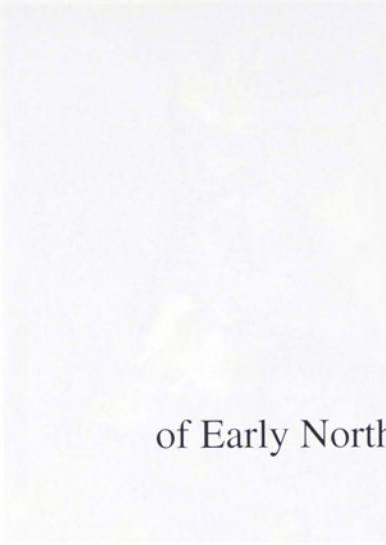


Archaeology
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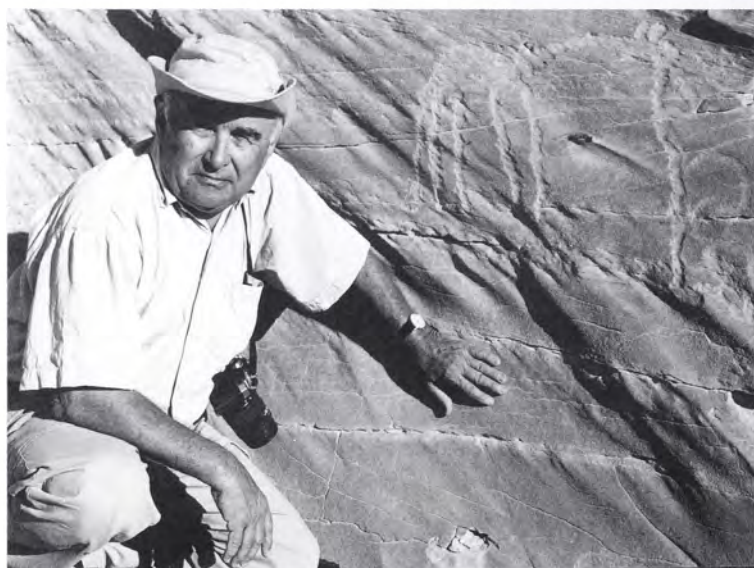


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In Memory of Lech Krzyżaniak

edited by

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In Memory of Lech Krzyżaniak

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Members of the first Symposium – Dymaczewo - 1980



Poznań Archaeological Museum – Opening of the Symposium - 2003

When Lech Krzyżaniak and I decided to organize the first international African symposium in Dymaczewo 27 years ago, it never occurred to me that the time might come when it would be necessary to draw up the symposium proceedings without him. It seems so odd to do so that I sometimes catch myself thinking I should drop into the museum in the evening to discuss the project with him, as was our custom during 50 years of friendship and collegiality, when we talked over all the more important events in our lives.

I will not enumerate all his good qualities and achievements. We know them all. We remember his professional passion, his inquisitiveness and diligence, as well as his kindness toward all whom he met, and the enormous personal charm by which he gained their friendship.

I am very glad that this volume is dedicated to him, and I cordially thank all who contributed to it. I believe that this tome will outlive us all, and the memory of Lech Krzyżaniak will remain with us throughout our lives.

Poznań, December 2006

Michał Kobusiewicz

We are indebted to Lech Krzyżaniak for so many things.

We - his personal friends - remember his irresistible charm, his humour, his imperturbable optimism even in the most difficult situations. "It's not so easy, but it could be much worse" was one of his frequent sayings. We recall wonderful conversations where we admired his profound and broad knowledge of world history, his independent evaluation of political questions, his enormous



cultural horizon. We still feel this atmosphere of being comfortable in his company, protected by his presence.

We - his partners in common projects - appreciate his integrative abilities and his talent to create confidence. His authority was respected by everybody. His long experience in fieldwork in Egypt and the Sudan gave him a great sensitivity for the mentality of these countries.. His tolerance and his respect and admiration of different ways of thinking made him a highly effective mediator between orient and occident. With Lech as a partner, a project in Egypt or the Sudan couldn't fail, since he was 'beloved by all'.

We - the scientific community - have lost an indefatigable fighter for international co-operation. It was his initiative which lead to the legendary Dymaczewo Conferences bringing together scholars from all over the world and made Poznań a centre of the prehistory of North-Eastern Africa. Thanks to his diplomatic skills and scientific visions the Archaeological Museum Poznań is today a unique link between European prehistory and the civilisations of Ancient Egypt and the Sudan. His active role in UNESCO; ICOM and the EU has promoted the role of archaeology in the international political and cultural dialogue enormously. Not the least he was a cultural and scientific ambassador of his beloved home country Poland.

Berlin, October 2006

Dietrich Wildung



Fourth Cataract region

Professor Lech Krzyżaniak died on the 10th July 2004, bringing to a premature end his active involvement in the field of archaeology.

Lech Krzyżaniak was born on the 8th February 1940. He graduated in archaeology from Adam Mickiewicz University in Poznań (1962). At the same university he presented his doctoral thesis (1968) and obtained his habilitation (1975). He was nominated a professor in 1992. Lech Krzyżaniak was educated in the field of prehistory. While he was still a student, he began working in the Archaeological Museum in Poznań, where he stayed to the end of his life, spending 22 years as its director.

At the beginning of his career as a researcher he carried out archaeological excavations in Poland. However, in 1966 he developed an interest in the prehistory of north-eastern Africa, and thenceforth remained faithful to these issues to the end of his life.

From the very beginning he was closely associated with the Centre for Mediterranean Archaeology, Warsaw University, commonly known as "the Station", directed by Professor Kazimierz Michałowski. He began to familiarise himself with research in Africa by participating in excavations of the Roman theatre in Alexandria, and at the medieval Christian site of Old Dongola in Sudan. Soon, however, as an educated and keen prehistorian, he began research into the Khartoum Neolithic at Kadero near Khartoum in co-operation with the Warsaw Station, on a concession received from the Sudan Antiquities Service. There he conducted modern, multidisciplinary excavations of the settlement and adjoining rich cemetery. These ceased only with his death. He also organised an

archaeological survey along the Blue Nile up to Roseires, which resulted in the discovery of a rich prehistoric settlement dating to different periods. Systematic excavations that began here were brought to a close as a consequence of the political situation at the time.

Recently, Lech Krzyżaniak was engaged intensively in organising rescue excavations in the Fourth Cataract region, an area that will be flooded as a result of the completion of the Merowe Dam.

The other significant area of Lech's interest was the study of prehistoric rock art. He undertook research in 1980, in the massif of Tassili in Algeria, but here also research was stopped due to political upheaval in the country. Lech returned to prehistoric art at the beginning of the 1990s, when in co-operation with the Dakhleh Oasis Project, he began studying the rich rock engravings in Dakhleh Oasis in the Egyptian Western Desert.

His research results brought appreciation in the academic milieu; hence, he was invited to participate in various research projects. In 1978 he commenced a perennial co-operation with the expedition from the Egyptian Museum in Munich, first excavating the cemetery in Minshat Abu Omar in the eastern Delta dated to the predynastic and early dynastic periods, and since 1995 excavating the Meroitic site of Naqa near the Sixth Cataract in Sudan, on behalf of the State Museum in Berlin.

Joint research with the German expedition turned out to be of the utmost importance for Lech's life because it is there that he met his future wife, Karla Kroeper, also an archaeologist, was most dedicated to him and with her Lech experienced the happiest years of his life.

For a couple of seasons he also participated in the expedition of Washington State University at the Old Kingdom site in Kom el-Hisn in the western Delta.

Although deeply engaged in extensive fieldwork, Lech Krzyżaniak also carried out intensive research. He is the author of an impressive number of papers, more than 200, as well as several books. He also attended many conferences. He was the chief organiser of seven international symposia on the prehistory of north-eastern Africa, recognised in the archaeological milieu as the "Dymaczewo Conferences". He was invited to deliver lectures in a number of countries in both the old and new world. Having great experience of museum issues, gained during many years of activity in that field, he was appointed as an UNESCO expert on the Nubia Museum in Aswan and the future Museum of the Egyptian Civilisation in Cairo.

His activity was widely acknowledged, as witnessed by invitations to become a member of different institutions and scientific bodies, the most important being membership of the Executive Committee and Permanent Committee of the International Union for Pre- and Protohistorical Sciences (UISPP). He was chairman of its 24th Scientific Committee. He was also a member of the

International Society for Nubian Studies, a member and for many years chairman of the Centre for Mediterranean Archaeology, Warsaw University, and a member of the Committee for Pre-and Protohistoric Sciences, Polish Academy of Sciences.

In recognition of his merits, he was awarded a number of decorations, among which he especially appreciated the Order of the Two Niles - the highest decoration awarded to foreigners by the government of Sudan.

Throughout his life Lech Krzyżaniak endeavoured to create an important centre of African prehistory studies in Poznań, and he succeeded. He left behind him numerous collaborators and students and his goals will certainly be pursued.

He treated his service for science as a duty, but also as a great adventure. He was most happy when faced with a difficult challenge. He was a kind of romantic, albeit he would probably not have agreed with such a view. It may be that these traits, along with his kindness, sociability, modesty and sense of humour, attracted to him people who formed a group marked by its team spirit.

He departed this life too early. It is a great loss for science and also for his family, friends and colleagues. His work and our remembrance of him will last for a long time.

Non omnis moriar.

Michał Kobusiewicz

(In: "Sudan & Nubia. The Sudan Archaeological Research Society", Bulletin No. 9:2005, pp. 85-86.)

For details of the life and work of Lech Krzyżaniak see the Poznań Archaeological Museum Home page:
http://www.muzarp.Poznań.pl/muzeum/muz_eng/wspomnienie/index_lechk.html
The LIFE OF AN ARCHAEOLOGIST IN 407 PICTURES
Prof. Dr. Lech Krzyżaniak - (1940 - 2004) - IN MEMORIAM

Prof. Dr. hab. Lech KRZYŻANIAK

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Abdelrahim M. Khabir

Some New Reflections on Islang and Nofalab Neolithic Sites in Khartoum Province, Sudan

The present interim report sets forth ^{14}C results of four radiocarbon samples retrieved from two Neolithic sites in Khartoum Province (Fig. 1) namely Islang (15°53'N, 32°32'E) and Nofalab 2 (15°52'N, 32°32'E).

The two sites were test-excavated by the present writer during July-August 1990. The cultural material recovered labelled Islang 2 and Nofalab 2 to distinguish it from el-Anwar's earlier work at these localities (el-Anwar 1981: 42-45 and 1982).

1. Islang 2

The site is located some 28 km north of Omdurman (Fig. 1). It is situated on a gravel ridge at ca. 39 m above the sea level and it lies two kilometres west of the Main Nile. The site is a small one and a total of 200 m² was excavated. The previously partially excavated area by el-Anwar totalling ca. 496 m² (el-Anwar 1981: 21). The excavated units yielded cultural material down to a depth of 50 cm in most places and exceeding that depth (ca. 60 cm) in rare instances.

1.1. Archaeological finds

The site yielded considerable amounts of finds comprising pottery, lithic artefacts, molluscan and faunal remains.

The pottery of this settlement (n=1312) is mainly decorated (ca.68% of the total collection). Zigzag is the most favourite motif. Further frequent motifs include triangles with dots, dotted lines, triangles, incised, combed, scraped, semicircular panels, impressed straight lines and slanting serration. Rocker stamping, combing, incisions and impressions were used to execute these decorations. (Fig. 2). The pottery is sand-tempered and mainly burnished by a hard-smoothed tool to get a compact lustrous surface of which plain specimens

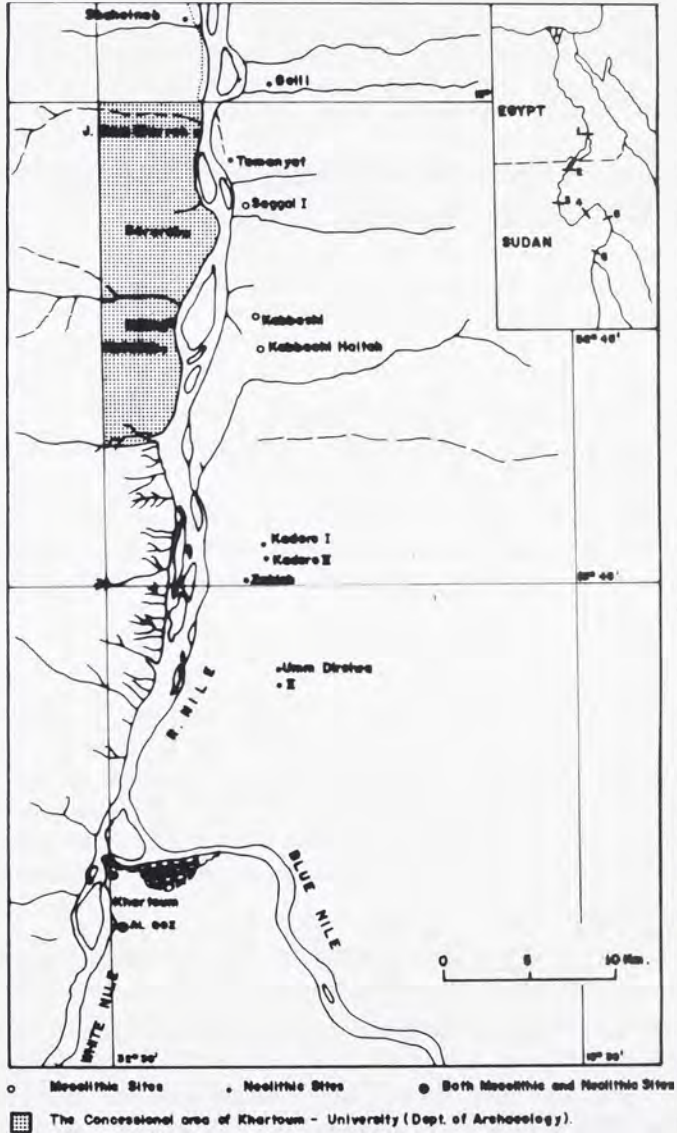


Fig. 1 The main Mesolithic and Neolithic sites in Khartoum province

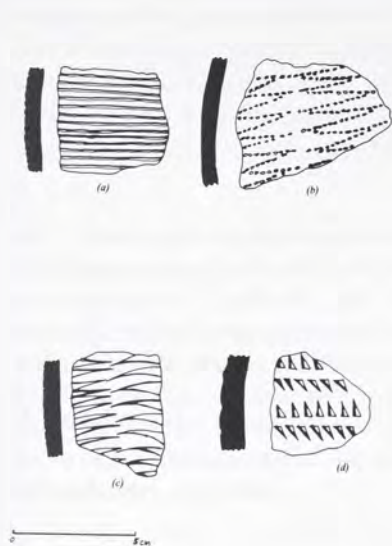


Fig. 2. Islang pottery

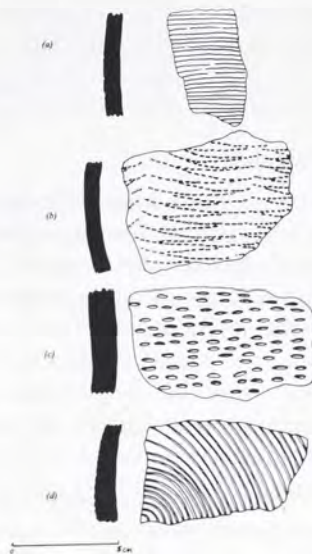


Fig. 3. Nofalab pottery

are the most frequent. The sherds are often smoothed on the inside only. The surface colour is mostly brown (7.5YR 5/2 Munsell soil colour chart 1975) generally breaking with grey (5YR 5/1) or dark grey (5YR 4/1) fractures of various shades. Complete pots were devoid in the collection. It could be judged from the rim-sherds that the present ceramic repertoire represents a limited number of vessel forms. Most are hemispherical bowls, cups are present but apparently rare. Wall thicknesses range from 2-11 mm with 4-9 mm thickness predominating. Notably, the horizontal breakage and uneven thickness of the walls raise the probability that Islang 2 pottery was made by coiling-technique.

The lithic artefacts include retouched tools ($n=207$), primary and secondary flakes ($n=2390$), blades ($n=12$), cores ($n=11$), chips ($n=537$) and ground stone ($n=106$). The raw material used consists primarily of quartz. Rhyolite was mainly used for retouched tools. Ground stone artefacts were exclusively made of silcrete sandstone.

1.2. Dating

The site has got a couple of calibrated radiocarbon dates; the oldest (based on shell material) is 4490 ± 150 B.C. (SMU-2575), being derived from square (I)

AL3 (30 cm below the present surface) and the youngest (based on charcoal) is 4330±90 B.C. (SMU-2565) being obtained from square (3,4) L2 (20 cm below the present surface). It is noteworthy that a radiocarbon date of 4706±170 B.C. (T-3880) was previously obtained for the same site labelled in full association with the radiocarbon producing levels include various types of pottery mainly rocker-stamped, retouched tools and stone grinders.

2. Nofalab 2

The site is located 26 km north of Omdurman on the west bank of the Main Nile (Fig. 1). The larger portion of the site was previously excavated by el-Sayed el-Anwar (el-Anwar 1981: 42-43 and 1982: 18-20). It is situated on a gravel ridge elevated two metres above the surrounding alluvial plain. The area of occupation measures 70 m from east to west and 140 m across from north to south. Surface finds suggest an estimated occupation area of 1200 m. In all the excavated units the greatest concentration of material occurred between 20-40 cm below the present surface. The cultural occupation often reached 70 cm in depth. The high concentration of finds between 30-40 cm is probably an indication that the period of occupation is unlikely to have been lengthy.

2.1. Archaeological finds

Cultural finds comprising abundant pottery, lithic artefacts, molluscan and faunal remains were recovered. Considerable quantities of pottery (n=2981) were solely found in fragmented condition, the bulk of which is decorated (ca. 76%). But unlike Islang 2 pottery (see supra and el-Anwar 1981: 44-45 and 1982: 68-77) „Vees“ decoration in this collection is the most popular motif (ca. 22%), zigzag decoration is the second most prominent motif. Further frequent motifs consist of incised, impressed, dotted lines, triangles, combed and linear impressions whereas black-topped red ware is scarce (Fig. 3)

The pottery is sand-tempered, of hard fabric and well-fired. The surface colour is mostly reddish brown (5YR 5/3 Munsell soil colour chart 1975). The fractures usually break with grey (5YR 5/1, 5YR 4/1, 10YR 6/1 Munsell) or dark grey (7.5YR 4/0, 5YR N3/0 Munsell) colours. The bulk of pottery is burnished, though surfaces are often smoothed on the interior only. Most of the pottery is slipped, particularly the fine plain sherds which are overwhelmingly coated with red or reddish brown slip. A red pigment of ochre was, in most instances, applied to the outer surfaces of the sherds when the clay was in the leather-hard state and prior to firing. The potsherds indicate direct rims probably belonging to large or medium-sized bowls. A few thin rims, probably cups, are in evidence and are exclusively of fine-textured ware. Vessel bases are not present in the collection. Wall thicknesses vary from 2 to 14 mm but the majority have thicknesses ranging

from 5-10 mm. It could be inferred from the uneven thickness of the walls that coiling technique was used.

The lithic artefacts recovered include retouched tools (n=343), primary and secondary flakes (n=697), blades (n=14), cores (n=11) and debris (n=606). Besides, some 119 specimens comprising grinders (ca. 52.3%), rubbers (17.6%) and fragments (ca. 30.2%) were found.

2.2. Dating

Two calibrated radiocarbon dates were reported from the this site; the oldest (based on shell) is 4380±80 B.C. (SMU-2577) whereas the youngest (based on charcoal) is 2705±259 B.C. (SMU-2561). These two dates were obtained from squares (4,3) A and (4,6) B, (ca. 70 cm and 30 cm below the present surface respectively).

3. Conclusions

The basic conclusions that I can draw at the present from the excavated material are as follows:

The cultural material reported in association with the radiocarbon-producing levels comprises pottery overwhelmingly executed with rocker-stamping technique as well as considerable quantities of retouched implements and groundstone artefacts.

With the exception of the sole radiocarbon sample of Nofalab 2 (SMU-2561) clustering around the 3rd millennium B.C. (Late Khartoum Neolithic), the rest of the samples from this site and Islang 2 have provided dates in the magnitude of the 5th millennium B.C. (see *supra*) and hence fall within the time range of „Khartoum Neolithic“ tradition (e.g. see el-Anwar 1981: 42-43; 1982; Hassan 1986: 85 and Haaland 1987: 60-61).

The pottery inventory of Islang 2 and Nofalab 2 which is mainly impressed and burnished, falls within the norm of „Khartoum Neolithic“ tradition as represented by Esh Shaheinab (cf. Arkell 1953: 68- 77, Pls. 29-33) and related sites. The close affinities in ceramic traits of the three sites (Islang, Nofalab and Esh Shaheinab) seem to confirm this partial synchronism which has already manifested in the radiocarbon dates obtained.

Acknowledgments

I am grateful to the department of Archaeology, Khartoum University for allowing me to conduct test-excavations at the Neolithic sites of Islang and Nofalab (part of the university concession) during July-August 1990. Late Professor. Ahmed M.A. Hakem of Khartoum University and Ex-Undersecretary of the state for Antiquities and National Museums, Sudan (1991-1994) provided

useful logistic help, may Almighty God rest his virgin soul in peace. Appreciation goes to Dr. T. Haas of the Southern Methodist University, Radiocarbon Laboratory (Dallas, Texas) for the analyses of the radiocarbon samples submitted.

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Przemysław Bobrowski and Maciej Jórdeczka¹

A survey in the Wadi Awatib near Naga

Introduction

Since 1996 an Expedition of the Egyptian Museum in Berlin led by Professor Dietrich Wildung has been conducting excavations in Naga, in the Central Sudan. During the seasons 2001 and 2002 the authors of the following report encouraged by the leaders of the expedition (Lech Krzyżaniak, Karla Kroeper and Dietrich Wildung) and supported by the approval of the Sudanese Antiquity Service and IAE PAN in Poznań management, launched a surface examination of the middle section of Wadi Awatib, where Naga site is located. Ewa Kuciewicz and Eliza Jaroni from the Archaeological Museum in Poznań occasionally took part in the research. The main objective of the research undertaken was to register every form of settlement which would enable the recognition of the wide settlement context of the above mentioned site, situated relatively far distant from the Nile Valley.

Localization

Wadi Awatib, or more precisely a system made up of the main wadi and a couple of side branches floating into it, is situated on the Butana Plain in the Central Sudan. The Wadi cuts into the surface of the plateau, built mainly of Tertiary sedimentary rocks (mostly sandstone), occurring on the bedrock of the Pre-Cambrian crystalline rocks, the so called Nubian-Arabian Shield (Plit 1996). The Wadi Awatib is over 50 km long and runs from south-east to north-west, flowing into the Nile Valley between the Sixth Nile Cataract (about 60 km to SW) and the town of Shendi (about 40 km to NE), in the vicinity of Wad Ben Naga (Fig. 1)

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Fig. 1. Localization of the Wadi Awatib in Central Sudan.

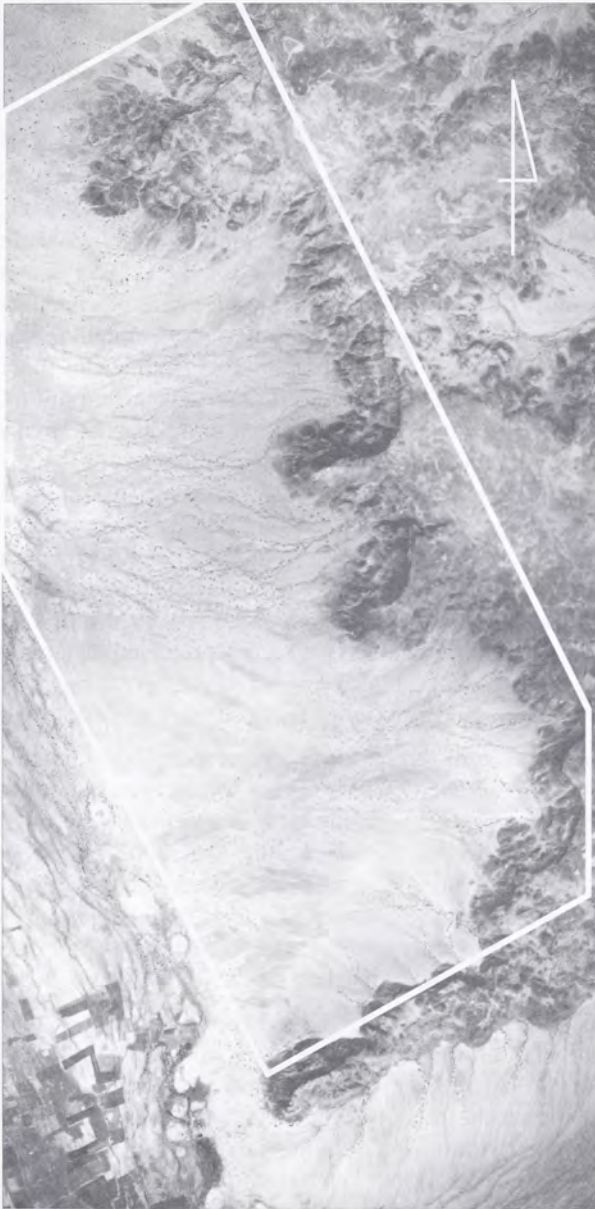


Fig. 2. Wadi Awatib. Tested Area.

Research

The research covered the central section of the Wadi Awatib, lying between Jebel Naga on the south and Jebel Matruk on the north. It is about 6 km long in a straight line and about 2.5 km wide in a transect, comprising both the foot of the wadi and the western edge separating it from the plateau (Fig. 2).

At the beginning of the research the authors had neither precise maps nor aerial photos of the area (the latter being available only since 2002), therefore in the first stage of the research it was necessary to draw a sketch plan of the examined area which would allow more or less precise mapping of the archaeological sites. A simple sketch, including the most characteristic elements of the relief, was made in the course of walking examination along the top and bottom edges of the plateau for several times, mapping the most characteristic points of the relief by means of the GPS device (eTrex Summit - GARMIN). As early as during the first stage of the research more than 60 archaeological sites were discovered and tentatively recorded. It was possible to determine superficially the function and chronology of some of them. They included settlements, workshops, burial grounds, single graves, as well as loose findings dated from the Middle Paleolithic, through Early Khartoum and Khartoum Neolithic up to the Meroitic period. A peculiar cluster of Stone Age sites was identified in the northern part of the area under research, in the vicinity of Jebel al Matruk. Prior to the survey professor Lech Krzyżaniak had already discovered in this area a settlement and a burial ground dated, on the basis of pottery found on the surface and some forms of stone tools, to the Early Khartoum period.

At the next stage of the research a more detailed examination of the area in question was undertaken. The starting point was the already identified northern cemetery associated with the temple and palace complex of the site of Naga. During the seasons of the years 2001 and 2002 40 archaeological sites were recorded and catalogued in detail in the area to the north of the cemetery, including four large and nine smaller settlements, two flint workshops, six burial grounds and seven single graves, nine traces of settlement and three structures of unclassifiable chronology and function.

The oldest recorded traces of settlement on the area of the Wadi Awatib, which most probably are dated to Lower and Middle Paleolithic, constitute two small workshops (WA 38, 39) for pretreatment of ferruginous sandstone. They were both situated on the rock shelving of the slope of the plateau, between its culminate point and the foot (the bottom of the wadi). These workshops covered a relatively small area of a couple to a dozen or so square metres. Nodules of raw material, precoces and numerous flake debitage have been found (including levallois flakes). A single chopping tool (WA 32) found on the same rock shelving can be dated to the same period (Fig. 3).



Fig. 3. Site WA 32. Chopping tool.

On the basis of stone artefacts as well as pottery four large settlements (WA 4, WA 7, WA 20, WA 23) can be connected with the Early Khartoum and Khartoum Neolithic settlement. The first one, situated on a relatively steep northern slope of the plateau shelving to the valley of a little side wadi, could have been connected with a rock shelter situated in the upper part of the slope. The archaeological material was relatively widely scattered over the area of a few hundred square metres, next to and below the shelter. Among the artefacts that have been found numerous tools and stone debitage deserve special attention. Small quartzite pebbles constituted the dominant sort of raw material, together with a large group of ferruginous sandstone and conglomerate. Quartz is predominantly found in the form of small pebbles of various colours (most often

white, but also bluish, pinkish, yellowish). The pebbles originated mainly from the crumbling of Nubian sandstone. They occurred both in the area of crumbling of the sandstone constituting the bedrock as well as in the form of secondary deposit on the surface of Nile terraces and the wadi flowing into them. It was widely used in the Paleolithic but most commonly in the Neolithic (Arkeell 1949; Kobusiewicz 1976; Krzyżaniak 1992). Its percentage contribution into the material structure of stone inventories on some sites in the Central Sudan, e.g. in Kadero, amounts to over 90% (Krzyżaniak 1992; Kobusiewicz 1996).

Single finds of debitage of fossilised wood and chert have been recorded as well. Quartz was predominantly used for small tools. The blanks were produced in two ways: either through traditional exploitation of predominantly small blade or flake cores (mainly single platform ones), or through the slicing technology aimed at obtaining regular crescent-shape flakes with one sharp edge from which segments were produced, used as armatures for composite tools (Kobusiewicz 1996).

A few quartzite cores as well as numerous debitage products from various phases of blank production have been found on the site. Among the tools two finished segments, a few retouched flakes and cortical blades, a side scraper, a notch and a drillbit (all produced by retouching cortical flakes) have been recorded. Ferruginous sandstone was used for producing classic cores as well as plentiful debitage in the form of relatively large flakes and blades struck off the single platform cores. Among other raw materials a scraper is made of fossilised wood and a core with changed orientation for blades and flakes (Fig. 4). Stone macrolithic tools are also abundant, including numerous fragments of querns, mainly flat forms, heavily exploited, often with visible traces of roughing, a number of grinding stone types (from flat to spherical forms, different types of hammers, retouchers and anvils Fig. 5). There can be found numerous examples of remaking large damaged tools into smaller forms. The raw material constituted mainly local types of sandstone, in case of hammers the hard ferrous type as well as quartz pebbles and nodules of conglomerate. Single fragments of Early Khartoum pottery have also been found on the site (identification according to L. Krzyżaniak).

The others of the large settlements mentioned (WA 7, WA 20, WA 23) were situated on a vast dune (originated probably to the close of Pleistocene), adjacent to the plateau forming the edge of the Wadi Awatib. In every case the archaeological material was scattered on the surface of several dozens of acres. The structure of the inventory was similar to the material found in the WA 4 settlement. Small tools, cores and quartzite debitage and also single tools, cores

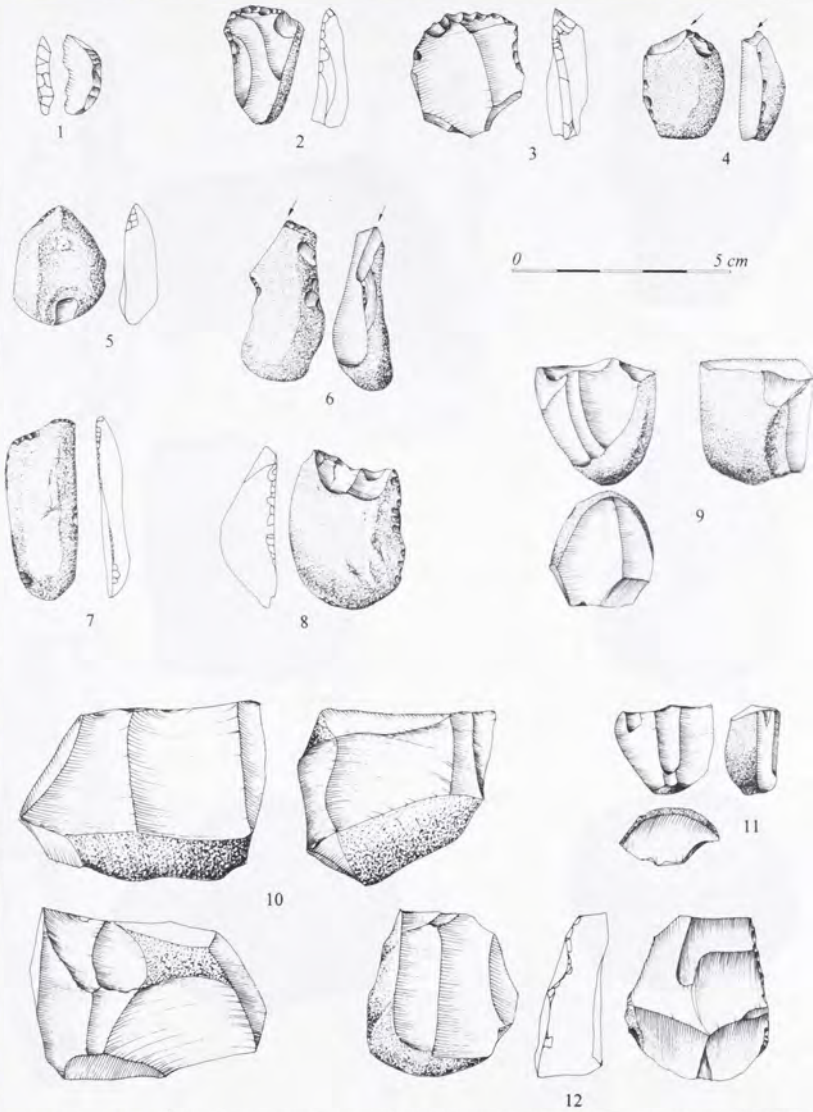


Fig. 4. Site WA 4. Cores and implements of quartz and sandstone.

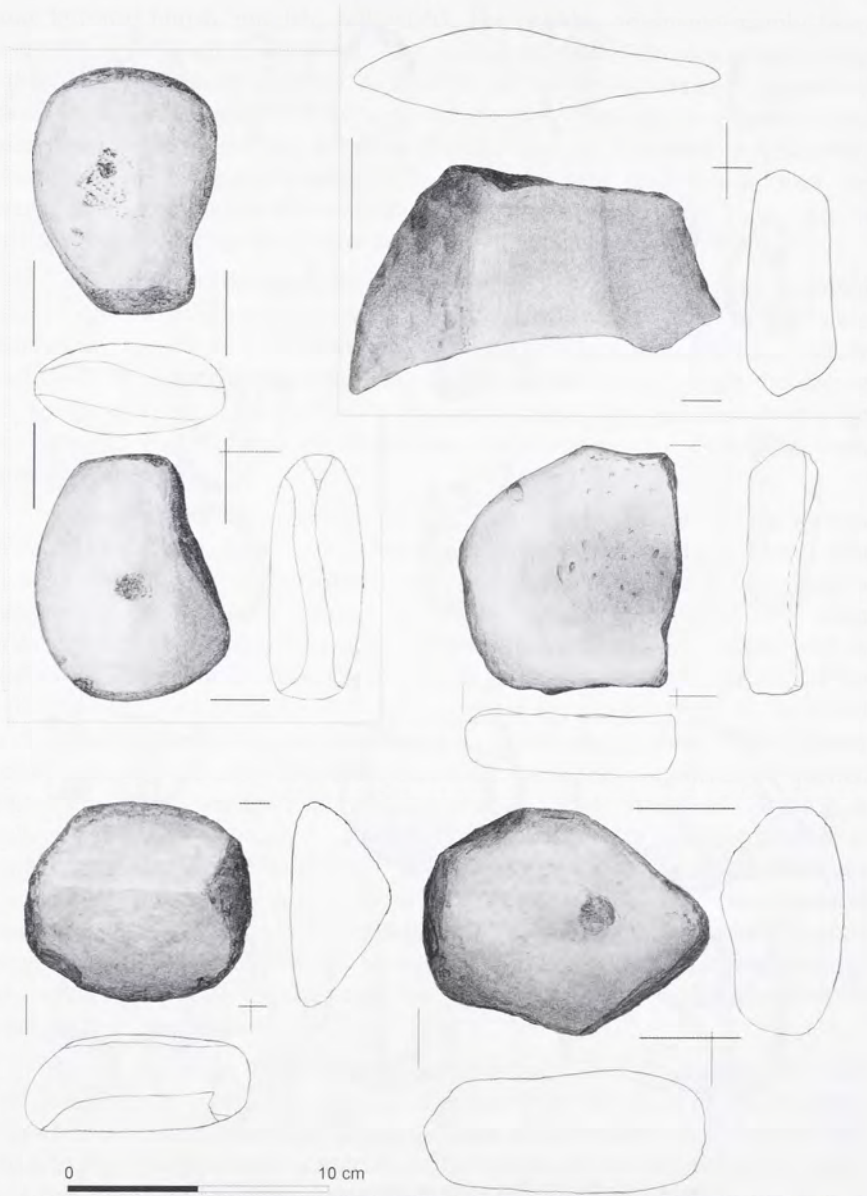


Fig. 5. Site WA 4. Macrolithic stone tools.

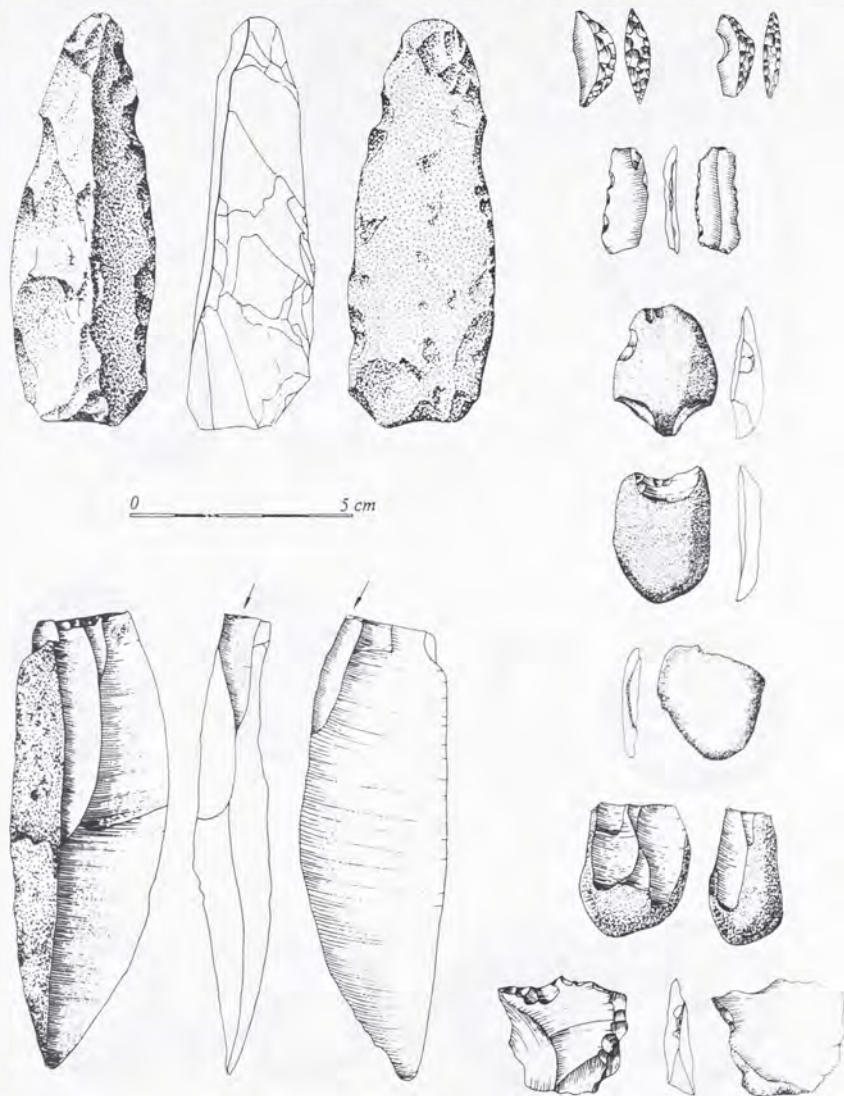


Fig. 6. Site WA 7. Cores and implements of quartz, chert and sandstone.

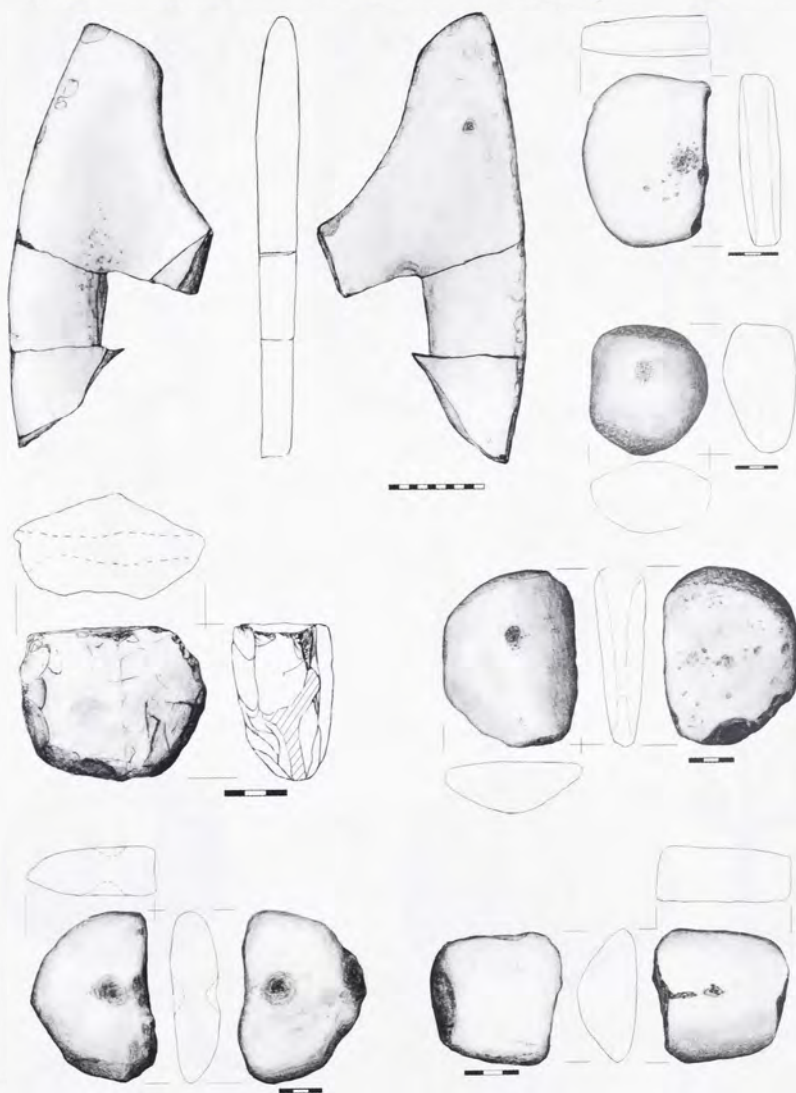


Fig. 7. Site WA 7. Macrolithic stone tools.

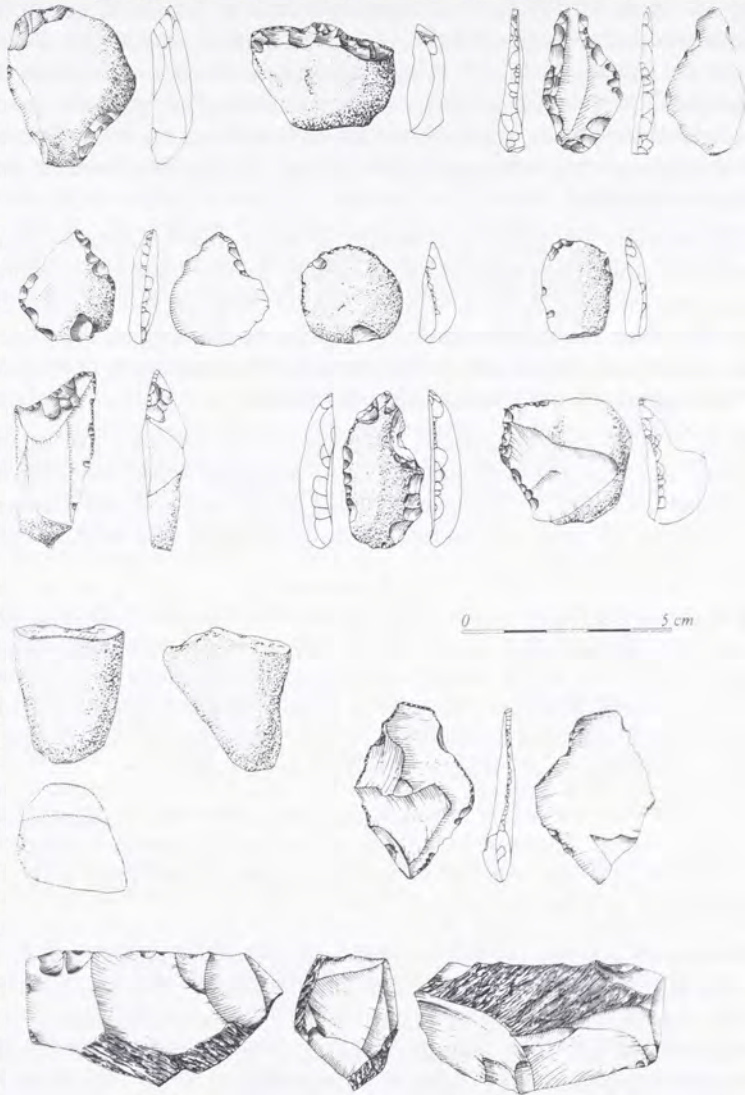


Fig. 8. Sites WA 14 (1-3) and WA 15 (4-12). Cores and implements of quartz and fossilised wood.

and debitage made of different raw materials such as fossilised wood, ferruginous sandstone and chert prevailed here as well (Fig. 6). Sandstone macrolithic tools were also abundant (Fig. 7). The technology of blank and tools production was analogous. Among other tools, segments, retouched and microretouched flakes, notches, perforators, scrapers and burins have been recorded. Ostrich eggshells and single pottery fragments found on the site can be connected with the Early Khartoum culture.

The remains of small settlements or short-time campsites containing similar flint or stone inventory and occasionally pottery have been recorded on nine other sites (WA 10, WA 14, WA 15, WA 22, WA 26, WA 27, WA 28, WA 34, WA 36). They were predominantly situated at the foot of the plateau, on small elevated areas, slightly above the bottom of the main wadi, undercut by the waters flowing into it from smaller seasonal streams.

WA 14 site deserves special attention due to the fact that apart from typical tools and quartzite debitage, traces of fossilised wood exploitation have been recorded here (Fig. 8). Irregular nodules of raw material and a dozen or so of flakes broken off with the traditional core technique and scaling technique have been recorded on the site.

The inventory found on the above mentioned sites however does not show clear diagnostic features that would allow their precise dating. The only exception is the WA 22 site where among archaeological material a few fragments of pottery of the Early Khartoum have been found. Single fragments of Meroitic pottery have been recorded on the WA 26 site, while on the WA 27 site single fragments of chronologically undetermined primeval pottery.

The next sites should be linked with earlier settlement of the Meroitic and Post-Meroitic period. These include three of the burial grounds mentioned (WA 13, WA 19, WA 21), one single grave and four traces of settlement in the form of small concentration of broken pottery.

About 380 graves have been noted on the burial ground WA 13. As regards the grave construction they may be divided into two types which may reflect the phases of burial ground use. The first type is represented by graves (barrows), built on a circular plan (of 2 to 5 m diameter) whose visible remains up to the contemporary times is a rim of large stones or sometimes stone mounds not more than 1.5 m high (above the contemporary ground level). The dimensions were worked out on the basis of an analysis of 34 graves, i.e. approx. 10% research of all graves on the burial ground. The other type is represented by graves in the form of stone cists (of 2-3.5 x 1-2.5 m) built on a rectangular plan and covered with a stone mound (of 2.5-5 x 1.5-4 m of height not exceeding 1.5 m at the highest point). Sometimes the grave cists have an additional rim made of

large stones. There are no rules as regards the localization of the graves in relation to the cardinal points of the globe. As observed on the burial ground, part of the cist graves were sunk into the rim or the inside of the circular graves, which would suggest their younger age (examples of grave construction Fig. 9). On the surface of the burial ground and in the direct vicinity of the graves (in the modern plunder shaft; in the investigated area a phenomenon of contemporary grave plunder and devastation has been noticed.) pottery has been found (Fig. 10) that could be dated to the Late Meroitic and Post-Meroitic period (according to K. Kroeper) Similar finds have been recorded on the burial ground WA 21, where Meroitic pottery, including painted pieces, has been found.

On the next burial ground WA 19, 48 graves have been recorded in total. All of them were built on a circular plan of a diameter varying from 8 – 20 m and the height of more or less invariable 0.5 m, occasionally reaching 1-2 m. In most cases the outer outline of the barrow, or stone cover have been preserved. In the central part of some graves a rectangular outline of the grave chamber can be seen. At some graves there are visible plunder shafts where fragments of Meroitic pottery have been found. A similar type of graves was recorded at three other burial grounds (WA 30, WA 35, WA 37), comprising from a couple to several dozens of graves. On the site WA 35 graves were clustered into a few groups, including a few smaller and some larger ones. No archaeological material allowing more precise dating have been found on any of the sites.

Single graves of various types were found in the investigated area (WA 1, WA 3, WA 5, WA 16, WA 17, WA 24, WA 29). These include barrows (WA 1, WA 3, WA 24, WA 29). The first one is a barrow of 12 m diameter and present height of about 0.5 m. It is almost completely covered with a mound of loosely scattered stones (of 20 - 30 cm diameter).

The next one is a high circular barrow built of large stone blocks. From one side it is destroyed by waters flooding in a rainy season from a small wadi running at its foot. Graves WA 24 and WA 29 had similar construction, both of about 18 m in diameter and present heights of 0.5 and 0.8 m. Graves WA 5 and WA 16 had the form of stone cists. Grave WA 5 was a rectangular stone cist (of 3 x 1.5 m dimensions) made of stone slabs, with a rim of stone blocks (of 5 x 9 m dimensions), the longer side lying along the N/S axis. The grave was probably totally covered with a stone mound (of about 15 m diameter). Grave WA 16 originally must have had a form of a small rectangular stone mound of 1.7 x 2.2 m dimensions, its longer side lying parallel to the N/S axis. The large tomb (WA 17), of 28.5 x 10.5 m in dimensions, was built on a rectangular plan, with its longer side parallel to the W/E axis and an asymmetrically situated rectangular grave cist (of 6 x 3 m dimensions), to which a small corridor was leading from the East of 1 x 1 m dimensions. WA 3 was the only grave whose chronology

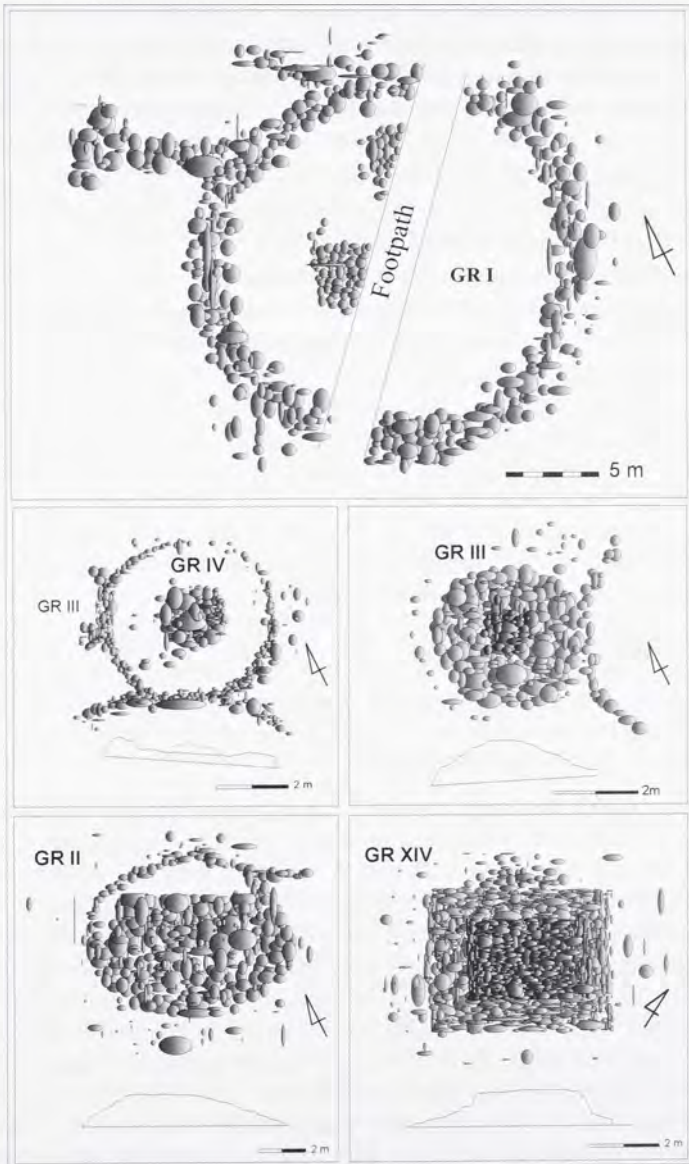


Fig. 9. Site WA 13. Plans of exemplary grave constructions.

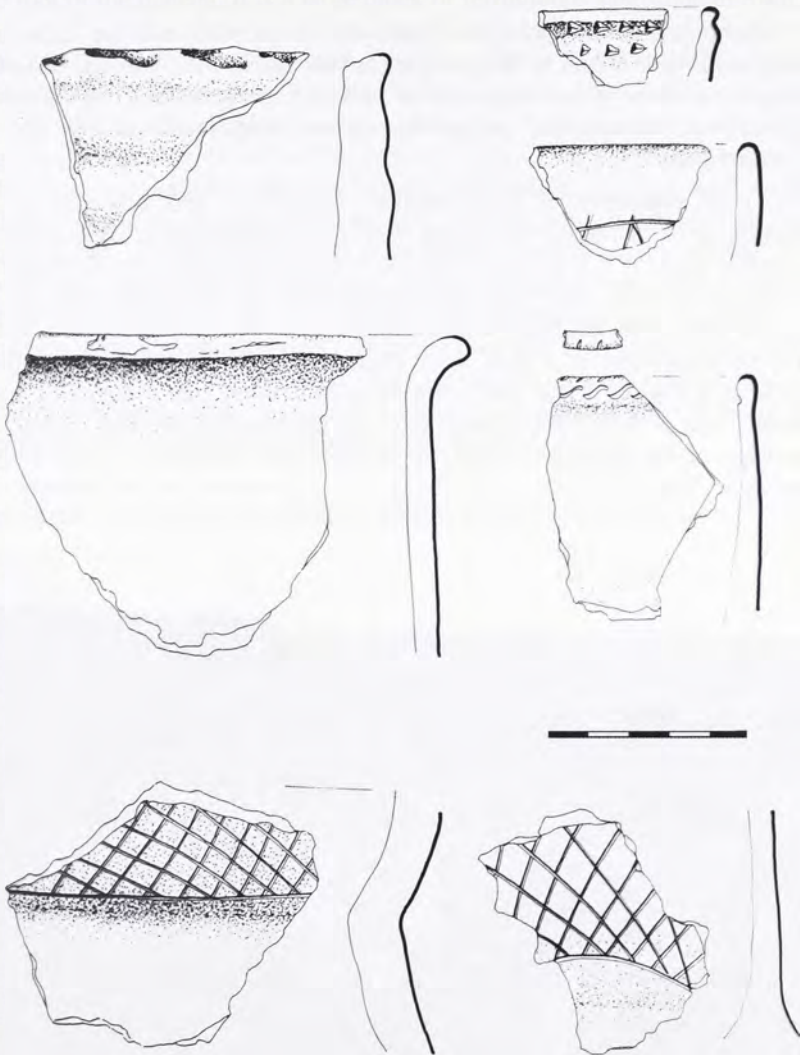


Fig. 10. Site WA 13. Pottery fragments.

could be determined, due to pottery found in a small plunder shaft situated in the upper part of the barrow.

Eight traces of settlement have been recorded on the area under investigation (WA 2, WA 6, WA 8, WA 12, WA 18, WA 25, WA 32, WA 40), in the form of a whole pot or fragments of broken pottery. In four cases they were Meroitic pots, whereas the chronology of the remaining four has not been determined yet.

Three structures of indeterminate chronology and function are also interesting. Two of them (WA 9 and WA 33) constitute stone cases built on a rectangular plan (WA 9 of 2.6 x 0.8 x 0.7 m dimensions), with its longer side parallel to N/S axis. The N, E and W sides of the case were built of large sandstone slabs, whereas the south side was open. The case was covered entirely with large stone slabs as well as small stones. According to the local people the cases were a kind of a trap for capturing wild animals (the remains of a small predator [most probably a fox] were found in the 'trap' on the WA 33 site). The chronology of the structure is difficult to determine, however, it is certainly not modern.



Fig. 11. Site WA 11. Indeterminate feature.

The third feature (WA 11) is situated in the central part of a wide hill lying at the foot of the plateau. It is a large block of ferruginous sandstone in form of a slab (of 4.5 x 4.2 m dimensions) slanting at 30° angle to NW, almost totally covered with several dozens of elliptic hollows whose shape resembles working surfaces of quern stones (Fig. 11). The hollows are 10 - 40 cm long, 5 - 25 cm wide and 1 - 6 cm deep. They are the result of long time grinding on these spots and gradual deepening of the hollows (clearly visible traces of scratching indicate the direction of grinding stone movement). Some of the hollows were made by punching, knocking pieces of stone out with a hard hammer and finally smoothing out. A grinding stone was found in the vicinity of one of the hollows. Between the hollows there are clearly seen engraved marks in the form of single or crossing lines, sometimes forming geometrical figures (e.g. a quadrangle with marked diagonals). They are probably older since some of them were destroyed during the process of forming the above mentioned hollows. It is difficult to determine both chronology and function of the feature. It is not used, however, by the contemporary inhabitants of the Wadi Awatib.

Further surface research, minor excavation surveys as well as synthetic report on the study results are going to continue in the years to come.

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Louis Chaix¹

New data about rural economy in the Kerma culture: the site of Gism el-Arba (Sudan).

Gism el-Arba is situated on the right bank of the Nile, around 3 km east of the river, near the modern village of Kadruka (Fig. 1). The archaeological remains belongs to the Kerma culture, a large kingdom which developed in Nubia, from the first cataract in the North to the fourth cataract in the South, between 2500 BC to 1500 BC (Gratien 1978; Bonnet 2004a; 2004b). The site lies around 25 kilometers south of the kingdom's capital, Kerma (Gratien 1997,1998; Gratien & al. 2002; Gratien & al. 2003). The main «kom» is a rural settlement dated from the Ancient Kerma, around 2500 BC to the Late Kerma, towards 1500 BC. During this period, several circular huts were built, between 4 to 6 meters in diameter. Raw brick buildings were also discovered including what must have been an administrative residence. Later, houses of the Classical Kerma were quadrangular in shape, built in mud bricks, with different rooms organised around a central courtyard. All these structures delivered numerous animal bones and animal figurines too.

In this short and preliminary (because the dig and the study are not yet finished) paper, we will present the main aspects of the economy of this village. In a second part, we intend to compare the animal exploitation of this rural settlement with the fauna from the metropolis, Kerma.

a. The fauna from Gism el-Arba

Bones come from two different areas (settlements 1 and 2), but their study is not yet complete and we present here the general results about animal exploitation, passing over the chronological and spatial differences.

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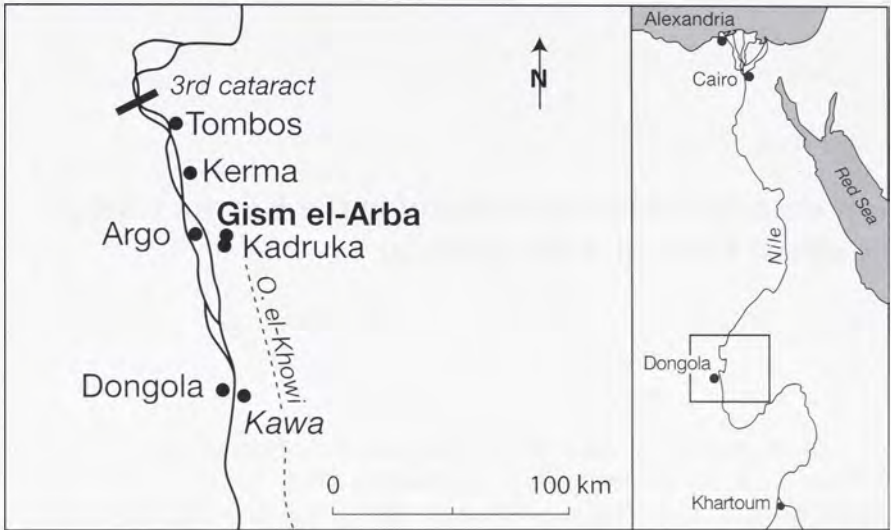


Fig. 1. Location map of Gism el-Arba and Kerma.

The majority of remains however originate from the Middle Kerma layers (2050 - 1750 BC).

Taking together all the animal categories, a total of 33.719 bones were recovered with 6848 attributed to mammals and 766 to other animal groups (birds, fishes, snails and ostrich eggs). Undetermined bones form 77.4 % of the total. (Table 1). The economy of Gism el-Arba is essentially based on domestic mammals which represent 89.2 % of the attributed remains. Amongst them, caprines (goats and sheeps) and cattle are clearly dominant. Some remains of donkeys and dogs were found, with less than 0.5 % of the domestic mammals. The wild mammalian fauna (0.7 %) is attested by rare remains of hippopotamus, gazelles (*G. dorcas* and *G. dama*), small felids and hares. Other categories of animals were also present, representing 10.1 % of the attributed remains.

Fishes are well attested in the settlement with more than 10 % of the determined remains. The study is not yet finished but we can observe the dominance of catfishes, mainly *Clarias* and *Synodontis*, with some large individuals. Fragments of ostrich eggs are abundant and a lot of beads were found in the two sites. Snails are rare. We have determined the presence of fresh-water gastropods like *Pila wernei*, *Lanistes carinatus* and *Cleopatra bulimoides*.

Amongst the bivalves, some remains of *Chambardia rubens* and *Mutela* sp. These taxa indicates shallow water but deeper ponds too.

Amongst the live-stock, caprines are dominant with 57.4% when cattle represents 42 %. The caprine herd show a clear dominance of goats (*Capra hircus*, 63.5%) when sheep (*Ovis aries*) represents 36.5 %. The two species were horned, the goats with scimitar horn-cores and the sheep with ammon-shape horns. Extraction of horn-sheats is attested for the goats. Sheep were tall animals, with long legs, very similar to those from Kerma (Chaix & Grant 1987). Goats are smaller and slender. Exploitation of caprines is characterised by a maximum of animals slaughtered before one year, but individuals more than 4 years old are present too. This figure indicate a system for meat exploitation but also for secondary products, probably milk, attested by the high percentage of goats. The preservation of skeletal elements show a relative uniformity in the distribution, indicating a local preparation of carcasses (Fig. 2a).

Cattle (*Bos taurus*) is, in terms of number of specimens, the second category. It is possible that, in terms of quantity of meat, this animal will occupy the first place. Some pieces indicate the presence of horned individuals but the bad conservation of the horn-cores do not allow a better description. Measurements of some bones show strong bovines, a little smaller than those found at Kerma (Fig. 3). The age distribution shows a clear maximum of slaughtered animals between 3 and 4 years. This scheme may indicate a meat production but also secondary uses (traction) and products (milk). The distribution of the skeletal parts is typical for a local preparation, with a higher proportion of rachis elements and extremities (Fig. 2b).

At Gism el-Arba, the importance of the live-stock is emphasized by the presence of numerous (more than 700) figurines of cattle and probably of caprines (Fig. 4). Whether they were reckoning counters, children's toys or religious objects, the purpose of these figurines has not yet been precisely identified (Chaix & Queyrat 2003). The remaining domestic mammals are the donkey (*Equus asinus*, 0.4%) and the dog (*Canis familiaris*, 0.07 %). Contrary to Kerma, we have not observed butchery marks on donkey bones.

b. Comparisons with Kerma

It seems interesting to compare the economy of this rural village with the system practised in the metropolis of the kingdom, Kerma. We will briefly emphasize the main similarities and differences.

For the similarities:

Gism el-Arba and Kerma are characterized by a clear dominance of domestic mammals. In the two sites, wild mammalian fauna is rare, testifying of

poor hunting activities (Fig. 5). Populations of the kingdom of Kush are clearly engaged in a production system, based on cattle and caprines. These two categories play an important role in the religion and funeral ceremonies too (Chaix 2001; 2003).

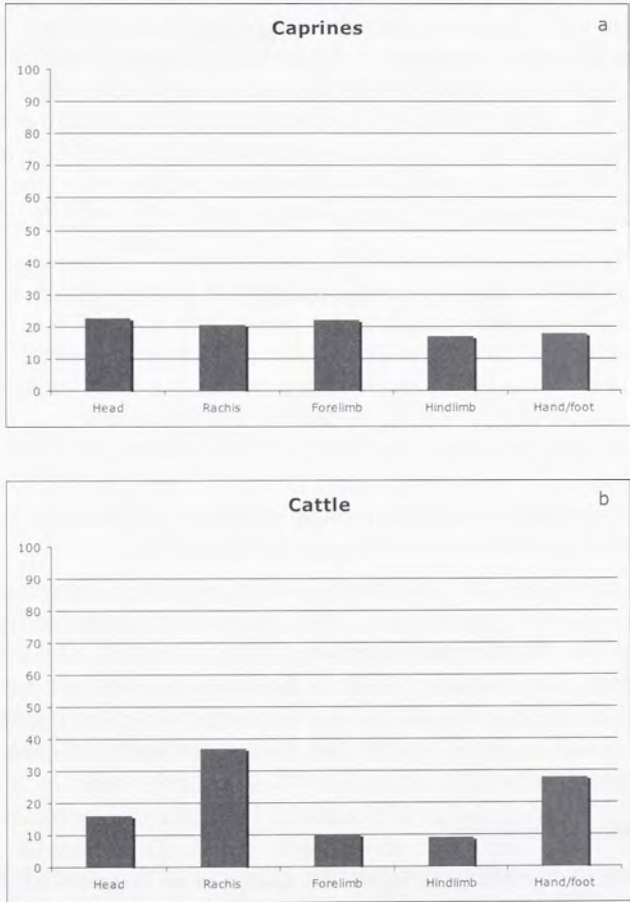


Fig. 2.: a. Caprines: distribution of skeletal elements. b. Cattle: distribution of skeletal elements.

If we consider the composition of the live-stock, the same species, namely, sheep, goat, cattle, donkey and dog are present at the two sites.

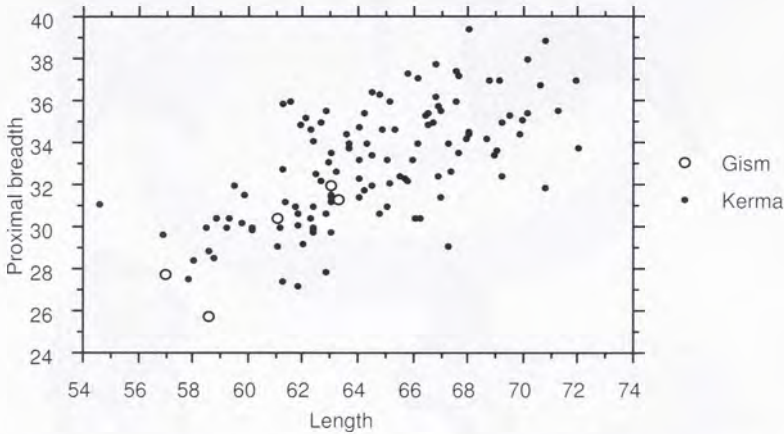


Fig. 3: Cattle - first phalanx: scattergram showing the smaller size of the pieces from Gism el-Arba.

For the differences:

With a more precise examination of the remains from Gism el-Arba and Kerma, we can find interesting differences.

Firstly, the preservation of the bones is better at Gism, with 77.4 % of attributed remains against 69.3 % at Kerma. It can be explained by the importance and the surface of the city of Kerma (around 20 hectares) with a lot of inhabitants affecting the preservation of bones lying on the soil. Another parameter to consider in Kerma is the variations of the ground-water level, very unfavourable to the bone conservation. Gism el-Arba represents a smaller surface of only 1.2 hectares, with a low habitation density and seems less influenced by the levels of the water too. The general composition of the two spectra shows some variations too (Tab. 2). They are illustrated by the figures 6 and 7. In terms of NISP, caprines are dominant at Gism el-Arba with 57.7 %, followed by cattle (42.3 %). At Kerma, remains of cattle are the most numerous (64.7 %), when caprines represent only 35.3 %. This situation can be linked with the great impor-

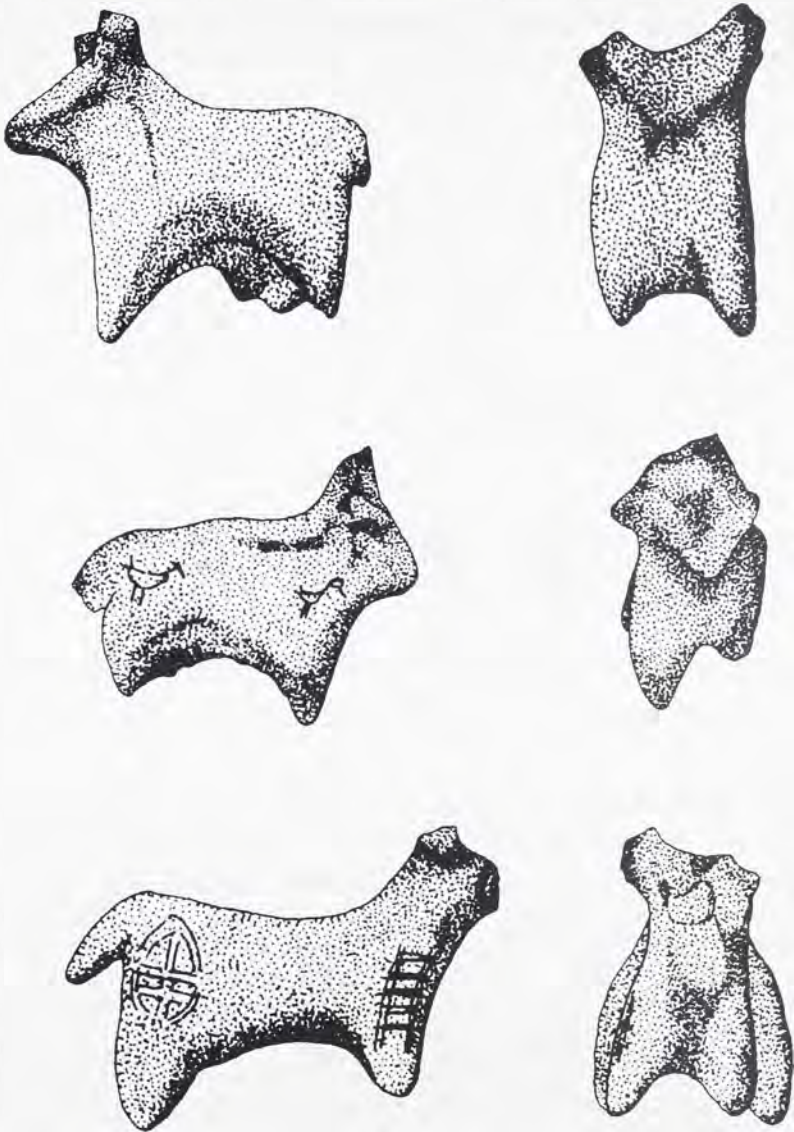


Fig. 4. Gism el-Arba: some examples of clay figurines of ruminants (drawing S. Marchi, in: Gratien & al. 2002: 88).

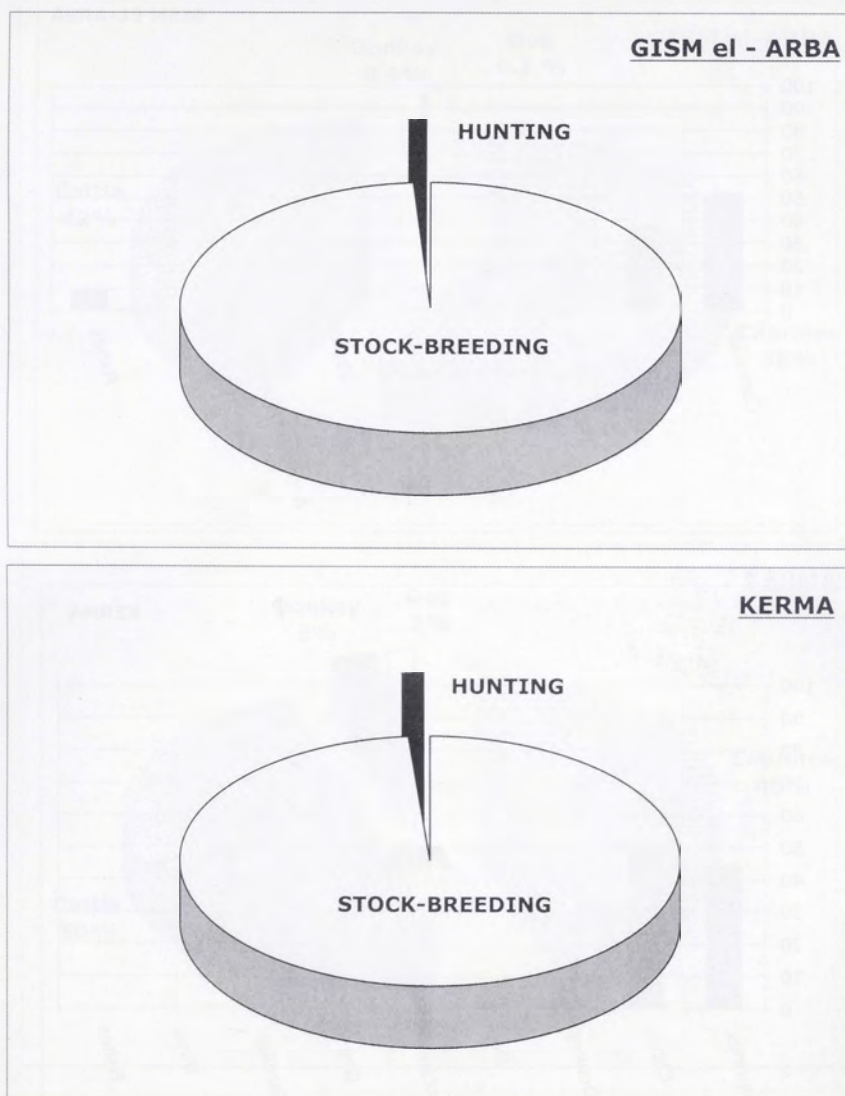


Fig. 5: Comparison between domestic and wild fauna at Gism el-Arba and Kerma.

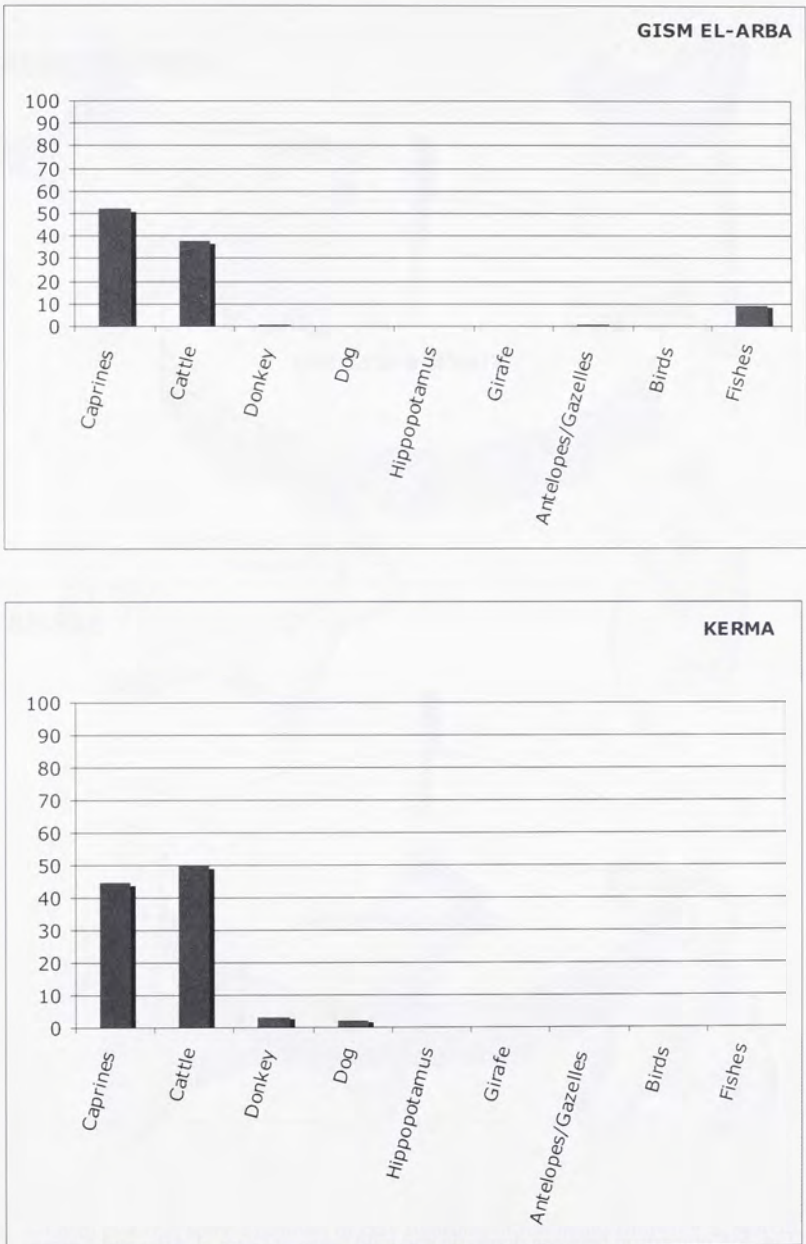


Fig. 6: Comparison between the faunal spectra of Gism el-Arba and Kerma.

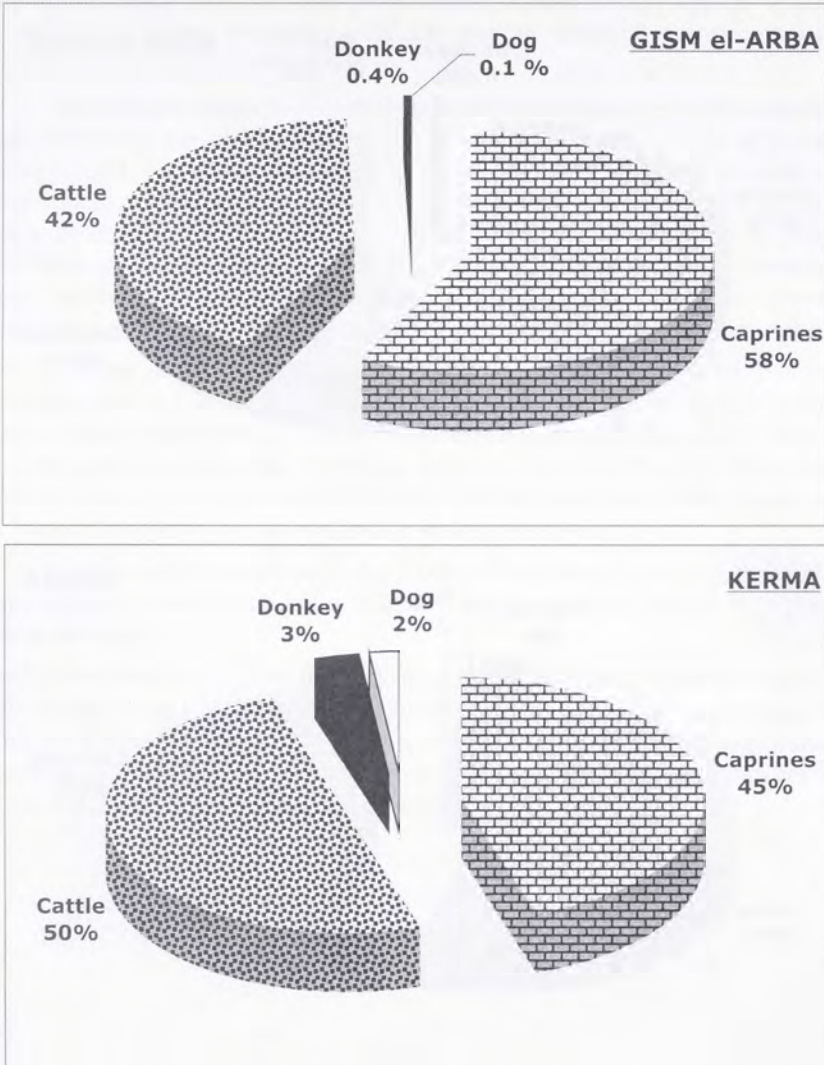


Fig. 7: Comparison between live-stock from Gism el-Arba and Kerma.

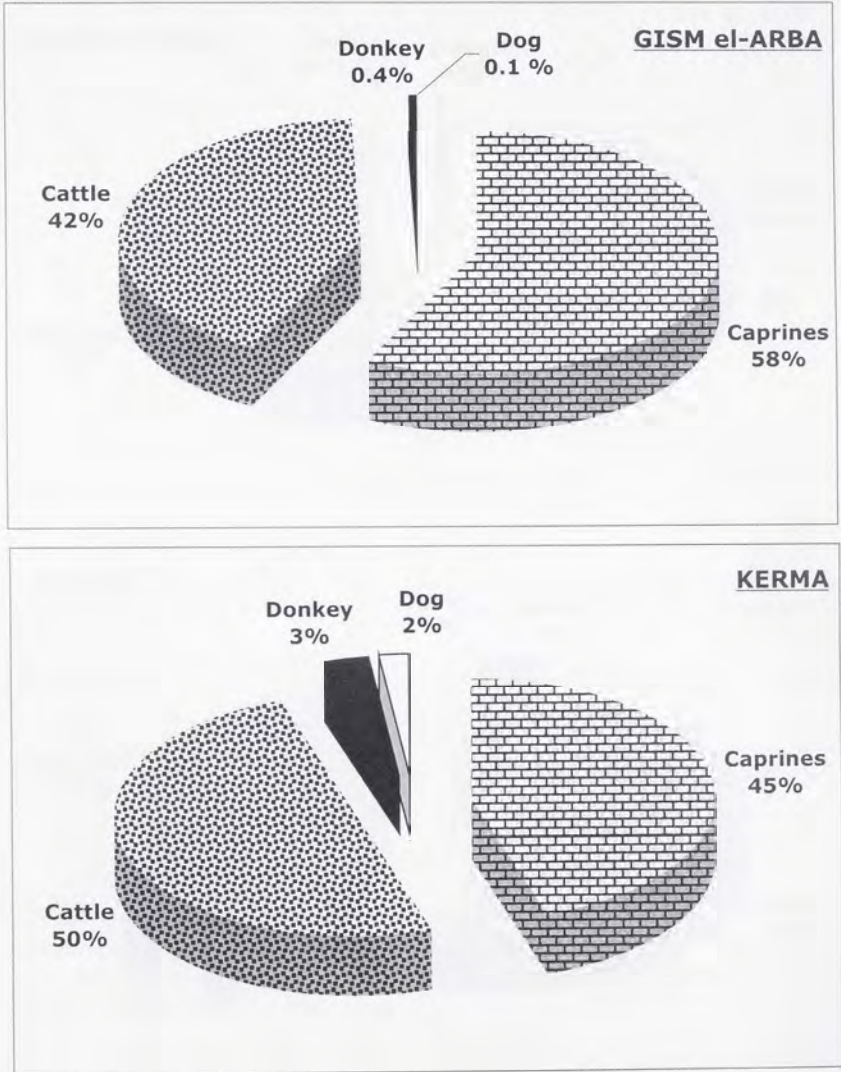


Fig. 8: Proportions of sheep and goats at Gism el-Arba and Kerma.

tance of cattle in the metropolis, where this animal is not only an important source of meat and secondary products but an essential component of the funerary rituals (Chaix 1994; 2001).

Amongst the caprines, Gism el-Arba is characterised by the dominance of goats (63.5 %) when sheeps forms only 36.5 %. The bigger amount of goats can be explained by the rural situation of Gism el-Arba, with a more arid environment compared with the Kerma basin. In the capital, on the contrary, we note a predominance of sheeps (66.5%) when goats represent 33.5 % (Fig. 8). The caprines' exploitation, illustrated by the age structure, indicates, contrary to Gism, an almost exclusive use for meat with very few old animals. About the cattle, one can note a slight smaller stature of the bovines from Gism el-Arba.

Another difference concern the ichtyofauna. At Gism el-Arba, fish bones are numerous and well preserved, with 665 elements (8.8 % of the attributed bones), when in the town of Kerma, these remains are very rare (0.2 %) and only big and strong pieces like vertebrae were recovered. These differences are probably linked with unfavourable factors like the variations of the ground-water levels and the intense human circulation in the metropolis.

At Gism el-Arba, although the study of fish bones is not yet finished, the main species belong to catfishes (*Clarias* and *Synodontis*) and to Nile perches (*Lates niloticus*).

Finally, the presence of more than 700 clay figurines mainly attributed to bovines and caprines (Chaix & Queyrat, 2003) in the settlement 2 of Gism el-Arba testify of the great importance of the live-stock in the Kerma culture. This large quantity in a rural settlement seems very strange compared with the few figurines found in the capital, Kerma. Actually, we have no explanation for this.

Tab. 1: Gism el-Arba: faunal composition.

Species	NSP	%
Caprines undet.	3761	
goat (<i>Capra hircus</i> L.)	89	
sheep (<i>Ovis aries</i> L.)	51	
cattle (<i>Bos taurus</i> L.)	2856	
donkey (<i>Equus asinus</i> L.)	30	
dog (<i>Canis familiaris</i> l.)	5	
Total domestic	6792	89,2
hippopotamus (<i>Hippopotamus amphibius</i> (L.)	1	
dorcas gazelle (<i>Gazella dorcas</i> (L.)	33	
dama gazelle (<i>Gazella dama</i> (Pall.)	2	
antelope/gazelle undet.	10	
small felid	2	
hare (<i>Lepus sp.</i>)	8	
Total wild mammals	56	0,7
birds	2	
fishes	665	
molluscs	24	
ostrich eggs	75	
Total others	766	10,1
Total attributed	7614	22,6
Fragments undet.	26105	77,4
Grand total	33719	22

Tab. 2: Comparison between the faunal spectra from Gism el-Arba and Kerma.

	Gism el-Arba		Kerma	
	NSP	%	NSP	%
Caprines	3901	51,98	15750	44,82
Cattle	2856	38,05	17500	49,80
Donkey	30	0,40	1050	2,99
Dog	5	0,07	700	1,99
Hippopotamus	1	0,01	15	0,04
Girafe	0	0,00	2	0,01
Antelopes/Gazelles	45	0,60	16	0,05
Birds	2	0,03	29	0,08
Fishes	665	8,86	80	0,23
Total	7505		35142	

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Mauro Cremaschi, Sandro Salvatori, Donatella Usai and Andrea Zerboni

A further “tessera” to the huge “mosaic”: studying the ancient settlement pattern of the El Salha region (south-west of Omdurman, Central Sudan)

Being well aware of its basic rescue archaeology character in an area of intensive urbanisation the Is.I.A.O. El Salha Archaeological Project started in November 2000. Three field seasons have been, so far, carried out in the region under investigation, which covers a transect of 35 by 5 km, from the river to the interior, west of the White Nile (Fig. 1).

The human and natural landscape changes a lot from the Nile bank to the western edge dominated by the elevated ridges of the Jebels. The Nile bank is densely populated and a large belt west of it, some ten kilometres in length, underwent in recent times intensive exploitation by quarrying activities and overgrazing, which resulted in severe degradation and almost complete desertification. Only the western part of the concession area, far from the Nile and close to the relief fringes, maintains its natural landscape which consists of a dry savannah, rich in acacia trees and seasonal grass cover.

Based on sampling strategies, the first survey field season was completely dedicated to cross the whole area under investigation and to figure out potentialities, problems and the overall complexity of the region. At the end of the first season of work it was possible to plan selected test excavations at different sites and more extensive operations at one of the deeply-stratified Mesolithic sites (10-X-6) located along the Nile bank. Excavation at the site 10-X-6 continued in November-December 2002 together with the test excavations at burial grounds of uncertain chronological attribution.

A small area of the concession still needs to be surveyed. It is the westernmost part of the higher terraces of the Jebels, which, according to the data at hand, seems to have been exploited until and during the Early Holocene.

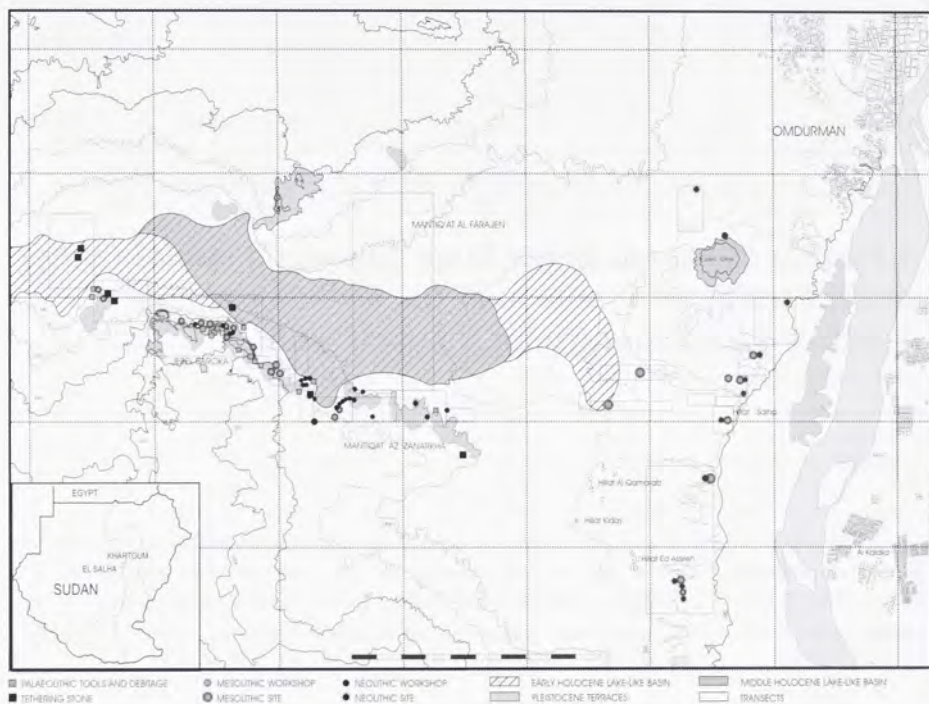


Fig. 1. Map of the area under ISIAO concession, showing surveyed areas and distribution of prehistoric sites with extent of palaeo-lacustrine formation.

One hundred and sixty sites have been located in the area under investigation and classified as follows:

1. sparse occupation scatters: one to a limited number of scattered artefacts;
2. concentrations: areas of different extent covered by densely distributed archaeological materials;
3. isolated tumulus: earthen mound covering underlying graves;
4. clustered tumuli: more than two and up to dozen earthen mounds;
5. isolated cairn: elevated stone made mound, circular or oval in shape;
6. clustered cairns: more than two and up to dozens elevated stone made mounds;
7. structural evidences: from the smallest surface stone structure to mud-brickwalls;
8. grinding stone workshops;
9. quartz workshops;
10. tethering stones.

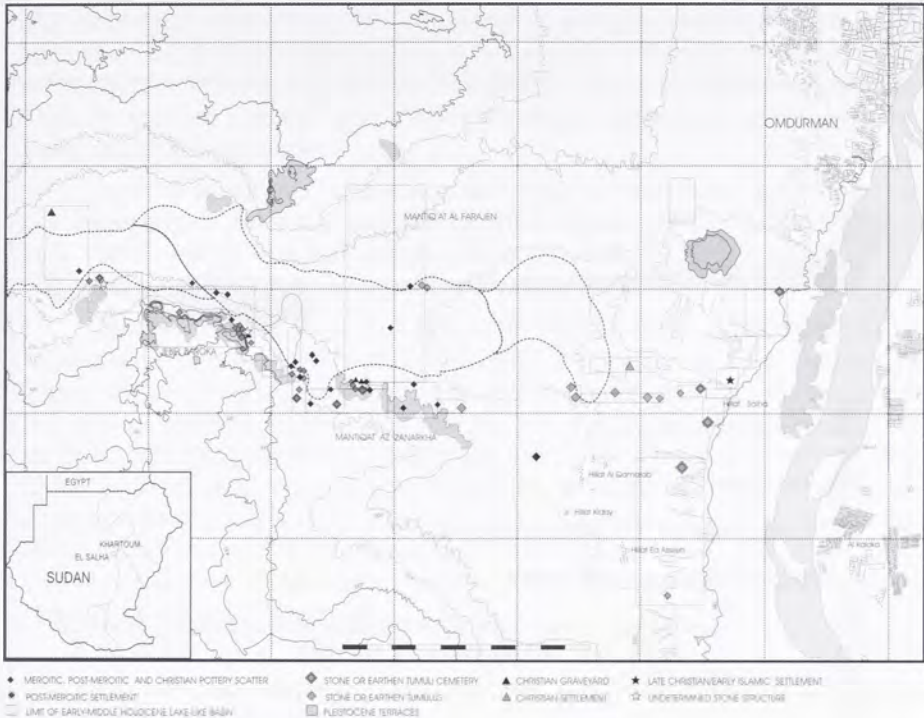


Fig. 2. Distribution of proto-historic and historic sites.

While continuing excavations at the Mesolithic – Post-Meroitic site 10-X-6 and testing Post-Meroitic graves in the cemeteries located during the first campaign next to the Jebel (10-U-21, 10-U-3), a basic program of geomorphologic investigation has been undertaken by two of the authors (Cremaschi & Zerboni). The sites' distribution clearly indicated that a large flat area between the Nile and the ridge of sandstone outcrops of the Jebel was completely devoid of prehistoric and proto-historic remains with the exception of Post-Meroitic earthen tumuli (Fig. 1, Fig. 2). Such a pattern was tentatively explained as resulting from the covering by sub-recent alluvial deposits (Usai 2003; Usai & Salvatori 2002). A silty alluvial deposit was indeed exposed along the trench dug by the Oil Company for the pipeline which links South to Central Sudan. While our hypothesis was not far from the truth, the issues of the geomorphologic survey proved to be much more complex and intriguing. A set of informal geomorphological/pedolithological units has been chosen to represent the morphogenesis of the area. Chronological attributions, while provisional, rely upon the general geological

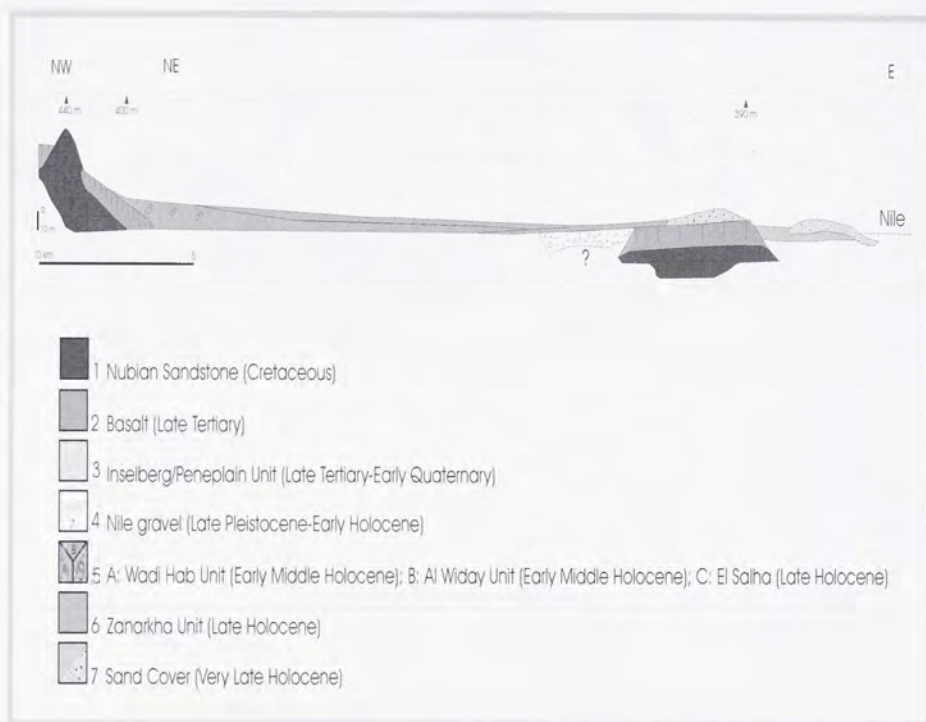


Fig. 3. Geomorphological map of the El Salha area.

characteristics of the region, and on stratigraphic relationships. The Holocene units are dated on the base of the archaeological context.

The geological bedrock of the area consists of early Tertiary sandstone (Nubian Sandstone) and of basalt. They are shaped in form of inselbergs and are surrounded by gently rolling surfaces: the peneplain, cut into deep red-coloured lateritic paleosols. This unit (Fig. 3: Inselberg/Peneplain Unit) may be related to early Pleistocene morphogenesis. As the oldest geomorphologic unit of the area, the Late Palaeolithic and Mesolithic sites, located along the northern margin of Jebel Baroka, are related to it. The Palaeolithic artefacts appear strongly abraded by wind erosion and patinated and they may have been subjected to a severe dry environment before the Holocene.

Wadi Hab is a large flat valley delimited by the Inselberg/Peneplain Unit and it is covered by of a sandy-clay deposit, about forty centimetres thick and

rich in Mollusc shells. The Geomorphological position, sedimentological characteristics and faunal content suggest a lacustrine or swamp origin. The age of this unit is, at present, hypothetical; the deposits cover the Inselberg/Peneplain Unit and they are therefore post-Pleistocene in age and may be attributed to the Early and Middle Holocene.

A more recent unit, called Zanarkha (Fig. 3), of possible Late Holocene age, consisting of sandy-clay deposits, brown in colour, overlaps part of the Wadi Hab Valley, and in one case covers a Neolithic Site, 10-V-6 (it also includes fragments of Meroitic pottery).

Toward the east some Holocene units related to the Nile sedimentation were distinguished: the Al Widay Unit (Fig. 3), consists of an alternation of lenses of grey massive silty-sand, green and red sandy-clay deposits and black thin organic vertisols, representing respectively levees and overbank deposits of the Nile. A buried Palaeo-Nile channel has been discovered below this unit. The El Salha Unit (Fig. 3), consists of well rounded Nile gravel of different lithology; it may be interpreted as a longitudinal bar of the Nile, lying some ten metres above the present river level. At the top of the formation, there are several large mounds consisting of Mesolithic and Neolithic sites. Both these units can be dated to the Early-Middle Holocene unit.

The Nile Terrace Unit (Fig. 3), represents the first terrace above the present river level; it is intensively cultivated and composed of black organic silty-clayey vertisols and sand bars.

The Holocene morphogenesis of the area appears to be related to an aggradational phase of the Nile, which led to the deposition of the gravel of the El Salha Unit and the over bank deposits of the Al Widay Unit. The Wadi Hab valley was therefore dammed up by the aggradation of the Nile and it was occupied by a lake some 30 km long with deposition from the Wadi Hab Unit. These geological events have to be localized during the early Holocene wet period because they required both an higher discharge of the Nile and at a local scale improved run off from in-land. This may explain the concentration of archaeological sites along its southern fringe; while the other relevant concentration of sites was located on the gravel bar (El Salha Unit) which separated the pond from the Nile course.

In fact, it is possible that after the onset of the Early Holocene wet period, which in other areas of the Nile Valley is recorded at the end of the tenth and the beginning of the eleventh millennium BP (Hassan 1987; Wendorf et al. 2001; Vermeersch 2002) and after the deposition of the gravel bar, which separated the Nile from the Wadi Hab, a first phase of occupation, dating to the Mesolithic period, occurred on top of the bar.

It is hoped that the excavation of Site 10-X-6, build up on this gravel, will provide further information on this specific problem. The material collected at the site seems to pertain to a more ancient phase if compared to sites found around the “reduced margins” of the swampy basin.

Whether all these sites are contemporaneous or not is not yet clear. More information and radiocarbon determinations are needed to accomplish this goal, but it is, anyway, a very unfortunate situation that most of the Mesolithic sites close to Jebels have been washed by successive flooding. One of the sites, a ca. 10 hectares scatter of Mesolithic artefacts, has been tested and trenches proved that no anthropic deposit rested on the red lateritic soil.

The Neolithic settlement pattern, apart from the sites located along the Nile, appears a little less clear as, probably, part of the evidence of this period is hidden under the Zanarkha Unit formation. Better evidence comes from an area sheltered by sandstone outcrops. Together with a few fragments of Neolithic pottery, two quartz workshops, systematically investigated, prove, typologically and technologically, that the Neolithic people settled the area around the swamp at least for selected activities.



Fig. 4. Tethering stone.

At one of these site, 10-U-19, a tethering stone was discovered (Fig. 4). While tethering stones are unusual in the region, and maybe in all Sudan, they are well known in the Saharan desert and in the Arabian peninsula and they are dated to the Neolithic (Central Sahara and Oman: Pachur 1991; Cremaschi & Negrino 2003). The tethering stones are typically positioned in locations attractive for wild animals and strategic for hunting activities as fringes of lakes

are. The fact that a tethering stone is located at the edge of the Wadi Hab Unit suggests that it was still a wet area around the VI millennium BP and it can be correlated to the wet period as recorded at the Fayum and in the Nabta region data (Wendorf et al. 2001; Vermeersch 2002). In connection with the onset of a dryer period in the Middle Holocene, VI millennium BP, is, maybe, the Late (?) Neolithic occupation of the Nile Terrace Unit silt. This site, called 10-X-3, is lying at the foot of a huge Mesolithic and Early Neolithic settlement built on the line of the Nile gravel bars.



Fig. 5. Post-Meroitic grave at cemetery 10-U-21.

While reduced in size, the lake survived until the Post-Meroitic period. Many sites of this phase, normally visible in the form of scatters of pottery, are related to the late lacustrine deposits. Also some graves, tumuli of the earthen type, are located in areas where the lake formations occur. Cairns made of Nubian sandstone are located on the outcrops of Nubian sandstone at the western margin of the Zanarkha Unit. These cairns date, as the excavation of some of them has proved, to the Post-Meroitic period (Fig. 5). The archaeological material found in these cairns is consistent with that recovered in a simple pit grave excavated at the northern periphery of site 10-X-6. The earthen tumuli are also considered to be of the Post-Meroitic period. While very few of them have

been archaeologically investigated (Marshall & Abd el Rahman Adam 1953), and their exact date is just a guess, it is interesting to note that they are located only in the area close to the Nile and, to the west, on alluvial deposits.

Two Christian sites have been found during the survey. One is a settlement with evidence of fireplaces and a widespread scatter of wheel made orange painted pottery, associated with handmade pottery types matching exactly specimens from Soba (Welsby & Daniels 1991). This site is located close to the south-western border of the swamp, not far from a Khartoum Mesolithic site. From surface observation it doesn't seem more than a temporary occupation that may have been used for agricultural purposes. Another Christian site has been located at the foot of the Jebel. It is a box grave cemetery where the graves are made with Nubian sandstone slabs. A cairn is also associated with this cemetery.

Well dated evidence of Islamic period occupation is furnished by Site 10-X-5. This site is occupying the Nile Terrace silts, at the foot of the higher Neolithic mound which should be, according to geomorphological inferences, built on the Nile gravel bar. The site has been ^{14}C dated to 1500 AD cal., on charcoal collected from a test trench during the 2001 season.



Fig. 6. Quartz arrowhead from site 10-U-44.

The most conspicuous gap in the cultural sequence concerns III to I millennium BC occupation. The few pot sherds picked up at the Mesolithic-Neolithic site 10-X-8 could not be more precisely dated or more definitely ascribed to a III or II millennium BC horizon. Likewise definite Meroitic evidence was not located in the region under investigation. Handmade, reddish-brown burnished pottery, decorated with a geometric combed pattern, does not seem to be particularly representative of this period. A nice concave base quartz

arrow-head (Fig. 6) found in a workshop site in the Jebel area may well date to the Kushite period. However, such scanty evidence does not allow any inference on the Meroitic presence in the area. It is not yet clear if the gaps are to be related to the environmental evolution of the area or if they are the result of the surveying methods employed. However, the intense nature of the survey observation makes the latter unlikely.

In the next season we will partly re-orient our surveying strategy according to the new data the geomorphologic landscape reconstruction have made available and reconsidering the effects on the local population dynamic of the historical Nile fluctuations. As is well known, a first period of drastic low discharge of the Nile is documented during the second and the beginning of the third Dynasty (Said 1993), 2900-2800 BC. From this time onward it seems that the history of the Nile has been one of alternating periods of low and high floods until the period ranging from 500 BC to AD 600 (Said 1993). If the Late Holocene Zanarkha Unit is related to this period is not clear at the moment without any radiometric determination at hand. It is possible anyway, as elsewhere stated (Caneva 2001), that in the third to first millennium BC settlement patterns are linked to environmental stress suffered by populations living along the Nile Valley.

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David N. Edwards

Mid Holocene game drives in Nubian landscapes?

Recent field survey in the Third Cataract region has now recorded some 550 new archaeological 'sites' spread along ca. 75 m of the Nile valley (Fig. 1). While much of the archaeological material encountered is relatively familiar, the survey has also identified a number of more enigmatic features, notably a series of linear stone features ('walls'). Many are quite ephemeral, often only a few courses of stone high, but others are more substantial structures with some examples 300-400 m long and possibly parts of more extensive complexes of walls extending over 1-1.5 km. Found in often very different landscape contexts within the region and varying considerably in scale, it seems unlikely all these 'walls' can be treated as a single class of monument and various 'walls' may have had very different functions and may well date to very different periods. A number of the larger wall structures are the subject of this discussion.

Long linear stone features were first encountered in 1991 (Edwards and Osman 1992: 54-59) along the Wadi Farjar, an ancient watercourse which traverses the prominent bend in the Nile on the Third Cataract. However, beyond noting their presence, no further work was undertaken at that time as work remained focussed on riverine areas. Further reconnaissance in that area suggested that such features in that area might be of late prehistoric date. The possibility was also considered that they might have been used for water-harvesting, supporting seasonal agriculture in the wadi (Edwards and Osman 2000: 61). Subsequently, further extensive complexes of walls were identified in parts of Sadeik-Habarab, along what may be an ancient Nile channel which runs ca. 1 km east of the present river, while more several more ephemeral walls were found in the very rocky area along the south side of Arduan island. However, with the aid of aerial photography and high-resolution satellite imagery it has become apparent that such various 'wall' structures are much more widely distributed in the region. Several further examples have been identified on the left (west) bank of the river from aerial photographs and several of these have

now been examined on the ground during 2005, in the areas of Tajab and Jawgul. All are found in the rockier parts of the cataract zone where there are now extensive areas of exposed granite and sandstone. To date, no such features have been found in the northern part of the survey area downstream of the Kajbar Cataract, where there is little loose surface stone. It is of interest that some potentially similar structures have recently been identified at a number of locations in the Fourth Cataract (Wolf 2005), another rugged and rocky landscape, with similar geology to this area.

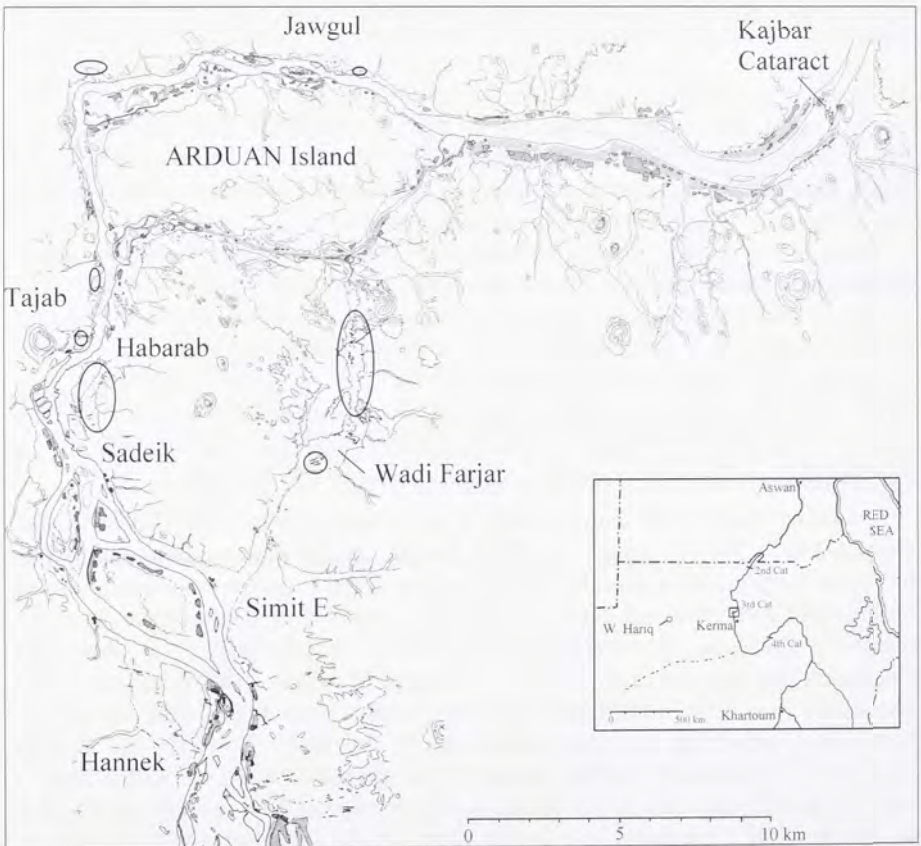


Fig. 1. The Third Cataract region (N.Sudan) with major groups of 'walls' ringed.

Wadi Farjar

One of the wall complexes so far discovered lies along the lower Wadi Farjar. This wadi once drained a substantial area within the bend of the Nile in the Third Cataract region, running from near Simit East at its south end, to rejoin the Nile near the southeastern corner of Arduan island (Fig. 2). The largest elements of the complex are two stretches of walls running along the two sides of the main wadi channel, ca. 5 km south of where it joins the Nile. The most substantial of these (FAR007) consists of a low wall standing 0.5-1 m high which extends over ca. 360 m of the rocky slopes curving around an embayment along the east side of the wadi (Fig. 3). At its south end it terminates at a rocky outcrop where the wadi narrows to a width of ca. 100m. There are two further small rocky outcrops within the wadi at this narrow bottle-neck. At its west end the wall stops at the wadi edge and does not seem to have run into or across it. A prominent feature along the line of the wall is a single gap ca. 26 m wide. While there is some limited collapse evident in places, the absence of spreads of rubble along the wall indicates that the original structure was never significantly larger than what we see today and the gap also appears to be an original feature of its construction.

There are no further structures directly linked to this wall, although on the relatively high rock outcrops just to the south of its western terminus are two small structures. The first (FAR030) is a low stone cairn, thought likely to be a burial monument. A few sherds found beside it may be of Napatan or possibly Kerma date (second – early first millennium BC?). A few metres to the south is a low stone kidney-shaped structure (FAR031) with an entrance in its south wall. No artefacts or other dating evidence was found with it. The only other artefacts discovered in this area were some thin spreads of sherd and lithic material (FAR029 – later Neolithic?) within the embayment immediately below the FAR007 walls. Several burnt mounds, which we interpret as the sites of burnt stands of trees (see below), are also found in this embayment as well as at several locations further north along the wadi.

On the west side of the wadi, another wall line (FAR021) runs north along its edge, beginning (ending) at the narrowest point of the wadi immediately opposite the end of FAR029. Running intermittently between boulders and rock outcrops, this feature extends over ca. 120 m, terminating at its north end at a small gully which runs into the main wadi from the west. There are no walls along the west side of the wadi north of this gully, although there are several other archaeological features in this area. These include a cluster of four Kerma graves (FAR033), a larger stone structure (FAR016) and some smaller stone features, some of which may be burial monuments of Kerma date, and another cluster of three or four stone foundations (FAR036), of unknown date. Some



Fig. 2. Wall-lines and other features in Wadi Farjar.
 (Original data © Quickbird 2003; distributed by Eurimage).



Fig. 3. Length of stone walling running along east side of Wadi Farjar (FAR007).

400m to the north, there is one further short length of wall ca. 50 m long (FAR037) running approximately W-E, located near the top of the slope above the wadi. It is unclear whether it relates to the other walls further up the wadi.

Further shorter lengths of walls have been identified in both directions along the wadi, some running parallel to it, with others running across its course. In its central area, the wadi forms a wide and relatively open plain, with a few rocky outcrops within it, bounded by low terraces. There further lengths of walls (FAR011) are located, running around a rocky outcrop on the north side of the wadi channel. The longest of these then turned south into the wadi, disappearing beneath the sandy silts of the wadi deposits. Amongst the rocks adjoining this area at least three potential prehistoric occupation 'sites' (FAR023-25) were identified amongst more extensive thin spreads of lithics and sherds. Similar material was found on the south side of the wadi.

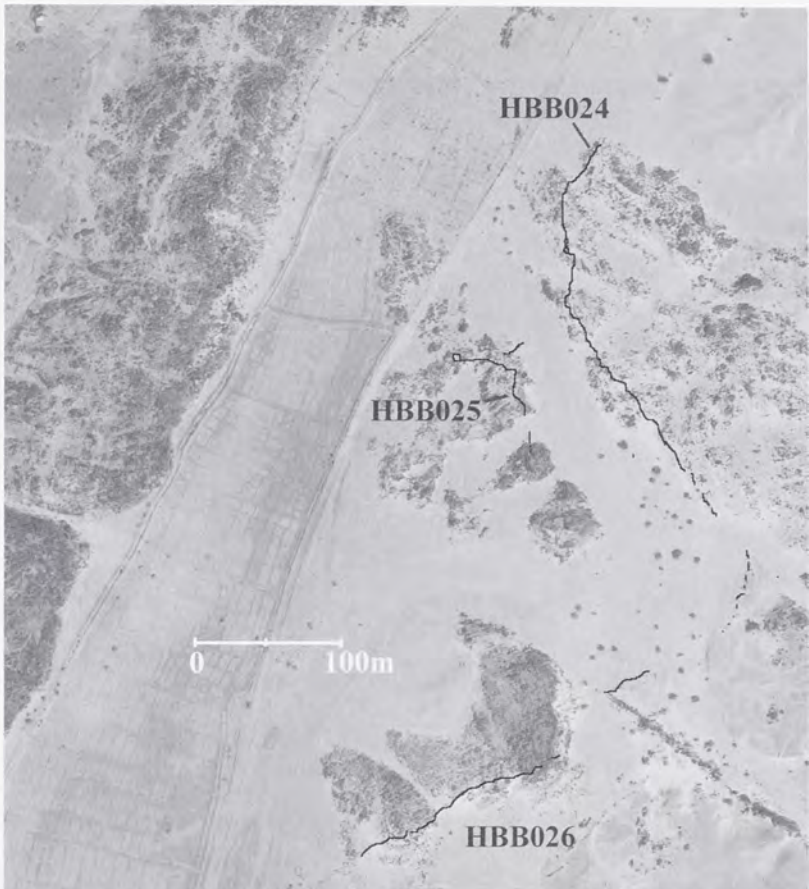


Fig. 4. Wall-lines along the east side of the palaeochannel in the Sadeik-Habarab area (Original data © Quickbird 2003; distributed by Eurimage).

Sadeik-Habarab

Another series of walls were identified in the Sadeik-Habarab area where three stretches of walls (HBB024-026), apparently all part of a single complex, lie on the east side of an ancient Nile channel which runs from Sadeik to Habarab, ca. 1 km east of the present river channel (Fig. 4). The longest of these HBB024 (ca. 320 m long), runs around a rocky headland and then along the eastern edge of a side wadi which runs into this larger palaeochannel. The course of the east end is still not fully determined but segments of walls continue around

the end of the wadi turning towards the southwest where further walls (HBB026) run for a further ca. 150 m. Facing HBB024 on the west side of the side wadi are a series of length of walls (HBB025, ca. 120 m long), including some which may be crossing a small side channel, and which are now partly buried. These walls seem to form part of a single complex, focused on the small side-wadi which winds around and between these rock outcrops. However, on the west side of the main wadi, there are several further stretches of wall running along its rocky edge, extending over a total distance of ca. 1.5 km. While much of this palaeochannel has recently been brought into irrigated cultivation there is very little evidence for significant occupation along this wadi after the second millennium BC, most sites dating to the Neolithic and Kerma-periods.

The function(s) of such structures

In the absence of obvious (ethnographic) analogies, proposing a function for such stone structures is not straightforward and will doubtless be further debated. However, this paper will discuss the possibility that they relate to prehistoric hunting activities, probably during the mid-Holocene, although we cannot as yet closely date them. More specifically it may be suggested that they are the remains of hunting drives and blinds used for forms of cooperative hunting.

While such structures have not, until very recently, been recognised elsewhere in the Middle Nile, they are not unique to this region. Potentially similar structures, insofar as they contain walls/stone alignments and other smaller cellular structures, are found, for example, in a number of parts of Northeast Africa and the Near East. A series of stone walls/alignments, some extending over ca. 2 km have been identified in the Egyptian Western Desert, in an area west of Dakhla (Riemer 2004). A number of further sites have been recorded in that general area. Current interpretation of the Egyptian examples generally favours a role in hunting. Interestingly, the geologist Haynes, who encountered similar stone alignments in the Egyptian desert records that one of his bedouin assistants did indeed suggest that such walls could be used for hunting gazelle “which generally will run along beside the stones rather than jump over them” (Haynes 1985: 301-302). His understanding of how such systems might have worked, and understanding of gazelle behaviour is of course of some interest as we lack modern analogues for such hunting systems in our region.

More generalised parallels, as well as similar problems of interpretation, may also be found in some quite well-documented occurrences of linear stone features, often known as ‘desert-kites’ in the Near East, distributed through parts of Syria, Jordan, Sinai, the Negev and Arabia (Echallier & Braemar 1995; Helms & Betts 1987; Meshel 2000; Van Berg et al. 2004). Most of these differ in some

important respects to the Sudanese examples. However, it is also reasonably clear that there may be several different types of structures which seem likely to have served a number of different functions. An important feature of many of the classic 'desert-kites' of the Near East are that they form enclosures. This feature, their landscape context, as well as their abundance in some areas, does seem to suggest that they relate to systems of pastoralism. However, current interpretations would suggest that while some may have been used for herding, others may have been used for hunting. The construction of low walls to guide game, often used with small stone blinds/hides, is recorded among modern Bedouin groups in parts of Arabia, also sometimes with pit traps (Jabbur 1995: 361-370). It should also be noted that some stone alignments, despite bearing some superficial similarity to 'desert-kites' may have had quite different uses. A so-called 'kite' in the central Sinai, for example, seems likely to be some form of cultic structure (Kobusiewicz 1999), reminiscent of the so-called 'antenna-tombs' encountered in the Libyan Sahara (Reygasse 1950: 56-62; Mattingly et al. 2003: 201-203).

In the absence of obvious modern analogues for such structures in the region, it may perhaps be instructive to look further afield, as potentially similar systems used for hunting are known in North America. Despite their distance in time and space, descriptions of such systems may be informative in relation to these African examples. The North American hunting drives consist of stone cairns, long stone alignments (drive walls), and/or arcuate to circular rock features/rock circles (Benedict 1996; Frison 1991). Low and often quite ephemeral walls simply serve to guide the animals towards a killing zone, while the stone circles seem to have served as hunting blinds/hides. In themselves it is important to recognize that the 'walls' do not contain the animals, but simply serve to guide their movement when being driven (the same point made by Haynes' Egyptian Bedouin informant). Frison explicitly notes how relatively slight stone features may be sufficient to guide the animals. Hunters' blinds served to conceal the hunters until the animals were within striking distance. These could be constructed if there were not natural features, like boulders, to hide behind. A range of other landscape features could also be used to help trap animals, including artificial corrals, seasonal watercourses (arroyos), and parabolic sand dunes (Frison 1991: 155).

There are of course many more practical questions concerning the functioning of these putative hunting features which require further investigation. How exactly may they have been used within the Nubian landscape? In some North American highland systems the blinds were commonly constructed on reverse slopes so that animals driven over a ridge would suddenly encounter the hunters in their blinds, in positions where the walls made escape difficult. The

location of wall lines running below the ridge lines might then suggest the direction from which animals were being driven towards the walls.

The ephemeral nature of many of these walls is often commented on when attempts have been made to understand how they may have functioned. However, presuppositions that the 'wall's were required to serve as effective barriers must be viewed with caution. As the anecdotal evidence offered by Haynes suggests, any judgements on the effectiveness of such features is likely to benefit from a much greater knowledge of animal behaviour than most archaeologists possess. We probably also need to consider the extent to which, in view of the likely date of these structures, they were constructed within landscapes with more soil and vegetation than there exists today. As such, it is certainly possible that they could have had other structures, made for example of wood or thorns, associated with them. Wooden drive lines and trap structures are known in parts of North America (Frison 1991; Frison et al., 1990; Keyser 1974). We probably also need to consider the presence of trees and other landscape features which have long disappeared when considering discontinuous wall features. Were such walls constructed in a landscape with significant tree cover or a landscape in which trees were disappearing? Such possibilities of course create further problems for interpreting such structures as we may be looking at only parts of larger complexes, other elements of which have left no archaeological traces.

If these wall structures are indeed of mid-Holocene date, as the Egyptian examples suggest they may be, a better understanding of the environment in which they were constructed will be important for understanding their purpose. That this landscape had significant tree cover during the mid-Holocene is apparent both from general palaeoenvironmental reconstructions and from more direct evidence for ancient trees widely encountered in this region. Enigmatic burnt features, sometimes identified as hearths, have been noted in various parts of northern riverine Sudan, for many years. More than 50 years ago, Arkell recorded their presence in large numbers in the Kerma Basin/Wadi Khowi, interpreting them as Kerma period (ca. 3rd-2nd millennium BC) hearths (Arkell 1950: 35). Recent survey work in that region has confirmed the widespread occurrence of such 'burnt mounds' (Reinold 1987: 45; Welsby 2001: 604-605). The test excavation of a small number of these produced no clear evidence for their origin or purpose, generally revealing irregular and often sinuous 'pits' filled with burnt material. What was interpreted as a smoothed mud lining and finger marks in the burnt material was taken as an indication that some at least of these features were indeed man-made, although their function remained unknown.

Examination of many examples of similar features in the Third Cataract region has suggested to us however that the vast majority, if not all, of such features are 'natural', in so far as they mark the sites of burnt trees. Some examples of such features were also found which maintained recognisable elements of the trees and their root structure preserved in burnt, sometimes vitrified, soils. The structure of the trees was often quite evident in some detail, for example in smooth surfaces where the bark/surfaces of trees had once been. Their distribution, most commonly along the edges of wadis, is also consistent with the likely distribution of the last ancient trees in this region. Such features are commonly found along the edge of the Lower Wadi Farjar, as well as along the Sadeik-Habarab palaeochannel, and another paleochannel (known as Gaamuffa) on the west bank in the Hannek area (see Fig. 1). No evidence was found to suggest an anthropogenic origin for these features or that the distribution of burnt features could be related to the distribution of sites or artefact scatters in more than the most general way. The only association that was evident was that the areas where such features were most abundant, such as along palaeochannels, often/mostly in some distance from the modern Nile, often showed evidence for significant occupation during the mid-Holocene (broadly through the Neolithic and Kerma periods).

Such an identification finds confirmation in the many examples of what are demonstrably ancient trees encountered in the Wadi Hariq (Fig. 1), a complex wadi system located in what is now open desert some 400 km to the west of our survey area (Jesse et al. 2004). There, radiocarbon samples date burning episodes which destroyed those trees to the third millennium BCA. The destruction of trees was occurring in an area where playa-conditions with rain-fed pools in the Wadi Hariq seem to have disappeared at the end of the third millennium BCA. Human occupation there, remote from permanent water supplies seems to have ended by the mid-second millennium BC in the face of ongoing climatic deterioration.

Despite our likely ignorance of so many of the skills involved in prehistoric game hunting, there are clearly many other aspects of these wall systems which may merit further attention. How might game be driven? Where were the killing zones in the different types of systems located? With wall systems which seem to relate to wadis, were animals being driven along them, contained within the wadis, with a killing ground at a selected bottle neck (as might be proposed at FAR007)? Alternatively, were they being driven towards the wadis from the higher ground around them? It is worth noting that some hunting traditions (sometimes referred to as 'miring') are known to direct game towards swamps/wetlands, from which animals may find it difficult to escape. This may be of interest in some of our cases where wall systems appear to be

focused on embayments close to the river which may, in periods of higher river levels, have been flooded for at least part the year. In such areas, we find complexes of walls sited on lower slopes surrounding these potentially swampy areas. In such cases, two different scenarios could be suggested, one in which animals could have been driven towards these swampy areas, with a killing zone on its margins, or a second in which they could have been driven out, towards the walls/blinds around the embayment.

Problems of chronology

As has commonly been found with such structures in other regions, establishing their date remains very problematica. By their nature, it is extremely difficult to establish direct associations between such stone structures and dateable artefacts, while finding other chronometric means of dating them remains difficult. In particular, the often heavy erosion/deflation of desert land surfaces makes the likelihood of recovering samples suitable for radiocarbon dating, for example, unlikely. Where material does survive, establishing a firm association between samples and structures remains difficult. Haynes, for example, was able to date charcoal from a hearth close to one of his stone alignments (6020 ± 140 BP), but obviously could not demonstrate a certain link between the hearth and the walls (Haynes 1985: 302).

Some idea of the relative and possibly absolute chronology of such features may also be acquired through detailed analyses of their relationship to other, more readily dateable features. In the Near East, the evidence of rock drawings, for example, has been used to suggest some of the 'desert-kite' features may date back to the Early Holocene Natufian period. A number of rock drawings which seem to date to that period have been identified in both Syria and Jordan which may depict such structures, in association with people and animals (van Berg et al. 2004: 94-97). However, no drawings which might relate to these structures have been identified from the Middle Nile amongst the large collections of published rock drawings (e.g. Hellström 1970; Otto & Buschendorf-Otto 1993), nor have any been encountered amongst the many rock drawing sites within our own survey area.

Further indications of data may be provided by the wider archaeological landscapes within which these features are located. This contextual information is probably most useful in relation to sites in the region's hinterlands, especially the Wadi Farjar, where the abundance of late prehistoric features and sites, and the marked absence of later material, is very marked. Our current understanding of this and similar wadi-systems is that they were most intensively used/occupied during the fifth – second millennia BCA. It may also be possible to suggest dating relative to other features such as burial cairns. In the lower Wadi Farjar

there were several burial structures which can be broadly dated to the Kerma period (later third – early second millennia BC). These seem likely to postdate walls in their immediate vicinity but we have, as yet, failed to find unequivocal stratigraphic relationships to confirm this.

Further up the wadi, in the relatively open plains around FAR011, at least three potential prehistoric occupation ‘sites’ (FAR023-025) were identified within the rocky outcrops immediately east of these walls. Further thin scatters of artefacts amongst the rocks around these occupation foci suggests that perhaps this whole area of rock outcrops was extensively occupied, on many occasions. Sherd material includes Neolithic, pre-Kerma and possibly early Kerma material indicating the intermittent occupation of this location over millennia. A potentially promising feature of these sites is the presence of animal bone, some burnt, which was noted on some of these sites. No collections have yet been made but observations of surface material on the surface suggest the presence of large mammals.

That kill sites could also survive must also be considered, especially if hunts involved numbers of larger game animals whose bones may have been more robust. Numerous examples of kill sites involving possibly hundreds of animal (typically bison, but also antelope and wild sheep), for example, are known from North America (Frison 1991).

Despite such uncertainties, the identification of potentially comparable sites in the western deserts of Egypt (Haynes 2001; Riemer 2004) is useful in indicating that a date as early as the mid-Holocene is certainly possible for such sites. With regard to these Egyptian sites, the environmental context is the most persuasive indicator of date, in that after ca. 6000BP (ca. 4900BC) the increasing aridity will have made occupation in that region increasingly tenuous. That there are also radiocarbon dates from that period from sites in the immediate vicinity of walls may be seen as strengthening the case for such a date.

In the Third Cataract region, where we have as yet found little evidence for Early Holocene populations, a rather later date is certainly possible for these features (ca. 5000-3000BC?), but in a ‘Neolithic’ period in which herding and cultivation will have coexisted with some hunting. However, in view of the growing evidence for ‘Mesolithic’ settlement on the northern margins of the Kerma Basin, ca. 30 km to the south (Honnegger 2004) some earlier exploitation of this area by hunters cannot be ruled out. The scarcity of finds of ‘Mesolithic’ material in the area, especially its easily identified pottery, need not of course be necessarily very significant, in that such material is likely to be scarce, or absent in what were primarily hunting sites.

An even later date cannot of course be ruled out, as the presence of several Kerma-period sites in these same wadis indicate. However, we know very little about hunting during the Kerma period and whether it may have remained a significant activity. The little faunal evidence we have for this period, which is almost entirely derived from the townsite of Kerma, only suggest that wild animals/game formed a relatively minor part of the diet there, with only a few Dorcas gazelle, Dam Gazelle and Nubian ibex represented (Chaix 1990). On the other hand, gazelle (as opposed to domestic animals such as sheep and cattle) burials are not uncommon in Kerma cemeteries in more northerly parts of Nubia (e.g. Vila 1987). There are also many depictions of game as well as domestic animals amongst the numerous rock drawing sites in the Third Cataract region. Our current understanding of the rock drawings of this region is that the majority of the 'prehistoric' drawings seem likely to date to the period of the fourth-second millennia BCA. It is certainly difficult to identify many drawings that we can confidently date much earlier or that the drawings of wild animals represent an earlier phase of rock drawings, predating those of domesticated animals.

Lost traditions of hunting?

It has been suggested that a feature of these putative hunting drives is their use for cooperative hunting. It is perhaps worth stressing that the scale of such structures and the way they are located in the landscape seem to imply forms of cooperative hunting rather different from those which involve tracking/stalking prey, which may be carried-out by individuals or small groups of people. As has been noted, we have not been able to locate any potentially analogous forms of hunting using hunting drives in this region in more modern times. Most of the records of cooperative hunting during recent centuries are dominated by accounts of hunting large game, notably elephant, giraffe and oryx (e.g. Davies 1919; Audas 1919). Another significant feature of such recent accounts is also, of course, the use of the horse, to run down game.

Those areas of the Middle Nile where stone features such as these have been identified are of course currently rather limited, namely the Third and Fourth Cataract regions. Such structures do not seem to have been recorded in riverine areas of Nubia further north, either in the Second Cataract region or the Batn al-Hajar, a rocky landscape very similar to that of these cataract zones further south. No records of such hunting systems have been found further south, although it must be recognised that there is very little loose surface stone to be found over very large parts of central Sudan. However, it is important to bear in mind that if these are indeed of mid-Holocene date, the environmental conditions and forms of social organisation which supported such systems have long disappeared. Such hunting systems simply may not have survived the changes in environmental and social conditions which were taking place during the later

Holocene. Indeed, the social and natural environments in which such hunting and such structures could occur may not have existed for several millennia. If such an interpretation of such structures is correct, they may be seen as a product of a particular set of circumstances in open sahelian/savanna landscapes, in which hunting populations found both game resources and the exposed surface stone with which such structures could be built. As such, it may not be so surprising that such features are proving so difficult to understand. Whether this interpretation is correct remains to be seen, but it seems likely that such structures can only be understood when located within their landscape context.

Thanks are due to Pawel Wolf and Derek Welsby for discussing their recent discoveries of potentially similar features in the Fourth Cataract region, and Huw Barton and Mathias Lange for helpful comments. Thanks also to Lech Krzyzaniak whose enthusiasm, generosity and wide interests inspired so many and will be sadly missed.

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The Prehistory of the Blue Nile Region (Central Sudan and Western Ethiopia)¹

Abstract

Some general ideas and hypotheses are presented concerning the prehistoric societies investigated by the University Complutense archaeological project in Central Sudan (1989-2000) and Western Ethiopia (2001-2005). The project included a survey of the Wadi Soba-El Hasib region east of Khartoum, excavations of two Mesolithic sites and one Neolithic site in the Wadi Soba area and the survey and excavations at several rock shelters in the Ethiopian regions of Benishangul and Metekkel. Data from different sources are combined in an attempt to construct a coherent historical narrative. Vestiges of some cultural hiatuses were noticed in the Sudanese region, namely at the beginning and the end of the Mesolithic period, the latter involving the emergence of social stratification and the decline in the status of women. The archaeological gap at the end of the Neolithic period is interpreted as a consequence both of the climatic changes and the impediments to social division. Early cultures of resistance and population movements towards the Ethiopian escarpment as an area of refuge are proposed as *longue durée* processes among Nilo-Saharan populations of the Eastern Sahel.

1. Introduction²

The present paper is a short summary of the archaeological survey and excavation work of the Blue Nile area near Khartoum, carried out between 1990 and 2000 by a team composed by different researchers, directed by the author

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² This paper is an enlarged and revised version of Fernández 2003b.



Figure 1. Map of Central Sudan and Western Ethiopia showing the general areas of research. The area within the square is shown in figure 2. The Ethiopian areas investigated, Benishangul and Metekkel, can be seen in the lower right-hand corner of the map. Archaeological sites (dots) and ethnic groups (italics) are indicated.

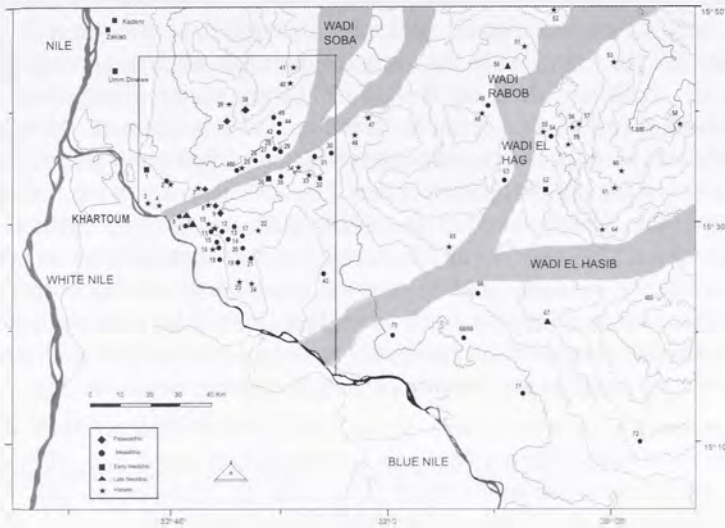


Figure 2. The research area on the eastern bank of the Blue Nile southeast of Khartoum, Central Sudan, showing the sites discovered in the intensive archaeological survey of the Wadi Soba area (1990-1994) and in the archaeological exploration of the Wadi Rabob-el Hasib areas (2000). The excavated sites of Sheikh Mustafa, El Mahalab and Sheikh el Amin correspond to nos. 13, 26 and 36 respectively.

and sponsored by the University Complutense of Madrid and the Spanish ministries of Education, Science and Culture. The final report was published in *Complutum*, the journal of the department of Prehistory, University Complutense (Fernández 2003a). Five seasons of archaeological survey were carried out during the winters of 1990, 1992, 1993, 1994 and 2000. The autumn campaign of 1994 and the winter campaigns of 1996, 1997 and 1998 were dedicated to the excavation of several Mesolithic and Neolithic sites. We concentrated on the Wadi Soba, Wadi Rabob, Wadi el Hag and Wadi el Hasib areas that are immediately upstream from the area investigated in the 1989 season when a rescue excavation was made at the Early Neolithic site of Hag Yusuf (Fernández et al. 1989). A general exploration upstream of the Blue Nile basin as far as the locality of Singa, including the central areas of the northern Gezira, was also undertaken during the 2000 campaign (Figs. 1, 2 and 8).

A total of 95 sites were discovered and recorded. The survey's main objective were the Prehistoric sites (61 sites), the Mesolithic period (Early Khartoum) being best represented with more than 80% of the sites discovered, the Neolithic sites (Shaheinab-Jebel Moya) making up most of the remaining

20%. Very few Palaeolithic remains were recorded. Some large Late Neolithic sites (such as Rabob, with surface remains scattered over an area of 30 ha) have been found for the first time in the Central Sudan, all of them located away from the course of the Blue Nile in the Butana and Gezira plains. Internal site structure and formation processes, ceramic seriation, and settlement patterns were thoroughly analysed for every period, applying statistical multivariate methods to the quantitative survey data. Some general historical trends were noticed in the survey data. The first is the shift from Nile-wadi aquatic exploitation by small mobile groups during the Mesolithic period towards demographic concentration of near-sedentary savanna hunting-pastoral populations in the Early Neolithic period (Shaheinab). After the Late Neolithic (Jebel Moya) period the groups became nomad pastoralists and their only archaeological record are burial tumuli fields up to the Christian and Islamic periods (Fernández et al. 2003a).

Extensive excavations were carried out at two Mesolithic sites, one in the Blue Nile river plain (Sheikh Mustafa-1, radiocarbon dated to c. 7930-7600 bp, no. 13 in fig. 2) and other in the Wadi Soba zone (El Mahalab, no. 26, 7705-6940 bp), and at an Early Neolithic site in Wadi Soba (Sheikh el Amin, no. 36, 5555-4590 bp). Multivariate methods such as principal component and rotated factor analysis were applied to quantitative data from excavated sectors and squares at the three sites. Even though the Mesolithic sites were partially deflated, significant information was gathered on cultural evolution in the area during the 8th – 5th millennia bp. The inferred scenario presents several trends of cultural-economic change. During the Mesolithic period, a shift was recorded from specifically Nilotic pottery decoration (incised wavy line) to Saharan types (impressed rocker and dotted wavy line), and from lithic backed points and narrow lunates, used for fishing and hunting big game, to wide lunates for the hunting of smaller game. Accordingly, hunted game size decreased throughout the Mesolithic sequence. The contribution of fishing to the local economy also decreased over the whole period of the three sites, while plant gathering, deduced from the frequency of grinders and seed impressions on the pottery sherds, increased to a maximum during the Neolithic. A decrease may be inferred, though, for the latter phases when the transition to a pastoralist way of life began (Fernández et al. 2003b).

From 2001 to 2005 an archaeological and ethnoarchaeological survey of the Blue Nile area in Western Ethiopia was undertaken under the author's direction, concentrating on the Benishangul-Gumuz regional state, both in the region southwest of the Blue Nile, Benishangul, and in the northeastern area, Metekkel (Fig. 1). Around the state capital, Assosa, and the small towns of Bambasi and Menge, all in Benishangul, several granite rock shelters with human occupation remains were excavated. Archaeological deposits from the final Middle Stone

Age until the recent 'Nilotic' cultures were unearthed. Ethnoarchaeological data, referring to settlement and domestic patterns, pottery making, house symbolic meanings and the problems brought about by modernity, were gathered from several ethnic groups in the region (Bertha, Gumuz, Komo, Mao and Amhara) (Fernández & González-Ruibal 2001; González-Ruibal & Fernández 2003; Fernández & Fraguas forthcoming; González-Ruibal forthcoming a-c; Fernández et al. in preparation). During the 2005 season the survey was begun of the northern region of the regional state, Metekkel, particularly of the Beles river terraces around the towns of Gilgel Beles, Almu and the new villages (*amba*) created by the big Tana-Beles resettlement project of the 1980s. Also a very short visit was made to the northern region of Metema between Gondar and the Sudan border. As the information from the entire region has proved of great interest for interpreting the previous results from Central Sudan, these have been discussed "from the Ethiopian side" in the present paper.

2. The Palaeolithic and Mesolithic at the Blue Nile region

The survey revealed very few data from the Palaeolithic period in the Sudanese region. The scant Middle Palaeolithic remains found suggest that the area was not totally uninhabited, as it was already known from a few other localities, such as Singa or Abu Hugar (Arkell 1949b: 45-47, pl. 27: 5-7). Not one single Upper Palaeolithic site was recognised, though lithic tools considered typical of that period (end scrapers, truncations) are more abundant in the Mesolithic sites of the eastern wadis than in those near the river, maybe as a result of cultural influences from Eastern Sudan where Late Palaeolithic industries have been recorded (Elamin 1987; Marks 1987).

At some of the rock shelters excavated in Western Ethiopia south of the Blue Nile near Assosa (Benishangul), namely K'aaba and Bel K'urk'umu, a rough industry in quartz was recorded, dated to the second half of the Holocene period. The retouched tools were mainly side and end-scrapers with a lunate only found in the upper levels of the second site. Technologically, though there were quite a lot of unidirectional and a few blade cores, the industry has very clear archaic features since a significant amount of the cores were centripetally flaked, with some discoid and Levallois examples, as in the previous late Middle Stone Age industry unearthed in the K'aaba lower levels (Fernández et al. in preparation). A different scenario emerges from our recent survey season north of the Ethiopian Blue Nile in the Metekkel region (June, 2005), which has revealed quite a large number of lithic surface scatters on the terraces of the Beles river, a northern tributary of the Blue Nile, and also in the Metema region west of Gondar and near the Sudan border. The industry is quite different from that of Benishangul, it is based mostly on blades and bladelets, knapped from fine-grained stones, chert and agate, and has a typical Upper Palaeolithic look. The

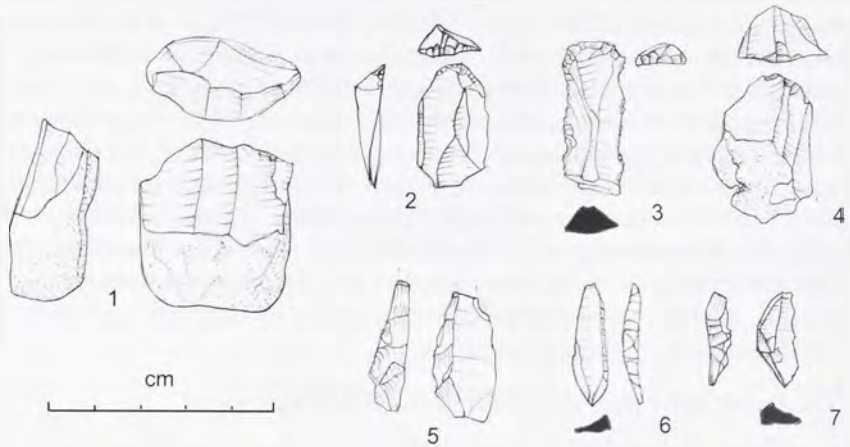


Figure 3. Lithic core and tools from the Beles river basin in Western Ethiopia. Blade core in agate (1), end-scrapers in chert (2) and agate (3-4), and backed blade (5), backed point (6) and lunate (7) in chert.

commonest technique was simple blade production from agate pebbles with a prepared, usually unfaceted platform at only one end (Fig. 3: 1). Retouched tools included mostly end-scrapers (Fig. 3: 2-4), backed blades (Fig. 3: 5) and a few microliths (Fig. 3: 6-7). Except for the smaller geometric component in the Beles sites, the industry is not very different from that recorded at the terminal Pleistocene and early Holocene sites of the Khasm el Girba area by the Atbara river in Eastern Sudan (Marks 1987; Marks, Peters & Van Neer 1989). The backed point no. 6 is exactly the same type that appears by the hundreds in any Mesolithic site in the Central Sudanese region (Fernández et al. 2003b: figs. 33: 18, 57: 29-30, 33-38). This evidence points to the possibility that the Sudanese hunter-gatherer groups took refuge in the Ethiopian elevated areas where there was still grassland and savanna during the period of extreme aridity of the Last Glacial Maximum around 18,000 bp (Clark 1988: fig. 3), and returned to the plains when the climate became wetter at the end of the Pleistocene period.

