, arch-backed pieces/bladelets, bi-pointed backed bladelets, backed points, segments, crescents, 'orange wedges' exists throughout the literature without mentioning that these tools could have been made by using quite different technologies. As a general chronological scheme it is suggested here that Early and Middle Mesolithic lunates or microlithic backed points have been obtained mainly from bladelets or blade-like flakes committed to a blade-oriented tradition (Table 2: groups 1 and 2). Around 6500 calBC a succession from elongated backed points/scalene triangles to lunates/isosceles triangles could be postulated although the triangle tradition is not very pronounced in the Khartoum area due to the use of quartz (*cf.* Dittrich 2011: 167f.). On the opposite, Neolithic segments or crescents were struck as flakes or even as segmented flakes while using the slicing technology (Table 2: group 4; *cf.* Kobusiewicz 1996). Their necks are thick and their cutting edges are often not straight as they would be if the blank had been a blade(let). Between these two main

[6] In contrast to the discussion of their probable function (*cf.* Honegger 2008).

Table 2. Typochronological scheme for sub-types of the 'dotted wavy-line' horizon (after Dittrich 2011: fig. 4.15-22)

type	technique	composition	tool shape and use	regions	fabric	associated lithic industry	dating [BC]
A	comb-like tool, single fan-like impressions with regular change of rotation point			Khartoum-Butana region, Gezira, Dongola Reach, Wadi Howar	temper: anorganic, shell, organic (rare)	macrolithic flaking industry (quartz, chert, rhyolite), broad lunates/ segments	5300–5000
B	comb-like tool, parallel single impressions arranged to waved bands			Khartoum-Butana region, Gezira, Dongola reach, Wadi Howar	temper: anorganic, shell, organic (rare)	macrolithic flaking industry (quartz, chert, rhyolite), broad lunates/ segments	5300–5000
C	comb-like tool/roulette, single fan-like impressions or rolling along guiding line, interlacing motifs by fast change of tool position			Wadi Howar, Khartoum-Butana region, Gezira, Dongola reach	organic temper	mainly flaking industry	5100–4700 ?
D1	three-toothed tool or comb, rocker stamp arranged to waved bands (also incised variants)			Lower and Upper Nubia	anorganic temper, mica (rare)	flaking industry ?	5300–5000 ?
D2	three-toothed tool, single impressions (also incised variants), archs or interlacing motifs by fast change of tool position			Lower and Upper Nubia	anorganic temper, mica (rare)	flaking industry ?	5300–5000 ?
E	double-pronged tool, rotating fan-like impressions, simple impressions or incisions			Khartoum-Butana region, Wadi Howar	fine anorganic and organic temper, surfaces burnished	Neolithic flaking industry (quartz, chert, rhyolite), adzes, gouges	4700–4000
F	comb-like tool, single impressions using a guidance grid (return technique)			Khartoum-Butana-Region (Sahara)	fine anorganic temper, surfaces burnished	Neolithic flaking industry	4500–4000

technologies, there belongs a third one using cortex backed blade-like flakes as blanks (Table 2: group 3). This technology was especially frequent in the middle layers of Shaqadud-Midden (Marks 1991b) representing a Late Mesolithic tradition to be dated to the second half of the 6th millennium BC together with the banded horizon as a popular pottery decoration concept. The chronological transitions between each of these different traditions stand for discontinuities

affecting communities on a supra-regional scale. In that way, the transition to slicing technology is associated to the lasting adoption of other Neolithic elements such as macrolithic tool types and practices of surface modifications.

The 'dotted-wavy-line' horizon: types and transition

The 'dotted wavy-line' (DWL) horizon is one of the most frequently discussed Holocene phenomena for Sub-Saharan Africa (Jesse 2003), while the proposed chronology ranges between 10,000 and 2000 bp (Jesse 2003; 2010). To break up the monolithic appearance of this phenomenon six technological variants, namely types DWL-A to F, have been defined for the study area of the Middle Nile valley and Nubia (Table 3; Dittrich 2011: 94-99). Each type shows close affinities to other contemporary decoration techniques such as rocker stamp banded decorations (types DWL-A, DWL-B), the Laqiya decoration as discussed in Jesse (2003: 154f.) (type DWL-C), banded decorations without the use of rocker stamp such as incised bands or archs (type DWL-D), Neolithic line application techniques as summarised by Dittrich (2011, 100) (type DWL-E), and the Neolithic return technique as described by Caneva (1987) (DWL-F). The application of types DWL-A and B, and especially of type DWL-C appears sometimes very similar to that of cord (roulette) impressions or cord roulette rolling (*cf.* Arkell 1949: pl. 75, 76, 78). In these cases, the significant decoration is often related to a black fracture fabric that contains organic temper such as chaffed grass.[7] It would seem interesting to study the supraregional appearance of such wares in more detail, as the chaff could be an indirect hint to the presence of dung of domesticated animals.

Most importantly, since the six varieties of DWL decorations transcend the Mesolithic-Neolithic dichotomy they could be used to assure the typochronological precision of the transitional process. They further form a suitable base for the study of mid-Holocene social networks and their mediating role in the process of Neolithisation, although it must be stressed that they sometimes occur in low frequencies or are even absent in favour of other less significant decorations. The types DWL-A and B are chronologically fixed by two dates of Kabbashi A to 5350-5000 calBC (Caneva *et al.* 1993; Dittrich 2011: cat. 34). Type DWL-F occurs in the top Neolithic layers of the Shaqdud-Midden sequence (Mohammed-Ali 1991: fig. 5-3a) whose depositional surface 6 is to be dated to c. 4700-4000 calBC. Type DWL-C is most probably to be connected with the oldest date of Conical

[7] Cf. also Arkell's 'imitation basketwork ware' and 'crude black fracture ware' (Arkell 1949), Clark's 'Naima ware' (Clark 1989), the organic temper wares of Multaga-3 (Gatto 2006b) or of the Early Khartoum Related Group/Karmakol industry of the Dongola reach (Marks et al. 1968; Shiner 1971; Usai 1998).

Table 3. Scheme of successive events or processes that produced discontinuity between sedimentation and the age of (re)deposited artefacts (after Dittrich 2011: fig. 2.7, tab. 5.15; sedimentological data after Palmieri 1983)

stratigraphy depth in m/ sedimentology	primary formation processes	temporality	impact by human occupation	deposition of artefacts/ecofacts	finds/structures and date of deposition
0–0,40	deflation 		phase 3: occupation on top of formation after closing	vertical translocation within older sediments, redeposition through digging	tumuli [c. 500 BC–500 AD]
0–0,40 gravel 35 % sand 45 % silt/clay 20 %	gravel deposition through wadi activity 	short-term events	–	secondary deposits	Mesolithic, Late Mesolithic and Late Neolithic finds (mixed) [after 3000 BC]
0,40–0,60	truncation by erosion 	periodical events	phase 2: occupation on top of formation and in interim stages after desiccation	translocation through desiccation cracks	[c. 5300–3000 BC]
0,40–0,60 gravel 17 % sand 41 % silt/clay 42 %	silt deposition by inundantion and in ephemeral lakes 	periodical events		mainly non-destructive covering	[c. 6000–4000 BC]
0,70–0,80			phase 1: occupation on top of formation after closing	vertical translocation within older sediments	Mesolithic finds and burials 6400–6000 calBC
0,70–0,80 gravel 75 % sand 13 % silt/clay 12 %	gravel deposition by Nile palaeochannel or wadi 	long-term and short-term events	–	secondary deposits	fossilised shells Late Pleistocene

Hill starting from 4850/4700 calBC (Keding 2000; Jesse 2003; cf. Dittrich 2011: cat. 12), and type DWL-D could be chronologically indexed by dates ranging from 5400-5200 calBC for the Egyptian site E-79-4 in the Bir Kiseiba area (Kobusiewicz 1984) to 5050-4850 calBC for the site 8-B-10C at Sai Island (Garcea and Hildebrand 2009). Jesse (2003: fig. 39.3) provided a good example where elements of DWL-D and DWL-B as well as a rim decoration executed by simple strokes were combined on the same vessel originating from Rahib Wells 80/73 in the Wadi Howar, proving a further chronological relationship for the two DWL

types. However, even for a study area extended into large parts of Northern Africa no typological traits for the DWL decoration concept predating 5400/5300 calBC can be confirmed given the fact that the data base available through publications is overwhelmingly formed of only loosely associated finds and dates (Jesse 2010; *cf.* critical discussion in Dittrich 2011: 192-209).

The chronology of Neolithisation in the Khartoum-Butana region

As shown above, for the Khartoum-Butana region the chronology can be mainly established by means of the stratigraphy of Shaqadud-Midden while the early periods of the 7th millennium BC are meanwhile thoroughly studied and dated in the White Nile region (Salvatori *et al.* 2011). The growing frequency of radiocarbon dates from 7050/6650 calBC onwards marks the onset of a distinctive Early Mesolithic occupation phase (7050–6250 calBC) succeeded by the Middle Mesolithic (6250–5650 calBC) and the Late Mesolithic (5650–5050 calBC) phases (Fig. 15). The division of Early Neolithic (5050–4800 calBC) and Middle Neolithic (4800–4000 calBC) has been modified here from Hassan (1986).[8]

Still a preceding Mesolithic phase without pottery production has to be taken into consideration. The sequence of chronologically significant decoration concepts consists of 'incised wavy-line' executed by area-wide and often irregular comb incisions, the appearance of which is not necessarily to be regarded in the sense of a decoration (Fig. 15). Arch-shaped incisions occur as a more recent development, sometimes already combined with the irregular application of the rocker stamp technique which is to be attested from 6250/6000 calBC onwards. Between 5650 and 5350 calBC Mesolithic banded decorations using rocker stamp and simple impression technique were introduced. The characteristic 'dotted wavy-line' types A and B are to be dated around 5350–5000 calBC as the most recent Mesolithic ceramic tradition, beside the re-appearance of area-wide rocker stamp decorations. The latter also mark the transition to Neolithic decoration techniques that follow immediately afterwards and throughout their whole sequence always comprise a significant if not exclusive proportion of rocker stamp. The type DWL-C and the related Laqiya decoration are possibly to be placed at the beginning of the Neolithic period (Keding 2000), while the types DWL-E and DWL-F are certainly to be dated to the Middle Neolithic.

The stone tool production techniques show a significant trend from blade technology which occasionally resembles rather a flaking technology in the Khartoum region due to the use of quartz as a raw material towards a pure flaking

[8] Though the actual transition might be more precisely placed at 4700/4600 calBC which is masked, however, by the long wiggle of 4800-4500 calBC (fig. 4).

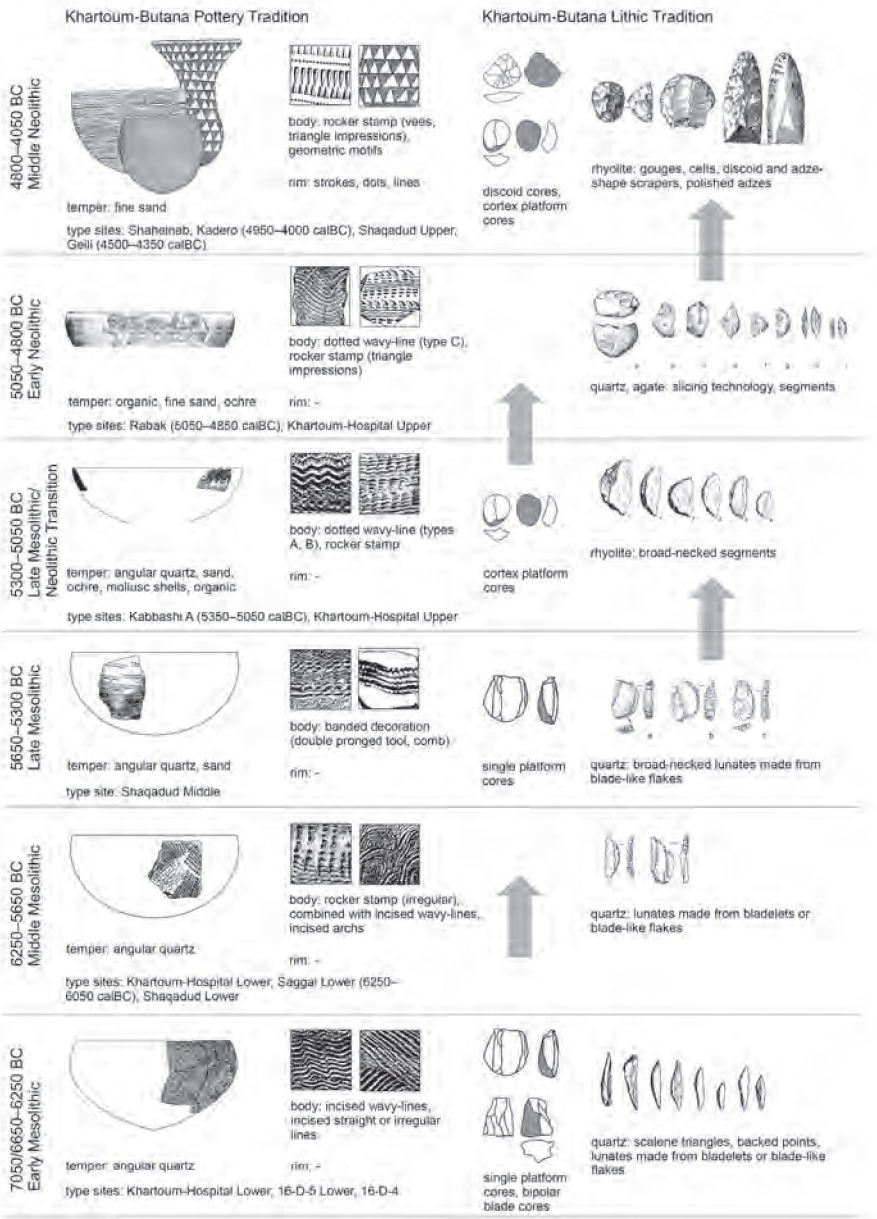


Fig. 15. Typochronological scheme for the Khartoum-Butana region between 7050 to 4050 calBC (arrows indicate continuation of the lithic technology to next period)

technology. The replacement of geometric microliths by thick-necked cutting inserts (segments) points to technological discontinuities starting around the mid of the 6th millennium BC and causing an irreversible modification of the stone tool inventory after 5000 calBC.

The chronology of neolithisation in Nubia

It is of interest here how the chronological scheme for Central Sudan can be correlated with that of Nubia. Although, in the North and in the South there existed at least two different Mesolithic traditions partly overlapping in the area of the Atbara junction, they share common elements as the arrangement of ornaments into banded decoration zones. As banded decorations of similar types appear widely in the literature[9] they could be subsumed as a temporal horizon. However, despite the conviction expressed in recent works (*cf.* Gatto 2006a; 2006b; Honegger 2003), it is not clear whether in Nubia a ceramic tradition existed parallel to the Mesolithic comb incision phase of Central Sudan (c. 7000-6000 calBC) as undoubtedly associated finds and dates are lacking. The Combined Prehistory Expedition had assigned most of the studied sites in Lower Nubia to a preceramic time-period, but missed to offer a concept for a probable 'ceramic' or Late Mesolithic and even for a ceramic Neolithic whose pottery finds were hardly mentioned (Wendorf 1968).

While acknowledging that even after more than 60 years following their publication, statistical data is still accessible due to the attention and the interest of the excavators, it has to be regretted that the methods used by Arkell (1949; 1953) and also by Myers (1958) have not found acceptance for work done in Nubia after 1960. The statistical discussion of stratified finds is virtually absent in the literature on Nubia and regions as far south as the Atbara junction, especially for sites that were claimed to be of chronological significance such as Dibeira West (Schild *et al.* 1968), Aneibis, Al Damer and Abu Darbein (Haaland and Magid 1995), Barga (Honegger 2005), or Wadi al Arab (Honegger and Jakob 2009). It is difficult to believe that each of these multi-period sites showed stratigraphical congruence as it was suggested by the excavators by superficially linking ecofacts used for radiometric dating, artefacts and other ecofacts (acting as evidence such as bones of domesticated cattle) without a methodological discussion.

The chronology of Lower Nubia has still to be partly established by the horizontal stratigraphy of Dibeira West (Fig. 16) although it must be much more clearly stated than in the original publication (Schild *et al.* 1968) that artefacts from the five distinguished sites DIW-1A and B, DIW-50, DIW-51, and DIW-53 had been

9 *Cf.* Rudin 1980: pl. 27.6-7, 31, 33; Haaland 1995: fig.2, 15b; Honegger 2003: fig. 6; Honegger and Jakob 2009: fig. 7; Dittrich *et al.* 2007: fig. 1.

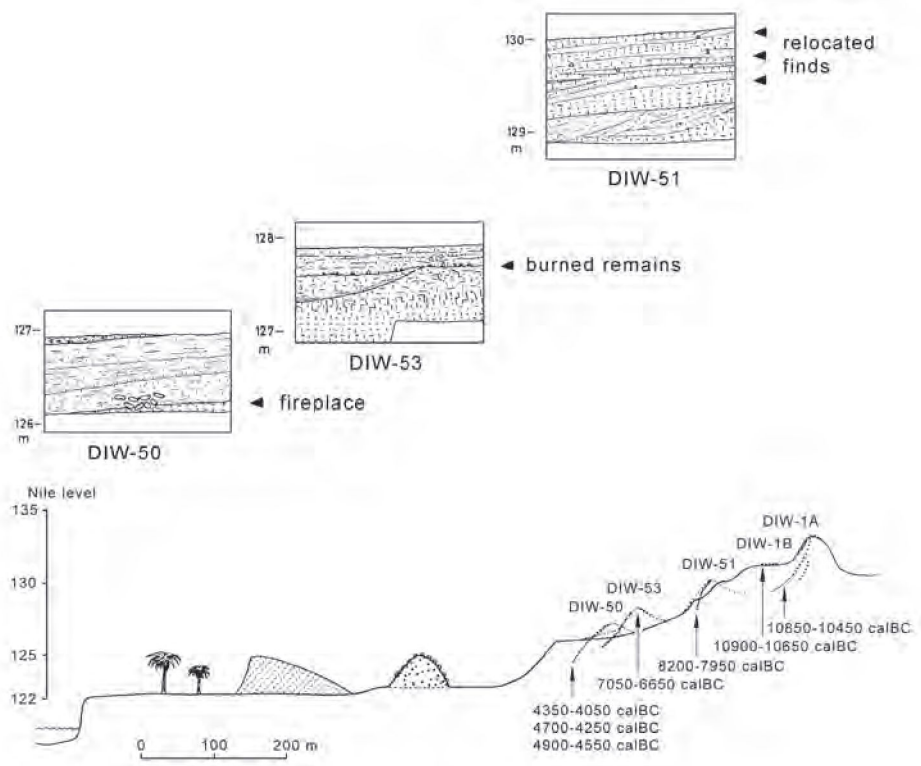


Fig. 16. Dibeira West. Relative levels of find concentrations embedded in silts and horizontal stratigraphy for the sites DIW-50, DIW-51, DIW-53 and DIW-1 (sections after de Heinzelin 1968, fig. 42-44; Schild *et al.* 1968, fig. 1-3)

mixed.[10] In fact, they tended to be eroded and washed down from the upper to the lower sites and furthermore incorporated into silt layers accumulating at a much later point in time. No stratigraphical statistics are available. It seems therefore to be the only appropriate method to view all these sites together as one palimpsest.[11] The ranges of the radiocarbon dates mark a Late Palaeolithic phase (11th millennium calBC), an Epipalaeolithic phase (8200-7950 calBC), a Mesolithic phase (7050-6650 calBC) and a Neolithic phase (4900-4050 calBC) which hint to repeated visits and manipulations of this spot (Dittrich 2011: cat. 16-18).

[10] Also the possibility of geological dating according to silt accumulation stages (de Heinzelin 1968) has been overestimated and has caused much confusion especially regarding the heterogenic pattern of Holocene deposits (cf. Wendorf et al. 1979).

[11] The concepts of Shamarkian and Post-Shamarkian Neolithic as defined by Schild et al. (1968) are highly questionable in their chronological relation when it is taken into consideration that the more recent site simply contained admixtures of older washed down artefacts (cf. Haaland 1977).

Mesolithic artefact types are mainly to be extracted from the inventories of DIW-51 and DIW-53, while Neolithic finds though being frequent and dated at DIW-50 were present at all of the mentioned sites (cf. discussion in Dittrich 2011: 165-168). Most interestingly, the characteristics of the Mesolithic facies (e.g. no associated pottery, great variety of microliths, use of blade and microburin technology) show great similarities to that of the Upper Capsian as it was acknowledged already by Schild *et al.* (1968), while the Neolithic facies contained typical macrolithic tools (e.g. adzes, scrapers) as well as imported tools made of Egyptian chert (including side-blow flakes, surface retouched tools). Both traditions can independently be confirmed by chronologies from outside the working area (for the Capsian cf. Rahmani 2003; 2004; for the Badarian *cf.* Holmes 1988; 1996). Therefore, they can be connected to date ranges of 7050-6650 calBC and 4900-4050 calBC, respectively, deriving from the sequence of Dibeira West itself.

However, the symptomatic lack of dates to the late 7th millennium and to the 6th millennium BC at the same site has caused some confusion that was responded by assigning other site inventories to differently defined concepts such as the Khartoum Variant (Neolithic) (Shiner 1968c; Nordström 1972), the Qadan (Shiner 1968a), or a 'miscellaneous' facies (Shiner 1968b). Marks (1970) avoided the attachment of such cultural terms but studied site inventories as if representing cultural units, too. Recently it has been attempted to additionally define early 'evolutionary' lines especially for the Khartoum Variant (Neolithic) that have been based on speculative radiocarbon date-artefact associations from the Egyptian Western desert (Usai 2005; Gatto 2006a). But it seems more appropriate to accept a Nubian Mesolithic on the basis of an Upper Capsian tradition for the Early Holocene and to split up all the former 'culture' definitions by their different chrono-typological components (see also critics of Haaland 1977). As it has been shown elsewhere, the Qadan is an epistemological conglomerate based on mixed finds from palimpsests that were commonly present at deflated Lower Nubian Nile terraces (Dittrich 2011: 168-172). It mostly consists of a Late Mesolithic production of blade-like flakes and segmented flakes transformed by backing retouch into broad necked lunates. This tradition finds its closest chronological parallels within the Shaqadud-Midden stratigraphy (middle and upper layers, see above). Other Qadan components comprise Middle Palaeolithic Levallois cores and flakes, as well as a high amount of 'pointes Levallois accidentelle' (as defined by Rahmani 2003: fig. 206) that have been mistaken as unretouched points by Shiner (1968a) but that normally would be excluded from tool analysis (see critics of Marks 1970: 412). It can be assumed

in general that there has been a transition from blade to flake production with the sequence of geometric microliths/blade technology, lunates/ blade or blade-like flake technology to segments/slicing technology in Nubia (Fig. 17). There is a constant lack in present studies to link this typological change in lithic technology to the Nubian pottery tradition. However, both specific traits in ceramics and in lithics, are to be seen as chrono-cultural units.

The Nubian Mesolithic pottery tradition is presumably to be paralleled no earlier than with Late Mesolithic banded decorations of the Khartoum region (5650-5300 calBC; Fig. 17). Technologically it is less characterised by the application of the rocker stamp technique as known from other regions but more importantly by impressions of a double pronged tool arranged to two-rowed bands which should not be confused with the Neolithic 'alternately pivoting stamp' which is related to the return technique (*cf.* Caneva 1987). These Mesolithic two-rowed bands are typical decorations preceding any type of Nubian 'dotted wavy-line' (e.g. DWL-D). This becomes obvious from DWL inventories such as Sai Island 8-B-10C (Garcea and Hildebrand 2009) and Abka-428 (Nordström 1972) where two-rowed bands have mostly disappeared and from banded inventories where DWL decorations are still lacking such as Umm Klait 3-Q-73 (Dittrich *et al.* 2007). Other kinds of impressions were produced by combs with three or four teeth which could be arranged into bands, or into the 'dotted wavy-line' type D. As the latter can be combined by simple strokes incised below the rim, this tradition is to be seen as starting point for the rim decoration becoming especially frequent throughout the Neolithic period.

This Nubian Late Mesolithic pottery tradition is followed by the Nubian Neolithic tradition (Fig. 17) characterised not only by various rim decorations such as dotted or herringbone patterns (*cf.* Nordström 1972: pl. 121; Gatto 2006a: pl. 1), but also by simple comb impressions and rocker stamp fillings (ibid.; Salvatori et al. 2008, fig. 16.30), or by impressions of double pronged tools arranged to 'alternately pivoting stamps' where dotted lines are impressed once more thereby acting as a guidance line (*cf.* Nordström 1972: pl. 123.12). As the sequence of dated grave inventories of Kawa R12 (Salvatori et al. 2008; Dittrich 2011: cat. 28) indicates there has been a growing regional variation from 4700 calBC onwards with only few elements assuring chrono-supraregional relationships such as the occurrence of the herringbone pattern (*cf.* discussion in Dittrich 2011: 175-178, 182-184). Yet the resemblance of herringbone rim decorations and horizontal rows impressed by the 'alternately pivoting stamp' technique within the Neolithic of Capsian tradition as

found at Hassi Mouilah/Algeria (Camps 1974: fig. 90) and dated to 4700-4350 calBC could hardly be overlooked.

Presently, there is no agreement on the overall chronological position for the Nubian pottery tradition but it is suggested here, that the stratigraphical position of banded decorations as outlined for Shaqadud-Midden, the close affinity to the succeeding 'dotted wavy-line' tradition which is in fact just a banded variety as well as the revised radiocarbon dates put forward here, support a chronological fixation starting in the mid of 6th millennium BC and covering the 5th millennium BC. It cannot be ruled out that the application of banded decoration is the result of an outside stimulation (e.g. Yarmoukian) that would make a concerted onset in the mid of 6th millennium BC even more probable. A similar effect could be present in the distributional pattern of the Neolithic herringbone patterns.

This general dating would also neutralise the questionable chronological position of the corresponding lithic inventories whose frequent macrolithic and flake-oriented components clearly speak for a later dating within the Mesolithic sequence or, even more probable, a Neolithic date after 5000 calBC. From this point of view an early Holocene date for the Khartoum Variant as suggested by Gatto (2006a) and Usai (2005) can be ruled out. In fact, the Khartoum Variant is an epistemological mixture of Late Mesolithic and Neolithic pottery and lithic traditions that have been found together at sites such as Abka-9 (Myers 1958; Dittrich 2011: cat. 1) and Abka-428 (Nordström 1972; Dittrich 2011: cat. 2) due to similar spatial preferences during the period of 5300 to 4000 calBC. The same phenomenon has been observed in the Khartoum area where low frequencies of 'dotted wavy-line' pottery that were always distinguishable by its different fabric occurred at Neolithic settlement sites such as Shaheinab (Arkell 1953), Shaqadud-Midden/upper layers (Mohammed-Ali 1991), or Sheikh el Amin (Fernández et al. 2003). In Sheikh al Amin the outside position of 'dotted wavy-line' pottery (415 fragments) could be statistically underlined by a correspondence analysis (out of 56,761 fragments, *cf.* Fernández *et al.* 2003: 314, fig. 52). Kabbashi A seems to remain the only site where it was not mixed with later or earlier elements so that this can be seen as rare exception (Caneva et al. 1993). To avoid further terminological confusion it is suggested here to give up problematic terms such as Khartoum Variant and Qadan for Lower Nubia in favour of terms like Nubian Epipalaeolithic (9800-7350 calBC), Early Nubian Mesolithic (7350-6450 calBC), Nubian Middle Mesolithic (6450-5650 calBC), Nubian Late Mesolithic (5650-5300 calBC), Late Mesolithic/Early Neolithic Transition (5300-4800 calBC) and Nubian Middle Neolithic (4800-4050 calBC) (Fig. 17).

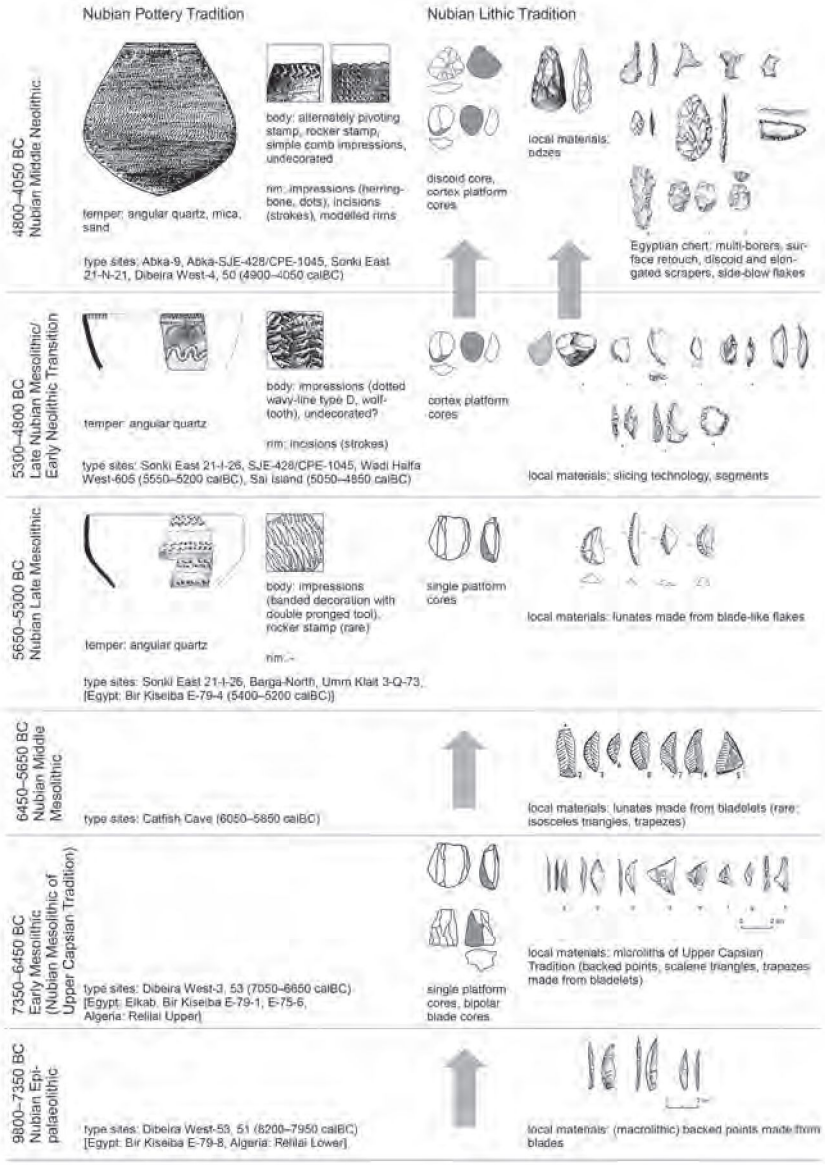


Fig. 17. Typochronological scheme for Nubia between 9800 to 4050 calBC (arrows indicate continuation of the lithic technology to next period)

Conclusions

The chronology of the Neolithisation process remains an arbitrary systematisation when based on various geological, statistical, or material information such as radiocarbon dating, stratigraphy, and typology. Therefore, chronology forming an incomplete index to past periods is not necessarily related to the full range of cultural history. Also it is inclined to make extensive use of generalisations. Although by chronology we are able to distinguish phases of continuities or discontinuities, it tells not so much about the nature of socio-cultural changes that have to be studied differently within a wider ethno-sociological and historical frame-work. In the first place, the advent of domesticates signifies a social transformation that it is also marked by the appearance of a changed burial rite and of a network of imported materials charged with prestigious meaning (Krzyżaniak 1991).

For a general chronological time-frame it is suggested here to use so called wiggle spaces as markers for time periods that are frequently matched by radiocarbon dates (Fig. 4). However, radiocarbon dates should not be employed as evidence for past events because they are always related to organic materials of former living organisms with specific properties. Clearly, the procedure of linking a radiocarbon date and a whole site or a site's complete inventory seems not a sufficient procedure anymore.

Also the definition of cultures, or industries based on potentially mixed assemblages should be rejected. On the contrary, questions of taphonomy, of formation and subsequent transformation of archaeological sites and therefore of the long-term human interest in reshaping landscapes and environments will probably receive growing attention. The concept of palimpsests acknowledges that such mixed archaeological assemblages are part of the present geological reality. The description of this geological reality requires the use of specific methods such as artefact/ecofact frequency analysis, statistics using Gaussian normal distribution curves, or sedimentological studies. However, also single finds do not so much act as evidence for past cultural events that commonly escape the archaeological method and are rather to be studied within historical conceptions.

From the viewpoint of preferred raw materials as cultural markers three traditions for the Middle Nile valley can be defined. In Central Sudan the late Pleistocene to early Holocene alluvial plains are settled by the bearers of a lithic tool production based on quartz (Khartoum Mesolithic tradition), while at the Atbara junction the lithic tradition is based on chert from the hinterland (Atbara Mesolithic tradition). In Northern Sudan the existing Epipalaeolithic flint

tradition is replaced by a Mesolithic tradition with similarities to the Capsian (Nubian Mesolithic of Capsian tradition). The respective pottery traditions of these regions show, however, chronologically different onsets. The Mesolithic comb incisions of the Khartoum-Butana region previously classified imprecisely together with other decorations as 'Early Khartoum' or 'Wavy-line' pottery (see critics of Jesse 2003) constitute – as a revision of Arkell's work – still the most substantial evidence of an 'early' pottery production for the African continent. The three regions are not only linked by a marked break in the lithic technology with a shift from a blade-oriented to a flake-oriented industry but also by the distribution of local varieties of pottery decoration concepts such as banded decorations (from 5650 calBC onwards) as well as sub-types of 'dotted wavy-line' (from 5350 calBC onwards). The following transition to the 5th millennium BC is not so much related to a profound change of pottery decoration concepts but of fabrics that start to contain a wider range of temper ingredients among them organic materials that are probably linked to animal husbandry.

As the 'dotted wavy-line' horizon overlaps the Mesolithic-Neolithic transition the question could be asked if this network carried the capability to spread ideas of farming as well as domesticated species. Is it possibly comparable or partly identical to a second network that spread macrolithic tool shapes and surface retouch as a signifying technology (Shirai 2006; Riemer 2007)? Or, is it rather associated to the Middle Neolithic network that spread imported raw materials like Red Sea shells, malachite, amazonite, or cornelian and mediated the idea of figurines and ritual vessels such as calceiform beakers (Krzyżaniak 1991)? The main difference between these networks lies in their spatial orientation: The first two networks are oriented along East-West, and respectively West-East routes as it is characteristically for forager groups moving within the ecological corridors of vegetation zones. However, the third one purposely crosses these ecological borders from North to South and vice versa being responsible for the incorporation of exotic domesticates along the axis of the Nile valley. With this, we see several different spatial reference systems the temporal overlapping and adjustment of which is what is to be subsumed as the process of neolithisation.

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Lower and Upper Egypt in the 4th millennium BC. The development of craft specialisation and social organisation of the Lower Egyptian and Naqada cultures

Introduction

The remains of the Egyptian civilization attracted people's attention already in antiquity (*cf.* Herodotus, Strabo). In the modern times people were primarily fascinated by monumental tombs and temples. The Near East was wandered about by wealthy amateur travelers who published reports, memoirs and drawings from their journeys (e.g. David Roberts, Amelia Edwards). Popular interest in monumental relics of the past influenced the character of excavation research, which in the middle of the 19th century was carried out within temple complexes (Giza, Saqqara) as well as tombs (the Valley of the Kings). Numerous researchers of that time, including W.M.F. Petrie, the father of modern scientific archeology of the Near East, denied the existence of an Egyptian civilization before the emergence of a centralized Pharaoh's state. The finds recorded at the Predynastic sites were interpreted as the remains left by the representatives of a "new race", who were believed to have arrived in the Nile Valley towards the end of the Old Kingdom period (Petrie and Quibell 1896).

The progress of research at the turn of the 20th century changed this view. Excavation works at Naqada, Abadaija, Hu, Abydos, Hierakonpolis as well as new publications (de Morgan 1896-1897; Quibell 1900; Petrie 1900-1901; 1901; 1902-1903; Quibell and Green 1902) shifted the beginnings of the Egyptian civilization to an earlier date, thus acknowledging the Predynastic period.

Our present knowledge of the Predynastic Egypt is entirely different from what was known by the pioneers who studied the oldest history of this region. The

abundance of archeological evidence and the application of new research methods allow for much more detailed investigations of this period.

One of the major problems in the archaeology of the Predynastic Egypt is that despite the growing number of data and changing research paradigms, some old and obsolete interpretations are deeply rooted and still commonly accepted by scholars. One of the examples illustrating this problem is the traditional division of the Predynastic societies into two separate units: the Naqada culture in the south and the Lower Egyptian culture in the north. The two cultures are defined in opposition to each other and compared, usually to the disadvantage of the northern societies that appear to have been inferior ones. Simplistic observations of this kind, which ignore the reflection on the nature of archaeological evidence, hinder the progress of research concerning the earliest Egyptian societies.

1. The Naqada culture

Initially the interest in the Egyptian past was focused around Upper Egypt, which became the main region of archaeological investigations. Intensive excavation works carried out at the beginning of the 20th century resulted in the growing number of data, and brought the need of chronological ordering and classifying of the material. The first periodisation of the Predynastic period was established by W.M.F. Petrie (1901; 1921). On the basis of material from his own excavations at Naqada, Ballas and Diospolis Parva, Petrie distinguished three cultural units in the Predynastic Egypt, naming them after eponymic sites: the Amratian culture, the Gerzean culture and the Semainian culture.

In 1957, W. Kaiser proposed a new relative chronology based on pottery from the cemetery 1400-1500 at Armant. In his chronological division of the Predynastic period, instead of the three cultures proposed by Petrie, he distinguished one unit - the Naqada culture - divided into three phases (Stufen) that were to reflect the continuity of cultural tradition and the evolutionary character of development. Although the chronology of the Predynastic period was analysed later by S. Hendrickx (1996) and T. Wilkinson (1996), and subsequently modified by the researchers, its final version has not been established, and the issue is still open to discussion (*cf.* Hendrickx 2011b).

Currently the term "the Naqada culture" is used to describe societies that lived between the 4th and 3rd millennia BC in Upper Egypt (Fig. 1). Geographical range of this culture changed over time. All the oldest Naqadian sites are situated within Upper Egypt, from Matmar in the north to Kubbaniya and Khor Bahan in the south (Midant-Reynes 2000: 47). Although it is generally accepted that during

Naqada II period the Upper Egyptian societies expanded north and southwards (Midant-Reynes 2000: 45), the problem of their expansion to the north is still widely discussed among scholars (Buchez & Midant-Reynes 2007; 2011; Köhler 2008; in press; Mączyńska 2011; 2013; in press c). The last phase of the Naqada culture, often referred to as the Protodynastic period, is believed to have been a time of cultural and political unification of Egypt. Indicative of the cultural unification is the location of the Naqada sites along all the Nile Valley and in the Nile Delta in the beginning of this period. The political unification, which laid the foundation for the early Egyptian state, was to be the next stage of development of the Naqadian societies (Bard 2000; Köhler 2010).

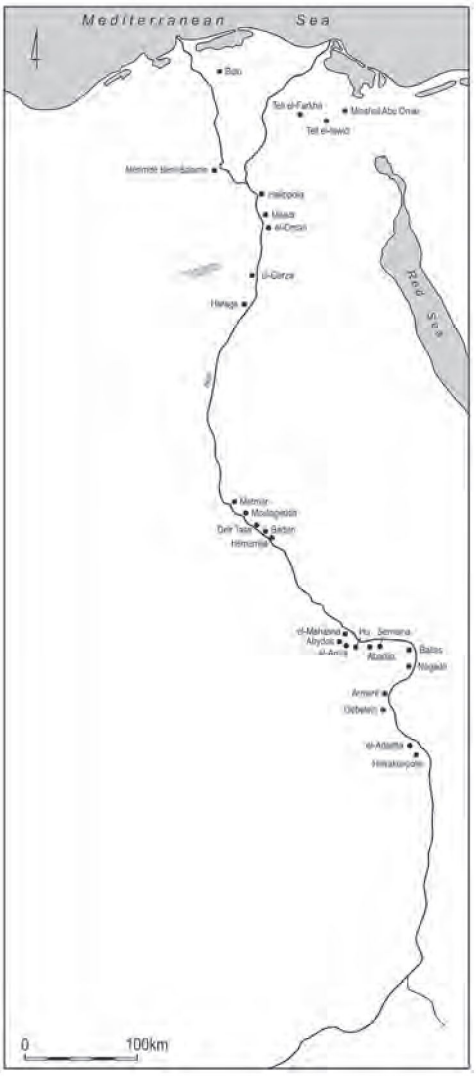


Fig 1. Egypt in the Predynastic period

Our knowledge about the Naqada culture (phases I and II) is based mostly on the data from 85 cemeteries and about 50 settlements. The main focus of research was put on the cemeteries. Little attention was paid to settlement sites, which are known mostly from surface surveys. Many of the data were obtained through excavations and published over one hundred years ago according to research standards different than today (Hendrickx and van den Brink 2002). In consequence our knowledge on the Predynastic societies of Upper Egypt relates more to burial customs than to the whole system of the Naqada culture. A more comprehensive picture of the Naqadian societies may be provided by recently excavated sites comprising both settlements and cemeteries, i.e. Hierakonpolis and Adaïma.

2. The Lower Egyptian culture

For many years Lower Egypt was of no interest to archaeologists studying the oldest Egyptian past. Additionally, due to its environmental conditions the Nile Delta was regarded to have been an almost uninhabitable swampland in the Predynastic period (Butzer 1976: 26). However, in the 1920s and 1930s some scholars abandoned the investigations in Upper Egypt and started the excavation research in the Delta area and at the Faiyum Oasis. That was a period of great discoveries concerning the Neolithic period and the beginnings of early Predynastic times in Egypt. Important sites at the Faiyum Oasis, Merimde Beni Salame or Wadi Hof were recorded and/or excavated at that time (Bovier-Lapierre 1926a; 1926b; Junker 1929-1940; Caton-Thompson and Gardner 1934; Debono and Mortensen 1990).

In the years 1930-1953 O. Menghin and M. Amer carried out excavations at Maadi. The archaeological evidence they revealed differed from the material known from the sites explored in the Delta several years before. Their findings attested that the settlement inhabitants had contacts with Upper Egypt and Southern Levant and, furthermore, they possessed the knowledge of metallurgy (Hoffman 1979: 200-201; Midant-Reynes 1992: 197). The new cultural unit was given the name the Maadi culture, changed to the Maadi-Buto culture after the discovery of similar material at the settlement at Buto. In the 1990s a new name was coined, i.e. the Lower Egyptian culture. Initially it was used interchangeably with the previous names (e.g. Adams and Friedman 1992: 325; Seeher 1992: 225; von der Way 1992b: 217) or added to them: Lower Egyptian Maadi-Buto culture (e.g. von der Way 1992a). Gradually the new term rooted in literature, replacing ones used before (Ciałowicz 2001; Mączyńska 2003: 213-226; 2011; 2013; Hartung 2004: 337). The name reflects a complex, non-homogenous character of this unit and its new quality, distinct as compared to the first Neolithic/early Predynastic cultures.

Extensive archaeological research carried out in Lower Egypt in the 1980s and 1990s brought to light new important sites, e.g. Minshat Abu Omar, Tell el-Iswid, Tell Ibrahim Awad, Tell el-Farkha (Kroeper 1988; van den Brink 1988; 1989; Chłodnicki *et al.* 1991; 1992a; 1992b). At the same time the research was conducted also at the previously known sites (such as Buto), at which the remains of Predynastic and Early Dynastic occupation were expected to find under the ancient cities (von der Way 1997).

The Lower Egyptian culture is the term describing communities that inhabited Lower Egypt in the first part of the 4th millennium BC (Fig.1). Radiocarbon dating allows for locating the culture in the range between 3800 and 3300/3200 BC, which corresponds to Naqada IA - Naqada IIIA1 periods in the relative Upper

Egyptian chronology (Ciałowicz 1999: 46; Watrin 2000: 170-173). By now, a total of 22 sites of this cultural complex have been identified and more are expected in the near future (Mączyńska 2011; 2013). However, only 7 of the sites have seen a comprehensive publication of all materials. These are: Maadi – settlement and cemetery (Rizkana & Seeher 1987; 1988; 1989; 1990), Buto settlement (von der Way 1997; Faltings 1998a; 1998b; Köhler 1998), Tell el-Iswid (van den Brink 1992), Tell el-Farkha (Chłodnicki et al. 2012) and cemeteries at Wadi Digla (Rizkana and Seeher 1990) and Heliopolis (Debono and Mortensen 1988). A considerable delay between the excavations on the one hand and the corresponding publications on the other, result in certain difficulties, which are the cases of Maadi, Heliopolis and es-Staff sites (Debono and Mortensen 1988; Habachi and Kaiser 1985; Rizkana and Seeher 1987; 1988; 1989). Some materials from the most recent research projects still await publication and are currently only available in the form of excavation reports, e.g. Tell el-Masha'la (Rampersad 2006), Kom el-Khilgan (Midant-Reynes *et al.* 2004; Buchez and Midant-Reynes 2007; 2011), Sais (Wilson 2005; 2006; Wilson and Gilbert 2003; Wilson *et al.* 2014); Tell el-Iswid[1] (Tristant *et al.* 2011; Midant-Reynes and Buchez 2014).

The Lower Egyptian culture is represented by settlements and cemeteries, with a considerable majority of the former. The data from both the types of sites allow for obtaining a more comprehensive picture of the societies than in the case of the Upper Egyptian culture, which is known mostly from funerary contexts. However, a relatively small number of Lower Egyptian sites as compared to the Upper Egyptian ones pose some interpretational problems. There are many unanswered questions concerning e.g. the development of the Lower Egyptian society, the Lower Egyptian-Naqadian transition, and the character of the Naqadian presence in the north. The sites vary in terms of chronology, showing different stages of development of the Lower Egyptian culture societies, which makes their comparisons difficult.

Archaeological investigations have revealed that some elements of the Naqada culture began to appear more frequently at the Lower Egyptian sites in Naqada IIC–IID period. This fact has been and still is interpreted through the prism of a so called Naqadian expansion. Most of the authors who refer to this problem assume that the appearance of southern influences in the north must have resulted from some movement of people and the arrival of Upper Egyptians to Lower Egypt. Since Naqadians are seen as the dominant party in this process, their culture is

1 Excavations of the French Institute of Oriental Archaeology in Cairo under direction of M. Beatrix Midant-Reynes.

believed to have influenced or even replaced the local one. In consequence of this process a single cultural unit – the Naqada culture - evolved in Egypt at the beginning of Naqada III period (*e.g.* Bard 2000: 58–59; Buchez and Midant-Reynes 2007; 2011). However, it should be emphasized that the presence of newcomers from the south has not been confirmed at any Lower Egyptian site. The archaeological evidence rather points to some interrelation between these two regions, especially in the second half of the Naqada II. In this period the Lower Egyptian and the Naqada cultures underwent many social, economic and ideological changes that resulted in the emergence in all the Nile Delta of centres markedly similar in many aspects of their culture.

There are several expeditions working in the Nile Delta, including Tell el-Farkha, Tell el-Iswid, Sais, Buto. The research carried out at those sites allows for verifying the existing views on the Lower Egyptian culture and for supplementing the knowledge about human activity in the region in the Predynastic period.

3. The Naqada culture vs. the Lower Egyptian culture

In the traditional view of the Predynastic period the Naqada culture and the Lower Egyptian culture are placed in opposition to each other. The Naqada culture is always seen as 'better', being more technologically developed and socially stratified. By contrast, the Lower Egyptian culture is considered unspectacular with its egalitarian social system, simple, poor burial customs and household production. The only 'advantage' this simple farming society had was its participation in the exchange network with the Southern Levant (Mączyńska 2006; 2011; 2013). The grounds for such comparisons have been questioned by E. Ch. Köhler (2008: 526-527) who stated that there is „a methodological and evidentiary imbalance" between the data from Upper and Lower Egypt. The Naqada culture, known mostly from funerary contexts, cannot be compared in a simplistic way to the Lower Egyptian culture, known mostly from settlement sites. Moreover, in recent years scholars have paid more attention to the regionalism within the Naqada culture, which points to the lack of one homogeneous unit in the south (Friedman 1994; Savage 2001; Köhler 2008: 523; 2014). In the light of the current state of research the Lower Egyptian culture seems to have been internally differentiated, as well. Therefore the two units in question should be compared very carefully, with regard to the nature of the archaeological evidence characteristic for each one.

Knowing all the above limitations the author of this paper has decided to compare two aspects of the Predynastic societies settled in Upper and Lower Egypt during Naqada I and II period, namely the level of craft specialisation and social

complexity. The choice to address these issues is not chance, as the problems concerning craft specialization and social organization in the north are rarely mentioned in the literature concerning the Lower Egyptian culture. So far, most of the authors, including the author of this article (*e.g.* Mączyńska 2011), only have stated that the Lower Egyptian society was characterised by a household mode of production and an egalitarian social organisation. However, recent investigations based largely on new data have allowed for more detailed investigations concerning these two problems. The author focuses on the recently obtained evidence and current interpretations concerning the mode of production and social organization in Egypt in 4th millennium BC, during Naqada I and II periods.

The aim of this paper is to focus mostly on Lower Egypt. For that reason some well known issues concerning the Naqada culture, particularly its social development, will not be addressed in detail. On the same grounds, theoretical considerations including hypotheses or theories and their interpretational problems will only be signalled in this study.

3.1. The development of craft specialization

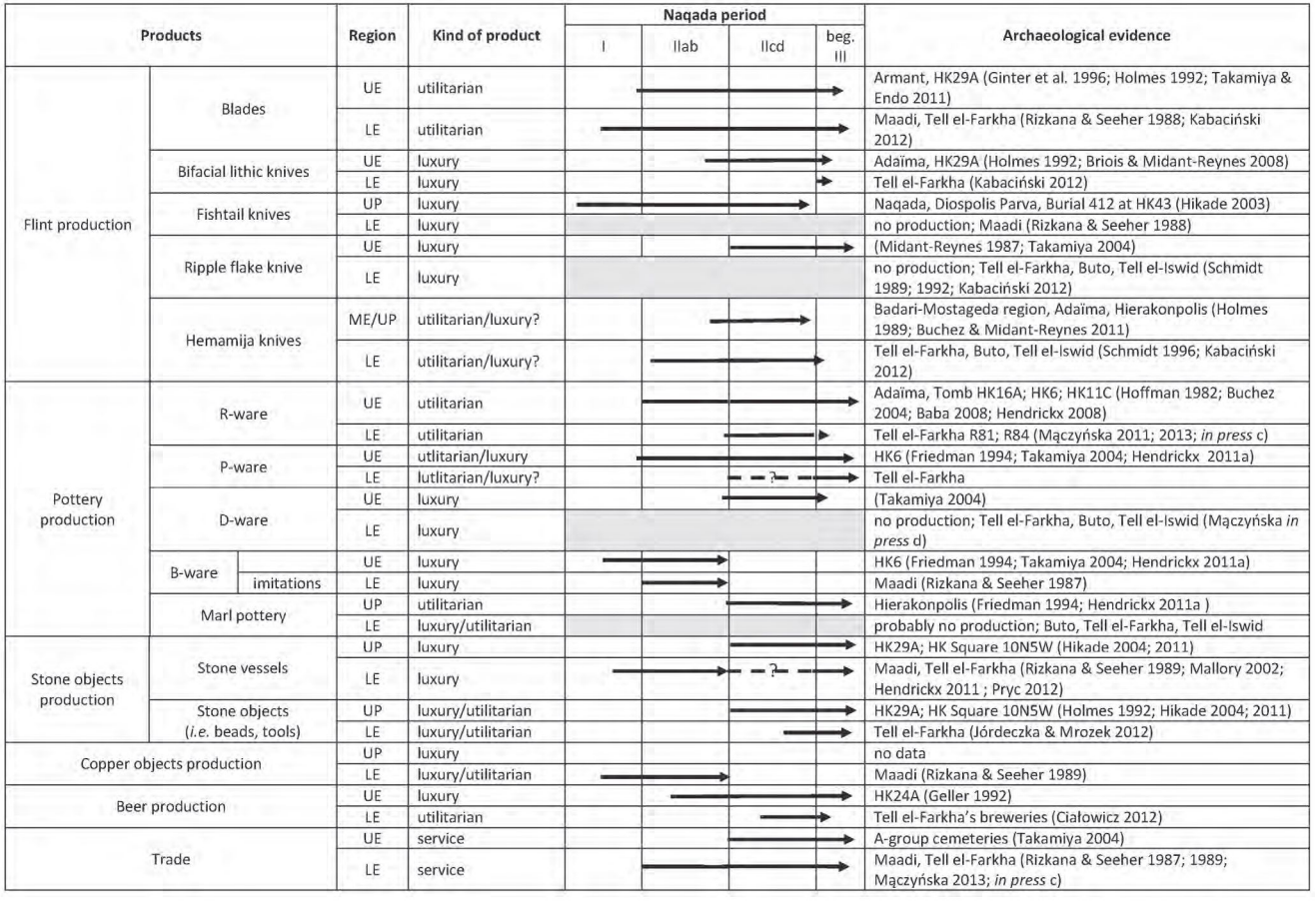
The first early Predynastic communities in the Nile Valley practiced agriculture combined with animal husbandry, satisfying their household needs through the production of goods in domestic context. This kind of subsistence economy created optimal, stable conditions for a steady growth of these populations. This in turn allowed for the accumulation of surpluses for the times of shortages, later transformed into the accumulation of goods for the exchange for other commodities. In response to growing demand for various items emerged the exchange market offering goods produced not in domestic context, but initially by part-time, and then by full-time specialists. It appears that pottery and stone implements were among the first goods that involved this mode of production. In the case of pottery standardization of vessels associated with specialised craftsmanship enabled easier and more effective production. Hence, the needs of growing population could be met, e.g. for basic, commonly used containers made from easily accessible Nile silt. Over time other workshops producing commonly available goods appeared. Furthermore, the demand for luxury goods associated with the increasing social stratification led to the appearance of a separate exclusive market offering commodities of high quality (e.g. flint knives, some types of pottery vessels, palettes). Goods of this type met the needs of emerging elites who used them to display their special position and validate their exceptional social status (Köhler 2010: 38-39).

3.1.1. The Naqada culture

In 2004 I. Takamiya presented the results of her research on the development of specialized production in the Naqada culture. According to the scholar in Naqada I period incipient specialization emerged in the lithic and pottery production (Fig. 2). Initially this was a part-time industry that involved the manufacturing of only a limited number of vessel types and flint implements. Among vessels produced by part-time specialists were probably Red polished and Black-topped wares. Their fine fabric, manufacturing techniques, surface treatment and firing conditions indicate that the production process must have been supervised by highly qualified persons. The same pertains to the vessels classified as D-ware. However, according to I. Takamiya a small quantity of D-wares, their non utilitarian character, wide distribution and style suggest that they were manufactured by full-time specialists.

Pottery from settlement sites dated to Naqada I and the beginning of Naqada II periods was represented mostly by utilitarian vessels classified as Rough ware (Friedman 1994; Mączyńska in press b), which were produced in domestic context in order to meet certain household needs. This observation suggests that specialisation in the south had a limited scope, including mainly symbolic contexts (grave goods). The good example in this case is settlement of Adaïma, where the majority of cooking vessels dated to the beginning Naqada II were produced in households for domestic purposes (Buchez 2004: 678-680). From the second half of Naqada II period onwards some types of vessels including Petrie's R81, R84 and L30 show a degree of standardization, pointing towards the production outside the domestic sphere. Specialised production of these vessels may have been associated with their function as early beer jars (Hendrickx *et al.* 2002; Buchez 2004: 680). This hypothesis can be further supported by the finds of pottery kilns in the brewery complex at Hierakonpolis (site HK11C), as well as by the relationship between brewery HK24A and the firing installation HK25D (Takamiya 2008: 200).

Interesting discoveries related to craft specialisation of the Naqada culture were made at Hierakonpolis (HK6). In Tomb16A a large number of vessels were found, with the majority of Rough jars with flat bases, low shoulder, wide mouth and simple, slightly reinforced rim (Hendrickx 2008). All of them are highly uniform, which suggests that they may have been produced in a single workshop or even by a single potter at HK11C (*cf.* Baba 2008: 665). They do not bear any traces of use, unlike other vessels from this tomb including Blacktopped jars with the traces indicating even heavily use. According to S. Hendrickx (2008: 77) Rough jars probably served the function of symbolic storage vessels provisioning the dead



Products			Region	Kind of product	Naqada period				Archaeological evidence
					I	IIab	IIcd	beg. III	
Flint production	Blades		UE	utilitarian					Armant, HK29A (Ginter et al. 1996; Holmes 1992; Takamiya & Endo 2011)
			LE	utilitarian					Maadi, Tell el-Farkha (Rizkana & Seeher 1988; Kabaciński 2012)
	Bifacial lithic knives		UE	luxury					Adaïma, HK29A (Holmes 1992; Briois & Midant-Reynes 2008)
			LE	luxury					Tell el-Farkha (Kabaciński 2012)
	Fishtail knives		UP	luxury					Naqada, Diospolis Parva, Burial 412 at HK43 (Hikade 2003)
			LE	luxury					no production; Maadi (Rizkana & Seeher 1988)
	Ripple flake knive		UE	luxury					(Midant-Reynes 1987; Takamiya 2004)
			LE	luxury					no production; Tell el-Farkha, Buto, Tell el-Iswid (Schmidt 1989; 1992; Kabaciński 2012)
	Hemamija knives		ME/UP	utilitarian/luxury?					Badari-Mostageda region, Adaïma, Hierakonpolis (Holmes 1989; Buchez & Midant-Reynes 2011)
			LE	utilitarian/luxury?					Tell el-Farkha, Buto, Tell el-Iswid (Schmidt 1996; Kabaciński 2012)
Pottery production	R-ware		UE	utilitarian					Adaïma, Tomb HK16A; HK6; HK11C (Hoffman 1982; Buchez 2004; Baba 2008; Hendrickx 2008)
			LE	utilitarian					Tell el-Farkha R81; R84 (Mączyńska 2011; 2013; *in press* c)
	P-ware		UE	utlitarian/luxury					HK6 (Friedman 1994; Takamiya 2004; Hendrickx 2011a)
			LE	lutlitarian/luxury?			?		Tell el-Farkha
	D-ware		UE	luxury					(Takamiya 2004)
			LE	luxury					no production; Tell el-Farkha, Buto, Tell el-Iswid (Mączyńska *in press* d)
	B-ware		UE	luxury					HK6 (Friedman 1994; Takamiya 2004; Hendrickx 2011a)
		imitations	LE	luxury					Maadi (Rizkana & Seeher 1987)
	Marl pottery		UP	utilitarian					Hierakonpolis (Friedman 1994; Hendrickx 2011a)
			LE	luxury/utilitarian					probably no production; Buto, Tell el-Farkha, Tell el-Iswid
Stone objects production	Stone vessels		UP	luxury					HK29A; HK Square 10N5W (Hikade 2004; 2011)
			LE	luxury			?		Maadi, Tell el-Farkha (Rizkana & Seeher 1989; Mallory 2002; Hendrickx 2011 ; Pryc 2012)
	Stone objects (*i.e.* beads, tools)		UP	luxury/utilitarian					HK29A; HK Square 10N5W (Holmes 1992; Hikade 2004; 2011)
			LE	luxury/utilitarian					Tell el-Farkha (Jórdeczka & Mrozek 2012)
Copper objects production			UP	luxury					no data
			LE	luxury/utilitarian					Maadi (Rizkana & Seeher 1989)
Beer production			UE	luxury					HK24A (Geller 1992)
			LE	utilitarian					Tell el-Farkha's breweries (Ciałowicz 2012)
Trade			UE	service					A-group cemeteries (Takamiya 2004)
			LE	service					Maadi, Tell el-Farkha (Rizkana & Seeher 1987; 1989; Mączyńska 2013; *in press* c)

Fig. 2. Development of craft specialization in Upper and Lower Egypt (on the basis of Takamiya 2004: tab.1)

in the hereafter. The scholar claims that the Rough jars from Tomb 16A "are the proof of specialized production which was probably organized in a professional workshop" (Hendrickx 2004: 80). In his opinion these vessels were not produced for daily use, but to serve a symbolic storage function. A large number of them placed in the tomb may have denoted the economic position of the deceased. Based on the dating of Tomb 16A to the beginning of the Naqada II period, Hierakonpolis is considered to have been the earliest centre of specialization in Egypt known so far.

Among other features probably associated with the development of specialisation in Naqada II period are technological changes in the production of pottery. In the opinion of R. Friedman (1994: 905-906) an increase in the occurrence of Rough wares can be observed at Upper Egyptian settlement sites dated to Naqada I to Naqada II periods. The growing number of Rough wares may have been associated with a decrease in fine ware pottery and the emergence of workshops. The production of Rough ware vessels was faster, cheaper and more efficient than the manufacturing of fine ware vessels. It was easier to make a workable paste tempered with dry straw, which additionally dried quickly, fired more rapidly and intensely. Due to the above characteristics, Rough wares could be produced on a mass scale. Vessels of this type, e.g. jars, were manufactured in workshops mostly for domestic purposes. By contrast, the production of fine ware pottery was labor-intensive, which is why the number of untempered Red polished wares diminished gradually and were finally replaced by Rough vessels. Other change possibly associated with specialised production was an increase in the number of marl clay vessels, well visible in the material dated the middle of Naqada II period onwards. According to R. F. Friedman (1994: 909), the appearance of marl clay ware in Upper Egypt may have been partly associated with the desire of the craftsmen to save labor and increase outputs. Possibly mainly for that reason Rough wares were gradually replaced by marl clay vessels starting from Naqada III period.

Significant technological progress in pottery production took place between Naqada IIIA1 and Naqada IIIA2 periods. Archaeological evidence points towards the production of standardized and cheaper vessels, the change associated probably with the appearance of pottery workshops in the settlement centres (Köhler 1997: 81-89; 1998: 63-72). The common use of rotating device and the production of many new vessel shapes is attested in that period. Furthermore , an increase in the number of good quality pottery of P-ware and S-ware can be observed. According to E. Ch. Köhler (1997: 81-89; 1998: 63-72) these changes may have been caused by increasing demand linked to the growing social complexity and/or changes in the socio-economic structure.

As far as flint production in the Naqada culture is concerned, D. Holmes (1989: 337-338) and I. Takamiya (2004) have shown that in Naqada I period some items, *e.g.* regular blades, were produced probably by part-time specialists. Research made by B. Ginter *et al.* (1996: 178-179) at the site of Armant has indicated the existence of blade workshop operated in Naqada I period. According to the scholars, at that time the settlement had some separated specialised sectors for the treatment of local raw material. In those sectors the researchers recorded the material representing a full sequence of production of blanks and bifacial tools, which would be a clear evidence for specialised production. In Naqada II period such specialized zones were replaced by workshops situated outside settlements, close to the local deposits of raw material. The exception in this case was the production of bifacial tools, which still took place within the settlement in that period.

Interesting observations have also been made in the case of flint finds recorded at Adaïma. F. Briois and B. Midant-Reynes (2008: 23-24) identified at the site two types of production: a local one involving simple methods, and a specialized one. The former was represented by the complete *chaîne opératoire* ranging from the raw material to finished tools. This was described by excavators as domestic production characteristic of a low level of technological advancement. In the case of second mode of production only finished tools were recorded in Adaïma, i.e. bifacial knives and roughly regular blades, the latter possibly used for the production of sickle blades. These items had probably been manufactured in specialized workshops outside the settlement.

In flint inventories dated to Naqada II period noteworthy are ripple flaked knives and fishtail knives. High quality of the knives with ripple flake surface retouch, attesting extensive skills of a flintknapper, suggests that they were produced in specialised workshops (Kelterborn 1984; Midant-Reynes 1987; Takamiya 2004: 1030; Briois and Midant-Reynes 2008: 21-22). According to T. Hikade (2003: 148-149) in the late Naqada II period late fish-tail knives were produced in the same workshops as ripple flaked knives, probably by the same group of flintknappers, most likely over many generations. Although those two types of knives were manufactured with different techniques, they both required a careful selection of raw material and several stages of production, each involving different range of skills until the knife was finished by a fine serration of the cutting edge. A flint workshop was recorded at HK29A site at Hierakonpolis. It specialised probably in manufacturing flint bifacial tools, i.e. knives and projectile points (Holmes 1992; Takamiya 2004; Hikade 2011: 84; Takamiya and Endo 2011: 740-741).

Over time, specialisation embraced also other crafts in Upper Egypt. Stone tools and stone beads, whose manufacturing required considerable effort and the amount of work, were produced in professional workshops, e.g. „temple workshop" HK29A or workshop at Square 10N5W at Hierakonpolis (Hikade 2004; 2011a: 84; Takamiya 2004).

Specialised production involved most likely the production of beer. The brewery HK 24A at Hierakonpolis produced probably 390 liters of beer per day, the amount exceeding the local needs (Takamiya 2004: 1032). In this case not only the production process, but also storage system and beer distribution had to be supervised by specialists.

Probably already in the Naqada II period, beside the local trade network, involving beer, pottery vessels and flint implements, there existed also a long distance distribution network of some goods, reaching probably Lower Egypt, Southern Levant and Nubia. Naqadian ripple flaked knives, palettes, beads and vessels were registered at Lower Egyptian sites in the context contemporary to Naqada I and II period (Maadi, Buto, Tell el-Farkha). The appearance of these imports in the north, although in small quantities, must have been associated with the involvement of the Naqada culture representatives (traders?) interested in goods accessible in the north including, items imported from the east. Thus, the Naqadians would have been responsible for the exchange and negotiations with trade partners, i.e. Lower Egyptians and/or Southern Levantines.

In the Naqada III period specialised craftsmanship reached a mass production level, especially in the case of highly standardized pottery and lithic assemblages. This mode of production emerged in a variety of fields as a kind of response to the increasing demand for both utilitarian and symbolic prestige items (Hendrickx 2011a). Its development was influenced also by long-distance trade involving the movement of goods along the Nile to the south and north, as well as by growing complexity of the Naqadian society. In the Naqada III period already well established elites needed prestige goods to display their special position and validate their high social status.

3.1.2. The Lower Egyptian culture

The Lower Egyptian assemblages have often been regarded as unspectacular in comparison to Upper Egyptian ones. According to B. G. Trigger (1983: 26) the northern sites „are distinguished from those of Upper Egypt by their monochrome, mainly undecorated pottery and by greater scarcity of jewellery, sculpture and decoration". Hence, it was natural for scholars to assume that the Lower Egyp-

tian culture had been characterised by a domestic mode of production. Today our knowledge concerning Lower Egypt in the 4th millennium BC is more complex. We are aware of imbalance between the available data from the south and north of Egypt. From this perspective, it is worth to re-examine the assemblages of the Lower Egyptian culture in terms of craft specialisation.

Undoubtedly the production of tools and other objects by the communities of the Lower Egyptian culture was based primarily on local resources, i.e. silt, flint, stone and animal bones, which came mainly from the Delta and possibly from the neighbouring areas. The use of locally available raw materials is interpreted as a sign of the adaptation of the Lower Egyptian communities to their environment. These resources were relatively easily accessible and did not generate high costs of transportation. The only exception in this case was copper, the resource imported all the way from Sinai through EBI centres of the Southern Levant (Mączyńska 2013).

The artefacts of the Lower Egyptian culture are represented by a markedly predominant group of strictly utilitarian items used in households, i.e. pottery vessels, flint and stone implements, and bone tools (Mączyńska 2013). The majority of them were manufactured probably by the representatives of the Lower Egyptian culture in domestic context for the needs of daily activities. In the case of pottery, features such as technological properties, mode of production and firing conditions point towards the absence of specialised production. E. CH. Köhler (1997: 81-89) describes this time as a household production stage.

Probably also some basic flint tools (e.g. endscrapers, burins, perforators, backed pieces and truncated blades) were produced in households from a widely available gravel flint. At Maadi settlement a large number of unused pebbles and cores with one or two platforms were recorded, which had been abandoned due to their internal flaws. According to I. Rizkana and J. Seehera (1984: 237; 1988: 14-16) these finds may indicate that knapping process took place within the settlement. Bone implements found at the site (e.g. awls, spatulas, pins and needles) were produced from widely available post-consumption remains. As far as stone implements are concerned, only the simplest ones (grindingstones and hammerstones of sandstone quartzite) may have been produced in households for daily needs, as the production of other kinds of flint objects required more effort and expertise. Interesting observations have been made by M. Jórdeczka and M. Mrozek-Wysocka (2012) with regard to stone items recorded at Tell el-Farkha. The researchers demonstrated that grinding stones and hammerstones may have been multifunctional, having application in the processing of other stone tools, crushing and grinding of dyeing materials, as well as crushing and grinding of plant foods.

However, it appears that not all archaeological assemblages recorded at the sites of the Lower Egyptian culture were characterised by a household mode of production (Fig. 2). Some ceramics, flint and stone items could have been produced by specialists. The type of specialization (part-time or full time) and its degree are difficult to determine due to the scarcity of data, including the lack of recorded workshops in the north. Only in the case of some items at least partly specialised production can be identified.

In ceramic assemblages noteworthy are imitations of blacktopped vessels found at Maadi. Even if those items failed to achieve the quality of the Upper Egyptian ones, their production undoubtedly required special skills, including advanced knowledge of the manufacturing and firing process (Rizkana and Seeher 1987: 51-52; Mączyńska 2013; in press c). Also Red polished wares, which were recorded in Lower Egyptian pottery inventories in small quantities, may have been produced by specialized potters, similarly as in the case in Upper Egypt (Friedman 1994: 876; Takamiya 2004: 1030-1031). What distinguished these wares from Rough ware vessels was fine fabric, which had to be prepared from Nile silt, tempered with fine sand and covered with red slip. The manufacturing of Red polished vessels required adequate knowledge of the production process and firing conditions. We cannot rule out that some of the vessels covered by red slip and burnished came to the north from Upper Egypt. However, local derivation can be corroborated in the case of vessels made from Nile silt tempered with long and very thin organic filler typical for the north, known as fibrous temper (e.g. at Buto, Tell el-Farkha, Tell el-Iswid). The notion of specialised production of Red polished ware can be further supported by the presence of Rough vessels covered with red slip in ceramic assemblages (*e.g.* Tell el-Farkha). The latter, due to lower technological requirements, could be produced in domestic context.

Analysing the production of pottery throughout the course of the Lower Egyptian culture one can observe some technological changes that may have been related to the development of specialisation. These changes, comparable to ones that took place in the south, involved an increase of Rough wares and a decrease of Red polished wares (recorded at Tell el-Farkha) associated probably with the need to simplify production (Mączyńska in press a).

The manufacturing of some flint implements required skills in knapping and debitage techniques. Specialised production of these items is attested at the site of Maadi, where apart from the prevailing gravel flint, also nodular flint was recorded among raw material finds. The latter is represented mostly by long and wide blades. According to I. Rizkana and J. Seeher (1984: 237; 1988: 14-16) a small

number of cores recorded within the site may point to the existence of workshops beyond the settlement area. The fossil flint recorded at Maadi had been most likely extracted at Abu Rawash, 20 km north-west of the settlement. Another finds produced in professional workshops are the Hemamija knives found at the sites of Tell el-Farkha, Buto, Tell el-Iswid (Schmidt 1989; 1992; 1996; Kabaciński 2012).

Specialised craftsmanship may also have involved some stone implements and vessels. M. Jórdeczka and M. Mrozek-Wysocka (2012), who investigated stone material from Tell el-Farkha, identified the traces of activities associated with reworking of worn and damaged implements at the site. They based their conclusions on the finds of both finished objects and numerous flakes, as well as production waste generated during core drilling. Moreover, several dozens of quartzite and sandstone semi-finished products were recorded at the site with characteristics suggesting an early stage of preparation of grinding stones and hammerstones. Some other techniques applied to stone production were also identified in the material from the site, i.e. removal of protruding elements, surface roughing, grinding, smoothing and polishing. E. Ch. Köhler (in press) claims that basalt bowls may also have been produced by specialists, as their manufacturing required adequate skills and effort. Although no workshops have been recorded at Maadi, a large number of broken and repaired stone vessels found at the settlement may suggest that their production took place in the vicinity (Mallory 2000: 95-96; 179; Mallory-Greenough *et al.* 2002).

Although archaeolgical evidence on metallurgy in the Lower Egyptian culture is scarce, it seems likely that the production of copper items, requiring adequate equipment and the knowledge of production process, was a specialised activity. So far the largest number of copper objects has been recorded at Maadi. Most probably the resource reached Lower Egypt in the form of ore as well as smelted semi-finished products. No traces of activities related to the smelting of ore were recorded at the site. A mention about the existence of metallurgical workshop at Maadi was made by K. H. Dittmann in 1936, in the publication concerning the archaeological investigations in Egypt, with reference to oral information by M. Amer (Dittmann 1936: 158). The majority of scholars claim that the ore was used more as a green dye than a raw material in metallurgy. I. Rizkana and J. Seeher (1989: 79) also believe that smelted copper found at the site may not have derived from the same source as the ore. Probably it was uneconomic for the inhabitants of Maadi to import large amounts of heavy ore, and then process it at the site. They may have preferred to import already smelted material in the form of ingots of a specified weight (3 ingots are known weigh-

ing ca. 825g) for producing implements (Rizkana and Seeher 1989: 17, pl. 4). Stylistic analysis of copper items from Maadi has indicated that they were local forms, different from those recorded in the Levant. According to B. Midant-Reynes (1992: 102) the Maadi community adopted the resource and processing techniques from their eastern neighbours, and then developed their own forms and stylistics of copper objects, adding to the metallurgy of the Delta in the 4th millennium BC. On the other hand, the absence of traces pointing to the smelting of ore is not necessarily the evidence that the activity was not performed at the site. According to L. Watrin (1998, 1218; 1999) a workshop specialised in copper processing may have been situated in the part of the settlement which was destroyed or not examined so far.

Craft specialisation within the Lower Egyptian culture involved probably also other activities. Discoveries of several big breweries at Tell el-Farkha point towards the existence of a large brewery centre producing beer on a great scale (Cichowski 2008; Adamski and Rosińska-Balik 2014). It seems that beer production involved a certain form of specialization. Producing a beverage of good quality depended on following the adequate procedure. Beer production required one to prepare cereals and then to monitor the brewing process (Kubiak-Martens and Langer 2004). A relatively large number of breweries discovered at Tell el-Farkha, as well as their well-organized network suggest the presence of a person (or persons) in charge of supervising beer production, and probably also the distribution of ready-made beverage. The separation of the breweries from other parts of the settlement by means of a mudbrick wall also suggests that beer production was a specialized occupation (Takamiya 2004: 1031-1032; Mączyńska 2013; in press c).

Finally, specialization may have involved trade activity, which required the engagement of people in transport and negotiations with trade partners (Takamiya 2004: 1033). Numerous imports from Upper Egypt and Southern Levant were recorded at the sites of the Lower Egyptian culture (Mączyńska 2003; 2006; 2013; 2014; in press c).Their presence suggests the existence of centres (e.g. Maadi, Tell el-Farkha), which were responsible for long-distance contacts and exchange with the above mentioned regions (Chłodnicki and Geming 2012; Ciałowicz 2012). They could have served as meeting places for people of different origins, who were most likely exchange partners: Naqadians, Southern Levantines and Lower Egyptians. The local societies took part in, probably organized and benefited from the exchange of goods and ideas in an active way.

3.1.3. Summary

The analysis of available data has not shown significant differences in craftsmanship between Upper and Lower Egypt (Fig. 2). They rather indicate a parallel development of the two regions. At this point it should be emphasised that our knowledge concerning craft specialization in Upper Egypt is based primarily on the material that came from cemeteries, i.e. grave goods, which due to their sophisticated character and very high quality must have been made by specialists. The problem of the character and organisation of specialised workshops has not been addressed due to insufficient data. Some new information concerning the development of craft specialistaion in Upper Egypt may be provided by the research carried out in recent years at the sites of Hierakonpolis i Adaïma.

As demonstrated above, the Lower Egyptian culture has long been compared to the Naqadian one without considering the character of the data, which often resulted in erroneous conclusions. Our knowledge of the northern culture has been enriched in recent years due to the excavation works carried in the region, particularly at Buto and Tell el-Farkha.

The analysis of the available data has shown that the development of craft specialization in the north began approximately at the same period as in the south, and its course was somehow parallel in both the regions. However, the communities in question lived in two different environments, had access to varied resources, and in effect generated different needs. Also the relationships with neighbouring regions may have had some impact on the needs of a given group, and in consequence, on craft organization.

A feature that both the regions have in common is a distinct specialised production of utilitarian and symbolic items. However, while in the south symbolic objects were put into graves to denote social position of the dead from the end of Naqada I, in the north the practice of equipping burials in luxury items did not appear until the second part of Naqada II. According to E. Ch. Köhler (in press) the northern communities did not have a custom of depositing valuable objects in graves.

3.2. Social organization

The development of craft specialization in Egyptian societies was strongly associated with their social organisation. Stable economy and abundant environment permitted the accumulation of surpluses not only for the times of hunger. The accumulated goods could be further transformed into other forms of wealth – pottery, stone or flint objects etc. The growing disparity in wealth between members of the same community resulted in the emerging of new elites in Naqada II period (Köhler 2010).

The process of social differentiation and the emergence of elites are difficult to interpret on the basis of archaeological evidence. The investigations concerning social organization of the past societies are inseparably linked with the study of funerary rituals, in accordance with the notion that social divisions in earthly life could have affected the organization of a given community's afterlife (*cf.* Savage 1997; Stevenson 2009). Social status of an individual could have been preserved also after his/her death by means of grave architecture, grave goods or even funerary rites. Large number of offerings, sometimes highly valuable, or unusual grave structure, may have denoted the individual's position (vertical differentiation) or his/her sex or age (horizontal differentiation). The existence of relationships between social organization on the one hand, and funerary practices on the other, has been frequently discussed among archeologists and anthropologists (*i.e.* Binford 1972: 208-243; Hodder 1982: 201; O'Shea 1984). However, scholars investigating the problem must remember that a funerary practices of a given society should not be treated as a consequence of an isolated process, but rather of a number of intertwining processes - demographic, social, ritual, symbolic, geological, depositional, and statistical (Braun 1981: 412). Also many other factors, elusive from an archeologist's perspective, could have affected funerary practices (Ucko 1969: 275).

3.2.1.The Naqada culture

In the case of the southern sites social changes can be best observed in funerary practices, which show an increase in the quantity of grave goods and, at the same time, a decline in a number of richly equipped graves. Given that the quantity and quality of offerings were meant to reflect the rank of a deceased, the differentiation according to social status is clearly visible in the material from Upper Egyptian cemeteries from the beginning of Naqada II period, and its first traces are recorded even at the close of Naqada I period (Guyot 2011: 1258). Social divisions in the Naqada culture were additionally emphasised by the existence of isolated parts of cemeteries or even separate burial grounds for the elites, *e.g.* cemetery T at Naqada, cemetery U at Umm el-Qaab, HK6 at Hierakonpolis (Midant-Reynes 2003: 191-216; Wilkinson 2000; Köhler 2010; Friedman *et al.* 2011).

B. Midant-Reynes (2003: 163-165) draws attention to two important phenomena in the funeral practices recorded at Naqadian cemeteries, namely accumulation and ostentation, which were associated with the separation of elites from the society in Naqada II period. High number of rich graves, and the quantity and quality of grave goods were to reflect social divisions (Savage 1997: 244-247; Bard

2000: 62). According to E.Ch. Köhler (2010: 44) at this stage a ranked or two-tiered society emerged consisting of elites and commoners.

The archaeological evidence on the existence of elites is considerable, as it includes ca. 15000 graves (Hendrickx and van den Brink 2002). However, the majority of graves were explored in the 19th century according to the contemporary standards, which caused significant loss of information concerning different aspects of funeral practices. Hence, much attention is paid today particularly to the recent research conducted in the region, among other sites at Hierakonpolis (Friedman et al. 2011).

The elite cemetery HK6 at Hierakonpolis is one of the most interesting sites showing the development of social complexity of the Naqadian society. Particularly notable is the Tomb 16 complex, the largest known one of this kind in NIC-IIA (Friedman et al. 2011). It had probably a superstructure, and was interconnected with a wider complex of enclosures containing a range of smaller tombs. Apart from huge amount of pottery and probably two ceramic masks recorded at the site, noteworthy is the whole organization of the complex, with fences, numerous human and animal burials, indicating that the special social rank of the diseased was emphasised already in that period (Friedman et al. 2011: fig. 3).

The development of the southern communities resulted in the emergence of polities governed by rulers in Naqada III period. This kind of a society was characterised by several social ranks including family members, officials, artisants, craftmen, farmers and laborers (Köhler 2010: 44).

3.2.2. The Lower Egyptian culture

The Lower Egyptian community has generally been seen as egalitarian, and thus free from social differentiation (Midant-Reynes 1992: 116; Commenge and Alon 2002: 140; Kemp 1989). This view has been based primarily on frequent comparisons of the Lower Egyptian culture to its contemporary Naqada culture, which showed a contrast between rich Naqadian graves and simple burials recorded in the north. However, such comparisons are not entirely reliable due to the imbalance of data available for those two cultural units. In the case of the Naqada culture 85 necropolises are known, while in the Lower Egyptian culture only several ones have been recorded so far. Despite the ongoing research in the north the knowledge concerning funerary practices of the Lower Egyptian culture is still poor. By now only 3 separate studies, concerning the material from the cemeteries at Maadi, Wadi Digla and Heliopolis, have been published. The cemetery at Kom el-Khilgan still awaits publication. Undoubtedly, important

moment for the discussion about burial customs of the Lower Egyptian communities, and hence their social structure, has been the identification of the oldest graves from the cemetery at Minshat Abu Omar as Lower Egyptian ones (Köhler 2008; Mączyńska 2013; 2014).

In terms of size and depth grave pits recorded at all known Lower Egyptian cemeteries are similar and they do not seem to indicate the social status or the age of the deceased. Even the youngest Lower Egyptian graves from group I at Minshat Abu Omar were shallow, and bodies were interred in them without any special preparations, probably immediately after the pit was dug. K. Kroeper (2004) concluded that neither the size nor the depth of graves was of importance in the period in question, and there was no a standardized grave size. Initially burials were characterised by a high degree of similarity and scarcity of offerings. This may have indicated the similar social status of the dead. In the oldest Lower Egyptian communities, which buried their dead at the cemeteries at Maadi, Wadi Digla or Heliopolis, it was uncommon to emphasise the importance of a dead person by means of a number and/or unique character of goods. Similar situation can be observed in the graves dated to Naqada IIC at the necropolis of Kom el-Khilgan. Only burials of group I from Minshat Abu Omar show considerable differences in terms of grave goods (Fig. 3).

Considering the available data, it would seem that one important element in the development of the Lower Egyptian culture is missing, namely the moment of change in burial customs, which manifested itself in the greater number and better quality of grave goods. The absence of graves dated to Naqada IID at Kom el-Khilgan is certainly an obstacle in the investigating of this problem. However, the data from settlement sites, including Buto and Tell el-Farkha, have not indicated any change in Naqada II period that would have been so important as to result in major changes in burial customs. The archaeological evidence points rather to continuous development of all the aspects of the Lower Egyptian communities, including craft specialisation, as was described above.

We can accept the hypothesis that initially the inhabitants of Lower Egypt had no need to distinguish their dead through architecture, grave size, or quantity and quality of grave goods. This does not mean, however, that a special social status was not validated in a different way. Maadi is one of the key settlements for the understanding of this problem. The research at the site corroborated the existence of trade exchange with Upper Egypt and Southern Levant and the emergence of specialized production of certain items (copper objects, basalt bowls). Although the inhabitants of Maadi possessed certain exotic imports (vessels, knives, pal-

SITE	NO GRAVES	PIT SHAPE	BODY POSITION	ORIENTATION OF				AVERAGE NO. OFFERINGS	NO. ALL OFFERINGS IN THE RICHEST GRAVE (NO OF CERAMIC VESSELS)
				BODY	HEAD	FACE	HANDS		
MAADI	75	OVAL	CONTRACTED, IN SOME CASES WRAPPED	LEFT OR RIGHT SIDE	NORTH SOUTH	WEST EAST	BEFORE FACE	1-2	4 (3)
WADI DIGLA	470	OVAL	HALF CONTRACTED	LEFT OR RIGHT SIDE	NORTH SOUTH	WEST EAST	BEFORE FACE	1-2	48 (1)
				WDII – MOSTLY RIGHT SIDE	SOUTH	EAST			
HELIOPOLIS	71	OVAL	HALF CONTRACTED WRAPPED	RIGHT SIDE	SOUTH	EAST	BEFORE FACE	1-10	12 (10)
KOM EL-KHILGAN	226*	OVAL	CONTRACTED	LEFT OR RIGHT SIDE	NORTH WEST	WEST EAST	BEFORE FACE	1-2	?
MINSHAT ABU OMAR	255	OVAL	HALF CONTRACTED	LEFT SIDE	NORTH	WEST	BEFORE FACE	2-5	33 (16)

* All graves dated to phases 1 to 3 including Naqadian graves (Buchez & Midant-Reynes 2011: 835)

Fig. 3. The Lower Egyptian cemeteries

ettes) they did not use them as grave goods. Among the more interesting finds recorded at Maadi are Blacktopped vessels and their imitations. In Upper Egypt vessels with black tops were used mostly as grave goods, and thus they are hardly found at settlements. It appears that although Lower Egyptians from Maadi used vessels imported from the south and imitated them locally, they did not follow the southern custom of their use as grave goods. Blacktopped vessels were not recorded in any grave at Maadi and Wadi Digla cemeteries, as they had been used probably only the settlements (Mączyńska 2013; in press a). The above context gives a new meaning to the statement by M. A. Hoffman (1979: 209) quoted by E. K. Köhler (in press) discussing social complexity of the Maadi inhabitants: "[merchants from this site] preferred to invest most of their extra wealth in trade, storage and metallurgy rather than in fancy tombs and luxury goods".

Different situation can be observed in the oldest graves at Minshat Abu Omar. Over 20% of them contain 1 or no offering, and more than 50% comprise 2 to 5 ones. The remaining burials contain more than 6 grave goods, which distinguishes this cemetery from Maadi, Wadi Digla and Heliopolis (Fig. 3; Kroeper 2004: Tab. 6). Grave 330, the richest one of group I, enshrining a female (?) aged 17 or 18 contained 33 offerings: locally manufactured pottery vessels, a single vessel of Southern Levantine origin, stone vessels, stone beads, flints, shells and a bone spoon (Kroeper and Wildung 1994: 116-122). Grave 231 with the second largest number of goods belonged to a male aged 20 to 40 and contained 25 items, including a W-ware vessel, stone balls, a flint knife and two decorated needles.

According to K. Kroeper (2004) the number of grave goods was the key factor differentiating graves from one another. She stated that the 33 offerings could have accompanied a leader or chieftain, and the high number of offerings reflected his/her social status rather than wealth. However, the analysis of grave offerings from Minshat Abu Omar suggests that it was not only the number of offerings that mattered. Particularly remarkable are grave goods from beyond Lower Egypt (from the south and the east), innumerous when compared to local objects, and distinguished in terms of form and raw material. All imported items were found in graves containing at least 3 offerings, while most of them were registered in graves with more than 6 offerings. Limited availability of goods imported from beyond Lower Egypt, as well as their different form and material must have made them particularly valuable. A fine example is grave 313, containing only 3 items, 2 of which are local Rough ware vessels and the third one is a Southern Levantine keg form vessel. Judging by the number of grave goods only, one would classify this particular burial as poor. However, it seems likely that the value of one of the grave goods, i.e. the Southern Levantine vessel, denoted a special position of a woman buried in that grave. It seems that the presence of rich graves at Minshat Abu Omar was associated with active participation of the community that buried their dead at that cemetery in the exchange between Upper Egypt and Southern Levant. Possibly the exchange was supervised by individuals-leaders, who in the result were given a special social status and access to imported goods. Naqadian or Levantine vessels, copper objects, stone vessels or flint knives may have been the items of local exchange, as well. However, in this case, due to their high value, items of this kind would have been possessed only by some members of the society (Mączyńska 2013; 2014; in press b).

The presence of a leader (or leaders) in Lower Egyptian communities can be inferred also from other discoveries. The high number breweries at Tell el-Farkha and their highly-organized structure suggest the presence of a person (or persons) in charge of supervising beer production. Although we are unable to determine the social status of such a supervisor(s), it seems likely that the function itself distinguished one(s) within the community. Furthermore, it is unquestionable that the amount of beer produced in this large brewery center must have been greater than the local demand for this liquid. Food surpluses – such as beer or even pork meat – could have been exchange goods (Mączyńska 2013).

Excavation works revealed two major buildings at the settlement of Tell el-Farkha which are markedly different in terms of form and size from all the previously known Lower Egyptian structures. The first one, located in the central part

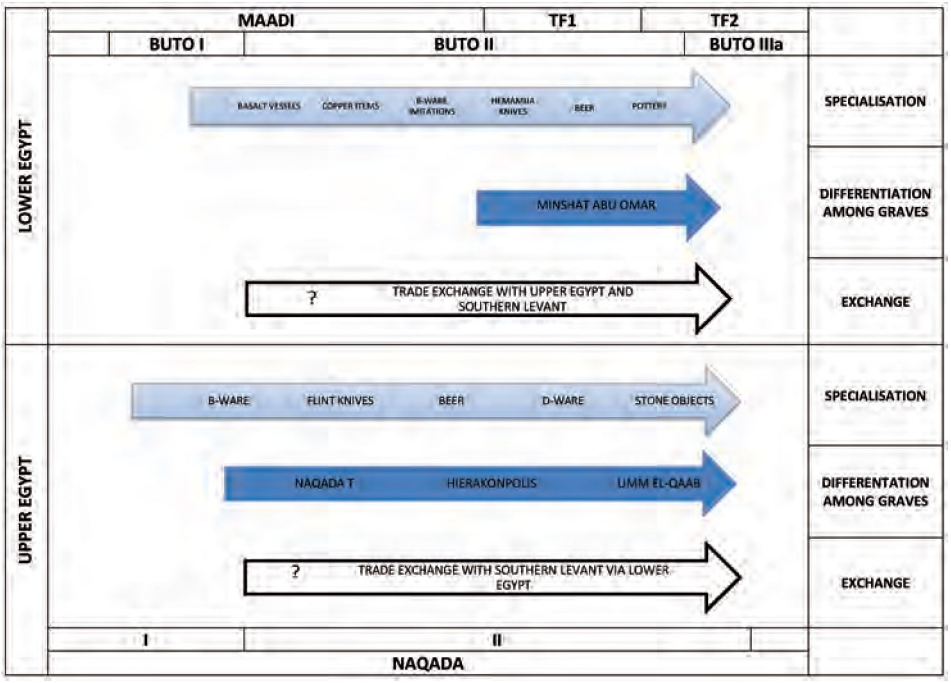


Fig. 4. The development of the Upper and Lower Egypt in the Predynastic period

of the hill, had a distinct courtyard and was divided into a number of rooms. Its location in the vicinity of the brewery may suggest that it was used not only for residential purposes (Cichowski 2001; Mączyńska 2013). The other building, referred to as the Lower Egyptian residence, is also unique due to its form, objects found within it and the presence of a mudbrick wall. It seems that the building, associated probably with commercial exchange, must have played an important role for the inhabitants of the settlement (Chłodnicki and Geming 2012).

3.2.3. Summary

In the light of the available data on craft specialization of the Lower Egyptian communities and their engagement in the exchange between Upper Egypt and Southern Levant it is difficult to maintain the notion about egalitarian character of the northern culture. We cannot exclude that social changes in the north had a similar course to those in the south (Fig. 4). Subsequent stages of social development can be observed in both the regions: economic stabilization and population growth, exceeding the household mode of production, and accumulation of

surpluses. Intensification of exchange in the middle of Naqada II period was an important factor in this development, as it enabled the access to imported objects, i.e. ceramic vessels, flint tools or stone objects, distinct from widely available, locally produced items. The data obtained from settlements, particularly from Tell el-Farkha and Buto, have shown that the quantity of imports from the south and east grew at that time. In the south, Naqada II was a period of intensive social stratification and formation of elites, who desired prestige goods for denoting and validating their special position and status. Luxury items could be obtained through the participation in the interregional trade network (Köhler 2010: 39; Guyot 2011: 1257). It seems that the Lower Egyptian culture saw changes in social complexity approximately at the same time. Those changes were related to the development of craft specialization and intensification of interregional contacts involving the exchange of goods and information. The community that buried their dead at Minshat Abu Omar took part in the exchange between Upper Egypt and Southern Levant and derived benefits from this participation and (likely) intermediation (cf. Mączyńska 2014; in press c). This activity must have had an impact on the social complexity. A similar situation relates to Tell el-Farkha, which, with its considerable number of discoveries (i.e. brewing center, special purpose buildings, imports, mudbrick walls and its location), is considered as a center of commercial exchange between Upper Egypt and Southern Levant (Chłodnicki and Geming 2012; Ciałowicz 2012; Czarnowicz 2012; Mączyńska 2013). Involvement in trade gave the inhabitants of Tell el-Farkha and Minshat Abu Omar easy access to imports. Items of the southern and eastern origin regularly reached the settlements, and some of them remained in the hands of their inhabitants. Undoubtedly, the exchange had to be managed and controlled by an individual or a group, who in the result gained a special social status. Furthermore, it is possible that such a function involved material benefits. At the current state of research and with a small number of publications our understanding of this issue is incomplete. The only archeological materials available for investigations are grave goods including imports distinguished from locally produced items by their form, material and probably value.

4. Conclusion

The problem of relationships between the Naqada and the Lower Egyptian cultures is still open to discussion. In the light of comparisons presented in the paper, the two units do not differ in terms of social organization and craft specialization to such an extent as was previously assumed. Undoubtedly they

underwent similar stages of development: the adaptation of new economic strategy, stability and population growth, the emergence and development of craft specialization, and the differentiation of society. Each of these stages was dependent on external factors (such as environment, available resources), and also on the choices of people being active participants in the culture. Therefore the development of both the units was not identical, and showed some regional features, *e.g.* prestige grave goods denoting social position of the dead in the south or the absence of such items in the graves of the north. In both the regions noteworthy are strong dependencies between craft specialization, social development and exchange activity.

The comparison of the Naqada and the Lower Egyptian cultures poses many problems, mainly due to the imbalance of archaeological data. The difficulties do not concern only the character of evidence (mortuary vs. settlement), but also the quantity and quality of the data available for both the regions. Hopefully, the information provided each year through excavations carried out in both the regions will supplement our knowledge on these two cultures.

An important step forward would be the recognition of the Naqada and Lower Egyptian cultures as non-homogenous units showing strong regionalism, with centres inhabited by societies similar with regard to features that resulted from belonging to a wider cultural community, but different in terms of location, access to resources, tradition, preferences and people's choices. The analyses of assemblages from Hierakonpolis, Abydos and Naqada regions made by R. Friedman (1994) have shown some variations within the Naqada culture. The Lower Egyptian culture is also regarded as a set of non-homogenous unites showing some features in common, but also many differences, not only in chronology, but in the degree of influence of environment and other local circumstances (Mączyńska 2011; 2013). On the one hand, the rejection of homogeneity of the two units makes their comparisons difficult. On the other, the identification of traits influenced by local circumstances allow for focusing on the fundamental features that those Predynastic cultures had in common.

Recent discoveries and research projects, including Tell el-Farkha, have shown that our knowledge of the Naqada and the Lower Egyptian cultures is constantly changing. The comparison of these two units, by challenging stereotypical views presented in the literature, sheds new light on the understanding of the Predynastic Egypt. Given the growing number of data, the comparisons involving other aspects of both the cultures would certainly be an invaluable source of information on the period in question.

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Hunter-Gatherers and Early
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Karolina Rosińska-Balik

Proto- and Early Dynastic graves from Tell el-Farkha (Egypt) in three-dimensional view. A case study of grave no.100

The methods and techniques of field work documentation are constantly being improved. In the era of visual media it was necessary to upgrade traditional drawings and recording of structures unearthed during archaeological prospection. The documentation process of excavated sites was always crucial especially when considered feature, accordingly to specific destructive character of archaeological examination, is accessible for the researcher for limited time. In parallel to graphical and visual improvement go possibilities of data interpretation. The new way of view gives not only eye-catching images but could be a great resource for further considerations, testing hypotheses or research result presentation.

The omnipresent pressure to visualize has forced archeologists to make their results more appealing by means of the easiest and most accessible forms of drawings, photographs and eventually photorealistic computer reconstructions, which are often more expressive than a thousand words. Such reconstructions can become a didactic tool, facilitating for example acquisition of knowledge of architecture. This statement is true not only for book publications, but also for multimedia presentations of different kinds. Internet use is a particularly good example. The photorealistic reconstructions in a three-dimensional view are the main objective of this paper. As a case study the very unique grave no. 100 from the necropolis of Tell el-Farkha in Egypt has been chosen.

Tell el-Farkha site

Tell el-Farkha is a site located at the northern edge of the Ghazala village in district el-Sharqiya in the Eastern Nile Delta. It consists of three mounds and covers an area of about 4.5ha with the highest point of 5m above surrounding fields. The discovery of this site just like another 30 was made during Italian Archaeological Mission to the Eastern Nile Delta in 1987. The Italians performed only three years of trial excavations and were able to distinguish chronological range of the site. Without spectacular finds they suspended research and later on resigned from the concession. Since 1998 Tell el-Farkha is under examination by Polish archaeologists led by Marek Chłodnicki from Poznań Archaeological Museum - former member of the Italian Mission (Chłodnicki 2012a: 9-15)and Krzysztof Ciałowicz from the Institute of Archaeology, Jagiellonian University in Kraków.

The site consists of three tells (koms) according to their location labeled Western, Central and Eastern. On each of them different activities took place during over 1000 years of the settlement existence. The chronological range covers periods from the Lower Egyptian Culture (called earlier the Maadi-Buto culture) until the Old Kingdom (Naqada IIB - Dynasties 3-4) and was divided into seven occupational phases.

Western Kom

The earliest evidence of its occupation come from the Lower Egyptian culture. The Western Kom fulfilled back then the function of habitat zone with simple structures which quickly transformed into industrial zone. The sequence of brewery devices were located there. The subsequent breweries, constantly rebuilt in the same spot with maximum 13 vats at the onetime, suggest great significance of beer production most probably as a trade good. The industry area in later phase became the most important one since the large sized edifice were erected there. This so called Naqadian residence was not only an administrative but also cultic centre since apart from many examples of seals, seals impressions and tokens found there, the unique deposit of over 60 figurines, miniature vessels and models was discovered (Ciałowicz 2012a; 2012b).

Central Kom

The Central Kom, which is also the highest one, reveals remains of settlement lasting for over 1000 years. At the very beginning inhabitants from the Lower Egyptian culture established here a separated from ordinary houses large building – Lower Egyptian residence. The size and special treatment of the area together

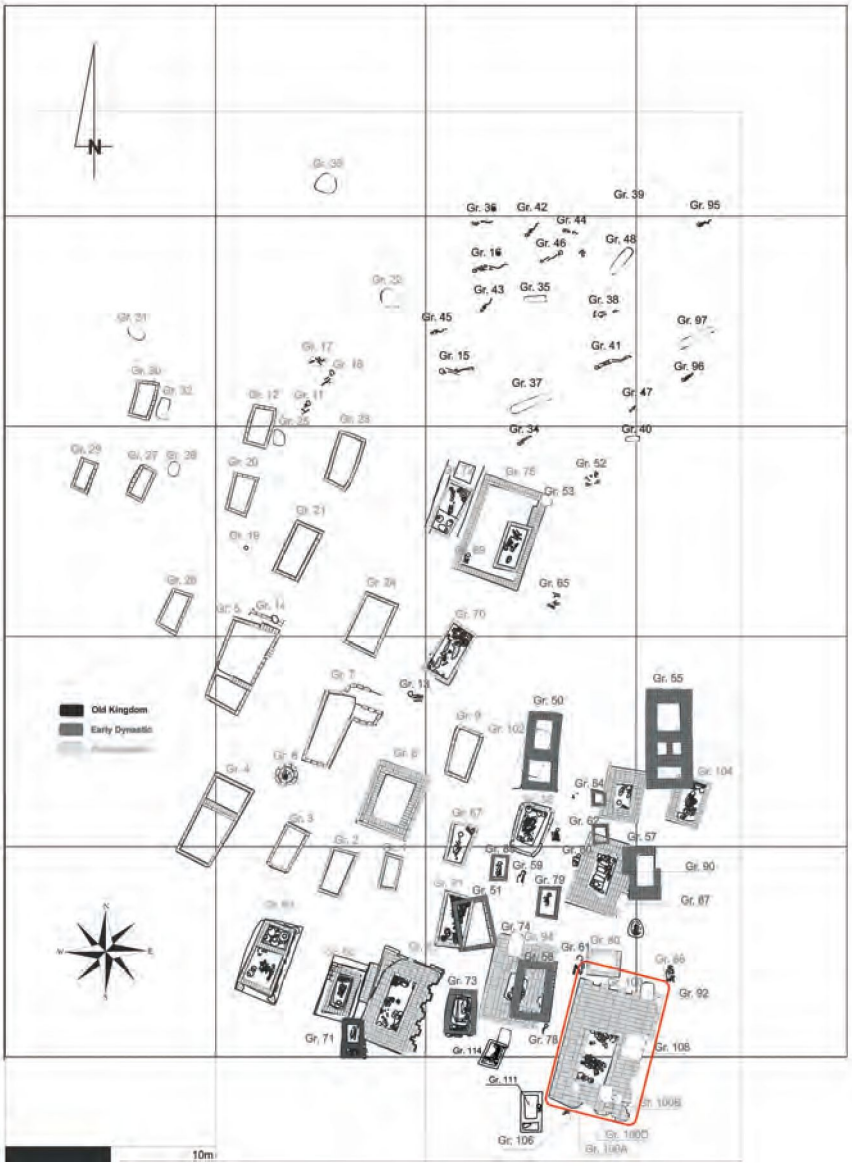

Fig. 1. General plan of Tell el-Farkha cemeteries

with many examples of imported items stress the fact that a kind of elite group might have inhabited this location. It seems that this elite controlled beer manufacturing at the Western Kom since the brewery from the beginning were always surrounded by a fence. In both cases the area was separated with, at first organic fences which were very early replaced by mud brick massive walls. With certain date of Naqada IIC for this event it creates the earliest mud brick construction in the Nile Delta.

The arrangement of the housing zone at the Kom was always on the NE-SW axis. The area was sometimes interrupted with small industries such as small brewery or flint workshops. The Central Kom was constantly settled until the abandonment during the Old Kingdom (Chłodnicki 2012b; Chłodnicki and Geming 2012).

Eastern Kom

Fourteen seasons of excavations at the Eastern Kom have shown what an exceptional part of the site it was. Up to date over 120 graves divided into three groups were discovered (Fig.1). The earliest however probably sepulchral activity here is connected with feature no.10 later called the mastaba. Since works on the structure are not terminated the exact date of it is difficult to state. Only judging by stratigraphical dependences we can prescribe it to the Naqada IIIA2/B1. Cemeteries underlying one above another were occasionally in some parts separated by poor settlements. In other parts they were placed exactly at the spot of previous graves disturbing them. It might be due to the fact that when a new wave of people arrived at the site, the plan of the previous cemetery remained unknown for them.

Cemeteries

Protodynastic graves

The chronology of graves in this group is estimated based on ceramic material and dates back from the dynasty 0 (Naqada IIIB-IIIC1-C2) to the half of the Dynasty I (Jucha 2012; Dębowska-Ludwin 2012: 53). Typical graves had the dimensions: 2-3 m x 1.8-1.2 m and were North-South aligned with a slight East deviation. The predominating form was a pit with regular and rectangular shape with walls lined with one row of bricks (most probably to support them)[1]. The majority of graves consist of a chamber containing both the remains of the deceased and elements of his equipment. Grave goods were usually placed by the shorter side but

[1] The reason of lining walls with bricks can be also explained with an attempt at making graves more like houses from mortal life. This thesis can by supported also by division of a grave into multi-chamber structure similar to ordinary house from these times.

could circle the body as well as be placed under the body. In the case when gifts consisted of more significant number of items the inside of the tomb was divided into a bigger grave chamber and small storage chamber/s[2]. The chambers were divided by a brick wall as well. The superstructure part was also built. It was frequently solid brick cover with the height similar to the underground part. Probably none of such covers survived in full. The superstructure parts found nowadays are heavily wasted due to subsequent burials and episodes of abandoned necropolis inhabitation. Another type of graves found in Tell el-Farkha cemetery counted among this group is mastaba. The underground part of this type consisted of one-chamber burial with brick walls surrounding it. The difference is immediately noticeable in the bigger superstructure part. The superstructure part was still a solid brick cover, however in some cases it was decorated with niches of sine and steplike projection (eg. graves nos. 63, 94, 100 – see: Dębowska-Ludwin 2010: 7-9). Apart from the above mentioned examples, some simple pit burials belong to the group due to its stratigraphic position rather than equipment.

The main factor in assessing to which group a grave belongs is pottery and its dating. Among the most frequent findings are clay dishes from beer and wine jars of medium and big size, cylindrical dishes and even products imported from the Levant (Jucha 2012: 77-79). Another substantially represented group are stone vessels, mainly bowls, jugs and cylindrical dishes (Pryc 2012: 299-300).

Early Dynastic graves

The second group of Tell el-Farkha graves is dated with the pottery starting from the middle of Dynasty I to its end or even to the beginning of Dynasty II (Naqada IIIC2 - IIID). The rules of a burial are set at that time and strictly obeyed subsequently. There are no forms proving the search for new solutions. Simultaneously, a schema for grave goods was also set. It seems not to consist of elaborate sets but rather repeating, non variable shapes.

The constructions belonging to this group are similar to the Protodynastic graves. They are still simple grave pits representing the poorest social group, graves with surrounding brick walls and mediocre equipment of middle class and bigger richly equipped graves.

The majority of burials are single. The deceased were placed on the left side of the body in more or less huddled head-north position. The axis is still north-south but with deviations to the west rather than east as was the case in the first group (Dębowska-Ludwin 2012: 66-72).

[2] For multi-chamber graves from Tell el-Farkha see Rosińska-Balik 2013: 41-52.

As was in case with the Protodynastic, in the Early Dynastic period the most frequent gift for afterlife is pottery, however in standardized form this time. Similarly, stone vessels had less elaborate forms and were made of alabaster (eg. Pryc 2006). Jewellery such as beads, cosmetic palettes, and other every-day-use items are also frequently offered as grave goods. However, one unusual set of models of granaries found nearby one of the biggest grave constitutes extraordinary example of deposit related to a burial (grave no. 50) (Kołodziejczyk 2009).

Among graves belonging to above described group of the Early Dynastic graves there is at least one example of unique grave complex – no. 55. This particular burial represents rare for this period and more popular in later periods enclosure which encircle the grave with kind of low wall with adjacent two subsidiary burials [3]. This group seems to be a continuation of the former but a hiatus between those two periods seems to be the case. Although, it were the same people that chose the same place for their place of burial, the lack of knowledge of the previous cemetery plan is noticeable. It is mainly seen in the repeated damages of the older graves. This is due to digging new graves and establishing new burials over the older ones, which disturbed the upper elements of the older graves and, even though protected, sometimes their burial chamber were damaged as well.

Old Kingdom graves

This group includes the youngest burials from Tell el-Farkha. Due to the lack of burial goods the exact time of those tombs is not possible to estimate with certainty. Generally they are dated to the Old Kingdom times. Stratigraphically, the Old Kingdom graves lie on the top of the tell, just under the surface of a present day level of the terrain.

Structures belonging to the Old Kingdom graves include very simple and shallow pits, usually in elongated, oval shape graves enabling the straight lying position. Deceased were put to the grave on his right side with head turned west, usually without any goods (Dębowska-Ludwin 2012: 72-74). Distinct funeral ritual manifested itself in different burial shape, the manner of burying and a completely different orientation of tombs are among the proofs that a diametrical change of practices occurred in that time, which might be caused by an inflow of a new population. Future research can answer to that question. Nevertheless, it is almost certain, that deceased buried in this group belonging to the last phase of peopling the Tell el-Farkha settlement.

[3] The complex of grave no. 55 is described in details with its virtual reconstruction in Dębowska-Ludwin and Rosińska-Balik 2014: 535-540.

Grave no. 100

To display three-dimensional computer reconstructions, a very interesting burial that represents the first group of Tell el-Farkha graves – grave no. 100 was chosen. In this grave dimensions of the only chamber are rather typical of this group (2.7 m x 1.6 m) but its superstructure is a large, over 6m long, mud brick construction of the mastaba type (Fig. 2). This mastaba reached about 1.5-2 m and was decorated on its three sides with niches creating a sine curved plan. It is probably one of the oldest examples of mastaba in the Lower Egypt (Ciałowicz and Dębowska-Ludwin 2013).

Grave no. 100 belonged probably to a male in mid-thirties. He was laid down on his left side with head pointed to the North. With the deceased there was a relatively rich set of offerings lodged. Among them were 35 pottery and 6 stone vessels, 1 pottery shovel, 1 grinder, 1 bead of carnelian and several animal bones. To preserve these goods and to provide peaceful rest there was not only a massive superstructure, not even depth of main chamber 1.9m but it was greasy mud fulfilling as well. It seems to be a very good solution since there were some traces of unsuccessful trial of rubbery (Dębowska-Ludwin *et al.* 2010).

The biggest peculiarity of this burial are 4 accompanying burials. Deceased buried in the subsidiary graves belonged to the age group of 5-10 years, while the condition of preservation of remains of one of them made impossible the examination of his/her age. All four burials were placed in the interior of superstructure, and an open arrangement of the bricks points to fulfillment of these burials in the course of its rising. The buried were not equipped with sepulchral gifts, but they were put in the contracted position, on one side, with heads to the North or South. This example of inhumations with subsidiary graves constitutes one of the earliest such sepulchral practice in Egypt (Dębowska-Ludwin and Rosińska-Balik, in print).

Reconstruction

To begin work with virtual reconstruction the first step one has to made is to collect all possible data about the structure of interest. In this case it was necessary to gain the best documentation available such as photographs and drawings made during excavation process. The more detail drawings, the more accurate virtual reconstruction. Also important are precise measurements which help in three-dimensional model building process. In the case of grave no. 100 from Tell el-Farkha drawings were made by using tachymeter and obtained this way observations on the basis of x, y, z coordinates were then transformed into a plain drawing on paper. This method allows mesure precisely and reduce a human error. The other advan-

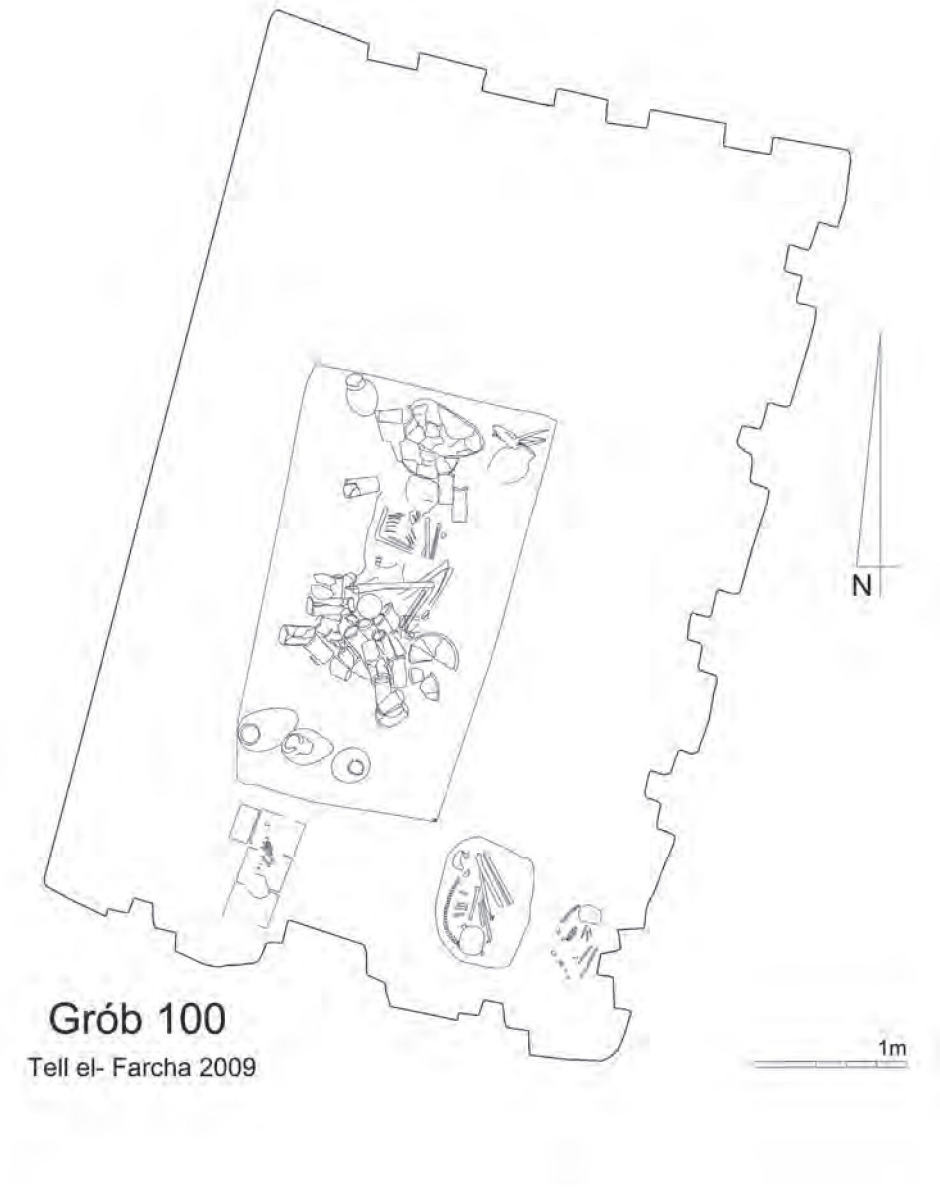

Fig. 2. Grave no.100 (drawing by K. Błaszczyk and M.Czarnowicz)

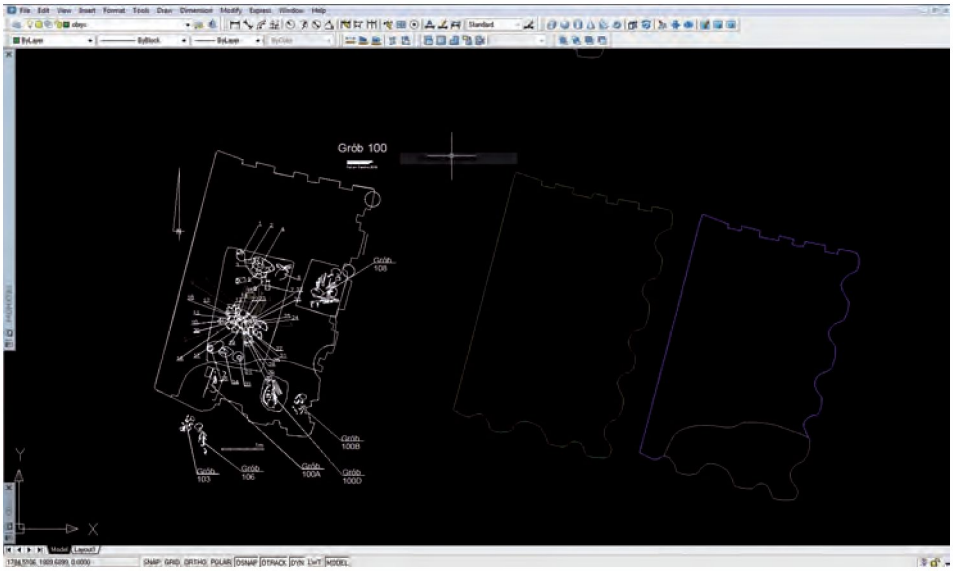

Fig. 3. Digital 2D plan of grave no.100 (by the author)

tage of the drawing supported by Total Station is the possibility of saving digital data in files operated by a graphic computer CAD (Computer Aided Design) software.

The next step is to load digital data into computer and connect them with previously scanned paper drawings. Having such prepared background we are now ready to create digital plans of a structure – in this case grave no. 100 - in different stages of examination. Of course using only traditional paper documentation is also good but might be infected with small errors. Very important thing at this step is to prepare the CAD to fulfill all needs in further work. To make work easier later it is very useful to prescribe to each group of objects created as a digital drawing a separate layer marked with label, colour and/or linetype. In this project there were separate layers for e.g.: grave goods, skeleton, underground structure, superstructure and others (Fig. 3). Later on layers help in managing a project, especially a complicated one. It is possible to hide some object not in use in the moment or to reveal underlying items. In case of grave no.100 this property was very helpful especially dealing with subsidiary burials located right above main chamber. To gain clear view of burials configurations, all "lower" layers (objects originally placed deeper in the ground) were undisplayed. Prepared in such way 2D drawing of the grave with all details of the structure and equipment was ready to further process.

In order to transform 2D drawings into three dimensional model it is necessary to use another tools designed to this purpose. Such tools allow to add to the plain object

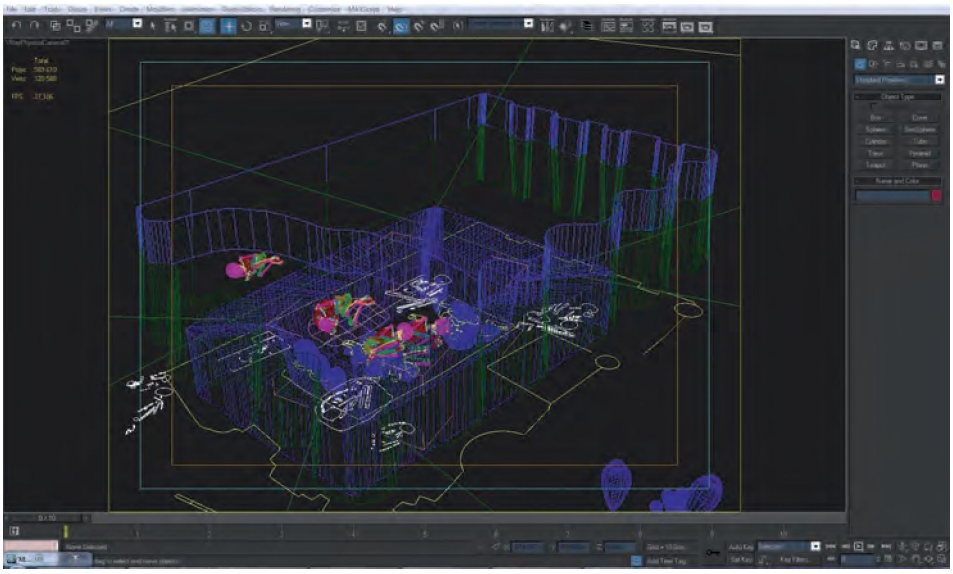

Fig. 4. Three dimensional model of grave no.100 (by the author)

its volume. There are several modes. For simple figures it is just prescribing proper thickness to the object but as a result we can gain most often angular solids. There are other tools which can change their edges by smoothing or rounding them. For other features such as e.g. pottery or stone vessels – a cylindrical or spherical items - more convenient tool is giving a volume of the object by rotating the previously prepared contour of it. All objects composing sepulchral gifts, the remains of the buried people - in form of three-dimensional skeletons - and all architectural elements were subjected to such action. Making models of all features and objects is just a half of the work. The other one is to arrange them in a way as close as possible to the reconstructed and preserved structure (Fig. 4). To this purpose serve general plans drawn during excavation and photographs taken as a standard documentation. As the creation of raw 3D computer model was completed the process of visualization could occur.

In order to achieve the final effect, which is photorealistic visualization, it is necessary to attribute proper textures to the given objects. This phase can be done either in the same computer software, or a different one which was designed mainly for 3D modeling such as e.g. 3DStudio Max. Textures, that is, the photographs of the materials from which the objects were made, make the so far created blocks look in characteristic way and give them facture, which brings them as close as possible to the actual look (Fig. 5). After assigning each element an appropriate texture, one can begin picture setting (Fig. 6). It looks like the setting of the photographer to take a

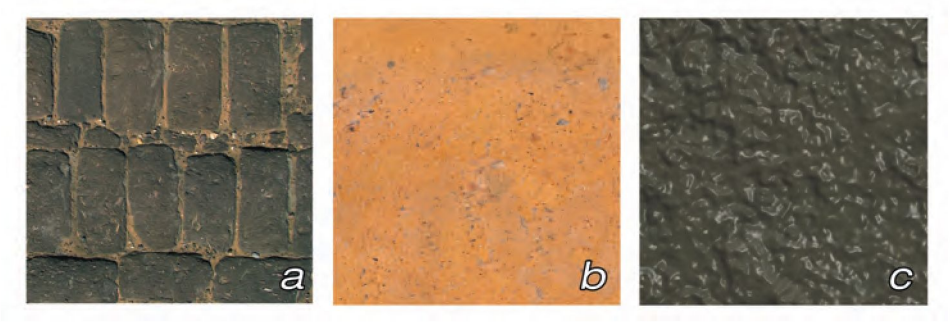

Fig. 5. Textures used in visualization; a) mud brick, b) pottery, c) liquid mud

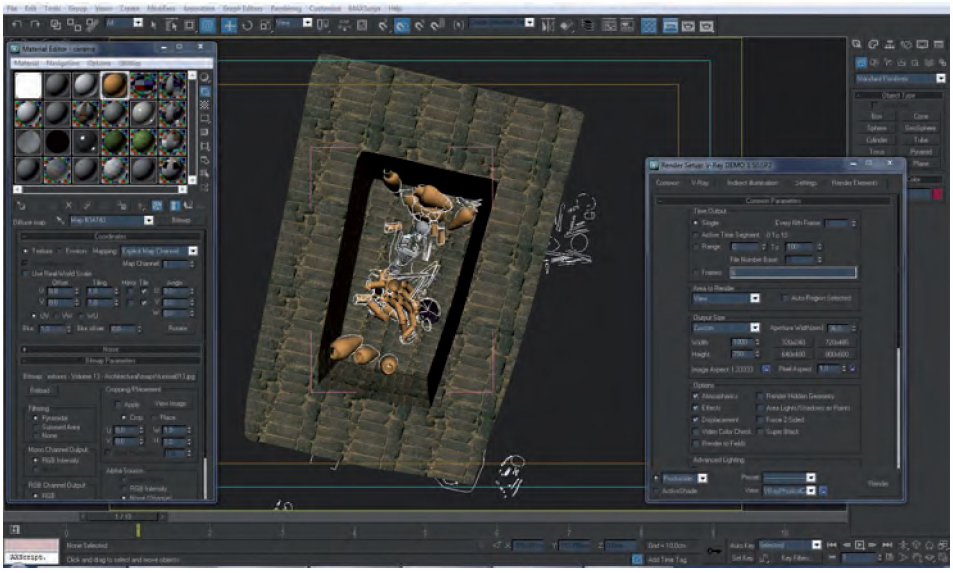

Fig. 6. Virtual model with assigned textures (by the author)

shoot, with the difference that it is possible to set the direction and intensity of incident light, setting unfeasible or difficult shots from above the lens, or to eliminate shadows, which in nature is impossible. But the work is performed by the computer. It consists in carrying out the calculations in order to achieve desired visualization of the construction (Fig. 7).

The next step is a creation of an animation on the basis of the reconstruction done before, allowing to watch the virtual tomb as in motion. There is a possibility of setting the camera to show the object in the most interesting way. It is also available – what had been presented during the conference – to animate the whole



Fig. 7. Three dimensional reconstruction and photographs (visualizations by the author, photo by R. Słaboński)

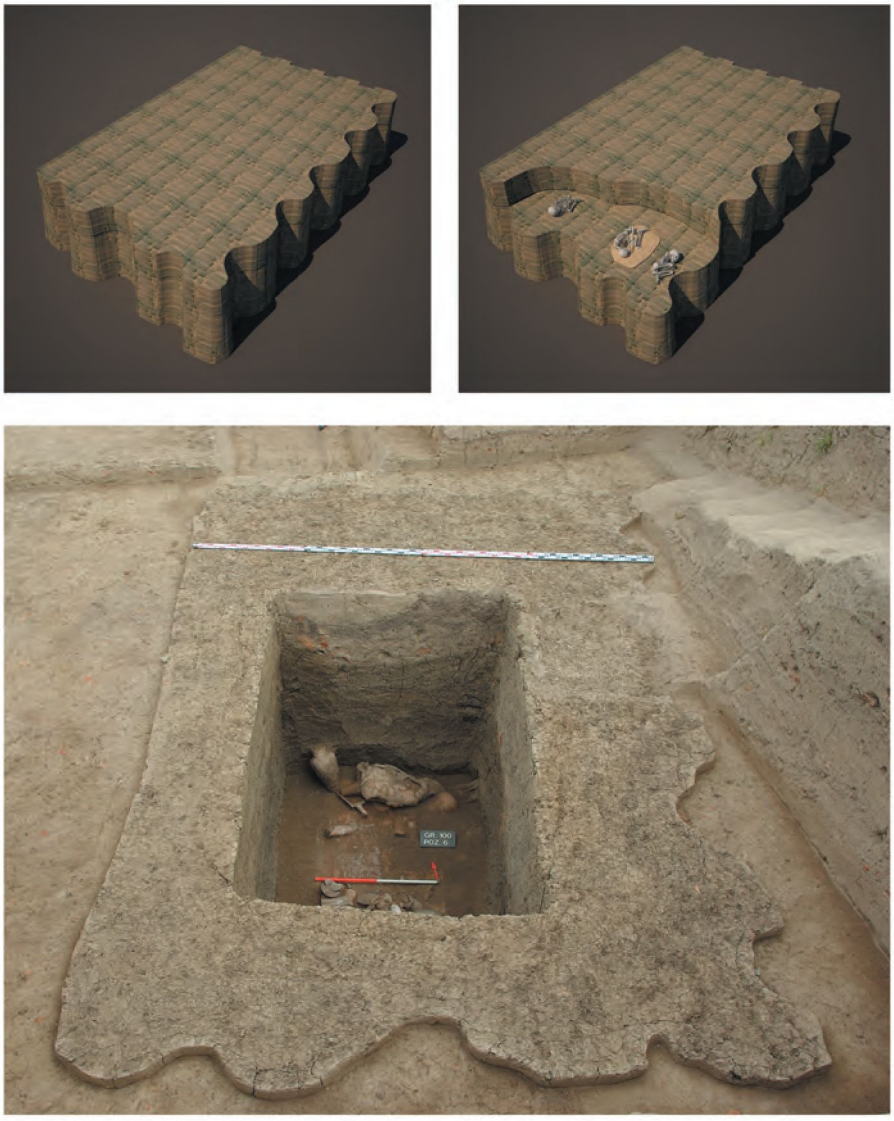

Fig. 8. Three dimensional reconstruction of superstructure with subsidiary burials and general view of superstructure remains (visualizations by the author, photo by R. Słaboński)

process of putting into a grave a deceased together with his grave goods, filling the tomb with liquid mud for protection, further construction of superstructure and finally placement of subsidiary inhumations during the last stage of covering the grave with mud brick mastaba (Fig. 8).

Conclusions

The constructions made that way let to capture objects in their initial forms, not frequently unavailable for us, or lost as a result of invasive research method, which undoubtedly is archeological prospection. The given example shows single architectural object. Of course, the possibilities are endless, and the next step will probably be to show the complex of the tombs, in their often interrelated configurations and intertwining systems. This type of combinations aiming at reconstructing e.g. the first system of all burials contemporary to themselves, can reveal numerous new facts invisible to the researcher using traditional methods (Dębowska-Ludwin and Rosińska-Balik 2014).

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Lenka Suková

Pictures in place: a case study from Korosko (Lower Nubia)

To the memory of Ján Midžiak (1932–2013), member of the Czechoslovak epigraphic expeditions to Lower Nubia (1963–1964)

Introduction

In 2004, the range of publications devoted to rock-art research was extended by *Pictures in Place: The Figured Landscapes of Rock-Art*, an archaeological book on rock art that places an emphasis on landscape and the relationship landscape has with the art, the artist and the audience (Chippindale and Nash 2004a; 2004b). In one paper included in the volume – *From millimetre up to kilometre: a framework of space and of scale for reporting and studying rock-art in its landscape* –, Christopher Chippindale (2004) proposed a framework of scales of study of rock art, moving up by orders of magnitude in physical dimensions (Chippindale and Nash 2004b). This artificial framework of four, closely inter-connected scales was used during the oral presentation at the 2011 Dymaczewo conference to provide a description (from kilometre to millimetre) and a discussion and evaluation (from millimetre to kilometre) of one of the nine painted shelters documented by the Czechoslovak expedition in the framework of the UNESCO-organised salvage campaign in Lower Nubia. Since the "Painted Shelter at Korosko" – together with the other occurrences of rock paintings from the Czechoslovak concession in Lower Nubia – has recently been published *in extenso* (Suková 2011a; 2011b), the first part of the presentation (from kilometre to millimetre) is reduced in this

written paper to a mere setting of the scene[1] to allow more space for a discussion and evaluation of the evidence stepping up from the millimetre up to the kilometre scale. However, this paper differs from the case study presented by Christopher Chippindale in one important aspect: since the "Painted Shelter at Korosko" and the landscape in which the exquisite rock paintings preserved in its interior had figured for millennia as "pictures in place" no longer exist, the description and evaluation of this rock-art surface constitutes the outcome of the study of "pictures of the pictures in place", i.e. the field documentation deposited in several archives in Europe and Egypt,[2] and the "pictures out of place", i.e. the blocks cut out from the rock-art panel and deposited or exhibited in the Museum of Nubia at Aswan and elsewhere in Egypt.[3]

General description of the occurrence

The rock-art panel (Czechoslovak expedition's field number 17 R XIII A) was recorded in Khor Fomm el-Atmur, a great valley that cut from south to north through the Korosko hills on the right bank of the Nile and discharged into the river by the village of Korosko East (ca. 180 km upstream of Aswan). It was located under an upward-moving projection of the upper section of a large sandstone boulder that stood at the north-western foot of a low, broad-based hill on the east side of the khor ca. 2.5 km to the south of the Nile. The rock surface bore what appears to be a painted procession of cattle, humans, and boat(s) that was interspersed with and, in some cases, superimposed by images of animals and humans produced by techniques involving reductive processes (Fig. 1). In the vicinity, minor petroglyph surfaces were recorded on separate surfaces of the same boulder (altogether 2) and on separate sandstone blocks scattered in front of or around the boulder (18) (Váhala and Červíček 1999: 84-85; Suková 2011a: 13-15, 49-55; 2011b: 150-173).

The excavation of the floor of the shelter by the EES Nubian Survey team in 1961 brought to light the evidence of occupation of the place during the A-Group (Early Nubian) and C-Group (Middle Nubian) times and of an ephemeral re-use of the shelter during the post-Roman or Christian (Late Nubian) times (Smith 1962: 79–90).[4]

[1] For a detailed description and illustration of the rock-art surface, see Chapter 2 in Suková (2011a) and Surface A under Ref. No. [17 R XIII A–B] in Suková (2011b: Tab. 4).

[2] Besides the archive of the Czech Institute of Egyptology (Charles University in Prague), these are: the Archive of the Egypt Exploration Society in London, the Centre of Human and Social Studies in Madrid, and the archive of the Museum of Nubia in Aswan.

[3] See *Appendix* in Suková (2011a) for the current location and condition of the removed blocks.

[4] The terms "Middle Nubian sequence" and "Late Nubian sequence" are adopted from Trigger (1965).



Fig. 1. "Painted Shelter at Korosko" (Czechoslovak expedition's field number 17 R XIII A) (photo Zbyněk Žába)

The millimetre scale: the dimension of the technique

Only a small number of occurrences of rock paintings are known from the Nile Valley in Lower Nubia, as compared with the wealth of petroglyphs of varied themes, styles, and dates. On the present rock-art surface, we find techniques involving additive processes (painting) employed alongside those involving reductive processes (petroglyph) for the marking of the natural rock. A close observation of the panel in the field (Smith 1962: 80) confirmed employment of three colour types for the production of painted figures: red, white, and blue. The former two are represented also on other painted surfaces in Lower Nubia (Weigall 1907; Bietak and Engelmayer 1963; Almagro Basch and Almagro Gorbea 1968; Suková 2011a; 2011b). The latter, on the other hand, constitutes a rarity in the rock art of the region (*cf.* Smith 1962: 91 and Suková 2011a: 45), but is known

from the colour-map of the C-Group peoples who combined it extensively with paints of red, yellow, white, and green colour types for decoration of their incised pottery and funerary stelae (Suková 2011a, 45-46; see, *e.g.*, Firth 1915, 19; Pl. 16b, 35a; Wenig 1978, 25ff.).

The paints were used either to create monochrome images, or combined to produce bichrome figures (Table 1). They were applied onto the surface by means of brushes the strokes of which are well-visible in a number of cases. The subtlety of lines noticeable on some of the figures attests to masterly handling of the brush(es) and paint(s) by some of the painters.

With monochrome images (altogether 34), all but two[5] were surface paintings drawn first in outline, the inner surface of which was subsequently filled in with the paint of the same type, in some cases applied in multiple layers. With bichrome images (34), one colour type was used as a primary colour and the other one as a secondary colour for the rendering of selected details or parts of body (markings on hides, legs, udders, kilts). Two different approaches to combining the paints for production of bichrome images could been discerned on the available photographs:

a) 26 motifs were first painted by means of the primary colour (dark red, blue) and selected parts were left blank to be subsequently filled in with the secondary (white) colour (*e.g.*, A.52, A.53, A.46, A.47; Fig. 6); or
b) 3 motifs were first painted by means of the secondary colour (white) applied in a thick layer on the parts that were to be white on the finished painting and in a thin layer on the rest of the motif; subsequently, the thinly covered parts were painted over by means of the primary (dark-red) colour (see A.31 on Fig. 4 for an unfinished figure of this type, and A.29 and A.30 on Fig. 5 for two finished motifs). With 5 bichrome figures, the exact procedure of their making cannot be established on account of their bad or incomplete preservation.

The paints of the three colour types were recorded on the rock-art surface in 13 (red), 4 (white), and 3 (blue) colour values. The marked variation in the preserved colour values of especially the red paints, the pigment for which was obtained from a red-ochre surface layer at the base of the shelter, can be explained as resulting from a number of causes and processes, including (but not limited to):

a) distinct composition and/or consistency of individual batches of paint prepared in the course of one and the same rock-art event by one and the same artist (Bietak and Engelmayer 1963: 38);

[5] These two figures (A.72, A.74) are preserved on the surface only as (incomplete) white outlines and may represent unfinished (or decayed?) animal (probably cattle) figures.

Table 1. Motifs produced by techniques involving additive processes (painting) and the colour types employed for their making: R – red, W – white, B – blue

Motif / *Colour*	*R*	*W*	*B*	*R&W*	*B&W*	*W&R*	*R&B*	*Total*
Cattle	16	10	1	12	1	1	1	42
Probable cattle	2	3	0	1	0	0	0	6
Human figure	2	0	0	17	0	0	0	19
Travelling boat	0	0	0	1	0	0	0	1
Total	20	13	1	32	1	1	1	68

Table 2. Motifs produced by techniques involving reductive processes (petroglyphs) and the techniques employed for their making: I – incision, E – engraving, H – hammering, R – rubbing (abrasion)

Motif / *Technique*	*I*	*E&H*	*I&H&R*	*I&R*	*Total*
Cattle	12	0	0	2	14
Hippopotamus	0	0	1	0	1
Ostrich	0	1	0	0	1
Indeterminate quadruped	11	0	0	0	11
Human figure	1	1	0	0	2
Total	24	2	1	2	29

b) distinct composition and/or consistency of the red paint prepared by different artists for the creation of new motifs, or for intentional interventions in – modifications of – existing figures (for the latter, see, *e.g.*, A.33, A.34, A.37, A.38, and the neck of A.36 on Fig. 5);
c) particular method of application of the paint(s) resorted to by the painter(s) (the approach chosen for the production of bichrome images, the actual number of layers of paint applied); and
d) differential exposure of the paints to the elements both from the point of view of place (location, quality of surface) and time (varied length of time allowed for weathering).

Among the techniques involving reductive processes (Table 2), incision in line or outline (27) clearly predominated (see, *e.g.*, Fig. 2). Engraving and hammering were

employed to a smaller extent, either to make whole figures (A.14, A.58; Figs. 3, 6), or as techniques complementary to incision (3) for an indication or differentiation of certain parts or details of motifs (A.67, A.86, A.93; Figs. 2, 7). In addition, the same techniques, together with scratching, were employed for interventions in painted motifs. These included repairs and restorations of painted images (e.g., A.51, A.90), or destruction of selected painted motifs (*e.g.*, A.15, A.46) or the panel as a whole.

The centimetre scale: the dimension of the figure and the motif

The identifiable motifs represented on the panel include 75 animal figures (56 cattle, 6 probable cattle, 1 hippopotamus, 1 ostrich, 11 indeterminate quadrupeds), 21 human figures, and 1 travelling boat produced on the rock-art surface by techniques involving additive or reductive processes. In addition to identifiable motifs, there were numerous non-figurative traces or marks some of which may represent remains of no longer distinguishable motifs.

Among painted motifs (Table 1), (probable) cattle clearly predominate. They include 17 long-horned and 5 short-horned cattle, 3 hornless individuals with a prominent lump on their forehead (Osborn 1998: 195), and 20 beasts with no horns discernible or preserved. There are 11 cows distinguished by udders shown on the underside of their bellies, 1 bull with the organ clearly depicted, 33 beasts with no gender indicated or discernible, and 3 calves. The dimensions of the painted cattle vary from 4.5 cm with calves to 36 cm with adult individuals. They are depicted as standing and shown consistently with their bodies in side view and horns and ears (where depicted) in front view; only in one case (A.30), short, forward-pointing horns are shown in side view. The orientation of the painted cattle is to the left (43), to the right (1), and downwards (head down) with the back turned to the left (4).

Most of the painted cattle is portrayed with a great care for the general body shapes and individual body parts and details, such as the head, ears, horns, markings on hides, tail, udder, legs, knees, and (often cloven) hoofs. The varied rendering of the general body shape and the peculiar ("diagnostic") details, size of the figures, and the approach adopted by the painters in their utilisation of colours observable on the photographs makes it possible to assign most of the cattle figures to groups or styles some of which can be deemed to represent the work of different artists. The most distinctive of these are three styles among the cattle painted in dark-red or dark-red and white, which I have designated as Style A (3; see A.35 and A.36 on Fig. 5), Style B (8; see, *e.g.*, A.8, A.10, A.24, A.52, A.53 on Figs. 3, 4, 6), and Style C (3; see A.29-A.31 on Figs. 4, 5). Stylistic analysis and assignment to groups or styles is impossible with 20 cattle that appear on the surface as heavily weathered or decayed remains of figures (A.1-A.3,

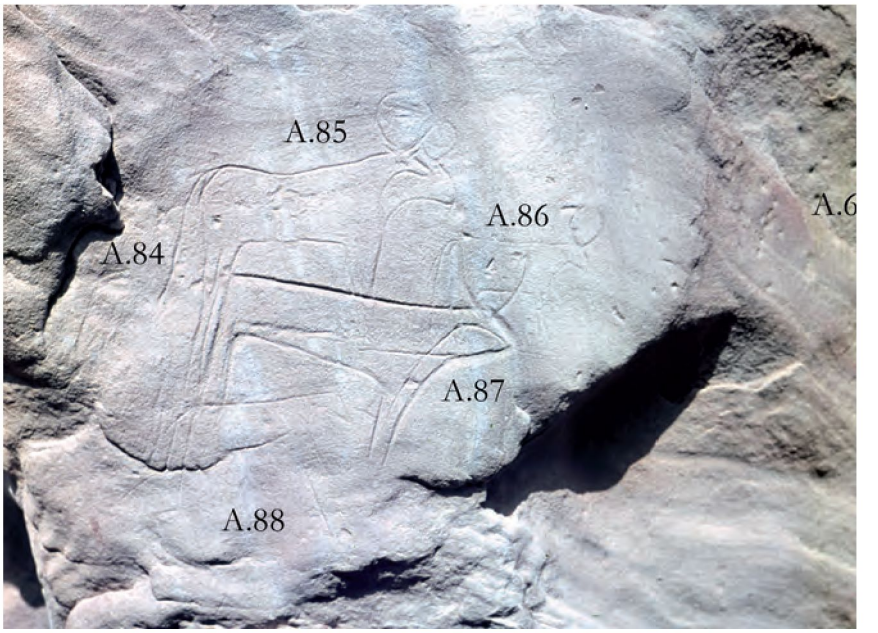

Fig. 2. Leftmost side of the rock-art surface (photo Zbyněk Žába)

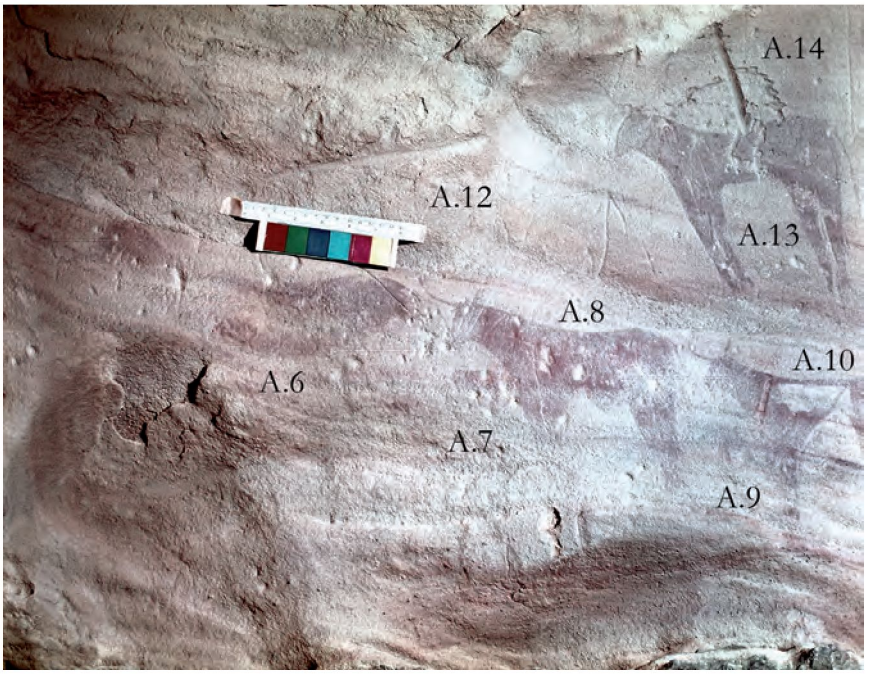

Fig. 3. Left part of the rock-art surface (photo Zbyněk Žába)

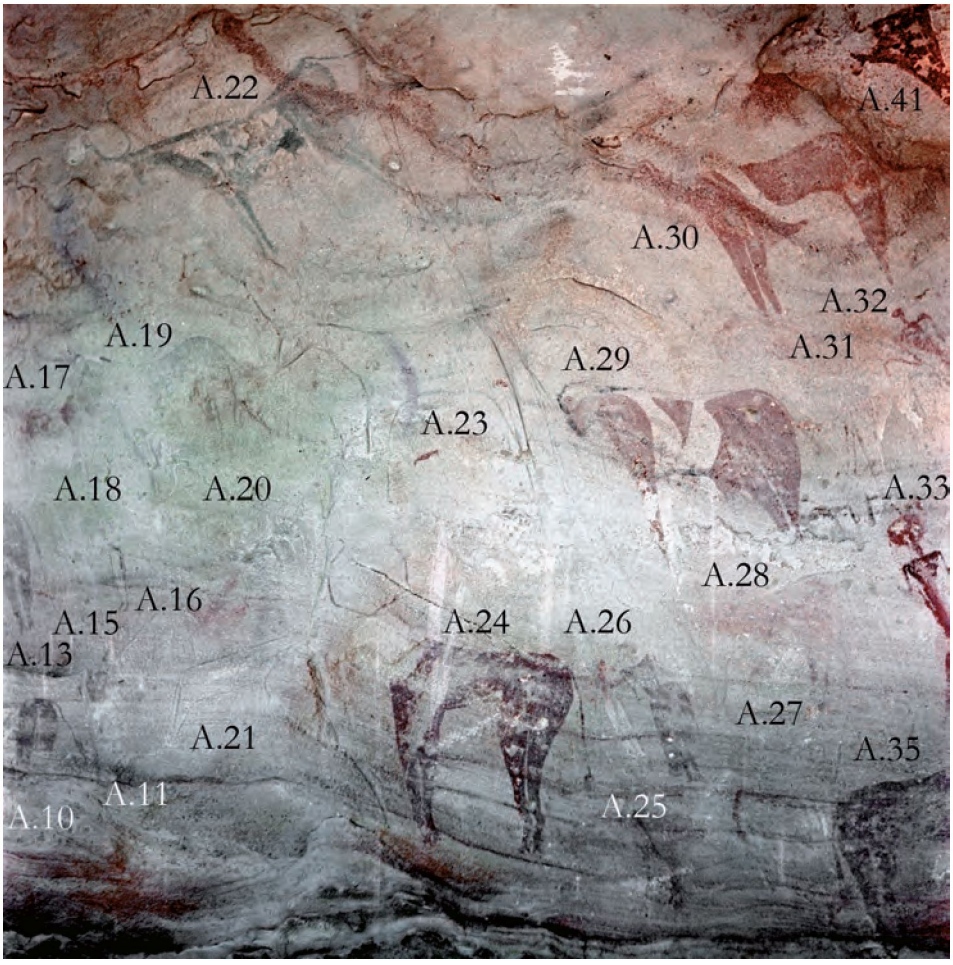

Fig. 4. Left-central part of the rock-art surface (photo Zbyněk Žába)

A.5, A.40, A.56, A.62, A.69, A.70, A.75, A.77, A.78, A.80), incomplete (unfinished) figures (A.42, A.72, A.74), or effaced figures (A.17, A.20, A.27, A.73).

Some of the painted cattle show evidence of intentional interventions, which I consider to be of an utmost interest:

a) 5 cattle figures of Style A (A.10, A.24, A.52) and Style B (A.36, A.49) have a deep groove engraved across their necks as if in an attempt to severe their heads from their bodies;
b) 2 cattle figures of Style B (A.24, A.53) have their head entirely erased by scratching or rubbing; the horns of one of them (A.24) were left intact;

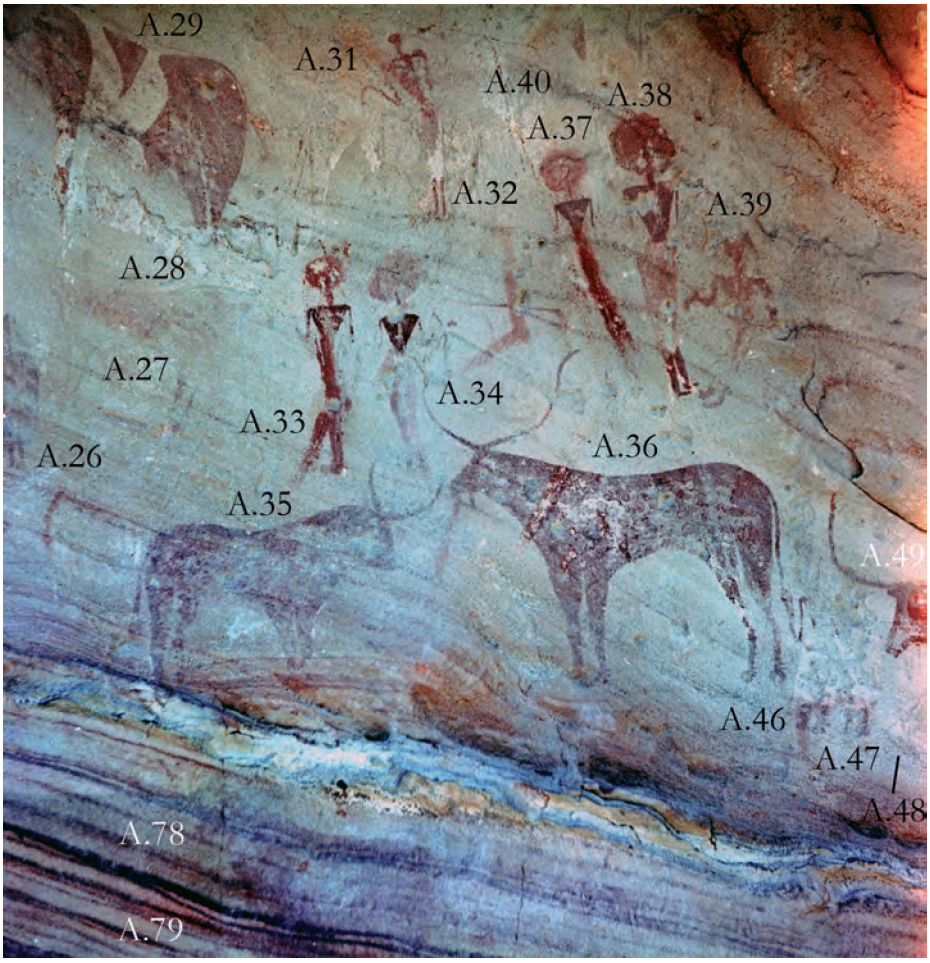

Fig. 5. Central part of the rock-art surface (photo Zbyněk Žába)

c) 3 cattle figures with the deep grooves engraved across their necks (A.10, A.36, A.49) have the grooves repainted with a red paint preserved in a colour value distinct from the one used for the making of the cattle; and
d) 9 cattle figures feature additional contouring lines incised along their legs (A.8, A.10, A.24, A.52, A.53), around their head and along their legs (A.13), around the horns and other parts of the body (A.51), around the head, neck, and belly (A.29), and at the place of the head from where the paint appears to have fallen off (A.90); in one case (A.29), the incised contouring line is filled in with blue paint.



Fig. 6. Rightmost side of the rock-art surface (photo Zbyněk Žába)

The cattle figures appear singly, in groups, or are arranged in a limited number of stereotyped spatial compositions. These include: the cow-and-calf motif, i.e., cows preceded by small calves (A.7+A.8, A.9+A.10, A.78+A.79), combat of two bulls over a cow (A.35+A.36+A.49), copulation of cattle (A.91+A.92), and cattle led or followed by one or two humans (altogether 8).

The humans accompanying the cattle (11) are all standing figures shown with their upper body in front view and lower body in partial profile. Their height equates to ca. 20 cm on average. They feature a round head, longer neck, straight or bent arms, trunks tapering from wide shoulders down to the waist, kilts, and feet.

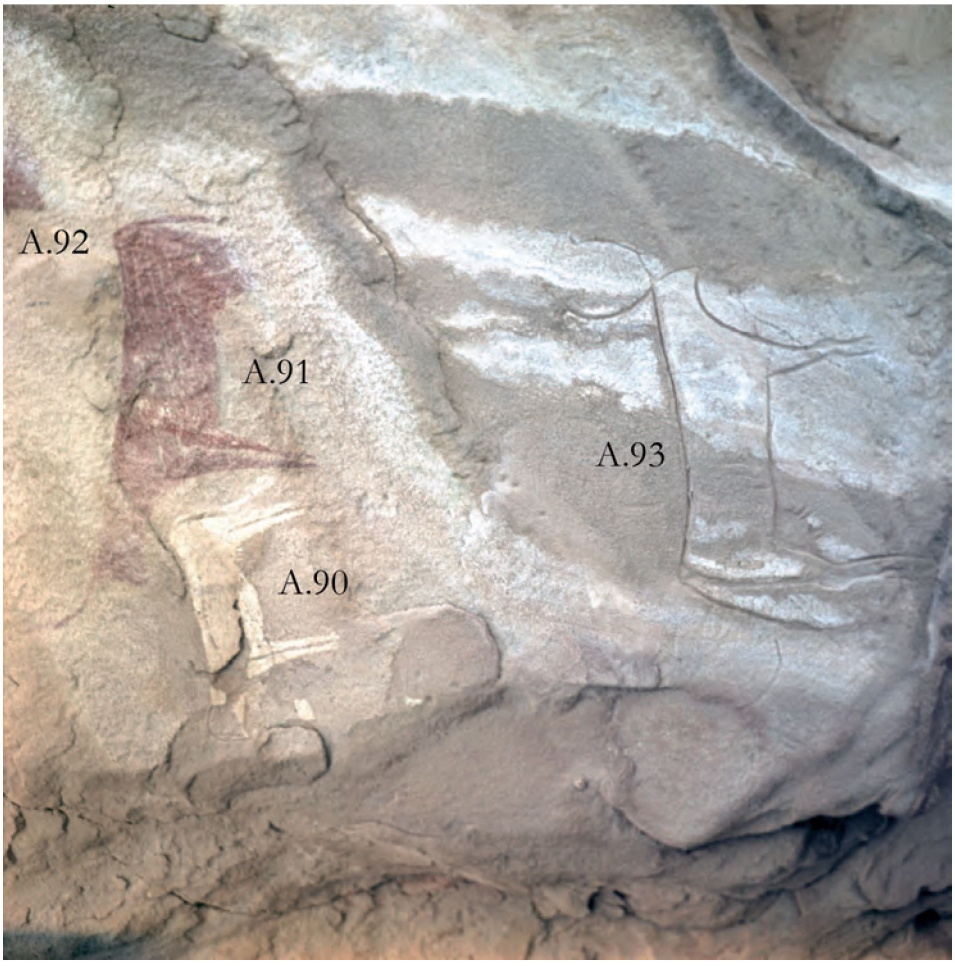

Fig. 7. Central part of the ceiling of the shelter just above the rear wall (photo Zbyněk Žába)

Apart from one figure (A.76) that is oriented to the right and faces a cattle figure in solid white (A.75), all the humans respect the orientation to the left in compliance with the dark-red or red-and-white cattle they are associated with. One of the figures accompanying the cattle (A.26) is blocked in monochrome (red) and features a wide and long red skirt corresponding to the bustle skirts of leather typical of females of the C-Group peoples (Firth 1915: Pl. 33; Emery and Kirwan 1935: Pl. 24; Steindorff 1935: Taf. 72, 94; Williams 1983: 97-99; Friedman 2004: 49, Pls. 1, 2; 2007: 60, Colour plate XXVI). The rest of the figures (10), on the other hand, have white kilts of varied widths and lengths, which may represent linen kilts characteristic of

the "dressing code" of the ancient Egyptians, and the rest of the body (head, arms, trunks, legs) painted in red (e.g., A.11, A.25, A.46–47); in (at least) one case (A.16), the white kilt is provided with a red contour. As no sexual attributes are indicated, the gender with most of the figures clothed in white kilts cannot be securely ascertained, except for two individuals (A.16, A.32) that are equipped with what appear to be a (herding) stick (or axe) and a bow and may be therefore regarded as representations of males – archers/herders. The ascertainment of gender with humans clothed in white kilts is further complicated by the fact that most of these figures are badly damaged or (nearly) entirely obliterated by hammering, scratching, and rubbing (*e.g.*, A.15-A.16, A.25, A.43, A.46-A.47).

Similar acts of iconoclasm badly affected also three standing figures (A.54, A.55, A.57) that form a secluded group of humans in no direct association with cattle (Fig. 6). All three are oriented to the left and are clothed in white kilts of varied widths and lengths, in one case (A.57) contoured by means of red paint. Unfortunately, the bad preservation of these figures and the uncertain representational value of the remains of white and red paints surrounding these figures make it impossible to sex the humans with certainty and to ascertain in what activity they may have been engaged.

There is another group of humans on the panel that show no direct association with cattle (A.33, A.34, A.37, A.38; Fig. 5). The distinct shape of these large-headed figures, their gender differentiated by means of clothing (male with no kilts in the case of A.33 and A.37 and female clothed in red – or rather pink – skirts in the case of A.34 and A.38), and their inconsistent orientation to the left (A.33), to the right (A.38), and no distinct orientation (A.34, A.37) are the result of intentional interventions in – modification and remaking of – earlier images of humans with small round heads and white kilts and oriented to the right. The original versions of these figures are still discernible underneath the layers of red paint of distinct colour shades applied over the original motifs in red and white and over the additional incised lines contouring their small heads (A.37, A.38) and/or their bodies (A.33, A.38).

Attached to these four central humans is another human figure (A.39) that appears to have been made by a less skilful hand different from the one(s) involved in the making of the rest of the figures. This presumably standing (male) figure blocked in monochrome (red) is holding a (herding) stick (or axe) in the right hand and is oriented to the left.

The presence on the panel of humans clothed in white (linen) kilts according to the dressing code of the ancient Egyptians (majority of the figures), a female representative of the Nubian populations (A.26), and the remaking of four figures

dressed in white kilts into figures clothed in more non-Egyptian (if not entirely Nubian) style (A.33, A.34, A.37, A.38) bring to the fore questions concerning the ethnicity and identity of the figures actually depicted on the panel, of their makers, and of their audience and consumers (Smith 2003).

At least four human figures form part of the largest motif painted on the panel – a large travelling boat (A.81, 73.5 cm in length; Figs. 1, 6) with a flattened bottom and a hull narrowing and curving out as it progresses towards the prow and stern posts. The sides of the hull show leashing indicated by a zig-zag line. At least three figures blocked in monochrome (red) and oriented to the right (oarsmen, or helmsmen) appear to be keeping the boat in motion by means of long (steering) oars. Another human figure, dressed in a white kilt, is standing to the right of them. Further to the right, faint traces of red paint may represent faded remains of a cabin or a deck-house. The bad preservation of the paint makes it impossible to determine the direction of movement of the boat.

The individual types and styles of the painted cattle and human figures and the stereotyped spatial compositions depicted on this panel are not uncommon in the rock art of Lower Nubia. More importantly, they are known also from the C-Group representational art (Williams 1983: 97-109, Figs. 9, 10, Pl. 96, 97; Emery and Kirwan 1935: Pl. 24; Firth 1915: Pl. 33a, 35a, 35b) and/or from other dated contexts – in particular the decoration of ancient Egyptian funerary monuments dated to the Old to New Kingdoms (e.g. Vandier 1969; Blackman 1915) and the painted decoration of the *Kerma Classique* funerary temple K XI at Kerma (see Bonnet 2000: 91, Figs. 66, 67). This makes it possible to attribute these motifs to the Middle Nubian sequence (C-Group times).[6] The same time span – the Middle Nubian sequence – can be claimed for the painted boat which finds the closest parallels with boats travelling on a ceremonial journey that recur in the relief decoration of the ancient Egyptian funerary monuments dated to the Old Kingdom onwards (Landström 1970; Vandier 1969) and appear also in the wall paintings adorning the *Kerma Classique* funerary temple K XI at Kerma (Bonnet 2000: 100, Figs. 63, 65).

The corpus of motifs produced merely by techniques involving reductive processes is dominated by cattle figures (14) and indeterminate (or incomplete) quadrupeds (11), incised in outline and, in one case, in line (see Table 2). Their dimensions vary from 4.8 cm to 27.5 cm. They are oriented to the left (9), to the right (11), upwards (head up) with the back turned to the left (4), and upwards

[6] This corresponds to Horizons IV and V in the chronology suggested for the rock art of the El-Kab region by Huyge (2002) and to C- and D-Horizons in the chronology defined for the Upper Egyptian and Lower Nubian rock art by Červíček (1986, 1992–1993).

with the back turned to the right (1). Among the cattle figures, there are 2 cows distinguished by udders and 12 beasts with no gender indicated. Majority of the cattle (11) are provided with horns of varied shapes and lengths (11); with 3 cattle figures, no horns are depicted or discernible. The cattle figures differ in the rendering of the general body shapes and parts (in particular the head, legs, tails) and in the inclusion or exclusion of certain details (such as ears, hoofs, knees, beards). Of a particular interest are three cattle figures (A.85, A.86, A.93; Figs. 7, 8) that appear to have been inspired by the forms of the painted cattle and two cattle images (A.18, A.28) that are incised over two effaced red-painted cattle (A.17, A.27) as if in an attempt to restore or revive the effaced images (Figs. 4, 5).

With the indeterminate quadrupeds (11), the absence of diagnostic details makes it impossible to identify the species of the animals depicted; in one case (A.48), however, we may consider the small quadruped to represent a calf on account of its close association with a painted cow (A.49). The animal figures represented on the panel include also a single figure of an ostrich (A.58, h. 18 cm) and a hippopotamus (A.67, 24 cm from ears to rear side), both of which are oriented to the right. Last but not least, there are two humans produced by techniques involving reductive processes. One of them (A.14) is a stick figure of a rider mounted on the back of one of the red-painted cattle. The other one is a simple standing stick figure (A.82).

With the motifs produced by techniques involving reductive processes, the types and styles of the animal species identified on the panel allow attributing the animal figures to the Middle Nubian sequence. The two human figures (A.14, A.82), on the other hand, can be placed – based on their forms – to the Late Nubian sequence.[7]

The metre scale: the spatial and temporal dynamics of the rock-art surface

The identifiable motifs and non-figurative traces and marks were spread over ca. 5 metres of the rear wall and the ceiling of the shelter (see Fig. 1 and Table 3). A great majority of the figures (81) and most of the traces of paints and incised marks and lines was located on the upper section of the rear wall where the smooth, evenly-grained sandstone offered the best-quality surface for the creation and preservation of rock art (A.1-A.76, A.84-A.88). The stratified and heavily-weathered lower section of the rear wall was found to bear only seven identifiable figures (A.77-A.83), although faint traces of red paint noticeable in particular in the upper zone of this section suggest a former presence of more, no longer discernible motifs.[8] The coarser surface of the ceiling of the shelter just above the rear wall bore five

[7] This corresponds to Horizon VI of Huyge (2002) and the Napatan-Meroitic Period of Červíček (1978).

[8] The presence of other boats, no longer distinguishable, was suggested by Smith (1962: 80).

Table 3. Distribution of the identifiable motifs over the sandstone surfaces of variable quality

Surface/*Motifs*	*C*	*PC*	*IQ*	*O*	*H*	*HF*	*B*	*Total*	*NF*
Lower section	4/1	0/0	0/0	0/0	0/0	0/1	1/0	7	+/+
Upper section	39/7	6/0	0/7	1/0	0/1	19/1	0/0	81	+/+
Ceiling	4/1	0/0	0/0	0/0	0/0	0/0	0/0	5	+/+
Peripheries	0/0	0/0	0/4	0/0	0/0	0/0	0/0	4	?/?

C – cattle, PC – probable cattle, IQ – indeterminate quadruped, O – ostrich, H – hippopotamus, HF – human figure, B – boat, NF – non-figurative marks and traces (possible remains of other motifs); the counts are given for techniques involving additive/reductive processes; "+" – presence, "?" – uncertain presence, "–" – absence

images (A.89-A.93) and a group of small V-shaped marks produced by means of red paint. Four more images (A.94–A.97) were distributed over other sections of the coarse sandstone on the underside of the overhang on the peripheries of the painted panel.

The painted motifs represented on the rock-art surface give an impression of forming a procession of cattle, humans, and boat(s) datable to the Middle Nubian sequence (C-Group times). However, the different types and styles of the cattle and human figures evince that this orderly procession constitutes the work of a number of individuals and consists of several layers of rock art. The exact chronological sequence in which the individual events of rock-art activity had taken place is difficult to establish in particular due to the rarity of superimposition of the paintings made in different styles. Nevertheless, some insights can be gained from the overall horizontal stratigraphy of the rock-art layers and the differential preservation of the paints.

The earliest rock-art layer on the panel is represented by 11 cattle figures painted by means of dark-red and white paints in *Styles A* and *B* attributable to two artists (if not one and the same individual) which occupy the best-quality surface of the upper section of the rear wall. All of the cattle are oriented to the left, i.e., towards the more open (east) end of the shelter, except for one figure (A.35) in the dynamic centre of the panel that faces to the right in a challenge to its neighbour (A.36). This consistent orientation of the cattle together with the positioning of some of them on slanting layers of the sandstone surface as on base lines (see Figs. 3-6) gives the rather static red(-and-white) cattle an appearance of a small herd walking up on paths through the landscape of the rock surface. These cattle figures, the most dominant motifs on the surface, can be deemed to constitute the central part – or the "backbone" – of the whole scene represented on the panel.

This "backbone" determined the placement on this part of the rear wall of the other motifs whose authors in all but one case (A.56) respected the earlier images and fitted their figures into whatever space was available. This is the case also of most of the human figures associated with the red(-and-white) cattle of *Styles A* and *B* (8) and the original forms of the humans in the centre of the panel (A.33, A.34, A.37, A.38) all of which appear to have been produced on the surface only after the red(-and-white) cattle were in place. Nevertheless, the correspondence of the preserved colour values of the dark-red paint recorded on these humans with that recorded on the particular cattle figures could suggest that they may still have been painted in the scope of the same rock-art event.

The exact sequence in which the infilling of the free space on the upper section of the wall may have taken place cannot be established with certainty. Nevertheless, the only case of superimposition of painted figures recorded on the panel – that of the white cattle A.56 over the human figures A.54, A.55, and A.57 – suggests that the white cattle were the last figures to be added to the surface. This is supported also by the location of majority of the white cattle on the low-quality portions of the upper section of the rear wall on the leftmost and the rightmost side of the panel.

The painted images of cattle and boat on the lower section of the rear wall (see Figs. 1, 5, 6) are more difficult to place with certainty in the relative chronological sequence of the rock paintings in the shelter on account of the progressed weathering and discoloration of the dark-red paint resulting from the differential qualities of the lower section of the rear wall and its increased exposure to the elements, in particular the wind-blown sand. An insufficiency of space on the good-quality surface taken up by the "backbone" and, possibly the other figures, could well serve as an explanation for the positioning of the travelling boat transporting a human figure dressed in a white kilt – the largest motif in the shelter – onto the available space on the stratified rock below. However, we cannot exclude that the natural stratification of the sandstone could have been utilised already in the earliest rock-art event(s) represented by the cattle of *Styles A* and *B* and/or the human figures dressed in white kilts: perceived as a representation of the waters of the Nile on which the boat would have been moving, it could have provided a complement to the other part of the Nile landscape – the land represented by the smooth surface of the upper section of the rear wall through which the red-painted cattle, accompanied by humans, were walking on paths provided by the surface layers of the sandstone. In such a case, the rock-art surface would provide a well-illustrated evidence of the importance of the natural properties of the rock surface for the early painters' laying-out their scene.

With the cattle figures identified on the stratified lower section of the rear wall (A.77-A.80), on the other hand, the reduced legibility of details make it impossible to use stylistic and technical aspects to determine whether the cattle images were added to the surface in the framework of the earliest rock-art event(s), or only after most of the space on the upper section of the rear wall had been already taken up by the remains of former artistic activities.

The motifs produced by techniques involving reductive processes appear to have been added to the surface in the course of several rock-art events all of which postdate the creation of most of the painted cattle. This is evidenced, on the one hand, by superimpositions of some of the petroglyphs over motifs painted in red (A.14, A.17, A.27, A.58, A.83) or white (A.61), by the style of rendering of some of the incised cattle figures (A.85, A.88) which appears to have been inspired by the painted cattle of Style B and, last but not least, by an apparent syntactic association of some incised animals (A.21, A.48) with those made by means of paint.

On the basis of the thematic, stylistic, and syntactic aspects of the rock art, the apogee of the rock-art activities on the rear wall and the ceiling of the shelter – involving additive as well as reductive processes – can be placed into the Middle Nubian sequence. The respect shown by later painters to the earlier figures may imply that the acts of creating new painted images – the individual rock-art events attributable to different painters – may have been motivated by a shared artistic (or other) design and have been carried out within a shorter period of time. Only 2 human figures (out of 21) attest to minor artistic activities having taken place during the Late Nubian sequence.

Nevertheless, of utmost importance as far as this panel is concerned is the observation that the natural rock surface in the shelter was transformed into the multi-layered rock-art surface that was eventually documented by the Czechoslovak team not only through acts of addition, but also through intentional interventions in the existing painted motifs. I divide the latter into acts of *modification* and *reduction*.

Among the acts of *modification*, I distinguish:

a) 'functional (ritual) destruction' of selected motifs through particular acts of iconoclasm; in the present shelter, it is the cutting-off and/or erasure of the head of the cattle painted in Styles A and/or B, all of which remained well-recognisable after these acts had been committed; and
b) 'restoration' of whole figures or their parts affected by human action, natural processes (decay of pigments, weathering), or otherwise; these included:
   - the refilling of the grooves cutting-off the heads of some of the cattle in Styles A and B with a red paint differing from that used for the making of the motifs;

- the re-animation of two effaced (washed-off?) cattle figures (A.17, A.27) by incising the figures A.18 and A.28 around the traces of red paint (see Figs. 3, 4);
- the incision of additional contouring lines around cattle (9) and human (3) figures, and, in one case (A.29) the refilling of the contouring lines with a paint of another (blue) colour type;
- the restoration of the head of the cow A.90 by incision after the white paint had fallen off; and
- the remaking of the original form of four human figures with small heads and white (linen) kilts in the centre of the panel by means of varied red paints into large-headed females dressed in red (pink) skirts (A.34, A.38) and males with no kilts (A.33, A.37) in the course of which the white front legs of the cattle A.40 were superimposed by the enlarged head of A.38.

As far as *reduction* is concerned, I differentiate:

a) 'selective destruction' bringing along (nearly complete) obliteration or removal of certain figures from the rock-art surface, namely:
   - the destruction of most of the human figures dressed in white kilts by hammering, scratching, and/or rubbing (Figs. 4-6); and
   - the removal (washing-off?) of some of the cattle figures blocked in monochrome (A.17, A.18) or painted in red and white (A.20, 73); and

b) 'indiscriminate destruction' directed against the panel as a whole (by hammering, scratching).

Of the intentional interventions involving modification, the cutting-off and the erasure of the heads of several cattle are of utmost interest. These acts affecting the figures have obviously been committed not with the aim to destroy the images, but to kill or deactivate the selected cattle. As the acts concerned only pictures attributable on stylistic grounds to two authors (if not to one and the same individual), we may assume that the identity or individuality of the painter(s) was known to those committing the acts; for this reason these acts of modification must have occurred shortly after the backbone of the scene was in place. The character of the acts suggest that the functional (or ritual) destruction (deactivation) of the cattle, all of which remained well-identifiable even after these acts (as compared with A.17 and A.27), were carried out with the aim to impair the standing or to affect the possessions (cattle) of the painter(s) and/or the groups, to which they may have appertained, through magic or ritual destruction of the figures representative of these individuals and/or groups, their identity and world.

Interestingly, with three of these killed cattle, attempts at rectifying the damage and reactivation of the animals appear to have been made through repainting of the grooves with another type of red paint. This particular "treatment" of selected cattle on the present rock-art surface, unprecedented in the rock art of Lower Nubia Menardi Noguera and Soffiantini 2008), attests that once created, the rock art may have lived its own life:[9] the evidence from the "Painted Shelter at Korosko" suggests that it could have played a role in expressing or implementing dynamics of intra- or intergroup social, economic, or other relations of the local Nubian (C-Group) communities.