According to our data, it seems that the whole Central Sudanese research area was almost empty before the eighth millennium, probably because of the frequent Blue Nile floods and the formation of swampy areas (Wickens 1982: fig. 6). Geochemical evidence from the base levels of El Mahalab (EM) site sug-

gests that climate was wetter before 8000 bp than in the following period (Lario et al. 1997). Significantly, the dates from Mesolithic sites in the Khartoum region are mostly more recent than 8000 bp, the few earlier ones (from a single site, Sarurab, cf. Khabir 1987) being not very reliable and probably not associated with cultural remains (Caneva 1999: 33). Six dates from Abu Darbein near Atbara in Eastern Sudan are between 8640 and 8330 bp (Haaland & Magid 1995: 49), this being perhaps another indication of the pre-eminence of eastern cultural influences on the area. Dates from the scarce sites known south of Khartoum hint at an even later date for the Mesolithic adaptation: e.g. 7470-7050 bp at Shabona (Clark 1989: 389). Furthermore, only a few small Mesolithic sites were found during our exploration of the Blue Nile area from Wad Medani to Singa (Fernández et al. 2003a: sites nos. 85, 86, 92). Several Mesolithic-like sherds were found by the author in our recent excavation in Ethiopia near the Sudanese border (Bel K'urk'umu rock shelter near Assosa), from a level dated to ca. 5000-4500 bp (Fig. 4: 1-3). A slightly earlier chronology has been proposed for the few wavy line sherds discovered in the Lake Turkana basin (Phillipson 1977: fig. 19, 3). All this evidence, albeit scanty, hints at a northern rather than a southern origin for the Early Khartoum culture in the Middle Nile region, contradicting previous hypotheses that proposed its source in the Great Lakes region (Stewart 1989).

What clearly distinguishes the Khartoum region, when compared with neighbouring areas, is the abundance of incised wavy line (WL) over other decoration types, namely the rocker impression which is characteristic of other regions. WL is also found in other Nilotic areas, but is considerably less frequent: 4% at Shabona (Clark 1989: fig. 12), 11% at Abu Darbein (Haaland & Magid 1995: 113) and around 16% in the Dongola reach (Shiner 1971: 141). Some of our surveyed and excavated sites, such as Karnus or Sheikh Mustafa, have percentages of WL amounting to more than 60% of the pottery sherds (see Fernández et al. 2003a: table 5). A high frequency has also been recorded at the Early Khartoum Hospital site (Mohammed-Ali 1982: 76). The results of our sites' seriation further suggest that even earlier sites producing only WL pottery without the rocker variety could exist and be found in the future (Fernández et al. 2003a: fig. 46). The invention of the WL technique in this region can be confidently postulated and perhaps it is no coincidence that undulating lines begun to be applied to pottery in the best-watered region of all the Saharan-Sahelian 'aqualithic' complex extension. Later, the same symbol was used to represent water in the Egyptian hieroglyph script (Wilkinson 1992). The subsequent gradual replacement of WL with rocker as the main decoration technique, which is evidenced by seriation and stratigraphical data both in the Blue and the main Nile, may have been a reflection of progressive cultural influences from the Saharan area. Also the early arrival of dotted wavy line (DWL) pottery to the

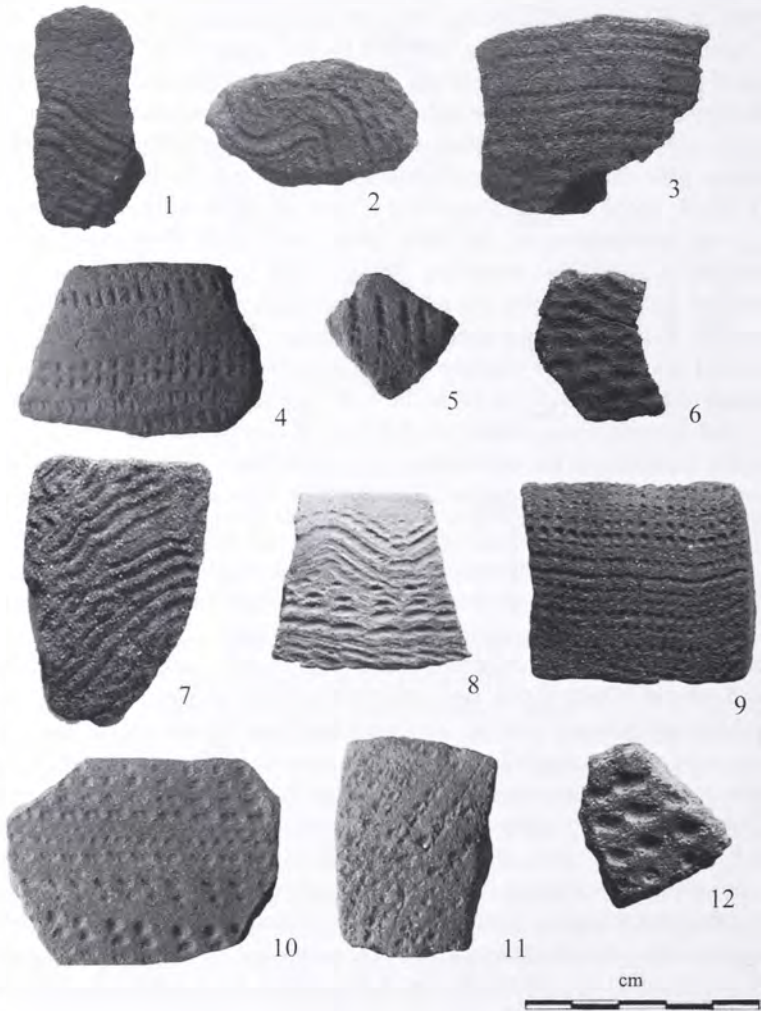


Figure 4. Pottery sherds from Western Ethiopia (1-6) and Central Sudan (7-12). The different decoration techniques may be compared: Wavy Line (1, 7), Dotted Wavy Line (2, 8), rocker impression with packed zigzag (3, 9) and spaced zigzag (4-5, 10-11), and Alternately Pivoting Stamp (6, 12). Sherds from Bel K'urk'umu (1, 3-6), Bul K'aito (2), Sheikh Mustafa (7-9), El Mahalab (10, 11) and a Mesolithic sherd from the Neolithic site of Sheikh el Amin (12).

Nile, attested by its occurrence in the two excavated Mesolithic sites (Sheikh Mustaba and El Mahalab), suggests that Saharan connections could have existed during most of the Mesolithic period.

Eventually, the Central Sudanese area lost its cultural originality and became integrated into the larger Saharan region. A few of the sites discovered in our survey can be ascribed to a later phase of the Mesolithic period in the region, characterised by the disappearance of WL pottery and the abundance of rocker and DWL types (Caneva & Marks 1990: 21-22; Caneva et al. 1993: 247-248).

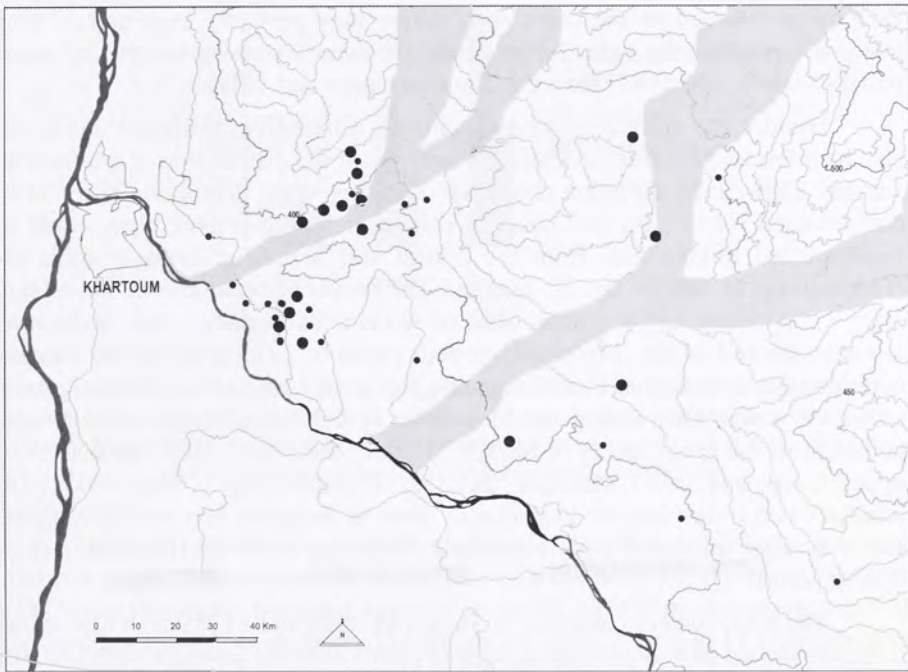


Figure 5. Distribution of Mesolithic sites in the Wadi Soba-Rabob-El Haj-El Hasib area (Central Sudan); bigger and smaller dots indicate larger and smaller sites.

In the light of the distribution of Mesolithic settlements over the Blue Nile landscape (Fig. 5), a model of seasonal movements between the river and wadi areas may be inferred. Probably as the Nuer used to do in recent times (Evans-Pritchard 1940), the groups moved towards the river and split into small parts at the beginning of the dry season, and later gradually concentrated on the last available water sources at the end of the season. Small and large archaeological

sites recorded in the riverine area could correspond to camps at the beginning and end of that period. More permanent villages seem to have been erected during the river flooding in the rainy season, when people would leave the alluvial plain and move to the wadi areas where elevated land made permanent settlements more practicable. Analysis of fish remains (Chaix 2003) and pollen from sediment samples (Ĺpez & Ĺpez 2003) indicate the proximity of deep waters at the wadi excavated site, El Mahalab. Also the ceramic seriation and settlement patterns (Ferńndez et al. 2003a: section 6) agree with the model, which had already been proposed on the basis of ethnographic analogy (Clark 1989: fig. 14). The copious material inventory found at many of the surveyed sites suggests that every year the groups returned to the same spot, where they probably kept part of their material paraphernalia safe, for example the heavy stone grinders and many pottery vessels, when they moved to the new camps and villages.

Besides the aforementioned synchronic differences, historical trends can also be inferred. Multivariate statistical analysis of the distribution of artefacts in-site has allowed the deflation processes operating since Prehistoric times to be compensated for in part, and some of the original stratigraphic array could be reconstructed linking data from the central and peripheral areas of each site (Ferńndez et al. 2003b: fig. 11, *passim*). The results of ceramic seriation of sites offer some evidence of a gradual shift of settlements from the wadi to the river towards the end of the Mesolithic period, possibly influenced by the climatic deterioration at the time. Faunal remains also give some clues about a general reduction in humidity during the Mesolithic period. Thus, fish bones are more abundant in the lower levels of Sheikh Mustafa, dated to c. 7930 bp, than in its upper levels and in El Mahalab, dated to 7705-6940 bp (Chaix 2003). The tendency is further confirmed by a sandy level in the upper levels of El Mahalab site indicating arid conditions between c. 7400 and 6900 bp (Ferńndez et al. 2003a: section 1).

The lithic material analysis in Sheikh Mustafa and El Mahalab also shows a change from a period with many backed points and few lunates to another with many lunates, especially broad types, and few backed points. The trend continued during the Neolithic period, when broad lunates are predominant. The change has been interpreted as related to climatic change and consequent variations in game availability. Many of the narrow-backed bi-pointed bladelets from the earliest times, particularly frequent in the lower levels of Sheikh Mustafa, could have served as fishhooks (Camps 1974: 232), since bone harpoons were not found. Both the faunal analysis (Chaix 2003) and the palaeodietary analysis of human bones (Trancho & Robledo 2003) from the same level indicate abundant fish consumption. Some points and narrow lunates were probably used as sharpened arrowheads, especially effective for killing big

animals, while broad lunates were more efficient as chisel-ended arrowheads to hunt smaller and faster game (Clark et al. 1974; Nuzhnyi 1989). Faunal data from the three sites show a constant reduction in game size from the earlier to the later Mesolithic sites (Sheikh Mustafa to El Mahalab) and later in the Neolithic site of Sheikh el Amin (Chaix 2003) (see correlation of lithic and faunal variation in the three sites in Fig. 6).

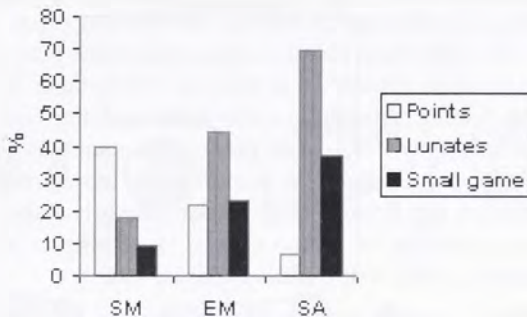


Figure 6. A model for the economic change during the Holocene in the Blue Nile area of Central Sudan: percentage variations of lunates and backed points in the two Mesolithic sites (Sheikh Mustafa, SM, and El Mahalab, EM) and the Neolithic site (Sheikh el Amin, SA) are probably related to the shift from big to small game hunting.

The high number of pottery sherds found in Saharan and Nilotic Holocene sites has puzzled researchers for many years. In the Mesolithic sites of the Blue Nile, some 150 sherds per cubic meter of archaeological deposit were recorded at Sheikh Mustafa, and even more, 275 sherds per cubic meter, at El Mahalab. The average size of the sherds recovered at Sheikh Mustafa site is 7.3 cm², which represents a mere 0.4% of the total area of a hemispherical bowl with a mouth diameter of 35 cm (mean value for 176 measurable rim sherds, see Fernández et al. 2003b: table 4). As an average value, then, each pot broke into 250 fragments. Could this have been the result of a deliberate process? As Nigel Barley puts it, “in Africa death involves the breaking of pots while marriage involves making them” and it is the very friability of pots which makes them “a source of ritual power” (Barley 1994: 92, 112).

There have been quite a number of theories on why pottery was invented and the way it was first used. Most authors have insisted on the new possibility of processing food by boiling and steaming that render meal more digestible and

palatable (e.g. Haaland 1992: 48). Among the Mesolithic groups of the Sahara and Nile Valley the meal could have consisted of gathered plants (Haaland 1992: 48), mostly cereals whose seeds have been found in some archaeological deposits (Barakat & Fahmy 1999) and whose impressions were recorded on sherds from several excavated Mesolithic and Neolithic sites (Magid 1989; 1995; 1999; 2003; Stemler 1990). It is also naturally proposed that fish was processed in the form of stews or soups in the pottery vessels (Sutton 1974; Stewart 1989; Haaland 1992). Plant gathering and domestic pottery making have usually been interpreted as female activities, on the basis of widespread ethnological data (Murdock & Provost 1973: table 1). In the case of fishing, information exists that today it is, and thus probably was in the past, mostly a quasi-masculine activity in up to 82% of the African study cases (Murdoch & Provost 1973: table 3). Men perform most of the current fishing activities in the Sahel and the Great Lakes areas, though some cases are known of female participation such as among the Nuer (Murdock 1967: 188). Nonetheless, in some of the more traditional, isolated Nilo-Saharan groups of the Ethio-Sudan border formerly called "pre-nilotes", such as the Gumuz, Mabaan or Komo (Fig. 11), fishing is a predominantly female task (Grottanelli 1948: 300; Cerulli 1956: 18-19).

While women's contribution to fishing is only probable, their nearly certain association with pottery and food-plants makes a good case for an important female role in Mesolithic expansion. A broad system of women exchange marriage has been advanced as a possible explanation for the striking similarities of Saharan pottery decoration (Caneva 1988b: 369). If decoration and generally stylistic behaviour may be considered a system for displaying information, aimed at a target population group that need the messages and can decode them (Wobst 1977), then the symbols embedded in the pots could probably be "understood" from the Atlantic Ocean to the Red Sea. One is tempted to imagine a single shared ideology for the whole of that vast area. A distant glimpse of this ideological domain may be caught in the strange scenes of the Round Heads style of rock art from the Central Sahara. Here male figures outnumber women but these often appear playing a prominent role (Sansoni 1994: 208; 1998: 149). Sometimes women are represented next to hemispherical containers full of what are probably seeds, or dancing in "worship" scenes, their bodies richly decorated with motives (scars?) that are reminiscent of the ceramic decoration repertoire (Barich 1998: 112-113). Regular association of motifs on pots and on the human body has been reported in Africa (Barley 1994: 128-132), as too has the possibility that scarification was one of the primary arts of the continent (Rubin 1988: 15). Early pottery excavated at Nabta in the Egyptian western desert has been ascribed a social and symbolic function because of its very scarcity (Close 1992: 162-163), and the long tradition of finely decorated Sudanese pottery that continues until the Meroitic and even the Christian period.

has been also interpreted as evidence of its probable continuous association with ritual practices (Edwards 1996: 74-75). The decorated bone fragments, usually with cross-patterned incised lines, frequently found in the Mesolithic sites, could be also connected with the symbolic realm (Fig. 7).

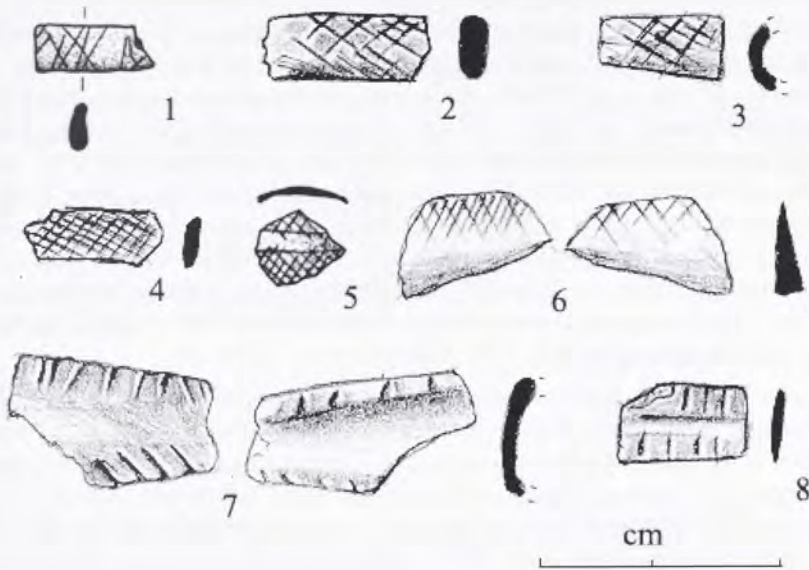


Figure 7. Incised bone (1-4, 6-8) and ostrich eggshell (5) fragments from the Mesolithic site of Sheikh Mustafa (Central Sudan).

Women and children are clearly over-represented in the meagre funerary evidence known from the Mesolithic period. At the Sudanese site of Saggai, four out of five excavated burials are of women (Coppa & Macchiarelli 1983: 118-122), and the few graves excavated in the Sahara, for instance at Uan Muhuggiag (Lybia) and Amekni (Algeria) are also of women and children (Barich 1998: 111). At the Egyptian Neolithic site of Merimda Beni Salama, the exclusive internment of women and children has been interpreted as a probable indication of matrilineality (Hassan 1988: 169). In Nubia, women also played an important role in Early Neolithic society, as evidenced by the almost exclusively female and child burials in El-Barga cemetery near Kerma (Honegger 2003: 289; forthcoming) and the prominent location of some female graves in the Kadruka

18 cemetery (Reinold 2000: 80-81; 2001: 6). Sometime later, data from the small Kerma cemetery of Abri in Northern Sudan (calibrated radiocarbon dated to ca. 1750 B.C.; Ferńndez 1982: 289-302), where female graves are more richly furnished than male burials, suggest the probable survival of higher female status in the rural areas far from the centres of power such as the Kerma capital itself.

2. The transition to a Neolithic economy

While it has been commonly held that the Khartoum Neolithic developed out of the Khartoum Mesolithic, there is a paucity of radiocarbon dates and archaeological information from the period of transition that has bewildered researchers (Marks et al. 1985: 262-263; Mohammed-Ali 1987: 81-82). Recent inquiry has partially filled the gap, with a few sites dated to the second half of the seventh millennium bp: El Qala'a and Kabbashi on the main Nile north of Khartoum (6620-6150 bp; Caneva et al. 1993: table 1) or the middle levels of Shaqadud cave in the northern Butana (Caneva & Marks 1990). One of the radiocarbon dates from the Blue Nile Sheikh Mustafa site falls within that period (6295 bp), but it contradicts the evidence from the rest of the accepted dates and the general earlier appearance of the material culture at the site.

A comparison of the ceramic seriation models proposed for the Mesolithic and Neolithic sites in our survey (Ferńndez et al. 2003a: figs. 46 & 56) shows that both at the end of the first period and the beginning of the second, the pottery decoration was predominantly based on the same technique, namely rocker impression. Nevertheless, most of the other variables are different: the Neolithic pots are more finely made, with thinner walls, burnished and often slipped outer surfaces, and new smaller vessel types and decoration types, such as plain pots, black topped red vessels and finely incised bowls, only appear from the beginning of the period. The overall impression of the pottery at hand is that it is of a quite different kind. Even the old rocker impression appears to have changed, combining different and finer comb-tools.

A significant shift also occurs in the settlement patterns: not one single important Mesolithic site was inhabited during the following period. Most, if not all, Neolithic settlements were occupied for the first time. Although Mesolithic sherds have been found in some Neolithic sites (Arkell 1953: 68; Krzyzaniak 1978: 171), they come from small settlements that were probably short-term camps such as those found in abundance during our research (Fig. 5). Even if we take into consideration the case of the Sheikh el Amin Neolithic site, where our excavations have revealed a certain amount of Mesolithic DWL sherds all over the site (Ferńndez et al. 2003b: fig. 50: 15-18), definite evidence of local transition between the two periods does not seem to be present. The general

impression is, then, that an important change took place in the region with the arrival of new groups with a different, livestock herding economy.

Climatic changes that occurred around 6000 bp represented the "great mid-Holocene arid phase" in the Sahara (Muzzolini 1995: fig. 30), corresponding with lower sea surface temperatures in the Mediterranean recorded after 5900 bp (Hassan 2002: 322) and the "Post-Late Neolithic arid phase" of the Nabta Playa record in the South Western desert of Egypt (Schild & Wendorf 2002: 24). This deterioration was perhaps the cause of a contraction of the aquatic economy that had predominated in Central Sudan throughout the preceding millennia. In fact, only the riverside Neolithic settlements such as Shaheinab or Geili have significant fish remains in their faunal collection (Krzyzaniak 1978: 165; Gautier 1988). In Sheikh el Amin, though a shell fishhook was found during the excavation, fish remains are insignificant (Chaix 2003: table 12). When facing climatic deterioration, Africans are forced to choose "between their homes and their environment" (David 1982: 50), and the possibility that some of the Mesolithic people migrated further south where humidity was still high, seems highly probable.

The Lokabulo tradition, named after a rock shelter in Eastern Equatoria some 1000 km south of Khartoum and dated to 3800 bp (Fig. 1), even though poorly known because of the disruption to research caused by the recent war in Southern Sudan, presents some characteristics reminiscent of the Central Sudan Mesolithic cultures (David et al. 1981). The pottery is quartz tempered and decorated mostly by rocker impression (though the excavators only recognised the spaced zigzag pattern as such), including some DWL sherds (David et al. 1981: fig. 6, pl. 1). Peter Robertshaw warned against drawing parallels between the same decoration technique (generally, comb-impression) from distant areas, arguing that Lokabulo sherds differ from those of Jebel Moya and thus rejecting the relationship between the prehistoric cultures of southern and central Sudan (Robertshaw 1982: 92). Nonetheless, central Sudanese Mesolithic rocker pottery is also clearly distinct from and earlier than the Jebel Moya pots decorated with simple impression, and Robertshaw's comparison of Lokabulo and Kenyan Kansyore pottery, some of which also appears to be decorated with simple impression, does not seem to be substantiated either (Robertshaw 1982: fig. 2). The faunal remains of Lokabulo consisted only of hunted wild fauna and the excavated deposits yielded a considerable number of mollusc shells, though they were devoid of fish remains (David et al. 1981: 11-19; David 1982: 52-53). Linguistic data, however, suggest the presence of a food-producing economy in Southern Sudan since the third millennium bc (Ehret 1982: 28) and thus contradict the scenario resulting from Lokabulo and other sites in the Eastern Equatoria region, which suggests a Later Stone Age hunter-gatherer economy well into the first

millennium AD (David 1982: 53). The more western site of Jebel Tukyí, with a more recent date (2130 bp), produced large domestic cattle (David 1982: 51) and rocker impressed pottery which Randi Haaland has identified as belonging to the Khartoum Neolithic tradition (Haaland 1992: fig. 11, 61-2).

Recent data from the Spanish survey research in Benishangul, West Ethiopia, halfway between the Khartoum and Eastern Equatoria regions (Fig. 1), are relevant here. The excavations of the Assosa area rock shelters yielded abundant quartz-tempered, Mesolithic-like sherds with WL, DWL and especially rocker decoration (Fig. 4). As in the Lokabulo site (David 1982: 52), at the Bel K'urk'umu rock shelter the pottery appears in the upper part (radiocarbon dated to 4965-4470 bp) of a Late Stone Age level with an archaic flake quartz industry that was described earlier in this paper. The same pottery types continue in the upper level, together with a similar industry but with fewer formal tools, dated to 2020-875 bp. In another excavated shelter nearby (Bul K'aito), rocker and DWL sherds (Fig. 4: 14) appear together with different pottery types, incised and grooved, dated to the first and early second millennium AD. The economy of these groups is not yet known since bones were not preserved in the shelters' acid soils, nor plant remains were found in the deposits or the pottery sherds. A possible fragmented "net-sinker" in pottery (Haaland 1992: fig. 3) found in the K'urk'umu shelter could indicate some fishing practices. Anyway, the persistence of old pottery types up to the first millennium AD recalls the Eastern Equatorial evidence, as do the archaic features of the current "pre-Nilotic" peoples in the border region between Sudan and Ethiopia (Grottanelli 1948). Some of these traits, such as the relevance of plant gathering and fishing, absence of big livestock, some matrilineal kinship remnants, incisor teeth extraction (Murdock 1959: 170-180; Bender 1975: 9-19) and even the racial morphological characteristics (Arkell 1949a: 114) are to some extent reminiscent of Khartoum Mesolithic features.

The Sudanese site of Sheikh el Amin shows major differences compared with other known Neolithic sites in the region. First of all it is located in the Butana plain far from the Nile, and this means a savanna economy with very little fish or the exploitation of other river resources. Livestock also appear to have been of minor importance to its inhabitants (cattle, 11,1%, sheep, 1,9%), since faunal remains are mostly of hunted wild fauna (87%; Chaix 2003: tables 12-14). After the crisis at the beginning of the Neolithic period referred to above, the climate in the site region became humid again, as implied by the faunal (e.g. *Phacochoerus*, Chaix 2003) and the vegetal remains (e.g. *Carex*, *Celtis* and *Sorghum*, see Magid 2003: table 1). The exploitation of food-plants seems to have been intensive in this site, where about 30 plant impressions on pottery have been recorded (Table 1). The proportion of sherds with plant impressions

compared with the total number of sherds recovered and examined, however, is lower than in the Mesolithic sites (0.071 % in Sheikh Mustafa, 0.085 % in El Mahalab, and 0.053 % in Sheikh el Amin). If the greater variation in plant species at the latter site is not an outcome of the larger pottery sample analysed (56,761 sherds, compared with 7,001 in SM and 4,680 in EM), or any other factor relating to pottery making and the processes of plant impression, it would indicate a greater emphasis on gathering activities in Neolithic times in the Butana plain. The large quantity of stone grinders excavated at the site suggests the same thing. A mean value of ten grinder fragments per excavated square meter, the frequency amounting to nearly 20 pieces in the central part of the site, were recovered in Sheikh el Amin. These figures are not as high as in the deeper levels of Kadero, where as many as a few hundred were found per excavated meter (Krzyzaniak 1978: 166), but they are much more abundant than in Shaheinab where only a few pieces were found (Arkeell 1953: 54). The lower number of grinders at the more recent areas of Sheikh el Amin possibly indicates the decreasing importance of plant exploitation when the climate changed towards the current arid conditions in the Late Neolithic period. As regards the much debated issue of early plant cultivation during the Mesolithic and Neolithic (see recent arguments in Haaland 1996; 1999; Magid & Caneva 1998), the wide variety of species in our data, with 10 different plants identified in 39 pottery impressions (Table 1), suggests a broad-spectrum exploitation of the environment, with the emphasis on seeds and fruits, rather than a concentrated strategy on a particular cereal plant, even if sorghum is the most prevalent species as it is in other Central Sudanese sites (Magid 1989; Magid & Caneva 1998; Magid 2003).

4. The Late Neolithic gap in the archaeological record

As in other regions during the Holocene, the Saharan Neolithic societies underwent major changes towards economic intensification and social ranking. The new condition has often been labelled "complexity", yet it would be better described as "inequality" (Paynter 1989; McGuire & Paynter 1991; Price & Feinman 1995). According to the anthropological data, tending animals, particularly cattle, involves such an assiduous commitment that there is a ubiquitous tendency for herds to be the private property of extended families inside the clans. This involves a major transformation in the social relations of production and the ideology of prestige (Ingold 1980). Archaeologically, the appearance of independent animal enclosures in the first farming societies has been interpreted as evidence of some kind of private property. In the Egyptian sites of Merimda and El Omari this feature is accompanied by separate grain silos in the huts, as opposed to the communal silos recorded at the earlier site of Fayum (Hassan 1988: 154-155; Midant-Reynes 1992: 116). In the Saharan area, Bovidian rock

art scenes change compared with the previous Round Head style, with an under-representation of the female figure in the drawings that conforms to the emergence of a pastoral ideology that attributes a greater significance to the masculine figure (Barich 1998; Gifford-Gonzalez 1998).

Even though no evidence of that kind – individual silos or enclosures – has been detected in the Khartoum Neolithic sites, there are several indications that social inequality was beginning to develop in this area too. At the Neolithic cemetery of Kadero, both the location and amount of grave furniture were used to differentiate the dead (Krzyzaniak 1991: table 1, figs. 2-3), most probably according to their social status (Binford 1971: table 4). The importance of men over women at the site is manifest, with 20 out of 28 adult graves whose sex could be ascertained, and six out of the eight richest tombs belonging to male individuals (Krzyzaniak 1991: table 2). Important socio-technical artefacts, such as porphyry mace-heads, were in all cases found associated with adult men graves (Krzyzaniak 1991: 523). The social élite was also ascribed grave furnishings of marine shells and malachite/amazonite objects traded from abroad (Krzyzaniak 1991: 531). The very fact that the two richest grave categories include children could even indicate that prestige was not merely acquired during life but inherited, just as it has been postulated an idiosyncratic feature of hierarchical chiefdom societies (Peebles & Kus 1977). Proof that this process was constantly proceeding in the Central Sudan comes from the cemeteries of Kadada, where only a few centuries later (Kadero is dated to 5900-5000 bp; Kadada to 4800-4600 bp) the graves showed an extraordinary array of differences in richness of furniture, including human sacrificial secondary burials (Reinold 2000: 70-71).

The site of Sheikh el Amin may be of relevance to this question. It was excavated in 1997 and 1998 over 140 square meters, yet no sign of Neolithic human burials was detected. Sherds from pottery vessels considered prestige emblems and exclusively associated with graves, such as the flare-mouthed finely decorated beakers (Reinold 2002: fig. 4) were not found either. Even rhyolite gouges, whose socio-technical character has occasionally been suggested (Haaland 1987: 221), are uncommon at the site, where only 26 pieces were found. In the riverine Neolithic settlement of Shaheinab, 467 pieces were recovered excluding those broken to less than half the original size (Arkell 1953: 31). This lack of evidence suggests a more egalitarian organisation of the Sheikh el Amin group than those living at the riverine sites, maybe connected to its economic adaptation based on hunting-gathering with a small herding component (13.1% of identified bones, cf. Chaix 2003: table 12). Several authors have discussed the difficulties that hunters faced in making the transition to food production, particularly to integrate herding (Smith 1990; Marshall 2000: 215), on

the grounds of current evidence of hunting people living on the edge of pastoral societies (Smith 1998: 26), and the persistence of hunting as a component of generalised pastoralism (Marshall & Hildebrand 2002: 121).

Sheikh el Amin probably represents a short-lived adaptation to the savanna ecosystem, based on multi-resource food procurement in small semi-sedentary villages. Shaqadud cave, a permanent post of hunter-gatherers without livestock until a very late date, could have corresponded to the same adaptation for groups further from the Nile at about the same period (Marks & Mohammed-Ali 1991).

Further cultural and economic changes are visible in the archaeological record several centuries later. Late Neolithic sites investigated during our survey, such as Rabob and Wad el Amin dated to after 4500 bp, present somewhat different features (Fig. 8). Surface distribution of artefacts follows a model of "sheet midden" that has been interpreted as the result of seasonally reoccupation of the settlement, with people erecting tents or temporary huts and choosing the waste zones in different places every year (Sadr 1991: 21-23, fig. 2.5). The site layout at Sheikh el Amin is quite different, with cluster midden mounds surrounded by empty spaces –cleared habitation zones– that could correspond to a permanent or at least a "medium" term occupation where people lived for a long time in the same structures (Sadr 1991: 21-23). Hence, a probable change to a mobile economy is noticeable at the end of the Neolithic period, which could relate to the inception of a more intensive pastoral economy in the region, as has been argued by several authors (Krzyzaniak 1978; Haaland 1987; Caneva 1988b).

Ceramic analysis and seriation of the surveyed Neolithic sites in the Blue Nile area make it obvious that there is a fairly substantial continuity both in the pottery manufacturing techniques and decoration types throughout the period (Fernández et al. 2003a: fig. 56). Similar models of evolution of archaeological types have been proposed elsewhere as evidence of uninterrupted cultural and demographic stability (for the Epipalaeolithic in the Maghreb, see Lubell et al. 1984: fig. 3.4). Therefore it seems that, contrary to the aforementioned evidence presented for the beginning of the period, there is no proof of a cultural and/or demographic gap during the Sudanese Neolithic as postulated by Haaland (1987; 1992). It does appear more probable that the same Butana Early Neolithic groups living at Sheikh el Amin and other sites as El Lahamda (Fernández et al. 2003a: section 7), gradually abandoned their sedentary economy and adopted a more nomadic herding economy. The resulting enlargement of their annual territories led to more frequent contacts with Eastern Sudanese groups, as reflected in the constant increase of simple impression decoration and internal surface scraping on their pots all through the period (Figs. 9-10).

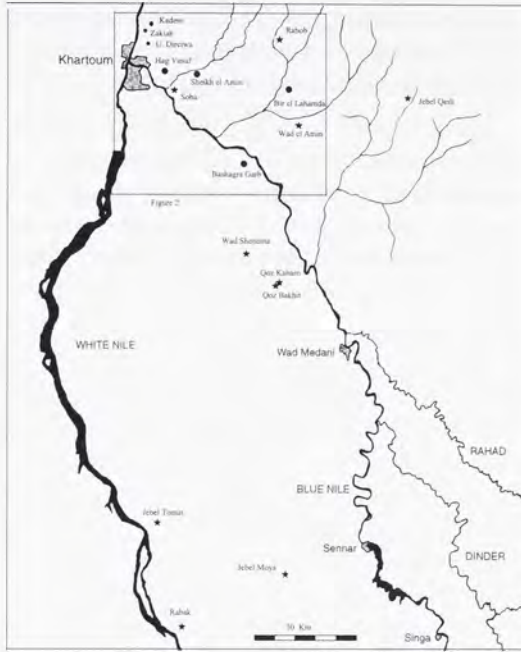


Figure 8. Distribution of known Early (dots) and Late (stars) Neolithic sites in the Blue Nile and Gezira areas of Central Sudan.

The progressive intensification of arid conditions in the Sahelian area (Wickens 1982: 44-47; Hassan 2002: 323) was one of the most likely causes of the higher mobility of the savanna groups. The riverine areas were still very suitable for human sedentary living and yet they appear almost completely devoid of archaeological remains from this period. Most of the known Late Neolithic sites are situated far from the river, and only two Early Neolithic sites (Bashagra Garb and Bir el Lahamda) have so far been found outside the core area around Khartoum and the main Nile (Fig. 8). Later on, a time comes from when there are no known archaeological sites either in the savanna or the river, with the possible exception of some burial mounds (Caneva 2002). The period roughly corresponds to the interval between 4000 and 2500 bp (c. 2500-700 BC calibrated), the latest date marking the beginning of the Napatan-Meroitic periods in the first millennium BC. This “vanishing” of the Late Neolithic cultures in Central Sudan has been related to the demise of the Nubian A-Group, and both of them to the changes in the balance of power in Egypt and Northern Sudan, namely the emergence of the Egyptian state and the Kingdom of Kush at Kerma (Caneva 1988b: 371). An external origin has been also alleged by Haaland (1987: 224-231; 1992:



Figure 9. Seriation of pottery decoration types percentages in the eight most important Neolithic sites surveyed in the Blue Nile area. The order is presumably chronological, the earlier sites being at the bottom and the most recent at the top of the chart. Legend: RK: Rocker impression (including packed and spaced zigzag, even and unevenly serrated edge, and plain types; variation of these subtypes appears erratic in the seriation); SIMP: Simple impression (see fig. 10); APS: Alternatively Pivoting Stamp; INC: Incision; BT: Black Topped; RIP: Ripple ware; DWL: Dotted Wavy Line.

58-61), who presents an appealing scenario of competition between Nilo-Saharan-speaking groups with multi-resource adaptation (the Khartoum Neolithic) and Cushitic-speaking specialised pastoralists (the Butana-Khashm el Girba traditions). The first would have migrated towards the south, preserving their way of life in more humid ecosystems while the Khartoum region was occupied by the pastoral groups coming from Eastern Sudan. The recent finding in the Khartoum region of tumuli, dated to 3220 bp, with some cross-hatched pottery similar to that of the Nubian Pan-Grave culture in Northern Sudan and the Mokram group in Eastern Sudan (Caneva 2002), ancestors of the present-day Beja Cushitic-speakers (Sadr 1990), appears to further support the hypothesis of intense cultural contact and displacement in Central Sudan.

The results of our survey in the Blue Nile do not, however, endorse such conclusions. The pottery from the Late Neolithic sites surveyed bears only some similarities to the eastern wares (namely the sherds with scraped surface). Furthermore, even if the replacement of rocker with simple impression was certainly important (Fig. 10), as the rocker technique had been used in the Nile and throughout the Saharan area for many millennia, the substantially gradual variation of pottery decoration types from Early to Late Neolithic times, which has been already mentioned (Fig. 9), seems to have continued without major breaks even until the following archaeologically “visible” cultural period, when the Meroitic culture was being formed in the first millennium bc. The hand-

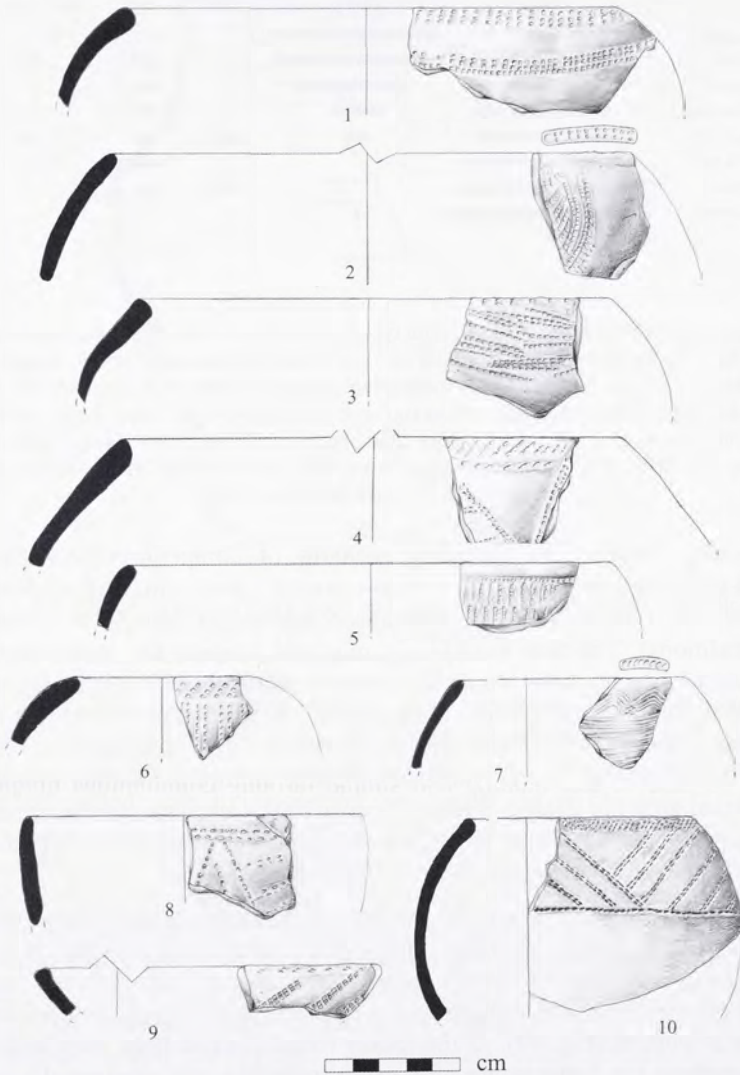


Figure 10. Simple impressed and incised (no. 7) sherds from Neolithic sites (mostly late) surveyed in the Blue Nile and Gezira areas: Wad el Amin (1), Qoz Bakhit (2, 8), Bir el Lahamda (3), Rabob (4, 6, 9), Bashagra Garb (5, 7) and Wad Sheneina (10).

-made black pottery tradition that is known in some Napatan sites and especially in the Early Meroitic sites, except for the change from bowls to closed bottles as the main vessel shapes, is clearly associated with Late Neolithic times and was decorated using mostly incision and simple impression techniques (see for example the vessels from Jebel Moya in Addison 1949 pls. 89-93, Geili in Caneva 1988a: 202-206, Meroe and Kadada in Lenoble 1995, or the rich collection from the Early Meroitic cemetery of Amir Abdallah in Northern Sudan, in Fernández 1984: 75-77; 1985: 372-425). In addition, the language written in the Meroitic script at the end of the last millennium BC and the first centuries AD, probably spoken in much of Central Sudan, was not Cushitic but had closer links with the Nilo-Saharan phylum (Bender 1981; 2000: 56).

Archaeological investigations of Sudanese Neolithic graveyards, such as Kadruka and Kadada, reveal that an almost "pre-dynastic" stage was achieved both in Nubia and the central Sudan at roughly the same time, the second half of the 6th and the first half of the 5th millennium bp, i.e. at the end of the 5th and during the 4th millennium BC in calibrated dates (Reinold 2000: 58-85). Yet the transition to state organisation was completed only in the northern region, with the onset of the Kerma kingdom. Significantly, the Nubian Nile Valley, like the Egyptian further north, meets one important specific pre-condition which Robert Carneiro (1970) claimed in his well-known theory on the origins of state societies, namely the "environmental circumscription". This criterion is met when a growing population lives in a confined area, delimited by mountains, jungles, deserts or seas (Claessen & Skalník 1978: 13). Extreme deserts did not confine the Central Sudanese groups and it is argued here that the availability of nearby suitable and nearly uninhabited land enabled them to avoid the transition to an unequal social organisation.

It is known that hunting and simple farming communities ubiquitously follow customary strategies to maintain social equality (Clastres 1978). In this case one of them could have been the shift to a more nomadic economy, approaching specialised pastoralism. Instead of adopting agro-pastoral strategies in the alluvial plains as the Egyptian and Nubian communities did, the human groups of the Sahelian Nile chose to flee from the river and wander the increasingly arid savannah. (Could this circumstance be also the main reason for the time lag in agricultural practices developing in the region?) African nomadic communities have often been considered intrinsically egalitarian polities, frequently being devoid of centralised authority and endowed with a "democratic" ideology (Bonte & Galaty 1991: 23-24). The material basis of this condition lies on the fact that livestock wealth, self-reproductive and mobile, cannot be easily monopolised (Bonte & Galaty 1991: 23-24) and that it is difficult for herders who travelled by foot to exploit the labour of others on a mass scale (Gold-

schmidt 1979: 23). In the different context of the European Megalithic cultures, the construction of big tombs has also been interpreted as another means of resisting social division (Criado 1989: 91-92). As a collective endeavour strongly related to the symbolic domain, the Late Neolithic burial mounds in Central Sudan could have functioned as a peculiar version of the *potlatch* ritual, i.e. the large-scale consumption of co-operative labour for the benefit of the whole group.

One of the best-known historical examples of “pastoral democracy” in North-eastern Africa is the Oromo people of southern Ethiopia and northern Kenya (Legesse 2001). Although originally egalitarian, though, Oromo became progressively autocratic in modern times (Hultin 1979), expanding through the conquest of a large expanse of southern Ethiopia and incorporating quite a number of simpler societies into their kingdoms (Hassen 1994). Some of those small egalitarian societies belonged to the larger group of Nilo-Saharan societies in the Ethio-Sudanese borderlands that have been mentioned above (Grottanelli 1948; Murdock 1959: 170-180) (Fig. 11). Historically, peoples in that area have resorted to their cultural traditions to avoid subordination and cultural assimilation, as an example of “cultures of resistance” or “deep rurals” (Jedrej 1995: 3). Emphasis on traditional material culture and rejection of innovations has been documented in other known cases of conflation of identity and resistance (e.g. Levi 1998).

A state organisation eventually became established in Central Sudan at the time of the Napatan and Merotic kingdoms. The same kind of social system prevailed throughout the periods of the Christian Kingdom of Alwa in the Middle Ages and the Funj Muslim Sultanate of Sennar up to the Egyptian conquest in 1821 AD. But these polities were mainly riverine systems, and the results of previous archaeological surveys in the Butana plain far from the Nile (Hintze 1959) and our own survey data reveal very few settlements, the main archaeological sites from those periods again being burial mound grounds (Fernández et al. 2003a: section 8).

Some linguistic and historical data from the region attest the existence of population movements and contacts across the Butana plain and along the Blue Nile river, connecting the Central Sudan and the Ethiopian escarpment (Fig. 11). The first is the ancient separation of the Kunama languages, a dialect cluster today spoken in south-west Eritrea, and the Koman languages (Gumuz, T'wampa, Komo, Kwama), spoken in the central Ethio-Sudan border, from the old proto-Northern Sudanic and proto-Nilo-Saharan language groups respectively (Ehret 2000: 273-277). These could be interpreted as the first historical splits of Nilo-Saharan peoples from the main stock situated in the Saharan and Sudanese plains. Second, we have the similarities observed between Meroitic and Barya

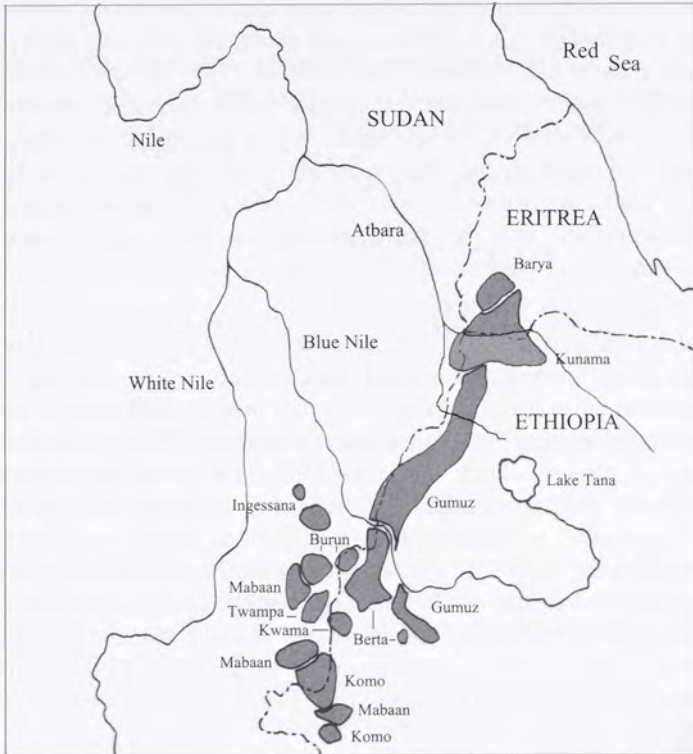


Figure 11. Distribution of Nilo-Saharan groups in the Ethiopian-Eritrean-Sudanese borderlands (after Moseley 1993: map 76).

(Nera), another Nilo-Saharan Eritrean language, possibly because of the influence of the state-level language over the people living in its frontiers (Trigger 1964; yet see Bender 1981: 5). The Meroitic has been also related to the border Koman languages (Shinnie 1967: 132, n. 7; Bender 1981: 29). Information from Arab travellers in the Middle Ages suggests that Kunama and Barya peoples were at that time settled nearer the core of the Christian kingdom of Alwa, from which a later displacement to their current position in the Highlands is deduced (Murdock 1959: 170; Pankhurst 1977: 3). Lastly, oral history from the Bertha people, now living on both sides of the central border, indicates that they also

moved to the Highlands from the southern part of Sennar kingdom in recent times (Triulzi 1981: 21-25).

All those frontier groups have preserved hunting-gathering practices until very recently, and though some of them tend cattle, those living in the forested escarpment are mostly hoe farmers (Cerulli 1956: 179). The current absence or insignificance of livestock does not in any case imply the same condition in the past, since the groups could have lost them due to the pernicious effects of the trypanosomiasis on cattle in the forest barriers when they arrived in the Highlands from the plains (Gifford-Gonzalez 2000: 119-123). Social organisation of all these communities was basically egalitarian until quite recent times (Grottanelli 1948: 311-315; Murdock 1959: 176).

What is suggested by all this information may perhaps be considered a part of the historical processes of *longue durée* at the Eastern Sahelian region. The closeness of a forested and rugged mountainous region may have been a powerful attraction as an area of refuge for small independent groups that shared an egalitarian social system and their general linguistic affiliation with the Nilo-Saharan language phylum. Their particular languages belonging to as many as six families of the phylum (Bender 2000: 44-46), suggests that these peoples reached the "sanctuary" in different historical periods. Even in a continent that has been characterised historically by mostly egalitarian economic and political systems (Coquery-Vidrovitch 1969; McIntosh 1999), or simply because of this very condition, many traditional groups have fiercely resisted the advent of "complexity" and subordination, even resorting to retreating to that inaccessible hiding place in the Ethiopian Highlands that Evans-Pritchard (1940) called the "corridor of death" (Johnson 1986: 219).

Later on, except for occasional slave raids (Pankhurst 1977), these *Shankilla* (black, slave) populations lived for centuries in an acceptably independent situation on the edge of the Sudanese and Ethiopian kingdoms, as historical reports from foreign travellers to the Highlands suggest (Ṕez, Lobo, Prutky, Bruce, etc.). Their subaltern position in modern times (e.g. Donham 1986: 12) could be more a consequence of the Abyssinian expansion in the 19th century than the result of the earlier enslaving practices. The Southern Sudanese refugees newly settled on the Ethiopian side of the border as a result of the civil war attest the persistence of a related process, which started in prehistoric times and has continued up to the present day. In some cases, such as the T'wampa (Uduk), the entire ethnic group, some 20.000 people, has been resettled in the old areas of refuge (James 1994), in what are now called the Tsore, Bonga or Sherkole refugee camps.

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Elena A. A. Garcea

Pottery making processes at Esh Shaheinab, Sudan

The site and the sample

Esh Shaheinab is located on the west bank of the river Nile about 50 km north of Omdurman (Fig. 1). It was one of the first sites excavated by Arkell (1953) in the Sudan and is mainly known for its Neolithic occupation, although Arkell's excavation brought to light remnants of a previous Early Khartoum occupation and later, Late Neolithic and Meroitic graves (Arkell 1953). The ceramic assemblage from Arkell's excavation is presently stored in the National Museum in Khartoum and was recently restudied by the present author (Garcea in press b). The majority of the examined sherds belongs to the Neolithic (764 pieces), some are from the Early Khartoum period (177 pieces) and a few from the Late Neolithic (28 pieces; Fig. 2).

Theoretical and methodological starting point

Artefactual materials were the first discriminating elements to distinguish between what Arkell (1949) initially called 'Wavy Line Culture' and 'Gouge Culture,' respectively, taking a ceramic decoration and a lithic implement as defining cultural markers. He soon changed those names into 'Khartoum Mesolithic' and 'Khartoum Neolithic' in order to specify the economic organisation and the relative chronology of the two cultures (Arkell 1953). Nevertheless, he continued to use stylistic and typological criteria to make temporal and cultural interpretations. He correctly identified the Dotted Wavy Line pattern as a "typological link between the pottery of the Khartoum Mesolithic and the pottery of the Khartoum Neolithic" (Arkell 1953: 69). His excavations at El Qoz, as well as at Esh Shaheinab, provided stratigraphic sequences that confirmed such interpretations.

Far from accepting guide fossils as cultural markers, I would like to emphasise that material productions result from a symbolic system of cultural



Fig. 1. Map showing Esh Shaheinab and other 'Khartoum Neolithic' sites located by Arkell (1953).

meanings. They are the products of a social network that identifies its culture in a precisely determined technological behaviour (Lemonnier 1993; Gosselain 2000; Livingstone Smith 2000). For these reasons, all stages of manufacturing processes are equally relevant and meaningful to define material identities, as artisans

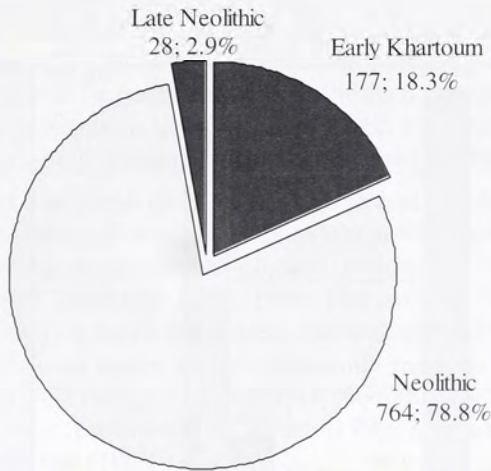


Fig. 2. Numbers and percentages of potsherds.

continuously make “technological choices” (sensu Lemonnier 1993) during their operational sequences. Choices can be unconscious and unintentional (Lemonnier 1993), as well as deliberate and competent (Pelegrin 1990).

Decoration is but one of the stages in the process of the chaîne opératoire of pottery manufacturing. The entire process starts with raw material procurement, assessment and preparation of the clay, it continues with production and finishing, and ends with use and discard of the pots (Garcea 2005). In order to consider all these parameters, I entered the data in a relational database on Access© platform. They were organized in a nested hierarchy through a system of linked user forms. Crossed field queries were used to elaborate the data.

Spatial distributions of pottery making traditions, of their use and discard have complemented the analysis of manufacturing processes as they allow to locate social identities and behaviours, or rather “sociotechnical aggregates” (Gosselain 2000). Statistical and geostatistical analyses have proved to be useful tools with regard to intra-site pottery distribution (Fontana 1998; Garcea in press a; Garcea & Caputo 2004).

As the decorative techniques and motifs of the ceramic assemblages from Esh Shaheinab have been presented elsewhere (Garcea in press b), this paper aims at pointing out some considerations on the meaning of the various stages in the manufacturing chaînes opératoires of the Esh Shaheinab pottery from the Early Khartoum, Neolithic, and Late Neolithic periods.

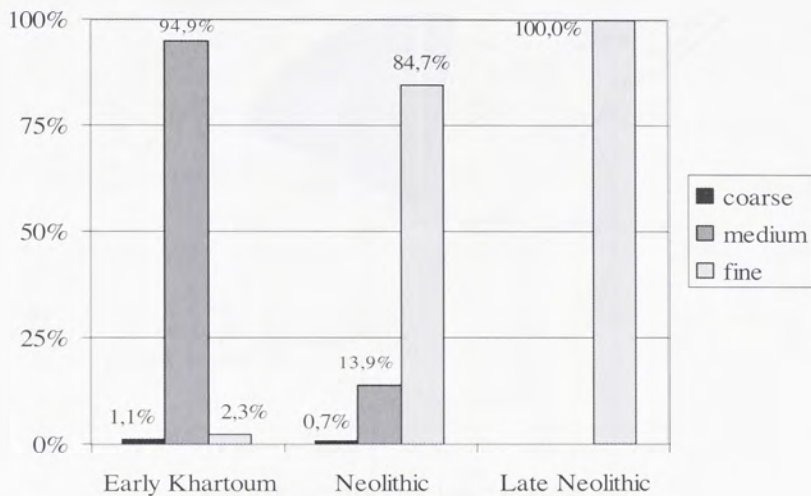


Fig. 3. Clay textures of ceramic pastes.

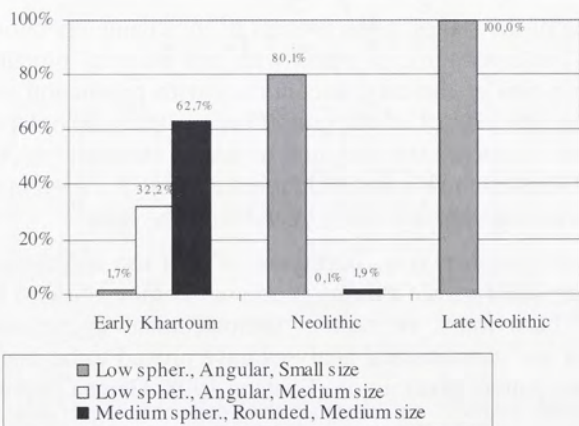


Fig. 4. Sphericity, angularity, and size of inclusions.

Raw material procurement, assessment and preparation

The technical behaviour of raw material procurement, assessment and preparation of the clay is not directly visible on the finished product (Gosselain 2000). However, it can still be partly detected on the final aspect of the fabric. As a matter of fact, clay preparation tends to be the result of habit, rather than cultural traditions with symbolic meanings (Livingstone Smith 2000).

The location of Shaheinab gave easy access to both the Nubian Sandstone formations and the Basement Complex, which could provide local availability of a large variety of mineral tempers for the pastes (Nordström 1972; 1981; 2004; Hays & Hassan 1974; Chlodnicki 1984; 1989; Francaviglia & Palmieri 1988; Garcea in press b). Clay textures show clear chronological differences in clay processing. Early Khartoum pastes are predominantly medium grained (Coarse: 1.1%; Medium: 94.9%; Fine: 2.3%), whereas Neolithic and Late Neolithic fabrics are, respectively, prevalently (Coarse: 0.7%; Medium: 13.9%; Fine: 84.7%) and exclusively fine (100%) (Fig. 3).

With regards to the main features of the inclusions, the classification of their sphericity, angularity, and size was based on estimation charts specific for each characteristic (cf. Orton et al. 1993: 238-239). Most of the Early Khartoum inclusions have medium sphericity, high roundness and medium size (62.7%). This combination of features disappears in the Neolithic (1.9%) and Late Neolithic (0%), whereas low-spherical, angular and small-sized inclusions are preferred in the later periods (Fig. 4).

In addition to mineral inclusions, potters incorporated organic tempers in the clay. Flat shapes usually come from undecomposed vegetal fibres, whereas tubular shapes derive from dung (Livingstone Smith 2001). Apart from the quantity of sherds for which it was not possible to determine the presence or the type of organic inclusion (labelled "n.d.": non-determinable), flat vegetal fibres were frequently employed in the Early Khartoum (Flat fibres: 15.8%; Tubular fibres: 1.7%). Neolithic (Flat fibres: 2.0%; Tubular fibres: 38.1%) and Late Neolithic (Tubular fibres: 42.9%) ceramics often included tubular shapes, indicating the use of dung for tempering clay (Fig. 5).

Production and finishing

Production and finishing, which include decoration, are the most visible stages of pottery making. As they are technically malleable, they can be easily transmitted to other potters (Gosselain 2000). Therefore, on one hand, it is true that the different styles of decoration can convey information on the identity of the group that produced them and the time and place of production (cf., among others, Plog 1980; Hodder 1982; Rice 1987). On the other, hand the easiness

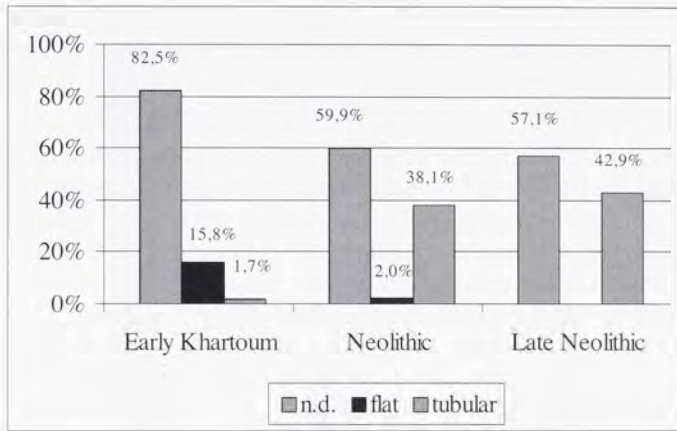


Fig. 5. Organic inclusions.

of transmission can favour their spread across cultural boundaries, depriving them of their cultural meanings as material products of a specific culture (Gosselain 2000).

The ceramic productions from the Upper Nile Valley offer clear examples of their diverse cultural meanings. Wavy Line ware represents the former case, which recognises the identity of a cultural group in a style of decoration, and the time and place of its production. In fact, this type of ware characterises the Upper Nile Valley in a defined cultural horizon and period of time, locally called Early Khartoum. Dotted Wavy Line ware typifies the latter case. It is spread from the Atlantic Sahara to the Red Sea and covers a span of time of several millennia (Garcea 1993; 1998). Such uniformity spoils any significant cultural connotation.

Use and discard

Intra-site distributions can provide information on the last stages of the operational sequence of ceramic productions: use and discard.

Geostatistic analyses can describe spatial patterns of abundance and were applied to the spatial distribution of the pottery from the three periods, Early Khartoum, Neolithic and Late Neolithic. The variations of pottery density were plotted on contour maps of the site. Mapping procedure applied kriging interpolation between sampled points to make estimates of objective isopleths. Kriging is the estimation procedure that uses known values and semivariograms to deter-

mine unknown values by plotting semivariances as a function of distance between sample points (cf. Flatman and Yfantis 1984; Garcea & Caputo 2004).

All potsherds were plotted on Arkell's original contour map (Arkell 1953: Plate 2). They were clustered according to their stratigraphic position into three groups of layers: Upper layer: 0/-30 cm; Middle layer: -30/-60 cm; and Lower layer: below 60 cm. The distribution and density patterns of these three groups were plotted.

As already noted (Garcea in press b), there are instances of undisturbed Early Khartoum layers below the Neolithic stratigraphy (e.g. squares I60/60+ and M83/70-100). The Early Khartoum pottery is mostly concentrated in one area of the site, but also appears in the eastern part of the excavated area (Fig. 6). The material was *in situ* and was present with respectable numbers of sherds throughout the entire stratigraphy of the excavated deposit. Kriging interpolation between sampled points shows the probable extension of the Early Khartoum occupation (Fig. 7).

The pattern of abundance in the three stratigraphic clusters of the Neolithic sample indicates that the site occupied a larger area in this period. The majority of the sherds were present in the upper and middle layers (Fig. 8). The contour maps of the pattern of density variation evidence a wide scatter in the upper layers and a concentration in two spots in the middle layers. Such variation may be due to post-depositional erosion of the archaeological deposit (Fig. 9).

Late Neolithic pottery was practically all located in the upper layer (Fig. 10). Contour maps suggest that it is more likely that the very few sherds in the middle layer penetrated from above, rather than being originally deposited there (Fig. 11).

Concluding remarks

To sum up, the systematic analysis of the Esh Shaheinab pottery, based on new analytical and statistical methods, provides information on the technological behaviour and cultural features of the three main pottery productions represented at the site.

Clay processing shows basic differences in the methods employed in the Early Khartoum in comparison to the Neolithic and the Late Neolithic. Preparation techniques, or possibly habits, underwent continuity in the Neolithic and Late Neolithic, although Neolithic pottery was probably locally made, whereas Late Neolithic ware was not.

The use of organic tempers can be related to subsistence patterns. Flat, undecomposed fibres were common in the Early Khartoum sample, whereas dung appeared with the adoption of herding in the Neolithic economic system.

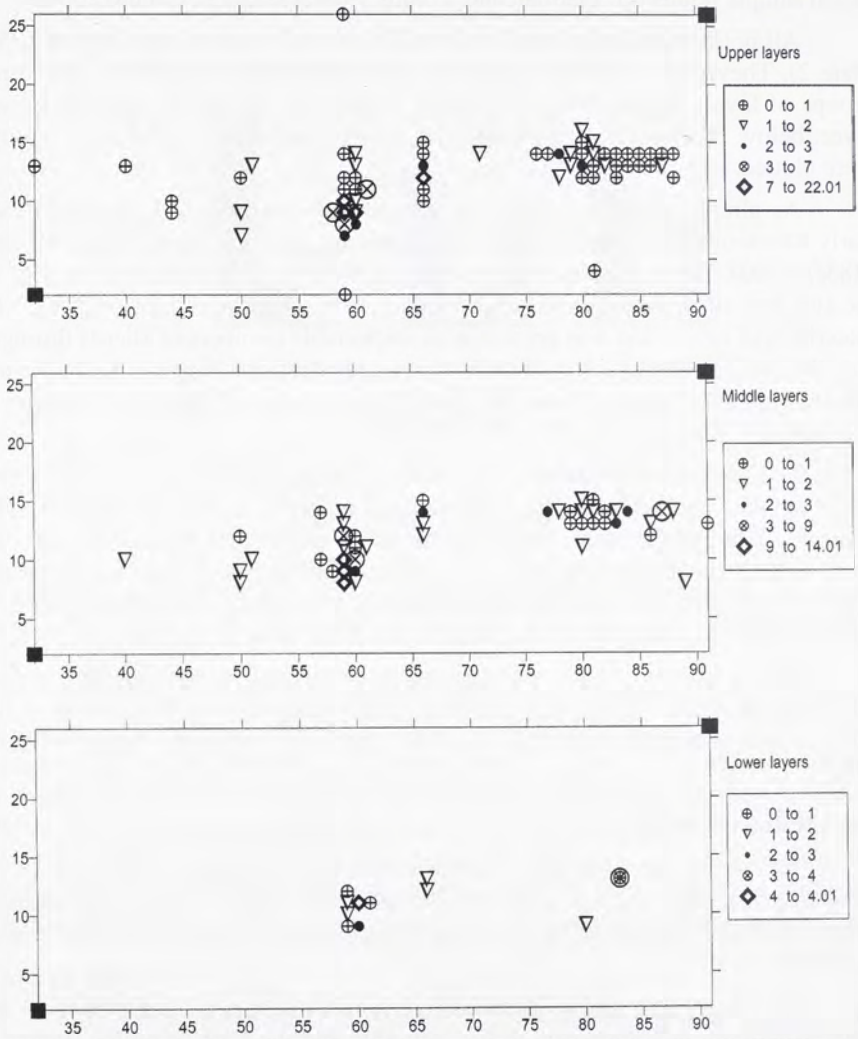


Fig. 6. Distribution and density patterns of the Early Khartoum pottery.

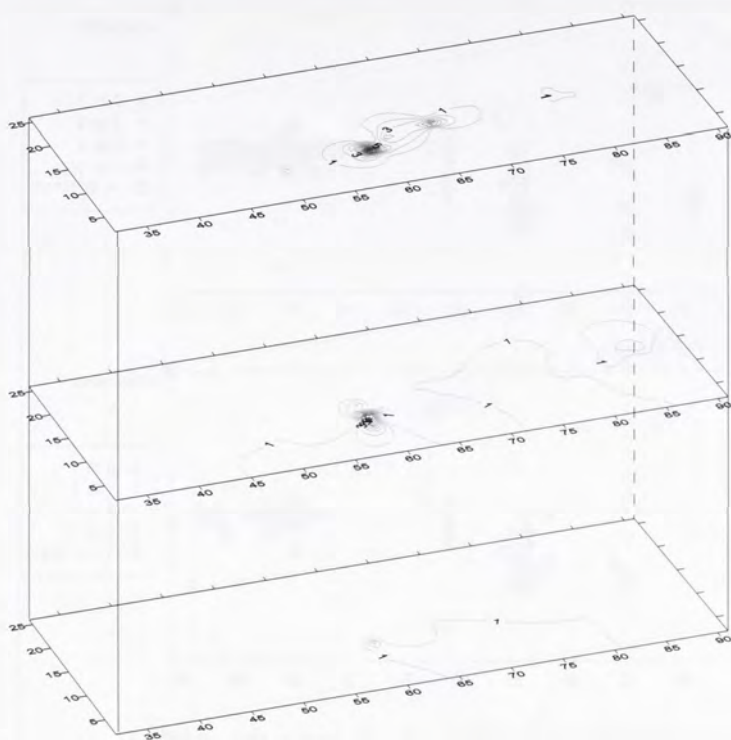


Fig. 7. Contour maps of the density patterns of the Early Khartoum pottery.

Furthermore, the frequency of dung suggests a continuous or repetitive use of the site in the Neolithic. Under these conditions, it could be accumulated and more easily exploited.

Intra-site distributions could provide information on the last stages of pottery manufacturing and post-depositional events. Geostatistical analysis showed that the Early Khartoum occupation was not as ephemeral as Arkell (1953: 3) believed. A stratigraphically documented deposit was still on the spot, in spite of the later uses of the site. The Neolithic occupation had the largest horizontal extension, although it was not very thick, confirming a repetitive settlement use. Finally, in the Late Neolithic, the site was only visited for funerary purposes by highly nomadic pastoralists.

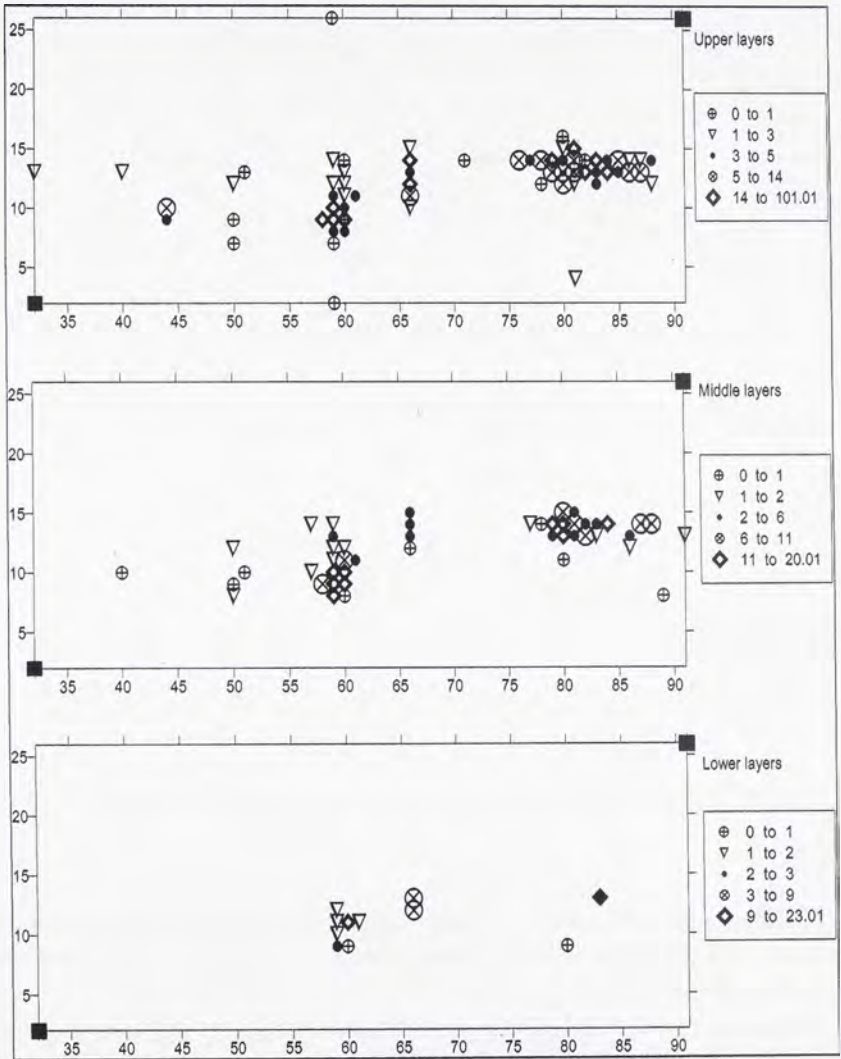


Fig. 8. Distribution and density patterns of the Neolithic pottery.

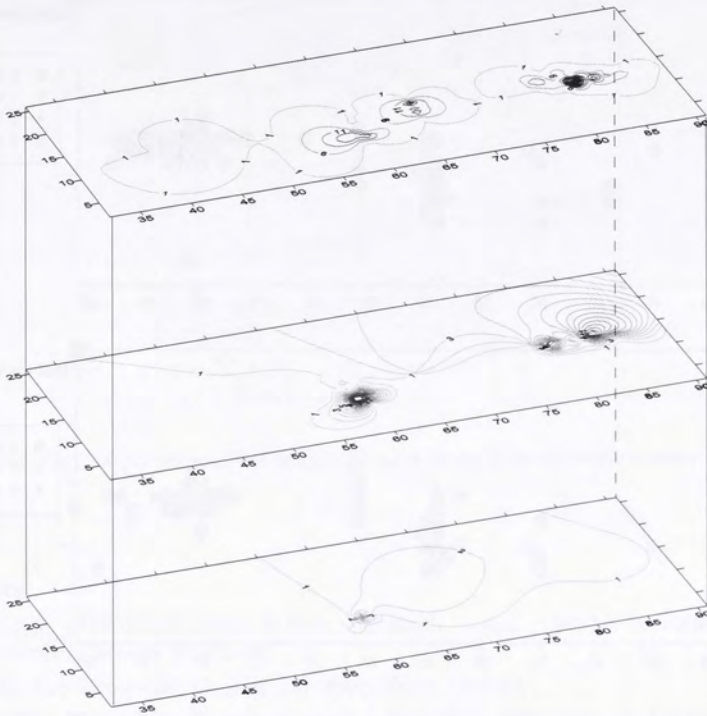


Fig. 9. Contour maps of the density patterns of the Neolithic pottery.

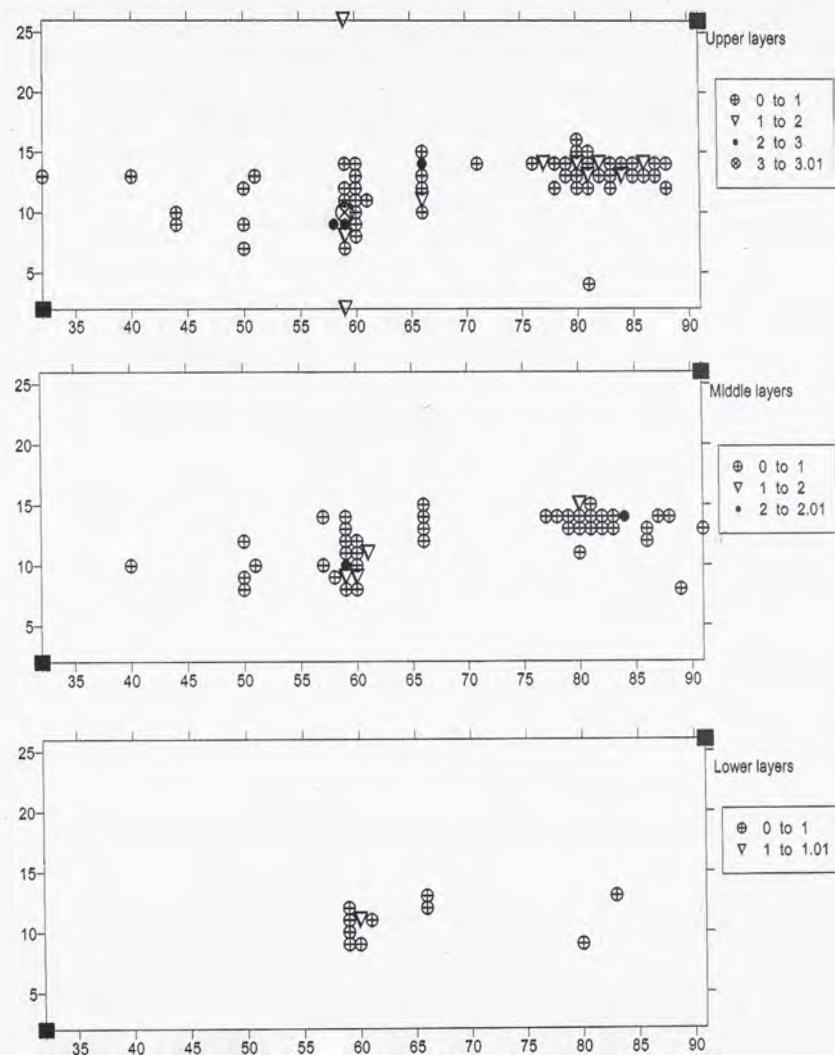


Fig. 10. Distribution and density patterns of the Late Neolithic pottery.

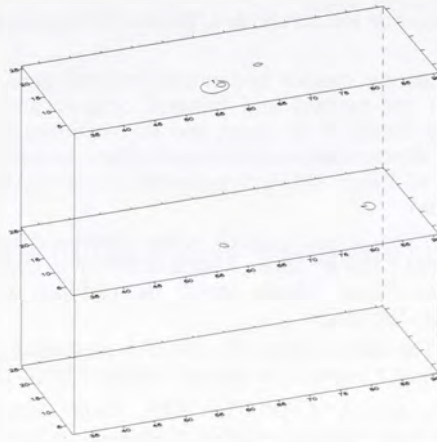


Fig. 11. Contour maps of the density patterns of the Late Neolithic pottery.

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Achilles Gautier

The faunal remains of the Early Neolithic site Kadero, Central Sudan

Kadero is an important and well known Early Neolithic or Khartoum Neolithic site dated to 4850-4250 BC, situated on the east bank of the Central Sudanese Nile some 20 km north from Khartoum (Krzyzaniak 1991). The site has been excavated for more than three decades and its archaeological harvest including a large collection of animal remains, is impressive. However, no detailed analysis of these remains is available. Sobocinski (1977) published a short paper dealing with the animal bone finds from the earliest campaigns (1972-1975). Another short paper presented a revision of the remains identified by Sobocinski and later finds (Gautier 1984). It was to be followed by a detailed account by the last mentioned author and a paper dealing with the fish remains by Dr Wim Van Neer. Both these papers were completed in 1985 but for various reasons they never reached the printer. Finally a small monograph with an introduction by the main excavator, the late Lech Krzyzaniak, dealing in principle with all the finds collected until 2003 was planned, but abandoned because of the unexpected death of Lech Krzyzaniak. These finds were presented at the 7th International Symposium "Archaeology of the earliest Northeastern Africa" in Poznan in 2003 with the aid of the table reproduced here (Table 1). Some preliminary comments were added.

The table shows that the Kadero fauna is quite diverse, but as is generally the case, it comprises several taphonomic groups, that is, groups of remains of animals with comparable death-to-burial history and hence varying archaeological significance. Most important is the group of animals used, comprising mostly animals which were eaten and thus consisting mainly of consumption refuse. The exact use of some animals is difficult to establish: python, Nile monitor or some of the carnivores may have been skinned and the skinned carcasses thrown away.

A special group within the first group comprises the Red Sea shells, *Nerita polita* and especially *Engina mendicaria*, used as beads. The larger bivalves, *Etheria elliptica* and again especially *Spathopsis*, formerly known under the generic name *Aspatharia*, were no doubt collected for making tools as exemplified by valves cut into pottery tools.

Penecontemporaneous intrusives are animals which came to a site by their own or other not human means or were brought to the site inadvertently by people. At Kadero they include the land snails, the amphibians, the small snakes, the lizard and the small rodents, who reached the site mainly by their own means. As to the smaller gastropods and bivalves, these derive no doubt mostly from the fluvial deposits on which the site was established and can therefore be included in the category of the reworked intrusives. The jerboa finds are no doubt mostly late intrusives because of their fresh aspect and the fact that they form clusters of skeletal elements combinable in single animals. The cowry, *Cypraea turdus?*, is probably another late intrusive. It was found on the surface and may derive from a later occupation.

The consumption refuse consists mainly of livestock, but people also collected ampullarids or apple shells (*Pila* and *Lanistes*) for food, and added fish, birds and mammalian game to their diet. As was to be expected the mammalian game consists mainly of antelopes. Kob, well represented in pre-Neolithic or Early Khartoum sites, is no longer very frequent. This may be the result of over-hunting as the species is a tenacious territorial antelope which will stay on its grounds even when people disturb them very much (see Gautier et al. 2002). Changes in the wild resource spectrum may have led people to include new animals in their game-bag such as the hare virtually absent in the known pre-Neolithic faunas. The Kadero hedgehog is the second record of this kind of small mammal in the Sudanese archaeofauna. Hedgehogs are eaten in Europe and Africa, but the Kadero find could be a penecontemporaneous intrusive.

The Kadero livestock finds consist mainly of cattle (more than 80%) and some sheep and goat. The cattle are large, attaining heights at the withers between c. 120 and 145 cm and I have been wondering whether people practised castration. The limited age distribution data give the impression that the Kadero people sacrificed much more easily small livestock than their cattle.

The faunal evidence provided by Kadero, as well as the less detailed data known from other sites of the same period, indicate clearly that cattle were very important to the early Neolithic people of the Central Sudan. However can we say Kadero presents evidence for the beginning of the so called cattle complex, that is, the economic, social and symbolic significance of cattle for many, especially if not exclusively Nilotic tribes of Africa? Traditionally these people have Sanga cattle. Sanga cattle are probably the descendants of the original and

probably autochthonous African cattle as exemplified by Pharaonic cattle formerly labelled *Bos africanus*, which have been crossed to some varying extent with zebu introduced in Africa during our era (Grigson 1991).

Another problem is presented by the scenario describing how and why pastoralism did come to the Central Sudan. Was there climatic forcing to use a trendy term? Was there over hunting as suggested for kob? Did these phenomena occur in synergy? Did livestock arrive at the right time with pastoralist immigrants or was livestock adopted from people elsewhere?

A detailed account and evaluation of the Kadero fauna and a comparison of this fauna with faunas from other Khartoum Neolithic sites by the present author and Dr Wim Van Neer is in preparation. This paper will be included in the forthcoming memoir summing up the excavations and research dealing with Kadero. The present small contribution is dedicated to the memory of our good friend and colleague Lech Krzyzaniak.

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Table 1. The fauna of Kadero (a).

Marine molluscs	<i>Nerita polita</i> (b)	-	-	R
	<i>Cypraea turdus?</i>	1	-	1
	<i>Engina mendicaria</i> (b)	-	-	F
	marine bivalve (b)	-	-	1
Freshwater molluscs	small gastropods (<i>Cleopatra bulimoides</i> / <i>Melanoides tuberculata</i>)	R	-	R
	<i>Pila wernei</i>	F	F	F
	<i>Lanistes carinatus</i>	R	R	R
	small bivalves (<i>Corbicula consobrina</i>)	R	R	R
	<i>Spathopsis</i> spp.	R	R	R
	<i>Etheria elliptica</i>	R	R	R
Landsnails	<i>Limicolaria cailliaudi</i>	F	F	F
	<i>Zootecus insularis</i>	R	R	R
Freshwater fish(c)5		40	65	105
Amphibians		5	6	11
Reptiles	crocodile (<i>Crocodylus niloticus</i>)	-	4	4
	Nile monitor (<i>Varanus niloticus</i>)	60	104	164
	lizard	-	1	1
	rock python (<i>Python sebae</i>)	18	29	47
	small snake(s)	6	23	29
Birds		16	4	20
Wild mammals	hedgehog (<i>Atelerix albiventris?</i>)	-	1	1
	small monkey, probably grivet monkey (<i>Cercopithecus aethiops</i>)	-	1	1
	hare, probably Cape hare (<i>Lepus capensis</i>)	11	-	11
	ground squirrel (<i>Euxerus erythropus</i>)	5	-	5
	tatera gerbil (<i>Tatera robusta?</i>)	4	2	6
	multimammate rat (<i>Mastomys</i> sp.)?	-	1	1
	lesser jerboa (<i>Jaculus jaculus</i>)	±30	-	±30
	unidentified smaller rodents	F	9	F
	porcupine (<i>Hystrix cristata</i>)	3	1	4
	canid, probably golden jackal (<i>Canis aureus</i>)	27	-	27
	honey badger (<i>Mellivora capensis</i>)	11	-	11
	medium sized viverrid (<i>Herpestes ichneumon</i> or <i>Atilax paludinosus</i>)	1	-	1
	small carnivores	2	1	3
	wild cat (<i>Felis sylvestrus</i>)	13	2	15
	large felid, probably caracal (<i>Felis caracal</i>)	10	P	10
	aardvark (<i>Orycteropus afer</i>)	1	-	1
elephant (<i>Loxodonta africana</i>)	1	1	2	

	warthog (<i>Phacochoerus aethiopicus</i>)	5	4	9
	hippopotamus (<i>Hippopotamus amphibius</i>)	8	7	15
	giraffe (<i>Giraffa camelopardalis</i>)	5	6	11
	medium sized antelopes, mainly redfronted gazelle (<i>Gazella rufifrons</i>)	5	2	7
	larger antelopes (d)	30	26	56
	medium sized antelope, probably kob (<i>Kobus kob</i>)	11	9	20
	small antelopes, mainly oribi (<i>Ourebia ourebi</i>)	166	38	204
Domestic or wild	small bovid (antelope or small livestock)	73	39	112
Domestic mammals	cattle (<i>Bos primigenius</i> f. <i>taurus</i>)	1028	498	1526
	goat (<i>Capra aegagrus</i> f. <i>hircus</i>)/sheep (<i>Ovis ammon</i> f. <i>aries</i>)	151	77	228
Total vertebrates		±1746	961	±2707
Total not identified vertebrates		±3000 0	6300	±36300

(a) Counts of fragments or specimens, i.e., finds which clearly belong together; F: frequent; R: rare; P: present but not counted, e.g., rib or vertebrae other than atlas or axis. (b) Only found in graves. (c) Mainly *Clarias* sp., *Synodontis* sp., *Protopterus aethiopicus*, *Lates niloticus*. (d) Tiang (*Damaliscus lunatus*), hartebeest (*Alcelaphus buselaphus*), greater kudu (*Tragelaphus strepsiceros*), etc.

Brigitte Gratien

Kerma people in Egypt (Middle and Classic Kerma)

Downstream from the first cataract, Nubian Classic Kerma remains are few, even if they are often well identified: they mostly consist of isolated pots, found inside of Egyptian tombs, or in settlements. Sometimes they are also found in burials of small groups or isolated Kerma individuals. As in Nubia, they are well dated to the Second Intermediate Period and the first half of the XVIIIth Dynasty. They can represent remains of Egyptians or egyptianized Nubians as well as ancient travellers; or they might represent traces of a commercial exchange of goods (Bourriau 1981: 25f.; Bourriau 1991: 129ff.). While Egyptian texts and archaeological remains prove that goods are moving in two directions – for example the exchanges taking place in the Egyptian fortresses on the second cataract – no one has ever mentioned finds from the most ancient Kerma cultural periods, i.e. Ancient Kerma and Middle Kerma (from the end of the Vth Dynasty to the end of the Middle Kingdom). One reason could be a mistaken identification of remains especially as the ancient phases of the Kerma culture have only been known since the 1970's. Kerma pottery was often misidentified as C-Group or Pan-Grave production. The fine Middle Nubia pottery is easily recognizable but this is not the case with the utilitarian pottery, such as storage jars and cooking pots. It is often difficult to determine affiliation to one or the other group. Here I shall try to research the very scarce documentation available to see if proof exists that Nubians from Middle Nubia arrived in Egypt before the Second Intermediate Period.

This question was the focus of a communiqué which was presented in Poznań, invited by Lech Krzyżaniak (Gratien 2000: 1f.). I would like to dedicate paper to him whom we miss so much.

Egyptian chronology and Kerma dates

Ancient Kerma	KA	End of Vth Dynasty until beginning of Middle Kingdom
Middle Kerma	KM	Middle Kingdom
Classic Kerma	KC	Second Intermediate Period until beginning of XVIII th Dynasty
Late Kerma	KR	End of Kerma culture, and phase of acculturation during the first half of the XVIII th Dynasty

These dates are corroborated by Egyptian pottery discovered in the same contexts as Kerma pottery (Bourriau 2004: 3-13). Pan-Graves are dated by Bourriau to the XIIth - XIIIth Dynasty i.e. contemporary to Middle Kerma; she confirms that no Classic Kerma pottery was ever found on a Pan-Grave site (Bourriau 1981: 25).

Ancient Kerma ceramic is easily recognizable. To my knowledge no single piece was found in Egypt nor north of Aniba with the exception of finds at Qurta. Some well known bowls very frequent on Kerma sites are also present on C-Group sites such as Aniba and Qurta, where the original location is not recorded (Steindorff 1935: pl. 51. 5-7; Firth 1927: pl. 25a). The Ancient Kerma sphere hardly reached the Batn el-Haggar as Lower Nubia then was occupied by the C-Group (Bietak's phases Ia and Ib), but we still have to understand the links between these two cultures (Honegger 2005: 240). This region was then a "zone-tampon", an intermediary between Iam and Egypt, as we understand it from Herkhouf's autobiography and his contemporaries. In Egypt itself, we hardly know of any material left by "pacified Nubians" from Middle Nubia.

From the XIth Dynasty onwards, the pharaoh's army intensified control over Lower Nubia which led to a direct link with the Middle Kerma population in the Second Cataract fortresses. Lower Nubia, i.e. Wawat, became a province, but seems to have maintained a separate commercial activity.

The difficulties in trying to attribute pottery to one or the other of these Nubian groups are many. The typical features of each needs to be known in order to identify the possible Kerma pots abroad, such as table pottery, cooking pots and containers. Fabric identification is no help to classification because the vessels are made from alluvial Nile silt (which is mostly the same all along the Nile valley) to which organic or mineral temper, mostly sand, is added. Our

ignorance of workshops does not allow us to recognize different production centres (De Paepe et al. 1992: 68ff.). Excavated Kerma settlements are scarce, therefore the work done at Gism el-Arba (between Kerma and Dongola) on settlements 1 and 2 is very informative because the domestic pottery in Gism el-Arba is different from pottery produced for burials.

Among the vessels easily identified and useful as chronological markers for their period are Middle Kerma table pottery, the short and cylindrical beakers with an everted concave profile (type M VIIb, d-g). During the Classic Kerma Period they become higher and narrower and are decorated with a white band between the red bottom and the black rim (type CIII; Gratien 1986: 421, 4d32, fig. 314, 321).

The most numerous bowls found are typical red black-topped pots, with rounded bottom and an everted rim, which were made during the entire Kerma period and during C-Group time. A single fine pottery sherd found in Egypt is often impossible to attribute to Middle Kerma, Classic Kerma or C-Group. It is the context, which determines the identification.

During Classic Kerma, the beakers with a white band (simply called beakers below) are a well known category easy to identify. But these vases could also have been purchased as luxurious goods like Cypriote or Palestinian ceramics. Similarly the red or black, entirely incised/impressed bowls, of which the area of production is as yet unknown, could either be C-Group or Kerma production.

Kerma storage jars are usually hand-made in a coarse fabric; with an ovoid or spherical body, a narrow neck and an everted, more or less thickened, lip. Some are decorated on the shoulder, neck or lip but the most voluminous ones are simply smoothed. They seem not to have changed from Ancient Kerma, to Middle and Classic Kerma. If only represented by sherds it is likely they may escape notice when present at an Egyptian settlement site.

The cooking pots vary to a very great extent. The bottom of these hemispherical, large bowls is often crudely incised or reinforced with a layer of silt with finger impressions or scratches, maybe to increase the stability of the pots. They are polished or burnished inside and outside, partly smoked or oxidized, with a black external, more or less prominent, rim. The Gism el-Arba excavations allow a reconstruction of their evolution. During Middle Kerma and the beginning of Classic Kerma, they often carry a geometrical, incised or incised/impressed pattern below the rim. Different stylistic patterns alone allow us to distinguish the workshops and the periods. The most frequent motifs are: peas in relief (“boutons repoussés”) during Ancient Kerma and incised radiated, hatched or squared triangles or chevrons during Middle Kerma. At that time

hatched triangles directly incised below the rim or below a horizontal line, seem to be the most popular and the most frequent pattern. I myself selected this pattern as characteristic for Middle Kerma as found in the excavations in Sai necropolis. In fact at the Gism el-Arba settlement excavations, where it was possible to obtain a clear stratigraphy of occupation levels, a longer use for this pattern was determined. The pattern is very frequent during Middle Kerma, is still in use at the beginning of Classic Kerma and then became scarce in contrast to the occurrence of mat-impressed cooking pots. Nevertheless the production of incised cooking pots seems to continue some time during Classic Kerma and C-Group of the Second Intermediate Period, with vases incised with herring-bones or horizontal strokes, produced by comb, on all or a part of the vases' surface. But, from Classic Kerma onwards, the most frequent cooking pots are those produced on rounded matting; during Late Kerma the mat became rectangular.

In the Second Cataract forts and northwards, we often find pots covered with long transverse incised hatchings. In the town of Buhen, pottery, probably later than the Old Kingdom, includes many cooking pots incised with chevrons or triangles (Gratien 1995: 43ff.).

If the fabrication of fine pottery needs a 'savoir-faire' and great skills, besides a well-controlled operating process, it must have been made in Nubian workshops and brought abroad. Cooking pots on the other hand are family productions, for which advanced technology is not necessary. This pottery was probably fired inside open kilns, away from the dwellings. The decoration applied indicate local tradition and preferences. So they could have been made locally as well as outside of Nubia by a Nubian or Egyptian or better, made by one and purchased by another as for example inside the fortresses. Why import/export fragile pottery when fabrication is so easy?

We have to remember that this pottery is still badly known. It is settlement ceramic of which not more than one piece was placed inside a tomb during Middle Kerma according to the evidence of Sai cemetery. Few settlements have been excavated in Nubia, maybe because work is long and fastidious. Settlements in Lower Nubia and south of Wadi Halfa are only summarily published. The Kerma settlement of Sai was washed away by successive floods. In Kerma town, stratigraphical study of the ceramic is still under progress. Surveys have provided little datable pottery because patterns of decoration are numerous and various (following the potters' imagination), even if the forms of the vessels are stable.

Keeping all these remarks in mind, we are going to re-examine the Nubian pottery found in Egypt.

Since Herkhouf's times expeditions could choose between two roads to travel from the Kerma-Dongola region to Egypt, if we accept the assumption that

Iam = Kush = Kerma, Kerma being the only site along the Nile in the western desert or in the Wadi el-Khowi important enough to correspond to Herkhouf's description (Edel 1955: 62-63; Vallogia 1981: 188; Grimal 1985: 120; Vercoutter 1979: 19 ff.; Bonnet 1990). The routes taken were the Nile road via the Lower Nubian forts or the desert road through the oases from Selima, Toschka to Kurkur and Dunkul. We also have to consider the still badly known tracks of the eastern desert (Kuper 2003: 12ff.). Kerma people could have left traces along the two first mentioned routes. During the Old Kingdom the expeditions could have travelled through Dakhleh; during the Middle Kingdom this path was in use and even more so during the Second Intermediate Period. One might suggest that the wealth of Dakhleh Oasis, and of Balat in particular, was based on trade with Nubia (Baud 1997: 19ff.; Baud et al. 1999: 1ff.; Marchand & Tallet 1999: 326, 333, fig. 45).

Dakhleh then Kharga, are often known as stop-over places on the road from Egypt to Sudan, in part known as Darb el-Arbain (Churcher & Mills 1999: 178). Several representations of Nubians, for example at the Nephthys Hill, were thought to be related to the Pan-Grave culture of the Second Intermediate period however they are presumably older because the pottery found there is dated to the Old Kingdom. This place could have been an observation post on the way to the oases (Kaper & Willems 2002: 82ff.). Two other main routes exist, the Darb el-Tawil (Manfalout-Ayn Asil) and the Girga-Khargeh/Dakhleh road (Leprohon 1986: 50ff.; Giddy 1987: 7ff.) going from the Nile to Dakhleh,

The net of roads to the West and to the South is a complex one. Further West, no single Nubian sherd has been discovered on the Abu Ballas road until now. According to R. Kuper, Herkhouf possibly travelled this way to Iam, which some authors, including myself, place in the region of Dongola. In Wadi Shaw a Meidum bowl was discovered (Kuper 2002: 1ff.; 2003: 12ff.). An inscription states that the steward *jmy-r pr Mrj* came to drive back the Oasiens, and is dated to the VIth or the XIIth Dynasty. On the road to Jebel Uweinat or to Abu Ballas (350 km long) the mission of R. Kuper has discovered about thirty stop over places used from the Old Kingdom until Ptolemaic times.

According to P. Kuhlmann, this newly discovered track should probably be more connected to Nubia, than to Libya, the Toschka quarries included. Balat could have been the starting point for expeditions going to the desert and to Subsaharan Africa, a road more difficult than the road via Elephantine, but maybe leading through the pasture estates of the Nubian cattle-breeders and through Iam. Dakhleh's function, similar to the evolution of function which the Nubian fortresses experienced, would have changed from the search for minerals during the IVth Dynasty to trade from the VIth Dynasty onwards. Rock drawings of bovines, hunting scenes with dogs and archers could have been inspired by C-

Group- or by Kerma-people, as we can suppose from recently discovered models at Gism el-Arba and Tabo (Kuhlmann 2002: 125, 133, 152).

The change and development of the second Cataract forts from military posts to trading posts during the XIIIth Dynasty maybe resulting from the increased importance of trade and the increase of the relations with Kush/Middle Kerma. This may be concluded from for example the abundant Egyptian and Kerma sealings recently discovered on Kerma sites such as at Beit es-Shetan, Kerma and Gism el-Arba (Gratien 2006: 115f.). Dating the Egyptian pottery found inside Kerma burials J. Bourriau showed the importance of Egyptian imports during Middle Kerma: the majority of pottery came from Upper Egypt until the mid-XIIth Dynasty, thereafter equally from Upper and Middle Egypt; during Classic Kerma we observe the same scheme (Bourriau 2004). As a result we interpret the Kerma productions on the extremity of the roads mentioned, as evidence of trade, if not of the real presence of Nubians, as well C-Group or Kerma people.

The Delta

Well identified Kerma finds, are scarce; all are dated to the Second Intermediate Period. At Tell Heboua in the Eastern Delta, a Second Intermediate Period site excavated by M. Abdel Maksoud, a sherd of a beaker was found by myself (fine fabric with everted rim, black-topped and burnished, Classical Kerma; Gratien 1990: 99 n. 9).

In Avaris / Tell el-Daba' at 'Ezmet Helmi palace, many Nubian sherds were discovered in sectors H/1, H/2, H/III, H/IV and H/VI, and published (Fuscaldo 2002: 167 ff; 2004: 111ff.; Hein 2003: 199ff.). From sectors H/1 and H/IV mostly beakers and cups with thickened lip are known, dated to Classic Kerma. In sector H/V the sherd of a mat-impressed cooking pot and one from the same period was decorated with "croisillons". In H/III and H/VI, about 80 sherds were found, some deriving from beakers (one coming from an offering-pit with a funeral meal and pottery from the beginning of Thutmosis III' reign), some from cups with a thickened lip characteristic of the Classic Kerma period (n° 5 = N° C III, 2 at Saï; Gratien 1985a: fig. 321). A-typical red and black-topped bowls, and cooking pots were also found as well as other ceramics: two undecorated cups, incised pots, nine round mat-impressed vases. These seem not to have been impressed with a rocker-stamp but instead they are examples of the well-known traditional technique of mat-impressed pottery, the surface being partially erased by polishing or smoothing (Type C I, 1 at Saï; Gratien 1985a: 430). Fabrics and surface treatments are similar to Sudanese productions: black rim, surfaces varying from red-brown to brown and dark grey, smooth, brushed or polished inside. The last example, n° 15, is a pot completely covered with incised squares,

and another one with incised hatchings similar to models known in Nubia in C-Group as well as in the Egyptian Second Cataract Forts during the Second Intermediate Period (for example Wadi es-Sebua' Gratién 1985b: 39ff. or Mirgissa, cemetery MFe Vercoutter 1975: 330, type 7).

The finds from Tell el-Daba' were usually not located in situ; they are dated by context into the Second Intermediate Period or the beginning of the New Kingdom which corresponds to the timespan in Nubia itself. Skeletons, presumably of Nubians, were discovered at Avaris, as well as two skulls inside of execration deposits, dated to the beginning of the XVIIIth Dynasty (Fuscaldo 2004: 113). It may be concluded that the presence of natives from the Kerma Kingdom is likely at Avaris and in the Eastern Delta at the end of the Classic Kerma period.

The Valley

Most of the Kerma ceramic material discovered in Egypt, is Classic Kerma. According to my experience at Mirgissa, Saï and Gism el-Arba it does not seem possible to establish a fine typology for beakers with a white band. Every attempt to do so was negative because curve and thickness of the body, total or partial burnishing are not significant and the differences are dependant on different workshops. J. Bourriau listed the finds all dated to the Second Intermediate period or the beginning of the New Kingdom, following this non exhaustive list.

- Memphis, Kom Rabi'a, six mat-impressed or incised sherds, from Classic Kerma cooking pots; according to D. Jeffreys a small foreign community could have lived there at the beginning of XVIIIth Dynasty (Bourriau 1991: 135ff., fig. 3.1-3; 1997: 159ff.; Jeffreys 1989: 2).
- Saqqara, T. 10, mastaba 3507: 2 beakers found with Egyptian furniture, beginning of XVIIIth Dynasty, tomb of an egyptianized Nubian in Amenhotep I's reign (Bourriau 1991: 138-139, fig. 5-6 and pl. 6.2 and 7.1-3; 1981: 31).
- Dahshur, small cemetery excavated by Sami Farag and Ahmed Moussa, a salvage excavation, with the discovery of "Pan-Grave" burials, south-west of Senusret III's pyramid, with non-identified pottery (Leclant 1974: 185).
- Kahun: the well-known sherd BM 55289 (Kemp 1977: 289ff.; Kemp & Merrillees 1980: 91), coming from a cooking pot incised with vertical and crossed hatchings, probably Second Intermediate Period if we compare it with Nubian pottery found inside the Second Cataract forts.
- Lisht, cemetery north of northern pyramid (Bourriau 1981: 27).
- Qau, cemeteries 7000 and 4500: in T. 7101, sherds of a beaker, mid-to end of the Second Intermediate Period (Bourriau 1981: 32).

- Abydos, Mace's cemetery D (D 80, 82, 93, 94); all the sherds are coming from beakers, and so-called "pan-graves", but are in fact Classic Kerma, end of the Second Intermediate Period and beginning of the XVIIIth Dynasty.
- Abydos, Garstang's cemetery E, sherds from a Classic Kerma beaker (Bourriau 1981: 33).
- Abydos, Peet's cemetery O; pieces of 11 Classic Kerma beakers (end of the Second Intermediate Period to New Kingdom; Bourriau 1981: 33).
- Abydos, Peet's cemetery C; in C 91, a Kerma vase, Second Intermediate Period to beginning of the XVIIIth Dynasty (Bourriau 1981: 33).
- Abydos, Garstang's excavations in 1908, n° 694 (11 beakers and a Classic Kerma tea-pot, in a pit with two skeletons in crouched positions; also n° 524 (one vase, four beakers and Kerma sherds with undatable Egyptian equipment (Bourriau 1981: 33).
- Ballas: Classic Kerma beakers were found on the site, beakers, jars with an impressed lip, cooking pots (their bottoms being reinforced with fingers' marks and incised with squares under the rim); fine pottery as well as coarse items, table vases, containers, cooking pots, indicate the stay of Nubians, different from the Pan-Grave-people (Bourriau 1990: 15ff.; Bourriau 1991: 132). The Egyptian pottery is dated from the end of the XVIIth Dynasty to the beginning of the XVIIIth Dynasty. The Nubian pottery comes nearly totally from the settlement; cooking pots are abundant, they are the only ceramic for cooking on the site. The Nubian ceramics belong to the Classic Kerma pottery, which can be dated to the end of the Middle Kingdom and the Second Intermediate Period; jars (of Saï type C IX), rounded mat-impressed cooking-pots or large squared incised cooking pots, as inside the forts, and beakers. So, J. Bourriau suggests, it is likely that Kerma Nubians were living together with Medjayou/Pan-Grave people.
- Abadiya, T. E2, and cemetery X: five beakers and a Nubian vase, besides Egyptian ceramic from the first part of the Second Intermediate Period (Bourriau 1981: 34; Petrie 1901: 13ff., pl. 38; 45; pl. 40 cem. X).
- Karnak, Treasury of Thutmosis I: some sherds, dated to the Second Intermediate Period, with one beaker piece with white band (personal communication H. Jacquet-Gordon).
- Thebes, Dra 'Abou el-Naga: six beakers found with Egyptian pottery inside the tomb of a woman and a child, end of the Second Intermediate Period (Bourriau 1991: 132).

- Hierakonpolis : squared incised cooking pots, rims incised with squares or triangles (Kemp 1977: 291ff.; Adams 1974a: n° 291 et 293; Adams 1974b: 34/125, 39/186, 57/88, 58/123, 76/211).
- Edfu : cooking pots in the town of the beginning of the XVIIIth Dynasty, dated not after the reign of Ahmose; some are decorated with hatchings and crossing lines (Bourriau 1981: 34); others, published by Weigall (1907: Pl. 77; Michalowski 1938: Pl. 30), are decorated with crossed hatching and chevrons, as we can see from the drawings; so we can compare them to the Second Intermediate Period production of the Second Cataract region.
- Gurob: Brunton excavated two poor tombs, T. 77 and T. 86, containing two beakers, dated to the end of the Second Intermediate Period or beginning of the XVIIIth Dynasty by J. Bourriau; possibly tombs of egyptianized Nubians (Bourriau 1981: 32).

The Western Desert and the Oases

Among finds from Wadi Shaw no Nubian remains appeared, even if similarities were striking. In 1983, W. Schuck discovered at the base of tumulus 83/110-9 the sherds of a hemispherical cooking pot, with restricted opening and incised hatched triangles, similar to Middle Kerma and C-Group productions. The offering is dated to the Kerma period. Among the neighbouring tumuli, positions and orientations of the corpses vary considerably. C14 dating spanned the 4th to the 2nd millennium BC (Schuck 2002: 242-243). The bowl mentioned above, similar to a Middle Kerma one, is an isolated witness of relations between the Wadi and the Nile valley.

The Nubian objects discovered in the Oases could have come from the Middle Nile or have been left by Medjayou in case of their having stayed there (Redford 1970: 2). Relations with the Kerma kingdom are well attested, in particular at Balat and Ayn 'Asil. The site was still occupied during the Middle Kingdom under the authority of a governor whose duty was – among others – the surveillance of the roads. The Second Intermediate Period level is well known, as well as the existence of a large dwelling and a XIIIth Dynasty cemetery. The ceramic found include a dozen of Classic Kerma sherds and others, called "pan-grave" or Kerma. From the town derive several sherds of cooking pots, which could belong to Nubians of the valley. We probably can identify pottery of Middle Kerma or the beginning of Classic Kerma, notably usual settlement ceramic. All of them are hemispherical bowls with a restricted opening; one was impressed on a rounded mat and incised with triangles, and shows a reinforced bottom, dated Classic Kerma (G 20-7-1, n° 6/5); others could equally be dated to Middle or Classic Kerma (Baud et al. 1999: 1ff.; Baud 1997: 19ff.); n° 1347-141 (fig. 6/1) is a pot decorated with squared triangles (?) under a horizontal line; n°

1470-41 (fig. 6/2) is incised with squared triangles; n° G 20-10-74 (fig. 6/3) is incised with merging triangles; two bottoms are reinforced with fingers (G 25-2 and 74, fig. 6/6 and 7); and, at the end, a small fine pottery bowl, red and black-topped, with a small convex and thickened lip, occurring during Middle and Classic Kerma.

Other sherds, coming from excavations of the town, are similar to Kerma tradition. They are cooking pots, numerous in the south sector, decorated with incised patterns, reinforced bottom. They are dated to the beginning of the New Kingdom, but are well known since Middle Kerma. Two sherds of fine pottery of red and black-topped beakers were also recovered (Marchand & Tallet 1999: 326, 333, fig. 45).

The Canadian team in Dakhleh Oasis, discovered some sherds which can be linked to Kerma, for instance, in settlement 32/390-I 5-1, two so-called "pan-grave" sherds, associated with Second Intermediate Period pottery: bowls with black tempered fabric, light brown surfaces, one incised with hatched triangles below a horizontal line, the second incised with hatchings (Hope 1980: 287; Mills 1999: 225, 259). They probably come from Middle Kerma or beginning of Classic Kerma cooking pots. Another (not illustrated) Nubian sherd was found in the Old Kingdom cemetery 32/390-K 2/1: a restricted vase, with burnished interior and covered with a red slip. We are not able to attribute it to a precise culture, as well as other sherds like pots with fingers' prints under the lip, or with an internal finely incised lip, either A-Group or C-Group (Mills 1979: 172; Hope 1980: 237).

Nubians also visited Khargeh Oasis during the Middle Kingdom and the Second Intermediate Period, but finds are scarce. At Garn el-Gina, a "Libyan" settlement was discovered, a camp with artefacts and ashes. Sherds are of a dark grey to brown fabric and incised, very similar to the Nubian cooking pots with their hemispherical restricted forms; the lip is simple, the decoration incised, usually a net of squaring covering the upper part of the bodies. They are identified as Nubians by Caton-Thompson (1952: 40ff., fig., pl. 123), but could be Second Intermediate period C-Group.

There we also find mat-impressed pottery, made of a black or grey fabric, with red-brown surfaces, numerous in Yeba Pass; another ceramic is decorated also with incised patterns, both are not dated. According to Arkell mentioned by Caton-Thompson, these categories could be linked with medieval and post-medieval pottery, well known in Kordofan, Darfur and Wadi el-Milk (Caton-Thompson 1952: 42, pl. 123/1; J.C. Darnell 2002: 132ff; D. Darnell 2002: 165f.). Similar pottery has just been discovered during the survey of Southern Wadi el-Milk, done by the French Archaeological Mission around Zankor and Abu Sofyan.

Pottery from Bir Nakheila and Kurkur seems to belong to the Second Intermediate Period, in particular a horizontally comb-streaked bowl with an incised lip could be C-Group as this type is well known in Wadi es-Sebua but also, not so rarely, in Kerma settlements (D. Darnell 2002: fig. 6).

At Kurkur, Nubian (C-Group or Kerma) pottery was found inside huts: mat-impressed sherds are mentioned (D. Darnell 2002: 172). This sector could be a part of C-Group or Kerma territories during the Second Intermediate Period but the road between Khargeh and the Valley remained under Egyptian control.

At Alamt Tal and in Gebel Tjauti many Nubian sherds have been discovered; the excavators associate them with the desert police: Nubian sherds with a black fabric and burnished dark red surfaces from bowls and jars were found with Kerma beakers and mat-impressed sherds to be dated to the Classic Kerma (Darnell & Darnell 1996: 36ff.).

Mines and quarries

In Wadi el-Hudi, inside the XIIth Dynasty fortress, few Pan-Grave sherds have been found besides Middle Kingdom pottery (Shaw 2002: 247).

The Toschka/Gebel el-Asr quarries as well as in Khufu's quarries in the western desert (Kuhlmann 2002: 143; Kuper & Forster 2003: 25 ff.) did not, as far as I know, provide any Nubian sherd.

As shown by these earlier studies, Nubians from Kerma lived in Egypt at the end of the Second Intermediate Period and the beginning of the New Kingdom (end of Classic Kerma). They brought with them ceramics for their own use such as table ware and cooking pottery. Drawing the attention of the excavators to these will certainly lead to more being recorded.

During Middle Kerma, Nubians travelled through the western desert as far as the Oases. On the other hand, no Middle Kerma production is documented in the Nile valley, no table ware or storage jars. The dating of the cooking pots is still imprecise because they could have been produced and fired anywhere in primitive kilns without great skills of fabrication. Datable cooking pots seem to be similar to the Second Intermediate Period ones. Therefore trading roads could have been under Egyptian control. The Nile road in Lower Nubia is blocked by Egyptian forts and towns under the control of the army and of the vizir's administration. Goods from Egypt arrived at Kush, as well as at Kerma town and at smaller villages farther away, for instance Gism el-Arba. The transport of the, probably state run, trade was under Egyptian control. Middle Kerma people therefore used the routes via the oases and Wadi Shaw. Some arrived at Ayn 'Asil, but do not seem to intervene in quarry activities, where, if there was need of local labour, the workers must be related to C-Group culture.

It was during Classic Kerma times that the second cataract barrier (held before by the Egyptians) fell, when Kerma took control of Lower Nubia, and of the roads to Thebes and Avaris via the desert tracks and Dakhleh and also via the Nile road. The presence of Classic and Late Kerma people is evident in Upper Egypt and in the Delta.

This observation is in accordance with the Semna Dispatches, as well as with seals and sealings found in Nubia. At Mirgissa, Uronarti, Askut and Semna South other sealings (XIIth and XIIIth Dynasty) are proof of Theban domination and of the army involved in the administrative management of the fortresses. The Egyptian imports into Lower Nubia were of a restricted kind: some vases and their contents, perfume vases, amulets. Little by little, trade progressed into some southern trading-posts such as Beit es-Shetan in Kerma, or settlement 2 at Gism el-Arba (Gratien 2004: 74ff.). Classic Kerma Nubians adopted their own registration system with seals carrying geometrical designs or heraldic signs. In January 2006 a nice Kerma seal was discovered at Gism el-Arba settlement 2; it was incised with spirals and modelled in form of a ram's head; the design is Kerma without any doubt. Imports increased and became more diverse; they came from as far as the Mediterranean sea. Since the Middle Kerma period, Nubians took control over the traffic of precious goods coming from Subsaharan Africa. They exercised control of the Lower Nubian forts during the Second Intermediate Period. Possibly the cooking pots decorated with incised chevrons, large hatches or large squares found inside the fortresses, dated to the Middle Kingdom or Second Intermediate Period can be associated with these people (Gratien in press). Some of the Nubians reached the Egyptian capitals at the ends of the trading roads before becoming prisoners of the Thutmosids and before Kerma was sacked.

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Randi Haaland

Ritual and political aspects of iron working; iron in war and conflict

Introduction

Meroe has been referred to as the Birmingham of Africa because of the enormous slag mounds surrounding the ancient city (Sayce 1911: 55).

I have in an earlier article discussed the importance of the slag mounds both for dating and for an estimation of the extent of iron working which took place, based on the volume of the slag recorded (Haaland 1980; 1985). My approach during the 1980's was focused on the technology and economy of iron smelting, as well as political aspects. I saw the political control and monopoly of iron working as important ways for the ruling class to control not only means of production but also the means of destruction (Haaland 1985). What eluded me at that time was the importance of the ritual-symbolic aspects of iron working. I had observed that a temple was built on top of a slag mound, but my interest at that time was not to get an understanding of the symbolism surrounding iron working. However, if we look at metal working from a wider cross-cultural perspective one sees that it is generally entrenched with symbolic meaning and ritual activities (see also Barndon 2001; Schmidt & Mapunda 1997). I thus think that the ritual aspects of iron working have to be considered and it is in this light that I see the building of the temple on top of the slag mound. This will be discussed below.

Ethnography of Iron working

Ethnographic studies provide abundant accounts of the symbolism of iron, iron making, blacksmiths and iron products. We find the transformative aspects of iron working to be striking in these cross-cultural studies. My own ethnographic studies show that there is a wide variation in technology of smelting iron

(four case studies). There is variation in the technique of treating the slag from the use of slag-pits to slag tapping, to variation in the type of furnace super-structures. However, transcending the variation in technology is the strikingly similar symbolic and ritual activities surrounding the smelting. The blacksmith's role in the material transformation (ore to iron) is claimed to be a metaphoric model for social transformation (rites of passage). The act of smelting is looked upon as an act of reproduction. Inserting the tuyeres and the blowing of the bellows are seen as an act of procreation, the smith penetrating the furnace (woman) and fertilising it, the product is the bloom (the child). Ideas associated with smelting are thus closely related to general ideas about procreation and transformation (Haaland et al. 2002; Haaland et al. 2004; Haaland 2004; Haaland 2004).

The earliest archaeological evidence for iron smelting comes from the Near East, in Anatolia. It is apparent that the ritual and symbolic significance of early iron objects was more important than the productive-technological aspects. The first smelted iron (13th century BC) was used to make ritual objects and ceremonial weapons. These were high prestige material being produced in the palace or the temple (Pleiner 2000: 8). Even as iron was gradually produced on a much larger scale these aspects of metal working remained. It was a metal looked upon with fear and viewed as evil. It was primarily used as means of applying political control. Linguistic and archaeological data indicate that iron, at least in the early phases, was under direct control of the ruling groups, whether religious or secular and a monopoly of craft specialists which would have facilitated the control by the ruling groups related to the palace or the temple. Among the Assyrians in the 9th century the metal daggers of the rulers came to represent his army (Pleiner 2000: 9). The political control of iron is a dominant feature in the history of iron.

The ethnography of today and history of early iron working in the Near East shows the ritual and symbolic importance of iron. Iron thus appears to have qualities that everywhere seem to stimulate people to spin far-reaching webs of significance (Geertz 1973) around objects and activities connected with its production and use. Although there are variations there seems to be global structural similarities that are difficult to explain only as a result of diffusion of ideas or migration of people. In the following, I shall look at the iron and iron working from this perspective. By drawing on the ethnographic case studies I will explore the evidence for ritual and symbolic importance of iron production at Meroe.

Iron working at Meroe

The very extensive remains of iron working (Fig. 1), clearly show the importance of this metal, however the puzzle is the limited amount of iron



Fig. 1. Slag mounds east of the city of Meroe. Note that the railroad is cutting across the slag mounds (Photo Randi Haaland).

objects found from the Meroitic period. An early survey of the iron products was published by Wainwright (1945) and by Trigger (1969). Recently more general remarks have been written by Welsby (1996) and Edwards (2004). It appears that most of the objects recovered consist of small items such as light weapons and objects used for personal decoration, only rarely do we find tools of direct value for agriculture or for other forms of production¹. Few iron objects are found in the mortuary contexts, and it was only during the late Meroitic period that iron objects, iron tipped spears and arrows, became common in burials over a wide area. Arkell stated in 1966 that of the 1.500 graves at Napata which preceded Harsiotef (4th century BC) only 18 contained iron objects and they were small consisting of arrowheads, tweezers etc. At other Meroitic cemeteries, which date between the 2nd century BC and 3rd century AD, the single barbed arrowhead is the most prominent artefact, especially from the 2nd century AD.

More recent work during the 1990's has considered the scale of iron production at Meroe. An estimate of the quantities of slag in the area of Meroe suggests it might represent some 5000 tons of iron, or 2500 tons of finished metal iron objects after smithing. This might represent an annual production of perhaps 5-20 tons of iron objects over a period of 500 years (Rehren 2001). However,

¹ Mahmoud Mohamed Beshir is for the moment working on a catalogue of the iron objects in the Sudan National Museum. This important work will be the basis for a Master thesis at the University of Bergen.

archaeological finds of iron objects are very scarce and it is clear that the vast Meroitic iron industry is not accounted for in the graves, even if one considers the possibility that much material was recycled and discarded. One has to consider other explanations; I will argue that iron was an important object of trade, Egypt being a likely candidate for export; this will be discussed below.

There are very few dates on iron working. Slag from iron smelting was found in a level, which is C-14 dated to the sixth century BC. However, dates from furnaces point to the main part of iron smelting taking place rather late within the Meroitic period. (Shinnie & Kense 1982). The ore was found in the hills to the east (Fig. 2) where it occurs as a black crust on the surface of the sandstone, which actually covers a large part of the Northern Sudan (Trigger 1969). Tylecote (1970) analysed the iron remains and he assumes that the ore has been roasted and broken up in smaller pieces before being smelted. The hardwood acacia trees needed to produce charcoal for iron smelting would have been available in the area. Two millennia ago the environment and vegetation



Fig. 2. The Pyramids of Meroe in the background, flanked by the sandstone hills rich in iron ore (Photo Randi Haaland).

would have been significantly richer than what we see today, and the local environment of the Meroe region might be classified as low Woodland Savannah (Edwards 2004). The area which today is semi-arid and quite barren is, to a large extent, the product of human activities especially over-exploitation of trees which would have been related to charcoal production for iron smelting, but also to

overgrazing (Haaland 1985). The Meroitic iron-smelting furnace was dome-shaped, made of fired bricks. Surrounded by six pot-bellows, with two holes made for fastening two tuyeres to the furnace. The pot-bellows were probably covered with animal hide. The pot-bellows and tuyeres were made of the same type of clay as used for making household pottery. The tuyeres were used to force air into the furnace and the technique of tapping the slag was used (Tylecote 1982; Shinnie 1985).

The technology of slag tapping has been closely associated with Roman iron working. The furnaces seem to have been used repeatedly and the re-use is taken to indicate an organized specialist industry with a division of society into activity areas (Shinnie & Kense 1982). Iron smelting appears to have taken place within constricted areas as was pottery making (Shinnie and Kense 1982; Török:1979). The smelting furnaces and associated finds such as the roasting of the ore are enclosed by a brick structure. The location of iron smelting within the walled city of Meroe close to the palace suggests that the iron working was controlled by the state, and is also an indication of the importance of this work, which needed to be protected. The unpredictable attacks and raids of different groups especially the nomads in the area might have been a factor in placing the activities within the royal quarters.

As Tylecote has pointed out the iron smelting technique used during the early period, i.e. 6th century BC, would have been different from the later Roman slag tapping type (see also van der Merwe 1980 for further discussions and references). There is little evidence of the earliest furnaces, however, finds of bowl-like pits could either be remains of slag pits from non-slag tapping furnaces or from forging activities (Tylecote 1970 van der Merwe 1980). The increased importance of iron from around the beginning of the first millenium BC and onwards, is consistent with the use of a more efficient slag tapping technique practised in the Roman period. The slag tapping technique probably spread southwards along the Nile valley during the first century AD, when there was an active Roman military presence in Nubia (Shinnie 1967; 1985; Török 1979; Tylecote 1982; Welsby 1996; Edwards 2004). The older technique of using slag pits would have been introduced much earlier, during the 6th century BC, most probably also from Egypt (Arkell 1961; Kense 1985; van der Merwe 1980; Miller & van der Merwe 1994), or possibly from the Horn of Africa-via the Arabian Peninsula (Kense 1985; van der Merwe 1980; Miller & van der Merwe 1994).

It does not seem that the technique of tapping the slag was continued in use, nor did it diffuse to the rest of Africa until almost 1000 years later, and then only to rather limited areas (Chiticure 2005). As stated by Miller and van der Merve (1994: 9) "The iron smelting technique at Meroe relates to the Egyptian and Roman technology and appears to have no bearing on the development of

metallurgy in West or East Africa". What is recorded of iron smelting in the Sudan and adjacent areas of Ethiopia today is all based on slag pits (Haaland 1985; Haaland et al. 2004, a, b; Todd 1985; van der Merwe 1980).

Interesting work on Meroitic iron objects has been done lately by Abdu and Gordon (2004). They have analysed objects from the early to the classic Meroitic period (300 BC - 250 AD), and they suggest that these represent a distinctive iron making style which is not found in the eastern Mediterranean or in Sub-Saharan Africa, but rather suggests transmission of knowledge to Meroe from the east, from Arabia or perhaps India, by way of the Horn of Africa. They emphasise here the deliberate use of iron-arsenic alloys and piled metal, probably to produce distinctly decorated surfaces. The smiths achieved a high level of skill in the preparation of their metal and in the shaping of small, complex objects. They argue that the material suggests that iron-objects-knowledge might have been introduced via trade across the Indian Ocean. Several cultural features show Indian cultural influence on the Meroitic culture, and this has led Vercoutter to suggest that Meroitic art was "indianissant (quoted in Shinnie 1967: 114).

Centralised control



Fig. 3. The ruins of the temple of the war god Apedemak built on top of the slag mounds (Photo Randi Haaland).

I have in my earlier work (Haaland 1980; 1985) argued for a centralised political control of the iron production at Meroe; in this article I will make a case for the importance of temples in this production. Two factors are relevant to discuss here, first the role of temples in maintaining centralised control of the

production and thus the system of redistribution and secondly the ritual role of temples in this production. The location of a temple in the south eastern part of the city dedicated to the war god Apedemak (dated to 246-266 AD) on a slag mound is an indication of the importance of the temple in the ritual and political aspects of iron working (Fig. 3). Slag mounds are reported at a number of important Meroitic sites such as Kawa, Napata, and Argo Island (Fig. 4). At these sites the slag heaps occur in connection with a Meroitic temple (Trigger 1969; Wainwright 1945).



Fig. 4. Major Meroitic sites.

I discussed (1985) how the concentration of iron working in a specific area would have had a negative effect on the vegetation, and lead to deforestation of the trees needed for iron smelting. In economic terms centralisation implies that more labour has to be devoted to the transport of charcoal to the smelting sites, than would have been the case under a decentralised system. Both ecologi-

cal and economic consideration would thus seem to favour decentralisation. There must have been very strong forces working in the other direction. The hypothesis is that these forces are found in the field of politics. The early savannah states were significantly based on military technology where iron products played an essential role (Goody 1971: 46). Control over the supply of these iron weapons depended on supervising and controlling the actual process of iron production, not in controlling the raw material: iron and charcoal, since this is readily available in the area. From the point of view of a central government this must have been a critical problem. On the one hand the raw material for iron production is in abundant supply and the technology used in iron production can be readily applied on a small scale without any additional resources. On the other hand decentralised use of this technology may imply a direct danger to political control since the weapons produced are a political source of locally decentralised power. Control over iron production would have been important to the central power, but the task of achieving it is difficult since once the technology is known it is simple to maintain. It is expected that such a technological situation would favour development of a wide range of institutional mechanisms – which served the interest of the central government.

The centralisation of the slag remains from Meroe is consistent with this interpretation. However the slag remains do not show the mechanisms involved. I have argued earlier (1985) that the development of forms of belief and institutions which set the blacksmiths apart from the other subjects of the state makes it easier for the central government to control the use of the iron producing technology which has to be controlled and that these belief forms were related to caste. The closer the association between the iron producing activities and the blacksmiths caste-like identity is and the more the ideology degrades the caste, the more constraints there would be on interaction between blacksmiths and other people, and the more one would expect the blacksmiths to be directly dependent in relation to agents of the central power. The hypothesis is thus that the stigmatisation, which is manifested in the caste-like division of labour, emerged in connection with political centralisation and a redistributive system of circulation of specialised goods and services.

I thus see that the iron working could have been based on a caste like division of labour that we can still observe among blacksmiths in Sudan, Ethiopia and in the savannah area. I will argue that the Kingdom of Kush was based on a strong centralisation of the production of iron, a centralisation that must have had as a consequence severe deforestation. An important question is the implication this ecological deterioration had for the centralised political power. I have previously argued (Haaland 1985) that this was one factor of many in the decline of the kingdom of Kush.

Ideology-rituals

As mentioned above a temple dedicated to the war god Apedemak, dated to the 3rd century AD is built on a slag mound at the south-eastern part of the ancient city of Meroe. In the political control and monopoly of iron working I see the temple manifested by the god Apedemak as ideologically and ritually important in legitimizing the political power. The temple could have been important in the investiture of the king, in his initiation into his new role. Ethnographically it is striking that cross-culturally one finds that the symbolism of iron working to a large extent occurs in social life - most importantly to status transformation. Such transformations, particularly by initiation into a new role, implies that a continuity in the community's status structure is brought about by the transformation of individual status (Haaland et al. 2002; Herbert 1993; de Maret 1995; Reid & McLean 1995; Sassoon 1983; Childs 1991; Schmidt 1997; Schmidt & Mapunda 1997). In our ethnographic studies of iron smelting it was obvious that the activities involved took place in contexts of techno/practical concerns as well as in contexts of symbolic meanings. Iron production can be seen as a kind of ritual where the transformative character of the activities, transforming ore to iron - nature to culture - is a complicated process. To be successful one has to perform certain rituals/magic to be able to succeed. A range of ritual is found in the whole technological process. From this perspective it is tempting to see the building of the temple on the slag mound in Meroe as a manifestation of rituals of iron smelting.

The lion god Apedemak is a Meroitic god that is mainly seen as a god of war (Žabkar 1975). We can see this in the iconography where Apedemak is presented with weapons, which are first and foremost the bow and arrow (Fig. 5), but also the spear and sword. A graffito on the temple wall at Musawwarat es-Sufra shows Apedemak dispatching large single barbed arrows, from a composite bow, into the back of a fleeing army (Hintze 1979: fig 3; Welsby 1996: 42). Within the same temple Hintze recovered several fragments of iron objects during his excavations in 1960-1961. Most interestingly are iron fittings and nails probably originating from a box, which contained the point of an iron spear. It is alluring to see these as votive offerings. The ritual significance of iron is also evidenced in iron being used in foundation deposits. The foundation deposits were a common feature of early Kushitic ritual and followed standard Egyptian practice. The objects were placed in pits dug under corners of buildings or tomb monuments. It is worth noticing that some of them were iron objects specially produced for this function (Welsby 1996: 19). They have been found in early contexts such as the foundation deposits beneath the pyramids at Nuri at the time of Harsiotef, 404-369 BC (Welsby 1996: 170).

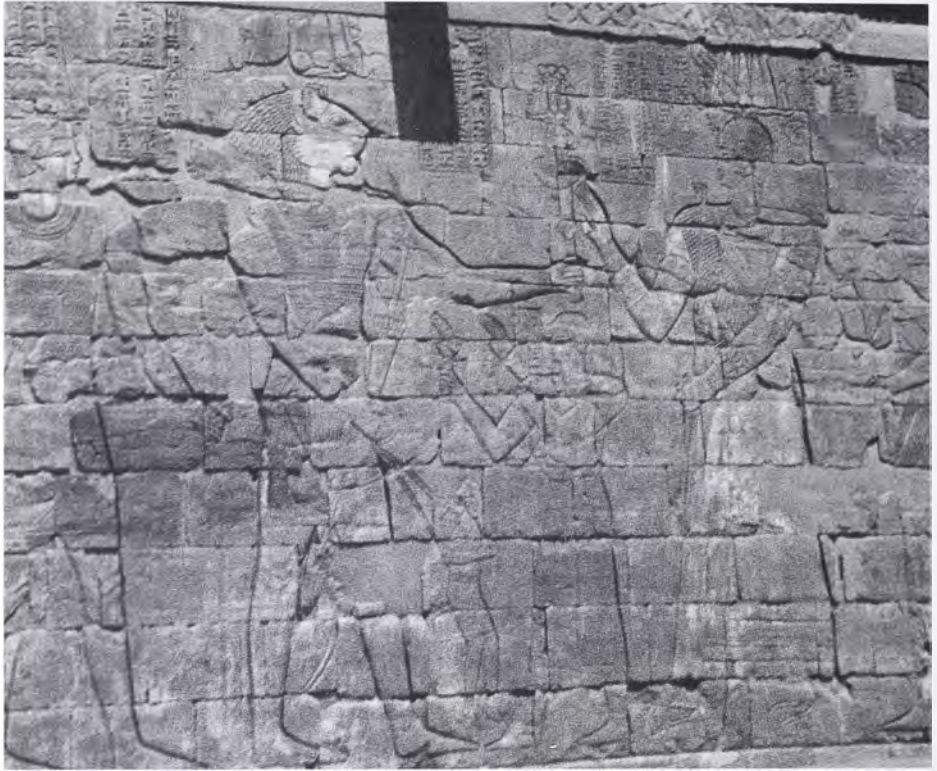


Fig. 5. The war god Apedemak holding a bow and arrow in one hand and a cord of prisoners in the other. Relief from the south wall at the temple at Musawwarat es-Sufra (Photo Randi Haaland).

Iron was very rare before the 6th century. An iron spearhead found in the tomb of Taharqo (690-664 BC) is wrapped in gold foil, indicating the very special nature of iron². Swords are depicted on temple walls, famous is the relief found at Jebel Qeili of king Shorkaror (20-30 AD), which shows him slaying the enemies holding a large spear and a quiver full of arrows. From his left shoulder there is a band from which hangs his long straight sword. He thus carries the sword in the same way the Beja and other tribes of the Sudan still do today (Hintze 1959; Shinnie 1967: 51). Hintze suggests that this scene could be a glorification of a Meroitic victory, against an attempted advance of the Axumites. A

² The dates used here are based on the list of rulers presented by Derek Welsby (1996) in his Appendix pp. 207-209.

similar scene is depicted on a sandstone plaque showing prince Arikhankharer (1-20 AD) slaying his enemies; the sword is carried in the same manner as referred to above.

The weaponry recovered from graves show the evidence for archery to be overwhelming, and indicates the importance of this in the Kushitic army. The arrowheads take a variety of forms; they are mostly tanged, with one or two barbs. Remains of bows have been found in the tomb of queen Amanikhatahan (62-85 AD) at Meroe. Examples of spears are frequently found in graves, and rare examples of swords (Welsby 1996: 42). A man buried with late Kushite pottery at Wadi es-Sebua, was found with an iron arrowhead lodged in his thorax. Two other individuals, who seem to have met a similar fate, were buried in the cemetery at Karanog (Welsby 1996: 41).

The iconography related to sovereigns and similarly to the god Apedemak underlines weapon and warfare, combinations of weaponry such as bow and arrows, spears and swords Török (1987). But as the discussion above illustrates the most prominent weaponry is the archery. An important scene is from the Lion Temple at Musawwarat es-Sufra where the king is elected by the ram headed Amon, which holds the bow and arrow in his right hand (Török 1987: fig. 29a). The relief of Apedemak shows him holding a bow and arrow in his left hand and a cord to which a prisoner is tied. As Shinnie expresses "His whole appearance as well as his equipment suggests strongly that we have here a warrior god of extreme importance" (Shinnie 1967: 142). Millet (1980) sees the god Apedemak first and foremost as the king's own god, a male deity par excellence, worthy of worship by a warrior king. Other reliefs show the rulers depicted with archery such as queen Shanadakheto (second century BC) and queen Amanishakheto spearing her enemies with weapons consisting of a bow and arrow, besides a long spear (Török 1990: figs 36, 38). The interesting iconography here is that weapons are associated both with male and female rulers (fig. 6), an indication of the dual nature of iron. Lenoble has looked at the representation of weaponry and found these to be quite abundant upon funerary chapel walls. What seems to be changing over time is the appearance of smiting scenes, stressing the military functions of the kingship. The stele of Harsiotef records a number of campaigns in which the king sent out his bowmen to do battle, the inscription also mentions the use of horsemen (Welsby 1996: 40). This seems to become increasingly important during the late Meroitic period, and Reliefs on the pylons of the Lion temple, Naga (Lenoble 1990: 253).

To sum up: important royal insignia were the sword, the spear, and arrows which are depicted on pyramid chapels and temples (Török 1990; Lenoble 2004). The large numbers of arrowheads found at Faras, Karanog, and Meroe in late Meroitic times may be seen to reflect the role of the central government in main-

taining security in an increasingly troubled period. It is only after the decline of Meroe that iron became a wide spread technology (Mapunda 1997; Trigger 1969).



Fig. 6. Reliefs on the pylons of the Lion temple, Naga. The king Natakamani to the left and the queen Amanitore to the right. The queen is holding a sword both in her right and left hand, while the king is holding an axe in one and a sword in the other hand (Photo Mahmoud Suliman Beshir).

We also know from written sources that the Meroites were threatened by war and rebellion. Strabo (25-21 BC) writes about the war between Meroe and the Romans during the office of Gaius Petronius as Roman prefect of Egypt. Pliny in his *Natural History* (VI. 35) gives an account of the campaign of Petronius, here he refers to a group of Praetorian troops which had been sent to Ethiopia by the Emperor Nero in about AD 61 (Shinnie 1967: 20). There is the account of King Aezenas, where he describes the defeat of Meroe by an Axumite army in 350 AD. The significance of this inscription has been much debated both in terms of whom they were fighting; as well as the time this happened (Shinnie,

1967: 52-54). However there can be little doubt that the Meroites had a strained relationship with the Axumites and that there were several conflicts as the reference to Hintze's interpretation of the scene depicted at Jebel Queili above indicates (Hintze 1979). Another major threat to the Kushite state has been posed by the nomadic raiding parties (Welsby 1996).

What comes across as an important part of the Meroitic political setting was war and conflict. The success of the Kushite army was attested by the survival of their state for over a thousand years. Without an efficient military force it is unlikely that this would have been achievable. My suggestion is that this was made possible not only by the large amount of iron being produced into weapons but most importantly that this was related to the centralised control of iron production. Hence we see the large slag remains, as evidence of large-scale iron working taking place in connection with the palaces and temples. The special activity areas related to iron production (and pottery production) are taken as an indication of the activities being restricted to people with a caste like identity. In this context it is apt to mention some interesting iron objects recovered at the town site of Meroe, which can be used in support of this argument. These were iron strips formed into an unusual shaped object, which may have been a standard placed on the end of a pole, in shape similar to some pot-marks, possibly used as royal property emblems (Shinnie & Kense 1982). If these were indeed markers of royal property it is a strong indication of royal monopoly of goods probably used in royal exchange.

Iron symbolism is ambiguous as it is associated with contrasting ideas - destruction versus production. In many of the great civilisations, it is the destructive (not the productive) forces that people generally associate with iron. The general impression is that iron tends to be associated with males with strength (physical as well as mental) and dominance. Interestingly iron objects predominantly are also associated with evil forces. On this background it is intriguing that iron-smelting activities are generally metaphorically associated with sex and reproduction. It is here worth mentioning that Apedemak the god of war was also seen as the god of fertility and provider of food (Žabkar 1975). The ritual significance is manifested in the temples being localised on slag heaps. Activities and tools connected with iron almost everywhere seem to be symbolically loaded. Iron symbolism is ambiguous as it may be associated with contrasting ideas - destruction versus production, death versus birth, male versus female.

Trade

Trigger (1969) argues that the Ptolemaic accession in Egypt was marked by an intensification of trade that resulted in increased prosperity, cultural florescence, and strengthened royal authority in Egypt, and the Sudan. Trade with

Egypt continued to flourish and probably expanded into the early period of Roman rule. The rise of Axum as a major trading state, which had access to sea-ports along the southern coast of the Red Sea gave them an easy access to trading partners in the North. However Edwards (2004) has pointed to the marked absence of references in Egyptian texts (of this period) to trade or other contacts with Meroe itself (Edwards 2004: 167). On the Meroitic side there is abundant evidence for long-distance exchange. Most of the material comes from burials. Imports include mainly metal vessels (especially vessels for serving-display), jewellery, worked stone, glassware, faience and a wide range of ceramics as wine and oil containers (Török 1989; Edwards 2004: 167-168). The distribution of imports suggests that most foreign artefacts entering the Meroitic culture were being distributed through an elite network, probably royal. This type of exchange would most likely have been a royal monopoly. During the previous Napatan period most trade contacts seem to have taken the form of "Embassy Trade", a form of elite gift exchange widely encountered in the Mediterranean and Near Eastern World. It was apparently the case during the earlier Napatan period. Such exchange seems to have continued during the Meroitic period, linking the Meroitic kings with successive Ptolemaic and Roman rulers.

Edwards (1999) argues that the real economic power base of the Meroitic state lay in trade, while subsistence economy had relatively little surplus producing capacity. This has also been emphasised by Adams (1981) who sees the wealth and power of the Meroitic state being founded on the commercial rather than the agrarian base. Obviously some surplus production had to be available for the support of the royal palaces and specialists. The agriculture did not seem to have been founded on irrigation but on swidden agriculture (the Saqiya, the water wheel, was introduced at the end of the Meroitic period). The economic interest of the state was not based on productive processes. Edwards dismisses the idea of the presence of an administrative hierarchy or landed estates (royal or temple estates), he sees the state power as founded to a large extent on long-distance trade (Edwards 1999: 315).

Although the historical sources are almost non-existent, elephants, ivory, ebony and gold have been suggested to be important exports (Edwards 2004: 167-168). I will add a fifth item which I will argue to have been of crucial importance, and this is iron. Iron was a scarce commodity in Egypt, related both to the scarcity of charcoal for smelting and to ore, which both were present in abundance around Meroe. Arkell (1966) suggested that ore was imported to Egypt, Shinnie and Kense followed this up in 1982 where they argued that much of the iron objects in Egypt probably came from imported iron, smelted elsewhere, but forged in Egypt since there are hardly any remains of iron smelting. An indication of the importance of iron used as tributes to Egypt is attested from

later periods. From the 14th century the tribute from the kingdom of Makuria (Dongola) to Egypt consisted of lances, besides slaves and wild animals (O'Fahey & Spaulding 1974: 17). This suggests the importance of iron weapons, although the armoury seems to have changed from the Meroitic time with an emphasis on archery to lances and spears. Edwards (1999), argues that iron occupied a central place in the Meroitic state, as it was the case in the development of early states across Sudanic Africa. Edwards (1999) sees the kingdom of Meroe to have shared many of the characteristics of other early savannah states of the Sudanic zone. The trade goods consisted of luxury goods such as imported wine, glass, and metalwork. This type of trade formed an important part of a wider prestige-goods-economy of exotic artefacts which was controlled by the crown and redistributed through the elite and formed the cement that bonded the political body together. With redistribution through the elites, they created and maintained political ties. The collapse of royal control over long-distance trade and the prestige goods it gave access to, would have had a significant effect to the political cohesion of the state (Edwards 1999).

Conclusion

To sum up, the early savannah states like Meroe were significantly based on a military technology in which iron products played an essential role. The political control of those products was thus very important. Iconography and burial finds show the significance of iron objects related to the elite-rulers. Iron was also of ritual significance as we see manifested in the temples being localised on slag heaps. Iconography on temples, pyramid chapels and grave finds emphasises iron objects. These are in contexts of transformations from living to dead, and most importantly in the investiture of rulers.

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Margaret Judd

Jebel Sahaba Revisited

Jebel Sahaba (Site 117), a cemetery near the 2nd Cataract, was excavated in the 1960's, under the direction of Fred Wendorf during the UNESCO salvage years. The skeletal remains, artefacts, and organic samples were shipped to Southern Methodist University (SMU) in Texas where they were housed for nearly 40 years. Following his retirement, Professor Wendorf generously donated these collections and his extensive archive to The British Museum in 2001; the skeletal collection arrived at the museum in March 2002. The skeletal collection, dated to 13,740 +/- 600 BP (Pta-116), basks in the notoriety of representing the earliest evidence of collective violence due to the presence of cutmarks, embedded and associated lithics, and parry fractures. Because of these observations, it was thought that living conditions in Nubian society were particularly violent and stressful during this period, perhaps due to environmental pressures caused by climatic change.

Since Anderson's original skeletal assessment in 1968, new methods of developing the osteological profile have emerged, as have methods of epidemiological and paleopathological evaluation. Upon arrival at The British Museum, the skeletal collection was inventoried and reassessed using current macroscopic standards. This paper summarizes the results of the reanalysis.

The Context

Site 117 was a cemetery site located 3 km north of Wadi Halfa, about 1 km east of the Nile, near a sandstone inselberg called Jebel Sahaba, a much more memorable name than Site 117 (Fig. 1). The burial pits were fairly close to the surface, as deep as 35 cm, and the majority were covered with stone slabs. Burials were discrete or multiple interments and most individuals were laid on the left side, head to the east, facing south; the hands were to the face and the body flexed. AMS dating was attempted to refine the earlier date obtained from



Figure 1: Map of Nile Valley showing location of Jebel Sahaba.

the first carbon sample, but was unsuccessful due to the interference of the consolidants used in the original reconstructions.