Of significance is also the selected destruction (*reduction*) of the human figures dressed in white (linen) kilts – according to the ancient Egyptian "dressing code" – and the remaking (*modification*) of four such figures into humans clothed in a rather non-Egyptian (if not entirely Nubian) style. These acts may suggest a marked dynamics of relations and/or encounters of the (representatives of the) local Nubian (C-Group) communities some of which may have come into contact with, or have adopted, some aspects of culture of the ancient Egyptians.

The kilometre scale: the place of the rock-art surface in the rock-art landscape of Korosko and beyond

The present rock-art panel is one of the 519 rock-art surfaces recorded by the Czechoslovak expedition in Khor Fomm el-Atmur (Váhala and Červíček 1999; Suková 2011b), the great wadi that formed the approach to the frequented caravan route connecting Korosko in Lower Nubia with Abu Hamid in Sudan (Fig. 8). The panel was concealed in a north-oriented shelter that was roofed by an overhang of a large, dark-patinated sandstone boulder that constituted a conspicuous feature in the open landscape of Khor Fomm el-Atmur (Fig. 9). The shelter was an ideal place for occupation, as it was of good size, ease of access, and protected from the sun for most of the day (Bietak and Engelmayer 1963,16). Moreover, it offered clear views both down Khor Fomm el-Atmur straight to the Nile and up the khor into the interior of the Korosko hills. The views may have counterbalanced the conspicuousness of the boulder in the open landscape of the wadi and increased the attraction of this space for occupation. Archaeological evidence of former human occupation of the shelter was brought to light through excavation of the floor of the shelter.

Interestingly, the rock-art and archaeological evidence appear to paint a different picture of the former human occupation of and activities at this place. The

[9] Cf. the rock art of Australia where, according to the ethnography, the point may be in the act of creating the images rather than in their enduring existence thereafter (Chippindale and Nash 2004: 7).

character and distribution of the debris revealed during the excavation points to a seasonal occupation of the shelter during the A-Group (Early Nubian) and C-Group (Middle Nubian) times and the main, if not the only function of the shelter being "domestic" (Smith 1962: 81, 89). In the light of the evidence of the rock art, however, the rock shelter appears to stand out rather as a special purpose site or a site of some social and/or religious significance.[10] This is suggested by the very presence of motifs produced by techniques involving additive processes, generally very rare in Lower Nubia, and, more importantly, by the inter- or intragroup "discussion" preserved on the rear wall and the ceiling of the shelter that attest to a complex history of use of this place for artistic and other activities during the Middle Nubian (C-Group) times.

While the individual types of motifs – cattle, humans, and boat(s) arranged in a procession – fall well within the rock-art repertoire of Lower Nubia,[11] the particular combination of single motifs, their groups, and four stereotypical spatial compositions involving cattle and humans finds the closest parallels in the relief decoration of ancient Egyptian funerary monuments of the Old to New Kingdoms in which processions (and presentations) of cattle of varied types accompanied by humans – sometimes even Nubian herders/archers (*e.g.* Blackman 1915, Pl. IV) – and boat(s) constitute a popular thematic cycle (see in particular Vandier 1969). An inspiration or influence on the present surface deriving most likely from the ancient Egyptian art and/or world is strongly suggested by the type of travelling boat and by the ancient Egyptian "dressing code" of the majority of the human figures represented on the panel. The female wearing the typical C-Group bustle skirt of leather, the non-Egyptian style of representation of the humans dressed in white linen kilts, the heterogeneous herd consisting of cattle portrayed in compliance with the C-Group representational art, and the utilisation of the particular characteristics of the natural rock surface (instead of introduction of artificial registers), however, rather suggest that we are dealing with an adjustment or adoption of this thematic cycle recurring in built funerary monuments for decoration of a natural place with a possible social and/or religious significance.

[10] A social and/or religious significance of the "Painted Shelter at Korosko" was suggested already by Trigger (1965: 78) who considered the place to constitute an early (i.e. Early Nubian) ledge shrine.

[11] In the area of Korosko, interestingly, there are several surfaces that bear painted or incised images that could well have been made by the same hands as those involved in the marking of the rear wall and the ceiling of the present shelter. With painted figures, this is the case of the painted shelter 17 R XVIII-1D in Khor Aweis el-Gurani (see Chapter 3 in Suková 2011a and Surface [405D] under Ref. No. 405 in Suková 2011b). For petroglyphs of cattle reminiscent of those painted or incised on the present rock-art surface, *cf.*, *e.g.*, Cat. (Ref.) Nos. 438A, 508, 515, 853C, 853L, and 949A in Váhala and Červíček (1999) and Suková (2011b).

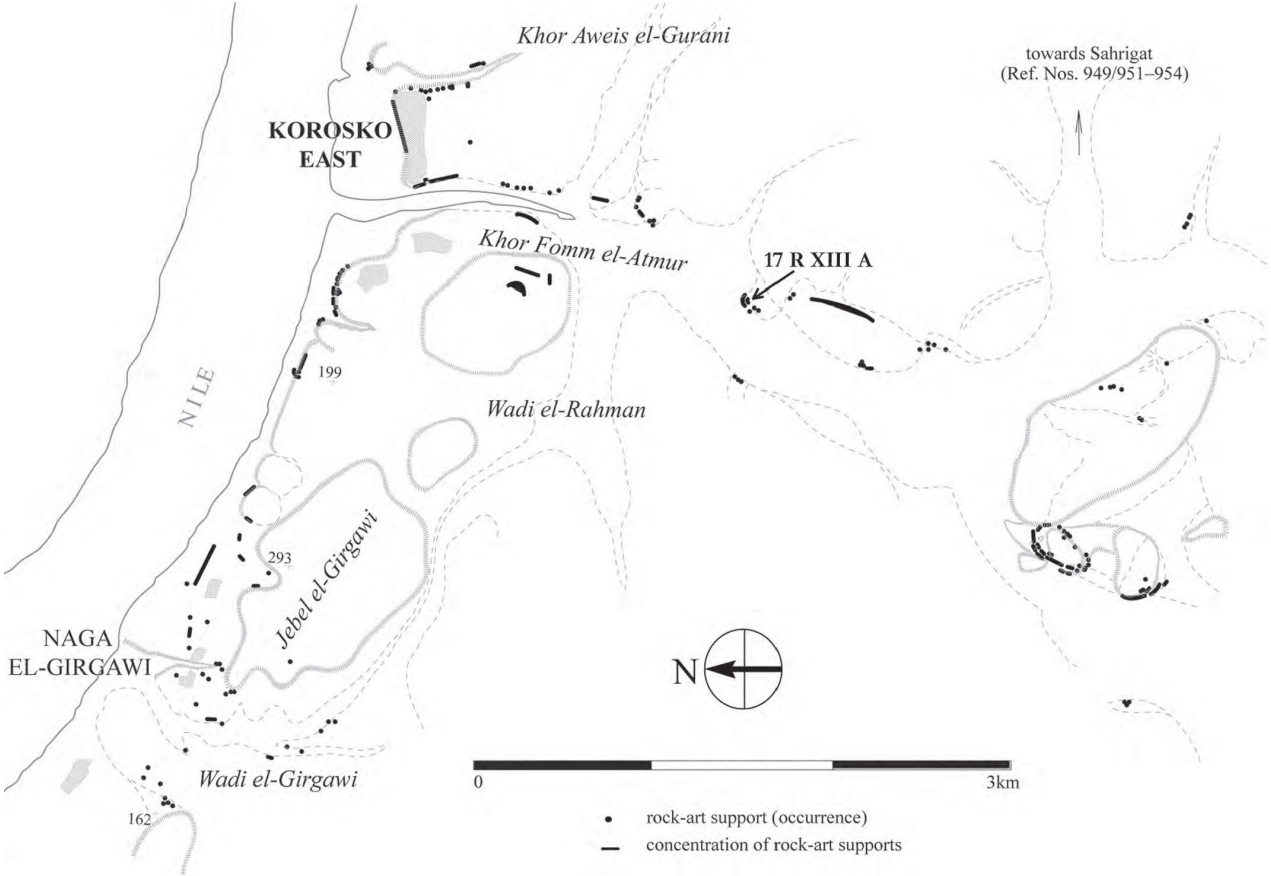

Fig. 8. Location of the "Painted Shelter at Korosko" in the rock-art landscape of the right bank of the Nile in the upstream part of the southern section of the Czechoslovak concession in Lower Nubia (drawing L. Suková and L. Vařeková)

The present evidence brings to the fore the questions regarding the (ethnic) identity of the figures appearing on the panel, of the individuals responsible for their additions, modifications, and reductions, and of the (un)targeted audience and consumers of the rock art (Smith 2003). The oscillating identity (ethnicity) of the figures could also point to the actual function of this place. With the location of this site in the borderland between the Nile and the mountains – the two of which are represented by the natural properties of the rock surface – in the open landscape of one of the largest khors, it would seem plausible to see in this place a venue of social and/or religious gatherings of the local Nubian (C-Group) communities some of which may have come into contact with an Egyptian influence, or even a venue where the encounters of two different worlds – the Nubian and the ancient Egyptian – could have taken place. The presence of the ancient Egyptians in this region during the Old Kingdom and in particular the Middle Kingdom – albeit of a rather specific character – and the adoption by the local Nubian communities of some aspects of the ancient Egyptian culture in life and upon death during the Second Intermediate Period and the New Kingdom are attested by the large number of rock inscriptions recorded in the vicinity of the modern village of Naga el-Girgawi, in Khor Fomm el-Atmur, and in Sahrigat (Žába 1974) and by the (Late) C-Group and New Kingdom cemeteries excavated in the Korosko region (Emery and Kirwan 1935), respectively.

Conclusion

In the present paper, the framework of scales proposed by Ch. Chippindale (2004) for the reporting and study of rock art as pictures in place was used for the presentation of one of the most exceptional rock-art surfaces from Lower Nubia that, since the 1960s, is accessible for research only through "pictures of the pictures in place" and "pictures out of place". Each one of the four, closely inter-connected scales made it possible to bring to the fore and discuss the technical, thematic, stylistic, syntactic, and locational and archaeological aspects of this rock-art occurrence that finds no parallels in the rock art of Lower Nubia. Despite the limitations of the sources available for the reconstruction of the transformation of the natural rock surface in the shelter into the multi-layered rock-art surface that was eventually documented by the Czechoslovak expedition, it was possible to build up an evaluation of the significance of the evidence and to raise a number of important issues, including (but not limited to) those concerning the (ethnic) identity, (social) dynamics, and function of rock art among the Nubian populations during the Middle Nubian sequence (C-Group times). Nevertheless,



Fig. 9. Location of the conspicuous boulder with the "Painted Shelter at Korosko" in the open landscape of Khor Fomm el-Atmur (photo Zbyněk Žába)

many of these issues have to remain open because those who could provide the appropriate answers are long gone and the pictures they had left of themselves, their life-worlds, and their aspirations have disappeared for good together with their places.

Acknowledgements

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Hunter-Gatherers and Early
Food Producing Societies
in Northeastern Africa
Studies in African Archaeology 14
Poznań Archaeological Museum 2015

Elena A. A. Garcea

Origin and Early Development of Food Producing Cultures at Sai Island and Amara West, northern Sudan

Introduction

The 2011 symposium on the later prehistory in north-eastern Africa celebrated its 30th anniversary since the beginning of this continuing series started in Dymaczewo. In the epilogue of the first Dymaczewo conference's proceedings, J.D. Clark wrote "it is remarkable that we have been able in these four and a half days to say so much about so little" (Clark 1984: 498). Much more has been said in the years that followed and new data are still continuing to come to light.

This paper presents some results of recent fieldwork on the later prehistory on Sai Island and in the district of Amara West[1], in northern Sudan. The two areas are about 20 km along the Nile Valley, Sai Island being upstream of the Amara West district, which is on the left (northern) side of the present river valley (Fig. 1).

Fieldwork at Sai Island

Investigations on the later prehistory at Sai Island included an extensive excavation at the Khartoum Variant site 8-B-10C, which lasted several years (Garcea 2011-2012; in press). The site is located between Jebel Adu to the west and the

[1] At Sai Island, I became in charge of the research on the later prehistory in 2004, thanks to an international cooperation between the late Francis Geus and Didier Devauchelle, past and present directors of the Sai Island Archaeological Mission of the University of Lille III – Charles de Gaulle. Moreover, since 2011, thanks to an invitation by Neal Spencer of the British Museum, director of the Amara West Research Project, and upon a formal agreement with the authorities of the National Corporation for Antiquities and Museums, I have been conducting surveys with test excavations of the prehistoric sites located in the district of Amara West.

present course of the Nile to the east and occupies an elongated area of about 20x150 m parallel to the Nile near the village of Adu (Fig. 2). The excavated area covered a surface of 105 square metres.

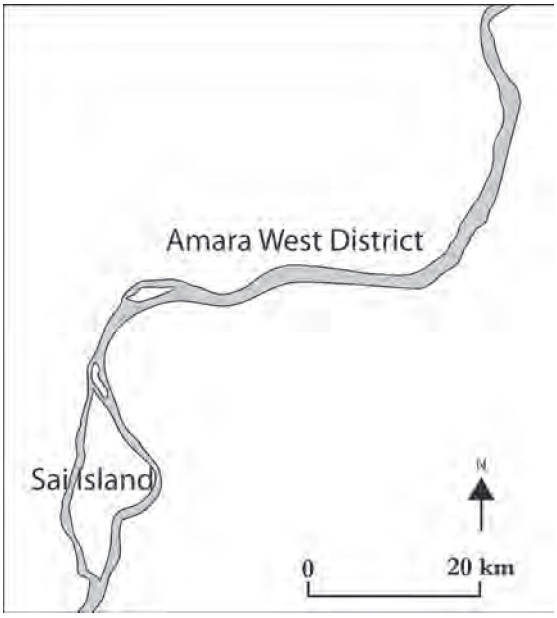

Fig. 1. Map of the Amara West District and Sai Island

Geoarchaeological investigations indicated that this site is located in a paleosol with a large quantity of deflated carbonate nodules on the surface, which formed when there was an active soil of a vegetated floodplain. Preliminary pollen analysis of the sediment confirmed the geoarchaeological evidence and revealed a rich floristic record, including more than 20 different plant types. Among them, tropical taxa predominated and herbs included a prevalence of *Gramineae*. These plants are indicative of a savannah landscape with a moist environment, supporting the presence of a vegetated floodplain as the carbonate nodules suggest. Faunal remains further corroborate the geomorphological and palynological evidence as they mainly consist of various types of mollusc[2].

After removing the artefacts on the superficial level at 8-B-10C, Level 1 was excavated during the 2004 and 2005 field seasons. This level exhibited a complex settlement organisation with 7 hut floors, 100 post holes, 3 hearths and 3 rubbish pits, and was radiocarbon dated to 5000 cal years BC: 6080±35 BP, or 5070-4900 cal. BC (KIA-24463), and 5980±40 BP, or 4950-4770 cal. BC (KIA-24464) on charcoal from one of the hearths. Pottery is mostly undecorated, but dotted wavy line motifs are present and make up 13.3% of the decorations made with the rocker technique. Retouched tools are typically not microlithic and comprise a prevalence of denticulated and notched flakes, several perforators and a few endscrapers. Lunates and backed bladelets are extremely rare, but a multiple edged side-

[2] Geoarchaeological investigations were conducted by Jennifer Smith of Washington University in St. Louis, MO, U.S.A. Pollen analysis was carried out by Anna Maria Mercuri of the University of Modena and Reggio Emilia, Italy. Faunal remains were studied by Louis Chaix of the Department of Archaeozoology at the Museum of Natural History, Geneva, Switzerland.

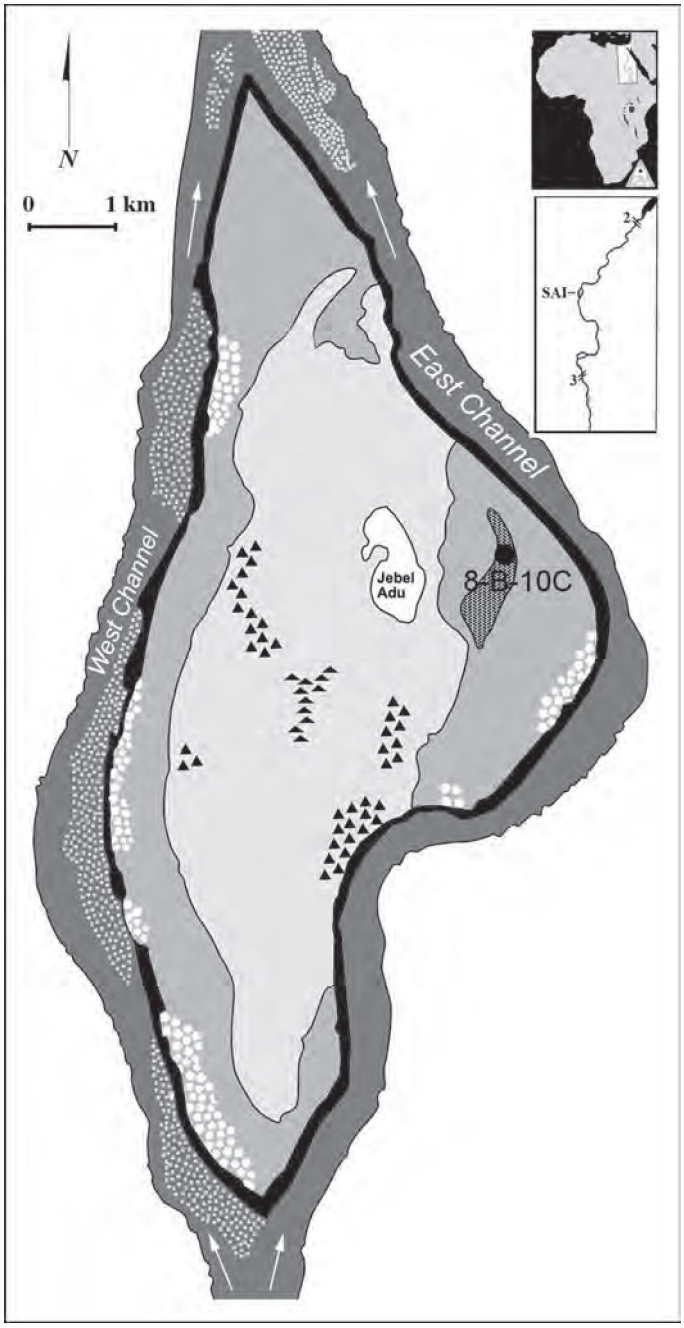

Fig. 2. Map of Sai Island with Site 8-B-10C (modified from Garcea and Hildebrand 2009: Fig. 1)

scraper made of 'Egyptian' translucent flint, which typifies the Khartoum Variant (Shiner 1968), was included in the tool-kit from this level.

Level 2 was excavated in 2009 and revealed another occupational system including 74 post holes with another complex of huts belonging to an earlier phase of intensive occupation of the site. One sherd showed the typical dotted wavy line motif and another one an alternately pivoting stamped decoration, which is also characteristic of the Khartoum Variant period. The lithic assemblage included a considerable quantity of refitting cores and flakes, suggesting a very good preservation condition of the archaeological deposit.

The excavation of the site finished in 2011 with the removal of Level 3. It appeared that this level lay on a paleosurface with scattered well-rounded pebbles, comparable to the present erosional surface surrounding the site. The paleosurface exhibited desiccation polygons with mud cracks, which formed when the moisture of the sediment dried up, once more confirming the former existence of a floodplain. No architectural features were observed in this level, but the continuing high density of artefacts showed that a third intensive occupational phase of the site existed prior to the establishment of the post holes and hut features. All pottery was non-decorated, but still showed the typical Khartoum Variant, rather coarse, ware. Retouched stone tools included rare lunates. The raw materials used to make lithic artefacts still comprised a large variety of rocks, with a prevalence of quartz, but also chert, quartzite, fossil wood, carnelian, sandstone, schist, as well as the characteristic 'Egyptian' translucent flint.

To sum up, Site 8-B-10C was located in an alluvial plain and was occupied on a semi-permanent basis during the formation of Levels 1 and 2. Conversely, the occupation phase associated with Level 3 was based on a more opportunistic, although recurring, settlement system than in the later periods, as the high frequencies of lithic artefacts indicated. Yet, all levels exhibited various characteristics of the Khartoum Variant complex. Considering the extraordinary density of artefacts, the site must have offered particularly favourable conditions for food and water resources to the numerous generations of people who settled there.

Fieldwork in the Amara West district

New investigations on the prehistoric sites located in the district of Amara West started in 2011. Aims of the survey included relocating the prehistoric sites previously recorded by Arkell (1939; 1941) and Vila (1977), georeferencing them, assessing their preservation condition, locating previously unrecorded sites, describing the palaeoenvironmental, geomorphic, and sedimentological features in

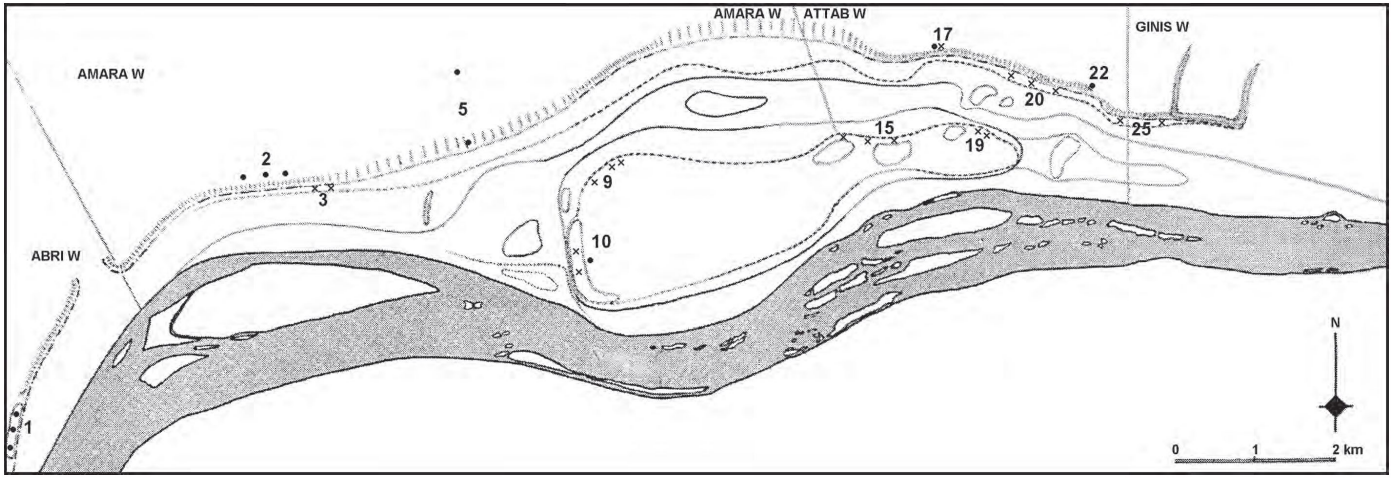

Fig. 3. Map of prehistoric sites in the Amara West district.□: Middle Stone Age sites; ☒: Khartoum Variant, Abkan and Pre-Kerma sites (modified from Vila 1977: 14).

the area, and collecting sediment, ceramic, lithic and archaeozoological samples for laboratory analysis. Fieldwork was focused on the prehistoric sites defined by Vila (1977) as "Palaeolithic," "Neolithic/Old Nubian," and "Old/Middle Nubian."

The surveyed area covered the entire district of Amara West, which includes the left (northern) side of the present course of the Nile here flowing from west to east for about 8.5 km, and 2 km from north to south (Fig. 3). Three previously unknown sites were discovered and were named according to the Archaeological Map of Sudan designed by Hinkel (1977), which Vila also referred to. As the last site in Vila's list was number 2-R-74, the new sites were given numbers 2-R-75, 2-R-76, and 2-R-77.

Middle Stone Age sites

Beginning from the earliest period, Vila (1977) listed five "Palaeolithic" sites (2-R-15, 2-R-20, 2-R-21, 2-R-71, 2-R-74) and mapped two other ones (2-S-17 and 2-S-22) in the easternmost part of the district (Vila 1977: 14). All of them could be relocated and a previously unknown one was found.

Site 2-S-17 appeared in good preservation condition. A consistent concentration of Middle Stone Age (MSA) artefacts was scattered on the surface. Levallois cores were often of small dimensions and one core was made with the Nubian technology. Levallois flakes, some showing facetted butts, were common and some of them were retouched. Bifacial tools were also present. Quartz, which was the most weathered type of rock, prevailed among raw materials. Other raw materials included brown chert and fossil wood.

Farther north, on a higher terrace, a previously unknown site was discovered. It was named according to the Archaeological Map of Sudan followed by Vila, and was given number 2-R-77. It appeared as the best preserved Middle Stone Age site, even though several artefacts were altered by wind blasting. The assemblage had a predominant flake component, although some flakes tended to elongated shapes. It included Levallois cores of large sizes and centripetal cores. The toolkit comprised simple and denticulated Levallois flakes, cortical bipolar flakes, notched flakes and flakes with alternate backed retouches. Among sidescrapers, one was tanged (Fig. 4), suggesting an Aterian affiliation. Quartz and chert were the most frequent raw materials. Quartzite and sandstone were also used.

It could be possible that these MSA sites were in use over a long time period, possibly spanning from an earlier time than the Aterian. Moreover, it should be pointed out that another tanged tool, a simple sidescraper on a Levallois blade (Fig. 5), was found is an isolated spot (N 20°50'47.9"/ E 30°25'14.7"), corroborating the presence of a late MSA, or probably Aterian complex.

Khartoum Variant sites

Following in chronological order, all other sites are Holocene in age. Among them, Vila (1977) defined the earliest ones as "Neolithic/Old Nubian," which, in his 2-R grid, he found in three places: 2-R-12, 2-R-66 and 2-R-68 (Fig. 6). They can now be assigned to the Khartoum Variant period. The latter site represents two different cultural phases: the Old and the Middle Nubian, and therefore has been renamed as 2-R-68A and 2-R-68B, the Khartoum Variant site being 2-R-68A. Four other sites were located and mapped in the easternmost part of the district (Vila 1977: 14): sites 2-S-15, 2-S-19, 2-S-20 and 2-S-25. Sites 2-R-66, 2-R-68A, 2-S-15 and 2-S-19 are the best preserved ones. Among them, 2-R-66 is located between the present left bank of the Nile and an ancient course of the river, on a terrace on the right side of the ancient channel. It covers an elongated area parallel to the Nile (Fig. 7). Both the ceramic and lithic assemblages could be assigned to the Khartoum Variant period. Decorations consist of packed dotted zigzags made with the rocker stamp technique, including dotted wavy line motifs, and some alternately pivoting stamped motifs. The lithic complex is microlithic and shows a production of small flakes and bladelets, which were also used as blanks for manufacturing geometric tools, in particular lunates, which are the most characteristic tools at this site.



Fig. 4. Aterian tanged sidescraper from 2-R-77



Fig. 5. Aterian tanged sidescraper on a Levallois blade from Amara West

Faunal remains of large mammals, fish, and gastropods were visible on the surface of this site. Given their fair preservation condition, they suggested that they were in situ and could have recently eroded out from the archaeological deposit. Seven test pits were dug for both geological and archaeological investigations of the sub-surface and showed that the Khartoum Variant deposit lay in a sediment between upper alluvial sediments of Pleistocene age and a lower deposit with later artefacts.

Among the eastern sites, 2-S-15 (Fig. 8) is comparable to 2-R-66, as it is in similar preservation condition and is located on a terrace on the right side of the ancient Nile channel at a distance of about 1.5 km. Pottery is decorated with impressions made with the rocker technique: it comprises both dotted and dashed zigzags. Lithics include typical Khartoum Variant tools, such as concave side-scrapers.

Another previously unknown site was discovered on a terrace on the left (northern) side of the ancient course of the Nile. While Vila (1977) predominantly identified Holocene sites on the southern bank of the paleochannel, it appeared that some archaeological sites were present on the northern bank, indicating that early Holocene inhabitants also occupied this area, even though not as intensively as the southern bank. The new site was named 2-R-76 and could also be assigned to the Khartoum Variant period.

Abkan/Pre-Kerma sites

The last category of inspected sites regards those that Vila (1977) defined as "Old/Middle Nubian". It comprises two sites, 2-R-58 and 2-R-68 (Fig. 6). Site 2-R-58 shows some possibly Abkan pottery on the surface, but was disturbed by later tumuli built in the same site.

Vila distinguished two occupations at Site 2-R-68, an earlier one, which can be now assigned to the Khartoum Variant period, and a later one, which can be assigned to the Pre-Kerma period. In order to keep the two occupations separated, the site has been renamed as 2-R-68A and 2-R-68B. The former is not very well preserved, whereas the latter is in much better preservation condition and consists of a concentration of circular or oval shallow depressions surrounded with gravel and cobbles of different sizes. Four test pits were dug and one of the depressions was cleared in order to assess the presence of anthropic features, which were confirmed during excavation, even though sand fill combined with the rapid degradation of the pit walls and prominent desiccation cracks did not allow determining the original dimensions and shapes of these features. The tested feature

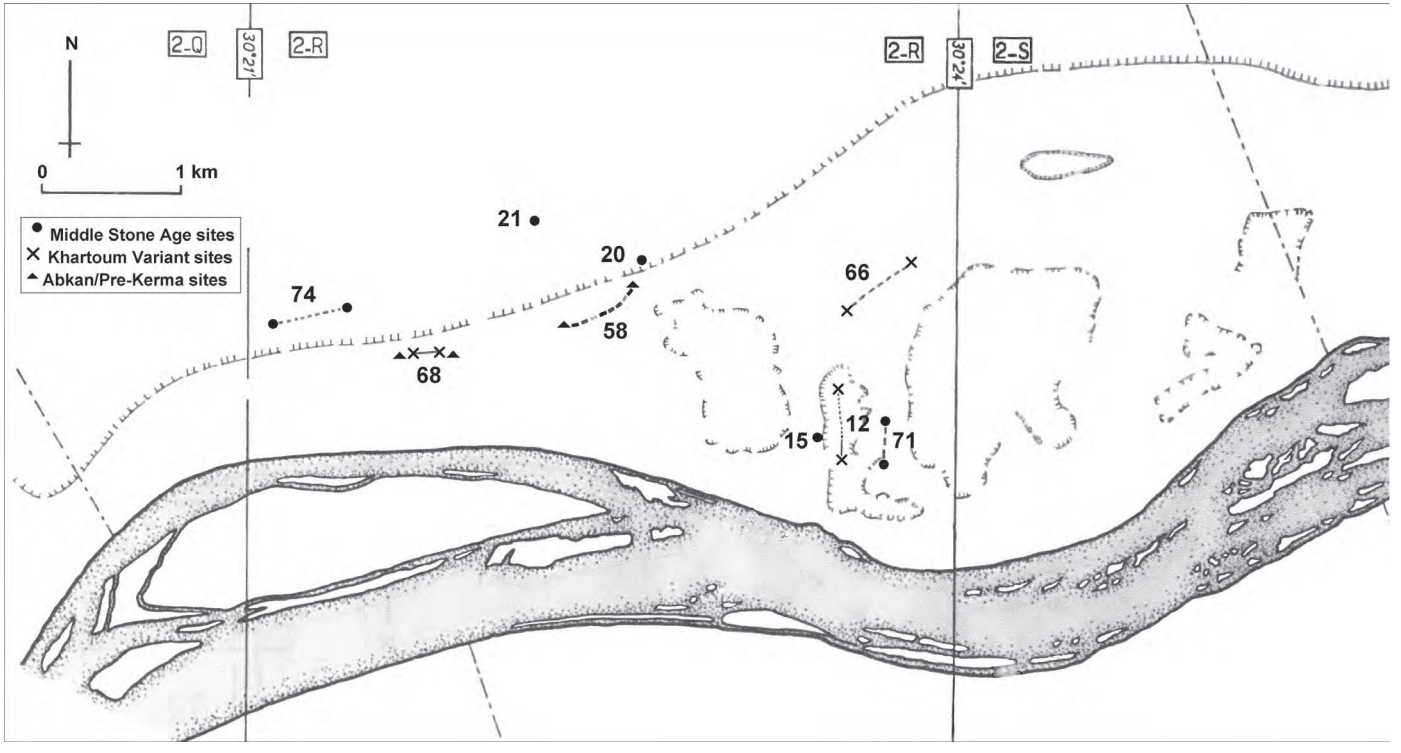

Fig. 6. Map of the prehistoric sites in Vila's 2-R grid within the Amara West District (modified from Vila 1977: 15)

measured about 4x2 m and was cut into the sterile silt. The lithic assemblage is made of different raw materials, including quartz, chert, carnelian, fossil wood, quartzite and schist. Prevailing cores have opposed, ninety-degrees and discoidal platforms. End-products are often microlithic. Retouched tools comprise notches, denticulates and lunates. Percussors are very frequent at this site, indicating that knapping was practised on the spot. The pottery assemblage appeared coherent with the Pre-Kerma period as regards both decorative motifs and technological features. The texture of the pastes is fine or medium with organic, possibly dung, and mineral inclusions. Most of the internal surfaces are black or brown burnished, whereas the external surfaces are red or brown burnished. Polishing is only occasionally visible and occurs on the sherds with a finer texture. Decorations comprise different types of incision: herringbone, criss-cross and geometric motifs. Some rocker and alternately pivoting stamped decorations also occur with both spaced and packed, dotted or dashed zigzags. Six clay lumps were also collected from the surface of a test pit (# 9).

Concluding remarks

To conclude, the first remark regards the beginning of human occupation at Amara West. It is possible that humans reached the area during the early MSA period, or even earlier. Furthermore, the presence of Aterian artefacts at Amara West is noteworthy. As is known, this techno-complex does not usually occur along the Nile Valley (Kleindienst 1998) and is rather a desert-oriented cultural unit (Garcea 2010; 2011). As a matter of fact, the district of Amara West exhibits environmental features that appear more comparable to the Western Desert of Bir Tarfawi (Wendorf *et al.* 1993) or Dakhleh Oasis (Kleindienst 1998) than the Nilotic, riverine landscape. Therefore, it seems plausible that some Aterian groups explored this area, which was much drier and in direct connection with the Sahara rather than with the eastern side of the Nile Valley.

As regards the 'origin and early development of food producing cultures', topic of this symposium, both Sai Island (Site 8-B-10C) and Amara West (Sites 2-R-66 and 2-S-15, in particular) indicated that the latest foragers chose specific spots that must have been favourable for water and food resources to develop long-lasting settlement systems based on permanent or recurrent occupations of extended areas. In fact, these sites are associated with floodplain deposits near the edges of active channels. Furthermore, carbonate nodules at 8-B-10C in Sai and carbonate root casts and Fe-Mn nodules at 2-R-66 in Amara West suggest that the occupants of these sites lived in vegetated floodplain environments.



Fig. 7. View of Site 2-R-66



Fig. 8. View of Site 2-S-15

Finally, the Abkan and Pre-Kerma sites in Sai Island are located in different areas than the Khartoum Variant ones, indicating a differently organized space within a relatively small and circumscribed area, as is the case of an island. On the other hand, in the Amara West area, the Abkan and Pre-Kerma sites are not as well-preserved as the Khartoum Variant ones. It is clear, however, that they were usually located in the same localities of the earlier sites, possibly suggesting a harsher environment, with lesser opportunities to find equally adequate resources for human settlement. These two areas, Sai Island and the Amara West district, although at a close proximity from each other, have provided interesting comparable material that contributed to add a little more to 'the little we knew,' as J. D. Clark had pointed out.

Acknowledgments

I was not in Poland in 1980 for the first "Dymaczewo Conference", but soon after I learnt that Dymaczewo was the place to go in order to thoroughly learn about the latest research and to meet the people who were fresh from the field. As I participated in my first fieldwork in Sudan in 1986 with Isabella Caneva, it came as a natural consequence for her to bring me to my first "Dymaczewo Conference," then still in Dymaczewo, in 1988. I never missed a conference since then. Today I would not be surprised if half of the participants of this symposium do not know what Dymaczewo means to us. To the other half, like myself, the memories of Dymaczewo are still fresh in our mind so much as our desires to get together for a longer time than the hasty encounters we make in the antiquities offices of Cairo, Khartoum, or elsewhere. It is a pity that neither Desmond Clark nor Lech Krzyzaniak is any longer with us to continue to talk about 'so little.' Nevertheless, if these conferences are continuing, it is because they initiated a process that nobody wants to end and their co-organizers can carry on as successfully. I take this opportunity to thank Marek Chłodnicki, Jacek Kabaciński, Michał Kobusiewicz, Romuald Schild, Marzena Szmyt, and Małgorzata Winiarska-Kabacińska, among others, for continuing this enjoyable tradition. I also express my gratitude to Isabella Caneva and to the past and present organizers with the wish to share this unique opportunity with the younger generations of our students, who were in Poznan with us in 2011 after 30 years.

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Hunter-Gatherers and Early
Food Producing Societies
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Studies in African Archaeology 14
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Ahmed Hamid Nassr Hmad

The Late Neolithic at Qalaat Shanansite within Shendi Reach

Introduction

The Qalaat Shanan site is located approximately 176 km north of Khartoum (Fig. 1) in south-western Shendi town, south-west of the El-Kadada Neolithic, approximately 800 m east of the Nile River (Fig. 2).

The site was discovered during the cooperative survey carried out by the Sudan Antiquities Service and the French Archaeological Research Units, from Khartoum to Shendi in 1984 – 1987 seasons. The Qalaat Shanan site is noted as Shendi Neolithic site. One test pit (3 x 3 m) has been dug on the site, which revealed late Neolithic evidence (Geus 1984: 17).

The site of Qalaat Shanan lies amongst a group of Neolithic sites in the Shendi area (Fig, 1) and it reflected a succession of various Neolithic activities from the early to the late horizons (Geus 1984; Sadig 2005; Reinold 2008).

In 1999 a survey was carried out by the National Corporation of Antiquities and Museums (NCAM) and Shendi University at inclusive of many local sites in the Shendi area. In 2001 the Qalaat Shanan site was defined by Salah Omer Alsadig who divided it into 3 Mounds based on archaeological surface materials and four test pits were excavated under his supervision.

The site extends onto a high open land from the south to the north, encompassing an area of 500 x 200 m crossed by several water channels (Fig. 2). A systematic excavation carried out in different parts of this site revealed the following:

- Mound A situated on the highest elevation of the northern part of the site: a test pit revealed Islamic graves.
- Mound B in the central part of the site: 18 test squares (2 x 2 m) were excavated. They showed a complex Neolithic culture.
- Mound C in the eastern part of the site: 32 test squares were excavated which revealed early Neolithic artifacts (Nassr 2012: 9-11).

The excavations suggested that the site contains various stratified materials from the early to the late Neolithic (Nassr 2012: 11). Here I would like to discuss the general attributes of the late Neolithic culture at Qalaat Shanan.

Landscape of the site

In recent years archaeological studies have recognized the importance of the landscape in the distribution of late Neolithic sites. This is clear in close proximity of the Nile River and evident in the distribution of late Neolithic artifacts in Mound B at Qalaat Shanan on the highly elevated area near the Nile, very similar on the bank of a big wadi called Um Gigiama and upon the open land east of the Mound A (Fig 2). This situation indicates a very important adaptation pattern of the late Holocene settlement in central Sudan (Mohammed-Ali 1982: 107).

From a geographical point of view it seems that Qalaat Shanan communities exploited the Nile River's environmental resources. Their remains indicate a hunter-gatherer, pastoral and farm settlement activities.

According to the landscape of the site and the late Neolithic sites discovered in Shendi area, a clear phenomenon has being seen. Most of the early Neolithic sites lie at a considerable distance from the present course of the Nile River (Geus 1981; Marks and Mohammed-Ali 1991). This suggests that the flooding of Nile's banks covered a significant portion of the surrounding plain, at least seasonally. Swamps and possibly small lakes could have existed there. Most of the late Neolithic sites that still exist today are generally close to the Nile and were even closer at the time of occupation, thus indicating spatial activities and permanent settlement, with an exception of that at the Shaqadud site in the hinterland (Marks and Mohammed-Ali 1991).

Late Neolithic attributes in stone tools industry

A large quantity of stone tools have been discovered at Qalaat Shanan. They represent different techniques and raw materials. Relatively large artifacts and the raw material from which they are made could possibly be indicative of the macrolithic tradition (both in terms of typology and technology).

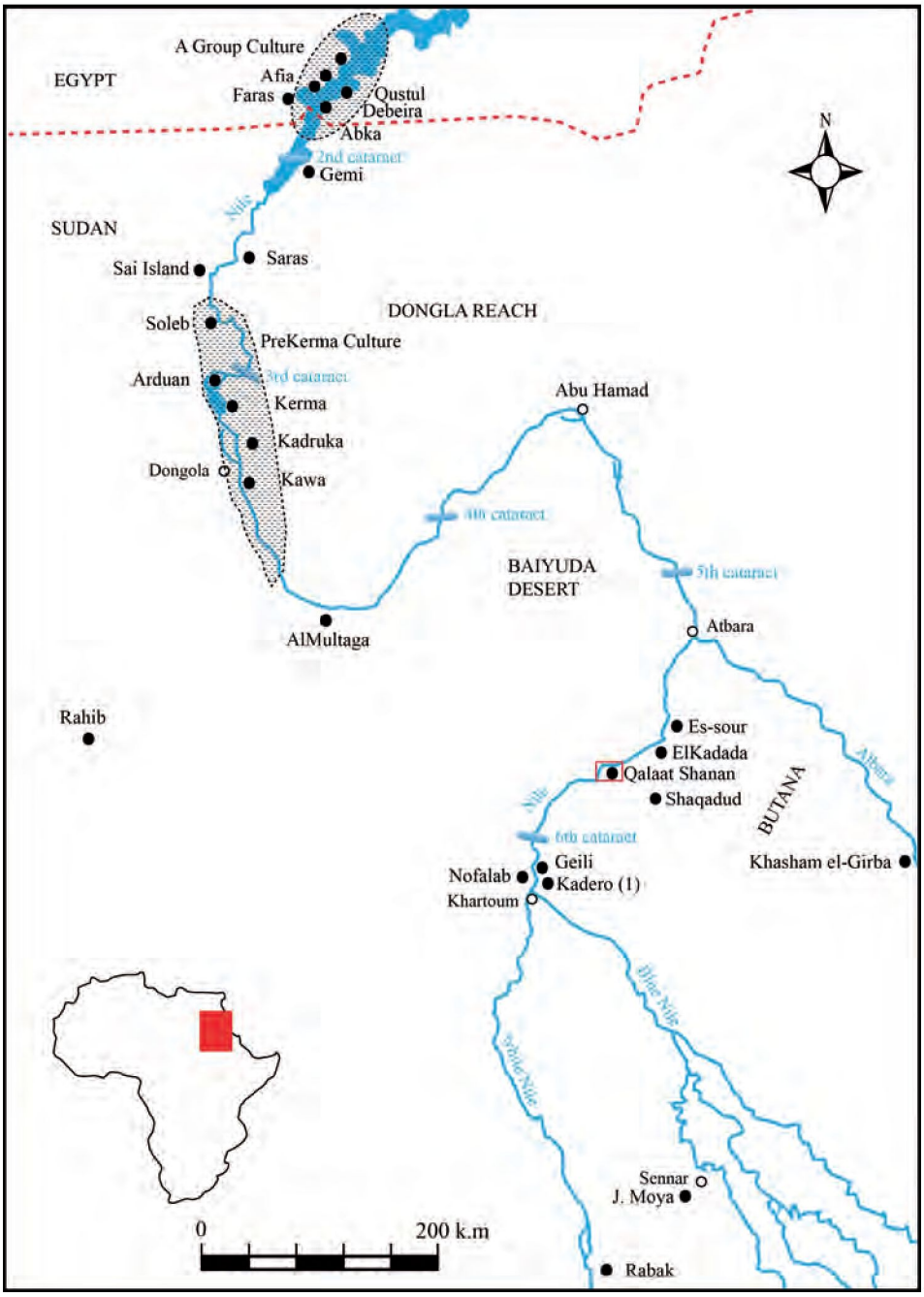

Fig. 1. Main sites show late Neolithic attributes (illustration by the author)

During the late Neolithic a diagnostic polished stone tools were found distributed throughout the site, some in settlement levels and others in graves. There were numerous sandstone grinder tools (upper and lower parts) of different sizes, and heavy quartz flakes, associated with finished tools and retouched pieces.

Denticulate tools were the most important class of the assemblage. Some of them were more alternating rather than "toothed". The tools were retouched on the ventral and dorsal surface of the blank. The tool distribution also included scrapers - convex and concave in shape. Side-scrapers were represented by small forms - simple, rounded and highly retouched only on the side surface of the blank.

Small deposits and waste pieces made from quartz, rhyolite and agate also occur. There was insufficient typological evidence to perform accurate dating and classification of the Neolithic horizon at the site. There were common traits based on lithic technology in the Neolithic site in Shendi area and the Butana (Geus 1984: 30-36; Marks and Mohammed-Ali 1991:34-62).

Objects clearly related to the late Neolithic techniques, represented by polished stone tools (i.e. a bracelet and amulet) made from flint and granite, with a highly smoothed surface were found in a grave but such examples are limited in the late Neolithic context.

A fragment of a grinder stone and a complete form of palette was found in a child's grave. It belongs to the same technical traditions as discovered at El-Kadada (Reinold 2008: 176).

The site provided also examples of polished stone axes made from flint, which seemed unique considering other types found in the late Neolithic sites in central and northern Sudan. They were very small (100 mm) in length and (40 mm) in width, with cutting edges ranging from 30 to 40 mm and polished surface carefully retouched on a portion of the butt end. (Fig 3). They are commonly connected with cemeteries and are rarely found on the surface and in the settlement levels. Other fragments of polished axes were found on the surface, similar in type to the form of those discovered in the three late Neolithic sites: El-Kadada, Kadero and Handikka (Krzyżaniak 1992: 243; Reinold 2008: 153; Sadig 2010b: 194).

Another group of polished stone tools found in the cemeteries includes a diagnostic tool made of granite and broken quartz pebbles, an amulet, mace-head, discs and a polished stone ring (Fig. 4). The majority of these types are made from different raw materials and during a process of production various techniques were used. They were finely smoothed, some of them are connected to grave goods, whenever found with skeletal remains.



Fig. 2. Aerial photo of the Qalaat Shanan site (from Google Earth 2013)



Fig. 3. Polished axe (photo by the author)



Fig. 4. Polished stone ring and mace-head (photo by the author)

Currently a major re-evaluations of the evidence of lithic technology of the late Neolithic culture has been made (Geus 1984; Reinold 2001; Honneger 2004; Sadig 2012) based between the others on the indication of the spread of cultural traditions and the relationship between different cultural areas and sites within the same region points to a consistent homogeneity. On the other hand, individual features of lithic typology in the Qalaat Shanan site could be a sign of a local cultural tradition at Shendi Reach in the late Neolithic period.

No bone tools such as harpoon or fish hooks have yet been found, only fish bones were used in some activities in a similar way as burins, while some pieces appear to be lip-plugs.

Late Neolithic pottery attributes

A large amount of pot sherds and complete vessels have been found at Qalaat Shanan, attributed either to early or late types. A remarkable number of the late Neolithic pottery was identified, mainly black ware, plain and decorated, and large mouth bowls, of various in shapes and sizes. This reflects a high degree of independence of creativity exhibited in burnishing and variations in decorative patterns.

In general, there are clearly distinct attributes of ceramic industries in Qalaat Shanan that shed light on the late Neolithic pottery production traits, as summarized below:

1. A variety of vessel shapes, bowls - both large and small - along with cups, decorated with parallels lines of dots highlighted with finely placed incision lines (Fig. 5). These vessels are similar to those which have been found at El-Kadada (Geus 1984: 26 - 32).
2. The textures of pottery include fine and hard coarse ware, most of which are decorated with geometric patterns both outside and inside of the vessel, with smoothed rims. These appear similar to pottery found in the settlement levels and as grave goods (Fig. 6). These traits are the same as that recorded on the late Neolithic bowls from Wadi Hawar (Wildung 1997). It is also typical of the A Group bowls and Pre-Kerma bowls in Northern Sudan (Nordström 1972; Honneger 2004).
3. Rippled and combed surface pottery are also represented in high percentage. The surface treatment and motifs are present on the entire object.
4. Pots deposited in burials, mostly open mouth, occur in a large variety of shapes. Decoration covers the entire surface of the vessel and is also present

inside on the rim in the form of geometric patterns (Fig. 7). The decorations/markings are generally large and hemispherical. They are typical of pot-burials in El Kadada in shape and decoration motifs (Reinold 2008:73-78).

5. Black topped wares are rare and a fragment of a brown-coloured pot with black line around the inside rim was recorded. Other - light brown – vessels are decorated with a thin black rim line on the interior and exterior. These traits are regarded as a phenomenon linking the late prehistoric tradition in Sudan. The Sudanese typical pottery vessels are red or brown in color and have a black rim. This includes both Abkan and A Group culture in lower Nubia, late Neolithic and Pre-Kerma wares in Upper Nubia (Geus 1984; Reinold 2001; Honneger 2004; Gatto 2006).

Above described attributes are very important to detect and clarify possible connections to the late Neolithic, the Cooper Age and the Bronze Age in the Sudan. In addition, these traits indicate the development pottery at Qalaat Shanan, which exhibits similar traditions of El-Kadad and Es-Sour pottery, especially in the case of small bowls decorated with the use of geometrics patterns (Geus 1984: 30-34), while the open mouth bowls and fragments of



Fig. 5. Fine surface small bowls (photo by the author)



Fig. 6. Parallel cord lines of the late Neolithic decorated bowl (photo by the author)



Fig. 7. Geometric decorated pot-burial (photo by the author)

decorated cups (Calceiform vessel) show similarities to Kadurka pottery (Reinold 2001: 8). On the other hand, the rippled decorations and topped ware are close to those of Pre-Kerma and A Group pottery (Honneger 2004: 42-46).

Finally, common features of pottery production are an indication of a large similarity of ceramic cultures of the late Neolithic and the origins of Chacolithic Age in the Sudan, while at the same time individual traits revealed a local diversity among the regions (Sadig 2010b: 98-112).

Economic indications

Several graves and settlement levels yielded remains of animal bones. No specific study has been conducted on these remains, however preliminary observations and classification of bones revealed many types of animals, both domesticated and wild.

The most important of these were bones of goat, sheep as well as cattle. The fish remains have poorly ossified skeletons, except for the characteristic tooth plates in the form of sharp cutting ridges made of dentine covered with enamel. Besides skeletons, shells of different shapes were found in both cemeteries and settlement levels.

It is difficult to illustrate the flora in the site before micro-wear analysis of the soil strata, however the decorations on the pottery indicates a possibility of designs inspired by plants found in the area and found at the excavation site.

Generally speaking, the Qalaat Shanan site yielded diverse fauna and flora consisting of mollusks, fish, reptiles and mammals. These can be divided in various typonomic groups and a similar Neolithic economy was recorded on several sites in central Sudan (Krzyżaniak 1992; Reinold 2008). However, the one most related to the late Neolithic period is that of domesticated animal remains.

Late Neolithic cemeteries

Cemeteries occupied a vast part of the site. Excavations brought into light a number of Neolithic cemeteries with primary and secondary burials accompanied by grave goods. A number of graves are connected with the late Neolithic tradition, in some aspects similar with the late Neolithic cemeteries discovered in the Northern and Central Sudan but different when considering other attributes.

The late Neolithic burials are adult or children graves. The grave pits are either a circular or oval in shape, without clear superstructures other than unidentified stone. On the basis of spatial distribution of burial contents these graves could be divided into three classes or types:



Fig. 8. Skeleton in contracted position without offering (photo by the author)

1. Six burials that contain no furniture, only skeletal remains laid in a contracted position of both sexes and few children (Fig. 8). Many scholars argued that poor grave is an indication of social position (Krzyżaniak 1992: 271), while others assumed that they indicate a Neolithic horizon (Reinold 2008: 203).
2. Five single furnishing burials. They contain a single vessel and two of them contain lithic tools. Numerous beads were found around the neck and legs of the skeleton with a polished bracelet on the arm of the deceased, while other burials just contain a polished stone ring and a mace-head found close to the legs. These attributes of burials as well as its contents are similar to those discovered in Kadero (Krzyżaniak 1992). However, Krzyżaniak dated them to the early Neolithic period. Based on attributes of the burials

it is quite possible that social status played a major role in the differentiation of burials, which may be reflected in cultural development. Many scholars argued that the differentiations among the burial's furniture in the late Neolithic proves gender diversity, which is represented by the richest tombs in personal adornments (Geus 1991: 59; Reinold 2008: 187-205; Sadig 2008: 17-21). Krzyżaniak has argued that the findings suggest the presence of specific furnishings, like a mace-head with male grave as a symbol of power, which is an aspect of the late Neolithic culture (emergence of chiefdom) (Krzyżaniak 1992: 274).

3. Group burials of double skeletons: another version of a transitional burial construction. Three types of content were discovered: (i) represented by two skeletons buried in one grave. The shape of the grave seemed circular and the depth ca. 100-130 cm from the surface. There is no separation between the skeletons. One grave of this class was found in Qalaat Shanan: two skeletons in a close contracted position, one is an adult and the other is a child, no furniture was present; (ii) two deceased present in one pit. The first is in contracted position in a circular shaft with the head to the east, the other was extended with the head to the south, laid on the back, a lot of beads around the neck and fragments of a bowl are close to the body (Fig. 9). The extraordinary aspect in this case is that the two bodies are on one level in different positions, which is an unmatched trait of the late Neolithic burials in Shendi Reach (Reinold 2008; Sadig 2012); (iii) the third case of this class are two skeletons in one pit, where one is in contracted position with a burnished bowl placed close to the head, while the other deceased is laid in a hyper-contracted position. The body appears to have been tied or inserted in a bag before being laid in the pit (Fig. 10).

This case is similar to another two, from Kadruka (grave 240-41) interpreted as a sacrificed female and male (Wildung 1997) and El-Kadada (Reinold 2008). The most important observation of those cases concerns the imposed confinement. A comparative study of these burials seems to indicate the presence of human sacrifice in the late Neolithic cemeteries (Sadig 2008: 18). This can provide us with a link to the comparisons between the late Neolithic in central Sudan and the origins of the Cooper and Bronze Age in Northern Sudan (Bonnet 1988: 16).

The major attributions of the late Neolithic burials at Qalaat Shanan were the occurrence of children graves which could reflect some kind of social status in the late Neolithic period. Two types of child graves were found, essentially bordering the inhabited area, Their distribution is very sparse and cannot be attributed to general cemeteries.

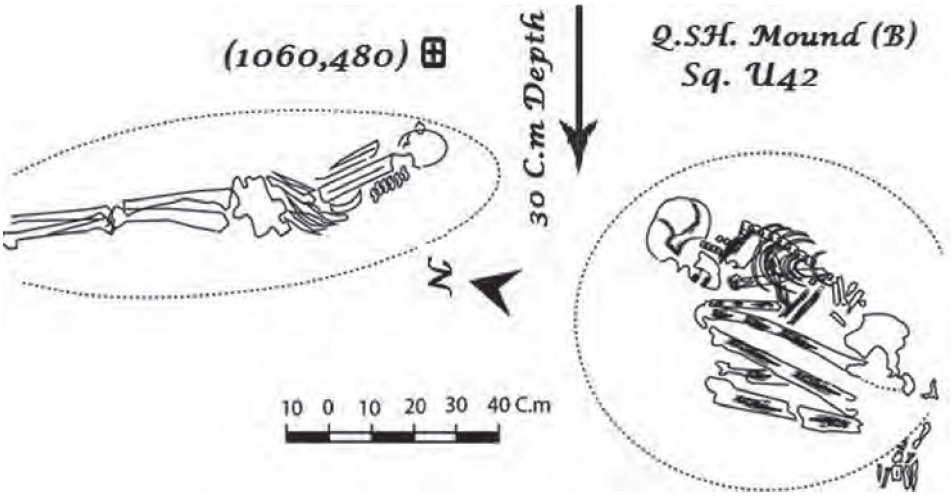

Fig. 9. Double skeleton grave; each skeleton in different positions (illustration by the author)

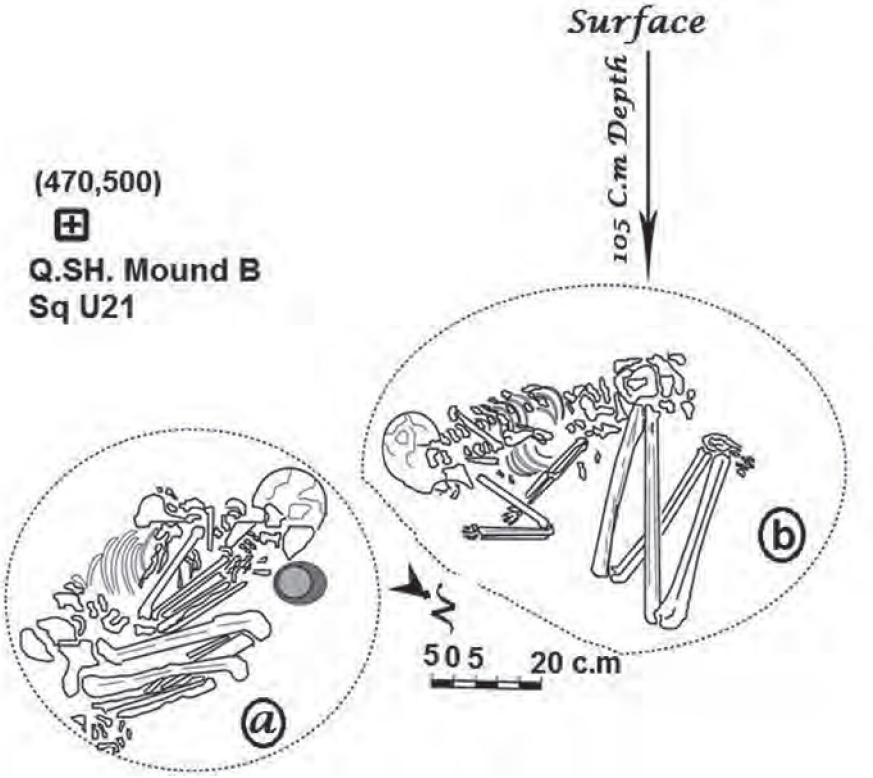

Fig. 10. Double skeleton grave with one carrying an offering (illustration by the author)

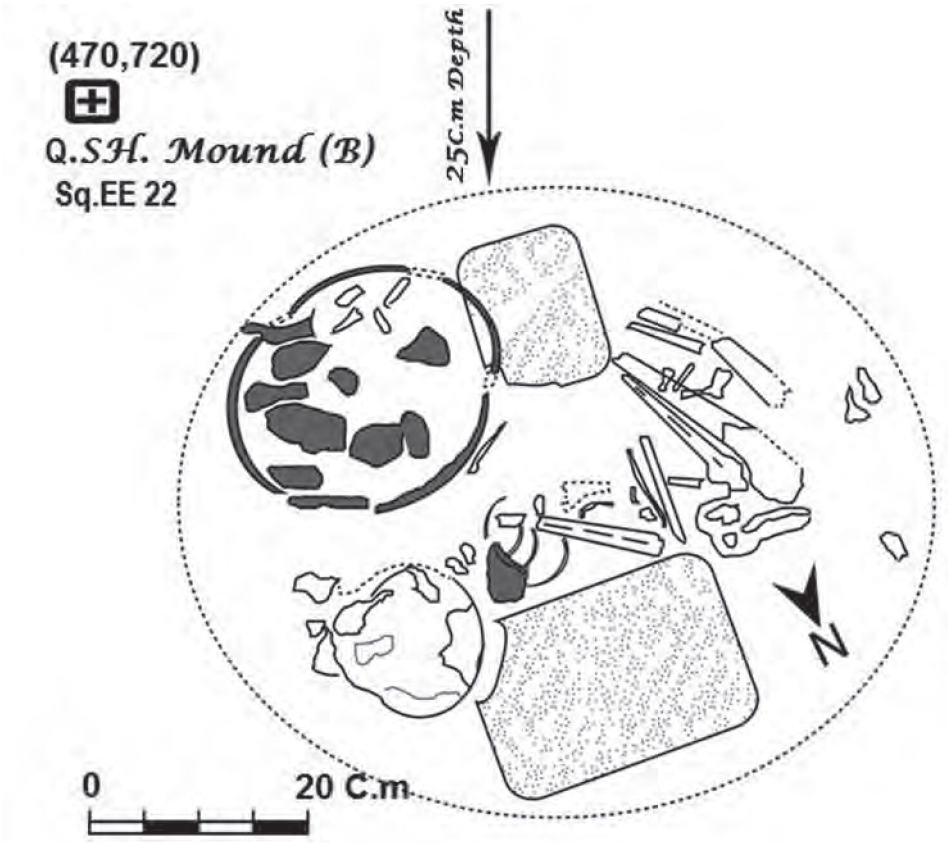

Fig. 11. Child burial with offerings: bowl and palettes (illustration by the author)

One of these types includes children c.a. 6-10 years old discovered in small circular pits. The first skeleton was found in a contracted position without furniture. The second was laid in a contracted dorsal lateral position and in the grave two polished palettes, rocker-decorated bowls and some fine circular beads have been found (Fig. 11). The third is the skeleton of a child in contracted position and consisting furnished with three small very burnished bowls found close to the body (Fig. 12). In my opinion these examples brought to light the late Neolithic burials differing from the other known locally at Shendi Reach and contemporary burial sites.

The last type of the late Neolithic burials discussed here is infant pot burials. Five such graves have been discovered at the site with the skeleton found inside a large open mouth vase. Some vessels were decorated with a rocker and geometric patterns. This type could be divided into four categories according to the offerings in the burial:



Fig. 12. Burial of a child containing four bowls (photo by the author)

1. A vase containing a skeleton of a child without furnishing.
2. A vase containing a skeleton placed inside a large vase (Fig. 13).
3. A vase containing an interior and exterior offering. Interior offering includes beads and a small bowl, exterior one includes a small palette found just beside the pot.
4. A large vase with the skeleton and offering put directly inside a funeral vase, including an offering of large objects: two complete burnished bowls placed above, one red, burnished and completely decorated bowl and three large *Etheria Elliptica* shells and beads (Fig. 14).

The most significant information obtained from the examples of pot-burials is the determination of the ages of the infants interred in pots. The preliminary study of Qalaat Shanan children pot burials' attributes showed a similarity to those recorded at El-Kadada and Es-Sour sites, although those in Es-Sour were not associated with this cemetery and have not yet been identified. On the other hand, the pot-burials at Qalaat Shanan and El-Kadada contain the remains of an infant laid in large pot found within the settlement site. However, some differentiations have been observed in this case between the two sites in the offerings and the location of pot-burials.

Reinold argued that it is possible to determine the method of burial applied to children up to the age of five or six, which is probably a step in the life of the adolescent (Reinold 2008: 280-281). Sadig, who discussed children burials and a funerary practice in the Middle Nile region, argued that the pot-burials from Es-Sour constitute the oldest evidences of that type in the Nile Valley (Sadig 2010a, in press).

Elsewhere examples of late Neolithic burial practices are limited to Shendi Reach, which could be associated with a local culture and connected with that pot-burials discovered in A Group and Pre-Kerma in Northern Sudan (see Nordström 1972; Honneger 2004).

Conclusions

The above description of the late Neolithic finds at Qalaat Shanan site have revealed invaluable archaeological information and showed many late Neolithic cultural features, which could be consistent with those known from the late Neolithic sites in Central and Northern Sudan, thus confirming their significance in understanding the cultural regional diversity in the late Neolithic period. On the other hand this information has indicated new Neolithic horizons, from the early to the late, and raised questions about the relationship of these late Neolithic com-



Fig. 13. Pot-burial inside a large vase (photo by the author)



Fig. 14. Pot-burial rich in offerings (photo by the author)

munities in Central Sudan with those in Northern Sudan as well as the cultural link among the Neolithic and Chalcolithic Age in Sudan.

Whatever conclusions can be drawn from the late Neolithic examples at the Qalaat Shanan site, they provide a concept of the development of culture in late Prehistory in Central Sudan, differing in some traits and similar in the other. The Qalaat Shanan site is similar to some sites in its main characteristics: polished stone tools, burnished pottery, indications of food production or various cemetery traditions. In addition there is an evidence at Qalaat Shanan that doesn't match other areas, which could be attributed to local traditions.

This perception requires a recognition that, while El-Kadada and Es-Sour represented a model culture of late Neolithic period, there was an extensive evidence of the late Neolithic culture at Qalaat Shanan, in Shendi Reach, which differ from other Sudanese Regions.

In summary, the following conclusions may be drawn about the late Neolithic culture at Qalaat Shanan:

1. Presence of polished stone tools, both in settlement levels and in graves, such as stone axes, mace-heads, stone rings, bracelets and amulet. In other words, deposits consisting of finished, flaked, retouched forms are common.
2. Large quantity of burnished pottery and small decorated bowls are common, together with large vessels richly decorated with finely treated and smooth surface.
3. While there is a lack of bone tools and figurines, a lot of bone beads and types of lip-plugs were found at the funerary of graves.
4. The cemeteries show a complex funerary tradition and a substantial differentiation between age and sex. Child pot-burials are common as well as grave goods in a single and double skeleton graves.
5. The occurrence of some burials inside the settlement indicates different occupations during the Neolithic period on the site, while in the later period the graves were placed following a spatial distribution pattern: adult graves in the western part of the site and children graves in the eastern part within the settlement. Despite the occurrence of some systematic patterns in burial customs, some variations are seen.

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Hunter-Gatherers and Early
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Giulia D'Ercole

The ceramic assemblages from Sai Island (Northern Sudan): connecting technological choices to cultural traditions between the 6th and the 3rd millennium BC

Pottery may be considered as one of the principal sources of evidence among the many elements which make up a material culture, as it yields a wealth of information about the societies of past ages. The many different stylistic and technological choices adopted in the manufacturing sequence of a vessel reveal a number of decisions which have a cultural importance (i.e. Gosselain 1998; 2000; Sillar and Tite 2000). In other words, the style and technology of pottery production appear as the expression of the social and cultural identity of human groups, both in terms of their individual history and background and also of their relations with other groups.

This paper proposes a comparative study on the pottery manufacturing sequences that characterized Sai Island (Northern Sudan) during the recent Nubian prehistory. A selected sample of Khartoum Variant (c. 7000-5000 BC), Abkan (c. 5000-4000 BC) and Pre-Kerma (c. 3300-2600 BC) ceramics collected from four different sites on the island was studied with regard to both its stylistic and technological characteristics. The archaeological data were integrated with petrographic (OM), mineralogical (XRPD) and chemical (XRF) analyses - carried out on fifty-six samples - in order to provide an analytical description of the different ceramic assemblages of Sai Island that may contribute to enlarge the general knowledge of the Nubian pottery traditions.

Sai Island: geographical, geological and cultural background

Sai Island is located between the Second and the Third Cataracts of the Nile, in a strategic geographical position on the border between Upper and Lower Nubia, and also close to the Nabta-Kiseiba area and to the oases of the Western Desert (Fig. 1).

Geologically, this segment of the valley contains two main outcropping domains: the Precambrian basement complex - mostly consisting of granites and metamorphic rocks - and the Nubian Sandstone Formation that lies upon it (Hays and Hassan 1974; Klemm et al. 2001; Shang et al. 2010). Small, scattered outcrops of Precambrian schist and quartz veins characterize the geological substratum of Sai Island too, while most of its inner surface is covered by eroding beds of Pleistocene and Holocene silts and gravel bars from Nile paleochannels (Goossens et al. 1997; Geus 2000; Garcea and Hildebrand 2009). The sandstone outcrop of the Jebel Adu represents one of the main geological features of the island (Fig. 1).

In the Early Holocene - during the Khartoum Variant period - Sai was limited to just the pediment surrounding the Jebel Adu. Weather conditions and seasonal precipitation for this period have been recorded (Garcea and Hildebrand 2009). The human people that lived at site 8-B-10C were sedentary or near-sedentary groups of hunter-fisher-gatherers (Fig. 1). Site 8-B-10C was dated to the final stage of the Khartoum Variant complex, at the end of the sixth/beginning of the fifth millennium BC[1].

Toward the middle Holocene a progressive desiccation of the climate affected many regions of Northern Sudan (Nicoll 2004; Kuper and Kröpelin 2006). Sai then was inhabited by Abkan groups with a subsistence economy based on hunting and fishing, integrated for the first time with animal husbandry, who lived at site 8-B-76, on the southern-western side of the island (Fig. 1).

The Pre-Kerma horizon can be placed during the so-called "Marginalization Phase" (c.f., Kuper and Kröpelin 2006) between the third and the second millennium BC: at that time arid or very arid conditions characterized the climate of the Western Desert and also part of the Egyptian and Sudanese Nile valley. Sai Island was inhabited by communities with an agro-pastoral economy. Two different sites can be referred to the Pre-Kerma complex: site 8-B-10A , a stratified settlement located on the south-eastern side of the island, and site 8-B-52A (Fig. 1): a granary site consisting of more than seventy storage pits used to store both wild and domestic plant seeds, including Asian domesticates grains and local specimens[2] (Geus 2004; Hildebrand 2006-07).

[1] Charcoal from hearths in level 1 was dated to 5980±40 BP (4950-4770 cal. BC) (KIA -24464) and 6080±35 BP (5070-4900 cal. BC) (KIA- 24463) (Garcea 2006-07).

[2] The barley was directly dated to 4151 ± 44 BP (UtC-5295) and 4142 ± 48 BP (UtC-5294), or between 2872 and 2612 cal. BC (Geus 1998).

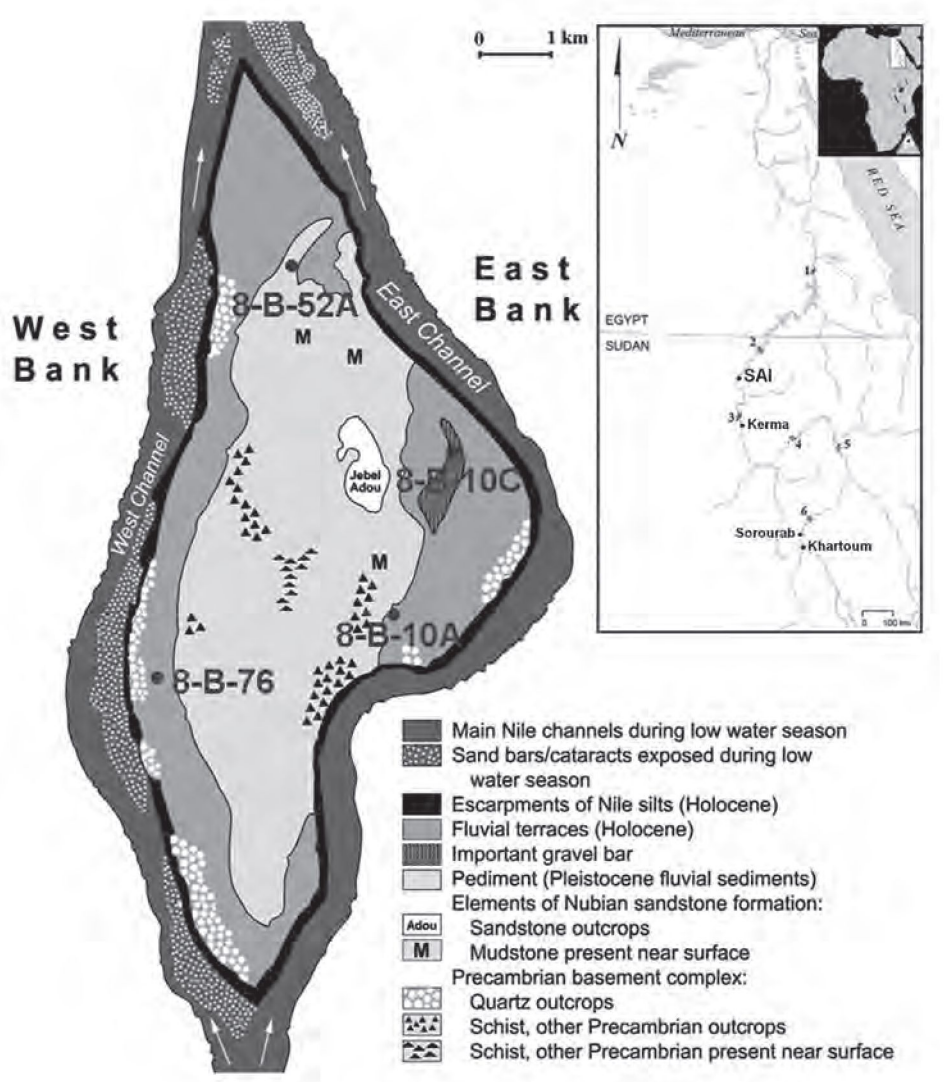

Fig. 1. Geological map of Sai Island (adapted from Garcea and Hildebrand 2009) showing the location of sites 8-B-10C, 8-B-76, 8-B-52A and 8-B10A

The ceramic assemblage: macroscopic data

The ceramic assemblage analysed comes from the four sites described above and consists of over 3,000 potsherds which have been selected during successive field seasons, starting from January 2009[3].

All data were entered in a relational database on an Access ® platform designed by Garcea (Garcea and Caputo 2004). The database collects information regarding the entire manufacturing sequence, including type, size and frequency of inclusions, texture, vessel body parts and thickness, surfaces treatment, as well as decorative techniques and motifs, following to the hierarchical system developed by Caneva (Caneva 1988; Caneva and Marks 1990).

The Khartoum Variant assemblage from site 8-B-10C

The ceramic assemblage from site 8-B-10C comprises 905 potsherds from the surface and from layers 1, 2 and 3 of the settlement[4]. This pottery represents the most ancient production on the island and is characterized by a sandy texture due to a large quantity of mineral inclusions in the paste. A small percentage of sherds contains also flat, organic remains of a vegetable nature (c.f., Livingstone Smith 2001). Surfaces are plain or just smoothened. Only few ceramics show burnishing and/or polishing marks; it is worth noting that when polishing occurs, it is mostly on the inner surfaces of the vessels, suggesting a function choice rather than a decorative need. Characteristic shapes are open bowls with straight walls, and thickness usually ranges from 6 to 10 mm. Body decorations include the typical Khartoum Variant impressed motifs made with the rocker stamp technique and often structured in bands of dotted wavy line (mostly short or arch shaped waves) (Gatto 2002; 2006; Jesse 2002; 2004; Honegger 2004). Rims were decorated with milled or notched impressions (Table 1; Fig. 2).

The Abkan pottery from site 8-B-76

The Abkan assemblage consists of 39 sherds that come from two test units, 1 x 1m each, excavated at the site 8-B-76. This pottery contains both mineral and organic inclusions, is light and brittle and shows a distinctive porous fabric. Surfaces are mostly black or brown on the inner side and greyish-brown externally,

[3] This study is part of my Ph.D research project during which I joined the Research Unit on Later Prehistory on Sai Island and took part in the investigations conducted by Elena A. A. Garcea of Cassino and Southern Latium University, in charge of the Research Unit for the Later Prehistory at Sai Island.

[4] The ceramic assemblage from the surface and from level 1 was previously studied by Garcea (Garcea and Hildebrand 2009; Garcea 2011-12; 2012). These results are here presented and discussed together with the evidences from layers 2 and 3.

Table 1. Technological and stylistic features of the four ceramic assemblages

Cultural horizon	Khartoum Variant	Abkan	Pre-Kerma	
Site	**8-B-10C**	**8-B-76**	**8-B-52A**	**8-B-10A**
Technological features				
Texture	medium; fine and coarse	fine; medium	medium; fine	medium; fine
Mineral inclusions	small and medium	small	small	small
	common; frequent	common	frequent; common	frequent; common
	angular	angular and rounded	rounded	angular
Organic inclusions	rare	common	frequent	frequent
	flat (vegetal remains)	tubular (herbivore dung)	flat and tubular (herbivore dung; vegetal remains)	tubular (herbivore dung)
Surfaces treatment	not present; rare burnishing/ polishing inside	not present; rare inside or inside/outside burnishing	inside/outside burnishing; inside polishing	inside/outside burnishing; rare polishing
Morphological features				
Shape	open bowls with straight walls	globular bowls; vessels with straight walls	storage jars; rare open bowls	small and medium open bowls; rare jars/vessels with inverted rims
Wall thickness	6-10 mm	3-8 mm	4-9 mm; > 15 mm (storage jars)	4-9 mm
Stylistic features				
Decorative technique	rocker impression	not decorated; incision; ripple ware	rocker impression; APS	incision; simple impression
Implement	combs with 3/4 teeth	stylus	plain and serrated combs; double pronged implements	stylus
Motif	DWL (short or arch shaped waves); dotted/dashed zig-zags	single lines	straight and dotted/ dashed zig-zags; paired lines	single/individuals lines
Structure	banded		continuous	panelled; herring bone and geometric
Rim decoration	milled/notched impressions	Black Topped	Black Topped	Black Topped

and only seldom appear burnished, whereas polishing does not seem to have been employed. Vessels display straight and globular walls with thicknesses ranging from 3 to 8 mm. Most of the sherds are not decorated; when decorations occur, they are mainly concentrated on the rim and may include simple incisions and impressions. Occasional ripple and black-topped wares were also recorded (Table 1; Fig. 3).

The Pre-Kerma pottery from sites 8-B-52A and 8-B-10A

The Pre-Kerma corpus comprises 2943 sherds, of which 448 come from site 8-B-52A (from silos 7, 39 and 44) and 2495 from settlement 8-B-10A. This pottery shares similar technological traits: it has fine-medium pastes containing small, frequent mineral inclusions as well as organic tempers. Both internal and external surfaces are burnished; while polishing is common only in the production of the granary site 8-B-52A, where it was mainly applied to the inner surfaces of the vessels. Pottery from the two sites display also a similar distribution regarding the wall thickness values, which are commonly between 4 and 9 mm, even if some sherds show wall thicknesses exceeding 15 mm. However, while at the granary site 8-B-52A ceramic shapes consist mainly of vessels with inverted rims and large jars suitable for the storing of goods; smaller bowls with everted or straight walls characterize the production of the settlement 8-B-10A. Decorations include incised motifs, as well as rocker-stamped and alternately pivoting stamped impressions (APS); black-topped and ripple wares are also frequent. Rims show milled impressions, geometric patterns or herringbone incisions (Table 1; Fig. 4).

The archaemetric analyses

Sampling and analytical methods

The archaeological data were integrated with petrographic, mineralogical and chemical analyses. Our pilot sampling consisted of fifty-six sherds, of which: fourteen come from the Khartoum Variant site 8-B-10C, seven from the Abkan site 8-B-76, and thirty samples were selected from the two Pre-Kerma sites (seventeen from site 8-B-52A and thirteen from site 8-B-10A). Five clay lumps were also sampled from the Pre-Kerma settlement 8-B-10A (D'Ercole et al. in press) (Table 2).

All the archaeometric analyses were performed at the "Dipartimento di Scienze della Terra e Geoambientali dell'Università degli Studi di Bari". Petrographic observation of thin sections was carried out with a Carl Zeiss "Axioskop 40 pol" polarized light microscope (OM). For X-ray powder diffraction analysis (PXRD) we used a PANalytical X'Pert pro MDS powder diffractometer with CuK radiation, and em-



Fig. 2. Examples of Khartoum Variant pottery from site 8-B-10C



Fig. 3. Examples of Abkan pottery from site 8-B-76



Fig. 4. Examples of Pre-Kerma pottery from sites 8-B-52A and 8-B-10A

Table 2. Ceramic samples selected for the archaeometric analyses

No. Sample	Cultural Horizon	Site	No. Square/ Silos	Layer	Decoration	No. Sample	Cultural Horizon	Site	No. Square/Silos	Layer	Decoration
SAI 01	Pre-Kerma	8-B-10A	N21/E19	S		SAI 29	Khartoum Variant	8-B-10C	101N/106E	2	
SAI 02	Pre-Kerma	8-B-10A	N20/E48	2		SAI 30	Khartoum Variant	8-B-10C	103N/106E	2	
SAI 03	Pre-Kerma	8-B-10A	N20/E49	3		SAI 31	Khartoum Variant	8-B-10C	103N/103E	1	
SAI 04	Pre-Kerma	8-B-10A	N20/E49	3		SAI 32	Khartoum Variant	8-B-10C	101N/102E	1	
SAI 05	Pre-Kerma	8-B-10A	N20/E48	5		SAI 33	Khartoum Variant	8-B-10C	103N/106E	1	
SAI 06	Pre-Kerma	8-B-10A	N20/E49	7		SAI 34	Khartoum Variant	8-B-10C	103N/106E	1	
SAI 07	Pre-Kerma	8-B-10A	N20/E49	7		SAI 35	Khartoum Variant	8-B-10C	103N/105E	1	
SAI 08	Pre-Kerma	8-B-10A	N20/E48	10		SAI 36	Khartoum Variant	8-B-10C	103N/106E	1	
SAI 09	Pre-Kerma	8-B-10A	N20/E48	10		SAI 37	Khartoum Variant	8-B-10C	102N/106E	1	Rocker Impression (DWL)
SAI 10	Pre-Kerma	8-B-10A	N20/E48	10		SAI 38	Khartoum Variant	8-B-10C	102N/106E	1	Rocker Impression (DWL)
SAI 11	Pre-Kerma	8-B-52A	silos 7		Rocker Impression	SAI 39	Khartoum Variant	8-B-10C	102N/105E	1	
SAI 12	Pre-Kerma	8-B-52A	silos 7			SAI 40	Pre-Kerma	8-B-10A	N20/E48	S	Incision
SAI 13	Pre-Kerma	8-B-52A	silos 7		Rocker Impression	SAI 41	Pre-Kerma	8-B-10A	N20/E48	7	Incision
SAI 14	Pre-Kerma	8-B-52A	silos 39		APS	SAI 42	Pre-Kerma	8-B-10A	N20/E48	9	Rocker Impression
SAI 15	Pre-Kerma	8-B-52A	silos 39			SAI 43	Pre-Kerma	8-B-52A	silos 39		APS
SAI 16	Pre-Kerma	8-B-52A	silos 39			SAI 44	Pre-Kerma	8-B-52A	silos 39		Rocker Impression
SAI 17	Pre-Kerma	8-B-52A	silos 39			SAI 45	Pre-Kerma	8-B-52A	silos 39		Incision
SAI 18	Pre-Kerma	8-B-52A	silos 44			SAI 46	Pre-Kerma	8-B-52A	silos 39		APS
SAI 19	Pre-Kerma	8-B-52A	silos 44			SAI 47	Pre-Kerma	8-B-52A	carré 15		BT

No. Sample	Cultural Horizon	Site	No. Square/ Silos	Layer	Decoration	No. Sample	Cultural Horizon	Site	No. Square/Silos	Layer	Decoration
SAI 20	Pre-Kerma	8-B-52A	silos 44			SAI 48	Pre-Kerma	8-B-52A	carré 19		Rocker Impression (BT)
SAI 21	Pre-Kerma	8-B-52A	silos 44			SAI 49	Abkan	8-B-76	TU1	4	
SAI 22	Abkan	8-B-76	TU2	1		SAI 50	Abkan	8-B-76	TU1	1	
SAI 23	Abkan	8-B-76	TU2	1		SAI 51	Abkan	8-B-76	TU2	1	Incision
SAI 24	Abkan	8-B-76	TU2	1		SAI 52	Pre-Kerma	8-B-10A	TU2	5	
SAI 25	Abkan	8-B-76	TU2	1		SAI 53	Pre-Kerma	8-B-10A	N20/E48	6	
SAI 26	Khartoum Variant	8-B-10C	92N/106E	2		SAI 54	Pre-Kerma	8-B-10A	N20/E49	6	
SAI 27	Khartoum Variant	8-B-10C	98N/106E	2		SAI 55	Pre-Kerma	8-B-10A	N20/E48	7	
SAI 28	Khartoum Variant	8-B-10C	101N/106E	2		SAI 56	Pre-Kerma	8-B-10A	N20/E49	8	

ploying NaF as an internal standard. Major elements determination was performed by X-ray fluorescence (XRF) with a Philips PW 1480/10 spectrometer, following analytical techniques outlined by Franzini *et al.* (1972; 1975). Loss on ignition (LOI) was determined by heating the samples at 1,000°C for 12 hours.

Results: mineralogical and petrographical data

According to X-ray Powder Diffraction analysis (XRPD) the fifty-six ceramic samples were classified in to three main mineralogical groups, each of them characterized by specific phase associations:

1. QPl (Quartz-Plagioclase) group: samples from this group contain mainly quartz and plagioclase, with a minor amount of K-feldspar and micas. Traces of calcite and clino-pyroxenes were also detected. This group includes most of the Abkan (six sherds) and the totality of the Pre-Kerma samples.
2. QKfs (Quartz-K-feldspar) group: samples from this group (twelve Khartoum Variant and only one Abkan sample) display the co-occurrence in X-ray patterns of picks of quartz, K-feldspar (commonly present in large quantities) and micas.
3. Q (Quartz) group: the two Khartoum Variant samples belong to this group are characterized by the only presence of quartz.

Microscopic observation on thin sections (OM) confirmed the mineralogical groupings; in addition this analysis revealed the presence, within each group, of different fabrics (or sub-groups), based on technological and textural differences between samples.

The QPl (Quartz-plagioclase) Pre-Kerma ceramics are all similar with respect to the mineral phases present inside them: mostly mono- and poly-crystalline quartz and plagioclase with a minor amount of K-feldspar, micas and micritic calcite aggregates plus some accessory phases (i.e. Fe-aggregates, epidote minerals, augite, green hornblende). However, the samples from the granary site 8-B-52A showed in comparison with those from the settlement 8-B-10A a higher amount of organic tempers: both plant fibres and glumes and particles of herbivore dung consisting of crumbled vegetal remains (Fig. 5, c). This could be explained as a specific functional choice in relation to the use, at the granary site, of large pots as storage containers for wild and domestic grains.

In the Abkan samples from the same QPl group, the organic content is mainly constituted by sub-millimetrical charcoal fragments that, since they display a high degree of angularity, are likely to have been added by the potter as an intentional filler (Fig. 5, b).

As regards the Khartoum Variant ceramics ascribed to the QKfs group, we can distinguish between two sub-groups: QKfs-Bt (prevalence of biotite mica) and QKfs-Ms (prevalence of muscovite mica), where the first one displays also a higher content of K-feldspar and a coarser grain size compared to the latter (Fig. 5, a). In these samples the presence of organic inclusions is rare and it seems to be only accidental.

Results: chemical data

The chemical data obtained by X-ray Fluorescence analysis (XRF) are consistent with the mineralogical and petrographic results. Only comparing the major elements, we can distinguish between the Khartoum Variant/QKfs samples, rich in potassium (K2O) oxide and the Pre-Kerma and Abkan samples from the QPl group, rich in calcium oxide (CaO2) (Fig. 6). The ceramic samples from the QPl group contain also higher percentages of Fe2O3 and TiO2 compared with the ones from the QKfs group. The content of SiO2 is quite homogeneous in all the samples, however its contribution appears particularly significant in the Quartz group (Table 3).

In conclusion, chronologically distinct products can be discriminated from a compositional point of view. Both chemistry and petrography suggest that the ceramics from the oldest Khartoum Variant horizon (QKfs group) were locally made using primary clayey sediments, containing large quantities of non-plastic mineral inclusions of angular quartz, K-feldspar and metamorphic rock fragments. The Precambrian basement complex may have represented the principal source for this raw material and tempers.

As regards the Abkan and Pre-Kerma ceramics from QPl group, the mineral suite (prevalent presence of quartz grains and plagioclase) and the finer grain size of the samples point to the selection of alluvial sediments related to the Nile river activity.

Final remarks

The comparison between the analytic and the macroscopic data allows us to perceive the existence of numerous variables affecting the production of pottery on Sai Island, to be attributed in part to the conscious technological choices made by the potter at the moment of production, and in part to the varying make-up of the raw materials selected to make the pots with. In the context of Sai therefore, pottery will have experienced, since the time of its first appearance during the Khartoum Variant horizon, a series of changes which are not merely stylistic, but in fact are mainly technological.

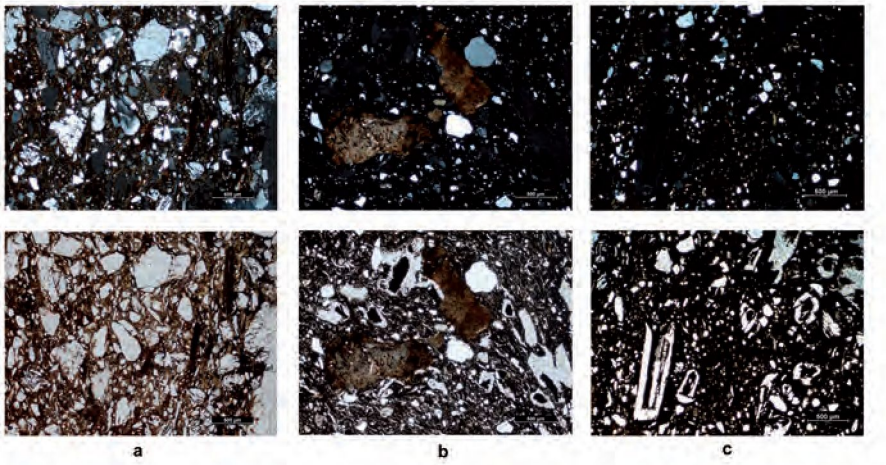

Fig. 5. Photomicrographs taken with cross polarized light (on top) and with plane polarized light (on bottom) of thin sections of (a) QKfs Khartoum Variant sample, (b) QPl Abkan sample and (c) QPl Pre-Kerma sample

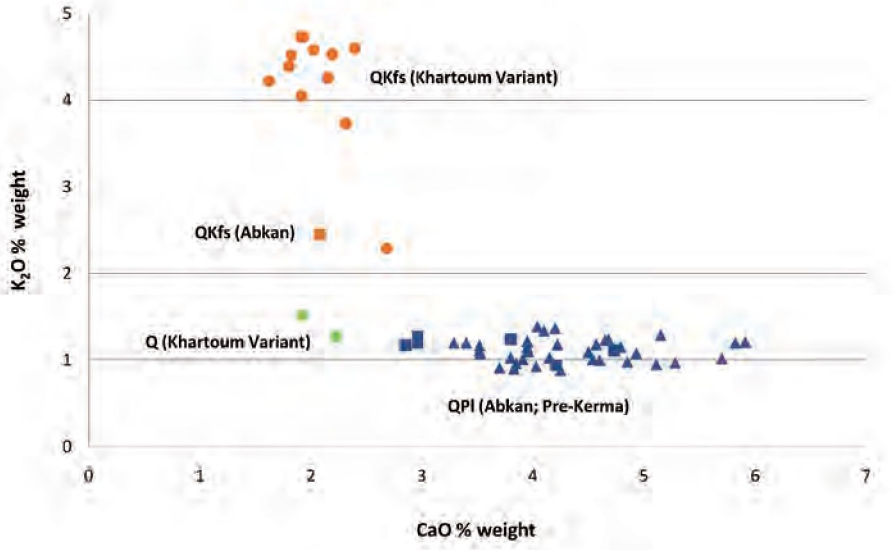

Fig. 6. CaO vs K2O plot (wt%). Blue triangles: Pre-Kerma (QPl) samples. Squares: Abkan samples; blue squares: QPl samples, orange squares: QKfs samples. Circles: Khartoum Variant samples; orange circles: QKfs samples, green circles: Q samples

Through the cultural sequence under consideration, two key moments can be seen to stand out, when the greatest number of changes seem to take place in the production of ceramics.

1. The transition, between ca. 5000 BC and 4000 BC from the Khartoum Variant horizon (site 8-B-10C) to the Abkan (site 8-B-76) when some of the most important technological and stylistic innovations have been recorded:
   a. The adoption of a new raw material (an alluvial sediment instead of the primary clayey sediment rich in mineral inclusions used for the Khartoum Variant ceramics);
   b. A different way of preparing the pastes, with the intentional addition of organic temper (mainly charcoal particles);
   c. A reduction in the thickness of the walls of the pots;
   d. The disappearance of certain techniques and decorative motifs typical of the earlier horizon (in particular dotted wavy line decoration) which are replaced by incised decorations and, for the first time, black topped wares;
   e. A more frequent use of different treatments for surfaces, in particular burnishing.
2. The transition, around 3000 BC, from the Abkan horizon (site 8-B-76) to the Pre-Kerma (sites 8-B-52A and 8-B-10A) in which the same raw material continues to be used (a silty alluvial sediment), but where the following technological and stylistic changes have been recorded:
   a. Preparation of pastes by addition of organic temper, both animal (herbivore dung) and vegetable;
   b. Production of pottery in a wider variety of shapes (open forms and storage vessels);
   c. The appearance of new decorative techniques, motifs, and structures (e.g., herringbone and other kind of geometric patterns) and at the same time, consolidation of earlier traditions (among them black topped and ripple ware);
   d. Common use of burnishing and polishing as treatments of the surfaces of pots.

These moments coincide not only with the well-known 'breaks' in the chronological sequence of the Recent Nubian Prehistory; more than anything, they take on importance when one considers what their real economic and cultural meaning is. In this light, it should be remembered that the transition from the Khartoum Variant horizon to the Abkan marks the decisive passage from an economy

Table 3. Chemical composition (wt%) of ceramic samples by XRF analysis

		SiO2	TiO2	Al2O3	Fe2O3	MnO	MgO	CaO	Na2O	K2O	P2O5	L.O.I
QPl (n=41) Abkan Pre Kerma	*x*	55,46	1,89	15,81	10,71	0,21	3,43	4,24	1,76	1,11	0,27	5,12
	σ	3,36	0,22	0,8	1,01	0,08	0,48	0,74	0,5	0,13	0,12	2,22
QKfs (n=13) Khartoum Variant Abkan	*x*	56,07	0,73	19,1	6,79	1,31	1,12	2,06	2,1	4,08	0,14	6,51
	σ	3,29	0,16	1,76	0,74	0,64	0,42	0,28	0,56	0,81	0,05	2,91
Q (n=2) Khartoum Variant	*x*	64,53	0,91	15,12	6,89	0,77	1,85	2,07	1,48	1,4	0,24	4,78
	σ	4,17	0,09	0,15	0,54	0,74	0,22	0,21	0,5	0,18	0,06	2,71

of hunting, fishing and gathering to the introduction of animal husbandry; while the beginning of the Pre-Kerma period is accompanied by the establishment of more complex societies, with a mixed agricultural-pastoral economy.

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Hunter-Gatherers and Early
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Marek Chłodnicki and Jacek Kabaciński

Radiocarbon dates from Kadero revised

Introduction

The first radiocarbon dates from Kadero were published by Randi Haaland in her Ph.D. dissertation in 1981 (Haaland 1981: 55). A year later Lech Krzyżaniak has published them again together with another four analyses (Krzyżaniak 1982). Three of them were coming from Northern and Southern middens and the differences between them according to L. Krzyżaniak were also visible in pottery and flint materials (Krzyżaniak 1982: 38; 1984: 310-311).

In 1987 the radiocarbon dates previously published by R. Haaland were corrected for the isotopic fractionation (S 13-C) (Haaland 1987:61) and in the archaeological literature double dates of the same samples (uncorrected and corrected) began to circulate unless Krzyżaniak is always in favour of uncorrected samples (Krzyżaniak 1992: 116). In that last publication he gives another date – for the first time from the grave (No. 60), with very large standard deviation.

Lech Krzyżaniak has in his disposal a series of another dates but never has published them. However basing on that unpublished 14C analyses he has published a general chronological frames of the Kadero site: between 5960 and 5030 14C years B.P. or ca. 4850-4250 cal B.C. Details of radiocarbon analyses from Kadero were supposed to be publish by Peter Breunig (Krzyżaniak 1991:516) in the planned Kadero I volume but finally was performed by J. Kabaciński in the volume on Kadero site that was published already after the death of Lech Krzyżaniak (Kabaciński 2010).

In 2008 Lange has published a list of 22 radiocarbon dates from Kadero site. Part of them (6 analyses) were signed as coming from Kadero 1 while the others from Kadero (Lange 2006: 319). Both, dated samples from graves and from settlement area were included in the list however without any separation or detailed label and to that publication, but not always to a whole the set of dates shown there, a number of researchers of the Sudanese Neolithic refer (Salvatori Usai 2008: 146, 151-152; Sadiq 2010:34; 2012: 146-147).

In the monograph of Kadero site the analyses made in Gliwice Radiocarbon Laboratory were omitted, instead a set of new 4 dates from Kadero cemetery were respected (Kabaciński 2010:418). Altogether in the archaeological literature 26 radiocarbon dates from the Neolithic site of Kadero are published and another one from a Meroitic grave.

In order to clarify above inconsistency we decided to revise all available information on the radiocarbon dating of Kadero site.

1. Context of the radiocarbon dates

Source analysis allow us to establish that 23 samples from the Kadero site were subjected to 14C analysis. In a few cases double analyses were performed on the same sample, either by analysis of its second part or the results of the already analysed material were modified. Most of the dates are related with the Early Neolithic, only very few with the Late Neolithic and the Post-Meroitic Period. Details of radiocarbon analyses including its calibration are shown in Table 1.

Nine dates are made on materials from 8 Neolithic graves, 11 from the northern midden and 3 from the southern midden and 1 from the Post-Meroitic grave (Fig. 1).

2. The graves

Nine dates were made on samples taken from the graves. Results of dating as well as detailed context are presented below.

Grave No. 60

Grave of male 35-45 years old on the depth 25-75 cm below the surface. This is a very rich grave and deceased was buried with a mace-head (Fig. 2). Inside the grave were found also seven pottery vessels: three small red polished bowls decorated with semicircural panels of impressed dots, three big deep black-topped bowls, big red polished bowl (Fig. 2), two bracelets of hippopotamus ivory, hippopotamus tusk, diadem composed of 5 strings of the beads made of perforated Red See shells of Engina mendicaria, necklace of carnelian beads, rhyolite axe, flint and quartz nodules, cores backed blade and segments (Krzyżaniak 2011: 96-137).

Table 1. List of radiocarbon dates from Kadero site. Calibration of dates made with the help of OxCal Program version 4.2 and IntCal13 calibration curve (Bronk Ramsey 2009)

Lab. No.	14C b.p.	Dated context	Dated material	cal BC									references
				68.2%		95.4%		99,70%		μ	σ	m	
				from	to	from	to	from	to				
Poz-4014	5565±35	Grave 220	Aspatharia sp. shell	-4447	-4361	-4458	-4346	-4502	-4331	-4404	33	-4403	Kabaciński 2011
Gd-6167	5510±100	Grave 114	Nilotic bivalves	-4459	-4258	-4551	-4055	-4691	-3993	-4352	115	-4359	Sadig 2012 after Lange 2006; Salvatori, Usai 2008
Poz-4012	5550±70	Grave 202	Aspatharia sp. shell	-4454	-4342	-4539	-4262	-4682	-4169	-4402	65	-4401	Kabaciński 2011
Poz-4165	5415±40	Grave 202	Aspatharia sp. shell	-4331	-4255	-4350	-4079	-4361	-4053	-4274	54	-4283	Kabaciński 2011
Poz-4057	5380 ± 40	Grave 203	charcoal	-4331	-4076	-4341	-4050	-4444	-3979	-4208	88	-4222	Kabaciński 2011
Gd-6162	5260 ± 120	Grave 101	Nilotic bivalves	-4237	-3969	-4341	-3800	-4455	-3696	-4095	139	-4100	Sadig 2012 after Lange 2006; Salvatori, Usai 2008
Poz-4308	4150 ± 30	Grave 243	charcoal	-2867	-2671	-2876	-2628	-2882	-2581	-2749	72	-2745	Kabaciński 2011
Poz-4164	1660 ± 30	Grave 132	charcoal	348	418	260	529	254	536	384	43	388	Kabaciński 2011
Kn-3334	5800±700	N midden	?	-5471	-3981	-6235	-3105	-7349	-2456	-4721	766	-4713	Sadig 2012 afterLange et. all 2006
Kn-2821	5500 ± 70	N midden	Nilotic bivalves	-4448	-4266	-4496	-4176	-4546	-4053	-4350	76	-4353	Krzyżaniak 1982; Salvatori Usai 2008; Kabaciński 2011; Sadig 2012 after Lange 2006

Lab. No.	14C b.p.	Dated context	Dated material	cal BC						μ	σ	m	references
				68.2%		95.4%		99,70%					
				from	to	from	to	from	to				
Kn-2822	5610 ± 55	N midden	Nilotic bivalves	-4487	-4369	-4545	-4346	-4681	-4329	-4441	57	-4438	Krzyżaniak 1982; Salvatori Usai 2008; Kabaciński 2011; Sadig 2012 after Lange 2006
Kn-2823	5380 ± 65	N midden	Nilotic bivalves	-4331	-4076	-4341	-4050	-4444	-3979	-4208	88	-4222	Krzyżaniak 1982; Salvatori Usai 2008; Kabaciński 2011; Sadig 2012 after Lange 2006
Gd-5653	5450 ± 70	N midden	Nile oyster	-4366	-4182	-4451	-4066	-4497	-4040	-4285	87	-4293	Salvatori Usai 2008; Sadig 2012 after Lange 2006
Gd-5651	5370 ± 60	N midden	Fresh water shell	-4327	-4075	-4335	-4051	-4361	-3985	-4200	86	-4204	Sadig 2012 after Lange 2006
Gd-6164	5510 ± 120	N midden	?	-4493	-4237	-4611	-4046	-4729	-3966	-4349	140	-4357	Salvatori Usai 2008; Sadig 2012 after Lange 2006
Gd-5649	5430 ± 60	N midden	Fresh water shell	-4346	-4236	-4438	-4056	-4452	-4046	-4266	77	-4281	Lange 2006
Gd-5652	5420 ± 70	N midden	Fresh water shell	-4351	-4084	-4439	-4049	-4460	-3992	-4248	90	-4267	Salvatori Usai 2008; Sadig 2012 after Lange 2006
Gd-5648	5720 ± 50	N midden	Fresh water shell	-4652	-4494	-4690	-4458	-4726	-4368	-4571	65	-4567	Salvatori Usai 2008; Sadig 2012 after Lange 2006
Gd-6161	5690 ± 80	N midden	?	-4669	-4451	-4706	-4365	-4799	-4332	-4541	92	-4536	Salvatori Usai 2008; Sadig 2012 after Lange 2006
Gd-5650	5480 ± 60	N midden	Terrestial shell	-4437	-4260	-4458	-4178	-4499	-4053	-4329	68	-4333	Sadig 2012 after Lange 2006
Gd-5647	5960 ± 70	N midden	Fresh water shell	-4937	-4770	-5024	-4691	-5207	-4582	-4851	88	-4848	Salvatori Usai 2008; Sadig 2012 after Lange 2006

Lab. No.	14C b.p.	Dated context	Dated material	cal BC									references
				68.2%		95.4%		99,70%		μ	σ	m	
				from	to	from	to	from	to				
Gd-6198	5380 ± 65	N midden	bone	-4338	-4072	-4442	-3992	-4487	-3961	-4211	105	-4222	Salvatori Usai 2008; Sadig 2012 after Lange 2006
SMU-482	5280 ± 90	S midden	Nilotic bivalves	-4232	-3995	-4331	-3956	-4366	-3789	-4122	106	-4122	Krzyżaniak 1982; Salvatori Usai 2008; Kabaciński 2011; Sadig 2012 after Lange 2006
T-2189	5030 ± 70	S midden	Nilotic bivalves	-3943	-3716	-3965	-3665	-4040	-3640	-3830	82	-3832	Krzyżaniak 1982; Salvatori Usai 2008; Kabaciński 2011; Sadig 2012 after Lange 2006
T-2189-corr	5460 ± 70	S midden	Nilotic bivalves	-4369	-4236	-4456	-4071	-4518	-4041	-4298	86	-4304	Haaland 1987; Kabaciński 2011; Sadig 2012 after Lange 2006
T-2188	5260 ± 90	S midden	Nilotic bivalves	-4229	-3983	-4331	-3821	-4356	-3778	-4103	110	-4104	Krzyżaniak 1982; Salvatori Usai 2008; Kabaciński 2011; Sadig 2012 after Lange 2006
T-2188-corr	5700 ± 100	S midden	Nilotic bivalves	-4684	-4454	-4770	-4350	-4908	-4262	-4556	109	-4551	Haaland 1987; Kabaciński 2011; Sadig 2012 after Lange 2006

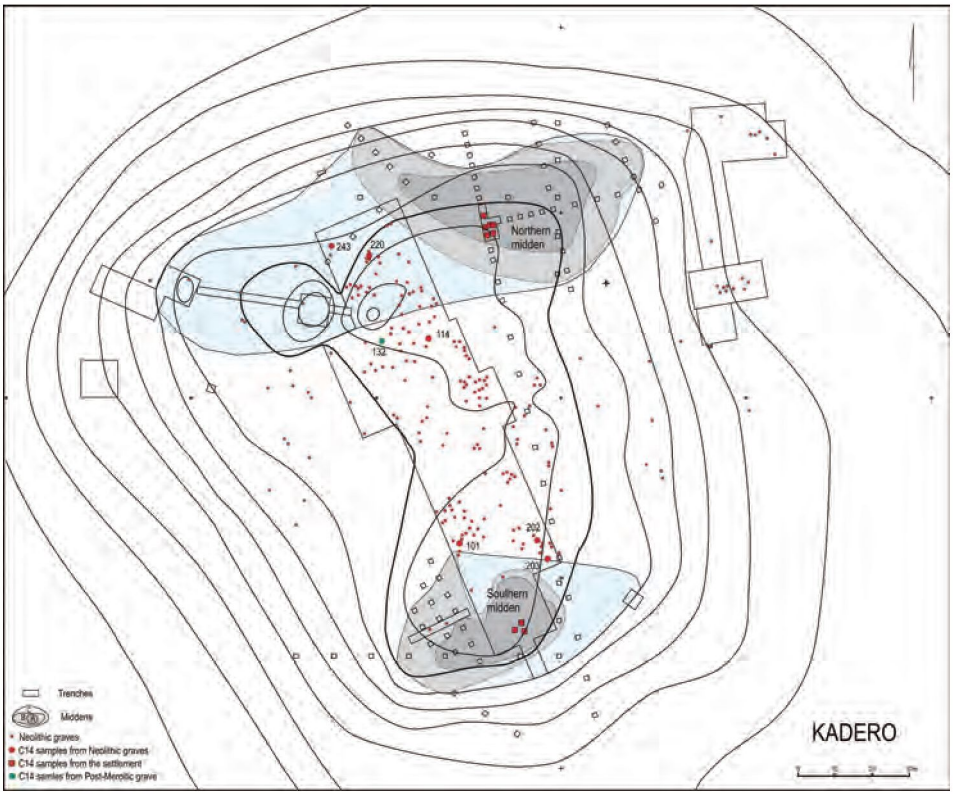

Fig. 1. Map of Kadero site with location of samples submitted to radiocarbon analysis

Charcoal sample (KN3334 and KN3335) was collected for radiocarbon analysis from the grave pit (Krzyżaniak 1983: 25; 1992: Tab.3). It gives the date: 5800 ± 700 b.p. Calibration of that date (Fig. 3) points the age of the sample with a wide range 6235-3105 years cal BC (with probability 95,3%) and median 4713 years cal BC.

Grave No. 114.

GGrave of a male 20-30 years old found on the depth 45-80 cm below the surface. This is one of the richest burials in Kadero (Fig. 4). The grave was furnished in six pottery vessels: two big restricted black-topped bowls, deep restricted bowl decorated with groups of incised parallel lines, big bowl decorated with groups of incised parallel lines; two caliciform beakers decorated with incised bands filled with comb impressions (Fig. 4); quartz, chert, agate segments and crescents, some

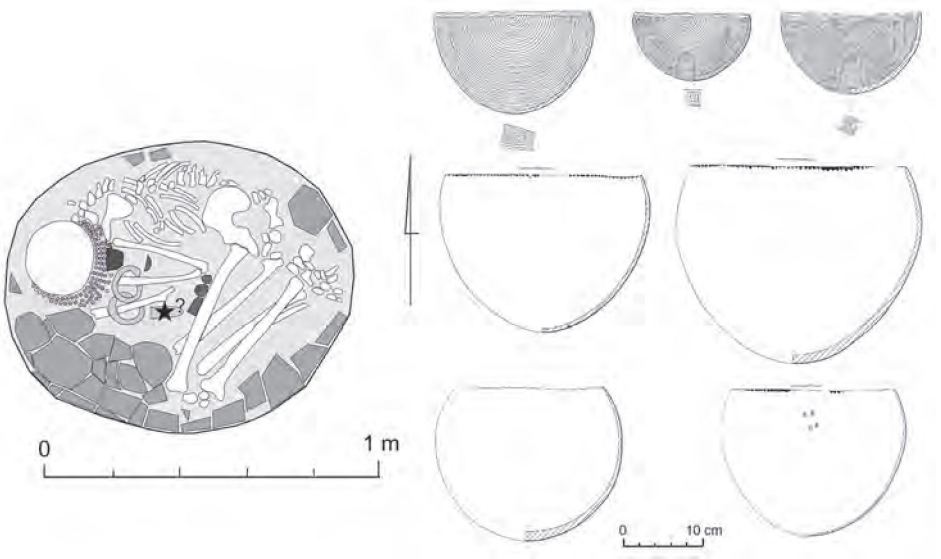

Fig. 2. Kadero site. Grave No. 60 and pottery from the grave

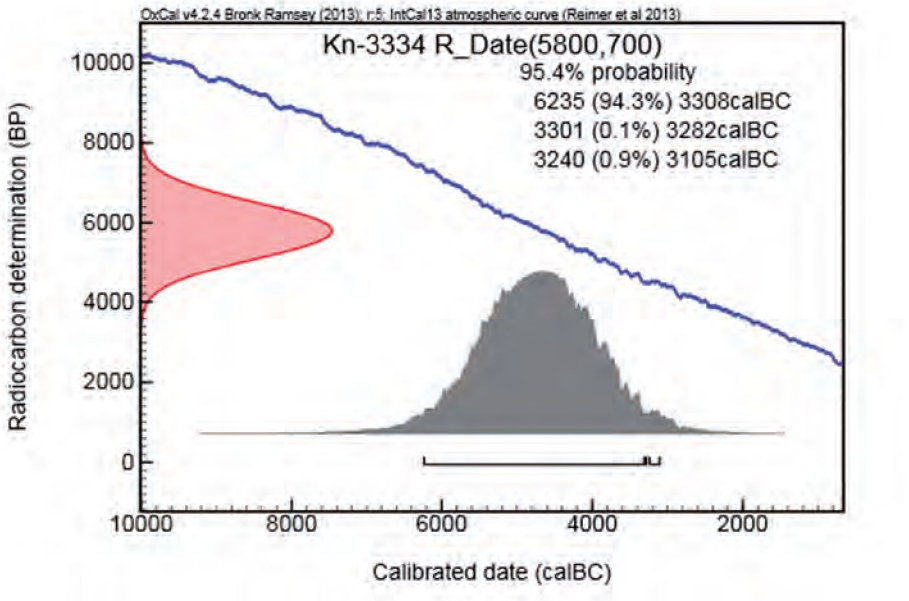

Fig. 3. Kadero site. Results of calibration of sample KN 3334/KN 3335 from grave No. 60

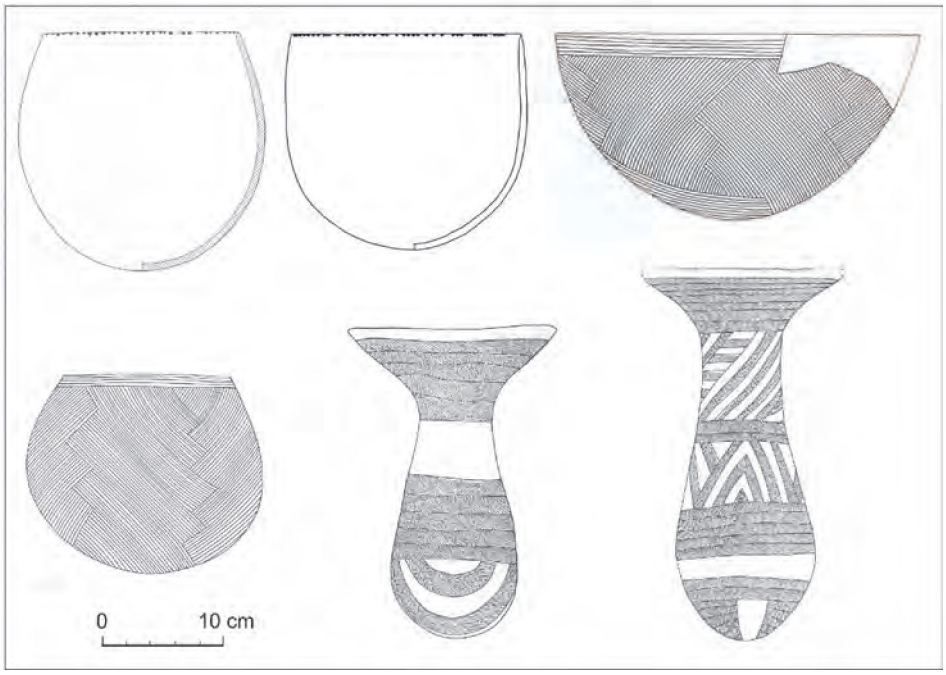

Fig. 4. Kadero site. Grave No. 114 and pottery from the grave

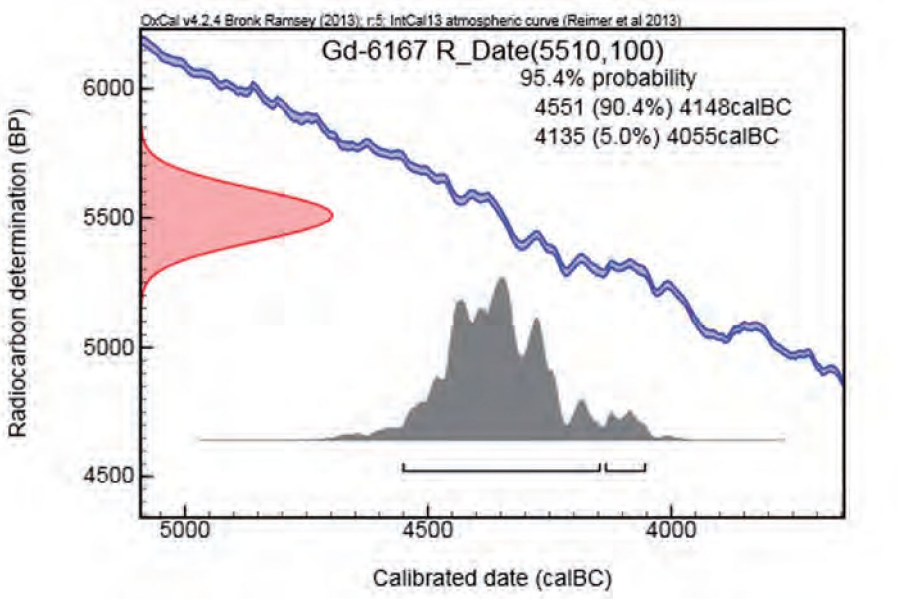

Fig. 5. Kadero site. Results of calibration of sample Gd-6167 from grave No. 114

with remains of mastic, quartz flakes; sandstone palette, lumps of green malachite and red ochre, marine shell and shell of Nile bivalve (Krzyżaniak 2011: 130-131).

The radiocarbon dating was made on the Nile bivalve shell – sample No. Gd-6167 – with the result 5510 ± 100 b.p. After the calibration (Fig. 5) the age of the sample is placed between 4551 and 4055 years cal BC (with probability 95,4%) and median 4359 years cal BC.

Grave No. 220

Grave of a child (Infans I) found on the depth 80-120 cm below the surface (Fig. 6). The grave was furnished with a medium size, deep bowl decorated with impressed decoration (Fig. 6:1), forty carnelian beads, three zeolite labrets and a shell of a Nile bivalve (Krzyżaniak 2011:181-182).

Shell of *Aspatharia* sp. submitted for dating (Poz-4014) produced the radiocarbon date 5565 ± 35 b.p. Calibrated age of that date is between 4458 and 4346 years cal BC (probability 95,4%) and median 4403 years cal BC (Fig. 7).

Grave No. 202

Grave of a child (Infans I) on the depth 25-55 cm below the surface (Fig. 8,). The grave was furnished with two medium size, deep bowls of combed ware (Fig.

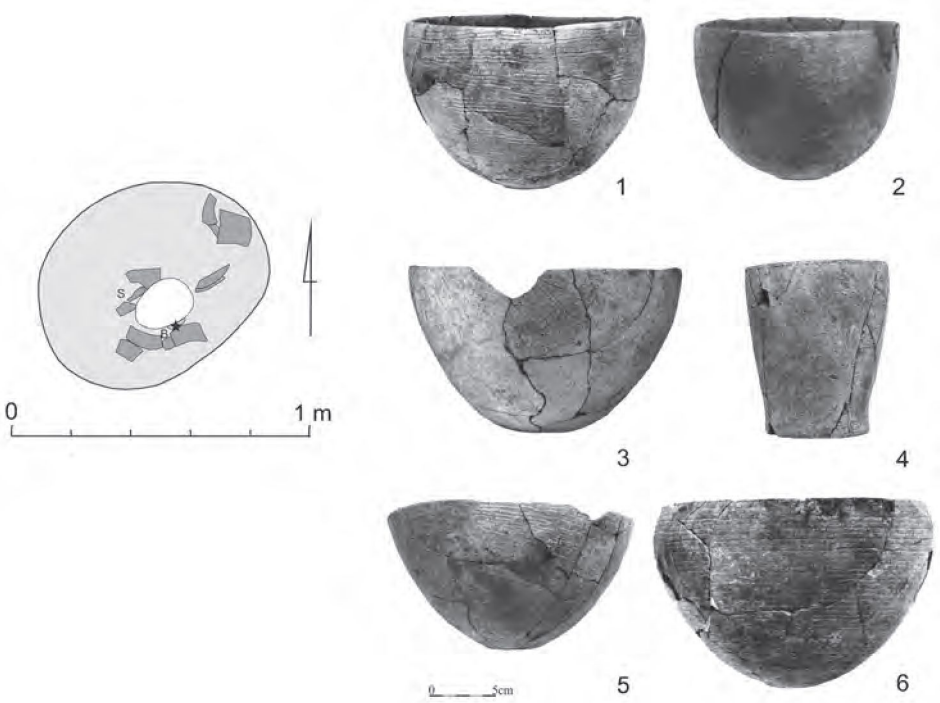

Fig. 6. Kadero site. Grave No. 220 (left) and pottery from: 1 – grave 220; 2-3 – grave 202; 4-6 – grave 203

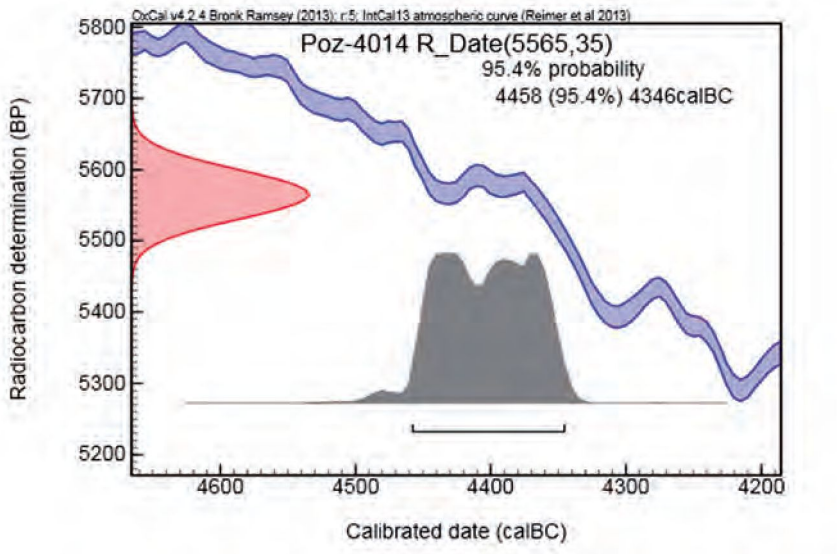

Fig. 7. Kadero site. Results of calibration of sample Poz-4014 from grave No. 220

6.2-3), sandstone palette, twelve carnelian beads, seven beads of Red sea shells and two shells of different size of the Nile bivalve (Krzyżaniak 2011: 171-172). The radiocarbon dating was made on both bivalve shells (Poz-4012 and Poz-4165) and the results are as follows: 5550 ± 35 b.p. and 5415 ± 40 b.p. respectively. Calibrated age (with probability 95,4%) of the first sample is placed between 4539 and 4262 years cal BC and median 4401 years cal BC while the second between 4350 and 4079 years cal BC and median 4283 years cal BC (Fig. 9-10).

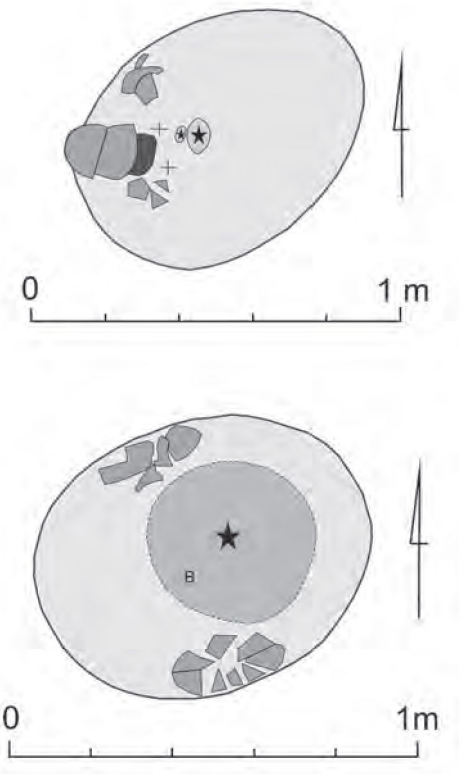

Fig. 8. Kadero site. Grave No. 202 (upper) and grave No. 203 (lower)

Grave No. 203

Grave of a child (Infans I) on the depth 45-82 cm below the surface (Fig. 8). The grave was furnished in three pottery vessels: deep cup with flat base decorated with incised triangles, medium size open bowl with combed surfaces, medium size bowl decorated with incised horizontal lines (Fig. 6.4-6); fourteen carnelian beads, single amazonite bead (Krzyżaniak 2011: 173). On the bottom of the grave red discoloration (ochre) with a small pieces of the charcoal was recorded. That charcoal was submitted for radiocarbon dating (Poz-4057) and the result was 5380 ± 40 b.p. The age of the sample after calibration (with probability 95,4%) is placed between 4341 and 4050 years cal BC and median 4222 years cal BC (Fig. 11).

Grave No. 101

Grave of a child (4 years old) on depth 40-55 cm below the surface (Fig.12). The grave was furnished with three pottery vessels: medium size deep bowl decorated with incised semicircular panels, medium size deep bowl of combed ware, fragment of a medium size deep bowl partly decorated with semicircular incised panels (Fig.12); sandstone palette; shell of Nile bivalve (Krzyżaniak 2011: 121-122). The

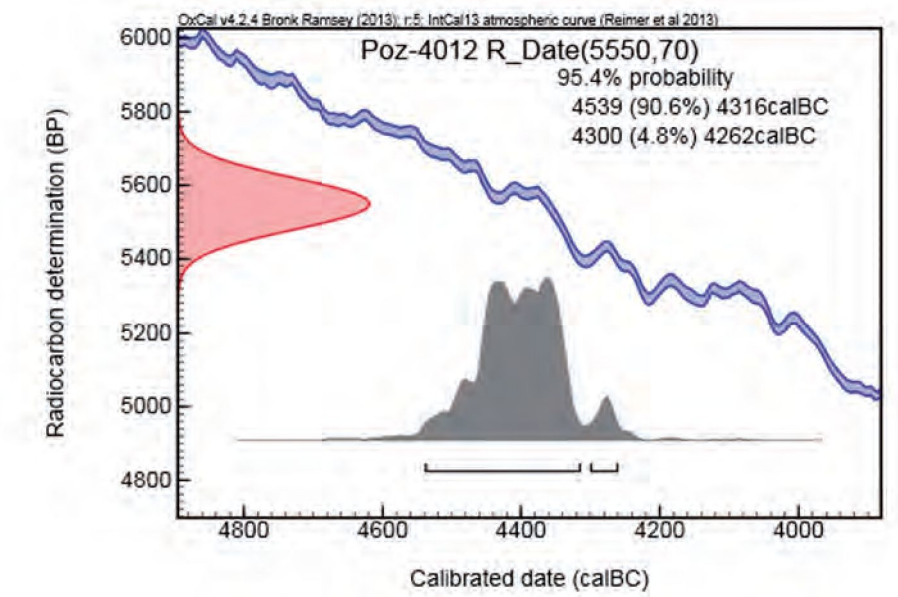

Fig. 9. Kadero site. Results of calibration of sample Poz-4012 from grave No. 202

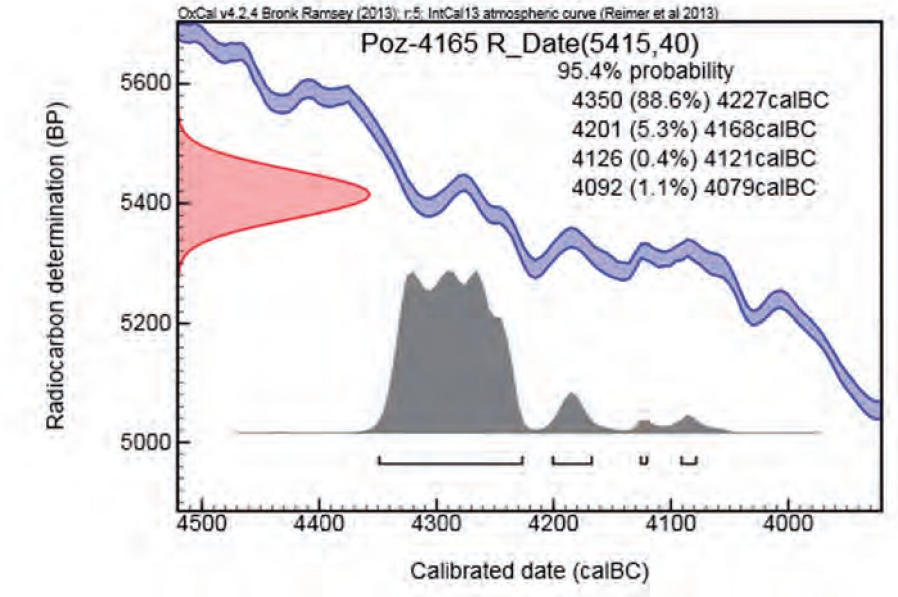

Fig. 10. Kadero site. Results of calibration of sample Poz-4165 from grave No. 202

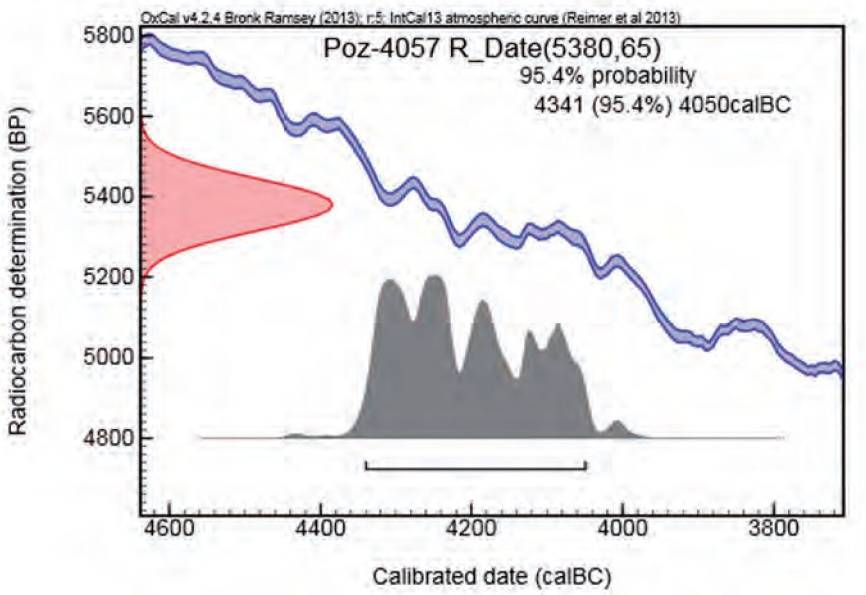

Fig. 11. Kadero site. Results of calibration of sample Poz-4057 from grave No. 203

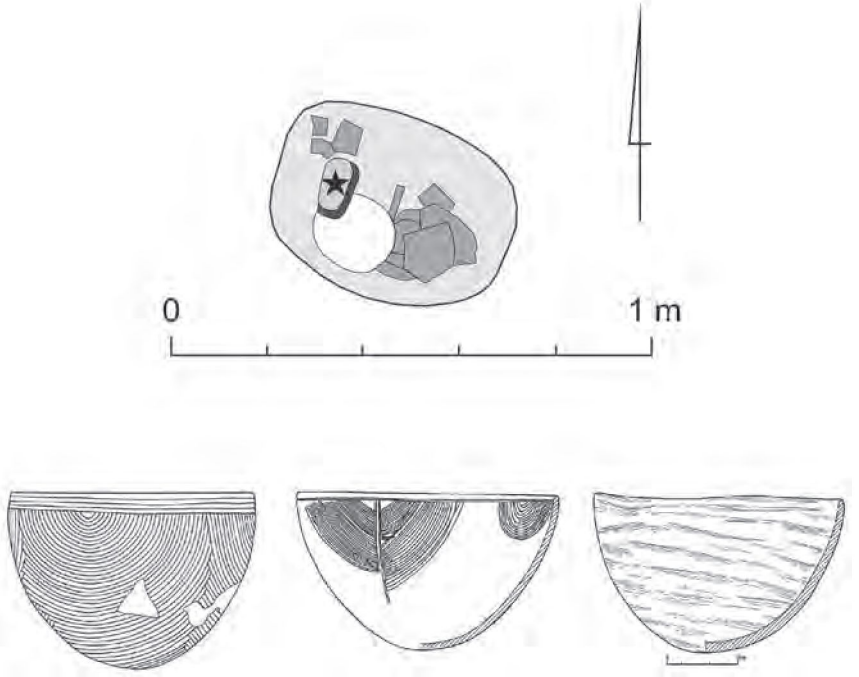

Fig. 12. Kadero site. Grave No. 101 and pottery from the grave

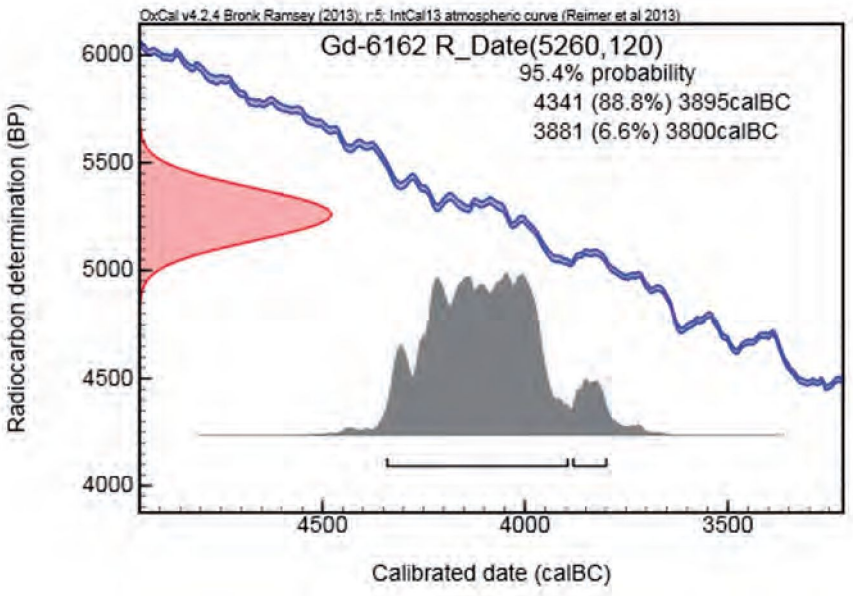

Fig. 13. Kadero site. Results of calibration of sample Gd-6162 from grave No. 101

radiocarbon dating was made on the Nile bivalve shell (Gd-6162) with the result 5260 ± 120 b.p. The calibrated age of the sample (with probability 95,4%) is between 4341 and 3800 years cal BC (Fig. 13) with median equal 4100 years cal BC.

Grave No. 243

Grave of an adult male in contracted position the depth 62-90 cm, unfurnished (Fig. 14). On the bottom of the grave a charred wood was recognized from which a sample for the radiocarbon dating was taken (sample Poz-4308) (Krzyżaniak 2011: 194). It gives the radiocarbon age 4150 ± 30 b.p. that after calibration (Fig. 14) is between 2876 and 2628 years cal BC (with probability 95,4%) and median value of 2745 years cal BC.

Grave No.132

Grave of the female 30-40 years old buried on the depth 105 cm. The body was positioned on the right side with the arms along the body (grave is partially destroyed in modern times) (Fig. 15). On the bones are preserved remnants of the textiles which might have been fragments of the shroud. (Krzyżaniak 2011: 211-212). The fragments of the clothes was used for the radiocarbon dating (Poz-4164) with the result 1660 ± 30 b.p. After the calibration it is between 260 and 529 years cal AD and median 388 years cal BC (Fig. 15).

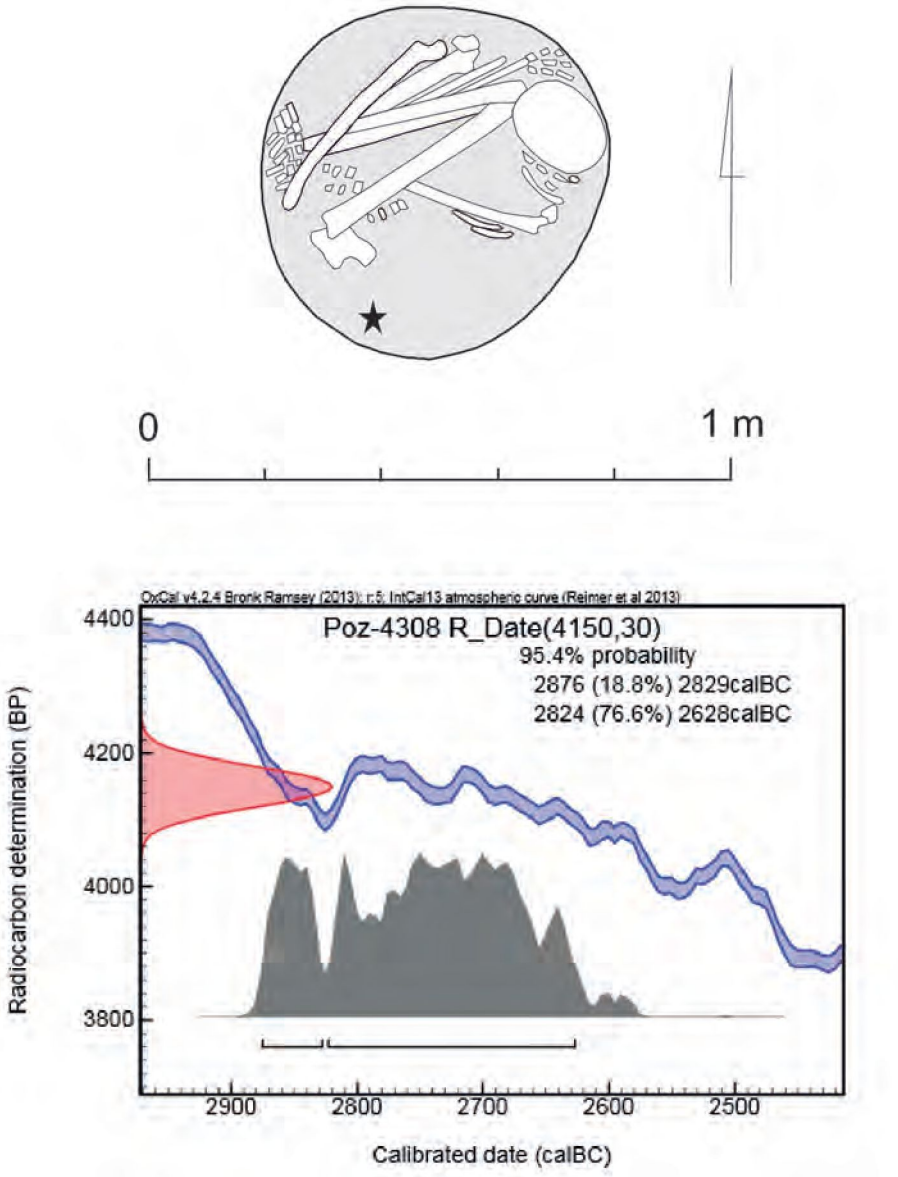

Fig. 14. Kadero site. Grave No. 243 and results of calibration of sample Poz-4308 from the grave

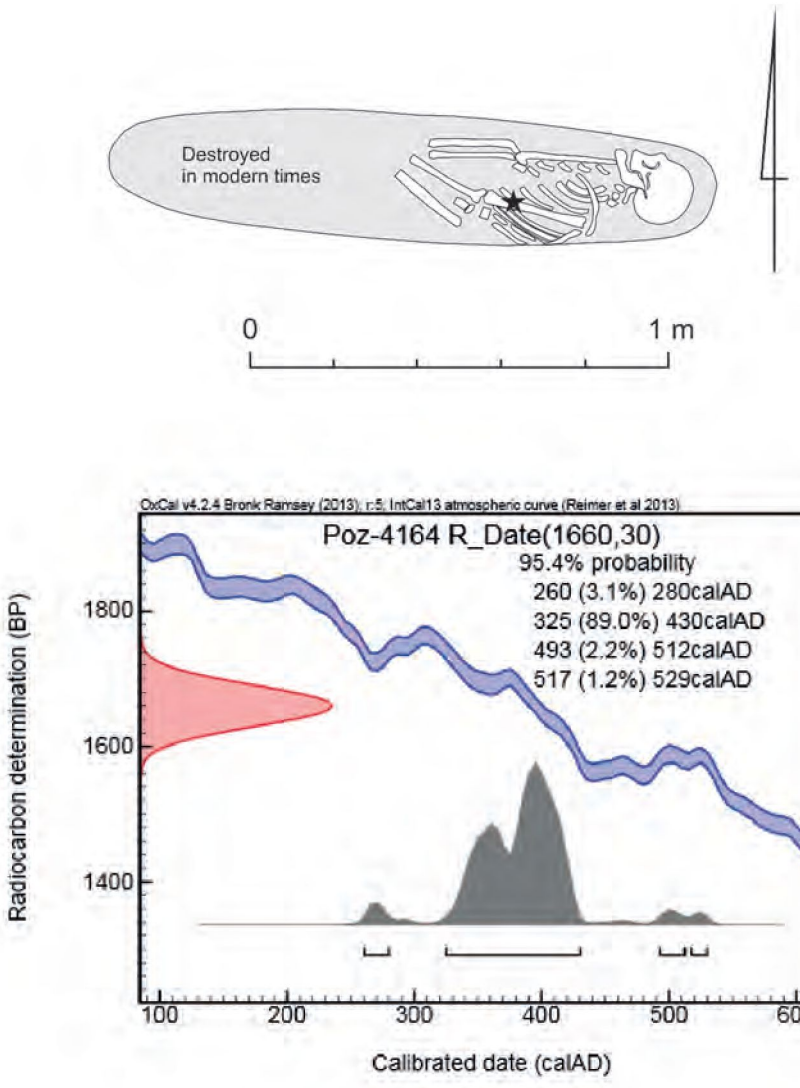

Fig. 15. Kadero site. Grave No. 132 and results of calibration of sample Poz-4164 from the grave

3. The settlement

3.1. The northern midden

From the northern midden the set of eleven radiocarbon dates is available. All of them were collected from the small trench located in the place when the depth of the accumulated settlement debris was the thickest (Fig. 1). All the dates were made on the shells of a Nile oyster, Nile bivalve or fresh water shell. Charcoals were collected from the depth of ca. 10-30 cm. Details of all eleven dates are shown in Table 1. The oldest radiocarbon age of the sample from the northern midden is 5960 ± 70 b.p. (GD-5647) while the youngest 5370 ± 60 b.p. (Gd-5651). The calibrated age of all the radiocarbon dates (Fig. 16) shown the age of the midden between 5024 and 4051 years cal BC with probability of 95,4%.

3.2. The southern midden

Three samples were collected from the trench located at the central part of the southern midden (Fig. 1). All of them are the Nilotic bivalves found close to each other. Two younger dates made on that samples come from the depth ca. 8-10 cm whereas the older was collected deeper – ca. 8-30 cm. However the nature of the Kadero middens– lack of reliable stratigraphy – makes the position of each sample in the strata useless for chronological control.

The two older radiocarbon dates from the southern midden are almost identical: 5280 ± 90 b.p. (SMU-482) and 5260 ± 90 b.p. (T-2188). The younger one is 5030 ± 70 b.p. (T-2189). The age range of the southern midden after calibration with the probability of 95.4% is between 4331 and 3665 years cal BC (table 1; Fig. 17). If we consider the Trondheim Laboratory correction of results of two samples dating (see Table 1) than the oldest date from the southern midden is 5700 ± 100 b.p. (T-2188-corr) and the youngest 5280 ± 90 b.p. (SMU-482). Than the calibrated age of that midden is substantially older with the range between 4770 and 3956 years cal BC (Table 1; Fig. 18).

4. Discussion on the radiocarbon dates from Kadero

Twenty six radiocarbon analyses from the Kadero site are one of the longest series of dates from one site ever done for the Sudanese Neolithic. However there is a number of problems that makes interpretation of that sequence difficult. The two basic issues are as follows:

(a) Radiocarbon analyses from Kadero were made between ca.1980 and 2000 in five different laboratories. During that time the methodology of radiocarbon

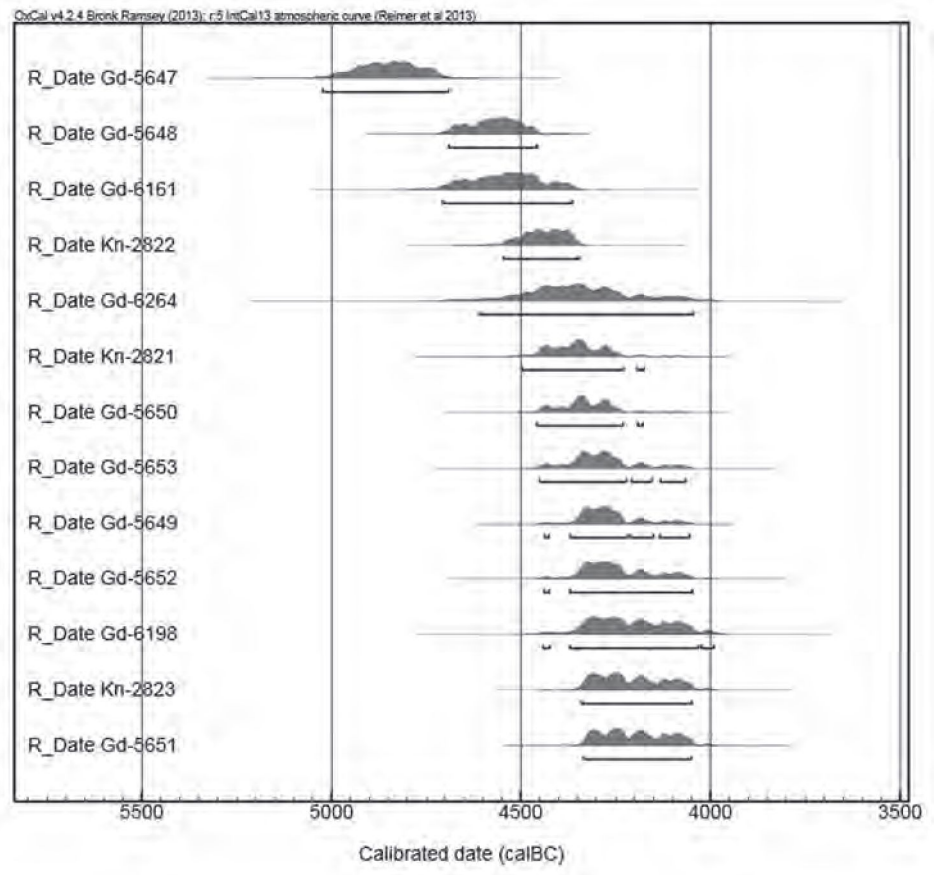

Fig. 16. Kadero site. The northern midden. Multiplot showing the results of calibration of radiocarbon samples

dating has substantially changed and that differences, not only between the laboratories but also within each laboratory, difficult to follow, influenced the precision of dating and its results.

(b) Different materials were the subject of radiocarbon dating, like charcoal, charred wood or cloth found from grave pit filling as well as shells of Nile bivalves and mollusks discovered either in the grave filling or in the sediments of the middens. Especially in that last case the possibility of large fresh water reservoir effect during the dating should be taken into account even if it is partially controlled by the observations on the archaeological content of features. In the case of charcoal, if a bulk sample is dated, what is the case of Kadero samples, the final radiocarbon age of the sample is an averaged result of each charcoal piece age included in the

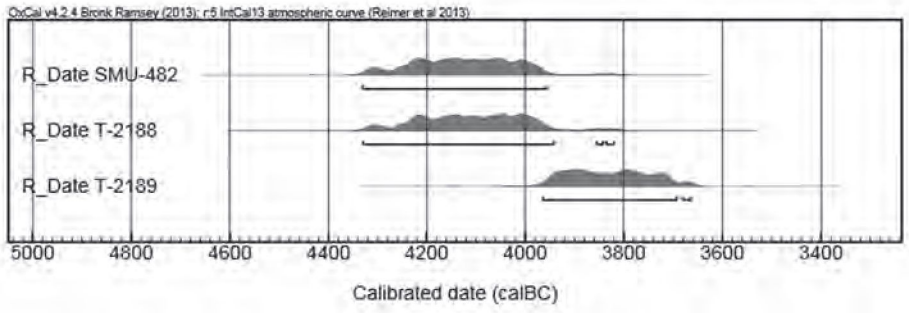

Fig. 17. Kadero site. The southern midden. Multiplot showing the results of calibration of radiocarbon samples (Trondheim Laboratory analyses without correction)

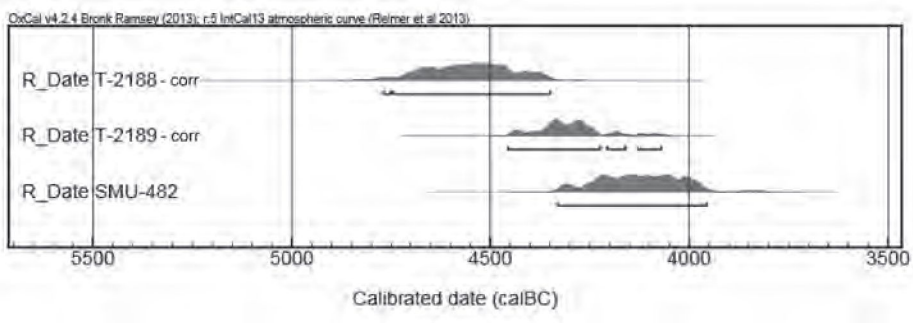

Fig. 18. Kadero site. The southern midden. Multiplot showing the results of calibration of radiocarbon samples (corrected Trondheim Laboratory analyses)

sample, what not necessary reflect the real radiocarbon age of the dated event (e.g. inhumation). Additionally, in the case of charcoals from grave pits we cannot be sure that they are connected with burials as the settlement activity on the site was very intensive and on the other hand no traces of burial practices with the use of fire were recorded during the excavations.

Analysing the calibrated age of all the dates from different archaeological contexts of the site some observations on relative chronology can be made (Fig. 19). The beginning of the settlement at Kadero can be dated slightly after 5000 years cal BC on the northern midden and occupation continue there up to ca. 3900 cal BC. The southern midden is younger. Depending on the corrected or non-corrected dates it began at the earliest after 4700 years cal BC or even later, after ca. 4300 years cal BC and finished ca. 3900 cal BC or ca. 3700 years cal BC.

The cemetery lasted no more than 500-600 years, between 4450 and 3900 cal BC. Assuming that the Neolithic people lived and were buried all the time on the same

place, we should rather accept corrected 14C dates from the southern midden made in the Trondheim Laboratory and the youngest calibrated age from that area – sample analysed in the SMU Laboratory - dates the latest phase of the occupation there. That is possible that there is a lack of the oldest graves in the record, synchronous with the beginning of the settlement in Kadero. – older than 4500 cal BC. Most probably they were eroded before the start of excavations of the site.

Conclusions

Six dated graves fit very well into the Early Neolithic. Not only the dates but also equipment of the graves confirms its, relatively long, chronology.

The dating of grave No. 243 is much younger as compared to the sequence shown on Fig. 18. The deceased was buried jest in contracted position in the same way as in other Neolithic graves. Because the grave is unfurnished, only the position of the body and the preservation of the bones are the arguments connecting this grave to the Neolithic. However we should remember that ca.60 % of the Neolithic graves in Kadero are unfurnished (Krzyżaniak 2011: 58) as well as many graves on the other Neolithic cemeteries in the Sudan.

This date is younger than the other dates collected on the Neolithic sites in the Central Sudan as Shaheinab, Umm Direiva, Nofalab, Zakiab, Ghaba, even Late neolithic Kadada (Sadiq 2012: 146-147). But similar dates are known from the Nofalab 2 (Sadiq 2012: 147), Shaqadud cave in Butana (Marks 1984:32), Jebel Tomat and Jebel Moya between the Blue and White Nile (Clark and Stemmler 1975; Sadiq 2012:149). For the lack of sites dated after three thousands until one thousand BC, that period was often considered as a gap in the occupation of the central Sudan (Haaland 1987: 224-225; Sadiq 2012: 149). It was interpreted as a shift toward the nomadic pastoral agriculture (Reinold and Krzyżaniak 1997: 13). The dates from Nofalab 2, associated with the material related to Shaheinab and the sites connected with as a late Khartoum Neolithic horizon (Sadiq 2012: 148) and the date from the grave 243 at Kadero, which is the burial typical for the Neolithic customs suggest that the Neolithic continues in the Central Sudan also at the beginnings of the 3rd millennium BC and not necessary this area was depopulated. It is possible to solve this problem by the radiocarbon analysis of other unequipped graves with the bodies in the contracted position.

Grave No. 132, because of the position of the body in the grave, was supposed by Lech Krzyzaniak to be a Christian one. Based on its radiocarbon age we can now suggest that the youngest phase of the cemetery at Kadero belongs rather to the early Post-Meroitic times than the to the Medieval period.

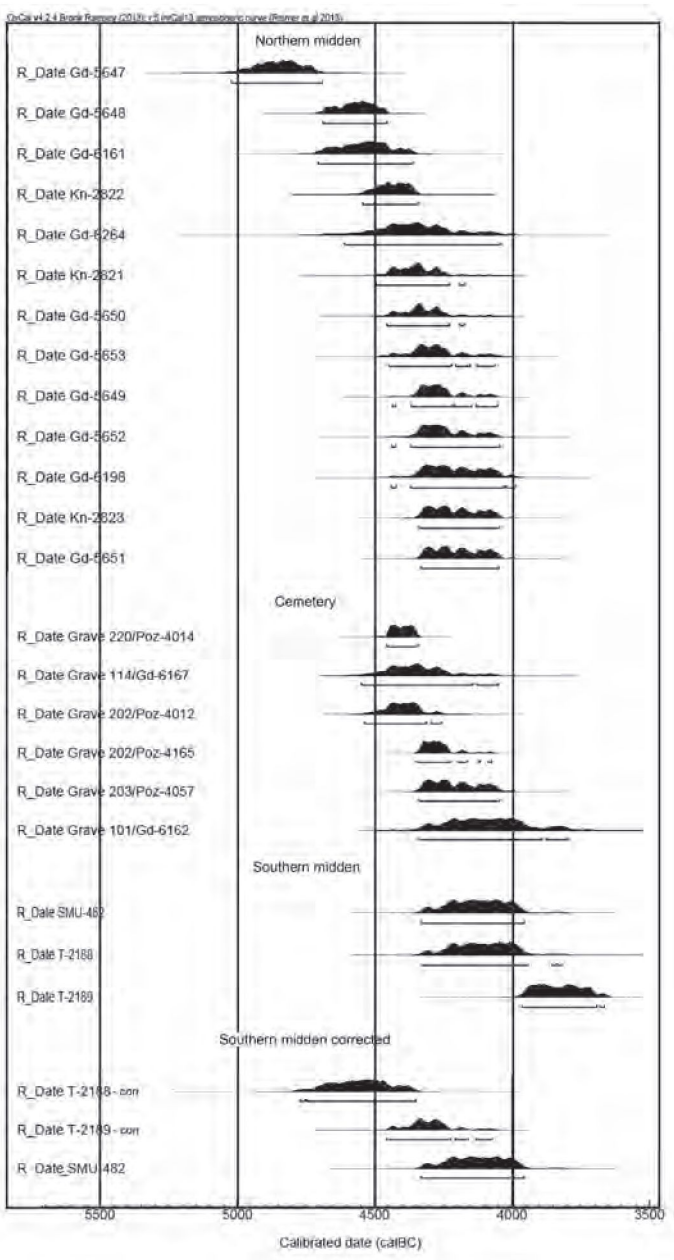

Fig. 19. Kadero site. Multiplot showing the results of calibration of radiocarbon samples for different part of the site (grave No. 60 is excluded from the plot due to extremely large standard deviation)

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II

Oases

Hunter-Gatherers and Early
Food Producing Societies
in Northeastern Africa
Studies in African Archaeology 14
Poznań Archaeological Museum 2015

Noriyuki Shirai

Filling the gap between the Fayum Epipalaeolithic and Neolithic

Introduction

The desert around Lake Qarun in the Fayum Depression has been well known for the scatters of elaborate stone tools since the 19th century, and many European antiquarians and archaeologists came to collect them around the turn of the 20th century. These stone tools are presently housed in museums around the world, but many of these stone tools have been left untouched in storage and unpublished, and hence have not received much scholarly attention. This article will describe what are known and unknown about Fayum Epipalaeolithic and Neolithic stone tools, and discuss what kind of new insights can be gained by studying such neglected museum collections. Emphasis is placed on the consideration that some undated tools can probably fill the alleged chronological and technological gap between the Fayum Epipalaeolithic and Neolithic.

Prehistory of the Fayum in publications and museum collections

There are three major publications on the corpus of prehistoric stone tools of the Fayum. The first is an article published by Heyward Seton-Karr in the Annual of the Antiquities Service of Egypt (Seton-Karr 1904). He was a very active British antiquarian who had sound knowledge of prehistoric archaeology through reading scholarly publications and loved prehistoric stone tools. He surveyed a wide area of the Fayum and made a large collection of stone tools. He sorted out the collection reasonably, and considered that most of carefully-retouched stone tools

in his collection would be dated to the Neolithic period by analogy with the stone tools of the European stone age.

The second major publication is one volume of the General Catalogues of the Egyptian Museum in Cairo published by the Canadian archaeologist Charles Currelly (Currelly 1913), and it deals with Seton-Karr's collection. Seton-Karr divided his Fayum collection into small portions and proudly donated them to many museums around the world, without making detailed inventories with destinations. Seton-Karr's Fayum collection in the Egyptian Museum in Cairo is thus only part of his whole collection but covers almost all types of Fayum prehistoric stone tools known to date. In the General Catalogue, Currelly classified Seton-Karr's stone tools more simply and presented good pictures of all tools housed in the Museum.

The third major publication is the British archaeologist Gertrude Caton-Thompson's monograph on her fieldwork and artefact study entitled *The Desert Fayum* (Caton-Thompson and Gardner 1934). She presented a new classification of stone tools and revealed that the users of those tools were Neolithic farmers who also lived on hunting and fishing. Her monograph is presently considered as the most authentic source of information about the prehistory of the Fayum, whereas Seton-Karr's and Currelly's publications tend to be ignored.

It must be kept in mind that Caton-Thompson was a relatively late visitor to the Fayum and that the Fayum was already disturbed by previous visitors' collecting activities when she started her fieldwork in the 1920s. As she mentioned (Caton-Thompson and Gardner 1934: 23, 31, 75, and 78-79), her fieldwork in the Fayum was not possible without Seton-Karr's preceding work, because her concession area (Fig. 1) was the same as his survey area and most of her sites had already been recognised by him and indicated on his survey maps (Seton-Karr 1904: fig.1; 1905, pl. I). Seton-Karr did not describe which stone tool was collected at which site in his publications, but it is possible that most of Caton-Thompson's sites had already been swept by Seton-Karr's collecting activity to a large extent. Therefore, the stone tool assemblage at each site reported by Caton-Thompson was not in an undisturbed state. In fact, Seton-Karr had collected some types of stone tools which had not been collected by Caton-Thompson, and it is obvious that Caton-Thompson's stone tool corpus is not perfect.

In addition, it must also be noted that Caton-Thompson did not publish all of her stone tool collection. It was common in the early 20th century that British archaeologists working in Egypt received financial support from many museums that were in need of nice objects for display, and then the archaeologists gave portions of their finds to the museums in appreciation for their financial support.

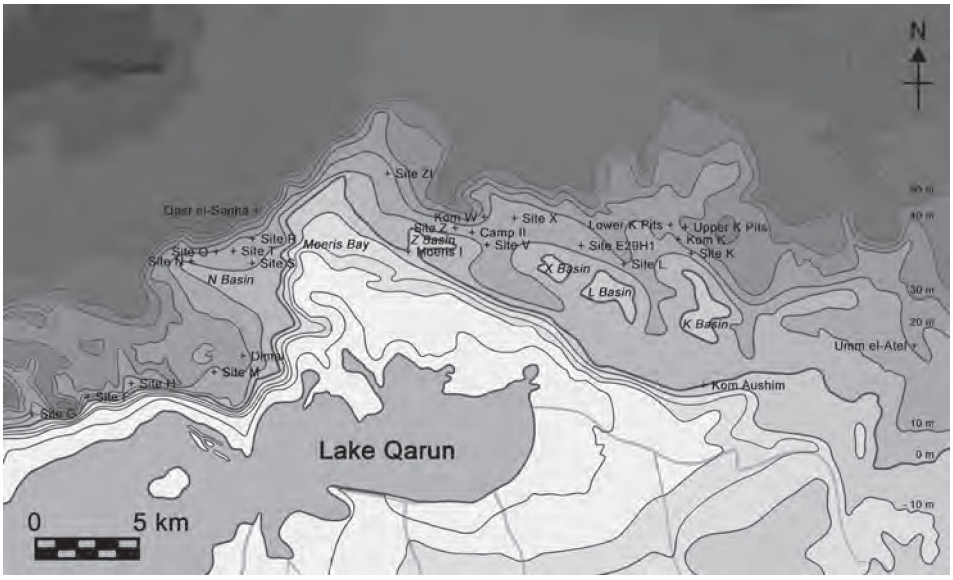


Fig. .1. Map of Caton-Thompson's sites on the northeastern shore of Lake Qarun

Caton-Thompson was not an exception. After a certain number of her finds in the Fayum were left in the Egyptian Museum in Cairo, the rest of her finds including stone tools, pottery and miscellaneous artefacts were brought to the United Kingdom. Masterpieces are kept and displayed in the Petrie Museum of Egyptian Archaeology in University College London and the British Museum, but the rest of her finds were distributed immediately after their arrival in the United Kingdom in 1926 and 1928, and thus long before the publication of *The Desert Fayum* in 1934. It is doubtful that she had enough time to study her collection thoroughly before the distribution. Therefore, it is worth studying her dispersed collection in order to know what are unpublished and to grasp the whole picture of her finds.

Whereas the majority of her collection were given to local museums in the United Kingdom, some portions were generously given to universities and research institutes in and outside of the United Kingdom. According to her distribution list (Caton-Thompson and Gardner 1934: xiv), her collection was finally distributed to 31 locations in nine countries, including Australia, Canada, Egypt, France, Ireland, Japan, the Netherlands, the United Kingdom and the United States. I have visited several museums which are known for housing Caton-Thompson's Fayum artefact collection, and happened to find other collections made by earlier visitors to the Fayum. These collections include many interesting stone tools which have never been exhibited and published.

A critical problem is that most of such collections in museums do not have much information about the exact provenance of individual artefacts. Ink inscriptions on individual artefacts merely say 'Fayum', and there is no clue to knowing exactly where in the Fayum they came from. Only Caton-Thompson neatly inscribed the find location on individual artefacts, and one can see at least which artefact derived from which of the sites she surveyed or excavated in the Fayum. In this situation, it is often said that museum collections of uncertain provenance are useless and worthless study. Nonetheless, it is significant to know what types of stone tools had already been collected before Caton-Thompson came to the Fayum, and to complement her stone tool corpus, through studying earlier visitors' publications and collections presently housed in museums.

Moreover, the present-day Fayum is severely disturbed. As many collectors have come to the Fayum and taken away a number of nice-looking stone tools on the desert surface since the publication of *The Desert Fayum*, very few formal tools are left in the field even though many debitage products are still there. As long as one works in the field, there are not many chances of dealing with formal tools. Another problem is that the Fayum is being rapidly destroyed by modern land use activities like farming and clay mining, and the chance of conducting fieldwork is being lost (Shirai 2010). In this circumstance, no one can say that Fayum stone tool collections in museums are worthless study. Rather, those stone tools in museums, which one cannot expect to obtain in the field anymore, are really important and valuable, and one must seriously consider how to make the most of them for a better understanding of the Fayum prehistory.

Fayum Epipalaeolithic and Neolithic tool classification and chronology

Caton-Thompson identified 25 classes of prehistoric stone tools that she obtained through excavations at some sites like Kom K and Kom W and surface collection at many sites (Caton-Thompson and Gardner 1934, 19-22). They are:

1) ground and polished axes
2) polished and flaked axes
3) flaked axes
4) adzes
5) gouges
6) planes
7) knife blades
8) daggers, spears, or javelin heads
9) halberds

10) chisels
11) ground points
12) triangular or slightly hollow-based arrowheads
13) concave-based arrowheads
14) sickle blades
15) leaf-shaped points
16) partially retouched, leaf-shaped points
17) pebble-butted points/knives
18) pebble-backed knives/scrapers
19) side-blow flakes
20) celtiforms
21) scrapers
22) backed blades
23) trihedral rods
24) tanged arrowheads
25) leaf-shaped arrowheads

She divided them into two groups according to their vertical locations, naming the Neolithic A group and the Neolithic B group respectively. The A group distributed at higher elevations of the slopes of prehistoric lakeshores, whereas the B group distributed at lower elevations of the slopes.

According to her, the A group includes:
1) ground and polished axes
2) polished and flaked axes
4) adzes
7) knife blades
8) daggers, spears, or javelin heads
9) halberds
10) chisels
11) ground points
12) triangular or slightly hollow-based arrowheads
13) concave-based arrowheads
14) sickle blades

The B group includes:
22) backed blades
Some types of 24) tanged arrowheads

She speculated that the following tool classes might probably belong to both A group and B group because they were often found at middle elevations:

3) flaked axes
5) gouges
6) planes
15) leaf-shaped points
16) partially retouched, leaf-shaped points
17) pebble-butted points/knives
18) pebble-backed knives/scrapers
19) side-blow flakes
20) celtiforms
23) trihedral rods

She also suggested that some of 21) scrapers and some of 25) leaf-shaped arrowheads might be dated to the post-Neolithic. On the other hand, she left the date of the majority of 24) tanged arrowheads and 25) leaf-shaped arrowheads uncertain (Caton-Thompson and Gardner 1934: 19-22).

As she assumed that the lake level kept lowering through the Neolithic period, she related the vertical distribution pattern of the A group and B group tools to the lowering lake level. She concluded that the A group at higher elevations was earlier in date than the B group at lower elevations, and that elaborate A group tools degenerated into crude B group tools through time (Caton-Thompson and Gardner 1934: 55-67).

New research by the Combined Prehistoric Expedition in the 1960s revealed that the B group is actually earlier in radiocarbon date than the A group and must be understood as an Epipalaeolithic culture named the Qarunian because it is characterised by microlithic tools. The A group was also radiocarbon-dated by using a sample from Kom W, the type site of the A group, and was recognised as the true Neolithic culture because of its lithic manufacturing techniques characterised by polishing and bifacial pressure flaking. The Fayum Epipalaeolithic falls in the 7th millennium BC, whereas the Fayum Neolithic falls in the middle 5th millennium BC. It was also revealed through geological observations that the lake level was fluctuating and seemed to have dropped at the transition between the Epipalaeolithic and Neolithic. Based on these new data, it was argued that there was a great chronological and technological break between the Epipalaeolithic and Neolithic, and it was asserted that the Fayum had been deserted and abandoned at the end of the Epipalaeolithic, and about 1200 years later, reoccupied by new

people who brought new technology (Wendorf and Schild 1976: 317-319). These argument and assertion were uncritically accepted by another research team that came to the Fayum in the 1980s (Wenke et al. 1988; 1989).

However, one problem still remains. Even though the A group and B group were radiocarbon-dated and reconsidered as Neolithic and Epipalaeolithic respectively, the transitional group at middle elevations, which was presumed by Caton-Thompson to belong to both A group and B group, was not considered at all, and many tools found at middle elevations are not surely dated. A question is whether there was really a great chronological and technological break between the Epipalaeolithic and Neolithic. The present situation is merely that several radiocarbon dates were obtained from high elevations and low elevations but not from a middle elevation. Therefore, it can be argued that the break between the two culture groups was actually made by this manner of sampling, and that undated tools at middle elevations may probably fill the alleged chronological and technological gap. I have argued elsewhere that some undated tool classes like 6) planes, 17) pebble-butted points/knives, 18) pebble-backed knives/scrapers, and 19) side-blow flakes could most probably be dated to the 6th millennium BC because similar well-dated tools are currently known at several sites in the Egyptian Western Desert (Shirai 2010; 2011). In the following, I would like to show some more tools which may be dated to the asserted blank period between the Epipalaeolithic and Neolithic, and to discuss that there may have been no considerable chronological break between them.

Some tool classes of the presumably transitional group

a) Small leaf-shaped or tanged arrowheads

Caton-Thompson collected hundreds of small arrowheads, but she was not sure about their date, as mentioned above. She presented only a small number of arrowheads as of uncertain date (Caton-Thompson and Gardner 1934: 22 and pl. LI), and did not publish all of her arrowhead collection in detail. Her unpublished collection in museums actually includes a variety of arrowheads (Fig. 2).

Thanks to the development of field research in the Egyptian Western Desert after the time of Caton-Thompson, such small arrowheads are currently well known in the northern half of the Egyptian Western Desert, and their first appearance is considered to be around 6500 cal BC (Riemer 2007a; 2007b; Kindermann 2010; McDonald 2013). It must be stressed here that these types of small arrowheads were quite common in the contemporaneous southern Levant. The southern Levant has a long tradition of making unifacially- or bifacially-

retouched, large arrowheads of up to 10 cm long since the Pre-Pottery Neolithic B (henceforth PPNB), but from around 6500 cal BC, much smaller arrowheads of less than 4 cm long appeared and became popular through the Pottery Neolithic (6500-5800 cal BC) (Gopher 1994; Rosen 2012). The spread of small arrowheads was almost simultaneous in the southern Levant and the Egyptian Western Desert. In this circumstance, it is very unlikely that only the Fayum was isolated from this trend. It is reasonable to consider that the undated small arrowheads of the Fayum in question are most likely to be dated to the middle 7th – early 6th millennia BC, which has been asserted as a blank period between the Fayum Epipalaeolithic and Neolithic.

When the assemblage of small arrowheads in the Fayum is examined in detail, tanged and winged short arrowheads, which are very similar to the Haparsa points of the Pottery Neolithic in the southern Levant, look outstanding. This type of arrowhead, as shown at right in the lower row in Fig. 2, is rare to absent at other sites in the Egyptian Western Desert, and their rarity or absence becomes the basis for an argument that small leaf-shaped or tanged arrowheads may have developed in the Egyptian Western Desert independently of the cultural influence from the southern Levant (McDonald 2013). It is not certain whether this was really the case, but it seems certain that their presence in the Fayum suggests a stronger cultural connection between the southern Levant and Fayum around the middle 7th – early 6th millennia BC, and this is only natural, considering the close distance between them.

b) Knives and daggers

Other tools that may be dated to the alleged blank period between the Fayum Epipalaeolithic and Neolithic are some types of knives. According to Caton-Thompson's classification, there are several types of knives (Caton-Thompson and Gardner 1934: 20-21 and pls. XXXVI-XXXVII, XLI-XLII and XLIV). However, her typology is difficult to understand, because she did not focus on the blade form but on the presence of cortex on the tool surface, and separated a pebble-butted knife class, a pebble-backed knife class and a dagger class from a knife blade class. By focusing on the blade form, they can be reconsidered as A) slender, tapered, single-edged form (the chef's knife type), B) slender, tapered, double-edged form (the dagger type), C) broad, tapered, single-edged form (the butcher knife type), D) long, narrow, single-edged form with a slight curve to the tip (the katana type), E) broad, single-edged form broadening to the tip which ends obliquely (the machete type).

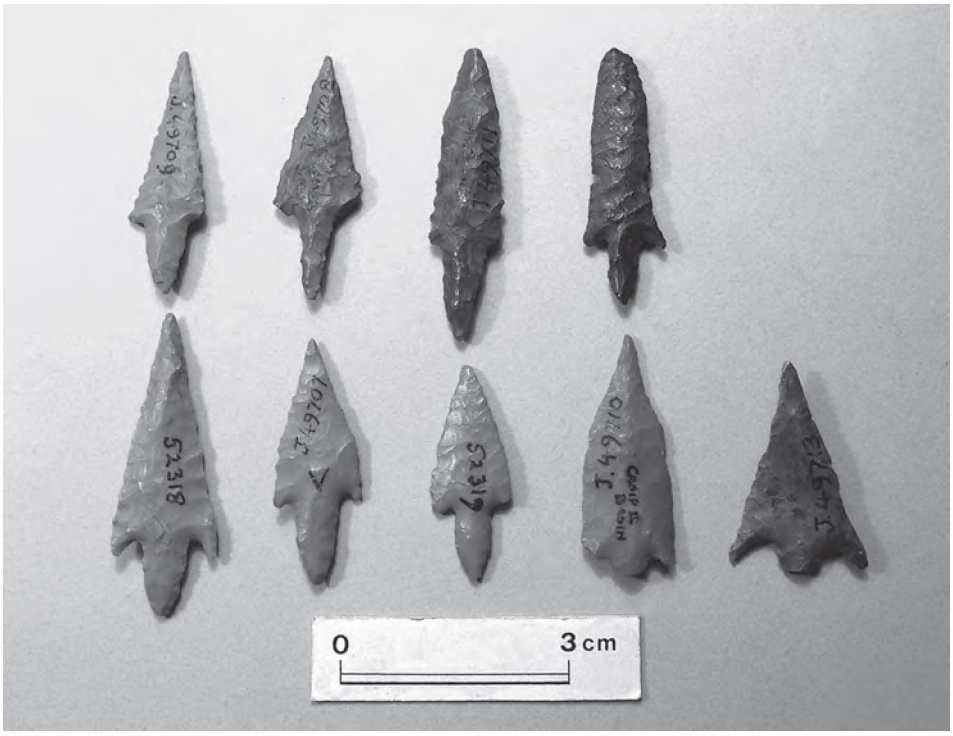


Fig. 2. Small arrowheads from various sites (Cairo JE49709, JE49708, JE49711, JE49712, JE52318, JE49707, JE52319, JE49710, JE49713)

In the southern Levant, complete examples of daggers are very few and most of them are fragmentary, but they certainly appeared no later than the early 6th millennium BC in the Mediterranean coastal regions (Olami *et al.* 1977). On the other hand, there are many complete examples of elaborate daggers and knives of both straight and curved forms at such sites as Djara and Farafra Oasis in the Egyptian Western Desert, and they are dated to the middle 6th millennium BC (Barich and Lucarini 2002; Kindermann 2010; Barich *et al.* 2012). Many of them are characterised by patches of calcareous cortex on one face or both faces, and this suggests that tabular flint nodules from limestone beds were used.