Inventory of Individuals

In general the bones were in 'fair' condition with some weathering (Judd 2001). Most of the long bone epiphyses were broken or damaged, as were those of the metacarpals and metatarsals. Very few small bones of the skull, hands or feet survived, while the ribs and vertebral columns were fragmentary at best. More than one individual was interred in eight of the Jebel Sahaba burials and in many cases, the small bones of the vertebrae, hands, feet, ribs or fragmented long

bones of the single and multiple interments were commingled. Individuals that were interred together were laid out simultaneously to ascertain whether any bones were mismatched or whether segments of one individual conjoined with that of another. In most cases the commingled bones were easily sorted as the individuals were distinct with respect to robusticity and age (e.g., 117-13, 14). When additional individuals were identified, they were treated as a separate entity and a letter was used to differentiate the skeletons in each burial context. For example, in Burial 11 the bones of two additional individuals were discovered: the original identified burial became Burial 11A and the other two burials were coded Burial 11B and 11C.

Demographic Profile

Anderson's (1968) skeletal analysis adhered to methods recommended in Montagu's (1960) introductory text for physical anthropology. Biological sex was determined from the skull, pelvis and long bones. The age of subadults was attributed by dentition, but no alternative methods were mentioned for children lacking teeth. The age categories for adults were young, middle and old, but the range of these ages was not stated. Anderson (1968: 996) mentioned that methods of aging were unreliable and that the pubic symphyses were too damaged to be useful in age assessment; a dental wear scheme created by Anderson (1968: 1021) may have been employed to assign age-at-death. Anderson estimated stature from formulae created by Pearson as well as Trotter and Gleser, but no references were referred to.

Biological Sex

Ideally the pelvis is the preferred bone with which to establish the individual's biological sex, however, in this collection no complete innomates survived and relatively few diagnostic features were retained on the broken fragments. Fortunately, many of the skulls were intact, which allowed for a reliable sex assessment. The more ambiguous long bone dimensions and a subjective robusticity evaluation determined biological sex in the absence of the skull and pelvis.

Sexually dimorphic characteristics of the skull and innominate suggested by Buikstra and Ubelaker (1994: 16-21) were scored. The pelvic diagnostic features consisted of the identification of a ventral arc, the concavity of the subpubic concavity, the breadth of the ischiopubic ramus, the angle of the sciatic notch and the intensity of the preauricular sulcus. The diagnostic features of the skull are associated with size, that is, the more robust the feature, the more likely the individual is male. Features examined included the nuchal crest, the mastoid, supraorbital ridge, glabella and mental eminence. Each feature was scored out of '5' with '1' denoting a female and '5' being male. An average score was calcu-

lated for each element, and then the elements were averaged. Generally, individuals scoring '2.5' or less were assigned as female, and those scoring greater than '3.5' were assessed as male.

Metrical measurements defined by Olivier (1969) and Bass (1995) were taken from the femoral head, bicondylar width of the distal femur, humeral head and radial head to augment the more reliable data or to suggest the biological sex in the absence of the skull and innominate.

Age-at-death

The determination of the adult age-at-death was similarly complex as the diagnostic features that degenerate with age were poorly preserved. When possible an age category was assigned based on the deterioration of the sternal rib end (Loth & Iscan 1989), auricular surface of the innominate (Lovejoy et al. 1985), and pubis (Suchey et al. 1986; Todd 1921a, b). The sternal rib end method is preferred by forensic anthropologists as there is little weight-bearing and activity on the ribs that may facilitate joint degeneration and deceptively overage the individual. Archival images revealed that ribs were observed during when the skeleton was exposed, but only a few fragments survived excavation and shipping. Therefore, age-at-death was determined primarily by the degeneration of the pelvic auricular surface and pubic symphysis. The age categories were assigned as follows:

Youth	<25 years
Young adult	25-35 years
Middle adult	35-50 years
Old adult	50+ years
Adult	undetermined

Aging by dental wear has been controversial in the past as genetic factors, diet, environment, and cultural activity influence the wear pattern between cultures. Mays (2002) has shown that dental wear is an effective method of assessing the relative age within British populations and in many cases dental wear aging was found to be equally as reliable as the degenerative techniques associated with the ribs and innominate. In order to assign an age category to individuals who did not retain diagnostic postcrania, correlations between postcranial aging and dental wear were developed. In this skeletal collection, the age category was established from the postcrania of 24 adults who also retained dentition. The maximum dental wear scores calculated for the first molars (Smith 1984) were sorted into a continuum of individuals exhibiting lowest to highest

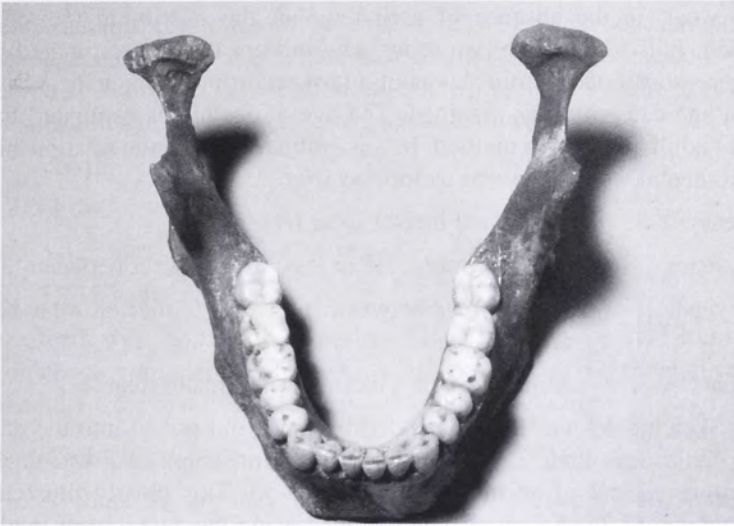


Fig. 2: The dental wear of an individual less than 25 years of age shows slight dentin exposure on the first molar dental cusps and anterior teeth.



Fig. 3: The dental wear of a male individual between 35-50 years of age shows complete removal of first molar cusps to expose the dentin, but enamel rim remains. The anterior teeth are similarly worn.

dental wear; in the absence of a first molar, the maximum incisor wear was recorded. Individuals with dentitions who did not have an estimated postcranial age were positioned within this continuum according to their dental wear score and an age category was assigned. The age-at-death was estimated for nine additional adults using this method. In this Nubian sample, the relationship between age and dental wear score was as follows (Fig. 2, 3):

<25 years	Molar and incisor wear less than '3'
25-35 years	Wear on molar '5' or less; incisor wear between '3' and '5'
35-50 years	Molar wear between '6' and '7'; incisor wear between '5' and '7'
50+ years	Molar wear '8'; incisor wear greater than '6'.

Skeleton 48 was the only individual who did not fit into the pattern. This young male, less than 25 years of age based on epiphyseal fusion, had dental wear more typical of an individual aged 35-50. This clearly illustrates that an incorrect age-at-death may also be assigned using the dental wear method, but as Mays (2002) argues, the other standard methods used to determine skeletal age are equally problematic.

Stature

It is preferred that stature be calculated from the leg bones, preferably the femur and tibia if both are present (Trotter 1970). Though not as reliable, the bones of the arm or fibula can also be used, in the absence of those of the lower body. Stature was calculated using the regression formulae created by Trotter (1970) for Afro-American males and females. In some cases complete long bones were absent and other less conventional methods were implemented. Steele (1970) devised formulae that determined the stature of individuals from fragmentary portions of bone defined by specific landmarks. In this investigation humeral segments 1 and 2, according to Steele (1970), were measured in the absence of the complete long bone and the regression formulae for Afro-American males and females were applied. When long bones or their appropriate segments were unavailable, stature was determined from the metacarpals (Meadows & Jantz 1992) and metatarsals (Byers et al. 1989). Stature was established for 42 adults, while Anderson's (1968: 1024) previous assessment presented a mean stature for nine males and three females only, which was 176.9 cm (range 168-184.8 cm) and 167.5 cm (range 162.8-174.3 cm) respectively.

Sub-adults

The sub-adult remains were extremely fragmentary and very few complete bones were present. A reliable macroscopic method to determine a child's sex

from skeletal remains continues to be elusive, however, age determination is much more dependable than the adults, particularly from the dentition. Dental age was scored according to the eruption sequence presented by Ubelaker (1978: 47) and the subadult age cohorts were assigned as follows:

Foetal	<birth
Infant	birth-3 years
Child	3-12 years
Adolescent	12-18 years

When teeth were absent, the lengths of long bones were used to estimate age based on charts compiled in Scheuer and Black (2000). The skeletal remains of eight subadults were identified: three infants and five children.

The Current Collection

There is some discrepancy between Wendorf's (1968) and Anderson's (1968) reports concerning the presence of skeletal remains. Wendorf reported the presence of skeletons in the field, but Anderson did not assess all of these individuals during his analysis. It is likely that the bones were in such dismal condition that they were not shipped back to SMU or were lost between their excavation and analysis the following year, as Anderson offers no comments concerning these individuals. These skeletons were:

8905-1	Bones not favourable for study (Anderson 1968: 1008).
8905-13	No material recovered (Anderson 1968: 1008).
8905-15	No comments.
8905-16	No comments.
8905-17	No comments.

One skull, labelled 'X', had no provenience, while the skull of another individual actually was part of neighbouring body. The number of individuals available for research from Jebel Sahaba site now consists of 13 very fragmentary children and 46 adults. This includes two newly identified infants from Burials 11 and 101 and an additional adult from Burial 101. There are 24 females and 19 males over 18 years of age and the biological sex and age of the remaining three adults is questionable.

Overview of Health

Originally assessed as being perpetually violent and stressed, a systematic analysis of the skeletal material proved quite the contrary. While violence was indeed indicated at the time of death for some of these individuals, that these

people lived in a stressful and violent society remains to be questioned. Evidence of macroscopic skeletal stress is typically found in decreased stature, dental health, infectious disease and trauma.

Stature

In the original assessment, stature was determined for nine males and three females. Since then, stature formulae have been created for partial long bones, the bones of the hands and feet among others as described above. Because very few completely intact long bones survived, these new formulae were utilised to give an estimate with a standard deviation equivalent to that of an intact arm bone or fibula. Stature was calculated for 18 females 25 years of age and older and 17 males. These results were perhaps the most revealing of this investigation to date. During this evaluation, it was observed that the bones were fairly robust - even the females were not particularly gracile. The male and female statures were significantly different for the sample with the average male height at 171 cm and the average female height at 161 cm. When these means were compared to those of skeletal samples from the later Badarian and Dynastic periods, the mean stature of the Sahaba group, far from representing an undernourished, impoverished group, was much greater than the mean stature of the individuals from the following periods presented by Zakrzewski (2003). Had the individuals experienced periods of nutritional stress during growth due to environmental or social factors, the mean stature would be expected to have been much less.

Dental health

Stress experienced by a growing individual can also be observed in the teeth, at least until the individual reaches 12 years of age, when all of the permanent dental crowns are fully formed but not yet erupted. The results of the original dental analysis were upheld - only one individual, Skeleton 35, exhibited dental enamel hypoplasia - linear grooves on the incisors that indicate a disruption in the production of enamel forming material due to a period of stress (Fig. 4). Because enamel does not remodel as bone does, it provides permanent evidence of growth disruption in contrast to the growth disruption lines formed in bone (Harris Lines) that tend to vanish with age due to bone remodelling (Aufderheide & Rodríguez-Martín 1998). It is noteworthy that the stature of this individual was calculated to be 168.6 +/- 5.19 cm (based on the left third metacarpal), which was below the male mean; no other visible pathology was observed.

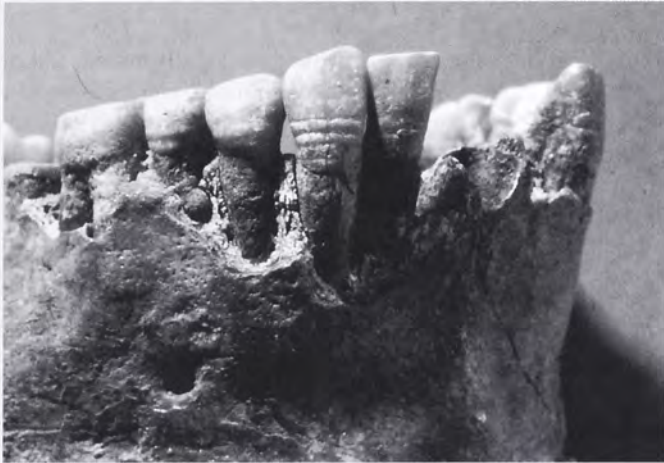


Fig. 4. Thin bands of linear dental enamel hypoplasia are located on the right mandibular second incisor, canine and second premolar.

Infectious and Metabolic Disease

Acute childhood infectious disease causing death is a standard indicator of poor health, diet, hygiene, living conditions, and sanitation in any society, modern or archaeological. In a cemetery sample we would expect to see a high proportion of infants less than five years of age, similar to the population pyramids of a developing society. In contrast, the demographic distribution of this sample was top heavy, with 12% of the group being five years of age or less. Though remains were scarce, 127 permanent teeth were recovered from the eight older children - there was no evidence of dental enamel effects in any of the dentitions and recent developmental stress among the recovered sample was not indicated.

An iron poor diet or parasitic infection is manifest in bone as porotic hyperostosis or cribra orbitalia, which are represented as a lacy lesion caused by an increase in the marrow production of red blood cells that causes bone to expand and expose the trabecular bone (Aufderheide & Rodríguez-Martín 1998). While this condition was endemic among children along the Nile River during the much later Meroitic and Christian periods (Judd 2004; Van Gerven et al. 1990), there was no evidence of these lesions among the children or adults. Non-specific infection was minimal on the leg bones of three individuals, and secondary to trauma on the skull of a fourth person.

Trauma

Trauma was much more frequent than originally noted, although minor and mundane in most cases, for example, 19 injuries were observed among the hands and feet. The most common injury was a healed slash on the head of a second or third hand phalanx, perhaps caused by a slipped lithic blade during faunal butchery. Skull injuries were particularly difficult to evaluate as most of the breaks were reconstructed and the skull finished with clear shellac. Eight individuals bore a small round vault lesion less than 1 cm in diameter, while one person had a healed linear depression - no injuries were observed on the face, but this was the area most frequently repaired. All injuries were well healed and bore no complications. No new injuries to the forearm were found, although a quantitative assessment using diagnostic fracture criteria (Judd 2002) was possible which determined that one of the originally observed injuries, the ulna and radius combination, was due to indirect rather than direct force trauma, likely resulting from a fall. The other seven ulna injuries, three of which belonged to one individual, were the result of direct force trauma, typical of parrying a blow (Fig. 5). The frequency of individuals with forearm parrying fractures was 10.9% (6 out of 46 individuals), which was identical to that of a sample from the Kerma Ancien sample (Judd 2001) and less than that of a sample from Medieval Kulubnarti (Kilgore et al. 1997). Injuries associated with fending off a blow were no more frequent among this sample than among other groups. Because these injuries were well healed, previous interpersonal altercations are indicated well before death and this group was therefore not unfamiliar with physical aggression.

The presence of cut marks and embedded lithic chips found in some of these bones makes the collection unique as it represents the oldest known evidence for collective violence. Small embedded microliths were originally observed in the remains of six individuals. Two new embedded chips were discovered in the right pelvis of Skeleton 21, who previously exhibited two lithic chips in the left pelvis. In all but one case, the lithics were reported to be embedded in the vertebrae or pelvis and with one exception, these individuals also bore one or more cutmarks. Cutmarks were more prevalent, but sometimes dubious, often resembling gnawmarks. As noted in the original assessment, the femur was most frequently affected, likely in order to sever the hamstrings and prevent escape. Cut marks or notches were noted on 12 individuals, five more than previously. Nine of the cases involved the femur (Fig. 6). It is indeed unfortunate that the bones with embedded lithics were not found among the skeletal collection upon arrival at The British Museum; a few archival images and descriptions in the original publications (Anderson 1968; Butler 1968; Wendorf 1968) are the only surviving evidence of these very important injuries.



Fig. 5. This group of ulnae exhibit middle and lower shaft healed 'parry' fractures that are associated with fending a blow. Note that there is little longitudinal deformity along the bone's axis, a typical feature of a transverse fracture line.



Figure 6: The posterior view of a right femur shows a small cut mark below the lesser trochanter. (right)

Every effort was made to locate Anderson's original notes and data collection sheets from the 1968 skeletal analysis by contacting his former students and colleagues who came into possession of his archives and collections, but the search proved to be unsuccessful.

Conclusions

The purpose of this report was to present the Jebel Sahaba skeletal collection in its current state in order to provide potential researchers with information concerning the collection's location, condition, demographic statistics and paleopathological overview. Bioarchaeologists interested in integrating this collection into their research design, and they are encouraged to do so, should contact the Department of Ancient Egypt and Sudan at The British Museum.

Acknowledgements

Claire Thorne and Sandra Marshall of The British Museum are thanked for their graphic illustration and photography, respectively.

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Derek A. Welsby

Two unusual monuments in the Northern Dongola Reach of the Nile, Sudan

During the course of the survey conducted on the east bank of the Nile in the Northern Dongola Reach on behalf of the Sudan Archaeological Research Society between 1993 and 1997 two unusual monuments were discovered. Here the nature of these monuments will be briefly discussed and suggestions made with regard to their function and possible parallels.¹

Both are distinctive and unique monuments within the survey concession which covered an area of approximately 930 km² (Pl. 1). They occupy the same position relative to the local topography, set within a few metres of the steep slope leading down from the desert plateau to the wide alluvial plain of the Nile Valley. As such they enjoy extensive views over the valley and are readily visible. Although only 1.5 km apart there is no suggestion that they are in any way associated and they are not the only monuments to occupy a similar position. In their immediate vicinity are a number of cairns and what may be hut circles.

The northern monument, designated site P35 (Fig. 1), consisted of a prominent sub-rectangular mound ca. 10 x 8 m in size and about 1.5 m in height. In the centre is a cairn 1.5 m in diameter and 0.5 m high. The whole appears to be formed of a mass of rough pieces of stone. There was a hint that the mound may be the collapsed remains of a rectangular structure but this is far from clear. What is highly unusual about this monument are the features extending from it to the east (Pl. 2 and 3). At the west end, first visible among the stone blocks of the mound under which they apparently extend (they presumably only extend under the rubble collapse from the mound/structure rather than pre-dating its

¹ The author would like to thank Dr Donatella Usai for reading a draft of this article and making a number of helpful suggestions,



Pl. 1. The location of sites P35 and P26 in the Northern Dongola Reach.

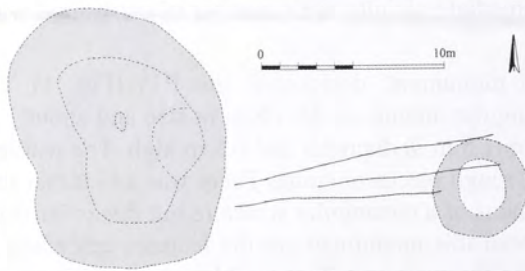


Fig. 1. The monument P35 in the Northern Dongola Reach.



Pl. 2. The monument at P35, general view looking west.



Pl. 3. Detail of the stone alignments at P35 looking south west.

construction.), are small stone slabs set firmly into the ground on edge and forming two roughly straight but slightly diverging lines (1.2 - 2.5 m apart) for a maximum distance of 14.7 m. Set between the two, and beginning 5 m to the west of the mound, is a third line of stones which runs parallel to, and is located a little closer to, the southern stone alignment. Overlying the eastern end of the alignments is a circle of stones, perhaps a hut circle, which may not have been an original component of the structure. Very few finds were recovered from this site and none can be certainly associated with the construction of the monument. A date within the Kerma period is possible but by no means certain.

Parallels for this monument within the Nile Valley are not known to the writer. The association of small upright stones with tomb monuments is not uncommon in the region. In the Kerma Ancien cemetery at Site H29 in the Northern Dongola Reach there were concentric rings of small stones set into the low tumuli and a similar arrangement is known from Kerma (Welsby 2001: 56-57, pl. 3.15; Bonnet 1990: figs 61 and 62). Rings of upright slabs are a common feature of graves in the Eastern Desert (Castiglioni et al. 1995: 69) and the Red Sea littoral (Magid et al. 1997: figs 2, 3 and 5) while individual stelae are known from the cemetery at Mahal Teglinos close to Kassala dating to the Middle, Classic and Late Gash Group (ca. 2700-1700 BC), and associated with C-Group graves; those at Aniba of very considerable size (Fattovich 1989; Steindorff 1935: Tafel 8-15). For linear arrangements of stones however, one has to look far to the west, to Libya and beyond from where many have been published (see for example Le Quellec 1990; Faleschini 1997; Gauthier & Gauthier 1998; 1999: 89-91; Falce & Falce 2000). Other linear arrangements of stones are common in the Middle East forming features associated with hunting. These, known as kites, are often very large and were used to channel animals towards a killing ground (see for example (Helms & Betts 1987).²

Most kites are of considerable size and the Dongola Reach example is clearly not of this type. However, there are some much smaller examples noted especially in the Sinai and Negev which are of the same order of magnitude as site P35 (Helms & Betts 1987: fig. 11). At site P35 the stones in the lines leading to the mound/structure stand very little above the ground surface although it is possible that they were used to support a lightweight fence of organic material. Conversely the structure, if such a thing is buried within the mound, at the west end is very substantial. The linear features could have channelled animals into the structure, although considering the shortness of the lines, these may have been domestic animals rather than wild animals in a hunting context. That they

² Evidence for what may be a functionally similar installation, consisting of lines of stones and timber posts, the latter thought to be the supports for a net, has been noted immediately to the west of the Nile at Soleb (Schiff Giorgini 1967-68: 255).

were not used to harvest rain water run-off is clear as the ground slopes up from east to west at this point.

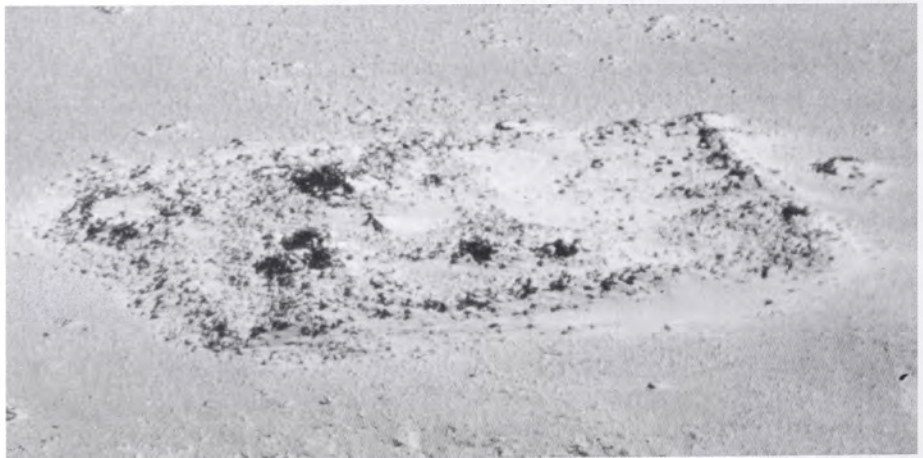
The other monument, designated site P26(29), is a rectilinear structure (Plates 4-6), the plan of which is partly masked by the rubble from its own collapse and by secondary stone hut circles and cairns erected on its ruined surface. Wall faces are visible, largely buried within the rubble, which allow a tentative reconstruction of its original form (Fig. 2.1). It is a trapezoidal structure, ca. 31 x 20-22 m in size, with its long axis aligned north-south. The southern third is occupied by a courtyard entered through the middle of the south wall by a narrow entrance flanked for a length of approximately 5 m by the inturned south wall. A small section of the external face of the south wall was partly cleared and four narrow courses ca. 120 – 140 mm thick, of roughly-coursed rubble laid as stretchers, were visible standing to a height of 460 mm. The floor inside the courtyard is at the same level as the external ground surface. Most of the rest of the building is on a podium over 500 mm high within which is a small chamber, with minimum dimensions of approximately 7 x 4 m, entered from the courtyard through a narrow doorway set slightly to the east of the centre line of the building. The floor of this chamber appears to have been at the same level as that of the courtyard although now it is extensively sanded up.

The podium, faced with rough blocks, appears from surface indications to be infilled with rubble. No evidence was found for a floor surface on top of it. Set into the top of the podium, and barely surviving above its surface, is the outer face of a wall which appears to delimit the chamber. This upper storey is roughly square and is set at an angle to the main axis of the podium/courtyard. Its west wall is ca. 4 m thick while the north wall may have been thicker, perhaps up to 6 m. The walls are constructed with a face of smaller and thinner slabs than those noted in the wall of the courtyard; the facing stones were all laid as stretchers. Very few finds were recovered from the vicinity of this building and there is nothing which can, with any confidence, be used to suggest a date for it. Immediately at the foot of the slope is a Kerma settlement but there is no evidence, for or against, associating the two.

There is no building known to the writer in the Middle Nile valley or in its hinterland which is comparable to this structure. What may be not dissimilar structures have, however, been reported in the far west, in Morocco and, although one would not like to suggest any direct link over such a vast distance, the form and function of those structures offers a possible explanation for the function of the building in the Northern Dongola Reach. The relevant monuments lie in the extreme south-east of Morocco at Taouz and Beraber (Meunié & Allain 1956). Among the large circular tumuli at the former site is a rectangular building 11.3 x



Pl. 4. The monument at P26(29), aerial view looking north.



Pl. 5. The monument at P26(29), aerial view looking east.



Pl. 6. General view of the monument at P26(29) looking north.

9.5-10 m in size, its long axis aligned north west to south east (Fig. 2.2). The southern third is a courtyard entered through a centrally placed doorway. The northern part is a solid podium in which is a small rectangular chamber, set partly over an oval burial chamber, entered from the courtyard. At Beraber North is a rectangular podium, 13.9 x 10.9-12.2 m in size and 1.1 m in height on which is placed a stepped structure of at least three storeys, attaining a maximum elevation of 3.3 m (Fig. 2.3). Entrances to three burial chambers are visible along the south-east face of the podium.

Of not dissimilar form to the Beraber North tomb are a number of monuments in Eastern Sudan particularly at Maman a little to the north of Kassala and at Asaramaderheib. These are most often square and two or three storeys in height, the uppermost storey usually being circular. Within the square base is a vaulted chamber entered by a low door. All are constructed from roughly dressed flat stones (Paul 1952; Delany 1952; Hinkel 1992: 76-77, fig. 10 with references). A medieval date has been suggested for them. To these may be added the monument erected over the tomb of the Kushite queen Amanitore (Beg. N.1) at Meroe, which survives as a two-storey monument, each storey a truncated pyramidal shape (Dunham 1957: 119-121).

The data provided by the survey of the two monuments in the Northern Dongola Reach offers no clear evidence for either their date or function. The

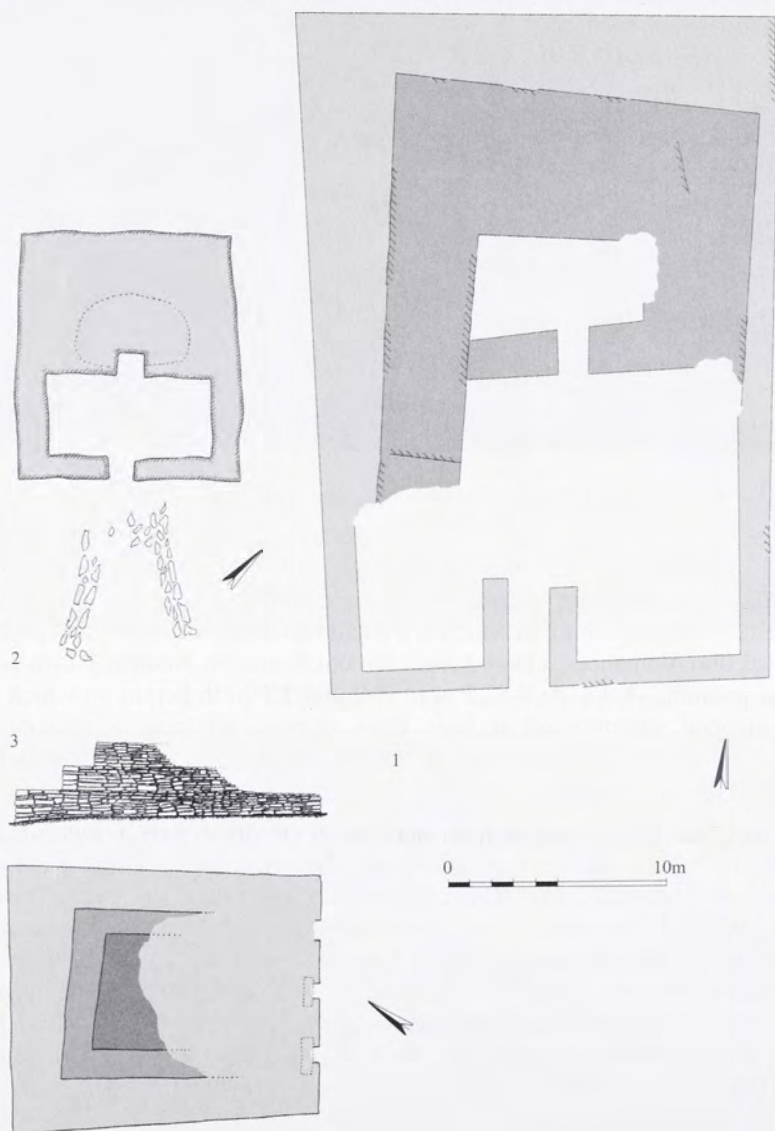


Fig. 2.1. The monument P26(29) in the Northern Dongola Reach;
 Fig. 2.2. The rectangular tomb monument at Taouz (after Meunié & Allain 1956, fig. 13).
 Fig. 2.3. Multi-storey monument at Beraber North (after Meunié & Allain 1956, fig. 19).

parallels noted above suggest that site P26 may be funerary although this does not exclude other possibilities (a religious monument, a military or administrative structure). The site is only a few kilometres south of where a modern track leading from the Northern Dongola Reach across the desert to Kareima leaves the Nile Valley. Its location might be compared to the enclosure found to the east of Kerma, in that case set at the foot of the plateau rather than on its summit (see Bonnet & Reinold 1993).

The remains at site P35 may also be funerary but there is the possibility that they were associated with hunting or livestock management. Only excavation will offer the possibility of further elucidation of these unusual monuments.

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Bruce Williams

A-Group Society in the Context of Northeastern Africa

A-Group contrasts with later C-Group, and some other cultural phases in Nubia in the diversity of its material culture and classes of burial. Major ancient phases with limited class distinction reflected in burials include most of C-Group, Pan Grave, and the pre-Twenty-Fifth Dynasty Napatán in Lower Nubia. Zibelius-Chen (1988: 55-63), for example, discusses C-Group. Some divisions in the earlier C-Group can be noted (Williams 1993: 37). Although the differences are not as strong as in late A-Group, the Neolithic showed distinctions of wealth and status, as did A-Group and Kerma (Geus 2002: 3-9), and the major phases of Napatán, Meroitic, and X-Group. Both the class distinctions and the cultural diversity were partly replicated in the Kerma, Napatán, Meroitic, and post-Meroitic or X-Group periods. The cultural diversity indicates contacts with a broader area than just the Nile Valley such that assumptions that the culture was entirely riparian can be challenged and parallels drawn between the cultural ecology of A-Group and later times.

The following article is offered in memory of Lech Krzyżaniak, who contributed profoundly to the study of early cultures in Northeastern Africa and generously offered large opportunities to explore, examine, and share new ideas and discoveries in a field that he did so much to change.

Social Differentiation in A-Group

Based on its limited number of sites and the modest number of tombs in its cemeteries, A-Group was once characterized socially as a scattered population of loose tribes and kin groups. (Geus 2002: 4-9). This characterization did not take into account the complexity and refinement of crafts and some customs, nor did it consider the selective preservation of sites in A-Group Nubia, and the strong bias in favour of cemeteries. Nordström (2004) analyzed A-Group social structure as revealed in the cemeteries. For the wider issue of development in the

early A-Group, see H.S. Smith (1991). Since modern Nubian strip-villages with large house-enclosures vastly reduced the number of sites available for exploration (Williams 1986: 5-7) A-Group was both under-represented and under-explored. Habitation sites on the desert edge seem, like many early habitation sites above the Third Cataract, to have been reduced to scatterings of sherds and stone debris by deflation where they were not originally rubbish scatters, despite the recent discovery of Pre-Kerma remains. Upstream, even in Kerma times, settlement sites away from Kerma tended to be small, with not very substantial structures (Welsby 2001: 589 gives a summary; for rural Kerma sites see Gratien 2002; Welsby, Macklin & Woodward 2002: 30-32). One site, however, was a kilometre long. Moreover implicit or explicit in the earlier characterization was the attribution of refined objects to an Egyptian origin that assumed a sharp cultural division between the regions, an assumption that alone supported the attribution. Despite Murnane (1987) the Gebel Sheikh Suleiman monument is still sometimes attributed to Djer (cf. Bongrani 1998).

A-Group is no longer considered a simple backwater. Evidence of concentration in wealth and authority is now recognized from a number of perspectives. This recognition came about, not just because of the cemetery of great tombs at Qustul, but an analysis of sites by Nordström, in which he discerned a burgeoning social differentiation in A-Group's middle and later phases (Nordström 2004; Geus 2002: 4-9). This social differentiation began earlier (cf. below).

Social differentiation, in both wealth and culture actually first appeared in the earliest cemeteries at Khor Bahan not far south of Aswan, which contained some remarkably rich tombs, (Nordström 2004: 140 and fig. 5; Gatto 1998; H.S. Smith 1991: 98-101) although differences in wealth were less than those found in contemporary Naqada I Egypt (Nordström 2004: 136; for the Naqada I Gebelein textile Williams & Logan 1987: 255-256 and fig. 15). The graves at Khor Bahan were typical of the Sudanese Neolithic, (cf. Geus 1991: 57-59, figs. 5-6 with Reisner 1910: figs. 69, 71, and 72 Cem. 17: 7, 17: 50 and 17: 56) while the pottery and most objects were typical of Naqada I Egypt (H.S. Smith 1991: 98-101; Nordström 2004: 104; Gatto 1998). Subsequently, the pottery and small objects of northern Nubia became increasingly like those of contemporary Sudan (Nordström 2004: 140-142) where differences in wealth also appear (Geus 2002: 3-4; Reinold 1991: 26-28) although Egyptian pottery storage vessels remained common (Williams 1986: 67-78). Middle A-Group tombs at Sayala were very rich, but this was also the date of the earliest great tombs at Qustul. If the transition to late A-Group is set at the replacement of rippled fine pottery by painted pottery, Sayala belongs to Middle A-Group, contemporary with the earliest two tombs in Qustul Cemetery L (note following). Sayala was a place of special importance (Geus 2002: 7; Nordström 2004: 139-143; H.S. Smith 1991: 107-108), as well as

Qustul (Williams 1986: 377-381, 165-167 and table 42). In the Late A-Group, new elements from the west were added to the pottery, for example with shapes that resemble A-Group, but with surfaces often indented ("controlled rilling"; see Hope 2002: figs. 8-10; cf. Williams 1986: fig. 10 P). At Tunqala West, one tomb had a high cairn-tumulus (H.S. Smith 1962: 64-69). The tumulus type was probably unusual. The great tombs of Qustul continued to be made on the same scale of size and wealth as their royal contemporaries in Naqada III Egypt (cf. for example Dreyer 1998: fig. 2, 4, with Williams 1986: fig. 159, L 23).

Pictorial evidence from symbolic images supports the conclusion that Nubia's rulers at that time claimed the same pharaonic status as their Egyptian contemporaries (Williams 1986: 138-147, 167-175) and some of it indicates they claimed victory in Upper Egypt (Williams 1986: 154-155).

Diversity in wealth is evident in the arrangement of cemeteries at Qustul. Excluding circular cache-pits, found in all areas, major burials in the cemeteries of Qustul occur in an ascending social order from north to south. Cemetery W1 contained burials ranging in wealth from small shafts with only one or two vessels up to burials in tombs several meters long, with numerous and varied pottery vessels and objects. Two of these were bed-form burials (Williams 1989: fig. 27, W11, fig. 51, V61). W1 and W42 here are Dyn. XXV in date (Williams 1990: figs. 2 and 8). Farther south, tombs in the large area called Cemetery V were larger, and they included shafts with side chambers, at least one bed burial, and probably large shafts. The bed burial and the trench with side chamber are of interest here, not just because of their recurrence, but because they differ from contemporary Egyptian tombs and from burials south of the Third Cataract. A few circular graves might appear in this large area. Although I originally interpreted them as reused cache pits, they contained A-Group pots of types not usually found in storage pits (Williams 1986: 117 and notes 12-13). Southernmost of the series was the cemetery of great tombs, L. A group of rectangular deposits nearby, Cemetery S, was probably ancillary to the great tombs making up a great funerary complex (Williams 1989: 99-104, 138). This sequence, from middle class to great tombs, may represent a social progression of the type found generally in the distribution of tombs in Egyptian necropolis, i.e. a north to south ascending social progression (suggested by G. Emberling and S. Harvey).

A-Group belonged to both the Neolithic of Sudanese tradition and the Naqada Culture, but recent discoveries in the Libyan Desert show that related cultures spread across the savannah, probably as far as the Gilf el-Kebir (see Schön 1996: Taf. 66-1 Wadi Akhdar II 81/2). While not identical with the core A-Group culture, they are within the range of variation represented in the valley sites, which display considerable eclecticism. The A-Group's radius of action was therefore larger in area than Upper Egypt, even if the area was more sparsely

populated. It should not be surprising to find that the A-Group developed institutions that matched this substantial area of responsibility with suitable signs of authority (for discussion of different items see Darnell 2002: 159; Rampersad 2000; Williams 2006; Heldall & Storemyr 2003: 37; see below). The growth of this power can now be examined against a wider background of events in north-eastern Africa that show wide-ranging relations and high levels of organization.

Sudan and the deserts in the later Neolithic and Pre-Kerma Periods

The deserts of ancient Egypt and Nubia were at least as important for the movement of people, animals, and goods as they have been in recent times. In the wet phase of the Holocene Sahara, the actual desert retreated some 800 kilometres northward, making wide areas available for at least seasonal occupation and greatly easing travel. It seems that monsoon rains reached as far north as Dakhla (Kuper 2002: 3). Recent research indicates that the early Nile-based societies each had a large range of action that included both the seasonally-inundated valley and the surrounding savannah. Discoveries in northern Sudan include evidence of relations with Upper Egypt's earliest culture, the Tasian, which has also left traces in the deserts (Darnell 2002: 162-65; Friedman & Hobbs 2002). To the south and west, relatively moist climatic conditions created a river in the Wadi Howar that flowed from Chad to the Nile (Keding 2004).

Complexity in the Sudanese Neolithic

Burials at Kadero and el-Ghaba/Kadada displayed differences in wealth that the excavators attributed to class (Geus 2002: 3-4). While the numbers and types of grave goods varied considerably, it is the size of the el-Ghaba cemetery that indicates the existence of a substantial settled population on a scale that compares with Upper Egypt (Reinold & Krzyzaniak 1997: 12). At Kadruka, Reinold excavated a cemetery that was apparently organized around the burial of a single individual and included sacrifices (Reinold 1991: 28).

The Pre-Kerma Culture

Knowledge of the Pre-Kerma Culture is still limited, but much of the Dongola reach has not been explored completely and sites are badly deflated. It is not surprising that few objects yet reveal specifics of a symbolic universe for them. At Barga, the excavator Honegger found a settlement that was organized carefully enough to indicate the presence of an authority, something he referred to as a pre-kingdom (Honegger 2004a: 91-93). Both at Kerma/Barga and Sai, circular pits were used for storage (Geus 2004; Honegger 2004a: 88-89), the normal storage technique used in the Nile Valley as far as northern Egypt (Williams 1982.) Significantly, a sealing with a definite symbolic design, indicates the presence of some kind of administrative arrangements (Honegger 2004b: 69, cat. 54).

The knowledge of rock art in this area is also very shadowy. A few applicable fragments of evidence, all from the igneous boulders that make up the dikes of the Third Cataract may indicate something of an early symbolic universe that parallels developments on the Lower Nile.



Fig. 1. Neolithic rock-drawing of a hunt, at Akkad on the West Bank of the Nile, near Tumbos.

(all rock-drawings have been digitally traced in white on photographs by the author. The opportunity to study these drawings was graciously provided by a gift of Mrs. Louise Bradbury to the Oriental Institute to support archaeological field research in Sudan and by Prof. Stuart Tyson Smith, director of the University of California at Los Angeles Expedition to the Dongola Reach in 1997 and the University of California at Santa Barbara Expedition to Tumbos in 2000, 2002, and 2005.)

At Akkad, on the west bank at the southern end of the Third Cataract, are a number of rock art stations, and remains of early sites, including Neolithic. At least one hunt scene is near an early site (Fig. 1). Another early drawing is a hippopotamus hunt pecked on a boulder at ground level sheltered behind a higher boulder with cattle drawings of the Kerma period (Säve-Söderbergh 1953: 15-19, fig 8). The rump of a hippopotamus figure found at Badari-Hemamiyeh is painted with a boat and men carrying harpoons (Brunton & Caton-Thompson 1928: 54 pl. 54-15; Williams & Logan 1987: 260-261). The relative date of the

drawing of the hippopotamus hunt on the boulder is secured by the fact that it is much more patinated than the cattle drawings on the more exposed rock in front of it. Its closest parallel is on a Naqada I palette in the Medelhavsmuseet (Säve-Söderbergh 1953: fig 8; Asselberghs 1961: pl. 46).

A second representation, at Hannek, is in a cluster of boulders that may have served as a kind of shrine. Surrounding it is a large Kerma, and perhaps earlier site. Representations pecked on the boulders include rhinoceros (Fig. 2), giraffes, and elephants. One elephant, crudely drawn, has the ears elevated and the trunk thrust forward, treads on a crenellated structure (Fig. 3) (cf. also Van Albada & Van Albada 2000: fig. 64). This combination can be compared with the elephant treading on triangles or mountains found in late Naqada Period Egypt (Fig. 4). (Quibbell, 1900: pl. XVI-4; Williams 1988a: 37, fig. 2d; Dreyer 1998: 173-180, fig. 104; Baque-Manzano 2002: 36-38; Kemp 2000: 223-226, fig. 10). In this case, however, the crenellations, matched by a curved line below that makes a complete shape, have a specific parallel in nature directly in view across the river, Gebel Alarambi (Fig. 5) (Williams 2006: 154).

A third example is a group of rock drawings on a cluster of boulders between the Hannek and Akkad sites, also near a Kerma site. This includes several boats, high at one end, truncated at the other, one with a simple curved cabin, containing what appears to be a human figure (see Raffaele 2005: Aha 1; Vandier 1952: 829; Engelmeier 1965: pl. II 1-4, 8; IV 5; XII 4; XXII 7; XLV 2; LIV 1). Exact parallels for these are difficult to find, but the nearest date to the Egyptian First Dynasty.

If it would be exaggeration to suggest a state with a detailed bureaucracy and complex official culture from these fragments, formalized symbolic religious thought and social differentiation are indicated, and some kind of administration, all at an early period, Neolithic and Pre-Kerma. Moreover, without being Egyptian, or having exact parallels in Egypt, these phenomena represent a parallel, informed, development.

Desert and Valley in Naqada Period Egypt

While Egypt's Naqada Culture and its northern neighbours were firmly rooted in the valley, the people of Upper Egypt were especially active in the Eastern Desert (cf. S.T. Smith 2004) most likely for mining, hunting, quarrying, and herding. In any case, from the Wadi Hammamat east of Coptos to the Wad Abbad east of El Kab and further to the south, masses of rock drawings attest to a sustained and intense interest in the Eastern Desert by the Upper Egyptians of the Naqada Culture (Cf. Winkler 1938; 1939; Rohl 2000).

A certain equilibrium between the seasonally-watered savannah lands and the continuously watered valley and oases remained intact as long as the Holocene



Fig. 2. Neolithic or Pre-Kerma rock-drawing of animals including a rhinoceros at Hannek site on the West Bank of the Nile in the Third Cataract, near Tumbos.

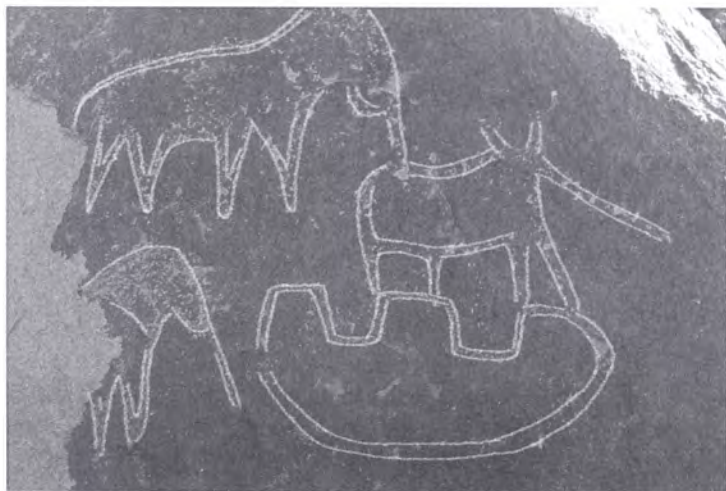


Fig. 3. Neolithic or Pre-Kerma rock-drawing of elephants, one striding across the summits of a *gebel* at Hannek site.



Fig. 4. Elephant striding across the summits of a *gebel*, on a carved ivory from Hierakonpolis, after Quibell 1900, pl. XV-4.



Fig 5. Hannek site, cluster of boulders with rock-drawings. Gebel Alarambi in the Eastern Desert is visible in the distance.

rains watered the land well enough to support a population. The relationships were not entirely symmetrical, even then, as the rock art indicates, but the existence of substantial water sources at various distances from the large, permanent ones gave a measure of independence to fairly large savannah populations. To some extent, variable preservation has contributed to an imbalance in the evidence. Settlements in the Nile Valley were reused, as the debris of construction and occupation raised them above the inundation. Being deeply covered by later remains, they are few and difficult of access. Early remains are best preserved on the desert edge where they were thick enough to resist deflation, not reused, and not dug away as *sebakh*. Desert sites were prone to deflation and more difficult to detect, which has kept them from attracting systematic attention until relatively recently. Kuper (2002: pl. 7) shows the major migration to the valley by about 4000.

Consolidation in the Valley

By 4000 B.C., this equation changed. Rainfall decreased so that the populations of the northern savannah found progressively less food for their cattle, and water became scarce. By some time in the early Old Kingdom, the Western Desert had become enough of a desert for travel to require special logistical arrangements, although parts of the *Darb el-Arba'in* could be traversed by donkey train as late as the Sixth Dynasty. Harkhuf's travels are well known (Helck: in LÄ II: 1130; Meurer 1996: 76-77), but note also Meri and his travels to the west (Kuper 2002: 10). The population dwindled as the desert expanded and it became possible for people who lived in areas with a permanent water supply to extend an importance into predominance, predominance into domination, and, sometimes, domination into control. This new equation of desiccation was not changed until the coming of the camel restored a new measure of mobility and independence, and sometimes superiority, to the desert. Some rainfall persisted in the Red Sea Hills, and this permitted overland contact with the savannah-lands and watercourses farther south. The Bedja have continued to live there in numbers sufficient to maintain a strong identity to the present day.

In the last half of the fourth millennium B.C., Egypt coalesced from a series of smaller kingdoms based on what were later major temple-cities of Upper Egypt into a single great entity, a colossus that had a profound effect on its neighbours. This Egypt was born in struggle. Weapons were among its earliest grave goods (see Petrie 1920: 22-23, pls. xxv-xxvi; Reinold 1987: fig. 7a, for example). The earliest art depicts hunts, some of the most impressive being organized hippopotamus hunts involving coordinated attacks by harpoon from land, small water craft and large boats (Säve-Söderbergh 1953; Williams & Logan 1987: 260-261). A few important paintings show that ritualized executions of bound prisoners also took place, presumably after combats (Williams & Logan

1987: 261-265; Williams 1988b: 46-51; Dreyer et al. 1998: 111-112, figs. 12, 1 and 13). They continued through the Naqada II (Williams & Logan 1987: 253-257) into the tumultuous period when the state encompassed all Egypt and they were stock themes of Egyptian art thereafter. Labels on some of these scenes of struggle indicate that they were directed not just against rivals in Egypt, but also the lands outside, such as Libya and Nubia (Asselberghs 1961: pl. 92; Raffaele 2005: Aha smiting Ta-Seti; also Vandier 1952: 834; for the Gebel Sheikh Suleiman Monument: Murnane 1987; Williams & Logan 1987: 263-264. See also Williams 1986: 167-172).

The late Naqada period corresponded to the drying spell, and this, probably combined with military force, depopulated the adjacent deserts. By the time of Narmer, today considered the dynastic founder, and his successor, Aha, Egypt was ready to neutralize areas adjacent to its frontiers, in Sinai, Palestine, and Nubia. (Nubia: H.S. Smith 1991: 108; Sinai: Hartung 1998: 346-348; Palestine: Hartung 1998: 348-378, 387-388). In doing so, Egypt ended two thriving trading communities and uprooted networks of communication that had endured for generations, founding an anti-settlement policy that continued until the late Old Kingdom. An echo of the end of the anti-settlement policy may be found in the rise of the C-Group, closely watched and managed by the nomarchs of Elephantine. These Nubians provided soldiers for the great Egyptian campaigns in Palestine. It was this triumphant and monumental Egypt, which gave rise to the historical conceit of a solitary eminence.

Representation and an Economy of Classes in A-Group.

The development of a class structure was discerned in the physical evidence of goods and graves, but it would be reasonable to expect that it would be reflected in art and architecture. Architecture hardly appears in A-Group, but there is a large amount of art, much of it significant. The rock art of Lower Nubia includes immense numbers of representations of river vessels, both ordinary and sacred. Of the same types as found in Naqada Period Egypt, these attest clearly to the importance of sustained contact with that country. They also point to a shared cultural background, because the religious and triumphal nature of the sacred vessels could not have been unknown in Nubia. Since A-Group had its own rulers, these vessels must have belonged in A-Group as much as Egypt. For Naqada period high-stern vessels at Djara, see Le Quellec, Flers and Flers (2005: 49-50, figs. 76, 77, 80) and for the victorious gesture with arms upraised in the Gilf el Kebir, sometimes in a line dance, see the same authors (2005: figs. 632, 783 in Uweinat). The similarity is general, however (Le Quellec, Flers and Flers 2005: 262-264). Uweinat and the Gilf el Kebir are almost equidistant from the Nubian Nile and the Wadi Howar.

However, it is ordinary boats that are of special interest here, because what they carry often differs greatly from the cabins on boats shown on the painted pottery of Upper Egyptian Naqada II, or even the Hierakonpolis Painted Tomb. Many Nubian boats are shown with a curved mound amidships that must represent a cargo (examples in Engelmayr 1965: pls. 3: 5c; 4: 1, 3, and 5; 16: 4; 17: 1, 2; 18: 7; 19: 4-5, 20: 1b; 23: 4). A similar representation of cargo appears later in the Sanam temple reliefs (Griffith 1922: pls. 26:1, 31:2). Detailed representations of cargo of this type appear in the bows of boats in Huy's tomb (Davies & Gardiner 1926: pl. 33). Lines crossing the mounds that intersect at right angles further indicate that this is a protective tarpaulin held by cords (cf. Engelmayr 1965: pl. 19: 4-5).

Certain trade goods appear in the archaeological record. Hundreds of cache-pits found with pottery at Khor Daud near Wadi Allaqi (Merpert & Bolshakov 1964) indicate that the gold mines were already exploited there. Carnelian mines near Toshka show the origin of that semi-precious substance to have been near the heart of A-Group Nubia, noted by a Norwegian-British expedition but not extensively explored (Heldall & Storemyr 2003: 37, referring to Stele Ridge; Harrell n.d.a; n.d.b). Incense, almost certainly of southern origin, appears not only in the great tombs at Qustul, but also in more modest graves, sometimes in fairly large fragments. It occurs frequently in Egypt (Petrie 1920: 44; Petrie & Quibell 1896: 21, 28, 29; Brunton & Caton-Thompson 1928: 63)¹

All of these products could be shipped in quite small, but still valuable packages and one wonders what actually was under the cargo-covers of these boats, but the monumental commemoration indicates it was probably precious and related to the goods Nubia was later customarily expected to yield as tribute. What other materials might have been traded is uncertain, but they perhaps included dates. The representations relate to trade along the river, but evidence exists for A-Group activity in the deserts.

The Relevance of the “Sudanic Kingdom.”

An important feature of the later Kushite cultures, Kerma, Napata, and Meroe, was that they consisted of a core official, formal culture surrounded by,

¹ see also Petrie Collection online, which notes a number of resin fragments). Petrie Collection online contains a number of resin fragments: 17122 from Tarkhan; 4360 from Naqada, large and small lumps; 4403 from Naqada; 5123 from Ballas; 5125 from Ballas; 51605 bead; 51997 unworked; 5450 from Ballas; 836 black; 59796 same; 72678 poss Naqada; 72582 possibly from Naqada; 72685 possibly from Naqada; 72686 probably from Naqada; 72688 from Meydum IV; 72691 probably from Naqada; 72942 from Naqada; 7364 from Lahun, a cake dating to Dynasty I; 75942 from Hierakonpolis, possibly resin for incense consisting of lumps and fragments; 75943 from Hierakonpolis, white resin; 9004 from Badari, important Badarian fragments; 9143 from Badari, beads, Badarian;

and imposed upon traditional cultures that could be considered diverse (Edwards 1998; Fuller 2003). Like its successors, A-Group society had a core official culture, with a variety of material cultures represented in its area of activity. It could thus be characterized loosely as a social antecedent of the kingdoms of Kush, the latest of which Edwards and Fuller have recently characterized as Sudanic. A group aspiring to dominance, with symbolic traditions more or less formalized to express that dominance that penetrated ordinary customs, and perhaps even the domestic economy acquired direct control or great influence over a wide area. Dependent or subject peoples might have had very different cultures, even though subject to the same rule. The ascendancy was military, although control of trade was a major objective of government action. The word control might at times be too strong to describe activity that merely suppressed some entity that threatened to interfere with trade. Certainly authority late in the Funj Empire or shortly after as seen by Burckhardt in its latest stages did not do much to police or regulate the trade routes that criss-crossed its northern domain. Trade in these areas had its own momentum, and all parties had a stake in its success, so wilful impedance was local and temporary. It was dangerous, so an important guarantee was in the fact that there were alternate routes for the same trade, namely slaves. A key point in the characterization of the kingdoms of Nilotic Sudan was their combined sway over lands with permanent water and those with seasonal supply augmented by permanent fixed sources, such as wells and hafirs. In a form appropriate to the technology of the Neolithic, this cultural ecology spread northward hundreds of kilometres by 9,000 B.C. and persisted for millennia, withdrawing southward at a pace that allowed Kerma to succeed the A-Group in a succession of kingdoms that lasted until the end of the ancient world.

Conclusion

Relatively new to this discussion are two major challenges to the belief that Egypt was isolated in Africa in early times. First, the Neolithic of Sudan is now known to have been much more complex socially than thought only a generation ago (Reinold & Krzyzaniak 1997: 12; Reinold 1991: 28) and it had significant influence on the earliest phase of Neolithic culture in Upper Egypt, the Tasian (Friedman 2002; see Darnell 2002: 158-159 for later connections, 162-165 for Tasian). This important relationship continued, shown most dramatically, in the northern Nubian A-Group when the pharaonic dynasty of rulers arose at Qustul to play a role in the emergence of united Egypt.

The second challenge is found in the evidence that the deserts were not just highways but places where there were actual populations, even if they were more mobile than the people in the valley. These desert dwellers even built significant stone monuments well before the Pyramids. These monuments, and the Qustul Dynasty show that unlike Nile-cantered Egypt, Nubia drew upon a base

that spread across the savannah, much like old Kush at Kerma (W.V. Davies, n.d.) or the Napatan and Meroitic empires much later. Neither Nubia nor the deserts were merely fields of activity for the Egyptians, their distinctive cultures interacted with Egypt and transmitted at least some ideas to and from more remote regions.

In ancient Saharan Africa, art, the most revealing of all evidence for transmissions, exists in a contrast between wide-ranging material cultures and a regionalized mosaic of highly developed artistic traditions. These traditions were not strictly isolated from one another, but they shared important details and even large themes across time as well as space to create a distinctively African cultural expression. Some of these themes and details appear in the cultures along the middle Nile, which have often been treated as though they were remote from the rest of the continent. Discoveries of recent decades have shown that Nilotic cultures developed with contact, influence, and participation from the deserts, and that these deserts were highways to regions farther away. After the advent of desiccation, the political entities of Nubia, however, retained wide spheres of action and cultural and economic pluralism.

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Friedrich Berger

Relative chronology of rock art at Djedefre's Water Mountain, SW-Egypt

Djedefre's Water Mountain (DWM) was discovered in December, 2000, by C. Bergmann on a walking tour with two camels (www.carlo-bergmann.de). The author visited it in December, 2004. DWM is one of many hills in an area about 70 km west of Mut (Dakhla). The mountain has a platform on its eastern side, which was artificially enlarged and protected by walls (Fig. 1). The difference in the patina between the upper and the lower part of the rock wall in Fig. 14 may indicate the levelling of the platform.

The mountain derives its importance from petroglyphs, including hieroglyphic inscriptions and paintings on the walls at the level of the platform. The oldest dated petroglyphs are a cartouche of Cheops and an inscription from his time (Kuhlmann 2002). This dating was confirmed at a test excavation on the platform, where roasted locusts were found at the bottom of the pit and radiocarbon dated to about 2610 BC (Kuper & Förster 2003). The name Djedefre's Water Mountain stems from a beautiful petroglyph (Fig. 2). Here the name of Djedefre, the son of Cheops, is written within a large hieroglyphic sign for „mountain“. The term „water mountain“ is presented by the combination of the sign for mountain with the sign for „water“, two parallel zigzag lines. In Fig. 3 the zigzag lines were later replaced by two horizontal lines and some short vertical lines and eventually the upper part was destroyed by pecking. Figs. 2 - 3 show that the surface of the rock was smoothed and possibly cleaned before the application of the petroglyphs.

On Djedefre's Water Mountain, there are several types of petroglyphs. One type comprises hieroglyphic inscriptions, images from Egyptian mythology and images related to the Nile valley. Other petroglyphs seem to be related to people from Dakhla and/or from the desert. To the left of the image of the water mountain in Fig. 3 there is a boat with several stick-figures representing humans.

Below is a curved line possibly representing another boat. At the right there is another stick-figure of a human with a long diagonal stick. Further to the right there is a picture of an oryx, the body is polished and the long horns are engraved. Oryxes do not need surface water for drinking, they are, however, not animals of the sands. They live in semi-desertic steppes (van Neer & Uerpmann 1989: 322). Other desert or steppe animals represented here are giraffes; their images were produced by pecking and engraving (Fig. 4). Animals not directly related to the desert are the griffon (Fig. 5) and the donkey (Fig. 6).

Images of women with skirts are represented in another type of petroglyphs (Fig. 7), similar to those reported by Winkler (1939: 27-30), Krzyżaniak (1988; 1999) and Krzyżaniak et al. (1991) from the east of Dakhla. At DWM they are highly schematic, the upper part of the body is an engraved line, and head and breast are pecked. The women are accompanied by men (Fig. 7). The images of men are composed of a vertical line for the body and two short lines each for the arms and legs, giving them the shape of an arrow. The head is sometimes expressed by a round cluster of dots, or two dots representing the eyes (Fig. 8).

The relative dating of the pictures can be interpreted from superimpositions. Kuhlmann (2002: Fig. 4) has already presented some examples. Here, the „arrow-man“ in Fig. 7 cuts into an older oryx. In Fig. 8 the woman on the right is partly superimposed by a softly pecked animal, probably a giraffe. In Fig. 9 the feet of the „arrow-man“ on the left cut into a pecked quadruped. The man on the right is partly superimposed over a giraffe with pecked legs and neck and a polished body. Both men have clusters of dots to represent the head.

Fig. 10 is located immediately on the left of Fig. 9. Here a giraffe is presented with engraved neck, legs and upper contour of the body. The body is slightly polished. The neck of this animal cuts into a pecked ostrich. The hind-legs end with dots, they are superimposed over another giraffe with less sharp contours. The front-legs of the first giraffe were purposely damaged when a piece of rock was cut out by five or six strokes with a pointed tool. The resulting depression was possibly used as a peg-hole (see below). I correlate the first giraffe with the „arrow-men“ because of the same technique and the same superimposition over pecked animals.

Fig. 11 lies immediately to the left of Fig. 10. It shows two „arrow-men“ and an eye-let. The man on the right has some dots at the top and two dots between the legs on both sides of the lower end of the body, possibly representing the testicles. The planned position of the eye-let was marked by the stonemason with a cross (there are further examples). This cross is superimposed over the man on the left. The right opening of the eye-let cuts away a part of the man on the right. This clearly demonstrates that the eye-let was produced later than the men were.



Fig. 1



Fig. 2



Fig. 3.



Fig. 4.



Fig. 5.



Fig. 6.



Fig. 7.



Fig. 8.



Fig. 9.



Fig. 10.

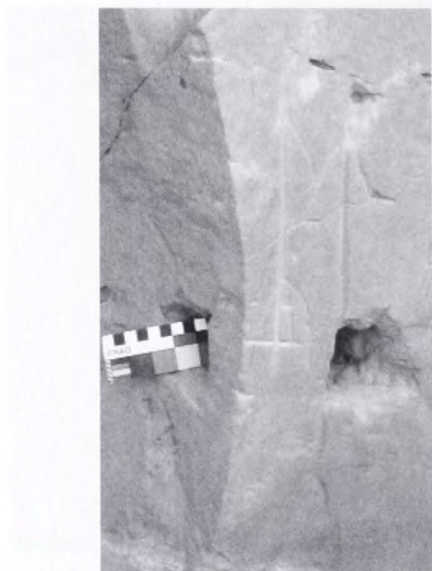


Fig. 11.



Fig. 12.



Fig. 13.



Fig. 14.



Fig. 15.



Fig. 16.

The next examples for superimposition are Figs. 12 and 13. The central part of Fig. 12 is a giraffe with sharply engraved contours and extremities. Each of the hooves is represented by two dots. For the tail there are several versions. Because of the technique and the angular shape of the body I correlate this animal with the „arrow-men“. The hind-legs of this giraffe end in another animal, which was produced by pecking and abrading. Because of the shape of the body and the long neck it may be an image of an ostrich, the legs of which are missing. The front-legs of the giraffe cut into the neck of this animal. The head of the giraffe was erased during the process of cleaning and smoothing the rock surface for a painting of a human whose heel is visible on the right side of Fig. 12. Above the giraffe a part of the image of another human was also erased.

Fig. 13 shows the extension of Fig. 12 to the upper right. The painting represents the Pharaoh in the act of „smiting his enemies“. The posture is similar to that of the Pharaoh on the Narmer palette. The image in Fig. 13 is not to be interpreted as a historical document, but as a symbol for the power of the pharaohs. Similar pictures were reported by Almagro Basch et al. (1968: Figs. 158, 160; lamina XXII) from the Nubian Nile valley. Those are petroglyphs. The latter was very expertly executed and has been dated to the New Empire. On the left of the painted pharaonic symbol of Fig. 13 there is a petroglyph of a human. The lower part was engraved and thereafter partly erased together with the head of the giraffe of Fig. 12 to make room for the red pharaoh. It is the lower part of the dress of an Egyptian man. The upper part of this image was completed by pecking, probably after the painting. It has a cross-band. The head and the crown are similar to those of the red pharaoh, the arms are missing. There are traces of petroglyphs visible on the smoothed area, but their meaning cannot be identified.

Eye-lets were mentioned above. Fig. 14 gives an impression of the position of three eye-lets high on the wall. For orientation: the red pharaoh (Fig. 13) is on the left. Fig. 8 is on the right-hand rock surface. For the preparation of the two left eye-lets large pieces of the rock were detached using a blunt instrument. On this occasion a petroglyph next to the middle eye-let was partly cut off. It is probably a large image of an ostrich similar to the smaller one above the eye-let (here only partly visible) created by soft pecking, a technique mentioned earlier. The light patina of these images again demonstrates the late dating of the eye-lets. Fig. 15 gives another overview. The images of Figs. 9 and 10 are on the left, Djedefre's Water Mountain (Fig. 2) is on the right. Figs. 14 and 15 demonstrate that the people who made the eye-lets did not pay any attention to the existing petroglyphs. Intellectually they were from a different group or time than the authors of the earlier rock art.

The inscription from the time of Cheops informs us that the people at the site of DWM were supposed to produce „mefat“ (Kuhlmann 2002: 136-137;

Kuper 2003). This is translated as „powder“ and interpreted as „ferric oxides“. Normally this mineral is called haematite. Many people all over the world have used haematite in the past as a basis to produce red colour. This was also required by the pharaohs in the Nile valley. Actually the rock art at DWM demonstrates that red colour was used there. There are three different examples. The red pharaoh in Fig. 13 has already been mentioned. The second example is on Fig. 15. On the right-hand side under the symbol of DWM there is a rectangle with engraved outline. It is subdivided into red and blank parts („blank“ being the colour of the rock surface). The meaning of this picture is not known, but it is probably of the same age as the symbol of DWM above and as the images below (Fig. 3). Several water mountain symbols were partly coloured in the same way. The third example of red colour is shown in Fig. 16. Here several rectangular areas were mechanically smoothed and, before or afterwards, were treated with red colour, probably in a low concentration in water. This use of red colour is unusual. Due to the mechanical smoothing several petroglyphs were nearly erased. It seems that they were produced by engraving and thus the timing of the application of paint may be after that of the „arrow men“. In one of the coloured fields there is a cartouche; the text has not yet been interpreted. One probable source of haematite is the quarries, which Negro et al. (2005) found already in 1991 WSW of Abu Ballas.

Fig. 3 shows side-by-side motifs from the Nile valley and from the steppe/desert (the oryx), probably created by different people. A time difference is, however, not visible.

Based on the observations above a relative chronology was drafted, separately for motifs from the Nile valley and for local motifs. This is not clear-cut for all cases. The time differences are certainly not of equal length, some may be very short and others may be longer, as the differences in patina demonstrate.

Here a comment may be added concerning the purpose of the eye-lets. There are about 19 of them at an elevation of 1.50 to 2.00 m above the ground. Kuhlmann (2002: 135,137) assumes they were used for tethering donkeys overnight to protect them from prowling wildlife or dogs. He is, however, surprised about the small number of donkeys to be tied up in comparison with the large number of people mentioned in the written text. The table above shows that the eye-lets are not from the time of the inscription under Cheops, but more likely from the time of the red pharaoh. There is another possible purpose. Schulz-Schaeffer (2001: 122-123) made an illustration where the eye-lets are used for the construction of a roof made with fabrics. This could also explain the peg holes, which are to be found at a similar height as the eye-lets.

Direct dating of rock art has been tried with little success until now. It would therefore be useful if archaeological data could give a hint as to the abso-

lute dating of the rock art. Kuper (2003) reports pottery from the Old Kingdom and from the Sheikh Muftah Group of Dakhla from the excavations at DWM. In Dakhla three local cultural units are distinguished. The first, the Masara unit from the ninth millennium BP (McDonald 1993), is not relevant here.

pecked animals damaging the water-mountain symbols (when?)	
red pharaoh; panel with red colour	eye-lets
	softly pecked animals
	women with skirt; „arrow-men“; engraved animals, some with polished body
	engraved giraffe with pecked and polished body
modification of water-mountain symbol	
water-mountain symbols; inscription of Djedefre; images of griffon etc.; use of red colour; ship (earlier?)	animals with polished body and pecked or engraved extremities; pecked animals and human (earlier?)
hieroglyphic inscription and cartouche of Cheops	

The second is the Bashendi cultural unit. The sites are to be found within the Dakhla oasis and in surrounding areas (McDonald 1993; 1999: 118-122, 127-128). Their stone tools show similarities with other cultural units from Khartoum to the Fayum and the Delta (McDonald 1996) and in the Western Desert (McDonald 1999: 127-128). It is therefore thought that the Bashendi-people were a local version of nomadic cattle pastoralists who used the oasis as an annual refuge. They are dated about 7600 - 6850 BP (Bashendi A) and after 6500 BP, mostly before 6100 BP for Bashendi B (McDonald 1999: 130). As Bashendi sites are to be found near rocks with petroglyphs of giraffes, ostriches, large antelopes, long-horned cattle and birds (reported by Winkler, 1939), it is assumed that these petroglyphs are the products of the Bashendi unit or related groups (McDonald, 1999: 128). DWM had not yet been discovered at the time when these reports were written. Because of the similarity of the motifs at DWM the earlier petroglyphs may have been created by Bashendi or similar groups.

The third cultural unit in Dakhla is the Sheikh Muftah culture. The sites occur only in the Dakhla oasis and few on the route to the Nile valley (and now

at DWM). At some sites there seems to be an overlap with Bashendi occupations. Most Sheikh Muftah sites are later than 5500 BP and some are coeval with the Old Kingdom presence in the oasis (McDonald 1993; 1999: 122-127, 129-130). The earliest ceramics of Pharaonic Egypt in Dakhla are from the Archaic Period 2920-2650 BC. By about 2300 BC many new migrants had arrived from the Nile valley. They lived side by side with the people of the Sheikh Muftah culture for several decades. At the end of the First Intermediate Period the Sheikh Muftah culture had disappeared and the size of the Pharaonic Egyptian community diminished (Mills 1999).

The images of women with skirts were reported from the eastern part of Dakhla and the road between Dakhla and Kharga (Winkler 1939:27-30; Krzyżaniak 1988; 1999; Krzyżaniak et al. 1991). Červíček (1986: 83) mentioned examples from Fukundi in Nubia and from Khor Ghattas near the Second Cataract. Bergmann found many of them at DWM and other places W and SW of Dakhla (e.g. www.carlo-bergmann.de). So, these images concentrate in and around Dakhla.

Winkler believes that the petroglyphs of „pregnant women with enormous buttocks“ are images of statuettes made by the „Early Oasis Dwellers“ and he assigns them together with the petroglyphs of the „Earliest Hunters“ to the Amratian Period (1939: 29,33). Červíček (1986: 83; 1993: 45) assigns the „female anthropomorph with the so-called false steatopygy“ or the „female anthropomorph with a wide decorated skirt“ to his C-Horizon (2100-1400 BC) and compares them with images on Nubian C Group pottery. In order to explain his timing he refers to his earlier work (Červíček 1974:139-note 455; and indirectly to 1974: 117 n. 320), where he, however, gives a much wider range for the attribute of „so-called false steatopygy“, namely Naqada, Group A, and Group C. The bases for these comparisons are not from rock art, but they are paintings on ceramic and figurines. Ucko, one of Červíček’s references, studied figurines from Egypt and other areas. He comes to the conclusion that the majority of the Predynastic Egyptian figurines are not steatopygous, but obese (Ucko 1968: 171). He realizes that steatopygia may be shown in objects of various cultures for different reasons, and he concludes that these are not necessarily true images of women. Therefore he recommends that steatopygia should not be used for correlations between different cultural units.

Following Ucko, it may not be justified to correlate the images of women with skirts in rock art with mobile art objects of any period from the Nile valley. On the other hand the images in rock art are restricted to a certain area in and around Dakhla. A cultural unit, which is also restricted to that area, is the Sheikh Muftah Unit. One may speculate therefore that the Sheikh Muftah people are responsible for these petroglyphs. If that were correct, the petroglyphs are to be

dated prior to the end of the First Intermediate Period when the Sheikh Muftah culture disappeared.

The interest of researchers in DWM presently concentrates on the activities of Pharaonic Egyptians concerning minerals for the production of red colour. Bergmann found in addition to DWM, however, many places with water mountain symbols, which he calls Outposts, and other rock art sites in the vicinity. This indicates that the inhabitants or visitors from Dakhla must have performed other activities besides quarrying and the transport of haematite in this area. This raises the question of water supply. While Bergmann found large jars at many places in the desert, especially on the donkey trail to Abu Ballas and beyond, there is no large jar in DWM. In the test trench Kuper (2003) only found kitchenware.

There are two possible sources for water, rain and groundwater. Bergmann believes that water was available in the area immediately SW of DWM. He calls this area Biar Jaqub (Jacob's wells). On the Russian map, sheet G-35-Г (G-35-G), Djedefre's Water Mountain lies at an elevation of about 220 m in an area with a general slope to NE towards the Dakhla depression. It is possible that some relatively small pools developed here after rains. About 25 km SE from DWM there is a depression below the 200 m line. In this depression area Meissner et al. (1993) interpreted Quaternary playa and semi-lacustrine deposits from satellite pictures. All these indications still have to be checked on the ground. The frequency of rains has decreased in this part of the Sahara since about 5000 BC. Arid to hyperarid conditions set in about 3500 BC. Dakhla experienced a lacustrine phase about 8000 - 3500 BC (Kröpelin 1993: 56-57). Rain was probably no longer a regular feature in 2500 BC.

The Dakhla-basin is part of a huge aquifer system in the Nubian sandstone covering N-Sudan, SW-Egypt and SE-Libya (e.g. Brinkmann et al. 1987). The archaeological site Lobo, initially a spring and later a well (Klees 1989; Midant-Reynes 2000: 147-148), was probably supplied from this aquifer. Similar springs/wells may have existed near DWM, but the area remains largely unexplored.

Bergmann is sure that he has found Wilkinson's second Zarzóora, which was said to be at a distance of two or three days walk straight west of Dakhla (see Almásy 1940: 72). The distance is certainly correct and the former existence of an oasis may have survived in the memory of the people. The most recent discovery, a sickle, was made south of DWM in December, 2004 (Fig. 17). It is now hidden at the site and the coordinates will be supplied on request.



Fig. 17

Acknowledgements

This manuscript is an abbreviated version of a presentation given at the annual meeting of the Association des Amis de l'Art Rupestre Saharien (AARS) in Ingolstadt 2005. I am grateful to K. Campbell for improving the English.

Postscript

During a second visit to Djedefre's Water Mountain and the surrounding area in January, 2006, we found a small piece of a green-blue mineral on the surface at the foot of a hill about 500 m north of DWM. The maximum dimensions are 11 x 8 x 6 mm. The entire surface of the piece is smooth and rounded. This may be an effect of wind and sand to which it has been exposed over a long period of time. There is no local source for this type of mineral, it was lost by a visitor. In the context of visitors from the Nile valley, the mineral is most likely turquoise. Alternatively, it may be amazonite. A method for a non-destructive analysis was not yet found.

North of DWM, we inspected several small depressions for similar conditions as at DWM. In one depression, about 13 km NW of DWM, we found a

small area with lake deposits. Nearby, there are the remains of several trees. A small loose piece of wood was collected and two radiocarbon dates were established. They yielded BP 3298 \pm 26 and BP 3370 \pm 26. The overall one-sigma-range is cal. BC 1729 - 1524 (KIA 29294 and 29295).

In the depression indicated on the Russian map and on the map of Meissner et al. 1999, mentioned above, we found some yardangs with dead bushes about 25 km ESE of DWM. A piece of wood yielded a radiocarbon age of BP 108 \pm 23 (KIA 29296). This late dating may explain the presence of the sickle (Fig. 17.) mentioned above.

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Late Neolithic Settlements (E-01-2 “CAMP”) from the Gebel Ramlah Playa Basin, South-Western Desert of Egypt (Preliminary Report)

I. Introduction

In the season of 2000, the Combined Prehistoric Expedition held a field school in Prehistoric archaeology, directed by Fred Wendorf and Romuald Schild, for a group of Supreme Council of Antiquity inspectors and geologists from the Geological Survey of Egypt. It was during one of the cursory surveys, when Kimbal M. Banks and Michael Kobusiewicz, together with a group of students, found concentrations of Neolithic sites located along the south-western shores of a fossil playa formed at the foot of a prominent, unnamed mountain, later to be named Gebel Ramlah (Sand Mountain). The gebel is situated about 25 km NW of Gebel Nabta (Fig. 1). The GPS coordinates of Gebel Ramlah are as follows: 22°42'37''N; 30°30'17''E; and about 278 m asl (Schild et al. 2002).

During the 2001 field season, the CPE began excavation of two sites, E-01-1 and E-01-2, located on the south-western shores of the Ramlah Playa Basin (Schild et al. 2002). The first one, excavated by Halina Królik contained remains of settlements attributed to the Early Neolithic phase of Al Jerar (house) and to Late Neolithic (graves, hearths, etc.). The second one (E-01-2), comprised a settlement and a graveyard. The exploration of the graveyard had been conducted by Michael Kobusiewicz, Jacek Kabaciński and Joel D. Irish in 2001 and continued over the next field season in 2003. During the latter season a settlement located nearby the cemetery was tested (Fig. 2).

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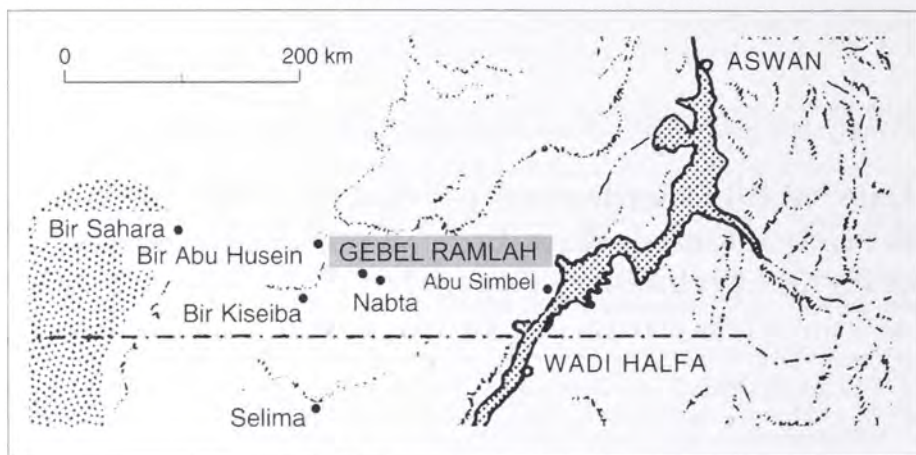


Fig. 1. Location of Gebel Ramlah.



Fig. 2. Gebel Ramlah, Location of site E-01-2 "CAMP".



Fig. 3. Gebel Ramlah E-01-2 "CAMP": North Profile of Trench.



Fig. 4. Gebel Ramlah E-01-2 "CAMP": Sample of hearth.

II. The Excavations

A trench of 4 x 5 m was laid out. The archaeological materials were recorded within square meter units and spits, 10 cm in thickness, conformably to natural bedding. Cultural remains occurred down to the depth of 70 cm below the surface. Three sedimentary units have been defined in the trench. The amount of archaeological material, however, decreased rapidly below the depth of 50 cm. The upper unit (Bed 9 of the local stratigraphic sequence, see Schild et al. 2002), 10 to 15 cm in thickness, is made up of loose, fine-grained, gray alluvial sand. The middle one (Bed 8), 35-40 cm in thickness, is composed of pale brown consolidated, conspicuously laminated sands of alluvial origin. The lower one (Bed 7), over 40 cm in thickness, is made up of a light yellowish brown, very consolidated gravelly alluvial sand. At the base of the trench is a very pale brown, consolidated sand.

More than 20 hearth lenses occurred throughout two upper sedimentary units. Some of them were fully excavated, while others only tested. Most of the hearths were oval, almost circular in shape (40 to 100 cm in diameter), and about 10 to 20 cm in depth (Fig. 3, 4). Numerous fragments of fire-cracked stones were found in a number of hearths. The finer deposit in the hearths consisted of a dark gray sand mixed with charcoal and very small fragments of burnt stones. In some cases, however, the presence of a hearth was marked by minor reddish oxidations. Twenty one biological samples were collected from the majority of hearths. All of these were examined by Dr. Maria Lityńska-Zajac, Institute of Archaeology and Ethnology, Polish Academy of Sciences. Ten radiocarbon assays from the site, on the other hand, have been measured by Dr. Gilberto Calderonii, University of Rome.

III. Description of the Material

About 1600 artifacts comprising lithic assemblages, lower and upper parts of a grinding stone, over 70 fragments of pottery, as well as almost 2600 faunal specimens (bone, shells, eggshells) have been recovered from the trench. An analysis of the surficial scatter-pattern of finds, as well as those pertaining to particular sedimentary units, show a minor concentration of finds at the northern part of the trench. Apart from that, a small concentration of pottery has been found at the depth of 20 cm as well as a cache consisting of several cores.

III.1. *The Lithic assemblages*

The trench yielded 1590 lithic artifacts, among which the following major categories have been defined: about 40 cores, 1464 debitage pieces and 86 tools. Most of the lithics were made of three types of raw materials: Egyptian flint (932 pieces or 60%), quartz (351 pieces or 22%) and chert (128 pieces or 8%). Lesser

amounts of stone artifacts were attributed to raw materials such as: petrified wood (63 pieces or 4% , agate (54 pieces or 3%), silica glass (30 pieces or about 1%), and quartzitic sandstone (21 pieces or 1%). Apart from these, there were single artifacts made from ferruginous sandstone (six pieces), basalt (two pieces) and granite (one piece), accounting for less than 1% of the total.

Of 40 cores, single platform specimens were the most numerous (16 pieces). Most commonly, these are small cores, less than 3 cm in length and width. Some of the cores show traces of limited preparation. There are also larger pieces, all made from Egyptian flint (e.g. one measuring 119x91x54 cm). Furthermore, there are five initially struck cores, among them three relatively large ones made from Egyptian flint. All of the latter were found deposited in close proximity, one touching another, and together with one single platform core, constituting a sort of cache. Finally, there are a few patterned and unpatterned, multiple platform cores; 90° cores; and 14 unclassifiable or fragmentary cores (Fig. 5).

The debitage, comprising in total 1464 specimens, include 356 flakes, 75 blades, 121 unidentifiable flakes and blades, 806 chips, and 106 chunks. As regards blanks, flakes from single platform cores, amounting to 232 pieces (approximately 67% of all flakes), are predominant. In vast majority, they are made from Egyptian flint, chert, quartz and agate. Their sizes range from 1.5 to over 5 cm in their maximum dimension (or diameter); the majority, however, being flakes of 2.5-3 cm in diameter. Primary flakes (57 pieces or 17% of the total flake number) and flakes from multiple platform cores (42 pieces or 12%) as well as 90° cores (13 pieces or 3%) are also relatively numerous. Among 75 blades, the ones deriving from single platform cores are dominant, amounting to almost 60 pieces (80% of all blades). Eleven specimens are primary blades (14% of all blades). The latter are usually small and their length rarely exceeds 3 cm. They are irregular and of proportions similar to those of flakes.

The collection contains 86 tools. Most of the tools (73 pieces or 84%) are made from Egyptian flint. Some, however, are made on chert (5 pieces) and quartzitic sandstone (4 pieces) blanks. The predominant tool forms are various pieces with continuous retouch (43 pieces or 50%) and denticulated flakes or blades (25 pieces or 29%). The remaining categories include: five perforators, three lunates (two of them made from agate blanks), three characteristic arrow-heads and three bifacial tools, one tanged point, one denticulated endscraper, and two unidentifiable tools. On the surface of the site, in close vicinity of the trench, a point with Heluan retouch has been recorded (Fig. 6, 7, 8).

III.3. Faunal remains

On the basis of preliminary analysis of the archaeozoological material (conducted by Dr. Achilles Gautier), the collection contains remains of cattle,

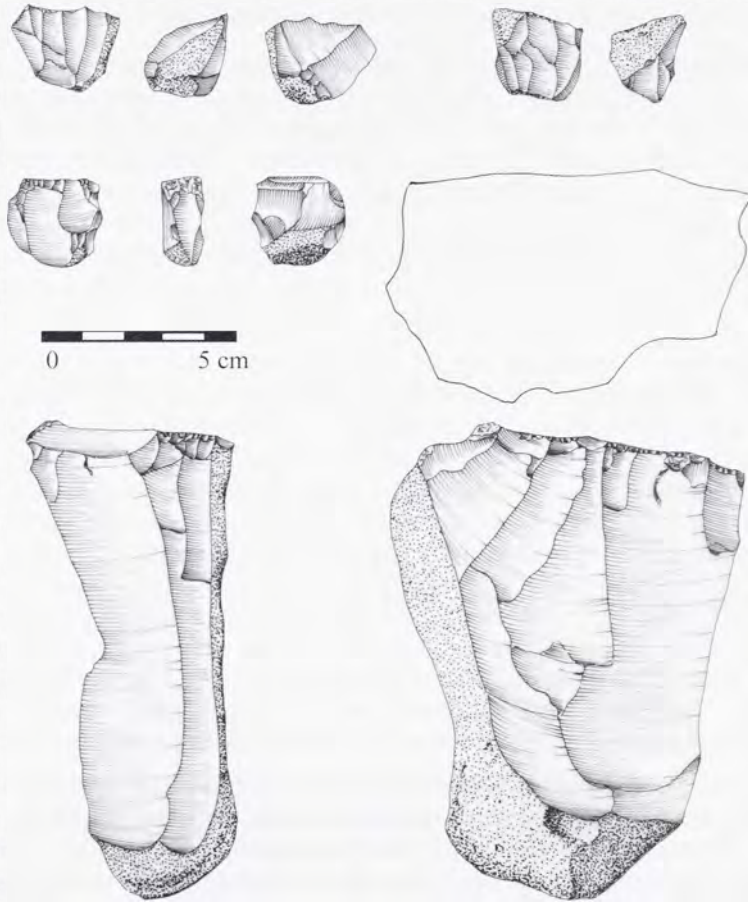


Fig. 5. Gebel Ramlah E-01-2 "CAMP": Cores.



Fig. 6. Gebel Ramlah E-01-2 "CAMP": Tools.



Fig. 7. Gebel Ramlah E-01-2 "CAMP": Tools.



Fig. 8. Gebel Ramlah E-01-2 "CAMP": Tools.

sheep/goat, two kinds of gazelle, fox and a large Nilotic bird. Moreover, a fragmentary large cowry, land and freshwater snails, as well as undecorated fragments of ostrich eggshells occur in the material.

Table 1. Uncalibrated radiocarbon dates from Site E-01-2 "CAMP"

Lab No	Age	Locus/ Depth	Material
Roma-1579	8550 ± 210 yr BP	Hearth 5: 0-10 cm	Charcoal
Roma-1576	6150 ± 80 yr BP	Hearth 6: 10-20 cm	Charcoal
Roma-1578	7775 ± 120 yr BP	Hearth 14 : 20-30 cm	Charcoal
Roma-1580	6400 ± 100 yr BP	Hearth 12: 20-30 cm	Charcoal
Roma-1582	6185 ± 100 yr BP	Hearth 14: 20-30 cm	Charcoal
Roma-1581	5980 ± 75 yr BP	Hearth 8: 20-30 cm	Charcoal
Roma-1584	6395 ± 85 yr BP	Hearth 11: 30-40 cm	Charcoal
Roma-1577	6570 ± 75 yr BP	Hearth 10: 40-50 cm	Charcoal

IV. Conclusions

The artifacts occurring throughout the upper 70 cm of the fine alluvial sediments together with numerous hearths, often intersecting, seem to have been deposited during numerous short-lived, seasonal occupation episodes. The sediments in which they are embedded suggest mineral deposition in low energy environments, perhaps shallow wadi banks and/or sheetwash. Alluvium of Bed 9 in the area of Site E-01-1 is interbedded with numerous lenses of muddy sands deposited in shallow pools formed in the rainy season. These must have attracted human populations of the area in the early dry season. A series of eight radiocarbon assays measured at the Rome University ^{14}C Laboratory (Table 1) additionally helps to place the occupations of Site E-01-1, Camp, in the time/culture units of the South-Western Desert. Except for two erratic assays (Roma-1579 and Roma-1578), probably resulting from the gathering of dead wood (Schild et al. 1996), the dates locate the occupations within an early part of the Late Neolithic wet interphase (Schild and Wendorf 2001: 47). The radiocarbon aging of the occupations perfectly agrees with the pottery styles recorded at the site indicating association with Ru'at El Baqar Late Neolithic (Wendorf and Schild 2001: 664; Nelson 2002: 9-19).

At the nearby site E-01-1, the sandy silts of Bed 6 containing relatively rich Al Jerar archaeology can be securely tied to the late section of the El Nabta/Al Jerar humid interphase ending around 7300 - 7200 ^{14}C years BP (Schild and Wendorf 2001: 46). The archaeology of Bed 7, in the stratigraphic trenches in the immediate vicinity of Site E-01-2, is unmistakably that of the Middle Neo-

lithic or Ru'at El Ghanam variant dated at Nabta Playa between ca. 7100 and 6500 radiocarbon years BP, and coeval with the Middle Neolithic humid interphase (Schild et al. 2002). This cultural episode is associated with our lower unit recorded in the trench. The aforementioned assumption is supported by the occurrence of typical Middle Neolithic pottery in this layer.

According to a number of ^{14}C dates, the adjacent graveyard of Site E-01-2 should be associated with the Final Neolithic humid interphase (Kobusiewicz et al. 2004). The already truncated grave pits of the Final Neolithic of Gebel Ramlah are dug into the low energy alluvial sands of Bed 6 containing Late Neolithic occupation horizons. Both, the stratigraphy and the ^{14}C aging clearly indicate that the Final Neolithic beds that could have been contemporaneous with the burials had been removed by deflation.

It cannot be ruled out that some of the artefacts found on the surface of the site in lag position are, in fact, coeval with the graves.

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Maria Carmela Gatto

The Early A-Group in Upper Lower Nubia, Upper Egypt and the surrounding deserts

Introduction

The Nubian A-Group is mainly known from evidence belonging to its Middle and Terminal phase (Nordström 1972). On the contrary, the Early A-Group phase for many reasons, including the splitting up and consequently virtual disappearing of the material within too many unreported museum collections (De Simone per. comm.), is still quite unknown. According to the current knowledge, sites related to the A-Group are located along the Nile Valley (Fig. 1) from Aswan north¹ to the Batn el Hagggar, south of the Second Cataract (Nordström 1972). The Early sites however, are recorded only between the First Cataract and the Dakka-Sayala area (Smith 1991).

In previous works I suggested (Gatto 1997, 2000) that only the evidence found at the Dakka-Sayala are to be connected with an Early A-Group presence, while those from the First Cataract should be related to a Naqadian settlement. The percentages of Egyptian and Nubian materials in the two regions differ completely and the Nubian component makes up the majority only at Dakka-Sayala sites. This point of view have been accepted by the few scholars who are dealing with the A-Group (Nordström per. comm.; Lange per. comm.).

In the last few years research in Upper Egypt and the surrounding deserts, searching for Nubian evidence in these areas, has been increased (Gatto 2003, 2005), and what I am now suggesting is that there is another, almost unknown, local Early A-Group variant north of Lower Nubia. In fact, unique cultural fea-

¹ The cemetery of Sheikh Mohammed is known in the literature as Kubbaniya South (Junker 1919). In reality, it is located midway between Aswan and Kubbaniya and, because a connection with the Aswan area seems to me more likely, I prefer to call it Sheikh Mohammed instead of Kubbaniya South.

tures, unknown elsewhere, have been recorded in the area surrounding the First Cataract, and from there northward up to Hierakonpolis and probably even Armant. They may indicate the presence of a regional variant of a culture combining, during the first half of the fourth millennium BC, both Egyptian and Nubian traditions.

Starting from this point, I will be here summarize what is known, up to now, of the Early A-Group and where Early A-Group or Early A-Group related evidence can be found.

The archaeological record from the Dakka-Sayala area

The knowledge on the Early A-Group is mainly based on the material culture coming from cemeteries located along the Nile Valley from Gerf Hussein to Mediq (Firth 1912, 1915, 1927). The few settlements found are still unpublished. This is the area where the Wadi Allaqi reaches the Nile forming the wide Dakka Plain. Some 15 cemeteries, out of the 35 related to the A-Group culture, can be dated to this early phase. However, because most of the Early A-Group graves are very badly preserved, for example at cemetery 73 the bodies are lying directly on the sand (Firth 1912: 98), it seems originally there were more graves than those recorded. As already proved by Smith (1966), at the beginning most of the Early A-Group graves were incorrectly assigned to the B-Group.

There are no radiocarbon dates available for this phase. Therefore, it seems the only possibility is to date the sites using the Naqadian artifacts found inside the graves. Unfortunately, the majority of the Early A-Group graves lack the presence of Naqadian artifacts, so their attribution is not so easy and must be made mainly using the typical Early A-Group ceramic productions. For the same reason, the reconnaissance of a pre- Early A-Group phase is very difficult.

Following Hendrickx' chronology for the Predynastic period (Hendrickx 1996), the Early A-Group should be dated between 3800 and 3500 BC, corresponding to Kaiser Stufen Ic-IIc (Kaiser 1957). Two different stages of it have been noticed: stage I dated to NIc-NIIa and stage II dated to NIIb-c (Gatto 200). Variations within the material culture of the two stages can be detected, particularly in the pottery production and in the grave typology. Unfortunately, the current state of research does not provide further, detailed, information.

The small Cemetery 103 in the Dakka Plain (Fig. 1) can be viewed as an Early A-Group type site, because it has graves belonging only to this phase. Other important cemeteries, for their state of preservation, are Cemetery 76, 79, 102 (Firth 1912, 1915).

Most of the Early A-Group grave shafts are circular in shape, often with a bee-hive section, and plastered internally. Few examples of rectangular shafts

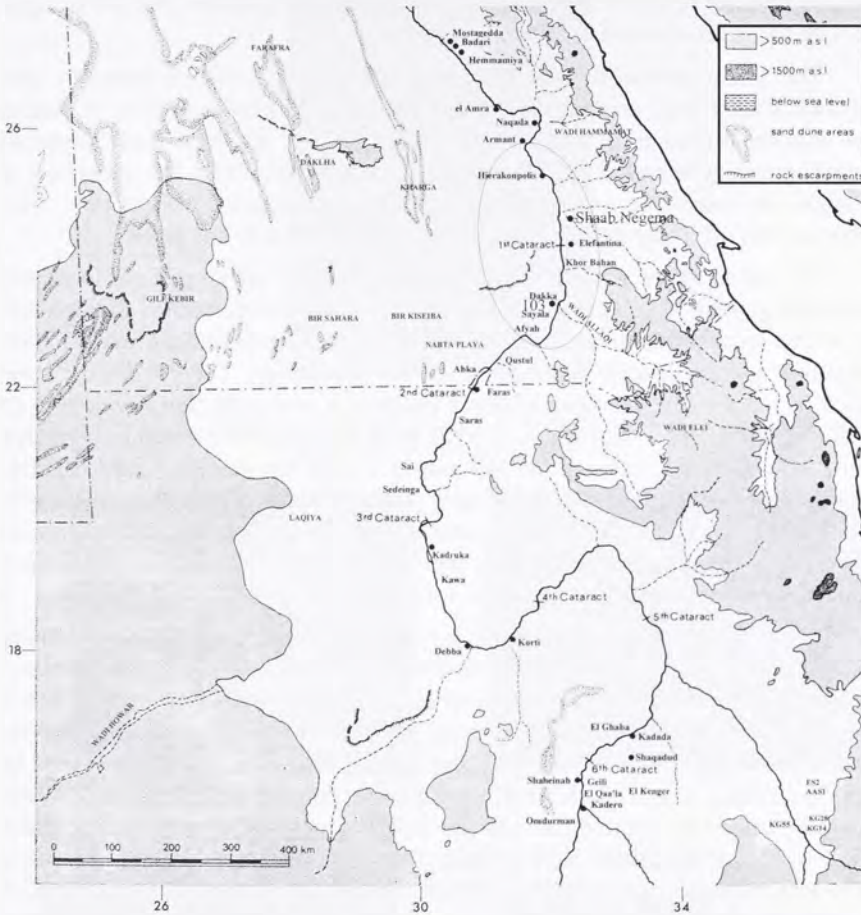


Fig. 1. Map of the Nile Valley showing the geographical distribution of the Early A-Group evidence, with location of cemetery 103 and Shaab Negema tumulus (adapted after Nordström 1972: PL. I).

with rounded corners, and in rare cases a side chamber, have been noted as well, but seem to be mostly related to the second stage of the phase. Sometimes stone slabs covering the shaft are still in place. At Cemetery 77 the graves are covered with rubble domes, similar in structure to the Terminal A-Group grave from Tunqala West (Firth 1912: figs. 92 and 94; Trigger 1965: fig. 6).

Single graves are the most common but some multiple burials occur as well. Usually the body is laid on or covered with leather and only sometimes with tied matting or linen. The body can be contracted on either the left or right side with the head oriented in different directions.

The grave goods include: beads as remain of necklaces; bracelets and pendants; leather cups and bags; feather fans; ivory and bone objects, including ivory combs; figurines; decorated ostrich eggshells; A-Group and Naqadian palettes; grinding stones; flint flakes; resins and minerals. With the exception of shells and the bones of a gazelle from one grave at cemetery 95 (Firth 1915: 42), neither animal offerings nor animal burials are associated to this phase.

Of course, pottery is the most common funerary offering. Both local and imported Egyptian vessels are used for this purpose. Unfortunately, the description of the local production is mainly based on surface treatment, adding only sometimes a very generic description of the decoration. The presence of the rippled technique, for example, is never noticed. It is certain that it was also in use during the Early A-Group, as a bowl from Sheikh Mohammed (Kubbaniya South), now displayed at Egyptian Museum in Berlin, shows (Wildung 1997: fig. 39) (Fig. 2). Moreover the fabrics are very poorly described and are consequently almost unknown. The use of sand, vegetal and ash as tempering in the fabrics, as well as dung, can be suggested, due to their use in the Nubian cultures, including the Middle and Terminal A-Group, but not proved.

There are six main Early A-Group ceramic productions (Fig. 3). Among them Burnished, Red Coated (also known as Red Slipped) and Black Mouthed Wares are the most common, often refined with the rippled technique and a milled rim. The decorated vessels usually show a variety of complex geometric patterns, made using both incision and impression, alternated with plain coated or burnished areas. Deep bowls with rounded or pointed base, convex profile, incurved, straight or everted rim are the typical Early A-Group shapes, usually related to Black Mouthed, Red Coated, Burnished and Rippled wares; while bowls with flat base and straight open walls are related to the decorated wares. It seems that at the end of the phase, during NIIc, some jars, similar but not identical to the contemporaneous Egyptian R and P jars, were produced. However, the way they are described and represented in the publications do not help to reconstruct their manufacture properly.

Interesting to note is the finding, within the debris of C-Group graves in Cemeteries 98 and 118, of four caliciform beakers (Firth 1915: PL. 27f, 1927: PL. 25a3) (Fig. 4). Of course, their location is not the original one and, even if Cemetery 98 has also A-Group graves, the attribution of such beakers to the A-Group culture is unlikely. On the contrary, they can be seen as evidence of a pre-A-Group occupation in the area. To be remembered, such vessels are typical of



Fig. 2. Red Coated Black Topped Rippled deep bowl from Sheikh Mohammed (Kubbaniya South) (after Wildung 1997: fig. 39).



d. Red polished black-mouthed ware.

a



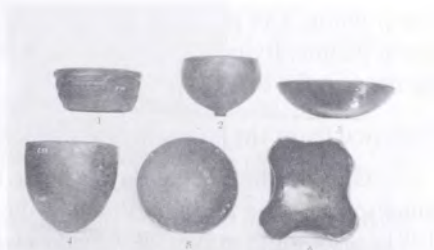
e. Red-painted and polished ware.

b



c. Incised designs on red or brown and black-polished ware.

c



d) Black polished pottery

d

Fig. 3. Early A-Group pottery (after Firth 1915: PL. 27c,d,e, 1927: PL. 20d).

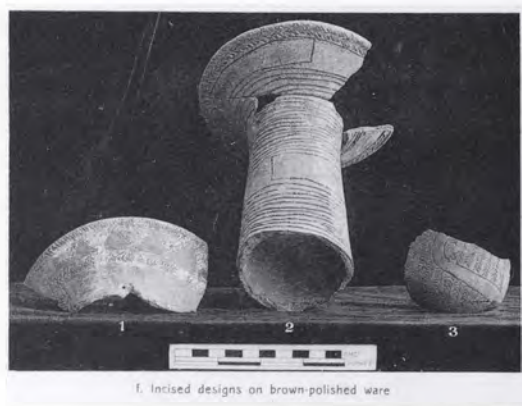


Fig. 4. Beakers from cemeteries 98 and 118 at Dakka (after Firth 1915: PL. 27f, 1927: PL. 25a3).

most of the Neolithic cultures of Egypt and Sudan dated to the fifth millennium BC, all to be included in the Neolithic Nubian tradition, but not of the A-Group (Gatto in press a).

Within the Early A-Group burials in the Dakka-Sayala region those containing Naqadian objects are never the majority: at Cemetery 103 40% of the graves contained Egyptian imports and in few cases, here 11%, some of which almost un plundered, Naqadian objects are the only offering related to the burial. Following this, a stable presence of some Egyptian people, maybe tradesmen, within the A-Group living in the Dakka-Sayala area can be suggested. In this respect, as previously noticed by other scholars (Nordström 1972), the complex of storage pits at Khor Daud (Piotrovski 1967), partially dated to the Early A-Group phase, can probably be seen as a bartering place where Egyptian and A-Group people, living along the Nile, were trading with nomads (or their nomadic segment) in the desert.

Evidence from the surrounding regions

Outside the Dakka-Sayala area Early A-Group evidence can be mostly found towards the north, both along the Nile and in the desert. Following Smith (1991) also some graves at Amada and Masmara can be dated to the Early A-Group phase. However, up to now, no other Early A-Group graves can be observed south of the Korosko bend, also because all the Late Neolithic graves in Sudan and Nubia lack the presence of Egyptian objects, a typical trait in the A-Group funerary assemblage.

Around the First Cataract and south of it, Early A-Group objects, and some graves, are recorded within the Naqadian cemeteries (Junker 1919; Reisner 1910; Smith 1991). This record, again, can be interpreted as the evidence of a scarce, but stable, presence of Nubians in the Egyptian territory. Because of the poor preservation of the graves, our knowledge of the oldest Early A-Group/Naqadian settlement in this region is mainly based on the evidence from Shaikh Mohammed (Kubbaniya South), Shellal and Khor Bahan Cemeteries.

Of course, the Early A-Group material corresponds, in many respect, to that known from Dakka-Sayala, except for the common presence of animal offerings and animal burials, particularly dogs and sheep-goat, in every cemetery. But this may be a Naqadian funerary custom, wrongly attributed to the A-Group, and adopted by them only in this area.

However, it must be pointed out that this is unlikely, as it simply is not that common in Egypt. Actually, apart from the First Cataract evidence, animal offerings and animal burials are commonly recorded only in the Badarian and Maadian cemeteries. Following this, such funerary practice may be a local custom in this First Cataract region stretching up to Hierakonpolis as it is not really a general Egyptian custom. If this funerary custom descends from the Badarian is still questionable but the possibility has to be seriously taken into consideration.



Fig. 5. Hole-mouthed jar from site HK54 at Hierakonpolis (courtesy of the Hierakonpolis Expedition).

Early A-Group or Early A-Group related pottery can be found also in Upper Egypt, in both funerary and settlement contexts (Needler 1984). Decorated and rippled vessels are recorded for example at Naqada, Adaïma, Mamariye,

Elkab and Hierakonpolis (H. De Morgan 1909; Baumgartel 1970; Needler 1984; Buchez and Midant-Reynes 2002). In the latter site, a systematic survey undertaken in 2002 has given more, new, information (Gatto 2003). Here, also “utilitarian” pottery has been found, including Early A-Group jars and some peculiar examples unknown in Nubia. A hole mouth jar (Fig. 5) with a typical Nubian decorated thick rim and an orange coating on a smoothed surface, has a crushed quartz tempered fabric with a large amount of mica in it. This fabric is not recorded in Nubia. Judging from the published description and picture, a deep pot with similar surface treatment and fabric has been found by the Darnells at the Cave of the Wooden Pegs in the desert behind Armant (Darnell 2002: PL. 89). Its attribution to the Badarian Culture is mainly related to its shape, while the fabric appears to be atypical. Following the Hierakonpolis example, a dating to the Early A-Group phase can be suggested and seems to correspond to the one proposed for the main deposit of the Cave, dated to NIc-IIId. Moreover, the Darnells recorded the presence of much Nubian pottery in the deposit, that again should be dated to the Early A-Group phase. This misinterpretation between Badarian and Early A-Group productions has to be pointed out.

At Hierakonpolis also a fine sand and possibly ash tempered fabric has been noticed. This time, similarities can be found with the Final Neolithic ceramic production of the Nabta-Kiseiba area, which are some centuries older than the Hierakonpolis examples (Nelson 2002; Gatto in press b). Moreover, it is interesting to note that the rippled decoration on both surfaces, found at HK64 at Hierakonpolis and at the unpublished site CPE E-00-5 north of Bir Nakhlai in the Western Desert (Fig. 6), is (again) a typical trait of the Badarian production.

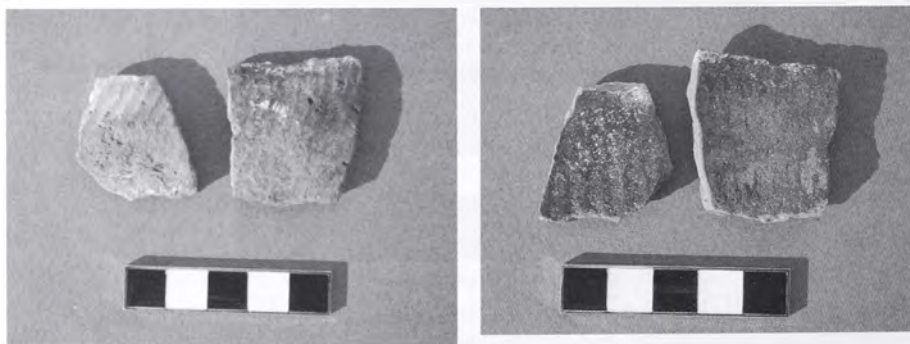


Fig. 6. Examples of Rippled decoration on both surfaces from sites HK64 (Hierakonpolis) and E-00-5 (Bir Nakhlai, Nabta-Kiseiba) (courtesy of the Hierakonpolis Expedition; courtesy of the British Museum).

The Shaab Negema tumulus

In 2005 an isolated stone tumulus was found in the Wadi al Lawi (Fig. 1), the main southern tributary of Wadi Kharit in the desert east of Kom Ombo. It is located in a very small valley, named Shaab Negema, to the west of the main wadi. The tumulus (Fig. 7), measuring approximately 7,5 X 7,5 m, is composed of two different concentric stone rings. A standing stone slab along the internal



Fig. 7. The Shaab Negema tumulus located in the desert east of Kom Ombo.

ring may possibly be interpreted as a stele, but only a systematic investigation can confirm or disprove it. Fifteen sherds belonging to three different pots were found at the surface. One is decorated on both surfaces with a wide rippled impression on a dark brown burnished exterior surface and a black interior (Fig. 8). Thanks to cross-reference with the aforementioned similar evidence along the Nile Valley and in the Western Desert, and to that found in the Kom Ombo plain

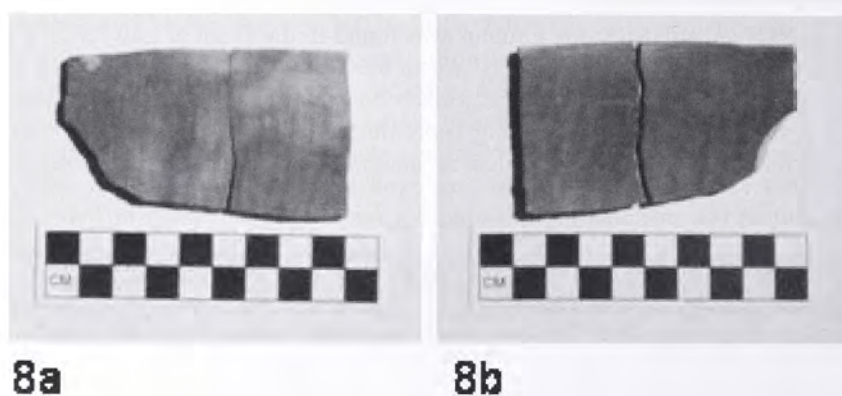


Fig. 8a and b. Rippled decoration on both surfaces from pottery found at Shaab Negema.

by Butzer and Hansen (1968), the grave can be tentatively dated to the late stage of the early A-Group phase (mid-4th millennium BC, N IIa-d). This find may be the only A-Group tumulus known north of Aswan and in the Eastern Desert.

Conclusive remarks

The relationship between the Early A-Group, the Final Neolithic of the Western Desert, and the Badarian already came to light in the recent past (Gatto 2002). All of them are the northernmost regional variants of the Nubian Group, which of course includes also cultures from the south, such as the Abkan, the Neolithic of Kadruka, and the Middle and Terminal A-Group. It is interesting to note that the aforementioned cultures are dated to two different millennia (V and IV millennia BC). However, the data here presented is giving more consistency to the interaction between the Early A-Group from Upper Egypt and the Badarian that really deserves further investigations.

Following this, because of the strong regional variations brought to light, the necessity to change the term A-Group is here suggested again, as it already was some years ago (Gatto and Tiraterra 1996). In fact, we are dealing with different units of the same culture group (as described by Clarke, 1968), which most certainly was present also in the Kerma region, as the affinities with the later Pre-Kerma culture seem to confirm (Honegger 2004). If we confined our definition to the culture group level, not going deeper into the clan/tribe level, it will be very difficult to understand intra-culture variations, so important to define the spatial distribution of the entire culture group, as well as of its single units. Detecting

minimal variations within the same cultural background can be really the key to determine and understand the intra-group dynamics.

Acknowledgments

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Birgit Keding

Pottery of the Wadi Howar – traditions, transformations and their implications

Introduction

Pottery is one of the most important sources of data for archaeological studies. Although mainly used for chronological and chorological classifications, it provides an abundance of information about many other aspects of prehistoric life. While often only treated as a functional item, the idea of its active role in the social web is today generally accepted. Thus the study of pottery sequences and their development should not only consider the environmental factors and ecological implications that encouraged the adoption of particular technologies. It is just as important to understand the social context in which the technological changes occurred. The role of pottery in cultural processes must therefore also be considered.

Case-study: The pottery of the Wadi Howar region¹

This paper presents an attempt to test the validity of using pottery to examine the background and processes of cultural change. The specific case study concerns the cultural transformations between the 6th and 2nd millennia BC in the Wadi Howar region, on the southern fringe of the Eastern Sahara (Fig. 1). Over the last 10,000 years, this part of the desert has been subject to considerable climatic and environmental changes, with increasing aridity spreading from north to south (e.g. Ritchie et al. 1985; Haynes 1987; Neumann 1989; Hoelzmann 2002). Due to its location and the fact that it was part of the

¹ The Wadi Howar region is one of the main areas investigated during the former BOS project (Besiedlungsgeschichte der Ostsahara) and the recent special research project ACACIA (Arid Climate, Adaptation and Cultural Innovation in Africa) of the University of Cologne, both financed by the Deutsche Forschungsgemeinschaft. The archaeological sections are directed by Rudolph Kuper and Hans-Peter Wotzka (since 2002).

ritual and, probably, ideological spheres, against a background of increasing aridity (Keding 1998; in press; Keding & Vogelsang 2001). At the same time, clear shifts in the regional and supra-regional patterns of land-use and social networks emerge (Jesse 2004).







	Lower Wadi Howar n = 94		West Nubian Palaeolake Basin n = 301		Middle Wadi Howar n = 860		Djebel Tageru n = 263			
pottery	10%	50%	10%	50%	10%	50%	10%	50%	Economy	BC
 Handessi B			0,6%			19,0%		11,8%	keeper of sheep, goats and cattle	ca. 1500
 Handessi A			0,3%			18,3%		4,9%	keeper of goats and cattle	ca. 1800
 Halbmond- Leiterband				49,1%		17,6%		7,2%	cattle keeper	ca. 3000
 Leiterband		14,8%		11,3%		17,6%		18,3%	cattle keeper	
 Laqiya	8,5%			12,9%		4,6%		2,3%	hunter- gatherer, fisher	ca. 4500 ?
 Dotted Wavy-Line		27,7%		13,6%		1,7%		8,4%	hunter- gatherer, fisher	ca. 5000

Fig. 2. Archaeological sequences of the Wadi Howar region and adjacent research areas, based on survey data collected between 1995 and 2000. 'n' indicates the total number of sites in each area. Percentages indicate the proportion of sites with pottery of the different phases. Since sites where no pottery was found as well as sites that were reoccupied during different phases are included, the sum is never 100 %.

These processes of change are not well understood. The appearance of new forms of material culture within a region can be explained by factors such as evolution, emulation, migration, exchange and innovation (CLARK 2001: 6-8). Equally, emulation can involve either the inception of unique local styles that reinterpret elements of neighbouring traditions, or the direct imitation of foreign styles. Foreign styles might also be brought into a region through intermarriage or migrant potters. Since the observed cultural transformations occur at the same time as drastic environmental changes, which probably went hand in hand with an increasing population density in the region as well as economic changes, they may well be connected with the economic intensification processes. In addition,

in both cases, it is assumed that at least the economic changes were mainly influenced by external impulses (2001). The first transformation, from hunter-gatherer-fishers to cattle-keepers, is thought to be the result of contact diffusion or the migration of people from the Nile Valley. The second transformation, from cattle-keepers to small-livestock herders of goats and sheep as well as cattle, is a clear adaptation to the increasing aridity and seems to have been strongly influenced by people from the northern and/or western areas. In other words, both changes are based on either emulation or the replacement of the former inhabitants by migrants into the area - which would produce similar artefact patterns.

Here, the numerous pottery finds in the Wadi Howar region are first examined with a view to determining their potential usefulness in revealing the cultural processes that underlie the observed changes. Do they help us determine in more detail such processes as emulation, migration or population replacement? This question is approached from four different angles:

1. a theoretical approach;
2. an analysis of the different types of pottery assemblage and their context in each horizon, with an emphasis on technological traits rather than decoration patterns;
3. an analysis of the formal variation in the pottery of each horizon in different areas;
4. a brief consideration of the decorative styles.

1. Theoretical approach: Material culture and style

In order to isolate those attributes of pottery that reflect different aspects of social processes, certain assumptions are made about the role of material culture and its relationship to human behaviour as well as about the interpretation of stylistic variability. Anthropologists and archaeologists recognise a broad range of meanings and functions in material culture, which go beyond purely utilitarian purposes. They include the following points:

- material culture "... reflects the choices ... (man) makes within an environment ... with which he interacts" (Schwarz 1979: 29);
- material culture is meaningfully constituted (e.g. Hodder 1991);
- material culture is dynamic and within its processes of change it is usually subject to reinterpretation (e.g. Johansen 1993: 9);
- material culture "... does not passively reflect society - rather, it creates society ..." (Hodder 1991: 6; also e.g.: Shanks and Tilley 1987/1992: 146-155, 171; Gosden and Marshall 1999; Gell 1998).

Thus, material culture can be seen as an indirect reflection of human society. However, there is "... no direct, universal cross-cultural relationship between behaviour and material culture", because "frameworks of meaning intervene and these have to be interpreted by the archaeologist" (Hodder 1991: 14).

For archaeologists, one of the most important features of material culture is style. Renfrew and Bahn (1991/1996: 401) describe style as "... how you do something". They cite the art historian Ernst Gombrich, who defines style as "... any distinctive and therefore recognizable way in which an act is performed or an artifact made" (quoted from Renfrew and Bahn 1991/96: 401). Style is therefore less a matter of functional need than "... a form of social rather than individual practices offering a triple vision of the world in terms of habituated forms of social consciousness, principles of structural order..." (Shanks and Tilley 1987/1992: 155). Consequently, style is widely valued as a possible indicator of cultural affiliation or group membership.

Discussions that explore types and functions of style in archaeology are numerous. An early influential approach was the concept of *Kulturkreise* or Culture Areas (Kosinna 1911; Graebner 1911) at the beginning of the last century. More recent important approaches include Binford's "Cultural Style and Drift" hypothesis (1965), as well as concepts that focus on the social information transmitted by style. These may include information about social dominance (Shanks and Tilley 1987/1992), interaction (Plog 1980) or demarcation (e.g. Hodder 1982; Washburn 1989). Other approaches often emphasize information exchange by differentiation of style, with and without a message (Sackett 1977; Wobst 1977; Wiesner 1983, 1984, 1990).

However, based on ethno-archaeological studies, the different models indicate that stylistic variety is an unreliable indicator of group membership. Instead, stylistic expressions of social identity are heavily dependent on context and elude most attempts at generalisation (e.g. Appandurai 1986; Hodder 1991: 6; Thomas 1991).

One question raised here asks what kind of formal attributes of material culture can reflect what kind of processes, such as enculturation, communication, etc. Broad-based approaches to style are therefore of particular interest. These include distinctions between active and passive styles (Sackett 1977) and thus extend the range of stylistic attributes beyond those that convey conscious messages. They provide a strategy for the isolation of specific artefacts and attributes that reflect an enculturative background, i.e. traditions (Carr 1995b: 252).

Adopting Sackett's isochrestic model, Carr suggests in his synthesised broad-based "unified middle-range theory of artifact design" (1995a, b) that physical and contextual visibility could be an indicator for the differentiation of

the message potential of artefacts and attributes (for a detailed analysis based on Carr's theory see Clark 2001).

One rule of this theory is that the higher the physical and contextual visibility of an attribute and the artefact, the greater its message potential (Clark 2001: 12). Ethno-archaeological studies show that high visibility attributes involve the active and sometimes conscious manipulation of goods to negotiate social relationships (active style). They are more likely to be emulated or imitated and are often encoded in decorative parameters. In contrast, "...attributes with low physical and contextual visibility can be assumed to have little message potential" (passive style) (Clark 2001: 12). They are automatic and largely unconscious, reflect a thoroughly internalised understanding of a shared craft tradition that is passed from generation to generation² and constitute "the way things should be done". As a result, they are very stable since less likely to be imitated or emulated and functional needs constrain the range of acceptable variation. These attributes are often encoded in the technological style of a community.

Generally speaking, "stylistic similarities (...) merely reflect a shared settlement history and a common enculturative background. (...) Stylistic differences are interpreted as the result of a stylistic or cultural drift between non-interacting groups (Binford 1965; Braun 1995)" (Carr 1995b: 195-198, 213, in Clark 2001: 12). Consequently, the documentation of chronological changes in ceramic attributes with different physical and contextual visibility is essential for the identification of major socio-cultural transition points in the Wadi Howar development sequence.

Three provisional assumptions structure the following study. The first is that the patterns of formal variation in the technological attributes of pottery constitute "technological styles" and represent deeply embedded cultural traditions. The second is that, for a given range of utilitarian goods circulating in restricted networks, these technological styles reflect the cultural affiliations of the producers. The third is that decoration parameters can be the result of conscious manipulations and may, therefore, reflect intentional messages about group affinity. For the cultural changes considered here, this means: in the case of migration,

² Some general patterns of the learning and transmission of crafts from generation to generation in recent traditional societies are pointed out by Arnold (1989). Pottery making is learned by imitation and practice rather than by direct teaching. Learning thus involves a series of complex motor-habit patterns of pottery production, combined with a cognitive knowledge of raw materials and knowledge of processes like fabrication and firing. These motor habits are unconscious; they are "...culturally patterned but habitually used activity patterns that cause particular muscles to be strengthened" (:180). They require repetition over a long period in order to be effectively utilised. Decoration patterns are derived less from motor-habit patterns than from cognitive knowledge, and are thus more easily modified than the basic motor habits involved in vessel production.

changes in both the technological as well as the decoration styles are to be expected; in the case of emulation, a change in decoration can be expected while a change in the technological style would only occur if it is accompanied by clear functional advantages.

2. The Pottery sequence of the Wadi Howar region

The assemblages studied have a chronological span from the 6th to the 2nd millennium BC, starting with the Dotted Wavy-Line and partly contemporary Laqiya phase, then the Leiterband-/Halbmondleiterband phase and, finally, the Handessi A and B horizons (Fig. 2, 3) (Keding 1998). A critical problem in this dating is the lack of clear sequences. The prehistoric settlements are usually severely eroded surface sites where a clear association of datable material and pottery is not always available. The analysis is therefore based on a few, better preserved reference sites for each horizon where some excavation has been done.

The “operational sequence” (Lemonnier 1986) of ceramic manufacture involves multiple steps, each of which poses problems that can be resolved in numerous ways, depending on the choices made by the potter. The typological classification of ceramics in the ACACIA analysis covers the main steps and is based on visual inspection.

Dotted Wavy-Line and Laqiya pottery (Fig. 3.1; Tab. 1, left row)

Dotted Wavy-Line pottery and the somewhat younger Laqiya pottery characterise the oldest pottery horizon known so far (Jesse 2003). They are most often found as small to medium fragments on settlement sites.

The brown ware is usually heavily tempered with coarse grains of sand as well as angular quartz, which was probably crushed. Occasionally, micaceous particles are also included in the paste, and plant impressions are sometimes found on the surface. The vessels were formed using the coil-and-scrape technique; both the outer and inner surfaces are generally burnished. The range of vessel forms comprises mainly pots and bowls but also includes dishes. Rim shapes are simple, while the bottoms are characterised by round as well as pointed forms. The pots are usually decorated from rim to bottom in the rocker-stamp technique using toothed implements. The different Dotted Wavy-Line and zig-zag patterns are arranged in closely packed horizontal bands.

Leiterband pottery (Fig. 3.2; Tab. 1, middle row)

The red-ochre Leiterband pottery and its variant, the Halbmondleiterband pottery, are generally well preserved (Keding 1997). They are often found in eroded pits, where the pots had been placed in a nearly complete state together with cattle bones (Keding 1997: 204-240). In many cases a ritual context seems probable.

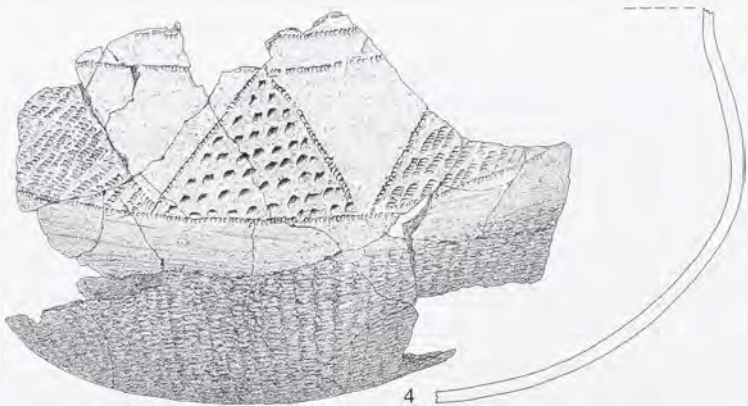
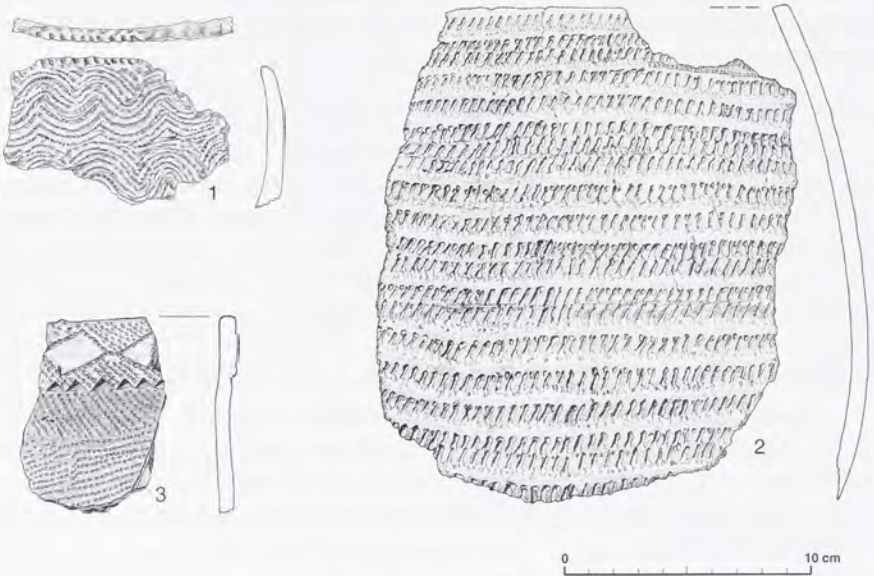


Fig. 3.1. Dotted Wavy-Line pottery fragment (Site S98/20);
Fig. 3.2. Leiterband pottery fragment (Site S99/1); Handessi A pottery fragment (Site S96/2);
Handessi B pottery fragment (Site S96/119).

Tab. 1. Characteristics of Dotted Wavy-Line and Laqiya pottery, Leiterband and Halbmondleiterband pottery, Handessi A and Handessi B pottery.

Pottery horizon	Dotted Wavy-Line/Laqiya	Leiterband	Handessi A	Handessi B
BC	~ 5000/ 4500	~ 3000	~ 1800	~ 1500
Subsistence	Hunter-gatherer-fishers	Cattle-keepers	Keepers of sheep, goats and cattle	Keepers of sheep, goats and cattle
<i>Technological attributes</i>				
Temper composition	mineral	mineral	organic and/or mineral	organic and/or mineral
" quantity	heavy			light
" quality	coarse			fine
Manufacturing technique	coiling	coiling	pinching/drawing	pinching/drawing
Surface treatment, outside	burnished or smoothed	burnished or smoothed	mat impression and/or burnished	mat impression and/or burnished
Colour, outside	brown	red-brown	brown, grey	brown
" , inside	brown	red	brown	black
Fracture, zones and their colours	brown/brown/brown	red/grey/red	black/black/black	black/black/black
Firing atmosphere	reducing	oxidising	reducing	reducing
<i>Forms</i>				
Vessel	pots, bowls	pots	necked pots, pots, bowls, dishes	necked pots, pots, bowls, dishes
Rim	simple	simple	simple	simple
Base	round or pointed	round	round	round or flattened
<i>Decoration</i>				
Position	rim/wall/bottom	rim/wall/bottom	rim/(wall/bottom)	rim/ inner rim/ neck/wall/bottom
Technique	rocker-stamp	rocker-stamp, incision (mainly rim)	comb, single and mat impression, incision	comb, single and mat impression, incision
<i>Arrangement</i>				
horizontal bands	repeated and linked	repeated and linked	pronounced single bands	pronounced single bands
geometric	-	very rare	frequent	frequent
decorated vessel zones	rim/wall/bottom	rim – wall/bottom	rim – wall/bottom	rim – inner rim – neck – wall/bottom

Leiterband pottery is always tempered with sand and about 30% of the shards also contain crushed quartz particles. Shaping was done in the coil-and-scraper technique; the red-brown surfaces are burnished and smoothed, sometimes with visible stroke marks. The limited range of vessel forms is dominated by various sizes of round-bottomed spherical and bag-shaped pots with no neck restriction. Only the outer surface of the vessels is decorated, either completely or just from rim to belly, with horizontal bands running parallel to the rim. The 110 different body decorations are almost exclusively impressed in the rocker-stamping technique using various combs and spatulas (Keding 1997: Fig. 37). Typical decorations on the pottery from Djabarona 84/13 site are different kinds of zig-zag pattern, "contraposed triangles", Leiterband patterns and Halbmondleiterband patterns. In this horizon, undecorated vessels also appear for the first time (Jesse in press). These may indicate the beginning of a differentiation between purely utilitarian household ware and decorated vessels for more public use.

*Handessi pottery*³ (Fig. 3.3, 3.4; Tab.1, right row)

Pottery of the Handessi Horizons comprises at least two facies, each with different attributes as far as technology, form and decoration are concerned, which have yet to be fully differentiated (Keding 1998: 10-11; Jesse this vol.; Lange this vol.). In general, this type of pottery is not well preserved in the Wadi Howar. It is usually found in small fragments on settlement sites. However, some nearly complete vessels of the later "Handessi B" horizon were found beside burials and seem to represent offerings.

Characteristic of the earlier "Handessi A" (Fig. 3.3) pottery are a grey-brown surface, a mineral temper which also contains some organic matter, spherical vessel shapes with only rarely a curved profile, as well as both incised and impressed decorations (Keding 1998: 10; Prill 2000). The incised decorations frequently include cross patterns, while the impressed decorations consist, in particular, of single triangular impressions and parallel comb impressions that often form geometric patterns.

Characteristic of the later thin-walled "Handessi B" (Fig. 3.4) pottery are a fine to medium-grained sand and organic temper and, usually, a mat-impressed or burnished outer surface and a burnished or smoothed inner surface (Günther 1995; Keding 1998: 11; Jesse this vol.; Lange this vol.). There is a wide range of vessel shapes, including different types and sizes of pots, dishes and curved-profile vessels. 60% of the pottery is decorated. Decoration on the inside of the

³"Handessi pottery" is the new term for the previous provisional expression "geometric pottery" (e.g. Keding 1998). "Handessi A" pottery corresponds to "fine geometric" ware, "Handessi B" to "coarse geometric" ware (see Jesse this vol.).

rim is noticeably more frequent. The most important techniques are incision and impression, with a predominance of geometric patterns and mat impressions. However, zig-zag patterns produced in the rocker-stamp technique are also known.

General trends in the pottery sequence of the Wadi Howar region

Notable trends in technology, form and decoration as well in the find context are evident in the assemblages. Although the technology of the early ceramic horizon is already mature, subsequent developments demonstrate a gradual evolution towards improved and more complicated manufacturing technologies as well as an increased complexity in decoration parameters.

There is a gradual development from a heavier, coarser tempered and more thick-walled ware to fine-grain tempered and thin-walled pottery. Additional technological improvements are indicated by the vessel forms: while the earlier horizons are characterised by very limited spectra, dominated by vessel forms with “simple contours”, the later assemblages have a wide range of forms that also includes vessels with technologically more complex composite contours. The same trend can be observed in the decoration parameters: the range of decoration techniques, patterns and arrangements as well as an ever more pronounced structure of the decoration system reveal increasing variety and complexity.

Nevertheless, certain portions of the sequence clearly underwent rapid stylistic changes, whereas other portions were much more stable. The most rapid and striking changes are evident in temper composition, manufacturing and firing techniques, vessel shapes and decorations. These points of discontinuity in the stylistic sequence seem to lack any transitional character and are concentrated in the Handessi horizons. In contrast, the assemblages of the Dotted Wavy-Line/Laqiya horizon and the Leiterband horizon reveal much more gradual changes rather than drastic transformations.

3. Regional trends in the pottery sequence

In order to study the formal variation of the pottery within each horizon, the assemblages have to be examined on a more regional level. If Carr’s model is valid, technological attributes and decoration features should provide qualitatively differentiated information, both chronologically and spatially.

Included in the analysis are sites from the Middle Wadi Howar, the West Nubian Palaeolake Basin – both research areas of the ACACIA project – and the Ennedi Mountains (Fig. 1). Assemblages from the last area were excavated in the 1950s by Gerard Bailloud on behalf of the Musée de l’Homme in Paris (Bailloud

1969; 1997)⁴. In the 1990s, I had an opportunity to compare Bailloud's material with the finds from the Wadi Howar region⁵.

The three areas had very different environments during the early and middle Holocene. The Middle Wadi Howar, a 400 km long section of the now dry water course to the west of Djebel Rahib, was a chain of lakes (Pachur and Kröpelin 1987; Kröpelin 1993). The West Nubian Palaeolake Basin, situated to the west, was a plain with the large West Nubian Palaeolake and some smaller lakes (Pachur and Hoelzmann 1991; Pachur 1997; Hoelzmann et al. 2001). In contrast, the Ennedi Mountains were characterised by narrow valleys and small natural ponds (Bailloud 1969; 1997). All three areas show traces of intensive occupation. However, while the people in the Wadi Howar area and the West Nubian Palaeolake Basin usually lived on dunes at the edge of the lakes, in the Ennedi Mountains there are long occupational sequences in abris and caves. The most prominent example so far is Delebo (Bailloud 1969). This site has a stratigraphic sequence with 5 layers spanning several pottery horizons, beginning with Wavy-Line and ending with Hohou, which corresponds to the Leiterband pottery. Unfortunately, there are no layers with geometric-patterned pottery. Consequently, this part of the present analysis is limited to the earlier pottery horizons⁶.

The technological complex

A comparison of the technological styles of the different assemblages from these three areas is of special importance. They are all situated in a region that was a cultural crossroads for eastern and western influences. However - on a regional level - the cultural assignment of the West Nubian Palaeolake Basin is of particular importance. Was this area a foreland used by people from the mountainous region to the west, or a hinterland used by groups from the Wadi Howar, or does it represent a unique and separate technological tradition?

The Dotted Wavy-Line horizon and the Leiterband horizon

Several patterns emerge when the Dotted Wavy-Line horizon and the Leiterband horizon are subdivided by region (Tab. 2; 3). Firstly, the technological

⁴ In 2003, the ACACIA project also started to do fieldwork in the Ennedi Mountains (Lenssen-Erz & von Czerniewicz 2005), with the participation of the author since 2004 (Keding in press b).

⁵ I thank the DAAD (Deutscher Akademischer Ausstauschdienst e.V.) and the MSH (Maison des Sciences de l'Homme) for the grant that enabled this study. I also thank the Musée de l'Homme in Paris and, especially, Prof. de Lumley, Dr. M. Perpère and Prof. G. Bailloud for permission to analyse the Ennedi material in 1994.

⁶ ACACIA project excavations of three sites in the Ennedi Mountains, in 2003 and 2004, revealed stratigraphic sequences but these did not include geometric-pattern pottery. However, surface finds included pottery with geometric decorations, which were dated in the second millennium BC (Keding in pressb).

Tab. 2. Dotted Wavy-Line pottery: regional characteristics.

Dotted Wavy-Line ~ 5000/4500 BC Hunter-gatherer-fishers Site	Region:	Region:		Region:
	Ennedi Mountains	Westnubian Palaeolake Basin		Middle Wadi Howar/Rahib
	Delebo	S98/20	S98/21	80/87
Analyzed by	B. Keding	B. Keding	B. Keding	F. Jesse
<i>Technological attributes</i>				
<i>Temper composition</i>	mineral	mineral and organic	mineral and organic	mineral
" quantity	moderate	heavy	heavy	heavy
" quality	fine to coarse	fine to coarse	fine to coarse	fine to middle
<i>Manufacturing technique</i>	coiling	coiling	coiling	coiling
<i>Surface treatment, outside</i>	smoothed or burnished	smoothed or burnished	burnished or smoothed	burnished or smoothed
<i>Colour, outside</i>	brown	ochre or brown	brown	red-brown
" , inside	brown	grey or brown	brown	red-brown
<i>Fracture, colour(s) and number of zones</i>	grey 1 zone	black / grey 2 zones	brown / black 2 zones	black-grey 1 zone
<i>Firing atmosphere</i>	reducing	reducing	reducing	reducing
<i>Forms</i>				
<i>Vessel</i>	Pots, bowls, dishes	pots, bowls, dishes	pots, bowls, dishes	pots, bowls
<i>Rim</i>	simple	simple	simple	simple
<i>Base</i>	round, flattened or pointed	round or pointed	round, pointed or flattened	round, (flattened, pointed)
<i>Decoration</i>				
<i>Technique, rim</i>	rocker-stamp	rocker-stamp, simple comb impression (?)	rocker-stamp, simple comb impression (?)	rocker-stamp, simple comb impression
<i>Technique, wall</i>	rocker-stamp	rocker-stamp, simple comb impression (?)	rocker-stamp, simple comb impression (?)	rocker-stamp
<i>Patterns, rim and wall</i>	Incised Wavy-Line; Dotted Wavy-Line; Orogowdé	Dotted Wavy-Line; Laqiya	Dotted Wavy-Line; Laqiya	Dotted Wavy-Line; Laqiya
<i>Arrangement</i>	horizontal bands, repeated and linked	horizontal bands, repeated and linked	horizontal bands, repeated and linked	horizontal bands, repeated and linked

Tab. 3. Leiterband pottery: regional characteristics.

Dotted Wavy-Line ~ 5000/4500 BC Hunter-gatherer-fishers Site	Region:	Region:		Region:
	Ennedi Mountains	Westnubian Palaeolake Basin		Middle Wadi Howar/Rahib
	Delebo	S98/20	S98/21	80/87
Analyzed by	B. Keding	B. Keding	B. Keding	F. Jesse
<i>Technological attributes</i>				
<i>Temper composition</i>	mineral	mineral and organic	mineral and organic	mineral
" quantity	moderate	heavy	heavy	heavy
" quality	fine to coarse	fine to coarse	fine to coarse	fine to middle
<i>Manufacturing technique</i>	coiling	coiling	coiling	coiling
<i>Surface treatment, outside</i>	smoothed or burnished	smoothed or burnished	burnished or smoothed	burnished or smoothed
<i>Colour, outside</i>	brown	ochre or brown	brown	red-brown
" , inside	brown	grey or brown	brown	red-brown
<i>Fracture, colour(s) and number of zones</i>	grey 1 zone	black / grey 2 zones	brown / black 2 zones	black-grey 1 zone
<i>Firing atmosphere</i>	reducing	reducing	reducing	reducing
<i>Forms</i>				
<i>Vessel</i>	Pots, bowls, dishes	pots, bowls, dishes	pots, bowls, dishes	pots, bowls
<i>Rim</i>	simple	simple	simple	simple
<i>Base</i>	round, flattened or pointed	round or pointed	round, pointed or flattened	round, (flattened, pointed)
<i>Decoration</i>				
<i>Technique, rim</i>	rocker-stamp	rocker-stamp, simple comb impression (?)	rocker-stamp, simple comb impression (?)	rocker-stamp, simple comb impression
<i>Technique, wall</i>	rocker-stamp	rocker-stamp, simple comb impression (?)	rocker-stamp, simple comb impression (?)	rocker-stamp
<i>Patterns, rim and wall</i>	Incised Wavy-Line; Dotted Wavy-Line; Orogowdé	Dotted Wavy-Line; Laqiya	Dotted Wavy-Line; Laqiya	Dotted Wavy-Line; Laqiya
<i>Arrangement</i>	horizontal bands, repeated and linked	horizontal bands, repeated and linked	horizontal bands, repeated and linked	horizontal bands, repeated and linked

styles within each horizon vary considerably. Secondly, an examination of the temper, firing technique and surface treatment suggests spatially discrete manufacturing traditions. This is the case for both the Dotted Wavy-Line and the Leiterband horizons. Thirdly, though the attributes vary widely, the technological traditions that structured ceramic production seem remarkably similar in their spatial structure over time.

Temper material

A closer look at the composition of the temper in the Dotted Wavy-Line and Leiterband pottery reveals a spectrum that includes sand, crushed quartz and organic materials as the main components. At the same time, the compositions in the different regional assemblages indicate three distinct patterns. The Dotted Wavy-Line pottery assemblages from the Middle Wadi Howar and the Ennedi Mountains are generally similar, with a dominance of sand and crushed quartz. The assemblages from the West Nubian Palaeolake Basin, on the other hand, are clearly different: crushed quartz is almost totally absent and up to 60% of the vessels have an organic temper. The same threefold pattern is visible in the Leiterband horizon: again, the pottery from the Middle Wadi Howar and the Ennedi Mountains shows the same general trend with a dominance of sand and crushed quartz, whereby the amount of crushed quartz is considerably higher in the latter region. In contrast, pottery from Site S99/1 in the West Nubian Palaeolake Basin is heavily tempered with organic material.

Surface treatment

The surface treatment reveals a similar picture. During the Dotted Wavy-Line period, the dominant attributes in all three areas are the same - smoothing and burnishing - even if there are proportional differences. However, while the pottery from the Middle Wadi Howar and the Ennedi Mountains is very homogeneous, the pottery from Site S98/21 in the Paleolake Basin is much more diverse. In the Leiterband horizon, the treatment of the outer surface shows a less clear picture: burnished surfaces generally dominate but the degree of care taken varies, with the assemblages from the Ennedi Mountains showing the greatest tendency towards higher quality.

Colour of the fractures

A third attribute worthy of mention is the colour of the fractures. Even if this is influenced by variable conditions, it does provide information about methods, which are also a feature of tradition. In the Dotted Wavy-Line horizon, in all three areas, the pottery fractures are usually not zoned but rather a monochrome grey or black indicating firing in a reducing atmosphere. However, while grey clearly dominates in the pottery from the Middle Wadi Howar and the Ennedi Mountains, in the case of the West Nubian Palaeolake Basin both the

inner and outer edges of the fractures show a wider range of colours. During the Leiterband phase, the structure and colour of the fractures point to the use of several methods with different firing conditions – a reducing atmosphere in the Ennedi Mountains and West Nubian Palaeolake Basin, but oxidising conditions in the Middle Wadi Howar. While the pottery from the last area is characterised by fractures with three colour zones - red outer zones and a grey to black core, the fractures in assemblages from the Ennedi Mountains and the West Nubian Palaeolake Basin are usually monochrome grey or black.

To sum up: On a regional level, the technological styles indicate at least three different expressions within each horizon, which are typical for the different areas – the Middle Wadi Howar, the Palaeolake Basin and the Ennedi Mountains. These might represent different traditions. While the technological features analysed are not always constant over time (e.g. the composition of the temper material in the Dotted Wavy-Line and the Leiterband pottery), the three different technological styles remained stable in their spatial structure for several thousands of years.

The Handessi horizons

The study of the technological styles in the Handessi A and B horizons is restricted to assemblages from the Middle Wadi Howar. There are no sites with this type of pottery in either the West Nubian Palaeolake Basin or the Ennedi Mountains (Tab. 1).

An overview of attribute variability in the Handessi horizons is very informative. Two aspects are particularly intriguing. Firstly, the variety of technological styles in Handessi A and B seems to be much greater than in the previous pottery horizons. However, this could be the result of evolving functions for both sites and pots. For example, the temper composition is clearly dominated by sand and organic material, but in varying proportions, quantities and qualities throughout both horizons. The treatment of both inner and outer surfaces is particularly varied in the Handessi A horizon: coarse burnish or burnish with visible stroke marks dominate but smoothed surfaces are also found. The outer-surface treatment in the Handessi B assemblages seems to be more narrowly defined. Firing techniques are not uniform: fractures show single as well as two-zoned colours and the inner surface is sometimes smudged. There is a similar diversity in the decoration parameters: techniques as well as patterns show a much wider range than in the older assemblages. Secondly, the technological styles of both Handessi horizons show significant differences in nearly all their attributes when compared with the earlier horizons. This is true of the temper, the manufacturing technique, the main outer-surface treatment, the firing technology and some pottery shapes as well as the decoration parameters. Thus, a clear break emerges in the basic concept of the pottery: this applies to

both the technological features and the decoration style as well as, probably, practical and social functions.

What do these trends mean?

If the above-mentioned assumptions are correct – that technological attributes yield information about traditions and reflect the introduction of inventions and the existence of “production centres” – the following conclusions can be drawn from the examination of the technological complex:

So far, the investigation reveals an archaeological record that reflects a separate evolution in each area studied as well as the influence of various neighbouring traditions at different times.

Entrenched social boundaries seem to have been established already in the Dotted Wavy-Line period. Assemblages from the Ennedi Mountains and the Wadi Howar, in particular, seem to be clearly defined. In contrast, the assemblages from the West Nubian Palaeolake Basin are more diverse; they share some traits with both the western and south-eastern assemblages but are also characterised by some important technological differences. This combination shows that this area had its own distinct technological style.