As long as one reads Caton-Thompson's publication, the variation of knives in the Fayum looks different from that in other contemporaneous sites in the Egyptian Western Desert. As she mentioned (Caton-Thompson and Gardner 1934: 20-21), some Fayum examples of the chef's knife type retain large patches of calcareous cortex on one face, but these seem to be few. The majority in the Fayum are pebble-butted and/or pebble-backed knives which have a tapered blade and

brown cortex on butt and/or lateral side. This suggests that rounded flint cobbles, which naturally occur in the Fayum, were preferentially used. Daggers and curved knives, which are common in the Egyptian Western Desert, are not well presented in Caton-Thompson's publication, except for one example for each (Caton-Thompson and Gardner 1934: pl. XXXVII-6 and pl. XLIV-2).

However, some examples in unpublished Caton-Thompson's collection (Figs. 3-5) demonstrate that the Fayum actually had more daggers and curved knives which are comparable to those from the sites in the Egyptian Western Desert mentioned above. Therefore, it can be considered that such knives and daggers in the Fayum are not stray items, but that their presence probably indicates the continuous human occupation of the Fayum in the middle 6th millennium BC.



Fig. 3. Dagger from Site K (Cairo JE52325)

c) Serrated sickle blades

Bifacially pressure-flaked, unilaterally serrated sickle blade is a hallmark of the Fayum Neolithic which is represented by type sites like Upper and Lower K Pits, Kom K and Kom W dated to around 4500 cal BC. However, it can be argued that its first appearance in the Fayum may have been much earlier in date than previously believed.

Sickle blades are apparently for harvesting cereal crops, and their first appearance in Egypt is most likely related to the diffusion of farming from the southern Levant to somewhere in Lower Egypt. The southern Levant has a long history of sickle blade making. According to some synthetic studies of the development of sickle blades in the southern Levant (Rosen 1997: 134-140; Gopher *et al.* 2001), sickle blades of the PPNA and PPNB were usually made from large blades or blade segments with slight lateral side serration, and thus their body form was narrow. It was in the PPNC and Pottery Neolithic Yarmukian culture in the 7th millennium BC that sickle blades were made from blade segments or flakes and were sparsely and deeply serrated bifacially on one or two lateral sides though the body was not thor-

oughly pressure-flaked bifacially. It was only in the Pottery Neolithic Lodian culture of the early-middle 6th millennium BC that flakes were thoroughly pressure-flaked bifacially, and their one lateral side was densely and shallowly serrated. Their body form tended to be wide. Such elaborate sickle blades declined in the southern Levant in the subsequent Wadi Raba and Qatifian cultures of the late 6th - early 5th millennia BC, and coarse serration on one lateral side of a blade or blade segment became common. The sickle blades of the Fayum Neolithic are most similar to those of the Lodian, but the sickle blade of the Lodian type disappeared in the southern Levant approximately 1000 years before they appeared at the type sites of the Fayum Neolithic mentioned above. Therefore, this chronological gap must be explained.

As shown in Figs. 6-8, there are variations in the sickle form in the Fayum, but Caton-Thompson has not highlighted these variations. She just mentioned that there were a pointed form and a rectangular form (Caton-Thompson and Gardner 1934: 21). The pointed and wide form was very common not only at Kom K and Kom W but also at the Levels II, III, IV and V of Merimde Beni Salama which are known to fall in the middle-late 5th millennium BC (Eiwanger 1988; 1992), but the narrow form with coarse serration is not common in Merimde. Coarsely serrated narrow sickle blades are not uncommon at surface sites in the Fayum (Caton-Thompson and Gardner 1934: Pl.XL), though it seems that the variation shown in Fig. 6 is a rare example even in the Fayum. Their exact dates are not obtained. It is not certain whether all of the variations are in the same period.



Fig. 4. Knife from Site Z (Cairo JE49739)



Fig. 5. Knife from Area L-X (Cairo JE52302)



Fig. 6. Sickle blade from Site X (Cairo JE52304)

Recently, some coarsely serrated narrow sickle blades have been discovered in the middle of the Egyptian Western Desert where there is no permanent standing water and no evidence of crop farming. At Seton Hill, which is approximately 150 km to the southwest of the Fayum, a bifacially flaked, unilaterally serrated sickle blade, whose tip is broken but is considered to have been pointed, has been collected on the surface, and is roughly dated to 5600-5200 cal BC based on associated diagnostic artefacts of the region (Kindermann 2010: 107-108, 471-472, fig. 302-1). Another four bifacially flaked, unilaterally serrated sickle blades, three of which are broken but are considered to have been pointed, have been found at different localities in Abu Gerara, approximately 400 km to the southwest of the Fayum. The localities are dated to around 5600-5200 cal BC based on a radiocarbon date and associated diagnostic artefacts (Riemer 2010: 612-632, 652, 659, fig. 33-1 and 33-2, fig. 70-5 and fig. 76-5). It is difficult to explain why there were sickle blades in such places, but it can be assumed on the basis of their presence in that period that the narrow form with coarse serration may be earlier in date than the wide form with fine serration, and that the first appearance of coarsely serrated narrow sickle blades in the Fayum would probably have been in the early-middle 6th millennium BC.

d) Flaked axes

Flaked axe of the trapezoidal or triangular form is also a hallmark of the Fayum Neolithic. As flaked axe did not exist in the preceding period, it is most likely that the axe was mainly used for shrub clearance at the beginning of farming and derived from the southern Levant.

The southern Levant has a long history of stone axe making. Flaked axes of oval to trapezoidal forms with polished working edge already appeared in the Middle PPNB, and there has been no notable technological development until

the Pottery Neolithic. Then, stone axes started to decline and were gradually replaced by rather elongated ones that should be called adzes and chisels through the Chalcolithic (Rosen 1997; Barkai 2005). Although not dealt with in a comprehensive study of axes in the prehistoric southern Levant (Barkai 2005), there seems to have been a unique axe making convention of leaving a patch of cortex on top of a body in the Pottery Neolithic Lodian culture (Yeivin and Olami 1979). As it is not difficult to remove such a patch of cortex in the making process, it appears to have been left there intentionally. However, such a patch of cortex does not seem to have had any practical function, and probably it is intended to show the raw material source as a brand mark. This odd feature is known in the examples from the type sites of the Fayum Neolithic (Fig. 9). In particular, Kom W has yielded the largest number of axes in the Fayum, and Caton-Thompson noted that flaked axes from Kom W frequently retain a patch of cortex on top of their bodies (Caton-Thompson and Gardner 1934: 26). However, not many illustrations and pictures of such axes are published, and such a patch of cortex is easily overlooked unless one handles real objects in museums.

As is the case with serrated sickle blades, the flaked axes of the Lodian type disappeared in the southern Levant approximately 1000 years before they appeared at the type sites of the Fayum Neolithic mentioned above. Therefore, this wide chronological gap needs to be explained. Unlike the serrated sickle blades, no comparable examples of axes are known in other regions of Egypt for arguing that the first



Fig. 7. Sickle Blade from Site X (Cairo JE49121)



Fig. 8. Sickle blade from Site X (Cairo JE52307)

appearance of such peculiar axes in Egypt was in the early-middle 6th millennium BC. However, considering that it is unlikely for such tools to appear suddenly out of nowhere in Egypt, it is no wonder if they derived from the Lodian of the southern Levant and appeared first somewhere in Lower Egypt and then in the Fayum as early as the 6th millennium BC, and persisted for a long time.



Fig. 9. Flaked axe from Lower K Pit 87 (Cairo JE52299)

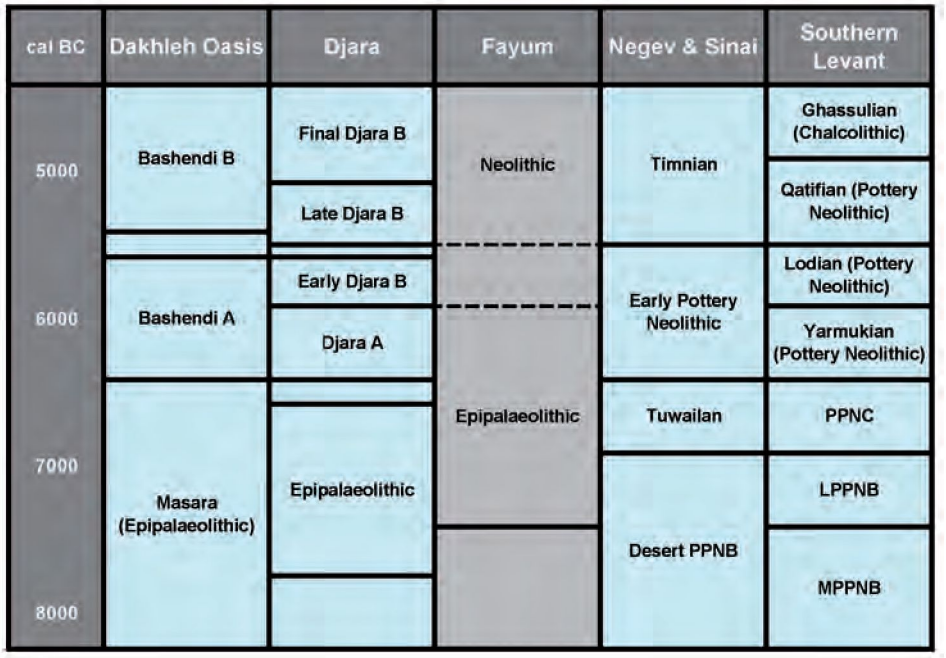
Discussions

It has been suggested that some tools in the Fayum might be put in the early 6th millennium BC, which had been asserted as a blank period between the Fayum Epipalaeolithic and Neolithic. It has also been demonstrated that farming-related tools in the Fayum Neolithic are similar to those of the Pottery Neolithic Lodian culture of the southern Levant that flourished in the early 6th millennium BC. Based on these things, new discussions are needed.

From a technological point of view, the first discussion is whether it is good to think that the Fayum Epipalaeolithic culture continued until around 6000 cal BC (*cf.* Shirai 2012). As described above, small bifacial arrowheads and large bifacial knives and daggers seem to have spread in the Egyptian Western Desert from around 6500 cal BC, and this is a great technological change and a hallmark of a new age, like the Bashendi A phase of Dakhleh Oasis and the Djara A phase of Djara. As Table 1 indicates, there is no consistency in chronological sequence between the Fayum and its neighbouring regions, and only the Fayum chronology looks very strange. Therefore, this Fayum chronology has to be reconsidered. The Fayum Epipalaeolithic should better end around 6500 cal BC at the latest, and a transitional period prior to the Neolithic needs to be inserted, especially if the original definition of the Fayum Neolithic by Caton-Thompson based on the type sites like Kom K and Kom W dated to the middle 5th millennium BC is kept unchanged.

The second discussion is whether the old assertion that the Fayum was deserted and abandoned around the end of the 7th millennium BC and later reoccupied by new comers with new technology is still acceptable. The lack of radiocarbon dates in a certain period in question is not necessarily the evidence for the de-

Table 1. Early-Middle Holocene chronology of Egypt and the southern Levant



population in the Fayum but may have been caused by the lack of data collecting at right sites. Even though geological data suggest that the lake level has been fluctuating and lowering, lithic evidence seems to suggest that the Fayum had never been deserted and abandoned but had been continuously occupied throughout the 7th-6th millennia BC.

If this was really the case, the third discussion is whether the Fayum Neolithic culture should be considered as a foreign culture brought by new comers. While the Fayum Neolithic culture had many tools in common with contemporaneous cultures of the Egyptian Western Desert, it was strongly influenced by the Pottery Neolithic Lodian culture, as exemplified by farming-related tools. However, the timing of the appearance of Lodian cultural influence and its long persistence in the Fayum despite its quick disappearance in the southern Levant and no more similarity in material culture between the Fayum and southern Levant thereafter suggest that the contact between them was minimum and very short-term, regardless of whether it was by human migration or by trade. On the other hand, as represented by elaborate concave-based arrowheads, the morphological development of some tool classes which are not directly related to farming activities

in the Fayum Neolithic is definitely autonomous, as comparable developments are known neither in the southern Levant nor in the Egyptian Western Desert. Therefore, the uniqueness of the Fayum Neolithic culture must be understood in terms of the persistence and diversification of tools rather than just the adoption of some foreign elements. Even though the human migration from the southern Levant to somewhere in Lower Egypt at the time of the diffusion of farming is not deniable, it seems that its demographic impact on the Fayum population was not great and that the Fayum Neolithic material culture was developed mostly by indigenous people.

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Hunter-Gatherers and Early
Food Producing Societies
in Northeastern Africa
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Combined Prehistoric Expedition Survey in the area of Fayum, Bahariya and Farafra Oases and Sinai

During 2010 spring season the Combined Prehistoric Expedition of the Institute of Archaeology and Ethnology, Polish Academy of Sciences carried out field prospection in the Northern Egypt in the area of three oases (Fayum, Bahariya and Farafra) as well as on Sinai Peninsula (Fig. 1). Main purpose of that research was to localize new research areas that could be of CPE scientific interest in future. The research team, directed by Jacek Kabaciński was composed of P. Bobrowski, A. Czekaj-Zastawny, M. Jórdeczka and H. Królik of the Institute of Archaeology and Ethnology Polish Academy of Sciences and M. Masojć of Institute of Archaeology, University of Wrocław.

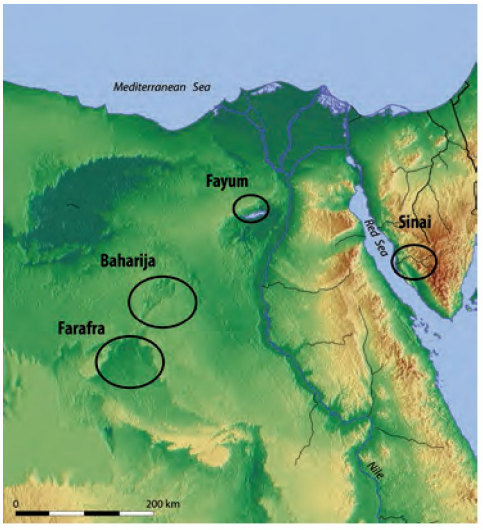

Fig. 1. Map of Egypt with areas surveyed by CPE in 2010 (map after wikipedia.org).

Altogether 46 archeological sites were discovered, of different age ranging from Middle Paleolithic to Neolithic. Every discovered site has its unique topographic (including GPS coordinates), and morphological description accompanied by set of photographs documenting its location and archaeological finds in situ.

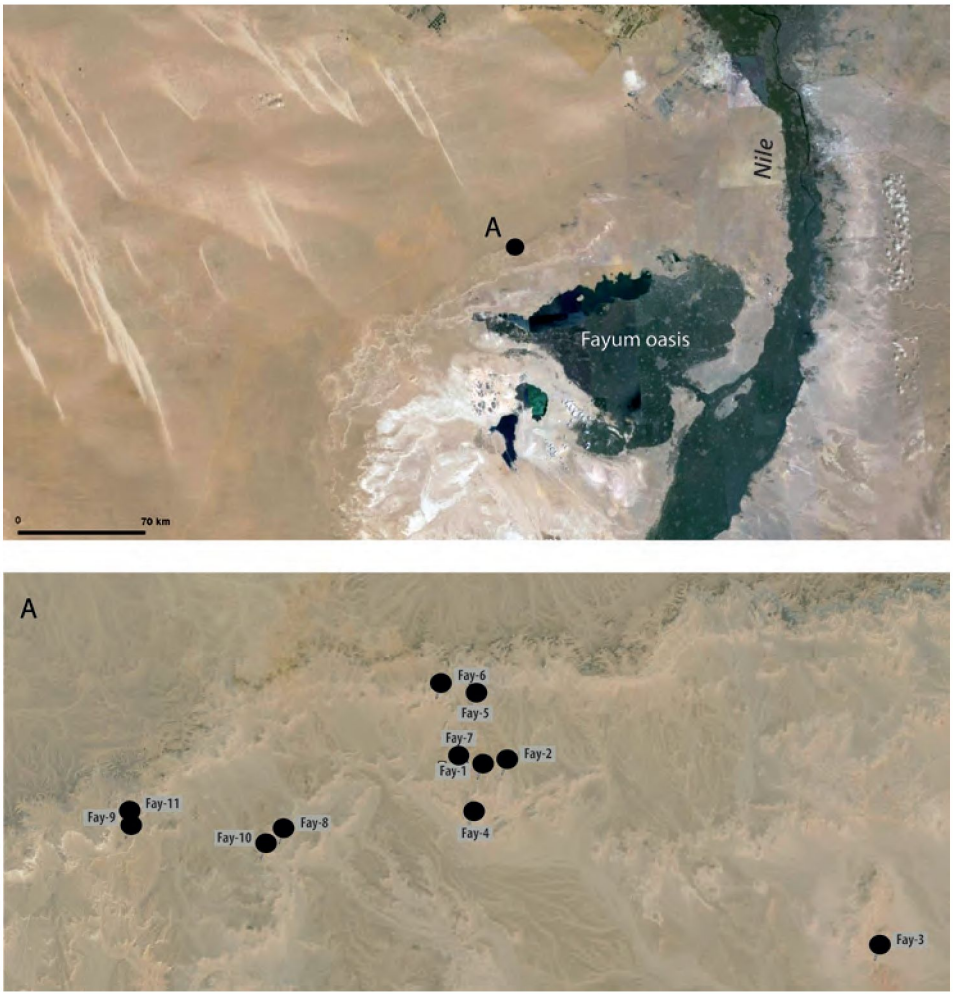

Fig. 2. Location of sites discovered in the Fayum oasis area (map after Google Maps 2010)

In the case of Fayum oasis, area located north of Qarun Lake between asphalt road from Giza to Bahariya oasis and second Miocene escarpment was searched (Fig. 2). Within that area 11 sites were recorded, spanned probably between Middle and Upper/Late Palaeolithic . On several sites artefacts related with Levallois technique or blade inventories were identified.

In Bahariya oasis area survey was performed south-west of the oasis, on the territory of Black Desert along the old track called "Old camel road" running toward Farafra oasis (Fig. 3). Here two concentrations of Middle Palaeolithic sites

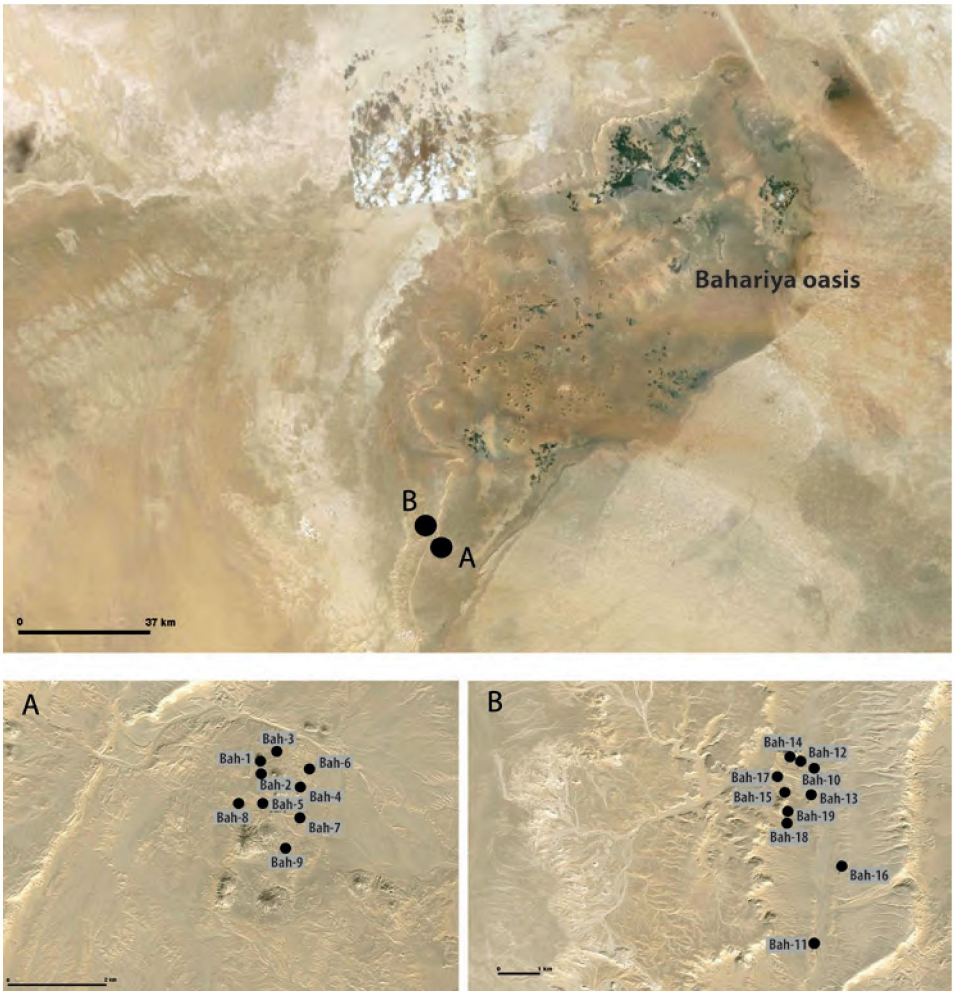

Fig. 3. Location of sites discovered in the Bahariya oasis area (map after Google Maps 2010)

with Levallois technique related finds were recorded accompanied by trace presence of younger settlements – of Upper and/or Late Palaeolithic affiliations. Altogether 19 sites occurred in that region.

Main areas of penetration in the case of Farafra oasis were located North-East, East and South-East of the oasis, in the region where numerous wells and natural water springs can be spotted. In majority that areas are heavily transformed by modern agriculture and surface observations are extremely difficult and non-effective. Very few traces of human settlement were also recorded on so called

White Desert (1 site). Only south-west of the oasis single rich site of workshop character, most probably related to Middle Palaeolithic (Levallois technique) was found, possibly associated with outcrops of hard sandstone and quartzite (Fig. 4).

At the beginning Sinai Peninsula (its middle part) was a main priority of our survey. Unfortunately, for different reasons our research, on limited scale, was concentrated in southern Sinai, in Tur area and Wadi Ferain (Fig. 5). Finally it appeared there is no access to that first region. In contrast, survey in Wadi Ferain brought into light a number of interesting and rich finds from Middle Palaeolithic to Late Neolithic. As a result 13 sites were recorded there.

Below we present a summarized description of every site recorded during the survey, according to research areas. Each site name has in front an abbreviation of a specific research area, site number after a dash and year of discovery preceded by a slash.

Fayum oasis

Fay-1/2010

GPS coordinates: N: 29° 36' 674"; E: 30° 27' 339"; H: 268 m a.s.l.

Site location: on a small plateau at the northern foot of a small gebel (Fig. 6).

Stratigraphy: stone materials were found on all the surface of a shelf (mostly in a secondary position) and within a small erosional wadi that cuts the plateau to the north (Fig. 7). Here numerous heavily fossilized animal bones were also recorded (Fig. 8), partially in situ, in several cm thick reddish soil (?) covered by 50-60 cm thick layer of calcified sands. On slopes of the gebel outcrops of chalcedony are visible.

Finds: Numerous cores and flakes of chalcedony including many cortex materials (Fig. 9). Cores are very simple, mostly single platform for flakes. One opposed-platform core for flakes was found. No traces of core preparation were recorded except of two cores where fragmentary crests on striking surfaces are visible. Several flakes were removed from discoidal cores. All debitage was removed by direct percussion with the help of hard hammer. Size of cores do not exceed 20 cm and blocks of chalcedony are not bigger than 30 cm in diameter. Except of a few denticulated flakes no retouched tools were present. Most probably that is a workshop located close to chalcedony outcrop.

Faunal remains discovered during the survey were a subject of subsequent geological expertize by prof. Romuald Schild and dr Bahay Issawi and it appeared that all that assemblage belongs to Miocene fauna abundant in Fayum area.

Chronology: Paleontological site (Miocene?) as far as bones it concerns. Archaeological finds related with Middle Palaeolithic?

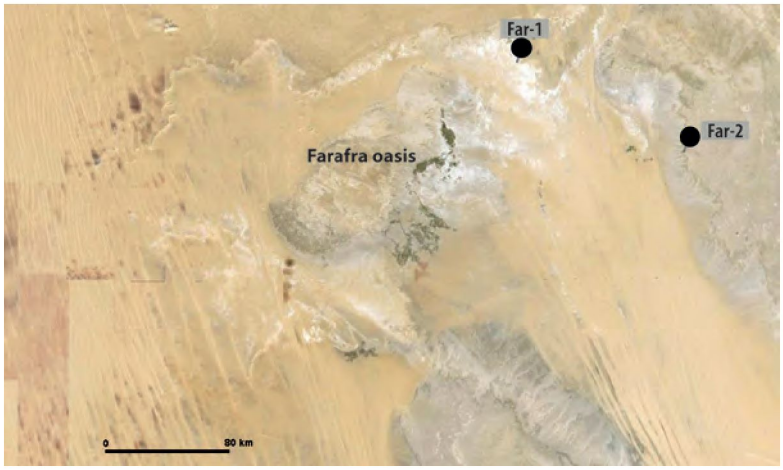

Fig. 4. Location of sites discovered in the Farafra oasis area (map after Google Maps 2010)



Fig. 5. Location of sites discovered in the southern Sinai Peninsula (map after Google Maps 2010)



Fig. 6. Fayum, site 1. Site location



Fig. 7. Fayum, site 1. Small wadi where animal bones are preserved *in situ*

Fay-2/2010

GPS coordinates: N 29° 36' 685"; E 30° 27' 462"; H= 267 m a.s.l.

Site location: on the remnant of a bedded sandstone inlier. Site surface is covered by a small chert pebbles and chalcedony concretions.

Finds: initial core and several flakes, all made of chert.

Chronology: ?



Fig. 8. Fayum, site 1. Fossilized bone



Fig. 9. Fayum, site 1. Examples of chalcedony cores

Fay-3/2010

GPS coordinates: N: 29° 35' 773"; E: 30° 29' 256"; H: 189 m a.s.l.

Site location: by south-eastern and southern foot of a pronounced large gebel, south of the first escarpment.

Stratigraphy: on a heavily eroded sand cover.

Finds: fossilized animal bones, including a rib, upper turtle plastron and reptile teeth. In the vicinity several eroded objects made of sandstone (including one resembling denticulated side-scraper) were found. Probably natural objects.

Chronology: Paleontological site (Miocene?) as far as bones it concerns.

Fay-4/2010

GPS coordinates: N 29° 36' 473"; E 30° 27' 279"; H= 263 m a.s.l.

Site location: north-west of site Fay-2/2010 on a eroded sandstone inlier.

Stratigraphy: that is a small chalcedony outcrop. Part of the material is placed in a secondary position.

Finds: several flakes made of chalcedony. Chalcedony nodules are small and mostly weathered.

Chronology: ?



Fig. 10. Fayum, site 5. Site location

Fay-5/2010

GPS coordinates: N: 29° 36' 978" ; E: 30° 27' 331"; H: 293 m a.s.l.

Site location: on a terrace shelf below the first (northernmost) escarpment (Fig. 10).

Stratigraphy: most probably a surface site with materials deposited on a heavily eroded terrace.

Finds: Numerous flakes and blades made of chert including overpassed blade from opposed platform core. Circular scraper on cortex flake. Single and opposed platform cores for blades (Fig. 11).

Chronology: Upper or (most probably) Late Palaeolithic.

Fay-6/2010

GPS coordinates: N 29° 37' 029"; E 30° 27' 163"; H= 308 m a.s.l.

Site location: below site Fay-5/2010, on a surface covered by numerous chert pebbles.

Finds: one opposed platform core for blades exploited with hard hammer direct percussion.

Chronology: ? (perhaps the same like site Fay-5/2010).



Fig. 11. Fayum, site 5. Examples of cores

Fay-7/2010

GPS coordinates: N: 29° 36' 723"; E: 30° 27' 223"; H: 252 m a.s.l.

Site location: ca. 300 m north-west of site Fay-1/2010. In the area of chalcedony outcrops.

Stratigraphy: on a surface of a heavily eroded hillocks, in the vicinity of gebel with chalcedony outcrop (site Fay-1/2010).

Finds: three flakes made of chalcedony including one from discoidal core. Removed with the help of hard hammer direct percussion.

Chronology: Middle Palaeolithic?

Fay-8/2010

GPS coordinates: N 29° 36' 455"; E 30° 26' 338"; H=264 m a.s.l.

Site location: within a small wadi.

Finds: nosed endscraper (or perforator) made of flat chert concretion. In a secondary position.

Chronology: ?

Fay-9/2010

GPS coordinates: N: 29° 36' 524"; E: 30° 25' 590" ; H: 269 m a.s.l.

Site location: on an eastern foot of a sandstone gebel (see site Fay-11/2010)

Stratigraphy: surface Finds, partially in secondary position ?

Finds: unfinished bifacial point, Levallois cores, flakes and blades, opposed platform core, single, heavily fossilized bones.

Chronology: Middle Palaeolithic, Upper Palaeolithic.

Fay-10/2010

GPS coordinates: N 29° 36' 397"; E30° 26' 242"; H= 264 m a.s.l.

Site location: on a flat top of a sandstone gebel (inlier).

Stratigraphy: Finds collected from a surface covered with numerous chert pebbles.

Finds: core for flakes with prepared back (crested), double platform core for flakes, single platform core for blades and flakes, initial flake core, several blades and flakes, tablet, endscraper on a blade and blade with use-retouch(Fig. 12).

Chronology: Upper/Late Palaeolithic.

Fay-11/2010

GPS coordinates: N 29° 36' 578"; E 30° 25' 590"; H= 287 m a.s.l.

Site location: on a top and slopes of a sandstone gebel. On the foot of that gebel site Fay-9/2010 is located.

Stratigraphy: Finds were recorded in a dusty, reddish-orange sands (perhaps remnants of a paleosoil).

Finds: two Levallois cores for flakes, several initial cores and unfinished side-scraper.

Chronology: Middle Palaeolithic

Bahariya oasis

Bah-1/2010

GPS coordinates: N: 27°55' 094"; E: 28° 33' 600" ; H: 174 m a.s.l.

Site location: within the concentration of gebels, between Bahariya-Farafra oases road and an escarpment west of that road. Site is situated on a pronounced hillock, in a saddle between last two gebels from the north.

Stratigraphy: on a heavily eroded surface of the hillock.



Fig. 12. Fayum, site 10. Debitage made of chert

Finds: several Levallois cores, 3 retouched Lavallois points, flakes, blades and retouched pieces. Inventory is made mostly of chert, sometimes of ferriferous sandstone. Heavily weathered.

Chronology: Middle Palaeolithic.

Bah-2/2010

GPS coordinates: N: 27° 55' 010"; E: 28° 33' 599"; H=173 m a.s.l.

Site location: on the eastern edge of a small wadi separating two groups of small gebels.

Stratigraphy: on a flat surface (ca 100 sq. meters) covered by chunks of a ferriferous sandstone

Finds: 5 flakes removed from single platform core and 2 cortex flakes, all made of a light brown chert. Heavily weathered.

Chronology: Middle Palaeolithic

Bah-3/2010

GPS coordinates: N: 27°55' 155"; E: 28° 33' 717"; H: 168 m a.s.l.

Site location: within the concentration of gebels, between Bahariya-Farafra oases road and an escarpment west of that road. At a low, southern terrace of a small wadi on the northern side (Fig. 13).

Stratigraphy: on a heavily eroded surface of the terrace.

Finds: very numerous Lavalloisian materials (cores, tools and debitage – Fig. 14) spread over few hectares. Most probably a large settlement – base camp. Lithics made mainly of chert, sometimes of a ferriferous sandstone.

Chronology: Middle Palaeolithic.

Bah-4/2010

GPS coordinates: N: 27° 54' 909"; E: 28° 33' 851"; H=170 m a.s.l.

Site location: eastern edge of a small wadi between two aggregations of gebels, on south-western side of the gebel and ca. 300 meters south of site Bah-2/2010.

Stratigraphy: Site seems to be completely deflated. Artefacts were dispersed on the area of *ca.* 100 sq. meters between scraps of a black ferriferous sandstone.

Finds: Sixteen flakes (including cortex, from single and multiple platform ones), flake end-scraper and flake with notch. All finds are made of chert and arte intensively polished by aeolian processes.

Chronology: Middle Palaeolithic.

Bah-5/2010

GPS coordinates: N: 27° 54' 823"; E: 28° 33' 591"; H: 171 m a.s.l.

Site location: within the concentration of gebels, between Bahariya-Farafra oases road and an escarpment west of that road, south of the most northern aggregation of gebels, on the low, southern terrace of a small wadi.

Stratigraphy: artefact were collected from a surface of a heavily eroded terrace.

Finds: one Levallois core and several flakes, all made of chert.

Chronology: Middle Palaeolithic.

Bah-6/2010

GPS coordinates: N: 27° 55' 019"; E: 28° 33' 927"; H=170 m a.s.l.

Site location: on eastern side of gebels aggregation, on southern edge of the wadi.

Stratigraphy: artefacts were concentrated within the area 20 x 20 m, on the surface of a terrace covered by scraps of a black ferriferous sandstone.

Finds: two Levallois cores, side burin on truncation, six flakes, including Levallois ones.

Chronology: Middle Palaeolithic.



Fig. 13. Bahariya, site 3. Site location



Fig. 14. Bahariya, site 3. Levallois materials

Bah-7/2010

GPS coordinates: N: 27° 54' 716"; E: 28° 33' 828" ; H: 162 m a.s.l.

Site location: within the concentration of gebels, between Bahariya-Farafra oases road and an escarpment west of that road. On eastern side of a central aggregation of gebels, on a low wadi terrace.

Stratigraphy: artefacts were collected from a heavily eroded surface of the terrace.

Finds: Levallois core, several flakes and blades including retouched forms (Fig. 15). Made mostly of chert.

Chronology: Middle Palaeolithic.

Bah-8/2010

GPS coordinates: N: 27° 54' 835"; E: 28° 33' 429"; H=163 m a.s.l.

Site location: at the foot of a gebel on south-western edge of the wadi.

Stratigraphy: artefacts were collected from an eroded sandy surface of *ca.* 100 sq. meters.

Finds: flake from single platform core, two unidentified flakes from quartzite sandstone, all weathered.

Chronology: ?

Bah-9/2010

GPS coordinates: N: 27° 54' 535"; E: 28° 33' 712"; H: 175 m a.s.l.

Site location: within the concentration of gebels, between Bahariya-Farafra oases road and an escarpment west of that road. South-eastern foot of central aggregation of gebels, on a low, northern terrace of a small wadi.

Stratigraphy: artefacts were collected from a heavily eroded surface of the terrace.

Finds: several Levallois flakes, single denticulated flake, all made of chert.

Chronology: Middle Palaeolithic.

Bah-10/2010

GPS coordinates: N: 27° 57' 248"; E: 28° 32' 951"; H=199 m a.s.l.

Site location: on a northern edge of a wadi that is cutting the foot of the gebel located between two tributaries of a large wadi.

Finds: four rounded stone constructions (Fig. 16) with an average diameter of ca. 80 cm (fire places ?) Above the constructions Levallois core, two cores for blades and two flakes were found.

Chronology: Middle Palaeolithic.



Fig. 15. Bahariya, site 7. Levallois materials



Fig. 16. Bahariya, site 10. Stone construction

Bah-11/2010

GPS coordinates: N: 27° 55' 831"; E: 28° 32' 742"; H: 203 m a.s.l.

Stratigraphy: artefacts were collected from a heavily eroded surface of the terrace.

Finds: numerous Levallois cores, flakes and blades, Levallois points, few side-scrapers, other retouched forms including denticulated ones (Fig. 17). All made of chert.

Chronology: Middle Palaeolithic.

Bah-12/2010

GPS coordinates: N: 27° 57' 311"; E: 28° 32' 786"; H=206 m a.s.l.

Site location: northern edge of a wadi oriented east-west. On a first terrace, ca. 9 meters north

Stratigraphy: finds are recorded on the surface of the terrace.

Finds: Workshop in the form of dense concentration of finds with a diameter of ca. 1.5 meters related to elaboration of fine quartzite sandstone (Fig. 18). Within a concentration ca. 100 flakes, 2 blades, 3 initial cores, pre-core ca. 25 cm long for blade production were encountered.

Chronology: Late Palaeolithic?

Bah-13/2010

GPS coordinates: N: 27° 57' 022"; E: 28° 32' 841"; H: 202 m a.s.l.

Site location: on a western edge of a large wadi oriented north-east, by a place where a smaller wadi is joining the large one from the west (Fig. 19).

Stratigraphy: finds are recorded on the surface of a heavily eroded terrace.

Finds: two kinds of material. First group comprises numerous Levalloisian artefacts, like Levallois cores (Fig. 20), points, side-scrapers blades and retouched flakes. Beside above finds clearly visible concentration of numerous slim blades removed from single platform cores with lisse buts (Fig. 21).

Chronology: Middle Palaeolithic, Upper or Late Palaeolithic.

Bah-14/2010

GPS coordinates: N: 27° 57' 356"; E: 28° 32' 705"; H= 205 m a.s.l.

Site location: on an island placed between two arms of a wadi, on a northern edge of wadi that runs from east to west. Site is located on the top of the hillock and probably is connected with the exploitation of raw material (sandstone).

Finds: large hand-axe and another unfinished made of a banded sandstone (Fig. 22), 1 flake, 1 single platform core for flakes. Artefacts are weathered.

Chronology: Middle Palaeolithic.



Fig. 17. Bahariya, site 11. Levallois materials



Fig. 18. Bahariya, site 12. Concentration of stone material



Fig. 19. Bahariya, site 13. Site location



Fig. 20. Bahariya, site 13. Levallois materials



Fig. 21. Bahariya, site 13. Blades made of chert

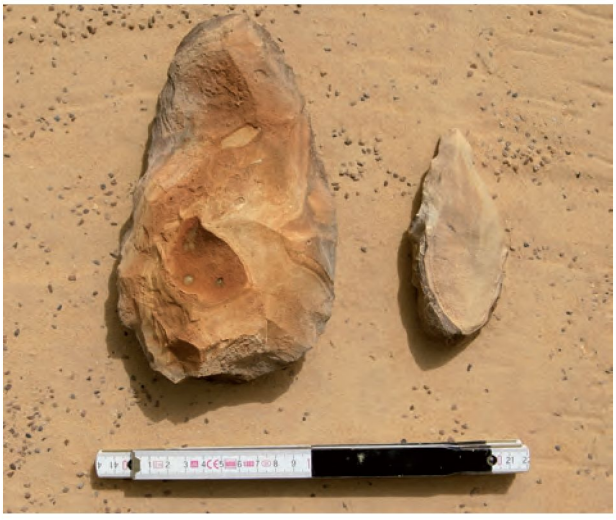

Fig. 22. Bahariya, site 14. Bifaces

Bah-15/2010

GPS coordinates: N: 27° 57' 060"; E: 28° 32' 639" ; H: 238 m a.s.l.

Site location: Sites Bah-15, Bah-17, Bah-18 and Bah-19 are located within a small basin surrounded by few gebels. Site Bah-15/2010 was found on a heavily eroded culmination of a most south-eastern gebel.

Stratigraphy: surface collection. Artefacts are relatively fresh suggesting that were exposed recently.

Finds: few dozen of artefacts made of chert, including Levallois cores, blades and flakes, single side-scrapers and retouched pieces.

Chronology: Middle Palaeolithic.

Bah-16/2010

GPS coordinates: N: 27° 56' 425"; E: 28° 33' 016"; H=203 m a.s.l.

Site location: on north-eastern edge of a large wadi.

Stratigraphy: finds discovered on a surface of a terrace segmented by a heavy erosion and covered by numerous chert pebbles and chunks of sandstone and chert.

Finds: single platform core and 5 flakes of chert. All polished by aeolian processes.

Chronology: ?

Bah-17/2010

GPS coordinates: N: 27° 57' 190"; E: 28° 32' 590" ; H: 208 m a.s.l.

Site location: sites Bah-15, Bah-17, Bah-18 and Bah-19 are located within a small basin surrounded by few gebels. Site Bah-17/2010 was found by the northern mouth of the basin on a low southern terrace of a wadi.

Stratigraphy: finds were recorded on a heavily eroded surface of the terrace.

Finds: few dozens of Levallois cores, flakes, blades and retouched tools. All made of chert.

Chronology: Middle Palaeolithic.

Bah-18/2010

GPS coordinates: N: 27° 56' 806" ; E: 28° 32' 627" ; H: 206 m a.s.l.

Site location: sites Bah-15, Bah-17, Bah-18 and Bah-19 are located within a small basin surrounded by few gebels. Site Bah-18/2010 was found by the southern mouth of the basin, on north-eastern edge of a wadi oriented north-west – south-east, that surrounds the basin from south-west and south.



Fig. 23. Bahariya, site 18. Biface

Stratigraphy: finds recorded on a heavily eroded surface of wadi's terrace.
Finds: Acheulian hand-axe, triangle in shape, heavily weathered (Fig. 23), Lavallois core and several Levallois flakes including some retouched forms.
Chronology: Middle Palaeolithic

Bah-19/2010

GPS coordinates: N: 27° 56' 902"; E: 28° 32' 642"; H: 199 m a.s.l.
Site location: sites Bah-15, Bah-17, Bah-18 and Bah-19 are located within a small basin surrounded by few gebels. Site Bah-18/2010 was recorded on a north-eastern terrace of a small wadi that cut the basin, close to its south-eastern mouth.
Stratigraphy: materials were located on a heavily eroded surface of the terrace.
Finds: several Lavallois flakes and blades made of a ferriferous sandstone.
Chronology: Middle Palaeolithic.

Farafra oasis

Far-1/2010

GPS coordinates: N: 27° 21' 379"; E: 28° 10' 228"; H: 120 m a.s.l.(?)
Site location: on a heavily eroded limestone plateau.
Stratigraphy: surface finds, in secondary position.
Finds: 1 core trimming flake, 1 piece of pottery.
Chronology: ?

Far-2/2010

GPS coordinates: N: 27° 04' 617"; E: 28° 42' 006"; H=149 m. a.s.l.
Site location: on a southern edge of a large wadi (wadi Karawein) running down from the escarpment.
Stratigraphy: finds discovered on the surface covered by weathered grey quartzite and quartzite sandstone (Fig. 24). Finds were found within the area of several hectares.
Finds: very rich site containing 2 cordiform bifaces (Fig. 25), side-scrapers, Levallois cores (Fig. 26) and flakes, single platform cores, hundreds of flakes, single blades.
Chronology: Middle and Upper/Late Palaeolithic.

Sinai Peninsula

Syn-1/2010

GPS coordinates: N: 28° 21' 766"; E: 33° 37' 598"; H: 56 m a.s.l.
Site location: within a large wadi oriented north-west – south-east.
Stratigraphy: on a surface of wadi deposits, in secondary position.
Finds: 1 end-scraper on flake, 1 flake, 1 cortex flake with denticulated retouch. All made of chert.
Chronology: ?

Syn-2/2010

GPS coordinates: N: 28° 45' 838"; E: 33° 21' 154"; H=191 m a.s.l.
Site location: on a northern edge of Wadi Ferian (*ca.* 20 meters from the very edge), on the southern slope of promontory formed in the place where small tributary joins Wadi Ferian.
Stratigraphy: on the surface covered by chert and quartzite chunks.
Finds: 2 blades and 7 flakes from different types of cores.
Chronology: ?



Fig. 24. Farafra, site 2. Site location



Fig. 25. Farafra, site 2. Biface

Syn-3/2010

GPS coordinates: N: 28° 45' 48.74"; E: 33° 21' 16.75"; H: 193,9 m a.s.l.

Site location: on a distinct promontory on the northern side of Wadi Ferian. Promontory was formed in the place where 2 small wadis join Wadi Ferian from the north.

Stratigraphy: archeological material was found on the surface of promontory.

Finds: Numerous finds made of brownish chert. Flake technology. Several cores with changed orientation for flakes exploited with a direct percussion of a hard hammer. No core preparation observed. Debitage composed mostly of flakes, blades are short and very rare. Few tools: 2 end-scrapers on flakes, 1 denticulated side-scraper. Lithics cover all the surface of promontory sometimes forming small concentrations. On a culmination of promontory a stone construction measuring 3,5 x 2,2 m and oriented north-south was recorded (Fig. 27). It is built of vertically embedded stones not larger than ca. 50 cm in diameter. Inside the construction 2 cores with changer orientation for flakes and several flakes were recorded.

Chronology: Upper Palaeolithic? Chronology of stone construction the same as lithics or younger.

Syn-4/2010

GPS coordinates: N: 28° 45' 604"; E: 33° 20' 825"; H=184 m a.s.l.

Site location: on southern slope of an inlier formed by Wadi Ferian and unnamed wadi being its right tributary.

Finds: single platform cores and cores with changed orientation for flakes, few flakes and retouched chunk. On the surface concentration of stones, ca. 1.6 x 2 m was recorded (fire-place ?; Fig. 28). Most probably site is connected with the extraction of chert.

Chronology: ?

Syn-5/2010

GPS coordinates: N: 28° 45' 48.36" ; E: 33° 21' 16.92" ; H: 163,4 m a.s.l.

Site location: on a culmination of a gebel located on the northern edge of Wadi Ferian; by the mouth of two wadis joining Wadi Ferian from the north.

Stratigraphy: surface collection.

Finds: several Levallois cores and flakes.

Chronology: Middle Palaeolithic.

Syn-6/2010

GPS coordinates: N: 28° 45' 615"; E: 33° 20' 804"; H=189 m a.s.l.

Site location: on the northern slope of a side wadi, a tributary of Wadi Ferian.



Fig. 26. Farafra, site 2. Levallois materials



Fig. 27. Sinai, site 3. Stone construction

Stratigraphy: finds were recorded in between natural chert pebbles covering the surface.
Finds: 5 single platform cores for flakes, initial core, several flakes and blades. All the material carry aeolian polish.
Chronology: ?

Syn-7/2010

GPS coordinates: N: 28° 47' 27.33"; E: 33° 29' 34.22"; H: 346,1 m a.s.l.
Site location: on a terrace shelf adjacent from the west to a very steep slope of a gebel, on northern side of a wadi that joins Wadi Ferian from the west (Fig. 29). In that very place the wadi is widen forming a kind of a basin by its mouth. On the southern side of that basin site Syn-8/2010 is located.
Stratigraphy: finds recorded on the surface of the terrace. That is a very large site having a chance for stratigraphic connection of surface deposits with wadi beds.
Finds: Almost all finds are made of a brownish chert. Inventory has a flake character with very rare blades. Single platform, opposed platform and cores with changed orientation for flakes are present. Traces of core preparation are visible: single primary and secondary crests and lisse platforms. Within tool group very characteristic large end-scrapers and side-scrapers made of flat cortex flakes are present (Fig. 30; some of them probably served as knifes) as well as high denticulated end-scrapers, denticulated flakes, massive picks with well distinguished tip (Fig. 31), Zinken-like perforator, 2 backed pieces, backed piece with second edge retouched, massive triangle. A fragment of an animal long bone was also found in between the stone artefacts.
Chronology: Neolithic, perhaps also traces of Late Palaeolithic occupation.

Syn-8/2010

GPS coordinates: N: 28° 47' 508"; E: 33° 29' 660"; H=362 m a.s.l.
Site location: eastern edge of a small wadi that joins Wadi Ferian from the south, on a slightly inclined gravel terrace having bay-like shape surrounded by high gebels from north, east and south (Fig. 32).
Finds: On the terrace few concentrations of stones are visible, probably fireplaces and around them numerous lithic materials including half-products of core- or flake axes, rare flake and blade end-scrapers, knife-like forms made of flakes or flat raw chert concretions, side-scrapers, retouched and denticulated flakes, triangular points with basal retouch, leaf-point, partially bifacial, perforators, flakes and blades (Fig. 33-34).
Chronology: Neolithic.



Fig. 28. Sinai, site 4. Stone construction



Fig. 29. Sinai, site 7. Site location



Fig. 30. Sinai, site 7. End-scrapers



Fig. 31. Sinai, site 7. Picks and perforators



Fig. 32. Sinai, site 8. Site location



Fig. 33. Sinai, site 8. Choice of tools

Syn-9/2010

GPS coordinates: N: 28° 42' 081"; E: 33° 54' 051"; H: 1110 m a.s.l.

Site location: within a wadi that joins Wadi Ferian from the south.

Stratigraphy: finds were found on the western side of a wadi, close to the exposure of consolidated sands - Pleistocene sediments that are observed in Wadi Ferian.

Finds: circular stone construction with a low entrance, built of pebbles and fragments of sandstone slabs. Vertical surface of consolidated Pleistocene sands served as a back wall. Diameter of the construction is ca. 4 m, width of the corridor entrance – ca. 80 cm (Fig. 35).

Chronology: ?

Syn-10/2010

GPS coordinates: N 28° 47' 495"; E: 33° 29' 724"; H=368 m a.s.l.

Site location: on a top of a gebel near the northern side of Wadi Ferian.

Finds: single mound circulated by a row of stones, robbed. Around the mound rare chert flakes are dispersed.

Chronology: ?

Syn-11/2010

GPS coordinates: N: 28° 41' 123"; E: 33° 58' 914"; H: 1278 m a.s.l.

Site location: on a northern slope of a small gebel, on northern edge of Wadi Ferian.

Stratigraphy: surface collection.

Finds: 1 flake and one side-scraper of quartz.

Chronology: ?

Syn-12/2010

GPS coordinates: N: 28° 42' 086"; E: 33° 54' 002"; H=1121 m a.s.l.

Site location: on the edge of the southern tributary of Wadi Ferian. On a top of a hillock built of consolidated sands and gravels.

Finds: concentration of stones, ca. 1,3 m in diameter. Large granite chunks marked the outline of the construction while smaller stones were put inside. Smaller stones can be also traced in some distance from the construction (Fig. 36). Function of feature is unknown – perhaps destroyed stone mound.

Chronology: ?



Fig. 34. Sinai, site 8. Choice of tools



Fig. 35. Sinai, site 9. Stone construction



Fig. 36. Sinai, site 12. Stone construction



Fig. 37. Sinai, site 13. Grave chamber?



Fig. 38. Sinai, site 13. Core for blades

Syn-13/2010

GPS coordinates: N: 28° 47' 358"; E: 33° 29' 808"; H= 362 m a.s.l.

Site location: western edge of a small wadi that joins Wadi Ferian from the south.

Finds: Artefacts were deposited on a flat elongated hillock covered by numerous chert and sandstone pebbles. Most probably that is an outcrop of raw material. In the middle part of the hillock culmination several destroyed mounds were placed (robbed grave chambers with stone construction are visible – Fig. 37). Very rich chert material: single platform cores for blades and flakes, initial cores, Lavallois core, denticulated side-scrapers, end-scraper on blade, cleaver, retouched flakes and retouched natural pieces of chert, flakes and blades, crested blades (Fig. 38).

Chronology: Late Palaeolithic?/ Neolithic (perhaps related with site Syn-8/2010).

Hunter-Gatherers and Early
Food Producing Societies
in Northeastern Africa
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Mary M. A. McDonald

Sedentism and the advent of food production in and around Dakhleh Oasis in the Western Desert of Egypt: a distinctively African phenomenon

Introduction

Melinda Zeder (2008), reviewing evidence concerning the emergence of the Neolithic way of life in the Near East and its spread across the Mediterranean Basin, characterizes North Africa as essentially *terra incognita* in this regard. The area's obscurity in this matter may not, as Zeder suggests, simply be a question of insufficient research into the question. Arguably, the region never experienced a Levantine-style Neolithic Revolution. Instead, Northeast Africa, beyond the Nile Valley and away from the coast, seems to have followed what Marshall and Weissbrod (2011: S408) call a "distinctive African pathway toward food production":

> "Animals were domesticated before plants, herding populations became more mobile than their forager ancestors, the subsistence system was characterized by a few morphologically wild domesticates (e.g. the donkey), a wide range of wild resources in ecodiverse combinations continued in use, and mosaics of hunter-gatherers and herders occupied varied regions. Pastoralism developed early in the arid topics, whereas the beginning of farming based on domesticated plants was late."

To explore the degree to which the area conforms to an African pattern of neolithisation, this paper will focus on the evidence from the great oases of the Central Western Desert of Egypt (Fig. 1). Over 30 years of fieldwork on the early to mid-Holocene archaeology has revealed a rich record concerning the origins and development of food producing cultures in Dakhleh Oasis and neighbouring areas (McDon-

ald 1999). Arguably, the most remarkable feature of the archaeological record for this period in Dakhleh Oasis – and the same pertains to the other area I have been working, the Plateau edge and Escarpment face above Kharga Oasis (McDonald *et al.* 2006) – is the degree of sedentism found in both the early and mid-Holocene, evidenced by the presence of clusters of slab structures (McDonald 1991; 2003; 2009).

When studies on the advent of food production began in earnest after World War II, initially in the Near East, sedentism was considered one of a bundle of traits that also included plant and animal domestication, pottery and ground stone, a 'Neolithic Package' that emerged roughly simultaneously. The assumption was that settled life could not have developed without the secure resource base provided by domestic foods, and conversely, that one had to settle to protect the growing crops, and to store and utilize the bulky harvest (Hitchcock 1982; Marshall 2006). In that sense, the Iraqi site of Jarmo, excavated in the 1950s by a pioneer of Neolithic studies, R. J. Braidwood, was the ideal Neolithic site, with good solid mud-walled architecture, both plant and animal domesticates, and with pottery and ground stone (Braidwood and Howe 1960; Braidwood 1967). Now, even in the Near East, the notion of a Neolithic Package is badly eroded, with evidence for sedentism appearing long before the advent of food production. The Natufians of the Levant, late Epipalaeolithic complex foragers, appear to have been fairly settled on sites featuring stone-built structures, burials, heavy grinding equipment and so on (Bar-Yosef 1998; Goring-Morris and Belfer-Cohen 2003). Furthermore, in the subsequent Pre-Pottery Neolithic A (PPNA), with emerging evidence of sites with elaborate ritual or special-purpose buildings, groups seem to have been still largely reliant on wild foods (Finlayson et al. 2011; Schmidt 2012).

In Dakhleh Oasis, it is not just a question of increased sedentism appearing long before the advent of food production in the area. Ironically, for the first cultural unit for which we have solid evidence of food production, *Bashendi B*, groups abandon the settled life to become mobile herder-foragers. In the balance of this paper, I will briefly review the archaeological record for early to mid-Holocene Dakhleh, and to some extent for Kharga Oasis, highlighting the changing relationship between sedentism and mode of subsistence, whether based on wild or produced foods.

The early to mid-Holocene record for Dakhleh and Kharga Oases

Three cultural units have been defined within the Dakhleh early to mid-Holocene record: the *Masara* or Epipalaeolithic, dated ca. 8300-6500 cal BC, the 'Neolithic' *Bashendi*, subdivided into Bashendi A (ca. 6400-5650 cal BC), and Bashendi B (5400-3800 cal BC), and the *Sheikh Muftah*, which may have spanned over 1500 years, extending into Old Kingdom times ca. 2200 cal BC.

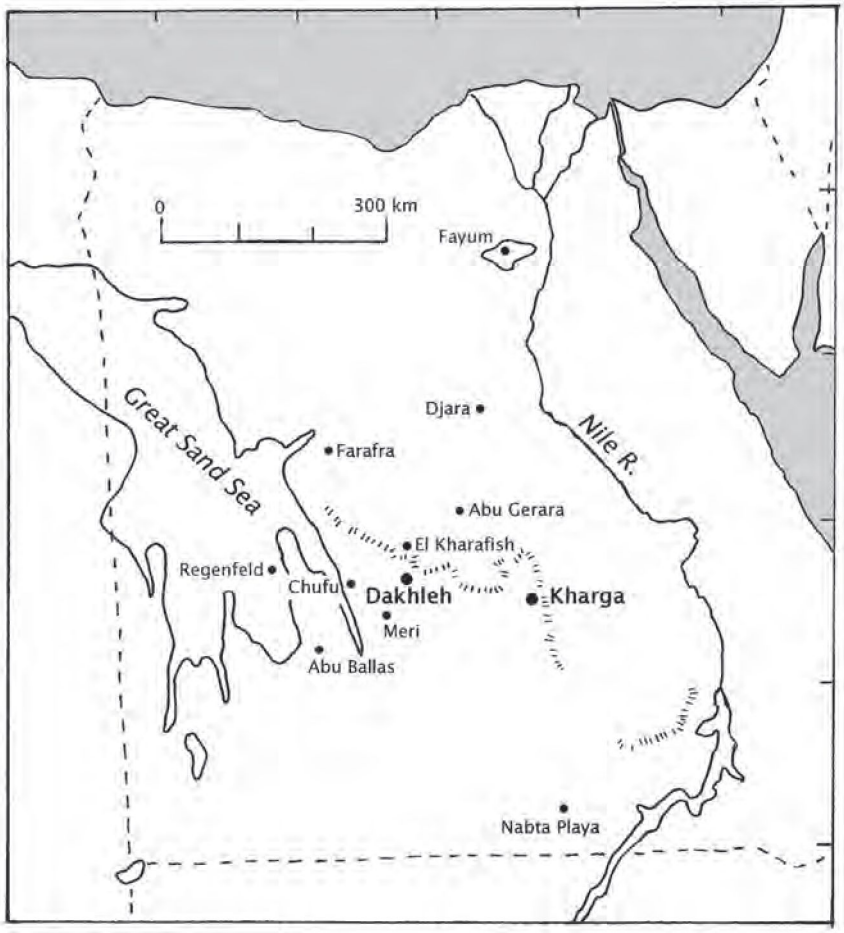

Fig. 1. Map of Egypt with main sites mentioned in the text

The early Holocene Masara

The Masara Unit is divisible into two main groups, A and C, on the basis of both artefact inventory and site type, *Masara C* (ca. 8050-7500 cal BC) being the more sedentary (McDonald 2003). Masara C sites are largely confined to a spot in southeastern Dakhleh, well beyond the extant oasis. Most of the 20 recorded localities consist of clusters of apparent structures, with the largest boasting up to 20 units. Masara C structures are rings of stone, typically round or oval, a few crescent-shaped, generally two to four meters in diameter, and often semisubterranean. Surface remains usually consist of a single tier of vertical sandstone slabs, which can stand three to four slabs thick in places. Various lines of evidence, the structures themselves, the expedient use of local lithic raw materials, a diverse and specialized lithic toolkit, and evidence for a number of other activities, all suggest a somewhat sedentary population (McDonald 1991). Heavy grinding equipment is present, including both slabs and handstones, but no pottery has been found.

There is no evidence of food production at these sites. They appear rather to be the base camps of 'collector' groups (Binford 1980; 1990) focusing on a broad spectrum of local resources. Faunal remains (Churcher *et al.* 2008) range from hartebeest, gazelle and hare, to ostrich and smaller (wading?) birds, to tortoise, lizard and toad. In the case of ostrich, they were feasting on both the bird itself and the eggs. Palaeobotanical remains (Thanheiser 2011) consist of both charcoal and plant macrofossils. From the charcoal, thirteen species of trees and shrubs were identified, including six that could be classified as southern or Sahelian elements. Macrofossils are from plants that grow in marshy areas, others such as sedges that grow abundantly after rains, and small-seeded legumes. Grasses are relatively unimportant, and there is no evidence for the use of tubers.

The faunal and palaeobotanical evidence suggesting a fairly wet environment in SE Dakhleh Oasis stands in sharp contrast to that from the rest of the Western Desert, which seems to have been in the grip of a sharp dry episode ca. 7900-7600 cal BC (Hassan 1996; 2002: fig. 2; Wendorf *et al.* 2001: 649). It would appear therefore that Masara C groups were pushed into settling in what may have been a small well-watered refuge within an otherwise suddenly reconstituted desert (McDonald 2009). Whatever the cause of the increased sedentism on the Masara C ridge, the area seems to have continued to attract settlers for over a millennium, long after conditions improved and campsites were again widely dispersed across the desert (McDonald 2007).

In Kharga, high above the oasis floor in the Midauwara embayment under the rim of the Libyan Plateau, there seems to have been a similar episode of increased

sedentization roughly contemporary with Masada C. Site MD-43, for instance, boasted about 20 slab structures, and a lithic toolkit very similar to that of Masada C (McDonald 2009). It is interesting to note that Masara C-like assemblages have been recorded on the oasis floor in Southern Kharga, but on what appear to be open-air sites without slab structures (Briois and Midant-Reynes 2010, 46). For the sites in Midauwara, we have as yet no organic remains to inform on subsistence.

The Late Bashendi A Unit

In Dakhleh Oasis, the next major episode of increased sedentism is associated with the Late Bashendi A in the mid-Holocene, ca. 6000-5650 cal BC. Occupation is again in the same area of SE Dakhleh, but conditions seem considerably more humid, with perhaps a bimodal (winter-summer) rainfall pattern (Goodfriend 1991; Neumann 1993; Arz *et al.* 2003). The number, variety and size of at least some sites increased dramatically. The largest, in fact the largest site recorded anywhere in NE Africa for this time, is Loc. 270, with 200 slab structures. Structures come in a variety of shapes and sizes, and appear to form clusters, perhaps reflecting social groupings (McDonald 2008). Excavation suggests a somewhat complex life history for the site, with individual structures abandoned and reoccupied, and activity areas shifting over the life of the site which, according to a suite of radiocarbon dates, could have spanned 900 years. Other sites with structures in the vicinity of 270 include a pair of much smaller, probable special purpose sites, Locs 306 and 307, and Loc. 269, a large stone ring measuring 48 x 35m. Grinding equipment, both slabs and handstones, is common on these sites. Pottery, in the form of a few small, thin-walled vessels, is present throughout the Bashendi A phase.

Organic remains recovered so far from Bashendi A suggest an intensive focus on strictly wild resources. Faunal remains are of game animals such as gazelle, a large bovid, a small carnivore, and three sizes of bird including ostrich (Churcher et al. 2008). As for plant food, the dicots and sedges that dominated Masara C samples are still present, but grasses are now the dominant group, with wild sorghum and several millets prominent in the assemblage. The macroremains also include a wide range of other food and medicinal plants, plus others that could be used as animal feed, fuel, or as raw material for technical purposes (Thanheiser 2011).

Despite the lack of evidence in the faunal collection, it seems likely that herding was practised in the Late Bashendi A. Domesticates, both cattle and sheep/goat, were by now present elsewhere in the Western Desert – at Nabta Playa, at Djara to the NE of Dakhleh, and at Farafra Oasis (Wendorf *et al.* 2001; Barich and Lucarini 2008; Kindermann 2010). The site layout at Loc. 270, and the presence in Late Bash-

endi A toolkits of implements elsewhere associated with pastoral groups, items such as scrapers on side blow flakes and of tranchets or planes, argue for the presence of herds or flocks (McDonald 2009). Loc. 269, the large stone ring, could have served as an animal kraal, although other functions are also possible.

In Kharga Oasis on the Escarpment face, there are mid-Holocene settlement sites that seem roughly contemporaneous with the Late Bashendi A. At Midauwara, site MD-18 consists of about 80 structures, most of them of mid-Holocene age (McDonald 2009). Loc. MD-24 is a much smaller site consisting of about 10 structures. Both yield Late Bashendi A-like artefact assemblages. Again though, as with the early Holocene sites, we have no information on subsistence.

The two large oases of the Central Western Desert seem unique in the area, in their possession in both the early and mid-Holocene of sites consisting of groups of slab structures. In Nabta Playa to the south, by the mid-Holocene, in the El Nabta/Al Jerar phase (ca. 7000-6200 cal BC), there are large sites like E-75-6 that are occupied for most of the year. They feature wells and bell-shaped storage pits, but the 'huts' are oval basins up to 30cm deep with a superstructure probably built of sticks. In the subsequent El Ghanam phase, roughly contemporary with Late Bashendi A, the few recorded sites consist mostly of large hearths, storage pits and wells. Slab structure sites do appear by Late Bashendi A times further north in the desert, around Abu Ballas to the southwest of Dakhleh (Kuper 1993) and at Meri to the west of the oasis (Riemer 2006). In the Farafra Depression to the northwest, two 'villages' have been investigated, one in Hidden Valley, with at least 10 slab structures, the other in the Sheikh el-Obeiyid area, with 25 structures (Barich and Lucarini 2008; Hamdan and Lucarini 2013). These sites were occupied, starting about 5650 cal BC, by people exploiting wild animals and plants, notably sorghum, and herding sheep and goats.

The Bashendi B Unit

In Dakhleh Oasis, it is only with Bashendi B that there is unambiguous faunal evidence for herding. From pits in Loc. 271, for instance, there are the remains of cattle and goat (McDonald 1998; Churcher et al. 2008). Botanical remains do not preserve well, but the presence of grinding slabs and handstones probably attest to the ongoing use of wild cereals. Wild animals, such as hartebeest and gazelle, continue to be hunted. Kuper and Kröpelin (2006) characterize this adaptation as 'multi-resource pastoralism'.

Bashendi B follows Bashendi A after at most a short gap, but the settlement pattern changes dramatically: Bashendi B groups appear to be mobile herder-

foragers practising transhumance (McDonald 1998; 2002). The slab-built settlement sites are abandoned. Localities now are typically open-air sites consisting of clusters of hearth mounds and associated cultural debris. Many occupy the same Southeast Basin as Bashendi A sites, but they occur upslope, above the level of the playa silts, around the edge of the basin. Elsewhere in Dakhleh, sites have been recorded within the Central Lowlands, and atop the Plateau to the north. Beyond the oasis itself, Bashendi B groups, identifiable by their Dakhleh-made pottery and chipped stone assemblages, ranged during the rainy season onto the Abu Gerara portion of the Abu Muhariq Plateau to the northeast of the oasis (Riemer 2010, 597), and as far as 100 km to the southwest, to such sites as Meri and Chufu (Riemer 2006). Elsewhere in the Western Desert, Bashendi B-like groups have been recorded in Farafra Oasis, within the Hidden Valley, el-Bahr and Wadi el-Obeiyid areas (Barich and Lucarini 2008; Barich et al. 2012). In Nabta Playa to the south, similar mobile herder groups date to the Late and Final Neolithic phases (Wendorf et al. 2001). Distant from any oasis, the core area of the desert, lacking any permanent surface water, remained the domain of pure hunter-gatherers (Riemer 2009). Sites at Regenfeld in the Great Sand Sea and others around Abu Ballas were occupied seasonally by groups hunting such dry-adapted species as gazelle, hare and addax, and grinding the seeds of wild plants. By 5300-4900 cal BC, these areas were completely abandoned due to dryness.

The dramatic shift in settlement patterns at the start of the Bashendi B is probably in part climate-related. It coincides with the increasing aridification that brought an end to the mid-Holocene humid period in the Eastern Sahara (Kuper and Kröpelin 2006).

The Sheikh Muftah Unit

Bashendi B is succeeded by the Sheikh Muftah Cultural Unit at perhaps 3800 cal BC (McDonald *et al.* 2001; McDonald 2002). Probably in response to continued aridification, the Sheikh Muftah seems more oasis-oriented, with sites located down slope from most Bashendi localities, often close to the margins of modern cultivation. Others are found on the slopes of spring mounds in the heart of the Central Lowlands (McDonald 1999, 124, fig. 7.3). But while sites are littered with heavy implements fashioned in tabular chert, and with more pottery than before, groups do not seem sedentary. The 70+ sites feature hearth mounds and fire pits, but virtually no structures. Moreover, they are not strictly confined to the oasis. The ACACIA group have recorded a number of Sheikh Muftah sites in their surveys to the north and west of Dakhleh (Riemer 2011). El Kharafish 02/5 is located

atop the Plateau some 30 km north of Dakhleh in what seems to have been, early in the third millennium BC, an unusually well-watered microenvironment. Site 02/5, its surface littered with artefacts, served repeatedly at the end of the winter rainy season as a base camp for a herder group coming from Dakhleh. There are also much smaller, probable short-term herder camps, located up to 100 km from the oasis. Even further afield, the occasional cache of Clayton rings made from Sheikh Muftah sherds may represent way stations for trans-desert travel.

The Sheikh Muftah people of Dakhleh were primarily pastoralists, keeping cattle and goats. The cattle, to judge from the maturity of most specimens, were exploited for milk and perhaps blood and/or transport, as well as meat. Wild ass or donkey bones were recovered from a number of sites, and the animal appears to have been domesticated by late Sheikh Muftah times (Churcher and Kleindienst 2006; Churcher *et al.* 2008). Hunting continued, with prey including gazelle, hartebeest, Cape buffalo, zebra, pig and hare (Churcher *et al.* 2008). Little is known about the exploitation of plants for food. At the El Kharafish base camp, hunters of gazelle and migratory birds supplied the meat, while the flocks, grazing on fresh spring pastures, were exploited for their milk (Riemer 2011).

The Sheikh Muftah unit persisted in Dakhleh to overlap with colonists who arrived from the Nile Valley in Old Kingdom times, ca. 2200 BC.

Discussion

In summary, groups in the large oases of the Central Western Desert of Egypt appear to follow a distinctive African pathway toward food production. In Dakhleh Oasis and on the higher land above Kharga Oasis, there is a long-standing tradition, starting in the early Holocene, of increased sedentism by groups intensively exploiting localized, apparently rich, wild resources. In the early Holocene, Masara C hunter-gatherers appear to have been pushed into settling in a small, well-watered refuge within a desert otherwise in the grip of a sharp dry episode. Their mid-Holocene counterparts, the Late Bashendi A, settled fairly densely in much the same locations in both oases, but under considerably more humid conditions. They harvested and perhaps cultivated rich wild stands of sorghum and millets, and hunted gazelle and a range of other animals. It is likely that they also kept herds and flocks. By this time, sites with slab structures are recorded elsewhere in the Western Desert, including the substantial 'villages' of forager-herders in Farafra Oasis. In Dakhleh, the first unambiguous faunal evidence for the herding of cattle and goats comes from sites of Bashendi B groups who, facing the aridification that ended the mid-Holocene humid period, abandoned the

settled sites of Southeastern Dakhleh. Bashendi B camps are scattered across the oasis and beyond it in the Abu Gerara region to the northeast and the Chufu area to the west, where they spent the rainy season. Meanwhile, in the dry core of the desert, the old hunter-gatherer pattern continued. The succeeding Sheikh Muftah, in response to ongoing aridification, set up their campsites down slope towards the centre of the oasis. However, when conditions allowed, they still practised transhumance, camping atop the Limestone Plateau at El Kharafish. Throughout the mid-Holocene part of the sequence, a variety of wild foods still constituted an important element of the subsistence system.

The Neolithic of Northeastern Africa was, to some extent, an import from the Levant. Most of the animals, sheep, goat, and probably cattle, arrived already domesticated. However, the Near Eastern crop complex, wheat, barley, pulses, and flax, penetrated no further than the Nile Valley and Fayum Oasis[1] They are cool-season crops (Harlan 1992), adapted to the winter rainfall (and winter sunlight) regime of the Near East, and a similar growing season in the Nile Valley. In the desert, at sites like Bashendi A Locality 270, people were intensively harvesting wild sorghum and millets, plants adapted to the African summer monsoon rainfall pattern. These plants continued to be exploited as Bashendi B-like pastoralists spread west across the Sahara, and then southward into the Sahel and beyond in the face of continued aridification. Only there would the first African domestic crop, pearl millet, appear by ca. 2000 cal BC, at such sites as Dhar Tichitt in Mauritania and Birimi in Ghana (Neumann 2005).

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[1] A few grains of emmer wheat, which may have been imported from the Nile Valley, were recovered at Site KS043, dated 4800-4200 cal BC, in the southern part of Kharga Oasis (Briois et al. 2012).

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Michał Kobusiewicz, Ewa Kuciewicz

Last Research of Petroglyph Unit in Dakhleh Oasis. Western Desert of Egypt

The Dakhleh Oasis is the fourth of a series of oases running from the north to the south in the Egyptian Western Desert (Fig. 1). Rock art has been most thoroughly examined in the Dakhleh and the Kharga oasis, located southwest of Dakhleh, owing to the presence of a number of sandstone remnants flat surfaces thereof ideal for engravings. In this paper we shall briefly present the results of thus far undertaken research into the extremely rich rock art of Dakhleh, a vast oasis, 80 km long and up to 20 km wide, stretching from the west to the east and particularly rich in sandstone remnants and cliffs in its eastern and central parts.

The first to investigate rock art in Egypt, including that in Dakhleh, was a German scholar Hans Winkler, who worked there in the late 1930s. He discovered and published a number of engravings, mostly from the eastern part of the oasis (Winkler 1939). Forty years later, in 1985, the research was undertaken by a Polish scholar Lech Krzyżaniak, a head of a group called The Petroglyph Unit working within The Dakhleh Oasis Project. Despite his untimely death, the group has continued the investigation.

Petroglyphs were carved into the surfaces of the above mentioned soft sandstone rocks (Fig. 2), which was easy to engrave with hard, probably flint implements. Petroglyphs were produced using a variety of techniques, particularly differentiated during the oldest, prehistoric period. Figures were outlined with lines of varying depth and width and were sometimes marked with pecking (*piquetage*), and filled with abrasion or pecking, in contrast to linear engraving techniques of later times, when figures or signs were more preferably marked with a continuous line.



Fig. 1. Location of Dakhleh Oasis

Rites were created by people that inhabited the oasis from the Neolithic to almost modern times. Four periods can be roughly discerned here, namely prehistoric, Pharaonic, Christian and Islamic. Dirk Huyge (2009) believes that even earlier, epi-Paleolithic art dated to c. 7000-5500BC should be present in the oases of the Western Desert, albeit it has not been evidenced thus far.

The richest, yet most difficult to interpret prehistoric art, is represented by hundreds of images, both individual and organised in scenes of multiple motifs. More precise chronology of the petroglyphs is difficult to determine, since at-



Fig. 2. Dakhleh Oasis. Example of sandstone panel covered by engravings (fot. M. Kobusiewicz)



Fig. 3. Dakhleh Oasis. Representation of people (fot. E. Kuciewicz)



Fig. 4. Dakhleh Oasis. Representation of wild animal – gazelle (fot. M. Kobusiewicz)

tempts at dating on the basis of the patina produced disappointing results. On the basis of the degree of patination, sometimes of the stratigraphy of representations or the presence of archaeological sites of the Bashendi culture and afterwards Sheikh Muftah culture in the vicinity (McDonald 1999; Krzyżaniak 1990) prehistoric art can be allegedly dated to the period from the sixth to the early third millennium BC.

This period is characterised by representations of human figures (Fig. 3) from realistic to greatly simplified. A number of animals such as giraffes, oryx, gazelles (Fig. 4), ostriches and probably domesticated animals i.e. cattle or dogs are abundant, while elephants, rabbits, lions and zebras are noticeably less common (Polkowski *et al.* 2013). They represent fauna typical of the humid Holocene period before the desertification of Eastern Sahara. Noteworthy is a complete lack of giraffe bones among the remains of fauna from archaeological sites of all periods registered at Dakhleh (Churcher 1999), albeit this does not eliminate the possibility of the animal presence. We shall discuss the giraffe-related issues below.

The analysis of the prehistoric images, briefly sketched above, produced two interesting ideas, comprehensible for the then people, yet largely mysterious to us. The first is a recurrent motif of female figures pictured either in a realistic manner with details of outfit, hairstyle, items of personal adornment and tattoos (Fig. 5) or very schematically (Fig. 6) (Polkowski *et al.* 2013). A common feature of all representations, be it realistic or schematic, is the negligence in depicting the upper part of the body, whilst the lower part - the hips and buttocks – are unnaturally heavily accented. At the same time breast, arms and legs are typically merely marked. These images are registered as single, in pairs or in groups.



Fig. 5. Dakhleh Oasis. Realistic images of females (fot. E. Kuciewicz)



Fig. 6. Dakhleh Oasis. Schematic images of females (fot. E. Kuciewicz)

The hypothesis of the cult of fertility witnessed herein seems well-grounded (Winkler 1939; Krzyżaniak 1990) as indicated by females' bulging bellies often suggestive of pregnancy as well as overly large, steatopygic-like buttocks, an indicator and a symbol of abundance and prosperity for the south African Bushmen. Oversimplification of the representations to the extent that a human figure is almost indiscernible is a testimony to their symbolic significance. Nonetheless, these shapes were probably immediately understandable for the then people and the message they carried was clear and obvious.

Representations of females are frequently found in particularly prominent locations, such as vertical panels perched on remnants easily visible from the distance. They are also registered on flat boulders lying horizontally on tops of steep sandstone remnants facing the sky (Fig. 7). More often than not such a hill is almost completely or completely devoid of other petroglyphs (Polkowski *et al.* 2013).



Fig. 7. Dakhleh Oasis. Flat boulder covered by images of females, laying horizontally on the top of steep sandstone remnant, facing the sky (Fot. M. Kobusiewicz)

Similar representations of women are known only from the site of Meri 99/36 (Riemer 2006) of the Western Desert, approximately 70 km west of the oasis of Dakhleh (Berger 2006) and more recently from the vicinity of the Kharga oasis (Ikram 2009).

Numerous representations of giraffes, which in accordance to our knowledge were absent in the oasis, stand for another idea, still more difficult to decode. Giraffes are typically fairly realistically depicted on their own or in groups. Interestingly, they are often led on a rope by a man (Fig. 8) or at least connected to a man by constant line. In addition, the foregoing representations of women are frequently accompanied by sometimes pregnant giraffes (Kuciewicz and Kobusiewicz 2008). This animal had certainly a special significance for the local Neolithic community, the nature of which cannot be determined as yet.

In the mid-third millennium B.C., during the reign of the Fifth Dynasty of the Old Kingdom, the oasis was settled by the representatives of the already well-organized Egyptian state. Judging from archaeological sources, the post-Neolithic local shepherds, referred to as the Sheikh Muftah culture, did not abandon the oasis, having undergone acculturation with time.

The rock engravings of the Old Kingdom and probably also of the later dynasties are relatively easy to distinguish owing to the typically Egyptian way of presenting hu-



Fig. 8. Dakhleh Oasis. The giraffe led on the rope by a man (Fot. E. Kuciewicz)

man figures (Fig. 9) or, even the images of tools typical for the Old Kingdom Egyptian dynasties (Fig. 10-11). Registered at various points in the oasis, they are most common in the immediate vicinity of the Egyptian watch posts, scattered in the area (Fig. 12) and occupied by guards sent from the then centre of power located in the centre of the oasis, namely a fortress and the settlement now called Ain Asil. The rites include realistic representations of people, abundance of single or double images of bare feet or sandals, of varying degrees of realism (Fig. 13). Known also from other parts of Egypt and Nubia, similar representations of feet were produced for a very long time, until the Roman period. According to one hypothesis they were meant to signify the symbolic domination over the place, area or even the state. Frequent are also feminine symbols in the form of a triangle cut across with a vertical line (Fig. 14). Watch posts are often accompanied by groups of parallel cuts in the rock (Fig. 15), a mark perhaps of guards counting days in the services while tracking the caravans or movements of nomads crossing the oasis.

Similar, yet chaotic cuts and geometrical figures should probably be dated to the Pharaonic Period as well. Sparse representations of boats, so characteristic of the pre-dynastic period and later times by the Nile and in the Eastern Desert, are also registered. Egyptian art should be dated since the end of the Fifth Dynasty, i.e. since c. 2300 BC at the earliest. It was certainly created until the beginning of the First Intermediate Period, while whether and how long it continued is hard to say.

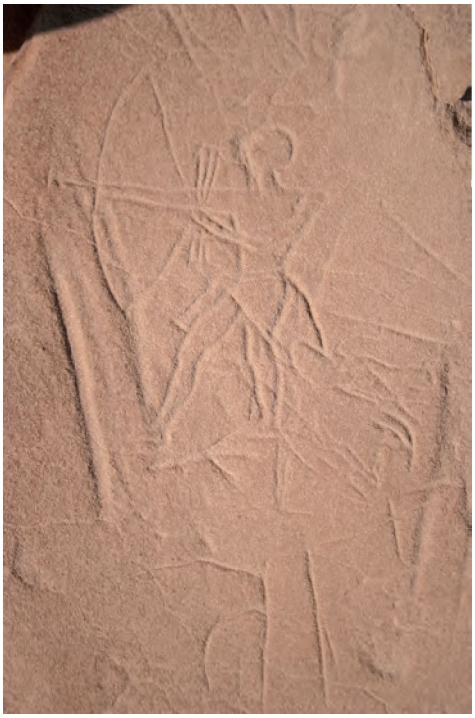

Fig. 9. Dakhleh Oasis. Picture of Egyptian soldier (Fot. M. Kobusiewicz)



Fig. 10. Dakhleh Oasis. Representation of the Egyptian bifacial flint knife (fot. M. Kobusiewicz)

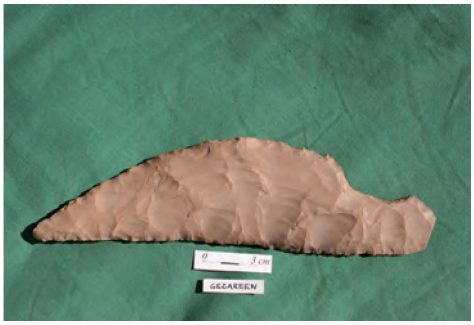

Fig. 11. Dakhleh Oasis. Original of the Egyptian bifacially retouched flint knife (fot. M. Kobusiewicz)



Fig. 12. Dakhleh Oasis. Watch post of the VI dynasty Egyptian guards (fot. M. Kobusiewicz)



Fig. 13. Dakhleh Oasis. Images of bare fits (fot. M. Kobusiewicz)

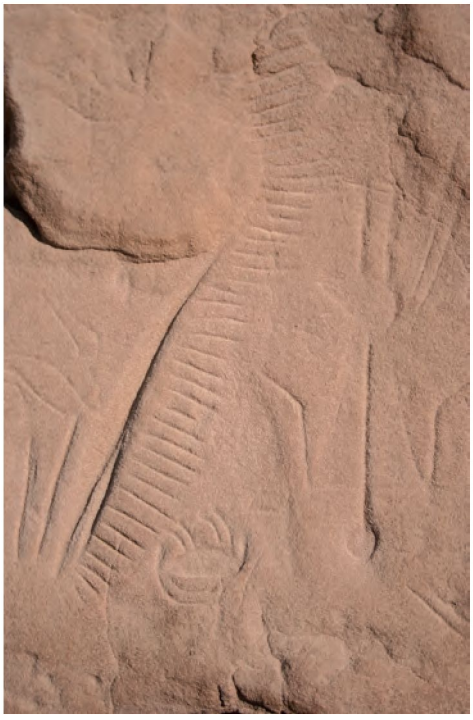

Fig. 15. Dakhleh Oasis. Group of parallel cuts (fot. E. Kuciewicz)



Fig. 14. Dakhleh Oasis. Feminine symbols (fot. M. Kobusiewicz)



Fig. 14. Dakhleh Oasis. Bedouin tribal mark – wusum (fot. E. Kuciewicz)

The Pharaonic period was followed by fairly less frequent rock art related to Christianity, present mostly in the form of various types of crosses. Finally, the art of the Islamic period is represented by images of camels, Arabic inscriptions and numerous tribal marks (Winkler 1939), the so-called Wusum (Fig. 16).

There is no rule with regard to the location of the petroglyphs. They are at found at different heights and at different slopes of sandstone remnants, with the presumptive exception for a relatively rare choice of southern slopes. Judging from the results of thus far conducted research, some places in the oasis attracted the attention of artists of successive generations, which is evident in case of the coexistence of rites from different periods. The question arises therefore whether, and in what way the existence of rock art of previous generations influenced the work of their successors.

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Pawel Polkowski

Meanders of interpretation: Interpreting the 'meandering lines'

Introduction

Rock art research is a specific domain of archaeology, which many scholars treat with reservation. This attitude is related to a fact that rock art researchers are often in a tenuous position when attempting to explore the cognitive realms of the distant past as it applies to interpreting rock art. Rock art often deprived of an archaeological context, difficult to date and not infrequently fragmentary in its preservation, is not easily interpreted and the narratives about rock art, due to the aforementioned difficulties, are usually subject to critical statements. The main barrier for interpretation is the imagery itself and its often abstract character. Single figures, even if recognizable as animals or humans, were certainly invested with diversified meanings. Giving meaning to these figures constitutes a major problem, if it is actually possible at all. That is why different approaches to rock art are represented among scholars. A substantial part of them prefer to be content with a description and identification of figures or structures; the other part try to attain the meanings from the past (Bahn 2002: 91; Le Quellec 2006, 166). In cases where one has ethnographic and ethnohistorical contexts available some insights into the veiled world of meanings are more possible. This is rarely the case for images from the eastern Sahara. Rock drawings in Egypt and Sudan, particularly the prehistoric and ancient, but also medieval ones, belong to traditions which no longer exist, hence all the knowledge about the societies who produced them comes mainly from the fields of archaeology and history.

Those two disciplines provide sources inspiring rock art interpretations. Rock art interpretation however, is not easy, but rather it is a winding path along the meanders of a river of ideas.