With the transition to the Leiterband horizon the picture of separate regional traditions does not change. Despite the transition to a cattle-herding economy, which must have involved changes in the organisation of labour, mobility and ideas regarding land use and ownership, the social boundaries reflected in the technological differences remain remarkably stable in all three areas and only gradually become more pronounced as time passes. On a general level, these boundaries are reflected in a more careful pottery manufacture in the Ennedi Mountains and a rather negligent finishing of the ceramics in the West Nubian Palaeolake Basin. In detail, they are demonstrated by technological attributes like temper and firing techniques. Functional differences related to micro-differences in subsistence practices between the plain and the mountains may have generated a demand for different vessel forms in each region. These findings do not negate the arguments for direct contacts with cattle herders or partial emulation. Principally, however, they support a model of in-situ development of the populations in the Wadi Howar region during the transition process from Dotted Wavy-Line to Leiterband pottery rather than a model of population replacement.

With the emergence of the Handessi horizons, technologically different ceramic traditions became established in the Wadi Howar region. The earlier discrete social affiliations vanished – probably due to the increasing aridity as well as a population shift. Even if some of the new technological attributes can be interpreted as technical improvements, distinguishing techniques in manufacture, temper, and surface treatment as well as in vessel forms hold the key to a differ-

entiation between the earlier and later horizons. All the decorative parameters - technique, pattern and arrangement - can be added to this list. What emerges from a comparative analysis of the Handessi horizons is a picture of increasing diversity due to the implementation of a set of already known but seldom used technologies. This pattern suggests an immigration of people, probably from the north. As shown by Friederike Jesse and Matthias Lange for the Wadi Hariq 400 km to the north east and the Wadi Shaw (both in this volume), similar pottery to the Handessi A horizon existed already in these areas (Jesse et al. 2004). At the same time, groups with different types of geometric-patterned pottery become archaeologically visible in the Ennedi Mountains (Bailloud 1969).

The decoration complex

Finally, a brief consideration of decoration styles: according to Carr's model, these often signal interaction between groups. They thus reflect different social affiliations rather than technological styles. I will not go into great detail here but simply mention the distribution of the decorations, which reveals a somewhat different picture to that drawn by the distribution of technological styles. It also demonstrates important chronological changes.

The Dotted Wavy-Line and Laqiya horizon (Fig. 4)

In the Dotted Wavy-Line horizon, assemblages from the Wadi Howar region and the West Nubian Palaeolake Basin are decorated with Dotted Wavy-Lines and their typically associated decorations, as well as with Laqiya patterns (Jesse 2002; 2003). Both types appear on technologically equivalent shards. Laqiya patterns are typical of a more regional pottery facies with its centre in the Laqiya area, 400 km to the north (Schuck 1989), and a distribution from the Selima Sandsheet in the north to Djebel Tageru to the south (Jesse 2002). The regular association of Dotted Wavy-Line and Laqiya decorations clearly demonstrates a relationship between the people of the two regions. In contrast, there is no pottery with the Laqiya pattern in the Ennedi Mountains (Bailloud 1969). Instead, the assemblages have a new type of Wavy-Line pattern – the Orogowdé pattern. This decorative element seems to be merely an addition to the older inventory, but it is found on a particularly fine type of ware. Thus, at the time of the Dotted Wavy-Line Horizon, the Ennedi Mountains marked a cultural or “social” boundary, which divided the Dotted Wavy-Line Horizon into an eastern and a western decoration facies (for details of the differences in the design style see Jesse 2002).

The Leiterband horizon (Fig. 5)

The distribution pattern changes with the transition to a cattle-keeping economy. During the Leiterband period, all three areas share the same pottery

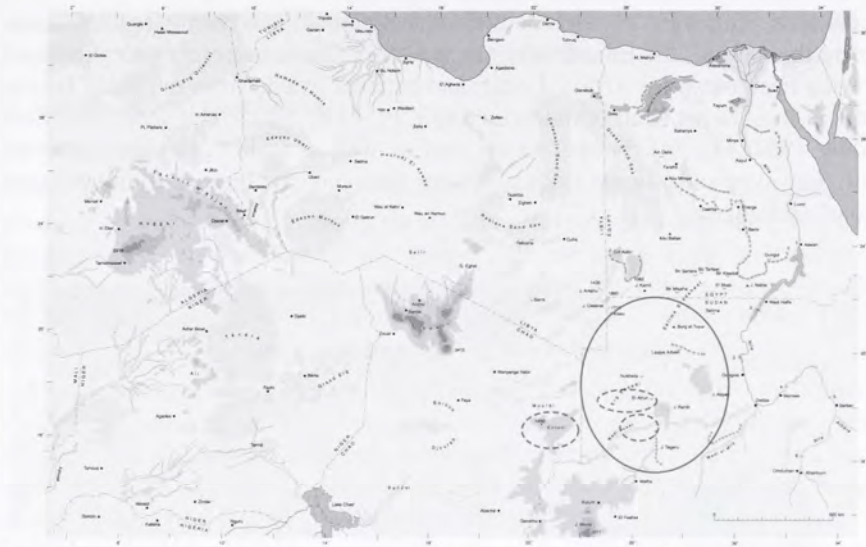


Fig. 4. Dotted Wavy-Line and Laqiya patterned pottery: distribution of decoration (continuous line) and regional technological traits (discontinuous line).

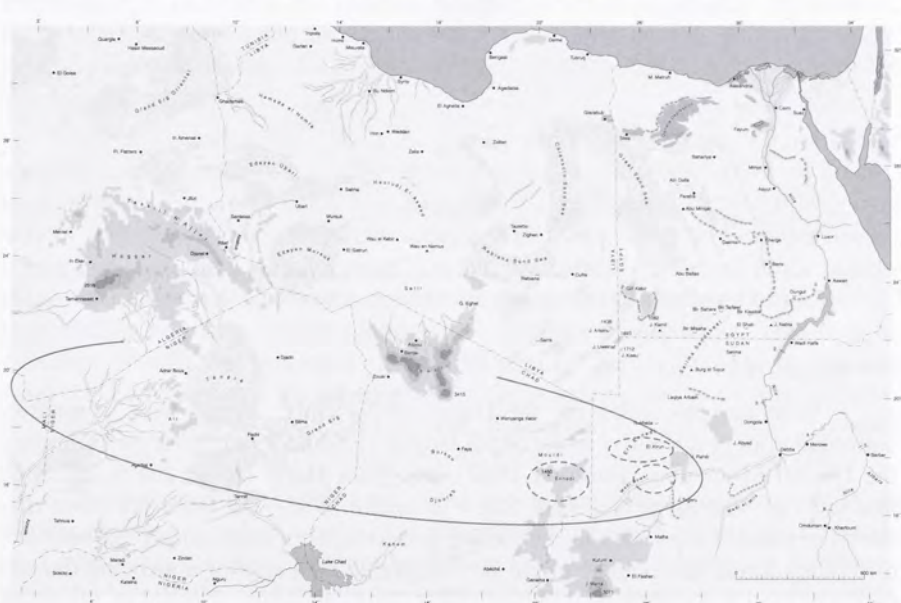


Fig. 5. Leiterband- and Halbmondleiterband patterned pottery: distribution of decoration (continuous line) and regional technological traits (discontinuous line).

decorations, although in slightly different regional and chronological forms. During this period, the Ennedi Mountains seem to have been a “cultural bridge” between East and West Africa: Leiterband patterns extend from the Wadi Howar in the east as far as Mali (Commelin 1983, Pl. LIV, 3-7) to the west (overview Keding 1997, Fig 74). Further to the east as well as to both the north and the south, however, only single finds of Darfur axes indicate the possibility of some kind of exchange.

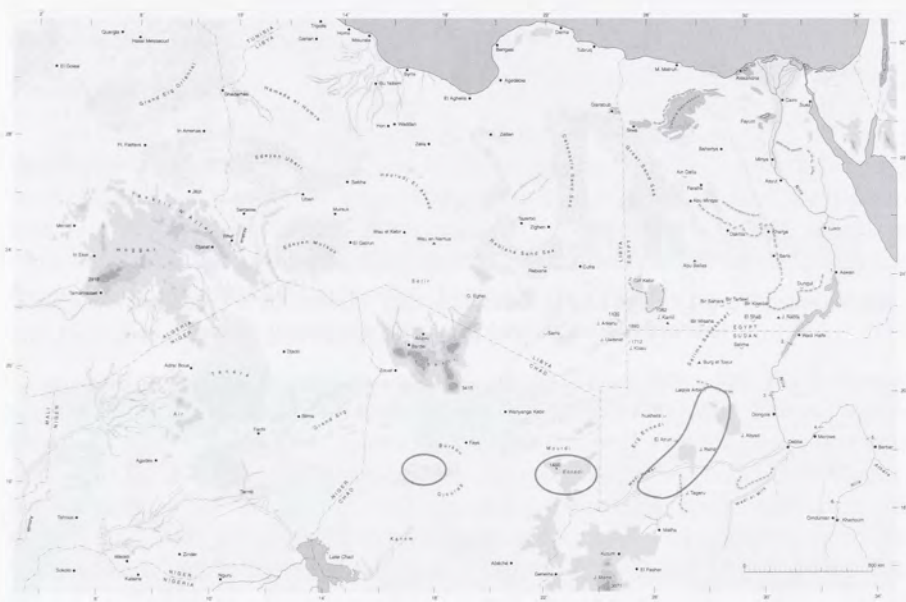


Fig. 6. Geometric-patterned pottery: distribution of decoration (continuous line).

The Handessi horizons (Fig. 6)

With the emergence of the Handessi horizons, groups with geometric-patterned pottery appeared in the Wadi Howar (Keding 1998; Jesse this volume), the Ennedi Mountains (Bailloud 1969), the Wadi Hariq (Jesse this vol.; Lange this vol.) as well as in the Wadi Shaw (Francke 1986), but there are more distinctly regional facies than in the earlier horizons. This increasingly “conscious” differentiation in the pottery might be interpreted as a sign of a growing demarcation of land and resources (Hodder 1982). This development could be the result of a decline in resources due to the increasing aridity and also be linked with growing population pressure due to immigration. At the same time, social proc-

esses such as a gradual “closure” of the societies (Lourandos 1997) due to increasing stratification must also be taken into account.

4. Summary and conclusion

To recapitulate:

Technological styles – as probable indicators of cultural affiliations among producers – demonstrate a strong regional imprint from the beginning of pottery production in the Wadi Howar region and adjacent areas. They indicate shared traditions in the sense of inherited suggestions and limitations. However, these local social units or “production” systems were not autonomous. This is underlined by the distribution patterns of the decoration styles.

Decoration styles – as probable indicators of cultural networks – cover a much larger area, uniting the different local technological styles in the regions studied. The similarities between decoration patterns indicate a shared set of ideas about the appropriate way to decorate pots. They may well also suggest shared ideas concerning ideology and/or “identity” and/or possible alliances.

The distribution areas of the technological and the decoration styles are not identical. Moreover, the boundaries between both styles are not equally emphasised in each area and indicate different degrees of stability. In addition, the production units seem to remain stable for a long period, while the larger networks show pronounced changes over time. This last point seems to prove the validity of Carr’s model.

The most drastic changes in the pottery and in the economy do not appear simultaneously, although points of discontinuity in the stylistic sequence do correspond to economic changes. For example, the adoption of a food-producing way of life – a step which is usually seen by archaeologists as an essential demarcation line in cultural “development” – is less dramatically reflected in the pottery than the later transition to increased small-livestock keeping, which would theoretically be just a logical adaptation to the drier environment. This may be evidence of different processes of cultural change. While it could be inferred from these findings that the transformation from hunting and gathering to cattle-keeping was largely an emulation process, the second change to small-livestock keeping would seem to have coincided with the immigration of new people.

As indicated by the last two of the above-mentioned processes, the Wadi Howar region was indeed a crossroads of cultural influences. However, the study also shows that this region cannot be viewed as a passive recipient of influences from the Nile Valley and the northeast throughout the course of its prehistory. A more appropriate model is one in which the resident population exhibited a whole range of responses to increasing aridity and demographic shifts within the

basin. These responses included emulation, the adoption of new technologies from other regions, the integration of immigrants and - at least at the end of the occupation sequence - migration.

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Rudolph Kuper

An attempt at structuring the Holocene occupation of the Eastern Sahara.¹

Looking at the six volumes of “proceedings” of the past Poznan symposia edited by Lech Krzyżaniak the efforts made to find always a suitable title for the volumes are obvious. Especially the time range seemed to have been sometimes difficult to define. Whether the distinction between „Late“ and „Later Prehistory“ has a particular meaning is hard to say, but in general this term seems to have been chosen wisely, even if (or because of?) its exact range is not very clear. To use for instance the concept of „Later Stone Age“ would not have been possible. Although more or less contemporaneous, it has the special meaning of „LSA“ in Sub-Saharan Africa. So “Later Prehistory” appears quite practical to cover the particularly complex chronological situation in the whole of Northeastern Africa, only a part of which shall be subject of the following considerations

Even in European prehistorical research with more than 100 years of experience, an attempt to cover larger areas with one chronological system is a difficult task (e.g. Lüning 1996). Varying definitions, differences in time and space and the often arbitrary use of terms basically hamper the establishment of a generally acceptable chronology. This is even more difficult in Africa which, also, is carrying a colonial burden in archaeology by the partition of the continent into Anglophone and Francophone spheres as well as by the often uncritical assignment of European ideas and terminology to African cultural circumstances.

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One example is the term „Middle Stone Age“ which only partially corresponds to the European „Middle Palaeolithic“ and should by no means be identified with the German term „Mittelsteinzeit“, meaning „Mesolithic“. Middle Stone Age is used in Sudanese archaeology, completely isolated from its special relation to the environmental and cultural circumstances of the Northern European Mesolithic for which it was coined. In the Sudan it is used for a prehistoric group with a hunting and fishing economy and already producing ceramic (generally known as „wavy line pottery“) with dates going back to the ninth millennium B.C. representing the earliest evidence for this technological advance in the Old World.

There is, especially concerning Northern Africa, an ongoing discussion concerning the cultural and historical meaning of pottery, focusing especially on the question as to what extent the appearance of ceramic technology justifies the use of the term „Neolithic“. The economic definition in the sense of Gordon Childe (1962:66) is broadly accepted among European (Anglophone) scholars whereas its use in Africa outside of the Egyptian Nile valley seems to be rather improper and even misleading. Basic objections in this regard were raised on well founded principle (e.g., Klees 1993; Sinclair et al. 1993) since the transition toward a productive economy in many parts of Africa did not run linearly in the evolutionary sense, but shows great differences in time, space and meaning. The recommendation concerning the term „Neolithic“ which was already formulated during the Burg-Wartenstein-Symposium in 1965, namely „that it be used with greatest care and that it be clearly defined in all cases“ (Bishop & Clark 1967: 898) has generally not been adhered to, just as the proposal to drop this term for Africa completely was not followed (Shaw 1967; Sutton 1973).

This is particularly relevant to the case of Northeastern Africa. Here the discussion about the rise of the Neolithic phenomena and the related terminology is mostly dominated by the extensive research between Jebel Nabta and Bir Kiseiba initiated by Fred Wendorf in 1972 and since then carried out together with Romuald Schild by the American-Polish-Egyptian „Combined Prehistoric Expedition“ (CPE). The impressive results which seem to elucidate the archaeological vacuum of an area the size of Western Europe is deceiving since the results came, in comparison with the core desert, from a relatively limited and hydro-geologically favoured area ca. 100 to 150 km west of the Nile. Publication titles like „Prehistory of the Eastern Sahara“ however create the impression of a transregional validity, reflected by the reception in literature of the proposed chronological sequences. The chronological division into „Early, Middle, Late and Final Neolithic“ (most recent Wendorf & Schild 2004) was in part based on the still controversial assumption of cattle domestication already in the ninth millennium B.C. and also on a synthesis of intensive geochronological observa-

tions, typological studies and radiocarbon dating. During the last years this sequence has experienced several chronological changes and additions (compare Wendorf, Schild & Close 1984: 7 and Wendorf & Schild 2004), but continues to be helpful as an orientation for the correlation of neighbouring regions.

This to a certain extent is also true for the since 1980 funded DFG-project „Besiedlungsgeschichte der Ost-Sahara“ based at the Institute of Prehistory at the University of Cologne. Its acronym B.O.S. may also be seen as an expression of the wish, stimulated by the research of the "CPE", to find definite proof for cattle domestication. However this project focused, from the beginning, mainly on large scale aspects of landscape archaeology which has continued to be a central topic of the Collaborative Research Centre ACACIA (Arid Climate, Adaptation and Cultural Innovation in Africa) at the University of Cologne, since 1995). Long term field research has been carried out along a North-South transect of about 1500 km between Siwa Oasis and the Wadi Howar in 40 research areas spanning eight geographically different regions. The results of the research should permit a comparative method to identifying overlapping general trends in the Holocene environmental and cultural development. Besides compiling regional cultural sequences and their dependence on environmental changes in the nearer surroundings, special attention is paid to the larger scale climatic development within the transect, which, since it includes summer- and winter rain areas in different latitudes, has different climatic preconditions (Fig. 1).

The regional cultural and climatic sequences strived for, with regard to large scale comparisons, naturally do not only reflect the specific data base of a certain area but also the individual view and the ideas of the individual authors, behind whom we often find different concepts of culture and time (see Gehlen et al. 2002). And so it seems even more necessary to have available for the chronological understanding within an area the size of Western Europe, and spanning the whole of the Holocene, a time- and terms-reference facilitating discussion of the different cultural phenomena and developments and their reciprocal relationships.

Certainly there are available sufficient radiocarbon dates to work without such reference terms for certain periods or phases; one could instead, for example, talk of the 8th or 3rd millennium B.C. But such a schematic raster alone is not appropriate to elucidate historical contexts and to serve a more general, extensive chronological orientation. This task could well be fulfilled by the term „Neolithic“ including respective subdivisions were there not, in addition to the fundamental doubts described above, more arguments against it: Concerning the economic base, in the Eastern Sahara we do not have any early proof for plant domestication while a number of indications and arguments point towards an intensive use of wild grasses. Moreover the alleged domestication of cattle

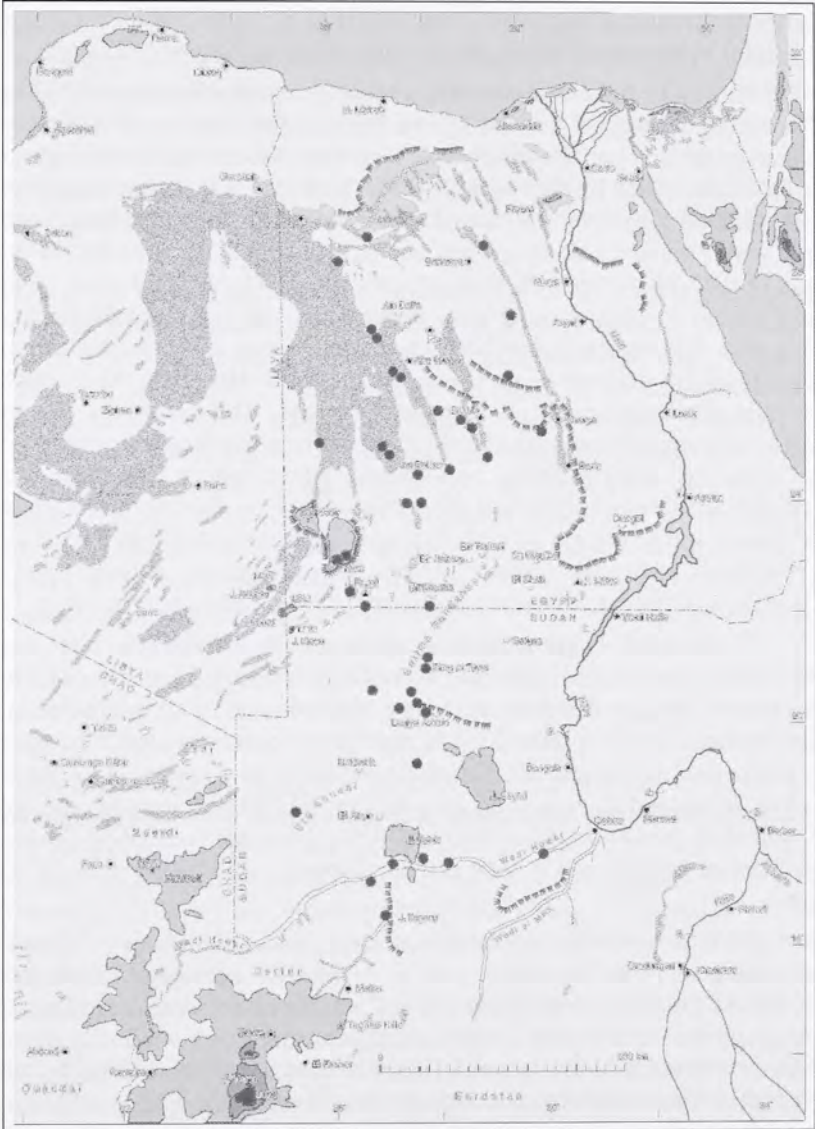


Fig. 1. Northeastern Africa with the research areas of the Cologne based DFG projects „Besiedlungsgeschichte der Ost-Sahara“ (B.O.S.) und SFB 389 „ACACIA“ (Arid Climate, Adaptation an Cultural Innovation in Africa).

already during the 9th millennium B.C. is still disputed and up to now limited to the area of Nabta Playa and Bir Kiseiba, so that one can hardly expect to develop any validity concerning a chronology of the Neolithic (including Holocene) covering the whole of the Eastern Sahara.

This conclusion is strengthened by the principle argument of Uerpmann that archaeology making itself dependent of economic data is giving up its own competence in dating (Uerpmann 1979:9). Having this in mind interpretative terms like „Pastoral“ appear unsuitable even for the chronological classification of relatively limited areas and seem to be useful only as an attributive addition to neutral terms for phases or periods (Cremaschi & di Lernia 1998; Barich 2002: Fig.13.4; di Lernia 2002: 280 ff.).

In general the mostly bad preservation of archaeozoological and archaeobotanical remains provide, at best, regional evidence, but by no means large scale assignments. The term „Keramikum“ or „Ceramic Age“ could perhaps serve best, as it has repeatedly been proposed (Pittioni 1950; Wendorf 1968: 1042; Kuper 1995: 125) as one solution towards an autonomous archaeological terminology. The appearance of pottery simultaneously with the re-occupation of the Eastern Sahara during the 9th millennium B.C. seems to hold true in an area along the southern fringes of the Sahara between the Nile and the Niger. In the North of the Libyan Desert where the earliest remains of Holocene occupation (Great Sand Sea) are clearly Epipalaeolithic (Riemer 2002), unequivocal early dated pottery is missing up to now. Considering the lack of original sources and the difficulty to define suitable scopes, it seems advisable for the time being, to abstain from prejudiced terms.

A way out of this dilemma and a practical solution providing a way to communicate concerning certain periods or phases in question, is given by the more than 500 radiocarbon dates available from archaeological contexts in the Eastern Sahara. They directly reflect human activities in the present-day desert areas and thus represent an independent, primary archaeological source (Fig. 2). There is however the danger that due to the use of cumulative curves some exceptionally well dated sites might lead to a distorted picture. Nevertheless in connection with the related archaeological finds and features, and their relationship to the geographical conditions of the various research areas, tendencies of a wide range occupational sequence depending on geographical latitude and the respective climatic conditions can be identify. The following division into „Early, Middle, Late and Final Holocene occupation of the Eastern Sahara“ allows a comparative synopsis of the cultural development between Siwa and the Wadi Howar.

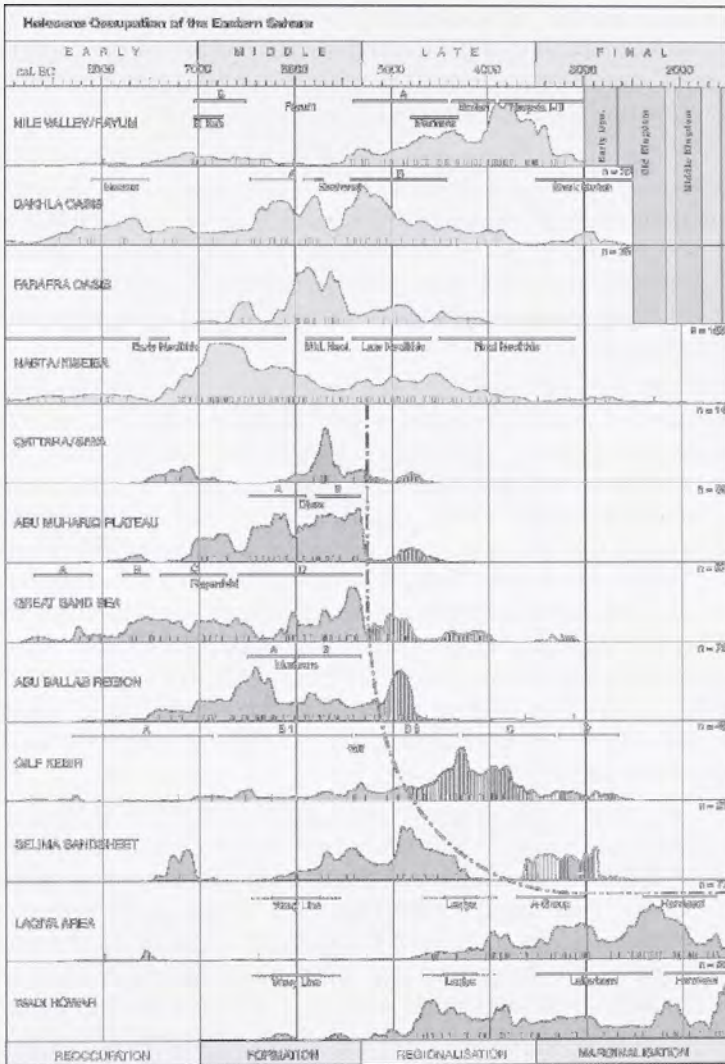


Fig. 2. Sequence of the Holocene occupation of the Eastern Sahara diagrammed by north-south arranged cumulative curves of the calibrated radiocarbon dates from the projects B.O.S. and ACACIA (dark coloured). On top, for comparison (light coloured), dates from the Nile valley, the Egyptian oases and the region Nabta / Kiseiba. The dashed line marks, following the geographical latitude, the break of occupation in the rain dependent parts of the core desert. Dates right of the line (shaded) belong to sites close to permanent water or extrazonal favoured areas like the Gifl Kebir. (Calibration by the version Cologne 2003 of the program CALPAL by B.Weninger.)

During the Early Holocene a time of „Reoccupation“ of the Eastern Sahara can be defined as starting with the northward shift of the monsoonal rains and the consequent savannah vegetation ca 8,500 B.C. and ending around 7,000 BC.

The earliest dates, shortly after 9,000 B.C., come from the area of Nabta Playa / Bir Kiseiba (Wendorf & Schild 2001: 52), while the occupation of the areas more to the Northwest as for example the Gilf Kebir and the Great Sand Sea only begins in the second half of the 9th millennium (Linstädter & Kröpelin 2004: 765; Kröpelin 2005: 57; Riemer 2002). This period comprises the phases El Adam and El Ghorab of the Early Neolithic according to Wendorf and Schild, the Masara Period of the Dakhla area (McDonald 2001), the Epipalaeolithic sites of the Great Sand Sea (Riemer 2002) and the Phases A1 and A2 in the Gilf Kebir (Linstädter 2005: 359). The localization of the place of origin of this resettlement is one of the unsolved question of this period, similar to the question of proof for early cattle keeping mentioned above. The Epipalaeolithic stone inventory indicates the life of hunter/gatherers but who, at least in the Southern part of the research area, already possessed pottery (Jesse 2003: Abb.40).

The following „Formation“ period, the middle period of the occupation of the Eastern Sahara comprises the timespan between 7,000 and 5,300 B.C., the main phase of settlement in the Libyan Desert. While the radiocarbon curves for most of the areas indicate continuous settlement activities, at Nabta Playa / Bir Kiseiba around 6,000 B.C. a hiatus appears between the Early Neolithic phases of El Nabta / El Jerar and the following phase of Ru'at el-Ghanam that covers the whole of the Middle Neolithic. This discontinuity obviously is also mirrored by some wide range cultural changes that include the introduction of sheep and goat from the Near East as well as the appearance of undecorated pottery that, e.g. in the Abu Ballas area, allows to distinguish between the phases Mudpans A and B (Kuper 1995). Possibly here the impact of a climatic event becomes visible which around 6,200 B.C. changed drastically the living conditions in the Near East (Weninger et al. 2005). At the same time, according to the predominance of bifacial artefacts also in the stone technology, a change is visible dividing around Dakhla oasis the phases Early and Late Bashendi A (Mc Donald 2001) and on the Abu Muhariq Plateau Djara A from Djara B (Kindermann in print: Fig.7). The most important cultural change however concerns the establishing of stock keeping. Here, in contrary to the traditional, Near Eastern model of „Neolithisation“ a North African variant of this transition becomes visible, since here obviously not nomadic hunter and gatherers became settled farmers, but relatively localised foragers changed their lifestyle to pastoral nomadism.

The end of the Middle Holocene occupation is marked on the Abu Muhariq Plateau by an abrupt break in the data curve around 5,300 B.C., that also is visible in other areas located distant from permanent groundwater, as the

central Great Sand Sea. Here obviously only the marginal parts continued to be used which were situated within the reach of the oases. The same is true for the Abu Ballas Area, where the region of Eastpans, that still shows well established cattle keeping around 5,000 B.C., seems to have been related by transhumance to Dakhla oasis. Obviously this break also left its traces in the Central Sahara. Here the continuous Holocene data sequence of the Acacus mountains in Western Libya also shows a clear hiatus at this time (di Lernia 2002: Fig.14.3).

In general the subsequent late occupation of the Eastern Sahara, a period of „Regionalisation“ between 5,300 and 3,500 B.C., is marked by an retreat into regions close to permanent water or favoured areas like the Gilf Kebir or to the plains to the south which were still within the reach of the monsoonal rains. Such wide range movements also can be traced in the archaeological material. The most remarkable event in the history of settlement happened around 5,300 B.C. when at the moment of the breakdown of occupation in the central parts of the desert, permanent settlement started in the Fayum and in the Nile valley. Here they formed the base of the early farming communities and their offspring, the pharaonic civilisation. This process lasted, altered by influences from different directions, far into the 4th millennium B.C. Within this process the origins of agriculture can be traced back to the Near East while the pastoral elements go back to Saharan roots, where besides the economic value of cattle also its ideological significance is of particular importance (Kuper 2006). The end of this period is indicated by the decline of occupation in the Gilf Kebir during phase C, obviously reflecting the definite progress of the desert, causing at the same time in the Southern part of the Libyan Desert new focuses of settlement in the regions of Laqiya and Wadi Howar, that had only been sparsely inhabited before.

The period of „Marginalisation“ of the Eastern Sahara during its final occupation comprises from 3,500 B.C. onwards also the late Predynastic and the Pharaonic time in Egypt. During this period at the Southern fringes of the desert obviously a culture of specialized cattle pastoralists developed that later became a main base of subsistence in the extended arid zones all over the continent. In the Laqiya area (Northern Sudan) related to a variant of the Nubian A-Group (Lange 2004), this cattle keepers are best represented in Wadi Howar at the site of Djabarona which is characterised by abundant pottery of the Leiterband type (Keding 1997). But also here the desert was in progress as is reflected during the Handessi-Phase of the 2nd millennium by a decrease of cattle bones and a predominance of sheep and goat among the archaeozoological material.

With respect to an general dearth of archaeological data and finds, the Northern part of the Libyan Desert beyond the Egyptian oases for long has been regarded as void of any human occupation during this period and thus outside of the pharaonic sphere of interest. New finds and findings now provide another

picture. This includes ceramic objects of until now unknown function, so called „Clayton rings“ (Kuper & Riemer 2000), that indicate an obviously episodic presence of people still around 3.000 B.C. even in such remote areas like the Western side of the Great Sand Sea. Moreover there have been discovered during the last years a number of pharaonic road stations that integrate the for long known place of Abu Ballas into a West and South-West bound road network, that according to the ceramic material, has been in use from the Old Kingdom to Late Dynastic times (Kuper 2001; 2003). While these stations presumably served for controlling the import of African luxury goods, that otherwise only reached Egypt via Nubia, a desert camp established under pharaoh Khufu West of Dakhla and also used under his son Djedefre, shows that already during the Old Kingdom laborious and expensive expeditions were sent to remote desert areas in order to acquire rare raw materials (Kuhlmann 2002; Kuper & Förster 2003). Hereby is documented that the network through the Western Desert established during the Early- and Mid-Holocene Wet Phase, has been continuously and much longer in use than was to be inferred from the later negative image of the desert and the lack of archaeological sources.

The cultural substance of the Holocene sequence outlined here in short is the outcome of an essay of the history of settlement of an archaeological terra incognita that was demanding great efforts in time and logistics. It shows that cultural development and population movements in the Eastern Sahara, driven by climatic change, essentially influenced the historical dynamics throughout the African continent. With regard to the dimensions of the research area and the rareness of reliable archaeological and environmental data however, the state of our knowledge even after 25 years of research still seems to be patchy. At least it allows us to sketch the outlines of a prehistoric development to which future results can be related. Surely these will alter the picture given above. Future research will show which of the described facts and concepts will prove substantial enough to contribute to the definition of a wide range historical periods. For the time being it seems reasonable to use the time markers detectable within the radiocarbon dates independently of their cultural context for a neutral classification. Such a structure featuring an Early, Middle, Late and Final Holocene occupation of the Eastern Sahara might, where possible, well be supplemented by regional time scales (e.g. „Regenfeld A ,B, C, D) or cultural attributes (e.g. „Neolithic“ or „pastoral“).

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Mathias Lange

The archaeology of Wadi Hariq (NW-Sudan): Results from the excavations 1999 and 2001.

Abstract:

During two seasons of excavation and intensive surface survey carried out in Wadi Hariq (NW-Sudan) in 1999 and 2001 more than 100 archaeological sites have been found. Two of these will be presented here. Pottery from these sites allows a classification to two different phases of the Handessi Horizon (ca. 2200 to 1500 BC). Bone finds indicate a subsistence as herders. Comparison of pottery decoration styles shows connections to the Nubian C-Group and Kerma culture. Combining this information with the geographical situation and chronological correlation of the sites it is possible to relate the Wadi Hariq dwellers to the Temehu mentioned by Harchuf in his famous report on his third expedition to Yam.

Introduction

In the year 1997 an expedition of the ACACIA project of the University of Cologne, led by R. Kuper and S. Kröpelin, surveyed an extensive wadi system situated in the Northwest of the Republic of Sudan. It lies ca. 300 km west of the Nile Valley and 180 km North of Lower Wadi Howar (Fig. 1). One typical feature of this Wadi system is the remains of intensively burnt, and therefore fritted sediments. These features must be the result of heavy fires on trees and gave the name for the Wadi Hariq, as Hariq is the Arabic word for fire (Jesse et al. 2004: 124). Archaeological sites discovered during this expedition showed large artefact scatters including pottery, bones, grinding implements and lithic artefacts. Thus, two seasons of extensive survey and excavation were carried out in the years 1999 and 2001 to collect a representative database for the study of the archaeology of this region. Most of the sites discovered can be related to the end of the Holocene settlement phase in this part of the Sahara, while the earlier

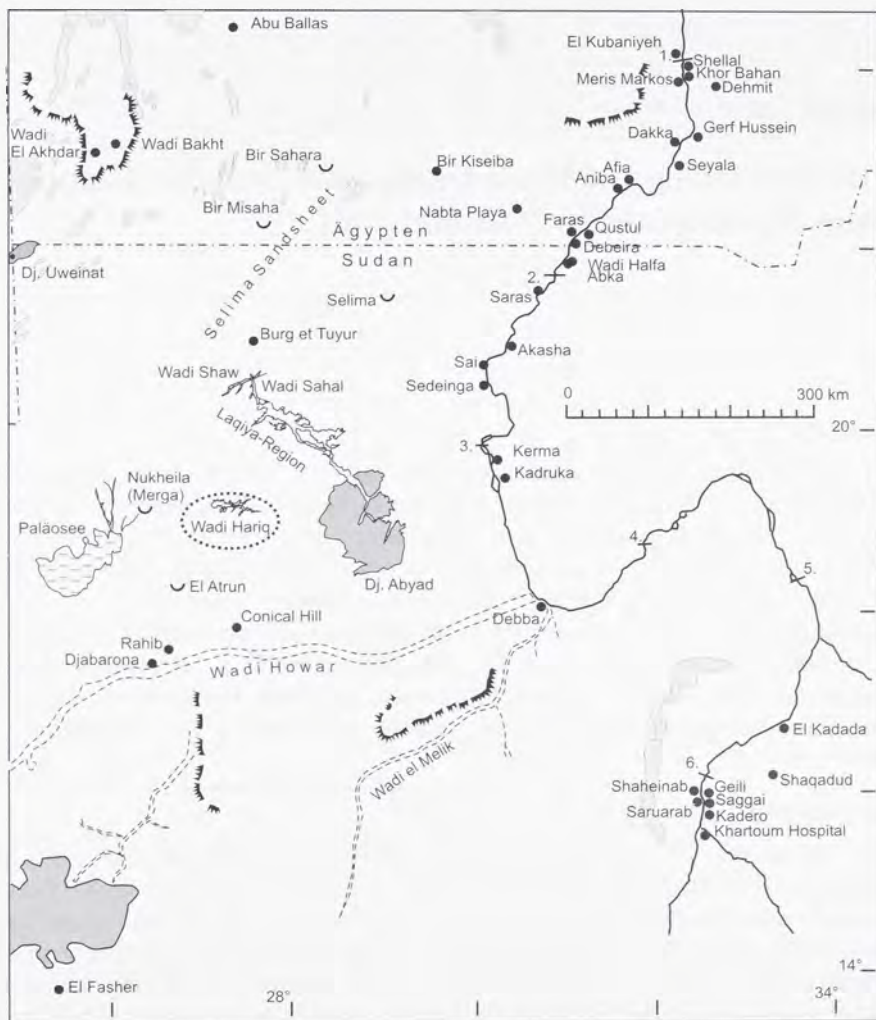


Fig. 1. Map of Northern Sudan with the location of Wadi Hariq.

Holocene and also the Palaeolithic age is represented only by very scarce finds. An overview of the archaeological sequence of Wadi Hariq has been presented elsewhere (Jesse et al. 2004). This paper will concentrate on two settlement sites

of the latest settlement phase, the Handessi Horizon (cf. Jesse this Volume, Keding 1998, Lange in press). The first one, Wadi Hariq 97/7 lies in the eastern part of the wadi system, while the second one, Wadi Hariq 01/1 is lying more to the west. Both sites are situated on the floors of large separated basins containing playa sediments as well as sandy layers.

Wadi Hariq 97/7

This site lies at the south-eastern end of a wadi channel stretching from northwest to southeast and connecting the two main Wadi channels. In an area of ca. 500 by 500 m the whole floor of the wadi is scattered with artefacts in various density. The great majority of the finds is lying in a layer of aeolian sands or on the playa. Only a few finds are still embedded in the playa sediments. A detailed surface survey was carried out with a total station in order to get information about the spatial distribution of the different types of artefacts. In the eastern part of the site, a number of stone settings and knapping sites were more or less well preserved. On the western edge of the wadi, in front of a sandstone cliff, several

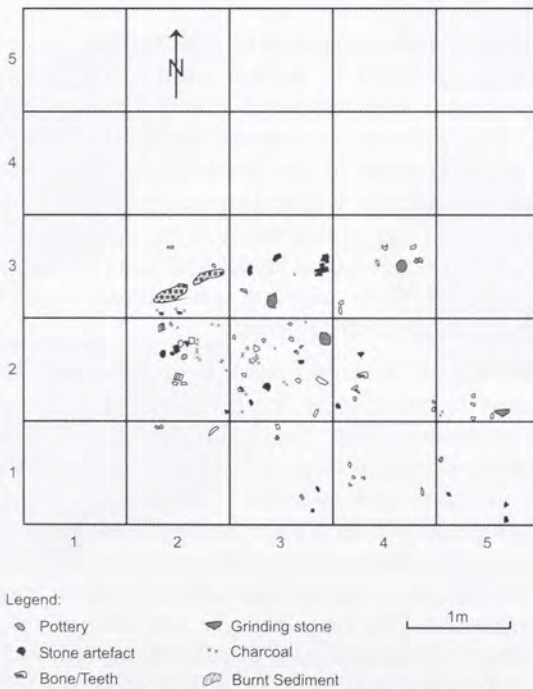


Fig. 2. Wadi Hariq 97/7-1. Excavation area after removal of aeolian sand.

concentrations of pottery, bones, grinding implements and stone artefacts were found. Here an area of 5m x 5m was excavated.

The excavation Wadi Hariq 97/7-1

After cleaning the surface a clear concentration of artefacts still embedded in the playa sediments became visible (Fig. 2). It included pottery, bones, lithic artefacts and grinding implements as well as charcoal concentrations and a few spots of baked sediment. Obviously, this concentration was lying in the area of a fireplace, around which activities of daily life once were centred. Charcoal remains from this concentration were determined botanically as *Acacia spec.* Two 14C-datings gave results of 2055±65 calBC (KN-5327: 3675±40 BP) and 2213±67 calBC (KN-5447: 3785±40 BP).

Pottery

The number of pottery fragments from this excavation sums up to 345 pieces with a weight of 862 g. Most of these are abraded on either one side or both, and therefore only 150 sherds, which were regrouped to 18 vessel units, could be examined.

The pottery was clearly dominated by simple brown wares with a mixture of organic temper and rounded to angular quartz sand grains as non-plastic components (temper group 2c in Jesse et al. 2004). The size of the sand grains is mainly below 0,25 mm, with only exceptional single grains above 0,5 mm. Small amounts of mica occur in some of the sherds. The surface colour varies from brown to dark grey. The average wall thickness lies around 5 mm. The surfaces were smoothed in a simple way so that traces of the smoothing still occur. In one single case a red coating occurs. One vessel unit is an exception though, as its temper contains a high portion of mica and sand with no visible organic remains and its surfaces were smoothed very carefully.

Of 18 vessel units 9 were decorated. Decoration was limited to the rim zone and occurs only in one case on the rim top (Fig. 3.1). Almost all motifs were arranged in horizontal rows. Impressed decorations made either with a comb or with a triangular stamp (Fig. 3.2), as well as Bouton decoration (Fig. 3.1) clearly dominate (conf. also Jesse et al. 2004: Fig. 10). Comb impressions appear on seven vessels, of which 5 show herring bone patterns. In three cases the comb impressions are combined with rows of Bouton decoration, and in three cases with rows of triangular stamps. One vessel shows a complex geometric pattern of comb impressions forming lozenges and chevrons (Jesse et al. 2004: Fig. 10.1). One vessel is decorated with two horizontal rows of irregular stamp impressions (Fig. 3.3). Altogether, this is a typical inventory of the Handessi A Horizon (Jesse et al. 2004: 156-157).

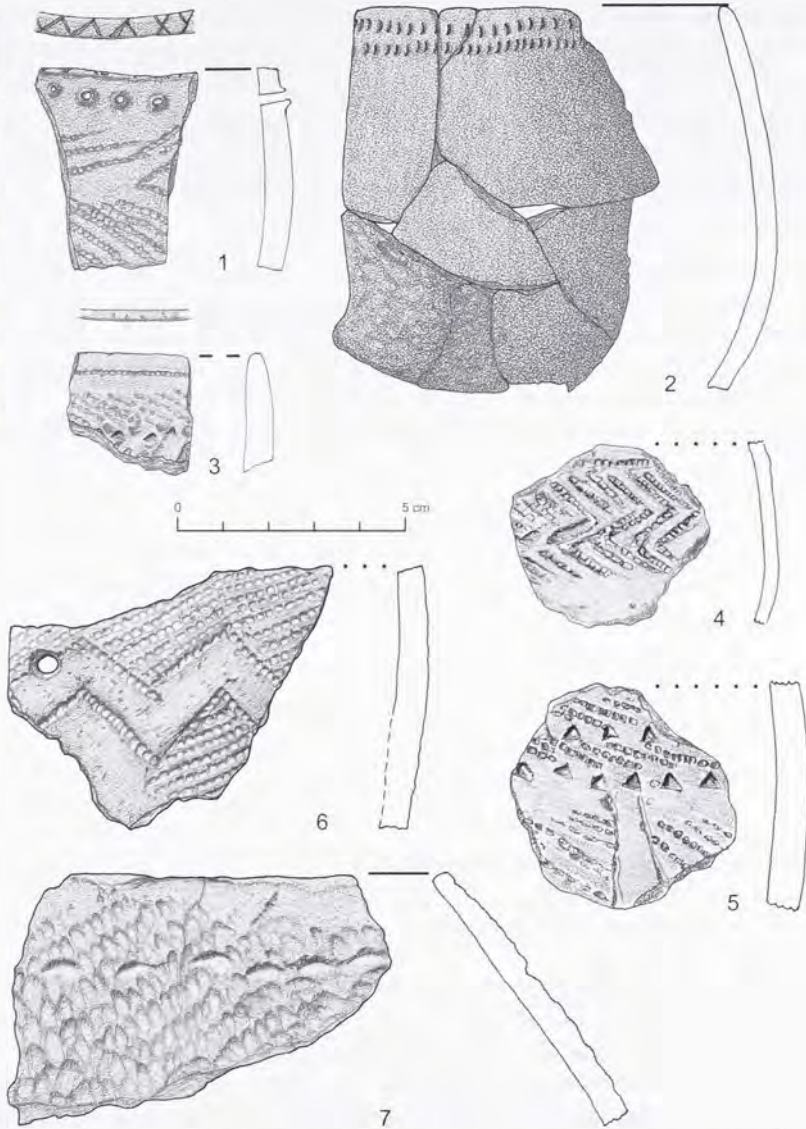


Fig. 3. Examples of Pottery. 1: Wadi Hariq 97/7-1, VU 3; 2: Wadi Hariq 97/7-1, VU 1; 3 : Wadi Hariq 97/7-1, VU 6 ; 4: Wadi Hariq 97/7, surface find 129; 5: Wadi Hariq 97/7, surface find 28, Wadi Hariq 01/1-1, VU 16; 7:Wadi Hariq 01/1-1, VU 21.

Lithic artefacts

The lithic artefacts from the excavation consist of 1618 pieces (Tab.1). The raw material is dominated by two raw material groups, different varieties of quartzite or silicified sandstone (72%) on the one hand and quartz (23%) on the other. Cryptocrystalline silices like chalcedony or flintstone make up 3,6% and other materials like siltstone or sandstone occur only in small amounts.

Debitage

The debitage >15 mm is clearly dominated by flakes (Tab. 1). Only three blades appear (=0,2%), which can be interpreted as accidental pieces. Flakes > 15 mm form 32% of all artefacts while splinters below 15 mm make ca. 50%, cores 1,1% (n=17) and modified pieces only 3,2% (n=52). Of the flakes and blades, only 238 pieces were complete. Length-width ratio of these is mostly between 1 and 2, with 27% being below 1 (length smaller than width) and 14% being elongate flakes.

Table 1: Types of artefacts

Artefact type	total	percent
Splinters <10 mm	447	27,6
Flakes <15 mm	340	21,0
Flakes >15 mm	511	31,6
Blades	3	0,2
Angular debris	166	10,3
Natural debris	62	3,8
Cores	17	1,1
Core fragments	6	0,4
Splinters of pièces esquillées	13	0,8
Burin spall	1	0,1
Modified pieces	52	3,2
Sum	1618	100

Further examination of the measurements on debitage dimensions included the CB-Index, as described by W. Schön for neolithic sites from Gilf Kebir (Schön 1994: 137). It gives a meaningful technological index, which can be used for comparisons with other assemblages. The CB-Index is calculated by dividing the product of the mean values of width and thickness of the complete unmodified artefacts of an assemblage through the product of the mean values of

butt length and butt width of the same artefacts. The CB-index for this assemblage is 1,88, which is a typical value for a Late Neolithic debitage production with hard hammer percussion in the Eastern Sahara (Schön 1994: 137).

Additional information on debitage production can be gained in counting the different types of debitage in relation to the raw materials. Only the most frequent raw materials quartz, silicified sandstone of different types (type 1, 3 and 4) and the raw material group flint and chalcedony, which make up 98,4% of all artefacts, were used for this count. Table 2 gives the percentages.

Table 2: Percentages of types of artefacts in relation to raw materials

Artefact type	silicified sandstone (type 1)	silicified sandstone (type 3+4)	quartz	flint and chalcedony
Splinters <10 mm	28	21	29	38
Flakes<15 mm	21	23	22	26
Flakes>15 mm	35	46	20	16
Blades	0	0	0	0
Angular debris	10	3	15	9
Natural debris	3	6	3	0
Cores	1	1	1	3
Core fragments	0	0	1	0
Modified pieces	2	1	6	9
Splinters of pièces esquillées	0	0	5	0
Sum	100	100	100	100
Total	1003	158	373	58

Some striking differences occur between the percentages of flakes and angular debris among the different kinds of silicified sandstone on the one hand and quartz and flint/chalcedony on the other. For example flakes count for 46% or 35% of the artefacts made from silicified sandstone, but only 20% of the artefacts made from quartz and 16% of those made from flint or chalcedony. On the contrary, angular debris makes up 15% of the artefacts from quartz, while 3% in the type 3 and 4 variants of silicified sandstone and 10% in type 1, and 9% in flint and chalcedony. Furthermore, flint and chalcedony have the highest percentage of splinters, while they have the lowest number of flakes. These different values can be best explained by the different traits of the different raw

materials. Quartz is locally available: It occurs in small rounded pebbles, withered out from Mesozoic conglomerates that form parts of the plateau of the Wadi Hariq. These quartz pebbles are not suitable for the production of large flakes and are mostly knapped with bipolar technique, resulting in a high number of scaled pieces (“pièces esquillées”), which were probably not used as tools but as cores, and the high frequency of angular debris. Silicified sandstone is the other type of easily available raw material. This raw material appears in many different coloured varieties. As it forms the major part of the local plateau it appears on all sites investigated in Wadi Hariq, though there are differences in the varieties on every site. On the contrary, flint and chalcedony are extremely rare and seem to have been brought to the site from further away. As the splinters from these materials have the largest share with 38%, one can guess, that some flakes or tools of flint were brought to the site and (re-)modified. This is also supported by the high percentage of tools made of flint. Three cores were also found, and these are very small, thus they have been used until the very last end, again pointing to a limited availability of these cryptocrystalline materials.

Table 3: Types of modified pieces in relation to raw material group

Tool type	Silicified sandstone, quartzite (all types)	Quartz	Flint and chalcedony
Use retouch, edge-splintering	5		1
Shallow ventral splintering	1		
Splintered piece	1	27	3
Continuous edge-retouch	3		1
Borer	1		
Scraper	1		
Truncation	1		
Triple-edged piece	1		
Unclass. modif. Fragments	6		
Sum	20	27	5

Modified pieces

Tool types were defined according to Schön (1994: 134-136). Of the 52 modified pieces 31 are scaled pieces (Tab. 3). It is questionable, whether these formed a real tool class or rather represent a special kind of flaking technique, or both. Most of these are of quartz (n=27), but some also of flint or silicified sand-

stone. Some of the scaled pieces from quartz are made of pebbles and show only minor bipolar splintering on the ends. Others represent a much later stage of use and show no rest of the pebble cortex. Some also show remnants of the ventral surfaces of flakes (conf. Jesse et al. 2004: Fig. 11.1), thus are definitely re-used flakes. It is nevertheless not possible to decide for each scaled piece made of quartz, whether it was made of a flake or pebble, and therefore it was decided here to put them all into the tool class.

The other tool classes comprise mostly use-retouched pieces (n=8) and pieces with continuous edge-retouch (n=4). Furthermore there are one borer, one side/end-scraper, one truncated piece and one triple-edged piece. Like in the debitage, most tools were made of silicified sandstone or quartz.

Tool dimensions are rather small for most pieces. Although there is not a single geometric microlith, there are many tools, which are of microlithic dimension: 31 pieces are not larger than 30 mm, and 17 even not larger than 25 mm. Nevertheless, most of these are scaled pieces and mostly made of quartz (n=24). The small dimension of most tools seems thus to be caused by the dimension of this specific raw material. Another small tool is a borer of silicified sandstone of 19 mm length. A single exception is the triple-edged piece made of silicified sandstone, which is 114 mm long and has a very massive basal part.

Comparison of tool and debitage dimensions

Table 4: Dimensional values of flakes and tools not made of quartz and not made of angular debris

Quartz flakes >15 mm (n=200)			
	length (mm)	width (mm)	thickness (mm)
Mean	29,36	24,63	7,83
Standard dev.	10,74	10,87	4,01
Median	27	22	7
Tools (n= 19)			
	length (mm)	width (mm)	thickness (mm)
Mean	38,47	32,37	11,11
Standard dev.	11,11	11,80	5,90
Median	39	34	11

In order to get a better understanding of the relation between tools and debitage, the size of the artefacts has been compared. Several precautions had to be made: Only complete flakes and only tools from flakes have been chosen. There are five pieces of angular debris, which show modifications. As their measurements cannot be compared to those of flakes or blades, these tools from angular debris had to be excluded. Second, the modified pieces of quartz are all scaled pieces. As at least some of these seem to be cores, rather than tools, it was decided to take out all quartz artefacts. Finally, the exceptionally large triple-edged piece was not included, as it was far outside the standard deviation. Calculation of values with and without this piece showed, that the general trend was only less strong without this piece, but it was not changed.

Mean values, standard deviations and median values of length, width and thickness of all flakes and tools except those made of quartz were calculated (Tab. 4). It becomes obvious, that preferably large flakes were chosen for modification.

The measurements of the flakes and tools made from quartz give further information on the limitations of this raw material. The largest measurement taken from a quartz artefact is 36 mm, this is a scaled piece. Many of the scaled pieces from quartz still show remainders of the pebble cortex on both ends and can thus be judged to be representative of the size of the pebbles available. The three cores of quartz have large areas covered with a pebble cortex. Their maximum length is 24, 27 and 24 mm. The largest out of 29 unmodified complete flakes of quartz has a maximum length of 29 mm and the largest splinters from scaled pieces have a maximum length of 25 mm. To conclude, one can say that the available quartz pebbles were probably not larger than 30-40 mm in general.

Other features of tools and debitage

The locally available raw materials show different kinds of cortex. The quartz pebbles have rounded surface from water transportation. The silicified sandstone appears mostly in more or less large blocks and cobbles with coarse, withered outer surfaces. As the distance from the site to the next rocky outcrops is less than 100 m, it was not necessary to decortify the raw material.

The portion of dorsal cortex on flakes and tools was examined by sorting the artefacts into five classes (0%, $\leq 25\%$, $\leq 50\%$, $\leq 75\%$, 100%). Different raw materials were regarded separately. As a result, about 55% of the flakes > 15 mm made of silicified sandstone (n=232) show no cortex and about 12% have more than 50% dorsal cortex. With quartz flakes (n=30), the portion of cortex is much higher, which is again caused by the raw material, since the small pebbles did not allow for a decortification: Only 20% show no cortex, but over the half shows more than 50% of the dorsal surface covered with cortex.

Remarkably, the coverage of dorsal surfaces of tools made from silicified sandstone or flint is even higher than that of the unmodified flakes. Here, one fifth shows a coverage of the dorsal surface of more than 50%, demonstrating, that the covering of a flake with cortex was no reason not to choose it for modification.

This is also true for the butt surfaces: One third of all artefacts show a cortical striking surface. One fifth is plain (*lisse*), while only a bit more than 10% is faceted. This means, that most debitage was achieved without intensive preparation of the cores. Furthermore, 15% of all artefacts show rests of cortex on the distal end, which means, that in these cases, the convexity of the flaking surface was not strong enough to prevent the impact from overpassing.

To sum up, the technical traits exposed by this inventory can be characterized as rather simple. The locally available raw materials were chosen for the production of the large majority of the flakes with a rather simple flaking technology and with hard hammering technique. The largest pieces were picked out to use them as tools. Tools mostly show use-retouch and were not standardized at all. A special use might be indicated for the scaled pieces, but this remains problematic.

Bones

The bone material from this site contained bones of domesticated animals like cattle (*Bos primigenius taurus*) and sheep (*Ovis ammon*), apart from bones of gazelle (*Gazella dama*, *Gazella spec.*) and antelope (*Addax nasomaculatus*) pointing to a pastoral way of life with some complementary hunting (conf. Jesse et al. 2004: 137).

Surface collection at site 97/7

Apart from the excavation an intensive surface survey was carried out in the surroundings of the excavation, using a total station. The aim was to get a representative sample of pottery which could also be used to show spatial distribution patterns.

Pottery

Altogether 113 vessel units were found on the surface of the wadi floor. About 60% of these show plant remains and rounded sand grains as tempering agents, while about 37% show plant remains and angular and rounded sand grains.

Again, comb impressions, Bouton decoration and triangular stamps form a large percentage of the occurring decorations (conf. Fig. 3.4, 3.5). Comb impressions appear as rows of dots (15% of all vessels), as herringbone patterns (5%) or as complex geometric patterns (10%). Bouton decoration makes up 10% and

triangular impression 3,4%. Also other kinds of single impressions appear (16%), as they did in the excavation material. They can therefore be classified as belonging to the Handessi A horizon.

Thus, we can say, 60% of all the pottery found in the vicinity of the excavation area shows the same kind of decoration types, as they appear in the excavated material. Nevertheless, there is one major group of vessels, which shows a very distinct kind of decoration pattern, the mat impression. Unlike the before-mentioned decorations mat impression is usually covering the whole vessel from the rim until the base. 24 vessels or 29,5% of all vessels are decorated like this. From these, seven show combinations with single impression motifs by stamps or combs in rows or other simple impressed designs. Mat impression is one of the typical decorations of the Handessi B horizon, which followed the Handessi A horizon in time (Keding 1998, Jesse et al. 2004: 156-157). It seems therefore, that settlement on this site lasted over a lengthy period of time with probably repeated seasonal use.

Comparison of temper groups and decorations

Study of the composition of the non-plastic components of the sherds showed differences between the sherds with mat impressions on the one hand and sherds with Bouton decorations, comb impressions, and triangular stamp impressions on the other hand. The former contain a higher amount of organic material as well as more round sand grains (temper group 2a in Jesse et al. 2004), while the latter contain a lower amount of organic material and rounded as well as angular quartz grains (temper group 2c in Jesse et al. 2004). This can be interpreted as a coincidence in the change of the decoration technique as well as the tempering material over time.

Chemical analysis of the pottery

Chemical analysis of trace elements of several pottery samples from Wadi Hariq 97/7-1 and from the surface survey showed a good agreement between the samples. This can be interpreted as evidence towards local production of pottery, especially as other samples of Handessi pottery from Middle Wadi Howar showed differences to the samples from Wadi Hariq, but were consistent within that group (Klein et al. 2004: 352). Transport of pottery between different regions therefore does not seem to have occurred regularly.

Site Wadi Hariq 01/1

The site Wadi Hariq 01/1 is situated in the northern part of the Wadi system in the middle of a wadi channel. This channel opens into the large basin of site Wadi Hariq 97/8 ca. 1,5 km further to the east (presented by Kröpelin, this volume). Here the wadi floor is covered mostly by a thick layer of sand. Only in

the western part of this basin a playa sediment becomes visible under the sand and here again some frittings appear. On top of the sandy layer a large artefact scatter stretches over an area of ca. 800 m x 600 m. This scatter includes numerous stone settings which can be interpreted as the remains of fire places and tent or shelter constructions. Furthermore there are many artefact concentrations with pottery sherds, lithic artefacts, grinding stones, bones and other remains. Here, one area was chosen for excavation because it contained numerous pottery sherds and a second, smaller trench was opened around a dense scatter of artefacts, which probably represents a knapping site. We will concentrate here on the first trench with the pottery, which was called Wadi Hariq 01/1-1.

Excavation Wadi Hariq 01/1-1

A trench of 6mx5m was excavated. After removing the aeolian sand covering the site two dark patches, a larger one and a smaller one, became visible (Fig. 4). These were containing ashes and charcoal and therefore interpreted as fireplaces. Stone artefacts, bones and some potsherds were found in situ embedded in the dark grey ashy sediment of the larger fireplace. One of these potsherds shows a decoration made of mat impression. Some charred faeces of a small animal were found in this fireplace and could be radiocarbon dated to $1681\pm 45\text{calBC}$ (KIA-17543; $3385\pm 25\text{BP}$). A third fireplace became visible some 3 cm below the surface. Charcoal from this fireplace was dated to $1632\pm 48\text{calBC}$ (KIA-17510; $3355\pm 25\text{BP}$). Both datings show good statistical agreement.

Pottery

Altogether 227 pieces of pottery with a total weight of 970 g were found in the excavation area, but a lot of these are smaller than 1 cm² or heavily abraded by wind and sand on one or both sides. From the total, a number of 125 sherds (total weight: 830 g) could be regrouped to vessel units, forming the rests of 17 vessels. While most of the vessel units are made up of only one, two or three sherds, three vessel units contain ten or more sherds (VU 16: 41 sherds, VU 17: 39 sherds, VU 12: 10 sherds). Many of the 41 sherds belonging to the vessel unit 16 are coming from the same square meter (Fig.4: square 23/12), including some of the bottom sherds still standing in the ground, showing that the sherds of this vessel were still lying in situ and were not moved after deposition. This may imply deposition of vessels in the settlement area for later reuse, a phenomenon that points to recurring seasonal settlement activity of nomadic people.

Technical features

The tempering materials of the pottery are very homogenous for all vessel units except one. They consist of rounded sand grains of size classes mostly below 0,25 mm or between 0,25 and 0,5 mm. Sand grains over 1 mm are rare. The organic material appears usually as negatives of burnt grass pieces or dung, mainly

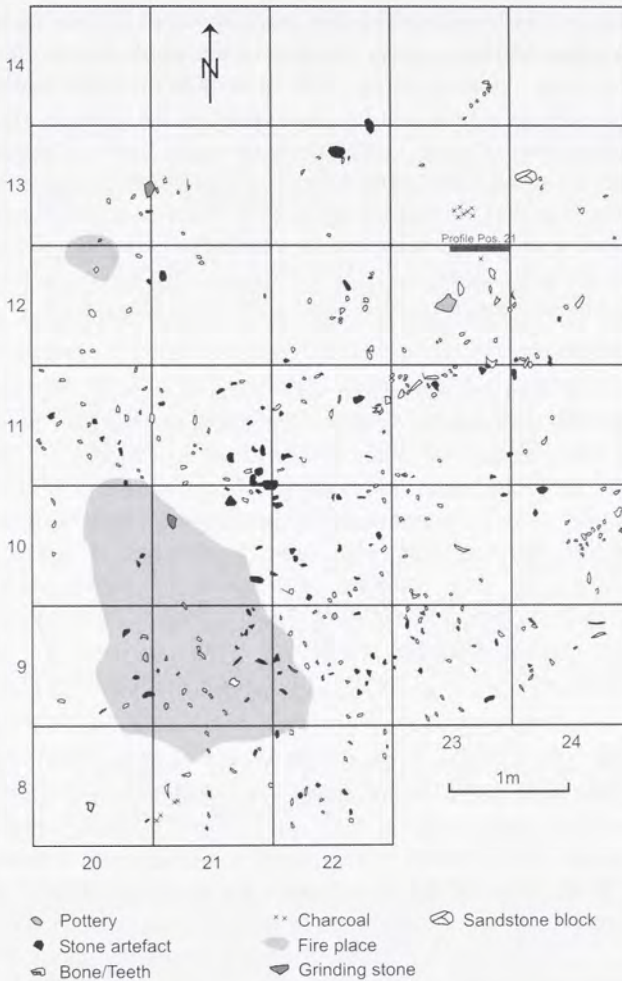


Fig. 4. Wadi Hariq 01/1-1. Excavation area after removal of aeolian sand.

mainly of small (below 2 mm) or medium (2-5 mm) sizes (temper group 2a in Jesse et al. 2004). No sherd showed any mica.

The only exception is a vessel unit showing very small angular sand grains never exceeding 0,25 mm in size and very fine organic material. Additionally, small grains of limestone (tested by hydrogenic acid) appear in these sherds. This vessel unit might represent some imported pottery, maybe from the Nile Valley.

The outer surfaces of the vessels show different shades of brown and greyish-brown, sometimes with black areas from the firing. The inner surfaces and also most of the breaks are usually black or greyish black. Thus, a reducing firing atmosphere can be proposed. Only three vessel units show light brown surfaces and oxidation zones in the breaks, resulting from an oxidizing firing atmosphere. The average wall thickness is 5 mm.

The treatment of the surfaces is usually quite simple, although a lot of sherds show traces of abrasion. In most cases the surfaces were smoothed but not burnished or polished and inner surfaces show a less careful treatment than the outer surfaces.

Vessel shapes

The vessel shapes could not be reconstructed with great success due to the bad preservation. The bottom sherds of vessel unit 16 clearly come from a rounded base. Some rim sherds point to restricted vessels with round forms. As no sherds with s-shaped profiles occur, it appears probable, that most vessels had a spherical shape.

Decorations

Most of the vessels were decorated and only three vessel units show no decorated sherds. Many of the vessel units with decorations consist of only small sherds, making it difficult to describe the decorative patterns. In several cases it is only possible to describe the decoration technique, but the pattern cannot be reconstructed. Six different kinds of decoration techniques were applied: Mat impressions (n=6), comb impressions (n=5), single stamp impression (n=3), incised decoration (n=2), spatula impressions (n=1) and roulette technique (n=1).

Mat impression and roulette technique both are applied all-over the vessel surfaces, while for example the stamp and spatula impressions appear only on the rim. All-over mat impressed decoration is combined with a row of stamp or spatula impressions at the rim on two vessels. This combination also appears very often in the pottery of the surface collection from this site (see below). The only rim top decoration was made of parallel oblique comb impressions. Below it follows a rim band with parallel oblique comb impressions. Other decoration patterns cannot be described.

Altogether, the pottery of the excavation area Wadi Hariq 01/1-1, consisting of 17 vessel units, appears as a homogenous assemblage of simple brown to grey vessels with a temper of rounded sand and organic material. Only VU 13 is apparently different, showing a very fine tempering and a red coating on the outer surface, which is unfortunately too abraded for judging whether it once was polished or not. Shapes seem to be mostly spherical and decorations are dominated by mat impressions and comb impressions. This makes it easy to

attribute this assemblage to the Handessi B Horizon. An interesting thing to note is the appearance of roulette decoration (probably twisted string roulette, determined by Maya von Czerniewicz, Cologne) on vessel unit 1 (Fig. 5), a technique which was not observed before in the Wadi Howar region. This type of decoration appears as a new element in the pottery of the Southeastern Sahara around 1700 calBC, just for the first time. Maybe it was introduced from the Kerma culture in the Nile Valley, where roulette decorations appear already in the Kerma Ancien (Gratien 1997: 397). Also mat impression appears in the Kerma culture, from Kerma Moyen onwards (Gratien 1997: 367). Thus, cultural links to the Nile valley become visible.



Fig. 5. Wadi Hariq 01/1-1, VU 3 with roulette decoration.

Lithic artefacts

The lithic artefacts from the excavation area have not yet been studied in detail. Preliminary results have been reported by Jesse et al. (2004).

Bones

The animal remains from this site were more numerous and better preserved than at site Wadi Hariq 97/7-1. Identified species include cattle, sheep and goat as domesticated species and Dorcas gazelle and Dama gazelle as wild species. This implies the same reconstruction of subsistence strategies as for site 97/7-1: Nomadic pastoralism, combined with occasional hunting (conf. Jesse et al. 2004: 153).

Surface collection at site Wadi Hariq 01/1

Apart from the excavation an intensive surface survey was carried out in the surroundings of the excavation, using a total station. The aim was to get a representative sample of pottery which could also be used to show spatial distribution patterns.

Pottery

Numerous potsherds have been collected from the surface surrounding the excavations at site Wadi Hariq 01/1 and registered with a total station. Altogether 171 sherds with a total weight of 2414 g were found at 65 locations ranging from scattered single finds to dense artefact concentrations. The sherds could be regrouped to 74 vessel units, of which 53 consist of just one sherd. The general appearance of the pottery can be described as strongly destroyed and abraded. Often only small parts of the vessel have been preserved showing just one or even no intact surfaces.

Technical features

Fabrics and burning techniques allow us to divide the pottery into two larger groups and a few exceptional pieces.

The great majority of the pottery has been tempered with rounded sand grains of usually 0.5 to 1 mm (max. 2 mm) and organic material (temper group 2a in Jesse et al. 2004). 53 vessel units or 75% of all vessels belong to this group. No mica appeared in any of these vessels. Another vessel unit also belongs to this temper group, but shows additionally small amounts of mica fragments of sizes ranging from 0,5 to 1 mm. A small group of five vessel units is also tempered with rounded sand grains and organic material, but also small grains of limestone in limited amounts.

A group of twelve vessels shows a temper with angular, opaque white quartz grains and organic material (temper group 2b in Jesse et al. 2004). The average size fraction lies below 0,5 mm but occasionally grains of up to 1 mm appear. The amount of organic material seems to be lower than in the first group. No mica appears. Again, one vessel can be added, showing the same tempering agents as the aforementioned, but also mica.

One vessel unit contains mostly angular sand grains of sizes below 0,25 mm and organic temper, but also small numbers of rounded sand grains up to 1 mm (temper group 2c in Jesse et al.). This vessel unit also has the lowest wall thickness with just 3,0 mm. Furthermore there are two vessel units which contain no or almost no organic material and a mixture of rounded and angular sand grains (temper group 1 in Jesse et al.). The average wall thickness is 5,7 mm, no differences between the different temper groups exist. Almost all sherds have a black or dark grey fracture colour and oxidation zones appear in less than one third of the cases. The sherds thus seem to have been burnt not very intensively (Nicolson 1993: 105).

The surface colours and the treatment of the surfaces also do not show any differences between the different tempering groups. Surfaces were smoothed in a simple way and no polishing occurs. The outer surfaces were treated more carefully than the inner surfaces: The outer surfaces show traces of smoothing in 15% of all cases, the inner surfaces in 75%. Coating of the surfaces appears in only five cases. Surface colours are dominated by brown (outside: 60%; inside 34%) and grey to black (outside: 30%; inside: 60%) colours, light brown or ochre colours being rare. The few vessels showing a red or reddish brown to light brown colour are coated.

To sum up, it can be stated that the collected pottery from site Wadi Hariq 01/1 shows rather homogenous technical features. It can be classified as a simple use ware with more or less carefully smoothed surfaces made of a ferruginous clay tempered with sand and organic material, burnt at a moderate temperature. Two main groups can be distinguished by their tempering agents, one showing rounded sand grains and organic temper, the other showing angular sandgrains and organic temper.

Vessel forms and rim tops

Only in a few cases vessel forms could be reconstructed, due to the overall bad preservation of the pottery. In most cases only small rim sherds or just only wall sherds are preserved. Simple globular vessel forms prevail, ranging from open bowls (n=6) to restricted vessels with more (n=2) or less (n=7) strongly inverted rims. Only one vessel has an s-shaped profile and one has a straight rim attached on the shoulder. In one case sherds could be identified safely as bottom sherds, belonging to a round base. Rim top forms include rounded (n=11) and flattened examples (n=6). The appearance of the different kinds of rim top forms is not correlated to any kind of vessel shape.

Decorations

Of 74 vessels only 8 are not decorated. The position of the decoration on the vessel can be divided into decorations restricted to the rim zone, decorations

on the rim in combination with all over decoration of the whole vessel and all over decoration of the whole vessel with no special rim decoration. Only one vessel has a rim top decoration, showing a criss-cross pattern made of incised lines (Jesse et al. 2004: Fig.14.).

Decoration techniques

Altogether nine different decoration techniques could be observed. These are: 1. Incision, 2. Single spatula impression, 3. Spatula impression in rocker technique, 4. Single comb impression, 5. Comb impression in rocker technique, 6. Single stamp impression, 7. Bouton decoration, 8. Mat impression technique, 9. Roulette technique.

Table 5: Frequency of decoration techniques

decoration technique	Wadi Hariq 01/1							W. Hariq 01/1-1	
	wall	%	rim	%	rim top	sum	%	sum	%
Incision	12	22,2	3	8,3	1	16	17,6	2	11,8
Spatula, single impr.	1	1,9	1	2,8	0	2	2,2	1	5,9
Spatula, rocker technique	1	1,9	0	0,0	0	1	1,1	0	0
Comb, single impr.	22	40,7	12	33,3	0	34	37,4	5	29,4
Comb rocker technique	2	3,7	0	0,0	0	2	2,2	0	0
Stamp impression	2	3,7	12	33,3	0	14	15,4	3	17,6
Bouton-technique	0	0,0	3	8,3	0	3	3,3	0	0
Mat impression	13	24,1	5	13,9	0	18	19,8	6	35,3
Roulette-technique	1	1,9	0	0,0	0	1	1,1	1	5,9
Sum	54	100,0	36	100,0	1	92	100,0	17	100,0

These techniques appear with different frequencies and different motifs on the rims and walls of the vessels. Comb impressions are the most frequent decoration technique, appearing on 40% of the decorated walls and 33% of the decorated rims (Tab. 5). Only mat impressions are comparatively frequent on decorated walls and rims with 24% and 14%, whereas other techniques appear either frequent on walls or on rims, or are not frequent at all. For example, stamp impressions appear on 33% of the decorated rims, but only on 3,7% of the walls, and bouton decorations appear on rims only (8,3%). These two decoration

techniques are thus typical rim decorations. Incisions, on the other hand, appear much more frequently as wall decorations (22%) as on rims (8,3). All other decoration techniques (spatula impressions, comb rocker technique and roulette decoration) appear only in few cases.

A comparison with the decorations of the pottery from excavation area Wadi Hariq 01/1-1 shows some strong similarities between the two assemblages, which are part of the same site. In both cases comb impressions and mat impressions form the most frequent part, followed by stamp impressions and incisions. Techniques, which are less frequent in the collected assemblage, like spatula impressions or roulette technique, are infrequent in the excavation material as well. Bouton decorations and comb and spatula impressions in rocker technique, which are infrequent in the collected material, do not occur at all. Thus, the pottery from the excavation area is representative for the site as a whole. Furthermore, also the assemblage from the collection appears as quite homogenous, suggesting that the collected pottery from Wadi Hariq represents a rather limited period of time.

Motif elements

The variety of motifs is comparatively high with 53 motif elements on 66 decorated vessels. In other words, almost every single vessel shows another decoration. Nevertheless, it is possible to reduce the different motif elements to a number of groups with apparently similar motif elements. The most frequent motif elements are incised crosshatched bands (n=10), with or without restricting lines and in two cases in combination with incised lozenges with crosshatched filling. Further lozenges appear in comb impression technique (n=5).

Of the 14 vessels showing a mat impression, five have a rim decoration with a single horizontal line of impressions of irregular stamps (Fig. 3.7) (conf. Jesse et al 2004: Fig. 15.1). It appears that these are a very common type of decoration of Handessi B pottery. The same impressed lines appear on two vessels without any further decoration, both of these showing two lines. Another large group of distinctive motifs are the herringbone patterns made of comb impressions, which occur on seven vessels.

Six vessels show lines of triangular stamp impressions, typical for the so-called Handessi A-Horizon, and in four cases combined with comb impressed decorations. Single horizontal lines of bouton decorations, again characteristic of the Handessi A-horizon, occur on three vessels, all of them in combination with further comb impressions. Further distinctive motifs are a pending filled triangle, made of incised lines, characteristic for both the Kerma-culture and the C-Group and chevron bands of incisions (n=3) or comb impression lines (n=2).

All in all, the majority of the pottery can be attributed to the Handessi B phase, while some sherds with the Bouton decoration and the triangular impressions point to a longer settlement history of this site, already beginning in Handessi A phase.

Comparison of temper groups and decorations

An interesting result came out from the comparison of the two main temper groups and the prevalent motif elements occurring on the vessels within these groups. The larger temper group, consisting of vessels with rounded sand grains and vegetal material (temper group 2a), contains all the vessels with mat impressed decoration and crosshatched incised decorations, while the other major group with angular grains (temper group 2b) contains two of the three vessels with bouton decoration. The third vessel with bouton decoration, is also tempered with angular sandgrains and vegetal material but contains a small amount of rounded sand grains as well. Most other vessels of temper group 2b are decorated with comb impressions in various motifs and thus are not distinctive from temper group 2a. As we know boutons as an older decoration type of the Handessi A phase and mat impressions as a younger technique, typical for Handessi B (Jesse et al. 2004; Keding 1998), this can be best explained as a chronological phenomenon, marked by a coincidence between the change of a tempering agent and a related decoration technique.

Vegetal remains

Among the pottery sherds from the surface collection was one sherd containing seed imprints of wild grasses, probably belonging to a species of Paniceae. This might suggest that collecting wild grass seeds was an option to enlarge the spectrum of subsistence strategies.

Conclusion

Excavations and samplings have been carried out in two different basins of the Wadi Hariq. 14C-dates from the excavated sites show that these are separated by probably at least three centuries. Further evidence can be drawn from the different stratigraphical positions of the two sites. While the find layer of Wadi Hariq 97/7-1, 14C-dated to around 2100 calBC, is partly embedded into a playa sediment, Wadi Hariq 01/1-1, dated to about 1700 calBC, is found on a thick layer of sandy deposits (ca. 1 m), which cover a playa.

Pottery with geometric decorations of the kind described here has been found in other regions of the Eastern Sahara as well, like the Laqiya region to the north and the Wadi Howar to the south. They have been initially described from Wadi Shaw (Francke 1986) and they have been characterized as one archaeological pottery horizon by Keding (1998). For this horizon now the name

“Handessi Horizon” is proposed (Jesse: this volume, Jesse et al. 2004). The pottery samples coming from the excavations and surface collections of the two sites have each shown different amounts of the decoration types. The pottery from the older excavation site, Wadi Hariq 97/7-1, is characterised by Bouton decorations, triangular stamp impressions and comb impressions in different motifs like herringbone patterns and geometric designs. The younger site, Wadi Hariq 01/1-1 is dominated by mat impressed pottery, which is a new decoration technique in this region, just like the roulette technique. Comb impressions occur in various geometric patterns again, but Bouton decorations do not appear any more and triangular impressions just once. These inventories therefore contribute to the understanding of the development of decoration styles in the Handessi Horizon and to the chronological subdivision of this archaeological group.

In the samples from the surface surveys this trend is less clear, surely due to an accumulation of finds from repeated settlement over a longer period of time. In all probability both basins of the Wadi will have been used for settlement over the same period of time, but preservation conditions changed the deposits and surely had an influence on the database. Site preservation was exceptionally good at site Wadi Hariq 01/1-1, where the remains of fireplaces and deposited vessels with the bottom sherds still in situ had been covered by layers of windborne sand, while at Wadi Hariq 97/7-1 the erosion had taken away the covering sand and exposed the find-bearing playa layers to abrasion.

Bone finds from the two excavations indicate a pastoral way of life. Nevertheless the herders took the chance to hunt antelopes and gazelles from time to time (Jesse et al. 2004: 153). From Neumann’s reconstruction of the vegetation and climate of the Eastern Sahara by archaeobotanical remains we can conclude that around 2000 calBC a year-round stay in the region of Wadi Hariq was impossible (Neumann 1989: 146). Therefore we must imagine the dwellers of Wadi Hariq as nomadic pastoral herders.

The nomadic way of life is also expressed by the archaeological finds. Both pottery and lithic artefacts represent a local production of goods necessary for daily life. In the case of lithic artefacts, production was simple and opportunistic, relying on local resources and using a simple technique. Large amounts of raw material were exploited, while only few artefacts have been chosen for further work, resulting mostly in use-modification and irregular edge-retouch. Pottery also was produced from local sources, as seems to be indicated by chemical examination of trace elements (see above) in potsherds from site 97/7. Pottery vessels were not transported but left on the site, where they were reused in the next season. This phenomenon is also observed among modern pastoral herders, as for example the Himba of Namibia (pers. comm. M. Bollig, Köln).

Some of the typical elements of the pottery decoration can also be found in the pottery of the Nile valley, like the Bouton decoration in the Kerma culture, or the geometric designs with lozenges and chevrons and triangles in the C-Group or the coating of the pottery with a red slip. Mat impression and roulette technique have to be mentioned also. On the other hand, there is no typical Kerma-pottery like beakers or red-polished ware. We can thus assume that the people of the Handessi Horizon in the desert had some ideas about pottery making and decoration in common with the people of the Nile valley. This would support the idea that there was contact between these two areas.

Sites of the Handessi A Horizon have a distribution from the Laqiya region in the North to the Lower Wadi Howar in the south. Until now no other archaeological culture dating around 2200 calBC has been found in the desert west of the Nile. We therefor can propose that the finds of the Handessi Horizon in its earlier stage, Handessi A, represent the material culture of the Temehu, as they are mentioned by Herchuf in the report on his third journey to Yam (Edel 1955: 52, 68-69; 1967: 156-157).

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Mathias Lange and Hans-Åke Nordström

Abkan connections - The relationship between the Abkan culture in the Nile valley and Early Nubian Sites from the Laqiya Region (Eastern Sahara, Northwest-Sudan)

Introduction

The main part of this paper is a description of finds and sites of a newly discovered cultural entity from the 5th millennium BC in the Laqiya region in the Eastern Sahara. The aim is to analyse its relationship to the contemporary Abkan culture of the Nile valley. Since the emphasis is on a comparative approach we think it is appropriate to start with an account of the characteristic features of the original Abkan.¹

Abkan in the Nile valley

Remains of the Abkan culture were originally discovered and defined by Oliver Myers who, at the end of the 1940s, excavated habitation remains in the Second cataract area near the Abka village. The major site, designated Site IX, consisted of a multiple pothole with stratified habitation remains combined with some rock drawings. He described his results in preliminary form in two papers in KUSH (Myers 1958 and 1960; cf. Nordström 1972: 239). The lithic material was analysed by Palma di Cesnola (1960). Unfortunately Myers did not get the opportunity to finish his task before his premature death in 1966 – he was actually working on a book called “Neolithic Nubians”.

¹ The first section, “Abkan in the Nile valley”, has been prepared by H.-Å. Nordström. The second part, “Early Nubian sites in the Laqiya region”, has been written by M. Lange. The short “Conclusion” is a joint responsibility.

During the 1960s, in connection with the international Nubian campaign, the Combined Prehistoric Expedition and other missions continued to find and analyse a number of Abkan sites in Lower Nubia. Joel Shiner, who actually coined the term "Abkan", recognised two different phases, the Early and the Developed Abkan (Shiner 1968). The present writer added a few years later a final stage, called the Terminal Abkan, while summarising the Abkan sites in the Second cataract area and in Batn-el-Hagar (Nordström 1972: 12-17).

In 1968 Oliver Myers' notes and analytical charts on Abka were sent over by Mrs Myers to the Scandinavian Joint Expedition in Uppsala where the volumes of the rock drawings in the area and the sites of the Early Nubian period were prepared for publication (Hellström & Langballe 1970; Nordström 1972). A few years ago I transferred most of Myers' ceramic data on to computer sheets (Excel and FileMaker Pro) in collaboration with Maria Carmela Gatto, who subsequently re-analysed the Abkan pottery in Khartoum, especially from Myers' Site IX. An account of this is in preparation.

Pottery fabric as a cultural marker

An important part of the find material from Abkan sites consists of pottery. The bulk is broken in sherds and the nature of the vessel shapes is poorly known. More than 80% of the pottery is undecorated. However, the sherds are rather easy to identify with the help of a simple technical analysis. It is very fortunate that a reasonably proper identification can be made without the use of decoration. Instead we can rely on the concept of pottery fabric, i.e. on technical properties of the ceramic material: type of clay, composition of tempering materials, firing, porosity, colour of the fired paste. These are analysed separately from the vessel surfaces that form another important group of properties in this context: surface texture (rough, smooth, burnished etc.) and surface colour. In addition there may be some decoration present. Fabric is always there; even when the surfaces are plain or eroded or the sherds are too small for any other analysis.

Myers recognised long ago, when working with the ceramic material from Armant in Upper Egypt, that we can use technical features as a cultural marker (Mond & Myers 1937). We know that ancient potters tended to choose clays and tempering materials and techniques of manufacture very carefully, in order to suit the purpose and the function of the pots they made, and they followed rather strict traditions from generation to generation. Distinct patterns can be discerned from this behaviour. The concept of fabric was developed in a systematic way especially during the Nubian campaigns of the 1960s (Nordström 1972: 48ff; Adams 1986: Ch. 8.) and in connection with the so-called Vienna System for Egyptian pottery (Nordström & Bourriau 1993; Bourriau, Nicholson & Rose

2000). With fabric we have one important tool for understanding the major pottery traditions in the Nile basement. The most significant in this cultural context are the Egyptian Predynastic, the Abkan, the A-Group, the Sudan Neolithic, and the Pre-Kerma complex.

The characteristics of the Abkan culture

The Abkan culture developed in the southern part of Lower Nubia and in Batn-el-Hagar in the 5th millennium BC and it is likely that its terminal phase was contemporary with the Early A-Group further north, i.e. during the first half of the 4th millennium BC. The Abkan may be regarded as a regional development related to a widespread culture group with its centre in the Middle Nile basin (cf. Conclusion below).

The special, sandy fabric (Fabric IC in Nordström 1972: 49) is combined with a medium-grade burnish on the exterior surfaces, a brownish grey colour, and a wall thickness of 5-10 mm – these form together the characteristic features of the pottery of the Developed Abkan. The non-plastic inclusions consist mainly of angular, sub-angular and sub-rounded grains of quartz and feldspar in size fractions up to 0.5 mm, while there are characteristic sub-rounded grains in fractions between 0.5 and 1 mm. Mica, fine-grained limestone and granitic rock may also be present in addition to irregular carbon particles. In sum, the paste consists of a rather silty ferruginous clay with a heterogeneous temper and the firing can be estimated to max. 700°C. The pottery is generally plain and undecorated – usually more than 80% is undecorated. The sparse decoration consists of impressed zigzag designs and some other patterns on the exterior or at the rim only (Fig. 1). The lithic assemblage of the Developed Abkan shows a characteristic array of traits, consisting of borers, groovers and denticulates. There is a high proportion of quartz in the debitage (Håland 1972).

The Terminal Abkan displays a lithic picture similar to the Developed Abkan, but with more microlithic inclusions, probably parts of composite tools. The pottery is now more differentiated than before, always of the sandy fabric (IC, described above) characteristic of the Abkan tradition, but displaying a more complete range of wares, from sherds with coarse or scraped exterior to vessels of black mouthed red polished, plain or rippled wares, often with milled rims (especially Ware Group M4 in Nordström 1972: 59-60). Other decoration is sparse. On a few sites there are inclusions of Naqada I and early Naqada II pottery, with its characteristic fabric and surface properties, for example on Site 429 in the Second cataract area (Nordström 1972: 221).²

² M. C. Gatto has later identified, in the collections of the Scandinavian Joint Expedition in Uppsala, more Predynastic potsherds in these Early Nubian contexts.

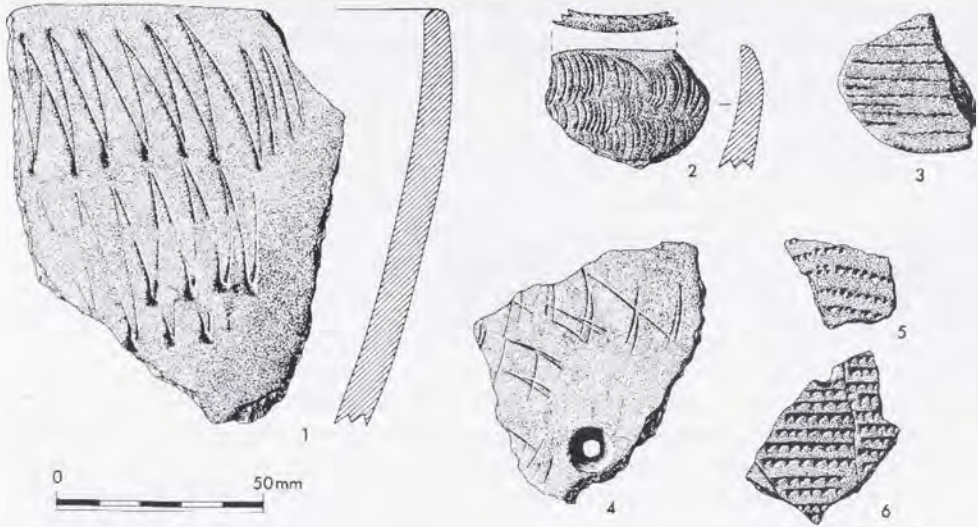


Fig. 1: Some sherds of Ware Group M1 with impressed decoration of Abkan date. Site SJE 365 in the district of Abka at the Second cataract (from Nordström 1972: Pl.139).

The geographic extent of the Abkan, as defined by its lithic tool kit and its pottery, remains to be established in more detail. The core area of the Developed Abkan still appears to be around the Second cataract and Batn-el-Hagar. Its distribution around this core is more clear now than before thanks to Maria Carmela Gatto's multi-dimensional analysis of the ceramic traditions in Nubia (Gatto 2002). As regards Lower Nubia, however, one very important task remains and that is the analysis of the finds from the so-called "Archaic camp" recorded by Reisner in Meris Markos, an extensive habitation area with numerous finds of stone implements and pottery (Reisner 1910: 215). This material is now stored by the Museum of Fine Arts in Boston – it would not be surprising if abundant Abkan connections were found there. Our lack of settlement data in Lower Nubia is otherwise a bit disturbing – partially it can be explained by prevalent archaeological strategies during the older campaigns before the 1960s with their emphasis on cemeteries. It may also be due to the fact that a rise of the Nile level at a time around 4 000 calBC may have covered, with alluvial silt, many habitation remains in Lower Nubia from the Terminal Abkan and Early A-Group phases (Nordström 1972: 15).

In the south there are numerous Abkan sites or inclusions of both Developed and Terminal Abkan pottery in Batn-el-Hagar and on Sai Island (Couartou

1999), where the habitations appear to follow the ancient shoreline. How far south the Abkan assemblages can be found is not established, nor its relation with the Sudan Neolithic. Gatto (2002: 15-16) has shown that there are clear ceramological affinities between the Abkan and the Karat group in Upper Nubia. The distribution in the East is not yet clear but this can be settled through a ceramological analysis of the findings of the Italian mission sponsored by the Castiglioni brothers (cf. Sadr 1997). An Abkan connection is definitely established in the regions to the west of the Nile, especially in the Laqiya complex analysed by Mathias Lange (see his account below).

Gathering and fishing may have been the basic subsistence activities of the Abkan while hunting may have declined in comparison with the earlier cultures. Fish bones are certainly common in the occupation debris. There is only weak evidence for animal husbandry (goat). As regards Lower Nubia, a certain polarity may have existed between the Early A-Group and Abkan, due to differences in terms of cultural ecology (environment, subsistence economy, social structure, external contacts). One enigmatic trait of the latter group is the absence of cemeteries - there is no single grave published so far that may be attributed with certainty to the Abkan. But it is likely that a fruitful exchange of material and ideas took place in Lower Nubia during this formative stage which led to the emergence of the A-Group proper.

Early Nubian sites in the Laqiya region

Material

In the years 1982 and 1983 two campaigns of the B.O.S.-Project of the University of Cologne were carried out in the Laqiya Region in Northwest-Sudan. During these two campaigns a large number of archaeological sites were found, which contained ceramics of different chronological phases (Cziesla 1986; Francke 1986; Schuck 1989). Wavy-line pottery was accompanied by a pottery showing the surface-covering decorations of so-called „Laqiya-type“ (Schuck 1989: 423). These two types are tempered with high amounts of angular quartz-grains of up to 2 mm. The distribution of this pottery connects the Laqiya-region with the Wadi Howar in the south (Jesse 2003: 189, Fig. 38). Apparently, the pottery with decorations of the Laqiya-type did not occur in the Nile valley. This pottery facies is related to a hunter-gatherer subsistence-pattern (Hoelzmann et al. 2001: 210). By ca. 4500 calBC a new ceramic style appeared in the Laqiya-region. It is characterized by a well burnished, hardly decorated pottery with a less coarse, sandy fabric with small amounts of organic temper material. The sites and finds of this new assemblage group are described in detail here.

Wadi Shaw 82/82-2

This site is situated in the eastern part of Wadi Shaw, where it is crossed by the Wadi Sahal. In an excavated area of 17 m² pottery sherds, stone artefacts,

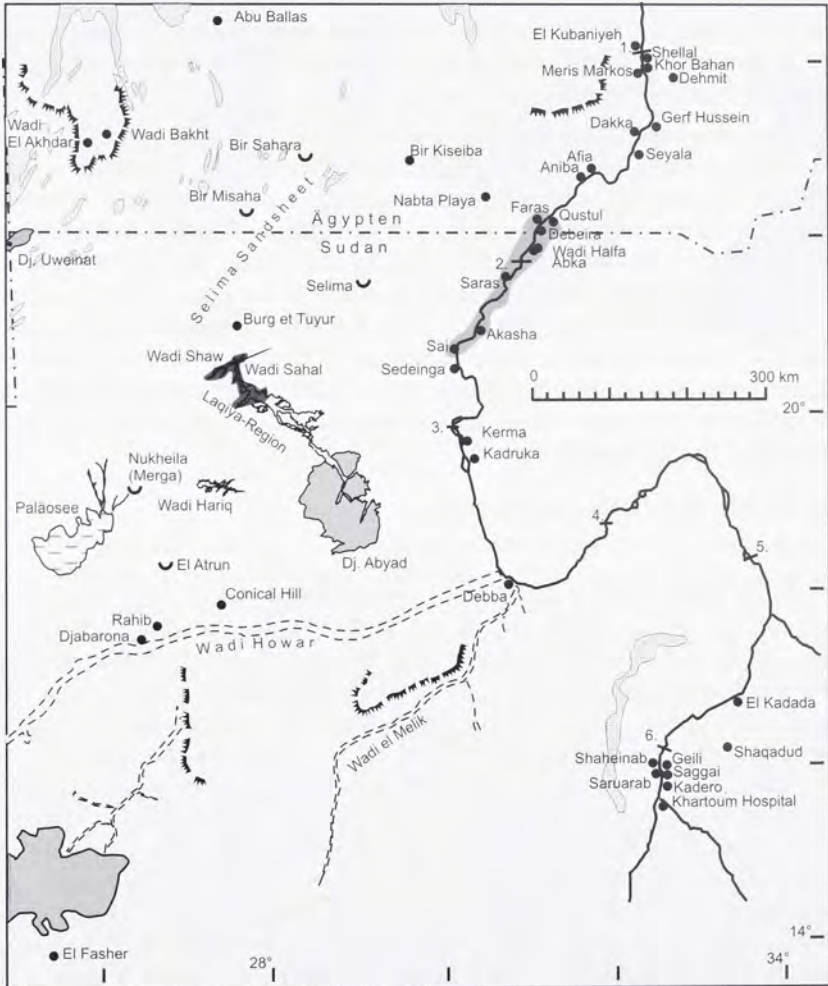


Fig. 2: Distribution of the Abkan (light grey) and the Early Nubian-related group of the Laqiya-Region (dark grey).

bones and two fireplaces with remains of charcoal were found. Radiocarbon dates obtained from these have median values ranging between 4600 and 4500 calBC (KN-3080: 5730 ± 160 BP = 4587 ± 170 calBC; KN-3854: 5710 ± 140 BP = 4563 ± 149 calBC; KN-3877: 5680 ± 130 BP = 4535 ± 139 calBC).

Pottery

The pottery finds consist of 31 sherds larger than 1 cm^2 , which could be assigned to eight vessel units. The general state of preservation was bad. Only three vessel units have rimsherds, which allow a minimum exaggeration of the vessel form. Three vessel units are damaged by abrasion, so that one of the wall surfaces is completely destroyed.

The vessel units could be grouped into two kinds of fabrics. Six vessel units are made of a fabric containing a high amount of angular sand grains of a size fraction up to 0.5 mm and small amounts of plant material. This fabric was named fabric "SP1" (from sand and plant). It is rather compact and hard and well-fired. The colour of the break varies from grey or brownish grey to dark grey and black.

The vessels show mostly greyish brown to brown or brown and black surfaces on the outside, although they do not appear to have been blackened systematically. The inner surfaces are mostly dark grey or brown to black. Two vessels seem to have been fired much stronger, resulting in a pinkish surface colour on the outside and light brown colour on the inside (one vessel unit shows only the outside) and a light grey or brown core.

Two other vessels contained a somewhat higher amount of plant material and more rounded grains of sand of average size fractions up to 1 mm. They were assigned to a fabric, which has been named "SP2". It appears to be rather identical with the fabric ID of the classification of Nubian pottery by Nordström (1972: 50). The surfaces, as far as preserved, are well burnished, but also burnishing marks or streaks occur. Decoration of the sherds is confined to simple impressions of oblique lines on the rimtop. It appears on all three vessels, where the rimsherds have been preserved.

Stone artefacts

According to Schuck (in pr.) altogether 2373 stone artefacts were found on this site. Almost 5 % of these are retouched ($n=114$). The debitage is dominated by flakes ($n=1582$), only seven artefacts can be classified as blades. Additionally there are 10 cores, 320 chips (flakes < 1 cm) and 340 pieces of debris. Almost 88 % of the artefacts were made of quartz or quartzite. Other raw materials are chalcedony, flint and fossil wood (12 %, $n=285$). But only 13 of the 114 retouched pieces are made of quartz or quartzite, while chalcedony, flint and fossil wood were preferred for making tools. The most frequent tools are

borers with 41 pieces (= 36 % of the tools). All of these are very small, almost microlithic, none of them being longer than 3 cm. Other tool types are scrapers (4 endscrapers and 3 side scrapers) notched pieces (n=6) and lunates (n=8).

Wadi Shaw 82/66

This site is situated in the area where the Wadi Shaw and Wadi Sahal cross each other. Around two structures of large sandstone slabs an area of 30 m² was excavated. The structures were covering two pits, 50 cm south of the first structure there was a third, uncovered pit. This pit yielded charcoal, giving a radiocarbon age of 4354±208 calBC (KN-3331: 5530±180 BP). In the pit under the second structure more charcoal was found, dated to 4218±98 calBC (KN-3180: 5410±65 BP).

Pottery

The pottery of this site consists of only one vessel-unit, made up of 22 sherds. It is made of the same sandy fabric with mostly angular grains of a size below 5mm. Plant remains are only a minor constituent. The vessel can be assigned to a brown polished ware with a blackened interior. No rim sherds were preserved and no sherd shows decoration. As this vessel unit does not comprise very detailed data to classify the site, the lithic artefacts again should be considered to get more information from this site.

Stone artefacts

The total number of stone artefacts coming out of the excavation area is 320. The retouched artefacts are 7,8 % (n= 25) of the total number of artefacts. The debitage is dominated by flakes, which make up 56% (n= 179), but the percentage of blades is with 10,9 % (n=35) considerably higher than at site Wadi Shaw 82/82-2. On the other hand, the small total number of artefacts might have a statistical influence on the sample. The dominant raw materials are different kinds of quartzite and quartzitic sandstones with 88,5 % (n=283). 37 Artefacts (11,6 %) are made of different varieties of flintstone. Despite this, half of the 24 retouched pieces are made of flint, so, in the tool kit, quartzitic raw materials are underrepresented. Three modified pieces could be joined together to give one retouched flake, and additionally two pieces of a retouched blade could be refitted as well. The assemblage lacks any kind of borer. Instead, the tools are dominated by pieces with continuous edge-retouch (n=7) and other retouched pieces.

Further tools are two burins (one with a primary and one secondary burin spall fitting to it) and additional burin spalls from four more burins, so altogether 6 burins have been used here. As so many burins appear, maybe this site was used to carry out a specific activity.

Laqiya Valley 83/125

The only other excavated site from the Laqiya Region bearing the same kind of pottery is of special interest, as it is a grave-site. Unfortunately, the site was deflated heavily. It consisted of two concentric stone-circles, the outer being ca. 12 m in diameter and the inner one (named "Stelle 1" or location 1) ca. 2,5 m. The outer circle was constructed mainly of local granite boulders and cobbles of sizes up to 50 cm and some sandstone and quartzite boulders as well. Most of the boulders of the construction were lying on the playa surface, but two were still standing upright. The inner construction consisted of similar pieces of rock. A few broken grinding stones were also used. This inner circle consisted of at least two layers of stone forming a small heap of ca. 50 cm height. Probably the outer stone circle was the enclosing of a tumulus which was once built over the grave in the centre, but was totally eroded later.

In the northeast of these structures, another round concentration of smaller cobbles and pebbles was found, called location 2 ("Stelle 2"). Its stratigraphic position and relation in comparison to the tumulus cannot be determined any more. Around the inner construction of location 1, an area of 4 x 4 m was excavated. In the centre of the inner construction a grinding stone of 60 cm length and a palette-like object of rough sandstone were uncovered. The grinding stone was covering some bones, which were probably preserved by this circumstance. A few fragments of these bones have been determined by H. Berke (Cologne) as part of a human skull-base from the region close to the ear. These bone fragments clearly indicate the interpretation of this site as a grave. Other bone fragments might be parts of humerus and tibia of a gazelle.

As most sherds from this area were found below or between the stone boulders of the inner stone circle, their stratigraphic position might suggest that they could have been deposited here before the grave was built. This would mean that the site consists of two different stratigraphical units. On the other hand, the sherds may also have been part of the grave goods. The twelve sherds from location 1 were reconstructed to eight vessel units. All of these except one are made of fabric SP1. They are all well burnished and show brown to greyish brown outer surfaces, while some inner surfaces are grey or grey-black and some others light brown. One small rim sherd shows a rounded rim top. One sherd contained a high amount of rounded sand grains and was described as a sandy fabric.

Under the second stone layer, which was also removed, a sterile layer of sand and gravel followed. Location 2 was excavated in an area of 2 x 2,5 m. The finds from this section included six sherds, two of which could be regrouped to one vessel unit. This vessel unit contained round sand grains and organic material and was assigned to fabric SP1. One of these two sherds was decorated with parallel comb impressions. Three sherds were made of fabric SP1 and one again

of a sandy fabric. The stratigraphic position of the sherds in comparison to the stone structure above again allows two interpretations, although in the case of location 2, it is very questionable, whether it could have been a grave. Other finds from this site were upper and lower grinding stones and a few dozens of stone-artefacts, some of which were retouched.

Finds from other sites

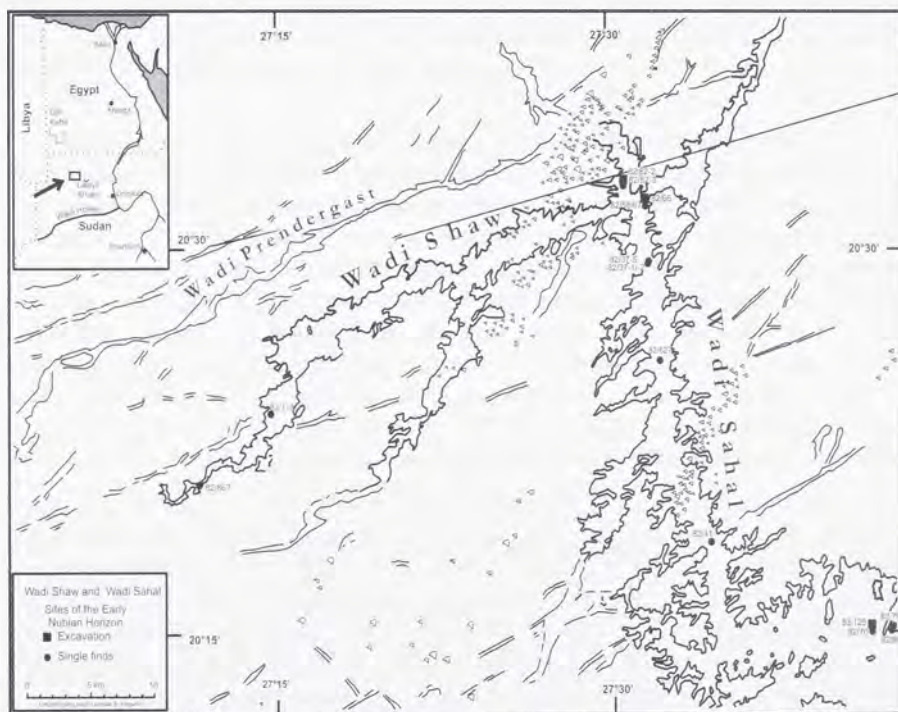


Fig. 3: Sites in the Laqiya-Region with pottery of the Early Nubian Horizon

All other sites from the Wadi Shaw and Wadi Sahal, which contained sherds of the fabric SP1 are survey sites, where only samples were taken. Altogether 11 sites can be put in this group. Sometimes there are only single sherds, sometimes up to ten sherds from two or three vessels. Site Wadi Sahal 82/37-1 comprised 82 sherds from an area of ca. 10 m². These could be assigned

to five vessel units, all except one belonging to fabric SP1. Two of these show a red coating of the surface. Another sherd shows a decoration of short oblique, thin incised lines, probably pending from the rim (Fig. 3. 6). The proposed rim is heavily abraded though, and therefore it remains questionable if this is a rim decoration.

Several more sampled sites comprised decorated sherds. Site Wadi Sahal 82/37-5 contains 11 sherds from 2 vessel-units, all from fabric SP1. One rim sherd shows a decoration with oblique, short (6 mm), incised parallel lines, pending from the rim (Fig. 3. 7). The same motif appears on a rim from site Wadi Shaw 82/82-3. Here, also another sherd with small comb impressions was found. They were apparently arranged in the same way, but the top of this sherd is too eroded to allow a definitive conclusion.

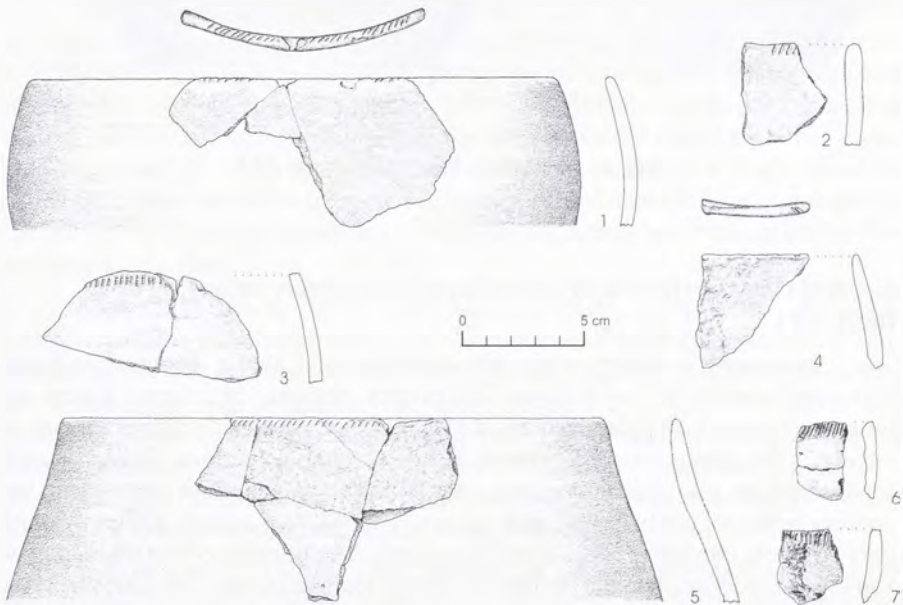


Fig. 4. 1: Wadi Shaw 82/82-2, VU1 ; 2: Wadi Shaw 82/82-2, VU2 ; 3: Wadi Shaw 82/82-3 VU3; 4: Wadi Shaw 82/82-2, VU3, 5: Wadi Shaw 82/82-3, VU1 ; 6: Wadi Sahal 82/37-1/2, VU3; 7: Wadi Sahal 82/37-5, VU1. Scale ca. 1:2.

Finally, some large sherds from site Wadi Shaw 82/62 must be mentioned (Fig. 5.). These are the only ones to be assigned to Fabric SP1 showing a rippled surface. The rippling was restricted to the body, while at the rim a zone of one to

two centimetres was left plain. This vessel was quite large with a rim diameter of ca. 25 cm.

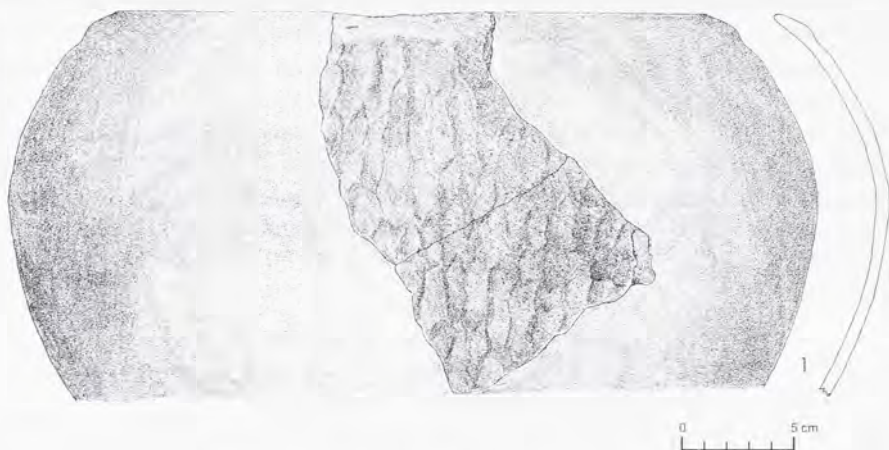


Fig. 5. : Wadi Shaw 82/62, VUI. Scale 1:2,5

General characterization of assemblages with pottery belonging to fabric SP1

In summary, pottery from the sites discussed above, assigned to fabric SP1, can be described as follows: The pottery of fabric SP1 forms a very homogenous corpus characterized by the appearance of a fairly large amount of angular sand grains of sizes around 0,5 to 1 mm, sometimes larger or sub-rounded grains also appear. Vegetal material forms only a minor component, but appears quite regularly. Mica also occurs. The fracture colour is light to dark grey or black, oxidation zones occur frequently. The porosity of the sherds is low and the hardness is high, the sherds are compacted and strong. The wall thickness has an average of 6 to 7 mm.

Surface treatment was generally carried out very carefully, most sherds show a very well burnished surface, some are even polished. Red coating of the surfaces occurs, but is rare. One example shows a rippled surface. Decoration is restricted to the rim zone or rim top and consists of oblique incised lines only.

Stone artefacts have been described from only two inventories from Laqiya-Region, from sites Wadi Shaw 82/82-2 and Wadi Shaw 82/66. Both assemblages are characterized by a large portion of coarse raw materials like

quartz, quartzitic sandstone or quartzite, which have been used to produce flakes mainly, with only a limited percentage of blades. On the other hand, among the retouched tools, the frequency of finer raw materials like flint or chalcedony is much higher. Types of tools include lunates, borers and burins, as the most frequent well defined types, and scrapers, edge-retouched pieces and notches.

Radiocarbon dates of two of the sites with pottery of fabric SP1 from Laqiya-Region suppose an age of ca. 4500 to 4200 calBC, thus, these sites appear to be contemporaneous with the Abkan in the Nile valley. It seems appropriate therefore to compare these two groups of assemblages, in order to understand their relationship.

Conclusion

Abkan connections between Laqiya and the Nile valley

The features described for fabric SP1 make it comparable or almost equivalent to fabric IC of the Early Nubian Pottery as described by Nordström (1972: 49-50), linking it to the Abkan pottery of the Nubian Nile valley. The low number of decorated vessels is another link to the Abkan. On the other hand, the typical decoration of the Abkan pottery in the Nile valley would be rather a zig-zag decoration in rocker technique, which did not occur on a single sherd of fabric SP1. Also the rather frequent occurrence of polished surfaces is unusual in the Abkan – to our knowledge it is absent in the pottery recorded from the Developed Abkan sites.

More links can be found in the stone artefacts. Shiner (1968: 611-612) characterizes the lithic assemblages of the Abkan as flake-based, with only limited amounts of blades, mostly produced from quartz, even though other materials would have been available. The most frequent tool types are borers and groovers. Scrapers, notches, denticulated and edge-retouched pieces altogether form a significant portion. The percentages of lunates are rather low (ca. 2-3 %). Thus, the general characteristics of the assemblages from the Laqiya-Region seem to be close to those of the Abkan in the Nile valley.

On the basis of the described features, it seems appropriate to stress the connections between the two cultural entities described above without classifying them as belonging to the same archaeological culture. We would propose to call the finds from the Laqiya region as “Early Nubian-related group of the Laqiya region” in order to make clear, that there is a connection between the Nile valley and the eastern Sahara. It can be seen from other finds and sites that this connection is kept and strongly intensified during the 4th millennium calBC, when the Laqiya region becomes part of the settlement area of the Lower Nubian A-Group (Lange 2000).

A step further: An Abkan culture group

David Clarke's term "culture group" refers to "a family of transform cultures" displaying a conspicuous level of affinity of characteristic features between interlinked assemblages (Clarke 1968: 317-320). It is a concept displaying closer affinities between traits than the much wider spatial and temporal term "technocomplex" (cf. Clarke 1968: Ch. 8).

We would like to introduce the term "Abkan culture group" for different regional cultures related in different ways to the Abkan as described above, combining the following features:

1. High or medium-level affinity with the pottery of Family M (Nordström 1972: 58-60), characterized especially by sandy fabrics, and with the ceramic tradition called the "Nubian Group, Phase 2", sharing attributes "such as the decorative technique, the stylistic motif, the surface treatment, the shape and the fabric, or more than one together", as defined by Gatto (2002).
2. High or medium-level affinity of the lithic traits, characterized by the use of the same range of techniques and raw materials. Quartz and quartzite are abundant in the debitage. The index for blade tools is typically low. Borers and groovers are usually abundant. Other retouched tools may include scrapers, edge-retouched pieces, notches pieces, and lunates.
3. Similarities in the settlement pattern and the economic structure. In this context, we wish to leave open, for example, the possibility of finding Abkan graves.

We emphasise that all three of the feature groups above should be included. We suggest that in space and time this culture group was characteristic of the Middle Nile basin during the 5th and early part of the 4th millennia BC.

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Mark Milburn

Some enigmatic phenomena of the East, Central and West Sahara

A. Triliths.

Since a connection between veiled Tibu of Tibesti and strange low three-legged tables built of stone seemingly fascinated a British governor of Bornu Province in Nigeria (Palmer 1936: 122ff), I propose to start with these in an attempt to update our scant knowledge hitherto. Such stone tables, or triliths, consist basically of a top slab supported on three “legs” or orthostats whose common dimensions may be about knee- or waist-height with a diameter of 40 – 100 cm across the top of the flat slab (Fig. 1). Higher examples do occur.

In 1935 a French officer, Lieut. Réquin, published a non-illustrated account of how a Tibu murderer could flee onto a mountain and perform rites involving a trilith plus a sacrificed goat. Such were believed to protect him from all pursuit.

Going back further in time it was mentioned that a chief in Tibesti would light a fire beneath a trilith and then sit down on it when he took up office (Palmer 1936: 122-123 & 202-203). It is not recounted how long he was obliged to remain in such a position. However no man was supposed to approach the fire unless he was veiled. Another practice recounted was to light a fire beneath a trilith, to check which way the smoke drifted and then to accept that direction as the best one in which to undertake a raid.

It does not look as though Palmer ever visited Tibesti. It is also possible that his informants deliberately or unwittingly misled him. Yet it seems improbable that such stories would have been invented to pander to the passion for history of an influential foreign dignitary, thus possibly gaining favours for people in his entourage. It has often been said that “there is no smoke without fire.”

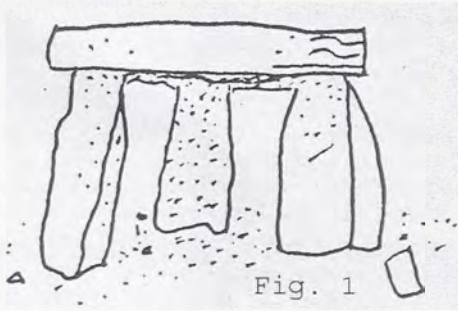


Fig. 1. Trilith (Drawing by John Godwin).

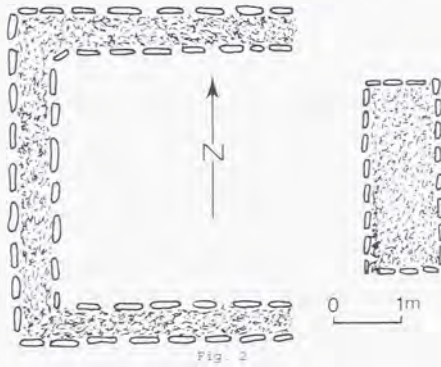


Fig. 2. "Basket-handle" or "Fatima Tent."

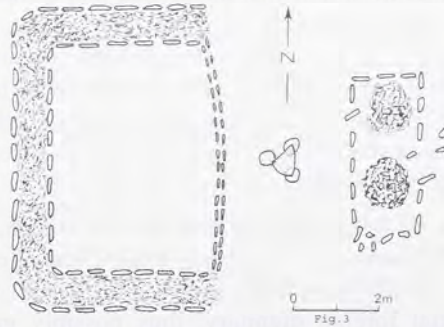


Fig. 3. Trilith placed between a "Basket-Handle" and its associated annex to east.

Coming now to a simple reason for building triliths, such objects are held by one source to have been erected as markers of territory (Claudot-Hawad 1993: 63). But what should one think of two triliths standing side by side? Or a line of small ones, each comprised of only two upright stones (orthostats) joined by a flat stone on top of them? I once saw such a line running uphill and roughly aligned on the peak of Garet-el-Djenoun in Tefedest.

When a central Saharan trilith is positioned among a group of funerary monuments or even directly within the confines of an enigmatic (and probably medieval) structure like a so-called "Basket-Handle" or "Fatima Tent" (Fig. 2), its presence and function as a marker of territory become harder to explain.

Some Air triliths of unstated location in Niger consisted of three pillars set upright "on the plan of an equilateral triangle" (Rennell Rodd 1932: 139) and it seems that the author was told that these were Islamic places of prayer. A game is mentioned by Palmer (1936:202) in which Tuareg youths place a boulder on top of any suitable trilith. Meanwhile I saw some very new-looking triliths in Ahaggar during the 1980s whose flattish cover-stones, far from being boulders, were of only moderate size and weight. This could indicate that some unknown use still continues.

In Fig. 3 is a sketch of a trilith set between a "Basket-Handle" and its accompanying stone-built "annex" to the east. It can also be positioned between the "arms" of the main structure, i.e., to west of the low line of stones a-b; to judge by examples observed hitherto, this latter stone line is only present in company with a trilith. It now becomes hard not to suspect indulgence in certain rites or superstitions. Whether those participating were veiled or not is unknown; however such composite monuments occur directly within the territory of the veiled Ahaggar Tuareg.

Triliths have also been seen in Mauritania (Hachid 2000: 266) and a collapsed stone table with at least four legs once caught my attention during the 1970s not far from the Mauritanian frontier-post of Aïn ben Tili. We know that there used to be veiled men in that general area too.

I am greatly indebted to B. Gabriel for two photos taken by him in 1966 in Enneri (=Wadi) Dirennao, Tibesti. For an overview of Dirennao see Gabriel (1977). He is seemingly the first European to have photographed objects similar to those reported by Réquin (1935) and deserves all credit for having done so (Gabriel 1972; Herrmann & Gabriel 1972: Abb. 12). At least one author appeared to think that it was I who had initially drawn attention to triliths (Hachid 2000: 266). However such is clearly not the case.

The triliths "were associated with small round stone platforms (on which sacrificial animals were probably killed) and with half open stone cists and slabs"

(B. Gabriel, in litt., 16 Nov 05). These are visible in Fig. 4, along with the actual trilith in the left centre portion of the picture.



Fig. 4. Trilith and associated remains in Enneri Dirennao, Tibesti. (Photo B. Gabriel)

Speaking now of the far side of the Eastern Sahara, A.J.Arkell mentions Tuareg introduced into Darfur to look after the newly-arrived camel. He asserts that their traditions indicate that such Tuareg came from Arabia, though regrettably without saying which traditions are involved. (Arkell 1973: 198-1999). However Arabia and Iran are not so far apart and elsewhere I have attempted to suggest the possibility of a connection with the veiled Atravan (fire-priests) of the Zoroaster cult in Iran, (Milburn, 1993: 40; 2005: 54). These are shown in an

illustration reproduced by Burckhardt-Brandenberg (1931: Table V, no. 5). The faces of such men are supposed to have been veiled so as to prevent their impure breath sullyng the sacred fire while making sacrifices (Anon, 1890: 969).

B. Hunting complexes.

In past years in the eastern Sahara considerable interest has been shown in "game-chutes" for capturing animals and birds (Hester & Hobler 1969; Riemer, 2004.). Even allowing for various uncertainties as to function of various apparent component parts of such complexes, it looks as though the general principle of long low walls, coming to an end with only a narrow gap between them, was used to channel game creatures into walled-in areas or pits in which they could be captured or killed. One can read that running gazelles, when frightened, tend to follow along rather than to cross an obstacle in their path (Hester & Hobler., 1969: 64).

Natural terrain could also be used to achieve the same result. Sites could be arranged to encompass existing paths followed by game animals and birds, a phenomenon only too evident in wooded areas in Europe to-day, especially during snowy conditions. The trails used by deer, for instance, often run quite close to those frequented by humans and parallel to them. At a seemingly exceptional site in the central Sahara some years ago this exploitation of suitable terrain was only too evident (Milburn and Wunderlich 1992); camels and donkeys, overtly dependent on local pasture and water rather than frequent human assistance, were observed following trails which passed through such an ancient complex. Its builders had cunningly used available features in which to position at least two killing-areas, consisting of a number of walled "boxes" or "stalls" with parallel sides and to which nets might have been affixed. It seemed to me highly probable that driven game creatures would not have seen such killing-areas until the very last moment. They might also have been chivvied into the "boxes" by skilled hunters adjacent to these.

In Fig. 5 visible animal trails pass through the area, with game seemingly having been chased from north to south, travelling from left to right within the clearly-visible "funnel" (marked by stone lines) until reaching the very dilapidated boxed-in "killing area" at the right edge of the picture.

This latter originally consisted of eight parallel-sided " boxes" or compartments, set together in a complex whose rough dimensions were 19.2 m long by 3.7 m wide, with outer walls of ca. 30 to 60 cm in height. The function of low piles of stones running across the mouth of the "funnel" is unknown. Another killing area was seen a short way to north, out of sight of that mentioned above. It consisted of nine "boxes." It is possible that the builders relied on the southern killing area to catch any game which got past the northern one.

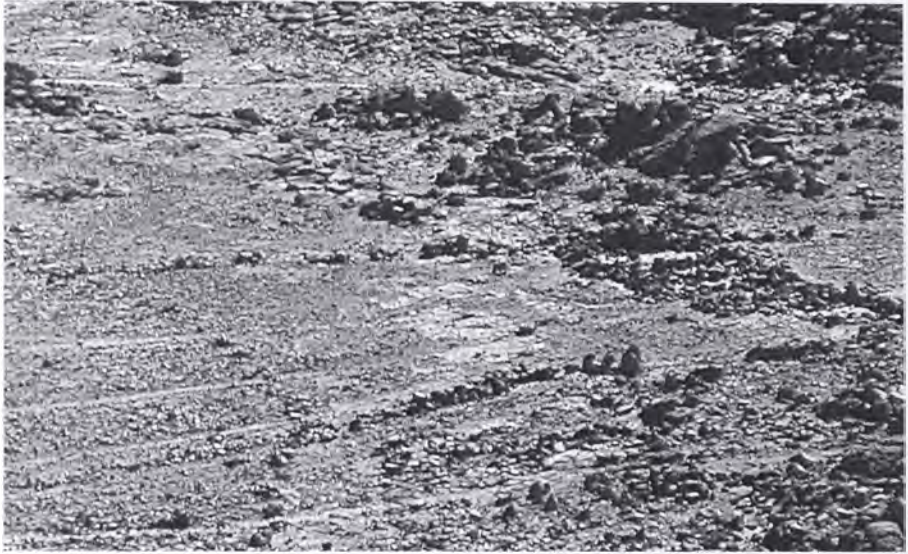


Fig. 5. In this part of the hunting complex, game seemingly travelled from left to right, ending in the boxed-in "killing area" at the right edge of the picture.

However so many stone piles are to be found in the general area of the complex, which is some hundreds of metres in length, that it is difficult not to conclude that a good many changes, perhaps improvements, may have been made over a long period. Should circumstances permit, I would welcome another visit to this highly-complex site in company with others better able than myself to evaluate certain enigmatic structural details overall.

In the early 1980s in the Djado area of northern Niger I chanced upon a single low wall placed along the edge of an escarpment. Since I had not by then heard of such devices for hunting, my attention was probably soon attracted by some other antiquity and I recall no details. But its function could have been to prevent game descending from the escarpment.

A French officer has recounted the existence of long low walls in the Saoura region of Algeria, as well as further north (Martin 1930: 196). He states that the ostrich-hunters have vanished long ago and that all that remains are the strange lines of stones found in the mountains of the Saoura; their purpose was held to have been to oblige driven ostriches to pass either close to a hunter or into a trap. The late Dominique Champault also told me of having seen such walls during her ethnological work there.

Thus, in spite of certain gaps in current knowledge of some aspects of hunting complexes, it seems clear that such walls, ending with only a narrow gap between them, are difficult to explain as anything other than a system for guiding animals or birds into areas in which they can be killed or captured (Cf. Gabriel 2003: 30). Their use will have dwindled with the introduction of accurate fire-arms (compare various forms of hunting practised during the 19th century; Daumas 1858). Once automatic weapons came to the desert, their presence signalled the death-knell of many types of game creatures and the consequent total lack of them in many areas where they formerly thrived.

Finally it remains to express sincere gratitude and appreciation of Lech Krzyzaniak, who did so much to further our knowledge and understanding of desert archaeology. It was always fun to be with him and one became so easily affected by his boundless enthusiasm and gaiety. I wish that he could have seen these notes before they appear in print. Most probably he would have suggested some changes and additions of which I have not thought. His remarks would inevitably have been interlaced with humorous asides and as a result one would have been grateful, as ever, for the benefit of his huge knowledge and experience and his generosity in sharing it with others.

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Nadja Pöllath

Mid-Holocene pastoralism in North-Western Sudan: cattle bone finds from Wadi Hariq and their cultural implications

Introduction

The palaeodrainage system named Wadi Hariq is located in the south-eastern part of the Sahara (northwestern Sudan) about 400 km west of the River Nile (Fig. 1). Within the valley system a total of 104 sites have been discovered during survey. Between 1997 and 2001 seven of the most promising sites were selected for excavation. In this report the faunal remains from site Wadi Hariq S 01/1 will be discussed. Based on the ceramics, the occupation of Wadi Hariq S 01/1 dates to the Handessi horizon B, i.e. ca. 1800 BC to the second half of the second millennium BC (Jesse et al. 2004; Jesse this vol.; Lange this vol.). The faunal assemblage of this site yields some cattle bone measurements, which prompted us to review the metrical data of cattle from all sites in the Wadi Howar region.

Archaeofaunas of Wadi Hariq S 01/1

At Wadi Hariq S 01/1 more than 4,400 faunal remains have been collected (Fig. 2). Due to the poor state of preservation - especially of the surface finds - the identification rate did not surpass 25%. The sample mainly consists of bovid bones, i.e. cattle, sheep, goat, scimitar-horned oryx, dama gazelle, and dorcas gazelle. Bone finds of giraffe were only found during the detailed mapping program carried out near the site.

Considering the number of identified specimen (NISP) and their weight, game was not important in the subsistence of the Wadi Hariq inhabitants. Meat supply was secured almost exclusively by livestock. The herds consisted mainly of cattle and goats with only a few sheep. Since we know that the ratio skeleton



Fig. 1. Map of northeastern Sudan with the location of Wadi Hariq.

weight to body mass is similar in most of the larger mammals, bone weight is a suitable parameter to estimate the dietary importance of a species (Kubasiwicz 1956). In this regard cattle was the most important animal, more than 70 percent of the meat consumed being beef.

The spectrum of wild taxa evidences different habitats within the site catchment (Fig. 3). On the one hand there are species that inhabit the true desert or semi-desert landscapes like dama gazelle and dorcas gazelle. These artiodactyl species will mainly obtain water from their food plants. Due to particular adaptations, these bovids are capable of going without water for long periods, possibly even their entire life. Hare also can obtain moisture from its food and this explains why the species occurs all over North Africa, even in the desert (Dorst and Dandelot 1972). Scimitar-horned oryx and giraffe, on the other hand, have somewhat higher ecological demands. The scimitar-horned oryx frequents the sub-desert steppes and arid grasslands but may also be found in the Sahel during

	NISP		Weight	
	n	%	g	%
Cattle	268	28,3	1913,2	71,1
Sheep	2	} 20,9	5,4	} 11,1
Goat	25		54,9	
Sheep/goat	171		238,9	
Total domesticated animals	466	49,3	2212,4	82,2
Scimitar-horned oryx, <i>Oryx dammah</i>	1	0,1	1,2	0,0
Dorcas gazelle, <i>Gazella dorcas</i>	3	} 1,0	32,6	1,4
Gazelle, small	6			
Dama gazelle, <i>Gazella dama</i>	1	} 0,8	9,4	0,4
Gazelle, medium-sized	7			
Rodentia indet.	1	0,1	0,1	0,0
Horned sand viper, <i>Cerastes cerastes</i>	1	0,1	0,1	0,0
Bovid, large	152	16,1	183,0	6,8
Bovid, medium size	14	1,5	52,7	2,0
Bovid, small	295	31,2	200,5	7,4
Total identified bones	946	100,0	2692,0	100,0
Mammalia indet.	3417		1530,5	
Ostrich, <i>Struthio camelus</i>	24 (egg shell)			
Zooteucus insularis	14			
Giraffe, <i>Giraffa camelopardalis</i> (not from the excavated area)	1			

Fig. 2. Composition of the faunal assemblages from site Wadi Hariq S 01/1. NISP and bone weight.

the dry season and occasionally even in the true desert after the rains (Dorst & Dandelot 1972; Kingdon 1997). Among the taxa recorded at Wadi Hariq the requirements of giraffe are the highest. Although they can refrain from drinking for weeks if they obtain enough moisture from their food, giraffes cannot survive too long without drinking (Dorst & Dandelot 1972). The presence of giraffe and oryx, however, shows that the Wadi Hariq palaeodrainage must have offered good pastures at least during part of the year. After the rainy season, the run-off

from the wadi slopes may have caused relatively favourable conditions within the wadi system, which allowed for a population of giraffes to survive. The foregoing suggests that the landscape resembled a mixture of (semi-) desert and northern Sahel.

	Dorcas gazelle, <i>Gazella dorcas</i>	Dama gazelle, <i>Gazella dama</i>	Scimitar oryx, <i>Oryx dammah</i>	Giraffe, <i>Giraffa camelopardalis</i>
Desert	+	+	+	
N-Sahel	+	+	+	
S-Sahel			+	+
Sudan Savanna				+

Fig. 3. Wadi Hariq S 01/1. The wildlife and their preferred habitats.

Water requirements of livestock are different. Cattle of present-day nomadic pastoralists in the West African Sahel, such as the Kel Temasheq (Tuareg), usually tolerate intervals of two or three days without water depending on season and quality of pasture. Goats can go without water for 15 days during the cool season, whereas in the hot season they need water every third day. In the dry season sheep accept up to five days intervals without water even if they have to cover distances of about 20 km. For the Kel Temasheq's sheep, for example, a 30 days period in the cool season and a one to two days interval in the hot season without drinking has been recorded (Smith 1980).

All domestic species mentioned tolerate arid conditions to a certain extent. In contrast to their wild counterparts, however, domestic animals cannot obtain enough water from their food plants. Thus livestock would not survive long without water. Although the wadi probably provided favourable conditions during the wet season, we doubt whether livestock would have found adequate pasture towards the end of the dry season, even if the herders had dug wells to guarantee a sufficient water supply.

In most bone samples from Saharan sites there is insufficient data concerning the age at death of the animals. This is, however, not the case in this assemblage, which produced a surprisingly high amount of bones of very young cattle and small livestock, in particular of perinate animals. In some cases we might be even dealing with the remains of unborn calves and kids. From our experience with faunal assemblages in arid regions, the likelihood that these

fragile bones are preserved through time is extremely low, suggesting that these animals were buried.

Principally, cattle and goat are polyoestrous, which means that they can conceive throughout the year (Rüsse & Sinowatz 1991). Modern stock-farming profits therefrom and is able to secure milk supply throughout the year by a staggered gestation of cows and small ruminants (e.g., Pingel 1986). As the extreme climatic and environmental conditions of (semi-)arid regions cause water and fodder shortage towards the end of the dry season, offspring born in the dry season has fewer survival chances since their mothers do not produce enough milk to feed them. In arid regions livestock-keepers will counteract by adjusting the reproductive cycles, so that births will take place during the rainy season when cows, goat and ewes find enough pasture and water. Thus the peak of births in modern West African N'Dama cattle and in different African goat breeds is in the middle of the rainy season (Smith 1980; Smith 1992; Felius 1995). Moreover, even today herders will try to avoid off-season births by preventing copulations or killing the off-season pregnant female at an early stage of gravidity (Wilson 1986; Muffarih 1991). Such a rational approach can also be assumed for prehistoric pastoralist societies.

Considering the environmental conditions at Wadi Hariq and its surroundings as suggested by the spectrum of wild fauna and the mortality profiles in livestock, this raises the question about the annual cycle of the pastoralists frequenting Wadi Hariq. While livestock-keeping may have been possible during the rainy season, it can be doubted whether the Wadi Hariq region did offer enough pasture and water during the dry season. Conceivably, pastoralists and their flocks spent this time of the year near permanent water bodies, e.g., the Nile valley. For sure, while the high relative frequency of fetal and perinate and/or neonate individuals in the faunal assemblage provides ample evidence for the presence of man and his flocks at Wadi Hariq during the rainy season, we cannot entirely exclude the possibility of a dry season presence, but have considerable doubts whether this was the case.

On the type and stature of cattle in North Eastern Africa

As said, the Wadi Hariq assemblage provided a number of cattle bones, the morphometrics of which might provide clues as to their geographic origin if compared with contemporaneous and older cattle. Following a modern definition, a (modern) breed is a group of animals that are related by a descent from a common ancestor. All individuals of a breed will produce an offspring with the same characteristics of the population when reproducing with other members of that population. These characteristics comprise size, shape of the body and horns, colour of the coat, weight, and performance (beef, milk, labour, reproduction),

among others. However, when dealing with domestic animals from prehistoric or early historic times, the definition of breed is not as narrow as today, since there did not exist tight breeding programs with defined breeding objectives. But there were distinct types of cattle that developed in different regions as a result of human selection towards certain features with landscape characteristics and pasture productivity acting as limiting factors moulding the phenotype. Roman authors, for example, distinguish between different types of cattle in different parts of the Roman Empire (Peters 1998: 32ff.). The cattle of Campania are described as white-coloured, of slender built and suitable for work. Umbrian cattle were tall and robust with bright or reddish coat. They were considered good draught animals. The Ligurian breed, however, was small and therefore not suitable for work, but fertile and very well adapted to the mountainous landscape characterising the Ligurian region.

Further back in prehistory we lack written information of this kind. To a certain extent depictions in rock art could fill this gap. From the colourful and detailed paintings in the mountains of the eastern Sahara we know a lot about the appearance, horn shape and coat colouring of cattle. But their dating remains a problem. Moreover, rock paintings do not occur in the Wadi Howar region. The rock engravings, which also depict cattle, however, show only few details, are rather stylised and therefore less useful to distinguish cattle types. Apart from this the dating of these engravings is also difficult (Jesse 2005, 36). In dynastic Egypt, however, detailed wall paintings show at least two different types of cattle: a tall and slenderly built, long-horned one Egyptian breed, and another one and a smaller, more robust short-horned type, likely introduced from the southern Levant (Boessneck 1988: 70; Laudien 2000: 30 ff.).

The archaeozoological analysis of bone material cannot provide, e.g., information about milk and beef performance or about the coat colouring. The only evidence revealed by the bones concern stature and size, and the shape of horn cores. Though horn cores may be of special interest when dealing with Nile valley archaeofaunas, they are generally rare in most faunal collections from the Eastern Sahara, including those from the Western Desert of Egypt, making stature an important feature when discussing prehistoric ruminant breeds (Laudien 2000). An animal's stature, however, is reflected by the relation of the length to the breadth of its bones. Differences in bone proportions therefore imply different breeds and this can be evidenced using scatter diagrams comparing length with breadth measurements. Usually a single skeletal element is chosen and specimens from different sites are plotted in one diagram (cf. Chaix 1994: 3; Peters 1998: fig. 19-21; Laudien 2000: 95 ff.). This requires a relatively large data set for each assemblage. In Saharan sites, however, complete bones are scarce and a straight-forward comparison of measurements cannot be

carried out. To deal with similar samples, several scholars developed methods to group different measurements into a single analysis. Among these Richard Meadow's Logarithmic Size Index method (LSI) is the most widely used scaling technique (Meadow 1999). Thereby the difference between the logarithmised breadth measurement of a particular bone and the logarithmised measurement of the corresponding bone of a standard skeleton is calculated (formula: $LSI = \log x - \log \text{standard}$; with 'x' being the measurement of the archaeological specimen and 'standard' the corresponding measurement of the standard skeleton). Results are displayed either in vertical-bar graphs (e.g., Linseele 2004: fig. 10 ff.) or in box-plots (e.g., Jesse et al.: 2004: fig. 24). Up to now, LSI was essentially applied to compare breadth measurements. In a recent study a modified application of the LSI method was proposed (Pöllath and Peters, in press), whereby the length and the breadth measurements of completely preserved bones have been calculated using the formula given above (for standard animal measurements see Manhart 1998: Tab. 103). The result are pairs of variables which can be displayed in a scatter plot as with the examples given above.

In this respect, the data from Sudanese desert sites have been compared to data from the Sudanese and the Egyptian Nile valleys to find out whether different cattle populations can be linked from a morphometrical point of view. The only bones from which there are length and breadth measurements available and which are therefore suitable for this kind of analysis are astragali and the first and second phalanges. LSI values have been calculated for materials from the Sudanese Nile Valley, which are dated between the 5th millennium and the 4th millennium BC (Kadada: Gautier 1986; Kadero: Gautier, pers. comm.; Esh Shaheinab: Tigani El-Mahi 1982, Peters 1986). The Egyptian data set comprises data from three sites: Abydos, Elephantine and Karnak. The Abydos bone sample comes from the tomb of Qa'a, dated c. 2780 BC (von den Driesch & Peters 1996). The bones from Elephantine date to the second half of the 3rd millennium BC (Boessneck & von den Driesch 1982), and those from Karnak North to the late 2nd millennium BC (von den Driesch & Boessneck, unpubl.). The Wadi Howar and Wadi Hariq materials date to the 3rd and 2nd millennium BC (Wadi Hariq: Jesse et al. 2004; Wadi Howar: measurements unpublished, in general Keding 1997, Van Neer & Uerpmann 1989).

In Fig. 4 the data sets from the different sites are combined. The values from Wadi Howar and Wadi Hariq cattle (light grey signs) group at the lower left corner of the diagram. The cattle from the Sudanese Nile valley (white grey signs) can be found at the upper left side, finally, the black signs refer to the values of the Egyptian sites and concentrate at the upper right side. The ranges covered by cattle from Egyptian and Sudanese Nile valley sites assume the shape of ellipses with principal axes inclined to the right side. Obviously, there is

almost no overlapping between these two ellipses. In contrast to this, the finds of the Eastern Saharan sites form a much broader ellipse with a more or less horizontal axis. Moreover, one observes an overlapping of the Eastern Saharan ellipse with the lower values obtained from the Sudanese Nile valley as well as the Egyptian Nile valley sites. From this the following working hypotheses can be deduced:

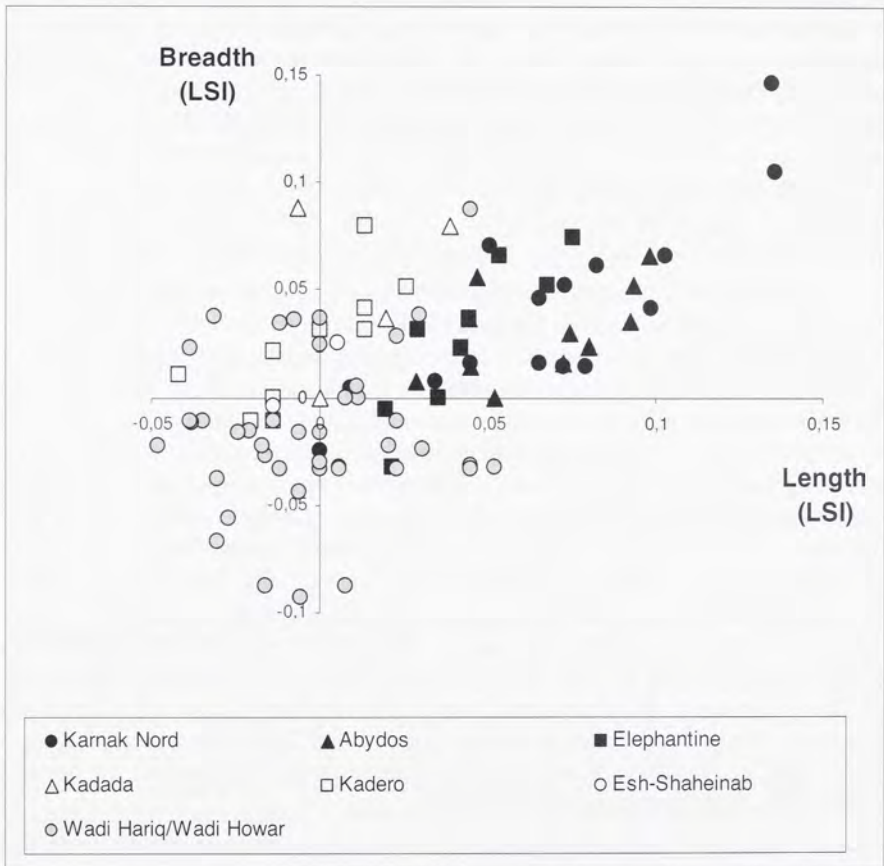


Fig. 4. Cattle in the Wadi Howar Region (light grey), the Sudanese Nile valley (white), and the Egyptian Nile valley (black). Scatter diagram of the LSI values of length and breadth measurements taken from complete bones.

- 1) The Sudanese and the Egyptian cattle have a different stature and therefore represent separate breeds and
- 2) The cattle population from the Eastern Sahara relates osteomorphologically to both the Sudanese and the Egyptian breeds.

To validate these hypotheses a divariate analysis has been carried out, in which bone allometry are compared. Allometry describes the relationship between dimensions of organisms and changes in the relative proportions of these dimensions with changes of absolute size. The skeleton of a vertebrate has to support the body. Its ability for this is proportional to the area of the bone's cross-section. While the volume and therefore the weight of a body increases as the cube of the size, the surface or the cross section of a bone increases only as the square of its size. If an animal doubles its size, the limbs have to bear eight times the weight. Thus bones of larger animals are not only relatively but also absolutely broader. Therefore the growth of bones scales allometric. This allometric relationship can be expressed by the formula $y = b \cdot x^a$. Logarithmised, we get the formula for the line of regression $\log(y) = \log(b) + a \cdot \log(x)$, where $\log(b)$ is a constant giving the intersection point of the line of regression with the y axis at $\log(x) = 0$ (Reichstein 1991: 20). The allometric exponent a defines the slope of the line of regression and is calculated using the formula for the principal axis of the scatter ellipse, which circumscribes the dispersion of the data points.