This article has two purposes. The first is to present selected rock art findings in the Dakhleh Oasis, that belong to the category called 'meandering lines'. This motif, so characteristic for Egyptian and Nubian rock art, has rarely been chosen as a subject of inquiry. However, an overview of publications dealing with that type of imagery highlighting the diverse interpretational ideas of other scholars forms a background on which I present my own interpretation, which agrees somewhat with the most widely accepted one. This interpretation then becomes a basis for reflections on issues of a broader character. The second aim of this paper is to discuss the difficulties behind every interpretation, not only of meandering lines, but of rock art in general. This includes discussing some of the theoretical aspects of eastern Saharan rock art research.

Surveying the Central Dakhleh Oasis

Rock art in the Dakhleh Oasis is recognized mostly on its eastern fringes, where it was discovered by Herbert Winlock (1936), Harding King (1925) and especially Hans Winkler (1939) and more recently by the Dakhleh Oasis Project members Lech Krzyżaniak (1987; 1990; 1991; 1993; 1994; 1999; 2001; 2004), Olaf Kaper (2009), Olaf Kaper and H. Willems (2002), Michał Kobusiewicz and Ewa Kuciewicz (Polkowski *et al.* 2013) among the others. Krzyżaniak began a rock art survey in the Central Oasis, roughly between Ismant el-Kharab and Balat (Fig. 1). After he passed away, Kobusiewicz continued this reconnaissance. The Petroglyph Unit conducted research in the area called the Painted Wadi, which runs from south to north in the eastern fringe of the ca. 10 km long and 4 km wide sandstone area located in the central part of the Oasis (Kuciewicz *et al.* 2007; 2008; 2010; Kuciewicz and Kobusiewicz 2011; 2012). Rock art found in the Painted Wadi proved to be chronologically similar to the petroglyphs known from the Eastern Oasis because both cover a very long time span from the Neolithic to modern times.

I have joined the Petroglyph Unit in 2011 and since 2012 developed a subproject named: *In the space of palimpsest. Rock art in the archaeological landscapes of Dakhleh Oasis*. Several objectives of this project include the continuation of the survey, landscape analyzes of rock art distribution and interpretive efforts towards petroglyphs from all the possible periods, particularly the post-prehistoric. The main goal of the studies is the application of certain theoretical concepts such as the 'biography of things', 'palimpsest' metaphor and the postprocessual notion

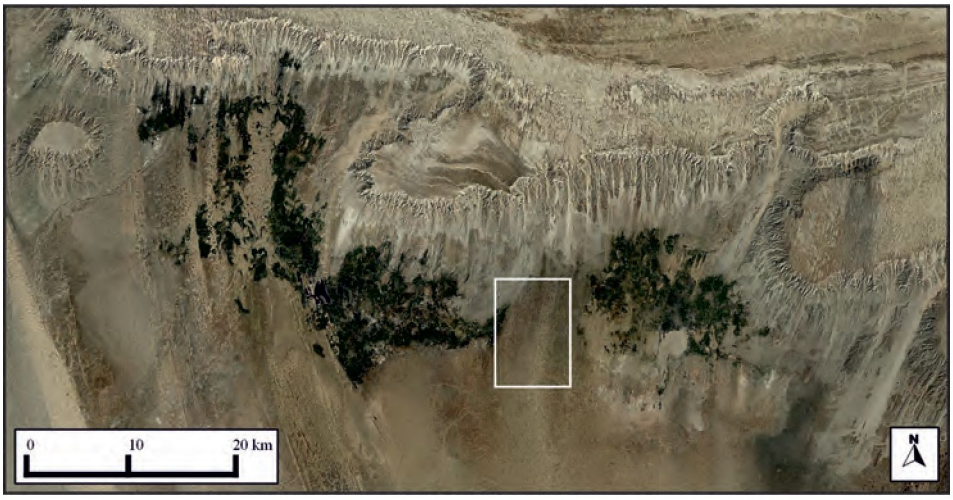

Fig. 1. On the map the area of the sandstone hills occurrence is indicated. It separates two huge areas of cultivation

of landscape and eventually creating narratives comprising the petroglyphs and landscapes, to Dakhleh rock art research. These topics are discussed elsewhere (Polkowski in press a; in press b).

During three[1] seasons of fieldwork 52 of 60 known sites in the Painted Wadi were visited and an additional 121 rock art sites[2] to the west of it[3] were discovered or refound. Figure 2 does not show sites, but individual rock art panels[4]. Rock art sites consist of one or more panels and a panel may comprise dozens of images, but even one single isolated figure can be classified as a site. To this date at least 711 petroglyph panels have been registered and a substantial part of the whole Central Oasis area has been surveyed (Fig. 2). There are several rock

[1] Last two seasons of fieldwork were conducted in frames of the project *In the space of palimpsest. Rock art in the archaeological landscapes of Dakhleh Oasis*, financed by the National Science Centre in Poland, decision no. DEC-2011/01/N/HS3/05994. Fieldwork in 2011 was possible due to financial help of the Polish Centre of Mediterranean Archaeology of Warsaw University and Poznań Archaeological Museum.

[2] Such a big number of sites is related to the fact, that on many of them only one or several pictures and/or inscriptions is located. Sites comprising dozens or hundreds of images are relatively rare.

[3] In 2007 a cursory survey northwest of the Painted Wadi was conducted, although, except few findings, (Kuciewicz *et al.* 2010) the rest remain unpublished. In 2009 the Petroglyph Unit surveyed an area located in the western fringe of the sandstone area, where 6 new sites was discovered (Kuciewicz & Kobusiewicz 2012). I revisited 4 of 6 officially registered sites in that area discovered in 2009 by the Petroglyph Unit.

[4] In some instances however also groups of panels and/or loose stones are marked as rock art panels. There is no strict criteria for deciding, which rock art panels belong to the same site. In most cases however a single hill with one or several panels is termed as a site.

art categories, which can be distinguished from a huge mass of the images. They comprise certain zoomorphic images like giraffes and oryx antelopes of likely Neolithic origin; sandal and foot depictions most likely from the Dynastic and Roman periods; pubic triangles dated similar to sandals; and crosses of different shapes related to the Roman and Byzantine periods. Yet another petroglyph class is formed by the images discussed in this paper: the meandering (or wavy) lines. They are registered on 6 sites discovered by the Petroglyph Unit between 2005 and 2009 and on 18 sites discovered between 2011 and 2013. The meanders are found on 43 rock art panels (Fig. 3) and comprise at least 89[5] full or partial depictions representing the meandering line motif (Table 1). This number could be even higher, although the state of preservation of some of the images makes their identification as meanders very difficult. It is probable that they are of the Neolithic origin. Yet, one cannot dismiss a possibility that some of them were produced earlier, i.e. in the Epipalaeolithic[6].

Description of the motif

All representations categorized as meandering lines, except one, were executed using one technique of pecking. They are not outlined figures, but rather the whole meander surface was worked in toto. These surfaces are not even and smooth (except one Type II example) as often happens in case of images, which were produced by an abrasion technique resembling a sunken relief type (some zoo- and anthropomorphic depictions were produced in that technique in the Oasis). The indented surfaces of meandering lines are rather irregular. Three characteristic shapes may be distinguished among the wavy line petroglyphs (Table 1, Fig. 4). The first one relates to a regular, rather symmetrical meandering line, whose bends are curved and more or less of the same size (TYPE I). Those figures resemble symmetrical sinuous lines. The second gender, rarely encountered, is probably a derivative of the Type I, most possibly its stylistic variation (TYPE II). This motif is characterized by a strong regularity, but its bends are somewhat angular. The third type of the wavy line may be described as having an asymmetrical and individualized trail (TYPE III). The line is still a meandering one, nevertheless it has bends of irregular size and in parts can be even straight. It may even roll up so that it forms sort of a spiral-like design. It could be reasonable to distinguish yet another type of image, which actually does not meander, but is just an abstract

[5] Assuming that my identifications are correct.

[6] Dirk Huyge suggested (Huyge 2009: 117; pers. comm. 2014) that geometric rock art from the Western Desert oases may belong to the Epipalaeolithic cultural horizon.

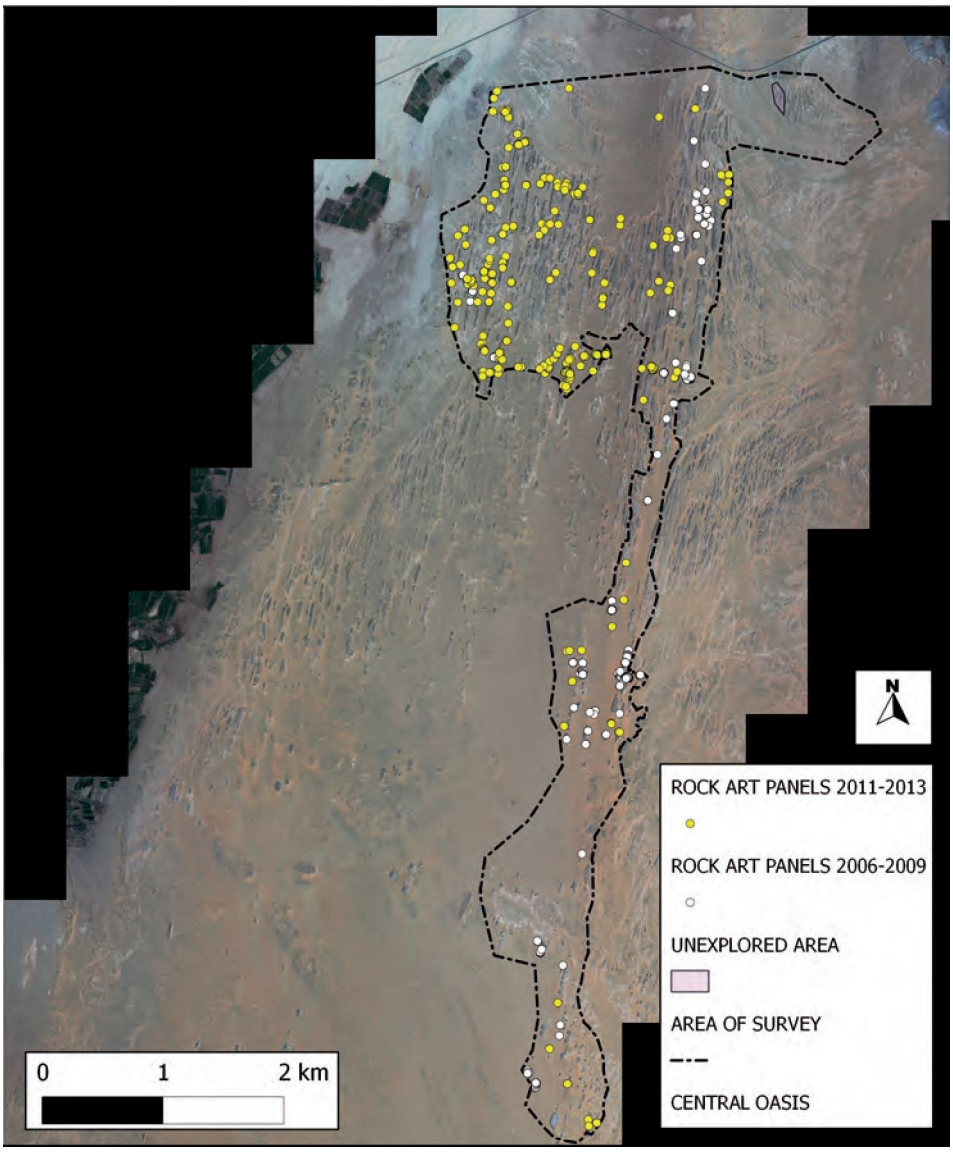

Fig. 2. Distribution of rock art panels in the Central Oasis

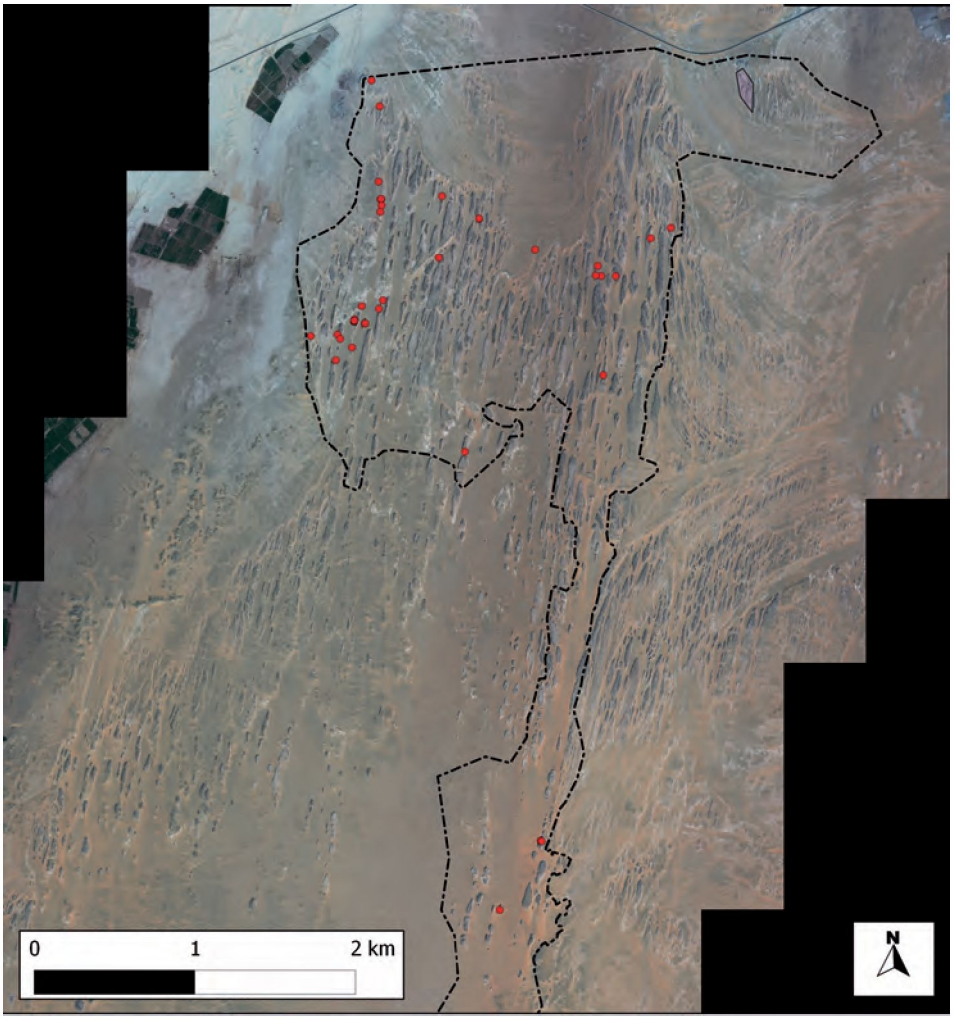

Fig. 3. Distribution of the panels containing the meandering line motif

Table 1. Rock art sites containing panels with the meandering line motif found between 2006 and 2013

No.	SITE no.	PANEL no.	TYPE	QUANTITY*	LOCATION	ACCESS (VISIBILITY)**	ASSOCIATIONS/ REMARKS	FIG no.
1.	CO16	1	1. REGULAR	1	E SLOPE, OVERHANG, OBLIQUE SURFACE	MODERATELY EASY (NOT VISIBLE)	ENGRAVED LINE	
2.	CO17	1	1. REGULAR	1	E WALL, ROCK FACE, VERTICAL SURFACE	EASY (EXPOSED)	-	
3.	CO18	1	1. REGULAR	2?	E WALL, BOULDER, VERTICAL SURFACE	EASY (EXPOSED)	-	Fig. 3
4.	CO18	2	3. ASYMMETRICAL	1?	HILLTOP, CENTRAL PART, HORIZONTAL SURFACE	EASY (NOT VISIBLE)	-	
5.	CO31	2	3. ASYMMETRICAL	1	W WALL, ROCK FACE, VERTICAL SURFACE	EASY (MODERATELY VISIBLE)	-	
6.	CO35	1	3. ASYMMETRICAL	1	OUTCROP, N EDGE, HORIZONTAL SURFACE	EASY (MODERATELY VISIBLE)	-	

No.	SITE no.	PANEL no.	TYPE	QUANTITY*	LOCATION	ACCESS (VISIBILITY)**	ASSOCIATIONS/ REMARKS	FIG no.
7.	CO40	2	1. REGULAR	1	HILLTOP,	FROM E:	SMALL PECKED CIRCULAR FIGURE	
					E EDGE,	DIFFICULT,		
					HORIZONTAL SURFACE	FROM W:		
						EASY (NOT VISIBLE)		
8.	CO40	3b	3. ASYMMETRICAL	1	HILLTOP,	FROM E:	ORYX	
					E EDGE,	DIFFICULT,		
					HORIZONTAL SURFACE	FROM W:		
						EASY ((NOT VISIBLE)		
9.	CO40	4	1. REGULAR (1)	2	HILLTOP,	FROM E:	-	
			3. ASYMMETRICAL (1)		E EDGE,	DIFFICULT ,		
					HORIZONTAL	FROM W:		
						EASY (NOT VISIBLE)		
10.	CO40	5	1. REGULAR (5)	6?	HILLTOP,	FROM E:	-	
			3. ASYMMETRICAL? (1)		E EDGE,	DIFFICULT ,		
					HORIZONTAL SURFACE	FROM W:		
						EASY (NOT VISIBLE)		

No.	SITE no.	PANEL no.	TYPE	QUANTITY*	LOCATION	ACCESS (VISIBILITY)**	ASSOCIATIONS/ REMARKS	FIG no.
11.	CO40	6	1. REGULAR	3?	HILLTOP, CLOSE TO E EDGE, HORIZONTAL SURFACE	FROM E: DIFFICULT, FROM W: EASY (NOT VISIBLE)	JOINED FRAGMENTS OF 3 DIFFERENT LINES?	
12.	CO40	7	1. REGULAR	3?	HILLTOP, E EDGE, HORIZONTAL SURFACE	FROM E: DIFFICULT, FROM W: EASY (NOT VISIBLE)	-	
13.	CO47	1	1. REGULAR	1	W WALL, ROCK FACE, VERTICAL SURFACE	EASY (EXPOSED)	-	Fig. 9
14.	CO52	2	1. REGULAR	1	W SLOPE, HORIZONTAL SURFACE	EASY (MODERATELY VISIBLE)	-	
15.	CO52	3	3. ASYMMETRICAL	1	W SLOPE, OBLIQUE SURFACE	EASY (MODERATELY VISIBLE)	TWO PECKED FIGURES: 1) UNDETERMINED 2) ORYX	

No.	SITE no.	PANEL no.	TYPE	QUANTITY*	LOCATION	ACCESS (VISIBILITY)**	ASSOCIATIONS/ REMARKS	FIG no.
16.	CO59	1a	1. REGULAR (2?) 3. ASYMMETRICAL (2?)	4?	ROCKY TERRACE, W SLOPE, HORIZONTAL SURFACE	EASY (MODERATELY VISIBLE)	VERY WEATHERED OVERLAPPING FIGURES	Fig. 5
17.	CO59	1b	3. ASYMMETRICAL	4	ROCKY TERRACE, W SLOPE, HORIZONTAL SURFACE	EASY (MODERATELY VISIBLE)	-	Fig. 7
18.	CO59	1c	1. REGULAR	1	ROCKY TERRACE, W SLOPE, HORIZONTAL SURFACE	EASY (MODERATELY VISIBLE)	ORYX	
19.	CO59	2	3. ASYMMETRICAL	2	ROCKY TERRACE, W SLOPE, HORIZONTAL SURFACE	EASY (MODERATELY VISIBLE)	-	
20.	CO59	3	3. ASYMMETRICAL	2?	ROCKY TERRACE, W SLOPE, HORIZONTAL SURFACE	EASY (MODERATELY VISIBLE)	ORYX	
21.	CO59	4	3. ASYMMETRICAL	2	ROCKY TERRACE, W SLOPE, HORIZONTAL	EASY (MODERATELY VISIBLE)	-	

No.	SITE no.	PANEL no.	TYPE	QUANTITY*	LOCATION	ACCESS (VISIBILITY)**	ASSOCIATIONS/ REMARKS	FIG no.
22.	CO59	5	1. REGULAR (1) 3. ASYMMETRICAL (4?)	6?	ROCKY TERRACE, W SLOPE, HORIZONTAL SURFACE	EASY (MODERATELY VISIBLE)	DEEP ENGRAVED PARALLEL LINES	
23.	C060	2	1. REGULAR	1?	E WALL, VERTICAL SURFACE	EASY (EXPOSED)	ORYX AND OTHER UNDETERMINED ZOOMORPHIC IMAGES	
24.	CO62	1	3. ASYMMETRICAL	4?	NE WALL, OVERHANG, OBLIQUE SURFACE	EASY (MODERATELY VISIBLE)	-	
25.	CO62	2	1. REGULAR	1	E SIDE, LOOSE BOULDER, HORIZONTAL SURFACE	EASY (MODERATELY VISIBLE)	ENGRAVED GROUPS OF PARALLEL LINES	
26.	CO63	2	1. REGULAR	1	HILLTOP, E EDGE, HORIZONTAL SURFACE	MODERATELY EASY (NOT VISIBLE)	-	Fig. 8
27.	CO63	3a	3. ASYMMETRICAL	2?	HILLTOP, E EDGE, HORIZONTAL SURFACE	MODERATELY EASY (NOT VISIBLE)	UNDETERMINED PECKED FIGURE	

No.	SITE no.	PANEL no.	TYPE	QUANTITY*	LOCATION	ACCESS (VISIBILITY)**	ASSOCIATIONS/ REMARKS	FIG no.
28.	CO63	3b	3. ASYMMETRICAL	1	HILLTOP, E EDGE, HORIZONTAL SURFACE	MODERATELY EASY (NOT VISIBLE)		
29.	CO65	1	1. REGULAR	1	NW SIDE, BOULDER, HORIZONTAL SURFACE	EASY (MODERATELY VISIBLE)	GAZELLE?	
30.	CO69	2	3. ASYMMETRICAL	3	BOULDER, HORIZONTAL SURFACE	EASY (MODERATELY VISIBLE)	UNDETERMINED PECKED FIGURES	
31.	CO80	1	3. ASYMMETRICAL	4	ROCKY RIDGE, HORIZONTAL SURFACE	EASY (MODERATELY VISIBLE)	UNDETERMINED PECKED FIGURES, INCLUDING POSSIBLE FISH REPRESENTATIONS	
32.	CO86	1b	3. ASYMMETRICAL	1	ROCKY TERRACE, W SLOPE, HORIZONTAL SURFACE	EASY (MODERATELY VISIBLE)	PECKING MARKS, CUP-MARKS? AND SANDALS	
33.	CO86	4	1. REGULAR	1	S SLOPE, HORIZONTAL SURFACE	EASY (NOT VISIBLE)	-	

No.	SITE no.	PANEL no.	TYPE	QUANTITY*	LOCATION	ACCESS (VISIBILITY)**	ASSOCIATIONS/ REMARKS	FIG no.
34.	CO94	1	1. REGULAR	1	HILLTOP, E EDGE, HORIZONTAL SURFACE	EASY (NOT VISIBLE)	OVAL PETROGLYPH	
35.	CO105	8	2. ANGULAR	1	N WALL, ROCK FACE, VERTICAL SURFACE	EASY (MODERATELY VISIBLE)	MANY FIGURES: 1) ORYX ANTELOPES 2) QUADRUPEDS – ANTELOPES? GAZELLES? 3) OSTRICH?	Fig. 6
36.	14-cze	4	1. REGULAR (4) 3. ASYMMETRICAL (4)	8	HILLTOP, S EDGE, HORIZONTAL SURFACE	MODERATELY EASY (NOT VISIBLE)	PAIR OF SANDALS	
37.	07-mar	1	3. ASYMMETRICAL	1	HILLTOP, W EDGE HORIZONTAL SURFACE	MODERATELY EASY (NOT VISIBLE)	UNDETERMINED PECKED FIGURE	
38.	07-lis	4	1. REGULAR	1	HILLTOP, E EDGE, BOULDER, HORIZONTAL SURFACE	MODERATELY EASY (NOT VISIBLE)	SANDALS, UNDETERMINED RECTANGULAR FIGURE	Fig. 10

No.	SITE no.	PANEL no.	TYPE	QUANTITY*	LOCATION	ACCESS (VISIBILITY)**	ASSOCIATIONS/ REMARKS	FIG no.
39.	14-lip	1	1. REGULAR	2	HILLTOP, CENTRE, VERTICAL SURFACE	MODERATELY EASY (NOT VISIBLE)	-	Fig. 2
40.	08-lis	2	1. REGULAR	1	HILLTOP, W EDGE, HORIZONTAL SURFACE	MODERATELY EASY (NOT VISIBLE)	UNDETERMINED ZOOMPRPHIC IMAGE	
41.	08-lis	3	1. REGULAR	3	HILLTOP, W EDGE, HORIZONTAL SURFACE	MODERATELY EASY (NOT VISIBLE)	GAZELLE?	Fig. 4
42.	08-lis	4	3. ASYMMETRICAL	2	HILLTOP, E EDGE, HORIZONTAL SURFACE	MODERATELY EASY (NOT VISIBLE)	-	
43.	09-maj	1	2. ANGULAR (1) 3. ASYMMETRICAL (1)	2	E WALL, ROCK FACE, VERTICAL SURFACE	EASY (EXPOSED)	MANY FIGURES: 1) ANTHROPOMORPHS 2) LIZARDS 3) ORYX ANTELOPES 4) OSTRICHES 5) SPIRAL	

* In some cases number of meandering lines is uncertain and/or the identification is questionable.

** Access to rock art may be easy/moderately easy/difficult/impossible. The petroglyphs can be not visible/moderately visible (visible from close-up)/exposed (well visible from a distance). Both access and visibility are defined from a perspective of a modern spectator walking at the bottom level of the wadi. Hence, the petroglyphs located at hilltops are termed here as 'not visible'.

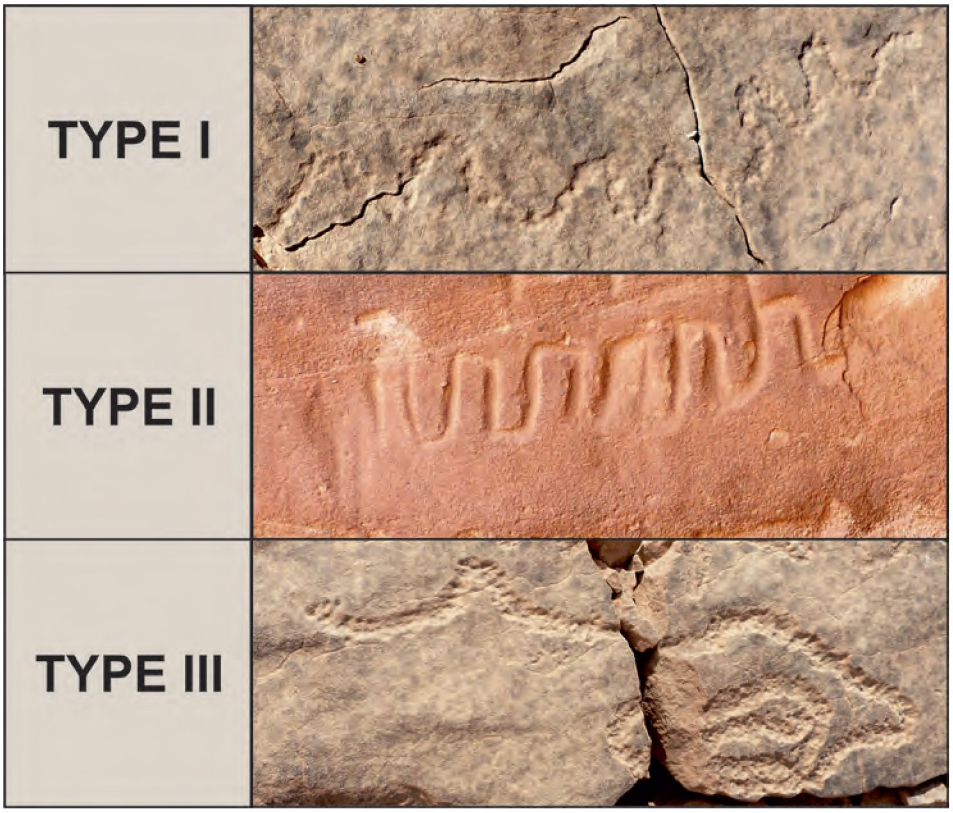

Fig. 4. A typology of the meandering line motif variations known from the Central Oasis

curved line. The sparse examples of this style of petroglyph may be a result of poor preservation and simply be only fragmentary pieces of once larger typical wavy lines. I estimate that 40 images may be recognized as belonging to Type I. Type II figures comprise only two examples and the rest of the figures may be taken as representing Type III.

The length of the meandering lines differs, but excluding fragmentary examples, most exceed at least 50 cm. Some representations are 1,5-2 m long. In this situation a finding from CO65 site seems to be an exception, because it measures only 7 cm. Almost all the petroglyphs are heavily weathered. In some cases heavy repatination causes the pecking to blend with the surrounding rock making them difficult to identify. Surfaces chosen for depicting wavy lines are usually of dark blue or dark grey colour (Fig. 5). It is possible that prehistoric authors intentionally chose those dark rocks to make their freshly executed petroglyphs contrast from the host rock.



Fig. 5. Two wavy lines executed on the nearly vertical surface at the 14/07 site. One of the meander's ends resembles snake's head

In case of 8 panels out of 43, meanders were executed on vertical surfaces and 3 on oblique ones. Ca. 75% of the images were produced on horizontal surfaces (Table 1). 18 panels are situated on the hilltops and the rest may be found on the slopes, cliff-like walls and on loose boulders scattered around the hills. Many panels seem to be easily accessible and also visible (Fig. 6), especially assuming their colouristic contrast with dark rocks when originally executed. Those images however, which are located on the hilltops have less 'public' character. They are not visible to anyone crossing this area, unless one knows about their existence or climbs the hillocks and accidentally encounters them. In the places, which I have labelled 'not visible'[7], the number of Type I wavy lines is more than twice as high as the petroglyphs representing Type III. However, because there are more places easily accessible and visible, one probably should consider the public/private dis-

[7] By the term 'restricted' I understand the rock art places difficult to access and/or not visible, when one is on the bottom of the valley. Most of them are accessible, although often 'hidden' at the hilltops. The term 'public' refers to those findings, which are visible, when one is approaching a site. It may be stated that the latter rock art demand from the observer less effort and knowledge to be noticed.

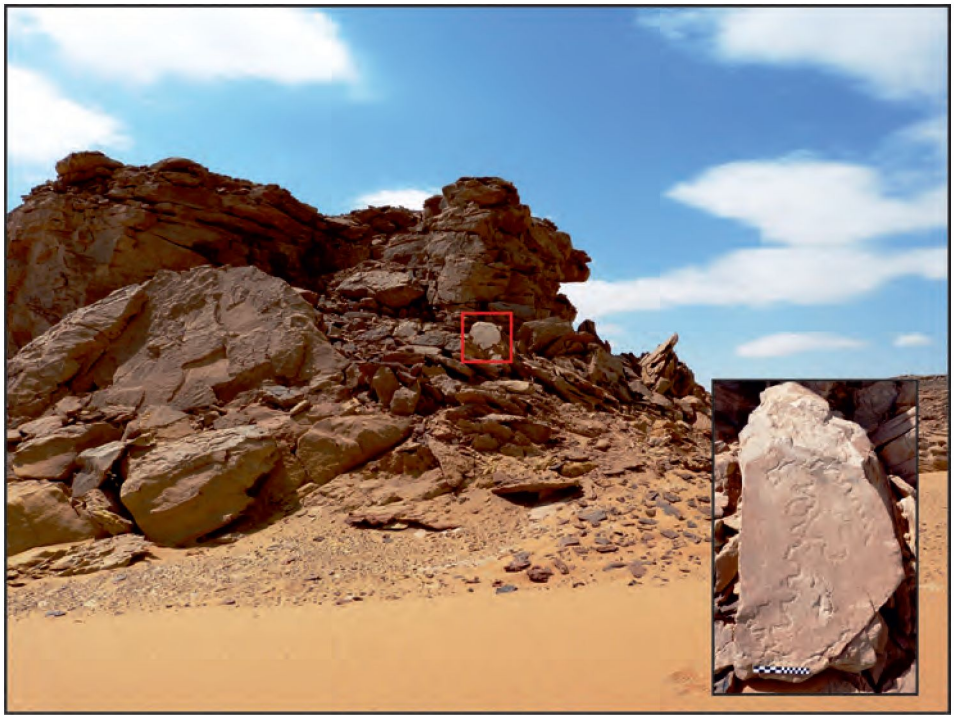

Fig. 6. Rock art site CO18 seen from NE and the boulder with the wavy lines

tinction a formality which does not reflect any functional or semantic differences. At this time functions and semantic differences remain questionable as does a question regarding the distribution of sites containing the meandering lines in the Central Oasis area. As it is indicated on Fig. 2 those places are located mostly along the western and northern boundaries of the Nubian sandstone occurrence area and singular examples were found in the Painted Wadi, closer to the eastern fringe. The centre of the area, where the hill network is densest, is almost devoid of the wavy line petroglyphs. However, until the survey is finished all the statements about any rock art distribution in this area remain inconclusive.

Table 1 shows drawings that are associated with the meandering lines including only those petroglyphs, which exist in direct vicinity of the wavy lines occupying the same panel or related panels. However, it cannot be ruled out that in the prehistoric people perceptions those images were meaningfully related to petroglyphs and/or groups of figures situated much farther away. Considering only the drawings closely juxtaposed with the meandering lines, one may conclude that the most frequent images associated with them are other wavy lines. This type

of image relationship occurs on 20 panels. In at least 10 instances meanders are accompanied by figures, whose forms are difficult to identify. They are executed in the same technique and the state of patination and weathering is identical to wavy lines. I believe they were probably produced by the very same authors. At two other sites (CO59 and CO62) some parallel engraved lines were executed next to meanders. The most interesting category of the associated figures consist of the figurative depictions. In the case of several quadruped representations it is extremely difficult to identify the species (Fig. 7). Two other cases show possible gazelle images. The most recognizable are the representations of oryx antelopes found on 7 rock art panels (Fig. 8). They were produced by the pecking technique, probably in frames of the same cultural horizon as the meandering lines. In other words, their mutual associations seem to be intentional and meaningfully constituted. These zoomorphic images are clearly smaller than the wavy lines, usually no longer than ca. 15 cm. Most of the associated petroglyphs are just singular images placed near the meandering lines. In only three cases do the panels with the wavy lines have more than a few figures associated with them. These are the sites 05/09, CO60 and CO105 (Fig. 9), where animals juxtaposed with the meanders represent different species, including oryx and other antelopes, gazelles and ostriches. It is interesting to note that the only two images of the Type II meandering line, the angular ones, are located at two of those sites. The concomitance of the meanders and anthropomorphic figures was observed only on site 05/09. Human representations are of two kinds: so-called 'pregnant women' (Winkler 1939; Polkowski *et al.* 2013: 106-111; see also James 2012) and characteristic elongated figures, possibly depicting men (Kuciewicz and Kobusiewicz 2012, 267-271). On the same panel giraffe images were produced and what appears to be two figures depicting lizards/crocodiles (?) as well as spiral. Although one cannot state with certainty that this complex scene was executed as a onetime event, it is likely that most of the figures belonged to the same period. This would mean that the meandering lines constituted one of the elements in the rock art motifs repertoire of the Middle and/or Late Neolithic, if not Epipalaeolithic, groups inhabiting the area of the Dakhleh Oasis.

Snakes, spirits or maps? Meandering lines in the literature

The meandering line motif is found at many sites in the Sahara, including examples from the Tassili-n-Ajjer, Fezzan, Atlas mountains (Huard et al. 1980: 306-322), in the area between Tassili and Tibesti (*e.g.* Hallier 1990: pl. 47, 48, 51, 124, 131, 139, 147), and even outside Sahara, e.g. in Saudi Arabia (Červiček



Fig. 7. Three meandering lines and one undetermined animal depiction associated with them. The panel is placed at the 11/08 site



Fig. 8. A horizontal panel with two images: an oryx antelope and irregular line beneath it. It is one of the panels containing meandering line motif found at the CO59 site

1976: 189, Fig. 279). The standard context for the Dakhleh Oasis findings however, comprise the images discovered in other parts of Egypt and Sudan[8], not only in the Nile Valley (Egypt: *e.g.* Winkler 1938, 1939; Červiček 1986; Storemyr 2008, 2009; Sudan: e.g. Myers 1958, 1960; Hellström and Langballe 1970; Huard *at al.* 1980; Červiček 1986; Váhala and Červiček 1999), but also in the Eastern (e.g. Rohl 2000; Morrow *et al.* 2010) and Western (*e.g.* Winkler 1939; Červiček 1986; Jesse 2005; Ikram 2009a; 2009b) deserts. On the basis of the selected publications presented below I would like to focus on varied aspects of interpretation of the meandering lines. Several different hypotheses have previously been proposed explaining what could be represented by this motif, some of them having a substantial influence in the literature.

Seemingly the 'safest' option is to give the petroglyph a general name or descriptive term. In order to work with a motif first it must be described and classified, and its name refers usually to its formal features. Therefore, we encounter the title type of imagery named as the wavy (*e.g.* Winkler 1938; 1939; Davis 1984; Červiček 1986) or *meandering lines* (*e.g.* Storemyr 2009; this paper). Such a name seemingly does not impose an equivocal interpretation, although its neutrality may be questioned. It may, because a name is resulting from someone's choice based on their observations. The name 'wavy' refers to only one feature shared with other images (although the most specific one), chosen from many others. It cannot be said that the 'meandering' notion is neutral also because it connotes a number of meanings, which can generate another ones, etc. A word 'meander' is involved in countless relationships in syntactic and paradigmatic orders. Therefore, when one is thinking about the 'meandering line' the language may suggest other associations, such as a meandering river for instance. This in turn may influence further perception of that motif and lead to relating it with the notion of water. It is however impossible to reflect on a thing, if it remains unnamed. What is important is the fact that a formal description is only seemingly neutral but it may in reality be a field full of interpretational traps.

If the wavy or meandering line names are only superficially neutral, then the next examples of these motif interpretations seem to be not neutral at all. The most common name (and interpretation at the same time) of the wavy line is a 'snake', 'snake-like' or 'serpentine form'. The two latter ones strongly suggesting

[8] The relations between the prehistoric 'geometric' rock art from the Upper Nile region and the Central Sahara were studied by Ulrich Hallier (1997). The 'serpentiform' drawings are amongst the petroglyphs, which were recorded in all the regions considered by Hallier in his research, i.e. in Nubia, Tibesti, Djado, Tassili and Hoggar. The pecked geometric motifs are linked by him with the spread of the 'wavy line' pottery.



Fig. 9. A complex panel located in N part of the site CO105. Except the Type II wavy line some quadrupeds and ostriches are visible. At the top of the panel also a hand and other animals were produced

that the petroglyphs represent an animal trait are terms, that may be taken with some interpretational 'freedom' by researchers. They describe the shape of the depictions as similar to snake's shape, but the images do not necessarily represent serpents. A power of suggestion however is strong enough to turn the rock art interpretation from 'snake-like' to 'snake' easily. Oliver Myers, discoverer of very important petroglyph sites in the area of the 2nd Cataract on the Nile in Sudan, described some of the figures as python-like designs (Myers 1958: 132, pl. XXXIII, Fig. 2, 3). When he described however their stratigraphic positions in the excavation trenches, he wrote that the *drawings of pythons were buried under the debris of Level 4 and 5* (Myers 1960: 177). I believe that there is a substantial semantic difference between the notions 'similar to snake' and 'snake'. The meandering lines as snakes seem to be the most frequently proposed interpretation and one may encounter it, for instance, in a publication prepared by the Scandinavian Joint Expedition to Sudanese Nubia (SJE) from 1970. SJE conducted research in the

area of Wadi Halfa in the Lower Nubia. A total of 10 depictions of wavy lines were registered and published in the corpus of rock drawings as a category 'S. Snakes'. Hence, the interpretation as animals is unambiguous. In this publication one may find also additional detailed identifications, where depictions S1, S2, S3 and S4 are described as possible representations of a cobra (*Naja haje* sp.?), which *fore part is raised vertically with a round head on the top* (Hellström and Langballe 1970: 154). The possibility that the wavy line represents a snake was considered also by Friederike Jesse (2005: 31) and explicitly identified as such by David Rohl (2000: 19, site JCB-1 in Kanais), Morrow *et al.* (2010: 39, site HAJ-6 in Wadi Umm Hajalu; pp. 57-58, site SAL-11 in Wadi Umm Salam) as well as Frantisek Váhala and Pavel Červiček (1999: pl. 85, 335) among others.

Some scholars did not content themselves with identification of the petroglyphs as zoomorphic images, but suggested a deeper symbolism related to them. Červiček considered a wavy line motif as a main motif characterizing the oldest temporal horizon of Egyptian and Nubian rock art (1986: 77-78, A-Horizon). According to the assumption that rock art *was primarily religious in character* (Červiček 1986: 71), recognizing in the meandering lines the snake form, he proposed that the lines had represented the numinous powers. He was inspired by analogies taken from Pharaonic times and directly related to Ancient Egyptian mythology. The essential role of snake entities, such as gods Akeru and Atum, as well as numerous demons, was provided as an argument in deliberations on the motif at least one millennium older. This creates a significant dilemma regarding how far researchers may go to extrapolate the meanings from one cultural context to the other. And does this exercise extend to the assumptions of the isochronological method, the one chosen by Červiček (1986: 73) as a tool in rock art research? A similar interpretational suggestion was made by Salima Ikram. The findings of the wavy lines in Kharga Oasis in places like 'Aa's Rock' and 'Snake Wadi' according to her could depict the *chthonic powers* (Ikram 2009a: 283). She considered a possibility that the snake images could have had both good and evil connotations and discussed them on the basis of the status of serpents in Ancient Egyptian culture (e.g. a juxtaposition of the sun god Re with his archenemy, Apophis).

Interpretations of much different character than those described above were proposed as well. Hans Winkler regarded the wavy lines and spirals, particularly those being associated with zoomorphic figures, as representing animals' entrails and considered them as related to the *spirit of the game* (Winkler 1938: 32; 1939: 32). German scholar believed that most images created by the Earliest Hunters have had a magical character implied on the basis of closely undefined ethnographic parallels.

What for many has appeared as snake representations, for Winkler seemed to be something completely different. Whitney Davis (1984: 87) wrote that these were not serpents but also considered those meandering lines, which seemed to be associated with animal figures. Davis did not interpret them as entrails, but rather as kind of illustrations of *hunting techniques or game capture*[9]. Contrary to Winkler's idea he was not writing about alleged magical character of drawings.

In case of the meandering lines, of the Type III in particular, another hypothesis was proposed. It was suggested that they were ancient maps (Cherry 2000). Peter Cherry considered possibility that the so-called multi-branched lines could reflect a complex character of regional wadi networks, whereas the single wavy lines could represent snakes indeed (Cherry 2000: 166). He presented three such potential maps, two of which were based on Winkler's pictures. He argued that one should not expect too much precision in these maps, as they had been produced in times, when no modern cartographical tools had been available. This lead was followed by Salima Ikram, who interpreted one of the rock art panels in Kharga Oasis in a similar way (Ikram 2009b: 79, Fig. 17). On this panel some asymmetrical meandering lines were executed, as well as a human figure with a possible penis and finally an oryx antelope. Ikram proposed to read this panel as a map, which could be understood as follows: a certain *person may find (or found) an oryx in a place indicated on the map*. Interpretational proposals of both Cherry and Ikram seem to be only careful suggestions. They have shown however that the discussion about wavy lines is still open and far from reaching any conclusion.

One final observation is related to the title motif indirectly, as the interpretation concerns a motif of a zigzag line found mostly in the area SW of Dakhleh Oasis, on Djedefre Water Mountain (DWM) and Biar Jaqub sites in particular. They were discovered by Carlo Bergmann (2011) and among countless petroglyphs a very characteristic motif was registered, resembling an Egyptian hieroglyph *dw*[10] filled with zigzag lines interpreted as water representation. Avoiding the discussion on chronological aspects and origin of this motif, as well as its potential ontology as protohieroglyph, I would like to look at its similarity with the meandering lines. Most of the Bergmann's examples of zigzag lines is described differently from wavy lines. Most of them are also smaller and are surrounded by a shape similar to the dw hieroglyph. Nevertheless, Bergmann also

[9] Davis, writing about the depictions of hunting techniques, thought not only about the meandering lines, but also about other curved lines, including those tethered to animals' legs and necks, e.g. giraffes'. That he considered also the wavy lines is indicated however by the following sentence: I doubt that any of these examples represents a serpent, as is sometimes claimed (Davis 1984, 87).

[10] The *dw* hieroglyph is listed as N26 (Gardiner 1957 [2007], 489).

presented some petroglyphs, which are not inscribed within any framework and they do not have typical zigzag shape. Part of them were named *crenellated lines* (Bergmann 2011: 95, Fig. 40) and resemble Type II meanders; others, like the one (although painted) from Gebel Uweinat (Bergmann 2012: 80-82, Fig. 14) are similar to the wavy lines of Type I. As he wrote: [these findings] attest to the seemingly age old convention amongst the Neolithic desert populations of using horizontal zigzag or rounded lines to mark locations where water was available (Bergmann 2012: 81, authors' emphasis).

Although other cases of images examined by Bergmann differ in shape and size from the subject figures of this paper, their similarity appears close enough to allow us to consider them when interpreting the meanders. This means that it should not be too controversial to state that an understanding of the wavy lines may be related also with marking the existence of water in the past or with other aspects of water. What makes water emblems somehow related to the meandering lines in the area of my investigations is also the fact that they were discovered relatively close, few dozen kilometres SW from Dakhleh. They seem to be chronologically linked, as Bergmann dated them, to the late 6th or early 5th millennium BC, which is a very old on the temporal horizon.

An early chronological attribution of meanders is a common feature of most of the hypotheses presented above. Winkler assigned them to his Earliest Hunters, whose he identified as hunter societies of the Amratian phase of the Naqada period (≈ Naqada I) and earlier times (Winkler 1939: 35). Per Storemyr, analyzing Winkler's site 53 in detail, came into conclusion that the oldest figures on the panel, namely the *meandering lines with "whips"* may be assigned to a time period before the Naqada I phase and the rest of the wavy lines come probably from the beginning of the Predynastic period (Storemyr 2009: 123). Myers, who discovered meanders in archaeological layers, was able to receive several C14 dates, according to which *pythons* had been created before the 4th millennium BC, most likely between 5000 and 4000 BC (Myers 1960: 177). Davis on the basis of Myers' research concludes too that the meandering line motif must have been in use before 4000 BC, perhaps long before (Davis 1984: 89). A date around 4000 BC exist also in Červiček's chronological tables, in which it forms a temporal dividing line between A- and B-Horizon (Červiček 1986). Therefore, as far as the chronology of meandering lines is concerned an agreement to some degree exists among different scholars. It seems then that this motif was in use in Epipalaeolithic and/or Neolithic contexts as long as the early Predynastic period. A dating of *water emblems* proposed by Bergmann fits this classification quite well.



Fig. 10. Another example of the meandering line. This one seems to be rolled and very much resembles a snake (CO59 site)

Back to the Oasis

The findings from Dakhleh Oasis include some of the most weathered and patinated petroglyphs, that seem to confirm an affiliation to the Neolithic or earlier horizon of rock art production. What may be said about them, especially in the face of aforementioned interpretations? Shapes of many meanders indeed resemble snakes and in some of them one may actually notice details underlying their animal character. Examples from 14/07 (Fig. 5), CO59 (Fig. 10) and CO63 (Fig. 11) sites seem to be quite naturalistic snake representations.

What influences the imagination are not only their shapes, resembling zigzag-shaped and moving (Fig. 11) or rolled and sun-warming specimens (Fig. 10), but also details like appropriately shaped heads (Fig. 5). Most of the potential heads are between the snakes. There are no examples of the elements, which could be interpreted as horns typical for the horned viper (*Cerastes cerastes*), but there are examples, which perhaps could be interpreted as depicting the Egyptian cobra (*Naja haje*). This is seen in at least two cases, where one side of the meander ends with an oval-shaped feature, depicting probably a cobra hood (Figs 7, 12).

This typical cobra feature is perhaps the best argument for the meandering line as snake and it was previously seen in other parts of the eastern Sahara (see above). Another argument supporting the snake hypothesis may be also a fact that the majority of images were situated on horizontal surfaces. It enhances the impression that one deals with the zoomorphic images depicting snakes in their natural positions. It seems that both movement and physical body of the animals was represented. Size of the wavy lines may be another naturalistic feature of those petroglyphs. In many cases they resemble the real size of snakes and are among the several exceptions already mentioned in the example from the CO65 site. Can one therefore conclude that all the meandering lines from Dakhleh represent snakes?

Some arguments against may be provided. Firstly, many of the meandering lines have no clearly distinguishable head. This may be a result of the state of preservation where many petroglyphs are damaged at their ends. Some images, mostly those belonging to Type III, form shapes which are difficult to identify with a snakes' movement or resting positions. Some images are located on vertical surfaces (Fig. 12). This by no means contradicts the identification of the meanders as snakes, but perhaps it weakens the naturalistic convention of figures hypothesis. Another difficulty for interpreting the meanders refers to the sizes of the wavy lines. The question becomes, why they would be depicted in sizes close to natural, if most of the prehistoric zoomorphic figures were shown in decidedly diminished scale. It is difficult to encounter giraffes or antelopes figures bigger than several dozens of centimetres. The quadrupeds being associated with the meandering lines are depicted in a much smaller scale. This is not an argument intended to invalidate the hypothesis of wavy lines' zoomorphic character, but it does raise the question as to the reason for the size difference between small scale quadrupeds and the full (or almost full) scale snake representations.

The question of scale or perspective is a question of a convention accepted in particular cultures. It is highly probable that the contemporary people approached this question in a completely different way than, for instance, modern scholars, raised in the culture having utterly different canons of art. One may find different proportions of figures in the principles ruling the art of the Pharaonic period to give an example. There size differentiation reflected the hierarchy of figures' importance. In case of the Neolithic pictures from Dakhleh such a hierarchization cannot be excluded. Different distinguishable categories of figures such as antelopes, giraffes, anthropomorphs, and meanders, may provide an argument that they usually have rather standardized sizes, with some exceptions among them. One cannot exclude however that behind this relative size uniformity stood not as a hierarchization,

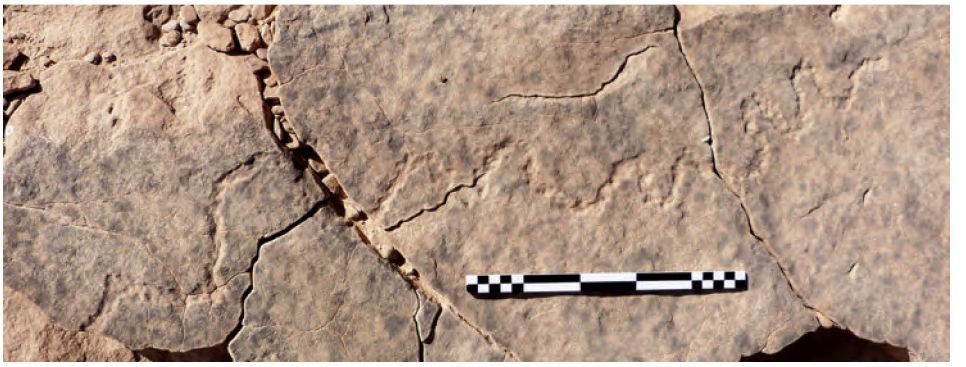

Fig. 11. A regular representation of the meandering line found at the CO63 site



Fig. 12. One of the most interesting wavy line depictions. One may notice an oval shaped end of the line, which can represent a cobra hood. The panel was registered at the CO47 site

but as an 'artistic' manner of that period; sort of an intersubjective way of expressing particular contents. It could be the shape and the meanings it comprised, was important, while size of the figures would remain a secondary feature. If one assumes that zoomorphic motifs such as oryx antelopes, giraffes, ostriches, lizards/crocodiles, anthropomorphs and meanders constituted elements of a syntax of the same sign system, then only the meandering lines, interpreted as snakes, would be represented life-size (or almost). Assuming they represented serpents, could the differences in scale be meaningful for contemporary authors?

Another way to interpret the meandering lines is to think about them not as a physical being, but as a mythological one. This question brings us closer to Červiček's conception (see above), that suggests that the meanders are not normal snakes, but rather supernatural entities depicted on the rock faces. Although, a reconstruction of the Neolithic cultures' mythologies is rather impossible, the very fact of their existence can be perhaps perceptible. As an argument, though quite weak, may serve the aforementioned question of images' scale. Assuming that the size of a figure is directly proportional to its position in a hierarchy, then the meanders could indeed represent some very important supernatural beings. However, it remains a supposition only, all the more that the wavy lines could have depicted something else other than snakes (in terms of shape). Then, the reasoning about their importance on the basis of proportions in regard to other figures becomes even more questionable. If we assume that they do not represent snakes and we put aside their potential mythological character, then what else could they depict?

The idea that they formed kind of prehistoric maps seems to me unlikely. Especially the depictions of Type I and II seem to be too symmetrical and regular to be taken as topographic representations. More possible would be that the complex compositions of irregular lines could be interpreted as maps. One cannot forget however that such a map could have depicted not the local topography, but instead the imagined, mythological one. An equally unlikely possible interpretation seems to be the one of animals entrails depictions. Considering that in only in few cases does the wavy line touch an animal figure, it seems to be an argument against the entrails hypothesis. Furthermore, there are not many meander-animal[11] associations in general. Yet another idea, the one of hunting techniques, is refuted due to the same reasons, at least in case of Dakhleh. The most regular meanders, the sinuous ones, perhaps could have been taken as graphic representations of water with the lines representing the shape of the

[11] We cannot be actually sure, whether the zoomorphic images depicted animals. They could denote very different contents, for instance, could represent families, tribes, events or mythological beings.

wavy water. The problem is that many of the meandering lines are not regular enough to represent waves in movement (see Fig. 5, 12).

The question of interpretation remains a problem in rock art research as various ideas are championed by researchers who expound on and defend their own theories. Attempts to explain the significance or purpose of the meandering lines were undertaken several times and produced diverse explanations. The plurality of ideas and interpretational issues is what I would like to consider in the last part of this paper.

Meanders of interpretation

As Christopher Chippindale wrote (2001: 254): "in many or most bodies of rock art, there are motifs we believe we can recognize as pictures of distinctive things, and others harder to discern. A moment's thought tells one that – since the image is often a different size and a different *color* – the essential clue by which we grasp what it images is its similarity in shape. Equally, the motifs we find ambiguous or opaque are those in which we see no decisive similarity in shape with a real-world object".

Those motifs, which we cannot identify in any way as known to us in reality, so we are not able to recognize them as objects we are familiar with, we usually call 'abstract' (Chippindale 2001: 256). The meandering lines are seemingly one of them. This is why often 'meandering' and 'wavy lines' names are being given. Although they underline their common particular formal feature, they primarily show that their identification is difficult and ambiguous. Additionally, when writing about them as abstract or giving them seemingly neutral names, one is treating them as objective notions. Some scholars would like to learn a hidden semantic content residing in a form of a petroglyph, defeat its 'abstractness' and identify it. Those were named by Bahn (2002: 91) as *idealists*, who interpret, hence try to read rock art. On the other hand there are *realists*, being conscious of all the constraints and who, in his opinion, do not interpret, but *focus on more tangible and attainable aspects such as location, technique, content, chronology, and change through time*. Robert Bednarik accompanies him stating that an archaeologist has no access to meanings given to rock art by their authors in the past (Bednarik 2003: 3). If one perceives the meandering lines from the perspective of the aforementioned dichotomy, he would conclude that the attempt to read the meanings of this motif (*e.g.* chthonic powers, animal entrails, *etc.*) is equal to idealistic approach, and focusing on formal description means joining the realistic camp. The never-ending battle between subjectivism and objectivism. But, is it not an illusive battle?

If the congruous assumptions are accepted with the philosophy practised by such phenomenologists like Martin Heidegger (1962) and Hans-Georg Gadamer (1975), we all, as human beings, are involved in the so-called hermeneutic circle or spiral. Whatever we say about an encountered phenomenon would not be objective, because our interpretation of it does not begin in any starting point, but is rather rooted in our experience. In other words, for whatever we experience, even for the first time, we already know something about it; we are equipped with sort of pre-understanding. Hence the circle metaphor, because there is no beginning nor the end of interpretation. Instead there is only continuous movement back and forth between the parts and the totality and working upon what is to be interpreted. Michael Shanks and Christopher Tilley (1987: 106), applied these assumptions in the field of archaeology and called the interpretation, after Gadamer, as *fusion of horizons*, in which past and present, as well as object and subject are interconnected. According to such a philosophy the analysing of petroglyphs, as well as all other phenomena, are dependent on the observer as the interpreter.

(...) in the hermeneutic circle the interpreter approaches a set of materials in the fullness of their contextuality, and presuppositions permit an initial understanding of the meanings of these materials. In a sense they anticipate their form and nature (Shanks and Tilley 1987: 106).

In the very moment a meandering line is perceived for the first time, the experience gives birth to an interpretation, its initial stage. This is why the viewer can immediately say something about it. If knowing that most prehistoric petroglyphs depict animals; being aware that snakes exist in the area of the research; knowing how they look like and also being conscious, what may be their behaviours, the investigator identifies, almost instinctively, the meanders as zoomorphic figures. Being involved in the hermeneutic circle the person perpetually works upon the subject of interpretation, referring to their own experience, which is gained simultaneously. Other knowledge is intentionally gained through reading the ideas of other scholars. However not all influences are known or perceptible. The process of interpreting may also be perceived as a dialectic relationship between the person and the petroglyph. As Ian Hodder and Scott Hutson wrote (2003: 196):

This involves a playing back and forth between the social and theoretical context of the interpreter, and the historical or cultural context of the object of interpretation. Both the interpreter and the object of interpretation contribute to understanding, always generating a new, hybridised meaning. In this sense, whether we like it or not, we think ourselves into the past. We need to be aware that we are doing this and we need to do it critically.

What results is always a hybrid of meanings, their transformation. They are not reconstructed, but rather adapted to the cultural context in which a person exists. This socio-cultural context is essential, because it provides some paradigms, which influence the interpreter. The cultural context of archaeological theories in 30's of 20th century was not without an influence upon the ideas proposed by Winkler. At that time a common belief, that the sympathetic magic was the motivation to produce rock art affected the German scholar, who interpreted the meandering lines as being related to the magic (see above). Červiček, who eventually saw in the wavy lines some primary spiritual powers in the form of serpents, was probably stimulated by his Egyptological background. It influenced his perception and understanding of this motif and it was possibly more natural for him to refer to the Pharaonic sources than to the other ones. In other words all our judgements about a particular phenomenon are always rooted in our experience and though we perpetually work upon the understanding of this phenomenon, due to the hermeneutic circle we are not able to separate ourselves, interpreters, from objects being interpreted. This theoretical reflection does not lead to a conclusion that we are absolutely free to impose meanings on phenomena from the past. On the contrary rather, this reflection makes us aware of the mechanisms of interpretation. It suggests we should be self-criticizing, thus implies a scientific rigour. Therefore, one is trying to understand the meanings from the past; is attempting to decode rock art, being however conscious that it is not a simple act of reconstruction.

All this leads to one more question. Rock art motifs certainly have been reinterpreted in different times and accordingly their meanings must have been transformed. The question appears, whether the only question we should ask is what those motifs meant to their authors? The primary context? Maybe an equally important question is one of how they could have been perceived by other spectators throughout the ages. The scholars are obviously not the first ones interested in the meandering lines, and what may be indicated by such phenomena as juxtapositions and superimpositions with younger images (Fig. 13). In three cases the wavy lines were juxtaposed with much younger depictions of sandals. Such situations mean that the meanders were at least seen and as a consequence interpreted in a particular way. It would be rather difficult to assume that the authors of sandals (most likely living in the Graeco-Roman period or earlier) conceptualized rock art in accordance with its primary semantics. When they experienced those petroglyphs, they invested them with some meanings in their pre-understanding and the effect of such reconceptualizations could manifest itself in the juxtapositions observed today. In fact, meanders are signs, whose *signifié* perpetually un-

dergo semantic transformations. One can say that the modern interpretations of scholars are just another expressions of those transformations – subsequent life stages in their biographies.

Although, many researchers would like to reach the level of understanding the primary meanings of rock art, rejecting the belief that an interpreter influences interpretation, and in the same time many scholars deny the possibility of accessing any past semantics and limit their investigations to a formal description of phenomena, treating it as unbiased and objective, one can distinguish yet another attitude towards the research. The interpreter and the subject of inquiry are the poles between which the interpretation is being born. The whole semantic past is dwelling in the rock art, which the interpreter, unable to separate himself from his own experience and expectations, attempts to understand. In this context Paul Bahn's words concerning the prehistoric rock art may provide an optimistic accent:

These are messages from other cultures, other worlds, and we know nothing of the artists' original intentions or the transformations in meanings that the art has undergone, so *there is no single correct interpretation*. However, since it is better to light a candle than to curse the darkness, what one can certainly do is to put forward observations, interpretations, and hypotheses about the images, which can be evaluated and eventually discarded when something better comes along (Bahn 2002: 92, authors' emphasis).

The inconclusive conclusion

At the very end it would be appropriate to take a stance and say something in favour of a particular interpretation. If one is to be inspired with many ethnographic and historical examples (provided, for instance, in: Tilley 1994; Bradley 2000), then it is very possible that the meandering lines constituted at one time the elements of landscapes, in which the mythical world manifested itself in varied ways, including rock art. How the places where we find them, were weaved into the mythical topography is difficult to answer. They could commemorate some events both real and mythical; they could form ceremonial localities or could just be related with the supernatural entities dwelling in them. In the forms of those petroglyphs, at least in part of them, I perceive representations of snakes. It is possible that these lines were perceived as supernatural beings as Červiček and Ikram suggested, and/or their execution could be just a manifestation of the authors' piety. Maybe the places, where one finds the wavy lines were localities, where real snakes were spotted frequently in the past and such observations could have been linked with mythical events, even theophany (?).



Fig. 13. This panel is located at the hilltop at the 11/07 site. Except the meandering line two sandals and other unidentified petroglyphs were produced. Although the motifs were executed in different times their possible mutual relations may form a very interesting subject to study

However, even if I assume that the images depicted snakes (no matter if mythical or 'real' ones), I am still far from grasping the particular meanings conferred in them. The *realists* would probably easily deny my suppositions about the mythological character of the meanders, whereas some of the *idealists* could accept them uncritically. My narrative about this motif emerges now, in the context of my current knowledge and experience. It is a proposal, never a reconstruction. At the same time I endeavour to provide the most probable vision of the past, which may lead to a better understanding of rock art. What I underline is that the interpretation is not free of judgements and valuation. On the one hand I acquiesce in seeing snakes in the meandering lines, on the other hand I rather reject the map interpretation. It shows that the 'life' of the interpretation is dependent on other people; it is subjected to negotiation and evaluation. Its 'probability' is discursive.

Post scriptum

I would like to refer once more to a biographical character of rock art (Polkowski in press a; in press b), that is directly linked to aforementioned reflection. It is not only a question of the primary status of petroglyphs, but also their lives until the present, which may be a subject of inquiry. In such a perspective rock art images gain a sort of agency – a power – and like living beings they enter relationships with another actors. That is why the meandering lines, the topic of this paper, are not only polisemantic, but living entities as well. The theoretical aspects of this paper are not new and seem to be well established in the archaeological literature. The interpretations of the wavy lines I provided are also strongly grounded in publications on the subject matter, but sometimes are not theorized in a sufficient way. The only 'new' element I presented here is the rock art sites discovered in Dakhleh Oasis in the course of the previous research. My intention was to use the rock art from these sites as the vehicle, upon which a theoretical and critical discussion may be instigated.

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III

The Desert

Hunter-Gatherers and Early
Food Producing Societies
in Northeastern Africa
Studies in African Archaeology 14
Poznań Archaeological Museum 2015

Jan Kuper

Filling a Gap: Early Holocene Evidence from Central Libya

Introduction

While the Holocene occupation of the Eastern Sahara[1] is reasonably well documented in the Western Desert of Egypt (Wendorf *et al.* 2001; Gehlen *et al.* 2002; Kuper and Kröpelin 2006) as well as in the far west of Libya (Barich 1987; Cremaschi and Di Lernia 1999; Garcea 2001), there is an approximately 1,000 km wide gap of relevant evidence between these regions. In this area, which has generally received little attention from archaeologists, only some artefacts from the site of "Dora 42/8" – already collected in 1942 – apparently bridged this empty space (Fig. 1). However, nothing more than an approximate location of the site southeast of Jebel Haruj and its exceptional history of discovery during World War II were known (Richter 1952). The initially collected stone artefacts suggested an Epipalaeolithic or Early Holocene age, though neither does any documentation of their sampling exist nor can their affiliation to a single site be securely stated. With the objective of clarifying the origin of the Dora assemblage and obtaining more precise chronological as well as economic and environmental information, the Heinrich-Barth-Institute, Cologne carried out an expedition to central Libya in 2008. This paper briefly summarises the project's outcome and reports on results from a short excavation undertaken, focusing on the spatial and chronological context of Dora 42/8.

[1] According to Pachur and Altmann (2006), the Sahara east of 10° East Longitude is referred to as Eastern Sahara.

Site Dora 42/8

The site presented here is located at the foothills of Jebel Haruj, a basaltic mountain in central Libya which covers a broad 45,000 km² area and thereby constitutes the largest volcanic field in the entire Sahara (Klitzsch 1968). Southeast of the massif is a small depression, which is embedded in Eocene limestone bedrock. Along its northern and eastern slopes a dense and almost homogeneous scatter of knapped stone artefacts stretches for about 300 m lengthways (Fig. 2). Within this scatter, which covers an exceptional large area of about 13,000 m², grinding equipment as well as fragments of ostrich eggshell, some of them decorated or worked into beads, were observed. In some sectors fragmented bones and ashy sediments were visible at the surface. Within the main artefact concentration lithic material appeared very homogeneous and, by means of diagnostic finds, could be assigned to the Epipalaeolithic period. To gain a fairly comprehensive insight into the site's structure – given the limited time frame for investigation –, several small trenches were spread across the site. A total of 27 m² were excavated in units of 50 x 50 cm down to a depth of 15 cm below the modern surface. Most artefacts were recovered from the uppermost centimetres, only a couple of pieces were found deeper in the sandy sediment. Evident features were almost absent, except for eroded fire pits, concentrations of bones as well as a knapping place consisting of broken tabular flint slabs, large blade cores and related debitage.

The artefacts

The excavated artefactual material consists of knapped and ground stone (including large lower grinding stones as well as palettes showing traces of colouring), ostrich eggshell and bone artefacts. Pottery was not observed. Knapped stone constitutes by far the most frequent artefact category at Dora 42/8 and thus forms the focal point of the analysis and of this short overview. The remaining material as well as a detailed analysis of the lithic assemblage will be published elsewhere.

Due to an artefact density of about 1,000 pieces per square meter, the analysis of knapped stone is mainly based on material from only one of five trenches, i.e. trench 42/8-1. This trench measures 6 m² and contained 6,179 pieces of knapped stone. This sample represents just 0.05% of the assumed total population at Dora (N=13 million), but because of the even spreading of the lithic material and its apparent homogeneity – apart from a very few probably Middle Stone Age (Aterian) stray finds – this sample can be considered representative of the chronological determination of the site.

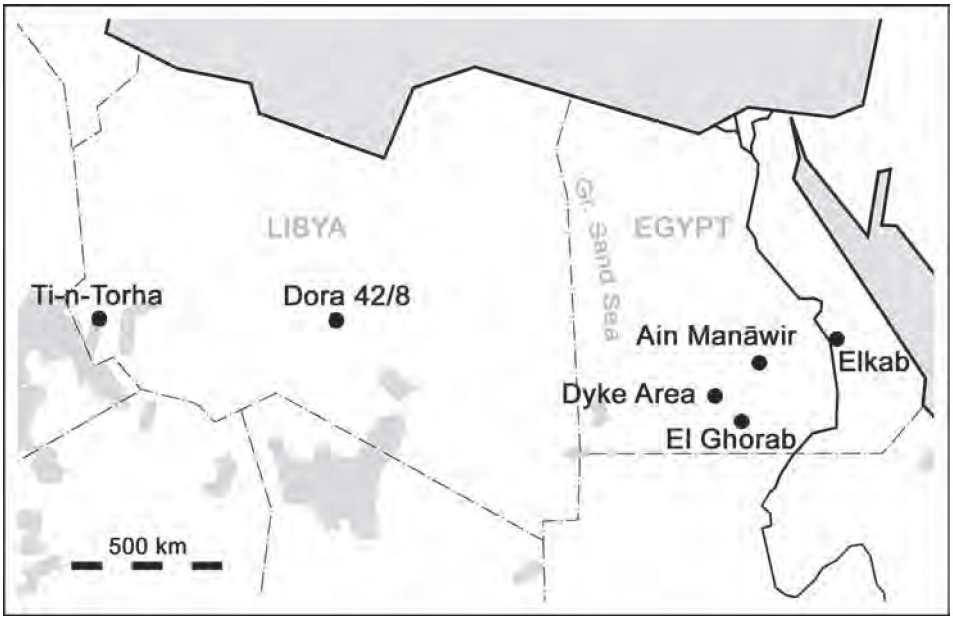

Fig. 1. Location of Dora 42/8 and other Epipalaeolithic sites mentioned in the text

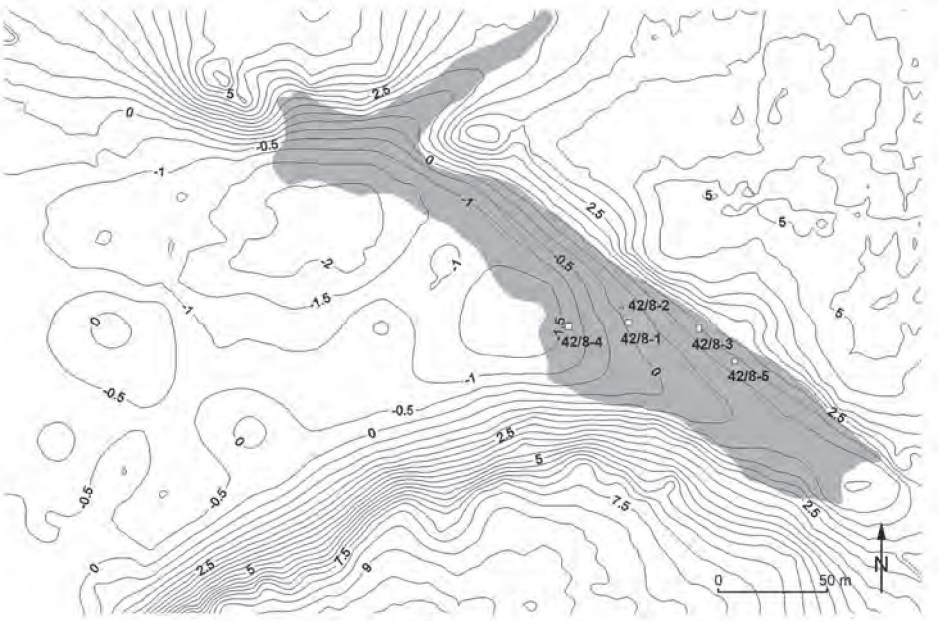

Fig. 2. Topographic plan of Dora 42/8 showing the main artefact concentration (light grey) at the northern and eastern slopes of a small depression and the location of five trenches excavated in 2008

The majority of stone artefacts (93.5 %) are made from a brown to grey flint, which is available in the immediate vicinity of the site. In those cases where a determination was possible, only the tabular variety of the flint was processed. The manufacturing of blanks was clearly aimed at producing blades, which outnumber flakes > 15 mm with a distinctly higher proportion (31.3 % and 23.8 %, respectively, of all blank types). Blades, defined as flakes > 15 mm, being at least twice as long as wide and having almost parallel sides and ridges, are relatively small (average length: 37.6 mm) and regularly made. They were, unlike flakes – which were produced using hard-hammer percussion – struck by soft-hammer direct percussion mainly from single (44.1 %) or opposed (26.5 %) platform cores. Such blades served as blanks for the prevailing microlithic toolkit (Fig. 3).

While shorter blades were processed into straight backed and pointed bladelets (Tixier 1963, Type 45) (Fig. 3:2), longer blades were mainly used, employing the microburin technique (Fig. 3:18), for the production of elongated scalene triangles with short, small sides (Type 95) (Fig. 3:15-17). The latter dominate the toolkit with 17.8 % – apart from microburins (36.2 %), which are not tools *sensu stricto* but were considered here for the sake of comparison with other assemblages classified according to the typology of Tixier (1963). Macrolithic tools, however, are rarely present and are mainly represented by notched blades (2.4%, Type 76) (Fig. 3:19).

Whilst taking additionally into account the lithic assemblage of trench 42/8-5, it was possible to reconstruct the *chaîne opératoire* of knapped stone production, comprising all stages from the initialisation of the core to the completed and eventually discarded tool (Fig. 4). The production sequence is reconstructed as follows: After the off-site procurement of tabular flint slabs, large blades – as testified in trench 42/8-5 – were struck from the slabs only after a rough preparation as cores. Once the cores were reduced to a certain size, further preparation and blank production followed – as noticed in trench 42/8-1 – until they had to be abandoned due to reduced size or knapping accidents. The selection of blanks for modification occurred mainly in a later stage of the reduction sequence, at a stage at which small blades required for the production of microliths were obtained. When these tools, used as projectiles as indicated by impact fractures (Fig. 3:17), were damaged, they were again brought to the site and may have been replaced by new insets. Thus, it is possible to reconstruct the major part of the *chaîne opératoire*. Apart from the procurement of raw material and certainly the use of the projectiles, all stages of the operational sequence were carried out at the site.

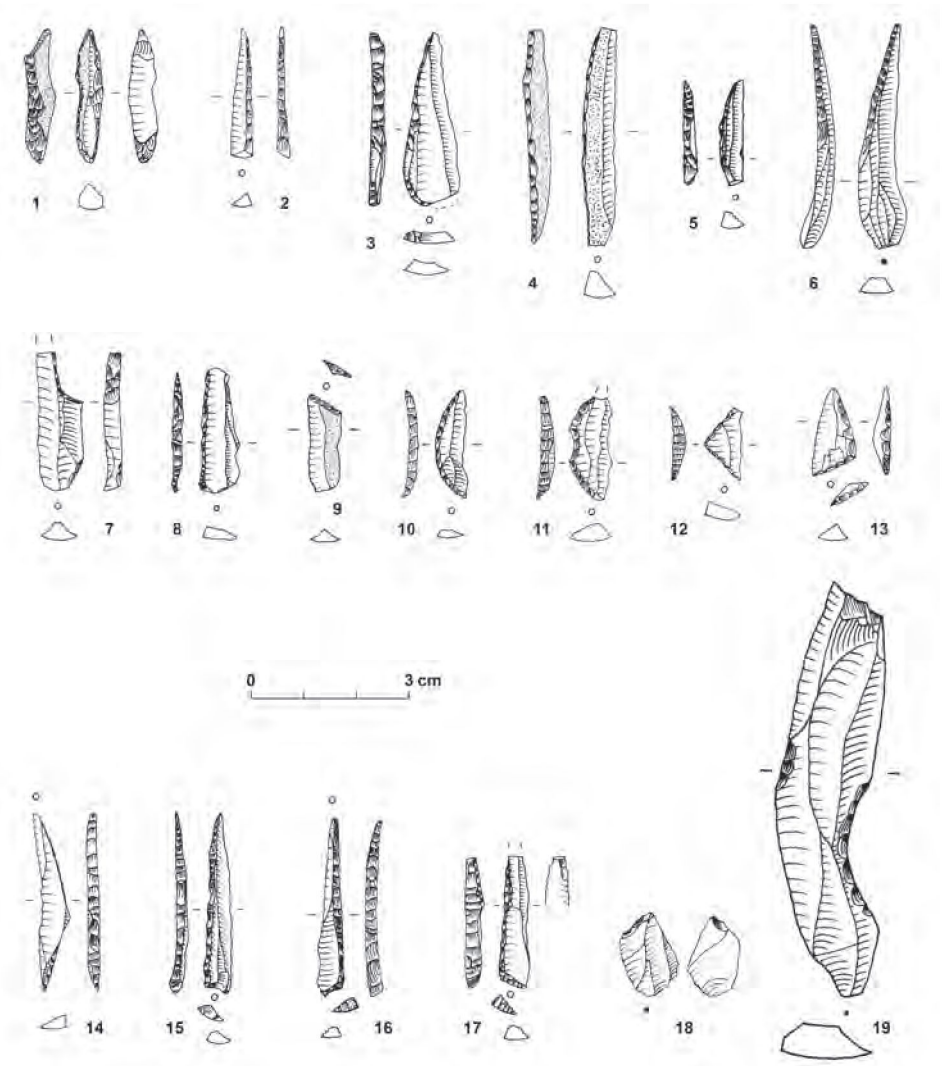

Fig. 3. Dora 42/8: 1 - perforator; 2-8 - backed bladelets; 9 - truncated piece; 10-17 - geometric microliths; 18 - microburin; 19 - notched blade. Types acc. to Tixier (1963): 1 – type 16; 2 - type 45; 3 - type 46; 4 - type 54; 5 - type 56; 6 - type 63; 7 - type 64; 8 - type 67; 9 - type 80; 10 - type 82; 11 - notched trapeze; 12 - type 89; 13 - type 90; 14 - type 94; 15-17 - type 95; 18 - type 102; 19 - type 76

Faunal and floral remains

The analysis of the faunal assemblage, including bone remains from four trenches as well as individual surface finds, was conducted by J. Peters and N. Pöllath (Munich) as well as H. Berke (Cologne). Results are so far only available as a preliminary species list. This list contains exclusively non-domesticated animals, among which are gazelle (*Gazella cf. leptoceros*), addax (*Addax nasomaculatus*) and oryx antelope (*Oryx dammah*). Besides these common bovids at Saharan sites, several remains of ostrich (Struthio camelus) were identified. Contrary to its frequent evidence in the form of eggshell remains, the direct proof of ostrich is exceptional, since up to now ostrich bone finds are not very numerous in the Sahara. In contrast to the here presented Early Holocene ostrich remains, the hitherto reported finds almost exclusively originate from younger, Mid-Holocene sites (Van Neer and Uerpmann 1989; Gautier 2001; Pöllath 2010). Merely the recently presented ostrich finds from Medjez II (northern Algeria) derive from a secure Early Holocene context (Merzoug 2011). Suggested explanations for the apparent scarcity of ostrich remains are a taphonomic bias (Pöllath 2010: 848), difficulties of bone determination (Merzoug 2011) and even a tabu on ostrich meat, as proposed by Morel for the Capsian of the Maghreb (Morel 1974). That the latter is not true for the dwellers of Dora 42/8 is indicated by the fact that the ostrich remains were found in context with other bones showing traces of either burning or smashing (H. Berke, pers. comm.).

Due to the poor preservation of plant remains, they unfortunately do not provide valuable information on the Early Holocene environment. Only a few pieces of charcoal could be identified as *Tamarix* (identification: S. Nußbaum, Cologne).

Dora 42/8 in a broader context

Due to its developed blade technology and its emphasis on backed bladelets and geometric microliths, the Dora lithic assemblage is of generic Epipalaeolithic character and is clearly part of the Early Holocene occupation of Northern Africa. On closer examination, however, only a few detailed similarities with inventories from climatically favourable regions such as the Western Sahara or the Mediterranean coastal area are visible. Much stronger parallels can be found in the Eastern Sahara. Here, the chronology of the Combined Prehistoric Expedition (CPE) offers the most detailed outline of the Early Holocene occupation (Wendorf *et al.* 2001). This period, labelled as "Early Neolithic" due to, among others, highly debatable remains of cattle (Wendorf and Schild 2001; Riemer 2007; Stock and Gifford-Gonzalez 2013), has been divided into three variants (El Adam-, El Gho-

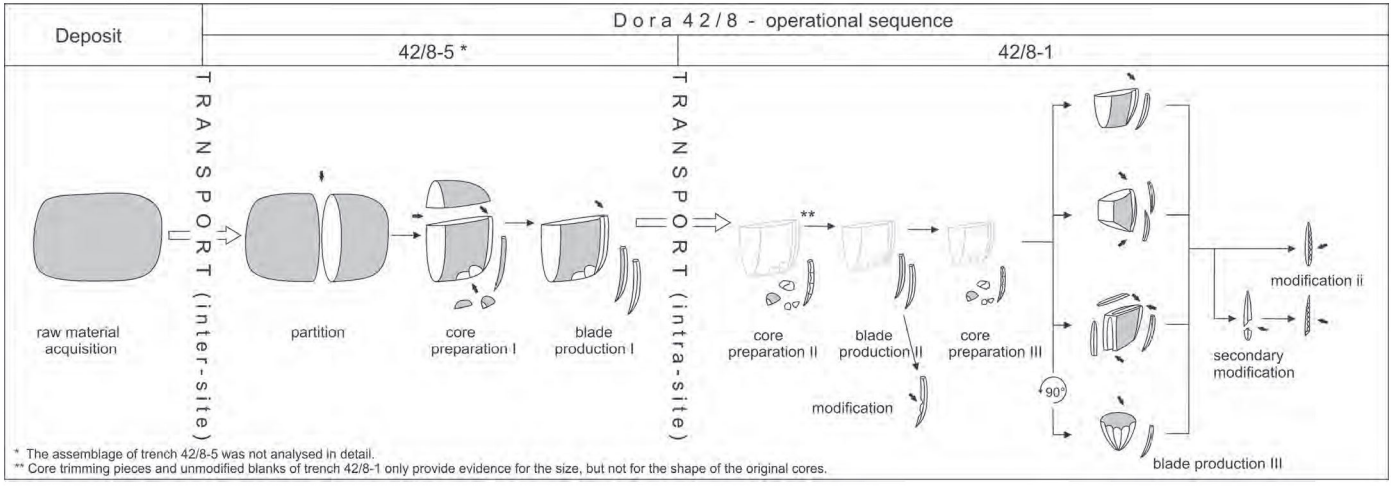

Fig. 4. *Chaîne opératoire* of knapped stone production at Dora 42/8

rab- and El Nabta/Al Jerar-Early Neolithic) of which the Early Neolithic of El Ghorab type (7,500-7,200 calBC) provides the most striking parallels to the lithic assemblage of Dora 42/8.

All assemblages available from this variant and typologically comparable lithic inventories from sites between western Libya and the Nile Valley were used for a supra-regional comparison[2]. Selection criteria for the comparison were an available tool classification following the typology of Tixier (1963) and a large enough sample for statistical analysis. These conditions are met by sites of the CPE in South West Egypt (El Ghorab E-79-4 LCL, E-79-4 CLW, E-79-4 SW; Kobusiewicz 1984) and Dyke Area E-72-5 (E)[3] (Schild and Wendorf 1977), the Epipalaeolithic site of ML1 at Ain Manâwir[4] (Briois et al. 2008), about 80 km south of Kharga Oasis and the site of Elkab, which provides the only evidence of human occupation of the Egyptian Nile valley during that period (Vermeersch 1978). West of Dora 42/8, only one site could be used for the comparison – the site of Ti-n-Torha East in the Tadrart Acacus in SW-Libya. Although the published assemblage is basically not suited for quantitative analysis (Close 1987), it is the only available lithic inventory of this type from the Libyan part of the Eastern Sahara. To set the chronological framework, two sites of the El Ghorab preceding stage of El Adam (8,800-8,100 calBC) (E-79-8 and E-80-4; Connor 1984b; Close 1984b) and two sites of the subsequent stage of El Nabta/Al Jerar (7,100-6,200 calBC) (E-79-5 and E-80-1 C; Connor 1984a; Close 1984a) from the study area of the CPE were included.

A Principal Component Analysis (PCA) of the toolkits of these sites was conducted using the frequencies of tool types. The first two components (together 47.9 % of the variance) were plotted in Fig. 5, which clearly shows the tripartition of the Early Neolithic according to Wendorf *et al.* (2001), whereas the individual stages are shown in reverse (youngest down) chronological order along the y-axis. Hence, the Principal Component 2 mirrors the chronological relevance of certain tool-types. The Principal Component 1 (plotted on the x-axis), however, mainly reflects the microlithic component of the assemblages. The site of Dora 42/8 is distinctly assigned to assemblages of the El Ghorab variant. This typo-chronological position is

[2] The only traces of Early Holocene occupation east of the Nile come from archaeological horizon 5 of Tree Shelter (Vermeersch 2008) and do not fit well to the Eastern Saharan Chronology.

[3] Only the excavated assemblage of site E-72-5 was taken into account.

[4] Even though two 14C dates place site ML1 to the mid-7th mill. calBC (Briois et al. 2008) the site will be included in the comparison since its lithic assemblage shows striking parallels to the El Ghorab variant. Briois *et al.* (2008) consider (inter alia) a lack of context between the dated ostrich eggshells and the bulk of the finds possible (see also: Riemer 2009, 595-596).