The divariate analysis compares two sets of pairs of variables. To conduct this analysis a skeletal element with a statistically sufficient amount of measurements has to be chosen. Since the Saharan sites do not provide enough data that fulfil this condition, we decided to compare with data sets from Nile valley sites in Sudan and Egypt to be able to confirm or reject the first hypothesis (lit. see above). The astragalus is a relatively abundant bone within the sites in question and was therefore chosen. The divariate analysis is carried out using DIVA, a software developed for metrical analyses of this kind. The program calculates the regression line that fits each data set. If there is no significant difference between the two sets of data, then they will have a common regression line. If the difference is significant, each set will produce its own regression line. If the latter applies, we are dealing with morphologically different populations. The validity of the data sets and the statistical significance of the results are checked by t- and F-tests (Cann 2003).

Fig. 5 shows the result of the divariate analysis of cattle astragali. The differences between cattle from the Sudanese Nile valley and from the Egyptian Nile valley are statistically significant (t-, F1/F2-Test). This corroborates the interpretation given earlier, that we are dealing with two morphologically different breeds. One could, of course, argue that this difference relates to the fact that

the samples analysed pertain to populations separated by millennia, since the specimens analysed from the Sudanese Nile valley date to the 5th to 4th millennia and those from the Egyptian Nile valley to the 3rd to 2nd millennia. To underline the validity of the foregoing assumption we compared a 5th millennium BC cattle population from Merimde, Lower Egypt, (von den Driesch & Boessneck 1985) with the one inhabiting the Sudanese Nile valley (Fig. 6). Again we observe a significant difference between the two data sets, indicating that even at that time there must have existed different breeds in Lower Egypt and

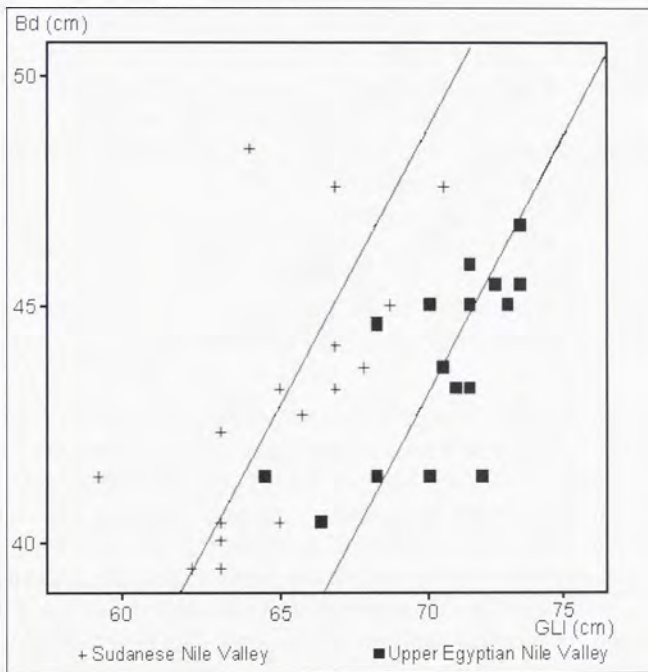


Fig. 5. Cattle. Astragali. Correlation of GLI (greatest length lateral) and Bd (breadth distal).

the Sudanese Nile valley. But the graphs shown here can only serve as a first approach, which has to be substantiated by an enhanced database. In the future it will be necessary to test the hypothesis with data sets of shorter time segments for each region.

With respect to the second hypothesis, the lack of sufficient data does not allow for testing. From figure 4, however, it can be seen that the Eastern Saharan

cattle on the whole were very slender compared to the two Nile valley breeds. The unusual distribution in a broad horizontal ellipse strongly suggests that we are not dealing with a homogeneous type of cattle. Since the Eastern Saharan cattle bone measurements show a considerable overlap with the measurements from Egyptian and Sudanese Nilotic cattle in their respective lower values size ranges indicates that they were linked genetically to both at a certain point. Both, the more robust type and the more slender type of the Eastern Sahara cattle population may have had bone proportions similar to their relatives inhabiting the Sudanese or Egyptian Nile valley, but the animals did not reach the same shoulder

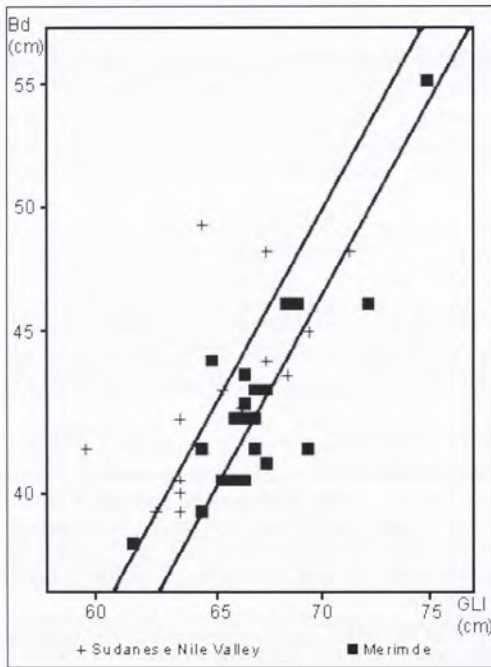


Fig. 6. Cattel. Astragali. Correlation of GLI (greatest length lateral) and Bd (breadth distal).

height, likely due to the poor pasture conditions. Thus from an osteological point of view, the cattle raised by the pastoralists of the Eastern Sahara do not represent a single type or breed, but a heterogeneous population with different geographic origin.

No doubt, the interpretation of the measurement data presented here depends on the representativeness of the respective data sets. For the moment the

results can only be considered preliminary and will have to be verified if additional data from new sites become available. This kind of analyses is also hampered by the fact that we do not have enough contemporaneous sites in each region. Therefore the results of this study can only serve as a basis for further research. In addition stable isotope analyses will be carried out to characterise chronologically and/or geographically separated cattle populations in order to trace back transhumant cycles, and to be able to discuss in more detail the subsistence strategies and decision making of prehistoric human groups inhabiting Northeastern Africa.

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Heiko Riemer and Peter Schönfeld

The prehistoric pottery of Abu Tartur, Western Desert of Egypt

1. Introduction

Abu Tartur (“father of the cone-shaped head”) is a sub-plateau of approximately 1,200 km² at the southern edge of the Egyptian Limestone Plateau (or Abu Muhariq-Plateau), separating the oases of Dakhla and Kharga in the Western Desert of Egypt (Fig. 1A-B). It was named after a conical hill at the northern caravan connection between Kharga and Dakhla, the so-called Darb el-Ain Amur. The generally flat-topped plateau surface has an absolute elevation of 540-570 m a.s.l. (Hussein 1990: 260) gently dipping to the north where it is joined by the northern parts of the Limestone Plateau. The plateau surface is a plain Hamada covered with stone gravel, interrupted in many parts by small wind-shaped hills. To the south and east the Plateau is surrounded by a steep escarpment up to 400 m high that drops down to the oases’ depression. The southern escarpment stretches out over some kilometres into the depression forming the Abu Tartur foot hills.

The sites mentioned in this paper are situated within an area of approximately 25 by 15 km in the south-eastern sector of the Abu Tartur Plateau (Fig. 1C), about 50 km west from the centre of Kharga Oasis. This is an area where rich phosphate deposits have attracted a large scale mining venture since the 1960s (Said 1971; Wassef 1977). After a decade of geological surveying and prospecting, the south-eastern plateau sector (“Maghrabi-Liffiya sector”) was the subject of a systematic exploratory programme on the large phosphate reserves in the early 1970s conducted by the Egyptian Geological Survey and Mining Authority (EGSMA) (Hermina & Wassef 1975; Wassef 1977; Hussein 1990). During the following years more than 100 km² of the plateau surface and the scarp face were topographically mapped, and within a perpendicular grid system a

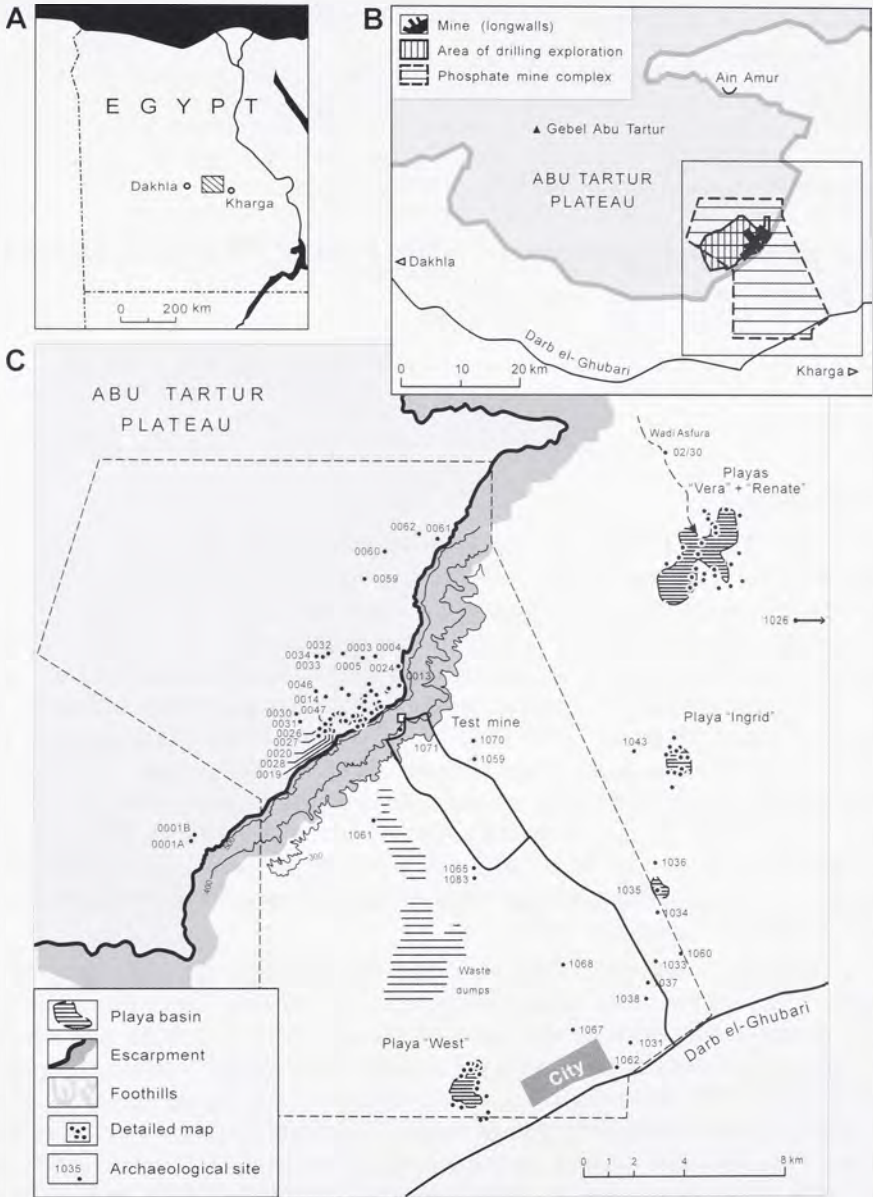


Fig. 1. A-B Location of Abu Tartur Plateau and the study area in the south-eastern section of Abu Tartur; C Study area showing the distribution of archaeological sites recorded at Abu Tartur.

drilling program was conducted to evaluate the position and potential of the phosphate deposit. An underground pilot mine was then advanced into the phosphate bed which now serves as an air adit for the major underground run-of-mine southwest of the pilot mine. During this time the large industrial complex around the test mine was erected in order to meet the extensive infrastructural needs.

The archaeology of Abu Tartur has much benefited from the enthusiastic work of Siegbert Eickelkamp. After a first activity in the late 1970s at Abu Tartur, he was the mining engineer of the Abu Tartur phosphate mine between 1981 and 1987. He was the first who discovered a large number of sites on top of the escarpment. Within the tracks of heavy drilling trucks covering the entire test area, artefacts and cultural layers became visible. In the following years, the sites as well as the artefacts were fully registered, and site maps were drawn on the base of the topographical maps that were available from the geological surveys. Moreover, other sites in the low land plains and playas in front of the Abu Tartur escarpment were found and registered by the same techniques.

Even if Eickelkamp could not carry out any excavation, his documentation is that of a systematic research programme of the surface sites, as he not only completely registered the surface tools found on a site, but also developed a systematic and comprehensive recording of topography, artefact clusters and geo-scientific settings. About 20 years ago it became visible, that his investigations despite done by an amateur archaeologist were also a contribution to rescue archaeology, as most sites of Abu Tartur were destroyed in the mean time by the growing industrial complex. The sites on top of the Plateau were already destroyed when they were found by Eickelkamp. Now after two decades the progressed weathering by wind erosion has left nearly nothing behind. Sites along the road that connected the mine with the paved road between Dakhla and Kharga, were entirely lost, as this area has been heavily built-up. At the western foothills of the escarpment, Playa "West" was one of the large playa basins systematically surveyed by Eickelkamp. The new village that was built during the last years reaches the eastern border of the basins, and many sites were destroyed throughout. The waste dumps that resulted from the processing of phosphate concentrates will probably reach the playa basin within a couple of years. Land reclamation for farming areas as well as new paved roads are under construction all around the mining complex. Moreover, looting and destruction of the archaeological sites can be observed as a consequence of the rapid population increase in this area.

136 sites have been recorded at Abu Tartur by Eickelkamp of which 62 sites lay on the plateau surface while 74 sites are located at playa depressions and on the sandstone plain in front of the escarpment. The sites at Abu Tartur (or AT) are indexed with a numerical code starting with AT 0001 for the sites on the

Plateau while the playa and plain sites have numbers from AT 1001 upwards. A critical re-examination of the Abu Tartur documentation and collection is now under way. The present paper gives a preliminary report on the examination of the pottery found on the Abu Tartur sites. The pottery collection comprises a total of 416 sherds recorded at 68 individual sites, which make up 50% of all sites registered for the Abu Tartur area (Table 1). Accordingly the mean value is about 6 sherds per ceramic site. In fact the number and quality of pots sherds found on the surface sites is rather low. The sherds are generally small in size and often corroded. Only 10% of the pots sherds consist of decorated pottery which complicated the classification. Therefore, a fabric analysis has been established based on the major tempering agents as defined by macroscopical identification of the sherds combined with a binocular examination of selected samples.

Table 1. Abu Tartur: Ceramic sites and their local distribution.

Location of sites	Total sites	Ceramic sites	%
Plateau	62	37	59.7
Foothills and plains	74	31	43.1
<i>Playa West</i>	16	10	62.5
<i>Playa Ingrid</i>	13	6	18.5
<i>Playa Renate + Vera</i>	27	5	46.2
<i>Sandstone plains</i>	18	10	55.6
Total	136	68	50.0

2. Fabrics

Five basic fabrics have been distinguished. With minor exceptions, they can be synchronized with the fabrics determined for the southern Limestone Plateau area at Abu Gerara (Riemer 2003). The following list of fabric types and possible variants can be given as a conclusion of the pottery analysis:

Fabric 1

Non-tempered or moderately tempered sherds with a dense closed matrix. The paste consists of a homogenous fine calcareous material (reactive to hydrochloric acid). Surface and core colours may range from reddish brown to pale brown and grey, however the core is mostly grey. Two variants have been ob-

served on the basis of non-plastic inclusions which in most cases probably represent accidental intrusions:

Fabric 1A = temper with plant grains visible as black burned-out voids,
Fabric 1B = rounded sand grains.

The variants as defined above do not display distinct groups, as on most sherds a combination of the two components can be observed.

Fabric 2

This fabric is characterized by a fine shale temper that can hardly be identified with the naked eye. The shale particles have a length that often does not exceed 0.5-0.7 mm (Fig. 2). In most sherds a certain amount of sand and/or other minerals have been added. The colours can vary from yellowish brown to brown.

Fabric 3

Fabric 3 contains sand, and may additionally have other minerals. The sherds are less porous than fabric 2, but not as dense as fabric 1. A great variety in colours occurs.

Fabric 4

Fabric 4 is the "coarse shale fabric", which geomorphologically speaking is, in fact, a "very coarse" fabric, as the shale particles can range up to 10 mm length. Although fine- and medium-grained shale make up the highest proportion among the shale particles, the larger grains are more significant for the fabric. Regarding the largest particles that can be observed on a sherd three variants have been defined (Fig. 2):

Fabric 4A = shale particles > 2-3 mm length (in the absence of the other variants, this group has been defined as fabric 4 at Abu Gerara).

Fabrics 4B and 4C = In contrast to fabric 4A, the shale pieces in these variants do not exceed 2 or 2.5 mm. Though these two variants seem to be completely different when studied with the naked eye, the microscopic examination does not reveal any difference on the base of shale grain size. The fabric 4B paste is of yellowish colour and relatively hard fired. In contrast, fabric 4C is reddish or red-coated with a soft, crumbly paste. The fabric 4B and 4C variants are previous, as they comprise a very small number of sherds.

Fabric 5

This fabric is characterized by a vegetal component of plant fibres, that may be combined with sand or angular quartz.

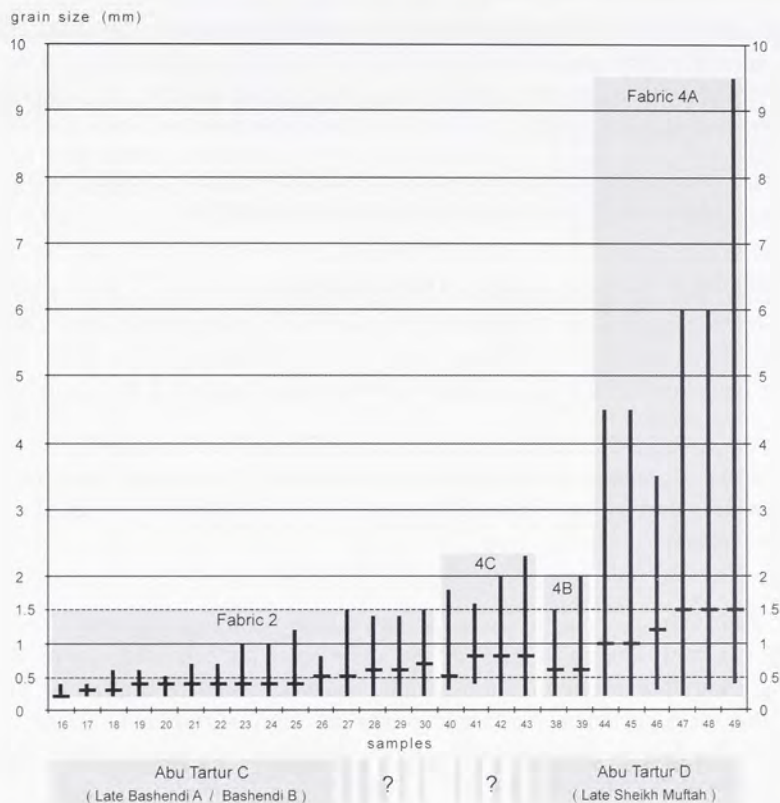


Fig. 2. Maximum, minimum, and mean value of grain size of shale particles used as tempering agents.

3. Ceramic attributes

3.1 Vessel shape

Due to the mostly small-fragmented condition of the collected ceramic material of Abu Tartur the original shape and size of the vessels is only reconstructable in a few cases. As far as discernible the majority of potsherds in all fabrics, with the exception of fabric 5, represent a very simple morphology that gives little base for detailed comparison. This morphology is dominated by open bowls with differing deepness and moreover by globular or slightly restricted jars (Fig. 3A). Although some differences exist, these seem mostly caused by the individual production of the pottery. Generally the number of vessels in all fabrics is too small to recognize any significant relations between fabric and shape.

Nevertheless a closer connection between fabric and shape is suspected concerning some cups with wide mouth made from fabric 4C. While flat cups are quite common in the fabric 4C, this shape is lacking completely in the fabric 4A and 4B-production which only represents the bowls and jars mentioned above.

The clearest relation between shape and fabric exists for the organic tempered fabric 5 where all potsherds belong to globular, decorated jars. These quite distinctive jars have a short everted neck and a thickened rim. As already assumed for similar jars found in Dakhla Oasis (Hope 2002) the uncommon fabric and shape clearly shows a non-local provenance.

3.2 Vessel size and wall-thickness

Due to the bad preservation of the Abu Tartur pottery only few potsherds allow the measurement of size. In no case is it possible to get any data concerning the former height of the vessels. For this reason the only hint on the vessel sizes is given by a small amount of potsherds still allowing the measurement of the rim diameter (Fig. 3B).

The available data for vessels made in fabric 1 are at least suited to show the small size of vessels which only show small rim diameters of maximal 150 mm. Despite the poor preservation of the pottery the wall-thickness can mostly be detected (Fig. 3C) and seems suited to verify the relation between vessel size and fabric. Indeed the small size of the vessels in fabric 1 correlates with the thin walled production of the potsherds which are usually less than 6 mm in thickness.

For fabric 2 at least eight vessels could still be measured, showing rim diameters between 140 and 280 mm and therefore a clear tendency to larger vessel sizes than fabric 1. The wall-thickness of fabric 2 potsherds mostly ranges from 4 to 7 mm but there are also examples up to 10 mm thick.

The few data available for fabric 3 give evidence of rim diameters between 140 and 210 mm but is certainly not enough to reflect the whole range of vessel sizes in this fabric. The wall-thickness is similar to fabric 2 but shows even thicker potsherds up to 12 mm. Among the thicker fabric 3 potsherds some examples decorated with packed dotted zigzag are to be mentioned.

For fabric 4A rim diameters between 200 and 290 mm show that evidently larger bowls were made in this fabric. Matching with the large size of the vessels and the coarse tempering the fabric 4A production also has the largest wall-thickness which often comes to 9 mm but in some examples also reaches 13 mm. Despite this, even thin-walled production is made in fabric 4A that on the whole shows the widest range among all fabrics. The amount of data for fabric 4B and C is too small even to show tendencies concerning the size.

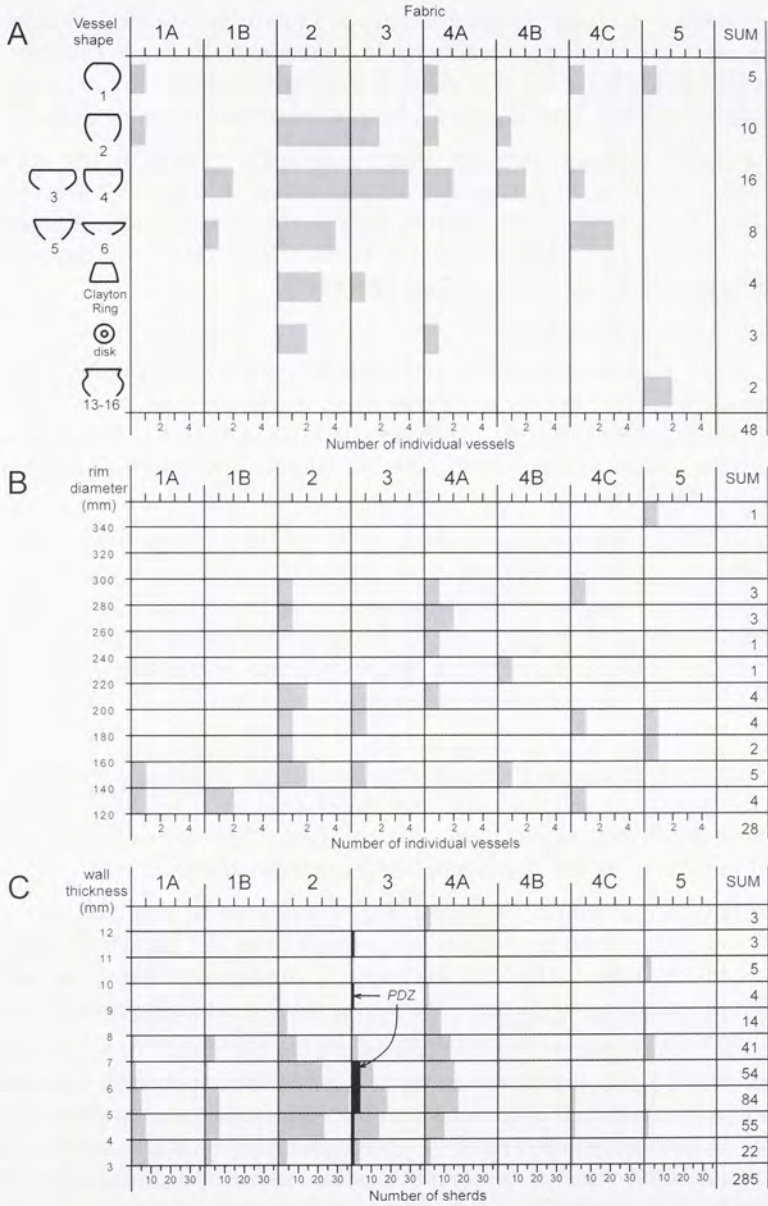


Fig. 3. Ceramic attributes related to fabrics: A Vessel shape; B Rim diameter; C Wall thickness (PDZ = Packed Dotted Zigzag sherds).

The rim diameter of fabric 5 vessels is between 157 and 350 mm and therefore shows a wide range based on a quite small amount. Nevertheless this impression is confirmed by the wall-thickness of fabric 5 potsherds between 4 and 10 mm, showing the same wide range.

3.3 Decoration

As in neighbouring regions of the oases and the Limestone Plateau decoration is very rare in the prehistoric pottery of Abu Tartur. Among the total number of 416 potsherds only 42 examples are decorated on the body. Rim decoration is even more rare and just evident on 22 sherds (Tab. 2).

Table 2. Abu Tartur: Frequencies of potsherds related to fabrics and decorations.

Body decoration	Fabrics								Total	%
	1A	1B	2	3	4A	4B	4C	5		
undecorated	29	23	141	71	97	2	7	4	374	90.0
Packed dotted zigzag				12					12	2.9
Rippled ware			9						9	2.2
Geometric motives		1	2						3	0.7
Brush						1			1	0.2
Mat-impressions								17	17	4.1
<i>Total</i>	29	24	152	83	97	3	7	21	416	100.1
<i>%</i>	7.0	5.8	36.6	20.0	23.3	0.7	1.7	5.0	100.1	
Rim decoration										
Black-topped			7	1	5				13	3.1
Thumb impressions			2						2	0.5
Carved rim			1	2					3	0.7
Cross-carved rim			4						4	1.0

Particularly in fabric 1 decoration is nearly absent both on the body and on the rim. The only exception is a fabric 1B potsherd with incised hanging triangles beneath the rim (Fig. 4.13).

Most variations of decoration are visible in fabric 2 where rippled body decoration (Fig. 4.16) and incised geometric motives beneath the rim (Fig. 4.14-15) occur. In addition to that, the rim can be decorated by blackening (Fig. 4.17),

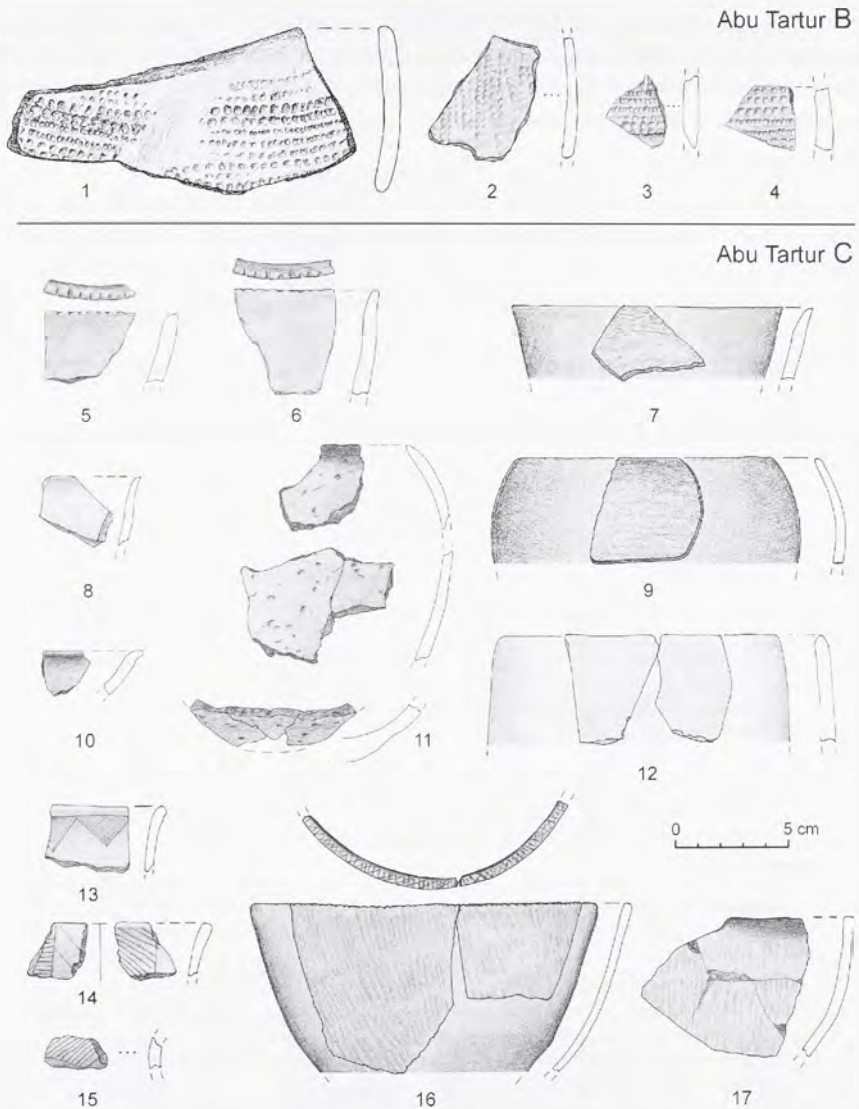


Fig. 4. 1-4 Abu Tartur B: AT 1004, 1017, 0006, 0007, Packed dotted zigzag decoration (fabric 3); 5-17 Abu Tartur C: 5-6 AT 0003, carved rim (fabric 2); 7-12 AT 0021, 0026, 0004, 0010, 0062, 0026, undecorated (fabric 1); 13-15 AT "034", AT 0062, AT 0062, beakers with incised geometric decorations (13 fabric 1; 14-15 fabric 2); 16 AT 0032, rippled surface (fabric 2); 17 AT 0014 black-topped red-polished with rippled surface (fabric 2).

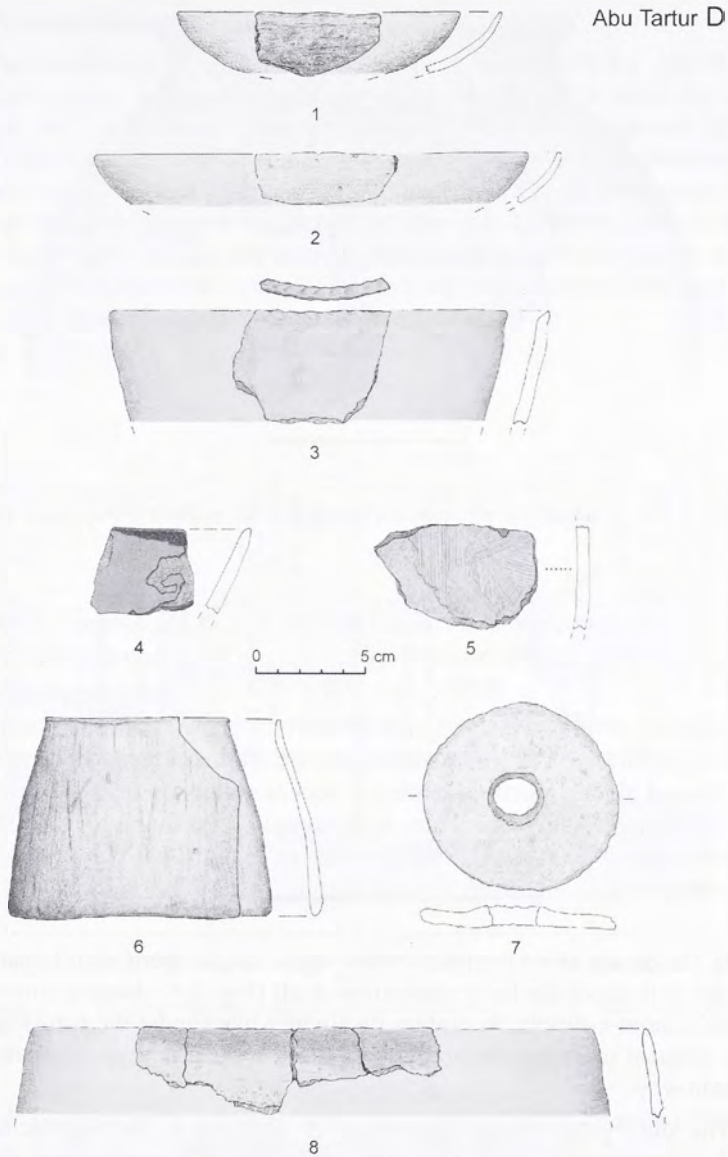


Fig. 5. Abu Tartur D (Sheikh Muftah): 1 AT 0014 (fabric 4C); 2 AT 0034 (fabric 4C); 3 AT 0049 (fabric 2); 4 AT 0003, black-topped red-slipped (fabric 4B); 5 AT 0003 "brush" decoration (fabric 4B); 6 AT 1006, Clayton ring (fabric 2); 7 AT 1029, Clayton disk (fabric 4A); 8 refitted from AT 0018 and AT 0049 (fabric 4A).

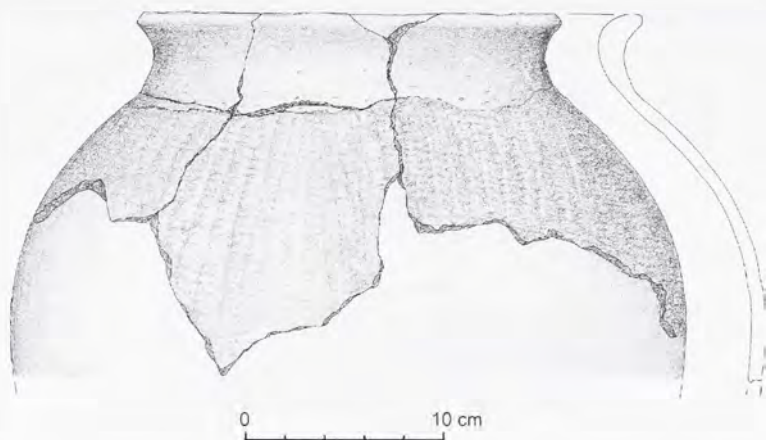


Fig. 6. AT 1033: Globular jar with mat-impressed decoration dated to the Islamic period.

thumb impressions or simple or crossed notches (Fig. 4.16). Despite this range all kinds of decoration known for fabric 2 are rare while the large majority is undecorated.

A group of potsherds assigned to fabric 3 shows the most sophisticated decoration among the ceramic material of Abu Tartur. The decoration with the packed dotted zigzag motif is made by rocker stamping (Fig. 4.1-4) and can clearly be linked to the Khartoum style complex. Potsherds decorated in this technique have already been found in other regions of the Western Desert and show connections to southeast Saharan regions (Warfe 2003; Riemer & Jesse in press).

In the coarse shale tempered fabric 4 one single sherd with brush decoration is the only proof for body decoration at all (Fig. 5.5). Merely some rims of 4A vessels show a simple decoration by slightly blackening the rim (Fig. 5.8), a stylistic element imitating the predynastic black-topped pottery in a rather unsophisticated way.

The only group where decoration is common is the organic-tempered fabric 5 where the decorated potsherds outnumber the undecorated ones. The dominating kind of decoration here is extensive impressions on the body of the vessel, resembling a basket (Tangri 1991; Hope 1999) (Fig. 6). Nevertheless the decoration seems to be made by a tool or mat and for that reason better is named “woven mat design” (Hope 2002: 45).

4. Abu Tartur Ceramic Chronology

The chronological sequence that has been established for Abu Tartur is provisional, as most inventories have not yet been studied. The terms used for the phases of the Abu Tartur sequence follow a descriptive regional approach labelled here as phases Abu Tartur A to D (Fig. 7). As pottery is absent in Phase Abu Tartur A this period is exclusively represented by stone artefacts and not considered here. Terms such as “Neolithic” can only hardly be used in a supra-regional scale, as economic and cultural developments in North Africa display a wide range of independent sub-systems and sub-developments that can not be defined as horizons of contemporaneous phenomena.

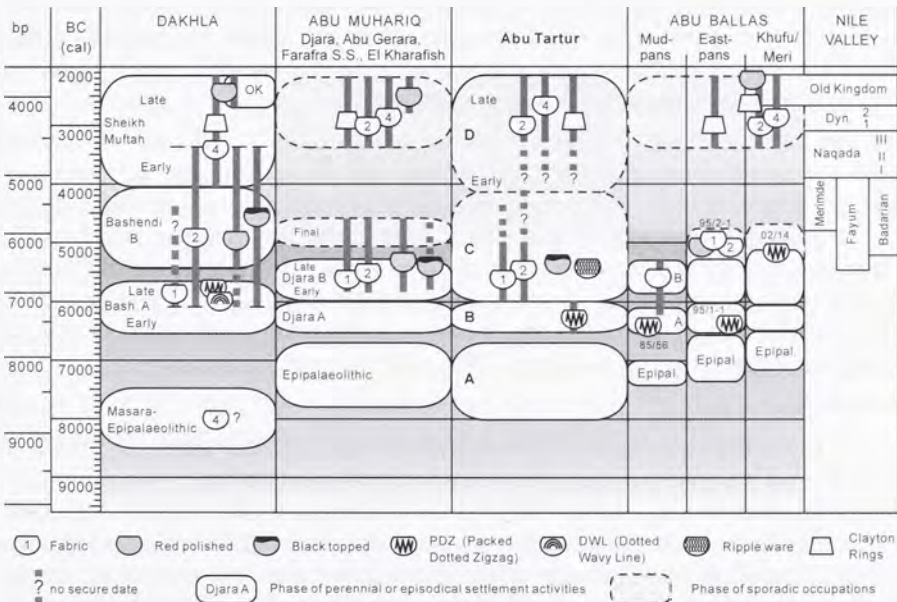


Fig. 7. Comparative chronological chart of Abu Tartur and adjacent regions (Dakhla chronology after Hope 1999; 2000).

Dating evidence for the Abu Tartur pottery derives from four sources listed here in increasing order of importance:

(1) Direct dating of the pottery has not yet been realized to a greater extent. Unfortunately plant temper which can be used for 14C-dating is rare among the

Abu Tartur pottery. Only in one case a sample of soot adhering to a potsherd (Fig. 7) was dated by conventional radiocarbon analysis, however, it yielded a date within the Islamic time.

(2) Context dating either performed as typo-chronological comparison or with connected absolute dates may offer an alternative if direct dates are missing. Most potsherds examined here were found on archaeological sites in connection with other artefacts, especially stone tools. In many cases, the context a site can provide is of great value as chronological indicator, though only a small number of sites have yet been completely studied. Moreover, the tool assemblages often yielded no definite clues as most collections are from surface scatter, and many assemblages are mixed up by intrusions of different phases.

(3) To some extent sherds and related ceramic attributes that have been observed together within the same context or site may offer some further dating evidence, as they can be grouped in sequences (seriation). But again, the quality of this method is strictly related to the context interpretation, and this may be a rather crucial point as we noted in the former paragraph.

(4) The most informative approach for the dating of the Abu Tartur pottery has been the comparison of fabrics and wares with those from the neighbouring regions where pottery has been well-dated. The ceramic chronology of the Dakhleh Oasis Project (DOP) that results from about 25 years of research in the Oasis is certainly the most valuable archive (Hope 1999; 2002; Warfe 2003). Another archive to be used are the results of the Cologne B.O.S. and ACACIA projects which have worked in the Western Desert north and southwest of Abu Tartur since the early 1980s (Kuper 1993; 1995; Riemer 2003).

4.1 Abu Tartur B

The earliest evidence of pottery can be dated to Abu Tartur B. This is a type of most prominent pottery decorated with the packed dotted zigzag motif by rocker stamping which can be linked to the Khartoum style complex. A total of 12 sherds (Table 2) decorated in this manner were observed from eight sites (Fig. 4.1-4). Most were found on top of the Plateau, but there are also some sherds from the large playa basins in front of the plateau escarpment. All sherds are of identical fabric. They are medium-walled (6-8 mm) and tempered with angular sand (fabric 3) that has been dated elsewhere in the Western Desert to about 6400/6300 BC (Riemer & Jesse in press). A ^{14}C -date from site AT 1004 (cf. Fig. 4.1) falls to about 6400 BC, two dates from AT 0006 and AT 1017 (cf. Fig. 6.2-3) to about 6100 BC. With regard to the lithic material found on AT 1004 and AT 1017, an age within Abu Tartur B can be distinguished on the basis of the retouched tools. The evidence known from Dakhla where similar decorated potsherds have been found has recently been summarized in an article by Warfe

(2003). The sherds found on two sites in Dakhla contain “profuse, coarse sand inclusions”, and in one case they also contain “red, black and white pebbles”. 14C-dates available for one of the sites range from 6300-5700 BC. The possibly younger horizon of Khartoum style pottery that is characterized by a vegetal temper has been dated to about 5500-4800 BC in Egypt (Riemer & Jesse in press). However, it has not yet been observed at Abu Tartur.

At the moment it is hard to say, if there is any non-decorated pottery present for the B phase. As there is no other than the decorated pottery reported from Dakhla and neighbouring regions, we tend to assume, that the local tradition of undecorated ceramic vessels did not start before Abu Tartur C, contemporaneously to the Late Bashendi A unit in Dakhla.

4.2 *Abu Tartur C*

It appears that the Abu Tartur C material consists of two fabrics, the thin-walled dense fabric 1 (Fig. 4.7-13) and the fine shale fabric 2 (Fig. 4.14-17). The shape types and sizes tend towards small closed globular vessels, however the range of variation includes open pots and bowls with straight and everted rim types as well.

The rim decorations may include carved rims. Among these are two rim sherds made of fabric 2 from site AT 0003 (Fig. 4.5-6). This rim decoration is known very early from Mudpans (Kuper 1993); and, with less similarity, from Abu Minqar (Zach-Obmann 2003). But the fabrics of Mudpans and Abu Minqar, so far as evaluated, do not show striking parallels to the mentioned Abu Tartur sherds. A similar example not only in rim decoration, but also in shape, wall-thickness and temper can be found among the Bashendi B pottery in Dakhla (Hope 2002: 43, Fig. 1p) which led to the assumption that the sherds of Abu Tartur and their rim decorations are to be placed in phase Abu Tartur C.

In a very small number, black-topped rims are present for the first time in Abu Tartur C, though the quality in manufacture is low, as the cores have not been blacked, and the surface treatment is irregular. The dating as well as the quality in manufacture goes well with similar sherds found in Dakhla (Hope 1999: 218) and at Abu Gerara (Riemer 2003). The sherd depicted here (Fig. 4.17) is the best preserved specimen at Abu Tartur, however, it is rather uncharacteristic, as it has a light rippling of the surface, which displays some improvisation of the technique known from the Early Predynastic. The site from which this sherd comes, AT 0014, has most probably a mixture of sherds from Abu Tartur C and D (cf. Fig. 4.1). Therefore the age of the black-topped rippled bowl can only be affiliated through the fabric that tentatively points to Abu Tartur C. Another vessel (Fig. 4.16) has in common with the former bowl the roughly rippled surface and the fine shale fabric (fabric 2). However, the surface has neither been

red-polished nor black-topped. An elaborate cross-carved decoration occurs on the flattened rim. The rippling has been performed as a kind of incised striation that has not been polished afterwards.

Two sherds are from one or two small beakers (Fig. 4.14-15) for which parallels can be found among the Tasian-like beakers from the Eastern Desert and Upper Egypt (cf. Friedman & Hobbs 2002). The incised geometric decoration is applied to the inner and outer surface. The surfaces are burnished and pale brown in colour. Paste and temper are identical to the local fine shale fabric (fabric 2). The sherds have been found at AT 0062 where a small scatter of lithic material exists that can be associated to phase Abu Tartur C (as well as the fabric 1 vessel in Fig. 4.11).

Another thin-walled everted rim sherd that has been listed at site AT 034 carries a carefully incised design of filled triangles on its outer surface (Fig. 4.13). The fabric is hard and well fired with reddish-brown well-burnished surfaces and a grey to black core slightly tempered with quartz grains. The fabric resembles the thin-walled dense sherds from phase Abu Tartur C (fabric 1B), though surface treatment and temper are slightly different. The AT "034" ensemble contains a number of Sheikh Muftah sherds (Abu Tartur D) that might point to a younger age of the decorated rim sherd, but without further information about the context the chronological setting is quite uncertain.

4.3 Abu Tartur D

Phase Abu Tartur D can be synchronized to the Sheikh Muftah cultural unit in Dakhla. As the most characteristic ceramic attribute of this phase, a very coarse shale temper (fabric 4A) occurs in large pots and bowls (Fig. 5.8). Although sherds of that kind can often be found at Abu Tartur, the number of reconstructed or refitted vessels is very small. As a principle the vessels have straight or slightly everted rims; therefore, they are rather open than in the former periods (a good selection of possible vessel shapes from Dakhla are published in Hope 2002).

Among the Sheikh Muftah pottery, a finer fabric can be observed that may contain a fine shale component, sand, and/or other mineral particles of varying colours. This fabric has been designated as fabric 2, as sherds can hardly be separated from those of fabric 2 sherds found on the Abu Tartur C site. As a guideline to separate the fabric 2 traditions of phase C and D, two attributes can be listed here: The Abu Tartur D sherds tend towards a higher porosity while the phase C sherds are rather dense. The proportion of shale seems to decrease from phase C to phase D while the amount of other minerals may be higher in the later phase.

At the moment, the transition from Abu Tartur C to D and the early D phase (or Early Sheikh Muftah) lack valuable comprehensive material, as

archaeological sites in the desert outside the oases are missing during this time period. The only data base that can be used is the material found in Dakhla (Hope 2002), however, only very little dating information is available for the transition from Bashendi B to Early Skeikh Muftah, and following Hope (2002: 45) an overlapping of Bashendi B with the Early Sheikh Muftah can not be excluded.

Comparing the grain size of the shale inclusions in different samples found at Abu Tartur, we noticed that there are a small number of sherds with coarse shale particles that do not exceed 2 or 3 mm in length. This is, in fact, longer than the fabric 2 maxima, but shorter than the fabric 4A maxima. They have been observed in a number of thin-walled cups and shallow bowls with compacted and well-burnished or polished yellowish surfaces (Fig. 5.1-2). As this kind of fabric that was defined as fabric 4C as well as the related cups and bowls have not yet been found on the desert sites elsewhere, we believe that we are dealing with a transition phase between Bashendi B and the Late Sheikh Muftah, or Abu Tartur C and D, respectively. Parallels have been found in Dakhla connected to sites which are defined as Early Sheikh Muftah (Hope 2002: 46-48).

Decorations occur on two sherds found together on site AT 0003 (Fig. 5.4-5). The sherds are again made out of a coarse shale fabric combined with various other minerals that have been defined as fabric 4B. The rim sherd (Fig. 5.4) has a black rim and a red-polished (or slipped) compacted surface. A brushing in various directions, that occurs on the body sherd appears to represent a decorative element (Fig. 5.5). As no identical parallel can be found among the Late Sheikh Muftah pottery elsewhere, we tend to assume an Early Sheikh Muftah age or Early Abu Tartur D age. This might be underlined by a brushed sherd that has been found on an Early Sheikh Muftah site at Dakhla (Hope 2002: 47, Fig. 4s).

The repertoire of the Abu Tartur pottery comprises two bowls or open pots which have a regular light notching of the flattened inner rim part (Fig. 5.3) that may have been performed with the thumbnail. The dating of these sherds remains uncertain. Surface treatment and fabric resemble the dense variant of fine shale fabric (fabric 2) and the roughly burnished surfaces of the Abu Tartur C pottery. However, the sherds were found on site AT 0049 together with characteristic (Late) Abu Tartur D (or Late Sheikh Muftah) pottery. The rim decoration neither occurs on Abu Tartur C nor on Late Abu Tartur D pottery which may suggest an Early Abu Tartur D age. Looking for parallels among the Dakhla pottery, rim type and rim notches may suggest affinities with the Early Sheikh Muftah (Hope 2002: 47, Fig. 4).

Clayton rings and discs have also been found at Abu Tartur (Fig. 5.6-7). They occurred as single finds within the surface scatters, but never within deposits as discovered on many desert sites (Riemer & Kuper 2000). The rings were made of the fabrics 2 and 3 whereas fabric 4A has never been used for the

rings. This is in good accordance to rings found elsewhere. As the coarse shale temper makes the vessels resistant against thermal shock, they most probably were used as cooking pots. In turn, the Clayton rings as well as the fabric 2 and 3 vessels obviously have never been used within a camp fire or in contact with high temperature. The discs can be made of all possible fabrics, as most of them are secondarily worked out of old vessel sherds. An unusual specimen is, therefore, a disc made out of a clay lump which was tempered with coarse shale (fabric 4A) (Fig. 5.7).

4.4 Historic pottery

The jar in question here (Fig. 6) is nearly identical to the jar found at Loc. 135 in Dakhla (Hope 2002: fig. 5b and pl. 58). It came from site AT 1033 which yielded no other artefacts. The vessel shows the characteristic mat-impressed globular body as well as the everted ovoid rim, such as observed on the Dakhla jar. Moreover, vessel size and fabric (sand and straw) have striking similarities to the Dakhla specimen. With reference to the general dating of site 135 in Dakhla, the jar has been placed into the Early Sheikh Muftah cultural unit, tentatively dated to the final 6th or 5th millennium BC (Hope 2002: 46). Charcoal adhering to the surface of the Abu Tartur sherds has now been dated by radiocarbon to 640 +/- 50 BP (KN-3725) which definitely falls into Islamic time (1330 +/- 50 cal AD), most likely into the Mamluks dynasty (1250-1517 AD).

5. Conclusion

Pottery appeared in Abu Tatur from about 6400 BC onwards. The 12 sherds distinguished for this early phase (Abu Tartur B) are decorated with a packed dotted zigzag pattern which can be connected to the Khartoum style tradition that occurs at other southern Egyptian sites during this time. While only a very small number of sherds are known for Abu Tartur B, potsherds are common on sites during the following phase C. Most pottery of Abu Tartur B is undecorated and can be linked closely to the shapes and fabrics that occur in Dakhla and Abu Gerara.

The examination of the pottery of Abu Tatur is the first step towards a complete study of the archaeology of Abu Tatur. It is to be hoped that the study of the lithic material and the context in which all the artefacts were found on the sites will once support a better assessment of the ceramic chronology. However, the lithic material represents the largest artefact group at Abu Tatur that surmounts the number of potsherds by far, and more time is needed for this second step. Therefore, it seems to us that this preliminary report on the pottery of Abu Tatur may serve as a valuable source throughout the next years.

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Origins and development of bifacial stone tools and their implications for the beginning of animal herding in the Egyptian Western Desert

Introduction

This paper will discuss the correlation between the beginning of animal herding and the appearance of bifacially-retouched formal stone tools in the Egyptian Western Desert in the Early-Middle Holocene on the basis of published information. It has been argued that domesticated sheep/goats had come from the Sinai Peninsula to Sodmein Cave on the Red Sea coast of Egypt across the sea around 5,800 cal. B.C., and then had been diffused immediately from Sodmein Cave to the Western Desert across the Nile Valley (Close 2002b). The arrival of the Levantine domesticates in the Egyptian Western Desert is a consequence of the southward dispersal of sheep/goat herding in the southern Levant which started no later than the PPNC period, but this description of the diffusion process does not explain how and why the Levantine domesticates were adopted in the Egyptian Western Desert when they became available to the inhabitants of Egypt. This question will be answered by asking whether any other unprecedented things were happening in the Western Desert at that time.

It has been observed that a small number of bifacially-retouched projectile points, including tanged and concave-based ones, as well as bifacially-retouched large knives, appeared in such regions as Farafra Oasis, Djara, Dakhleh Oasis, and Nabta Playa just before or almost coincident with the introduction of domesticated sheep/goats into the Western Desert around 5,700 cal. B.C. Therefore, it may be assumed that the development of bifacial stone tools was somehow correlated with the beginning of sheep/goat herding in those regions. The reasons why bifacial stone tools did not appear in the Nile Valley in the Late Pleistocene but developed in the Western Desert in the Early-Middle Holocene may be clues

to understand how and why Levantine domesticates were adopted in the Western Desert at that time.

Origin and development of bifacially-retouched stone tools in the Western Desert

Through the Late Pleistocene and Early Holocene, lithic industries of North Africa have been dominated by the microlithic backed bladelet. According to Close (2002a), backed bladelets appeared suddenly out of nowhere all across North Africa from Morocco to Egypt 21,000-22,000 years ago, and endured for at least ten thousand years. A more curious thing is that although there were some interregional variations, the basic form of backed bladelets had been so standardised across the continent and millennia, irrespective of the availability and variability of raw material and the purposes of use. Therefore, one is tempted to assume some social factors behind this extreme consistency of backed bladelet. Given this historical and geographical context, a question arises as to why the toolmakers in the Egyptian Western Desert in the Early-Middle Holocene gave up their obsession with backed bladelets and started to make a variety of bifacially-retouched tools.

As far as we know, the earliest bifacially-retouched formal projectile points appeared not only in Dakhleh Oasis in the Bashendi A period but also in Djara in the Djara A period after 6,400 cal. B.C. (Gehlen et al. 2002; Kindermann 2003; 2004; McDonald 1991a). The Bashendi A specimens include concave-based, tanged, and leaf-shaped points of various sizes, whereas the Djara specimens do not include large concave-based and tanged ones at all in the earlier period named the Djara A (around 6,400-6,100 cal. B.C.) but large tanged ones appeared in the later period named the Djara B (around 5,800-5,400 cal. B.C.) after a short interval around 6,000-5,900 cal. B.C. Following this Djara sequence, it may be assumed in Dakhleh Oasis as well that all forms of bifacially-retouched projectile points which were roughly included in the Bashendi A period can be subdivided, and that tiny tanged and leaf-shaped ones are dated to the earlier half of the Bashendi A period while large concave-based and tanged ones are dated to the later half of the Bashendi A period. Other bifacially-retouched items like large knives are also notable in Dakhleh Oasis and Djara, and their date seems to be late in this sequence.

Bifacially-retouched formal projectile points flourished after 5,900 cal. B.C. in neighbouring regions such as Abu Gerara, Kharga Oasis and Farafra Oasis (Barich & Lucarini 2002; Caton-Thompson 1952; Hassan et al. 2001; Holmes 1992; Riemer 2003; Smith et al. 2004). Surface surveys at some sites along the margin of the Great Sand Sea, such as Siwa Oasis, Sitra, Lobo and Mudpans, yielded bifacially-retouched, leaf-shaped or tanged projectile points

which could be dated to around this period (Gehlen et al. 2002; Hassan & Gross 1987; Klees 1989; Cziesla 1989).

Further to the east, an investigation at Sodmein Cave in the mountainous terrain of the Red Sea coast yielded a certain number of bifacially-retouched, leaf-shaped projectile points which could be dated to around 5,800 cal. B.C. (Vermeersch et al. 1994; 1996). Further to the south, intensive surveys and excavations in the Nabta-Kiseiba region revealed that the first appearance of bifacially-retouched formal projectile points was in the Middle Ceramic Period (5,900-5,500 cal. B.C.) though they were quite rare, and that the number and variety of bifacially-retouched formal projectile points slightly increased in the subsequent Late Ceramic period (5,400-4,600 cal. B.C.) (Wendorf & Schild 2001; 2004).

It seems that the elaboration of bifacially-retouched tools culminated in the Fayum in northern Egypt around 5,200 cal. B.C. Projectile points, knives, axes and sickle blades were made by bifacial technology. Slightly after that, similar items appeared in neighbouring sites like Merimde Beni Salama in the western Nile Delta and El-Omari near modern Cairo, and this lithic tradition still survived in the Badarian culture of the 5th-4th Millennium cal. B.C. in the Nile Valley of Middle Egypt.

Judging from the evidence available at present, the origins of bifacially-retouched formal tools were somewhere in the middle of the Western Desert between the Great Sand Sea and the Nile Valley around the end of the Early Holocene, and the development and dispersal of bifacially-retouched formal tools continued through the Middle Holocene.

Natural preconditions of the appearance of bifacial stone tools in the Western Desert

The first point to be explained is why such a new set of bifacial stone tools as those observed in the above-mentioned sites had not appeared in the Late Pleistocene but developed in the Early-Middle Holocene. It is assumed that something was different between the Pleistocene and the Holocene, and that the difference gave the possibility for the development of such unprecedented tools.

1) Climate, flora and fauna

The Early Holocene climate of Northeastern Africa is characterised by the advent of generally wetter conditions but with recurrent and abrupt arid intervals after the Terminal Pleistocene aridity (Hassan 1996; 1997; Haynes 2001; Nicoll 2001; 2004). The major determinants of the climatic condition in Northeastern Africa are the Mediterranean polar front which comes from the north and spreads winter rain, and the African monsoonal rain belt which comes from the south and

deposits summer rain. The amount of rainfall has definitely affected the vegetation in Northeastern Africa, and the vegetation in the past as well as at present is a good indicator of the range of the northward-southward shifts of the Mediterranean polar front and African monsoonal rain belt. At present, the southern limit of Mediterranean flora is around the latitude of Cairo, while the northern limit of Sudano-Sahelian steppe shrubs is around the latitude of the Fifth Cataract of the Nile, and the vast area between these two distinct vegetation zones is absolute desert (Nicoll 2004). According to botanical and sedimentological studies, it seems that the Mediterranean polar front has shifted southward to around the latitude of Dakhleh-Kharga Oases, and the African monsoonal rain belt has also shifted northward to around the latitude of Dakhleh-Kharga Oases during the Holocene pluvial maximum dated to around 5,800-5,300 cal. B.C. (Haynes 1987; 2001; Neumann 1989a; 1989b). Recent discoveries of wild sorghum and Mediterranean poppies in Farafra Oasis (Hassan et al. 2001) also suggest the convergence of the African monsoonal rain belt and the Mediterranean polar front around this latitude in that period.

A remarkable change in subsistence in the Early-Middle Holocene Western Desert is the beginning of intensive exploitation of wild grasses including sorghum by hunter-gatherers in such sites as Nabta Playa, Abu Ballas and Farafra Oasis (Barakat 2002; Barakat & Fahmi 1999; Barich & Lucarini 2002; Barich & Hassan 2000; Hassan et al. 2001; Wasylikowa et al. 1993; 1997; 2001; Wasylikowa & Dahlberg 1999). It has been argued that Holocene plants were more productive, nutrient-rich, and cold/drought tolerant than Pleistocene plants due to the improvement of the atmosphere for plant growth, and hence it was almost inevitable for Holocene hunter-gatherers to become increasingly dependent on plant food (Bettinger 2001). Therefore, the beginning of intensive plant exploitation in the Western Desert in the Early Holocene is quite reasonable.

Other remarkable changes are the beginning of cattle herding in such sites as Nabta Playa, Bir Kiseiba and Dakhleh Oasis, and the beginning of sheep/goat herding in such sites as Nabta Playa, Dakhleh Oasis and Farafra Oasis (Barich & Lucarini 2002; Barich & Hassan 2000; McDonald 1998; Wendorf et al. 1984; Wendorf & Schild 1994; 2001). The beginning of animal herding is obviously related to the spread of new vegetation during the Early Holocene, because wild grasses in the Western Desert must not only have attracted wild game animals but also have become good pasture plants for livestock (Wasylikowa et al. 1997; 2001). Therefore, the explanation of the appearance of unprecedented bifacial stone tools in the Western Desert in the Early-Middle Holocene must take account of the spread of new vegetation caused by the Holocene atmosphere and pluvial regime. It may be assumed that the development of bifacial projectile points was triggered by the beginning of the hunting of previously less-encoun-

tered animals which were attracted by the pasture plants, or the beginning of more intensive hunting of familiar animals in the Western Desert.

The extensive Late Palaeolithic fauna from the Kom Ombo Plain in the Nile Valley provides a good sample of the wild animals which have been present in a well-watered environment under cool and dry climatic conditions of the Terminal Pleistocene. Only six ungulate species, including hippopotamus, wild cattle, hartebeest, wild ass, dorcas gazelle, and barbary sheep, occurred in Kom Ombo (Peters 1990). They are definitely the faunal base on which hunters in the Western Desert in the Early-Middle Holocene have depended (Van Neer & Uerpmann 1989).

Major game animals in the Nabta-Kiseiba region in the Early-Middle Holocene had been dorcas gazelle and hare, both of which are desert-adapted and water-independent species, and it seems that the Nabta-Kiseiba region had never become wet enough to attract more water-dependent animals like hartebeest and hippopotamus even in the Early Holocene optimum (Gautier 1984; 2001). Therefore, the former assumption that the beginning of the hunting of previously less-encountered animals triggered the development of bifacial projectile points is apparently not the case in the Nabta-Kiseiba region. An important fact is that the number of gazelle in the archaeological record of the Nabta-Kiseiba region decreased through the Early-Middle Holocene while the number of hare increased. This may possibly imply that bifacial projectile points were inventions to raise the success rate of the hunting of gazelles which were going extinct. In the Nabta-Kiseiba region, it has been reported that the first appearance of bifacially-retouched points was in the Middle Ceramic period (5,800 cal. B.C. onward), and this is almost coincident with the decrease of the number of gazelles. However, it can be said that flake points are not necessarily inferior to bifacially-retouched points in terms of flying distance and killing power, especially if other attributes such as shape and weight are equal. In the Middle and Late Ceramic periods, bifacially-retouched points seem to have been very few, and less-retouched flake points had never been replaced by bifacially-retouched points. Therefore, the appearance of bifacial points in this region cannot be explained in terms of functional superiority but rather in terms of differences in hunting strategy as to whether it is on a stalk basis or an ambush basis, and such differences may have affected the time spent to make and repair points.

In Dakhleh Oasis, there is very scarce evidence for the fauna in the Early Holocene, but ample evidence has shown the presence of the basic ungulate species mentioned above except for barbary sheep, and the presence of the Ethiopian fauna including elephant and giraffe has also been suggested in the Middle Holocene (Churcher 1999). There is some doubt as to whether the remains of the Ethiopian fauna derived from the Middle Palaeolithic context and

were accidentally associated with the Holocene artefacts, because both of them were surface finds (Close 1992: 171). But if the Ethiopian fauna under question was actually associated with the Middle Holocene environment, it was certainly a new addition to the basic fauna in Egypt and hence previously less-encountered. Although it is not certain whether these new large animals became the prey of hunters in Dakhleh Oasis in the Middle Holocene, the number, variety and size of bifacial projectile points became large through the Bashendi A and B periods, and interestingly, it seems that elephant, giraffe and hippopotamus went extinct during the Middle Holocene. It may possibly be assumed that their extinction was caused not only by increasing aridity but also by overhunting, and that large bifacial projectile points which first appeared in the Bashendi A period played a role in the overhunting. Hunting large and tough animals must have required special techniques, and it is reasonable to think that the large concave-based or tanged bifacial projectile points must have been used to tip either hand-held spears or throwing spears, and the spears were delivered to large, slow-moving animals at closer range under greater control and with greater force, than arrows which were tipped by small and light points and shot at relatively small, fast-moving animals from a distance with relatively less accuracy. Indeed, in the Neolithic of the Fayum, two large concave-based spearheads were found embedded in the bones of elephant and hippopotamus respectively (Caton-Thompson & Gardner 1934: 72, 84), and these findings clearly indicate at what kinds of target animals such large concave-based spearheads were shot.

As for possible targets, one question is why there were large concave-based or tanged bifacial projectile points in the sites of Djara, Farafra Oasis, and the Nabta-Kiseiba region, where the existence of large game animals like elephant and hippopotamus has not been reported. Large and heavy concave-based or tanged bifacial projectile points are apparently not suitable for tipping arrows, because arrows tipped by such heavy points would be seriously unbalanced and their flying performance would not be good. Even though such large projectile points did tip hand-held spears or throwing spears, spears are not suitable for hunting fast-moving animals like dorcas gazelles, which were the most common in those sites, but are the most effective against large aggressive animals which are inclined to counterattack rather than flee. Therefore, different explanations about the targets of large bifacial projectile points are necessary. One possible explanation is that those large projectile points were designed to kill humans and not animals. This possibility will be discussed later in relation to social circumstances.

2) *Geography*

The second point to be explained is why such a new set of bifacial tools had not appeared first in the Nile Valley but developed first in the middle of the

Western Desert. It is assumed that something was different between the Nile Valley and the Western Desert, and that the difference gave the possibility for the development of such unprecedented tools. It is widely recognised that procurement of lithic raw materials is absolutely essential for making stone tools, and the availability and quality of lithic raw materials critically affect and condition the making of stone tools (e.g., Andresky 1994; Bamforth 1986). Therefore, the distribution of sources of lithic raw materials in the Western Desert and the Nile Valley must have offered possibilities and constraints for tool making.

In terms of geography, the main area where bifacially-retouched formal tools developed in the Early-Middle Holocene is a vast rocky plain on the Limestone Plateau which abuts the Nile Valley in the east, between the latitude of Esna in the south and the Fayum in the north. Extensive scarps of the Limestone Plateau are seen in the west, and major oases are located at the foot of the scarps. Wherever bifacially-retouched formal tools appeared in the Early-Middle Holocene, such as Siwa Oasis, Farafra Oasis, Dakhleh Oasis, Kharga Oasis, Djara, Abu Gerara, Sitra and Lobo, it seems that good quality lithic raw materials like flint were abundant locally or available in the vicinity, and there is no evidence for long distance transport of exotic raw materials. It must be noted that the remains of lithic workshops have been reported in some of these sites (Barich 1996; Caton-Thompson 1952; Cziesla 1989; Hassan and Gross 1987; Kindermann 2003; 2004; Klees 1989; Kuper 1996; 2002). They indicate that lithic raw material procurement and subsequent reduction took place locally, and that tools were also made locally.

In contrast, the Nabta-Kiseiba region, which was another major centre of Early-Middle Holocene cultures, is characterised by a flat or undulating desert plain on the Nubian sandstone bedrock with a number of playas, a series of sandstone scarps capped by thin flint layers, named the Kiseiba Scarp, and some sandstone outcrops like the Gebel Nabta, and the vast area next to the Kiseiba Scarp is dominated by the Selima Sand Sheet. It has been revealed that it was not uncommon for the inhabitants of playa sites in the Nabta-Kiseiba region in the Early-Middle Holocene to bring good quality lithic raw materials like flint from remote scarps, even though they exploited locally-available, coarse-grained raw materials like quartzitic sandstone, and there were few bifacially-retouched formal tools (Wendorf & Schild 2001; Wendorf et al. 1984). In the sites of Bir Safsaf, where the ground surface is almost covered by sand and no rock outcrops are readily available, people who used this area seasonally while harvesting wild grasses and herding cattle in the Early-Middle Holocene, had no other choice but to bring all lithic raw materials and tools with them from outside the area, and no elaborate tools developed (Close 1990; 1996).

On the basis of these contrasting geographical and geological conditions between the north and south of the Western Desert, it may be presumed that easy access to the sources of fine-grained flint on and around the Limestone Plateau in the north of the Western Desert could be an advantage for the development of bifacially-retouched formal tools earlier than that in the south, where the sandstone bedrock predominates. Since there are few comparable contemporary archaeological sites in the Nile Valley, it is hard to argue whether accessibility to good quality nodules or cobbles of flint in the Nile Valley affected the development of bifacially-retouched formal tools. In the Nile Valley, flint nodules occur not only on the upland surface but also in consolidated deposits exposed at the rock wall of the valley. In addition, it is also possible to exploit secondary deposits of flint cobbles which were eroded out from the valley wall and transported downslope to the streambed. It seems that this situation was favourable enough for the development of bifacially-retouched formal tools which require fine-grained raw material of a certain size. Therefore, it may be that the lack of such tools in the Nile Valley in the Early-Middle Holocene is simply due to the problem of site preservation (Vermeersch 2002), but other possible reasons will be discussed later.

Interpretations of bifacially-retouched stone tools

Given these natural conditions, the next step is to examine and interpret the appearance and development of bifacial stone tools in the Early-Middle Holocene Western Desert in terms of adaptive strategy and emergent social complexity.

1) Adaptive strategy

Raw material economy is the first concern of the adaptive strategy of hunter-herder-gatherers. According to the idea of economising behaviour (Odell 1996), toolmakers make the most of hard-to-obtain or scarce lithic raw materials, not only by obtaining as many usable flakes as possible from a lithic core, but also by making tools and then using, reshaping, and recycling them repeatedly, in case the raw materials at hand are depleted and access to the sources is unpredictable. Such a series of behaviour can foster the ability to make labour-intensive bifacial tools. An important insight is that bifacial tools are inclined to develop among highly mobile people who forage in the environments where the availability of good lithic raw materials is occasionally limited. In contrast, it has been argued that in the environments where good lithic raw materials are everywhere and readily available, toolmakers are likely to waste the materials and to prefer expedient cores and tools, and thus time-consuming and labour-intensive stone tools do not always develop (Bamforth 1986; Parry & Kelly 1987).

The case of the Nabta-Kiseiba region and Bir Safsaf seems to contradict this idea of economising behaviour. It is thought that Early-Middle Holocene people visited the sites of the Nabta-Kiseiba region and Bir Safsaf after summer rainfall and stayed there for short periods, and hence they were quite nomadic. One study in a playa site in the Nabta-Kiseiba region revealed that more than half of all lithic raw materials used there derived from source areas some 100 km away from the site. The preferred raw material, flint, was brought there in the form of unworked cobble as well as partly decorticated core, but no bifacially-retouched formal tools developed there (Kobusiewicz 1984). Another study in a couple of playa sites in the Nabta-Kiseiba region revealed that people used flint cores in a rather wasteful manner despite a burden of obtaining flint from distant source areas (Close 1999). In Bir Safsaf, people not only carried large flakes as blanks for making partly-retouched tools but also carried cores and struck off a series of flakes when the occasion arose, and they sometimes brought unimaginably heavy unworked blocks of quartzitic sandstone, presumably for future use (Close 1990; 1996). Although they made a certain variety of tools, most tools remained simple, and no bifacially-retouched formal tools developed. These facts seem to suggest that making bifacial tools in advance, and resharpening during use and movement, are not necessarily the only means to economise the use of hard-to-obtain or scarce raw materials, and that toolmakers could find it better to carry lithic cores than to carry completed tools, probably because they adopted a circulating mobility strategy on a seasonal basis and their lithic raw material procurement had been embedded in their routine movement. It may also be concluded that the abundance of good quality lithic raw materials was a necessary but not a sufficient condition for the development of bifacial stone tools in the Western Desert. In addition to toolmakers' consideration on raw material economy, some other socioeconomic circumstances must have required or allowed the development of bifacial stone tools.

Adaptive strategy can also be discussed in terms of the tool curation/expediency dichotomy, or the tool reliability/maintainability dichotomy. Although the concept of curation has been abundantly discussed (e.g., Nelson 1991; Odell 2001) and the economising behaviour mentioned above is also one of curatorial adaptation, most arguments have centred on the difference between curated and expedient lithic technologies depending on the difference in mobility strategies. Foragers who are characterised by a residential mobility strategy are concerned with the risk that tools may break so badly and cannot be used on the next occasion, especially while they are moving in an environment where lithic raw materials are not always readily available, and hence tool maintainability is very important for them. In contrast, collectors who are characterised by a logistical mobility strategy are more concerned with the risk that tools may fail to serve for expected tasks on specific occasions, and hence tool reliability as well

as tool maintainability is critical. Therefore, highly specialised tools can be developed in this context at the expense of maintainability or versatility. Curated tools are made at residential sites in advance of expected tasks at distant sites, transported from site to site, resharpened and used repeatedly, whereas expedient tools are made at task sites at the time of need, used and then discarded upon completion of the task (Bettinger 2001; Binford 1979; 1980; Bleed 1986). Curatorial behaviour implies that toolmakers can afford to spend much time making and resharpening specialised tools for specific tasks, and this behaviour would result in the elaboration of the tools.

In the Western Desert in the Early-Middle Holocene, informal flake tools include sickles, scrapers, perforators, notches and denticulates, which seem to be related to food gathering and craft working tasks, whereas bifacially-retouched formal tools include arrowheads, spearheads and large knives, and they seem to be related to hunting and butchering. This suggests that curation was mainly applied to hunting and butchering tools, and that hunting and butchering were logistically organised. In other words, the development of highly-specialised tools like bifacially-retouched projectile points and knives in basically expediently-made tool assemblages in such sites as Dakhleh Oasis, Farafra Oasis and Djara in the Early-Middle Holocene may indicate the decline of encounter hunting and the emergence of a certain degree of sedentism combined with logistical mobility.

Although the Western Desert became inhabitable in the Early Holocene wet phases, there is no doubt that people had to aggregate around water sources like oases and ephemeral lakes fed by rainfall while adopting a logistical mobility strategy or a circulating mobility strategy on a seasonal basis. Therefore, a degree of sedentism must have been a necessary solution to maintain a close link to water sources and accompanying food resources, and the necessity of sedentism must have been recognised more seriously by the inhabitants of the Western Desert than it had been by those who inhabited the Nile Valley, because the number of water sources was limited in the Western Desert. Even in the Nile Valley, many human bodies which show the evidence of violent death at Late Palaeolithic sites of Wadi Kubbaniya and Gebel Sahaba (Wendorf 1968; Wendorf & Schild 1986) suggest that fierce conflicts between human groups were not uncommon in the Terminal Pleistocene, and it seems likely that such conflicts had been caused by claims for access to essential resources. It may be said that stressful situations and some degree of conflict between different human groups were features of life during the Terminal Pleistocene. Improvement of climate and resultant resource abundance in the Early Holocene may not immediately have led to human population increase, but must have increased its chances. No evidence of violence in the Early-Middle Holocene Western Desert may suggest

the appearance of a new set of social relationships which reduced bloody conflicts.

As more people aggregated around a limited number of water sources perennially or seasonally, the rights to the water sources and accompanying food resources may have become more specific and rigid, and the notion of territoriality may have been generated. In such circumstances, freedom of movement for food quests must have become gradually hampered, even though the rights to visit each other's territory may have been ensured by socioeconomic ties like reciprocity and exogamy. In the case of the Western Desert in the Early-Middle Holocene, recurrent arid intervals could be another cause of stressful situations, and population/resource imbalances must have continually taken place in the short term. It has been argued that in such circumstances much labour may have become increasingly invested to ensure sufficient yield from one's own territory, because it was burdensome to visit and exploit an other's territory. Procuring and storing as many food resources as possible while they were abundantly available would become key subsistence strategies, no matter how time-consuming and labour-intensive the foraging and processing of the food resources were (Bettinger 2001). It has also been argued that such an intensification of food procurement in circumscribed habitats had the potential to lead to the beginning of food production, especially if predictable, relocatable and tameable food resources were available (Rosenberg 1990; 1998).

A tendency toward a certain degree of sedentism has been inferred in Nabta Playa and Dakhleh Oasis as early as the Early Holocene on the basis of lithic assemblages, site distribution and the existence of water wells and storage pits for harvested wild grass seeds (Kobusiewicz 2003; McDonald 1991b; 1998; Wendorf & Schild 1998; 2001; 2002b; 2003). It would be possible that moderately stressful situations over the procurement of water and food took place in these regions, and that digging water wells and storing surplus food were viable solutions to stay in one's own territory as long as possible and to avoid unnecessary conflicts with people inhabiting neighbouring areas. Although both regions seem to have been abandoned around 6,000 cal. B.C. due to a short arid interval, when people returned there to settle down again after 5,900 cal. B.C., they brought domesticated sheep/goats. It may be possible to suggest that domesticated sheep/goats were another solution to augment the amount of available food resources, thereby adjusting population/resource imbalances in circumscribed habitats.

It must be noted that the people in both regions were equipped with bifacial stone tools just before or almost coincident with the adoption of domesticated sheep/goats. A similar phenomenon is observed in Farafra Oasis and Djara as well, though their date seems to be a little later (Barich 1996; Barich & Hassan

2000; Barich et al. 1996; Gehlen et al. 2002; Kindermann 2004). Therefore, the explanation of why bifacial stone tools first appeared and developed in the Western Desert in the Early-Middle Holocene must take into account the possibility of increasing unprecedented social stress, which may have been caused by growing population and emerging rigid territoriality. Considering such possible social circumstances, the presence of unreasonably large bifacial projectile points and the absence of probable target animals in Farafra Oasis, Djara and the Nabta-Kiseiba region may imply that those projectile points were designed to kill enemy humans, as mentioned above. However, since there is no clear evidence for violent death of humans in the Western Desert in the Early-Middle Holocene, it is hard to know whether large projectile points were actually used to attack enemy people. No evidence of violence seems to suggest that people became smart enough to reconcile territorial conflicts in alternative ways.

2) *Emergent social complexity*

An alternative interpretation about the development of bifacial stone tools in such possible social circumstances is that the bifacial stone tools had some symbolic meanings and some significance for the establishment and maintenance of intra/inter-group relationships. As discussed above, it may be said that both less-retouched informal flake tools and bifacially-retouched formal tools can serve for cutting or thrusting tasks in almost the same manner. The question is why toolmakers took the trouble to make time-consuming bifacial tools even if informal flake tools were able to serve the same purpose. The toolmakers' concern about tool reliability/maintainability must be one reason, but the non-utilitarian function of bifacial stone tools must also be taken into consideration.

It has been argued that even anatomically pre-modern Acheulian hominids made fine symmetrical handaxes in order to attract mates by showing their ability to make high quality tools and proving themselves intelligent and physically healthy, because they were living in large, complex and competitive societies in which sexual selection pressures and inter-male competition for mates were intense (Kohn & Mithen 1999). It has also been argued that anatomically and behaviourally modern humans acquired the ability of making more elaborate bifacial stone tools and possibly giving them symbolic meanings as well as utilitarian functions, as seen in Solutrean bifacial stone projectile points and knives in Upper Palaeolithic Europe. The reason why symbolic meanings were given to bifacial stone tools is because people were living in the severe environment of the Last Glacial Maximum, where personal qualities such as carefulness, perseverance and exactitude displayed in hunting were very much appreciated. As a consequence, a correspondence may have been created between similar skills exercised in hunting and tool making, and the stone tools became not only utilitarian objects but also symbolic items which communicated meaning about

both the nature of the tasks for which they were used and the person who undertook the tasks (Sinclair 1995). The reason why the toolmakers were enthusiastic about acquiring such appreciation is that excellent hunting weapon makers had the right to get a large portion of meat procured by hunting or the right to distribute the meat, as has been demonstrated by ethnological studies (e.g., Wiessner 1983). The food quest can provide hunters or toolmakers with great opportunities to raise their status through procuring and distributing food (Wiessner 1996). In this sense, it is no wonder that bifacial technology was applied to butchering tools like large knives as well in the Solutrean case, because butchering was another important concern of ambitious food providers. Butchering knives are quite visible to many people waiting for the distribution of meat, and hence some symbolic meanings are likely to be given to the knives.

On the other hand, there is another study suggesting that a very small number of bifacially-retouched formal projectile points among basically expedient tool assemblages in a Ceramic Late Stone Age culture in Ghana, may probably have been made by male hunters who had sometimes gone out of their own territory. The hunters encoded some messages regarding their personal and group identity in the uniquely-made projectile points, expecting that people living in neighbouring territories would pick up stray projectile points on the ground by chance and know about the presence of neighbours. In a sense, widely-distributed and visible items like projectile points would have functioned as business cards and occasionally claimed territorial expansion (Casey 1998). Such a case has been known in the ethnology of the Kalahari Bushmen (Wiessner 1983).

It can be said that essential tools for survival are likely to become the media for the representation of personal or group identity. Using Wiessner's terms (1983), assertive style, which carries the message that the maker or owner is different from others, as well as emblematic style, which stresses conscious affiliation to a certain group, can appear in such tools. It should be noted that bifacial technology was initially applied exclusively to hunting and butchering tools in the Egyptian Western Desert in the Early-Middle Holocene. Therefore, I assume that bifacial stone tools in the Western Desert in the Early-Middle Holocene have not merely been utilitarian objects but also symbolic items which represented personal or group identity and delivered social messages to other people in and outside their community. In other words, the appearance and development of elaborate bifacial stone tools in the Egyptian Western Desert in the Early-Middle Holocene may probably be interpreted as a reflection of internally and externally stressful circumstances and resultant competitive aestheticism among toolmakers.

It has also been known in ethnological studies that elaborate projectile points made by renowned toolmakers were often shared or exchanged among

hunters who believed that well-made projectile points would ensure good hunting, and hence the projectile points could move long distances by inter-group exchange (Hitchcock & Bleed 1997). If such an ethnological example is the case in the Egyptian Western Desert in the Early-Middle Holocene, the presence of unreasonably large and elaborate formal stone tools without possible target animals may be explained in terms of symbolic and stylistic behaviours by hunters who wished the success of hunting and satisfied their vanity, rather than bloody conflicts between aggressive men.

Implications of the development of bifacial stone tools for the beginning of animal herding in the Western Desert

While most scholars are coming to agree that a resource-rich environment is an essential condition for the emergence of social complexity and the beginning of food production, there is still controversy over what conditions could drive prehistoric people to intensify food procurement and to compete with each other (Hayden 1995; 2001). In the case of Egypt, it seems plausible that moderately stressful and circumscribed situations under periodically or seasonally resource-rich conditions of the Early-Middle Holocene Western Desert have caused recurrent population/resource imbalances on an unprecedented scale and have driven the inhabitants to enhance food security through storage, sedentism and territoriality. In contrast, the Nile Valley seems to have escaped such stressful and circumscribed situations and failed to encourage the inhabitants to intensify their subsistence, even though a degree of inflow of refugees from the Western Desert may have caused some social tensions and reorganisations of territories.

If bifacial stone tools in the Western Desert in the Early-Middle Holocene were a reflection of emerging socioeconomic competition among individuals, who were enthusiastic about raising their status by procuring and providing food through using elaborate stone tools, then the introduction of domesticated sheep/goats into several regions may also be interpreted to have been motivated by such competition as well as a need for reliable back-up food. The lack of elaborate stone tools in the Nile Valley in the Early-Middle Holocene may also be interpreted as an indication that less stressful situations retarded the adoption of domesticates. Novel food like the meat of domesticates and their dairy products may have enabled ambitious food providers to get ahead of the competition. The reasons why elaboration of bifacial projectile points and knives continued after the period of the initial adoption of domesticates and culminated in the Fayum Neolithic and the Badarian Predynastic culture, may be because hunting was still a prestigious task in most regions regardless of the availability of the domesticates, and because bifacial stone tools did not easily lose their value as the media of social representation or the means of status display.

As has been argued in Near Eastern Neolithic research (e.g., Goring-Morris & Belfer-Cohen 2001), stylistic and symbolic aspects of seemingly utilitarian material culture like lithics should not be ignored for a better understanding of the dynamics of prehistoric societies. Emergent social complexity in the Western Desert in the Early-Middle Holocene has been inferred on the basis of the spread of a limited number of pottery vessels after 9,000 cal. B.C. (Close 1995) or the appearance of monumental stone structures after 5,400 cal. B.C. (Wendorf & Schild 1998; 2001; 2002a; 2004), but the innovation in lithic technology after 6,400 cal. B.C. must be regarded as a symptom of incipient socio-economic complexity which, in some cases, led to the adoption of foreign domesticates in the Western Desert.

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Pierre M. Vermeersch, W. Van Neer and F. Gullentops

El Abadiya 3, Upper Egypt, a Late Palaeolithic site on the shore of a large Nile lake

1 - Site situation

During the 1985 survey, the Belgian Middle Egypt Prehistoric Project of Leuven University discovered several Palaeolithic sites in the Naqada area, Upper Egypt. One was at el Abadiya, near Danfiq (Fig. 1: 1). Several excavation campaigns were organised to excavate an Upper Palaeolithic site, which now we call el Abadiya 1 (Vermeersch, Van Peer & Paulissen 2000). A new field campaign took place from February 18 to March 25, 2001¹. In the 2001 campaign, we intended to continue the exploration of the Upper Palaeolithic of the region, but the survey of the area led to the discovery of el Abadiya 2, which was identified as a Naqada 1 site (Vermeersch, Van Neer, & Hendrickx 2005), whereas el Abadiya 3 proved to be a Late Palaeolithic site. As the excavation at El Abadiya 1 provided few new data, we decided to investigate el Abadiya 3.

Excavation procedure

El Abadiya 3 (25°50'26.89"N, 32°41'55.52"E) is located some hundreds of metres west of el Abadiya 1 (Fig. 1), just north of the Meri Girgis monastery,

¹ The expedition members were Dr. Pierre M. Vermeersch, director, Patrick Bringmans, Tim Vanderbeken, Thomas Cardon de Lichtbuer, Thijs Van Thuyne, Caroline Ryssaert, Kathleen Verfaillie, Tuur Van Hove and the inspectors of the Antiquities department, section of Qena, Ahmed Ismail and Hakiem Ahmed El Sagir. The expedition members gratefully acknowledge the kindness of Mr. Hussein Ahmed Hussein El Afuni, chief inspector at Qena. The "Fonds Wetenschappelijk Onderzoek - Vlaanderen" and the "Katholieke Universiteit Leuven" provided funding. The "Netherlands-Flemish Institute in Cairo" provided care of the administrative support.

At the end of the excavations the material was prepared for conservation and registered in the register book # 59 of the Egyptian Museum. The artefacts have been put in an unsealed wooden box stored in the sealed storeroom of the Antiquities Department at Quft.

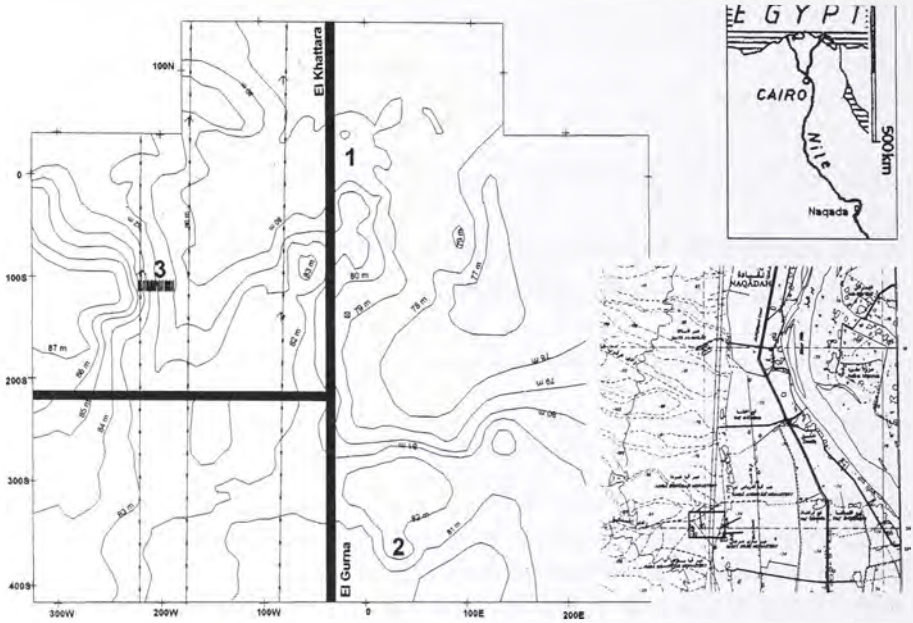


Fig. 1. General map of the Abadiya area with the position of the Isnan site (#3), the paved roads and the power pylones (\uparrow) with their power lines. The Nagada 1 site (Vermeersch, Hendrickx, Van Neer 2005, #2) and the Shuwihkatian site (Vermeersch, Van Peer & Paulissen 2000, #1) are situated east of the desert road from Khattara to El Gurnah.



Fig. 2. Position of El Abadiya 3 on a satellite picture of the area (Satellite and aerial imagery provided courtesy GlobeXplorer.com and Partners. Copyright [2004]. All rights reserved.).

near Abu Diyab Shark, Danfiq, Upper Egypt, west of the new paved desert road between Taramsa and Gurnah (Fig. 2). The site is situated on the lower eastern slope of a small hill, which borders a large depression, west of the cultivated area.

A topographic plan (Fig. 1) indicating the position of the three sites was constructed using the base line initially established at the Shuwikhatian site of el Abadiya 1 (Vermeersch, Van Peer & Paulissen 2000). Within the grid system (in metres) of the el Abadiya 1 site (Fig. 4), the local grid point 20N10E is equal to 359.570S, 25.868E, and 82.696 m a.s.l.; point 20N30.16E to 361.7135S, 45.855E, 82.091 m a.s.l.

Geomorphology



Fig. 3. View on the site from the east and from the south.

The site is located west of the cultivated plain at the rim of a flat embayment, which opens onto a large plain in the lower desert at an elevation of about 79m. Just south of power line pylon no. 220 the site leans against a flat, gravel covered, low hill (87m). The site was discovered because the surface of this concave slope was littered with artefacts and had a distinctly grey colour. To the south and to the east, the area had been extensively disturbed by the building of new desert paved roads. The geomorphologic evolution is illustrated by the schematic profile Fig. 5, based on all the excavation activities.

The hill is built up of coarse sand (thickness unknown) at its base (Fig.5: 8), covered by 2.3m grey layered sandy clay (Fig.5: 7), with several horizons of root drips and of calcrete formation. The top of this fluvatile deposit, apparently of Nilotic origin, is covered by 0.3m heterogeneous, rubified gravel (Fig.5: 6), wherein chert and quartz cobbles dominate. We interpret this profile as the remains of a Nilotic bed and flood plain deposit, eroded to an unknown extent by a local wadi. The weathering of the sediments of the Nile terrace is not as intensive as generally found in the Dendara Formation (Paulissen & Vermeersch, 1989). We therefore presume that these deposits are younger and tentatively correlate

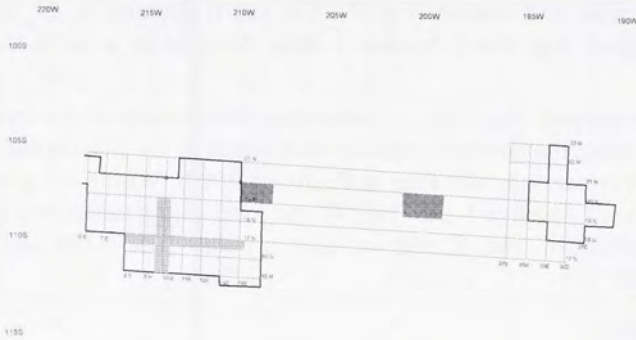


Fig. 4. Local grid inside the grid of El Abadiya 1; black areas are survey pits.

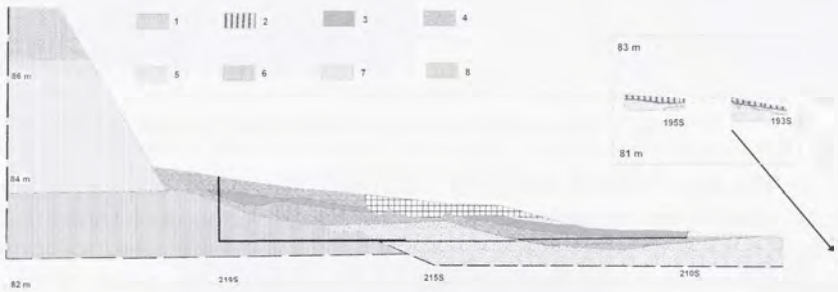


Fig. 5. General profile at the site; 1: zone disturbed by vehicles (DL); 2: black sandy clay attributed to the Sheikh Houssein Formation (SH); 3: Accumulation of prehistoric remains (GSL); 4: screed deposit; 5: aeolian sand (AS); 6: local gravel deposit; 7: Nilotic flood plain deposit; 8: Nilotic sandy bed deposit.

them with the Middle Pleistocene Kennisah deposits, near Nazlet Khater (Vermeersch 2002).

The wadi gravel may be thought of as part of a bahada, as numerous height points around 90m are figured on the topographical map (Fig.1). The movement of these cobbles supposes more humid conditions. We distinguish this phase as Danfiq Phase, a bahada around 14m above the actual flood plain of the Nile in the Danfiq area.

The Middle Pleistocene Danfiq bahada has been considerably eroded, following the incision of the Nile. The latest part of this erosion is discussed with the synthetic profile of the excavation pits, Fig. 5.

The bedrock presents a steep slope in the hillside, followed by a gentle dip under the plain. The nick point coincides with the appearance of the cohesive, more resistant clay. The interpretation as a pediment is reinforced by the presence of a thin slope wash layer with pebbles up to 7cm diameter, derived from the bahada cover. The pedimentation supposes less arid conditions than now. Our detailed levelling (Fig.1) shows that in the area extensive flat, gravel covered hillocks occur at 83m sloping down to 82m. This extension shows that it is an important pedimentation phase. On top of this, a loose, homogeneous sand body (Fig.5: 5) occurred, which is doubtless an aeolian patch. It shows the classic dunal situation, not touching a steep obstacle, which causes ascending winds. It represents an arid phase. A thin slope wash layer caps the sand, indicating the return to less arid conditions.

A striking dark layer in the upper part consists of archaeological remains and charcoal of a prehistoric occupation. It slopes down as dark silty clay in the flat embayment at 80m. The surface is here littered with *Corbicula consobrina* shells. In the nearby excavations of el Abadiya 1 these shells were covered by black silty clays, producing the typical constellation of the Sheikh Hoessein clay (Paulissen & Vermeersch 1989, 2000) deposited around 12,500 BP by very high Nile waters. In that excavation well developed river beach deposits of this inundation could be identified between 80.4 and 79.7m. *Corbicula consobrina* is a bivalve species that typically inhabits permanent waters of the Nile. It is able to colonise flooded areas, but will only survive there when the waters are permanent (Van Damme 1984). *Corbicula consobrina* has been attested at numerous Pleistocene and Holocene sites along the Nile and its presence is often related to sandy substrate of alluvial origin. Reworked shells occur at many archaeological sites in Egypt, but finds of animals in a living position are rare. This is the case at el Abadiya 3, where they indicate that permanent waters had been available for a sufficient time to allow the species to colonise the flood plain and to undergo a growth period that was much longer than the relatively short flood season of the normal hydrological behaviour of the Nile. In other words, *Corbicula* shells in a living position indicate a period of at least a few years of permanent water and can be found in both fluvial and lacustrine environments (Van Damme 1984).

Finally the topography has been disturbed by the traces of numerous vehicles apparently related to the maintenance of the nearby power line.

Stratigraphy

Several profiles in the excavated area have been studied. Here we describe profile 20N7-11E (Fig. 6):



Fig. 6. Profile at 20N7-11E; for legend see text.

- 8: (DP: desert pavement): A thin layer of sand and pebbles is a lag deposit. It is conspicuous that no cracks originate from this surface.
- 7: (DL: disturbed layer): Disturbed layer due to the power line maintenance vehicles passing over this surface.
- 6: (US: upper slope wash): Very heterogeneous sandy and fine pebble deposit (2.5Y 7/8 in wet condition; 7.5YR 6/3 in dry condition). The sandy fraction is less important than in layer 4. Prehistoric remains occur but are rare. In this deposit a slight coloured desertic soil had developed.
- 5: (GSL: grey silty layer): Very heterogeneous dark grey coarse silty sand (7.5Y 4/1 in wet condition; 7.5Y 7/2 in dry condition) with small pebbles and prehistoric remains. Locally, its base is characterised by a thin veneer of black ash. Below layer 7, the layer is highly disturbed, but, occasionally preserved. Faunaturbation is very important. The silty fraction and the dark grey colour is apparently the result of a mixture of the deposits of the Sheikh Houssein clay, lower down the slope, and the local slope wash deposits. The mixture could have occurred when humans came out of the water and walked on the slope with muddy feet.
- 4: [LS: lower (scree - slope wash)]: Very heterogeneous loose sand (5YR 4/3 in wet condition; 10YR 6/2 in dry condition) with, mainly in the western part, scattered pebbles. Numerous crotovinas have been observed. Occasionally some fine charcoal particles are found. Below layer 7 the presence of some pebbles in a mainly vertical position are probably related to disturbance by vehicle movements. Shallow very fine cracks originate from the interface with layer 5.

- 3: (AS: aeolian sand): Compacted fine aeolian sand (5YR 3/3 in wet condition; 10YR 5/2 in dry condition) with, at its base and on top, some rare pebbles. Crotovinas are present and are filled with deposits from layers 4 and 5. Fine cracks originate from the interface with layer 4. Below layer 7 the same phenomenon is present as in layer 4.
- 2: (CS: colluvial sand): Compacted heterogeneous sand (5YR 3/3 in wet condition; 10YR 5/2 in dry condition) with some scattered small pebbles. At the sand base a continuous pebble horizon is thinning slope downwards (20 cm thick in the west; 7 cm in the east). Some cracks originate from the interface with layer 4. No cracks have their origin at the interface with layer 3. The deposit is composed mainly by sand from layer 1, mixed with some slope wash pebbles.
- 1: (NS: Nilotic sand): Compacted coarse sand (5YR 3/3 in wet condition; 10YR 5/2 in dry condition). The sand has several cracks, up to 3 cm wide, starting from the eroded top of the sand. In the cracks some small pebbles (max. 2 cm) have been incorporated. The cracks below layer 2 are somewhat larger than those from the contact with layer 4.

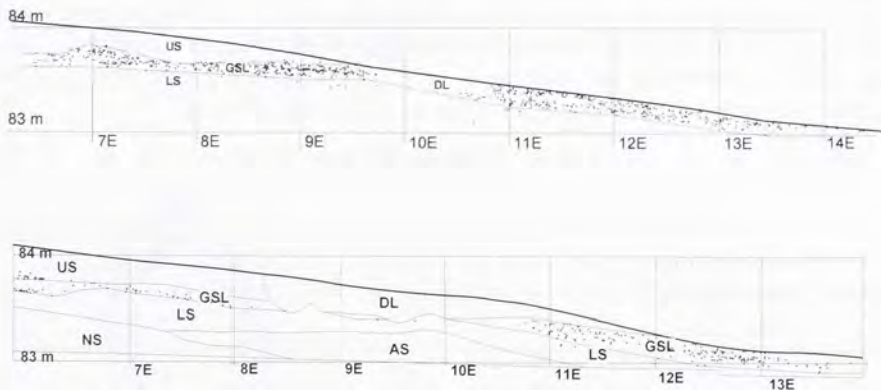


Fig. 7. Profile with plotted artefacts along profile 17N (upper) and 19N (lower).

The artefact-bearing grey silty deposits (GSL, layer 5) are incorporated in a stratigraphical context (Fig. 7) where the coarse Nile sand (NS) forms the base of the profile. These Nile sands are overlain by aeolian sand (AS). In between these deposits some slope wash had accumulated. Subsequently, the area was strongly eroded, causing a truncation of both the Nile and the aeolian sand and

the deposition of a gravelly slope wash deposit (LS). That slope wash thins towards the lower parts of the slope. The grey silty layer (GSL), containing the human remains, rests on top of this slope wash deposit and is thus clearly younger than the aeolian sand. It is covered by a new slope wash deposit (US) in which a desertic soil was formed, forming a reddish coloured weathered horizon (7.5 to 10YR6/3). In the centre of the artefact accumulation, tracks from trucks (DL) have partially disturbed the GSL. On the lower reaches (Fig. 5) of the site (27-30E), the silt-clay deposits of the Sheikh Houssein Formation (SH) cover the aeolian sand. There, at the interface between the aeolian sand (AS) and the Sheikh Houssein Formation (SH), we found a horizon with archaeological remains, which is the continuation of the GSL. The remains of the Sheikh Houssein Formation are less than 10 cm thick and are clearly eroded by the present surface. Between the eastern and the western part of the site no SH deposits are preserved.

In the slope wash (US and LS) deposits, clearly separated from the GSL, an assemblage of no longer fresh artefacts was found in 20N6E. We interpret this assemblage as the result of mass movements that, from higher on the slope, introduced an older assemblage onto the top of a younger one. A mixture with the GSL assemblage cannot, of course, entirely be excluded. In our description of the lithics we have dissociated this assemblage from the main assemblage. We call it the "assemblage X", which is very poor in characteristic material but seems to have been produced by a mainly Levallois-like method.

Table 1 - Assemblage X

	N
Centripetal or Levallois Core	63
Blade	22
Flake	135
Retouched piece	10
Chip	42
Convergent side-scraper	1
Total	273



Fig. 8. Convergent side-scraper (assemblage X).

The assemblage has not been studied in detail but we consider it as belonging to an unspecified Middle Palaeolithic. A convergent side scraper (Fig. 8)

seems to confirm this attribution. The artefacts of this assemblage X have not been integrated in the distribution plans of the main site.

The main assemblage was found in the GSL on the upper parts of the site and at the interface between the SH (Sheikh Houssein Formation) and the aeolian sand (AS) on the lower parts of the site. Excavation proceeded by trowelling in spits about 5 cm thick within surface units of 1 or 2 m². Artefacts were tridimensionally registered by a laser theodolite. MapInfo© was used to plot the plans. We were assisted by six local workmen in carrying away the excavation dump. All excavated deposits were washed through a 4 mm mesh sieve. Artefacts retrieved from the sieve have been plotted in a random way (using MS Excel©) in the squares from which the dump was collected. Some pits were dug to understand the local stratigraphy. In order to preserve stratigraphical profiles we did not excavate two perpendicular strips of the site (grey area on Fig. 4).

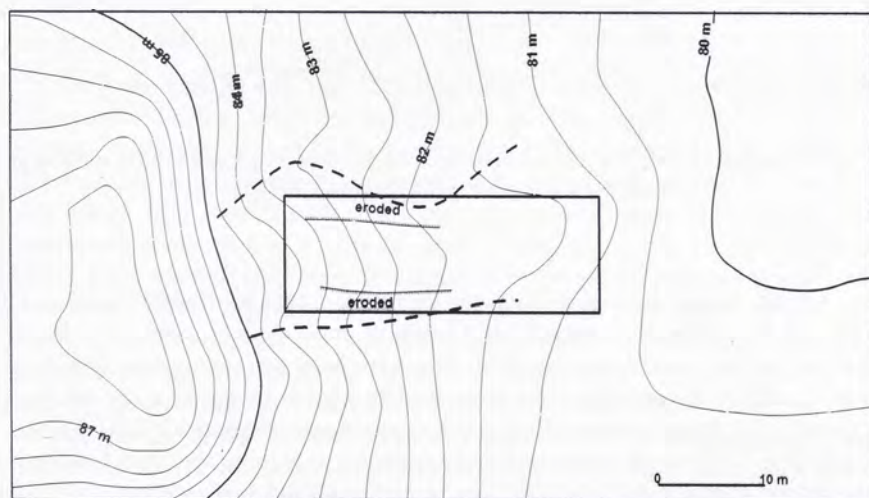


Fig. 9. Topography of the site area.

The squares 20N9 & 10E were not excavated but here a stratigraphical pit was dug at the beginning of the campaign. All the dump was sieved but not retrieved with regard to its exact position, which resulted in an overestimation of the material belonging to the GSL. In these squares material was thus not registered tridimensionally. From the plan of the plotted artefacts one observes that, apparently in squares 18 & 19N8E the excavation was done with less care, resulting in a probable under-representation of the archaeological material.

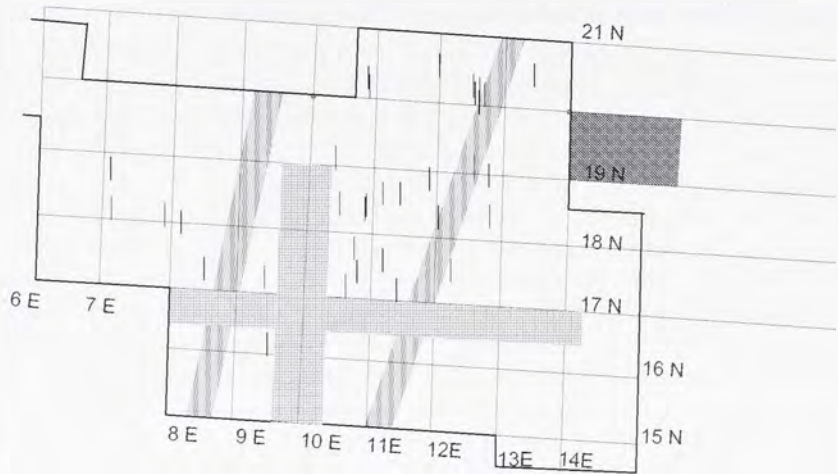


Fig. 10. Excavated area with the most obvious truck tracks (dark grey area); vertical symbols are artefacts, which were found in vertical position.

On the higher part of the site, the vertical artefact distribution reaches 10 to 15 cm. Occasionally, some small artefacts have been lowered by faunaturbation and are found below the GSL. Most artefacts were lying horizontally or sub-horizontally. Especially in the area disturbed by truck tracks some artefacts are found in a vertical position (Fig. 9). A slight bioturbation in 17-18N6-8E was often visible. *Crotovinas* are present and artefacts inside them are often less fresh. Some areas, such as 19N 10-12E, are in quite a good preservation state: All artefacts were still in a horizontal position.

Structures

The general layout of the artefacts (Fig. 13) is of oval form. This is, however, mainly the result of the erosion history of the site. Its northern and southern parts were eroded by shallow gullies (Fig. 11, 12). In the east the concentration is eroded probably by a generalized aeolian activity, which caused an interruption of the archaeologically rich deposits between 15 E and 27E. In the eastern part of the site only a very thin veneer of archaeological deposits was preserved below the deposits of the Sheikh Houssein Formation.

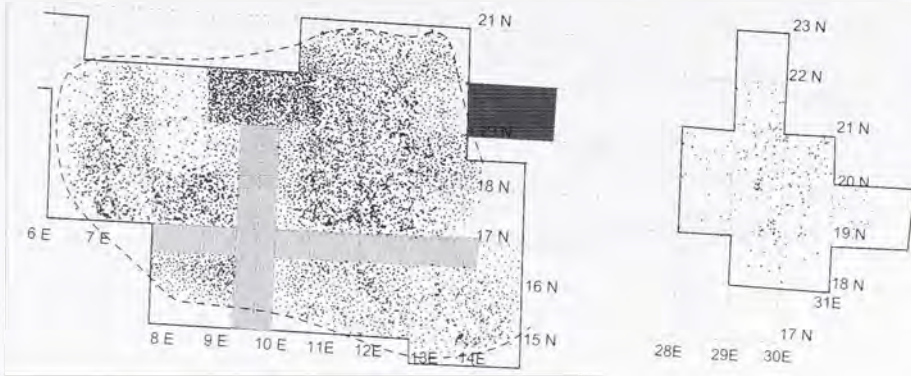


Fig. 11. Artefact distribution with registered (star) and sieved (point) artefacts.

Only the hearths and their heated sediments have been partially preserved as structural elements. However, mostly only the lower part of the hearths was preserved. It is characterised by the presence of a thin charcoal veneer resting on rubified sediment, burnt bone and heated flints. Charcoal has most often been blown away from the hearths and scattered around them. The hearths are unstructured, sometimes in a shallow (max. 5 cm) pit. Ashes in the hearth are reduced. They seem to have been incorporated in the whole archaeologically rich deposits. In 17N9E, artefacts are for 90% burnt. The distribution of the eight identified hearths suggests that the site is undoubtedly a palimpsest of several occupation events. The presence of several occupations is confirmed by the results of the ^{14}C dating, which do not overlap in time. Burnt pieces seem to have been moved down the slope, probably because of a postdepositional creep. A concentration of burnt pieces in 17N8-9E suggests that there had been a hearth nearby, which was obliterated by a later occupation. Charcoal is somewhat concentrated around the hearths but no real charcoal remains in situ were found.

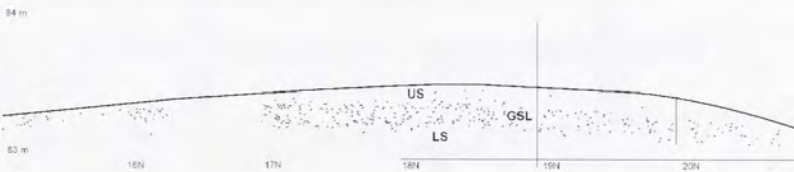


Fig. 12. South-North profile at 12E with plotted artefacts.

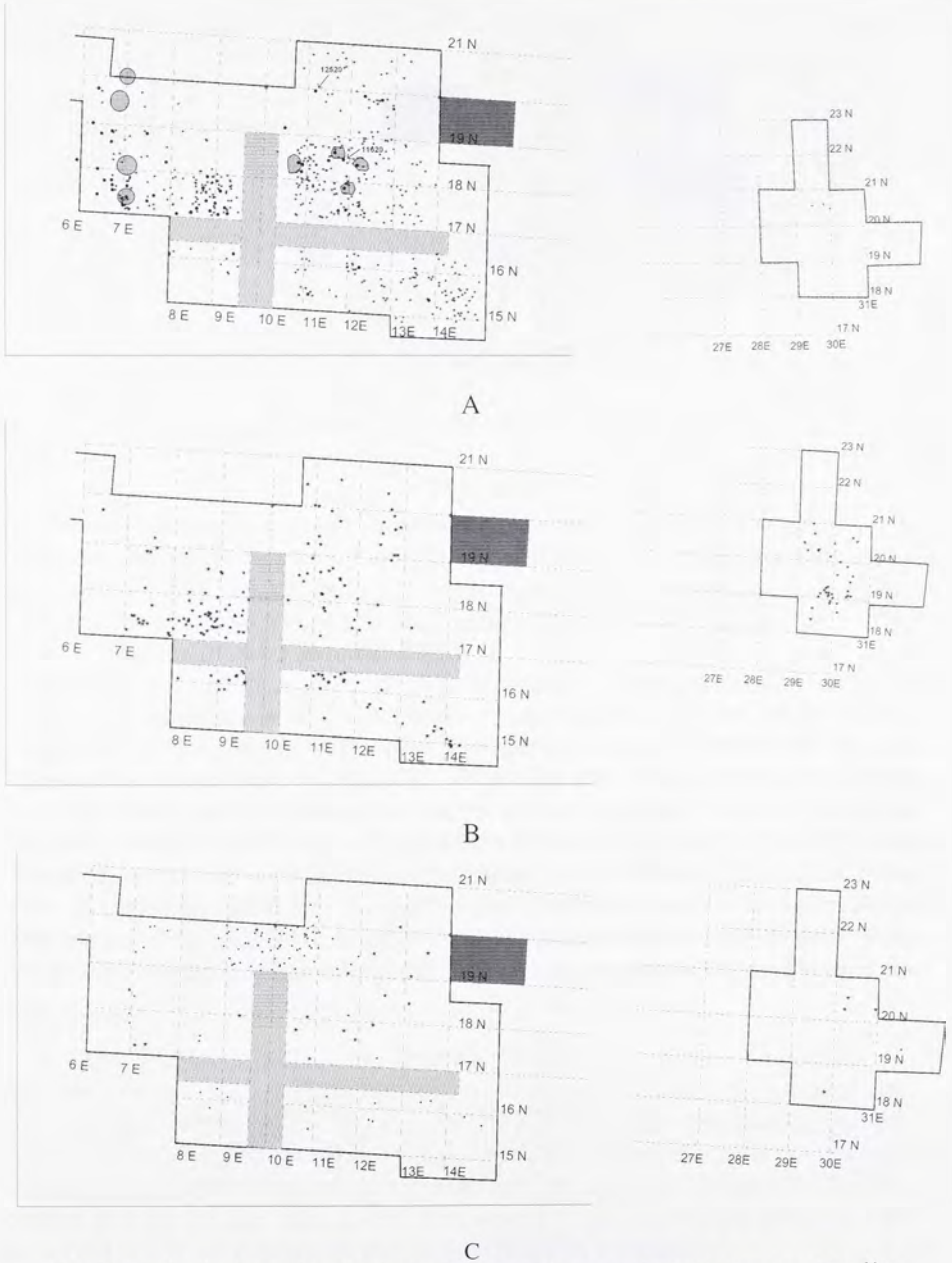


Fig. 13. A: distribution of hearths, charcoal (dot) and burnt artefacts (star) and position, ¹⁴C samples; B: faunal remain distribution; C: core distribution, plotted (star) or from sieve (dot).

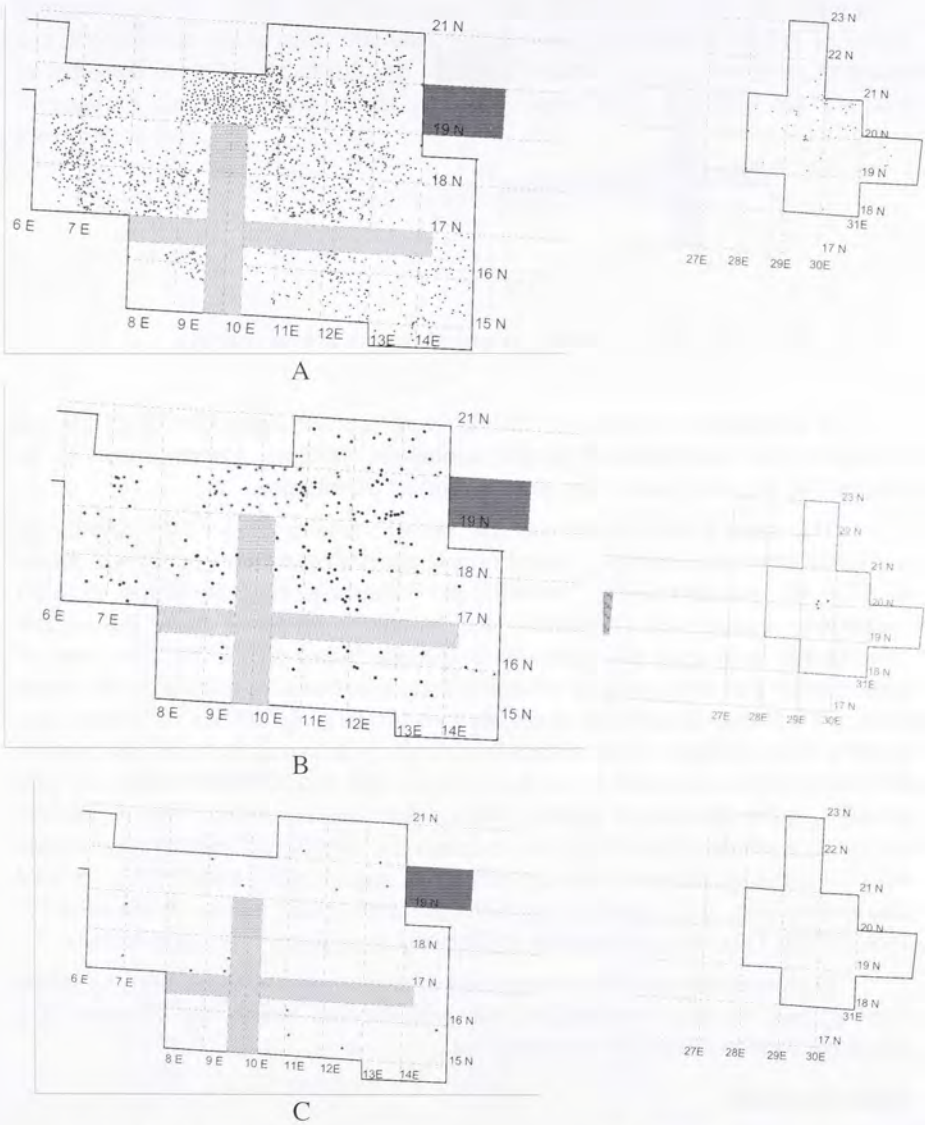


Fig. 14. A: Flake distribution, plotted (star) or from sieve (dot); B: blade distribution plotted (star) or from sieve (dot); C: quartz distribution.

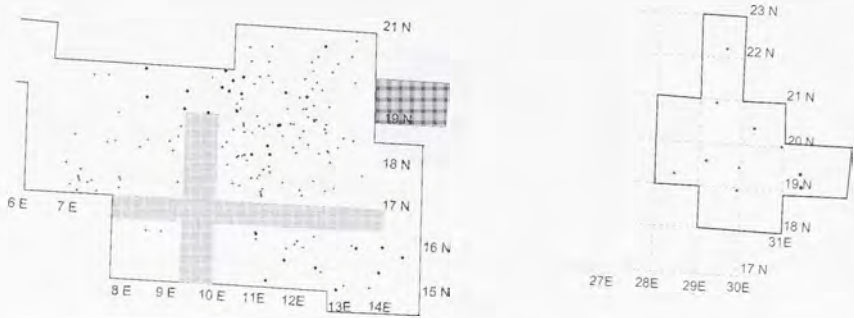


Fig. 15. Tool distribution, plotted (star) or from sieve (dot).

A distribution analysis of the different artefact categories (Fig. 13, 14) provides little understanding of the settlement structure. Quartz seems to be confined to the outer part of the general artefact distribution.

The spatial distribution of the faunal remains (Fig. 13B) shows no particular trend, except that a large concentration of hartebeest bones was found in 15N14E, an area where artefacts are relatively rare. In terms of MNI (minimum number of individuals) the hartebeest material from this square corresponds to at least two individuals. All the bones are in the same state of preservation and two portions of articulating elements, belonging to the ankle joint, are present. In addition there are two articulating lumbar vertebrae. This material may represent waste disposal of butchery activities that took place at the periphery of the site, close to the water shore. The fact that the remains are still partially in the anatomical position shows that the bones were rapidly buried, maybe as a result of trampling in the relatively soft clayey substrate, combined with covering by sediments during periods of higher water levels. Only the tool distribution (Fig. 15) suggests that activities took place mainly in the area 17-20N10-12E. This area corresponds to the position of four of the eight hearths.

In conclusion due to the succession of several occupation phases, of which there appears to be at least eight, each with its own hearth, the structure of a single occupation cannot be reconstructed.

Lithic Artefacts

The major artefact categories

A rich assemblage consisting of 8250 lithic artefacts was recovered. These undoubtedly represent many occupation events on the shore of the high water

lake in the Nile valley. However, they are treated here as a single unit because the stratigraphic study gave no arguments for splitting up the collection. Moreover, some artefacts had been moved downward by slope wash and gravity and deposited on top of other artefacts, which were more or less *in situ*. As would be expected in such a redepositional setting, the artefacts are essentially the same in each of the excavated levels and they have been grouped together for presentation here.

Table 2 - Raw material.

	<i>N</i>	%
<i>flint</i>	8250	99.7
<i>quartz</i>	22	0.3
<i>Total</i>	8272	

Table 3 – Debitage categories.

	N flint	% flint	N quartz
Core	332	4.02	6
Blade	381	4.62	
Cortical blade	5	0.06	
Blade fragment	168	2.04	
Bladelet	52	0.63	
Bladelet fragment	37	0.45	
Flake	2155	26.12	14
Flake fragment	266	3.22	
Cortical flake	185	2.24	
Cortical flake fragment	6	0.07	
Burnt flint chunks	181	2.19	
Chips	4270	51.76	1
Chunk	131	1.59	
Tested cobbles	4	0.05	
Burin spall	11	0.13	
Undefined	66	0.80	
Total	8250	100.00	22

Finding good quality lithic raw materials was not a problem for the occupants of el Abadiya 3. The most frequently used lithic material was a good quality grey-brown flint, abundantly available as cobbles in the nearby Wadi Al-

Hamdaniyya, north of the site. Flint was used for over 99% of the debitage. Quartz cobbles were used for the production of some small flakes. The artefacts recovered from below the site surface are fresh with cutting edges and unpatinated. Freshly excavated artefacts obtain, some time after the excavation, a white patina. Artefacts recovered from the surface or from the slope wash deposits are sometimes less fresh. Some artefacts, from the lower slope wash deposit of 20N6E are sometimes rolled and probably belong to a Middle Palaeolithic occupation remain. They have not been considered in this study. 23% of the artefacts had suffered fire damage.

Cores

Cores (Fig. 20) were manufactured on wadi chert gravel derived from the chert nodules of the Eocene limestone in the area and on small quartz cobbles. Most of the cores show relics of the cortex, especially on the posterior surface. The platform is generally unifacted and consists of a split surface.

Table 4 – Frequency of identified core classes.

Single platform core	7
Opposed double platform core	6
Crossed platform core	13
Discoïd core	24
Total	50

Some of the cores were measured and the results are summarised in tables 4 and 5. Discoïd cores (Fig. 20: 5, 8, 9) dominate the assemblage, but they are generally small and entirely exhausted. Crossed (Fig. 20: 6) and opposed (Fig. 20: 3-4) platform cores are numerous, and they occur at much higher values than do the flakes and blades from this type of core. The reason for this is probably that the opposed platform cores began as single platform cores. Near exhaustion they were finally transformed into opposed platform cores. Whatever the cause, single platform cores (Fig. 20: 1, 4) are significantly under-represented in this assemblage. Indeed, flaking scars on the dorsal side of a sample of artefacts (N=256, mainly tools) are for 87.5% unipolar and 12.5% bipolar, suggesting a clear preference for the use of blanks produced from single platform cores. Core trimming elements are rare: only ten rejuvenation flakes have been found. Cores were exploited with a hard hammer technique.

The measured (all flint) single platform, opposed platform, crossed platform and discoïd cores (table 5) have average lengths of 50.5, 54.3, 48.5 and 53.2 mm respectively, with standard deviations of 13.8, 12.4, 13.3 and 17.0 mm; the

average width is 40.4, 37.5, 47.0 and 79.1 mm, with standard deviation of 11.2, 12.0, 15.4 and 14.8 mm; while the average thickness is 29.0, 30.0, 33.2 and 23.0 mm, with a standard deviation of 7.8, 2.5, 6.9 and 6.6 mm. Most cores have no back preparation. Core trimming elements are scarce. Most cores are entirely exhausted.

Table 5 – Attributes of the cores.

	N	Average length	σ	Average width	σ	Average thickness.	σ
Single platform cores	5	5.08	1.38	4.04	1.12	2.90	0.78
Opposed platform core	4	5.43	1.24	3.75	1.20	3.00	0.25
Crossed platform cores	12	4.85	1.33	4.70	1.54	3.32	0.69
Discoid cores	17	5.32	1.70	4.91	1.48	2.30	0.66

Debitage

Absolute and percentage frequencies of the types of debitage by raw material are given in Table 2. Cortical pieces (2.4%) are not common in this assemblage. In general the lithic flaking process aimed at the production of blades and elongated flakes (Fig. 21-22). Bladelets occasionally occur but were not produced systematically. Most blanks were obtained from single platform cores as shown by the flaking direction observed on the dorsal surface (Table 6). Burin spalls and other debitage are less numerous. Two Kombewa flakes have been identified. The collection is rich in chips and unretouched flakes. The Levallois method has not been used.

Table 6 - Flaking direction of the dorsal surface.

Dorsal surface attests	N	%
Cortical surface	1	0.5
Bipolar flaking	28	12.8
Unipolar flaking	190	86.8
Total of analysed items	219	100.0

The dimensions of the complete and identifiable debitage are summarized in Table 3. Average blade length (for 44 entire items measured) is 5.7 ± 1.4 cm, average blade width is 2.2 ± 0.8 cm. The length to width ratio is 2.8 ± 0.8 and the thickness to width ratio is 2.9 ± 1.6 . Blades are thus rather short and wide. They are rarely symmetrical (Fig. 22:7-8) and often pointed (Fig. 21: 2, 4-6, 11-15; 22: 2-4). Bladelets (Fig. 22: 11-12) are rare. Blades and elongated flakes have been

Table 7 - Butt type.

	<i>N</i>	%
Cortical butt	9	4.8
Flat butt	125	67.2
Filliform butt	7	3.8
Dihedral butt	4	2.2
Faceted butt	2	1.1
Pointed butt	39	21.0
Total items analysed	186	100.0

been used as blanks for most tools. Most of them have been obtained from single platform cores. Pointed blades have often been retouched as to obtain retouched points. The thickness to width ratio for all blades ($N > 200$), complete or fragmented, is 3.1 ± 1.4 .

The butt of flakes and blades is mostly flat or punctiform. Dihedral or faceted butts are scarce. Butt length has an average of 13.72 ± 8.21 mm with a mode of 8 mm. Butt thickness has an average of 5.76 ± 3.62 mm with a mode of 6 mm. The bulb of percussion and the ripples are generally well developed in most specimens, suggesting a hard hammer approach.

The debitage and cores clearly indicate that the lithic technology at Abadiya 3 emphasizes the production of flake and elongated blanks. All debitage characteristics point to a very simple lithic production method with a much reduced preparation of the cores. elongated blanks could easily be obtained by selecting elongated flint cobbles from the wadi. Few of the cores found at Abadiya 3 had been extensively prepared. The scarcity of cortical flakes (flakes with more than 50% cortex on their dorsal surface) indicates that many of the cores were not shaped at the site but were imported from the nearby wadi after an initial shaping. Final shaping and debitage of the cores took place at the site as is suggested by the high number of chips (nearly 52% of all flint artefacts). A few flakes were obtained from smaller quartz pebbles, which served as cores for the production of a very limited number of flakes. The manufactural aspects of the artefacts in the collections studied can be summarized as follows: The Levallois flake tradition is absent. Blade production is the purpose of the debitage. Bladelets were not aimed at. Microburin technique was not used. Production was generated mainly from single platform cores. Faceting of butts on both flakes and blades is very low.

Retouched tools

The most important tools category is the end-scraper (tab 8, 9). Retouched flakes and blades are very numerous. Some burins are present. The production of

Table 8 - General composition of the tool categories.

	<i>N</i>	%
End scraper	48	26.67
Side scraper	8	4.44
Burin	7	3.89
Borer	1	0.56
Composite tools	3	1.67
Retouched pointed blade	17	9.44
Denticulated blade	18	10.00
Notched pieces	6	3.33
Retouched blade	8	4.44
Retouched blade fragment	22	12.22
Retouched flake	39	21.67
Varia	3	1.67
	175	100.00

pointed blades generates a tool category of retouched pointed blades. Microliths are entirely lacking. The microburin technique has not been used.

End scrapers

End-scrapers represent the most common tool class, averaging 25.3 per cent of all tools. Most of these are simple end-scrapers on a blade (Fig. 23: 4, 9, 11; 24: 2, 6, 9, 10; 25: 3, 8, 10). Occasionally cortical blades have been used (Fig. 23: 9, 11; 24: 6; 25: 3). Sometimes the left scraper head has been resharpened by a ventral retouch ((Fig. 23: 9; 25: 10). End-scrapers with one or two retouched edges are numerous (Fig. 23: 6-7, 10, 12; 24: 8; 25: 1, 5, 7, 9). Retouches of the edge are irregular, partial or even denticulated and en *écaille* (Fig. 23: 6). Ventral retouch as well as normal retouch occur. Some of the end-scrapers lack their proximal end due to a fracture or a retouch (Fig. 24:2). End-scrapers on a flake (Fig. 23: 1; 24: 1, 3, 5; 25: 2), most often elongated, have often been made from heavy, large blanks. Occasionally they have an ogival scraping head (Fig. 25: 2). Often one or two edges have been retouched (Fig. 23: 2-3, 5, 8; 24: 1, 4, 5; 25: 4). Cortical patches are frequent. Some of the end-scrapers are keeled with a high scraping head (Fig. 23:5, 10). The scraper heads have predominantly rounded outlines.

Side-scrapers

Some side-scrapers are present (Fig. 26: 10-13; 27: 1-3) but much fewer than the end-scrapers. Single ones (Fig. 27: 3) are present, but most are double.

They have flake blanks, sometimes cortical (Fig. 27: 1). Sometimes the flake presents also an important retouch of the proximal edge (Fig. 26: 10-11), a bilateral double side-scraper and a transverse side-scraper. The scraper-retouch is sometimes more or less denticulated.

Table 9 – Tool list.

	N	%
End-scraper		
End-scraper on a blade	6	3.33
End-scraper on a blade fragment	7	3.89
End-scraper on a blade with a retouched edge	6	3.33
End-scraper on blade with two retouched edges	3	1.67
End-scraper on cortical blade	2	1.11
Double end-scraper on blade	1	0.56
End-scraper on a flake	15	8.33
End-scraper on a flake with two retouched edges	1	0.56
End-scraper with ventral thinning of scraping edge	1	0.56
End-scraper with lateral central notch	1	0.56
End-scraper fragment	1	0.56
Keeled scraper	2	1.11
Keeled scraper with retouched edges	2	1.11
Side scraper		
Single side-scraper	2	1.11
Double side-scraper	5	2.78
Transverse side-scraper	1	0.56
Burins		
Angled burin on snap	4	2.22
Double angled burin on snap	3	1.67
Borer		
Borer	1	0.56
Composite tools		
End-scraper - side-scraper	1	0.56
End-scraper-burin	1	0.56
End-scraper-borer	1	0.56
Retouched pointed blade		
Retouched pointed blade	8	4.44
Retouched pointed blade fragment	5	2.78

Denticulated pointed blade	3	1.67
Denticulated pointed blade fragment	1	0.56
Denticulated piece		
Denticulated blade	6	3.33
Denticulated blade fragment	1	0.56
Denticulated cortical flake	1	0.56
Denticulated flake	8	4.44
Denticulated flake fragment	2	1.11
Notched pieces		
Notched flake	3	1.67
Notched flake fragment	2	1.11
Notched flake with ventral thinned bulb	1	0.56
Retouched blade		
Retouched blade	7	3.89
Blade with two retouched edges and a notch	1	0.56
Retouched blade fragments		
Retouched blade fragment	6	3.33
Blade (fragment) with utilisation retouches	3	1.67
Blade fragment with one retouched edge	4	2.22
Blade fragment with two retouched edges	9	5.00
Retouched flake		
Retouched flake	21	11.67
Flake with utilisation retouch	10	5.56
Flake with two retouched edges	1	0.56
Retouched flake fragment	6	3.33
Ventrally retouched flake	1	0.56
Denticulated flake (not fresh)	1	0.56
Retouched flake (not fresh)	1	0.56
Convergent side scraper (not fresh)	1	0.56
Total	175	100.00

Burins

Burins (Fig. 26: 2-5, 7-8) constitute a characteristic element in the assemblage. Their frequency is, however, much lower than that of end-scrapers with 4.0 per cent. Most have been made on blade blanks. Others have been made on heavily retouched flakes (Fig. 26:7-8). Typologically, they all belong to the category of angled burins on snap (*burin d'angle sur cassure*). Double burins on snap are present.

Borer

A single borer is present (Fig. 26:9), but it is not really sharp and should rather be considered as a retouched pointed flake.

Composite tools

Composite tools are found. They are characteristic but not numerous. There is the combination between an end-scrapers and an angled burin on snap (Fig. 26:1), an end-scrapers and a borer (Fig. 26:6) and an end-scrapers and a side-scrapers.

Retouched pointed blade

The production of blades generated most often pointed blades. Some of those blades have been retouched. We have the impression that the toolmaker had a clear intention of making pointed tools by applying a retouch to one or both edges of the pointed blades. We thus dissociate such artefacts from the more general category of retouched blades and consider it as a special tool category. Some of the retouched pointed blades have been obtained by a very regular retouch on both edges of the pointed blade (Fig. 28:3, 6). The point itself seems not to have received special attention because it was not made sharper. Other retouched pointed blades (Fig. 27:14; 28:4-5, 7-9) display a more irregular retouch, sometimes dorsal, sometimes ventral. The retouch is often not entirely continuous. The point is often broken away. Occasionally an edge display an intense visible use wear (Fig. 28:5).

Notched pieces

The notches are predominantly located on the lateral edges (Fig. 27: 7), but sometimes on the distal end (Fig. 28:10). The kind of blanks used and the way they are produced show a great variability.

Denticulated pieces

The denticulates are made on both flakes (Fig. 28: 15) and blades (Fig. 28:1). The denticulated edge is generally located laterally (Fig. 28:12). They are also predominantly dorsal. The notches defining the denticulated edge are usually small (less than 10 mm.). Denticulates with large notches (Fig. 29:7) are uncommon.

Retouched pieces

Retouched pieces are the most common "tools" next to endscrapers, forming an average of 38.3% (Table 8). The retouched pieces suggest an intensive use of the blanks. It is not excluded that some of the retouched pieces are the result of postdepositional activities, such as trampling, but we believe that most of the retouched pieces are the result of an intensive utilisation. The fact that

many pieces have been broken, is an indication of intensive use. In most cases, flakes (Fig. 29: 1) outnumber blades (fig; 27: 12, 15; 28: 2). The retouch is sometimes continuous (Fig. 28: 11), mainly partial and non continuous (Fig. 27: 11, 13; 28: 14) but often on both edges. The retouch is dominantly dorsal (Fig. 38) but a ventral or an alternating (Fig. 28: 13) retouch is not uncommon.

Varia: We presume that these intensely weathered artefacts are intrusive.

Dating

Two charcoal samples from layer GSL, one from 19N11E (ME01/09/1943) and another from 18N11E, between two hearths (ME01/09/2108), have been submitted for ^{14}C dating. The following results were obtained:

11620 \pm 55 BP (KIA-14812) for ME01/09/2108

12520 \pm 70 BP (KIA-14813) for ME01/09/1943.

The two dates are statistically different, confirming the occupation of the site at different times. It is probably not a coincidence that the youngest age corresponds with hearth structures that were still visible while the older date corresponds to an area where no such structures could be observed, because they probably were obliterated by later occupation activities.

Faunal remains

About 550 faunal remains were found during the excavations of Abadiya 3 of which approximately 200 specimens were identifiable (Table 10). The assemblage is characterised by preferential preservation of robust skeletal elements of large species. The material is heavily fragmented and often specimens are observed that had clearly fallen apart *in situ* whereby the fragments of a single element were only slightly displaced and cemented together in a calcareous matrix.

Among the mollusc remains, two species occur - *Valvata nilotica* and *Bulinus truncatus* - that can be considered intrusive within the substrate on which human habitation took place. *Bulinus truncatus* inhabits a wide range of aquatic habitats, from running to stagnant water, even of a seasonal nature whereas *Valvata nilotica* occurs in slow running rivers and lakes with rather dense vegetation (Brown 1994). These two small freshwater gastropods have been recorded in numerous Late Pleistocene and Holocene sites along the Nile (Van Damme 1984). *Valvata nilotica* no longer lives in Middle and Upper Egypt, but its presence is attested at several archaeological sites, showing that it occurred previously as far south as the second Nile Cataract. It is not clear whether these two small gastropod species are contemporaneous with the human habitation or whether they were already present in the substrate on which people settled. In

any case, since both species can occur in slow running or stagnant waters, their habitat requirements do not exclude contemporaneity. All the other faunal remains are probably anthropogenic.

Seven remains of *Unio abyssinicus*, a medium-sized Nile bivalve easily recognizable by its heavy hinged teeth (Van Damme 1984: 56), were found. This species no longer occurs in the Egyptian part of the Nile and is presently only found in Ethiopia (Van Damme 1984). However, during the Late Pleistocene and early Holocene its distribution was much larger. This edible species does not occur on flood plain s and typically inhabits permanent waters; for reasons of ac-

Table 10 - Faunal list of Abadiya. Figures indicate NISP (number of identified specimens).

<i>Valvata nilotica</i>	1
<i>Bulinus truncatus</i>	1
<i>Unio abyssinicus</i>	7
unidentifiable bivalves	5
clariid catfish (Clariidae)	15
unidentifiable fish	2
goose (<i>Anser sp.</i>)	1
ducks and geese (<i>Anatidae</i>)	8
coot (<i>Fulica atra</i>)	1
raven (<i>Corvus sp.</i>)	1
unidentifiable birds	29
hare (<i>Lepus capensis</i>)	2
wild donkey (<i>Equus africanus</i>)	2
dorcas gazelle (<i>Gazella dorcas</i>)	14
barbary sheep (<i>Ammotragus lervia</i>)	1
hartebeest (<i>Alcelaphus buselaphus</i>)	110
aurochs (<i>Bos primigenius</i>)	24
large bovids	18
unidentifiable mammals	308
total identified	208
grand total	552

cess, harvesting must have been restricted to periods when the water levels were relatively low. *Unio* may have been collected for food, but, like other large Nile bivalves (Gautier 1983: 60), they can also have been used as small containers or as raw material for the production of objects. Five additional bivalve remains

were found that could not be identified with certainty, but their overall dimensions correspond to those of *Unio*.

All the identifiable fish remains belong to the catfish family of the Clariidae of which two genera (*Clarias* and *Heterobranchus*) occur in the Nile. The well-preserved articulation of a pectoral spine has the typical shape of *Clarias* (cf. Gayet & Van Neer 1990) which is still today the most common genus in Egypt. Clariids are typical flood plain dwellers that can easily be captured during their spawning run at the beginning of the floods and, later on during the year, when the waters are lowering and the fish occur in residual pools (Bruton 1979). Using the reconstructed sizes of the fish it is often possible to establish the fishing season since the average dimensions of the specimens are larger during the early-flood than during the late-flood season (Van Neer 2004). The catfish from Abadiya 3 are relatively small: the specimens that allowed a size reconstruction measured 10-20 cm standard length (SL) (1 specimen), 20-30 cm SL (1 spec.), 30-40 cm SL (1 spec.) and 40-50 cm SL (2 spec.).

Forty bird remains were found, but due to the poor preservation only 11 of them were identifiable to some extent. The majority of these belong to the Anatidae family and one of these remains - a humerus - could be assigned with certainty to a goose. The other duck and goose remains were not further identifiable due to their fragmentary nature and because a large number of species can occur in the Nile Valley. A tibiotarsus of a Rallidae could be identified as coot (*Fulica atra*), a bird visiting the Nile only during winter (Hollom et al. 1988). The dimensions of an incomplete carpometacarpus of raven fall within the variation of *Corvus corone* and *Corvus ruficollis*, two resident species with a wide distribution that are much attracted to human habitations where they act as scavengers (Hollom et al. 1988).

The mammal fauna from Abadiya 3 consists mainly of medium-sized and large ungulates. The only smaller mammal found is hare (*Lepus capensis*), represented by a radius and a pelvis fragment. The proximal width of the radius (Bp 8.1 mm) illustrates the smaller dimensions of the North African hare compared to *Lepus europaeus*. The presence of wild donkey (*Equus africanus*) is indicated by a patella and a first phalanx. Finds of this species in the Late Palaeolithic of Upper Egypt are rare: thus far the wild donkey has only been attested before at Kom Ombo (Churcher 1972). The same site is also the only one of its kind where bary sheep (*Ammotragus lervia*) were found, a species that is represented at Abadiya 3 by a calcaneus with the typical morphological characteristics described in Gabler (1985). Dorcas gazelle (*Gazella dorcas*) is represented by 14 remains originating from various parts of the skeleton (teeth, vertebrae, ribs, long bones, foot elements). The only measurable fragments are two distal tibiae (Bd 22.0mm and 23.0mm). The numerically most important species at the site is har-

Table 11: Measurements of the hartebeest postcranial remains. All the measurements are in millimetres and have been taken according to the standards described by von den Driesch (1976).

humerus		
BT	52.2	51.3
Bd	56.5	-
radius		
BFp	52.8	
Bp	58.3	
ulna		
BPC	27.8	
metacarpus		
Bd	41.7	
tibia		
Bp	76.1	
astragalus		
GLl	52.6	
GLm	49.4	
DI	29.4	
naviculocuboid		
GB	44.2	
phalanx 2		
Bp	21.6	
phalanx 3		
DLS	56.0	
Ld	48.0	

tebeest (*Alcelaphus buselaphus*). It is represented by skeletal elements of all body parts and, as mentioned above, three portions of still articulating bones were found. The individual elements are cemented together by a calcareous matrix. One of the clusters consists of an astragalus, calcaneus, naviculocuboid, ectomesocuneiform and proximal metatarsal (Fig. 21), the other one is also an ankle joint comprising an astragalus, naviculocuboid, ectomesocuneiform and a small fragment of a calcaneus. Two lumbar vertebrae in articulating position were also recovered. Each of these clusters was counted as one specimen in the species list. The measurable hartebeest elements are indicated in Table 11 and the data on the slaughtering ages are listed in Table 12. Ageing criteria exist for the dentition of hartebeest (Mitchell 1965) but not for the fusion date of their long

Table 12 - Ageing data obtained on the bone fusion and tooth eruption of hartebeest and wild cattle. NF=non fused; F=fused.

fusion data	hartebeest		wild cattle	
	NF	F	NF	F
1-1.5 years				
distal humerus	-	3	-	-
proximal radius	-	3	-	1
1.5 years				
proximal phalanx 1	-	2	-	1
proximal phalanx 2	-	1	-	-
2-2.5 years				
distal metacarpus	-	1	-	-
2.5-3 years				
distal metatarsus	1	-	-	-
2-3 years				
distal metapodal	1	2	-	-
3-3.5 years				
proximal calcaneus	-	1	-	-
3.5-4 years				
radius & ulna	-	2	-	-
proximal ulna	1	1	-	1
distal femur	-	1	-	
proximal tibia	-	3	-	1
4.5 years				
pelvis	1	-	-	-
5 years				
thoracic vertebra	1	-	-	-
tooth eruption data	hartebeest		wild cattle	
2-2.5 years				
M3 erupted	1			
2-5 years				
M3 erupted			1	

bones. As an alternative, the fusion dates of domestic cattle were used (Silver 1963).

It appears that the majority of the hunted animals were subadults and adults. They were killed when older than 1-1.5 years, and a relatively large number of bones indicates animals hunted at an age of at least 3.5-4 years. The

remains of wild cattle (*Bos primigenius*) are mostly in a poor state of preservation, but their identification was facilitated by their large size that distinguishes them from those of hartebeest. Several tooth fragments, however, could not be securely identified and have been lumped in a 'large bovid' size category, including hartebeest and wild cattle. The poor preservation also explains why only one aurochs element was measurable (an astragalus, GLm 75mm and GLl 81.5mm). The few indications for the age at death, based on tooth eruption and long bone fusion of domestic cattle (Silver 1963), suggest that mainly subadult and adult animals were hunted (Table 12).

The number of traces that could be observed on the faunal material is very limited. Fine, more or less parallel cutmarks were seen on a distal metapodal of hartebeest, and among the unidentified material three burnt fragments of large mammal bone (hartebeest or aurochs?) occur. The faunal remains also included a worked bone, probably made from hartebeest or wild cattle bone. This double point, with a length of 32.4 mm, probably represents a fish gorge, a primitive form of fish hook to which a rope was tied in the middle. The bait is attached so as to ensure that the gorge is parallel to the rope. The gorge takes a transversal position in the mouth or branchial cavity when the bait is swallowed by a fish (von Brandt 1984). Set out for the night, bottom lines with baited gorges may have been suitable for capturing *Clarias*, which effect daily inshore movements for feeding. Similar objects have been found at sites where fishing was an important subsistence strategy, such as loci E-78-3, E-78-4, and E-81-1 at Wadi Kubbaniya (Gautier & Van Neer 1989) and Makhadma 4 (Van Neer et al. 2000).

The reconstruction of the relative importance of the various food procurement strategies (harvesting of molluscs, fishing, fowling and hunting) is hampered by the poor preservation conditions of the faunal material. Fragile remains such as those of fish, birds and molluscs are no doubt underrepresented and also among the mammal fauna it is obvious that smaller species, such as hare, are rare. Even within the bovids it is not excluded that the abundance of the smallest species, the dorcas gazelle, was affected by this phenomenon of differential destruction. Sampling procedures involved the use of 4mm mesh sieves and this may be an additional factor explaining the low number of small bones, for instance of fish.

In any case, the bovids seem to have been the major providers of animal protein. By taking into account the number of remains and the total weights of dorcas gazelle (35 kg), hartebeest (150 kg) and wild cattle (500 kg) suggested for these species (Gautier & Van Neer 1989), a rough estimate can be made of their relative contribution to the diet. The gazelles would have yielded 2% of the bovid meat, followed by aurochs (41%), and the major contributor would have been hartebeest (57%). These three species are the typical, major components of the

terrestrial fauna exploited during Late Palaeolithic times in the Egyptian Nile Valley (Gautier 1984; Gautier & Van Neer 1989: 154-155). If the number of specimens identified is taken as a measure of the proportions in which these species were hunted, it appears that hartebeest was the most frequently exploited bovid throughout prehistoric Nubia and Egypt (Table 13). Also at Abadiya 3 this is the case, and hartebeest is even more common here than at all the other considered sites; there may, however, be a slight bias due to the concentration of well preserved hartebeest bones in one area of the site.

Table 13 - Relative frequencies of wild cattle, hartebeest and dorcas gazelle at Abadiya 3 (present study) and at other Late Palaeolithic sites in Nubia and Egypt (from Gautier & Van Neer 1989: 155). The proportions are based on number of identified specimens.

	% wild cattle	% hartebeest	% gazelle	sample size
Abadiya 3	16.2	74.3	9.5	148
Wadi Kubbaniya	17.8	66.3	16.0	940
Fayum	13.1	60.7	26.2	84
Isna & Idfu	37.2	56.7	6.1	635
Kom Ombo	39.9	51.8	8.3	591
Wadi Halfa	50.6	40.6	8.8	1120

The analysis of the artefact distribution, and of the structures and stratigraphy of the site suggests multiple occupation phases, whereas the faunal material yields some evidence regarding the seasonal exploitation of resources that may be indicative of the season(s) during which the site was visited. For the reconstruction of the resource scheduling it is worth underlining that, even in the lake environment postulated below, fluctuations in water levels occurred that had an influence on the accessibility of species. In late spring or early summer, lake levels must have been relatively low as a result of evaporation and reduced influx of water. The presence of *Unio abyssinicus* shells indicates mollusc harvesting when the water levels were low enough to permit access to the permanent water body to which this species is confined. The fish remains suggest exploitation, of relatively shallow waters, probably during the same season. The fish bones belong exclusively to clariid catfish of small to medium size which seems to exclude representing specimens captured during the yearly spawning season when the inflow of nutrient-rich water triggers inshore movement and reproduction. The absence of tilapia, a taxon also often encountered when shallow waters are exploited, could be due to a combination of small sample size, poor preservation conditions (its bones are smaller and less sturdy) and sampling procedures

(4mm mesh). Alternatively this absence may be a result of the fishing techniques employed. Baited fish gorges attached to bottom lines are very effective for capturing clariids whereas tilapia fishing with such gear would require the use of gorges attached to rod and line or to drift lines. Finally, the local hydrological or topographical conditions may for some reason have been less suitable for tilapia. Despite the presence of only a few identifiable taxa, the birds provide important information. Ravens are resident species and may have been captured all year round, but the coot, the goose and the other anatids are winter visitors. The traditional fowling season defined by Butzer (1976) for the period AD 1000-1800 extended from October to March, but during the late glacial period it may have been longer. Combination of the information provided by the molluscs, fish and aquatic birds shows that the site must have been occupied for at least part of the winter into the spring or early summer, when the water levels were seasonally lowered (cf. Fig. 10 in Van Neer 2004).

The terrestrial fauna can also be interpreted to some extent in terms of seasonal availability and abundance. It consists mainly of ungulates some of which may have been captured at a distance from the Nile. The barbary sheep is a typical inhabitant of rocky and dry montaineous areas and also the wild donkey climbs and moves with ease among rocks and cliffs, especially during the day (Dorst & Dandelot 1976). At night they come down to the valleys to graze and can hence also have been captured in broken, flat country and open grass plains. Dorcas gazelles are also typical inhabitants of desert and semi-desert environments that can occasionally, or seasonally, venture into the Nile Valley. At Wadi Kubbaniya, it was noticed that dorcas gazelles were more frequent during the low-water season when they may have penetrated farther in the Nile Valley (Gautier & Van Neer 1989). It was suggested that snares laid on tracks used by dorcas gazelle coming to water may have been an effective capturing method. Taking into account the ecological requirements of hartebeest and wild cattle, we believe that these herbivores were hunted in the Nile Valley or at its margins. Both species are bulk-roughage feeders, mainly on grasses, and therefore probably displayed an overlap in their niches. Hartebeest seems to prefer habitats between open grassland and woodland or shrub and is a rather mobile species; it more readily moves away from waterlogged areas than wild cattle that was probably more restricted to wetter habitats. However, when conditions were seasonally drier they may both have been abundant close to the main channel and thus maybe more accessible to hunters (cf. Gautier 1988: Figure 1). Here, capturing these large herbivores can have been more effective if they were driven into shallow water where they could be impeded before attacking them with bow and arrow, spears or other wounding or striking gear (Gautier & Van Neer 1989: 159). It is therefore unlikely to be a coincidence that a concentration of hartebeest remains was found near the former water edge.

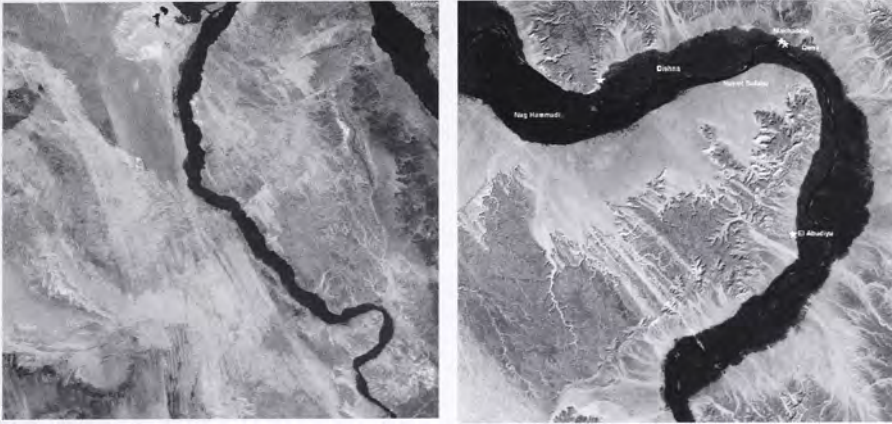


Fig. 16. Left: Satellite picture of the western desert in Middle Egypt (Satellite and aerial imagery provided courtesy GlobeXplorer.com and Partners. All rights reserved). Right: Landsat 1 (USGS, LM1188042007231490) picture of the Qena bend.

Discussion and Conclusion

The Late Palaeolithic Nile Valley in Upper Egypt

The el Abadiya 3 site is a late Palaeolithic site situated at the elevation of about 4 m above the present flood plain, in a stratigraphic context of the Sheikh Hussein Formation, the highest Nile deposits of the Late Pleistocene. Similar sites have already been studied in the Dishna plain and the Makhadma area (Vermeersch Paulissen & Huyge, 2000a and 2000b) where the deposits have been correlated with an event of the “Wild Nile”. We now believe that another interpretation of the physical environment better fits the observation of the Late Palaeolithic high Nile deposits (Gullentops et al. submitted).

Wendorf and Schild (1989:769; Schild & Wendorf 2002-2004) have stressed that, with reduced stream competence and an increased sediment load during the Late Pleistocene, the Nile downstream from its headwaters changed from a massive stream following a single channel and became a much smaller river flowing in numbers of braided channels across a flood plain, which rose continuously as more and more sediment was deposited. This rise in the flood plain and filling of the valley occurred in spite of the fact that, at least during the Late Palaeolithic period of alluviation, the Mediterranean was more than 100 m lower than it is today. The level of the sea had no impact on the flood plain level in Upper Egypt and Nubia. The authors proved that the Late Palaeolithic Allu-

viation began well before 20,000 B.P. There are indeed 64 radiocarbon dates associated with this alluviation at Wadi Kubbania (Wendorf & Schild 1989: Table 13.1); the oldest is about 20,600 B.P. and the youngest is about 12,400 B.P. There, a series of exceptionally high floods, which may correlate with renewed flow from the White Nile, resulted in a final phase of silt accumulation on top of the sediments of the seepage lake, with a maximum elevation at 27 m above the modern flood plain. This upper silt has not been dated at Kubbania but is estimated to be about 12,000 years old. Schild and Wendorf imagine this river as a comparatively small stream with a flood plain cut by several ephemeral braided channels, with little or no flowing water, but with a large flood after the seasonal rains each year at the headwaters.

This view is however difficult to maintain. Another model should be used to interpret the Late Palaeolithic Nile behaviour in Egypt. There are no indications that the whole Nile Valley over its entire width has even been filled with deposits of a braided river. This would have been an extremely huge amount of deposits. From a hydrodynamic point of view it must be stressed that high inundations necessitate extreme discharges, tens of times stronger than the pre-dam floods, which would change the valley in a channel, preclude all sedimentation of suspension charge and result in strong erosion both vertical and lateral (Gullentops et al. submitted). There are no geomorphologic signs of this. Indeed, according to Schild and Wendorf (1989: 91) the Late Palaeolithic, Nilotic sediments in Wadi Kubbania are all overbank; there are no channel or near-channel deposits. In the given context, only one mechanism is possible: sedimentation in local, temporary lakes produced by ephemeral damming. Huge alluvial cones of tributary wadi are not present because of the unsuitable climatic conditions. Dunal damming by strong aeolian activity is the only possibility. It supposes simultaneous local hyperaridity to mobilise the sand sources and extreme drought in the upper Nile to realise practically a seasonal endorheic regime, which would allow the gradual built-up of a dunal barrier. Such conditions are well known and low discharges of the White Nile have been proposed (Livingstone 1976; 1980) and are now generally accepted for parts of MIS2 and especially the end (Barker & Gasse 2003). The channel of the White Nile was partially or completely blocked by dunes south of Khartoum until sometime between 12,500 and 11,500 B.P., when the Terminal Pleistocene Early Holocene transgressions of the White Nile buried the dunes beneath a mantle of alluvium (Williams and Adamson 1980: 297-298). At the same time the Eastern Sahara and the Red Sea area (Moeyersons e. a. 1999) suffer highest aridity.



Fig. 17. Dune sand crossing the crest of the Gebel El Gir, south of Nazelet Safaha, providing the sand at El Abadiya 3 (layer AS).

In the Western Desert of Egypt, long sand streaks are visible on satellite documents (Fig. 17). Along the Middle Nile (Dairut) edge, such streaks show dramatic sand movement that even now is sometimes active. The satellite images show the presence of important longitudinal dunes that developed nearly parallel to the Nile valley, as is the case of the Dairut area with the South Wadi el-Rayan dune field (Fig. 17 & 18). Even now some of the longitudinal dunes make incursions into the Nile valley itself (Embabi 2004: 112) imposing the need for measure against the destruction of agricultural activities in those areas. The dune field takes the form of linear dunes, while their orientation varies between 133° and 173° with a mean direction of 157.7° . Said (1993:143) has pointed out that in numerous texts from the pharaonic period around 2200 BC there is mention of the frequency of sand storms and the accumulation of sand. This may be understood if we assume that, with the advent of aridity, dunes started to form along the western fringes of the river. Ordinarily these dunes, which form during the winter storms, are flushed during the summer floods when these are high enough to wash the sand out. When the floods are low, dunes accumulate and encroach on the agricultural land. This seems to have been the case during the period when the longitudinal Khafouf dune field, which stretches for 175 kilometres (Said 1993: Fig. 1.24) along the western bank of the middle latitudes of the Nile (29° N to 28° N), was probably formed. In this stretch, aeolian sand and dune remains from the el-Khafouf formation (Said, 1981) inter-finger both the Prenile deposits of the Middle Pleistocene and the Ne Nile sediments of Late Pleistocene (Said,

1981). Even in modern times, wind-driven sands from the large fetches of the Western Desert were deposited on the flood plain and the river bed itself. Before the building of the High Dam most of the sand that was deposited on the bed of the river was flushed out into the Mediterranean Sea by the annual flood of the river. On the other hand, the sand, which accumulated over the western banks of the river, was ordinarily inundated by the flood waters and was incorporated into the sediments of the river. At times of low floods and extraordinary aridity, however, the dune and wind-driven sands remained uncovered, slowly encroaching on the flood plain of the river and forming dune fields of great areal extent over the western bank (Said 1993: 248). At present, this dune field is stabilized and covered by a thin layer of Nile mud which may have been formed by a temporary lake.

The Saharan dunes show the slightly curved stream flow of the prevailing northern wind in winter (Fig. 17), which is clearly funnelled by the wide incised valley from Asyut to the south east. Irregularities in the valley wall produce individualised wind cells, which give clear cut parallel streaks over tens of kilometres. In hyperarid conditions of the LGM and a natural, non irrigated, Nile valley this funnelling wind will deflate the Nile sediments and moreover, in addition to the sand introduced from the desert, find coarser sands in all the wadi cones. Huge amounts of sediment must have been brushed up the valley. At the sharp bend at Nag Hammadi the material continues its south eastern direction and a suspension charge invades the limestone plateau (Fig. 17). Individual streaks can be followed over 50 km, crossing the plateau and falling in the valley upstream of Luxor (Vermeersch, 2005). A similar dune was formed south of Nazlet Safaha and, in crossing the crest of Gebel el Gir (Fig. 7), it provided the sand that accumulated at el Abadiya 3 (layer AS). It is evident that the Nile bend at Nag Hammadi is a suitable place for abandonment of the traction load and building up of a dune field. In 1980 sandpits, just outside the actual flood plain, showed a succession of more than 10 m dune sands prograding westwards.

The sand accumulation in the valley during the LGM would have started from West until, at Nag Hammadi, it reached the eastern and northern valley cliffs damming the entire Nile valley by dunes. The topography upstream from Nag Hammadi shows that a dune field of 15m high is sufficient to develop an endorheic basin and eventually a lake reaching upstream even far beyond Qena. The dam must be seen as a large dune field. It developed during the yearly low waters and overflow channels were then easily repaired. Seepage was minimalised as the suspension laden waters clogged the pores. The Sheikh Houssein Formation is indeed a typical suspension deposit, characterised by a silty clay in which the sand fraction is less than 5% (Paulissen & Vermeersch 2000). If some Nile flow went through the dune field during high waters it was insufficient to

at Makhadma and at el Abadiya are situated at a similar elevation above sea level (tab 1), indicating a similar water level at the time of occupation, still somewhat dryer as can be read from the satellite picture (cfr FG).

Table 14 – elevation above sea level of the Late Palaeolithic sites (after Hassan 1974, Vermeersch, Paulissen & Huyge, 2000a & 2000b).

Site E61M6	Isnan	Dishna plain	76.0 m	Deflated Sahaba silt
Site E61M7	Isnan	Dishna plain	76.0 m	Deflated Sahaba silt
Site E61M3A	Isnan	Dishna plain	76.0 m	Deflated Sahaba silt
Site E61M3B	Isnan	Dishna plain	76.0 m	Deflated Sahaba silt
Site E61M10	Isnan	Dishna plain	76.5 m	Deflated Sahaba silt
Site E61M8	Isnan	Dishna plain	76.5 m	Deflated Sahaba silt
Site E61M1A	Isnan	Dishna plain	76.5 m	Deflated Sahaba silt
Site Makhadma 2	Isnan	NW of Qena	77.7 m	Eroded Sheikh Houssein silt
Site E61M3C	Isnan	Dishna plain	78.0 m	Deflated Sahaba silt
Site E61M9A	Isnan	Dishna plain	78.0 m	Deflated Sahaba silt
Site Makhadma 4	Afian - Isnan ?	NW of Qena	78.0 m	Eroded Sheikh Houssein Formation
Site E61M9D	Isnan	Dishna plain	79.0 m	Deflated Sahaba silt
el Abadiya 3	Isnan	Naqada	82.0 m	Sheikh Houssein Formation

The best interpretation for the position of these sites is the model presented here with an extensive Nile lake from Nag Hammadi to far upstream Qena. There is thus no need for catastrophic Nile floods with exceptionally high levels throughout the Valley (Butzer & Hansen 1968; Paulissen & Vermeersch 1987; Wendorf 1968; Wendorf & Schild 1976) to explain the high elevation of the Late Palaeolithic sites and the related Nile deposits.

Chronology of the Makhadma Nile lake

The series of twenty-five radiocarbon dates from the highest Late Pleistocene deposits in Upper Egypt calibrates very clearly with the Bölling period (Fig. 19). Such an observation can be understood when we presume that at the end of the LGM, the damming dune field was at its highest level. The warmer conditions coincide with higher discharge as well from the Blue Nile as from the White Nile. During the Bölling, this situation resulted in very high lake levels behind the Nag Hammadi dam until the discharge was able to breach the damming dunes. We presume that the damming dunes were the weakest at the northern part

of the Nag Hammadi bend. The breach occurred there and resulted in the creation of the high cliffs of the right bank, north of Nag Hammadi. Once the damming dunes were breached and with higher discharges, the Nile was deeply incised in the lake deposits and was able to erode most of the damming dunes. However, west of Nag Hammadi, even now, the flood plain remains. The ^{14}C chronology of the Late Palaeolithic sites suggests that they coincide (CalPal calibration) with the transition from the pleniglacial to the Bölling/Alleröd interstadial (Fig. 19). Several ^{14}C dates correspond to the dry cold period preceding the warming up period of the Bölling. Date measurements continue to be present in the first part of the Bölling, but came then to an abrupt end. A renewed occupation can be associated with a short reconstitution of a dam and a high water lake at the end of the Bölling. The Old Dryas, the Alleröd and the Younger Dryas have no dates at all.



Fig. 19. Topography of the present day Nile valley with the possible extent of the Makhadma lake (dotted area).

We agree with Schild and Wendorf (2002-2004) who see the end of the Late Palaeolithic Alluviation and the beginning of the Late Paleolithic Downcutting as largely coeval with the opening of the overflow at Lake Victoria at ca. 12,500 radiocarbon years B.P. (Livingstone 1980), a major transgression of Lake

Albert shortly after 13,000 ^{14}C years B.P. (Beuning *et al.* 1997: 276), and the increased flood discharge in the Blue Nile at about 12,000 radiocarbon years B.P., (Williams & Adamson 1980; Adamson 1982; Adamson, Gasse, & Street 1980; Adamson, Gillespie, and Williams 1982: 187), a series of events coeval with Bölling, the early part of Greenland Interstadial I of Walker *et al.* (1999: 1146).

The absence of late Pleistocene sites downstream from Nag Hammadi is explained by Schild and Wendorf (1998) as the result of the late Pleistocene low sea level in the Mediterranean, which should have caused a regressive erosion of the Nile. As far as we understand no positive arguments can be presented to sustain this hypothesis.

An additional argument for the lake hypothesis is provided by the fish fauna of Makhadma 4. The ichthyofauna of this site is composed of a very high proportion of tilapia (68% of the identified remains in the 2mm sieved residue), unlike the majority of the Late Palaeolithic fish faunas along the Egyptian and Nubian Nile, that are always characterised by a heavy preponderance of clariid catfish (Gautier & Van Neer 1989: 153; Van Neer 2004: 256). Several studies monitoring the effects of artificial damming of African rivers have shown that profound changes occur in the species composition of the fish fauna and that these ichthyofaunas typically become dominated by tilapia (e.g., Petr 1975). In Lake Nasser, the proportion of tilapia in the fish landings increased from 27% to 90% during the first 15 years that the lake was at working level (Agaypi 1992) and still today these fish are the major species landed. It is clear that, in geological terms, damming of rivers such as the Nile has an almost immediate effect on the fish fauna. Descriptions of present day tilapia catches in function of fishing efforts in dam lakes show moreover that yields are low when the annual draw-down is too large or too fast (Bernacsek 1984: 42). High proportions of tilapia at Makhadma are therefore better in agreement with long lasting lake environments than with a more irregular, unpredictable Nile regime that was previously invoked ('Wild Nile' floods). The existence of a lake environment is also supported by the incremental study on the tilapia otoliths from Makhadma 4 (Van Neer *et al.* 1993), showing a prolonged exploitation within the year. Also the length-frequency distributions of the tilapia (Van Neer *et al.* 2000: 277) point in the same direction: the expected bimodal distribution of the first two year classes is blurred due to an overlap between the cohorts. This overlap could be related to the extended period during which young fish were captured each season, but also to the length of the growth season that varied over successive years of fish exploitation as a result of variation in the lake levels.

The environmental conditions at the el Abadiya 3 site

The environmental conditions at that time of the occupation at the el Abadiya 3 sites correspond with an extensive lake that covered large parts of the

Nile valley. The water levels of that Makhadma lake were certainly subjected to seasonal changes. But with the onset of the Bölling, the clear warming up and increasing of precipitation in East Africa at the end of the Pleistocene, the Nile discharges started to become much larger, resulting in very high waters of the lake, up to 9 m above the present flood plain at Dishna, 7 m at Makhadma and 4 m at el Abadiya. Those deposits did not cover the higher part of el Abadiya 3 because it was situated on the shore of a bay at the Makhadma lake. A thin layer of deposits attributed to the Sheikh Houssein formation has covered the eastern part of the site. The analysis of the site layout suggests that the site is a palimpsest of several occupations on the same place. As the bone material is better preserved than in the higher part of the site we presume that the lower part was rapidly covered by deposits from the highest lake levels. The higher part of the site could then be somewhat later than the lower part, but the difference could also reflect only some seasonal occupation rather than a diachronical position of the site parts. It remains however possible that the youngest date of el Abadiya 3 is correlated with the Alleröd. If so, the situation could point to a reestablishment of the dammed position and a short high level of a new lake during the first part of the Alleröd (Fig. 17). As el Abadiya 3 is situated on the shore of a small shallow bay of the Makhadma lake, small changes in the lake level can uncover large areas of lake bottom.

Late Palaeolithic Occupation

The probably multiple el Abadiya 3 occupation consists of short camps of hunter-gatherer-fishers along the shore of a large lake during the early Bölling. The assemblage with a dominant position of the end-scrapers, the absence of microliths and of the microburin technique suggests an attribution to the Isnan. The name *Isnan* (Wendorf & Schild 1976) has been given to several groups of sites found in Upper Egypt from Kubhaniya to Dishna (Hassan 1974). Wherever they occur *in situ*, they are associated with deposits of the latest local phase of the Late Paleolithic Alluviation.

Whereas on most Isnan sites (Wendorf & Schild 1989), an extensive use of flint nodules and slabs quarried from the Eocene cliffs is characteristic, this is not the case at el Abaiya 3 where the flint nodules from wadi gravels were chosen. As at other Isnan sites, cores were exploited with a hardhammer technique. Globular cores are the most frequent type recovered but an analysis of the flaking remains clearly indicates that artifacts with unipolar flaking traces are by far the most important. This suggests that artefacts were produced mostly from single platform cores. Core and platform shaping did not receive much attention from the knapper. Most artefacts have thus a flat butt and core-refreshing elements are rare. At el Abadiya 3, the assemblage is clearly a (elongated) flake assemblage in which blades are not numerous. Bladelets are nearly totally absent.

A special attention has been given to the production of pointed elongated flakes. A pointed flake, very similar to those from el Abadiya 3, is illustrated by Wendorf & Schild (1989: Fig. 39.5: 6). Tools have preferentially been made on blade blanks. Some side scrapers on flake are present.

Table 15 – Major tool class frequency of the Isnan sites with more than 100 tools.

	Aba 3	E61M 4B	E61M 4C	E61M 6A	E61M 6C	E61M 7A	E61M 7C	E61M 9A	E61M 0B	E61M 10C	E61M 10D	E71K 14D	E71K 14A	E71 K22
N	175	264	188	260	164	145	138	138	238	182	222	?	?	?
End scraper	26.7	32.2	30.9	31.9	37.8	26.9	29.0	19.5	18.1	25.1	31.1	63.5	54.8	45.0
Side scraper	4.4											1.7	1.2	1.3
Burin	3.9	8.3	7.5	9.2	7.9	12.4	21.0	3.6	3.8	10.4	3.2	2.7	12.5	16.9
Borer	0.6											0.8	1.0	0.1
Notched piece	3.3	18.9	18.6	15.0	18.3	21.4	20.3	25.4	26.5	25.5	23.0	18.6	11.4	14.4
Denticu- lated piece	10.0	9.5	13.3	11.9	8.5	13.1	5.1	11.6	14.0	9.3	12.2			
Compo_ site tools	1.7	2.7	4.3	6.9	3.7	1.4	0.7	0.7	4.2	2.2	0.9			
Re- touched pointed blade	9.4													
Re- touched piece	38.3	23.5	23.4	13.1	22.6	20.0	17.4	34.1	29.0	25.7	27.9	5.2	7.4	4.1
Varia	1.7	4.9	2.1	11.9	1.2	4.8	6.2	5.1	2.5	3.8	1.8	2.2	1.8	7.8

Burins are never numerous but always present. The overwhelming presence of retouched pieces, notches and denticulates characterises the Isnan at all sites. Backed elements-including arch-backed bladelets, backed bladelets with two perpendicular truncations, and a few trapezes-occur occasionally occur in the Isnan, but not at el Abadiya 3.

Wendorf and Schild (1989) have stressed the complexity of the Final Palaeolithic in the Nile Valley. In Upper Egypt it is characterised by the Afian and Isnan. These industries had similar adaptations to the lake environment, with seasonal emphasis on fishing and ground plant foods plus some hunting of large mammals. Backed bladelets, so characteristic at the earlier Late Palaeolithic, are no longer dominant. Grinding stones were present in most of the sites at Isna and at el Kilh but were absent from the Dishna sites and from Makhadma - 2. This may indicate a different season of use for the sites at Isna. If the grinding stones there were used for processing mature tubers, then the sites were occupied at least during the winter. However, there is no other evidence (such as winter birds) to support this suggestion.

The site of el Abadiya 3 is best understood as a place where prehistoric people came regularly on a visit. These visits to the border of the large lake of Makhadma had been undoubtedly intended for the exploitation of the fish of the lake but also as a base camp for hunting bovids and water fowl. The level of the water of the lake was undoubtedly very dependent on the season. We assume that the water level was highest during the late summer months and lowest in late spring. There were, of course, large level differences from year to year depending on the upper Nile discharge. Since several occupations succeeded each other, no real occupation structures were preserved. Indeed, each new occupation destroyed the remains of older ones. There is no doubt that all kinds of domestic activities were performed here. This must be inferred from the presence of numerous tools. Whether certain lithic artefacts were used as hunting weapons or as fish gear is uncertain, as long as no micro wear-analysis has been performed.

Acknowledgements

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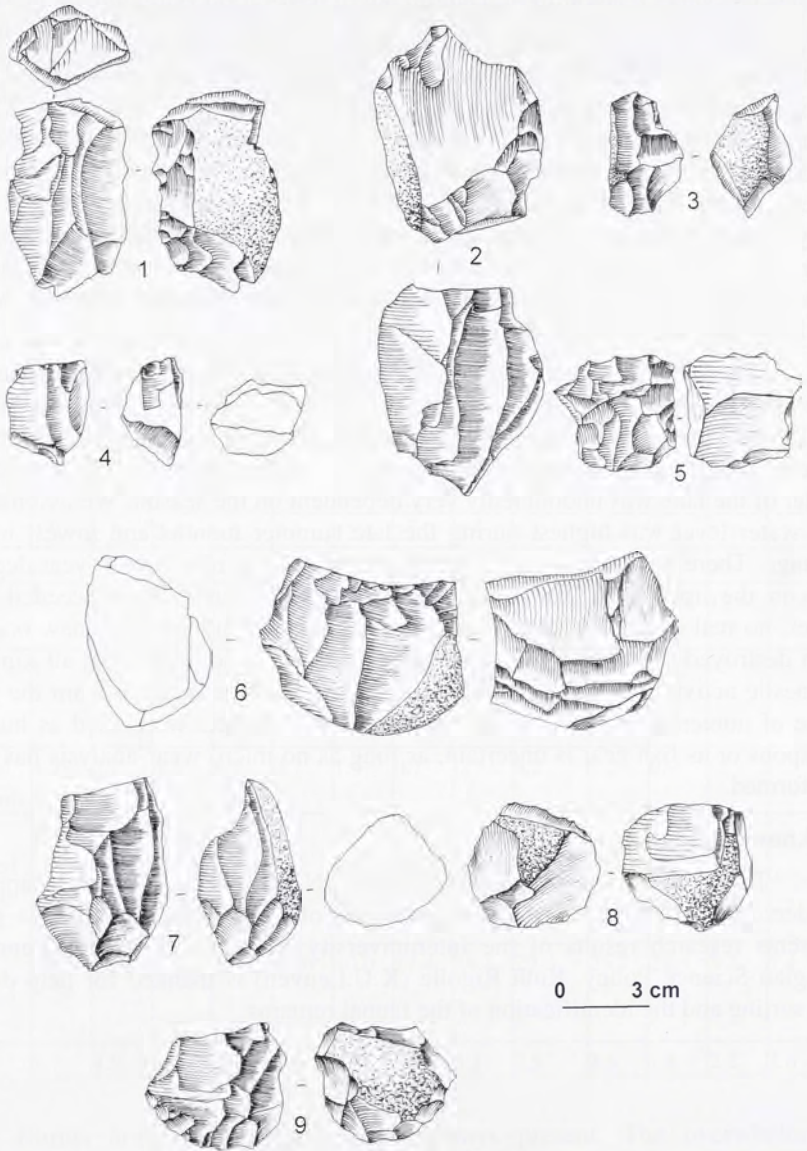


Fig. 20 . Cores from El Abadiya 3.

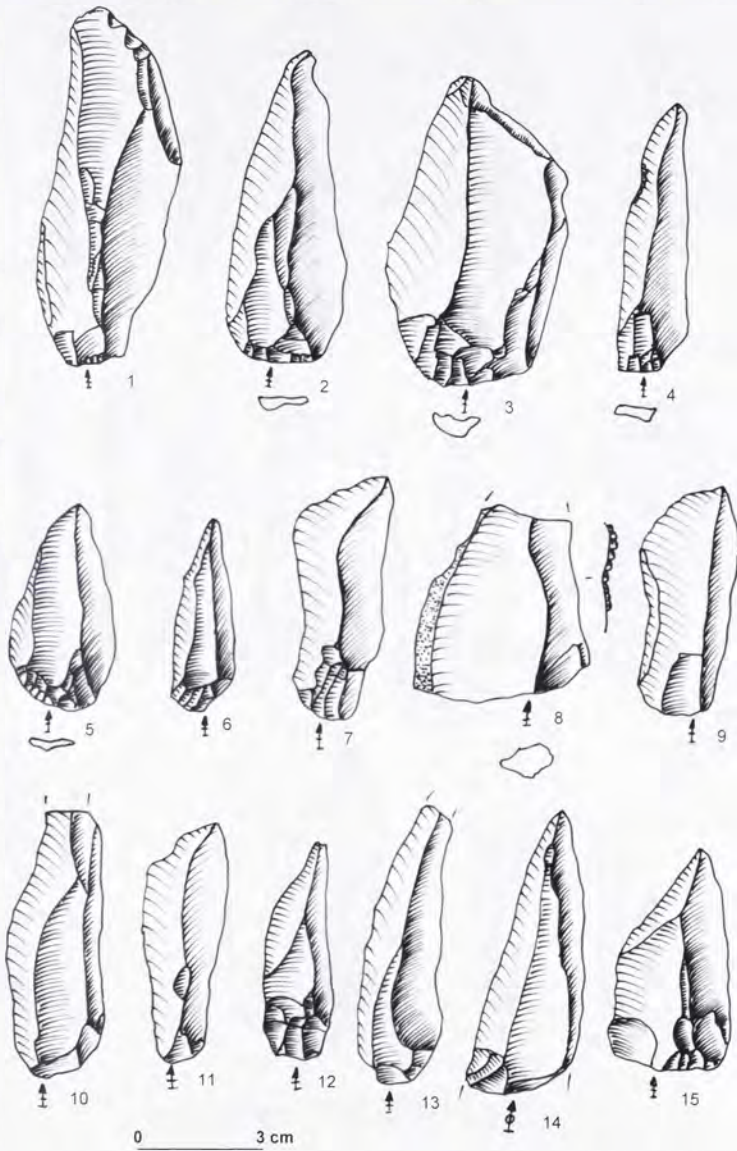


Fig. 21. Blades from El Abadiya 3.

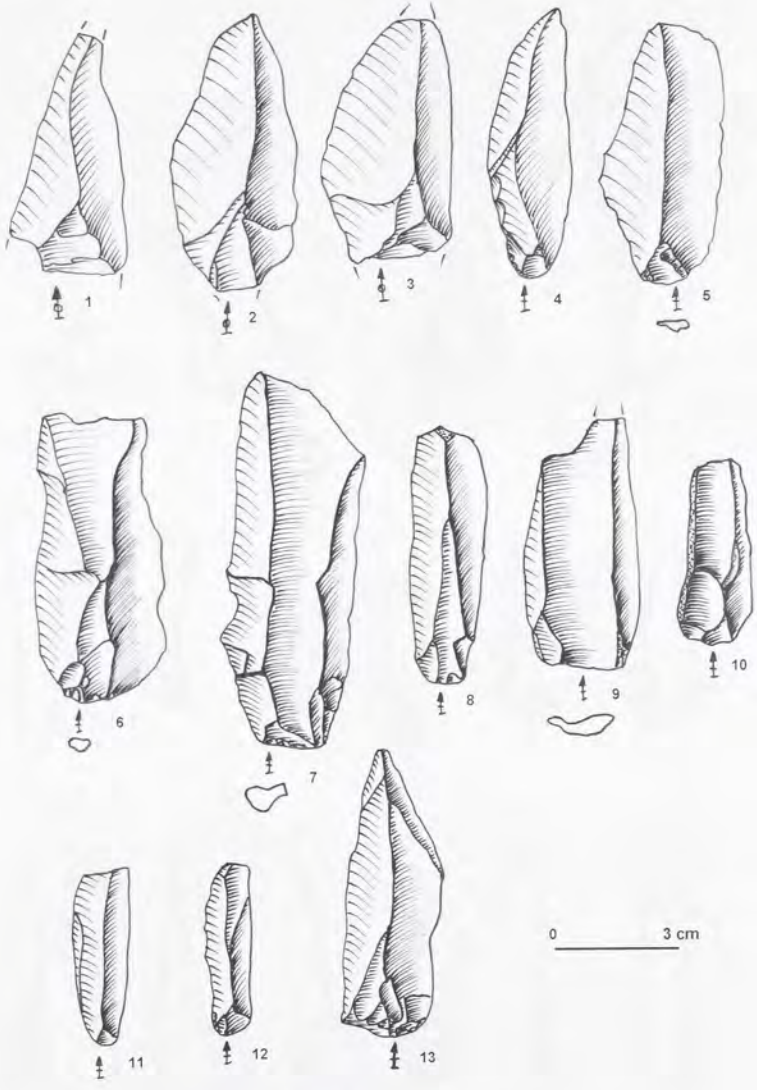


Fig. 22. Blades from El Abadiya 3.

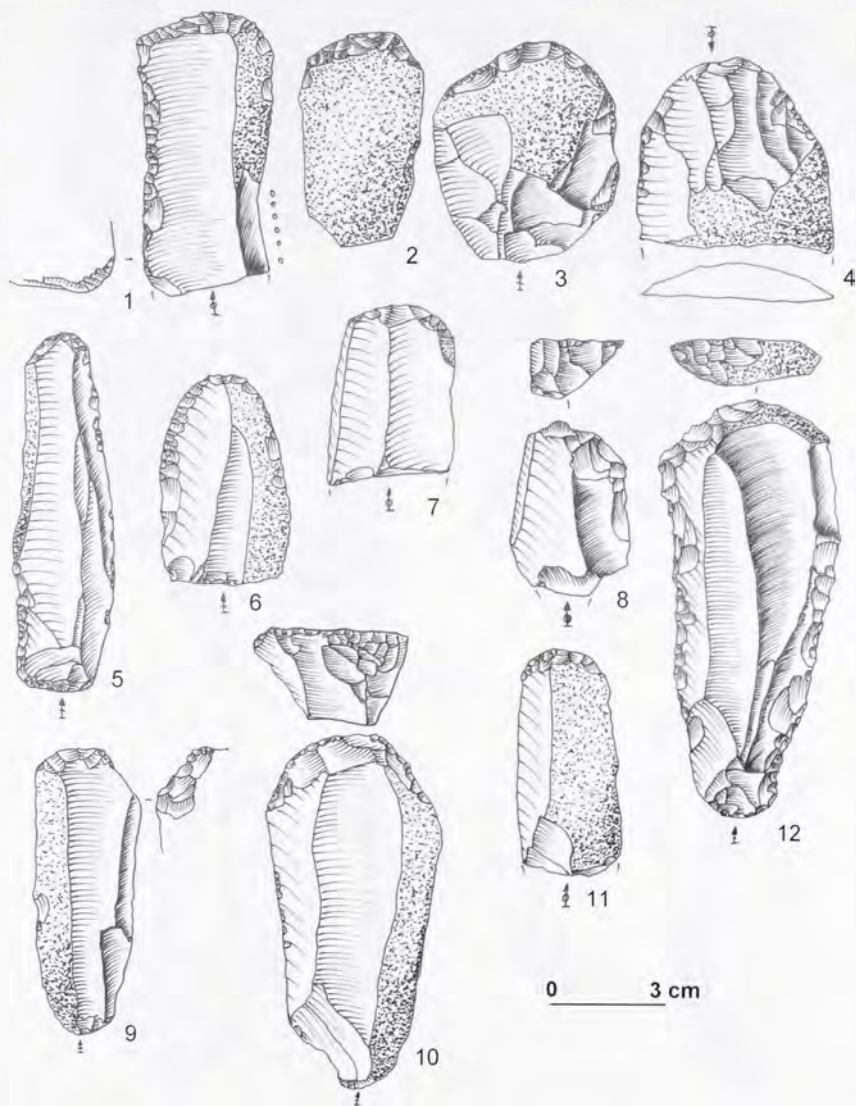


Fig. 23. End-scrapers from El Abadiya 3.

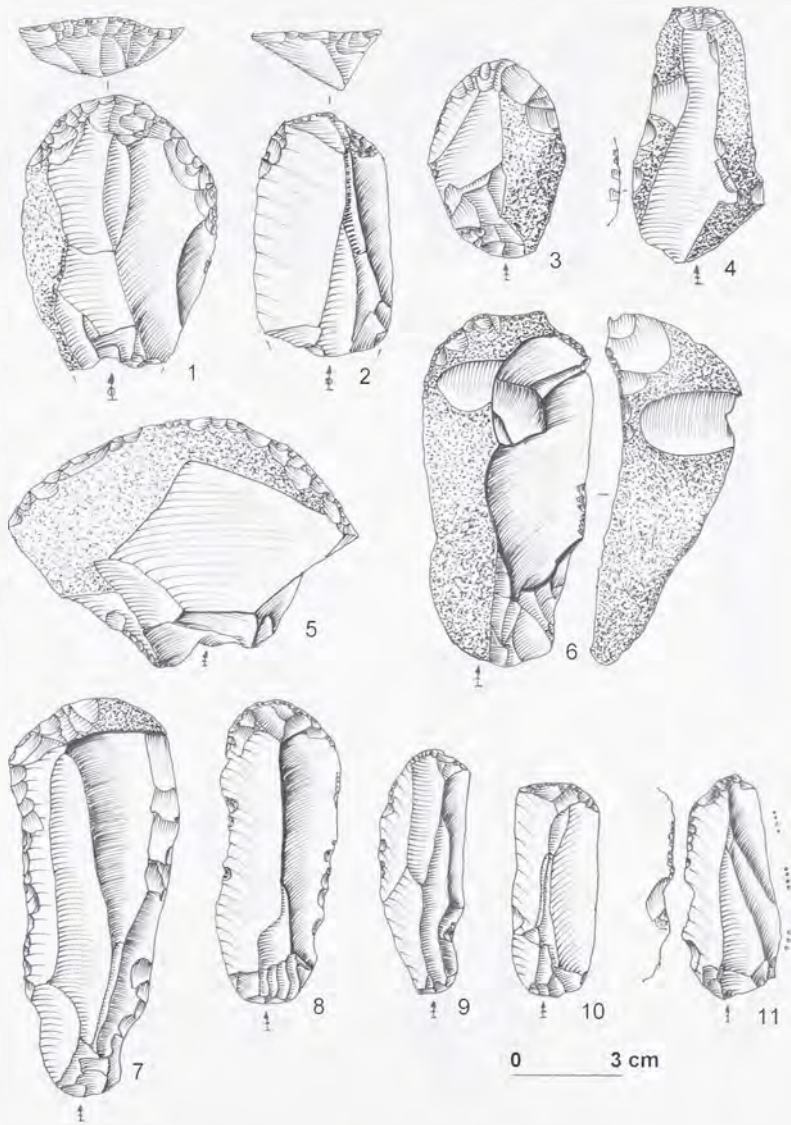


Fig. 24. End-scrapers from El Abadiya 3.

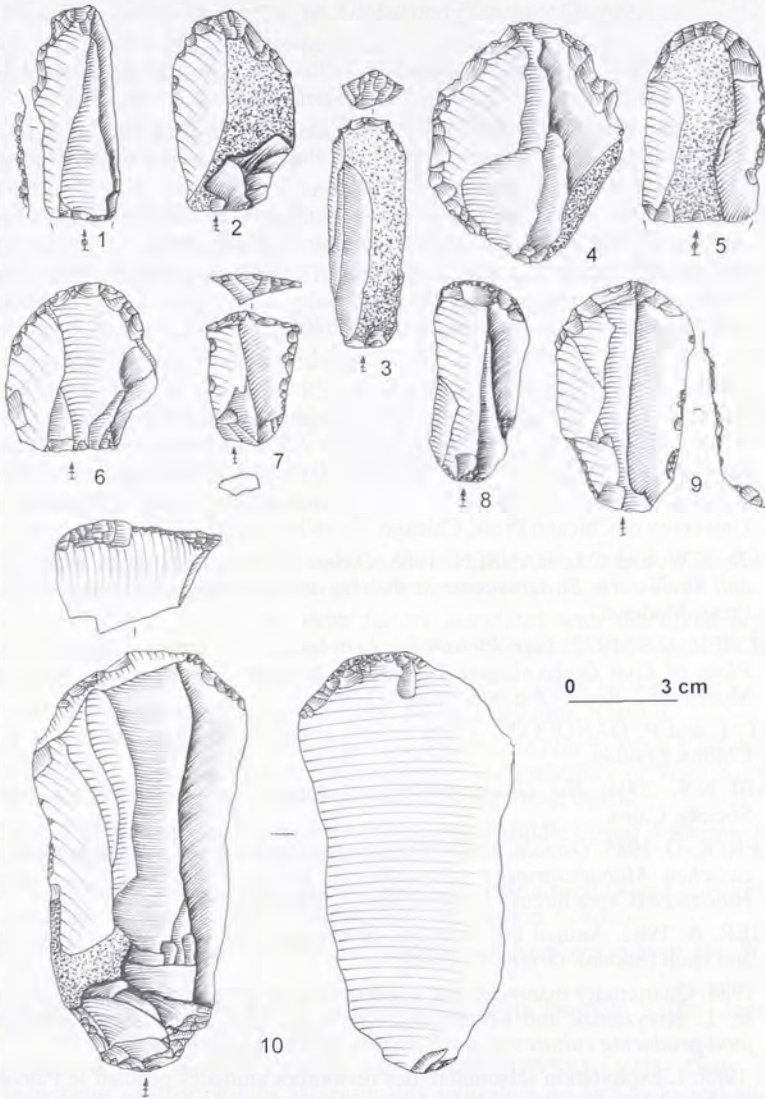


Fig. 25. End-scrapers from El Abadiya 3.

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C. S. Churcher¹ and M. R. Kleindienst²

A Pre-Dynastic Ass (*Equus asinus*) from the Sheikh Muftah Cultural Horizon of the Dakhleh Oasis, Western Desert, Egypt

This report on an early domestic donkey is dedicated to Lech Krzyzaniak and his consuming interest in the petroglyphs of Dakhleh Oasis. Lech and his wife, Karla Kroeper, recorded hundreds of depictions of animals, but few of them are equids. Donkeys with loads or harness are not uncommon, but late chronologically; there are some questionable zebras of probable older dates, but no wild asses. We hope this discovery may illuminate the history of asses in northeast Africa and their place in its wild fauna.

Abstract

Much of the skeleton of a small ass (*Equus asinus*) was recovered from alluvial pan sediments in the Dakhleh Oasis, south of Masara, on February 9th, 2002. The skeleton comprises the lower jaw, ribs from the right side of the chest, long bones from three of the four limbs, and some wrist, ankle and pedal elements. No signs of butchering or skinning, and no bone breakage prior to burial, are evident. Absence of some major elements, e.g., skull, vertebral column, one entire limb, and compact packing and flexing of the limbs, indicate selection of the portions present, and their interment as a unit without foreign debris, suggest an intentional and planned discard. The elements were placed on the existing sediment surface without signs of a pit, without any obvious arrangement, and with a naturally distinct layer sealing in the bones. This layer contained Late Sheikh Muftah cultural lithic flakes.

Elements of a second animal were recovered in association with the main skeleton and apparently form part of a skeleton represented by elements in a

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hearth midden some 10 m to the west, indicating the coeval relationship of the hearth midden and the discarded ass bones.

Also in the hearth midden were two massive bovid calcanea, one each of wild cattle (*Bos primigenius*) and Cape or African buffalo (*Syncerus caffer*), and elements of goat (*Capra hircus*). These finds indicate that the Sheikh Muftah peoples possessed cattle and asses, and were able to hunt or scavenge Cape buffalo. Goat (*Capra hircus*) has been reported previously from Sheikh Muftah cultural contexts.

Introduction

An area of Holocene pan or marsh silts along the southern margin of cultivation south of Esbet Masara (Loc. 406; Lat. 25°28'21.12"N, Long. 29°03'16.26"E), El Wassif el Dakhl (The Dakhleh Oasis), Wadi el-Gedid (New Valley), Western Desert of Egypt, contain a number of middens or hearth mounds dating to the Late Sheikh Muftah cultural period, about 5,000 to 4,000 B.P. The hearth mounds are some 10-15 m apart, contain many fragments of pottery, some lithics and fire-cracked stones, and bones, some broken. Some areas have dense invasions by gypsum crystals (magnesium sulphate), especially on the surfaces of old roots, pottery sherds, or along cracks in the clayey silts. The ancient and much deflated bottom deposits of a pan or marsh representing the last throes of a shrinking Holocene Palaeolake Kellis (Churcher & Kleindienst in press) are consistently silty and uniform, and appear to have built up from alluviation under a seasonal hydraulic lacustrine or paludrine regime of wet and dry, but without evidence of mud cracks and thus strong desiccation in dry seasons.

The unique occurrence and recovery of a partial skeleton of a wild ass or domestic donkey (*Equus [Asinus] asinus*) (ICZN 2004) in which the bones were unbutchered, some still articulated and flexed, with ribs in series, and compactly deposited has implications for the time of domestication of the wild ass. No signs of carnivore attention to the bones are evident. The bones lacked flesh when deposited, though the flexed and articulated limb elements were probably still connected by tendons. Cuts and gnaw marks are absent, and the deposition appears purposeful and tidy, and thus probably through human agency.

The skeletal elements lay within blocky gray silts associated with leaf impressions and plant remains from reeds or grasses, broad leaves, and small twigs. The bones rested on a 2-3 cm thick friable, granular, charcoal rich layer, in which small pieces of burnt bone occur. This layer was soft enough to be excavated with fingers. Late Sheikh Muftah cultural evidence is present in the friable basal layer as well as in the upper layer sealing in the bones. The ass is therefore considered coeval with the Late Sheikh Muftah peoples' nearby occupation layers.

The bones at the skeleton site were in two groups – a small southern cluster with a metatarsal, a thoracic vertebra, and some ribs (02-H-30 *s* right metatarsal III, vertebra and ribs uncatalogued) and a larger northern cluster with tibia, cubitus, astragalus, mandible, a thoracic vertebra, scapula, and humerus (02-H-30 *n* rt. tibia, *e* rt. cubitus, *q* rt. astragalus, *a+b+c* mandible, rt. scapula *d*, and rt. humerus *t*). These are listed in Table 1, Materials, and measurements of the lower dentition and main skeletal elements given in Tables 2 and 3, respectively. Some smaller elements (phalanx, calcaneum, podials, etc.) had been freed by aeolian erosion and distributed downwind of the cluster. Some had suffered hollowing of surfaces from wind erosion. An interesting aspect of the collection is the absence of the skull or any part of it, the presence of but a single scapula and humerus, and only three thoracic vertebrae when 12 ribs are present. An articulated right forelimb (represented by flexed humerus, cubitus and metacarpal III) was wedged into the lingual fossa of the mandible at right angles to the molar rows with the jaw lying on one of its labial faces; a metatarsal III lay parallel to the occlusal dental faces. It appeared that the bones had been set down as compact bundles and left on the surface of the charcoal-rich lower layer, to become buried in what may have been a fairly massive silt unit (20-25 cm thick). As no gnawing, disarrangement or dispersal from carnivore or scavenger activity is evident, and as the bones remained in tidy groupings, it may be that the pan site was flooded at the time or soon after the bones were set down and thus they were never available to scavengers. A right radius (30f.) and a right scaphoid (30 x) may belong to a second animal (see next).

Additional skeletal elements of ass were recovered from a hearth midden some 10 m west of the bone cluster (specimens H-68 a-f). Only one of these appears to belong to the same individual as those in the main cluster, and the rest are considered to belong to a second and more robust animal than the bones that represent the first animal; possibly these represent male and female individuals, respectively. Within this hearth midden and thus temporally and spatially associated with the two asses, elements of cattle (*Bos* cf. *taurus* or *B. primigenius*), African or Cape buffalo (*Syncerus caffer*), Dorcas gazelle (*Gazella dorcas*), and goat (*Capra hircus*) were recognised.

Description of Material

Bones and fragments of cattle are the most obvious in Sheikh Muftah hearth middens because of their larger size and resistance to destruction. Gazelle and goat bones may be more numerous in the original composition of the bony debris but are liable to be removed first from the midden by hyaenas and canid scavengers. In the hearth-mound cow is well represented by many elements, including teeth, e.g.g., lower third molar or milk fourth premolar, distal ends of fused metacarpals III+IV, podials (two navicular-cuboids, astragalus, calcaneum,

pisiform, ulnare, two magna, phalanges I, II, and three unguals III, and proximal volar sesamoid III). Cape buffalo is represented by a calcaneum, two maleolars and the proximal end of phalanx I. Dorcas gazelle is sparsely represented but confirmed by a male horncore tip. Goat is well represented by many parts, including teeth, longbone shafts, and part of a massively ridged adult male horncore. Differentiation of the buffalo postcranial elements from those of cattle relies on distinctions between *Bos* and *Syncerus* advanced by Peters (1988). Measurements of the *Bos* calcaneum is large for domestic cattle from the Dakhleh Oasis Old Kingdom deposits at Ein el-Gezaren and may represent *B. primigenius*, but they are still smaller than those typical for *Syncerus*; the calcanea differ qualitatively as for *Bos* and *Syncerus*, respectively.

Discussion

The source of the domesticated ass or donkey is obscure, with postulated origins as disparate as North America (Texas) (Quinn 1958) or Northeast or East Africa (Egyptian and Sudanese Red Sea Hills, or Ethiopian Highlands) (Haltenorth & Diller 1980). Most Egyptian evidence is subfossil and derives from early historic or pre-dynastic levels of Old Kingdom Pharaonic Egypt, and is thus donkey. A single metatarsal III is recorded from Bed II, 1.5 Myr BP, in Olduvai Gorge, Tanzania (Churcher 1982) which, upon comparison, appears indistinguishable from the modern animal. While not conclusive, this evidence from ca. 1.5 Myr BP suggests an eastern African origin, probably in the drier areas of the broken terrain along the Great Rift Valley as Pleistocene evidence of *Asinus* in Asia is sparse. Quinn (1957; 1958) applies *Asinus* to Nearctic equines that are usually placed in *Equus*. *Equus Asinus africanus* was endemic in the Atlas as late as 300 AD, but there seems to be 'no definite evidence of a continuous range within historic times across the northern part of the continent to the Sudan' (Ansell 1971: 5-6).

Bones and teeth of asses are found scattered over Dakhleh Oasis, its nearby desert and the Libyan Escarpment. This is probably due to the habit of the local dogs, foxes and jackals of transporting isolated elements from the dead donkeys dragged into the desert to dehydrate and disintegrate (termed 'caniports' – lower jaws, isolated bones or lower limbs or feet with wrists or ankles and possibly cannon bones). They may be found as much as 10 km from the nearest habitation, and hence occur on many Neolithic sites within their surficial lag deposits. Such bones are assigned recent historic ages and are not considered to influence the early local history of this animal. Ass/donkey is identified from Archaeological Localities 072, 092, 108, 118, and 136, and ass teeth were recovered from a fire pit, Locality 135, south of Kellis' South Tombs. Donkey is also known from the Old Kingdom site of Ein el-Gezaren and the Romano-Byzantine sites of Kellis (Ismant el-Gharab) and Mouthis (Ismant el-Mut).

Haltenorth and Diller (1980: 109) summarize the history of asses in the Saharan region and consider them as originally extant 'from Morocco to Cyrenaica, extinct [in the wild] by about AD 300' and 'formerly [in] the savannah zone, or in prehistoric times also in the Sahara including the geographic E. Sudan from Kordofan ... to N.E. Egypt.' Hoogstraal (1964) considers *E. asinus taeniopus* as the local subspecies.

Haltenorth and Diller (1980: 109) state 'In Ancient Egypt [the ass was] domesticated about 4000 BC, as the source of domestic donkeys'. Instances of ass bones or teeth occurring in surficial layers (see above) have raised the possibility that an ass may have been known to the later Neolithic inhabitants. Gautier (1980) noted ass remains from the Middle Palaeolithic sites of Bir Tarfawi and Bir Sahara. Butzer and Hansen (1968) list ass from Late Palaeolithic sites in shoreline deposits of a palaeolake stage in the Fayum Depression. Churcher (1972), Gaillard (1934), Oakley (1965) and Reed and Turnbull (1969) record ass from Late Pleistocene and Epipalaeolithic sites in the Plain of Kom Ombo. Van Neer and Uerpmann (1989) suggest that wild *E. asinus* once occupied areas in the northwest Sudan. A relict population may exist 'in the Libyan-Egyptian border region near Giarabub north of Siwa Oasis (... and [represents] perhaps survivors of [*Asinus*] *atlanticus* ?)' (Haltenorth & Diller 1980: 109).

A partial skeleton was excavated from pan deposits stratigraphically below an extensive Sheikh Muftah cultural site (Loc. 136) in Camelthorn Basin but was dismissed as an intrusive burial (Churcher 1986b). However, partial hartebeest skeletons in apparently articulated or approximate skeletal relations recovered from similar pan deposits in both the Sheikh Muftah pan area (Loc. 072) and along the eastern edge of Camelthorn Basin (Loc. 358) suggest that the Loc. 136 ass could have been a natural burial independent of human aid.

The status of the Locality 406 ass, based on recovered evidence, is that of a domesticate in late Sheikh Muftah cultural times, within a time span of 3,000 to 2,000 BC or 5,000 to 4,000 BP, with the possibility of individuals existing as a wild population in earlier Bashendi cultural times. This conclusion supports the opinions of Butzer and Hansen (1968), Churcher (1972), Haltenorth and Diller (1980) and Reed and Turnbull (1969).

The status of asses in the Late Neolithic of Dakhleh Oasis is still somewhat unclear as it appears to have been a domesticate of the local pastoral peoples and may have been also a member of the extant wild fauna. The wild subspecies of the Western Desert may have been *E. a. africanus* extending north from the Sudan (Ansell 1971). Hoogstraal (1964) prefers *E. a. taeniopus*, which Ansell considers synonymous with *E. a. somaliensis*. Haltenorth and Diller (1980) prefer *E. a. atlanticus* of the Atlas (Morocco to Tunisia) extending east to Cyrenaica and Egypt. It is impossible to determine subspecies from fossil

evidence, especially for terrestrial mammals whose taxonomy often depends on pelage colouration.

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Table 1. Materials.

The following specimens are identified within one catalogue number as 02-H-30, items a to z, aa to bb. 30 y is unused.

a	L dentary, horizontal ramus only; compressed laterally and ascending ramus damaged.
b	R dentary, horizontal ramus only; as for 'a'
c	symphyseal region with incisors, shattered and compressed
d	R scapula, damaged in vertebral area
e	R cubitus (radio-ulna), entire
f	R radius, larger, lacking distal end, eroded. 'e' and 'f' represent two different individuals. 'f' probably part of 20-H-68.
g	R metacarpal III, entire
h	L metacarpal III, entire
i	R phalanx I
j	L phalanx I, lacking distal end
k	R phalanx II. Articulates with 'i' and 'l'
l	R phalanx III (ungual), wind eroded
m	R tibia, damaged
n	L tibia, lacking proximal end. 'm' and 'n' from same individual
o	R patella
p	L calcaneum, restored
q	R astragalus. Matches 'z'
r	4 proximal sesamoids
s	R metatarsal III, entire
t	R humerus, shaft only
u	R splint metatarsals II and IV. Articulate with 's'
v	L humerus, shaft and distal end
w	incisor fragments, isolated
x	R scaphoid. Different and larger individual than 'aa', below; probably part of 02-H-68.
z	L astragalus, entire
aa	L scaphoid, entire
bb	L unciform, entire

Additional ass skeletal elements recovered from the hearth midden deposit. Catalogued as 02-H-68, items a to f.

a	R metacarpal III, entire
b	L tibia, proximal end. Not part of 02-H-30, and does not mirror 30 n
c	metacarpal III. Now missing
d	L cuboid tarsal, lateral half, small individual

e	R patella, fragment
f	R splint metacarpal IV. Articulates with 02-H-68a

Assignment of elements to individuals.

The following groups of elements appear to articulate with one another and to represent discrete individuals.

Animal 1.

This animal is mainly represented by the elements found in the main cluster of ass bones (02-H-30 a-z, aa-bb). The right forelimb elements were found flexed across the lingual cavity of the mandible. Right forelimb elements – scapula 30 d, humerus 30 t, cubitus 30 e, scaphoid 30 x, metacarpal III 30 g. Left forelimb elements – humerus 30 v, unciform 30 bb, and metacarpal III 30 h. Right hindlimb elements – tibia 30 m, patella 30 o, astragalus 30 q, metatarsal III 30 s, splint metatarsals II and IV 30 u. Left hindlimb elements – tibia 30 n, astragalus 30 z, calcaneum 30 p. A mandible in three pieces 30 a, b, and c is assumed to belong to the same individual.

Animal 2.

Two elements (30 f and 30 x) were found mixed with the elements constituting Animal 1 but represent the second more robust individual (02-H-68 a-f). Four other robust elements were recovered from the nearby hearth mound. Right forelimb elements catalogued within 02-H-30 – radius 30 f, R scaphoid 30 x; various elements catalogued within 02-H-68 – L tibia 68 b and L cuboid 68 d, and R metacarpal III 68 a, R metacarpal IV 68 f (articulates with Mc III 68 a), and R patella 68 e.

Table 2. Measurements of lower dentition of *Equus asinus* from Loc. 406, Masara, Dakhleh Oasis, Egypt.

Abbreviations: L = left; R = right; cem = cement; enam = enamel. Dimensions: proto-metacnid = protoconid-metacnid width; hypo-m'conulid = hypoconid-metacnolid length; hypo-entoconid = hypoconid-entoconid width; meta-m'conulid = metacnid-metacnolid. Measurements over enamel ridges only are less than those over cementum and enamel. All teeth are in mandible 02-H-30 a and b. Measurements in mm.

Tooth		Mesiodistal Length	Buccolingual width over proto-metacnid	Buccolingual width over hypo-m'conulid	Buccolingual width over hypo-entoconid	Mesiodistal length over meta-m'conulid
		enam cem	enam cem	cem enam	enam cem	enam
P ₂	L	28.9 28.6	11.4 12.8	14.3 16.0	12.2 15.2	14.5
	R	27.9 28.1	12.6 12.7	14.4 15.8	12.6 16.0	13.8
P ₃	L	25.0 25.5	15.0 17.0	15.8 18.1	11.7 17.6	17.0
	R	24.8 24.8	14.5 17.2	16.7 18.8	13.4 18.9	16.5
P ₄	L	24.4 25.3	15.2 18.4	15.8 18.3	12.1 17.2	15.5
	R	24.9 25.1	15.5 16.4	16.4 18.6	12.1 16.4	16.2
M ₁	L	22.3 22.2	13.5 16.8	13.0 16.2	10.9 15.6	13.3
	R	22.5 22.5	13.0 17.5	14.0 16.3	12.3 15.2	13.2
M ₂	L	21.6 20.8	12.8 15.2	12.1 14.6	14.2 13.4	13.3
	R	21.4 20.0	13.2 15.7	12.4 14.1	15.6 14.2	13.0
M ₃	L	23.8 25.3	12.1 13.6	11.6 12.2	9.0 10.7	11.3
	R	24.1 26.6	11.4 14.0	9.6 12.6	8.7 11.6	11.0

Total length of toothrow P₂-M₃ = L 147, R. 146;

Length of premolar row = L 78.2, R 67.6;

Length of molar row M₁-M₃ = L 68.1, R 67.6.

Table 3. Measurements of whole postcranial elements of *Equus asinus* from Loc. 406, Masara, Dakhleh Oasis, Egypt.

Abbreviations: TL = total or overall length; AP = anteroposterior diameter; Tvs = transverse diameter; Prox = proximal; MidS = midshaft; Dist = distal and Cond = condylar positions; Mc = metacarpal; Mt = metatarsal; Ph = phalanx; radio-ulna = cubitus or radio-ulna;

Numbers refer to elements catalogued within specimen number 02-H-30. '-' indicates dimension does not exist. Measurements in mm.

Dimension	Mc III	Mc III	Mc III	Mc III	Ph I	Ph II	Radio ulna	tibia	astragali
	30g	30h	68a	30s	30i	30k	30e 30f	30m	30q 30z
TL	190	188e	172	233	70.1	33.4	279 330e	288	47.6 45.0
Prox AP	26.9	26.0	22.0	36.0	28.0	21.1	27.1 29.8 ³	58.8	27.2 ⁴ 25.0
Prox Tvs	39.3	37.8	36.1	38.3	37.2	34.2	59.9 -	66.9	37.0 39.7
MidS AP	17.3	17.5	17.0	19.9	17.4	14.5	19.4 -	28.4	
MidS Tvs	22.2	21.5	22.5	20.8	21.0	29.3	17.0 -	21.4	
Dist AP	15.1	16.1	14.0	34.5	13.6	-	31.7 -	-	
Dist Tvs	35.7	35.3	30.9	17.5	31.3	-	54.5 -	-	
Cond AP	26.0	24.5	21.3e	27.1	17.9	18.1	23.5 -	34.4	45.2 44.4
Cond Tvs	35.2	34.8	30.9	35.0	31.5	30.8	46.4 -	64.0	32.0 ⁵ 31.7 ⁶

³ Depth in semilunar notch

⁴ Over navicular-cuboid facet

⁵ Tibial facet

⁶ Tibial facet

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Geoarchaeological investigations in Dakhleh Oasis, Western Desert, Egypt: Did a meteorite strike Dakhleh during the time of Middle Stone Age occupations?

For Lech Krzyzaniak, whose investigations of the rock art in the 'South-east Basin' emphasized the importance of the geoarchaeological problems in the eastern Dakhleh palaeo-oasis, and the eastern Palaeolake Teneida Basin.

Abstract

Geoarchaeological research in the Dakhleh Oasis region has led to the recognition of 'anomalies' in the prehistoric environmental setting. A natural glass (Dakhleh Glass) was discovered in the course of mapping and survey for archaeological and faunal remains associated with extensive Pleistocene palaeolake deposits. Other 'anomalies' in the geological settings appear to be related, and together with the glass pose the question of whether a meteorite, or a series of meteorite fragments, struck the Dakhleh region sometime between 100,000 and 200,000 years ago, during the time of Middle Stone Age occupations.

Introduction

This paper reports on ongoing geoarchaeological research into an unusual heating event that occurred during end-Middle Pleistocene times in Dakhleh Oasis region, central Western Desert of Egypt (Fig. 1). 'Geoarchaeology' as a specialized subdiscipline has attained formal status in archaeology, geology, and other earth sciences only relatively recently. However, such investigations were pioneered in the Western Desert oases in the 1930's by Gertrude Caton-Thompson and Eleanor W. Gardner (e.g., Caton-Thompson 1935; Caton-Thompson 1952; Caton-Thompson & Gardner 1932, 1934; Gardner 1932, 1935). Similar in-



Fig. 1. Dakhleh Oasis Region, Egypt, showing main topographic features and towns, with contours at 150, 200 and 400 m above mean seal level. The 150 m contour encloses the modern Eastern and Western basins within the oasis, and el-Akoulah Pan to the southeast. Dune streaks stippled. hollower basins to the east of Dakhleh close within the 200 m contour.

terests in regional studies motivate the integration of environmental and archaeological research by the Dakhleh Oasis Project (DOP).

Usually, geoarchaeological research involves the study of relatively long-term processes that affect environments and their human inhabitants. Occasionally, one finds evidence of short-term, even instantaneous, catastrophic events (McGuire, et al. 2000; Nicoll 2003). Of these, the least common is probably evidence for meteorites striking the Earth in inhabited areas. Such observations have been limited to the Historic Period, or later prehistory (e.g., Rigby, et al. 2004; Santilli, et al. 2003; Veski, et al. 2001; Veski, et al. 2004). "Because meteorite falls are rare and unpredictable, any observation of them takes place quite by chance. However, accounts of spectacular events accompanying the falling of stones from the sky are to be found in the early histories of many regions. Such things must occasionally have been witnessed even in prehistoric times...." (Mark 1987: 1). To date, no studies of Pleistocene meteoritic events have integrated archaeological research with that of other sciences.

Even relatively small impact events would cause devastation in the

surrounding area, and have cultural as well as physical effects among humans. Myths from many areas suggest how humans have attempted to 'explain' the inexplicable (Cassidy and Renard 1995; n.a. 2004, 2005; Santilli, et al. 2003). Some idea of what happens can be gained from reconstructions of the Barringer (Meteor) event in Arizona, United States of America (1.2 km diameter crater), that occurred some 50,000 years ago (Kring 1997; Kring & Bailey n.d.); or the witnessed Tunguska airburst of 1908 in northern Russia (e.g., Andreev & Epiktoeva 1996; Bissell 2002; Bronshten 2000; Fast 1996; Hogg 1962; Kulik 1938). Vegetation and animal life is destroyed or heavily damaged for 10's of km around an impact or blast site. For the Barringer event, it is estimated that the blast would have produced winds of >1,000 km/hour, with changes in pressure and thermal emissions that would have destroyed vegetation over an area of 800-1,500 km² and damaged plant life over a further 200-600 km². Animals, or humans, within 3-4 km would have died, and those within a radius up to 24 km would have been seriously injured (Kring & Bailey n.d.). Fortunately, the Tunguska explosion was above sparsely inhabited Siberian taiga. "Two thousand square kilometers of ancient forest were blown flat, men 60 km from the fall site were thrown down and seared by the heat" (Turco, et al. 1981: 19). "The blast flattened the forest to a radius of 15-35 km and damaged houses in Vanovara, 70 km away" (Trayner 1994: 227). Tungus camps were destroyed, artefacts were melted, and reindeer herds were killed (Bobrovnikoff 1928; Gallant 2002; Hogg 1962). The Tugus ascribed the event to the wrath of god (Gallant 1994).

Anomalies and Investigations

Beginning in 1987, during surveys for archaeological and palaeoenvironmental evidence in Dakhleh Oasis region, members of DOP noted a number of puzzling anomalies. Kleindienst found dark coloured, slaggy material lagged on the surface of Pleistocene lacustrine deposits lacking cultural associations [Archaeological Locality (Loc.) 211]. This was identified as a natural glass¹ (Dakhleh Glass, DG) by Schwarcz in 1992, and subsequently analyzed (Schwarcz, et al. n.d.). The calcium-aluminum-silica glass has a unique composition, and represents sediments that melted at around 1100-1200 °C—either the lakebeds, soils, or the matrix of Pleistocene limestone gravels in the area. An averaged ³⁹Ar/⁴⁰Ar determination for the glass at Loc. 211 is 122,000 ± 40,000 years (Schwarcz, et al. n.d.), recalculated as 129,000 ± 40,000 years (Kleindienst, et al. n.d.) Human actions, volcanic activity, forest or grass fires, and lightning strikes were ruled-out as formative causes; but a meteoritic event was considered unlikely. The origin of Dakhleh Glass remained a mystery.

¹ DOP earth scientists regarded the material as anthropogenic slag. The absence of Historic Period cultural evidence made this identification unlikely.

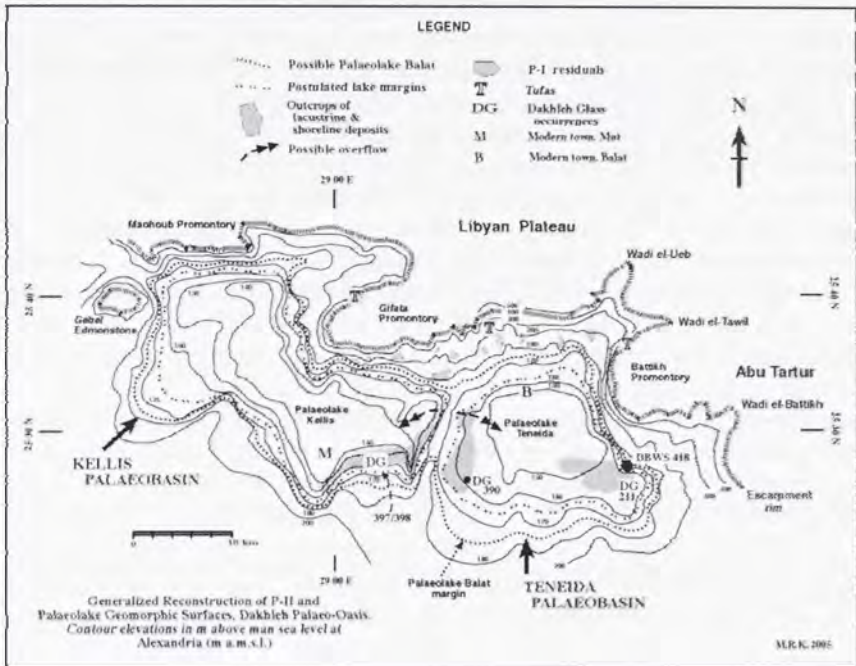


Fig. 2. Reconstruction of Dakhleh Oasis as it may have existed between 350,000 and 100,000 years ago, with large palaeolakes in the eastern Teneida Palaeobasin and the western Kellis Palaeobasin. Contouring based upon existing remnants of the P-II geomorphic surface with the addition of 20 m height to general modern grade elevations. Mapping of lacustrine outcrops as of 2003; later survey has located additional outcrops in the northeastern Kellis Palaeobasin. Map shows the locations of the Dakhleh Bow Wave Structure (DBWS 418), and occurrences of Dakhleh Glass (DG); see legend on figure.

Probable lacustrine deposits in Dakhleh were noted by Churcher in 1980 (Churcher 1981), but were only proved by finding faunal remains preserved in them in 1996 (Churcher, et al. 1999; Churcher, et al. n.d.). Subsequent mapping shows that long-lasting palaeolakes occupied two palaeobasins: Palaeolake Teneida on the east and Palaeolake Kellis on the west, reaching shoreline elevations of ~165 m. The lakes probably sometimes joined as Palaeolake Balat, reaching highest shoreline elevations of >175 m (Fig. 2). The lakes were fed by groundwater from artesian springs, as well as by intermittent overland flow demonstrated by tufas preserved on the Libyan Escarpment face, allowing the

persistence of freshwater bodies even during drier climatic times. Geoarchaeological dating places the lakes between ~350,000 and 150,000 years ago, with associated terminal Earlier Stone Age through older Middle Stone Age occupations, although they may have persisted to the end of the Middle Pleistocene, ~135,000-125,000 yrs ago (younger Middle Stone Age occupations). The scattered faunal remains evidence an African savanna environment surrounding the lakes. Over 30 m of bedrock and lake deposits have since been removed by erosion over much of the palaeo-oasis area (Churcher and Kleindienst n.d.; Kleindienst, et al. 2004).

In the course of mapping the Pleistocene lake deposits, searching for fossils and artefacts, the Churchers and Kleindienst found two additional occurrences of Dakhleh Glass: one localized area on the southern margins of Palaeolake Teneida (Loc. 390); and a large area of surface finds, with some glass in situ within lake deposits of Palaeolake Kellis (Locs. 397 and 398) (Kleindienst, et al. n.d.; Mills 2003) (Figure 2). The mystery of how these glass 'splats' formed became more intriguing, given the relationship to the palaeolakes and to the time of Middle Stone Age occupations (see below).

While investigating the northern rim of Palaeolake Teneida, north of the areas with lagged Dakhleh Glass and the Holocene El-Akoulah Pan, Churcher and Kleindienst discovered an area of tectonically disturbed strata, where Duwi Formation (Fm.) beds were standing nearly vertical, inward dipping and surrounding an apparent 'teardrop' shape. Bee Churcher dubbed this the 'Bow Wave Structure' (Mills 2000). To the south, in wadis cutting the north rim of El-Akoulah Pan, were 'blobs' of apparent Mut and Duwi Fm. sediments, lying out of their normal stratigraphic positions and resting on eroded Taref Fm. sandstone surfaces. Duwi Fm. should conformably overlie Mut Fm., resting in turn on Taref Fm. sandstones, dipping northward at only 1-3o (Hermina 1990; Kleindienst et al. 1999). The reasons for these 'displaced sediments' also remained a mystery.

However, having ruled-out most of the usual causes for natural and human glass production, we applied the 'Sherlock Holmes' rule': that whatever explanation is left, however improbable, must be true. At least it becomes a working hypothesis: could Dakhleh Glass, in fact, be evidence of a meteorite impact? We began to think that the glass and the displaced sediments could be related to the 'Bow Wave' (Mills 2000). Haldemann noted features of interest on aerial photographs. Schwarcz obtained a high-resolution satellite image of the area west and northwest of El-Akoulah Pan (Loc. 211 and northward) that confirmed the aerial photographs. It showed a circular feature northeast of the 'Bow Wave', which is picked out by wadi channels, possibly an infilled crater in P-II limestone gravels ~300-400 m in diameter - three main geomorphic surfaces have been recognized; on these, soils and Pleistocene alluvial limestone gravels overly erosion surfaces,

or pediments. From earliest to youngest, these are termed P-I, P-II, and P-III. The older two are usually only preserved as elevated terraced remnants, while the P-III is more complex and extensive (see Kleindienst *et al.* 1999).

If so, both features might be evidence that a meteorite (or several pieces of one) hit the area. In 2004, Kleindienst obtained photographs of the eroded surface of the 'Bow Wave' that show light reflecting off a circular feature ~200-300 m in diameter, within the uptilted sediments; strangely, we have not 'seen' that before, and can only assume that on that day and at that time 'the light was right'—a phenomenon well known to desert explorers. Both P-II and P-III gravels lie on remnants of erosion surfaces within the feature, showing that it is older than the formation of the later Pleistocene P-III surface, and coeval with the now degraded P-II surface. We also observed tectonic disturbances over a wider area ~1.5 km across (Mills, *et al.* 2004). We now term the entire area the 'Dakhleh Bow Wave Structure' (DBWS) (Kleindienst, *et al.* n.d.). This has become a 'suspect' meteorite strike area, for detailed investigation by the planetary scientists.

However, there is a problem of whether masses of hot glass melt can be ejected from rather small (300-400 m diameter) impact craters for 10's of km. Vegetal impressions, vesicular structure and flow lines indicate that the glass was emplaced while viscous, and Osinski has found evidence comparable with known impactite from other meteorite craters (Haldemann *et al.* 2005a; Haldemann *et al.* 2005c).

Haldemann obtained SIR-C imaging for Dakhleh, and discovered that we have other intriguing anomalies which may relate to our problem (see Haldemann *et al.* 2005b; Haldemann *et al.* 2005a; Haldemann *et al.* 2005c). In particular, a 3 km diameter circular feature west of Balat shows only on radar imaging. Smith's ground transects in 2005 indicate that there is some puzzling geological evidence in that area. Sediments there are now mainly eroded to the level of the Taref Fm. sandstones. Only a few outcrops of lake deposits of the Lake Balat Fm. (western Palaeolake Teneida) overlying Mut Fm. mudstones are still preserved. This area, and others further west within the cultivated areas of the oasis, require investigation in order to account for the Dakhleh Glass emplacements at Loc. 390 and Locs. 397/398 (Kleindienst, *et al.* n.d.).

Conclusions from geoarchaeological research

Geoarchaeology provides a framework for whatever heating event created Dakhleh Glass. Age ranges of Middle Stone Age units in Dakhleh are based upon geomorphic settings and correlations with chronometrically-dated tufas at Kharga Oasis that overlie sediments incorporating Middle Stone Age artefacts (Kleindienst 2003, 2005; Smith, *et al.* 2004). Lithic artefacts in the basal lake-

beds in the Loc. 211 area underlie the eroded surfaces with lagged glass by 3-4 m. They are assigned to the Teneida unit (provisionally, older Middle Stone Age developmental stage), possibly older than 150,000 years (Kleindienst 2003). On the surface of the P-III gravels within the DBWS only scattered, 'small-sized Middle Stone Age' pieces have been found (Loc. 418) which must be later Pleistocene in age, and which are likely to postdate the Dakhleh Unit (Aterian Complex). Isolated Dakhleh Unit tanged points have been found on surfaces to the south from which Lake Teneida Fm. beds were probably already eroded when these were dropped. The Dakhleh Unit is thought to be younger than ~70-90,000 years. Thus, although direct chronometric dating of archaeological units at Dakhleh is still unsatisfactory, the cultural evidence agrees with the broad-range $^{39}\text{Ar}/^{40}\text{Ar}$ determination on Dakhleh Glass, and confirms that the heating event took place between ~100,000 and 200,000 years ago (Kleindienst, et al. n.d.).

Large-sized lithic raw materials are lacking in the general area of the DBWS and Loc. 211, and that of Locs. 397 and 398. The Tarawan cherts preferred by Middle Stone Age artisans are not found in those parts of the oasis (Hawkins and Kleindienst 2002). The Teneida unit associated with the Palaeolake Teneida deposits in the Loc. 211 area appears to represent occupation site aggregates, with some relatively large Levallois components made of Tarawan cherts that must have been imported for ~6-10 km (Kleindienst 2003). Artefacts are medium- to small-sized in the Middle Stone Age aggregates at Locs. 397/398. This may reflect the lack of large raw materials on the southern Palaeolake Kellis margins, and the distance to sources of Tarawan cherts below the Escarpment across a large lake. These aggregates may also be water-sorted. However, it is possible that they date to the end of the Middle Pleistocene, and are therefore younger than the Teneida unit. Their stratigraphic relationship to Dakhleh Glass has not yet been determined, and this Middle Stone Age material awaits detailed analyses.

Was it a meteorite impact event? If so, what would happen in Dakhleh? The evidence of Dakhleh Glass either lagged on, or in place within lacustrine deposits indicates that the heating event that produced the natural glass was related to the palaeolakes. Dakhleh Glass was certainly emplaced during the time of lake sedimentation in the Palaeolake Kellis basin. (As yet, none has been found in the Teneida Palaeobasin sediments.) The devastating palaeoenvironmental effects that would have occurred if meteorite(s) struck the shores, or the water bodies, of the Pleistocene palaeolakes are of concern for understanding the prehistoric archaeology and the Pleistocene environments of Dakhleh. If such a catastrophic event occurred during a drier period, the environment might take a long time to recover. The oasis area would cease to be a refugium for plants,

animals and humans, even with local water availability, because connections with other distant refugia that could repopulate the area would be problematic. Natural resource availability would be low or nonexistent. If the event occurred during a wetter period, recovery could be expected to have been faster, but still might take 100's to 1000's of years. Whatever the heating event was that produced Dakhleh Glass; there is a unique geoarchaeological problem under investigation in Dakhleh Oasis.

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M. Kobusiewicz

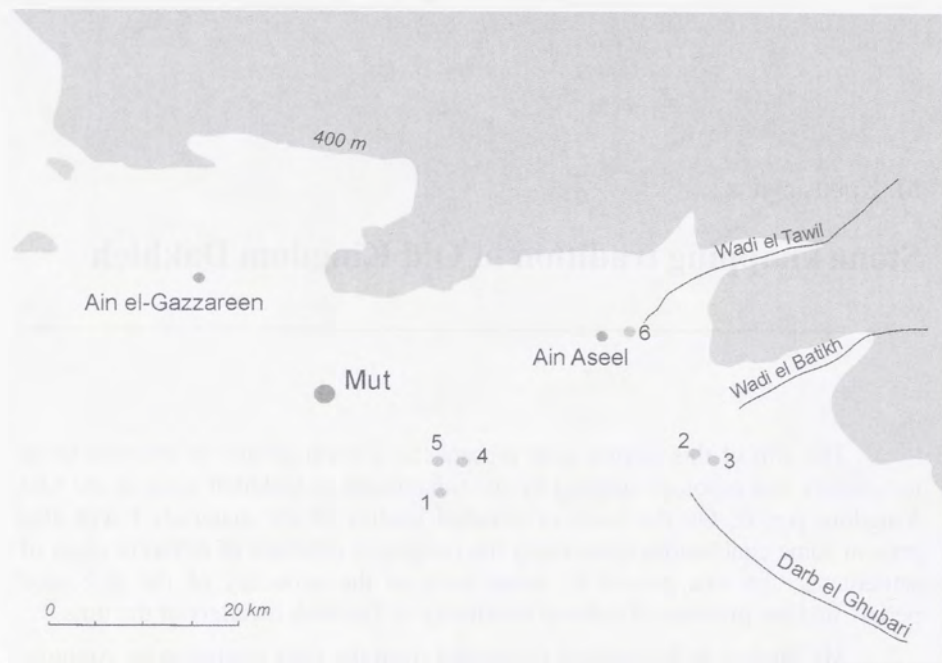
Stone knapping tradition in Old Kingdom Dakhleh

The aim of this lecture is to present the general picture of chipped stone technology and typology applied by the inhabitants of Dakhleh oasis in the Old Kingdom period. On the basis of detailed studies of the materials I will also present some conclusions concerning the reciprocal relations of different types of settlements, the role played by stone tools in the economy of the discussed period, and the problem of cultural continuity of Dakhleh dwellers of the time.

My interest in this subject originated from the kind invitation by Anthony Mills, the director of Dakhleh Oasis Project to come and work on the chipped stone assemblage derived from the ancient Egyptian village Ain el Gazzareen investigated by him in the western part of the oasis (Mills, Kaper 2003). Here I would like to express my gratitude for a chance to carry out this investigation. My thanks go also to Olaf Kaper and Colin Hope for the possibility to study collections from some watch posts (Kaper & Willems 2002) and from the temple El Kharab in Mut.

The fourth type of site taken by me into account is a rich chipped stone assemblage from a large town settlement Ain Aseel situated in the centre of the oasis near Balat, described in details by Midant-Reines (1983, 1985, 1998).

The study of these four different types of settlements (Fig. 1), from the same time period but with different functions, led me to an attempt to suggest a review of the problems related to the role of chipped stone in the life of Old Kingdom Dakhleh dwellers. It may also throw some light on the following question: was the aboriginal population expelled by the colonizers coming from the Nile valley or did they become the subject of the acculturation, slow absorption by the dominant Egyptian civilization? Most of the sites mentioned above are dated to the Vth and VIth Dynasties. The only exception maybe the temple El Kharab from Mut dated by C. Hope to the IV Dynasty.



Dakhleh Oasis. Old Kingdom sites mentioned in the text
1-6 watch posts

Fig. 1.

To approach the problem I applied the method of the dynamic technology proposed by R. Schild (1980) similar to the French so called *chaîne opératoire*.

Since the known type lists of the chipped stone are not suitable for the analysis and interpretation of the Dakhleh Old Kingdom assemblages, the new list was created for retouched tools. This list, containing 25 types, was based on the richest assemblage excavated in Ain el Gazzareen until the year 2000. The characterization of cores and debitage is based on the special collection from the square O16. Materials from this square were carefully and precisely collected, including small flakes, chips and all kind of debitage waste. The excavator's intention was to achieve a full representation of chipped stone industry necessary to understand the intentions of stone knappers and the way they worked.

All completely preserved cores and pieces of debitage originating from the square O16 were precisely measured, raw materials as well as types of blanks, striking platforms, angles of striking surfaces, degrees of core preparation and

utilization etc. were defined. Analysis of these data made it possible to reconstruct the intentions and methods applied by stone knappers to attain the planned results. Conclusions concerning the above issues formulated on the materials obtained from Ain el Gazzareen can be successfully applied to the remaining Old Kingdom stone assemblages from Dakhleh oasis.

Raw materials

Two kinds of raw materials played the main role in the chipped stone assemblages from Dakhleh. The first one is the so-called nodular chert. It occurs in relatively small nodules ca. 6 -10 cm in diameter of more or less spherical shape and covered by thick coarse cortex. According to Munsell Color Card its colour is brown, pale brown or dark brown. Nodules of this chert eroded from Palaeocene lime stones occur in great number at the foot of the scarp bordering the oasis from the north.

The second important raw material is tabular chert. It occurs in the shape of flat tablets often covered by smooth whitish cortex. The most common colour of tabular chert is reddish yellow, but also strong brown and rarely reddish brown. The last colour, according to some scholars, could be the result of heat treating (McDonald 1993). Sources of this material are not known to me. Considering its frequency we may assume that the sources of tabular chert should be not far away.

Chalcedony is found only on the watch posts. In Bee's Lookout numerous products made of this material were derived from one large, partially exhausted spherical nodule, covered by grey, fine grained cortex, which has many small cracks on its surface. The colour of chalcedony is white bluish grey or pinkish grey. Close to the surface it changes for cherry red. I can not identify the sources of chalcedony. Infrequently some pieces of quartzite could be found. They were eroded, like nodular chert, from the upper cretaceous sediments of the northern scarp.

Chipped stone technology

This study gives a clear picture of the chipped stone typology and technology from four different types of the Old Kingdom settlements from Dakhleh: a local village (Ain el Gazzareen), fortified town – the dominant site for the Dakhleh Egyptian community (Ain Aseel), the temple (Mut el Kharab) and finally the row of the watch posts surrounding the oasis (Seth Hill, Bee's Lookout, Nephtys Hill and several others). All these settlements played different roles in the economical, social and political life of Dakhleh in the Old Kingdom.

Let's try to compare these different units. From a technological point of view all of them are clearly similar. Four technological approaches were applied.

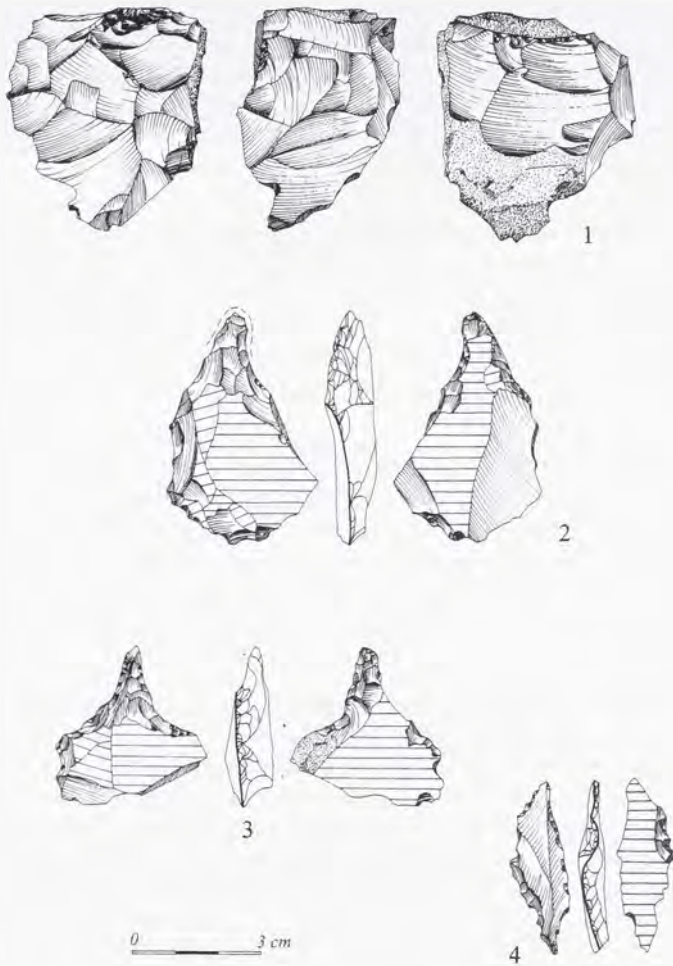


Fig. 2. Ain el Gazzareen. Dakhleeh Oasis. 1- multiplatform core for flakes; 2- groover; 3 – perforator; 4- double backed perforator.

For the nodular chert flake technology was absolutely predominant. Single platform, or in farther stages of processing, the multiplatform cores were used for exploiting nodules of this raw material (Fig. 2:1). Core preparation – that is the steps necessary for obtaining the more sophisticated forms of blanks – was very rarely applied. The final products were flakes used for production of different types of rather small retouched tools, such as perforators (Fig. 2:3-4), groovers

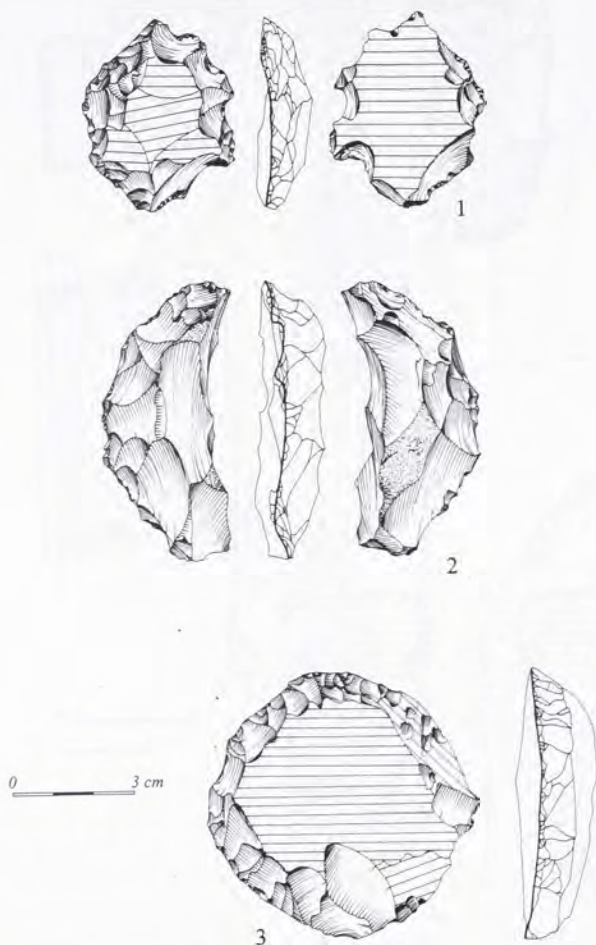


Fig. 3. Ain el Gazzareen. Dakhleh Oasis. 1- denticulate; 2- crescent; 3-heavy duty scraper.

(Fig. 2:2), denticulates (Fig. 3:1), crescents (Fig. 3:2) and retouched flakes. In the initial stage of processing the hard hammer was used more often, but later the soft hammer made of bone or hard wood. The second, completely different technological approach was applied for the elaboration of the tabular chert.

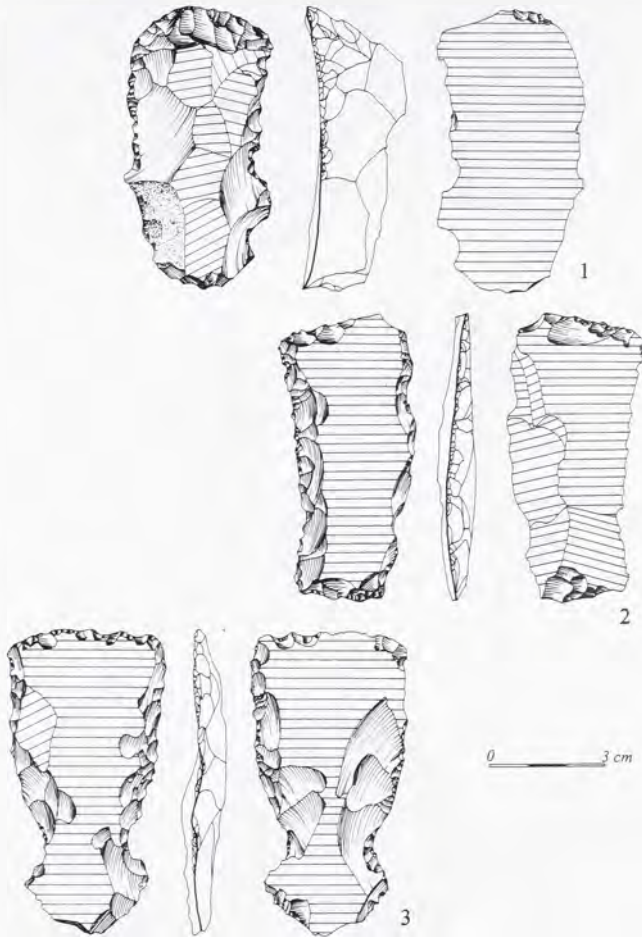


Fig. 4. Ain el Gazzareen. Dakhleeh Oasis. 1- end-scraper; 2- chisel; 3- double notch.

The cores were never made of this kind of raw material. The tools were produced by flaking a chosen piece of chert tablet to achieve a desired shape. In this way larger tools were obtained, such as different scrapers (Fig. 3:3; 4:1), chisels (Fig. 4:2), double notches (Fig. 4:3) and massive rectangular (Fig. 5:1) or triangular (Fig. 5:2) sickle inserts.

The third technology was a bifacial retouching for making different types of bifacial knives (Fig. 5:4). Midant-Reines (1998) writes that, in the case of Ain

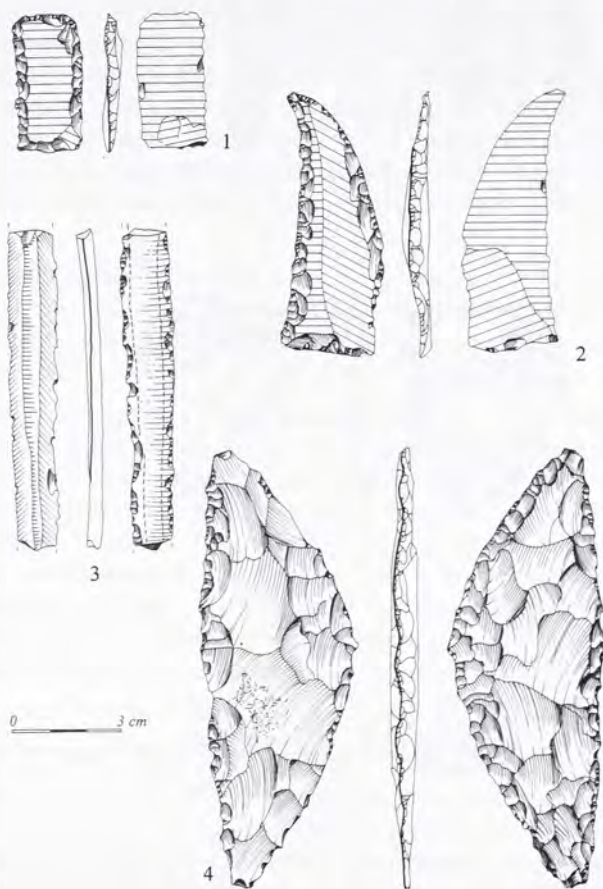


Fig. 5. Ain el Gazzareen. Dakhleh Oasis. 1- massive rectangular sickle insert; 2- massive triangular sickle insert; 3- lamellar sickle insert; 4- bifacial knife.

Aseel, such knives were imported. But, considering the large number of characteristic biface trimming flakes (Fig. 6:4) known from Ain el Gazzareen, less numerous from Ain Aseel and abundant in Mut el Kharab, we can state that the bifacial knives were locally made and repaired. The projectile points known from Ain el Gazzareen and from the watch posts were also carefully bifacially retouched (Fig. 6:1).

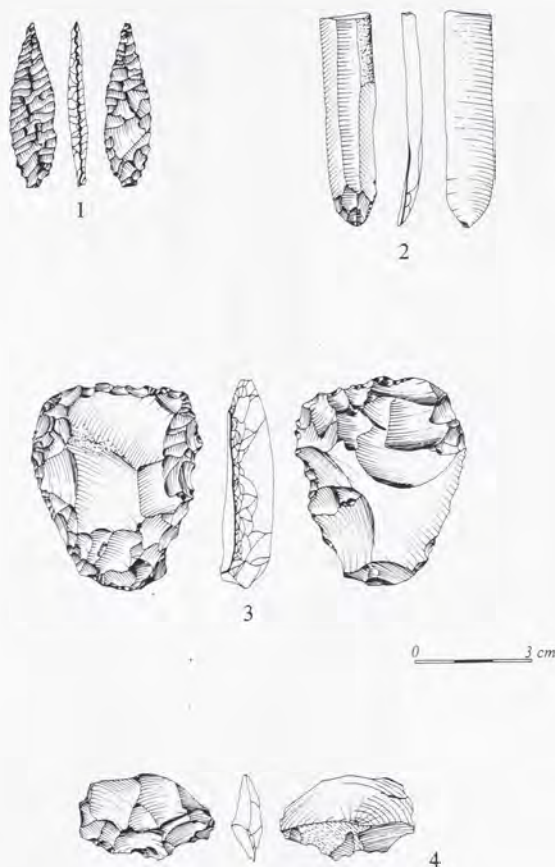


Fig. 6. Ain el Gazzareen. Dakhleeh Oasis. 1-bifacially retouched projectile point; 2- half-product for lamellar sickle insert; 3- scaled piece; 4-biface trimming flake.

The fourth technological variant is the exploitation of the discoidal core struck all around for obtaining flakes. We have only one such example – a large discoidal core of chalcedony found at the watch post Bee's Lookout.

In Ain el Gazzareen, as well as in Ain Aseel, the high quality, elongated, straight and regular blades occur obtained from single platform core by means of a special, very precise, so-called pressure technique. These blades were semi-finished, half-products for lamellar sickle inserts (Fig. 6:2). They were found, but not produced there. All of them derived from a high quality Egyptian flint of which no cores or any debitage pieces were found. It means that these blades

were imported from somewhere and we can not say that the pressure technique was practiced in Dakhleh.

Some scholars would probably like to mention one more technology used by stone knappers in the oasis. It would be the so called "scaling", supposedly for obtaining flakes with strongly weaved surfaces, by striking a piece of stone placed on a hard support by hard hammer from above. The remnants of this procedure should be scaled pieces (Fig. 6:3). I believe that the scaled pieces are not the result of an intentional scaling, but they were simply wedges used for splitting such materials as wood or bone. That is the reason why I classify scaled pieces as tools.

Speaking about technology we have to note that some pieces of tabular chert bear traces of burning. The question is whether the burning was an intentional heat treating to facilitate the knapping process, or just traces of occasional contact with fire.

In general, estimating the character of cores and blanks, as well as the lack of characteristic debitage waste resulting from the succeeding stages of processing, the chipped stone technology of Old Kingdom settlements from Dakhleh seems to us primitive. The so called chaîne opératoire was rather short. But it does not mean, however, that for these stone knappers the more developed technologies were completely unknown. If we assume, that the bifacial knives were produced on the spot, it would mean that the Dakhleh knappers were also familiar with the more sophisticated techniques. It is additionally confirmed by the presence of beautifully and precisely executed, bifacially retouched arrow heads.

Differences between assemblages

Some differences between the compared assemblages appear mainly in the number of some types of retouched tools. Scrapers and retouched flakes are always abundant. Significant differences are observed in the amount of denticulated tools, numerous on the watch posts but less abundant in the villages. By contrast, the bifacial knives and sickle inserts found in the large numbers in the village settlements are absent on the watch posts. The absence of sickle inserts on the watch posts is not surprising, considering the function of this sites which had nothing in common with the activities demanding sickles, whereas the striking abundance of denticulates is difficult to explain.

The most obvious differences between the assemblages under discussion are visible in the amount and the kind of used raw materials. It is clearly visible that the watching crews, as opposed to the village dwellers, rarely used tabular chert abundant elsewhere, but probably for them it was hard to get.

Both village-type settlements were well provided with raw materials. The situation was not exactly the same with the watch posts. Here, apart from the lack of tabular chert mentioned earlier, the scarcity of raw material is proved by the presence of more exhausted cores of nodular chert and more differentiated set of types of raw materials. This scarcity is also supported by the reutilization of old, intensively weathered Middle Palaeolithic blanks, and some times also Levallois cores, often present on the surface in many places of the oasis, and originating from the settlements several dozens of thousands of years old. The Middle Palaeolithic blanks were found in quite a large numbers in watch posts Nephtys Hill and Seth Hill. The repeated use of the old Middle Palaeolithic blanks on the watch posts is not surprising, considering that the watch-men could probably not leave their posts to search for raw material and they had to use whatever was close at hand.

Activities performed with a help of chipped stone tools

When analyzing the chipped stone materials it is possible to some extent to define the activities performed by means of this objects. First let's see what we know about the organization of stone tools production.

Judging from a small number of primary flakes we can assume that the earliest stage of chert nodules elaboration took place outside the settlement, probably simply on the spot where the nodules were found. Here the first useless surface flakes covered by cortex were struck off. Then the roughly cleaned pre-cores were brought to the village. The next stages of knapping process took place in the individual homesteads. The chipped stone occurs everywhere and, up to now, no single room or structure was found containing chipped stone assemblage significantly different from the others. The hypothesis of individual home-made production is additionally supported by the two discoveries of stone-knapper sets in the pots found in ordinary houses in Ain Aseel (Midant-Reines 1998).

It seems that the inhabitants of the Old Kingdom villages in Dakhleh were self-sufficient as concerns chipped stone products with one exception of imported high quality blades of Egyptian flint serving as sickle inserts. These imported blades were most probably retouched and inserted into wooden handles at home as it was needed.

As it was mentioned above the watch-men had to manage with the raw materials brought or found in the close vicinity of their watch posts. Judging from the location of chipped stone concentrations known from Seth Hill and Nephtys Hill we can assume that most of the activities connected to stone knapping, such as tool production and storing took place in hut-like stone constructions protecting from wind and probably covered by a kind of roof.

What kind of functions were served by stone tools in every day life of the Old Kingdom Dakhleh dwellers?

In the case of Ain Aseel and Ain el Gazzareen Midant-Reines is right to say that the tools played an important role in agriculture (sickle inserts) and possibly also, to some extent in rituals (bifacial knives). In the case of the knives we could discuss if all of them had only the ritual function. After all metal was not common in Dakhleh at the time and it was still about one thousand years before the introduction of iron. Knives of some sort were indispensable for housekeeping, so, at least some of them must have been used in the every day life. It is hard to say if the rare projectile points found in the villages were elements of weapons or hunting gear.

Chipped stones from the watch posts had different functions. The sickle inserts connected with agriculture are practically absent in the watch posts. Also absent are also bifacial knives or even biface trimming flakes derived from shaping or repairing this type of tools. The remaining types of retouched tools are banal forms ready to perform all sorts of functions, for example grooving petroglyphs in soft sandstone, sings and notches often found on the watch posts. The large number of scaled pieces, to my mind – wedges, used for splitting some unknown materials, is strange. The relatively numerous arrow heads were elements of weapon in this case. The few retouched tools from the poor but interesting chipped stone assemblage from Mut el Kharab do not tell us much, but the large number of biface trimming flakes derived from producing or repairing bifacial knives is striking. Could it be to some cult activities involving such tools?

The origin of the Old Kingdom chipped stone tradition

So much about the problem of chipped stone assemblages of the late Dynasties of the Old Kingdom Period in Dakhleh. No doubt that, in spite of slight differences between the discussed sites arising from their different roles, the choice of raw materials, the technological approach and the tool typology, create a coherent picture.

Let's us return to the question: does the stone knapping tradition of Old Kingdom Dakhleh originate from the culture of the local Neolithic or Post-Neolithic populations dominated by the Egyptians invading the oasis from the Nile Valley, or, was the old tradition suddenly and violently interrupted, as the result of the expulsion of the native inhabitants instead of their acculturation ?

According to my previous observations the chipped stone assemblages from Dakhleh seem to differ from these known from the Delta region of the same time. It is not clear as yet how it looked like in other regions of the ancient Egypt. This problem shall be the subject of further investigations. So far it is difficult to propose any final answer to the above question.

For the present the first hypothesis that the Old Kingdom flint knapping tradition is local, seems more likely. The Final Neolithic assemblages known from the oasis and its closest vicinity, called by M. McDonald Sheikh Muftah Cultural Unit (here I wish to express my gratitude to Mary for permission to study these materials) represent the features which prove cultural continuum in the later Old Kingdom assemblages. It is manifested in Sheikh Muftah collections by the presence of numerous artefacts made of tabular chert, such as scrapers, sometime large in size, denticulates, perforators, massive rectangular sickle inserts, bifacial knives and also tanged, bifacially retouched arrow heads (McDonald 1993, 2001, in print). These tools are also popular in the Old Kingdom assemblages, but the number of their variants increases. The wares seem to be more precisely manufactured and more standardized than in the case of Sheikh Muftah.

The uninterrupted continuation of the stone knapping tradition seems to indicate that the ancient inhabitants of the oasis, overpowered by the representatives of a highly organized Egyptian state remained in their place, becoming the subject of slow acculturation. The stone knapping tradition always shows a strong durability and it takes some violent events to break it. In Dakhleh chipped stone assemblages we do not find traces of such events.

The connections of Dakhleh to the Egyptian State

Here the question of imported sickle blades appears again. As it was mentioned above these blades represent an alien element, because they were imported. It is hard to say whether from the Nile Valley or Delta where such artefacts are found in large numbers, or, maybe from some specialized workshops waiting to be discovered in Dakhleh itself or in the neighbouring oasis. Any way the presence of these highly standardized wares seems to indicate the ties to the centralized Egyptian state. A similar phenomenon was observed on the Old Kingdom town Kom el Hisn in the western Delta dated to the V Dynasty (Wenke et al.).

We have to agree that the import of these standardized sickle blades means the beginning of the process of assimilation of Dakhleh population, still preserving old stone knapping tradition, with the realm of the highly organized Egyptian Civilization.

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Giulio Lucarini

The use and exploitation of sorghum and wild plants in the Hidden Valley village (Farafra Oasis Egypt)

Introduction

One of the most debated and intriguing aspects of sorghum exploitation is the long period of time between the first gathering of wild species and full domestication of the plant. The earliest evidence indicating that wild sorghum was gathered comes from the Egyptian Western Desert (Farafra and Nabta Playa areas) (Barakat & Fahmy 1999; Fahmy 2001; Wasylikowa 1997; 2001; Wasylikowa et al. 1995) and from the Atbara region (the sites of Abu Darbein, El Damer and Aneibis), and dates back to around 8000 bp (Haaland 1995: 159-160; Haaland & Magid 1995).

According to Haaland (1995: 168-171; 1999: 402) an intensified use of wild sorghum is attested alongside the appearance of the first cultivation activities, during the sixth millennium BP, at several sites in the Khartoum area (Zakiab, Kadero 1, Um Direiwa). The Egyptian Western Desert, with the large samples of charred plant remains and the large amount of grinding equipment found there, must have also been a crucial area during these first cultivation experiments (Barich 2004a; Lucarini in press, b; Wasylikowa 2001).

A late occurrence of the first domestic sorghum specimens has been seen at the sites of Jebel Tomat, Meroe and Qasr Ibrim, where it dated from the first century BC to the third century AD. Even if the impressions of domestic sorghum identified by Costantini (Costantini et al. 1983) on potsherds are considered valid, estimated to date from the second millennium BC, the gap between the simple gathering of wild specimens and the occurrence of the first domestic sorghum is still great.

The Hidden Valley complex

As already briefly mentioned, the Farafra Oasis is one of the regions that has provided the first examples in north Africa of intensive gathering and exploitation of certain wild grass species, in particular *Sorghum*. The oasis is located about 600 km south-west of Cairo, in the middle of a vast 10,000 km² depression, surrounded by plateaux that, because their heights are limited, are easy to cross.

Starting in the 1990s, the research of the Archaeological Mission of the University of Rome "La Sapienza", directed by Barbara E. Barich, focussed on the upper course of Wadi el-Obeiyid, a fossil river that "runs" between the two mountain ranges of the region (the Quss Abu Said and the Northern Plateaux). It forms an important artery through the northern sector of the depression, and particularly in the so-called "Hidden Valley" settlement area, a small elliptical drainage basin with a surface area of less than 2 km². The area, located at about 60 km northwest of Qasr Farafra, has provided important evidence of repeated occupation phases related to humid periods during the Early and Middle Holocene. The Hidden Valley research area consists of a settlement system, which is exceptional for such an open-air desert location, made up of a 'village' and a complementary supply area for the raw materials used in stone manufacture, located on the Northern Plateau about two km north of the village. A cave decorated with engravings and wall paintings is also part of the system, and its entrance opens onto the slope of this plateau.

The village (Fig. 1), which had permanent habitation structures and hearths, was the main inhabited nucleus of the area and was located on the shore of an ancient water basin, which is today characterized by a Holocene beach residue (*playa*). The dates obtained from the charcoal sampled in the site range from 7670 to 6190 bp with clear evidence of repeated occupation of the area.

Paleobotanical analysis of soil samples taken from various archaeological features revealed high levels of burnt grass grains inside the village. This floral evidence suggests that the Hidden Valley Village could have hosted an autonomous process of intensive exploitation of wild grasses. Even the large number of grinding stones, clearly indicates the emphasis put on plant resource exploitation by the site's occupants (Lucarini, in press, b).

The geomorphological study carried out at the site highlighted the presence of a stratigraphic section made up of 12 sedimentological layers (Barich & Hassan 2000; Hassan *et al.* 2001), attributed to three main occupation horizons. Barich (2004b) has identified four different occupation horizons (A-D), each correlated to documented aspects of both the Nabta Playa region and the Dakhla Oasis.

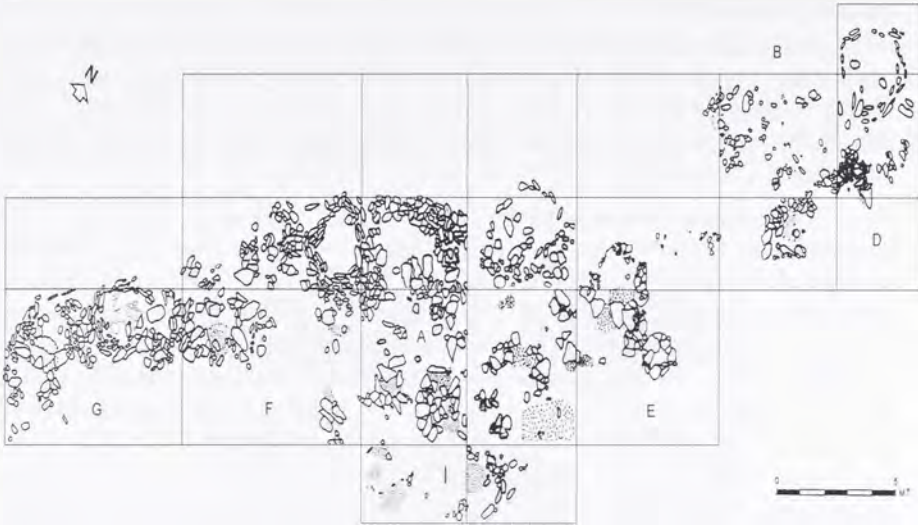


Fig. 1. Hidden Valley Village – Planimetry of the excavated area.

The oldest horizon (In the following sequence I have united Barich's phases B and C into a single horizon "B") can be dated to between 7670 and 7320 bp, when mobile communities began to settle along the northern shore of the lake, developing a more continuous occupation model. The second occupation phase, from 7200 to 6500 bp, was generally characterised by an arid climatic tendency that encouraged further semi-stable settlement. The lithic industry produced retouched bifacial lens-shaped and tanged arrow heads, which indicates small and medium-sized animal hunting. In addition sheep and goat breeding was practised; even ostrich egg fragments have been found, which in the absence of ceramics, were mainly used as containers for liquids. The 30 identified botanical taxa (Fahmy 2001: 241, 243) also show the huge emphasis placed on plant utilization. This exploitation of plant species is also confirmed by the presence of pot-holes: small cooking holes that were filled with ash and used for food preparation, inside of which are often found the remains of carbonized plant material, and in the same layer various lower and upper grinding stones have also been discovered. Finally, during the most recent occupation phase (6500-6100 bp) permanent dwelling structures have been identified, they were outlined by large limestone slabs laid out in circular or oval shapes. These formed proper hut bases, of relatively small dimensions, and were used by the semi-nomadic groups during those periods when they stayed near the lake.

Sample identification

The palaeoethnobotanical analyses of the plant remains recovered from the Hidden Valley Village were carried out by A.G. Fahmy (Helwan University, Cairo). A total of 89 soil samples, from more than 100 litres of deposit, were collected from the various areas of the site, during the field campaigns of 1996, 1997, 1998, 1999, and 2001.

The sampling strategy ensured that samples were collected both in less representative areas of the site, considered as “general area”, and in more strategic areas, such as the hearths, pot-holes and ground deposits directly associated with grinding equipment. The large number of palaeobotanical samples to have survived in the site deposit is mainly thanks to two preservation processes: the carbonization of plants used both as food and fuel, and the deposition of thick and solid *playa* sediments which, by sealing the archaeological features, allowed the botanical remains to be well preserved inside them (Fahmy 2001: 241).

The Hidden Valley Village provided a total of 634 botanical remains (seeds, grains, culm fragments and leaflet fragments) belonging to 30 different taxa (Fahmy 2001: 241). The botanical complex is highly represented by grasses, which are present in almost all the samples: the small millets, *Brachiaria* sp., *Cenchrus* type, *Digitaria sanguinalis*, *Echinochloa colona*, *Panicum repens* and *Setaria verticillata*, belonging to the Paniceae tribe, and *Sorghum*, belonging to the Andropogonae tribe. These grasses may have been plentiful in the site’s vicinity, and in particular around the water basins and the depressions which characterized the area.

Sorghum remains make up 40.6% of the total number of palaeobotanical samples identified from the site. The good preservation state of the sorghum caryopses, mainly due to the carbonization process, allowed the identification of the samples to a subspecies level. The morphological features of these sorghum remains (Fig. 2) look similar to specimens from the site E-75-6 at Nabta Playa, attributed to *Sorghum bicolor* subsp. *arundinaceum* (Fahmy, 2001: 240; Wasylikowa, 1992; Wasylikowa *et al.*, 1995: 143).

Even if the very high frequency of sorghum could be attributed to its large sized grains and to good preservation conditions, it is also possible that these high percentages can be considered the result of cultural preference. As at Nabta Playa, sorghum may have been preferred by human groups for its bigger grains and better nutritional qualities. The large number of grains, which have been found in greater numbers than other parts of the plant, is further evidence of the use of this grass as food (Fahmy 2001: 240).

The sorghum samples from site E-75-6 are dated from 8060 to 7950 bp (Wasylikowa 1997: 102). The oldest specimens from the Hidden Valley Village

can be dated back to 7600 bp. Considering their morphological features and given their early date and the archaeological context in which they were found, their wild status can now be established (Fahmy, in press; Wasylikowa 2001: 578; Wasylikowa *et al.* 1995: 143). With regard to the samples recovered in Nabta Playa, Wasylikowa and Dahlberg (1999) assumed that *Sorghum arundinaceum* could have been cultivated through a *décrue* technique, which did not favour the domestication of the plant.

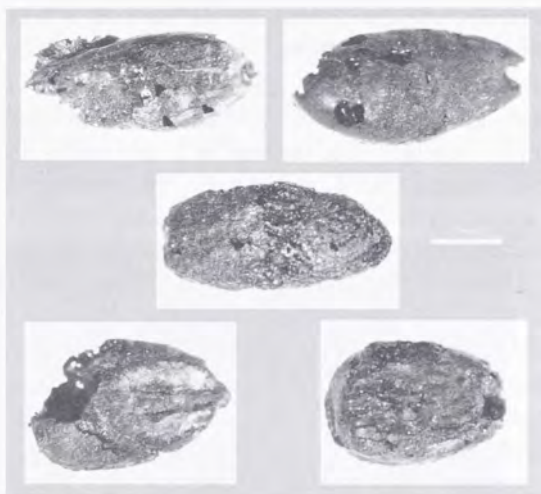


Fig. 2. Hidden Valley Village – *Sorghum arundinaceum* grains.

The other taxa recovered in the site have lower percentages, from 8-15% of the entire palaeobotanical complex. Fahmy (in press) has suggested that the wild species could have been accidentally collected during the gathering of *Sorghum*. Still, even if such low percentages could confirm Fahmy's interpretation, I would argue that the sedentary groups in the Hidden Valley, in addition to mainly exploiting *Sorghum*, also voluntarily and knowingly made use of the other species found. The importance of these other species has been widely testified by the numerous ethnographic observations about African nomadic groups who still use the same plants. Should sickle have been found present, the technique of using them is such that it presupposes that bunches of plants were cut, often with different species clumped together, and this could have helped strengthen the theory that these plants were accidentally present in the sample. However, the absence of these tools in the Hidden Valley area and the use of the

particular gathering techniques that will be analysed in more detail below, instead supports the theory that most of the taxa were knowingly gathered and exploited.

During the village's occupation, the Hidden Valley basin may have been characterized by a savannah environment where grasses were mixed with other wetland and aquatic plants, such as *Carex*, *Coronopus niloticus*, *Juncus* sp., *Phragmites australis*, *Schouwia purpurea* and *Typha* sp. The rhizomes of *Typha* and the leaves of *Schouwia purpurea* could have been eaten, while the entire plant of *Schouwia* could also be used to light fires. Samples of *Ephedra* sp. and *Hyoscyamus* sp., typical dry habitat plants have also been found at the site (Fahmy 2001: 243).

The anthracological analyses carried out by Dr. M. Cottini (ARCO: Cooperativa di Ricerche Archeobiologiche, Laboratorio di Archeobiologia, Musei Civici di Como), revealed that the region's arboreal vegetation was mainly characterized by *Acacia* and *Tamerix* trees, the remains of which have been recovered at a ratio of two to one in the Hidden Valley Village. Due to the preservation status of the *Tamerix* genus, it has not been possible to identify it at species level. However, the presence of some fragments of *Tamerix aphylla* leaves among the palaeobotanical samples (Barakat & Fahmy 1999: 37-38; Fahmy 2001: 243), allow us to state that this species was present in the area.

The state of preservation of *Acacia* remains made the identification of this genus at species level particularly difficult. Only a few fragments have been confidently identified as *Acacia raddiana*. On the contrary, the identification of other samples as *Acacia asak* and *Acacia etbaica* is not secure.

The species *Acacia raddiana*, *Acacia nilotica*, *Acacia ehrenbergiana*, *Tamarix aphylla* and *Tamarix nilotica*, still present in the Egyptian Western Desert, have also been identified in the Dakhla Oasis (Ritchie 1999: 74, 77).

It is not unlikely that branches of *Acacia* and *Tamerix* could be used, not only for fuel, but also in the preparation of hut superstructures that characterized the final occupation horizon of the Hidden Valley Village, or for small structures used for protecting hearths from the wind. *Sorghum* and *Panicum* stalks and leaves could also be used for this purpose, as well as for making mats. *Acacia* and *Tamerix* woods can be considered very good materials for manufacturing small tools.

Statistical analysis and intra-site sample dispersal

An important goal of this study has been to analyze the association of plant taxa with archaeological sectors, layers and features (hearths, potholes and soil deposits near grinding stones) in order to gain a better understanding of the distribution pattern of plants in different areas of the village. In this quantitative

analysis we considered the total number of specimens present in a particular context (abundance) and average number of a single taxon (or all taxa) per litre of analyzed sediment (density).

When looking at the sample distribution in various areas of the settlement, sectors E and F had the highest number of elements (236 and 250 palaeobotanical remains respectively). Next in order were sectors G with 69 units, A with 37 and I with 16. Twenty-six samples were found in Test III, which was a small trench (3 x 2.5 m), located about 15 m south of the village, and opened during the 1998 excavation. It was dug at the site of some limestone slabs, which were similar to those of the final occupation horizon of the main settlement, and which were associated with a level of ash and charcoal. Test III also had the highest average density in the whole village, with 13 palaeobotanical remains found for each litre of analysed sediment. Next were sectors F and G (located on the far west of the village), with densities of 8.3 and 8.6 samples per litre of sediment. Areas E, I and A had lower densities (5.2, 3.2 and 2.5 respectively).



Fig. 3. Hidden Valley Village – Hearth with wood fragments and palaeobotanical remains.

Among the various taxa, *sorghum* proved to occur most frequently in all areas of the village. Of the 250 palaeobotanical remains found in area F, a very high number (180, of which 85 were *Sorghum*) came from sector F1, where a large well-preserved hearth was found (Fig. 3). The high densities of palaeobotanical samples, characteristic of sectors G and F could be due to an accumulation of food preparation remains. The dating of the hearths present in this area of the settlement is to between 7100 and 6700 bp.

As already mentioned, even sector E, located in the central-eastern excavated area of the village, and characterised by the presence of small hearths and some pot-holes, had a large number of samples (236 in total, of which 42 were *Sorghum*). Even if dwelling structures have not been clearly identified, this sector has the most complete stratigraphic sequence in the village, in fact dates have been obtained from it of 7670 ± 63 (R-2469) and 6190 ± 270 (Gd-9629) bp, which mark the upper and lower limits of the site's use.

The lowest indices of abundance and density of palaeobotanical remains were recorded in sectors A and I. They are located in the centre of the excavated area, the former more to the north, and the latter more southerly, near to the edge of the ancient lake. During the excavation season in 2001, various limestone slabs were found in sector A, buried at about 50 cm from the current surface level and laid out in a circle (Barich & Lucarini 2002: 105). The structure, which had a c. 3 m diameter, was characterised by the presence of large hearths which provided evidence of various occupation phases. The deposit inside these hearths included 37 carbonized palaeobotanical remains, including various samples of wild grasses. The dates obtained were between 7000 and 6900 bp. The limited presence of palaeobotanical samples in area I of the village, can probably be put down to the strong deflation processes that the upper section of the deposit underwent. The stratigraphy and dating, in fact, clearly shows that the hearth structures found on the surface belong to the village's oldest occupation horizon.

Analysis of the associations between the palaeobotanical remains and the archaeological features has shown that the highest abundance of plant remains come from within hearths (454 remains in total, of which 193 are sorghum). A lower number of remains come from pot-holes (32) and from soil samples taken from near grinding stones (16). The remaining 132 items relate to the areas of the site that are not characterised by the presence of particular archaeological features and defined as the "general area".

Soil samples taken from near grinding stones show the highest density (35.6 remains for each litre of analysed deposit), even if the limited number of samples (16) found does not permit, at least in the current state of research, such a relationship to be considered as secure.

The densities of botanical samples (among which the greatest quantities were sorghum and leguminosae) from pot-holes, hearths and general areas had decidedly lower results (8.9, 6.6 and 4 units).

Even if the high percentage of palaeobotanical finds within hearths shows the use of some wild species as fuel (particularly in the first phase of lighting a fire), the presence of spontaneous grasses, and in particular *Sorghum*, *Setaria*, *Echinochloa* and Leguminosae, found within pot-holes and in association with

grinding stones, seems to confirm the theory that these plants were a primary food resource for the human groups in the area.

Use-wear analysis

The stone tools from the Farafra Oasis and in particular from the Hidden Valley Village have also been functionally analyzed. During the January and December 2003 field campaigns the lithic artefacts underwent a use-wear analysis in order to find any glossy polishes on their working edges that could be attributed to plant exploitation.

Among the 400 objects found in the Hidden Valley Village (sectors D2, E1 and B4), those artefacts were selected that typologically could have been used for this purpose (presumed sickles, notches, denticulates, but also un-retouched blades and flakes, etc).

In the preliminary phase of this work, all the selected implements were investigated by means of a magnifying glass at magnifications of 4x and 10x. All the lithic artefacts showing particular morphological features (especially abrasions and removals) were selected for closer microscopic examination, carried out with a Nikon SMZ-U stereoscopic microscope (at magnifications between 10x and 63x) and then microphotographed with a Nikon Coolpix 4500 digital camera.

No evident bands of gloss were observed on the implements' working edges. On the contrary, some edge removals and edge-roundings were found that could be linked to scraping and cutting medium-hard and hard material.

It should be noted that during stereoscopic microscope observations, a large number of the analysed tools showed signs of alterations, which in some cases were heavily done. In particular, the presence of a luminosity quite commonly found on the surface of the artefacts, in some cases, obstructed any attempt at analysis. In particular those examples found in the higher deposits at the Hidden Valley Village were found to be completely "illegible" in functional terms.

The need to carry out additional analyses to those done on site, in order to integrate an evaluation of the microscopic use-wear analysis, and the impossibility of exporting the archaeological artefacts to Italy, led to the production of high-definition reproductions of the edges of these tools, using *Elite H-D+*, a hydrophilic resin for making impressions, commonly used by dentists. These copies then underwent further and more accurate observations in the laboratory of the Museo delle Origini di Roma, by means of an Eclipse ME-600 metallographic reflected-light microscope (at magnifications between 100x and 200x). This closer analysis has further confirmed the absence of gloss due to working siliceous

plants and revealed that the presence of edge-roundings could have been caused by scraping leather and other hard animal material (maybe bone; Fig. 4).



Fig. 4. Hidden Valley Village – Lithic tool showing micro traces caused by use on hard animal material (magn. 100x).

It should be highlighted that the sediment's abrasion formed a widespread light glossy patina on all the surfaces of the lithic artefacts that present medium-grade alterations. Even if this glossy patina makes light polishes less visible, it cannot cover heavy polishes, like the ones due to scraping leather or the high gloss left on implements by cutting siliceous plants.

Moreover, it is interesting to note that no special stone tools associated with soil tillage were found at Nabta Playa (Wasylikowa 2001). Furthermore, the importance of tools made from perishable materials, such as wood, should be noted; these can be confidently hypothesized thanks to ethnographic comparisons, even if it is difficult to prove them on an archaeological basis. Magid (1989: 177) reports that in the Sudanese sites of Abu Darbein, Anebis and El Damer: “*wooden tools were most likely the main tools which were used also in the tilling and sowing activities*” and that harvesting could simply be done by hand. It is interesting to note that even at the site of Upper K, in the Fayum Depression, along with large numbers of complete and fragmentary sickles, some sticks were found, c. 40-75 cm long, made of tamerix wood, that were probably used as threshing sticks (Caton-Thompson & Gardner 1934). The differences between the botanical samples and the evidence for particular activities show that in Fayum there was a more accentuated “*agricultural understanding*”, and it can be ruled out that remains of similar tools could be found at Farafra. In any case,

in the Hidden Valley Depression the use of wooden tools is suggested by the abundant presence of acacia and tamerix remains. These species, apart from being used primarily as firewood, have particular characteristics that made them optimal material for making various types of tool as well.

In April 2004, in the context of a mission to study the archaeological finds from the Farafra excavations, currently stored at the SCA Office of the Kharga Oasis, functional analysis of the artefacts was extended to the entire lithic complex. Some artefacts that already revealed particular characteristics such as high gloss, edge removals, edge roundings and abrasions from use during the initial analysis by stereoscopic microscope, then had their replicas studied more closely with a metallographic microscope, and proved to have traces of gloss and striations probably associated with cutting spontaneous grasses and working wood, both materials found abundantly in the region.

As the wild status of the plant species from Farafra, Nabta Playa and Abu Ballas has been ascertained, it remains to be understood if particular cultivation techniques had been developed, or if simple gathering was practised only.

As already briefly mentioned, no artefacts have been found that can be directly associated with the exploitation of plant resources, with the exception of grinding stones, in the archaeological context of Nabta Playa, nor at other sites of the same chronological phase in the Abu Ballas and Dakhla Oasis areas. In the light of this, the data from the Farafra Oasis take on a greater importance. The analyses carried out on the lithic artefacts have, in fact, allowed us to establish that, alongside the more widespread gathering wild grasses by hand, stone tools were also used, even if only marginally (Lucarini in press, a). From the results of these analyses, it seems that unretouched blades and flakes or barely shaped tools that could be held and used to cut a small number of plants, even without being hafted beforehand. Therefore, even if they cannot be defined as proper sickles, some of the finds from the Hidden Valley Village deposits could have been used as opportunistic small knives, that were then discarded after a short period without being reused.

The main cause of the invisibility of plant-cutting artefacts in other contexts in the Egyptian Western Desert must therefore be due not to a lack of use of these tools, but to a limited and discontinuous usage that has only rarely left clear evidence, and also to the heavily altered state in which these artefacts have come to us.

Conclusions

The more intense population phase in the Hidden Valley Village, between 7200 and 6500 bp, is also the time span to which a large part of the plant species belong that were found in the archaeological features within the site. The human

occupation of the Hidden Valley Village became, in fact, more stable during the course of the seventh millennium bp, when the human groups, attracted by the presence of abundant water, settled in the area. In this phase, the gathering and exploitation of the plant species, among which wild grains and sorghum in particular played a predominant role, was coupled with the raising of domestic caprovids, the oldest examples of which date to about 7000 bp (Barich & Lucarini 2005) and by the hunting of small animals.

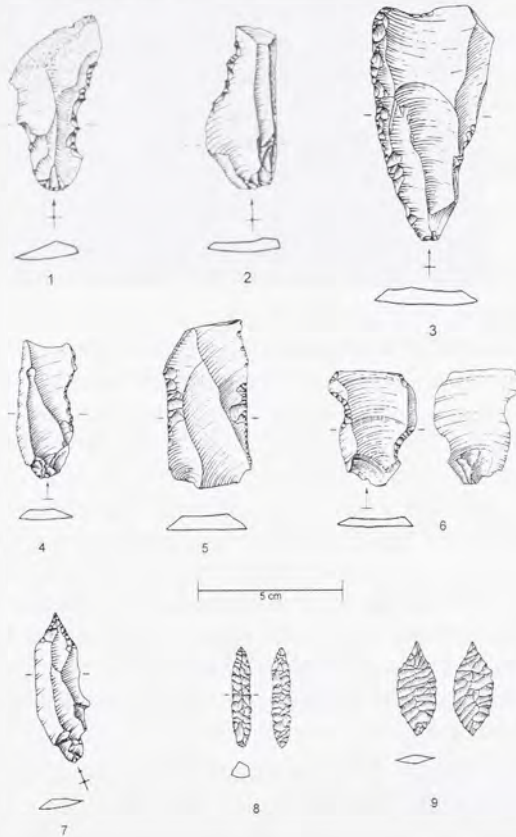


Fig. 5. Hidden Valley Village – Lithic artefacts coming from the site (1-2-4: denticulates; 3: side-scraper; 5: piece with continuous retouch; 6: notch; 7: borer; 8: bifacial drill; 9: lens-shaped bifacial arrowhead).

The stone artefacts belonging to this phase show a simple knapping technique, mainly on flakes, with no core preparation (Fig. 5). As already mentioned some of the debitage elements and retouched tools (among which retouched flakes,



Fig. 6. Sheikh el Obeiyid area – Bifacial knife.



Fig. 7. Sheikh el Obeiyid area – Retouched blade probably used as sickle element.

side-scrapers, notches and denticulates show the highest percentages) could have been used in the wild plant gathering.

On the contrary, the numerous stone tools (bifacial knives, tranchet axe, arrow heads) (Fig. 6) found on the surface of the Hidden Valley basin, having such characteristics as to be seen as forerunners of the classic Predynastic types from the Nile Valley, can be associated with the later occupation horizon of the site, characterised by the presence of well-structured hut bases. It can be supposed that some of these more recent artefacts (particularly bifacial knives, denticulated blades and gouges) that are very numerous in the various areas of the depression, could have been similarly used for the gathering of wild plants and for the exploitation and working of wood (Fig. 7). The large number of grinding stones can be added to this, as they were found in abundance over the whole basin area (Fig. 8).

The first evidence of real cultivation activity in the Nile Valley and right in the Fayum Depression can also be related to this period. Even if the Fayum A phase cannot be considered, *tout court*, as agricultural, the sites attributed to this horizon show an ever increasing importance given to plant exploitation. As is known, the first lithic artefacts to be securely associated with cereal gathering activity are in the Fayum A horizon, and it is noteworthy that the oldest domesticated cereals found in Africa, also from this same cultural phase, came from the *Upper Granaries* including the species *Triticum dicoccum*, *Hordeum hexastichum*, *Hordeum vulgare*, *Hordeum distichum*, and *Triticum vulgare* (Caton-Thompson & Gardner 1934: 46-49).

In the Egyptian Western Desert, the first real sickle elements have been associated with the Sheikh Muftah phase at the Dakhla Oasis, which began at the

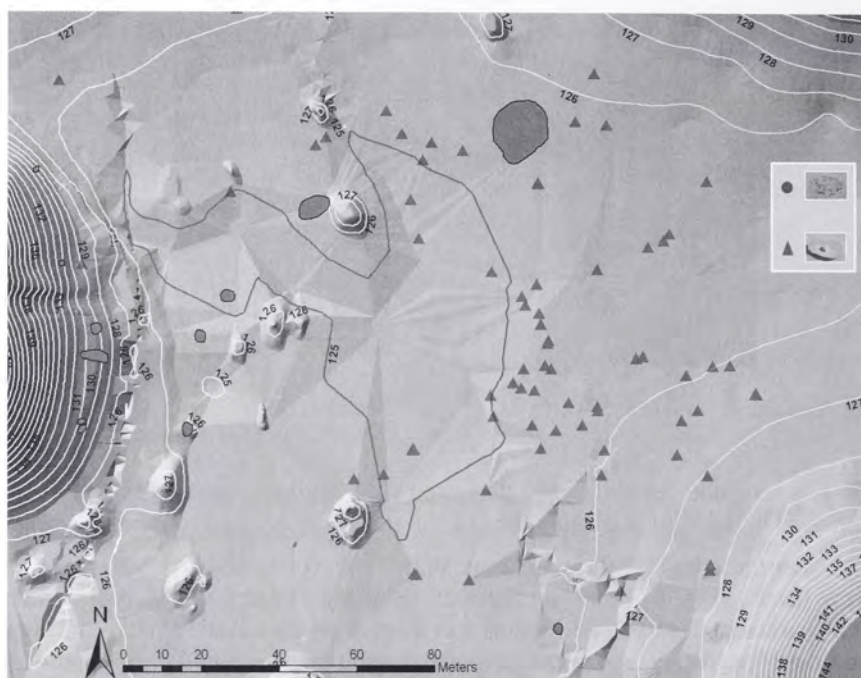


Fig. 8. Hidden Valley Basin – *Digital Elevation Model* of the basin showing the distribution of hearths (circles) and grinding stones (triangles).

end of the sixth millennium bp (McDonald 1999; 2002). The archaeological material both from Fayum and from Dakhla, as well as the appearance of grain from the Levant in the Nile Valley, testify to the Late Neolithic community paying increasing attention to agricultural activity, as well as the raising of domestic animals. This was later further developed, in the following periods and represented one of the fundamental contributions to the birth of the first Predynastic Egyptian cultures.

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Mary M. A. McDonald

Holocene Prehistory of the Wady el Midauwara above Kharga Oasis, Egypt

Introduction

Since 1987, Pleistocene archaeologists, environmentalists and geochronologists belonging to the Dakhleh Oasis Project, and since 2001 to the Kharga Oasis Prehistoric Project (KOPP), have been working on the Escarpment along the eastern edge of Kharga Oasis. The Pleistocene archaeologists, M.R. Klein-dienst, M.F. Wiseman and A.L. Hawkins, are reassessing the classic geoarchaeological sequence established in the 1930's by G. Caton-Thompson and E.W. Gardner, and securing chronometric dates on the tufa deposits that seal some of the archaeological remains. The geologists, R. Giegengack and J.R. Smith, focus on the tufas themselves. Laid down by spring discharge during humid periods, the tufas provide a good record of Quaternary climate change, allowing them to establish a palaeoenvironmental sequence for the last half million years, relevant for the entire Western Desert of Egypt.

Initially, Holocene prehistorians were not involved in these studies. It is general knowledge that there is Holocene material in Kharga Oasis. Caton-Thompson (1952) reported both early and mid-Holocene material in various locations on the oasis floor, and atop the Libyan Plateau overlooking Kharga. Likewise, the Combined Prehistoric Expedition (Wendorf & Schild 1980) published early and mid-Holocene sites near Kharga City, and A. Simmons and R. Mandel (1986) found similar sites on the floor and atop the Plateau in their site survey of the northern part of Kharga. In recent years a team from the French Institute including B. Midant-Reynes has been finding abundant Holocene material as they surveyed northward from Dush on the oasis floor.

The KOPP focus however has been on that transitional zone between the Plateau top and the oasis floor, the Escarpment face. This is where the tufas

occur, but the associated archaeological sites are all of Pleistocene age. In fact, Caton-Thompson, who investigated much of the Escarpment, remarks (1952: 32) that she found virtually no Holocene material “on the scarp undercliffs, and the silty solution basins in the tufas”. It came as a surprise then when, in 1996, colleagues began reporting Holocene material from the Wadi el Midauwara in southern Kharga (which Caton-Thompson had not visited). In 2000, after examining small chipped stone collections from Midauwara made for dating purposes by Smith, I visited the pass for one day of fieldwork. Due to the remoteness of the area, subsequent visits have also been short: one day in 2001, nine days in 2002, six in 2003, and five in 2005.

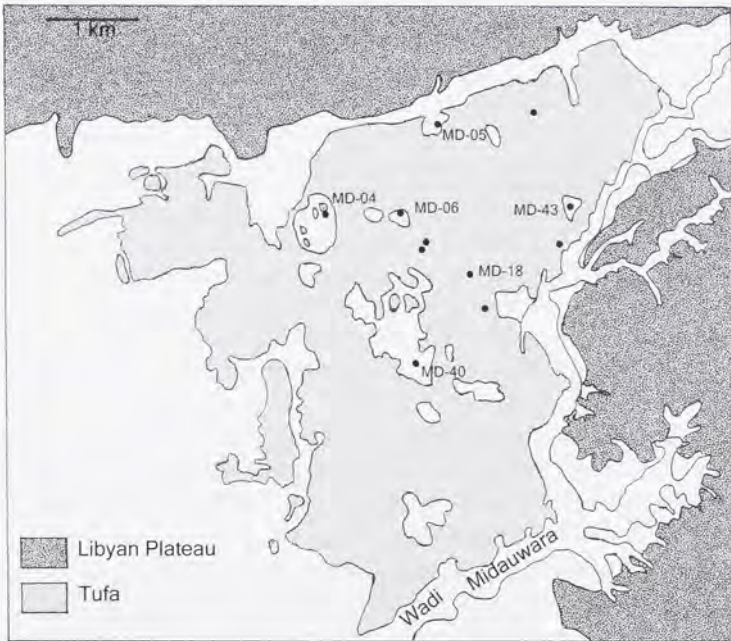


Fig. 1. Kharga Oasis Wadi el Midauwara: Midauwara Unit sites mentioned in text.

At Midauwara, the tufas and associated archaeology are found just under the crest of the Escarpment, in a roughly rectangular-shaped embayment ca 4 x 5 km, bordered on the south by the main wadi (Smith et al. 2004: fig. 3). While a systematic survey is difficult, given the rough, broken surfaces of the tufa deposits, an estimated 6 km², towards the centre of the embayment’s 20 km², have been examined so far for Holocene remains (Fig. 1). No Holocene cultural

material has been found in direct association with the tufas. Rather, sites occupy many of the silt-filled aeolian depressions, while sparse scatters and individual finds can be found also on the surfaces of the tufas between the hollows.

Sites seem to span much of the early and mid-Holocene, with cognates for units in the sequence found in Dakhleh Oasis and elsewhere in the Western Desert. It seems, moreover, that many locations are not just short-term transit camps for groups traveling to and from the Kharga Oasis Lowland, but are settlement sites, several with stone-built shelters. We have designated two local cultural units, the *Midauwara Unit* for the early Holocene or Epipalaeolithic type of localities, and the *Baris Unit* for the mid-Holocene localities. Both units, it would appear, can be subdivided.

The Midauwara Cultural Unit

Midauwara Unit localities

Seven localities can be classified as Midauwara sites, while four others have both Midauwara and Baris components (Fig. 1). Three types of Midauwara locality have been identified. Most common are relatively small occupation sites with a few features, hearth mounds and/or slab structures, and associated artifacts. Typical perhaps is KH/MD-06, with a few cobble-covered hearth mounds and two or three probable slab structures, one of them measuring 5 x 2.5 m, located on a silt-covered depression floor. Associated with these features is a range of chipped stone tools – Ounan points, drills, notches and denticulates etc., and scatters where blades and flakes had been knapped. There are also grinding slabs, a few ostrich eggshell beads, and a decorated ostrich eggshell fragment. Other Midauwara unit sites of this type include MD-05, 07/44, 29, 37, 38 and 42.

A second type of Midauwara locality is an apparent large settlement consisting of many slab structures. Two have been recorded so far, MD-43 and MD-18, Cluster 1. MD-43 occupies a basin ca. 200 x 80 m overlooking the main wadi (Fig. 2). It consists of at least 20 slab-built structures, a few less coherent piles of slabs, and three clusters of fire cracked rock (FCR). The structures are small (ca. 2 to 3 m across, the largest about 6 m across), and most are arc or crescent-shaped, opening to the south, their slabs either lying flat or perched on edge. Associated with the features are chipped stone tools and knapping scatters, grinding slabs and handstones, and ostrich eggshell scatters and beads. MD-18 Cluster 1 (Fig. 3) consists of perhaps a dozen fairly fragmentary slab structures and several clusters of FCR. Adjacent to it on the depression floor are two other clusters of slab structures assigned to the mid-Holocene Baris unit (see below).