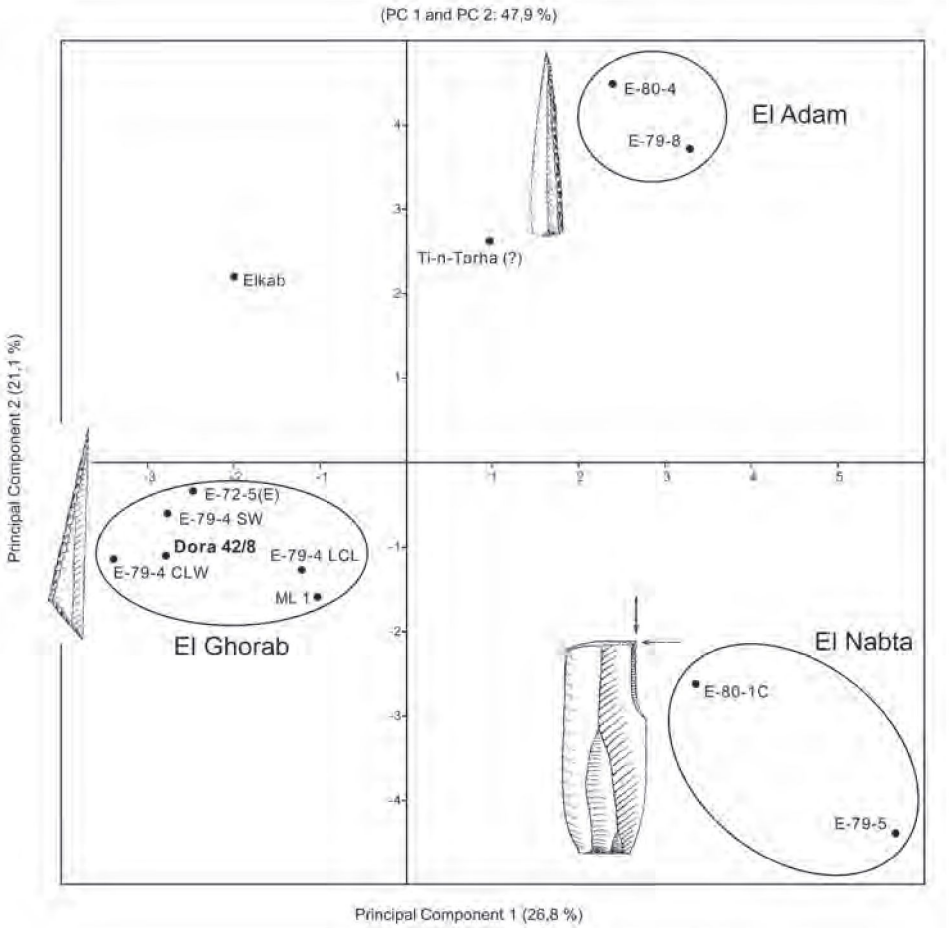

Fig. 5. First and Second Principal Components scattergram of North African Epipalaeolithic assemblages on the basis of lithic toolkits, which clearly shows the tripartition of the "Early Neolithic" according to Wendorf et al. (2001). PC 1 reflects the microlithic component of the assemblages, PC 2 the chronological relevance of certain tool-types. Also shown are typical tool-types of the three Early Neolithic variants

supported by three radiocarbon dates from charcoal samples from three different trenches, varying between 7,400 and 7,100 calBC (Table 1). Hence, the available evidence speaks for a single phase of occupation of the site, even though repeated occupation events probably occurred within decades or centuries.

The assemblages of Ti-n-Torha and Elkab are not assigned to one of the Early Neolithic clusters. An expected affinity to the stage of El Ghorab is not suggested by the plot of the PCA. Even though the assemblage of Ti-n-Torha is not a true random sample (Close 1987), thus does not provide a reliable basis for interpretation, the typological distinctions of both sites are probably best explained by their location on the fringes of the Eastern Sahara. The Nile valley and the Acacus mountain range are, beyond doubt, both ecologically favoured areas, which certainly required other subsistence strategies than the (semi-) arid core area of the Eastern Sahara during the Early Holocene – a fact that can be expected to find its expression also in different compositions of toolkits.

Discussion and Conclusion

Dora 42/8 is an open-air settlement site which was, probably repeatedly, used by foragers during the second half of the 8th mill. calBC. Animal bone finds as well as knapped stone artefacts suggest that hunting was an important food procurement strategy of its dwellers. The exclusive evidence of non-domesticated animals corresponds with the composition of the tool assemblage, which is mainly composed of microliths that are to be interpreted as arrowheads. The macrolithic toolkit can be seen as further confirmation, since it is composed almost exclusively of notched blades, which can be considered as tools for the shaping of arrow shafts. The evidence of large grinding stones – given their assumed main use for the preparation of vegetable foods – suggests that gathering of plant resources was also part of the subsistence. The significance of the two economic components gathering and hunting, however, can not be estimated on the basis of the excavated material.

Evidence for the duration of occupation at the site is offered by both, findings and finds. Fire pits containing remains of burned or processed animal bones suggest intra-site butchering and consumption of the kill. This and the presence of large lower grinding stones indicate longer lasting and more sedentary activities. The integrity of the chaîne opératoire of stone tool production from the initialisation of the core to the discarding of used pieces is another important indication for extended stays at the site. The production of ostrich eggshell artefacts points to the same direction, as it is a task that is more frequently reported from long-

Table 1. Radiocarbon dates from Dora 42/8. Laboratory dates were calibrated using CalPal 2-D dispersion calibration, version October 2013 (Weninger and Jöris 2008) with the Intcal09 dataset

Lab. ID	Trench	Material	Method	14C yrs BP	δ13C (‰)	Yrs calBC
KIA-37153	Dora 42/8-1	Charcoal	AMS	8276 ± 43	-25,11	7320 ± 100
KIA-37154	Dora 42/8-3	Charcoal (Humic acid)	AMS	8304 ± 37	-25,54	7380 ± 70
KIA-37155	Dora 42/8-5	Charcoal	AMS	8123 ± 53	-25,82	7130 ± 70

term used sites (Richter 1991, 228-234). The wide range of activities attested at site Dora 42/8 and the considerable amount of artefacts of estimated 13 million pieces of flaked stone in connection with a limited occupation period suggest that the site was repeatedly visited and predominantly used, certainly for decades or centuries, as a "base camp" (*sensu* Binford 1980).

The correlation of the typo-chronological analysis of the lithic assemblage with the results of the radiometric dating suggests a supra-regional significance of the CPE-chronology, a framework that has been developed in a rather limited study area on the eastern fringe of the Sahara. In addition, the supra-regional typological comparison presented here indicates an extremely homogenous spectrum of tools left behind by Early Holocene hunter gatherers during a relatively narrow time period. For now, it remains unclear which processes underlie this resemblance of material remains of contemporaneous sites separated by more than 1,000 km. Moreover, future research has to clarify whether the occupation of central Libya during the middle Epipalaeolithic shown here was a brief episode – conceivably fostered by short-term favourable climatic conditions – or whether it was part of a continuous cultural development, possibly running parallel to the neighbouring regions.

Acknowledgments

I am grateful to the Department of Archaeology (DoA), Tripoli, which not only actively supported the excavation, but even allowed the loan of the entire collection. This project would not have materialised without the initiative and support of the re-discoverer of site Dora, Michael Rolke. I thank Isabell Schmidt for helpful comments and suggestions that considerably improved this paper.

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Hunter-Gatherers and Early
Food Producing Societies
in Northeastern Africa
Studies in African Archaeology 14
Poznań Archaeological Museum 2015

Romuald Schild, Fred Wendorf

Displaying the Nabta Playa Monuments in the Nubian Museum, Aswan, Egypt

Introduction

Nabta Playa, in the South Western Desert of Egypt (Fig. 1), is not only one of the major Neolithic settlement regions of the Sahara, but also the largest Neolithic ceremonial center of the entire African continent, spreading over a surface area of about 10 sq. km., and stretching in time from about 8,500 to 3,500 years BCE. It contains a large amount of sacred installations (Fig. 2) represented by two great fields of offering tumuli situated on the Sacred Mountain, or Gebel El Muqaddas in the north of the area (Figs 3, 4), and in the Valley of the Sacrifices (Fig. 5) located nearly two kilometers to the south of the gebel; a possible solar calendar on a small hillock at the mouth of the same Valley of the Sacrifices (Figs 6, 7); four fields of megalithic stelae counting several hundreds of shaped sandstone blocks farther to the south and southeast (Fig. 8); and at least two alignments of stelae (Figs 9, 10) directed towards the polar region in the northern celestial hemisphere, and Sirius and/or Orion (?); as well as an impressive burial tumulus overlooking the clusters of stelae from the west (Fig. 11).

Researching sacred installations in the Nabta Playa Basin

After the early three field seasons at Nabta Playa (1974, 1975 and 1977), the Combined Prehistoric Expedition transferred its work first to the prehistoric sites located in Kharga Oasis (1976), and following the 1977 season briefly to Kubbaniya, on the Nile, just north of Assuan (1978), then to the Kiseiba Scarp (1979-1980), and again to

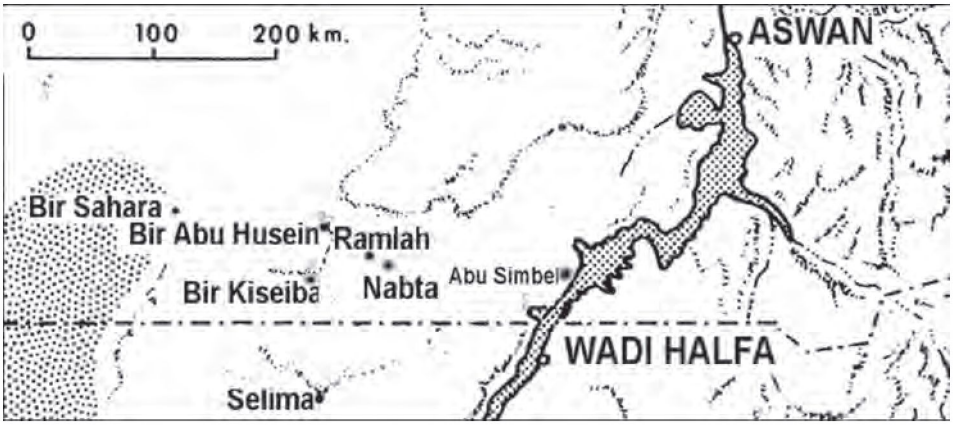

Fig. 1. Location of Nabta Playa

Wadi Kubbaniya (1980-1984). Subsequent field seasons were spent at Bir Sahara and Bir Tarfawi (1985-1988), and at Bir Safsaf and Wadi Arid (1984-1985) (Wendorf and Schild 1980; Wendorf *et al.* 1984; 1987; 1989; 1993). In 1990, the Combined Prehistoric Expedition reactivated its interest in the Nabta Playa Area and conducted very intensive excavations and mapping in the Nabta Playa basin during the 1990-1994, and 1996-2009 field seasons (Wendorf *et al.* 2001). Naturally, the megaliths and sandstone block quarrying were the main focus of study during the years 1990 to 1997 and 2001 to 2009 (Bobrowski *et al.*, 2012; McKim Malville *et al.* 1998; 2008; Schild and Wendorf 2004; 2012; Wendorf and Królik 2001; Wendorf and McKim Malville, 2001), but the other excavations at surrounding sites near Gebel Ramlah (Kobusiewicz *et al.* 2010) and Bergat El Shab cemented their importance in place and time.

Non Archaeological Interest in Nabta Playa

In 2002, a physicist, Dr. Thomas G. Brophy, following the publication of Volume I of the Prehistory of Nabta Playa (Wendorf *et al.* 2001), began secretive investigations of Nabta Playa megalithic monuments. Shortly afterwards he was followed by Mr. Robert Bouval, a writer and author of several well-read books on ancient Egypt in which he has advocated the interaction of Pharaonic Egypt with extraterrestrial creatures.

In 2002, Dr. Brophy published *The Origin Map. Discovery of Prehistoric, Megalithic, Astrophysical Map and Sculpture of the Universe*. It is a book discussing association of certain Nabta Playa megaliths, particularly the possible calendar circle and the slightly shaped rock underneath the cluster of fallen stelae termed a *Complex Structure A* by Wendorf and Królik (2001, 505). In the book, Dr. Brophy

(2002) has argued that the possible Solar Calendar was in fact a star viewing diagram constructed at about 16,500 years ago, which represents a map of the stars of Orion. The sandstone *mushroom*-like rock underneath the *Complex Structure A*, however, depicts a detailed map of our galaxy carved around 17,500 BCE

The book triggered a great interest in the remote desert area of Nabta Playa in the *New Age* religion followers as well as those interested in extraterrestrial phenomena. Soon numerous illegal "tourists" began visiting Nabta Playa megaliths in the archaeological off seasons. In the years 2004-2007 the "tourist" started to build new megaliths and reconstruct the old ones using original stones or bringing them from the neighboring prehistoric installations. One of the "fully reconstructed monuments" was the Solar Calendar. The Supreme Council of Antiquities of Egypt could not offer a constant surveillance of the remote Nabta Playa Basin Area (compare Schild and Wendorf 2012) and its protection. It became obvious that some of the most endangered elements had to be moved to places where they could be viewed and protected.



Fig. 2. Map of major sacred installation of Nabta Playa (not to scale). Drawing by Marek Puszkarski

Selecting the Monuments in the Field

In the 2008 season two groups of monuments, both endangered or ruined by the tourists had been selected for the transfer to the Museum. The first of those was the possible calendar. Before the transfer the already "reconstructed" by the "tourists' calendar was mapped in details (Fig. 7) and all the elements



Fig. 3. Gebel El Muqaddas. The person in the middle stands at the foot of a deflated tumulus in lag position. Southeastern tip of the gebel. Photograph by R. Schild



Fig. 4. Gebel El Muqattas, Site E-06-4. Excavating a small tumulus. Looking northwest. Photograph by R. Schild

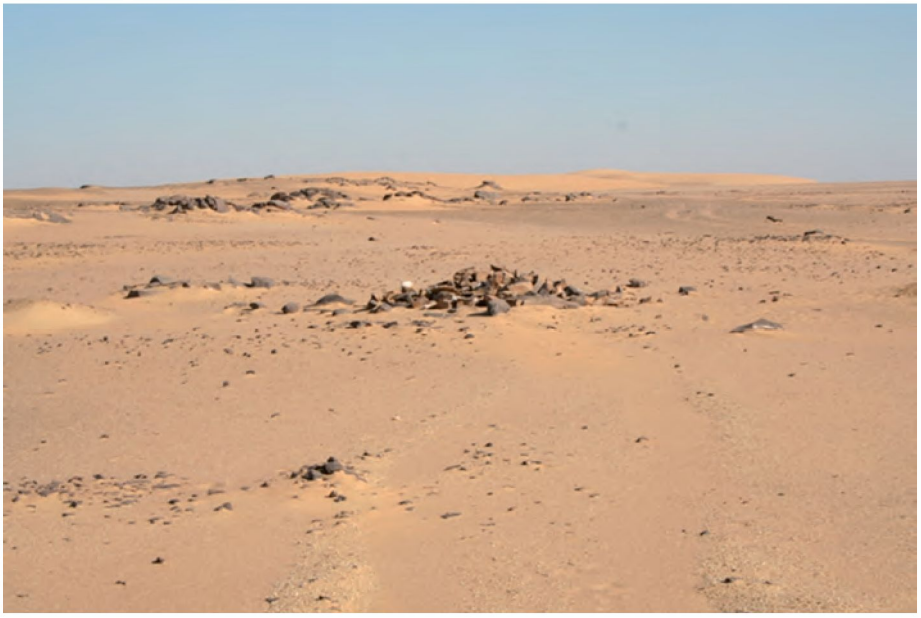

Fig. 5. Valley of the Sacrifices. A reconstructed Late Neolithic tumulus (Site E-91-1n). Looking northwest. Photograph by R. Schild



Fig. 6. Valley of the Sacrifices, a possible solar calendar (Site E-92-9) in 2004. Looking northeast. Photograph by H. Tallah Abdelebaset Ahmad



Fig. 7. Valley of the Sacrifices, Site E-92-9. Reconstructed by "tourists" solar calendar being mapped by Betsy Alexander in February 2008. Photograph by M. Jórdeczka



Fig. 8. Western Group of Stelae. Two clusters of collapsed and broken stelae. Photograph by R. Schild



Fig. 9. Alignment A, Megalith A-2. Tilted and collapsed and broken stelae, looking northeast. Photograph by R. Schild



Fig. 10. Reconstruction of Megalith A-2. Painting by M. Puszkarski

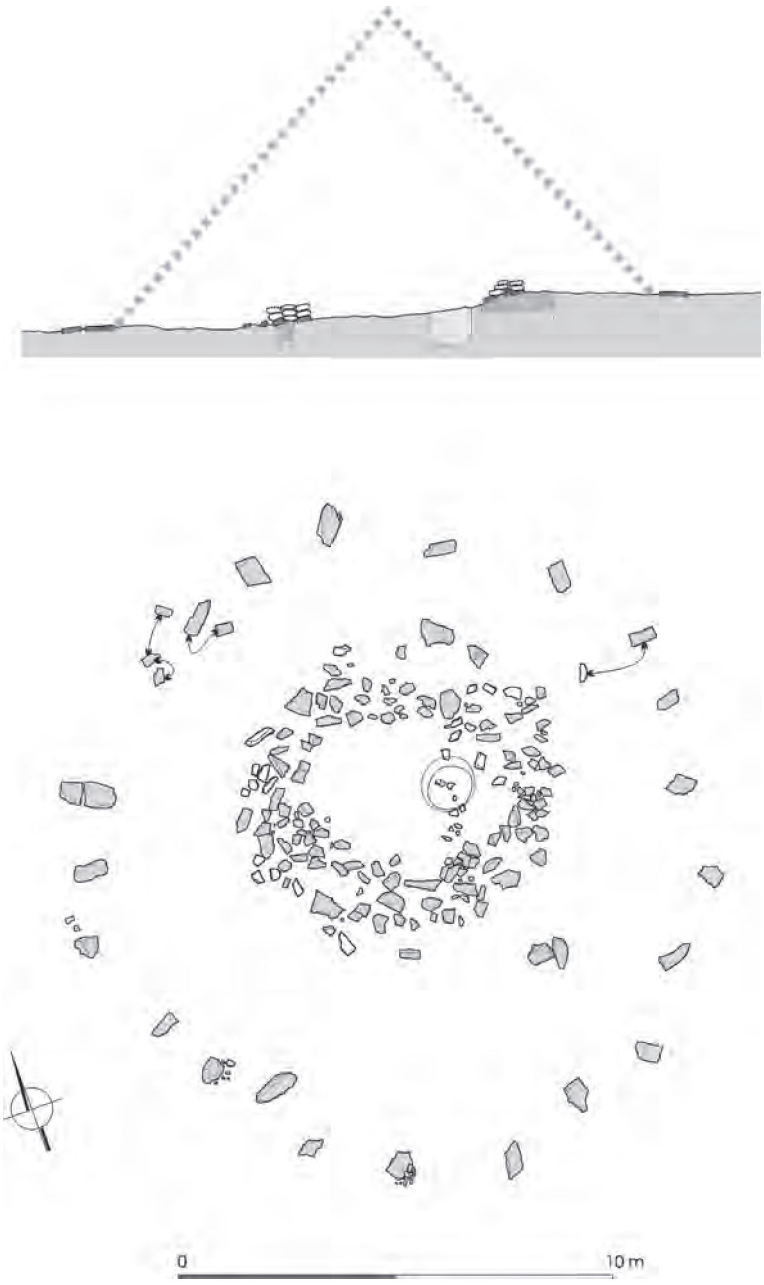

Fig. 11. Tumulus of Little Lord of Nabta Playa. Map and cross-section showing possible earthen superstructure. Drawing by M. Puszkarski



Fig. 12. Selected elements of the Solar Calendar awaiting packing. Photograph by R. Schild

compared with the sketch of the monument drawn in the 1992 field season (Applegate and Zedeño 2001, Figs 14.1, 14.2). All the intrusive, later elements of the structure were left in the field and the original ones numbered, photographed and packed in wooden boxes for transportation (Fig. 12). In total there were 37 stones thought to be the original vertical components of the installation, many of which, particularly those used for the construction of tall sights (gates) have been worked by flaking their sides (e.g., Figs 13-15); others, usually elongated blocks, may often show non-weathered, fresh bases indicating that the specimens were inserted in the sand (compare Figs 16-18).

Seven samples of the stelae were selected from the Western and South Eastern Fields of Stelae. The exact position of each of them was recorded in detailed maps of the fields. As to the third installation of the group, a "cow sculpture" recovered from the pit under the collapsed stelae of Complex Structure A, it had been brought to the Nubian Museum in Aswan already in the late 1990s by the Supreme Council of Antiquities following the excavations of Structure A (Site E-96-1) in the 1996 season (Wendorf and Królik 2001).



Fig. 13. Chipped vertical component of a sight. Photograph by R. Schild



Fig. 14. Chipped vertical component of a sight. Photograph by R. Schild

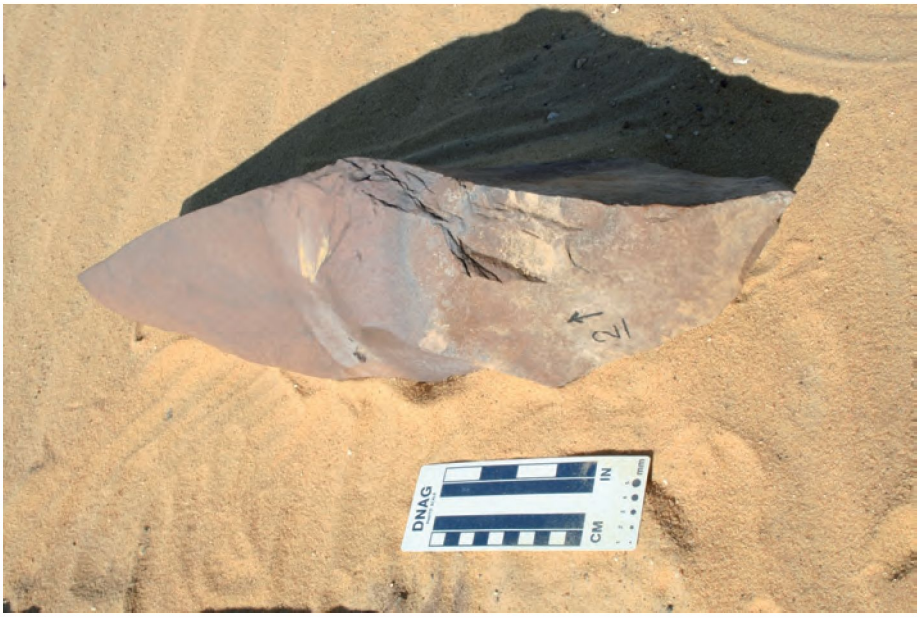

Fig. 15. Chipped vertical component of a sight. Photograph by R. Schild



Fig. 16. Vertical, blocky components of sights. Note fresh, non-weathered bases. Photograph by R. Schild



Fig. 17. Vertical, components of sights. Note a fresh base on specimen n. 10. Photograph by R. Schild



Fig. 18. Vertical components of sights. Note a fresh base on specimen n. 33 and weathered, truncated distal end. Photograph by R. Schild

Moving Selected Monuments to the Nubian Museum in Aswan

Following the permission of Dr. Zahi Hawass, the then Chairman of the Supreme Council of Antiquities, on February 10, 2008 the Combined Prehistoric Expedition, in the presence of an Extraordinary Committee headed by the late Undersecretary of State Mr. Atia Radwan (Fig. 19) as well as a police escort, successfully transferred selected monuments from the Neolithic Ceremonial Center of Nabta Playa to the Nubian Museum in Aswan (Fig. 20). The set contained seven sandstone stelae and thirty seven sandstone elements of the possible Late Neolithic solar calendar. Another element of the exhibit, a worked block of sandstone resembling a cow excavated from the pit dug underneath the Megalithic Structure A in the Western Field of Stelae was already in storage in the Nubian Museum.



Fig. 19. The late Undersecretary of State Attia Radwan sitting on a collapsed, broken stele (right) and Adel Kelany, Inspector of the Supreme Council of Antiquities at Nabta Playa during removal of selected antiquities in February 2008. Gebel Nabta in background. Photograph by M. Jórdeczka

Setting the Monuments in the Garden of the Nubian Museum

In March 2007, pending the permission of the Chairman of the Supreme Council of Antiquities to move certain endangered monuments of Nabta to the Nubian Museum director of the Museum Dr. Ossama Abdel Meguid selected a space for the monuments on the shelf of an ancient granite quarry in the front, western garden of the Museum (Fig. 21-23).

Probable Solar Calendar

The setting of the installations in the winter of 2009 began with the solar calendar. This complex appliance has been recognized as a probable ancient calendar indicating the summer solstice at the time of its use, or the beginning of the summer rainfall in the South Western Desert of Egypt. It was astronomically dated to



Fig. 20. Placing the stelae on a trailer. A box near the tarmac contains vertical components of the solar calendar. Photograph by M. Jórdeczka



Fig. 21. Nests carved in the granite prepared for the setting of calendar's sights. Photograph by M. Jórdeczka



Fig. 22. Sights and the ring ready to be set in the nests. Standing: (from left) police guard, Romuald Schild, Marek Puszkarski, Michał Kobusiewicz and Heba Tallah Abdelbaset Ahmad. Photograph by M. Jórdeczka



Fig. 23. Setting the sights in the concrete filling the nests. Photograph by M. Jórdeczka

about 4000 BC, basing on the assumption that the east of the north line of sights indeed points to the position of the rising sun at the time of summer solstice (Mc Kim Malville *et al.* 1998).

The remnants of the solar calendar were discovered on a small, but prominent, sandy knoll at the mouth of the Valley of the Sacrifices. The calendar was originally reconstructed as made of a stone ring, measuring nearly 5 m in diameter, with two lines of sight within the circle, constructed using several pairs of upright, elongated sandstone blocks, or "gates." The first line of sight points approximately to the north, while the second one may indicate the position of the rising sun at the summer solstice, marking the beginning of the rainy season in the desert. There are, however, other hypotheses concerning the use of the devise linking it with Sirius. The exact age of the device is not known, although a radiocarbon date from a nearby hearth indicates an age of about 4,900 BCE, a date contrasting with that suggested by the paleoastronomy.

The direction of the calendar sights or gates was copied from that recorded in the field on which the first reconstruction of the device has been based (compare Applegate and Zedeño 2001, Fig. 14.3). The new analysis of the original field records and the mapping and inventory of stones taken in the early February of 2008 suggested that the number of observation gates might have been slightly different than that proposed in the reconstructions made in 1992 and 1997, published in 1998 (McKim Malville *et al.* 1998, Fig. 3b) and 2001 (Applegate and Zedeño 2001, Fig. 14.3). Therefore, a new reconstruction of the monument was recommended in 2009. It seems that the partially shaped blocks making the elements of the sights have been more numerous than suggested in the 1992 reconstruction. This has implied the presence of at least four pairs of gates (sights) in the center of the devise instead of two gates suggested in the first reconstruction.

An important element of the installation is a proposed ring enclosing the sights. Its presence has been postulated on the basis of the scatter pattern of displaced slabs in the areas outside the sights, for no clear-cut outlines of a ring have been preserved in the archaeological record. Many of the slabs concentrated in the northwestern, or the highest section of the hillock outside the sights (gates) while several, dispersed flat stones rested on the northeastern and eastern slopes of the rise suggestive of an important downslope creep of the stones.

A relatively large number of flat sandstone slabs around the device, in its immediate neighborhood and at the foot of the hillock upon which the calendar was placed, makes the hypothesis of a ring plausible, but not incontestable (Fig. 24). Therefore, the installation assembled in the Museum Gardens is a



Fig. 24. Completed reconstruction of the possible solar calendar, looking north. Photograph by M. Jórdeczka

hypothetical proposal, perhaps the most likely under the circumstances, the strongest parts of which are the bearings of the sights. Details concerning the number of gates and the sheer existence of the ring seem to make the weakest parts of the hypothesis.

The Stelae

An installation of displaying seven specific stelae is made up of an assortment of the complete or nearly complete objects selected in February 2008 (Figs 25-29). The individual elements of the group have been collected from two major fields of stelae, the Western and the South East Field. The stelae have been set together to resemble the real individual clusters of stelae (compare Fig. 30), which today are without exception composed of collapsed and broken blocks. The stones face north, the circumpolar region of heaven where the stars never die and where there is no death at all. This is the region of Dāt, the goal of the deceased, the *Field of Offerings*, in which the departed will live as a successful spirit, according to Egyptian cosmology (compare Frankfort *et al.* 1961, 57). It is here that the spirits encounter their northern emergence into the world (Allen 2005, 10), and here that the king would become a circumpolar star (Spencer 1982, 140).



Fig. 25. Moving the largest stele towards its nest. Photograph by M. Jórdeczka



Fig. 26. Moving the largest stele towards its nest. Photograph by M. Jórdeczka



Fig. 27. Moving the largest stele towards its nest. Photograph by M. Jórdeczka



Fig. 28. Setting the largest stele in its nest. Photograph by M. Jórdeczka



Fig. 29. Setting the last stele in the nest. Photograph by M. Jórdeczka



Fig. 30. The stelae and the solar calendar, looking north; The Old Cataract Hotel in the background. Photograph by M. Jórdeczka



Fig. 31. The cow, looking west. Photograph by M. Jórdeczka

All the exhibited specimens show traces of working by knapping, some abraded by exposure to airborne sand. The work may be limited to certain parts of the blocks, i.e., edges and top (Stele 5 from Complex Structure A) or extend to the nearly entire perimeter of the slab (Stele 2 from Complex Structure B). Four displayed examples have rounded tops (Stelae 2-4, broken, 7).

All the stelae are believed to date to the Final Neolithic of the Western Desert. A radiocarbon assay, on charcoal from a pit underneath Complex Structure E at Site E-96-1 , Western Field of Stelae, gave a calibrated date of about 3400-3500 BCE (Wendorf and Królik 2001) while a series of radiocarbon measurements on charcoal from the hearths in the sandstone quarry supplying the blocks to stelae manufacturers indicate an activity in the 4500 – 3400 cal. years BCE age bracket.

The Cow

In February 2010 a crudely worked sandstone block, resembling very schematic outlines of a cow, was brought from the stores of the Nubian Museum and set in a nest carved in the granite next to the group of stelae (Fig. 31). It had been extracted from a pit under Complex Structure A of Site E-96-1 in the 1996 field

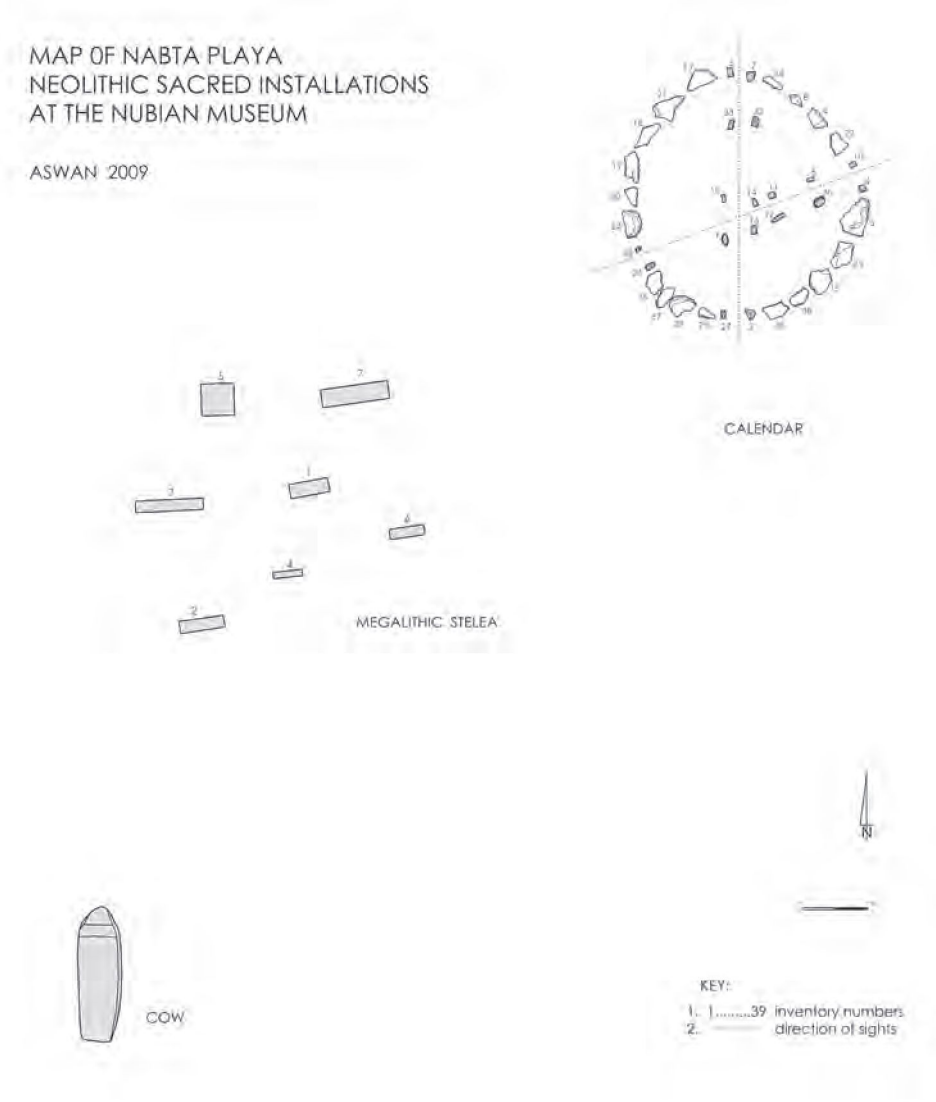

Fig. 32. Map of the installations. Drawing by M. Puszkarski



Fig. 33. Putting the Western Desert sand around the installations

season and transferred to the Nubian Museum by the Supreme Council of Antiquities a few years later. The cow has completed the display of the Nabta Playa Monuments in the Nubian Museum (Fig. 32).

The area in which the stelae and the calendar are placed has been covered by original yellow desert sand brought from the Western Desert to give an impression of the desert environment to the group (compare Fig. 33).

Closing Remarks

The sacred installations of Nabta Playa exposed in the outdoor area of the Nubian Museum are the first prehistoric architectural monuments ever exposed in an Egyptian museum.

Both, the possible calendar and the stelae, form an eye catching, impressive set of megalithic monuments that have not only a historical meaning, but make a profound artistic impression.

Acknowledgments

The removal and exhibition of the Sacred Installations from Nabta Playa in the Nubian Museum have been sponsored by the Combined Prehistoric Expedition Foundation and the Institute of Archaeology and Ethnology, Polish Academy of Sciences.

We wish to thank the Supreme Council of Antiquities, Dr. Zahi Hawass, then Chairman of the Council, the late Mr. Atia Radwan, Under Secretary of State for Upper Egypt Antiquities, Mr. Adel Kelany and Ms. Heba-Tallah Abdel Baset Ahmed Ibrahim, both of whom have been inspectors in Upper Egypt, for permitting us to move the antiquities to Aswan and erect the installations and for helping us throughout the project.

We wish to express our profound thanks to Dr. Ossama Abdel Meguid, Director of the Nubian Museum, Dr. Mohammed Rageh, Mr. Ahmed Abdelrahman and the staff of the Museum for their friendly support they gave us in the Museum and during mounting of the exhibition in the winter of 2008, 2009 and 2010.

Finally we wish to acknowledge the advice and assistance in a number of means of Professor Michał Kobusiewicz and Mr. Marek Puszkarski as well as the excellent photographs taken by Maciej Jórdeczka.

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Hunter-Gatherers and Early
Food Producing Societies
in Northeastern Africa
Studies in African Archaeology 14
Poznań Archaeological Museum 2015

Agnieszka Czekaj-Zastawny, Jacek Kabaciński

New Final Neolithic cemetery E-09-4, Gebel Ramlah Playa, Western Desert of Egypt

Introduction

Gebel Ramlah Playa is a paleo-lake adjacent from the south to Gebel Ramlah, a prominent hill located ca. 150 kilometers west of Abu Simbel. Region of Gebel Ramlah belongs to Egyptian part of the Western Desert (Lybian Desert) that covers close to 3 million sq. kilometers and extends from the western edge of Nile valley to Lybian border on the west and from Mediterranean Sea to Sudanese border (Issawi *et al.* 1999). That is an upland part of Egypt with average altitude between 250 and 320 meters a.s.l. (Fig. 1). Southern part of that area was for many years a research area of the Combined Prehistoric Expedition (Wendorf and Schild 1980; 1995-96; 2001; Schild and Wendorf 2001; Wasylikowa 2001; Nelson 2002; Schild *et al.* 2002; 2005;). In 2008 season, during one day trip from Gebel Nabta Playa to

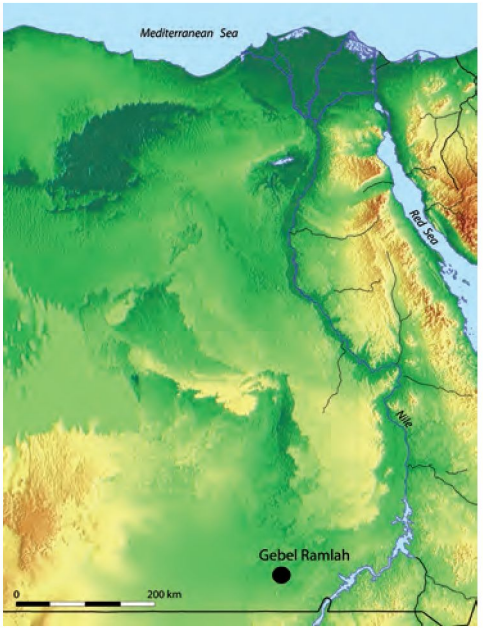

Fig. 1. Location of Gebel Ramlah Playa

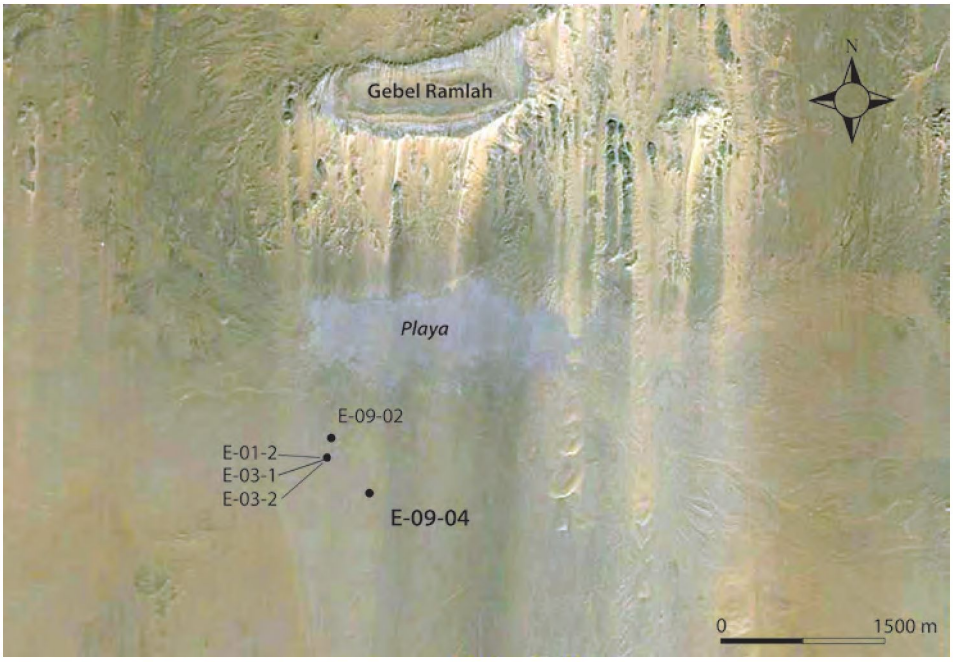

Fig. 2. Location of cemeteries of Gebel Ramlah

Gebel Ramlah, Marta Osypińska recorded an unknown settlement with eroded vessels, concentrations of animal bones and a fragment of bracelet made of shell.

In 2009 CPE field season A. Czekaj-Zastawny and J. Kabaciński have surveyed the area around a Final Neolithic cemeteries of Gebel Ramlah, excavated by M. Kobusiewicz, J. Kabaciński and J. Irish in 2001 and 2003 (Kobusiewicz *et al.* 2004; 2010). During that research the area of settlement recorded in 2008 was carefully checked. Several dozen meters south of the settlement remnants of a new Final Neolithic cemetery were recorded, named as E-09-04. Like other sites discovered in that season (cemeteries E-09-01 and E-09-02 as well as a single burial E-09-3) it is located on the southern edge of Gebel Ramlah paleo-lake. Site E-09-04 is located about 600 meters east of already published Final Neolithic cemeteries and cemetery E-09-02 (Fig. 2).

Site location and description of finds

The site is located at the northern pronounced promontory of a small hill surrounded by two small stream valleys (*wadi*) (Fig. 3). It was identified by the presence of objects that are usually found in the burials of a Final Neolithic on a deflated surface of the desert. During test excavations remnants of at least 2 graves were recorded.

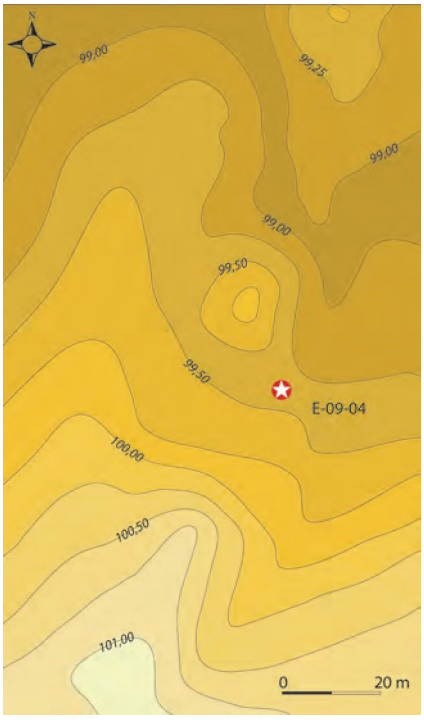

Fig. 3. Topographic map of E-09-04 cemetery area (after map of P. Wiktorowicz)



Fig. 4. Photograph of grave No. 1 before excavations

Grave No. 1.

On the top of the grave pit a large palette made of granite was recorded accompanied by two Red Sea shells of *Cypraea pantherina* and a piece of red ochre. Below these object a bottom part of grave pit was recorded to the depth ca. 10 cm below the surface. Horizontal dimensions of that pit were ca. 80 x 50 cm (Fig. 4-5). No human bones were preserved. Palette is rectangular in shape with rounded corners and measures 20,1 x 13,8 x 2,3 cm. On one of its surface traces of red colorant are visible (Fig. 6). Both *Cypraea pantherina* shells were of the same dimensions (8,4 x 4,3 x 5,2 cm and 8,5 x 4,1 x 4,8 cm), partially eroded and modified the same way: natural entrance to the shell was broaden by partial removal of denticulated edge (Fig. 7-9). One shell served as a container for malachite colorant. Traces of it are still visible (Fig. 10).

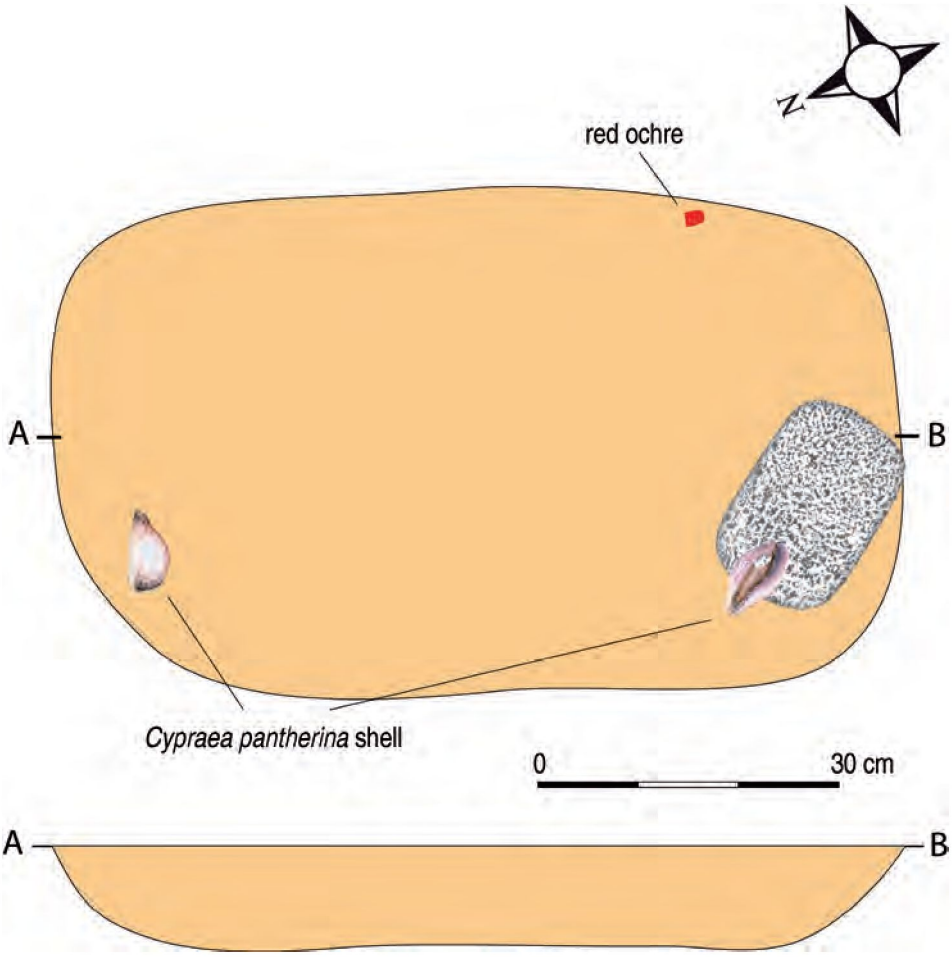

Fig. 5. Plan of grave No. 1

Grave No. 2

It was located ca. 1,5 meters north of grave No. 1. It was completely destroyed by deflation and neither grave pit nor human bones were preserved. It was identified by the presence of another *Cypraea pantherina* shell recorded on the surface. The shell itself was heavily eroded and only surface with modified entrance survived (Fig. 11).

Around above graves a few shallow, oval pits without any finds were recorded, most probably bottoms of other grave pits.

Final remarks

Site E-09-04 is another Neolithic cemetery identified on the shores of Gebel Ramlah paleo-lake. High degree of destruction do not allow to define its size and details of population buried here. However characteristic, even if scarce, grave goods allow us to synchronize that cemetery with a better preserved cemeteries of Gebel Ramlah located few hundred meters away. Good analogies of granite palette come from cemetery E-01-2 (Bur. 1, 2, 4, 6 and 12; Kobusiewicz *et al.* 2010, Fig. 1.8:2; 1.9:2; 1.13:21; 1.18:2; 1.21; 1.23:6; 1.24:5; 1.40:5; 1.41:9), E-03-1 (Kobusiewicz *et al.* 2010, Fig. 1.700 and cemetery E-03-2 (Bur. 6, 8 and 9; Kobusiewicz *et al.* 2010, Fig. 1.89:6; 1.90:5; 1.98:7; 1.99:1; 1.100:7; 1.101; 1.103:2). Also shells of *Cypraea pantherina* are found in the graves of Final Neolithic cemeteries of Gebel Ramlah, namely in burial No. 11 of a cemetery E-01-2 (Kobusiewicz *et al.* 2010; Fig. 1.38:4; 1.39:3; Kurzawska 2010) and burial 9 of cemetery E-03-2 (Kurzawska 2010; Kobusiewicz *et al.* 2010, Fig. 1.99:4; 1.100:2; 1.101).

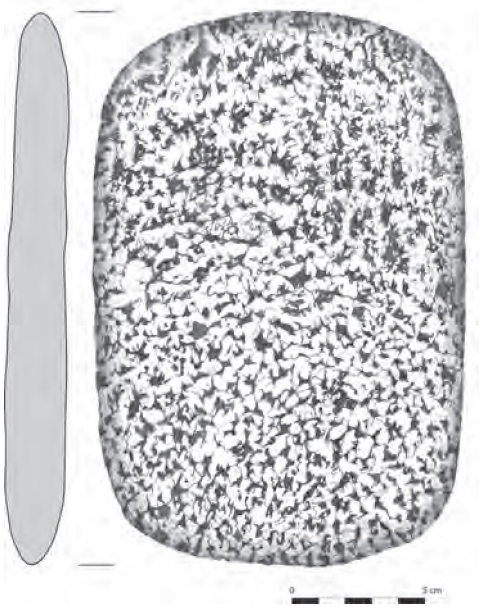

Fig. 6. Granite palette from grave No. 1 (drawn by J. Mugaj)

Another site where analogous objects were recorded is a cemetery marked as R12 located much more to the south, in the Southern Dongola Reach. The cemetery is very large and was used for a long time (Salvatori and Usai 2008: Table 13.1), however at least part of burials can be synchronised with the Late or Final Neolithic of the south-eastern Desert of Egypt (Wendorf and Schild 2001) . Of 154 burials some contained palettes made of granite - grave 44, 94, 101, 110, 129, 142, 144 (Salvatore and Usai 2008: Fig. 16.71:110; 16.77: 510, 511; 16.146:429; 16.157:443; 16.201:701; 16.232:890; 16.236:785; Pl. 5.6; 5.7). Another burial – grave No. 78 (Salvatore and Usai 2008: Pl. 11.18) was furnished with a shell of *Cypraea pantherina*.

In spite of a fact of total destruction of the E-09-04 cemetery, that is another evidence of a developed ceremonial behavior of the Late and Final Neolithic populations inhabited the area around Gebel Ramlah lake. A unique presence of chronologically different Neolithic cemeteries within the area of a few square kilometers makes exceptional chance to follow changes in burial rites in the younger part of the Neolithic.



Fig. 7. Grave No. 1. Shell of *Cypraea pantherina* (drawn by J. Mugaj)



Fig. 8. Grave No. 1. Shell of *Cypraea pantherina* (drawn by J. Mugaj)



Fig. 9. Grave No. 1. Photograph of shells of *Cypraea pantherina*



Fig. 10. Grave No. 1. Photograph of malachite in a shell of *Cypraea pantherina*



Fig. 11. Grave No. 2. Photograph of shell of *Cypraea pantherina*

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The Late Neolithic: Regional Diversity and Cultural Unity in Central Sudan

Introduction

The so-called Late Neolithic term is applied to some sites that share similar material culture, graves, and subsistence economy. Some sites like Shaqadud Cave are related to this period although they exhibit exclusively a local material culture and mode of life. Other sites like es-Sour (Sadig 2005) have dates belonging to the Late Neolithic although they remained and continued without any changes throughout their time span. There is, however, sufficient evidence to show continuity in these sites and to suggest that they represent a continuous cultural tradition. An unknown sequence of occupation can be traced through the 4th millennium BC. This means that any attempt to divide the Neolithic period of Central Sudan must include specific studies of the material culture and modes of life. Any division must not be restricted to chronology; it must also be applicable to the whole cultural elements of every site.

The Late Neolithic development of the Central Sudan represents a wide distribution of the post-Khartoum Neolithic "cultures/horizons" (c.4000 BC) which spread from the Shendi Reach south of the Atbara River down into the Gezira Plain between the White and Blue Niles (Fig. 1, 2). These "cultures/horizons" can be grouped into three distinct regional manifestations:

1. The first of which existed in the Shendi Reach area and is associated with the sites of el Kadada (Geus 1984a) and es-Sour (Sadig 2010).

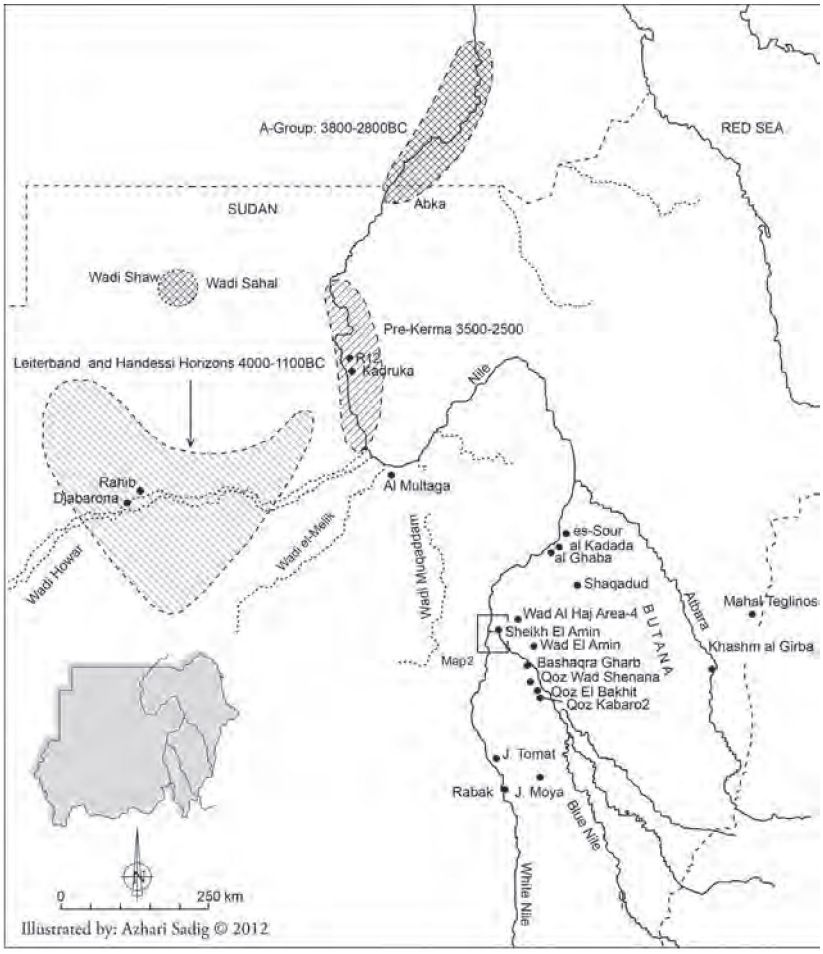

Fig. 1. Location of Neolithic Sites 1

2. The second existed in the Khartoum region and is primarily associated with Late Neolithic burials at Esh Shaheinab, Omdurman Bridge, and el Geili (Arkell 1949; 1953; Caneva 1988).
3. The third regional manifestation of the Late Neolithic existed in the Butana and is associated with the site of Shaqadud (Marks and Mohammed-Ali 1991) and maybe the Blue and White Niles (Haaland 1987; Fernandez *et al.* 2003).

The first two Late Neolithic developments in Shendi and the Khartoum region appear to be very closely related to one another and probably represent a single facies which contained two or more "culture/horizon" groups (Caneva 1988: 163-187). The third development, associated with the middle to southern Gezira

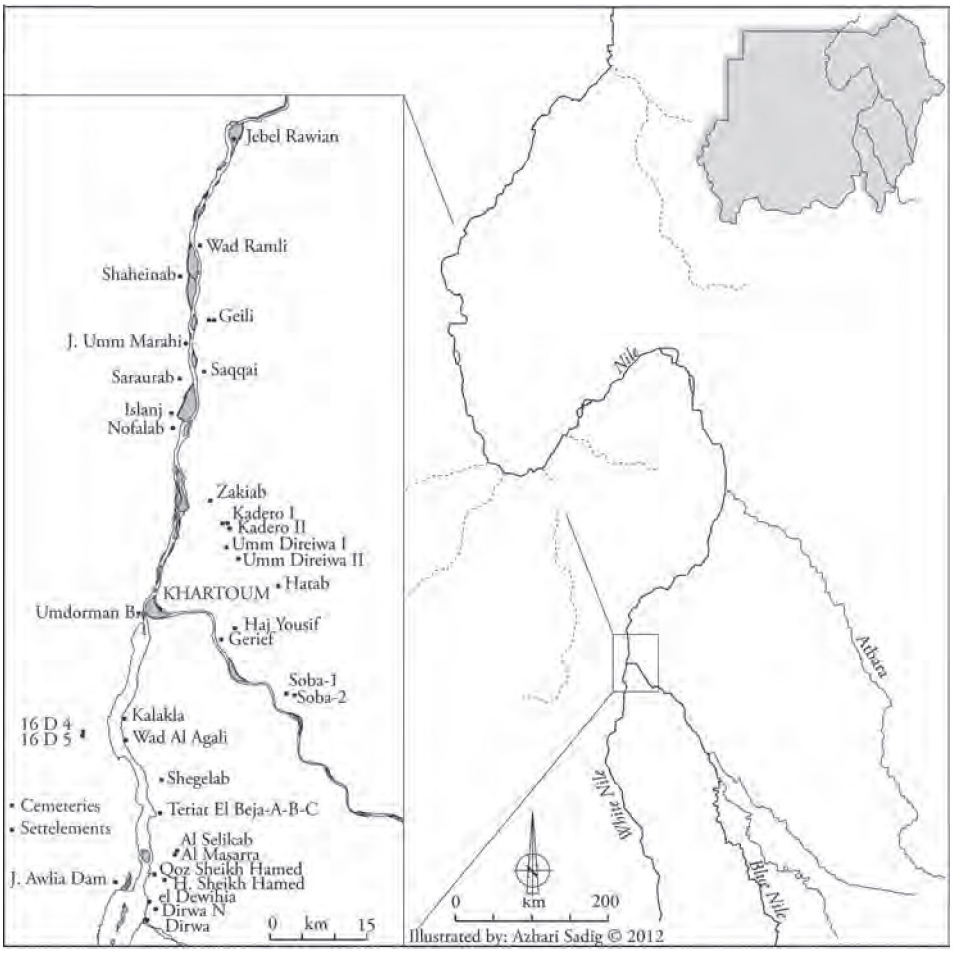

Fig. 2. Location of Neolithic Sites 2

Plain, appears to represent another facies which does not share as many common elements as the first two do. It is very likely that this particular facies is later in time than the other developments in the Shendi Reach area and the Khartoum region. The common denominator among these Late Neolithic developments within the Central Sudan is that they were indigenous to the region and probably evolved out of an earlier Khartoum Neolithic base (Geus 1984a; Haaland 1987; Caneva 1988).

Late Neolithic Subsistence Economy

The archaeological evidence of Neolithic subsistence shows that the people practiced subsistence using multiple resources during late Neolithic. There is evi-

dence for food production based on animal husbandry since 6000 BP. It seems that all the riverine setting of the Central Sudan during the VIth and Vth millennium BC, was occupied by populations following basically similar mixed economy strategies, which consisted of the following (based on Krzyżaniak 1984: 314):

1. Riverbank Adaptation: subsistence based on fishing, collecting and hunting, supplemented by small-scale animal husbandry (possibly only of the ovicaprids).
2. Valley Plain Adaptation: subsistence based on large-scale animal husbandry (mainly cattle) of a pastoral character combined with the intensive collecting (perhaps already with elements of specialization) of seeds of wild tropical cereals, other grasses, tree fruits, mollusks, and some hunting. The remains from the Neolithic sites in Central Sudan represent a sedentary or semi-sedentary mixed economy population, which in some cases included cultivation of domesticated plants, and herding of domesticated animals. Haaland has argued that the processes of cultivation started at an early date and constituted the selection pressures which finally led to the evolution of domesticated sorghum (Haaland 1987).
3. Wadi Adaptation: subsistence based probably on pastoralism, hunting and collecting. This adaptation can be observed at the sites of Shaqadud (50 km from the river Nile bank), Sheikh el Amin (18 km), Wad el Amin (25 km), Bir el Lahamda (40 km), and at Wadi Rabob (58 km).

All of the three systems were found in one or more late Neolithic sites. According to Haaland (1978) that some "inland" sites might have been occupied as herding camps during the rainy season. The recognition of "base camps," as opposed to other site types, rested not only on the large size of such sites as Kadero but also on the presence of large numbers of grinding stones (Haaland 1979). In addition, Haaland went on to postulate that large numbers of grinding stones implied cereal cultivation, in spite of the fact that the earliest evidence for domestic cereal (sorghum) in the central Nile Valley was from the site of Jebel et Tomat, dated to A.D. 245 ± 60 (UCLA 1874) (Clark and Stemler 1975), though Fuller and Hildebrand (in press) suggested that the domesticate sorghum (Sorghum bicolor) was present in Nubia and Libya by 0 BC.

Clark (1973: 59) stated that "...the prehistoric populations of Jebel Tomat were cultivating sorghum, owned stock, were hunters, fowlers and also fished". No evidence was found of permanent dwelling structures and this "suggests the use of light, easily transportable shelters of mats or grass". At the time the settlement was occupied, the Jebel would have been almost an island at flood time (July to

December) and it may be suggested that Jebel et Tomat was a wet season (flood time) settlement of a population that "spent the other part of the year living on the Nile itself and practicing a regular system of transhumance between the Nile and the jebel, in a similar manner to the traditional pattern of the pastoral population in the region today practicing dry cultivation of sorghum during the rains which now fall in July and August. The whole region of the Gezira Plain south of Jebel Aulia is today cultivating only Sorghum and Pennisetum but the earliest evidence of them is too recent to be of use. Other late evidence comes from Abu Geili, north east of Khartoum, where a Meroitic engraving of King Sherkarer (c.12-17 A.D.) shows what appears to be a field of Sorghum (Shinnie 1967: 51).

According to Marks *et al.* (1985: 261) the Shaqadud people "...had adapted primarily to grasslands and were not merely Nilotic folk exploiting the savanna after the summer rains as had been postulated. Furthermore, "....there is relatively little evidence for riverine exploitation, in spite of the presence of both the Atbara and Gash rivers in the core area". The authors speculate that Shaqadud is probably one of many yet undiscovered sites that show this grassland adaptation, and that it was likely part of a larger tradition that spread eastward from the Butana steppe all the way to the Ethiopian border. However, based on the work in Eastern Sudan (Fattovich *et al.* 1984) it is no longer realistic to view sites such as Shaqadud as merely "...eastern outliers of a Nilotic adapted culture (Marks 1991: 31) or as places to which Nile herders moved their livestock after the rainy season. We are now faced with the larger problem of explaining why large stratified sites exist in the Butana and the Atbai and how they relate to contemporary occupations in the Nile Valley.

Present state of knowledge about the Late Neolithic in Central Sudan

Four "Cultures/Horizons" can be recognized in the Neolithic context of Central Sudan (Sadig. 2012, 2013):

1. Classic Early Neolithic Horizon: sites contain the typical Esh Shaheinab material culture, especially gouges (Geili, Nofalab and Kadero I).
2. Terminal Early Neolithic Horizon: sites share some traits with Esh Shaheinab but lack gouges (Rabak, Jebel Tomat, and Nofalab2).
3. Late Neolithic Horizon Type A: sites like el Kadada are partly contemporary with the late period of other two assemblages listed above but reflect more sophisticated material culture than them (Es-Sour). Some similar materials have also come from a small cemetery at Geili, partly overlying the Early Neolithic settlement (Caneva 1988).

4. Late Neolithic Horizon Type B: this horizon contains different sites with archaeological materials that differ partially from riverine sites (Shaqadud (A), formerly Jebel Moya (Phase II)[1] and Jebel Tomat).

The first and second horizons cover the 'Early Neolithic' of the Central Sudan, broadly spans the 5th millennium BC, while the third and the fourth horizons related to the 'Late Neolithic', runs through the 4th into the early 3rd millennium BC. The late Neolithic clearly continues much later in some parts of the Central Sudan, even if we still know relatively little about the later prehistory of many regions.

Late Neolithic Horizon Type A

1. Shendi Area:

Excavation at el Kadada showed the presence of Neolithic remains consisting primarily of burials in the form of either child pot burials or normal adult inhumations in grave pits. No remains of habitations were found, although finds were collected from what is likely a settlement area (Geus 1984a). The combined remains show an intriguing combination of features from the Khartoum Neolithic, the A-Group, and the C-Group complexes. Two radiocarbon dates obtained from shell samples (4630±80 B.P. and 4830±50 B.P.), indicate a definite contemporaneity with the A-Group to the north. The similarities with the Esh Shaheinab Neolithic are not numerous, but at the same time, they cannot be ignored. These include "...serrated Nile bivalves...amazonite beads, lip-plugs, barbed bone harpoons, [and] shell fish hooks (Geus 1984b: 369). Important differences between el Kadada and Esh Shaheinab occur in the pottery decorations and in the complete absence of the gouge at el Kadada.

Similarities with the A-Group are far more numerous and include some distinctive decorated bowls very similar to examples found in the A-Group "Royal cemetery" at Qustul (Geus 1984a: Plate 12; Williams 1986: Fig. 34), frequent occurrence of circular or sub-circular grave shafts, super imposed burials, and a large quantity of grave goods inside the shafts. Undecorated sherds, related mainly to quite coarse, black-topped red wares, were found in the Neolithic site of Es-Sour, 15 km north of el Kadada (Sadig 2005; 2008a; 2008b). Such black-topped red wares have been found at Esh Shaheinab (Arkell 1953: 75) and Geili (Caneva 1988: 110). They are also reported to have been quite common at Kadero, el Kadada and among the pottery assemblage of the A-Group of Lower Nubia (Nordström 1972: 88-89) and are consistent with the relatively late 14C dates obtained for the site at

[1] See the contribution by M. Brass in this volume for the new chronology, based upon a re-examination of the pottery and OSL dates on the pottery

Es-Sour (Wk23036: 5296±48 BP [cal. BC:4140±80], Wk23037: 5330±54 BP [cal. BC:4160±80], Wk23038: 5180±48 BP [cal. BC: 4000±40]) (Sadig 2008a). These dates slightly earlier than the oldest dates from el Kadada (GIF-5770: 5170±110 BP (Geus 1981) [cal. BC: 3990±160]).

Typical C-Group characteristics evident in the el Kadada material culture are the abundance of black incised pottery, sometimes with white filling, as well as the presence of the circular grave shafts that are special of the early C-Group. It may well be wondered how the site of el Kadada was assessed given these cross-cultural characteristics. Geus (1984b: 368) proposes that the culture be viewed as "...a late and brilliant development of the Central Sudanese Neolithic, presenting a number of affinities with the A-Group and C-Group of Lower Nubia", but he also cautions against adopting Arkell's terminology too literally for this site (Geus 1984a)

One of the most important observations at el Kadada cemetery concerns the superimposed inhumations of two and three individuals. A comparative analysis of these burials seems to indicate the presence of human sacrifice in those tombs containing three bodies. If confirmed, as Geus said, "this would be the first occurrence of a custom destined to become widespread in later times, particularly in Kerma" (1984a: 58). Geus argued that the presence of human sacrifices, the increasing complexity of the graves and their grouping in clusters are all factors that point to "a non-egalitarian society in which the elements of social differentiation were beginning to exist" (1984a: 58).

2. Khartoum Area:

Along the riverine Central Sudan, some evidence may indicate that some populations continued to live in the region. The recent finds of tumuli at Umm Singid (Wadi Kanjer, Khartoum North), dated to 3220 BP [cal. BC: 1506] (Caneva 2002), and with some cross-hatched pottery similar to that of the Nubian Pan-Grave culture in Northern Sudan and the Mokram group in Eastern Sudan, ancestors of the present-day Beja Cushitic-speakers (Sadr 1990), appears to be a further support for the existence of some population in the Khartoum region during the middle of the second millennium BC. There is also late materials from Khartoum Hospital (Arkell 1949) and Saggai (Caneva 1983), which has been almost completely ignored in research so far. Arkell (1949. 49) noted that some of later sherds found in this site might belong to a ware also found at Jebel Moya and "not earlier than the Napatan Age". Arkell also noted some sherds dated to what he termed as "protodynastic date" (1949: 95). Sherds from two or three fine red ware bowls were attributed to "Pan-grave ware"....."seems to be that they come from a Pan-grave"

burial" (Arkell 1949: 95). In Saggai, Caneva (1983: 28) reported late Neolithic graves that are differ totally in shape as well as their depth from late Neolithic graves in the region. These data, along with those from Khartoum hospital site need more detailed analysis in terms of cultural identity.

There are no sites in the Khartoum area, except Nofalab2, that yielded a C14 date after ca. 3000 BC. According to Khabir (*per. comm.* 2011), the dates from Nofalab2 (4230±220 BP [cal. BC: 2860±320], 4130±220 BP [cal. BC: 2690±270]) were found in full association with pottery and lithic finds that are akin to Esh Shaheinab and other related sites (equivalent to what he has termed "a late Khartoum Neolithic Horizon"). The absence of gouges – typical of early and classic Neolithic criteria - coupled with the steady increase of more refined pottery in this occupational level mixed with ashes seems to reinforce this suggestion (Khabir 2006). With these dates, it seems that Esh Shaheinab phase lasted far longer than originally thought.

Late Neolithic Horizon Type B

1. Southern Central Sudan:

Three sites in the Gezira Plain south of Jebel Aulia- Jebel Moya (Addison 1949), Jebel Tomat (Clark 1973), and Rabak (Haaland 1987) - have given dates between 2600-2000 BC. The late Neolithic component associated with these sites has been termed the Jebel Moya tradition or complex (Clark 1973: 60; 1984: 122-124; Haaland 1987: 220). The ceramics of "Jebel Moya Complex" combined shapes and motifs resembling those of C-Group, Kerma and Butana Group ware (Gerharz 1994: 334). Both Clark and Haaland believe that the Butana Group might be a part of the Jebel Moya Complex (Clark 1984; Haaland 1987), though the Butana comparison has subsequently been disputed by Winchell (2013). Furthermore, Brass (2013), has since shown that there are no sherds with anything beyond a superficial resemblance to pottery from the Kerma, C-Group or Butana groups and has proposed a different chronology for the site.

The site of Jebel Tomat is situated about 40 km due west of Jebel Moya on the east side of the White Nile. Jebel Tomat consists of an extensive village occupation with graves, which probably began sometime during the late Neolithic and lasted well into Meroitic times (Clark 1973; 1984). The bulk of the occupation at Jebel Tomat consists of a midden deposit approximately 120 cm in depth. One radiocarbon date recovered at 80 cm below the surface placed the early occupation of the site at about 2600 BC (Clark 1973: 57).

The site of Rabak (also referred to as Kosti) is situated on the east side of the White Nile (ca. 3 km from the river's edge) about 20 km upriver from Jebel Tomat

and about 40 km to the east of Jebel Moya (Haaland 1987: 35, 45). Of the three sites, Rabak has the clearest evidence of a late Neolithic occupation in this part of the central Nile Valley. This site is about 16,000 m2 in size and has about 60 to 80 cm of midden deposits (Haaland 1987: 45-46). In the lower levels of the deposit is a Khartoum Neolithic occupation, while the upper levels contain a Late Neolithic occupation. The Khartoum Neolithic occupation dates roughly between 6000 and 5800 BP, while the Late Neolithic occupation dates to about 4500 BP (Haaland 1987: 61). Given that there is an approximate gap of 1500 years between the latest Khartoum Neolithic occupation and the Late Neolithic occupation, it is possible that there was a settlement hiatus between the Khartoum Neolithic and Late Neolithic at this site (Haaland 1987: 46). However, Haaland argues that the ceramics at Rabak represent a continuous sequence between the Khartoum Neolithic and the late Neolithic components there (Haaland 1987: 362). The lithics are also very reminiscent of the earlier Khartoum Neolithic material (however, no gouges are at Rabak) farther north (Haaland 1987: 35, 46).

The ceramics of the late Neolithic occupation at Rabak consist of mostly simple contour vessels with either smoothed or wiped exteriors (burnishing is less common) with impressed decorations (dots, and simple dentations) many of which have been restricted to the rim portion of the vessel (Haaland 1989: 362–364). The chipped stone artifacts from Rabak were manufactured from flakes (mostly of quartz) consisting mostly of retouched flakes followed by convex and concave scrapers (Haaland 1989: 361-362). Some of the larger chipped stone artifacts (mostly convex scrapers) were made from rhyolite (which was a preferred raw material used in the Khartoum Neolithic in the Khartoum province) imported from the 6th Cataract some 300 km north of Rabak (Haaland 1989: 362).

As mentioned earlier, the sites of Jebel Tomat and Rabak also have ceramic assemblages associated with the Jebel Moya complex. Of these two sites, only the ceramics from Rabak have been published in any detail (Haaland 1987, 1989) As it has been previously pointed out, Rabak (which is only 40 km to the west of Jebel Moya) consists of a multi-component occupation and contains both Khartoum Neolithic and Late Neolithic ceramics, of which the later are believed to be affiliated with the Jebel Moya complex (Haaland 1987: 46-47; 1989: 363-365). It was also felt that the ceramics at Rabak show a development from the Khartoum Neolithic to the Late Neolithic.

Some of the Rabak sherds associated with Haaland's Jebel Moya complex are also found in the Khartoum Neolithic levels. according to Brass (2013), The Jebel Moya-like sherds are found in Layer 2, the second youngest lay-

er. Also, Jeble Moya OSL dates (Brass 2013), cast serious doubt on the Layer 2 date from Rabak or at least on the stratigraphic association of those Jebel Moya-like sherds with Layer 2. So a huge question mark over associating the sherds with the Khartoum Neolithic. As mentioned above, Haaland believes that the Jebel Moya complex (at least at Rabak) may have developed out of the local Khartoum Neolithic (Haaland 1989: 364). This is based on the fact that there is an overall gradual trend of the appearance and disappearance of varying ceramic types between the Khartoum Neolithic and late Neolithic levels at Rabak. Indeed, Haaland believed that level 2 at Rabak represented a transition between the Khartoum Neolithic and the late Neolithic. At the site of Jebel Tomat, there is an increase in the frequency of thin burnished sherds through time, as well as an increase of large pots (assumed to be smoothed) with "thick rolled" (exterior thickened) rims (Clark 1973: 58). However, it is important to note that there are no burnished sherds at Rabak.

Based on the sites of Jebel Moya and Rabak, no Kerma or Napatan artefacts have been uncovered at Jebel Moya (Brass 2013). Among the impressed decorated ceramics, dentated (evenly serrated edge) rocker stamped and double pronged decorations (alternate pivoting stamping) were common (for Assemblage 1 and for aspects of Assemblage 3, but not for Assemblage 2 (Brass 2013). As mentioned above, this later decoration is also commonplace in the late Neolithic ceramics of the central Nile valley farther to the north (Geus 1984a; Caneva 1988: 112, 179).

As part of an ongoing programme of research, Brass re-examined the extant archival excavation records held at the Duckworth Laboratory for the first time since Addison. These records were combined with the laboratory's osteological database to construct a new, updated and expanded Register of Graves for Jebel Moya (Brass 2013). Three assemblages have been determined from the remaining Jebel Moya pottery assemblage at the British Museum, totaling 486 (mostly) rim sherds. None of the assemblages were directly associated with "late Neolithic" as mentioned in earlier publications (Clark 1973, 1984; Haaland 1987). Although there are Jebel Moya-like sherds at both sites, It's the very unclear dating from each site (shell from Rabak and one Neolithic from Tomat). In short, the chronology of the early occupation of both sites needs revision.

Similar material from Rabak has been discovered near Kawa (40km north of Rabak), and at Soba (30 km south of Khartoum). Surface collection from the White Nile (Dwahiaya site near Jebel Awlia), Central and west Gezira (Qoz sites) seem likely to relate to a 'late" phase of a Neolithic occupation and this is confirmed at the sites of Kabarao and Qoz Bakheit.

The site of Shaqadud in the western Butana presents a different panorama. Identification of Shaqadud as a Neolithic site is far from the truth; Shaqadud is a complex site, which includes several sub-sites and several occupation phases, including a distinctly "Post-Neolithic" one (Shaqadud Cave). The occupation at the site continues through to ca. 2000BC. Pottery from the site also bears comparison with northern traditions of the third millennium BC, with black and red burnished wares and heavily incised decoration. The Atabai plains east of the Nile in Eastern Sudan increasingly appear as culturally distinct from the riverine areas by the fifth millennium (Mohammed-Ali 1985: 26). Neolithic sites have been located in this area, contemporary with the last half of what has been designated the Kassala phase; there occurred a group of over fifty sites termed "Jebel Mokram". This phase has been generally dated to around 2nd millennium B.C. and is characterized by seasonal occupations of nomadic groups who moved into the Butana and the Atbai (Mohammed-Ali 1985; Fattovich *et al.* 1984: 182).

2. North and East of Central Sudan:

In Lower Nubia, the Abkan "Early" Neolithic is followed by the so-called A-Group culture that has been radiocarbon dated from the mid-4th to the mid-3rd millennium BC. Evidence related to the A-Group culture is located along the Nile between Kubbaniya, north of Aswan in Egypt, and Melik en Nassir, south of the Second Cataract (Nordström 1972). Other evidence was located far west near Laqiya and Wadi Shaw (Lange 2006). Among the main areas, substantial differences in the archaeological remains, such as the typology of the shafts of tombs, pottery, the evidence associated with the burials and other materials included in the grave goods, were noticed.

According to Salvatori (2008: 143), it is possible to recognize the following Neolithic sequence in Upper Nubia:

1. An early Neolithic phase in the cultural sequence of Upper Nubia starting around 6000 cal BC. Unfortunately, the el-Barga Early Neolithic actually covers only the first half of the 6th millennium BC and a gap of almost five hundred years separates it from the Middle Neolithic A at Kadruka cemetery and el-Barga settlement.
2. The 5th millennium BC is well represented by some of the Kadruka and el-Multaga materials.

Almost nothing is actually known about Upper Nubian cultures during most of the 4th millennium BC. The last date refers to the beginning of the so-called Pre-Kerma period discovered in the Kerma region. The Pre-Kerma period is ra-

diocarbon dated between the end of the 4th millennium and the beginning of the 3rd millennium BC (Honegger 1997).

A small number of sites were located in the Third Cataract region which may be dated to the 'Late Neolithic' of this region, commonly identified as the 'pre-Kerma', currently dated to the later part of the fourth millennium BC and continuing through the first half of the third millennium BC (Edwards and Sadig 2011). Again, identification of sites has depended on the presence of some very distinctive styles of pottery decoration, showing many correspondences with the long-known A-Group of Lower Nubia (Edwards 2004: 66-8), currently best known from the Kerma area (Honegger 2004a; 2004b). In this respect it must be noted that a number of sites where thin scatters of lithics and undecorated sherds were encountered may well be of broadly 'late Neolithic' date; it seems likely that on occasions such material is not always easily distinguishable from similar material dating to the Kerma period.

Some chance finds of polished stone tools, while lacking context, must also be considered as perhaps falling into this period. These include finds of polished stone axes from the Arduan area and a mace-head found beneath Jebel Agetteri. It may also be noted here that two further axes were found by Azhari Sadig on the hill-slopes west of Handikke in 2008. This recent find would seem to be an interesting example of a deliberate caching, or some other form of (ritual?) deposition, of a kind not previously encountered in the Middle Nile.

The region of Wadi Howar and the adjacent areas provide evidence for human occupation between the 6th and 2nd millennia BC. The first traces of human occupation are represented by pottery decorated with dotted wavy line and Laqiya-type patterns, which date to the 6th and 5th millennia BC. Humans practised fishing, hunting and gathering. During the 4th millennium BC, a new mode of subsistence appeared: intensive cattle herding. Leiterband and Halbmondleiterband patterns are typical for the decoration of pottery in this period (Jesse 2008). In Lower Wadi Howar, incised herringbone patterns appeared. With the onset of the Handessi Horizon at around 2200 BC, which is characterized by geometric patterns, a further change in the way of subsistence occurred. In response to increasing aridity, small livestock like sheep and goats were added to the herds. The varying intensity of human activities in different areas of the Wadi Howar region can clearly be attributed to environmental changes. At the beginning of Holocene occupation, all sectors but Middle Wadi Howar which was too wet and marshy were intensively used. With the Leiterband Horizon, the focus of occupation shifted to Middle Wadi Howar. During the Handessi Horizon, the Ennedi Erg

region and Lower Wadi Howar were no longer suited for permanent habitation due to increasing aridity. Lower Wadi Howar was, however, still used as an important thoroughfare. Site distributions show a growing concentration along Middle Wadi Howar after the 3rd millennium BC, thereby reflecting the climatic change with increasing aridity spreading from north to south.

In the further east, surveys beyond the River Atbara have identified many sites on the steppes between the Atbara and the Gash, known as the 'Saroba Phase', for which dates in the 5th millennium BC have been suggested (Fattovich *et al.* 1984). Parts of this area seem likely to have still been swampy, at least on a seasonal basis. The local populations seem to have remained essentially hunter-gatherers, with evidence for the hunting of mainly smaller mammals like small bovids, warthog, and monitor lizards as well as the collection of Pila shells. The eastern region increasingly appeared as culturally distinct from the riverine areas by the 5th millennium BC. Domestic livestock seems to have reached the region fairly later than areas further west, probably in the late 4th millennium BC, and is associated with the 'Butana Group', sites lying along the Atbara and the palaeochannels of the Gash which at that time flowed west to join the Atbara. During this period, the channel of the Gash seems to have progressively moved eastward, reaching its present course in perhaps the 2nd millennium BC. Hunting and the exploitation of aquatic resources were still important among those who may have been relatively sedentary. The pastoral element seems to have become more prominent during the 3rd and early 2nd millennia BC, identified as the 'Gash Group', occupying and exploiting the Gash Delta, with settlements of varied size scattered across the alluvial plain (Edwards 2004: 64). Some have deep *in situ* deposits suggesting that they were stable, long-occupied settlements, while others were quite ephemeral.

Late Neolithic as seen from the recent excavation at es-Sour

The site of el-Sour (16°57"045' N / 33°43"133' E) is located about 35 km north of Shendi, 1.5 km from the right bank of the Nile and west of the Khartoum-Atbara railway (Fig. 1; 3). It was discovered during a field-training season of the Department of Archaeology, University of Khartoum, in February-March 2004. It occupies an area of approximately 176 x 90 m (64 x 90 m for the main kom) and while generally flat, it features two low mounds in its eastern part. The nearby village extends over much of the western part, while the central part of the site has been much disturbed by tracks running across it. Currently, three C14 dates are available[2] (see above).

[2] A freshwater mollusk (Nile oyster) shells from levels between 20 and 50cm in squares C6, B13 and F7. Performed at the Radiocarbon Dating Laboratory of University of Waikato, New Zealand,

These dates place the site in the middle Neolithic of central Sudan (labeled in this paper as Late Neolithic Horizon Type A) and perhaps slightly earlier than the oldest dates from el Kadada (GIF-5770: 5170±110 BP) [cal. BC: 3990±160] (Geus 1981).

Following the discovery of the site, surface collections and test excavations were carried out in five seasons (2005-2009). The finds from es-Sour seemed to be scattered over the site with no definite arrangement, except for the greater concentration at depth.

The lithic inventory includes flakes, cores, a few retouched tools, crescents, burins, borers, and grinders. The finished tools are few and poorly made. They exhibit a somewhat limited technological and typological variability. The occurrence and density of artifacts was variable but continuous, from the surface down, although the largest group was concentrated in the top 50 cm of deposits. No polished stone tools and gouges of the type found at El Shaheinab were found, except for two small fragments of granite palettes found on the surface. It is odd, however, that our sample contains only one identifiable, broken polished axe. However, one interesting find was small rhyolite artifacts of characteristic shape and two small hollows on both faces. Their function remains uncertain, although the shape suggests that they may have been used as a fine polishing / grinding tool or palette. The example from es-Sour is very similar to specimens found at el Kadada (Geus 1984a: 69, Fig. 5). Parallels are also known from Eastern Butana and a site near Kassala.

The preliminary analysis of the material revealed a minimum range of rocks used as raw materials (include quartz, sandstone, rhyolite, quartzite, granite, fossil wood, and Hudi chert). Giving the available raw materials used by the inhabitants of es-Sour, it is obvious that their selection was very limited. With exception of granite and rhyolite, the sources of the other rocks could be easily found in large amounts in close locations of es-Sour. Granite and rhyolite were the object of some regular exchange networks along the Nile exploiting the sources of these rocks, for example, at the Sixth Cataract.

The main characteristics of the potsherds are their hard texture, good firing and polished surfaces (Fig. 4). A coloured polished slip was evident in some examples. The decoration generally covers most of the surface, extending to near, or to the rim itself. The predominant surface colour of the sherds is grey through dark grey, to brown and black. Most of the variations in colour appear to be the result of the firing process. The rims are simple in shape with vessels at the site including a range of mainly openmouthed forms. The prevalent vessel forms seem to be medium-size open bowls and hemispherical vessels. Undecorated sherds are often characterized by a scraped or wiped surface, with good burnishing on some examples.



Fig. 3. Es-Sour site: General View and hinterland



Fig. 4. Potsherd from Es-Sour

The ceramic collection from El-Sour included all the techniques and motif types favored in the Khartoum Neolithic of the Central Nile Valley. A variety of techniques was employed, including impressing, incision, rocker stamping and combing, giving in effect a number of ornamental motifs. Rocker stamping was the preferred technique accounting for more than 60% of the total. The impression technique stood for more than 19.5%, incised lines 8.4% and the rest 12.1%. Other Neolithic sites in the area offer a similar picture with rocker stamping predominating: 45% at Geili, 58-72% at Nofalab, and 50% at El Shaheinab. Similar decorative patterns and/or techniques are found at other Neolithic sites in the Central Sudan, especially at Zakiab and Um Direiwa. At Kadero, however, rocker stamping accounts for 36% of the total, while incised motifs account for more than 18% (against 8.4% at El-Sour). Rippled pottery is less abundant than at el Kadada. The undecorated sherds are often characterised by a scraped, or wiped surface, although they are often burnished. They relate mainly to quite coarse, black-topped red wares. Such black-topped red wares have been found at Esh Shaheinab (Arkell 1953: 75) and Geili (Caneva 1988, 110). They are also reported to have been quite common at Kadero (Krzyżaniak 1984), el Kadada and among the pottery assemblage of the A-Group of Lower Nubia (Nordström 1972: 88-89) and are consistent with the relatively late date suggested for the site at es-Sour. The ceramic collection from es-Sour included all the techniques and motif types favoured in the Khartoum Neolithic of the Central Nile Valley. A variety of techniques were employed. These include impressing, incising, rocker stamping and combing, resulting in a number of motifs.