The third type of Midauwara unit locality is an isolated blade-knapping station. Two examples are MD-04 and MD-40. MD-04, on silts at the edge of a large depression in the NW corner of the tufa area, consists of two tight clusters

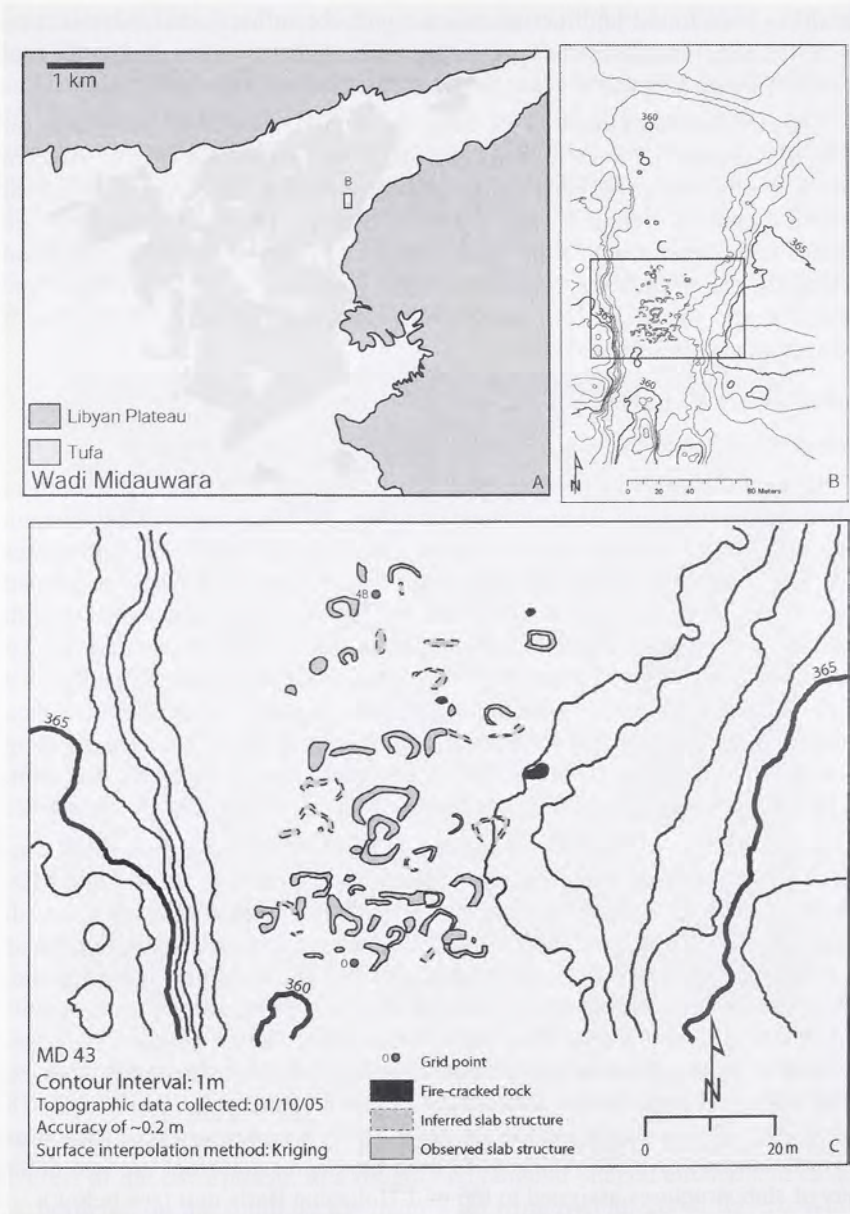


Fig. 2. Locality MD-43 with its slab structures within Wadi el Midauwar. (Illustration by J.R. Smith).

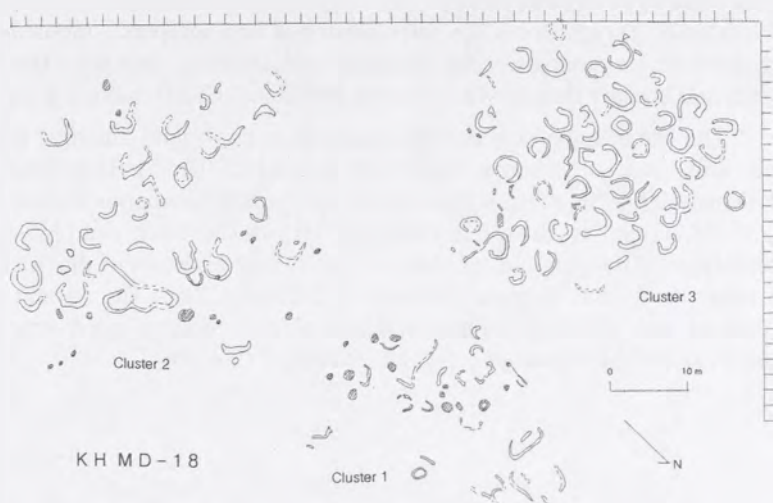


Fig. 3. Loc. MD-18: Cluster 1, Midauwara Unit; Clusters 2 & 3, Baris Unit. Hatched areas: clusters of fire cracked rock.

of knapped material ca. 20 m apart, the larger of the two ca. 3 x 1.5 m. Thirty meters away is a third, more diffuse knapping scatter ca. 14 m in diameter. MD-40 is an isolated blade-knapping station ca. 5 m in diameter, located in the centre of a large deep basin, otherwise thinly covered with Pleistocene-age material, and with a mid-Holocene scatter near its southern rim. A hearth mound covered with dark coloured FCR, located 14 m away, might be associated with the knapping cluster. Almost no formal tools were found on either MD-04 or MD-40.

Midauwara Unit chipped stone

a) Lithic toolkits

It has been noted above that the Kharga Midauwara unit closely resembles the early Holocene or Epipalaeolithic entity in Dakhleh Oasis labeled the *Masara Unit*. Recently, two major subdivisions of the Dakhleh Masara unit have been defined (McDonald 2003). Masara A and Masara C differ rather dramatically in their timing, adaptation and cultural affiliations beyond the oasis, and they feature quite different lithic assemblages. Briefly, Masara A sites are characterized by blades knapped from good quality nodular chert and then notched, den-

ticated or continuously retouched. Also typical are backed bladelets, elongated scalene triangles, and the Ounan point (McDonald 2003: table 1 & fig. 2). Masara C assemblages are also blady, but knappers are more eclectic in their choice of raw material. Typical tools are thick-sectioned end scrapers, “nibbled” notches and denticulates, concave-sided triangles and trapezes, and the “Harif” point, shorter and broader than the Ounan point (McDonald 2003: table 2 & fig. 5).

The same dichotomy in lithic assemblages is found amongst the Midauwara unit sites in Kharga Oasis (McDonald 2003: 51 ff.). Thus MD-06 (McDonald 2003: fig. 8) and most of the other small occupation localities – MD-29, 37, 38, 42 and 44, as well as the larger MD-18 Cluster 1, yield Masara A-like assemblages. Knapping clusters MD-04 and 40 are also part of this tradition. On the other hand, two localities, MD-05 (McDonald 2003: fig. 9) and the large settlement site MD-43, feature the Harif points, concave-sided triangles, end scrapers and nibbled notches typical of Masara C (Fig. 4).

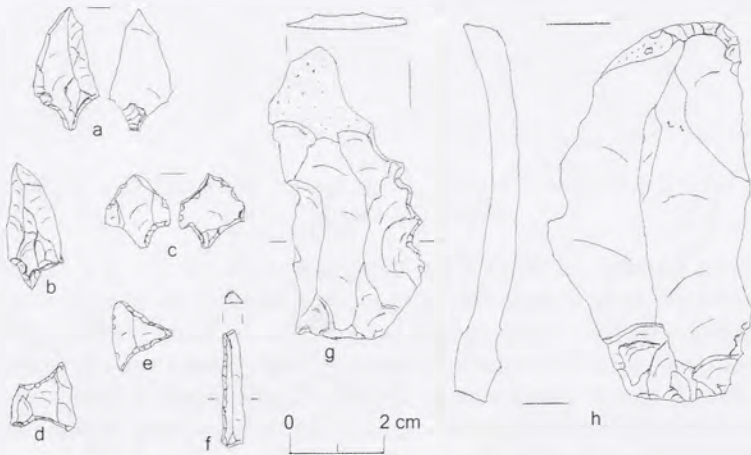


Fig. 4. Loc. MD-43 lithics: a – c, Harif points; d, trapeze; e, triangle; f, backed bladelet; g, denticulate; h, end scraper.

b) Lithic technology

Controlled samples taken from several of the localities, MD-04, 05, 06, 18 Cluster1, and 43, can be used to begin characterizing the technology employed on Midauwara sites. Reduction strategies on the two Midauwara sub-units seem to differ somewhat.

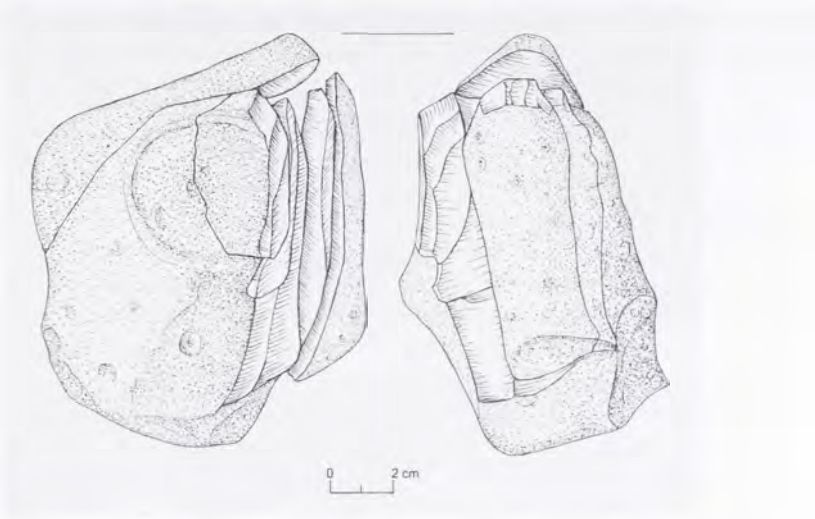


Fig. 5. Loc. MD-04: core A-I reassembled. Drawn by J. O'Carroll.

In 2002, Kleindienst gridded and collected one of the tight blade-knapping clusters on MD-04 (she wished to ascertain the degree of directional dispersal of differently sized pieces in that environment: Kleindienst et al. 2003: 21). 430 pieces were collected (the deposit was not screened). The raw material is uniformly a good-quality nodular chert patinated to a dark grey-brown. Six of the eight core units on MD-04 could be reassembled to some extent, and they all suggest a simple but efficient approach to blade knapping entailing the very minimum of core preform preparation. The usual procedure (Fig. 5) seems to have been to choose a flat or wedge-shaped nodule of an appropriate size, remove a large cortical flake from the edge, and then use the resulting scar as a platform to strike blades off the edge of the nodule, working that face inward until blades started hinging off or the remaining core became too short (Fig. 6)¹.

Débitage on the knapping site MD-40, and on MD-06 and MD-18 Cluster 1 suggests that a similar technique was commonly employed on those localities. On MD-05 and 43, cores are smaller and appear to have been more heavily worked. Core fragments (ridge flakes, tablets and lateral fragments) suggest more core preparation on these sites, while blades retain very little cortex.

¹ Cf. the elaborate core-shaping strategies employed by roughly contemporaneous Capsian groups in the Maghreb (Rahmani 2004: fig. 11).

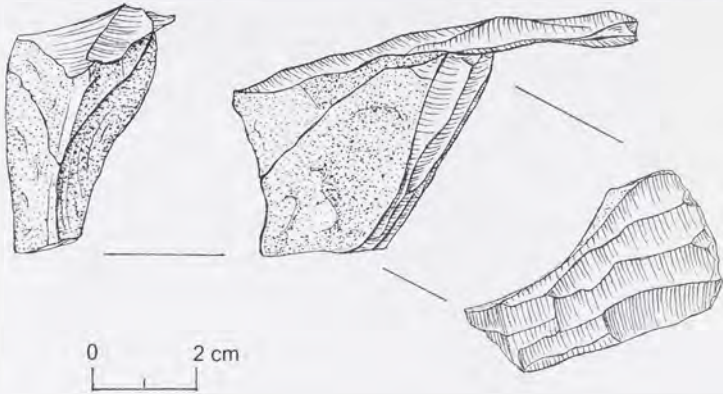


Fig. 6. Loc. MD-04: exhausted core Q-37. Drawn by J. O'Carroll.

On MD-04, 73% of the removals are blades, and of those, 33% are bladelets in the classic sense ($w < 1.2$ cm). The blade/flake ratio is much lower on the other sampled sites, although higher on MD-43 and 05 (50 – 55%) than on MD-06 and 18 (22%). MD-43 has a high percentage of bladelets (50%), and blades are of uniform thickness, perhaps reflecting requirements for the production of geometrics and/or points. On MD-04, 75% of blade platforms are either linear or point form, while on all other sites the most common type is plain or single faceted.

Dating the Midauwara Unit

Two radiocarbon dates are available for Midauwara Unit sites.

Ostrich eggshell fragments from MD-06 are dated:

TO-9970 34,110 \pm 320 BP

Charcoal from MD-05 is dated:

VRI-2105 6030 \pm 120 BP cal BC 5060 – 4780

The date from MD-06 seems far too old. In Dakhleh, the analogous Masara A, on the basis of nine dates, spans nearly 1500 years, from 9200 BP (McDonald 2003: table 3). In Kharga, three dates from the Combined Prehistoric Expedition "Terminal Palaeolithic" site of E-76-6 on the oasis floor, cluster fairly tightly around 7900 BP (Wendorf & Schild 1980: 188). It is likely that the dates for MD-06 and related sites fall somewhere between 8300 and 6700 cal BC.

The date for Masara C-like MD-05 seems too young. For Dakhleh Masara C, ten dates range from about 8900 to 8300 BP. This suggests a range of ca. 8000 – 7400 cal BC for MD-05 and related sites.

The Baris Cultural Unit

Baris Unit Localities

Ten localities are classified as Baris sites, while four others, as mentioned above, have both Midauwara and Baris components (Fig. 7). Two main groupings of Baris sites can be defined, based on the predominant feature present, whether slab structures or hearth mounds. The two groups are characterized by different artifact assemblages, and probably differing adaptations.

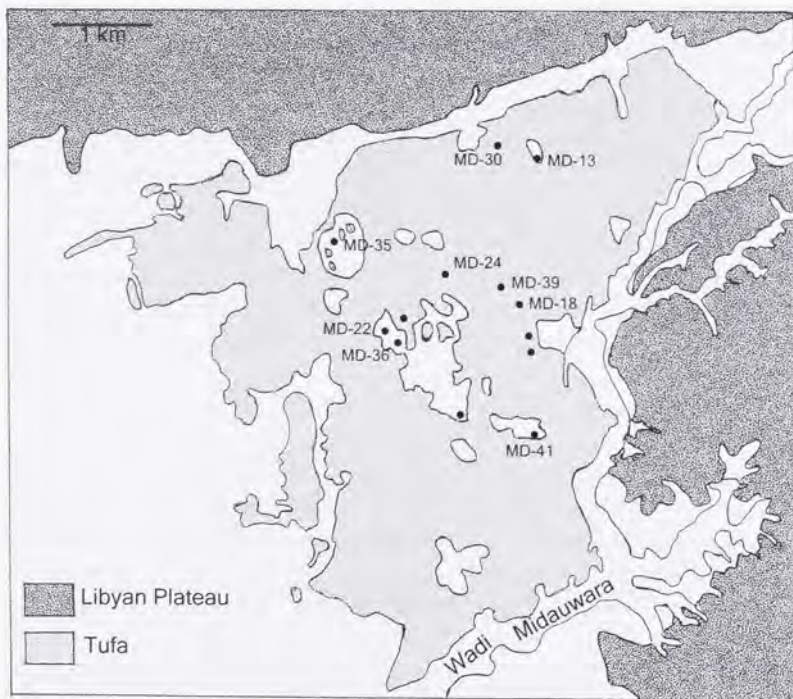


Fig. 7. Wadi el Midauwara: Baris Unit sites mentioned in text.

Baris sites with slab structures

The largest by far of the slab structure sites is MD-18 (see above), where Cluster 2 and Cluster 3 pertain to the Baris Unit (Fig. 3). The site occupies a shallow, triangular-shaped depression measuring 200 x 170 m. Cluster 2 consists

of about 24 structures, and Cluster 3, the most intact of the three, about 40 structures. On Cluster 3, most structures are rounded and ca. 2 to 3 m across, while a couple may be bilobed. On Cluster 2, units appear to be slightly more varied in shape and size. Several clusters of FCR were recorded on Cluster 2, only two on Cluster 3.

The chipped stone industry on Clusters 2 and 3 is predominantly flake-based and fashioned on a greater range of raw materials than the Midauwara industry. Tools include bifacial arrowheads in a variety of sizes and shapes, bifacial knives and side blow flakes, and drills, notches and denticulates. Grinding slabs and handstones and a few ostrich eggshell beads were recorded. Pottery is present but rare on most Baris sites. Seventeen sherds from up to six vessels were recorded on Cluster 2 and 3. They include both thin-walled, undecorated examples in a sand and gypsum fabric, and impressed sherds in a coarse sand fabric².



Figure 8. Loc. MD-24 artifacts: chipped stone tools and impressed sherd.

MD-24 is a much smaller site, occupying a narrow depression ca. 90 x 30 m. It consists of nine or ten oval and crescent-shaped slab structures. The artifact

² Analysis of the pottery from Wadi el Midauwara is by A.R. Warfe (Warfe not dated a; not dated b).

scatter includes grinding slabs and handstones, knives, side blow flakes, and a bifacial arrowhead (Fig. 8). Fourteen sherds were collected, twelve of them thin-walled and undecorated, the other two bearing impressed decoration.

MD-30, in a shallow basin ca. 80 x 25 m atop a tufa ridge, consists of about six structures built of slabs and cobbles, and a pair of mounds with FCR. Artifacts include a grinding slab fragment and several handstones, arrowheads, a drill, and a thin tabular item with bifacial retouch on one edge.

Baris hearth mound sites

Most of the hearth mound sites are found downslope to the west of MD-18 and 24, and occupy large deep basins.

MD-22, in a deeply deflated basin ca. 300 x 200 m, consists of five clusters of hearth mounds and associated features and artifacts. There are between 25 and 30 hearth mounds in Cluster 1 alone. Hearth 1, a typical mound ca. 120 cm in diameter and 20 cm high proved, on excavation, to be a shallow basin, 100 x 70 cm, with a flat fire-stained floor covered by a layer 6 cm thick of powdery charcoal, and filled with FCR.

Among the chipped stone tools are knives, tranchets, side blow flakes, three Armant-like celts or axes (cf. Caton-Thompson 1952: 173 & plate 103), and various blade and flake tools (Fig. 9). Grinding slabs and handstones occur, some made on imported materials. The rich ground stone industry includes balls of various sizes, rings, beads, mace head fragments, and a small axe of black silicified shale.

Pottery is found on all clusters, and about 550 sherds were collected. Much of it is similar but not identical to the plain wares from MD-18 and 24. Vessels are thin-walled, simple bowls, either open or closed. Fabrics are mostly fine to medium grained, and tempered with sand and shale in varying quantities and sizes. But other fabrics were noted as well: a silty one with organic inclusions, another with coarse shale inclusions, while a Badarian ripple-ware sherd was recorded on Cluster 1. Similar pottery was found on MD-36, just to the south.

Several other hearth mound sites have been recorded at Midauwara, some of them featuring a few slab structures as well. MD-35 is a hearth mound field ca. 200 x 80 m in the large basin to the north of MD-22 that also contains MD-04. One or two possible slab structures were noted as well. MD-41 is located in a deep basin to the south of MD-22. Here a number of hearth mounds and a few crescent-shaped slab structures occupy a series of narrow draws along the west side of the basin. MD-39, on the other hand, is somewhat anomalous, lying upslope to the east in one of the shallow depressions between MD-18 and MD-24.

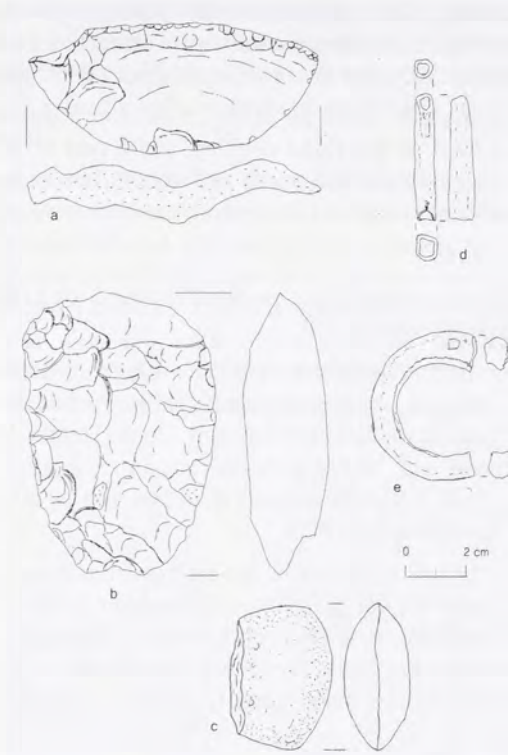


Fig. 9. Loc. MD-22 artifacts: a, side blow flake; b, Armant axe; c, ground stone axe; d, stone bead; e, ground stone ring

Dating the Baris Unit

For the Baris Unit, as yet no absolute dates are available. Dating is on the basis of more securely dated sequences elsewhere in the Western Desert and beyond. As with the Midauwara Unit, the closest ties seem to be with the mid-Holocene sequence in Dakhleh Oasis, which is divided into Bashendi A, dated ca. 7500 – 6800 BP, Bashendi B, 6700 – 5000 BP, and Sheikh Muftah, 5200 – 4000 BP (McDonald 2001; 2002). In this scheme, Baris slab structure sites can be equated with Bashendi A localities such as 270 and 307. Sites in both oases share the structures themselves, and similar chipped stone and ceramic assemblages. Similarly, Baris hearth mound sites closely resemble Bashendi B and Sheikh Muftah localities in terms of the mounds themselves, their chipped and ground stone industries, and the pottery.

Support for this framework can be found in dated material from elsewhere in the region that has been found on Baris sites. An example is the “Khartoum related” impressed ware found on MD-18 and 24. This pottery, which occurs in Dakhleh as well, appears to have been imported from the south, where it has been dated ca. 7500 BP (Gehlen et al. 2002: 95-96). As for material on the hearth mound sites, imports from the Nile Valley such as the Badarian ripple ware and Armant axes would date ca. 5500 – 5000 BP.

On this evidence, the Baris Unit may span a long period, and be divisible into early and late subunits. Thus *Early Baris* would include sites such as MD-18 and 24, and date ca. 7000 BP or 5800 cal BC. *Late Baris* sites such as MD-22, 36 and 41, with artifacts reminiscent of Bashendi B and early Sheikh Muftah, and with imports from the Nile Valley, might date ca. 6000 – 5000 BP or 4900 – 3800 cal BC.

There is not much evidence for occupation of the Midauwara Pass beyond that point. What little there is, such as a Pharaonic era copper axe, probably represents travel through the pass, rather than an occupation.

Subsistence and adaptations in the Baris Unit

There is as yet little firm evidence on subsistence for Baris Unit sites, beyond a hartebeest tooth from MD-22, and tools such as a tethering stone on MD-13, small stone circles, possible watering places (cf. Gabriel 2002: 60) on several sites, and arrowheads and grinding stones, also on several sites. Based on evidence of this sort, and on comparisons with the Dakhleh sequence, one can postulate that, in Early Baris times, semi-sedentary groups on MD-18 exploited abundant wild resources, both plant and animal, and might also have herded goats. The later groups responsible for the hearth mounds on MD-22 may have been primarily pastoral nomads.

Acknowledgments

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Heiko Riemer

Out of Dakhla: Cultural diversity and mobility between the Egyptian Oases and the Great Sand Sea during the Holocene humid phase.

Introduction

During the Early Holocene or Epipalaeolithic the flaked stone tools show great similarities throughout the entire Sahara. The Mid-Holocene period, approximately starting at 6400 BC (all dates are calibrated) and running until the beginning of the deterioration of the Eastern Sahara around 5000 BC, reflects a shift towards marked regional diversity that, following Close (1990: 176), might result from higher population density than during the Early Holocene. Regional diversity is of importance to define similarities between archaeological sites, and consequently scholars have stressed certain parallels as a result of contacts or influences between regions. For instance, influences of the “Saharo-Sudanese Neolithic” represented by ceramic decorative patterns of the Khartoum style have been reported from Dakhla (McDonald 1992; Hope 2002; Warfe 2003). A number of cultural traits of the oases region have in turn provoked some speculation about cultural affinities with the Nile Valley, Fayum or Merimde (McDonald 1991). In the north-western province McBurney has postulated a “Cyrenaican Neolithic” or “Neolithic of Libyco-Capsian Tradition” represented by pressure-flaking in the flint work, and the introduction of pottery at Haua Fteah (McBurney 1967). Tentatively he proposed a rather western influence from the Neolithic of Capsien tradition. Eiwanger’s “south-western facies of Levantine Early Neolithic” (Eiwanger 1988: 53; 1994, 44) represented in layer I (“Urschicht”) of Merimde Beni-salame (Eiwanger 1984) spread along the Mediterranean coast incorporating Merimde as well as the Cyrenaica (Eiwanger 1987: 86). In turn, he saw an African or Saharan tradition in Merimde from layer II upwards (1988: 53). Further hypotheses on contacts or influences across the

Western Desert could be listed here, but one may have a closer look into Hope's introduction (2002, 39) to the Dakhla traditions and influences where a great list already exists. It is not without irony, that they altogether suggest a hyper-active network throughout the inhospitable barren desert. The problem is that most of the contact or influence hypotheses do not illustrate the mechanisms of communication or distribution of cultural traits, and no attempts have been made to systematize the different facets of contact patterns (exceptions in Warfe 2003). Moreover, there is a lack of quantitative evidence that leads beyond simple parallels in artefact morphology.

The study of archaeological sites throughout the Western Desert of Egypt by the B.O.S. and ACACIA missions during the last two decades has revealed some data that could help to create a rather realistic scenario of the past contacts and diverse cultural traditions, not least, as both projects followed a supra-regional approach.

The beginning at Regenfeld

It is quite clear that the "contacts" in the Western Desert of Egypt took place during the seasonal or episodic movements of the prehistoric dwellers before they returned to the wells, spring mounds and other permanent water resources during the dry season. It is also a basic assumption that the ecological conditions and the socio-economic fundament were faraway from an intensive exchange or trade system. In turn the oases and other favoured places obviously were meeting points where some exchange resulted from the population agglomeration during the dry episodes. The distribution across the deserts, however, results from the seasonal movements of hunter-gatherers or pastoralists.

The idea to study the different cultural influences and their mechanisms in the Western Desert was initiated by the archaeological work of ACACIA conducted west of Regenfeld in the southern Great Sand Sea (Fig. 1) during two campaigns in 1996 and 1997 (Riemer 2000; 2003a). The excavations and surface collections on the Regenfeld playa produced a small number of lithic assemblages from the Mid-Holocene wet phase which obviously indicated various individual cultural influences from different regions, and a high mobility of the prehistoric groups. Local raw materials for stone tool production are nearly absent in the area of Regenfeld, and much of what was found on the prehistoric sites was gathered outside. Libyan Desert Glass, quartzite and flint came from outcrops which are up to 250 km away from Regenfeld.

It was then noticed that the sites of Regenfeld may contain retouched stone tools which were not found in combination elsewhere in the Libyan or Western Desert. On the one hand, there are transversal arrow-heads which resemble the tradition of the Gilf Kebir (phase Gilf B) (Schön 1996; Linstädter &

Kröpelin 2004) and the sites of Mudpans (Mudpans A/B) (Kuper 1993; 1995). On the other hand, there are striking parallels with the lithic tool kit and the techniques of facial retouch as found in Dakhla Oasis (Bashendi A/B) (McDonald 1991; 1999) and on the Egyptian Limestone Plateau (Djara A/B) (Kindermann 2004).

The Southern Great Sand Sea, located between the more favoured Gifl Kebir Plateau in the southwest and the Oasis of Dakhla in the northeast, can be seen as the most arid core zone of the desert with only episodic precipitation and no availability of fossil groundwater during the Holocene wet phase. It is likely that human occupation of the desert region only took place after episodic rainfall when small ponds and playas held surface water. However, the less developed relief of the country limited the run-off, and enlarged basins were obviously rare. It is therefore likely that this desert area was a barrier zone between northern and southern Egypt, though it was penetrable during good years.

The region of Regenfeld situated in the centre of this desert area was definitely incorporated into the territory of various prehistoric groups who came from the southwest as well as from the northeast. The Regenfeld playa is a 600 m long playa basin where silty sediments agglomerated up to 6 or 7 m high. This basin was a pool which potentially could provide long lasting water stands over weeks or months. With regard to the many human occupation sites at this playa, the basin certainly profited from the enormous distances between the water pools across the Sand Sea creating an island-like character within the barren Sand Sea. During their episodic movements through the desert the hunter-gatherers of the Holocene wet phase distributed the various raw materials and tool types throughout the desert. It is plausible that years of intensive rainfall effected an extensive distribution over the entire Sand Sea while years of poorer rainfall only led to a population agglomeration in the vicinity of the oases. In turn, the properties of lithic traditions within an area can give an indication of the frequency of human occupations, and which tradition dominates within a region (Riemer in press).

This was the hypothesis when the project went into its next phase, and the research programme that was then performed for the following years should prove this hypothesis. As the Great Sand Sea is by far too large for a high resolution field survey, a transect between Regenfeld and Dakhla Oasis was selected to continue the work (Fig. 1). The primary objectives were to study the properties and proveniences of tool types and raw materials, and to analyse the production sequences for further details. The assumption was to find an increasing percentage of bifacially retouched tools and artefacts made of flint with decreasing distance to the oasis.

A reconnaissance survey in the southeastern Sand Sea east of Regenfeld revealed only a small number of sites, and none of them was large enough for

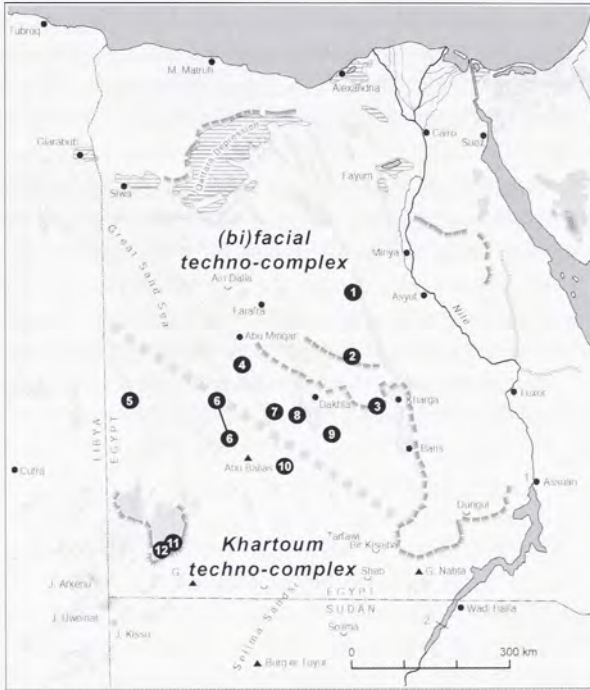


Fig. 1. Map of Egypt showing the Mid-Holocene techno-complexes, and the ACACIA/B.O.S. study areas mentioned in the text: 1 Djara; 2 Abu Gerara; 3 Abu Tartur; 4 Abu Minqar; 5 Glass Area; 6 Regenfeld; 7 Chufu; 8 Meri; 9 Eastpans; 10 Mudpans; 11 Wadi el-Bakht; 12 Wadi el-Akhdar.



Fig. 2. “Joint venture at Ladies Hill” (= Meri 99/36) in November 2000. From left to right, bottom: Lech Krzyżaniak, Ewa Kuciewicz; top: Heiko Riemer, Karin Kindermann, Andreas Pastoors, Eliza Jaroni, Michał Kobusiewicz.

further statistical examination. It was then, in the end of 2000, when a one-day joint-venture tour of ACACIA and DOP (Dakhleh Oasis Project) was organized to the rock art site of "Ladies Hill" (Fig. 2), a location that was registered in 1999 as "Meri 99/36". The team of the DOP petroglyphs unit headed by the late Lech Krzyżaniak visited the rock depictions while the other group discovered some Mid-Holocene surface sites, listed in the following as sites Meri 00/80, 00/81, and 00/82.

In 2002 an extended field survey was conducted in the area west of the Meri sites which was named "Chufu" after a Pharaonic site in its vicinity (Kuper and Förster 2003). While "Chufu" is a hilly country positioned close to the Great Sand Sea, the sites of "Meri", named after a Pharaonic inscription some kilometres away (Burkhard 1997), are located in a plain or gently undulating landscape. At least, the survey campaigns to Meri and Chufu yielded five large Mid-Holocene assemblages of which four have been recorded afterwards by surface collections and small excavations. The examination of two assemblages from Meri and Chufu has been finished until now, and a number of preliminary results can be presented here. Moreover, on site Chufu 02/14 the playa remains have been investigated in order to reconstruct the geomorphologic development of the playa basins.

The study area of "Meri"

The landscape in which the sites of Meri are positioned is a rather plain or gently undulating sand sheet interrupted by small inselbergs and escarpments up to 20 m high, and patches of sandstone gravel. The altitude is more than 300 m a.s.l., and groundwater of the Nubian Aquifer are out of reach in this area. The sites in question are situated east of a 10-15 m high escarpment that stretches from north-northeast to south-southwest (Fig. 3). A number of rocks and small sandstone cones are scattered in front of the small escarpment. A shallow basin with a recent playa deposit with soft mud curls on the surface and dry vegetation form the place where the archaeological sites have been discovered. A more detailed examination of the basin indicated that older and more extended playa sediments were present but in large parts covered by wind blown sand. Between the 2 m and 4 m elevation lines, test excavations yielded reddish "playa sand" consisting of reworked or mixed-up playa silts. This probably marks the shore-line area of the old episodic lake. The position of most of the artefact material at the 2 m contour line is another good indicator for the highest water level that occurred here.

Three clusters of surface artefacts were found and subsequently recorded as three individual assemblages (00/80, 00/81, and 00/82). Meri 00/80 and 00/81 were situated at the former playa basin. On both sites the surface is covered by a

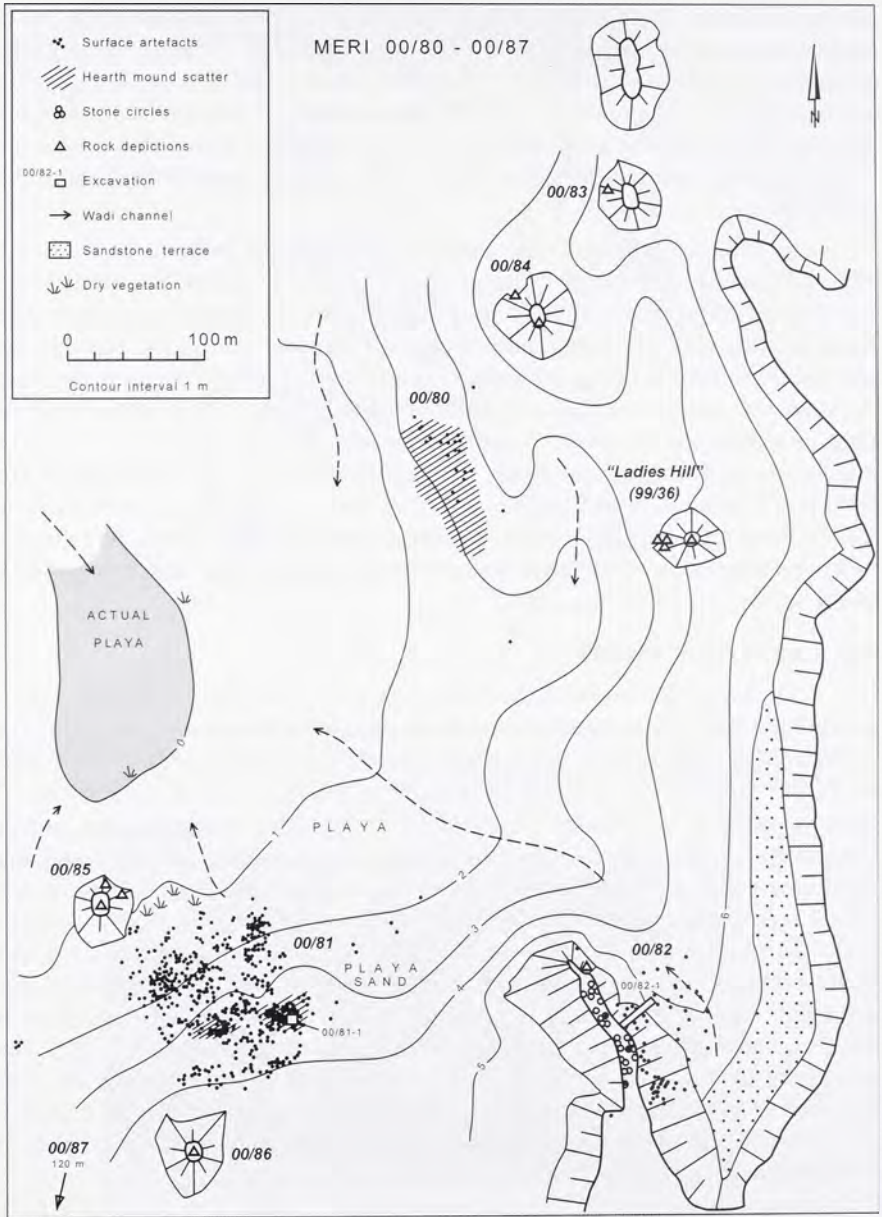


Fig. 3. Meri 00/80, 00/81, 00/82 and connected sites: site map.

dense scatter of grinding implements, knapping debitage and hearth stones. While on 00/80 and 00/82 only a small number of retouched tools and grinders were found, the area of 00/81 yielded the mass of the tool assemblage. 00/82 is situated on the east flank of a 15 m high spur of rock that juts out to the north-west into the basin. The top surface of the spur of rock, that measures approximately 100 m in length and less than 10 m in width, is covered by about 20 stone circles. Though stone artefacts within the stone structures were rare, the small collection that was made here, as well as a ^{14}C -date places the spur of rock "city" into the same period as the surface clusters down slope. It was therefore decided to put the three assemblages together into one that accounts 53 retouched tools, 27 cores, and 121 upper and lower grinders at least.

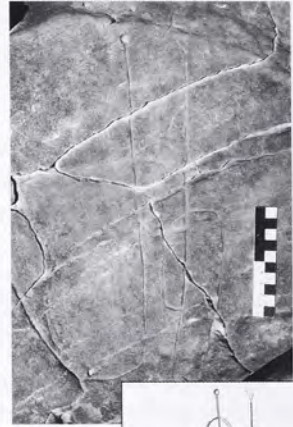
Although, the surface sites yielded an assemblage that is of great interest for the study presented here, the most impressive features are the depictions on the rocks surrounding the playa (Fig. 3). Among them are many women-like figures (Fig. 4) that gave the central hill (=Meri 99/36) the name "Ladies Hill". The documentation conducted in 2000 concentrated on 99/36. A survey carried out on the rock depictions, which were investigated by Bettina Patrick in 2002, indicated that the neighbouring hills, two in the north of 99/36, and three to the southwest, yielded further rock depictions which were briefly recorded, and listed as sites 00/83 to 00/87. Again, women-like depictions could be observed at many of the sites. The techniques in which they were carried out include pecking, incising, and grinding (Fig. 4). While the arms and the upper-bodies of the females are worked as single lines, either incised or pecked, the opulent lower part of the bodies, and in some cases the breasts, are outlined and often facially ground or pecked resembling a sunk relief. The manner in which the techniques are used can differ greatly, and different techniques can be combined in one figure. The females are often integrated into larger groups or couples facing each other. Other petroglyphs found in proximity to the female depictions are giraffes and a great variety of non-figurative elements and symbol-like objects, such as crosses and rows of lines.

The closest parallels are to be found among the rock depictions at Tineida village and along the Darb el-Ghubari east of Dakhla Oasis first recorded by Winkler (1938; 1939), and investigated by the DOP since the 1980s (Krzyżaniak 1987; 1990; Krzyżaniak & Kroeper 1985; 1990; 1991). Winkler's "pregnant women" (1939: 27) are obviously identical to what was found at the Ladies Hill, but they have not been found elsewhere until now (though Červíček 1992-93 associates Badarian/Naqada figurines). Although the females might point to a close connection of the desert dwellers of the Ladies Hill with Dakhla Oasis, it can not be made certain that the depictions and the camp sites around the Ladies Hill are contemporaneous. For the prehistoric time Winkler has suggested a two-



1

0 10 cm



2



4-1. Meri 99/36 "Ladies Hill", panel C (outlined and fully pecked).

4-2. Meri 00/85, panel J (incised).



3



4-3. Meri 00/87, panel B: (incised and partially polished).

Fig. 4. 1-3: Rock depictions of women-like figures.

phased relative chronology including the "Earliest Hunters" followed by the "Early Oasis Dwellers". However, absolute dating of rock art and its relation to other artefact classes is notoriously difficult. Winkler's "Early Oasis Dwellers" among which the female depictions have been subsumed can hardly be connected to the ceramic and lithic-based chronological sequence. Although the "Early Oasis Dwellers" have roughly been connected to the Sheikh Muftah phase (Krzyżaniak 1990), a somewhat earlier date can not be excluded.

The study area of "Chufu"

The area of Chufu is situated close to the eastern dune trains of the southern Great Sand Sea, with an east-west extension of approximately 30 km. Within this area the landscape is hilly with myriads of inselbergs ranging from small rocks to large hills up to 50 m high. The predominating north-south wind is channelled between the hills and ridges resulting in heavily wind-blasted surfaces and deep, longish blown-out basins. These pans are often several meters deep with steep sides. Their width normally does not exceed more than 100 m while their length can go up to several hundred meters (Fig. 5). A number of larger basins show Holocene stillwater sediments (playa sediments) intermitted by aeolian sand and weathered shale. The actual situation, however, displays a high amount of deflation up to several meters since the Mid-Holocene, and playa deposits are still reduced to remnants at the edges of the pans and adjacent hills.

At many playa basins artefact scatters have been found which date to the Holocene humid period. As in many other parts of the Western Desert, the basins created favourable living conditions after a rainfall when surface water ran-off and formed rain ponds in the basins for weeks or months. From a large amount of sites discovered during field surveys, three sites have been studied in detail, namely Chufu 02/14, 02/15, and 02/17. The investigations conducted at these sites comprised complete surface collections of selected areas, as well as a number of test excavations. As the study of Mid-Holocene assemblages was the primary subject, the Early Holocene or Epipalaeolithic surface clusters have not yet been recorded on these sites. To date the Mid-Holocene assemblage of site 02/15 has fully been examined; regarding the other assemblages, some preliminary conclusions can be presented.

The westernmost playa 02/14 was selected for a more detailed geomorphological analysis related to the archaeological study of the connected site. It can be seen as characteristic for the other playas. The playa depression of 02/14 extends about 300 m in north-south direction and about 200 m in east-west direction (Fig. 5). The centre of the basin is about 5-6 m below the surrounding surface indicating traces of advanced deflation (Fig. 6). Playa remains at a foot slope of the central hill (hill 3) partially overrun by slope rubble rises more than

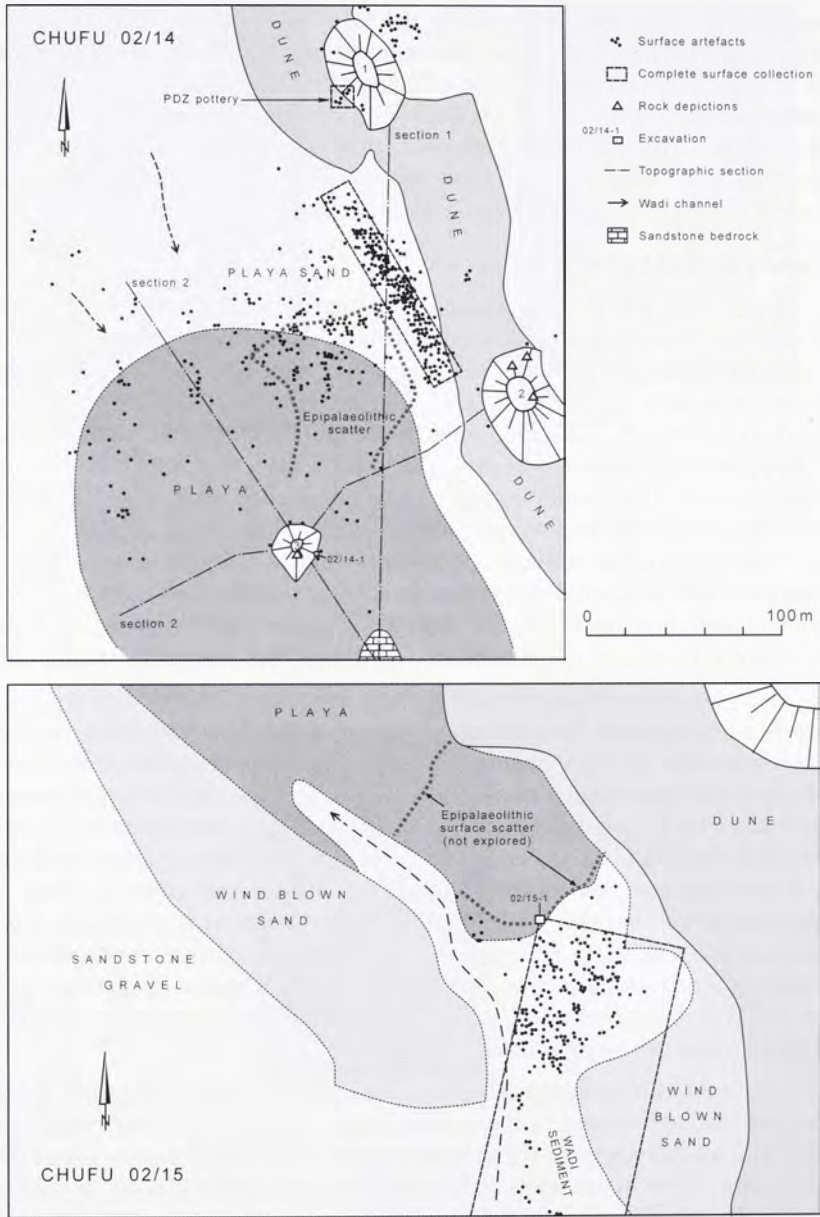


Fig. 5. Chufu 02/14 and 02/15: site maps.

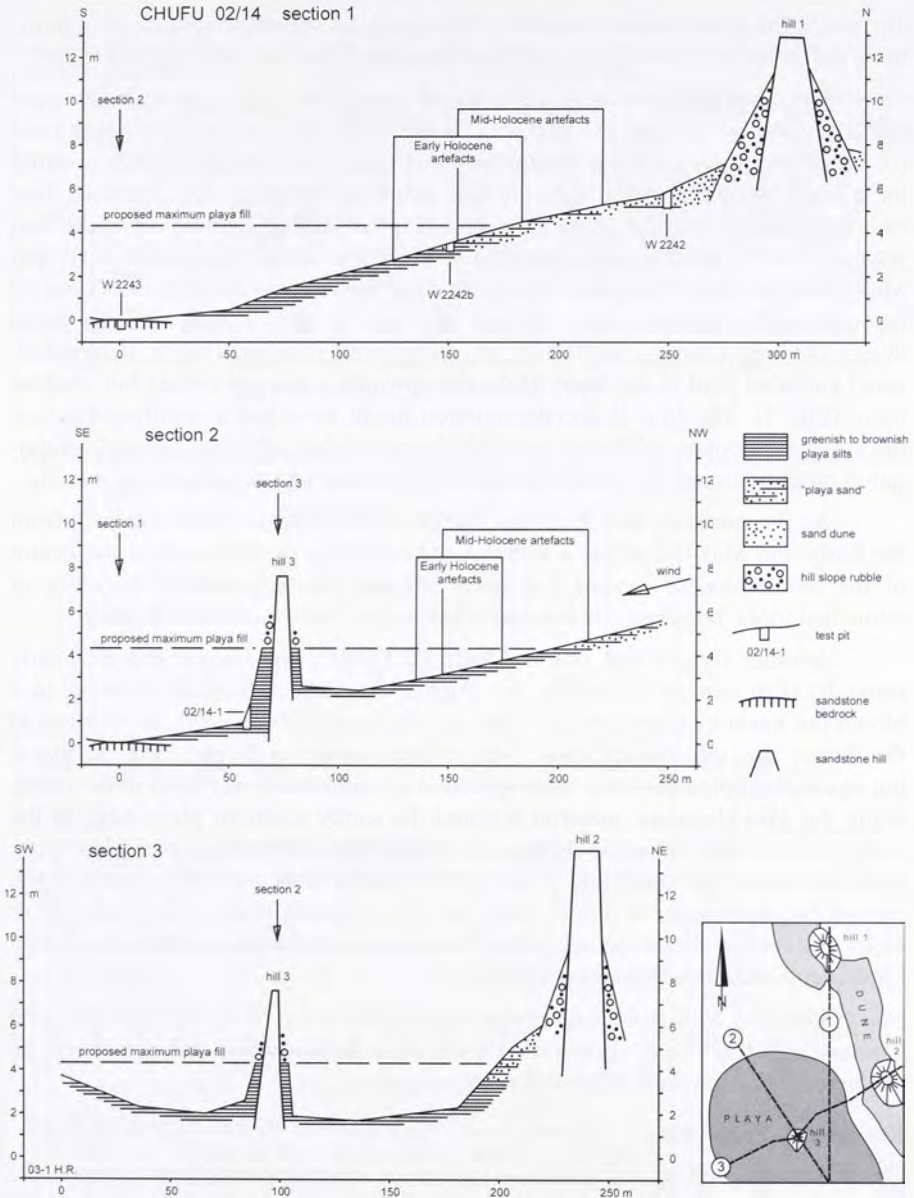


Fig. 6. Chufu 02/14: topo-sequence of the playa basin recorded along three sections.

4m above the actual basin's surface. This gives an approximate rate of a minimum deflation of 0.6 mm per year in the duration of the last 6000 or 7000 years.

The Holocene artefacts are situated along the playa edges; none were located in the central part. At all basins, it could be observed that Early Holocene (or Epipalaeolithic) artefacts were distributed on a lower level of the playa while the Mid-Holocene material scattered somewhat higher along the shoreline. Test excavations revealed that there is a stratigraphic sectioning between older and younger artefacts in the parts of the playa where the surface clusters of Early and Mid-Holocene tend to overlap. It is quite clear that the formation process can be reconstructed as a successive alluvial and aeolian sedimentation of the basin during the wet phase during which the water pond changed from a steep-sided, small surfaced pool in the Early Holocene towards a more extended but shallow basin (Fig. 7). The Mid-Holocene situation might have had a positive effect on the vegetation cover, while the probably increased loss of water through evaporation quickly turned the basin into an uncomfortable swampy place.

As the northern and north-eastern playa was covered with artefacts from the Early and Mid-Holocene, a sample area of 100 m by 10 m within the centre of the Mid-Holocene scatter has been selected for a complete recording of retouched tools, however, the inventory has not yet been examined in detail.

Another large playa site is Chufu 02/15 that has been discovered only some 1000 m east of 02/14 (Fig. 5). Again, the playa sediments occurred in a blown-out basin of approximately 300 m length and 100 m width. In contrast to the former site, the artefact scatter was situated at the southern end of the playa, but again, the Epipalaeolithic tools spread at a somewhat lower level in the north, while the Mid-Holocene material covered the sandy southern playa edge in the south and the adjacent wadi channel. As the surface artefacts of Early Holocene age could easily be sorted out, a study grid of about 200 m by 90 m was laid out for the documentation of stone tools. The grid covered most of the entire Mid-Holocene scatter. 81 retouched tools, 70 cores, and 134 nearly complete grinding implements have been recorded and studied.

The two Mid-Holocene assemblages from Meri 00/80-00/81-00/82, and Chufu 02/15 for which all recorded tools have been studied and listed will be presented and compared in the following chapters.

Retouched stone tools

The assemblages in question indicate a striking parallelism in the lithic tool kit (Table 1). The dominant group among the retouched tools are arrow-heads that range from 19-24%. Among them, bifacially retouched, leave-shaped and stemmed pieces dominate while laterally retouched, stemmed points are rare (Fig. 8; Fig. 9.1-8). Only one transversal arrow-head was found on site 02/15 (Fig. 9.5).

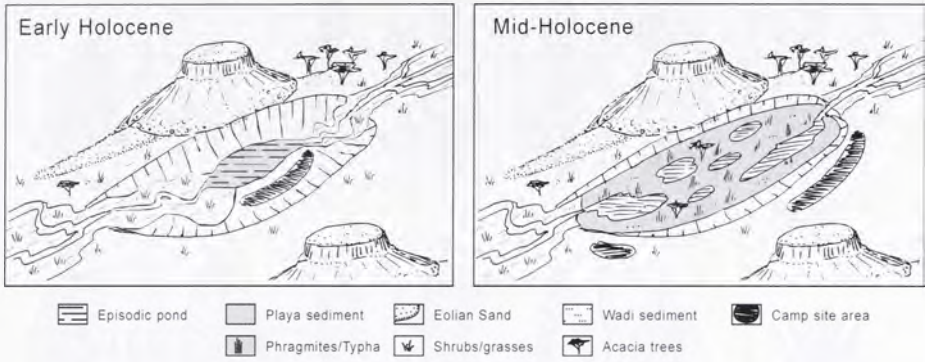


Fig. 7. Draft reconstruction of playa development at Chufu 02/14. Early Holocene: pond created after rainfall in deflated depression; Mid-Holocene: developed playa sedimentation created an extended playa basin with shallow ponds.

Type								unknown	total		
HUGOT	C	D		F		H					
ACACIA	5-8/15-18 101-108	65-68	60-64	51-58	283	231-248	201-216				
no.	12	1	2	1	1	3	1	21	Chufu 02/15		
%	57.1	4.8	9.5	4.8	4.8	14.3	4.8	100.1			
	71.4		28.6								
no.	10							21	Meri 00/80 00/81 00/82		
%	100.0							100.0			

Fig. 8. Chufu 02/15 and Meri 00/80, 00/81, 00/82: Frequencies of arrow-head types (including points as well as transversal arrow heads of type Tixier 89).

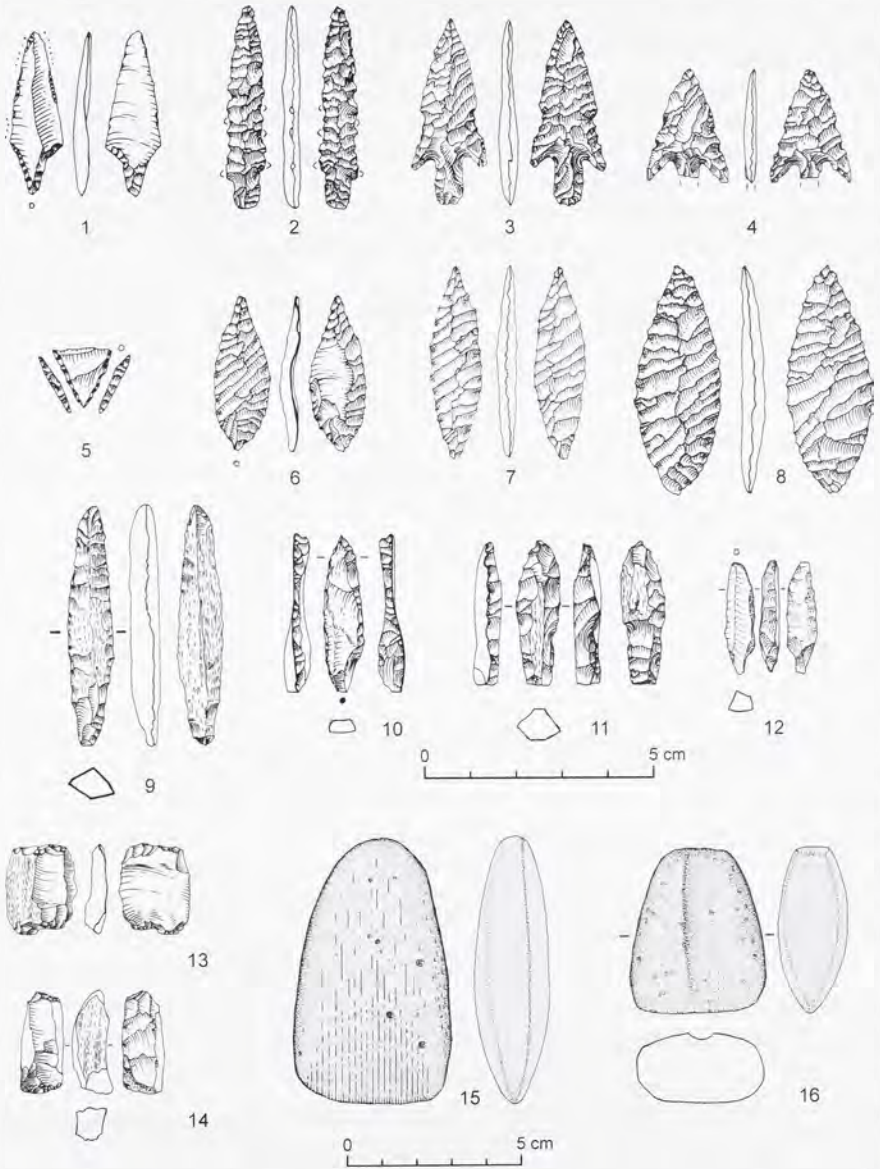


Fig. 9. Chufu 02/15: 1-4 stemmed and winged points; 5 transversal arrow-head; 6-8 leaf-shaped points; 9-12 mèches de foret; 13-14 scaled pieces; 15-16 ground planes (15 fossil wood; 16 black quartzite).

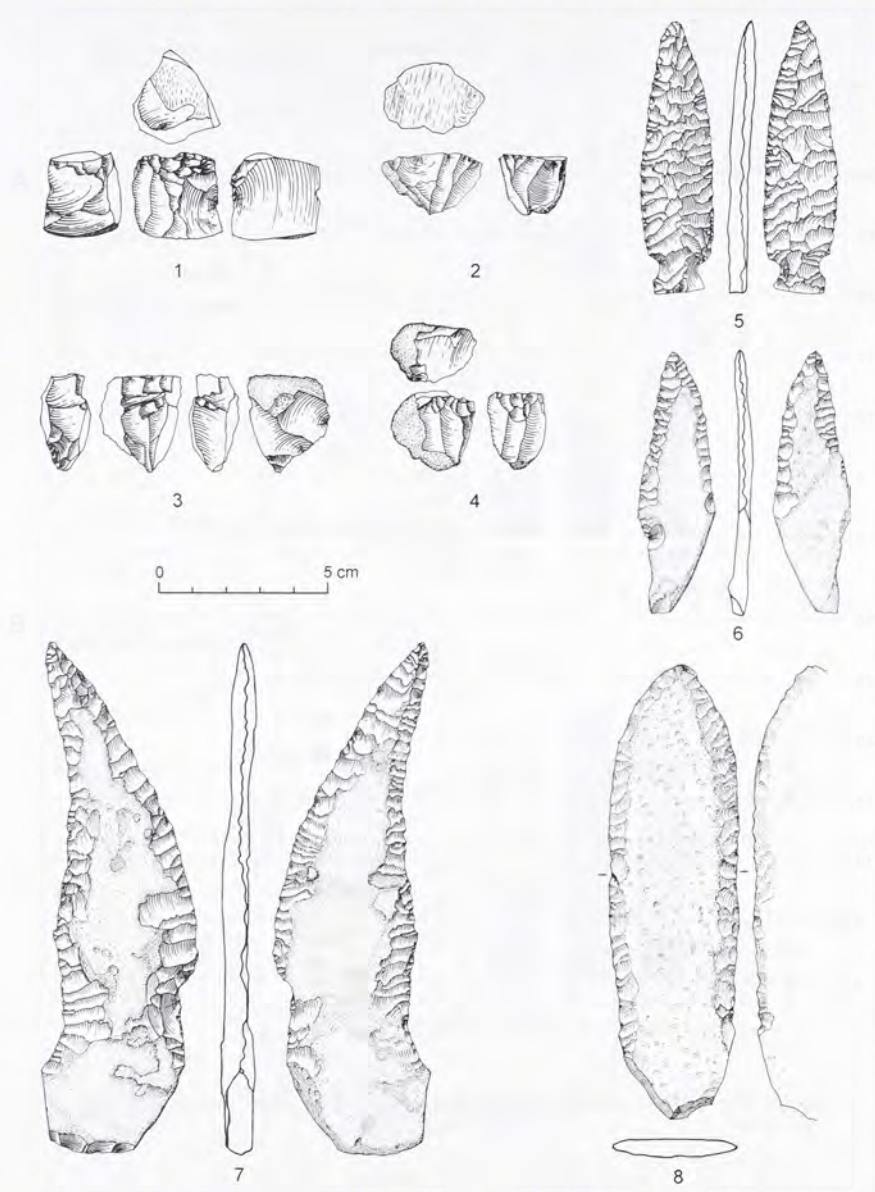


Fig. 10. Chufu 02/15: 1-4 cores (1, 4 flint; 2-3 fossil wood); 5-8 knives (5-7 flint; 8 black quartzitic sandstone).

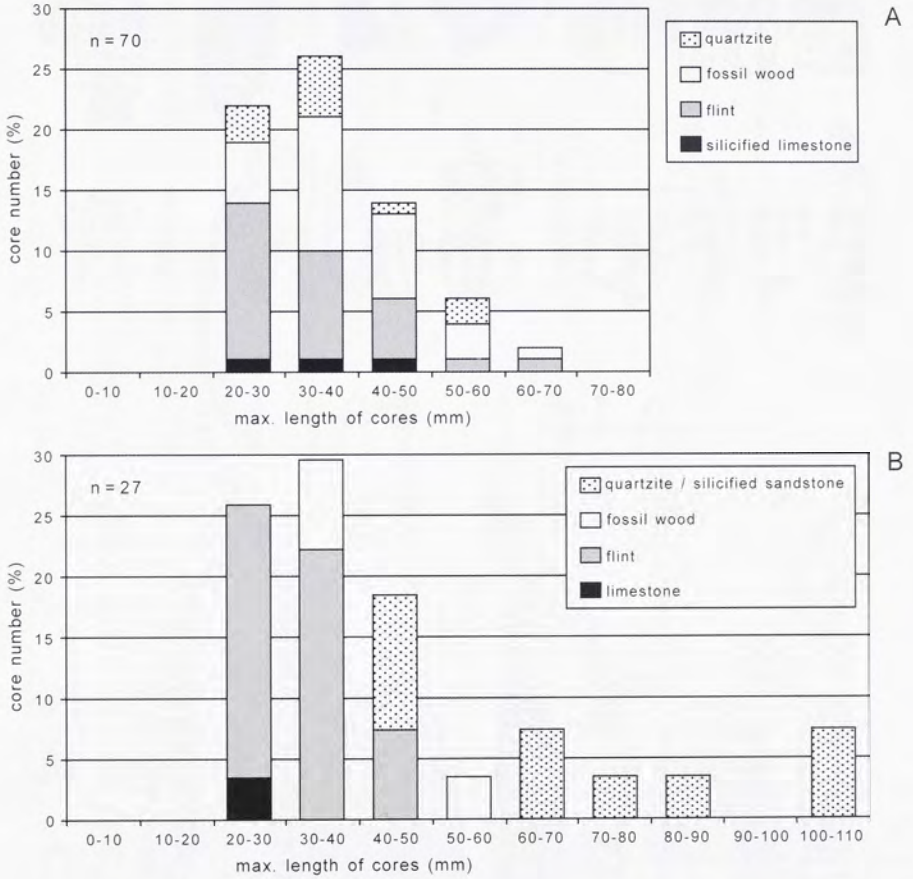


Fig. 11. Chufu 02/15 and Meri 00/80, 00/81, 00/82: core length and raw material.

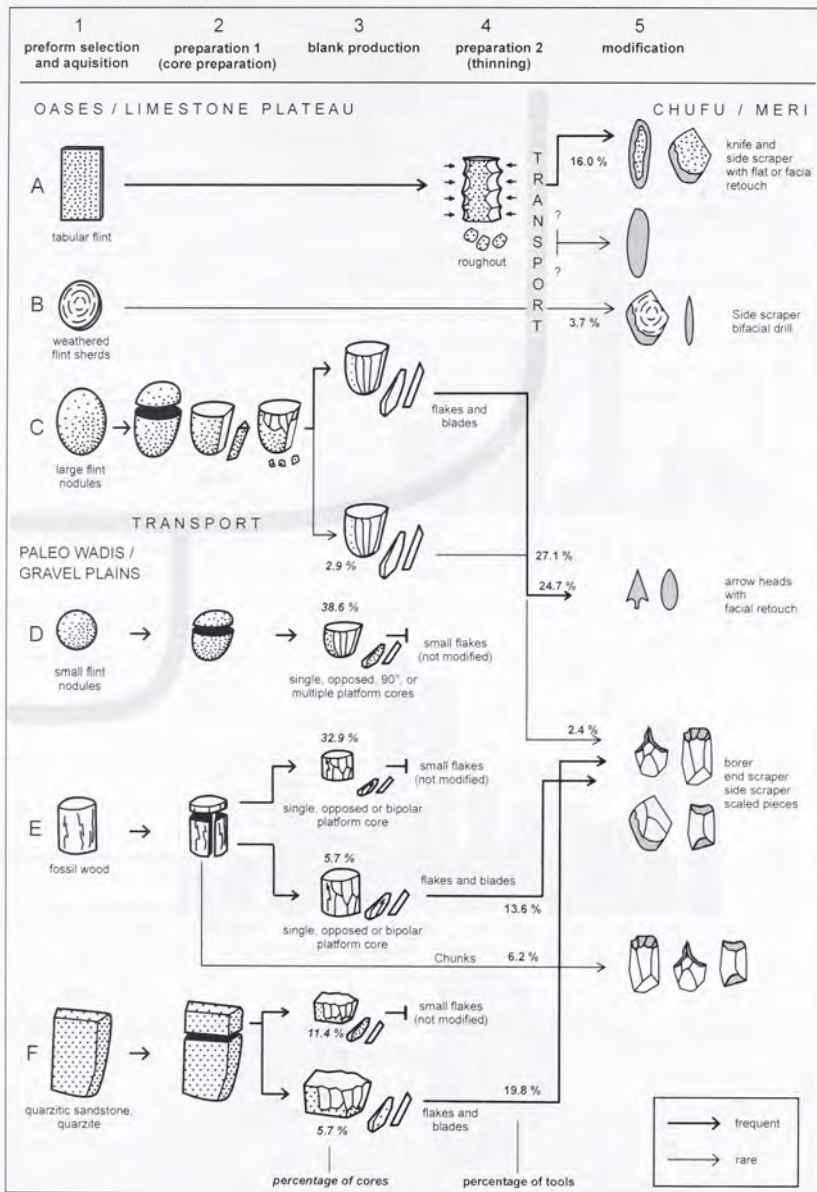


Fig. 12. Generalized reduction sequence (*chaîne opératoire*) for the Chufu/Meri area. Percentages on cores and tools are based on the assemblage of Chufu 02/15-surface (small cores < 5 cm).

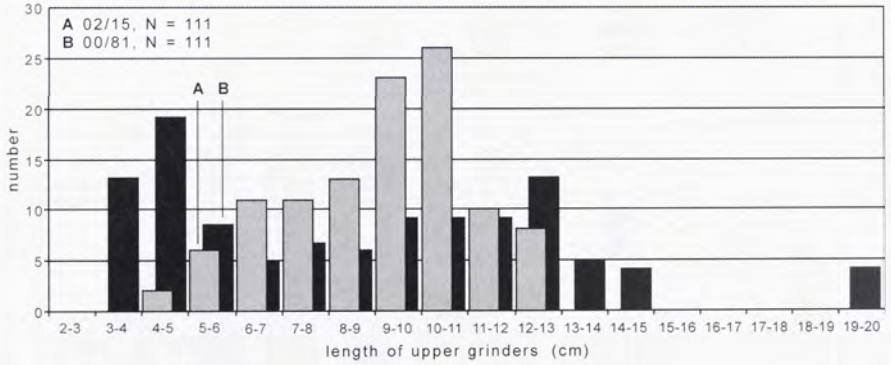
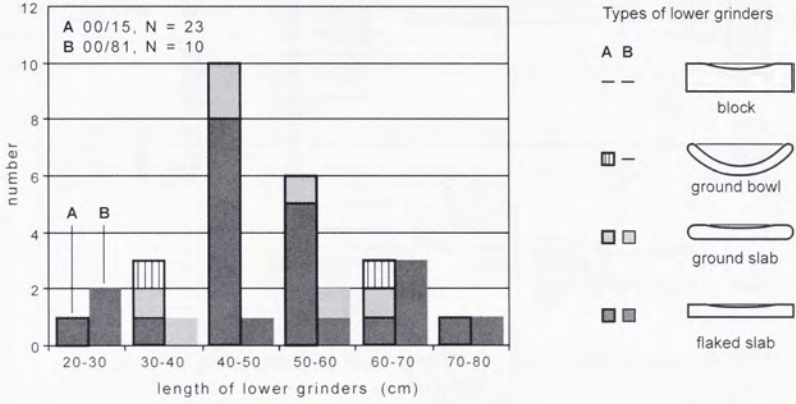


Fig. 13. Chufu 02/15 and Meri 00/80, 00/81, 00/82: type and length of lower and upper grinders (handstones).

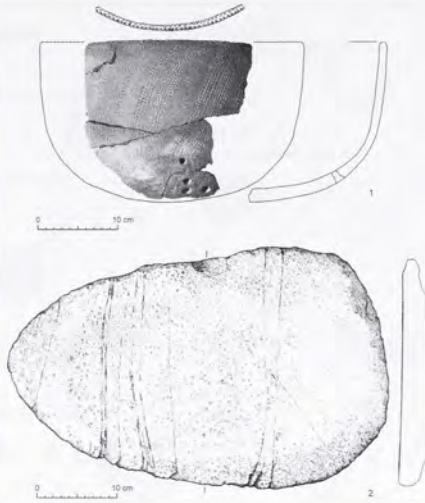


Fig. 14.1 Ceramic vessel decorated with packed dotted zigzag dated to about 5100 BC (Chufu 02/14); 14.2 Lower grinder with transport traces (Chufu 02/17).

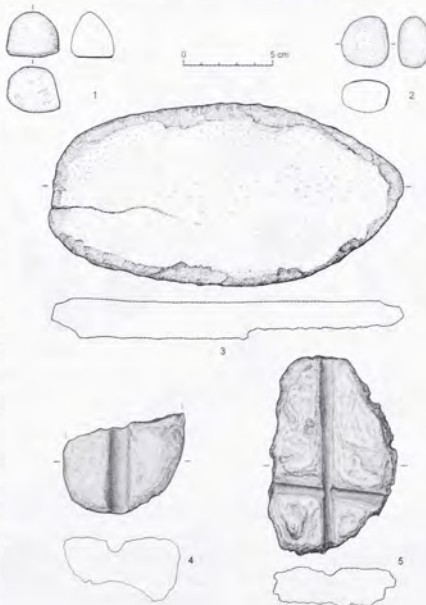


Fig. 15. Meri 00/81 and 00/82: 1-2 small upper grinders (quartzitic sandstone); 3 palette (quartzitic sandstone); 4-5 grooved abraders (fine sandstone).

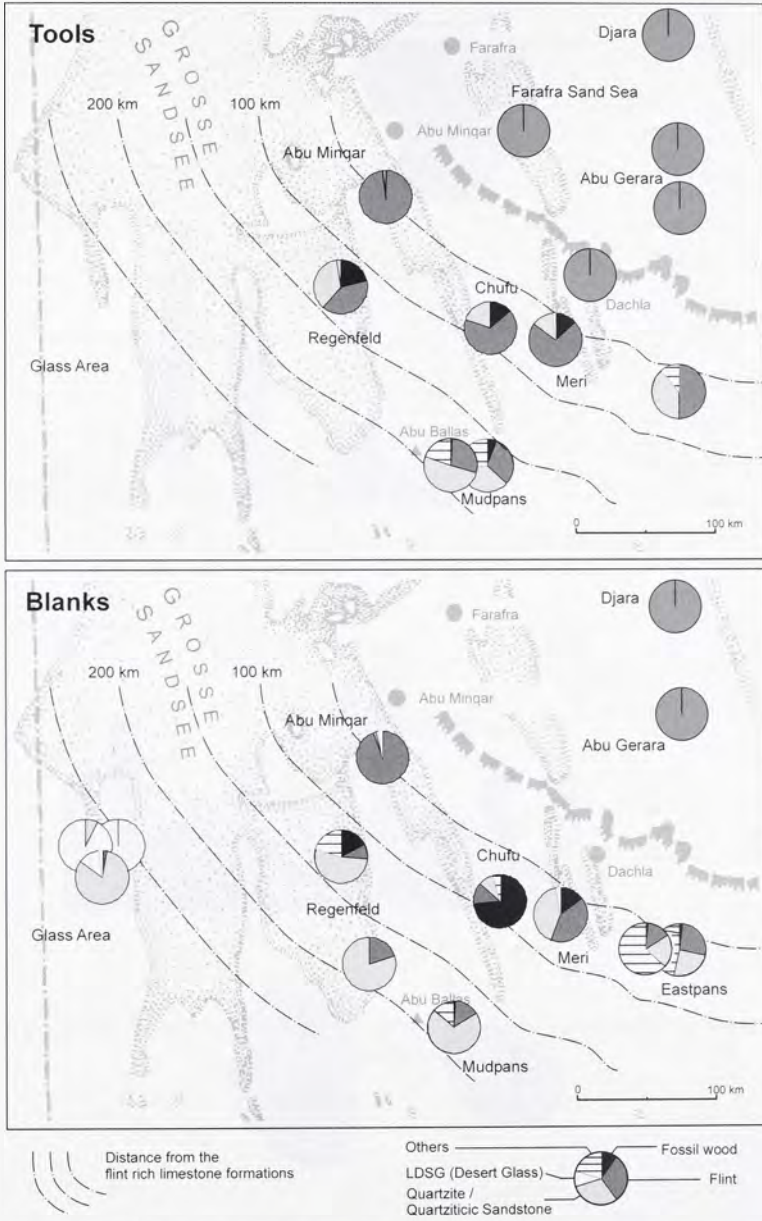


Fig. 16. Distribution and frequencies of raw materials of tools and blanks (source and site list in Fig. 17).

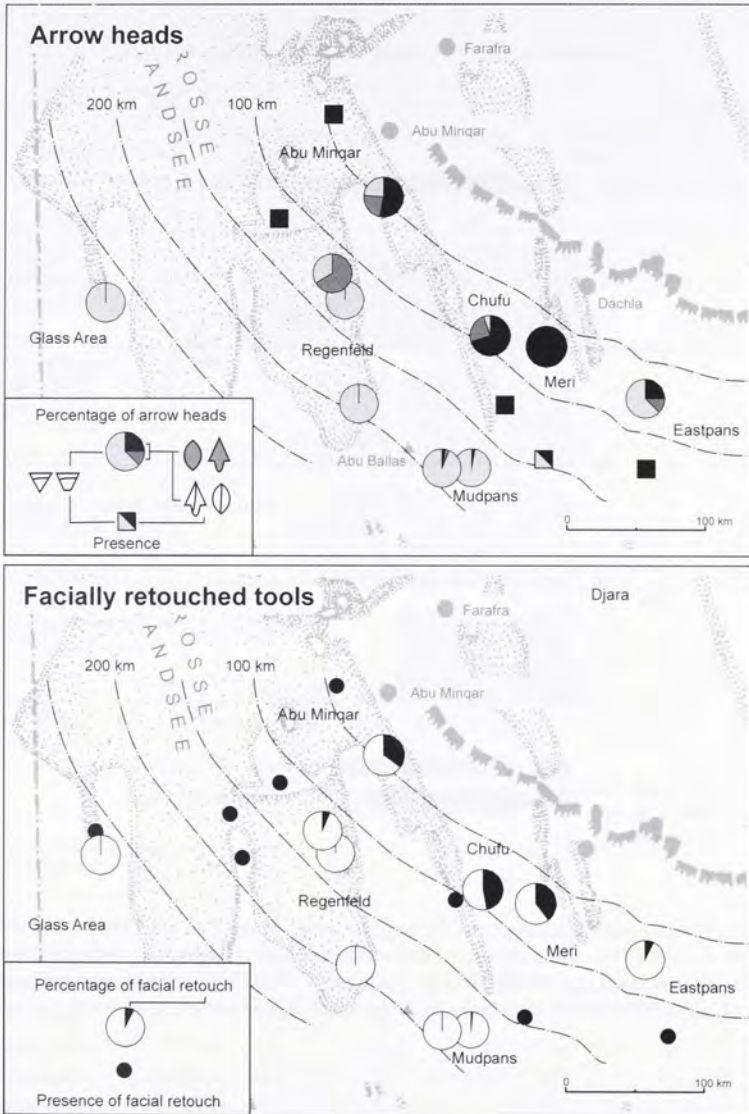


Fig. 17. Distribution and frequencies of arrow head classes and facially retouched tools. (source: Dakhla after McDonald 1982, 136; B.O.S./ACACIA sites southwest of Dakhla: Glass Area 81/61-1+2; 96/13-0; 96/13-3; Abu Minqar 81/55-5; Regenfeld 96/19-Cl. 1; 96/1-3-West; 96/15-3+4; Mudpans 85/56; 85/51-1 to 4; Chufu 02/15-0; Meri 00/80-0 to 00/82-0; Eastpans 95/1-1; 95/1-2).

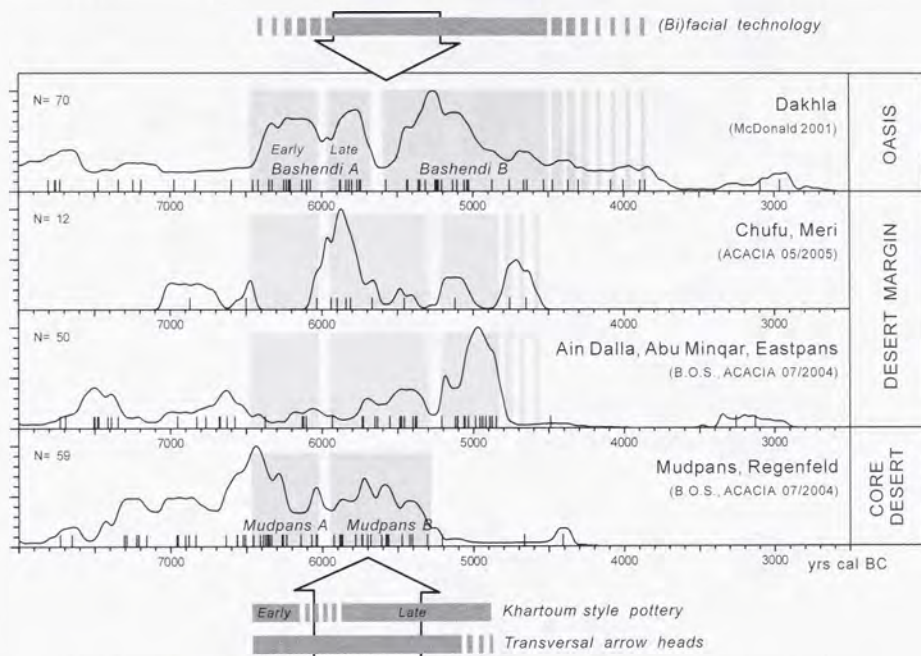


Fig. 18. Chronological sequences of the regions under study. The ticks on the x-scale are the mean values of the individual calibrated dates, the cumulative histograms represent the intensity of occupation (Calculated with CalPal program version 2005, www.calpal.de; calibration data base: CalPal 2005-SFCP Cal Curve, B. Weninger, ^{14}C -laboratory, University of Cologne).

Table 1 A. Chufu 02/15: frequencies of tool classes.

Tixier type	Tool type	no.	%	Blank type					Raw material				
				blade/flake	tabular	natural debris	chunk	unknown	flint	fossil wood	black silicif. sandst.	other silicif. sandst.	quartzite
1-11	End-scraper	5	6.2	4			1		2	3			
16	Meche de foret	5	6.2	3			2		1	2		2	
45	Backed point	1	1.2	1					1				
73-79	Notch/denticulate	5	6.2	5					5				
82	Segment	1	1.2	1					1				
89-93	Triangle/trapeze	1	1.2	1					1				
104	Scaled piece	4	4.9	2			2		1	3			
105	Edge-retouch	19	23.5	18		1			13	2	1	3	
	Arrow points	20	24.7	10				10	19				1
	Side-scraper	6	7.4	3	2	1			4			1	1
	Bifacial drill	1	1.2			1				1			
	Knife	11	13.6	1	10				4		1		6
	Roughout	2	2.5		1			1	2				
	<i>(bi)facial</i>	38	46.9										
	Total	81	100	49	13	3	5	11	54	11	2	6	8
	%			60.5	16.0	3.7	6.2	13.6	66.7	13.6	2.5	7.4	9.9

Table 1 B. Meri 00/80, 00/81, 00/82: frequencies of tool classes.

Tixier type	Tool type	no.	%	Blank type					Raw material				
				blade/flake	tabular	natural debris	palaeo-lithic flake	unknown	flint	fossil wood	black silicif. sandst.	other silicif. sandst.	quartzite
1-11	End-scraper	1	1.9	1					1				
12	Single piercer	2	3.8	2					1				1
16	Meche de foret	6	11.3	5		1				5	1		
66	Backed bladelet	1	1.9	1					1				
73-79	Notch/denticulate	6	11.3	4			2		4		1		1
80	Truncation	2	3.8	1		1			2				
104	Scaled piece	3	5.7	1		2			1	2			
105	Edge-retouch	16	30.2	10	2	1	1	2	12		2	1	1
	Arrow points	10	18.9	5		3		2	10				
	Side-scraper	1	1.9		1				1				
	Knife	4	7.5		1				4				
	Roughout	1	1.9		1				1				
	<i>(bi)facial</i>	21	39.6										
	Total	53	100.1	30	8	8	3	4	38	7	4	1	3
	%			56.6	15.1	15.1	5.7	7.5	71.7	13.2	7.5	1.9	5.7

Knives range from about 8 to 14% and make up another important tool group (Fig. 10.5-8). In both inventories, *mèches de foret* (Fig. 9.9-12), notches/denticulates, and to some extent splintered or scaled pieces (Fig. 9.13-14) are frequent tool types. Only end-scrapers show significant differences between both assemblages, as they amount to about 6% on site 02/15, while the sites of Meri have only 2%.

More than two thirds of the tools in both assemblages are made out of flint (synonymous for flint *and* chert) (Table 1). Among the flints, two or three varieties can be listed as very frequent: (1) a soft, opaque grey flint with dusky weathered surfaces (to be found in form of large nodules or weathered pieces in the wadi terraces of the Limestone Plateau escarpment at Dakhla, or on the Plateau itself); (2) a reddish to brownish nodular flint with brown scarred cortex (the nodules are very small and might have been collected from Wadi gravels in front of the Plateau escarpment); (3) a brownish to yellowish caramel flint which is of better quality for flint knapping than the varieties previously mentioned (the caramel flint was predominantly found in geological formations that crop out at the Plateau escarpment east and north of Kharga and along the Abu Gerara escarpment). Less frequent is the so-called "silicified limestone". This is, in fact, a glossy nodular flint (non-reactive to hydrochloric acid) of opaque white colour. Outcrops of this flint have only been found in the Farafra Sand Sea.

Chufu and Meri are situated within the Nubian sandstone formations, and it is quite clear that all flint varieties are from non-local resources that were exploited elsewhere on the limestone.

Fossil wood which was used for the tool production within proportions of 13-14% is a local or sub-local resource that can be collected within a day's walk nearly anywhere southwest of Dakhla and in the Great Sand Sea. Quartzite and sub-metamorphic sandstone (here paraphrased as "quartzitic sandstone") has a total account of 15-20%. Theoretically it can be found anywhere on the sandstone formations, however, outcrops of quartzite and high quality metamorphic sandstone are rare in the region. However, a number of large quartzite cores found on the sites of Chufu and Meri may point to the presence of unknown outcrops not far from the sites.

At first glance, the analysis of the raw material of the cores presents a picture that seems to be in good accordance with the tool analysis (Fig. 11): Flint is the most important source, followed by fossil wood and quartzite/quartzitic sandstone. It is, however, somewhat surprising that most cores are to be found in the size classes of 20-40 mm length (Fig. 11). These small cores (Fig. 10.1-4) are not well-exhausted, as one might expect, but often show only a single knapping platform and/or a high percentage of cortex. The cortical cores are predominantly made out of the small nodules of the red-brown flint variety mentioned above.

which are too small for tool production. In turn, many tools collected on the sites of Chufu and Meri consist of flint varieties that have not been flaked on the sites. This provides quite a good argument that most retouched tools were produced outside of Chufu and Meri, possibly in Dakhla or on the Limestone Plateau (Fig. 12). To prove this reconstruction of the production sequences, the debitage as found within two excavation squares on Chufu 02/15 and Meri 00/81 has been examined. Although, the percentages of raw materials vary to some extent in the excavations, the flint varieties which were used for the tools could not be found among the production waste. As there is nearly no tool that is small enough to be struck off from these nodules, the only explanation that can be offered is that the flakes have been produced in order to get small sharp tools without the need of any edge retouchment.

About 20-30% of the tools were made out of tabular flint or flint sherds that were naturally produced by thermal and salt weathering. This implies a production strategy that concentrates on the selection of useful natural blanks on the flint outcrops. Therefore a blank production was not needed, and the flint knapper could immediately start shaping and thinning the natural blank in order to create the working edges. This kind of *chaîne opératoire* is most characteristic for the “(bi)facial techno-complex” on the Egyptian Limestone Plateau for which the sites of Djara and Abu Gerara can be listed (Kindermann 2003).

It was often not necessary to thin tabular flint, as the pre-forms were thin enough. Knives were predominantly made out of tabular flint, and this explains why most knives do not have a complete facial retouchment – which would appear as a result of thinning –, but only a flat working of the edges (Fig. 10.6-8). Another distinctive relationship between form and function can be observed for the splintered pieces. They were often made out of massive chunks either naturally or artificially formed (Fig. 9.13-14).

The spectrum of flaked tools indicates an impressive parallelism to the oases and the Limestone Plateau region, though there are some minor differences. While on the Plateau and in Dakhla side-blow flakes and flaked planes are common for the Mid-Holocene since the Late Bashendi A/Bashendi B and Djara B phases, they are absent in the Chufu/Meri area, and we do not have a plausible explanation for this phenomenon yet. As planes probably were used for cutting and processing wood, this could be an indication for rather sparse wood resources in Chufu and Meri. However, this is questionable, since two ground planes or axes were found at Chufu 02/15 (Fig. 9.15-16).

In conclusion, the schematic reconstruction of the production sequences (Fig. 12) lists the major lithic strategies performed. It is clear that many primary procedures for tool production did not take place on the sites of Chufu and Meri, but elsewhere; and also that there is a high amount of small cores used for the

production of small unmodified flakes. Raw material procurement, tool tradition and the general strategies that become visible in the *chaîne opératoire* clearly point to frequent contacts with the oases and the plateau region to the north and northeast. In fact the Chufu/Meri area can be linked to the “(bi)facial techno-complex” for which sites on the Egyptian Limestone Plateau (Kindermann 2003; 2004; Riemer 2003b) and in the oases of Dakhla (McDonald 1999; 2002), Farafra (Barich & Hassan 1988; Barich & Lucarini 2002), south of Abu Minqar (Klees 1989), and Kharga (Caton-Thompson 1952) can be listed.

Grinding stones

The grinding equipment is a very dominant group of tools on all large sites of the Mid-Holocene, which probably was used to process wild cereals. Unfortunately, most of the lower grinders are fragmented, and often hundreds of tiny pieces of grinding slabs occur on the sites. For instance, the surface scatter of site Meri 00/81 revealed 372 small fragments of lower grinders while only 10 lower grinders were preserved in a way that allowed to measure or reconstruct the length and to evaluate the shape (As a standard formula to reconstruct size and shape, more than 50% of a grinding stone must be available).

In the assemblages of Chufu and Meri grinding stones are numerous (Fig. 13). Listing only the complete or reconstructed grinders, the sites yielded 33 lower grinders and 222 handstones. The lower grinders were made on relatively thin slabs with flaked or polished edges, or made as fine polished bowls out of sandstone blocks. One lower grinder from 02/17 has rope marks and abrasions on it which indicate that it was obviously tied for transport (Fig. 14.2). Immobile block grinders were not used on the sites.

The high amount of grinders from the Mid-Holocene sites points to the intensive utilisation of wild cereals. It is possible to suggest that after rainfall there was a dense grass vegetation on the sandy substrate along the neighboured dune trains, which then was exploited by the prehistoric people.

There is a number of smaller grinders which can be described as palettes (Fig. 15.3). On the site of Meri 00/81 they are very frequent. The corresponding handstones are made of quartzitic sandstone or of natural quartz pebbles (Fig. 15.1-2). The bimodal distribution of the size classes on site Meri 00/81 (Fig. 13) may indicate that grinders and palettes were individual functional classes. It is most likely that the palettes were not used for the preparation of cereals, but to powder colour sediments. The shale and sandstone formations in the area provide intensive colour pigments in red and yellow.

As a special type of tool, grooved abraders have been found in a small number on the sites of Chufu and Meri (Fig. 15.4-5). They were made out of a

fine-grained sandstone, probably in order to polish arrow shafts or ostrich egg shell beads.

Pottery

As implied by the assemblage of 02/15, the people who occupied the Chufu area used the tool kit of the northern oases and the Limestone Plateau. They obviously entered the oases of Dakhla during the dry season while they were in the Chufu area after rainfall. Only little evidence occurs in the Chufu area which points to a southern influence; for instance, transversal arrow-heads are very rare.

Considering this, it was expected to find some pottery in Chufu which would resemble the wares of the Late Bashendi A or Bashendi B cultural units of Dakhla Oasis. Unfortunately, pottery is nearly absent on the sites of the Chufu area, with a small number of exceptions. Many potsherds found show traces of advanced wind-abrasion, and are difficult to determine. However, two well preserved pots were found on site 02/14 buried among the rubble of a hill slope. The outer surfaces show a packed dotted zigzag pattern characteristic for the Khartoum style (Fig. 14.1). It is known from a number of sites that the northern extent of Khartoum style pottery reached Mudpans and Eastpans, Dakhla Oasis, and Abu Tartur (Hope 2002; Warfe 2003; Riemer & Jesse in press). The mentioned desert sites yielded the dotted zigzag pattern that was found in stratigraphic connection to radiocarbon dates around 6500-6300 BC. In Dakhla this pottery decoration falls into the Bashendi A unit, that might be parallel with our dates. The dating is, however, a crucial point, as the pots of Chufu are tempered with plant material while the pottery mentioned above yielded a mineral temper. Plant temper combined with packed dotted zigzag was found in the Glass Area at the western border of the Great Sand Sea, but the ^{14}C -dates fall into a period between 5400-4900 BC. A ^{14}C -date recently made on the tempering agent of one of the Chufu sherds yielded an age around 5100 BC (Tab. 2), and it seems that the plant temper marks a younger horizon of Khartoum style tradition into Egypt (Riemer & Jesse in press).

Notwithstanding, the two Chufu pots decorated in dotted zigzag pattern clearly indicate a southern influence in Chufu, while undecorated wares representing the typical Dakhla pottery tradition have only been discovered in a very small number.

Subsistence

At date, only wild animals are indicated for the sites of Chufu and Meri, but further excavations and determinations of bones have to be expected. It is still an open question whether domesticated animals were introduced into the

region. A first step towards pastoralism is evidenced for the Late Bashendi A unit in Dakhla Oasis as well as for Eastpans, some 100 km south of Dakhla, at about 5000 BC. The latter gives reason to suggest that pastoral nomads (which in fact combined hunting, gathering and herding as a multi-resource management) penetrated the desert in the vicinity of the oases. In contrast, bones of domesticated animals were not observed in the assemblages of Mudpans and Regenfled, and it was suggested that the herds were not able to cover the enormous distances between the water pools in that area (Riemer 2005). On the other hand, the areas of Chufu and Meri are between 80 and 100 km away from Dakhla; therefore, they lie in the range of the herders' territories, such as the sites of Eastpans.

Conclusions on spatial distribution and chronology

During the study of the Mid-Holocene assemblages recorded in the area of Regenfled, situated in the centre of the southern Great Sand Sea some 250 km away from Dakhla Oasis, a small proportion of facially retouched tools have been registered, as well as a certain amount of non-local flint, both of which point to contacts with the oases region and the Egyptian Limestone Plateau behind of the oases (Fig. 16-17). Raw materials and artefacts must have been distributed during the seasonal or episodic movements of the desert dwellers, as exchange processes probably played only a minor role in the desert.

The ongoing field work in the areas of Chufu and Meri has provided large Mid-Holocene prehistoric sites between the Great Sand Sea and Dakhla Oasis. As expected due to the hypothesis developed on the basis of the Regenfled analysis, the lithics found on the two sites of Chufu and Meri indicate a predominant influence from the Dakhla and Limestone Plateau area, respectively. Among the tool types are stemmed and leave-shaped points, knives, and side-scrapers, which are so characteristic for the sites of Dakhla, Abu Gerara, Djara etc. The facial/bifacial technique is the most prominent modification type for many tool types found on the sites, and places the area, some 100 km southwest of Dakhla, within the "(bi)facial techno-complex". A more detailed picture was drawn by the study of the lithic production sequences. They principally are the same as on the Limestone Plateau, however, the availability of high quality flint on the plateau and the absence of flint on the Nubian Sandstone southwest of Dakhla results in an effective decrease of larger flint cores and primary products on the sites of Chufu and Meri.

As was outlined above, it is apparent that the prehistoric dwellers of Chufu and Meri came from the northeast, most likely from Dakhla Oasis. However, it can not be denied that there is also some intrusion from another influence that clearly points to the south or southwest. The most important argument is the pottery of Chufu 02/14, decorated with the packed dotted zigzag motif, that can

be connected to the rocker stamp technique of the Khartoum style pottery in Sudan and southern Egypt. Local pottery of the Dakhla tradition is surprisingly rare on the sites of Chufu and Meri. The presence or absence of pottery does not consequently correlate with lithic traditions elsewhere, as the difference between Farafra or Djara, on the one hand (nearly without pottery), and Dakhla or Abu Gerara, on the other hand (many potsherds) illustrate (cf. Lucarini 2002; Kindermann 2004; Hope 2002; Riemer 2003 a). However these regions belong to the “(bi)facial complex”. We do not yet know why some prehistoric groups in Egypt tended to use pottery, and others did not. This might be explained by different subsistence strategies (presence or absence of pastoral elements?) and/or the diverging distances which had to be covered without water, but we do not have any certain evidence about this as yet.

Looking at the tool types, the transversal arrow-head is the only type that can securely be connected to a southern and southwestern influence, as this kind of arrow-head is characteristic on sites in the Gilf Kebir, at Mudpans, and elsewhere in the southwest (Fig. 17). Although the transversal arrow-head is not absent on the sites of Chufu (Fig. 9.5), stemmed and leave-shaped points are clearly dominant. This may illustrate that groups from the south only rarely came into the Dakhla region as a consequence of the enormous distances which had to be covered without groundwater resources, while the groups from Dakhla regularly visited the desert in the vicinity. It would not be surprising if climatic influences also played a role within these overlapping traditions, as the border zone between winter and summer rains has most likely to be located in the area between Mudpans and Dakhla. While the archaeobotanical record at Mudpans points to a summer rain domination (Neumann 1989), Dakhla might be oriented to the winter rain zone, or at least lies within a transition zone with overlapping summer and winter rains. Sites and artefacts that have been found deep in the desert, such as at Mudpans and Regenfeld, probably represent the rounds through the desert enabled by summer rain. Whereas the Chufu/Meri-area can be allocated to a desert margin close to Dakhla Oasis that profited from both, summer and winter rains, or that could have been occupied during the drier years when Regenfeld was outside the range of macro-movement of the prehistoric groups.

The study of the chronological development indicates another difference between the areas in question. The ¹⁴C-dates used for the this comparison are figured as calibrated cumulative curves using the CalPal program (Fig. 18). They comprise 70 dates from Dakhla Oasis (McDonald 2001), 59 dates from Mudpans and Regenfeld representing the faraway core desert, and a total of 62 dates from areas close to the oases region (“desert margin”), among them 12 dates from the Chufu and Meri areas (Table 2). The graphs listed in order of the areas mentioned suggest a shifting of the final depopulation (“exodus event”) when the

Table 2. ^{14}C dates from the study areas of Chufu and Meri.

Lab.	site	feature	mat. ¹	^{14}C -yrs BP	age cal BC ²
KIA-18416	Chufu 01/01-4	upper playa	Ch	6960 +/- 35	5840 +/- 60
KIA-18414	Chufu 02/14-1	camp fire	Ch	7000 +/- 35	5900 +/- 60
KIA-21540	Chufu 02/14	surface	CPT	6165 +/- 50	5120 +/- 80
KIA-18413	Chufu 02/15-1	camp fire	Ch	7955 +/- 55	6870 +/- 120
KIA-18412	Chufu 02/15-2	hearth mound	Ch	7160 +/- 35	6030 +/- 30
KN-5492	Chufu 02/17-2	hearth mound	Ch	5800 +/- 40	4650 +/- 50
KN-5491	Chufu 02/17-3	fire place	Ch	5880 +/- 40	4760 +/- 40
KIA-21545	Chufu 02/17-4	knapping place	Ch	7640 +/- 35	6500 +/- 50
Poz-8628	Meri 00/81-1	camp fire	Ch	6920 +/- 50	5810 +/- 60
KN-5476	Meri 00/82-1	ash slope, bottom	Ch	6755 +/- 50	5670 +/- 40
KN-5594	Meri 00/82-1	ash slope, top	Ch	6875 +/- 45	5770 +/- 50
Poz-8586	Meri 00/82-2	stone circle	OES	7050 +/- 40	5940 +/- 50

¹ abbreviations used for material: Ch = charcoal; OES = ostrich egg shell; CPT = charred plant temper (Packed dotted zizzag potsherd).

² calculated by 2-D Dispersion Calibration Program CalPal, Version 06/2005 (calibration data base: CalPal 2005-SFCP Cal Curve) by B. Weninger, ^{14}C Laboratory, University of Cologne.

occupational history of the desert areas stopped as a consequence of the drying trend at the end of the Holocene humid phase. The drop off in dates from the areas in the core desert about 5300 BC can be seen as the earliest climatic signal for the onset of the Eastern Sahara deterioration trend (Gehlen et al. 2002; Bubenzer & Riemer in press). The curve calculated for Dakhla Oasis illustrates a decrease of the dates about 300 years later, as well as a low-levelled continuation during the following millennia. The areas of the desert margins at Chufu, Meri, southwest of Ain Dalla and Abu Minqar, as well as at Eastpans south of Dakhla surprisingly neither follow the curves of Mudpans and Regenfled nor that of Dakhla. Here, the final occupation phase took place around 5000 BC. This

observation is important in the face of the fact that the deterioration of the Eastern Sahara was rather a continuous trend than a rapid fall off. It is quite logical that differences in the carrying capacities of the various areas, and the growing risks with increase in distance from the oasis must have led to a diversified occupational history.

Having outlined the study of the Chufu and Meri sites that yielded detailed insight into the spatial diversity of archaeological traditions, a provisional map of the spatial distribution of archaeological traditions in Egypt's Western Desert during the Mid-Holocene humid phase can be drawn. Two different techno-complexes can be separated on the basis of the flaked lithic material, and to some extent on the pottery as well. A transition zone, where both traditions in material culture are to be found, can be explained as being the result of overlapping territories. Throughout the Great Sand Sea, both traditions are well-separated as a consequence of the enormous desert distances that had to be covered during the seasonal movement (Fig. 1). At Nabta Playa and Bir Kiseiba, both traditions can be observed in close proximity (Wendorf et al. 2001). Sites that can be linked to the northern bifacial techno-complex have been found predominantly atop the Limestone Plateau north of Nabta/Kiseiba, while the sites around the large playa basins can be assigned to one of the two traditions, or at least indicate assemblages composed of both.

It is quite interesting to see that there is rather a north-south gradient that separates the cultural traditions than a west-east change in material diversity, alike the one which has been subsumed among the model of the Sahara-Sudan-Neolithic vs. the Neolithic of Capsien tradition across the western and parts of the central Sahara. And again, there are some arguments which point to the climatic gradient between the northern and the southern Sahara, primarily the differences in the summer-winter rain distribution (Vernet 1995), that might have been the basic motor behind the cultural spread.

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J.L. Thompson and G.M. Madden

Skeletal Biology of Neolithic Human Remains from Dakhleh Oasis, Egypt

Introduction

Dakhleh Oasis is located in the Western Desert of Egypt, roughly 800 km south and west of Cairo and 250 km west of Luxor (Mills 1979). One of 5 major Oases in the region, it measures about 100 km in width by 25 km in length (Cook et al. 1988). Since 1977, the Dakhleh Oasis Project has been investigating the prehistory and history from the mid-Pleistocene to Roman times. One of us (JLT) was invited to join the project in 1996, to focus on the recovery and analysis of prehistoric human remains. Human remains are well known in the oasis from Pharaonic and Roman times (e.g. Molto 2000; Fairgrieve & Molto 2000) but, prior to these times, no skeletal evidence has been analyzed until recently.

During the initial phases of the Dakhleh Oasis Project, much of the Oasis was surveyed to discover the extent and nature of the archaeological material remains. At this time, several skeletons were noted eroding out of sediments beneath, and/or from, a deflated surface associated with the Sheikh Muftah cultural unit (McDonald, personal communication). Artifacts from this unit include pottery, ground stone, copper fragments, and chipped stone (McDonald et al. 2001). Faunal remains of domestic and wild fauna are associated with these artifacts. Radiocarbon dating was carried out on charcoal from hearths from several sites. Initial results indicated dates from ca. 7800 to 4720 ± 80 B.P. for the Sheikh Muftah cultural unit (McDonald 1993), but these now have been revised to ca. 5200-4000 B.P. (McDonald et al. 2001). One skeleton was retrieved in the early 1980's and placed in storage until recently.

In 1996, three of these burials, now in a fragmented state of preservation, were relocated near the village of Sheikh Muftah. In subsequent field seasons, two more, almost complete individuals were found, not yet eroded from the soil.

These two skeletons were fairly intact, but in a fragile state, requiring the use of consolidants to ensure their preservation during excavation. Four of these five individuals were buried in a flexed position indicating a common mortuary practice. Fragments of a sixth individual, thought to be more of the one recovered in the early 1980's, was located near the village of Balat. However, examination of the remains revealed two individuals were present. Nearby, several toe bones were recovered and perhaps represent an additional burial not yet excavated. In total, the dental and skeletal remains of seven individuals from the mid-Holocene have been recovered and one burial remains to be excavated. Of these six individuals have been analyzed and provide interesting insights into the lifeways of Dakhleh's Neolithic peoples.

The mid-Holocene is a time of significant climate change in the Sahara. Environmental evidence suggests that from the early to mid-Holocene, ca. 9500 to 6100 BP, a humid phase took place in the eastern Sahara (McDonald 2001 1999; 1998; 1996; 1993) followed by a period of aridification. By 5000 B.P., as a direct consequence of this drying trend, the desert surrounding Dakhleh became increasingly arid and virtually uninhabitable. As a result, the oasis became a refuge for the local pastoralists, who had to rely more heavily on its resources. Archaeological evidence confirms that the majority of the Sheikh Muftah sites dating to this time period are located near the center of the oasis where some water remained available (McDonald et al. 2001). Faunal remains from these sites are highly fragmented and it is possible that bones were being broken open to obtain marrow. This suggests that food was scarce and people were attempting to maximize resources available to them (Churcher 1983; McDonald 1999). According to Fagan (1995: 284) desert populations "...responded to drier conditions by settling closer to permanent water, where they faced the same problem as the people of the Nile – seasonal food shortages and the constant threat of starvation". To determine whether these individuals suffered from any dietary stress requires an examination of all dental and skeletal evidence available. The recovery of six individuals from this time period, then, provides a unique window into the life and health of people whose livelihood was affected by an increasingly arid environment.

The purpose of this chapter is to report on the skeletal biology of the available Neolithic human remains from Dakhleh Oasis. While some details of this research have already been published elsewhere (Thompson 2002; Thompson & Madden 2003), the presentation of this work forms a summary of results to date. This contribution therefore represents a work in progress, but provides interesting insights into the biology and behaviour of people from this time period.

Sample

The sample reported on here consists of six individuals varying in their degree of preservation and extent of fragmentation. Specimens are numbered according to site location. As seen in Table 1, one individual comes from site 100, located near the village of Balat, and is numbered 100-1. Three individuals are from site 365 and are numbered 365-1, 365-2, and 365-3. Two individuals from site 375 are numbered 371-1 and 375-2. Sites 365 and 375 are located near the village of Sheikh Muftah. Table 1 lists age, sex, and pathology for each specimen.

Assessment of the dentition

A detailed description of the dentition is in preparation. However, germane to the issue of health and behaviour is a discussion of dental pathology including enamel hypoplasia and hypocalcification, dental caries, periodontal disease, and dental abscesses.

Enamel hypoplasia is a pathology that affects teeth during development and is thought to indicate stress events like poor nutrition, infection, parasitism, and weaning (Duray 1996; Buikstra & Ubelaker 1994; Goodman & Rose 1991; Hillson 1979; Malville 1997; Moggi-Cecchi et al. 1994; Wright 1997 but see also Saunders and Keenleyside 1999) or result of hereditary anomalies and localized trauma (Duray 1996; Goodman & Rose 1990). Enamel opacities such as hypocalcification are more likely an indicator of systematic stress from disease or inadequate nutrition (Buikstra & Ubelaker 1994). Since both pathological conditions occur during dental development, they present a unique opportunity to assess health and potential health stressors.

During normal growth, enamel formation can be disrupted by nutritional or disease stressors and the disruption appears as a horizontal groove or shallow depression around the crown of the tooth or as pits in the enamel (Malville 1997; Goodman et al. 1992). While some variation in dental development is known to occur between populations (e.g. Friedlaender & Bailit 1969; Mayhall et al. 1978; Jaswal 1983; Owsley & Jantz 1983; Tompkins 1996), the general chronology of tooth formation is known (Liversidge 2003) and so the age at which the stress event occurred can be estimated. While some teeth are more susceptible to hypoplasia than others, the documentation of events on all teeth potentially provides a more complete record of childhood stress events (Wright 1997).

As seen in Table 1, several of the Dakhleh people present both hypoplasia and hypocalcification. While some defects likely occurred during weaning, others occur during later stages of the development of the dentition, at about age 10, suggesting that systematic stress from disease and/or poor nutrition occurred throughout the growth period.

Dental caries represent a way of assessing dietary regimes of past populations. Research has shown a clear increase in the incidence of caries from prehistoric to historic times in Egypt and neighbouring regions (Hillson 1996; Armelagos 1969; Green 1972). In particular, there is a correlation between increased caries rates and a shift from a hunting and gathering economy to one based more on agriculture (Pfeiffer & Fairgrieve 1994; Beckett & Lovell 1994). Hunter-gatherers tend to have a low caries rate when their diet contains meat and low carbohydrate plant food (Hillson 1996). With the increase of starch in the diet, linked to the introduction of cereal agriculture, root caries are more common, especially in adults, although root caries are also linked to periodontitis (Hillson 1996). With the introduction of highly cariogenic sugars the incidence of occlusal (pit and fissure) and/or interproximal caries rates increases, and more agricultural children present caries than in previous time periods (Hillson 1996).

The archaeological remains indicate that, in Sheikh Muftah times, in the mid-late Holocene, people were primarily pastoralists (McDonald 1993). Bowen & Pearson (1993) found that pastoralists, with a diet rich in protein and milk products, had lower caries rates because dairy products coated the tooth and afforded some protection against caries production. However, as seen in Table 1, four individuals suffered from root caries. While no teeth affected by caries were recovered for 365-1 (a surface scatter of bone fragments, teeth, and fragments of gnathic remains), this individual suffered from an abscess and periodontal disease. Only some of the dentition was recovered from 100-1 and many teeth are covered in a layer of calculus preventing analysis (but see comment below). Despite the small sample size, this finding raises interesting questions about the dietary components of these people.

Periodontal disease involves bone loss around the teeth as the result of infection and inflammation of the periodontal ligament and surrounding tissues. Several factors are related to the incidence of periodontal disease, including age, sex, environment, diet, dental hygiene, as well as genetics (Hillson 1996). Individual 365-1 presents abscesses in the maxilla and mandible. Bone loss may therefore be due to periapical periodontitis (contributing to dental root caries) and/or acute abscessing in this instance. Individual 365-2 presents typical vertical bone loss on the buccal side of several mandibular teeth. Of interest, is the apparent link between levels of carbohydrate intake (associated with agriculture), and levels of alveolar bone loss as well as accumulation of calculus on teeth (Hillson 1996).

Assessment of the skeleton

Porotic hyperostosis was observed on the crania of individuals 365-1 and 375-2. Porotic hyperostosis is an anemic condition indicating physical stress

(Fairgrieve & Molto 2000). In both cases the condition was assessed as minimal: several small perforations of the frontals and parietals were noted. Due to the fact that these individuals were adults, with only minimal indications of porotic hyperostosis, this likely represents a state of healing (Aufderheide & Rodriguez-Martin 1998). However, it has been shown that individuals who suffered from porotic hyperostosis also experienced a reduced life expectancy. At this point the sample is not large enough to establish a normal life expectancy to contextualize the occurrence of this disease. Currently, researchers are debating the cause of this anemic condition, but believe it could be due to inadequate diet, malaria (thalassemia), parasites, or other infectious agents (Angel 1967; Stuart-Macadam 1992; Fairgrieve & Molto 2000).

An area of periostitis, or sclerotic bone, was seen on a fragment of femur shaft of individual 375-2. Sclerotic bone appears during the healing process, resulting from trauma, infection, or disease (Aufderheide & Rodriguez-Martin 1998) and is laid down on the outer cortex of the bone giving it a porous, raised and/or striated appearance (Ortner & Putschar 1985). Periostitis sometimes correlates with other health indicators like porotic hyperostosis (Ortner 2003; Aufderheide & Rodriguez-Martin 1998).

Individual 365-2 presented with calcaneal (or heel) spurs on both feet. These spurs are known as peripheral enthesopathies, which are osteophytic lesions, located at tendon attachment areas (Larsen 1997). They form as the result of strenuous activities like long distance walking and running (Cox & Mays 2000; Larson 1997).

Degenerative joint disease, or arthritis, was present in only one individual, 365-2. This was the only individual in the sample who had reached at least 40 years of age, therefore it seems likely that this form of degenerative joint disease is age related. Arthritis occurs for a variety of reasons including infection, trauma, heredity, and physical activity (Larsen 1997). There are several types of arthritis that generally cause different kinds of bony change and have different patterns of skeletal distribution. For example, rheumatoid arthritis (Waldron et al. 1994) was ruled out in this case based on the absence of erosive lesions and incongruent skeletal distribution patterns. In addition, although osteophytes were present on the vertebrae, there was no evidence of fusion of the vertebral joints, thus ruling out psoriatic arthritis, Reiter's syndrome, ankylosing spondylitis, and diffuse idiopathic skeletal hyperostosis (Arriaza 1993; Rothschild et al. 1999). This narrows the diagnosis to osteophytosis or osteoarthritis. It is generally understood that both conditions are related to mechanical stress (Bridges 1994; 1991; Jurmain 1990; Maat et al. 1995). Osteophytosis affects the bodies of the vertebrae causing lipping around the margins, while osteoarthritis of the vertebrae affects the articular facets of joints, causing eburnation, porosity, and

osteophytes (Bridges, 1994). An individual may suffer from osteophytosis alone or a combination of osteophytosis and osteoarthritis (Maat et al. 1995). The lumbar vertebrae are usually affected more often by arthritic changes than the thoracic or cervical vertebrae (Bridges 1994; Jurmain 1990). It is interesting that 365-2 suffered from osteophytes in all types of vertebrae. This may point to an active lifestyle but is not necessarily associated with a particular form of subsistence (Bridges 1991).

In addition to the vertebrae, 365-2 also showed arthritic changes in the form of lipping at the glenoid fossa of the scapula, the distal humerus, the proximal radius and ulna, and the clavicle. Jurmain's (1990) work relates advancing age of an individual to osteophytic changes in the shoulder more than changes that occur in other joints, which may be due to other causes. According to Maat et al. (1995), peripheral osteophytosis is usually more frequent in those suffering from osteoarthritis. Arthritis tends to occur more frequently in females, but, until more skeletal specimens are recovered, we are unable to determine whether sex differences occur in this population (Bridges 1991; Larsen 1997). An interesting fact is that 365-2 also suffered from a cervical vertebral fracture which may relate to his arthritic condition.

The compression fracture of the cervical vertebrae in 365-2 is not severe. The vertebrae itself has taken on a wedge-like shape due to the collapse of the anterior internal structures of the vertebral body (Arbitol & Kostuik 1998). This level of compression fracture is considered stable and would not likely have resulted in the death of the individual or the need for excessive care by the community. (Rah & Errico 1998). Compression fractures can be categorized as injuries resulting from accidents, loss of bone mass associated with arthritis, or mechanical stresses (Larsen 1997). According to Larsen, accidental injuries occur most frequently in the long bones and ribs. The breakage patterns do not seem to apply to accidental injury in this individual. Due to the weight and rugose nature of the bones of individual 365-2, loss of bone mass, or osteoporosis due to an arthritic condition, appears unlikely. However, the bones have not yet undergone radiographic examination, which may help to test this hypothesis. Therefore, based on our current assessment, this cervical vertebrae fracture is more likely due to the micro-trauma (small tears or breaks in the tissue) experienced during repetitive mechanical stress associated with daily tasks. Lovell (1994) states that the cervical spine can be adversely affected in individuals who carry objects on their heads in the course of their daily activities. It may be that this individual transported heavy items on his head on a regular basis.

Discussion/Conclusion

Although age estimates are approximate, based on the amount of wear on the occlusal surface of the dentition, it can be estimated that the average life expectancy for these people was between 20-30 years of age (Thompson 2002). The pathological evidence indicates that the population, represented by these individuals, was possibly subject to long periods of health stress during childhood and throughout their lifetime. What caused the health stress is unknown, but diet, malarial infection, or parasitic infestations are likely candidates.

One individual, 365-2, gives us special insight into the lifeways of these people. This 40 year old male lived long enough to develop age-related arthritis in several locations throughout his body. In addition, evidence of arthritis linked to repetitive activities and the presence of a mechanically induced enthesopathic lesion on his calcaneus suggests a highly active lifestyle. This individual was the only one with an associated burial item. The copper pin associated with this male could be a status symbol, but „the lack of noticeable burial monuments or of elaborate grave goods... reinforces the picture of small, egalitarian groups“ (McDonald et al. 2001). In addition, the presence of the artefact with this active individual reinforces the hypothesis (McDonald et al. 2001) that there was some contact between the Nile Valley occupants and peoples of the outlying oases. Males from the Nile Valley Predynastic cemetery of Hierakonpolis, roughly coeval with the Sheik Muftah Unit, carried copper pins in leather pouches at their waists (Friedman 1998). Furthermore, ceramics from the Nile Valley have been found at Sheikh Muftah localities, including Locality 100 where one burial was found. Thus there are several lines of evidence that connect Dakhleh Oasis to other areas within Egypt at this time. Future research will concentrate on a comparison between biological affinities of the Dakhleh Oasis sample as compared to one from the Nile Valley to investigate the possibility of movement between these two regions.

No archaeological materials were found within the burial context that would suggest their economic/dietary strategy, but we assume these people are the makers and users of the Sheik Muftah cultural remains. The domestic fauna associated with these material remains indicate pastoralism, while the presence of wild fauna points to limited hunting indicating a mixed economy. What is interesting is that the occurrence of root caries in the dentition of several individuals, including the 40 year old male, in addition to the overall heavy dental wear, suggests an increased dependence on starch-rich plant foods. According to McDonald et al. (2001), changes seen archaeologically over the course of the Holocene may reflect increasing sedentism or an increased reliance on cultivars during the Sheikh Muftah period. This hypothesis may be substantiated, in the

future, by the analysis of dental calculus (Dobney & Brothwell 1986; Fox et al. 1996) and/or chemical analysis of bone.

The climatic information shows the Sheik Muftah period to be a decreasingly hospitable time, with an increase in aridity in the surrounding region (McDonald et al. 2001). Shallow, open water or swamp may have been present, at least west of the Balat cultivation (McDonald, 1982 field notes) providing evidence to support the fact that the water in the region may have been drying up, and may have contributed to the restriction of these people to the more central part of the oasis. The stress evidenced in the dental and skeletal pathologies of this sample may reflect worsening conditions imposed by the changing environment. These burials therefore provide us with new information about the Neolithic peoples of Dakhleh Oasis and expand our knowledge of the desert populations during the mid-Holocene of Egypt.

Table 1: Incidence of Dental and Skeletal Pathology in the Dakhleh Sample

Site/ individual #	Age	Sex	Hypoplasia	Hypocalcification	Carries	Abcesses	Periodontal disease	Porotic Hyperostosis	Periostitis	Peripheral enthesopathies	DJD*	Fracture
100-1	Adult	M	X?	—	—	—	—	—	—	—	—	—
365-1	17-25	M	X	X	—	X	X?	X	—	—	—	—
365-2	40-45	M	—	—	X	—	X	—	—	X	X	X
365-3	20-25	F	X	X	X	—	—	—	—	—	—	—
375-1	25-35	M	X	X	X	—	—	—	X	—	—	—
375-2	30-35	?	X	X	X	X	—	X	—	—	—	—

* DJD=Degenerative Joint Disease

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Experimental Archaeology in Dakhleh Oasis, South Central Egypt: New Insights on the Prehistoric Pottery Industry

Introduction

A recent focus of research in the study of prehistoric pottery from Dakhleh Oasis (Fig. 1) has centred on the 'life history' of the pot: that is, on the processes involved in pottery manufacture, use, reuse and discard. An improved understanding of these processes, and of the pottery industry in general, is beginning to shed light on the overall adaptive and behavioural patterns of the mid-Holocene oasis groups, in particular the Sheikh Muftah Cultural Unit (5200–4000 bp) which remains poorly understood (McDonald 1998; 2001; McDonald et al. 2001). Initial attempts to investigate these processes were frustrated by the limited amount of information that could be gleaned from the ceramic record. One way of countering this was to incorporate experiments into the research program: the experiment enables us to observe past processes in their operational state (Skibo 1992: 11-30; 2000), and is therefore a potentially significant source of data that can supplement the ceramic record when it comes to addressing such issues as prehistoric pottery manufacture and use.

This point is illustrated in the following study which reports briefly on a field experiment that took place in Dakhleh over the course of nine days in December 2002. The experiment was essentially a pilot study that set out to gather data on prehistoric pottery manufacture by replicating each stage of the manufac-

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Fig. 1. Map of Egypt showing location of Dakhleh.

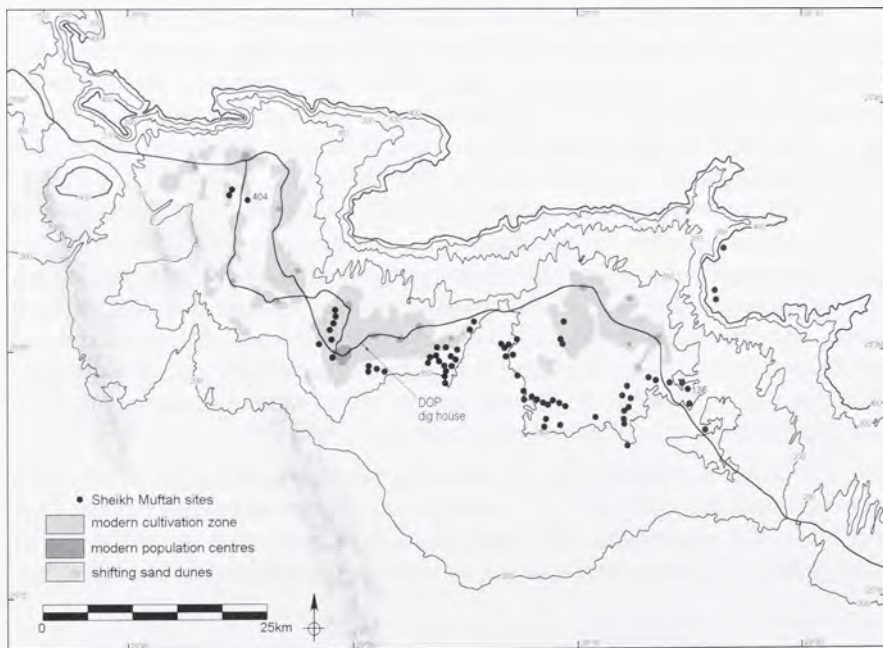


Fig. 2. Map of Dakhleh showing location of Sheikh Muftah sites and modern impact on oasis.

turing process using materials and methods that were available to the Sheikh Muftah. This enabled us to observe, in real terms, the time and labour costs involved in the production of pottery. Although our expectation was to acquire sufficient data for future experiments³, the results were more instructive than anticipated and offer a number of insights on this process. These are discussed below for what they tell us about Sheikh Muftah pottery manufacture and how this technology could have been integrated into the organisational patterns of these oasis inhabitants. The latter point is of particular interest as the Sheikh Muftah were highly mobile which, as a rule, is not wholly conducive with pottery-production.

A brief overview of the Sheikh Muftah pottery industry

Over 70 Sheikh Muftah sites have been recorded in and around the oasis (Fig. 2).⁴ Pottery has been recovered from the majority of these, and in most cases the sherd collections represent somewhere between five and 30 vessels.⁵ The material is not unlike that reported for 'Late Neolithic' industries in this part of northeast Africa (Kuper 1995; Gehlen et al. 2002; Nelson 2002), only it appears to be cruder in its manufacture. The original vessels were often open or slightly restricted and preserved simple or inflected contours. Most of these appear to have been quite large (≤ 30 cm in height and width), with walls generally in the range 4–9 mm before thickening towards the base. There is nothing by way of embellishment in the form of appendages (feet, spouts, handles, etc) and decoration is infrequent, occurring mainly in the form of rim-top incisions. Surfaces often preserve a thin self-slip and are generally quite rough, though some particularly smooth examples have been recorded. Occasionally surfaces are deliberately textured by way of finger rills applied during the leather-hard state (Fig. 3). Virtually all Sheikh Muftah fabrics are produced from iron-rich clays, which produce a range of reddish-brown (2.5YR 4/4-5/6; 5YR 4/3-6/6) and/or grey-brown (7.5YR 5/2-5/4; 10YR 5/2-5/4) fired colours, and it is common to find fire-clouds preserved on both exterior and

³ Since presenting this paper in July 2003, two additional field experiments have been conducted based on the results of the current study. A comprehensive report on the design, procedure and interpretations relating to all three experiments can be found in Warfe (in press). A photo essay has also been published on the first experiment (Jamieson and Warfe 2005).

⁴ Most of these sites are found on the oasis floor in the modern cultivation zone (<110m a.s.l.), on the edges of this zone (approx. 130m a.s.l.), or further upslope (<136m a.s.l.) towards the desert border (McDonald 1998, 135). A few sites are located atop the plateau to the north (Fig. 2), or well beyond the oasis proper – members of the ACACIA team have reportedly come across a number of sites in the surrounding region that have yielded 'Sheikh Muftah-like' pottery (H. Riemer pers. comm., December 2004).

⁵ Localities 136 and 404 (Fig. 2) are exceptional in this regard as these sites have yielded several thousand sherds that represent some 550 vessels between the sites.

interior surfaces. Fabrics are mostly medium-bodied in texture and can comprise a range of non-plastic inclusions: the most common example is known for its frequent sand-and-shale inclusions (Hope 2002), while other fabrics are shale-rich, sand-rich, vegetal-tempered, or comprise distinct clay aggregates.⁶

Our understanding of the manufacturing process prior to this experiment can be summed up in a few points. The ceramic record indicates that manufacture involved the use of local clays (Eccleston 2002), non-plastic tempering agents (Eccleston 2002; Hope 2002), non-radial construction techniques (Tangri 1992, 117; Hope 2002, 48), and firing by way of open and/or pits fires (Edwards and Hope 1987, 4). There is no clear evidence for centres of production and the distribution of pottery indicates that manufacture probably took place on a site-



Fig. 3. A typical Sheikh Muftah vessel with a textured surface.

by-site basis. The essentially egalitarian nature of Sheikh Muftah groups (McDonald et al. 2001, 9) gives the impression that manufacture took place at the most basic 'household' level (i.e. van der Leeuw 1977; Costin 1991), presumably for replacement/consumption purposes.

Experiment design

The selection of both raw materials and manufacturing techniques was guided by the principle that the field experiment should seek to place the

⁶ At the time of the experiment these aggregates or 'clumps' were tentatively identified as grog inclusions (Jamieson pers. observ., December 2002). Further analysis has revealed these inclusions are, in fact, clay pellets (Warfe pers. observ., January 2003).

analyst/s in an environment that closely resembles the archaeological context under investigation (Skibo 1992, 22-23). This was achieved largely by conducting the experiment at the DOP dig house, which is situated in the middle of Sheikh Muftah territory (Fig. 2). From here, we were able to assess the time and labour costs involved in materials collection with the view that Sheikh Muftah potters would have expended similar costs operating from sites in the region.

This approach rests on the assumption that the same materials were present during Sheikh Muftah times which, despite shifts in the local geomorphology and ecology (Kleindienst et al.1999), was probably the case.⁷ The clay and non-plastic inclusions collected for the experiment along with the key fuel sources, tamarix and acacia, are widespread throughout the oasis today and have been since the beginning of the Holocene period (Kleindienst et al. 1999). While donkey dung, palm matting and straw were also sourced for fuel, it is not clear whether these were available to the Sheikh Muftah (U. Thanheiser pers. comm., July 2003; C. Churcher pers. comm., February 2004). If not, other materials with similar combustible properties – i.e. plants and animal dung – were known to exist in the oasis during the fifth millennium bp (McDonald et al. 2001).

The selection of manufacturing techniques was based on the ceramic record (see above). Where this information was not available, we adopted techniques based on the ethnographic record of modern-day 'pre-industrial' potters (Rye 1981; Arnold 1985). In such cases, the techniques were used only if we felt they were within the technical 'know-how' of the Sheikh Muftah potters. In selecting our methods we were mindful that the Sheikh Muftah potters could have employed any combination of techniques from a wide pool of choices depending on personal preferences, communal demands, the availability and reliability of resources, levels of output and so on (for instance, Schiffer and Skibo 1997). This experiment must therefore be seen as one in which only a select range of technical choices were tested: some or all of which *could* have been those used by the Sheikh Muftah potters.

Experiment procedure

The collection and preparation of materials took place over two days. All resources, including the fuel, were collected from within a 150m radius of the dig house with minimal effort. The only exception to this were the shale inclusions (see below) which were collected from the closest known outcrop some 8km east of the dig house.

⁷ Reconstructions of the palaeoenvironmental record for the sixth and fifth millennium bp indicate that this part of northeast Africa was subject to similar conditions as today, including minimal or nil seasonal rainfall, high temperatures and formidable northerly winds (Hassan 1997; McDonald 1998; Wendorf and Schild 2001; Nicoll 2004).

Approximately 11kg of a relatively fine-grained grey-green (5Y6/3; 5Y7/3; 5Y7/6) clay was taken from the base of the dig house mound – the same clay can be found exposed in patches across the oasis lowlands (Warfe pers. observ., January 2003; 2004). This was ground by hand for over an hour to the point that most particles could be sieved through a 1mm screen.⁸ All largish non-plastic inclusions were removed in order to produce a finer mix and roughly 5500ml of water was added to the clay until it reached a workable state of plasticity. This was then kneaded for roughly 30 minutes and divided into six batches – labelled I to VI – each of which would receive a different temper (Fig. 4), except for batch VI which was intended to remain untempered as a control. The tempers produced for this study – fine shale, coarse shale, chaff, sand and grog – were based on Sheikh Muftah fabrics (see above).

The preparation of these inclusions was costly in both time and effort. Roughly half an hour was spent crushing shale to produce fine ($\leq 2\text{mm}$) and coarse (2–8mm) particles, and a similar amount of time was spent crushing modern pottery sherds to acquire a sufficient quantity of grog ($\leq 8\text{mm}$ in size). Vegetal temper was collected by sieving the straw collected for fuel. This again was a fairly lengthy process. Each of these was then added to individual clay batches in quantities consistent with Sheikh Muftah material: in the case of Fabrics I, II, IV and V this meant somewhere between 300–400gm of fine shale, coarse shale, sand and grog, respectively. Approximately 35gm of chaff was added to Fabric III. After adding the inclusions, we found that Fabrics II, III and V were not as malleable as we had hoped and around 300gm of sand was added to all fabrics, including Fabric VI.

The construction and drying phase took place over four days. Nineteen vessels and one perforated disc⁹ were produced, along with 12 briquettes on which a 10cm scale was incised to measure shrinkage rates (Fig. 5). The construction of each vessel was a relatively protracted process and one that was complicated by the morning coldness and the afternoon winds which fatigued the clay and accelerated the drying process, sometimes resulting in failure during this stage. It is interesting to note that the chaff-tempered Fabric III seemed to fatigue faster than the other fabrics, which made it particularly difficult to form.

⁸ It is assumed that the Sheikh Muftah potters would have used hides or woven materials if they chose to separate their clays

⁹ Eighteen perforated discs have been found on Sheikh Muftah sites. The function of these remains unclear, though they tend to be found in association with truncated cones, or 'Clayton rings' (Riener and Kuper 2000; Gatto 2002; Hope 2002, 46). Interestingly, all but one of the examples have been worked from existing pottery vessels, presumably after use-failure. To do this would take some time and we were curious why discs were not made anew with vessels. We still cannot explain this as the disc only took around ten minutes to form and survived the firing process.



Fig. 4. Clay batches with respective inclusions piled to the side.



Fig. 5. Briquettes with incised 10cm scales.

The method of construction was fairly straightforward and simply involved constructing base sections out of slabs and then building on these with coils, or forming the entire vessel using coils. Having said this, it was especially difficult to produce walls within the range 4–9mm without malformation at some point. It was also difficult to produce large vessels unless this was conducted in several stages allowing the lower body to dry slightly in order to hold shape for the construction of the upper body. Little effort was invested in surface treatments, and most vessels simply received a thin-slip. The briquettes, which were exposed to the sun and wind, indicated approximately 10 percent shrinkage within the first 48 hours, after which point there was no further change.

The firing process took place over three days. A pit fire, as opposed to open fire (for distinction see Nicholson 1993, 108), was chosen as the preferred apparatus for two reasons. First, pit fires can maintain relatively high temperatures and some Sheikh Muftah pottery is fired in excess of 800°C (Edwards and Hope 1987, 4-5). Secondly, pits containing charcoal have been recorded on Sheikh Muftah sites, though it is unclear whether these were used for firing pottery.

The dimensions of Sheikh Muftah pits seem to vary on an individual basis and have also been obscured by a number of post-depositional factors. The pit dug for the current purposes measured approximately 120cm in length, 95cm at its widest, 25cm at its deepest, with an opening that faced 315° north-northwest. The orientation of the pit, as well as its shape, was designed this way to maximise the amount of wind required to fan the flames – though there is no archaeological evidence to suggest the Sheikh Muftah would have done this. The clay objects were grouped in the pit, separated by layers of fuel (Fig. 6) to ensure relatively uniform exposure to heat and oxidation.

The firing began at 16.00 hr to coincide with the onset of the daily winds. Within a few minutes the estimated 4-5kg of fuel in the pit had almost completely burned away, and over the next half hour a further 30kg was added to the fire (Fig. 7). In an attempt to reduce the rate of combustion, the opening to the pit was closed off to prevent wind fanning. After 40 minutes, most of the fast-burning fuel was smouldering and had formed a canopy over the pit. At this point, the walls of the pit were pushed inwards and dung was placed on top to completely smother any remaining flames. The pottery was left in the pit for roughly 42 hours to ensure sufficient cooling before removal.

Results

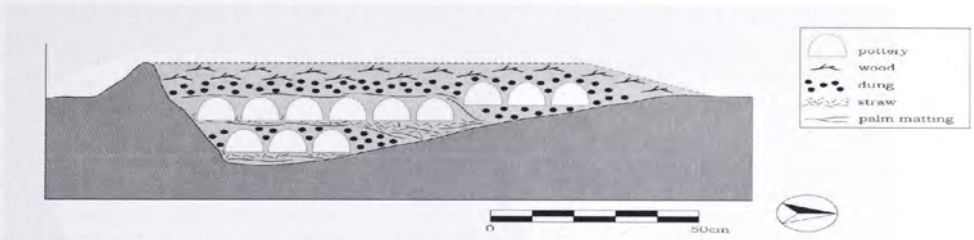


Fig. 6. Stylised cross-section of firing pit.



Fig. 7. Firing in progress (photo taken facing south).



Fig. 8. A Sheikh Muftah vessel (right) and experimental vessel side-by-side.



Fig. 9. Collection of experimental objects after firing.

Results

The experiment took nine days and involved varying levels of labour expenditure. The more costly exercises were those that fell earlier in the sequence – i.e. the materials collection, preparation and construction, and the digging of the fire pit. Up to six people were involved in two of these exercises and we worked almost constantly during daylight hours. The labour investment dropped considerably after this point and involved only intermittent checks on the objects during the drying stage and the supervision of the firing for roughly an hour.

As for the fired objects, these were found to resemble the Sheikh Muftah material in most formal properties (Fig. 8). Analysis of sherd sections at x40 magnification revealed that the colouration and zoning of the experimental objects compare closely with Sheikh Muftah samples. The only notable difference concerns the texture, which was denser in the case of the experimental material. Analysis has also revealed that none of the experimental tempers, with the exception of sand, are comparable with Sheikh Muftah samples. The chaff we used was considerably coarser than the vegetal temper used by the Sheikh Muftah potters, and the angularity, texture and colour of both the grog and shale inclusions is nothing like that observed in the original. On the other hand, the 'bricky' ring of the experimental objects, the 2.5–3.5 scratch resistance (*Mohs*), and the relatively high transverse strength fit the profile of the Sheikh Muftah material. The reddish-brown and grey-brown surface colours are also comparable (see above), though the experimental objects preserved far more extensive fire-clouding (Fig. 9).

Discussion

The results clearly demonstrate that while a number of the materials and techniques we chose were appropriate, others were not. Beginning with clay, the similarities in groundmass indicate that the same bed was tapped by the experimenters and Sheikh Muftah potters alike. This was not unexpected as the same clay is exposed at various points in the oasis lowlands and is easy to access even when covered by Holocene sediments (Warfe pers. observ., January 2004). It is also an ideal clay for pottery manufacture: it is easily workable in its wet state, it retains plasticity for several hours, and does not require excessive inclusions – a point illustrated clearly with Fabric VI which maintained both its malleability and strength during the construction stage. The differences in texture have been ascribed to different preparation techniques, as opposed to differences in the clay. While we spent over 90 minutes grinding and wedging the clay, it is likely the Sheikh Muftah did not invest the same levels of time and effort in preparation. If the clays were extracted in their wet state – i.e. from the edges of water catch-

ments – the removal of ‘clumps’ and air pockets would presumably take only a matter of minutes (Warfe in press).

In terms of the non-plastic inclusions, the results indicate we need to rethink this aspect of the study. As mentioned earlier, our decision to produce a grog temper was misguided by preliminary analysis of the ceramic record. It now appears that the Sheikh Muftah did not recycle their pottery in this manner. The presence of clay aggregates in Sheikh Muftah pottery could be the result of pellets forming naturally in a larger clay-body that has not yet been sourced in the oasis, or the mixing of clays: both hypotheses require further testing. As for the chaff, the carbon-lined pseudomorphs in the Sheikh Muftah pottery are considerably finer ($\leq 5\text{mm}$) than those preserved in the experimental sections ($\leq 15\text{mm}$). Although our method of obtaining chaff was questionable (see above), it is not clear whether this temper was ever added by Sheikh Muftah potters. The fineness of particles in the original pottery could be the result of using a dung temper (i.e. Nordström 1972, 42), or collecting clay from beds that retain vegetal matter through lacustrine formation processes. Again, further analysis is needed to test these points.

The shale we prepared appears nothing like the grey-green or dark-grey lath-like particles in the Sheikh Muftah pottery. Our immediate interpretation was that we tapped the incorrect source, until it was revealed through x40 magnification that all experimental fabrics preserved fine lath-like shale particles in similar distribution to the original material. Evidently, fine shale particles appear naturally in the clay and can enter the paste without the potters’ knowledge, as it did with us. The presence of coarse shale inclusions is not as easily explained. Some of these particles are in excess of 15mm and simply could not have gone unnoticed by the potters. So far, no known clay sources with naturally occurring coarse shale inclusions have been recorded in the oasis, and the only known outcrop for this type of shale is a band running across the northern escarpment of the oasis (Warfe pers observ., January 2003). If this served as the point of extraction, considerable time and labour costs would be added to the procurement process.

If we can take the low failure rate as an indicator – only two vessels removed from the fire pit were extensively pitted and another exhibited minor fractures along coil joins – the techniques selected during the construction stage appear to have been appropriate. One of the more interesting insights derived from this process was how the fabrics performed at different times of the day. Although we had difficulties dealing with the elements (i.e. sun and wind), it is possible that the Sheikh Muftah capitalised on these by scheduling different stages of construction throughout the day. Assuming this process involved the production of several vessels at once, it is likely that parts of the vessel were

constructed first then allowed to partially dry before the completion of the vessel at a later point (for instance, Rye 1981, 21). Such a process may explain how the Sheikh Muftah potters managed to produce such thin-walled material whereas we were forced to produce thicker walled pottery in order to maintain the structural integrity of the vessel in its wet stage. As we did not allocate much attention to treating the vessels this process was not sufficiently addressed in the study, though it perhaps goes without saying that the application of coats and compaction would require some time and effort.

The low failure rate also says something about the drying process. Even the thicker objects indicate that 48 hours was a sufficient period of time to remove the bulk of 'shrinkage water' (Rice 1987, 63-64), but was not too rapid to produce deformation or stress cracks. Evidently, the temperature, lack of humidity and the afternoon winds provides an ideal environment for drying and one that is comparatively short – ethnographic examples indicate this process can take up to several weeks (Arnold 1985, Table 3.1).

The surface colours of the experimental objects, as with their scratch resistance and transverse strength, tell us that the firing process was also of sufficient duration, and that appropriate temperatures were reached. The extensive clouding on these objects indicates that the firing atmosphere was oxygen-starved, resulting from a poor choice of apparatus, or fuel, or both: dung can have a smothering effect and a more balanced oxidised-reduced atmosphere is attainable through open fires (Warfe in press). While the objects were not removed for 42 hours this was felt to be excessive, especially as the ethnographic record documents pottery being removed from non-kiln firings less than 30 minutes after ignition (Rye 1981, Table 3).

Drawing on these points, one of the interesting outcomes of this study was that we regularly overestimated the time and labour investments required for each stage of manufacture. We now feel that these investments could be reduced considerably at a number of stages. In fact, it is estimated that the entire process could be reduced to three or four days on the grounds that a modest quantity of vessels were to be produced (i.e. roughly a dozen vessels), and that at least three able adults were involved in the process. The collection of materials, and the preparation and construction could all take place in one day, provided that minimal effort was expended in producing the paste and that construction involved a well-organised production line of sorts. The costs involved in collecting the materials cannot be compromised. Likewise, the drying process cannot be accelerated and two days must be dedicated to this phase of manufacture. As for the firing process, all indicators suggest that this could be successfully completed within a matter of hours, not days (Warfe in press). It is noteworthy that this final stage of manufacture could also be incorporated into

other 'communal' activities, such as food preparation, in which case the costs involved in collecting the materials become diffused. These are interesting points when considered within the wider framework of Sheikh Muftah organisational patterns.

It was mentioned in the introduction that Sheikh Muftah groups were highly mobile, an assessment based principally on the absence of architectural remains and storage facilities (McDonald et al. 2001).¹⁰ It is well known that mobility places a range of constraints on the potter often impeding or preventing him/her from completing their task: it can distance the potter from the materials they require for production; it can situate the potter in a cold, moist or wet environment, making the collection and preparation of materials dangerous or exceptionally labour/time intensive; and it can reduce the necessary time required for critical stages of production, resulting in a process with high failure rates. While these points stem from Arnold's (1985, 109-126) ethnographic survey based on modern-day potters, it is no coincidence that the emergence and/or increased production of pottery in antiquity was often concomitant with shifts towards more settled adaptations (Hoopes and Barnett 1995, 4).

It is significant then, that mobile groups from a number of regions still produce pottery (Arnold 1985, 119-120). This often involves adopting strategies that serve to minimise or obviate the problems noted above. Alternatively, groups may occupy regions that are warm, dry and have abundant resources, in which case these problems may not arise, or if they do, they may not be as significant. The results of this experiment indicate that Dakhleh was one such niche, and this begins to explain how Sheikh Muftah groups could maintain a technology more suited to sedentary lifestyles.

The environmental conditions and the access to resources resulted in a process that we feel could be undertaken in a matter of days. Although we are unsure of the precise nature of the Sheikh Muftah settlement patterns – whether groups maintained set routes, the number of stops made on a seasonal round, the length of time for each stop, the range of movement, and so on – it is unusual to find residentially mobile groups spending less than a few days on the same patch (i.e. Kelly 1983, Table 1). It might be assumed then, that the average Sheikh Muftah stop was of adequate length to conduct all stages of pottery manufacture. It may also be assumed that if movement was confined largely to the oasis lowlands, then the necessary materials – with the exception of coarse shale –

¹⁰ There is little evidence for specialised activities on Sheikh Muftah sites to attest the dispersal/aggregation patterns typically associated with more complex settlement strategies, which gives the impression that the Sheikh Muftah were practicing a form of 'residential mobility' (i.e. Binford 1980). This said, it is possible that more 'permanent' sites may be buried beneath the modern agricultural plots in the oasis lowlands (McDonald et al. 2001, 9).

could be accessed on the spot. There would be no need to deviate from the usual rounds to collect resources or to carry them as a form of 'embedded procurement' practice (Binford 1979). In short, it appears that pottery-production could be worked into the organisational patterns of the Sheikh Muftah irrespective of the nature of the settlement systems.

This is not to say that the settlement systems had no impact on the technological organisation. Presumably, the Sheikh Muftah potters were faced with the usual problems associated with constantly transporting pottery – namely, a high breakage rate of vessels (i.e. Arnold 1985, 119-120). This perhaps explains why so much of the Sheikh Muftah pottery appears to be crudely made. While there was evidently enough time to undertake all stages of manufacture, the apparent slapdash construction could reflect a tradition that places less emphasis on producing finely made pottery, with the expectation that vessels have a relatively short lifespan. In other words, we may be dealing with an 'expedient' technology (i.e. Binford 1979), in which production investments were kept to a minimum given the high replacement costs. Of course, as with the experiment, far more research needs to be undertaken before we can offer anything more than first approximations in regard to technological organisation.

Conclusion

To recap, the aim of this study was to highlight the usefulness in conducting experiments as a way of understanding processes that are no longer visible in the ceramic record alone. Although this has been presented as a pilot study, and hence a wide range of issues have received only superficial attention, the instructive results highlight the potential of this approach. We now have a better understanding of the materials and techniques used by the Sheikh Muftah potters to perform their craft, and a much clearer understanding of the time and labour costs involved in this process. In a broader sense, these findings have contributed to a better understanding of the overall organisational patterns of the Sheikh Muftah Cultural Unit.