The character of the pottery assemblage from es-Sour needs to be further explored, not least because so much of our published comparative data relates to assemblages derived from cemeteries (*e.g.* el Kadada or el Ghaba), which cannot be seen as 'typical' and may differ significantly from those from settlement sites. The relative abundance of pottery and good preservation of much of it, provides an excellent opportunity to increase our understanding of the range of Neolithic pottery in use on settlements sites during this period.

Other finds of potential importance were many fragments of human figurines (Fig. 5). Some of them represent human heads, with no prominent features, very similar to examples found at el Kadada (Geus 1984a: 22). The hair of one figurine is decorated with rippled decoration. The others are incomplete human figurines, each one comprising the torso of a female body. Unfortunately, the upper and lower parts of the figurines were lost. The purpose of these pottery figurines remains unclear, although it is often assumed that they have a religious significance.



Fig. 5. Human Figurines from Es-Sour

Other artifacts were rare at el-Sour. Very few beads made of egg-shell, carnelian beads, lip-plugs, a single shell object used as a comb for decorating pottery and one ivory artifact were recorded. The ivory tool could have been used as an awl/perforator, but it could have been equally well a personal adornment. Other typical Neolithic bone artifacts, such as harpoons and gouges, were not found. Bone tools are absent from most other Neolithic sites in Central Sudan, although recent finds in more arid areas further north have suggested that this may be due to poorer preservation.

Faunal remains consisted of bones of wild and domesticated animals including domesticated cattle, giraffe, buffalo as well as numerous remains of shells. This identification was carried out by Prof. Achilles Gautier who based his identifications on photographs of the remains.

Late Neolithic Pot-Burials

At present the earliest evidence of pot-burial in the Middle Nile Region goes back to the Late Neolithic. At el Kadada, extensive remains revealed the first example of pot-burial, shows a particular ritual for the burial of children, all deceased, before the age of six years (Reinold 2000: 72-73). The superposition of plan in curves of levels with the plan of the burial distribution permits the identification of two cemeteries occupying the slopes of the terrace. These

two cemeteries contain only adult's burials. They are situated on the hillside in border of the terrace. The top of this terrace is flattened and defines a space of about 900 m^2 which was devoted for settlement. On this occupation site, seventeen vase burials were found sparsely distributed around the main mound of the site, essentially bordering the inhabited area. Their distribution is very sparse and cannot be attributed to a cemetery, the conclusion is reached that these children were buried inside or on the border of the houses. The burials did not appear to conform to a particular spatial organization, as some were isolated, while others occurred adjacent to another, and others were cut into slightly earlier pot burials.

Few other objects are found in these graves and are not representative compared with those from adult burials. The pottery vessels appear to have been previously used and are sometimes broken (urns sometimes have a pierced base). The objects were deposited on or underneath the bodies or were placed against the walls of the vessels. They included mollusc shells, beads, items of amazonite, agate, carnelian, and quartz, elephant ivory bracelets, pottery, and fragmentary and complete palettes.

I think Reinold's most significant contribution in his study was to determine the ages of the infants interred in pots. Reinold writes: "Malgré la très mauvaise conservation de ces squellettes, il est possible de déterminer que ce mode d'inhumation s'applique pour les nouveau-nés et les enfants jusque ver l'âge de cinq ou six ans ... Le statut d'inhumation en plein terre (i.e., the adult burials) à el Kadada, intervenant pour les sujets d'âge supérieur à six ans, correspond probablement à une étape dans la vie de l'adolescent (initiation...). (Reinold 1985: 281).[3] The latter idea is, I think, a fascinating one, and although not developed further by the author, could supply a logical reason for the infant vase burial in both es-Sour (see below) and el Kadada contexts. I will take the idea one step further to suggest that the enclosure of an infant in the vase could be symbolic of the enclosure of the individual in a womb, suggesting perhaps that the person was still considered in a child-like state or closer to childhood than, as Reinold implies, an individual who had already undergone an initiation procedure towards adolescence or adulthood. Such an ideology would adequately explain why older children and adults were not buried in vases.

[3] "Despite the very poor preservation of these skeletons, it is possible to determine that this method of burial applies to children up to the age of five or six years ... The status burial ground in the open (the adult burials) in el Kadada, speaking for subjects aged more than six years, is probably a step in the life of the adolescent (initiation. ..)."

Bacvarov (2008) notes that the majority of pot burials found in south-eastern Europe are believed to have been still births, though some have been found to contain individuals up to six years old. Similarly, in the southern Levant pot burials have been documented with age ranges from fetal to ten years old (Orrelle 2008). However, a Lebanese burial site from the Chalcolithic period (4000-3150 BC) revealed that of 2097 burials, 2059 were pot burials that did not show any age based selection for the use of pot burials since nearly half of those found were adults (Artin 2008). The higher occurrence is likely attributed to the fact that a smaller body is easier to fit into the vessel, indicating that perhaps pot burials hold practical and symbolic meaning.

Orrelle (2008) examined pot burials in the southern Levant with the aid of ethnographic data from modern populations. Pot burials are used by some modern communities in northern Sudan for stillborn births and in Zimbabwe for stillborn and aborted fetuses. In both of these communities Orrelle (2008) makes the observation that pot burials symbolize the womb; however these two cultures view it in a different context. The Sudanese population views the pot as a metaphor for the ideal womb, protective and watertight, which would not have resulted in a stillborn fetus; while in Zimbabwe the pot is not intended to represent idealized protection, but rather a womb that has not yet given birth. The Zimbabwians place the pot burial in a dry riverbed, resulting in the body being washed out of the pot during rain, symbolizing birth (Orrelle 2008).

Although the extensive archaeological research has considerably extended the amount of knowledge on the Neolithic burial rite, only recently other evidences were discovered for this practice. Most new findings come from es-Sour (Fig. 6-7) and Qalat Shanan (Nassr 2012). Although preliminary reports, contains the new information of pot-burials, has been published since 2005 (Sadig 2005; 2008a; 2008b; 2010), the new data were not mentioned by Reinold in his last publication when he stated that "no other site in Central Sudan or Upper and Middle Nubia has provided this type of burial, but this custom is found in Lower Nubia" (Reinold 2008).

A preliminary study of es-Sour material has been undertaken so far, but it is difficult to draw comparisons between this material and the el Kadada pot burials because so few examples are known in the former case and these have not been as well reported as those at el Kadada. One important discovery at the site was evidence of pot-burials. Four pot-burials were discovered at es-Sour. The four pots containing the burials are large and decorated. One of these pot-burials lacked any kind of grave goods.

The offerings associated with three of the burials include:

1. Offerings placed directly into the funerary vase (in one case these included fragments of ostrich eggs, shells and one bead.
2. Offerings placed inside and outside the pot (internal offerings include small grinder, pounder, beads, and shells. External offerings include lower and upper grinding stones found just beside the pot.
3. Offerings placed directly into the funerary vase. These contain two complete bowls and a single shell.

The graves themselves were simply hollowed-out pits near the habitation area. Reinold stated that at el Kadada the vase burials "...ne semblent pas faire l'objet d'un rituel important" (Reinold 1985: 279-289).[4] I would argue, however, that the discovery of objects inside the vases with the bodies indicates that some sort of funerary ritual was associated with the infant pot burials, whether we think of it as 'important' or not.

Later evidences of pot burials are very limited. Comparative material for A-Group infant pot burials is very sparse. Except for the occasional occurrence of an infant pot burial, children were generally given a burial treatment similar to that of adults. Generally older children were buried in pits, albeit in much smaller graves than those used for adults. Children were also buried with male and/or female adults, with no evidence of what the factors were in the choice of this type of burial over the independent child burial. A-Group infant pot burials did occur in direct association with adult burials, such as in Grave 60 at Cemetery 148 near Jebel Um Simbela (Firth 1927: 228). A newly-born infant was placed in a thin red-polished bowl at the feet of the adult in the grave. Both burials appear to have been made simultaneously. Again, unless one advocates sacrificial burial, this type of situation can only indicate a death of the mother during childbirth in which the infant was stillborn.

The inclusion of objects inside A-Group pot-burials has not been noted. If this was not an oversight on the part of excavators, could it indicate that el Kadada and es-Sour perhaps represent a more evolved form of the infant pot burial?

The burial type is known nowhere else in Nubia and the Sudan except at el Kadada and es-Sour, but it is also known in the Naqada II phase in Egypt (Cenival 1973: fig. 39). One infant burial was found inside a vase at el-Amrah (Vandier 1952: 237-238), without grave offerings of any kind. In his "Manuel d'archéologie Égyptienne", J. Vandier emphasizes that the practice was almost exclusively reserved for children (Vandier 1952: 237-238 and fig. 151). Ikram (2003) also notes

[4] "does not appear to be an important ritual".

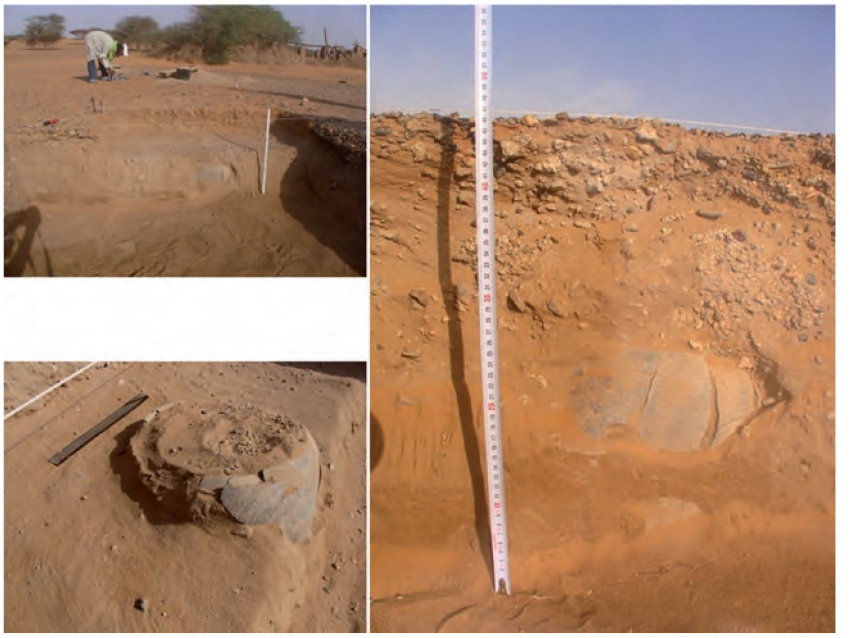

Fig. 6. Pot-Burials from Es-Sour 1



Fig. 7. Pot-Burials from Es-Sour 2

the use of pots and even baskets for burials in predynastic Egypt. The use of pots has been attributed to a desire for cheap ready-made receptacles instead of more elaborate labour intensive coffins.

At Abydos at least one infant in a pot was found interred with grave goods consisting of a wavy-handled pot and two additional vessels (Vandier 1952: 238). Vandier has also noted that in undisturbed graves containing infant pot burials, there was a definite preference for a southward orientation of the vessel opening. This feature has not been noted in the A-Group, es-Sour or el Kadada examples. A few other examples were from Kubanieh (Junker 1920: 39) and other sites excavated during the major surveys of 1907-1911. Between Meris and Markos traces of a camp were discovered belonging to the late phase of the Predynastic Period. One tomb (No. 404, Cemetery 41) consisting of a large pit covered by a large bowl forming a lid. It contained a child's skeleton and two small pots (Reisner 1910: 219). The other example (Firth 1927: pl. 25 e, f) is Tomb 23 in cemetery 110 and dated back to the C-Group or the Kerma period.

As yet no Neolithic adult burials have been found and the area of the site so far investigated would seem to represent a settlement area. As at el Kadada, child burials, which the pot-graves represent most likely, may have been buried within the settlement area, apart from the main cemetery. Further excavations will be required to determine whether any structural features survive on the site, although it is possible that it has been severely deflated. More testing and survey work is also needed to see if there is an associated cemetery in the vicinity. In the absence of radiocarbon dates the exact date of the site remains as yet uncertain, although there are enough similarities with material from sites such as el Kadada to suggest a date in the later Neolithic period (late 5th-4th millennium BC).

The most distinctive features of the El-Sour material suggesting a date in the later Neolithic include the high flake index, pottery decoration styles, special types of lithic artifacts and potburials, along with carnelian beads and human figurines. Gouges, a typical tool at earlier sites such as Esh Shaheinab, are absent. However, the character of the pottery assemblage needs to be further explored, not least because so much of our published comparative data relates to assemblages derived from cemeteries (e.g. el Kadada or el Ghaba) which cannot be seen as 'typical', and may differ significantly from those from settlement sites. Such differences may also explain the absence of items such as polished stone axes, mace-heads and palettes (all likely to be prestige objects) from this settlement site. similar to other Neolithic sites in Central Sudan but the potential differences deserve additional investigation.

The evidences from es-Sour prove that the early pot-burial development in the Middle Nile Region displays two distinct chronological levels:

1. A Late Neolithic core area in el Kadada and es-Sour
2. Later post-Neolithic manifestations scattered in Lower Nubia. The practice is known to have continued into the C-Group, where pot burials were made outside the family tomb, and beyond, Firth suggests that this was merely a matter of convenience. He writes: "Burials of newly born infants appear to have been often made in household bowls, filled with sand, charcoal and earth, and these bowls were then buried just outside the superstructure wall of the family tomb. No doubt it was not thought worthwhile to unseal the doors to the funerary chambers for the sake of an infant." (Firth 1927: 49). Other examples were recorded in the fortress of Askut (*c.* 1850-1070 BC, New Kingdom/Third Intermediate Period), located a little upstream of the Second Nile Cataract in Sudan (Britton 2009). Seven fetal skeletons (dated *c.* 1260-770 BC) were examined for their biocultural significance. These individuals, all interred in ceramic pots, were excavated from the pomoerium (the religious/sacred boundary or symbolic wall) of Askut's fortress. The interment style and burial location indicate that these individuals were treated differently in comparison to the children and adults of Askut, who were most likely buried in the cemeteries along the banks of the Nile.

Both the age and location of the pot burials from Askut hold suggestions for social treatment of fetuses. It may have been beneficial to populations in the past to bury fetuses or infants in pots as ceramic vessels were less costly and labour intensive to produce than coffins. This suggests that such skeletons would not receive the same funerary rituals as people who had been more integrated into society, especially when considering implications of cultural views on fetuses - that they were not fully integrated into society or viewed as nonpersons as described by Reinold (2008).

Another example was noted by Francigny (2009) at site 8-B5.A in Sai. He mentioned that it is most likely that at the beginning of the Christian era, the Meroitic grave shafts could be easily recognized, due to their sandy fills. Thus, people from that period would have taken advantage of these spots, which were relatively easy to dig, in order to deposit fetal and stillborn burials (Francigny 2009: 96). The greater part of the burials was made in pottery vessels. Fetal and stillborn babies were placed in amphora or cooking pots.

As noted above there is much evidence for pot-burials outside the Nile valley dating from the late seventh millennium BC in Anatolia to about AD 500 and

later in Albania, Italy and elsewhere. These show much more variability of this funerary practice. Some of pot-burials were located inside the houses, and others were placed within adult cemeteries. It is obvious, on the current evidence, that the sites of es-Sour and el Kadada represent the oldest attestation of pot-burials along the Nile Valley known so far. The es-Sour dates are younger than those of el Kadada, though this does not prove that the origin of this practice is to be sought in the latter site.

General remarks

The Neolithic of the Sudan has been formed through gradual changes among early Holocene hunter-gatherers. Certain elements of Neolithic life like pottery production continued from the preceding local culture. Other aspects such as a pastoral lifeway are thought to be introduced by inter-regional contacts. The people at Esh Shaheinab had domesticated goats and cattle about 6000 years ago but fishing was still important and they had pottery similar to that of their hunter-gatherer predecessors at the site of the Early Khartoum in the same region.

The late Neolithic development of the central Nile Valley represent a wide distribution of post-Khartoum Neolithic cultures (*ca.* 4000 BC) which extended from the Shendi Reach south of the Atbara River down to the southern Gezira Plain between the White and the Blue Nile. These cultures can be grouped into four distinct regional manifestations:

The first of which existed in the Shendi Reach area and is associated with the sites of el Kadada (Geus 1984a; 1984b), and Es-Sour (Sadig 2010). The second existed in the Khartoum province and is primarily associated with Late Neolithic burials at Esh Shaheinab, Omdurman Bridge, and el Geili, (Arkell 1949; 1953; Caneva 1988). The third regional manifestation of the late Neolithic existed in the Butana and is associated with the site of Shaqadud (Marks and Mohammed-Ali 1991) and in the southern Gezira Plain and associated ceramics from Jebel Moya and Jebel Tomat (Clark 1973), the later occupation at Rabak (Haaland 1987) and maybe the Blue Nile (Fernandez *et al.* 2003).

The first two late Neolithic developments in Shendi and the Khartoum province appear to be very closely related to one another and, for all practical purposes, probably represent a single facies which contained two or more culture groups (Caneva 1988: 163-187). The third development, associated with the southern Gezira Plain, appears to represent another facies which does not share as many common elements as do the first two. It is very likely that this particular facies is later in time than the other developments in the Shendi Reach area and the Khar-

toum province. The common denominator among these late Neolithic developments within the central Nile Valley is that they were indigenous to the region and probably evolved out of an earlier Khartoum Neolithic base (Geus 1984a; 1984b; Haaland 1987; Caneva 1988).

The evidences from areas south of Khartoum (University of Khartoum Survey along the White Nile) (Eisa 1999), suggest that there might have been a widespread late Neolithic occupation along both Niles (White and Blue Niles (Fernandez *et al.* 2003) and in the hinterlands away from them. Levels at Rabak site are datable to the fourth millennium BC (Haaland 1987: 45). Link with interior of Gezira are indicated by the presence of very similar pottery at Jebel Moya, Jebel Tomat and other sites (Haaland 1984). The Jebel Moya pottery found at Rabak has one associated date in the uppermost layer, early 3rd millennium BC. The occupation at Tomat continued into the 3rd millennium BC (later than any Late Neolithic site in the Khartoum-Shendi region). Shells from the site, found at a depth of 60-80 cm, in a soil pit dug by Williams in December 1971, yielded a date of 4540±200 years BP [cal. BC: 3250±260] (in Clark 1973: 57). This may be an indication that the beginning of the settlement may be as early as 3000 B.C. but the date should be treated with caution until it can be verified.

Potentially, even later material has also been found in a single burial on the edge of Jebel Makbor, ca. 5km away from the river (Lenoble 1987). There, a contracted burial beneath a stone cairn was associated with pottery which has similarities with material of the late third and second millennia BC from Dongola Reach. According to the findings at the 4th Cataract, the finds from Jebel Makbor are apparently of Kerma horizon and influence. This may point out to an emergence of different burial custom in the edge of Butana, dating back to the end of the second millennium BC.

The sites of el Kadada, Jebel Tomat, Shaqadud Cave, and Jebel Moya offer a different panorama, with dates in the 4th and 3rd millennia BC. The current Jebel Moya chronology is early 5th millennium BC, 3000-800 BC, and 800-100 BC (Brass per. comm. 2011). Shaqadud Cave sheds more light on the chronology of Central Sudan since Shaqadud Cave is the only site that survived during the late 2nd millennium BC.

There are also some surface sites discovered along the Begrawiya-Atbara road during a survey which contain some material stylistically similar to the 3rd millennium pottery at Shaqadud (Mallinson 1996). These sites need a detailed study but their existence holds potential for future investigation of the cultural history of Central Sudan.

It must be kept in mind that the Neolithic culture in Sudan is characterized by the slow spread of several cultural traits across different environments in different periods as it seen from northerner and eastern hinterlands. Discussion on the spread of late Neolithic goes beyond these spatial, chronological and cultural limitations. Moreover, in Central Sudan around Khartoum, the development of Neolithic economy and society is generally due to increasing emphases on herding, while in northern and eastern Sudan as well as the western environs much evidence demonstrates the extension of long occupation during the 5th-2nd millennia BC.

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Michael Brass

Mortuary theory, pottery and social complexity at Jebel Moya cemetery, south-central Sudan

The Jebel Moya massif lies in the southern part of the Gezira Plain which is situated between the Blue and White Niles south of the 6th Cataract (Fig. 1). The massif is approximately 250 km south south-east of Khartoum. It has a perimeter of 11 kilometres. The excavated area is known as Site 100, hereafter called Jebel Moya, and is situated in a basin-like valley within the north-eastern portion of the massif (Fig. 2).

Sir Henry Wellcome initiated the first of four excavation seasons on 29th January 1911 when the first test trenches were dug. These initial test trenches were named after the nearby villages which the respective workers came from, for example the Segadi and Moya New Trenches (Addison 1949). Around a fifth of the estimated 10.4 hectares of the site was excavated until the end of the fourth season in April 1914. Plans for further seasons were abandoned upon the onset of the First World War. In total, 3135 burials in 2791 graves were excavated, making it the largest burial complex yet excavated in sub-Saharan Africa.

The majority of the excavated artefacts and all of the physical anthropological remains and the excavation records were shipped to the United Kingdom where they were examined in the late 1930s and post-1945 (Addison 1949; Mukherjee et al. 1955). Subsequently, there have been two studies of note. The first was the revisiting of the issue of chronology by Rudolf Gerharz (1994) in the early 1990s using only the Registrar of Graves compiled and published by Addison. The second was a population affiliation study using dental characteristics of the

remaining teeth housed and curated by the Duckworth Laboratory (University of Cambridge) (Irish and Konigsberg 2007). The nature of the site and the wealth of inadequately interpreted artefacts provides a unique opportunity to extend the presently poor representation of social archaeological knowledge of the areas south of Khartoum (Sadig 2008; Salvatori 2012).

While the original fieldwork yielded important materials, no attempt has previously made to elucidate the nature of social organisation as reflected in the mortuary assemblages. There is a necessity to develop more sophisticated hypotheses about the development of the site, the elucidation of the changing nature of socio-political order in the southern Gezira Plain, and the processes affecting its cultural evolution in order to address a number of research questions in my ongoing doctoral research programme:

- Is the cemetery principally concentrated in one era of time or did it evolve over several discrete periods?
- To what extent are phenomena, including gender, age, grave goods and burial postures spatially clustered or scattered within the cemetery, and how do they aloe for informed social analysis of change?
- Does the distribution of grave goods spatially and temporally demonstrate significant social differentiation in comparison to comparative mortuary assemblages elsewhere in the Sudan and southern Egypt?

As such, this paper looks in brief first at issues of social complexity and mortuary archaeology in Africa today and secondly at how using these perspectives re-examination of the extant materials allow for informed social analysis of change at Jebel Moya.

Issues in social complexity

Over the last four decades in particular, diverse models on early cultural complexity in Africa have explored how social relationships, their interconnectivity and mediation through communities, embodiments of wealth and material culture create the social complexity embedded at all levels of society (MacDonald 1998; McIntosh 1998; McIntosh 1999; Di Lernia and Manzi 2002; Smith *et al.* 2002; Brass 2007; Garcea and Hildebrand 2009). The framing of archaeological research into this complex web elsewhere has previously been dominated by the tendency to downplay the full range of social diversity while focusing on high-level society as the epitome of social formation through the development of over-arching models. For example, dual inheritance theory has been used to integrate ritual and social inequality into a model outlining how ritually sanctioned justification may be mo-

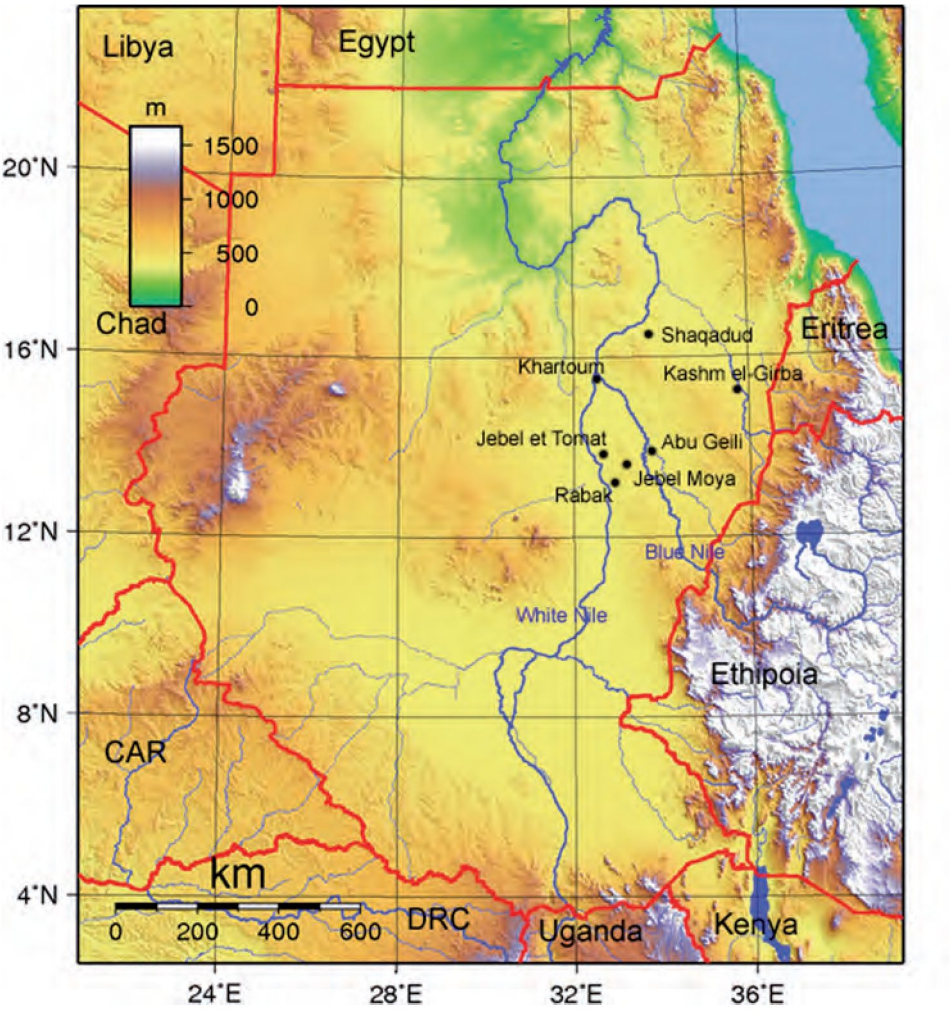

Fig. 1. Placement of Jebel Moya (Sudan) in relation to other well known sites

nopolized by high-ranking individuals to increase their lineage's social status (Boyd and Richerson 1985; Aldenderfer 1993; Richerson and Boyd 2005).

Combining the data and conclusions drawn from archaeology, oral traditions and historical linguistics, the seminal edited volume "Beyond Chiefdoms: Pathways to Complexity" (McIntosh 1999) aimed to challenge the prevailing neo-evolutionary paradigm which had marginalised Africa for the previous two decades in the debates on the forms, trajectories and manifestations of social complexity. Arguing also against Fortes and Evans-Pritchard's (1940) lumping of African soci-

eties into state and stateless categories characterised by kinship of lineage systems, the contributors presented case studies where political power was diffused heterarchically and invested in diverse structures such as age-groups, lineages, spirit cults and title societies.

With multiple loci of power, African ideologies and conceptions of power often balance competing interests which cross-cut society, resulting in contemporary polities present with different levels of scale and integration. Where present, individual offices of leadership often involve shared distribution systems such that ritual suzerainty and political sovereignty do not necessarily correspond (Southall 1999). Through the understanding that complex societies can exist without the presence of monumentality, the contributors re-orientated their focus onto regional ecological, cultural, and historical fluidity and influences as shapers of the processes of cultural development and their material manifestations.

These and other non-African attempts to move on from the perceived stagnation of the "complex society" debate have drawn upon theoretical tools such as, for example, Giddens' (1984) and Bourdieu's (1977) theories of structuration (whereby individual social engagement is an embodied experience and cannot be divorced from institutions and society), concepts of agency (demonstrating that social landscapes, individual experiences and technology are inter-connected within socially constructed environments) and, to a lesser extent, indirectly biased transmission (where a cultural trait developed or adopted by a successful or high profile person is adopted by the wider society if it proves advantageous) to explain how social complexity has been manipulated and expressed through material culture.

Therefore, how complexity emerges within (usually extra-African) societies has been the subject of numerous studies with different definitions of complexity and evolutionary trajectories (Southall and Gutkind 1970; Earle 1989; 1991; Vail 1991; Yoffee 1993; 2005; Arnold 1996; Johnson and Earle 2000; Southall 1999). One such study uses these theoretical constructions to model how transient, achieved status could have evolved into permanent elites by using agency as the catalyst and structuration as the cultural limitations framing the process (Spencer 1993). Such agencies can include exchange, inter-regional cultural exchanges, and the continual fluid evolution of linking discrete landscapes, including mortuary areas, into conceptual systems (Brass 2007).

However, the analytical focus of these studies has tended to be pitched at the level of socio-political formulation and integration. Some recent studies have attempted to move beyond such vocabulary, recognizing that it throws up conceptual obstacles through its historical baggage within socio-evolutionary theories as



Fig. 2. Google Maps view of the basin where Site 100 is located with remains of Wellcome's buildings visible.

deployed by archaeologists (McIntosh 1999; Pauketat 2007). Such studies attempt to reformulate complexity as a conceptual tool through approaching the material culture with the aim of elucidating the multiple layers and scales of meaning, and their interactions, as their own study thereby removing the artificial boundaries on what constitutes a complex society and its material manifestations (Kohring and Wynne-Jones 2007). The renewed focus on difference scales of interaction and their dynamics, ranging from the individual to institutional or organisational levels, opens new avenues for research exploration and the development of new models on how they may be recognised in the material record, particularly mortuary and settlement localities.

Investigating social complexity through mortuary assemblages

Experiencing and making your way through life entails material and spatial dimensions with continuous cultural re-fashioning of materials, landscapes and bodies. The difficulty lies in how these diverse aspects of life are reflected in and transformed through burial rites, and how they can be reconstructed from the resulting material and skeletal remains. As acknowledged by Fried (1967), although

burial practices may reflect aspects of socially stratified societies, the resultant material traces may not "confirm to later generations the existence of differential status". Generally, different members of society are disposed of according to the social norms. Key factors such as increasing population density or dispersal, and proportional differences in age and sex, do not necessarily correlate with ratios of burial types in a cemetery. An additional challenge lies in determining the changing inter-relationships between kinship groups, where shifting alliances or increases/decreases in power may provide spatial or material pointers that assist in deciphering and reconstructing mortuary data.

Furthermore, there is no direct, inherent correlation between complexity as a conceptual tool and the expression of formalized inequality, which goes against the implicit grain of previous neo-evolutionary studies that not only tended to look for patterns in differences and similarities between societies but also regarded the monopolization of power and resources as being reflected in the variation of grave goods (McGuire 1983b; Paynter 1989; McGuire and Paynter 1991). Essentially, with regards to the latter, incipient, transient and semi-permanent hierarchies may result in increased socio-cultural and thus mortuary heterogeneity as elites consolidate their control over more diverse groups of people and material resources, together with simultaneous differential levels of access to those resources depending on the scale of social hierarchies and the number of groups involved (McGuire 1983b).

One such attempt was a move to look at understanding burials in terms of their social role as "powerfacts", with such work drawing upon social anthropological work on the transformation of kinship during royal death rituals (Hoffman 1979; Huntington and Metcalf 1979). This theoretical focus, as epitomized by the works of Binford and Brown (1971) and Saxe (1970) in particular, gained currency, especially in North American archaeology, as part of an evolution of processualism in which positivist mortuary studies played a large role. Drawing upon the conceptualization of identity as "social persona" or social identity in different relationships (Goodenough 1965), this new focus proposed parameters by which the social standing of the deceased can be measured (Brown 1995).

While the mortuary rites of some early societies may contain material expressions of inequality, Paynter (1989) also cautions that is not indicative of inheritable elite roles and therefore formal stratification. Power can be heterarchical, i.e. counterpoised, not vertically ranked (Crumley 1995), with fluid heterarchical relationships permissible at given scales within broader hierarchical social systems; the heterarchical inter-relationships can be seen as a mechanism through which

different social units aggregate (McIntosh 1993). Thus, the mortuary populations of Jenne-jeno in the first millennium AD have been presented as a homogenised group representative of a heterarchical society attempting to de-emphasise difference in the interests of stability (McIntosh 1995).

For Binford, the parameters for the relationship between the deceased and the community (a determinant of identity) - and the social persona - were age, sex, wealth and societal position (intra- and inter-social social units). McGuire (1983a) later added elements of power and religion. Of these parameters, wealth predominated and was defined as the abundance (or lack thereof) of grave goods, a parameter which lent itself to more easily accessible statistical analysis for social ranking and inference. The living status was inferred in death by measuring, amongst others, energy expenditure in grave construction (O'Shea 1981). This could include differential treatment of the body and grave, ranging from location to grave cut or tumulus size (Binford and Brown 1971).

However, due to different dimensions of burial customs, the construction of the death image also involves items attached to or placed around the body, and the material remnants of items used during mourning or celebratory funeral rites (Parker Pearson 1998). Such an approach moves beyond the number and type of grave goods, with assigned status values, to the recognition that a poor grave may contain a well respected individual who had no requirement to be "indexed" further by the living (Parker Pearson 1998). Further criticisms have centred around how variability is disguised by the application of processual quantitative approaches (Chapman et al. 1981; Hodder 1982; Parker Pearson 1999), which have been used to measure the emergence of inequality and hierarchical social complexity (Tainter 1978; Bard 1994; Wilkinson 1996; Savage 2001).

It is through the manner of burial – the actions of and the social make-up of the mourners – that the deceased is represented and identified (Pearson 1999; Stevenson 2009). By attempting to better understand the nature of rites which do not leave material traces, one can develop a more holistic understanding of apparent differences in burial treatment (Van Gennep 1960) whereby the funeral rites sustain, negotiate and revitalize the social order and identities (Bloch and Perry 1982). In addition, some societies in which status is achieved view it as socially acceptable to deposit high value goods in the graves with older individuals (Binford 1972), while young adults (even those who have already achieved some form of standing) may not be buried with similar goods due to cultural taboos against marking grief in more permanent material form with the body (MacDonald 2001), which is a potential component of embodied experiences of grief (Tarlow 1999).

Moreover, some grave assemblages might be attributable to inheritance (Chapman et al. 1981), which may explain some of the poor quantity of grave goods in prehistoric semi-sedentary pastoralist societies in the eastern Sahara (Kobusiewicz et al. 2010). Other issues concern the effect sampling bias and the time depth of sites have on determining the rate and scale of social change from burial assemblages due to evolving customs, living social orders and the temporal spread of burials whereby burials which seemingly reflect different statuses may be comparable (O'Shea 1981; Parker Pearson 1999). Grave goods may also be comprised, part or in whole, of requisite religious items that are not necessarily directly reflective of the social standing of the individual (Tarlow 1999; Robb 2007).

Moving beyond and recognizing that the treatment and placement of the body can also reflect notions of heterarchical differentiation or alignment, it has been suggested that gender and personal identity are secondary to social standing dependent on age in kinship-based societies (Carr 1995). It is an assertion which can be challenged ethnographically where the concepts are heavily intertwined (Hutchinson 1996) but which can shed light on rules marking the conceptual transformation of living society expressed in material form during death's cultural formation processes.

The make-up of the grave assemblages is thus not necessarily reflective of a person's status and wealth while alive, or a mirror of the social complexity layers of a society, but rather a mechanism through which the living create links to the dead, reflecting on overcoming the social disruption caused by death through the continual creation of burial spaces within the social and physical landscape of the living. Mortuary practices may therefore also involve considerations of territoriality or spatial clustering within cemeteries may indicate elements of relatedness or desired affinity (Dunham 1999; Di Lernia and Manzi 2002; Smith et al. 2002).

Nature of the burial and settlement materials at Jebel Moya

I re-examined the original excavation records at the Duckworth Laboratory and constructed a new Registrar of Graves over the course of 2008-2011. The new registrar includes the results of a re-sexing by the laboratory staff of the extant skeletons also curated at the Duckworth Laboratory. The Registrar and Addison's published grave distribution map form the basis for ongoing study not just of multiple variables such as the quantity and spatial variability of grave goods, artefacts made from non-local raw materials and sexing, but also for the undertaking of cluster analysis using the statistical program R to determine the evidence for and the extent and forms of social differentiation as reflected in the mortuary assem-

Table 1. Known cardinal orientations for human burials

Cardinal orientation	Number of human burials
North	222
North-west	733
North-east	308
South	104
South-east	295
South-west	442
East	226
West	498

blages. It also assists in identifying structuring mortuary principles how material culture was combined and articulated near and/or within graves, and therefore how pottery and other grave goods were used in certain contexts. These analyses are ongoing and the results are in the process of being firmed up. Therefore, the remainder of the article will focus upon those aspects of my research which I am in a position to share, namely what new insights can be derived from the pottery assemblages.

The depth of the site at the time of excavation, from the highest point of the ground surface to the lowest bedrock, is 280 cm (2.8 metres). Four strata were recorded in descending order: Stratum A – D. Of those graves whose stratum position was recorded, 8 were Stratum A, 1778 Stratum B, 1033 Stratum C and 237 from Stratum D. However, these strata hold no correlation with chronologically development of the site (Brass and Schwenniger 2013). There are 313 bodies deposited in oval-shaped graves; the description of the shape of the remainder of the graves has been lost, suffice to say there were tumuli or chamber burials such as are found to the north within and along the Nilotic boundaries of the Meroitic State (Bashir 2010; Francigny 2012; Suková and Cilek 2012).

Of the total number of 3135 human burials, the positioning of 217 were prone, 1695 supine, 355 on their left and 430 on their right side. There were 36 crouched burials. The highest proportion of elongated burials is from those who were buried supine, followed closely by prone. The bodies were also buried in numerous cardinal directions (Table 1). The majority of the burials were facing either in the direction of somewhat north or west.

The types of grave goods recorded in association with the burials are comprised of amulets, anklets, armlets, beads, bone points and implements, borers, bowls, bracelets, celts, clips, coils, earrings, earstuds, grindstones, hair clips, hair ornaments, knives, lipstuds, maceheads, needles, nosestuds, pebbles, pendant, pins, quirms, rings, rubbers, scarabs, shells and statuettes in variable quantities. The raw materials from which these artefacts were made originated locally, from sources along the nearby Niles and from further to the north, likely brought south along Meroitic trade networks.

Central to improving the understanding of the stratigraphic complexity of Jebel Moya and subsequently decoding the inter-site variation in material culture is the establishment of a secure chronology. Briefly (see Brass 2009; Brass and Schwenniger 2013 for further details), the site was first dated by Addison (1949) to the first millennium BC, between 1000-400 BC. He later revised his dates from the last centuries BC to the fourth century AD (Addison 1956). Some forty years later, Gerharz (1994) proposed three phases: Phase 1, early 5th millennium BC; Phase 2, 3000-800 BC and; Phase 3, 800-100 BC. Gerharz used Addison's old Registrar of Graves as the underpinning of his work and did not re-examine neither the extant excavation records or the surviving artefacts, particularly the pottery assemblages.

Classes of pottery assemblages can be sensitive chronological indicators, though caution is necessary against the selection of unsystematic variables which could lead to suppression of variability. As such, variation, change and sometimes function can be deduced through the composition of multi-dimensional datasets. The application of such a textured approach enables engagement with complex behaviours to shed light on socio-economic, ideological, political and personal motives reflected by the methods chosen by potters, and permits archaeologists to move beyond mundane and inadequate descriptions such as "red burnished ware", "Dotted Wavy Line" or "rocker stamp" (Gosselain 2000; Haour *et al.* 2010; MacDonald 2011), contra Caneva (1987). Although Caneva's typological classificatory system remains in widespread use in the Sudan, with modifications (Gatto 2002), issues of style and ceramic cultural traditions as employed through ethnographic and archaeological analyses particularly in West Africa (Gosselain 2000; Gosselain *et al.* 2010; MacDonald 2011) have yet to be adequately engaged with by ceramicists working in the Sudan.

Attribute-based approaches work particularly well with hand-made ceramic vessels, which comprise the entirety of the Jebel Moya assemblages. This approach focuses on an object's characteristics, for example, size, material, colour etc. On

a broader level, its advantage is that one can analyze morphology and design. When applied to pottery, it permits the researcher to break a vessel down into its constituent components which can then be compared intra- and inter-site for statistical coherence (McIntosh 1994). It can also assist in making inter-regional comparisons (MacDonald 2011). There is a requirement to define the tools used during the manufacturing process: the technological and decorative styles have meaning spatially and temporally (Haour et al. 2010). Sometimes large-scale variation means that this needs to be narrowed down to the frequencies of select attributes from which attribute clusters can be generated.

The decision to employ of an attribute-based analytical approach moves the discussion beyond the descriptive (Addison 1949; Clark 1973; Clark and Stemler 1975; Manzo 1995) to open the opportunity for a more textured account through the measuring, distribution (spatially and temporally) and diversity of the pottery (Haour et al. 2010; MacDonald 2011). The previous descriptive analyses looked at surface decoration and at claimed surface similarities with pottery from other regions in the Sudan. Brass and Schwenniger (2013) instead examined the composition of and how the decorative motifs were made on the pottery sherds, and the types of pottery found in mortuary contexts. The variables chosen for the analysis of the British Museum pottery included shape, fabric, surface finish and decoration (Brass and Schwenniger 2013). Aims included the attempted identification of attributes showing evolutionary change and those which marked a distinctive disjuncture, thereby providing a better understanding on what attributes are time sensitive markers. As very briefly summarised above, these attributes allowed for subsequent sorting to identify these trends and to generate relevant typologies through the recognition of analytical types (Brass and Schwenniger 2013).

The previously formulated chronological sequences of change have been challenged by my investigation of the representative pottery collection curated at the British Museum which comprise 486 sherds: Six samples have been OSL dated and a new chronology formulated (Brass and Schwenniger 2013). The internal consistencies of the dates correspond with the division of the sherds into three assemblages based upon attribute analysis (Brass and Schwenniger 2013). In short, Assemblage 1, corresponding to Gerharz's Phase 1, was not dated and comprises of stamped and pivoted comb, while the Dotted Wavy Lines sherds reported by Caneva (Caneva 1991) could not be located. Assemblage 2 comprises of stamped comb, spatula- and stylus-stamped, wad of cord, dragged comb and incised fillet sherds; three samples date the assemblage from the mid-second millennium to the mid-first millennium BC. Assemblage 3 comprises of stylus and comb-stamped, dragged combs and fre-

quent incised lines on sherds; three samples date the assemblage from the 1st century BC until the mid-first millennium BC which is hypothesised to encompass the majority of the burials (Brass and Schwenniger 2013).

While the OSL determinations have proved invaluable in providing reliable bracketing of time periods for the three different assemblages, the dates are not an end in themselves but rather mitigate conflation between chronological and social variation. Essentially, they lay out the chronological backdrop aiding in elucidating information about the social order of the inhabitants. Choices and practices manipulated through subtle changes in the composition of the sequence of production are part and parcel of the technological knowledge system in use by the communities. There is greater inter- than intra-assemblage temper variation, while the use of decorative techniques was fairly standardised within the different assemblages. Within each of the assemblages is a set of shared rules concerning the composition of the temper and production techniques. The potters likely used the vessels as a reservoir of shared production knowledge, or both. Assemblage 2 has the greatest temper variation with sand paste and coarse sanded grit, sometimes with mica and/or chaff. These visual characteristics – temper and firing – represent differences in the working and sorting of the raw materials and firing techniques. The red colouring in the red-ware from Assemblage 2 is a result of firing and the process involved is therefore slightly different from the firing used to produce the other chevron-ware.

By contrast, the primary variation in the later Assemblage 3 occurs not in the temper, which is similar throughout, but rather in the size and thinness of vessels and how the range of decorative motifs was employed. While the rim forms remained relatively stable – mostly thin and simple – there was an increased tempo in stylistic shifts and internal decorative variation compared to the previous assemblages. The previous two assemblages are remarkable for their lack of diversity in motifs. At the same time, the range of decorative techniques – predominantly stylus- and comb-stamped, and incised motifs – has a degree of homogeneity. While the increase in different types of motifs may be suggestive of culturally heterogeneous populations, the osteological studies to date suggest they were biologically homogeneous (Mukherjee *et al.* 1955; Irish and Konigsberg 2007). In addition, the small range of decorative techniques used, the standardisation of patterning (zoned) and its appearance in only a handful of mortuary contexts, despite ubiquity of pottery across the site, is suggestive of an open, non-hierarchically situated knowledge of pottery production with a socially agreed level of individual expression and distribution.

The surface treatments of the Assemblage 3 vessels were highly differentiated, materialising a great deal about technological knowledge systems of the individual makers, and the level of their socio-technological integration within the wider community. The decoration and surface treatments express difference between the individual potters. The degree of standardisation is suggestive that production did not occur at household level, where more diversity in use of resources and pottery recipes would be expected. This is perhaps suggestive of that maybe hierarchical ideals were expressed in material form through controlled clay acquisition and the matrix composition of the sherd, while underlying these are heterarchical aspects of shared technology and production organisation facilitating the complexity of everyday relationships as well as the organising principles of the communities: Jebel Moya potters used specific technological knowledge and practices resulting in sets of standardised techniques and linked the community together through these shared production systems.

Although the operational sequences and technological products were part of the *habitus* of the communities which used Jebel Moya, there is no correlation between the deposition of pottery and the age and/or sex of the individual, or a connection between the inclusion of pottery in burials and graves with comparatively rich burial goods. It appears therefore that pottery was not used to mark status in burial and must be understood as part of the complex social dynamics within which the manufacturers of the pottery operate. Pottery not in direct association with the burials may not necessarily be automatically ascribed to domestic contexts (very scant evidence exists of any form of structures related to settlement or domestic activities). Pottery can symbolise beliefs about the transgenerational nature of the interconnectivity between the living and the dead; by placing pots (whole or broken) near to or on top of a grave, beliefs about age, social achievements and standing are communicated to current participants in the mortuary rites and to future visitors (Sterner 1995). This shifts the focus away from form and function to processes and scales of enculturation, and how the behaviours are inter-connected to the production and reproduction of social boundaries (Gosselain 2000) and by extension to the different material manifestations of social complexity (Kohring and Wynne-Jones 2007).

Social groups have structures and identities which differ and are more flexible, being recognised, interpreted and performed by different individuals based on perceived identities and contexts as befits their interests. People can have multiple, overlapping identities, the material symbols of which are open to manipulation. Therefore, while distinct variations in material culture may reflect forms of social

boundaries, this is not necessarily reflective of ethnic boundaries; this is particularly relevant during the first millennium AD at Jebel Moya with the biological homogeneity of the inhabitants (Mukherjee et al. 1955; Irish and Konigsberg 2007) and the constrained diversity inherent in Assemblage 3. The variety of the decorative motifs, within a structured zoned layout which does not deviate, is a variable which may have its roots both in inhabitants being part of mobile pastoralist societies along the southern frontier of the Meroitic State in the Gezira Plain (Brass 2014).

Discussion

It may be that the Meroitic State extended its reach into the Gezira Plain through expanded agricultural settlements, trade networks and trading stations at around the same time as it moved into the Butana (Edwards 1996; Brass 2014) and it's southern economic basis shifted from winter rainfall to summer rainfall crops like sorghum (Fuller 2013, personal communication), though this idea is based entirely upon the new dates from Jebel Moya and previous dates and botanical remains from Jebel et Tomat as the Gezira essentially remains a vastly underexplored region of the Sudan. The cultivation of sorghum would have been theoretically possible in the Gezira with a required minimum rainfall of only 400mm. Although a dental carie study aligns the skeletal remains with pastoralists and not agro-pastoralists (MacDonald 1999), the botanical evidence from Jebel Tomat (Clark and Stemler 1975) points towards gathering of plants and the cultivation of domestic sorghum as having formed part of the food exploitation systems present in the southern Gezira during the early first millennium AD. There therefore appears to be societies with different degrees of sedentary and pastoral components present in the southern Gezira, which occurs as well in the neighbouring Butana.

What material evidence there is indicates the social development in the central and southern Gezira Plain long proceeded along different lines to societies in and around the area and to the north of Khartoum (Edwards 1996; Fernández *et al.* 2003; Salvatori 2012; Brass and Schwenniger 2013; Sadig 2013). The archaeology to the west and further south is less well known and the establishment of a firmer chronological and social framework for Jebel Moya would assist in anchoring future studies in the region. As the largest known cemetery locality in the region, the site provides extraordinary scope for exploring the interplay and interaction of indigenous and external cultural traditions.

As such, my continuing doctoral research is into the presence of rich burials and detecting potential burial clusters, and how they may relate to indicators of institutionalised hierarchy or transient elites, while the pottery from both

burial and non-burial contexts (Brass and Schwenniger 2013) may be indicative of a permissive form of social mobility and one in which a kin group's standing might be stated or enhanced through rites and social practices creating social legitimacy (Kohring and Wynne-Jones 2007; Fleisher and Wynne-Jones 2010). While there is no indication that any of the graves were of secondary use, there are instances of burials under-cutting, cross-cutting or pushed up against other burials; these may be social members wanting to associate themselves for a variety of reasons (family, status association, etc). The variety and frequency of bodily orientations are not reflective of different temporal periods (contra Gerharz 1994) and may not necessarily be reflective of different groups per say burying their dead at the same locality, but rather it may be due to variable cultural traditions within a particular area.

Additionally, imported items, whether from settlement or burial contexts, can assist in determining external trading contacts. The few known animals – cattle and dog only – may have been buried for a variety of reasons ranging from ritual combating of social unrest or illnesses, a large social ceremony or the death of a prominent leader (an effective change in social status), or to denote changing social conditions such as new long-distance relationships or a new group settling in the area, essentially acting as social bindings in both life and death (Hutchinson 1996) amongst communities using Jebel Moya to burial their dead in the most prominent massif in the southern Gezira Plain. On the southern edge of the Meroitic State which was very likely.

These communities were very likely entwined in long distance trade networks both to the north, to the east into the Butana and possibly to the west with the Meroitic State and other communities. As the largest mortuary complex in sub-Saharan Africa, the site ranks as one of the most vivid symbols of the domestication of power and its materialisation in the landscape, and forthcoming findings should be of interest to both scholars interested in pastoral studies, in communities on the edge of states and empires, and to those scholars engaged in Meroitic studies.

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IV

Varia

Hunter-Gatherers and Early
Food Producing Societies
in Northeastern Africa
Studies in African Archaeology 14
Poznań Archaeological Museum 2015

Yannick Fouda

Settlement patterns change in Central Cameroon

Introduction

Human settlements have been distributed in various landscapes across time and space. The distribution of human settlements in a specific region and landscape is not a random phenomenon, throughout time and space settlement location has been influenced by different factors. It should be noted that settlement location is specific to each region and is shaped by the history of the region. In case of the Yoko subdivision in Central Cameroon lying between the 5° of latitude North and the 12° of longitude East (Fig. 1), the long history of human migrations spanning the pre-colonial and colonial periods (Mohammadou 1971; 1999; Von Morgen 1972; Martin 1973; Barbier 1977; Siran 1981; Ghomsi and Bah 1987; Kadomura 1994), and the natural setting characterized by a contact zone between the Savanna and the Rainforest with natural features as dome-shaped massifs, undulating hills, overhangs and caves, were two important factors favouring the establishment of human settlements.

Reasearch in the Yoko region

In the above perspective, an archaeological settlement patterns study was carried out in the Yoko region with the aim of analyzing the type of archaeological sites, their layout in the landscape, the factors influencing settlement patterns and the catalysts of settlement patterns change. It should be underlined that this research was archaeologically based, however, it was supplemented by oral tra-

ditions, historical, geographical, ethnographic and sociological data. Taking the above into account, the following questions underlying this research work:

a) what are the site types
b) how are they distributed in the landscape
c) what are the factors behind settlement choice
d) how have the settlement patterns changed through time

Archaeological surveys were conducted in the villages of Fouiy, Matshari and the subdivisional town of Yoko. To discover sites we applied the following surveys: foot survey, toponymic survey, vegetation formations survey (Chard 1968; White and Abernethy 1996; Edwards and Bell 2000). Oral interviews with local informants were also relied upon in order to identify archaeological sites. Altogether, fourteen sites (Fig. 2) were identified and classified into three main categories: habitation, cave/rock shelter and iron workshop sites. These are as follows:

- 10 habitation sites (4 at Fouiy, 4 at Matshari, 1 at Nein and 1 at Yoko),
- 2 cave sites (1 at Fouiy, 1 at Matshari) and 1 rock shelter (1 at Matshari)
- 1 iron workshop (Mangay).

The sites were further subdivided into surveyed and non surveyed sites. Mt. Fouiy, Mbang cave, Lom, Mt. Ngihini and Yoko fall under the first category, while the reverse is true for Mvori, Fouiy 1, Fouiy 2, Mt. Mbere, Matshari 1 and Mt. Matshari. The second category was either reported to us by local informants or earlier identified by previous researchers, like Mangay (Elouga 1993) and Fouiy (Tueche 1996).

Traces of ancient human activities were characterized by surface finds like stone tools (Fig. 3), potsherds (Fig. 4) and grinding hollows (Fig. 5).

Settlement pattern structure and dynamics

Subsequently we proceeded with the analysis of settlement pattern dynamics. Out of the fourteen sites identified and reported, 71,43% constituted habitation sites, 21.43% caves and rock shelters,7.14% iron workshops. 78.57% represented open air sites as opposed to 21.43% for caves and rock shelters. The spatial distribution of sites revealed that they were either concentrated or isolated (Fig. 6). The German explorer and army officer Kurt Von Morgen (1972) who explored the area noticed that most of the time settlements were isolated and fortified. The distribution of sites in relation to the topography revealed that 57.14% were upland settlements as against 42.86% lowland settlements with altitudes ranging between 600-900 m (Fig. 7). In most cases, sites are located in a predominantly savannah vegetation with patches of forest galleries (Fig. 6) and with water courses in the vicinity.

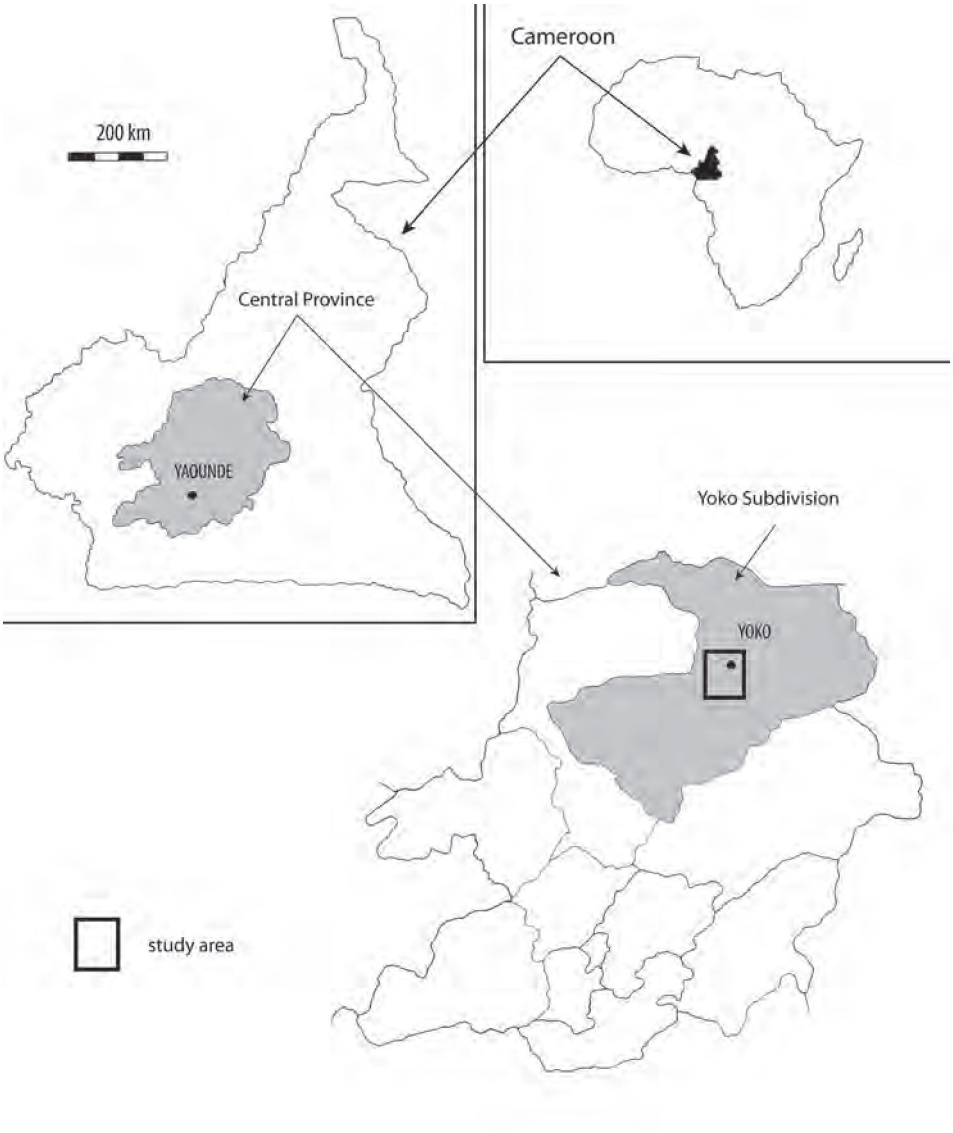

Fig. 1. Location of the study area

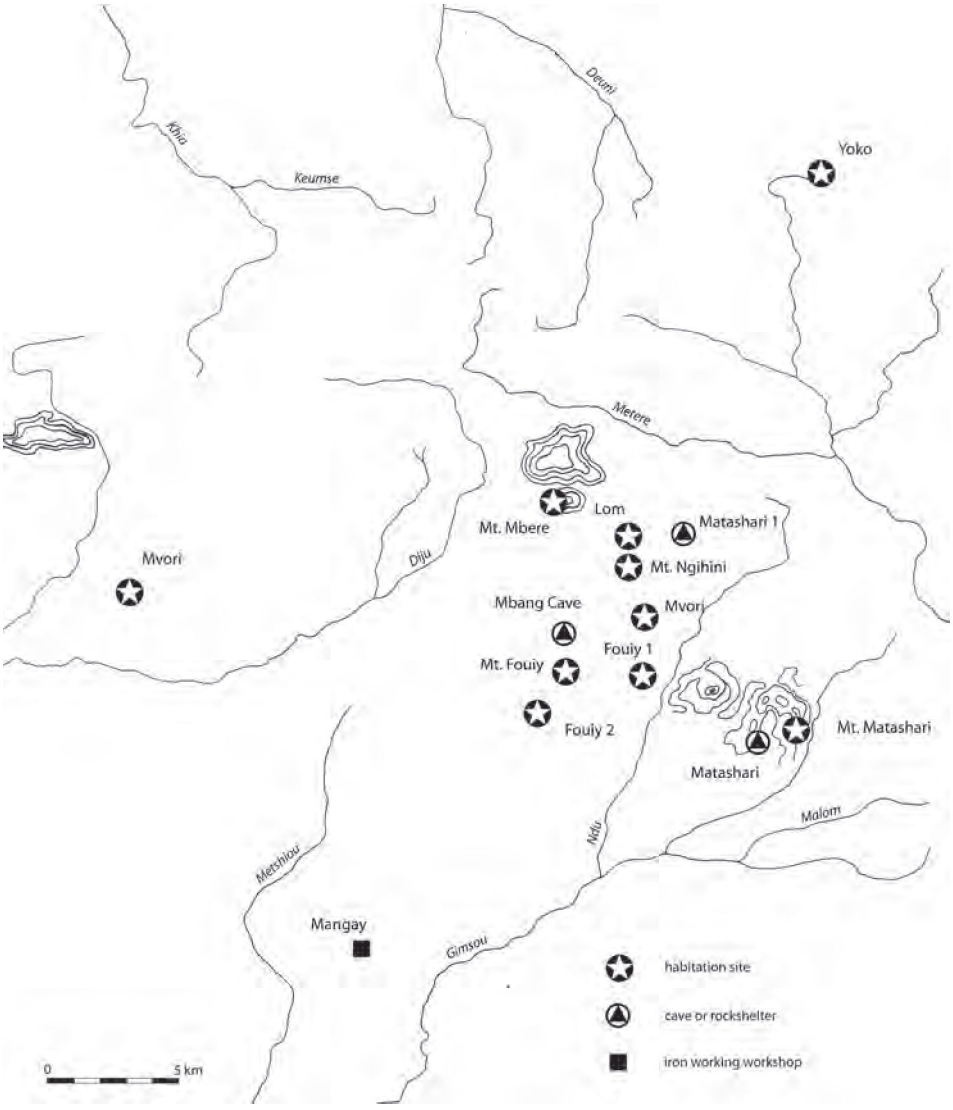

Fig. 2. Distribution of archaeological sites



Fig. 3. stone tool



Fig. 4. Potsherds

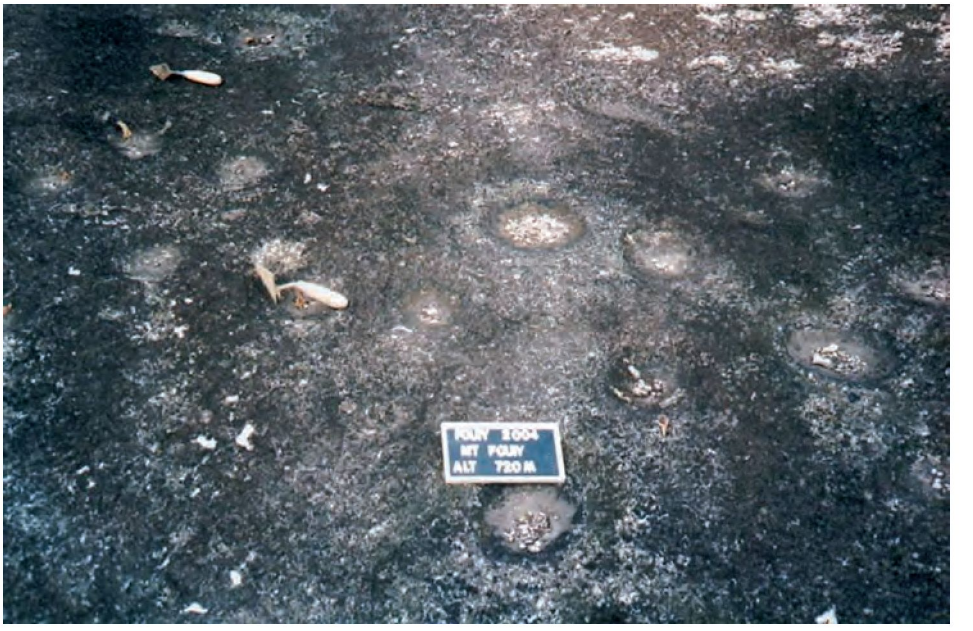

Fig. 5. Grinding hollows

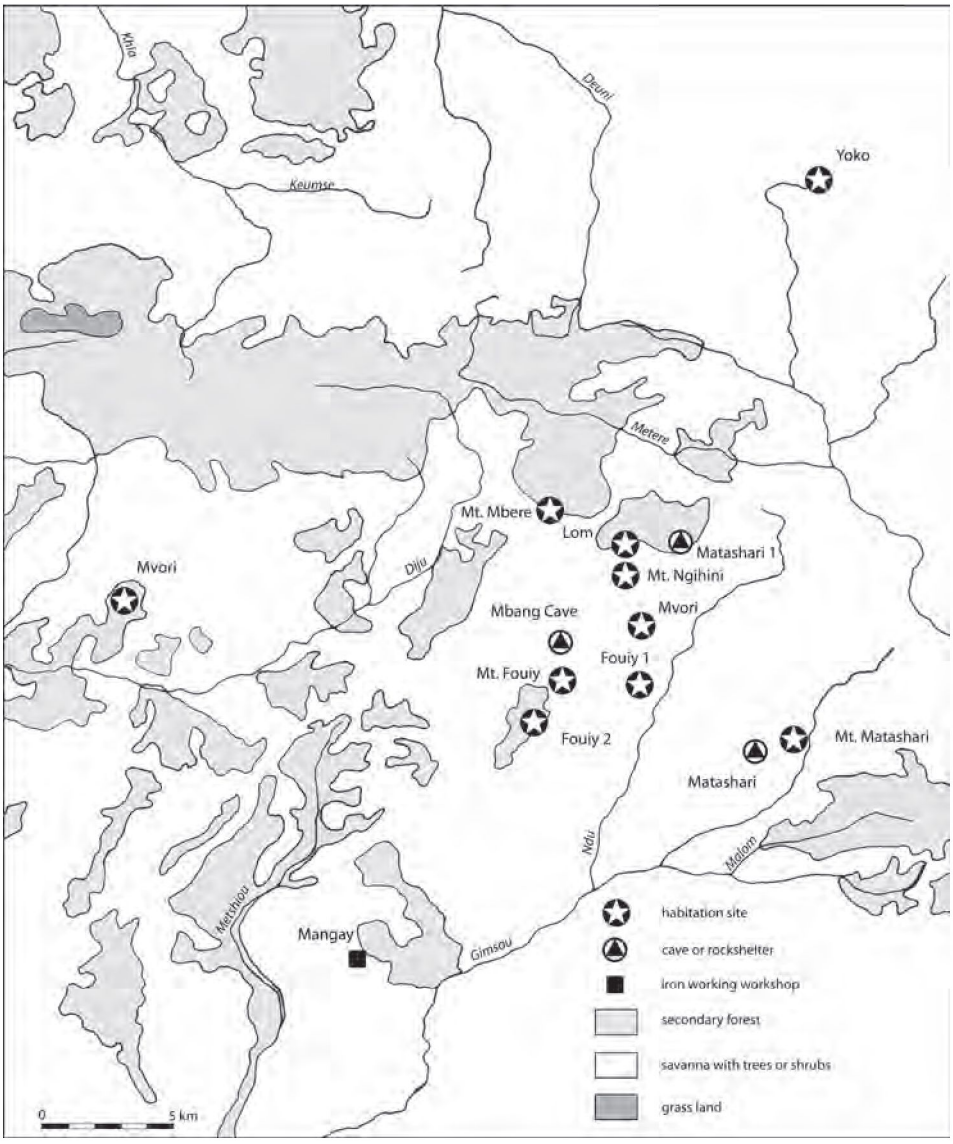

Fig. 6. Vegetation and distribution of sites

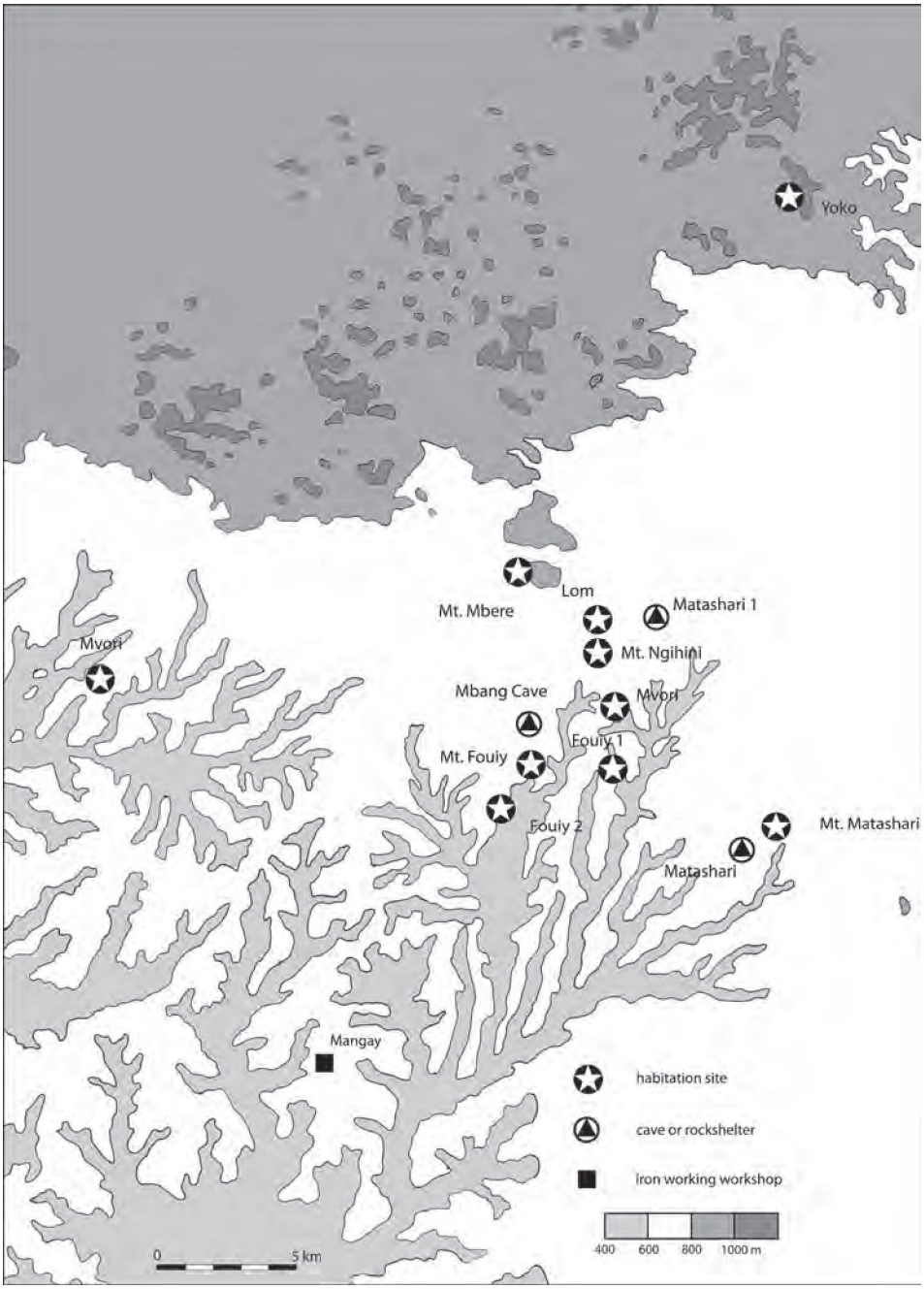

Fig. 7. Relief and distribution of sites

Up to this point, the only traces of habitation were identified at loam. These habitations were characterized by the outline of six circular features laid out in a nucleated pattern and spaced 2 to 3m apart. In one of the structures the floor was covered with burnt clay, hearth fragments (Fig. 8) and daub remains (Fig. 9).

The distribution of sites in relation to the topography, relief and other natural features provided interesting information regarding the settlement pattern dynamics. It was observed that the most recurrent pattern was upland settlements in a predominantly savannah vegetation with patches of forest galleries and a water course in the vicinity. The alternative pattern was characterized by lowland settlements lying close to mountainous areas. The vegetation and water course pattern is similar to the upland settlement. The settlements were more or less dispersed and in some cases habitation structures were nucleated.

The implication of the above observations and analysis is that sites were not randomly selected. Upland settlements were foremost connected to safety reasons. We learned from Von Morgen (1972) that back in time, populations regrouped either upland or deep in forest galleries into large isolated and fortified villages. Von Morgen (1972), Ghomsi and Bah (1987) and Mohammadou (1971; 1999) further advanced that the drift of populations in the second half of the 18th century from the Adamawa southward and Fulani pressure led to a state of constant warfare thereby reinforcing the idea of upland settlements as defensive units. The locals put forward the same explanation.

Climatic considerations can also be held accountable for the prevalence of upland settlements over lowland settlements. Kadomura's work (1994) revealed that the climate prevailing during the 16th, 17th and 18th century in the Sahara-Sahel area was generally humid. If we take into consideration the fact that it affected the Guinea-Savannah domain, then it would have been highly probable that living conditions in the marshy lowlands were unfavourable because of heavy rainfalls causing erosion and flooding. As a result it was infested with insects, unsuitable for farming and building.

On the other hand, we observed that lowland settlements were in close proximity of mountainous areas. This pattern also had defensive connotations as the mountainsides and caves served as a retreat in time of war or danger. When lowland settlements were not in close proximity of the mountains they were set deep in the forest as Von Morgen (1972) noticed.

Natural resources can also account for the location of sites both uphill and downhill. Soils in the study area are clayey in nature with high concentration of ferralitic components. This may explain why pottery is the most represented

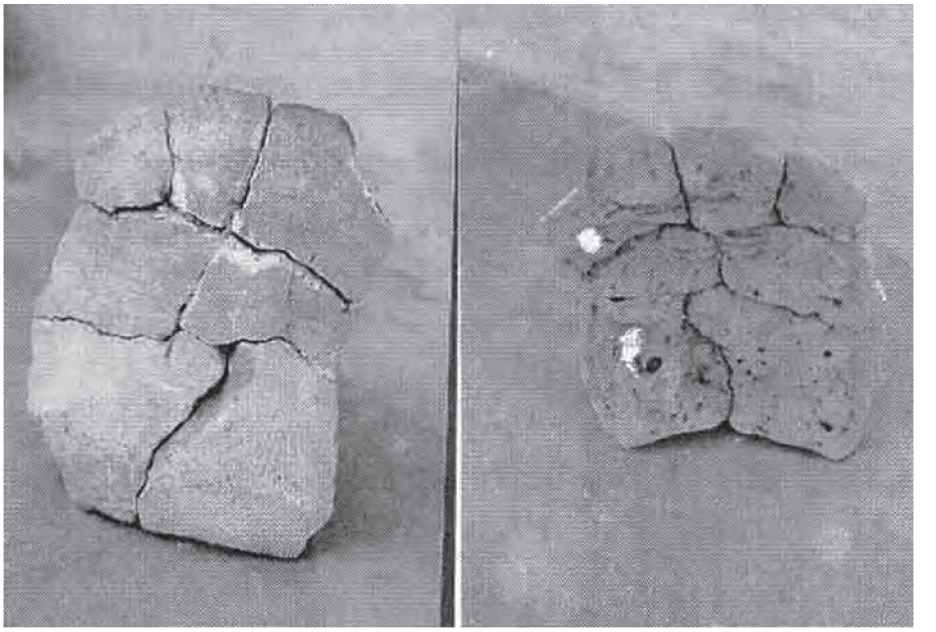

Fig. 8. Burnt clay.

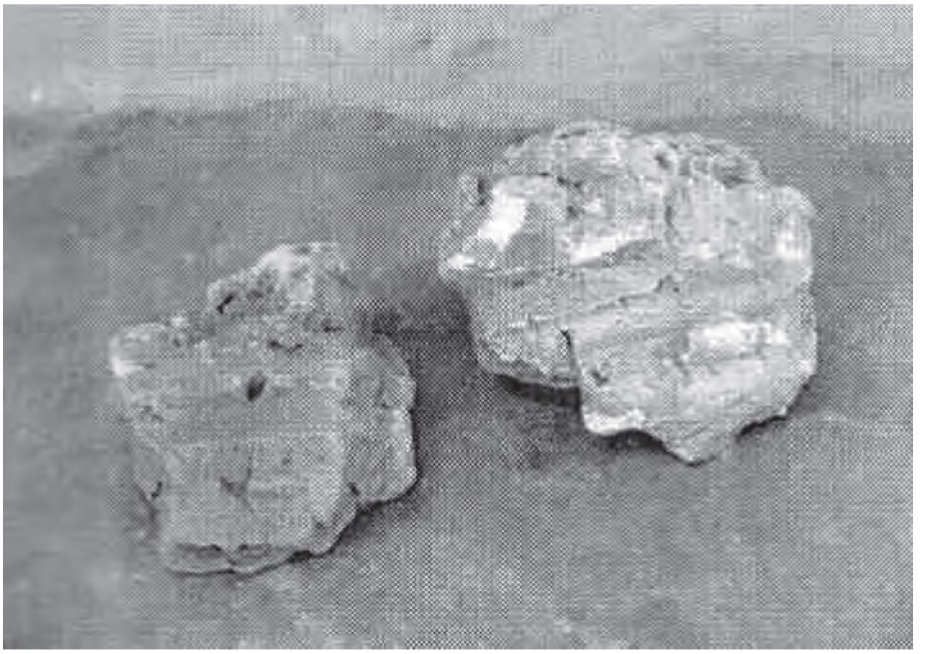

Fig. 9. Daub

assemblage. Von Morgen (1972) also indicated that iron working was the most flourishing activity then, so red ferralitic soils together with forest galleries constituted a good source of raw material thereby influencing settlement choice. The same holds for massifs and the lithic assemblage. Similarly, water was also a vital element as well as fertile land. The idea was further fostered by locals who stated that areas where water courses did not completely dry up during the dry season were the most suitable areas for settlement. The same is true for areas which could support farming activities as locals live in farming communities.

Earlier, we learned that settlements were organized in large isolated villages. This implies large populations or large number of people. Hence the carrying capacity of the study area may have also played a role in favoring settlement implantations. This view of carrying capacity is highlighted in Von Morgen (1972) account when he described 1000 huts in the Ndumba Mountains site in Nguilla village. Siran (1981) on the basis of Dominik's (1896) and Von Stettens (1893) accounts supported the same claim- mentioning 1500 circular huts at Linté and about 6000 people living in then Nguilla. The archaeological work conducted by Elouga (2001) in this area confirmed the above claims. This is in line with the surveys and test-excavations we conducted at Mt. Fouiy and Lom sites where high concentration of surface scatters was observed.

Discussion

As seen above, factors as natural resources, carrying capacity and defensive considerations greatly influenced ancient communities when establishing their settlements in the Yoko region and its environs. Three settlement patterns have been identified so far: upland settlements, lowland settlements in proximity of mountainsides, lowland settlements nestled deep in forest galleries. In the absence of dates it would be tentative to suggest whether these patterns are coeval or one preceded the other. It should be underscored that the ancient settlement patterns identified till now is different from the way local settlements are organized and laid out nowadays.

From what we have observed, all ancient upland and lowland settlements have been abandoned and in some cases lowland settlements have been transformed into burying grounds and caves turned into ritual/ceremonial places. All settlements nowadays are concentrated along the main road and the ancient architecture has receded in favour of modern forms. How and when these changes took place is still unclear. However, in the light of results obtained so far, we will attempt to account for these changes.

Of the two sites test-excavated, Mt. Fouiy (Upland) and Lom (Lowland), deposits of the former were thicker than those of the latter, indicating that the first site might be older than the second. Potsherds further supported this view as Fouiy pottery was rather coarse and less decorated than the pottery of Lom. This suggests that upland and lowland settlements may not be coeval and according to local informants upland settlements date far back in time as compared to lowland settlements. Hence, the probability that a switch from upland to lowland settlements may have occurred is high. This change may have occurred for several reasons.

Population density may have triggered the relocation of upland settlements downhill. Historical accounts and archaeological surveys provided valuable information regarding the densely populated Mountainsides, this has been corroborated by local informants. The high population density may have had a significant impact on the carrying capacity and land sustainability. Archaeological remains and features such as grinders, grinding stones and grinding hollows suggest we are dealing with agrarian communities. Consequently, the high population density and agriculture put pressure on land and water resources, thereby making it difficult to meet agricultural needs. As a result of this settlements were relocated downhill.

Another aspect examined is the competition for land by different communities. The North-South migratory movements which took place in the 17th, 18th and 19th century, coupled with Fulani pressure between 1825 and 1830 was marked by constant tension and warfare as communities vied for land and resources (Kadomura 1994; Mohammadou 1999). This state of affairs led many communities to redefine their settlement strategy. The Fulani for example had a great advantage over other communities because they possessed horses which enabled them to cover long distances, move more easily, subdue and conquer new areas and people. In this light, some communities relocated downhill deep in the forest or marshy areas in response to the incessant raids launched by Fulani horse-mounted cavaliers.

A close link can also be established between settlement patterns change and climatic changes. In his study of "climatic changes, droughts, desertification and land degradation in the Sudano-Sahelian region" Kadomura (1994) pointed out that a severe drought occurred in the 1680's throughout the central Sahara to the Sudano-Sahelian region of West Africa. This severe drought had great consequences on Cameroon; where a cavalry warfare and raiding reached as far as the Guinea savanna domain thereby dislocating agrarian populations from hill-tops and forested areas to the south. Mohammadou (1999) also makes mention about a similar episode of drought and famine which occurred between the 1750's and the 1850's in the Adamawa region. This led to the violent drift of many popula-

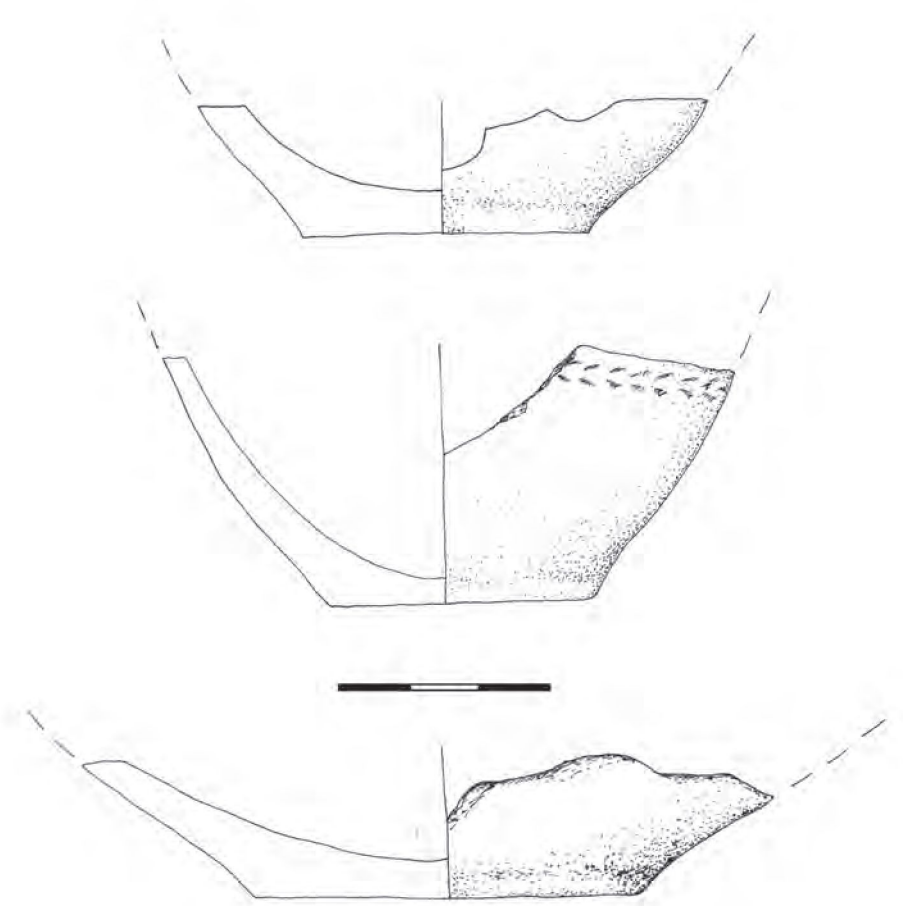

Fig. 10. Potsherds from Mt Fouiy site

tions from the Adamawa area southward. Climatic changes that set in motion the violent drift of populations southward eventually resulted in the dislocation agrarian peoples from their hilly settlements.

The German colonization of Cameroon was followed by upheavals on the economic, political, social and cultural viewpoints. In order to control and administer

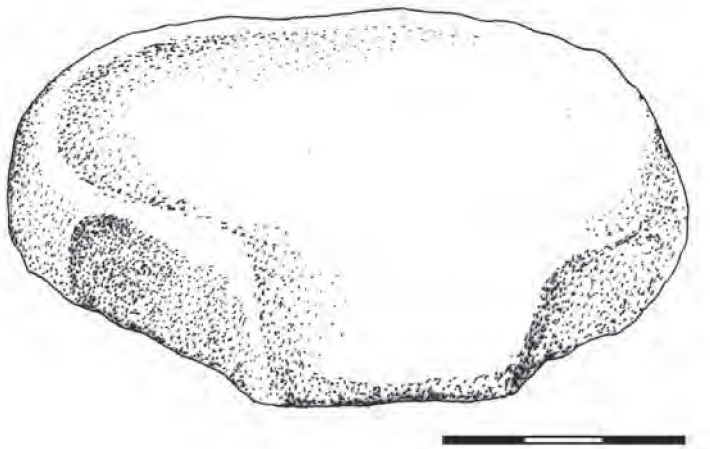

Fig. 11. Grinder from Lom site

Cameroon effectively, the Germans had to penetrate in the heartland of the territory. This achieved, they engaged in several infrastructure constructions all over the country (Ngoh 1987). As such, the locals were dislodged from their upland settlements and forced to relocate downhill along the main roads constructed by Germans. Consequently, a shift from nucleated villages to linear or elongated ones occurred under German impulsion.

This shift was also felt on architecture as circular huts with conical thatched roofs and clayey earth walls were abandoned in favour of quadrilateral forms characterized by rectangular huts with raffia roofs at first, and then to rectangular houses with modern building material such as bricks and corrugated metal roofs. It should be underscored that local informants reported copying the quadrilateral style form the Beti (one of the largest ethnic groups inhabiting the Centre-South Cameroon region).

The two sites test-excavated - Lom and Mt. Fouiy - mainly yielded ceramics (Fig. 10), lithic tools (Fig. 11), very few animal bone remains, snails and charcoal. Plus some iron items handed to us by locals. As none of the sites have been dated, it is therefore very difficult to place the sites within a chronological time scale.

Nonetheless, we have clues in pottery decorative motifs such as grooves, pontates, fishbone patterns, knotted string, chevrons, wavy lines and lozenges/pineapple skin designs which have been dated in neighbouring sites. These designs are associated to sites dated to the Early Iron Age and sub-recent periods (Wirmann and Elouga 1998; Mbida 1998). In addition, historical sources examining migratory movements in this area place them around the 16th and 19th century A. D. and sometimes even earlier. One can tentatively suggest the chronology spans the early Iron age and recent periods.

To conclude, this preliminary research provided insights into settlement patterns change. However, some aspects still remain unclear and an in-depth study is required to fully understand settlement pattern and kindred issues in this region of Cameroon.

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