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Joanna Aksamit

A new list of vases with ‘Cult-signs’

In 1913 P.E. Newberry published in *Liverpool Annals of Archaeology and Anthropology* a ‘List of Vases with Cult-signs’ (Newberry 1913b). The list included 159 Predynastic pots with a design of painted boats with standards, documented in 25 museums and private collections or published in excavation reports. Vases of that kind, belonging to Petrie’s *Decorated* class, were a much discussed theme in the first half of the 20th century. Among other matters, much was written about boats’ standards and their meaning. Many scholars followed trends current in anthropological studies of that time and suggested the existence in early Egypt of tribes with their fetishes (Loret 1902; 1906; Moret & Davy 1923). Elaboration of those ideas led to the interpretation of the standards of Predynastic boats as emblems of purported early Egyptian territorial units – later nomes (Newberry 1913a, 1927). That interpretation, widely popular in Newberry’s times, was contested almost from the start by Steindorff (1909), who pointed out that the earliest list of nomes was known only from the Fifth Dynasty and argued that there was no evidence for the formation of nomes before the Old Kingdom. That opinion gained support among the next generation of scholars (Helck 1950: 123-124; Baumgartel 1955: 11-14; 1960: 149-151) and the alternative idea, that the standards should rather be regarded as symbols of divinities, is usually accepted to this day. There are still many unclear points in that theory, but before the discussion is resumed, the sources themselves should be reconsidered.

A list of Predynastic standards was compiled already by J. de Morgan (1897). De Morgan’s list included 14 forms, however, some of them were in fact the result of a draughtsman’s error (cf. Foucart 1905: 265; Piotrovskij 1930: 17). Other lists followed (Loret 1904: 69-100; Foucart 1905: 267; Göttlicher-Werner 1971: Pl. V, 1), but the most widely used is to this day the list published by Petrie (Petrie 1921: Pl. XXIII), quoting 32 forms of standards. Petrie’s list rightly omits

some misdrawn standards from de Morgan's list and adds to the repertory a number of forms identified on vessels coming from excavations in Diospolis Parva, but it still includes forms which have never existed and classifies variants as separate forms. On the other hand, some forms of standards included neither in Petrie's, nor in any other existing list have been identified since 1921.

Newberry's *List of Vases with Cult-sings* is a particularly valuable tool to study D Ware vessels with boats and standards. The repertory of forms, although least numerous (13 standards, without variants) is more reliable than those of other lists (with a single exception: a goat classified as a standard is in fact only an animal standing on the cabin of a boat (cf. Catalogue Sotheby 1922; Schlögl 1978). However, a number of corrections should be made also to Newberry's list. Not only some typing errors in inventory numbers need correction, but also the number of catalogued vases should be reduced to 151, because some vessels were listed two or even three times, usually when Newberry apparently did not make a connection between a drawing published in an excavation report and the actual vase he could see in a museum. Moreover, a considerable number of vases, seen by Newberry in private collections, changed hands since the early 20th century. Regretfully, only a few of them can be traced now in public museums or contemporary private collections; the rest, not published properly before the change of the owner (among them vases from Newberry's own collection, sold out and dispersed after his death) have disappeared from public view or are impossible to be recognized, as their current owners are often not aware of their history.

The main reason for publishing the following list is, however, a considerable increase in the number of vases, which can be taken into consideration. It should be pointed out that Newberry never examined all museums and collections of his time and, consequently, his list does not include many vases known already by 1913. Several vases with boats were excavated and published in excavation reports after that date (El Kubaniya, Haragah, Brunton's excavations in Middle Egypt, more recently Tamit, Minshat Abu Omar and Adaima), many others have been purchased at the antiquities market or donated to museums by private collectors.

The following list includes 238 vases with boats and standards. No more than 100 of this number appear on Newberry's list. Identification of 23 vases seen by Newberry at the antiquities market in Cairo and Luxor is currently not possible and, to avoid double occurrences, those vases have not been included in the present list. Listed separately are vases belonging in 1913 to private collectors or museums, which could not have been located by the present writer and of which no images could have been identified, either. Among them are some vases from Liverpool University's Institute of Archaeology (presently

School of Archaeology, Classics and Oriental Studies, University of Liverpool), supposedly destroyed during the World War Two; several vessels from the Berlin Museum perished in those years, too, but they could have been included thanks to their particularly detailed publication (Scharff 1931).

The vases are arranged according to the standards carried by their boats, in a sequence similar to that adopted by Newberry. However, in contrast to Newberry, who was interested not only in the vases themselves, but also in combinations of standards, and, as a result, mentioned each particular combination at least twice, each time with the standards in a different order, the principle in the present list is that the vases are given priority over the combinations of standards. Consequently, it was decided to include also those vessels, of which only one side and one standard were known to the present writer at the time of submitting the text. It is hoped that in most cases the data will be completed shortly.

Twenty-eight forms of standards can be distinguished. Variants are noted for accuracy's sake, but in the final summary all variants of a particular standard are counted as a single form. A zigzag, bent in both directions, is definitely the most frequently occurring standard, followed by 'hills' in all variants (2 to 5 triangles) and 'horns'. The sequence of the occurrence of the most popular standards is, therefore, exactly the same as that observed by Newberry and is unlikely to change even when new material is added. However, particularly noteworthy are forms not included in the previously published lists. The fact that they could be identified not only demonstrates that the repertories published to date are not complete, but it also implies, that new forms can still emerge with newly documented vases. On the other hand, some unique forms noted on vessels from Abadiya and Hu, which could not be located by the present writer, are included in the list, but should be regarded as doubtful until the vases themselves are located and checked.


Most of the catalogued vases are known to me from photographs or reliable drawings, but some collections I could also examine myself. It must be stressed, however, that the present list is by no means complete and the number of vases still remaining undocumented in museums or private collections is difficult to assess. I would be most grateful for references to vases not mentioned in the present list, as well as for information about the current location of the vases known to me only from old publications.

Acknowledgements

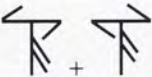

The present list was started already when I was preparing my M.A. thesis at the Warsaw University, and considerably extended during preparation of my Ph.D. thesis, written under the supervision of Prof. Lech Krzyżaniak. For years

before completing my Ph.D. and ever since I have been gathering information about D Ware with boats with invaluable help of dozens of curators in charge of collections spread over the world. So many people should be thanked here, that it is not possible to mention them all and mentioning some would be an injustice to the others. I would like to express my warmest thanks to all who have ever answered my queries, and particularly to those who shared with me their knowledge and even images of unpublished vases under their care.



In the first place, my thanks should go to Lech, who could see most of the material presented here, but did not live to see it in print.


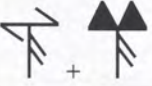
Present location	Excavated	Reference
		
? (1+)	Badari	Brunton & Caton Thompson 1928 : Pl. LIV, 10 (sherd)
? (1+?)	Badari, tomb 3715	Brunton & Caton- Thompson 1928: Pl. XL, 43d
Berlin, Ägyptisches Museum 13823* (2)	-	Scharff 1931: No. 330
Berlin, Ägyptisches Museum 14166* (1+)	-	Scharff 1931: No. 335
Berlin, Ägyptisches Museum 14363* (1+)	-	Scharff 1931: No. 336
Boston Museum of Fine Arts (BMFA) 11.308 (2)	Mesaeed, tomb 102	D'Auria et al. 1988: Fig. 30
Bristol City Museum and Art Gallery H 601 (*Brist. 100) (3)	Hu, tomb (U) 89	-
Cambridge, Fitzwilliam Museum E.1.1928 (2)	-	Bourriau 1981: No. 32, Fig. 31



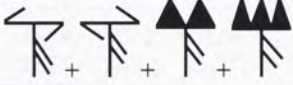
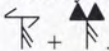
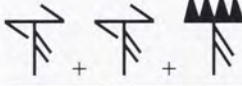


Chicago, Oriental Institute Museum (OIM) (1+?)	-	Mellink & Filip 1974: Pl. 202
Detroit Institute of Arts 70.656 (2)	-	webpage of DIA
Edinburgh, the Archaeological Museum 590		
Liverpool, School of Archaeology, Classics and Oriental Studies, University of Liverpool (LIA) E.3030* (2)	-	-
LIA E.3031* (1)	Hierakonpolis, Fort cemetery, tomb No. 70 (cf. Adams 1987: 71)	-
London, British Museum (BM) 50751 (*as A.16793) (2)		Torr 1898: Fig. 5a, b; Aksamit 1992, Pl. 2. No. 3
London, Petrie Museum 6341 (D 43C) (2)	-	Petrie 1921: Pl. XXXIV, 43C
MacGregor 3370 (2)		
Moscow, Pushkin Museum 4786 (2)	-	Hodzhash 1971: Pl. 2
Munich, Staatliche Sammlung Ägyptischer Kunst, ÄS 2733 (2)	-	-
Murch One (2)		
Newberry Three (2)		
New York, Metropolitan Museum of Art (MMA) 10.176.129* (2)	-	-
Oxford, Ashmolean Museum (AM) 1895.571 (*erroneously 95.572) (D 43A) (2)	Naqada, tomb 1852	Petrie & Quibell 1896: Pl. XXXIV, 34; Payne 1993: No. 856


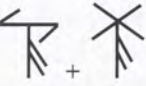
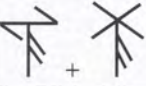



Oxford, AM 1895.815 (1)	Naqada, South Town	Payne 1993: No. 851
Private Swiss collection (1+?)	-	Page-Gasser et al. 1997: No. 15A
Stockholm, Medelhavsmuseet 18726 (3)	-	George 1975: No. 153
Stockholm, Medelhavsmuseet 1969.97 (2)	-	George 1975: No. 144
Turin, Museo Egizio S.406 (2)	-	-
Yale University Art Gallery 1937.157 (3)	-	Scott 1986: No. 10
		
BMFA 11.304	Mesaeed, tomb 57	http://www.mfa.org
LIA E.3038*	-	-
New York, MMA 10.176.124*	-	-
Oxford, AM 1933.1416	-	Payne 1993: No. 857
		
? (1+)	Mostagedda, area 4000	Brunton 1937: Pl. XXXVIII, 2 (sherd)
? (1+)	Badari, tomb 107	Brunton & Caton-Thompson 1928: Pl. LIV, 16
? (2)	Abadiya, tomb 184	Petrie 1901: Pl. XX, 12
Atlanta, M.C. Carlos Museum, Emory University 1921.23 (1+?)	-	http://carlos.emory.edu/ODYSSEY/EGYPT/egyptlife
Baltimore, John Hopkins University (1+?)	Mahasna	-

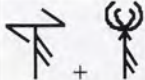
Berlin, Ägyptisches Museum 13051* (1)	Naqada, tomb 1536	Scharff 1931: No. 332
Berlin, Ägyptisches Museum 14361* (1+)	-	Scharff 1931: No. 332A
BMFA 13.3952 (2)	Mesaeed, tomb 877	http://www.mfa.org
Bristol City Museum and Art Gallery H 605 (*Brist. 226) (2)	El Amra, tomb 226	-
Brussels, Musées Royaux d'Art et d'Histoire (MRAH) E 1715* (1+). Newberry mentions also a pot BMRAH inv. no. 1931, from Naqada, tomb 810, with the same standard. According to Hendrickx (1986: 35) the pot has no decoration.	Naqada, tomb 852	Hendrickx 1986: Fig. 2
Cairo, Egyptian Museum CGC 11566* (1)	-	Quibell 1904, 1905: 118-119, Pl. 23
Cairo, Egyptian Museum CGC 11567* (2)	-	Quibell 1904, 1905: 119, Pl. 23
Chicago, OIM 5181 (1+?)	Abadiya, tomb B 248	Petrie 1901: Pl. XX, 6
Chicago, OIM (* MMA 07.228.134) (1+?)	-	Lythgoe et al. 1919: Fig. 4E
Hannover, Kestner Museum (2)	-	Woldering 1956: 9
Laon, Musée archéologique municipal (1+)	-	Catalogue Sotheby 1913: No. 320, Pl. XXVII; Sée 1973: 28
London, BM 26636* (2)	-	Torr 1898: Fig. 2a, b
London, BM 26657* (2)	-	Torr 1898: Fig. 4a, b
London: Petrie Museum 6331* (D 44P) (2)	-	Petrie 1921: Pl. XXXIV, 44P
Manchester Museum 11946* (2)	Naqada, tomb 562	http://www.museum.mn.ac.uk




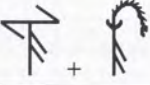
Moscow, Pushkin Museum 4787 (1+?)	-	Pavlov & Hodjache 1959: Pl. 7
Munich, Staatliche Sammlung Ägyptischer Kunst, ÄS 1632 (1)	-	von Bissing 1934: Pl. II, 9a-b; Löhr & Müller 1972: Pl. 6
Oxford, AM 1895.605* (D 40) (1)	Naqada, tomb 390	Petrie & Quibell 1896: Pl. XXXIV, 40; Payne 1993: No. 853
Oxford, AM 1933.1415 (2)	-	Payne 1993: No. 854
Oxford, AM 1933.378 (1+)	-	Payne 1993: No. 863 (sherd)
Paris, Louvre E.28021 (*Guimet One) (1+)	-	-
Private Swiss collection (*MacGregor 3493) (1)	-	Catalogue Sotheby 1922: No. 1756; Schlögl 1978: Pl. 16a, b
Toronto, Royal Ontario Museum (ROM) 958x200 (1+)	-	-
Wien, Kunsthistorisches Museum 7469 (2)	El Kubaniya South, tomb 21.h.2	Junker 1919: 53, Fig. 19; Seipel 1993: No. 3
		
? (1+)	Abadiya, cemetery B	Petrie 1901: Pl. XX, 3
		
Basel, Schweizerisches Mu- seum für Volkskunde III 10765	-	-
Bonn, Sammlung des Ägyptologischen Seminars der Universität, 218	Naqada, tomb 1047	Regner 1998: No. 77

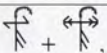
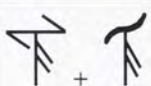
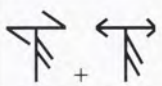
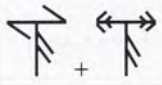
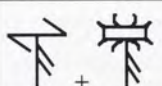
Dunedin (New Zealand), Otago Museum E.24.12	Badari, area 3800	Brunton & Caton Thompson 1928: Pl. XL, 43 d2; Waite 1950: Pl. 15
Edinburgh, National Museum of Scotland 1921.754	-	Aldred 1965: Fig. 25
London, Petrie Museum 6308* (D 41D)	-	Petrie 1921: Pl. XXXIII, 41D
New York, MMA 07.228.60*	-	-
Paris, Louvre E.11427	-	Catalogue Sotheby 1913: No. 310/2
Turin, Museo Egizio S.4699	Hammamiya	Fattovich 1978: Fig. 1
		
Berlin, Ägyptisches Museum 14362*	-	Scharff 1931: No. 333
Hannover, Kestner Museum 1954.125	-	Brunner-Traut 1984: Fig. 8
		
?	Matmar, tomb 5102	Brunton 1948: Pl. XII, 12
Cairo, Egyptian Museum CGC 18806*	-	von Bissing 1913: 29-30, Pl. V
LIA One		
Manchester Museum 7755	-	http://www.museum.manch.ac.uk
New York, MMA 10.176.118*	-	-
Rea One		

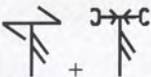
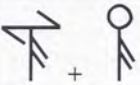


		
Cairo, Egyptian Museum CGC 11569*	-	Quibell 1904, 1905: 119-120, Pl. 24
Paris, Louvre E.24774	Zawiyet el-Mayetin	de Cenival 1993: Fig. 3
		
Oxford, AM 1933.845	-	Payne 1993: No. 868
		
Bristol City Museum and Art Gallery H 612 (*Brist 225) As 	El Amra, tomb b 93	-
		
Leiden, Rijksmuseum van Oudheden (RMO) F.1901/9.86 (*A.III.82)	-	Boeser & Holwerda 1905: 8, Pl. I, 21; Schneider & Raven 1981: 98, No. 11
		
New York, MMA 10.176.116*	-	-
Swansea, Egypt Centre W5308 (*MacGregor 3367)	-	Catalogue Sotheby 1922: No. 1757, Pl. LIII
 (2 boats)		



London, BM 36328* (Repeated as A.36328, without the third standard.)	-	Budge 1922: 247; James 1979: Fig. 18
		
London, Petrie Museum 6340* (D 45M)	-	Petrie & Quibell 1896: Pl. LXVII, 12
New York, Brooklyn Museum 09.889.400	Adaima, tomb 1	Needler 1984: No. 58
		
BMFA 99.712*	Abadiya, tomb 158	http://www.mfa.org
		
Oxford, AM E.2823*	Abadiya, cemetery B	Payne 1993: No. 867
Turin, Museo Egizio, S.414	-	Donadoni-Roveri 1988: Fig. 32
		
Oxford, AM 1955.556	-	Payne 1993: No. 862
		
London, BM 49570	-	Torr 1898: Fig. 1; Ross 1931, 94, Fig. 3
		
Aswan, Nubia Museum A.45	Risqalla, tomb 30:9	Reisner 1910: Fig. 289, 2; Nubia Museum







(D 40T)		1997: 15
Berkeley, Lowie Museum of Anthropology 6-4000	Naga ed-Dêr, tomb N 7521	Lythgoe & Dunham 1965: Fig. 148d; Spanel 1988, Fig. 3
Berlin, Ägyptisches Museum 18566 (*Berlin 12g10/1)	Abusir el-Melegg, tomb 12g19	Scharff 1926: No. 32, Fig. 6, Pl. 11
Bolton Museum 76.09.13	Mahasna, tomb H 133	Ayrton & Loat 1911: Pl. III, 15; Donohue 1967: Pl. 2c
Cairo, Egyptian Museum CGC 2083*	-	De Morgan 1896: Pl. X, 2; (Second standard drawn incorrectly.), von Bissing 1913: 27, Pl. III
Hildesheim, Pelizaeus Museum 763	-	Kayser 1966: Fig. 1
MacGregor 3369		
Newberry Two		
Oxford, AM 1895.600* (D 47B)	Naqada, tomb 1209	Petrie & Quibell 1896: Pl. LXVII, 11; Payne 1993: No. 869
Philadelphia, University of Pennsylvania Museum E.1399* (Erroneously AM, repeated erroneously as Naqada, LXVII, 7.)	Ballas, tomb Q 576	Petrie & Quibell 1896: Pl. LXVI, 7; Silverman 1997: No. 63B
Rome, Museo delle Origini annesse alla Facoltà di Lettere e Filosofia dell'Università di Roma VO 40	Tamit, tomb 10	Tamit 1967: Figs. 41,6, 43, Pl. 30
Stockholm, Medelhavsmuseet 10310	-	George 1975: No. 151
		





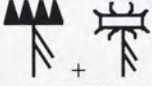
BMFA 13.3955	Mesaeed, tomb 665	http://www.mfa.org
Churchtown, Southport, Botanic Gardens Museum 52 (*Bootle One)	-	-
		
New York, MMA 20.2.10	-	Edgerton 1923: Figs. 5-8; Hayes 1953: Fig. 14.
		
Oxford, AM 1895.595* (Erroneously Diospolis Parva XX, 1&2, repeated as Naqada LXVI, 3.)	Naqada, tomb 1268	Petrie & Quibell 1896: Pl. LXVI, 3; Payne 1993: No. 859
		
Cairo, Egyptian Museum JE 64910		Donadoni 1969: 12; Saleh & Sourouzian 1987: No. 4
London, BM 36326* (Only one boat, with two standards; only the first standard mentioned by Newberry).	-	Bowen 1960: Fig. 2
		
Copenhagen, National Museum 5496		Blinkenberg & Friis Johansen n.d.: Pl. 9, Nos. 3-4
LIA E.6900 (*?) (According to the drawings provided by LIA, the standards are much damaged. They could possibly	-	-







have the forms  (mentioned by Newberry.).		
Manchester Museum 5299*	Gerza, tomb 199	Petrie et al. 1912: Pl. XII, 1
New York, MMA 07.228.125*	-	-
New York, MMA 36.1.121	Hierakonpolis Fort Cemetery, tomb 27	Lansing 1935: 41, Fig. 5
		
Dattari One		
		
Leiden, RMO F.1901/1.25 (A.III.67) (*erroneously A.III.69)	-	Boeser & Holwerda 1905: 7
		
Cleveland Museum of Art 14.639	-	Berman & Boháč 1999: No. 54
		
Aswan, Nubia Museum A.43	Meris-Markos, tomb 41:406 (cf. Reisner 1910: 220, Fig. 154, No. 21)	Nubia Museum n.d.: 51
London, Petrie Museum 10769 (D 44D)	Gerza, tomb 101	Petrie et al. 1912: Pl. XII, 2
Paris, Louvre E.10838	-	-







		
Seattle Art Museum 67.85	-	Bacharach et al. 1977
		
Toronto, ROM 910.85.79	-	Hoffman 1988: No. 24
		
?*	Naqada (Ballas?), tomb Q100	Petrie & Quibell 1896: Pl. LXVI, 8
		
? (1)	Naqada, tomb 1220	Petrie & Quibell 1896: Pl. LXVI, 2
Behrens One (2)		
Bristol City Museum and Art Gallery H 600 (*Brist. 88) (Erroneously El Amrah XIV, D 51) (2)	El Amra, tomb (b) 88	-
Cairo, Egyptian Museum CGC 2084* (3)	-	De Morgan 1896: Pl. VIII, 1 a-b; von Bissing 1913: 28, Pl. V
Kelekian One (2)		
LIA E.3034* (2)	-	-
London, BM 36327* (3)	-	Shaw & Nicolson 1995: 196
London, Petrie Museum 6301* (D 43K) (2)	Naqada?	Petrie & Quibell 1896: Pl. LXVI,4
London, Petrie Museum 8815* (D 40M) (1+)	-	Petrie 1921: Pl. XXXIII, 40M

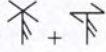
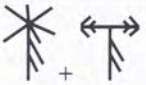

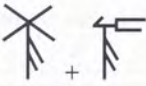


Manchester Museum 3133* (2)	Naqada, tomb 1840	http://www.museum.man.ac.uk
Philadelphia, University of Pennsylvania Museum E.15731 (2)	-	-
Private Swiss collection (1+?)	-	Auktion Basel 1972: 6, Pl. 5
Stockholm, Medelhavsmuseet 10227 (1+)	-	George 1975: No. 146
Toronto, ROM 900.2.88 (1+)	-	-
		
? (2+)	Mostagedda, area 1600	Brunton 1937: Pl. XXXV, 16
Brussels, MRAH E.3003 (1)	-	Hendrickx 1994: pp. 28-29
London, BM 58212 (1+?)	-	Shaw & Nicolson 1995: 226
Stockholm, Medelhavsmuseet 10600 (2)	Mostagedda, tomb 221	Brunton 1937: Pl. XXXV, 17; George 1975: No. 148
		
Oxford, AM 1895.578* (Newberry mentions also another vessel in the Ashmolean Museum, inv. no. 1895/570, with the same combination of standards. However, according to H. Whitehouse (a letter of 18 th September, 1986), the vessel 1895/570, not included in Payne 1993, is painted with	Naqada, tomb 1680	Petrie & Quibell 1896: Pl. LXVII, 13; Payne 1993: No. 866

scale pattern rather than boats.)		
		
? (1)	Adaima, tomb 100	Midant Reynes 2003: Fig. 3c
Kelekian One (2)		
LIA E.6022*(As  + ) (1)	-	-
		
?*	Naqada, tomb 1048	Petrie & Quibell 1896: Pl. LXVI, 5
Hildesheim, Pelizaeus Museum 371	-	Kayser 1966: No. 88
Newberry One		
Paris, Louvre E.27128	-	Vandier 1973: pp. 110-111, Fig. 10
		
Cairo, Egyptian Museum JE 88124	-	-
Cambridge, Fitzwilliam Museum E.179.1938	-	Bourriau 1981: No. 33
Lyons, Palais des Arts		
Toronto, ROM 900.2.87	-	-
		
London, BM 35502* (D 46D)	El Amra, tomb b	Randall-MacIver &




	225	Mace 1902: Pl. XIV, 46D; Aksamit 1992: Pl. I
Stockholm, Medelhavsmuseet 11123	-	George 1975: No. 147
		
Copenhagen, National Museum 9866	-	Catalogue Sotheby 1926: No. 72
London, BM 30920* (Repeated with only the first standard, repeated again as Diospolis Parva, XX, 8.)	Abadiya, tomb B 354	Petrie 1901: Pl. XX, 8 ; Capart 1905: Fig. 95
Newberry One		
		
Berlin, Ägyptisches Museum 13822*	-	Scharff 1931: No. 329
		
Oxford, AM 1895.577* (D 45B)	Naqada, tomb 1873	Petrie & Quibell 1896: Pl. LXVI, 10; Payne 1993: No. 864
		
Würzburg, Martin von Wagner Universität H.90	El Amra	-
		
LIA One		


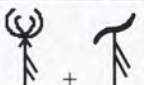

		
Saint-Germain-en-Laye, Musée des antiquités nationales 77.718e	Tukh	Cleyet-Merle & Vallet 1982: pp. 144-145
		
London, Petrie Museum 8813* (D 41N)	-	Petrie 1921: Pl. XXXIII, 41N
		
New York, MMA 11.150.32*	-	Lythgoe et al. 1919: Fig. 4F
		
Berkeley, Lowie Museum of Anthropology 6-3538	Naga ed-Dêr, tomb N 7338	Lythgoe & Dunham 1965: Fig. 90 h, j; Aksamit 1992: Pl. 2, No. 2
		
Indiana University Art Museum 59.45	-	Celenko 1996: Fig. 11
New York, MMA 19.2.14	-	Hayes 1953: Fig. 14
		
Bristol City Museum and Art Gallery H 614 (*Brist 104) (Only the first standard,	El Amra, tomb b 104	Randall-MacIver & Mace 1902: Pl. XIV, 51b

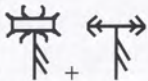
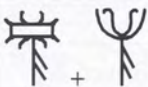

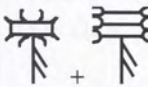
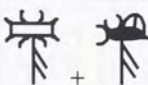
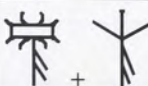
incorrectly  (D 51B)		
		
Berlin, Ägyptisches Museum 19120 (*Berl. 1024/2) (1+)	Abusir el-Melegg, tomb 1024	Scharff 1926: Fig. 5, Pl. 12
LIA One (2)		
Lyons (2)		
Paris, Louvre E.11428 (2)	-	Catalogue Sotheby 1913: No. 312
Pittsburgh, Carnegie Museum of Natural History 14772-4 (2)	-	Patch 1990: No. 4
New York, MMA 99.3.2* (2)	-	-
		
London, Petrie Museum 6342* (Repeated as Naqada LXVI, 9, with incorrect second standard; the form  is in fact a mixture of two separate elements.) (D 41M)	-	Petrie & Quibell 1896: Pl. LXVI, 9
		
Berkeley, Lowie Museum of Anthropology 6-4015	Naga ed-Dêr, tomb N 7522	Lythgoe & Dunham 1965: Fig. 150 e, f; Fazzini 1975: 11
		
Cairo, Egyptian Museum JE 97755	Minshat Abu Omar, tomb 757	Kroeper & Wildung 1994: 47, Pl. 17 (A)


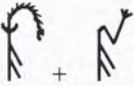

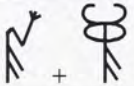

		close examination of a peeled-off surface around the second standard reveals traces of two lines running diagonally from the horizontal bar. A combination  is, therefore, more plausible.)
		
LIA E.3033* (only the first standard quoted as  .)	-	-
		
?*	Abadiya, tomb 58	Petrie 1901: Pl. XX, 9
		
BMFA 11.314 (2)	Mesaeed, tomb 62	Smith 1961: Fig. 7
London, Petrie Museum 6300* (D 45S) (3)	-	Petrie 1921: Pl. XXXIV, 45S
Paris, Louvre E.10825 (1)	-	Boreux 1925: 11, Fig. 2
		
? (D 41A) (1+)	Naqada	Petrie & Quibell 1896: Pl. XXIV, 41
Aswan, Nubia Museum A.42 (2)	Dehmit, tomb 43:68	Reisner 1910: Fig. 289, 1
Berlin, Ägyptisches Museum	-	Scharff 1931: No. 331

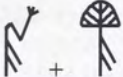

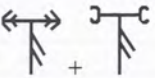


13824* (2)		
Berlin, Ägyptisches Museum 13826* (2)	-	Scharff 1931: No. 334
Brussels, MRAH E.3004 (3+)	-	CD-ROM Egyptian Treasures in Europe, vol. II
Cairo, Egyptian Museum CGC 18808* (1+)	-	von Bissing 1913: 33, Pl. V
Cairo, Egyptian Museum CGC 2082* (D 47C) (2)	-	De Morgan 1896: Pl. X, 1; (Standards drawn incorrectly.) von Bissing 1913: 26, Pl. III
Cairo, Egyptian Museum CGC 2089* (D 40N) (2)		De Morgan 1896: Pl. IX: 3; (Standards drawn incorrectly.) von Bissing, 32, Pl. V
Cambridge, Museum of Archaeology and Anthropology, z.17100 (2+?)	-	-
Hannover, Kestner Museum (1+)	-	-
Leipzig, University Museum E.3027 (2)	-	Steinmann 1998: No. 80
LIA E.3027 (*L.-Smith One) (2)	-	-
London, BM 65366 (2)	-	Graff & Manlius 2003
London, Petrie Museum 36233 (2+)	Haraga, tomb 452	Engelbach & Gunn 1923: Pls. XXV, 2, XXIX, 2
London, Petrie Museum 8812* (D 47G) (2)	-	Petrie 1921: Pl. XXXIV, 47G
Manchester Museum 3755* (2)		http://www.museum.mn.ac.uk







Munich, Staatliche Sammlung Ägyptischer Kunst ÄS 1819 (3)	-	Wildung 1981: Fig. 14
New York, MMA 07.228.135* (1+)	-	-
New York, MMA 15.2.34 (4)	-	Catalogue Sotheby 1913: No. 322, Pl. XXVII; Hayes 1953: Fig. 14
MMA One with (2)		
Rea One (2)		
Oxford, AM 1895.606 (2)	Naqada, tomb 173	Payne 1993: No. 858
Saint-Germain-en-Laye, Musée des antiquités nationales 77.719G (4)	Silsila	Cleyet-Merle & Vallet 1982: 139
Saint-Germain-en-Laye, Musée des antiquités nationales 77.766 (1+?)	-	Cleyet-Merle & Vallet 1982: 153
Stockholm, Medelhavsmuseet 18724 (2)	-	George 1975: No. 145
		
Oxford, AM 1891.25 (*20/5/1891)	-	Payne 1993: No. 861
		
Bristol City Museum and Art Gallery One	El Amrah?	
London, BM 26635*	-	Torr 1898: Fig. 3a, b
		






Oxford, AM 1948.17 (D 47F)	-	Payne 1993: No. 869
		
Cape Town, Iziko Museums SACHM 2520	Naqada?	Boshoff & Cornelius 2002: Pl. IC
		
Leipzig, University Museum E.3010 (*Berl.13227)	-	Steinmann 1998: No. 48
		
Amsterdam, Allard Pierson Museum (1+)	Badari, area 3800	Brunton & Caton Thompson 1928: Pl. XL, 41k (sherd); (Standard drawn incorrectly.) Lunsingh Scheurler 1927: Pl. 4, Nos. 12-13
BMFA 13.3923 (1+?)	Naga el-Hai, tomb 439/1	http://www.mfa.org
Bonn, Sammlung des Ägyptologischen Seminars der Universität 222 (1+)	-	Regner 1998: No. 76
Cambridge, Fitzwilliam Museum EGA 4571.1943 (3)	-	Bourriau 1981: No. 31, Fig. 32
Essen, Folkwang Museum (1+?)	-	Führer 1964: Fig. 6
London, Petrie Museum 8814* (D 41J) (1+) (Newberry: <i>Petrie Two (one with</i> ²). One of them can be the pot 8814)	-	Petrie 1921: Pl. XXXIII, 41J

New York, MMA 07.228.136* (1+)	-	Hayes 1953: Fig. 14
Louvre One		
		
?*	Naqada, tomb 414	Petrie & Quibell 1896: Pl. LXVI, 6
Berlin, Ägyptisches Museum 14314 (*erroneously 14317)	-	Scharff 1931: No. 327; Aksamit 1992: Pl. 3
New York, MMA 07.228.126*	-	-
		
London, Petrie Museum 6333 (D 41U)	-	Petrie 1921: Pl. XXXIII, 41U
		
Paris, Louvre AF 6851	-	Égypte 1973: No. 42
		
Yale University Art Gallery 1937.159	-	Smith 1981: Fig. 3; Scott 1986: No. 11
		
Chicago, OIM 10758	-	Mellink & Filip 1974: Pl. 203
		
Paris, Louvre E.11429 (on	-	Aksamit 1989-1990:

loan in Warsaw, National Museum, 143325)		No. 4
		
?, previously YMCA Jerusalem C.601 (1+?)	-	Preger 1975: Fig. 33
Aswan, Elephantine Museum (?) A.44 (1+?)	Kuri, tomb 102:329	Firth 1915: Pl. 27a
Moscow, Pushkin Museum 4784 (form of standard unclear) (1+?)	-	Hodzhash 2002: No. 165
Oslo, Ethnographic Museum 10520 (1+)	-	Naguib 1987: No. 4
Turin, Museo Egizio S.413 (1+)	-	Donadoni Roveri & Tiradritti 1998: No. 125
		
London, Petrie Museum 9544	Badari, tomb 3770	Brunton & Caton Thompson 1928: Pl. XL, 43e
		
Luxor Museum 248 (3)	-	-
		
Bristol City Museum and Art Gallery H 606 (*Brist. 164) (Second standard incorrectly )	Abadiya, tomb B 164	Petrie 1901: Pl. XX, 4

		
Baltimore, Walters Art Museum 48.2094 (*Newb. One)	-	Newberry 1913a: 132, Fig. 1
		
Berlin, Ägyptisches Museum 20304* (2)	-	Scharff 1931: No. 328
LIA E.3035 (*?) (As Newb.One?; decoration most probably modern.) (1)	-	Adams 1988, Fig. 29; Aksamit 2001: 60, Fig. 1
		
Cairo, Egyptian Museum CGC 18802*	Ahaiwa	von Bissing 1913: 32-33, Pl. V; Perc 1974: 24, Pl. 2
		
? (1+?)	Badari, area 4600	Brunton & Caton Thompson 1928: Pl. XL, 41e
?, previously Hilton Price collection 4337 (1+?)	-	Catalogue Hilton Price 1908: Pl. XXXV
New York, MMA 10.130.1168 (*Murch One) (2)	-	Mace 1911: 23, Fig. 16
Toronto, ROM 910.85.80 (1+)	El Amra, (tomb a 139?)	-
		

Bristol City Museum and Art Gallery H 604 (D 48C) (1+)	El Amra, tomb b 197	Randall-MacIver & Mace 1902: Pl. XIV, D 49; Grinsell 1972: 22, Fig. 7
		
Oxford, AM 1895.584 (*erroneously 1895.684) (2)	Naqada, tomb 454	Petrie & Quibell 1896: Pl. LXVII, 14; Payne 1993: No. 865
		
Oxford, AM E.2877* (D 41B) (2)	Hu, tomb U 122	Petrie 1901: Pl. XVI, 41b; Payne 1993: No. 852
Newberry	Kostamneh	
		
Cairo, Egyptian Museum JE 58510 (2)	-	-
		
Stockholm, Medelhavsmuseet 10293 (2)	-	George 1975: No. 150
		
Copenhagen, National Museum 5484 (1+)	-	Blinkenberg & Friis Johansen n.d.: 4, Pl. 9
		
London, Petrie Museum 6306 (D 41C) (1)	-	Petrie 1920: Pl. XIX, 41C

		
?, previously Hilton Price collection 4340 (1+?)	-	Catalogue Hilton Price 1908: Pl. XXXV
		
? (D 40L) (1+?)	Abadiya or Hu	Petrie 1901: Pl. XVI, 40b
		
? (1+?)	Abadiya, tomb B 389	Petrie 1901: Pl. XX, 5
		
? (2)	Abadiya, tomb (B) 425	Petrie 1901: Pl. XX, 10
		
? (1+?)	Abadiya, cemetery B	Petrie 1901: Pl. XX, 7

Comments

* marks a vase catalogued by Newberry (Newberry 1913b)

Entries written in *italics* and indented refer to vessels listed by Newberry, which could not have been identified for the purpose of the present list. Their standards are not counted in the final summary.





















(1) Only one boat is depicted on a vessel or the second boat has no standard.

(1+) The standard of the second boat not preserved.






(1+?) No information about the standard of the second boat.

(2), (3), (4) Same standard occurs two, three or four times on a single vessel.

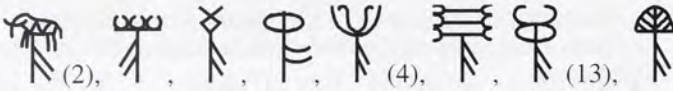
To avoid excessively long bibliography, the number of references has been limited to maximum two for each vase. Vessels illustrated in *Corpus of Prehistoric Pottery and Palettes* (Petrie 1921) are marked, beside their museum inventory numbers, also by their symbols, according to Petrie's system. References to www pages are quoted only when no other publication could be traced.

	(24),		(25),	:	152 on 115 pots			
	(18),		(19),		(20),		(21):	77 on 64 pots
	(5):				74 on 50 pots			
	(7):				25 on 22 pots			
	(9),		(10),		(11):		21 on 21 pots	
	(28),		:		20 on 17 pots			
	(31),		(32):		14 on 13 pots			
	(27):				9 on 8 pots			
	(8),		:		8 on 6 pots			
	(1),		(12):		8 on 6 pots			

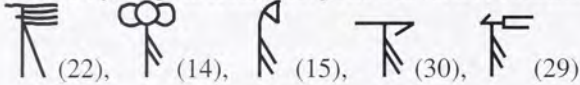
Appearing on 2-3 pots:

	(17),		,		(23),		,		(3)
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Appearing only on single pots:



noted only on pots from Diospolis Parva, not confirmed:



Numbers in brackets refer to Petrie 1921, Pl. XXIII

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Branislav Anđelković

Models of State Formation in Predynastic Egypt

1. Introduction

The theories regarding complexity and state emergence in Egypt, as noted by Geller (1992: 154), “could be grossly labeled as ecological, economic, or ideological explanations, or combinations of these”. It is clear that we cannot attribute state formation to any single factor *per se*, although, as we shall see, there may have been a predominant one. State formation was rather the result of a wide spectre of constituents operating together (cf. Anđelković 2002) and to achieve it, to paraphrase Cottrell (1955: XI), geography, energy resources, climate, population and ideology had to be mixed in certain right proportions.

As summarised by Levy and Holl (1998: 4), there are three major groups of processes which operate contemporaneously but at different levels through time: *short-term* processes, such as, for instance, political history, events, the acts of individuals; *medium-term*, characterised among other things by cycles of socio-political, economic, agrarian and demographic change; and *long-term* that may include the natural environment with geological, climatic and geomorphologic aspects, as well as the social environment with dominant controls over production, technology and ideology that affect social evolution.

There are many limitations on our attempts to provide an explanatory spatio-temporal-causal model of state formation: not only the modest amount of available data, but also the practically unlimited number of possible combinations of factors and the fact that sometimes a cause and its effect are so distant one from another in time, space and even in category that it is not easy to define, trace and understand properly their interconnection and the related causality. For instance, Hassan (1997: 472) suggested that “the course of state formation may be traced back to the herders of the Sahara approximately 2,000 years before unification”.

2. State formation models, hypotheses and theories

The way in which the terms *hypothesis*, *theory* and *model* are used in a number of works on the subject, do not always enable us to make the necessary contextual distinction between them. According to Campagno (2001) state formation theories can be categorised as *monocausal* (single factor) or *pluricausal* (several factors), as well as universal (the very same factors cause emergence of the state wherever it occurs) or *particular* (the factor/factors can be applied to just one particular case), while the factors themselves can be classified after two basic criteria: consensus (social agreement) or violence (conflict inside a society and between different societies). As stated by Campagno (2001) “wars or conquest seem to be the more appropriate to produce a State-like situation (...) winners and losers of the war might become dominators and dominated of a new social situation of State type”. Theories of state formation, as seen by Bard and Carneiro (1989: 22), fall into two basic groups: conflict theory and integration theory. We agree with Kemp (1989: 31) that individual cases “vary a great deal in their particular circumstances”. Even if we manage to assemble “a check-list of universally valid causes” (Kemp 1989: 31) the precise mode, timing and proportion by which the “ingredients” of the state formation “recipe” are mixed together would probably be very different, but paradoxically with the very same final result – emergence of the state (for the parameters of statehood see Anđelković 2005).

The formation of the state in Egypt has been explained by several main models (cf. Siegemund 1999). The models were grouped by Griswold (1992: 237-238) into two categories: *prime-mover* models – utilize factors like circum-scription, irrigation, warfare, trade, population pressure, and technological development (the last two primary causes of the rise of the Egyptian state added from Hassan 1997: 473) – and *systems theory* models (there was no prime-mover but the state formed through a combination of interacting factors, none of which was sufficient in itself to enable state formation). However, we believe that the border between the two suggested groups of models is more porous than hermetically sealed. Although we incline to the systems theory approach, we tend to think that the interacting factors cannot be of uniform importance and in equal proportion. On the other hand, it is highly unlikely that the predominant factor would be effective at the crucial moment – to bring about the formation of the state – if deprived of interaction with its proper framework. That brings us to some sort of a hybrid “systems prime-mover theory” model as perhaps the most plausible. As noted by Hassan (1997: 473), if the rise of the Egyptian state is regarded as a sequential development in successive stages, it is possible that *different* variables (such as fluctuations in rainfall and Nile floods, farming and herding, political organization, demographic changes and religion) were influential at each stage.

Butzer (1976: XIV) defined three *independent* variables as: environment, technology and population (in terms of demographic and/or cultural context), on or through which the fourth *dependent* variable – social organization and differentiation, with factors such as trade, religion and warfare – is modelled.

Although Hassan's statement (1988: 164, with references) that models of the political evolution of Predynastic Egypt and state formation are still largely exploratory – referring to population, irrigation, technology, warfare and trade – is on the whole still valid, yet there are significant recent contributions in the domain of state origin (e.g. Hendrickx, Friedman, Ciałowicz & Chłodnicki 2004; Midant-Reynes et al. 2005). The main approaches concerning state emergence in Egypt are presently to be perceived as:

1. *Unification/forcible annexation model.*

There are several variants of the theory (one of them is termed the *classical model*, see Köhler 1995: 81, 82; cf. Kaiser 1990), including warfare (e.g. Griswold 1992: 243-254) and/or the conquest option, including "a conquest by marriage" (Griswold 1992: 246; cf. Petrie 1939: 79), but most of them are inspired by "the traditional, semi-mythological explanation provided by the Egyptians themselves" (Savage 1997: 226) who "viewed their internal universe in terms of the symbolic dualism" (Butzer 1976: 99). Namely, the Two Lands, i.e. Lower Egypt (northern Egypt or the Nile Delta) and Upper Egypt (southern Egypt or the Nile valley), were unified by a victorious king. As noted by Hassan (1988: 174) if "there is any truth to the unification conquest myth, it may reside in the "conquest" of the Nagada region by the followers of Horus from Hierakonpolis"; namely, the unification of the predynastic kingdoms of Hierakonpolis and Naqada "may have been generated the legend of the Two Lands identified with the gods of Nagada (Seth) and Hierakonpolis (Horus)" (Hassan 1997: 477); for the view that mythology was developed by the elite to explain their position as leaders see Griswold (1992: 253). A broad consensus has been reached that northern Egypt was conquered by the ruler of the south. Although a significant amount of data testify to a rapid development of socio-political complexity and eventually state level society in protodynastic Upper Egypt (e.g. Andelković 2002; 2004; 2005), the evidence for an equal political counterpart, entity of Lower Egypt is mostly lacking. Moreover, the differences in architecture, pottery production (for instance, Köhler's 1995: 87 research on the pottery from Buto pointed to "an apparently less developed social system than in Upper Egypt"), quality and quantity of grave goods, so-called artistic achievements, "power artefacts", etc. (some of the "powerfacts" are unpretentiously listed by Geller 1992: 168 as "maceheads and palettes, and pottery and stone form abroad"), appear to imply, at least judging from the data in hand, a certain developmental gap between "culturally advanced neighbours" of Naqada culture on one side, and

Maadi-Buto/Lower Egyptian culture on the other (cf. Fattovich 1984: 51). As Trigger put it (1983: 68) “the especially rich natural resources of the Delta may have resulted in an even slower realization of the full potential of a food-producing economy than took place in Upper Egypt”. There is also a possibility that, in contrast to Upper Egypt, the Lower Egyptian culture(s) longer adhered to the Neolithic-minded logistic and world view (despite the introduction of copper) (cf. Seeher 1991: 317). Note that the Lower Egyptian Maadi community was on a chiefdom level (as suggested by Köhler 2005) while the Upper Egyptian culture approached the threshold of statehood already in Naqada IC-IIB; and a proto-state emerged in Naqada IIC-IID1 (Anđelković 2002; 2004; 2005). Finally according to Childe, a group of Upper Egyptian *nomes* conquered Lower Egyptian *clans* (Bard 1994: 3) [emphasis added]. Moreover, as noted by Wilkinson (2002: 244) “An iconography of power (...) was being developed by the rulers of Predynastic Upper Egypt, not by their Lower Egyptian counterparts, if such figures even existed”. The swift, easy and permanent spread of Naqada culture to the north seems to confirm this notion. Some Lower Egyptian sites, such as Maadi, were brought to an end, other sites (with so-called “transitional” phase/layer), such as Buto, were assimilated, along with the establishment of some Naqada culture settlements in Lower Egypt (cf. Midant-Reynes 2003: 114, Carte 3). A different opinion, that “the social, political, economic, logistical, administrative and ideological foundations” of the state formation “had been laid in both parts of the country”, was presented by Köhler (2005). The Lower Egyptian culture was defined as “a vast cultural complex which spread over the Nile Delta and as far as Fayum in the south in the early Predynastic period” (Mańczyńska 2003: 223). As noted by Bard (1994: 24) “the emerging picture of Egypt in the 4th millennium BC is of two different material cultures with different belief systems”. Concerning the “Lower Egyptian Predynastic cultural zone”, Kemp (1989: 43) concluded that “In comparison with their Upper Egyptian equivalents, their pottery and other products appear crude and unsophisticated”.

The versions of unification theory mainly vary in regard to who united the country, whether it was in a peaceful – according to Wildung (1984: 269) “The rise of the Egyptian state occurred (...) as a broad-range evolution in the whole area (...) and it seems to have been carried out harmoniously, without any major conflicts” – or violent manner and how long it took (i.e. was it achieved by one ruler/generation or several of them?). According to the Abydos list and Manetho’s *Aegyptiaca*, the first king of unified Egypt was the legendary Menes, the debate about the true identity of whom is still open (cf. Wilkinson 1999: 66-67). However, note that the “fact that on the Cairo fragment some of these little figures wear the double crown means also that the Egyptians themselves did not, at least in earlier times, see Menes as the very first unifier” (Kemp 1989: 46, 352 n. 44). The ideas that the changes in material culture evident in the successive

predynastic stages, the establishing of “two well-organized monarchies, one compassing the Delta area and the other the Nile valley proper” (Emery 1984: 38), and the transition to the Dynastic period, should all be ascribed to the New Race, Dynastic Race, master race, originating “from somewhere else” (for a brief summary see Geller 1992: 48-49) that entered the valley by “gradual infiltration or horde invasion” (Emery 1984: 38) are now generally untenable and abandoned. As Holmes has noted (1989: 21), there is no need to look for some foreign invaders who brought civilization to Egypt from what is a vaguely defined “east”, since the origins of Egypt are firmly rooted in its prehistoric past.

As stated by Hassan (1997: 476) the rise of a unified state was most likely “not the result of a single battle, but the culmination of alliances, as well as fragmentation and reunification, over a period of at least 250 years or about ten to 12 generations”. Until the 1980s, the Narmer palette was regarded as evidence for the “unification”, despite the obvious fact that the violent scene of the “kneeling, conquered enemy whom the king is about to smite with his mace” is depicted (Bard 1992b: 304). As noted by Wilkinson (1996: 95) such “unification” rather represents “successful expansion of Upper Egyptian power into (...) Lower Egypt”. Although the term “unification” is still in use, what is practically meant by it is a process through which one side eventually “conquered and annexed” the other (for the interchangeable use of the terms see for instance Hassan 1997: 477), so the present author applied the term *forcible annexation* (Anđelković 1995: 17) or assimilation by power. As Savage put it (1997: 230) “we might even envision a Narmer or Menes initiating *warfare* upon a polity in Lower Egypt, thus *uniting* the Two Lands” [emphasis added]. Indeed, this “was not a process of peaceful expansion, but one that involved warfare for the acquisition of [the] cattle, booty or land” (Bard 1994: 3) that supported the power base. Note that after the disappearance of Lower Egyptian tradition – starting shortly after the beginning of Naqada IIC, to be completed toward Naqada IID2 – only one culture was left in both Upper and Lower Egypt. However, this by no means stopped the power struggle “both within and between” (Hassan 1988: 172) Naqada lords/lineages/elite/interest groups and a similar trend continued throughout the Dynastic period. Since the omnipresent and diverse evidence of conflict (Anđelković 2002; Campagno 2004; van Wetering 2005) hardly signify “political unification” but rather “the wars of unification” it seems that the prevailing factor in the unification/forcible annexation model is that of a conflict over power.

2. Hydraulic model.

According to the “hydraulic hypothesis”, the state development was dependent on irrigation, i.e. the rise of political power is attributed to the need to manage expanding irrigation systems as a complex subsistence activity. In the 1920s Moret and Davy suggested that controlling a river the magnitude of the

Nile required the coordinated labour of a large group of people spread over a wide area and organized by a central governing agency (Haas 1982: 70-71; cf. Geller 1992: 16, 155). Such an approach was, with significant differences, promoted by the works of Wittfogel (1955; 1957; cf. Steward 1955; cf. Siegemund 1999: 254 n. 119), Butzer (1976) and Krzyżaniak (1977; cf. Griswold 1992: 238). Not necessarily in disagreement with the views that the “Nile regime provided for easy production of agricultural surpluses with no need for centrally controlled irrigation schemes” (Geller 1992: 155) and that effective large scale irrigation (as far as the “large scale” or “sophisticated” notion is concerned, we should bear in mind that for the “proportional” understanding of the particular pre- and protohistoric context it is very important to perceive Predynastic phenomena “in forms, terms and standards appropriate to their own times”, Anđelković 2005) probably did not exist in Egypt before modern times – i.e. there is “no sophisticated irrigation before it was introduced effectively during our modern era” (Hassan 1988: 165) – some scenes on C-class pottery (van Lepp 1995) and the Scorpion macehead (Butzer 1976: 20-21) bear witness to the presence of an irrigation system “composed of complex canals, basins and weirs” (van Lepp 1995: 208) and attest that “hydraulic engineering” was practiced in the predynastic period in Upper Egypt. As stated by Atzler (1995: 46) intensive agriculture and production “was only feasible through artificial inundation landscape manipulation, and the often assumed picture of a relatively small population which could have used abundant natural resources until dynastic times is apparently misleading”. The two main versions (cf. Griswold 1992: 238-239) of the hydraulic model differ in regard to: whether the leaders/elite bring about the construction of public works such as irrigation canals, or if it was *vice versa* – the central control becomes necessary to coordinate large scale irrigation/public works? Although Butzer (1976: 110-111) actually argues against irrigation as a basis for the state-centred society and the linear causality model of stress→irrigation→managerial bureaucracy→despotic control, he consents that “the transition from natural to (...) artificially regulated irrigation had been *completed* by the end of the Predynastic era” [emphasis added]. In fact, Butzer (1976: 100-101) was right in rejecting population pressure, ecological stress or reaching of the carrying capacity of the land as prime movers in stimulating intensification of agricultural production. But what he severely underestimated was the emerging political ambition and “exploitative capabilities” of the local rulers/elite who were not hungry for agricultural products but rather for prestige goods and power (cf. Anđelković 2004: 543) – as noted by Bard (1994: 118) “Irrigation agriculture provided a surplus (...) but it also supported corvée labor, full-time specialists, elites and a kingship”. That is why the surpluses (and more and more surpluses) were needed. According to Bard (1992a: 16) “controlling surplus agricultural wealth was *the key* to social differentiation”. Since the “surpluses do not just

develop, because most people and small groups produce only what they need to survive”, to “produce a surplus a force must be applied” (Griswold 1992: 238-239) – including surplus created from raiding and warring (Griswold 1992: 249, 254). The potential for accumulating pockets of surplus form the basis of power (Kemp 1989: 35). Accordingly, the important factor in the hydraulic model is again conflict over power, partly realized by water management. To paraphrase Siegemund (1999: 255), not subsistence but rather surplus was dependent upon coping with large masses of water. Besides, the role of the Nile, as a “uniquely serviceable river” (Wittfogel 1957: 250) in state formation processes was important in enabling development of “inundation culture” (Atzler 1995), as well as fast and effective internal communication and easy, low cost transportation. As noted by Wenke (1989: 135) “the location of almost every settlement within a few kilometers of this transport network, probably explains much of the political and religious unity of Egypt”. All in all, “Wittfogel got it right (the association between Social complexity and rivers) but for the wrong reasons” (Guillermo Algabe, personal communication, April 6, 2001).

3. *Circumscription model.*

The theory, introduced by Carneiro (1970) with revision (Bard & Carneiro 1989) and later withdrawal (Bard 1992a: 16), indicates a process of conflict over scarce resources, namely, population pressure within local polities led to inter-regional competition and eventually warfare. As Siegemund put it (1999: 248), an ecological setting physically circumscribes a particular territory on which live a certain number of people – in other words, “Dry desert sand circumscribes the arable part of the Egyptian Nile Valley” (Geller 1992: 156); in time the resources for subsistence become scarce (the shortages induced by the circumscription), so the people will fight over them to gain control over these resources; a complex organization of the prevailing group arises, making the others subservient, and eventually a state comes into being. This scenario denotes the major factors in Egyptian socio-political evolution as: environmental circumscription, resource concentration, population pressure, increasing social complexity and warfare. Increasing trade and exchange of agricultural surplus and elite goods may also have been important in the establishing of the managerial institutions of local polities, whereas social circumscription would have been a significant factor in limiting the expansion of regional polities into new territories (Bard & Carneiro 1989: 21, 23). As we have said elsewhere (Anđelković 2004: 543) the circumscription model had the potential to explain state formation in predynastic Egypt, except in failing to introduce the main and most important reason for the competition, the true prime mover – the will to power. Natural resources and energetic potential were more than abundant in the Nile Valley (cf. Anđelković 2002) so, the conflict was hardly caused by scarce resources, population pressure or

approaching the carrying capacity (i.e. the maximum population that a particular territory will support without undergoing deterioration). Whatever (battles or alliances, force or fraud) made hundreds of small autonomous villages yield their sovereignties to proto-nomes, and made proto-nomes in their turn yield sovereignties to a more complex and powerful polity, and so forth until the early state emerged, it was ultimately power-related. The most manifest aspect of "the play of power" (Hassan 1988: 175) was a fight over land, or better said, fight over territory (and more territory) and that is why every subsequent political entity, from Upper Egyptian proto-nomes to the all-Egyptian early state (cf. Anđelković 2004), encompassed a larger territory in comparison to its precursor. The process was driven by "the inherent tendency of absolute power to expand beyond its borders" (Needler 1984: 31). That power has both material and ideological components was confirmed by a simultaneous development of characteristic – "from conqueror to god" as Griswold put it (1992: 252) – iconography, poses and actions of pharaonic symbolism (such as, for instance, the figure of a ruler smiting his enemy/enemies represented on a vase from Umm el-Qaab Naqada Ic grave U-239, the Hierakonpolis Naqada IIc painted tomb T 100, or Narmer Naqada III palette). The rise of the state also coincides with the monopolization of force, manifested in a decreasing number of confronting sides (Anđelković 2005). Although Siegemund (1999: 371) suggested that what was actually circumscribed were the "needs" of elite (wood, ivory, copper, gold, precious stones etc.), restricted by ecological and political factors, we believe that the named items, and many more, merely belonged to "a long list of gains that went to the ultimate winner (...) because what the Egyptian elite were really fighting for was absolute power" (Anđelković 2004: 542). It seems that the key factor in the circumscription model is again a conflict over power, i.e. not over scarce resources but rather caused by a sort of "power circumscription".

4. Multivariate-multistage systemic interplay model.

There are several scenarios that explain state formation by a multiplicity of factors, as the result of many inter-related sets of factors, such as access to land, trade goods, religious ideology, warfare, political manipulation, etc. (cf. Savage 1997: 226). Two main branches of this model, despite the factors involved (as noted by Griswold 1992: 241, one can practically "insert any elements that he/she feels are important to the formula"), centre either on competition, or consensual behaviour and mutual benefits respectively. According to Kemp (1989: 32, 34) through the analogy of game playing (namely, a board game of the 'Monopoly' kind where players compete to acquire wealth through stylised economic activity, as players take turns moving around the board according to the roll of the dice; the game is named after the economic concept of monopoly, the domination of a market by a single seller) we can envisage the

course which took the competition of individuals/communities with one another; thousands of games proceeding simultaneously, with the winning 'players' (sometimes "many generations treated as a unity", but also lineages or individuals) reaching higher and higher game levels until finally a single winner – i.e. "the winning kingdom (centered at Hierakonpolis)" – takes all. Namely, a "Proto-kingdom of Upper Egypt based at Hierakonpolis (...), embarked on a military expansion (...) which engulfed the whole of Egypt" (Kemp 1989: 45, Fig. 13). This serious war game probably started because of the "propensity to compete" or more specifically "a powerful urge to dominate", whereas important determinative factors were: a remarkably fertile "natural resource base" and "the creative power of the [Egyptian] imagination to fashion a distinctive ideology" (Kemp 1989: 35). Kemp (1989: 34) continues with the notion that game theory helps "to understand the process of massive social and structural change which lay behind the appearance of the first states". Savage (1997: 228-231), along with emphasizing that the state formation for Kemp may be seen as "a process of the accumulation of power", suggests that "the creation of the Egyptian state, as a state, is probably the by-product of economic ambition", concluding that a combination of Kemp's game theory with action/practice theory best explains the available data. There are fewer positions of valued status than there are people capable of filling them, so the limited supply of high-ranking positions creates a struggle for their occupancy; the struggle occurs not only at the level of single polities, but at the inter-polity level as well, until eventually, from a milieu of competing chiefdoms, the state emerges (Savage 1997: 228-231). A multivariate-multistage systemic interplay model that promotes consensual behaviour and mutual benefits is offered by Hassan (1988: 165-175). According to his view, attempts of neighbouring communities to dampen the fluctuations of yield (as the most destabilizing factor of agricultural production) by pooling the resources, led to the emergence of community representatives/chiefs; further enlargement of the economic units "through alliances, with occasional incidents of fightings", led to a hierarchy of chiefs and the emergence of larger regional political units; legitimation of power, emphasized by status goods and funerary offerings, stimulated trade and the industry of funerary goods; skirmishes with "Libyan" and "Asiatic" raiders added to the image of chiefs as keepers of world order; the dramatic reduction in the Nile flood by the end of the Late Predynastic, promoted the fusion of Hierakonpolis and Naqada, followed by expansion northward to Lower Egypt as the final enlargement of economic units that "led to the rise of a state society governed by supreme rulers" (Hassan 1988: 135, 165-166). It is reasonable to believe that instead of only pooling the resources, neighbouring communities rather cooperated in coordinating and combining their hydraulic-economy-related efforts (manipulated ponds, basins, canals, river-levee-fixations, weirs construction, etc.), that brings us close to the hydraulic model.

No matter which side of the medal a particular author may chose to single out, whether competition or consensus, in both cases the role and significance of power – that turns out to be system's goal – is prominent. Hassan (1988: 166) argues for mutually beneficial economic decisions and consensual "organization through coordination" but yet notes that his model may also be construed in terms of "conflict theory", acknowledging that conflict between social groups is ubiquitous. In other words, "the play of power among various actors within a hierarchical organizational pyramid is perhaps the most important force structuring social relations and economic pursuits" (Hassan 1988: 175) As indicated by Griswold (1992: 241, 243, 250) some "largescale interregional cooperation" is not supported by the palettes of the period. Indeed, violence is highlighted in several other instances as well (e.g. Campagno 2004: 690). Along with the power iconography – i.e. representations "sustaining and underscoring dominance" (Hassan 1988: 165) – the tendency toward warfare is reflected by early royal symbols (bull, lion, falcon, scorpion) and the bellicose personal names of several Predynastic kings (Kemp 1995: 684). Partially revising his model, Hassan (1997: 478-479) states: "Conflicts arising from agricultural failures and alliances formed to secure trade goods (...) and to aggrandize the power of the chiefs led to a series of political developments, including the rise of petty states and regional kingdoms, which were subsequently fused in yet larger kingdoms". Indeed, a conflict over power turns out to be the key factor in the multivariate-multistage systemic interplay model as well.

5. Trade model.

By this model trade was seen as a prime mover to state formation. Two kinds of trade have been suggested: trade in general [i.e. within the Nile valley] and foreign trade (Griswold 1992: 239). Over the distance of approximately 100 km there are some differences in regard to plant and animal life as well as minerals (Hartung 1998: 37) that promoted regional trade, along with the differences in skilfulness of the local craftsmen. Moreover, the demand for status goods "stimulated and fostered quarrying and mining activities, as well as artistic and industrial developments" (Hassan 1997: 474). As stated by Wilkinson (2000a: 382, 385, 395) in early Naqada II, "Foreign trade – the acquisition of imported goods, control of commodities with which to trade, and access to trade routes themselves – seem to have played a crucial role in the process of state formation", whereas in late Naqada II "trade in prestige commodities seems to have become a decisive factor in the politics of Predynastic Upper Egypt"; and the "ultimate triumph of the Thinite kingdom [over the kings of Hierakonpolis and founding of the Egyptian state] is at least partly explicable in terms of its strategic advantage for foreign trade". According to Trigger (1983: 68-69) the mineral resources, especially gold, became an important item of trade that

“enhanced the regulatory power of those headmen whose communities were well situated to exploit these resources and may have been a major factor promoting the emergence of these communities as important economic and political centres”. Fattovich (1984: 52-55; cf. Geller 1992: 157-158) noted that there is “a direct link between trade and the accumulation of wealth” and suggested that the transition from segmentary society, via chiefdom, to “a proto-statal society” is caused by: a) “the progressive development of an extensive exchange network within the population and of long distance trade”; b) the increasing specialization in prestige items production (that in turn improved trade); c) the progressive development of collective activities connected to subsistence and to the production of instrumental goods and prestige items (the latter as a consequence of the improvement of the internal and external exchanges); d) the progressive accumulation of political power by individuals originally charged only with ritual functions. According to Fattovich (1984: 54) a personage, originally charged with hunting rituals in Naqada I, progressively acquired other ritual functions and political power, becoming a chief in Naqada II and a king in Naqada III. Following the similar thread, Siegemund (1999: 503, 506, 669, 683-686) argues that gradually more and more political power was added to an originally spiritual leader, namely “Pharaoh as spiritual leader came first and the state grew around that position”. In Naqada II, Fattovich continues (1984: 52-55), the development of long distance trade (...) affected the emergence of two chiefdoms [Naqada and Hierakonpolis]; in Naqada III “a complex administrative system of statal type developed as possible consequence of the progressive conquest of the northern regions by the chiefs of Hierakonpolis”. As noted by Bard (1994: 117) the geography of the Nile valley would have greatly facilitated regional trade and exchange of craft goods and materials by water; however, “conflict inevitably arose (...) as economic competition within the narrow valley increased”. Trigger (1983: 69) suggested that “Competition over trade may also have led to political struggles among the emerging polities (...) and the desire to protect trade (...) or to eliminate middlemen, may have led to the conquest of northern Egypt”. According to Campagno (2004: 694, 700; cf. Campagno 2001) “wars at the time of the emergence of the state might be related to the competition for prestige goods”, or more precisely – the competition “between Upper Egyptian communities to monopolise the trade networks that connected them to faraway regions (such as Nubia, Syro-Palestine and Mesopotamia)”. The “members of the elite” as “the main local beneficiaries of these exchange practices” (Campagno 2004: 696), or we can rather call them ‘players’, “compete (...) by exchanges of different commodities, and later more openly by conflict” (Kemp 1989: 32). Moreover, what perhaps started as the war for prestige goods, in time turned into the war for: “the right order”, the redefinition of “the cosmic conception (...) in the Nile Valley” (Campagno 2004: 700), and “regulatory power” (Trigger 1983: 69).

In a word, it turned into a war for power (Anđelković 2004: 542-543). It seems that warfare and conquest either introduced to access the trade routes, to control the trade routes, to eliminate middlemen, or to monopolize trade, promoted the conflict over power as the important factor of the trade model too.

6. *Cultural transplantation model.*

According to Rice (1991: 32-36) Naqada II was “responsive to a much more powerful and (...) more sustained alien influence” and “these foreign influences seem especially to have heightened the native Egyptian genius and to have produced a galvanic series of new advances in the Valley’s society”: “Naqada II phase (...) is one which was crucial for the formation of the Pharaonic or dynastic state” so the “influences from the east at this time did act as significant stimulus to the course of Egyptian development”. This model in a way leans on the trade model because “International trade (...) appears to have provided some motive force to drive the evolution of Egyptian complexity” (Geller 1992: 159). The “Mesopotamian connection” may have been, according to Savage (1997: 258) “the primary factor which stimulated the emergence of the state in Egypt”. The “gold-hungry easterners”, namely, south-western Asian people/ Sumerians/ Elamites/ Mesopotamians, made their way to “little independent ‘courts’ which (...) were established in various of the Predynastic centres of population such as Hierakonpolis and Naqada” and “touched off some of the most important elements in Egypt’s development” (Rice 1991: 35-36). Enabled by Egypt’s efficient foreign trade network (demonstrated for instance by lapis lazuli in Naqada II graves), on one side, and by the enthusiasm for profit of “a mercantile, seagoing culture, [and] its people avid for trade” on the other, “a degree of contact existed in the late Predynastic period between the *Egyptians* and Sumerian and Elamite *ideas* and *concepts*” (Rice 1991: 34, 45, 242; cf. Mark 1998) [emphasis added]. According to Griswold (1992: 253) foreign interaction, including the incorporation of foreign elements into Egyptian constructions, can be seen as a way of consolidating power. That fits well with Rice’s notion that “Most of the evidence for contact with western Asiatic ideas (...) is visual and is connected with the Kingship” (Rice 1991: 259). As noted by Smith (1992: 240) “it seems that most of the elements of (...) ‘greater royal cycle’: the hunt, the victory, the royal progress by boat and possibly the sacrifice, can be paralleled in early Susan/Sumerian sealings”. Although it is to be expected that foreign trade was accompanied by “a transfer of ideas and symbols” (Smith 1992: 245; cf. Griswold 1992: 80-85) it is much less possible that some “state formation seed/recipe” was either transplanted-exported from Mesopotamia or imported by Upper Egypt. The Upper Egyptian rulers simply “needed administrative mechanisms to maintain their authority” (Wilkinson 2002: 244). The evolution of writing “may have been partially a result of contact with Mesopotamia but was in

most ways essentially a native Egyptian development” (Wenke 1989: 139). Moreover, “by the end of Naqada I (...) the ideology and institution of kingship were already emerging at a few key centres in Upper Egypt” (Wilkinson 2002: 237) which means that chronologically succeeding incorporation of “artefacts of complexity” and elite/status/ruling-related foreign elements, was indeed a “creative borrowing” serving to consolidate the power of Upper Egyptian lords/political structures. In other words “symbols of control and authority were borrowed from contemporary Mesopotamian iconography by Egyptian rulers anxious to develop and promote the ideology of power” (Wilkinson 2000b: 28). This again implies conflict over power as the dominant factor.

3. Discussion

It seems that the more the significant recent developments in the domain of Egyptian Pre-/Protodynastic archaeology progress, the further the state formation “border line” has to be pushed back (cf. Anđelković 2005). Accordingly, the models presented above – and these models are not necessarily mutually exclusive – although in many of their elements they were shaped by authors that referred to the beginning of the Dynastic period as the “point zero” of state formation, should rather be transferred to the Predynastic period. The proto-state, also termed the Upper Egyptian Commonwealth, which emerged in Naqada IIC-IID1, was followed by the All-Egyptian early state (Upper and Lower Egypt) in Naqada IID2-IIIB/IIIC1 (politically the term Dynasty 0 can be applied to this phase) (Anđelković 2002; 2004; 2005). Whatever factors, including the *motivating factors* (cf. Ortner 1984: 151) and perhaps *negative factors* (i.e. those that enabled state formation by their absence), we decide to consider as prevailing, it is obvious that many more causes, charismatic individuals, personal decisions, world views, chances and circumstances, probably even emotions – according to Ortner (1984: 151) a whole range of emotions, for instance need, fear, desire, must surely be part of the motivating force – contributed to the development of Egypt as an entity. Evidently, it is impossible for such complex and intricate environmental, social and individual choreography to happen twice in the same way, even within the very same environmental setting, so it seems that some “state-by-numbers” formation model of the “check-list” type can hardly be established as universally valid. And indeed, that would not be necessary, since paradoxically, as we have already stated – despite the variety of different factors, elements, environmental and chronological frameworks (cf. Haas 1982; Feinman & Marcus 1998; Yoffe 2005) – after the particular point, all roads of state formation, so to speak, “lead to Rome” – namely in the end a state arises/comes into being/is created. However, the paradox is present only at first sight. In spite of the differences, there seems to be the predominant factor – conflict over power – as a sort of common denominator in all six presented models. The pattern sug-

gested by all the models demonstrates that: a) in the functionally interwoven matrix of various, synergic elements, perhaps diverse in every model, at some “point of no return” the concentration/cumulative effect of economic power reaches its critical mass b) crossing such an “event horizon” inevitably provokes conflict over political power – present in all models – namely, a “power chain reaction”, from which emerges c) conflict over absolute power, that ultimately leads to state formation. Hats off to the ruler – the god on earth – the Divine King.

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State Formation in Ancient Egypt after the reading of Ibn Khaldûn's *Muqaddimah*

1. Introduction

The consolidation of the Egyptian state after the process of political unification at the end of the Predynastic period is, without a doubt, one of the central but more controversial issues in the debate about the origins of ancient Egyptian civilization. Even with the increase of archaeological evidences and inscribed material, our knowledge of the historical process that took place in that remote period is still fragmentary and, as a consequence of it, must be necessarily supported by theoretical approaches.

Indeed, from the abolished image presented by 19th century Egyptologists, of a "Conquering Master Race" or "Dynastic Race" (Emery 1961: 30f.), to the most accepted present theories which consider the unification as the culmination of an internal process, first cultural and then political (Baines 1995: 102), the treatment of the subject, far from being solved, is diverse and full of nuances.

Meanwhile, the quest for a comprehensible development of an emerging state or state-organized societies during the Predynastic and Early Dynastic Egypt has directed the attention of archaeologists to the increasing division of labour linked to the development of intensive agriculture. According to this, historiographic tendencies point out on adaptation from an economy of subsistence to one of production, which forced Neolithic communities, especially in Upper Egypt and Lower Nubia, to adopt more complex forms of society based on social inequality (Midant-Reynes 2003: 369-375).

Besides the predominant emphasis on economic changes, we must add technological, sociological and, of course, ideological elements without which it is impossible to evaluate the magnitude of any given cultural system. These are, in fact, main factors (some of them ponderable and some other imponderable

ones), through which particular theories evolve, trying to establish an objective base for historical analysis.

Far from adding fuel to the controversy on the point of departure for state and kingship in Egypt, the present article captures, in this respect, essential aspects of the masterpiece the *Muqaddimah* (Rosenthal 2005; Monteil 1997) written by Ibn Khaldūn (1332-1406), one of the most illustrious fourteenth-century Arab authors. In intensive reading of some of the passages of this excellent work we find a plethora of interesting arguments whose logic and brilliant consistency offer us a valuable, alternative explanation of the origin and development of human societies and the general ideological context leading to state formation and institutions.

2. Bedouins and sedentary people as natural groups

One of the first important aspects in Ibn Khaldūn's *Muqaddimah* is that referred to the dual conception of society, where a basic principle is given as follows: Bedouins – considered here as exponents of a nomad or non-urban society – and sedentary people are “natural groups”. The fact of considering both as “natural groups” is explained because, in his words, they “*exist by necessity*” (Rosenthal 2005: 92). This statement acts as a kind of introductory argument through which Ibn Khaldūn considers two pre-existent sociological models, which means different behaviour patterns, group identity and social structure (Rosenthal 2005: 92). Indeed, “natural” is a concept apparently used here to justify social, even biological, evolution, as Bedouins are considered “*the basis of, and prior to, cities and sedentary people*” (Rosenthal 2005: 93). But the notion of “natural” linked to “necessity” involves also divergence of interests, as both groups are, in fact, the result of adaptative strategies to a given “natural” environment (Rosenthal 2005: 45-69). Thus, nomads and sedentary people must be considered sociologically antagonists, although the latter, it is assumed, stems from the first.

Such a division, presented as the earliest stage in the development of human societies, does not imply, however, a rigid separation. In Ibn Khaldūn's view, both social systems are dynamic and, because of that, closely related and submitted to a process of interaction. This seems obvious at least in the case of nomads, about which it is said: “*urbanization is found to be the goal to which the Bedouin aspires. Through his own efforts, he achieves what he proposes to achieve in this respect. When he has obtained enough to be ready for the conditions and customs of luxury, he enters upon a life of ease and submits himself to the yoke of the city*” (Rosenthal 2005: 93). But what is there in return for sedentary people? This is indeed the most attractive aspect in Ibn Khaldūn's theory and will consequently deserve full attention.

3. From leadership to royal authority

When observing the ways leading to the formation and consolidation of "royal authority"¹, Ibn Khaldûn focuses part of his arguments on how nomadic structures take a significant role in its acquisition. First and very important in this particular point is the notion of "group feeling" or "esprit de clan" (Monteil 1997) considered here as a main factor leading to state formation. For Ibn Khaldûn, such a concept involves different internal characteristics.

- a) "group feeling" is the base of nomadic social organization from which social distance among individuals and territorial groups are regulated;
- b) "group feeling" concerns blood ties, rooted on a common descent, giving place to cohesion and solidarity among relatives, even mutual defence and protection. However, "group feeling" goes further including also "clients" and "followers" sharing in the "group feeling" of their masters;
- c) The association built upon common descent and the resulting "group feeling" is stronger than any other, even that acquired through intermarriage;
- d) "group feeling" is in the origin and development of a lineage;
- e) when two "group feelings" come into close contact, the less influential one gives added power to the foremost one (Rosenthal 2005: 285; Monteil 1997: 588).

Thus, in his opinion, group feeling is in the origin and development of a lineage (Rosenthal 2005: 102-103). If a highest ranking lineage is imposed in the group feeling, the resulting political organization is leadership, which prevails on other lineages, even "clients" and "followers" sharing in the group feeling of their masters. This is the way through which a "greater group feeling" is obtained (Rosenthal 2005: 108), "patriotisme supraclanique" (Monteil 1997: 216). Therefore, due to the fact that lineages are ranked according to a genealogical principle, "*only those who share in a group feeling can have a "house"*" (Rosenthal 2005: 102) and the dominant "group feeling" (leadership) will be a perfect candidate *for/in* acquiring royal authority. Sedentary people may invoke a "house" but that is fictitious because their "*group feeling has completely disappeared*" (Rosenthal 2005: 102).

Contrary to the current and most accepted theories that understand the origins of state as the result of evolutive social structures from rural to urban communities and, hence, the consolidation of an earlier system of rule giving place to (proto) kingship, for Ibn Khaldûn the development of the apparatus of

¹ This is a key concept in the *Muqaddimah*, seen by Ibn Khaldûn (Rosenthal 2005: 47; 151) as "*a natural quality of man which is absolutely necessary to mankind*". "Royal authority", as a legal monopoly of coercion: tax collection, subject dominion, military expeditions... , clearly assimilated to the notion of state.

government leading to the state can only be explained by the capacity of a group, the nomadic group, of maintaining the social balance between cohesion (“group feeling”) and inequality (“superiority”); “*leadership exists only through superiority*” (Rosenthal 2005: 101). Thanks to “superiority” (Rosenthal 2005: 109) a tribe gains control over a corresponding amount of wealth and comes to share prosperity and abundance. From that moment on, relations among individuals are based on status and hierarchization. Also the ruling dynasty is stronger and the tribe “*submits to its rule. However, the toughness of desert life is lost. Group feeling and courage weaken*” until it is destroyed. “Superiority” is then for Ibn Khaldūn, the entrance door to sedentary life and one of the most important factors supporting “royal authority”. Once superiority is imposed “*all other people can only hold ranks below the rank of the ruler and under the control of the government*” (Rosenthal 2005: 308).

The fact that urban centres practise many crafts² and trade, in an economy founded on the notion of surplus, becomes responsible for their loss of social cohesion and military effectiveness and, consequently, their impossibility of “growing” politically in a higher centralization of power. This is because in the social relations of sedentary people, kinship ties have been progressively replaced by status (growing social inequality) and, thus, eliminated the faculty for leadership which, in his opinion, is only sustained by group feeling. The consequence is, in this case, the decline of a real political control which is supplanted by the development of mere local bureaucracies (oligarchy). Local bureaucracies whose political control is held by those few who claim nobility as members of “*the most noble (but fictitious) houses*” (Rosenthal 2005: 102-103). Of course, those local bureaucracies can gain prestige and command but never a real, effective “royal authority”.

As “group feeling” conveys what Ibn Khaldūn calls the “desert attitude”, this exclusively concerns the Bedouin civilization. In its primary sense, “desert attitude” seems to act as a mechanism against (urban) corruption. For Ibn Khaldūn (Rosenthal 2005: 94) sedentary life “constitutes the last stage of evil and of remoteness from goodness”, moving away the risk of ambition and social exclusion (through the existence of a feeling of solidarity and cooperation). On the contrary, (Rosenthal 2005: 94) Bedouins are nearer the “*first natural state of creation*” and because of that “*closer to being good than sedentary people*”.

² Among the crafts considered by Ibn Khaldūn (Rosenthal 2005: 318-319) agriculture is seen as “*the oldest of all crafts*” and “*prior to and older than sedentary life*”. However, among nomads agriculture and other economic activities are not developed beyond mere subsistence levels, while among sedentary people all economic activities, even agriculture, are practised for “extracting surplus products” or “profit”.

But, going further, we can interpret such a concept as an implicit strategy for maintaining "social cohesion", i.e., a kind of "guardian" of nomad traditions. Therefore, the "desert attitude" invoked in *Muqaddimah* together with the term "austerity", would mean, in the last sense, the vindication of the nomadic group identity which unconsciously rejects all those things involving social changes and developments. This situation can be explained in the following ways:

a) the farther in a social aspect a nomad group is from urban civilization the stronger its group cohesion ("group feeling") and the deeper its "desert attitude". This will inevitably take us to the section (Rosenthal 2005: 118-119) where Ibn Khaldūn deals with the disastrous consequences of the encounter between desert-rooted nomads and sedentary people and the domination of the former.

On the other hand, b) the nearer in a social aspect a nomad group is from urban civilization, the better group cohesion ("group feeling") and "desert attitude" are combined to help the leadership aspirations of high rank lineage, thus contributing to its consolidation as a dynasty after the establishment of "royal authority" within a sedentary society.

However, (Rosenthal 2005: 109) an excess of sedentary habits and fast loss of desert attitude "*break the vigour of group feeling*" and, consequently, the tribe is not able to protect itself and then not able to acquire royal authority. It is inevitably "*swallowed up by other nations*". The moment in which there is an interaction between nomad attitude and sedentary attitude is then a delicate moment. Only the capacity of maintaining the perfect balance will permit the leader to obtain strong "royal authority".

This pattern is seen with special interest by Ibn Khaldūn, leading him to establish five stages of political development (Rosenthal 2005: 141-142) through which the new dynasty will start its unavoidable pathway towards its decline or "senility". The two first stages are crucial because royal authority will progressively get rid of its compromises before clients and followers – who will be replaced by new adherents, servants and helpers – producing a steady decrease of group cohesion ("group feeling") and bringing an increase of inequality ("superiority"). As a consequence, "royal authority" reinforces its position and acquires (see third and fourth stages) definite power and dominion. See the important role of the law (even religious laws) in restraining fortitude and providing fear and docility. For Ibn Khaldūn, law is clearly the expression of coercive power (Rosenthal 2005: 96).

A principal role in this socio-political process is played by religion which, according to Ibn Khaldūn, seems to constitute a subsystem of social interaction, providing it with reinforcement of group cohesion among nomads, but destroying

fortitude and increasing docility once it is imposed by law (religious laws) among people turned to sedentary life. For the consequences of religious propaganda giving additional power to a dynasty at its beginning see Rosenthal 2005: 126-128.

To sum up, the conception of state given by the *Muqaddimah* is clearly expressed not in terms of “internal social evolution”, from the enlargement of prosperous urban communities, but as the result of the interrelation between these two unitary and, at the same time, opposite sociological systems.

From this encounter, simple forms of communal leaderships (nomad groups) will become a more coercive and complex rule activity, “royal authority”. In this exchange, the wealth generated by urban economy, social specialization and technical development (sedentary groups), will provide the nascent institution of kingship with more effective, legal, instruments of power.

4. State formation in ancient Egypt after reading the *Muqaddimah*

From the examination of the accurate sociological model of Ibn Khaldûn, we infer two possible methodological perspectives. 1) archaeological; 2) historical, which could be very useful in the evaluation of the processes leading to state formation in ancient Egypt.

1) Archaeological perspective:

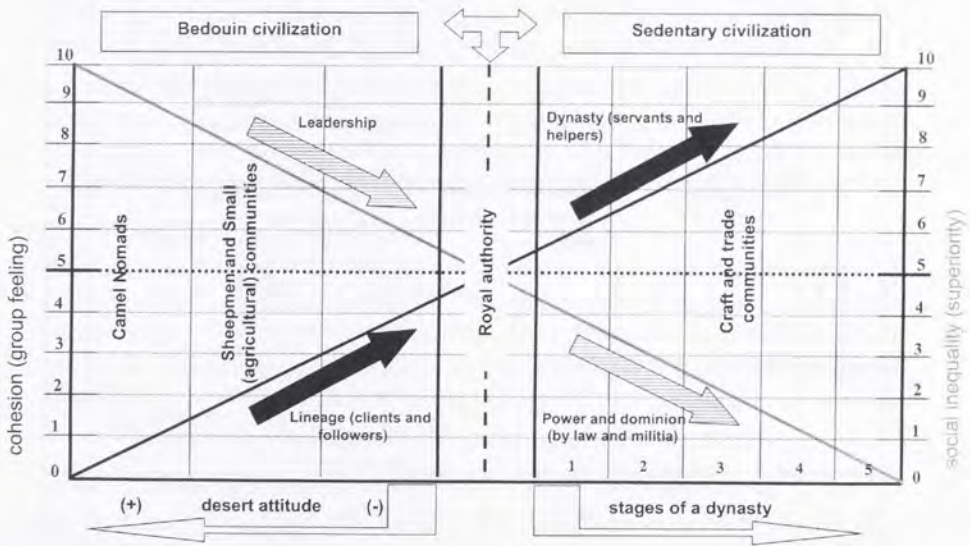
A central concept for the archaeological analysis of Predynastic cemeteries in Egypt is that of “inequality”. In the last few years there has been an effort to establish a real, objective, quantitative methodology which could help the historical interpretation in the context of social indicators (social stratification; Castillos 1982: 29-53; Wilkinson 1996; Griswold 1992: 193-198) This has led to several empirical approaches ranging from the study of associated artifacts, to grave size, volume, etc., in order to determine social position. The positive value of the results obtained constitutes a significant advance toward scientific interpretation of the development of Predynastic society. In this sense, the search of objective factors based on possible statistical materials leads us to seriously consider the particular contributions of Ibn Khaldûn’s theory.

One central concept in the *Muqaddimah* is “group feeling”, which is seen as a primary instrument for accepting group norms and for the consolidation of alliances among nomadic leaders in their way to obtain “royal authority”.

“Group feeling”, referred also to the identification and connections (congeniality, shared social values, group goals) among individuals within a community, would be equivalent to social cohesion, which has been an important variable in the study of primary and secondary groups (“Primary groups” or “face-to-face groups”, and “secondary groups” or large groups whose members do not

know each other, e.g. ethnic groups.) and satisfactorily applied as an indicator in behavioural predictions of group dynamics (Berger-Schmitt 2000). Likewise, for Ibn Khaldūn, cohesion ("group feeling") would be highly dependent on inequality ("superiority"), a concept described, on the other hand, as a distinctive feature of sedentary groups in the acquisition of status and social differentiation.

Much of the theory developed through the *Muqaddimah* consists of the analysis of societies (Beduin and sedentary) in those terms. Thus, the combination of both concepts provides a chain of interactions in the regulation of political order, which eventually becomes an indicator or measure of power. The following graphic representation (Graphic 1) visualizes the above-mentioned interactions between social cohesion (group feeling) and inequality (superiority) according to the sociological processes described by Ibn Khaldūn.



Both variables are expressed in two y-axes ranged from 0 to 10:

y = Cohesion Level, **CL** (black line) and y' = Inequality Level, **IL** (grey line).

0 = lowest level of cohesion or inequality, while 10 = highest level of the same both variables.

By means of this we can be obtain the following classification (Table I):

Table I

CL LEVEL	AFTER IBN KHALDŪN'S CLASSIFICATION	CURRENT ANTHROPOLOGICAL CLASSIFICATION	MAIN CHARACTERISTICS	IL LEVEL
10-8 ↓	From camel nomads to pastoral groups	Bands, tribes (hunting-gathering support activities)	According to the <i>Muqaddimah</i> , these nomadic groups are more rooted in desert life. They are also characterized by more simple forms of social and political organization, nearer to the so-called "egalitarian societies".	0-2 ↑
7-6 ↓	From pastoral groups to small (agricultural) communities	Leadership/Chiefdom	Presence of different lineages within the group, ranked according to a genealogical principle. In this stage a more centralized power (leadership) grows, supported by clients and followers linked to their masters by kin ties (often fictitious). Social inequality is represented by membership to the ranked lineages in spite of the fact that blood ties, group goals and shared values (cohesion) are maintained and determine that political decisions are mostly taken by consensus.	3-4 ↑
5 ↓	Royal authority —stages 1-2—	Interaction between nomadic and sedentary groups ↓ State	Ideal balance between "group feeling" (cohesion) and "superiority" (inequality). Political power and dominion will be progressively imposed: from chiefdom to kingship. The ruler sets his goal of "superiority" (coercive laws and militia) and gains total control over the groups (nomad and sedentary). Religious propaganda gives additional power to kingship and the dynasty.	5 ↑
4-3 ↓	Royal Authority —stages 3-4—	"	The third stage is the last stage in acquiring complete authority: creation of monuments, big constructions and large buildings (cities). Fourth stage: great influence of tradition and predecessors on the ruler. "Servants and helpers" take the place of "clients and followers".	6-7 ↑
2-0 ↓	Royal Authority —stage 5—	"	"Servants and helpers" have definitely replaced clients and followers. Conspiracy is settled in the royal court. The dynasty reaches "senility" and is eventually destroyed.	8-10 ↑

A preliminary analysis of this model reveals, among others, the following principles:

- I) given a social group, submitted to the two variables, Cohesion (“group feeling”) and Inequality (“superiority”), it is deduced that: the Cohesion Level (**CL**) among individuals of that group diminishes or increases oppositely to Inequality Level (**IL**)³. However,
- Extreme levels (0 and 10) of both variables, **CL** and **IL**, are absolute and, consequently, ideal values. Actually, there is no social group showing complete cohesion or inequality.
 - Although the opposite relation between both variables, **CL** and **IL**, is always maintained, their resultant levels may be altered by means of specific actions (e.g. legitimating of leaders or institutions, discrimination of transgressors, reward to conformers...) in order to balance or to adjust social relations or distance, or to guide political goals. Such alterations are usually promoted from the elites or influential groups in their regular exercise of power.
 - due to the fact that the interaction of both variables, **CL** and **IL**, drives a social group through an operative instrument of government, the difference between them clearly becomes an indicator or measure of power; we call this *Index of Authority* (**IA**). A simple formulation of that index is: $IA = CL - IL$.

From such expression it is found that:

- II) the Index of Authority (**IA**) increases when the values of the Cohesion Level (**CL**) and the Inequality Level (**IL**) get closer, and diminishes when those same values of both variables separate. **IA** reaches its maximum value (0) when **CL** and **IL** have the same value, i.e., when they are perfectly balanced. Likewise,

when $IA > 0$; it denotes the preponderance of **CL** over **IL**, while

when $IA < 0$; it denotes the preponderance of **IL** over **CL**.

From the assumption of this new variable, **IA**, within the sociological model of Ibn Khaldûn, we obtain the following diagram:

³ i.e. the variation (Δ) of both functions, **CL** and **IL**, in a given interval of time, gives opposite values: $\Delta CL(t) = -\Delta IL(t)$ and vice versa, $\Delta IL(t) = -\Delta CL(t)$.

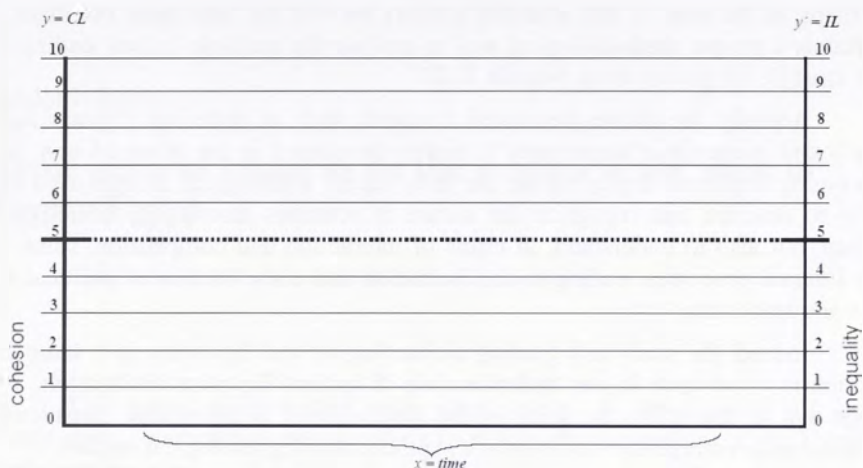
<i>IA</i>		<i>CL</i>	NOMAD GROUPS	<i>IA</i>
10	ROYAL AUTHORITY	(+)	cooperative modes of government	10
8		↑		Leadership
6			↓	
4		↕ (interaction)		4
2				2
0			0	
-2			-2	
-4			-4	
-6			-6	
-8		critical level	(+)	
-10				-10
<i>IA</i>		<i>IL</i>	SEDENTARY GROUPS	<i>IA</i>

To sum up, part of the theory expressed in the *Muqqadimah*, which has been sketched before, offers the opportunity to investigate deeply in the specific archaeological context concerning state formation in ancient Egypt. Thus, the above-mentioned different variables and possible ways of measurement obtained would be added to previous methods of assessing social status and measuring social inequality, in order to be systematically adapted and applied to the archaeological quantitative analysis.

This would mean: a) the possibility of refining results from the examination of elements of stratification in Predynastic and Early Dynastic cemeteries; b) getting more accurate empirical approximations of the potential effects of cohesion (*CL*) and inequality (*IL*) in the socio-political environment, especially that of the social elites, avoiding *ad hoc* reasonings (Up to the present, inequality has been considered the only variable that leads to state formation.).

Perhaps the quickest way to get some insight into the effects of cohesion and inequality (e.g. *Index of Authority*) in a particular sociological context is to consider its geometric representation at a given period of time (t). Consequently, to the previously considered axes, $y = \text{Cohesion Level (CL)}$ and $y' = \text{Inequality Level (IL)}$, a third axis must be added, $x = \text{time}$, in order to achieve a more precise image of the interaction of both variables and their corresponding evolution along the chronological periods (see Graphic 2).

Graphic 2



While several possible factors of measuring inequality have been considered and some of them successfully proved in the archaeological analysis of Predynastic and Early Dynastic cemeteries, the abstract concept of cohesion and the determining factors, which help to measure such variable, have not been contemplated yet. From the point of view of sociology, social cohesion constitutes a relevant variable that drives group performance. Hence, identifying its possible dimensions and strong connections with social inequality would make sense and justify the future archaeological research, even in a wider context beyond that of state formation in ancient Egypt.

2) *Historical perspective:*

Leaving aside the possible empirical applications of Ibn Khaldūn's theory within archaeological research, our attention focuses now on the vindication of the significant contributions of this author to the analysis of socio-political systems.

It is commonly accepted that the Egyptian society at the end of the Predynastic period was a society in transition, composed of groups clearly influenced by different cultural environments and ethnic backgrounds. To this reality we must add the consequences of an economic accumulative system which helped to transform society into more complex forms of social division and hierarchization. But how these main factors could have contributed to the growing of complex structures of power, or which particular circumstances might lead to the estab-

ishment and consolidation of a unified kingship, are some of the questions about which, up to the present, Egyptologists have not given conclusive answers. Perhaps, at the heart of Ibn Khaldún's theory we will not find them, but there is certainly a proper methodological way to analyse the multiple causes leading to the struggle for power along Nagada II-III.

Actually the above-mentioned concepts such as cohesion ("group feeling") and inequality ("superiority"), highly developed in the *Muqaddimah*, are becoming important topics within the most recent sociological models used not only to describe and recognize the nature of relations among individuals of a group, but also to understand, in terms of interaction and competition, some of the internal processes leading to the formation and consolidation of political elites and leadership.

Indeed, the main task guiding archaeologists and historians in a same direction is to advance in our understanding of ancient Egyptian civilization. We hope that in that effort the spirit of the *Muqaddimah* is favourably considered, helping us to enlarge the methodological platform of Egyptological studies.

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Rodolfo Fattovich¹

Some general remarks on the origins of the state in Upper Egypt

This paper is dedicated with great sorrow to the memory of Lech Krzyżaniak, remembering the wonderful and friendly atmosphere of the Dymaczewo conferences.

Introduction

This paper is an attempt to outline a processional analysis of the origins of the state in Upper Egypt on the basis of a correlation between social, economic and ideological transformations in predynastic and early dynastic time, and to suggest a possible interpretation of this process. I have restricted this analysis to Upper Egypt for two reasons: 1) At present, despite many gaps in the record, it seems that the process of state formation started in Upper Egypt, where a cultural continuity from the early Predynastic Period to historical time can be identified (see e.g., Hoffman 1979; Trigger 1983; Fattovich 1984, Bard 1987, 1992a, 1994a, 1994b; Hassan 1988, 1997, 1998; Wenke 1989, 1991; Seeher 1991; Baines 1995; Assmann 2002: 27-45; Midant-Reynes 1992, 2003; Andelković 2004). 2) Despite more intense investigation in the last twenty years, the development of social complexity in Lower Egypt, encompassing the region of present Cairo and the Delta, is not yet fully understood (see Rowland 2004).

This process was apparently characterized by a progressive expansion of southern people to Middle Egypt in middle predynastic time and the eastern Nile Delta in late Predynastic time, and culminated with the incorporation of the whole lower Nile Valley into one territorial state in early dynastic time. The rise of the state was also characterized by the emerging of hierarchical societies and

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petty kingdoms in Upper Egypt in early to middle predynastic time and an early state in late predynastic time, as well as the progressive transformation of local leaders with a possibly ritual function into regional petty sacral kings and eventually a divine king from early to late predynastic times. The consolidation of a central administration, a state religion and the introduction of writing in middle to late predynastic time was another relevant aspect of this process (see Bard 1992b; 1999a; 1999b; Hassan 1997; 1998; Kaiser 1974; 1990; Kemp 1989; Köhler 1995; Spencer 1998; Trigger 1983; 1987; Wenke 1989; 1991; Wilkinson 1996; Andelković 2004). The following aspects of social, economic and ideological development in Upper Egypt in the late 5th to early 3rd millennia B.C. have been considered in this analysis:

1) Territory and demography:

- 1a Territorial expansion
- 1b Settlement pattern and urbanism
- 1c Demography

2) Economy:

- 2a Subsistence economy
- 2b Craft specialization
- 2c Trade
- 2d Navigation

3) Society: 3a Social hierarchy

- 3b Administration
- 3c Elite and/or royal cemeteries

4) State Ideology:

- 4a Religion
- 4b Temples
- 4c Funerary ideology

5) Kingship:

- 5a Regalia and royal rituals
- 5b Royal funerary rituals
- 5c Royal ideology.

The factual evidence is well known and has been described by many authors (see e.g., Petrie 1920; Massouard 1949; Vandier 1952; Baumgartel 1955-1960; Arkell & Ucko 1965; Kaiser 1974; Krzyżaniak 1977; Trigger 1983; Bard 1994b; Wilkinson 1996; Midant-Reynes 1992; 2003). Therefore, the evidence will be quoted only when necessary. The paper is divided into three sections: overview of the available evidence; tentative interpretation of the process; conclusions.

State Formation in Upper Egypt: Basic Evidence

1a Territorial expansion

In the late 5th millennium B.C. the Badarian people occupied the regions around Asyut and along the Qena bend of the Nile with clusters between Hiw and Ab'adiya and near Nagada. In the early to mid-4th millennium B.C. the Nagada I people occupied most of Upper Egypt, with major concentrations around

Asyut, along the Qena bend as far as Gebelein, and around Hierakonpolis. In the mid-4th millennium B.C. the Nagada II people occupied the whole Upper Egypt from Abydos to Hierakonpolis and the region of Asyut, as well as the northern middle Egypt, and penetrated to the east as far as Gaza. In the late 4th millennium B.C. the Nagada III people occupied the whole valley, Lower Egypt, and the eastern Nile Delta. Eventually, in the early 3rd millennium B.C. the whole valley and Delta were incorporated into one territorial state, most likely as a consequence of a progressive military conquest by southern kings (see Baines & Malek 2002).

1b Settlement pattern and urbanism

In Badarian time settlements were apparently located on the terraces along the east bank of the Nile, as well as along some rivers in the Eastern Desert and perhaps on the Red Sea coast, suggesting seasonal movements from the alluvial plain to the bordering terraces and into the Eastern Desert (see Hassan 1980; Fattovich 1984).

In Nagada times, settlements were apparently clustered to form discrete territorial units, ca. 10/15 km long and sites spaced about 2 km apart. They included mainly temporary camps and semi-permanent villages in Nagada I time, and villages in Nagada II times (see de Morgan 1897; Fattovich 1984; Hoffman et al. 1986; Hassan 1993; Bard 1987; 1997; Craig Patch 2004). In Nagada II time large (urban) settlements appeared at Hierakonpolis, and most likely at Naqadah (Zuwaitah) (Kemp 1977; Fattovich 1984; Bard 1997). In Nagada III time Nagada probably declined as a major centre, Hierakonpolis was an urban settlement, and Abydos was a major ceremonial centre related to the royal cemetery and funerary cult of the late predynastic kings. Some settlements were probably protected by mud-brick walls (see Kemp 1989; Bard 1997).

In early dynastic time most likely the first capital city of unified Egypt was located at Thinis, near Abydos, but no evidence of this settlement has been found, so far (Kemp 1977; Bard 1997). Memphis in Lower Egypt apparently became a major centre at this time (Mortensen 1991).

1c Demography

The trend of demographic growth in Predynastic and Early Dynastic Egypt is still uncertain (Butzer 1999). Mortuary and settlement evidence point to a sharp increase in population from Nagada I to Nagada II times, with a greater density around Hierakonpolis, Nagada and Abydos. (Hassan 1980; Bard & Carneiro 1989; Bard 1997). However, the esteem of the population in predynastic time is debated and an average population between 200,000 and 800,000 has been suggested (Perez Lagarcha 1996).

2a Subsistence economy

Subsistence economy in Upper Egypt relied mainly on agriculture, and the farming techniques depended on the summer floods (Wetterstrom 1993, 1999), with a progressively decreasing role of hunting and fishing and increasing exploitation of domestic cereals and livestock from Badarian to Nagada II times. In Nagada III times agriculture was the dominant component of the economy (Fattovich 1984). The predynastic farming practices were most likely based on flood basin agriculture. The evidence from the Scorpio mace-head suggests that at the end of the 4th millennium floods were controlled with levees or dikes (Butzer 1976).

2b Handicrafts and art

Craft specialization progressively increased from Badarian time, when only the manufacture of stone vessels and possibly some copper may have required a more specialized skill, to Nagada II time (see Krzyżaniak 1977; Fattovich 1984; Hassan 1998; Takamia 2004). Most likely, some specialized craft centres appeared in Nagada I time (see Krzyżaniak 1977; Finkenstaedt 1981; Fattovich 1984). In Nagada II time specialized manufacturing centres were located in the Nagada-Ballas region and at Hierakonpolis. The wall paintings in Tomb 100 at Hierakonpolis suggest that a „elite/royal“ art emerged in Nagada II c-d times (see Krzyżaniak 1977; Fattovich 1984; Kemp 1989; Bard 1997). A wide range of specialized artisans and artists were working for the king and the high rank officials in Nagada III and Early Dynastic time. The colossal statues of Min at Coptos, dating to the late Nagada III - early Dynasty I, suggest that a monumental art appeared at this time (see Krzyżaniak 1977; Fattovich 1984; Kemp 1989; Bard 2000).

2c Trade

The exploitation of raw materials from the marginal regions progressively increased from Badarian to Nagada III times. In Badarian and Nagada I time hard stone and copper from the Eastern Desert, and shells from the Red Sea coast were used. In Nagada II time raw materials from the Eastern and Western Desert were exploited, and obsidian was imported from Eritrea. In Nagada III times, copper mines in the Eastern Desert, hard stones and other minerals from the Eastern and Western Desert were used (see Baines & Malek 2002; Klemm, Klemm & Murr 2002; Zarins 1996).

The regional exchange networks are virtually unknown, but pottery evidence may point to an increase in local trade from Badarian to Nagada III times. Lower Egypt was surely included into a trade network with the south in Nagada II time (Fattovich 1984; Hassan 1998; Midant-Reynes 2003).

Long distance trade also progressively increased, including Palestine in Badarian time, Levant, Mesopotamia, Nubia, Sahara and Southern Red Sea in Nagada II and Nagada III time. There is no sure evidence of long-distance trade in Nagada I time, but the occurrence of lapis lazuli in some tombs points to the inclusion of Upper Egypt into an incipient long distance trade circuit with the Middle East (Krzyżaniak 1977; Fattovich 1984; Hassan 1998; Friedman 1999; Midant-Reynes 2003). In Early Dynastic times, trade with the Levant was dominant, as we can infer from the huge quantity of products from this region in the royal tombs of Dynasty I (Bard 2000; Midant-Reynes 2003).

2d Navigation

Regional and long distance trade was probably practiced along the Nile with boats (see Vinson 1994). In Badarian and Nagada I time small papyrus boats were used. In Nagada I time large boats with many oars appeared. In Nagada II times large incurved boats with many oars were surely used to navigate on the Nile, as far as Sayala in Lower Nubian (Engelmayer 1965), and perhaps in the Red Sea area (Zarins 1996). The Nagada II boats usually have a standard on the bow. The figures on the top of standards depicted on Nagada II jars, initially interpreted as possible symbols of gods (see e.g., Vandier 1949), most likely were symbols of descent groups (Moret 1923). In Nagada II c-d time elite large boats with a high stern were used, as well. In Nagada III times both large incurved boats without a standard and elite boats were used.

3a Society

Mortuary evidence points to an increasing social hierarchy in Upper Egypt from Badarian to Nagada III time, as we can infer from a great variability in posture of the bodies, shape and size of the graves, quantity, type, quality and location of the grave goods in the single burials, suggesting that burials reflected status and rank of the individuals (Fattovich 1979, 1982; Atzler 1981; Bard 1994a; Castillos 1998). The occurrence of groups of tombs sharing similar features (mainly in type of grave, and quantity and quality of grave goods) in Badarian and Nagadian cemeteries, as well as the apparent absence of a clearly cut differentiation in the type of grave, and quantity and quality of grave goods on age/sex basis (but age and sex are not always well defined in the anthropological record) through the whole cultural sequence may suggest that the burials reflected social segments and a social hierarchy based on descent groups (Fattovich 1988; Bard 1994a; Savage 1997; Midant-Reynes 2003).

A few richer tombs with over 10 artefacts may point to an incipient social hierarchy in Badarian time (Fattovich 1982; Castillos 2002). A firm evidence of social hierarchy dates to Nagada I-II time, when some burials with a great amount of grave goods appeared, suggesting some control over resources (Fat-

tovich 1982; Griswold 1992; Bard 1994a; Midant-Reynes 2003). The occurrence of tombs of officials at other provincial cemeteries as well as smaller tombs and simple pit graves dating to Dynasty I throughout Egypt is also evidence of an accentuated social stratification at this time (Bard 2000).

3b Administration

A form of administration arose in Nagada II times (Baines 1995; Kemp 1989). Clay sealings, sometimes with the impression of a roll-seal, were found in the Nagada II rural settlement at Hu (Nag Hammadi) and Nagada II/III settlement at Zuwaidah (Nagada) (Barocas, Fattovich & Tosi 1989; Bard 1996) and in the largest Nagada II and Nagada III tombs at Abydos (Dreyer et al. 1996). Roll-seals, similar to Mesopotamian seals, were collected in Nagada II graves at Zuwaidah (Nagada), Nag ed-Deir, Matmar, and in Nagada III graves at Zawijet el-Arjan and Abusir el Melek (Boehmer 1974a; 1974b).

At present, very few predynastic tombs, mainly dating to Nagada II c-d time, can be ascribed to officials on the occurrence of roll-seals (Boehmer 1974a; 1974b). They include both low status and elite graves suggesting that Predynastic officials belonged to different social groups, and were sometimes buried close to the chiefs (e.g., tomb T 29 at Zuwaidah). High rank officials and priests existed at the end of Dynasty 0 and in the 1st Dynasty they were a small kin group very close to the king (Emery 1961; Kaplony 1963-64; Edwards 1964; Baines 1995; Wilkinson 1999).

Beginning in Nagada II c-d time writing was used on seals and tags for administrative and/or recording purpose. Since Nagada III time writing was also used on royal commemorative art to display the ideology of the state (Kaplony 1963-1964; Bard 1992b).

3c Elite and/or royal cemeteries and royal palaces

Tombs of high status individuals dating to Nagada I time occur at Abydos and Hierakonpolis (Dreyer et al. 1998; Friedman 2004). High status elite (royal) cemeteries dating to Nagada II time occur at Hierakonpolis and Zuwaidah (Nagada) (Case & Payne 1962; Bard 1994a; Adams 1996; Friedman 2004), and some large tombs with evidence of clay sealings at Abydos, dating to Nagada II c-d times, may be the burial places of predynastic petty kings (Dreyer et al. 1996). Perhaps, „royal“ tombs also occurred in other cemeteries, as we can infer from some painted fragments of linen with scenes similar to those of Tomb 100 at Hierakonpolis from a grave at Gebelein (Donadoni Roveri, D'Amicone & Leospo 1994). A royal cemetery appeared in Nagada III (Dynasty 0) time at Abydos. A small elite (royal?) cemetery with three large tombs dating to Nagada III was also found at Hierakonpolis (see Adams 1999; Dreyer 1999). Finally, the royal tombs of Dynasty I at Abydos and the contemporary tombs of high rank

officials at Saqqara point to a clear separation of the king and the elite from the rest of the population (Bard 2000).

There is no evidence of „royal“ palaces before Nagada III times. Beginning in Dynasty 0 the residence of the king became a major feature of the early state in Upper Egypt, and the palace had a symbolic role in the early royal ideology. Most likely, the palace had a multiple function, and served as a royal residence, a centre of the state administration, and a manufacturing centre for a palatine sophisticated craft and art. So far, the only archaeological evidence is the Early Dynastic palace of Khasekhemwy at Hierakonpolis, dating to the end of Dynasty II (Kemp 1989: 53-55).

4a Religion

The reconstruction of predynastic religion is still uncertain (Ries 1975). Some aspects of the religion can be inferred from iconographic evidence dating to Nagada and Early Dynastic times.

A frequent decoration with symmetrical convergent triangles framing a Y-, X- or star-shaped space, sometimes associated with symbols of mountains, plants, and water on Nagada I painted bowls may represent a regularly spaced universe organized according to the cardinal points (Raphael 1947: 109), and suggest that the idea of an ordered universe dates back to early Predynastic times. Female figures painted on D Class jars and some female figurines have suggested a goddess cult in Nagada II time (e.g., Hassan 1992), although no figurine from Predynastic graves can be safely related to divine figures (Ucko 1968). A bovine head surrounded by stars carved on a Nagada II/III palette from Gerzeh suggests that the sky was imaged as a cow (Donadoni 1955: 5), and may point to a sky-religion in late prehistoric times (see e.g., Wainwright 1938; Hassan 1992).

At present, there is no evidence of individual gods in Predynastic times (Hornung 1990). The frequent representation of wild animals, often associated with symbols of water, mountains and plants, on predynastic vessels and palettes, as well as the occurrence of animal burials in predynastic cemeteries suggests that the natural world was an important component of late prehistoric religion in Upper Egypt. In Nagada III times wild animals maintained an important ideological role as they are frequently represented on knife-handles and ceremonial palettes (Hornung 1990; Kemp 1989). Some animal graves at Hierakonpolis suggest that formal animal cemeteries occurred in Upper Egypt at this time (Adams 1996).

Two (masked?) figures carved on Nagada III ceremonial palettes suggest that the representation of deities with human body and animal head appeared in Nagada III times. These figures, along with the earliest representation of a cow-goddess with a human face (Hathor) on the Narmer's palette from Hierakonpolis

and the anthropomorphic statues of Min from Coptos, suggest that individual gods with specific attributes were distinguished at this time (Hornung 1990).

In early dynastic time the religion focused on sky-gods, such as Horus and Hathor, directly related to the king. Short inscriptions dating to Dynasties I and II and later annals suggest that a „pantheon” consolidated at this time, and included gods with a southern or northern origin (Emery 1961; Edwards 1964; Wilkinson 1999).

4b Temples

At present, there is a very scarce evidence of temples for the cult of the gods in Predynastic and Early Dynastic Egypt, although temples or shrines are represented on inscribed labels dating to Dynasty I (Kemp 1989; O'Connor 1992). A large ceremonial structure, dating to Nagada II c-d, was discovered at Hierakonpolis (Friedman 1996). Artefacts and deposits from early temples (Dynasties 0-II/II) have been excavated at Coptos, where two big statues of the god Min were discovered, at Abydos and Hierakonpolis (Bard 2000). Some architectural evidence of an early temple was found at Hierakonpolis (Fairservis 1983). An urban shrine dating to Early Dynastic times was discovered on Elephantine (Dreyer 1986; Kaiser et al. 1995).

4c Funerary ideology

Funerary ideology was a basic factor to strengthen the social ties of the individuals, and most likely to legitimize the rights to access to cultivable land, grazing areas and exploitable resources by descent from common ancestors buried in the village cemetery (Fattovich 1982; Bard 1992a).

The burials were usually oriented with the head to the south facing west, and probably reflected a symbolic relation of the hereafter with the sky (Fattovich 1982; Bard 1992a). The orientation of the body along the Nile and the occurrence of boats painted on Nagada I bowls and Nagada II jars, as well as model boats from Predynastic graves (Vandier 1952), may point to the belief in a journey in the afterlife. The discovery of a bowl filled with soil and containing some seeds of wheat in a Nagada II grave near Nagada suggests a belief in the renaissance after the death, which in historical times was connected with the cult of Osiris (Bard pers. com.).

In Early Dynastic time the burial customs of commoners were the same as in the Predynastic period. The bodies were buried in oval or oblong graves on the left side, the head to the south, grave goods were placed at the side of the burial. Only the artisans and servants were buried close to the royal tombs at Abydos and Saqqara and were often oriented to the north. Sometimes, a small stele with the name of the owner was located near the tomb (Emery 1961: 135-139).

In Dynasty I boat burials were sometimes associated with the tombs of officials, suggesting that at this time the journey in the afterlife was reserved to the elite (Wilkinson 1999). In turn, the carved stelae with offerings in tombs of the late Dynasty II at Helwan suggest that a mortuary cult of the elite consolidated at the end of the Early Dynastic period (see Barocas 1978).

5a Regalia and royal rituals

Most insignia and regalia of the Pharaoh and some rituals the king performed in Early Dynastic and Old Kingdom times surely descend from Upper Egyptian prototypes (Fattovich 1970; Hassan 1988; Baines 1995).

The kilt and the ostrich feathers may go back to Badarian times. The penis sheath, red crown, false tail, bow, as well as the hunt to the hippopotamus and the iconography of smiting enemies date back to Nagada I times. In particular, the red crown is represented on a Nagada I potsherd from Nagada (Wainwright 1923; Baumgartel 1975; Baines 1995; Midant-Reynes 2003). The hook-sceptre, the stick, the pear-shaped mace-head, the standards, and possibly the white crown, the ritual run, and a very singular ritual of the king capturing an antelope with the hands go back to Nagada II times (Fattovich 1970). This evidence suggests that the figure of the king was forged in Upper Egypt during the Nagada period, and indicates a symbolic link with hunting, herding and fighting, rather than farming (see Helck 1954; Hassan 1988).

5b Royal funerary rituals

The wall paintings in Tomb 100 at Hierakonpolis provide a picture of the „royal“ ideology in Nagada II c-d times (Baines 1995). These paintings show boats, wild animals, scenes of hunting, dancing and sitting women, and scenes of fighting (see Vandier 1952; Monnet Saleh 1987). Boats, wild animals, and dancing women are frequently depicted on pots from Nagada I and Nagada II burials, and may reflect general beliefs about the afterworld. The scenes of hunting, fighting and smiting enemies are typical of this tomb, and may reflect a specific symbolism of the king.

The Pyramid Texts record two specific rituals, which were later included into the funerary ritual of the king in the Old Kingdom (Fattovich 1987): the disarticulation of the body, and the disjunction of the head from the body. Disarticulated bodies occur in predynastic burials since Nagada I times (Murray 1956; Fattovich 1982, 1988; Wengrow & Baines 2004), and probably survived as an elite and/or royal funerary ritual up to the early 4th Dynasty. This type of burial was rare and was probably reserved to specific individuals. In Nagada II time burials with a disarticulated body are often associated with rich graves, and at Zuwaidah (Nagada) disarticulated bodies occur in the elite tombs of Cemetery T (e.g., T 5, T 42). The disjunction and possibly later re-deposition of the head in

the burial occurs only in the cemeteries at Nagada, Ballas, Nag ed-Dir, and Adaima. This ritual appeared in Badarian times, but was more frequent in Nagada I and II times. These burials are not very frequent, and might have been restricted to a segment of the population (Fattovich 1982, 1988; Midant-Reynes 2003). Burials with the disjunction of the head at Nag ed-Dir and Adaima, dating mainly to Nagada I, are often poor (Fattovich 1988; Midant-Reynes 2003). At Zuwaidah (Nagada) burials with a disjunction of the head occur in rich tombs in Cemetery B (Petrie *up.m.*; Petrie & Quibell 1896).

In early dynastic times the royal funerary ideology greatly increased in complexity and integrated different predynastic elements into one system focusing on the king (see Wilkinson 2004). Funerary enclosures, where the cult of the king was practiced after the burial, were located to the northeast of the royal tombs and closer to the edge of cultivation at Abydos (see O'Connor 1989). The sacrifice of retainers, who had to accompany the king in the afterlife, most likely represented the total submission of people to the kings. They were usually buried in small pits surrounding the royal tombs at Abydos and Saqqara (see Baines 1995). The representation of a personage carrying a ladder in a scene of a possibly funerary ritual on an ivory tag of Djer (Dynasty I) from Saqqara (Emery 1961: fig. 21) may point to an astral destiny of the dead king (see Faulkner 1966). Finally, boat burials dating to the end of Dynasty II were associated with the royal mortuary cult at Abydos (O'Connor 1991, 1995).

5c Royal ideology

The scene of smiting enemies in Tomb 100 at Hierakonpolis may suggest a military role of the kings in Nagada II times. This role surely increased at the end of the Predynastic period, just before the unification, when the king was represented in the form of a lion or bull destroying the enemies on ceremonial palettes (see Baines 1995), and was symbolically codified with the iconography of the king smiting enemies on Narmer's palette. The ceremonial stone mace-heads of Scorpio and Narmer from Hierakonpolis, as well as some Early Dynastic ivory tags of Djer and Den (1st Dynasty) show the king as a focal figure of the state festivals, and personally performing some rituals (Emery 1961; Millet 1990).

The earliest possible evidence of a sacral kingship dates back to Nagada III times when the kings were associated with wild animals, which were later identified with different gods. Wild animals were also included in the names of Dynasty 0 and early Dynasty I kings (Baines 1995). The palette of Narmer suggests a direct association of the king with the sky-god Horus, and his female counterpart Hathor at the end of the Predynastic times. In Early Dynastic times the falcon symbolizing Horus always surmounted the royal serekh with the name of the king, suggesting a possible identification of the king with the god. At pre-

sent, we do not know if the king was a god-king or was an agent of the god and derived the authority from him (Posener 1960; Hassan 1992; Baines 1995).

The process of State formation in Upper Egypt: a tentative interpretation

Table 1 is a tentative synthesis of the whole process and represents the temporal trajectories of the single components and their possible correlation. In the last column a speculative interpretation of the process, based on a competition between descent groups, is suggested. This table shows that the evolutionary trend in the process of state formation in Upper Egypt was characterized by:

- 1) Emerging homogenous cultural area, suggesting some interaction between local communities; low demographic growth; subsistence economy based on hunting-gathering, domestic livestock and agriculture; low craft specialization; limited local exchanges; small boats; small settlements; low social hierarchy with an emerging elite; common funerary ideology; emerging personages with specific features in Badarian time.
- 2) Consolidation of a homogenous cultural area, suggesting a more intense interaction between local communities; increasing agriculture; increasing population; increasing craft specialization, with at least one main specialized centre; expanding local exchanges; use of large boats with many oars; emerging settlement hierarchy; increasing social hierarchy with high status elite tombs; emerging differentiation in the funerary ideology; emerging concept of an ordered universe; presence of personages with insignia and performing rituals mainly related to hunting, and with military features in Nagada I time.
- 3) Expansion into Middle Egypt and Lower Egypt; increasing agriculture, maybe with use of artificial basins; increasing population; increasing craft specialization with some major centres of production; expanding regional and interregional exchanges and trade; use of large incurved boats with many oars and standards and elite boats; emerging urbanism; increasing social hierarchy with emerging chiefs/petty kings and elite cemeteries; emerging administration; increasing differentiation in funerary ideology between people, elite and chiefs/petty kings; natural world and sky as main elements of religion; temples; chiefs/petty kings with insignia and performing rituals mainly related to hunting, pastoralism and with military features in Nagada II times.
- 4) Expansion into eastern Nile Delta; increasing agriculture with use of basins; strong craft specialization with at least one major centre of production and emerging palatine art and craft; expanding interregional exchanges and trade; use of large incurved boats with many oars and no standard and elite boats; consolidation of urbanism; strong social hierarchy with kings, elite cemeteries

and a royal cemetery; increasing administration; increasing differentiation between elite and kings in funerary ideology; sky religion; major temples; kings with mainly military features and performing great festivals in Nagada III time.

- 5) Incorporation of the whole lower Nile Valley into one territory; agriculture with basins; strong palatine art and craft specialization; expanding interregional exchange and trade, mainly to the Levant; use of large elite and royal boats; royal palace as focus of the settlement pattern; very strong social hierarchy with kings at the top and a royal cemetery; articulated administration; strong differentiation between elite and kings in the funerary ideology, and progressive incorporation of all funerary ideological elements into the king; individual deities and formation of a proper „pantheon” with increasing number of temples; sacral kings performing great state festivals in Early Dynastic time.

This evolutionary trend suggests that the formation of the state consisted of two interacting processes: a) an economic and political process of progressive transformation of a household economy into a palace economy, and local leaders into paramount kings and eventually pharaohs, and b) an ideological process of progressive transformation of a ritual leader into a sacral king.

a) Household vs. Palace: the economic and political process in Upper Egypt

The main aspect of the state formation in Upper Egypt was the progressive transformation of a household economy in early predynastic times into a „palace” (state) economy in Early Dynastic times, when the Pharaoh had complete control of land property and external trade as well as the exploitation of mineral resources in the Eastern Desert and Sinai (see Fattovich 1984; Wilkinson 1999; Bard 2000; Baines & Malek 2002). At present, in the absence of exhaustive settlement and off-site evidence, this process can be tentatively outlined as follows:

- 1) In Badarian times, household economy was dominant. Most likely, subsistence economy relied on individual and collective activities. Individual activities were hunting, fishing, and gathering in the alluvial plain. Collective activities were practiced at a household scale and likely included cultivation and animal husbandry at the edge of the alluvial plains and the low desert. Hunting big savannah and river mammals and reptiles may have required collective action, maybe under the direction of ritual leaders. Handicrafts were most likely practiced at a household scale, although the manufacture of stone vases required a specific skill and may have been practiced by a few households only. Products could circulate at a local scale. The occurrence of a few richer graves suggests that some individuals may have enjoyed a greater affluence and were possibly involved with some regional and incipient interregional trade.

- 2) In Nagada I times, a household economy similar to the earlier one was probably still dominant. The emerging of specialized manufacturing centres (such as Nagada) and increasing craft specialization, most likely, expanded the network of regional trade. The Nile became the main road connecting separate communities together, and large boats were built for a longer navigation. In particular, the evidence of boats with many oars points to a collective activity, not directly related to subsistence, at a larger scale than household, perhaps at descent group scale, under the possible direction of petty leaders. This may have also stimulated: a) A more rational crop production to generate a surplus to support collective production and exchange activities at a regional scale. b) The emergence of leading descent groups and within them leading individuals with a consequent increasing social hierarchy at a descent group and individual scale (see also Savage 1997). c) The request of prestige materials and goods, such as, e.g., lapis lazuli, by the incipient elite, and the development of a larger network of external contacts and exchanges.
- 3) In Nagada II times, the occurrence of at least two major centres of production at Nagada and Hierakonpolis most likely generated a more articulated network of exchange and competition between elite descent groups within the centres, and between the centres. Actually, both Nagada and Hierakonpolis had strategic locations to exploit the mineral sources in the Eastern Desert and to get to the Red Sea, as well as to control the Nile route to the north (Nagada) and to the south (Hierakonpolis). This may have also stimulated a more rational control of cultivated land to increase crop production for sustaining the new exchange system and specialized activities. In particular, the progressive diffusion of rectangular houses in this phase may point to a more regular organization of space, which may also reflect more precise division of cultivated land by means of basins (see also Lehner 2000). The competition between leading descent groups may have stimulated a greater request of exotic materials to symbolize their prestige, expanding the exchange circuits with a consequent increase of long distance trade.

Initially, different descent groups and their leaders were involved with this process. The number of standards on the prow of big boats depicted on pots at Nagada suggests that at least eleven descent groups were initially active. Moreover, the competition between descent groups at a local scale stimulated the rise of single dominant groups and the transformation of their leaders in petty kings. A consequence of this change in the social system was an increased request of exotic materials as status symbols of the kings and their kinship and a greater impulse to long-distance trade under the control of the new dominant elite.

Long distance trade might have been a strong incentive for the elite to control the regional economy, production of craft goods, trade routes, and access to sources of prized goods and/or raw materials, and the control over trade, routes, or access to resources would have led to increased militarism, reinforcing the authority of the local leaders as war-chiefs (Bard 1987, 1989). At the same time, control on the circulation of goods (and possibly tribute) was improved and an administration arose. The introduction of mud-bricks may suggest that a standard measurement was introduced to better define the limits of cultivable land of households and villages under the control of the king.

- 4) In Nagada III times, competition between local centres concluded with the rise of a dominant paramount king (see Kemp 1989; Trigger 1987). The king controlled all economic activities with the support of his descent group, and performed some crucial agricultural activities, such as e.g., the opening of basins or the construction of ditches, suggesting that the king already had some control on land tenure and crop production. Abydos became the main ceremonial centre for the cult of the dead king of this early state, and the palace was the core of the whole system.
- 5) In Early Dynastic times, after the unification of the Nile Valley under one king, the Upper Egyptian system was applied to the whole country, and a strong centralized territorial state arose.

b) From ritual leader to sacral king: the ideological process

Archaeological, iconographic and textual evidence dating from Predynastic to Early Dynastic times clearly points to: a) a progressive legitimization of the royal and elite power through a manipulation of the funerary ideology; b) an increasing role of the king as a military and ritual leader; c) the progressive development of a sacral kingship (Baines 1995; Bard 1992a; 1992b, 1994a; 1994b; Fattovich 1970; 1984; 1987; Hassan 1988; Kemp 1989). At present, the following changes in ideology can be outlined:

- 1) Most likely, the Pharaoh descended from a personage with a specific status (possibly a ritual leader) dating back to Badarian/Nagada I time. Some elements – such as the false tail, the bow, and the hunt of hippopotamus – may relate this personage to hunting rituals. Apparently, the disarticulation of the body was a funerary ritual reserved to this personage. The red crown might have been a specific symbol of this personage, at least in the Nagada region.

Ritual leaders, providing a possible analogy, occur among the Borana (southern Ethiopia) and the Meru (northern Kenya), as well as other Cushitic and Nilotic peoples (see Fattovich 1987). The Borana are a semi-nomadic pastoral people divided into descent groups with an age-class system. Political decisions are taken in an assembly where some individuals may have a position

of leadership on their rank and prestige. They recognize the authority of a few ritual leaders with a strong sacral meaning. These personages are directly related to a Sky-God, and are the intermediaries between the human and the supernatural world. Their symbols include different objects, such as a turban, a metal phallus, a stick, and a bracelet with a very strong magic power. The title is inherited by the son, but when the heir is still a young child the office is held by his uncle (Bassi 1996).

The Meru are a segmentary society with age-classes and a dual division into white and black clans, consisting of different lineages. In colonial times, an assembly of elders, including the leaders of the clans, controlled political and ritual activity. A particular status was assigned to the *mugwe*, whose authority derived directly from the deity. The *mugwe* guaranteed the welfare of the community, and had a political role, attending the assemblies as a leader. Symbols of the *mugwe* were a skin-mantle, a straight stick, a curved stick with magic power, and a crown, as well as a specific object (*kiragu*) with a strong magic power (Bernardi 1971; 1983).

Early predynastic burials suggest that the basic aspects of funerary ideology (grave goods, orientation of the body, boats) consolidated at this time. Maybe, the conception of an ordered universe emerged in Nagada I times.

- 2) A major transformation occurred in Nagada II times, when hierarchical societies with chiefs or petty kings arose in Upper Egypt. Mortuary evidence suggests that chiefs and elite shared the same basic hereafter destiny of the rest of the population, as we can infer from the paintings of Tomb 100 at Hierakonpolis. At this time elite burials were larger and richer than non-elite burials, and formal burial grounds were used for the chiefs.

The occurrence of rich burials with disarticulated bodies at Nag ed-Dir and Cemetery T at Zuwaidah (Nagada), suggests that Nagada I „ritual leaders” got a high rank, and most likely evolved into petty kings, at least in the Nagada and Abydos region. The paintings in Tomb 100 at Hierakonpolis, representing scenes of fighting and smiting enemies, suggest the emergence of a symbolism of the king as a warrior.

Apparently, wild animals and the sky, already represented as a cow, were focal elements of the religion at this time. The occurrence of a large cult centre at Hierakonpolis – and possibly at other major settlements – points to a centralization of the cult in Nagada II times.

- 3) Paramount kings surely appeared in Upper Egypt in Nagada III times (Dynasty 0). Tombs, palaces, and a formal ceremonial art were the main symbols of the supremacy of the king. A formal art style emerged at the end of

the Predynastic period, and the foundations of the Egyptian „Great Tradition” (see Assman 1992) were established at this time.

The ideology of the king imposing order on a chaotic natural and human world consolidated in Nagada III times (Kemp 1989: 43-56). Ceremonial palettes and mace-heads also emphasized the military and ritual role of the king, who is represented destroying his enemies and performing the major state cult festivals. Sacral kingship was probably established at this time, through the identification of the king with the sky-god Horus. A differentiation of deities into gods with specific characteristics and a proper personality apparently started in Nagada III times.

- 4) A proper state ideology consolidated in Dynasties I and II, and funerary monuments became the most impressive symbols of this ideology. A polytheistic religion with a few paramount gods related to the king and some local gods also emerged at this time as a consequence of the new territorial and administrative organization of the state. Cult temples were established in provincial centres, as well. The king became the focal figure of the state, and the authority of high rank officials depended directly on him, as members of the royal lineage. This process culminated at the end of Dynasty II when ceremonial boats for the navigation in the afterlife, which still were a prerogative of the elite in Dynasty I, were buried close to the royal tombs and the king incorporated all elements of funerary ideology.

Conclusion

The process of state formation in Egypt was characterized by a progressive transformation of a household economy in Badarian to Nagada I times into a palace economy in Nagada II to Nagada III time. Competition between descent groups in extending control over resources and exchange networks at a regional and interregional scale was a major factor of increasing social hierarchy and emerging of petty kings. Most likely, increasing control of craft production and land tenure was the main factor, which regulated the political game by alliances among descent groups and probably warfare up to the rise of an early state. Manipulation of the ideology was another crucial factor to legitimate the role and power of the petty kings and kings up to the emerging of a sacral king, who guaranteed the whole social and natural order.

Finally, demographic increase in Upper Egypt, along with control of the Nile route in the network of long distance trade with the Levant, may have stimulated the progressive colonization of Middle and Lower Egypt, that was the background to the unification of the country in Early Dynastic time.

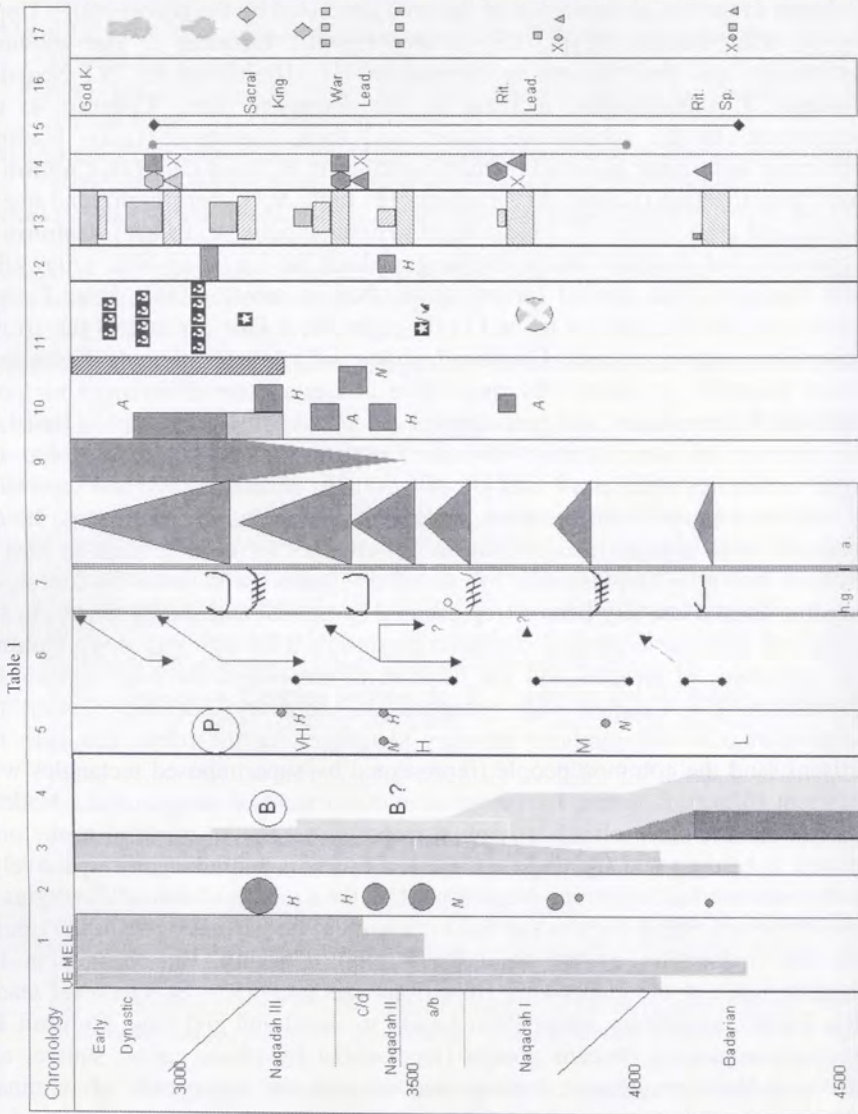


Table 1: tentative synthesis of the process of State formation (captions) .

Column 1: territorial expansion of the area interested by the process (UE: Upper Egypt; ME: Middle Egypt; LE: Lower Egypt); **Column 2:** rise of main settlements and their increasing dimensions (H.: Hierakonpolis, N.: Naqada); **Column 3:** demographic increase in the interested area; **Column 4:** the components of the subsistence system and their importance (gray: hunting-gathering; light gray: livestock; white: agriculture; B: flood control); **Column 5:** craft specialization (L: low, M.: medium, H.: high, V.H.: very high), and rise of specialized craft centers (N.: Naqada, H.: Hierakonpolis; P: Palace); **Column 6:** expansion and direction of the exchanges along the Egyptian Nile valley (line with lozenges) and abroad (arrow down: Nubia; arrow to the right: Eastern Desert and Red Sea; arrow up and to the right: Near East), length of the arrows shows the intensity of trade; **Column 7:** shape and attributes of boats; **Column 8:** social hierarchy, as shown by qualitative and quantitative differences in toms; **Column 9:** appearance and spreading of an articulated administration based on the presence of administrative devices; **Column 10:** appearance of elite and royal cemeteries at different sites (A: Abydos; H.: Hierakonpolis) and separation of royal cemeteries from the ones of the rest of population (represented by the rectangle with oblique lines); **Column 11:** changes in religion from an idea of ordered universe (represented by rounded symbol with crossing lines), to possible animal and sky deities (represented by animal and star symbols), to sky gods, and to a true organized pantheon (represented by sitting deities); **Column 12:** appearance of temples and the location of the earliest recorded temple (H.: Hierakonpolis); **Column 13:** changes in funerary ideology, with the consolidation of differentiated funerary ideologies for the rulers, the elite, the artisans, and the common people (represented by superimposed rectangles with different filling); **Column 14:** progressive enrichment of insignia of the leaders-rulers from the ones related to hunting (represented by the triangle) to the ones related to herding and fighting (represented by cross and hexagon respectively), to the ones related to farming (represented by the square); **Column 15:** origins of royal funerary rituals such as the disarticulation of body (black line in the figure) and the disjunction of the head (gray line); **Column 16:** changes in the characteristics of the leader-king from ritual specialist (Ris. Sp.) to ritual leader (Rit. Lead.), to military leader (War Lead.) to sacral and god king; **Column 17:** competition among descent groups (represented by cross, circle, square, and lozenge), their progressive homogenization and the emergence of dominant descent groups (squares and lozenge respectively), up to the emergence of an unique descent group expressing the king and characterized by an internal hierarchy (circle topped by a square).

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Serena Giuliani

Defining Pan-Grave Pottery

The subject of my Ph.D. research was the study of the diagnostic traits of the Pan-grave culture and their regional variation within the Egyptian and Sudanese Nile Valley, in the first half of the 2nd millennium B.C. The ultimate aim of the whole project is to clarify and to define the social and economic pattern of the Pan-grave culture and its territorial distribution along the Nile Valley, as well as the relationship that linked the Pan-grave people to Egypt.

The initial part of this research is an attempt to identify and define the typical features of the Pan-grave pottery, in order to distinguish the Pan-grave from the other Middle Nubian groups. The most intricate problems in the study of Nubian pottery is the identification of decorative models and the attribution of them to each of the Middle Nubian cultures, Pan-grave, C-group and Kerma. This turned to be a very difficult task as most of the decorative patterns are very similar in the three main attributes: shape, surface treatment and decoration. For this purpose, I produced an updated version of the Pan-grave pottery Corpus. This Corpus, the result of the cataloguing work and of a fresh analysis of all the Pan-grave pottery available from excavations and museums, was not intended as a simple description of the pottery, but was carried through in order to identify the cultural traits of the Pan-grave pottery tradition, as regards decoration as well as shape; and to find different pottery types for daily use, on the one hand, and for cult use linked to funerary rites on the other. Indeed, this distinction between settlement pottery and funerary pottery in the Pan-grave culture turned out to be most interesting, leading to new results.

Descriptive criteria

The descriptive criteria of the Pan-grave pottery were taken from the cataloguing and classification of Middle Nubian pottery production made by Bietak (1966; 1968) and by Nordström in the 1980's. Bietak proposes a division

of the Pan-grave repertoire in nine main groups, based on the decoration (Fig. 1), while surface treatment and shape are not taken into consideration as main attributes, with the exception of four-horn plates (type P14).

The typology of Pan-grave pottery proposed by Nordström is based on his ware concept and he divides the pottery corpus in four type groups distinguished by the surface features, including colour, surface treatment and decoration: P1 (Drab coarse or smooth wares; Drab, plain polished wares); PII (Plain polished black ware); PIII (Black incised wares); PIV (Polished red-and-black wares). With these two studies as a base, I evaluated which criteria could be most suited for a grouping of the Pan-grave pottery.

The possibility of using pottery fabrics as a basic criterion had to be ruled out. The analysis of pottery fabric cannot yet be used in this phase of the work. In fact it is currently in progress.

Shape also cannot be a distinguishing criterion: Pan-grave pottery is exclusively hand-made, and therefore very often asymmetrical, with differences in the dimensions and in the diameter-to-height ratio within the same vessel, which could be misleading if calculated too exactly. Moreover, the Pan-grave pottery is composed only by open forms as cups and dishes.

Surface treatment, as proposed already by Nordström, I considered to be the most appropriate choice. Moreover, surface treatment and the black-topped technique are the most evident characteristics of Pan-grave pottery.

Using Nordström's criteria and incorporating new data from my up-dating of the Pan-grave pottery Corpus, I could work out a new typology dividing Pan-grave pottery in five main groups:

- Group I. Uncoated ware
- Group II. Uncoated black topped ware
- Group III. Red coated black topped ware
- Group IV. Red coated ware
- Group V. Black coated ware

In fact re-analysing Nordström's typology I found out that his Type Group PIII (Black Incised Wares) does not exist outside the Scandinavian concession in the Wadi Halfa reach. Type Groups PI, PII and PIV are conventionally described as polished, while as I will explain in detail below, Pan-grave pottery is characterised by the technique of burnishing and never by polishing¹. At the

¹ Nordström used the terms burnish and polish synonymously while recognizing the distinction between them as different degrees and techniques of surface compaction (Nordström 1972: 46f.) For practical reasons he retained the term polish in concordance with the general use in the pottery descriptions at that time (pers. communication, 2006).

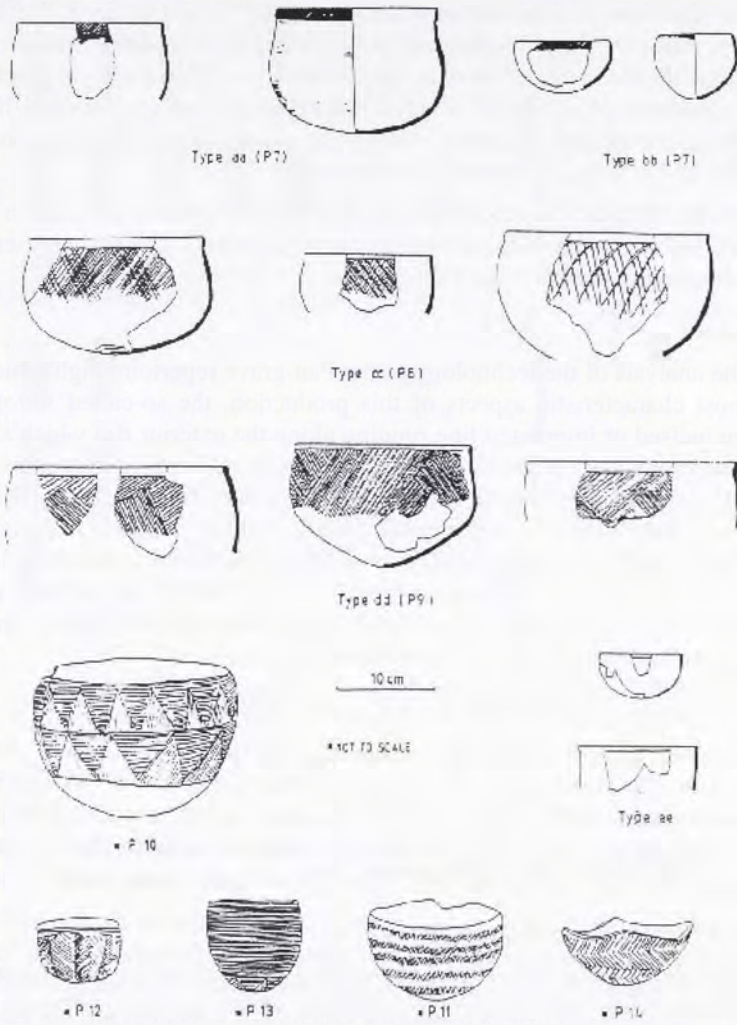


Fig. 1. Pan-grave typology according to Bietak (1966; 1968).

same time the class of Red coated ware (Group IV) is not present. We should remember, anyway, that the Nordström typology is exclusively based on the pottery remains of the Scandinavian Joint Expedition. This pottery collection is indeed substantial enough to be divided in a typology, but on the other hand it came from a limited part of Lower Nubia only, clearly displaying a regional differentiation in the Pan-grave pottery production.

Finally, Brigitte Gratien (2000) proposed a very general description of the decorative motifs in the Middle Nubian pottery, without defining any cultural marks belonging to each Nubian group.

Rim shapes

The analysis of the technology of the Pan-grave repertoire highlighted one of the most characteristic aspects of this production, the so-called *set-off rim*. This is an incised or impressed line running along the exterior rim which sharply divides the mouth from the external walls of the vessel. In my opinion, the *set-off rim* is not a decorative element but the sign of a specific technological choice used only by the Pan-grave people in the Middle Nubian Cultures. In this respect it could be considered as an indication of a different cultural tradition and therefore a cultural marker. A typology of the rims of the Middle Nubian pottery was already presented by Nordström. From this basic work I have extracted only rim types present in Pan-grave pottery production (Fig. 2).

Direct rim type (Nordström Type A1, A2, A3, A4, A7)

The rim does not show any technological-functional element differentiating it from the vessel walls. In Pan-grave pottery production we find in particular the Round rim (thickness of rim is the same or very close to thickness of body) and the cut rim (the rim is cut by tool - knife or spatula). The cut could be horizontal to the orifice plane or, less frequently, oblique inside vessel.

Set-off rim type (Nordström Type A8, B1)

The tool's action entails in most cases a swelling of the rim towards the outer surface. Inside this group two variations, which are more common in the Pan-grave repertoire, can be highlighted:

A8: The rim outlined by the incised or impressed line leans to the outside. Internally the rim and the body are seamless.

B1: The rim outlined by the incised or impressed line has a twisting profile, and it is convex due to the manual pressing of the potter on the inside of the vessel, just under the inside profile of the rim. This rim is typical of the cups with a bag-shaped contour, for example.

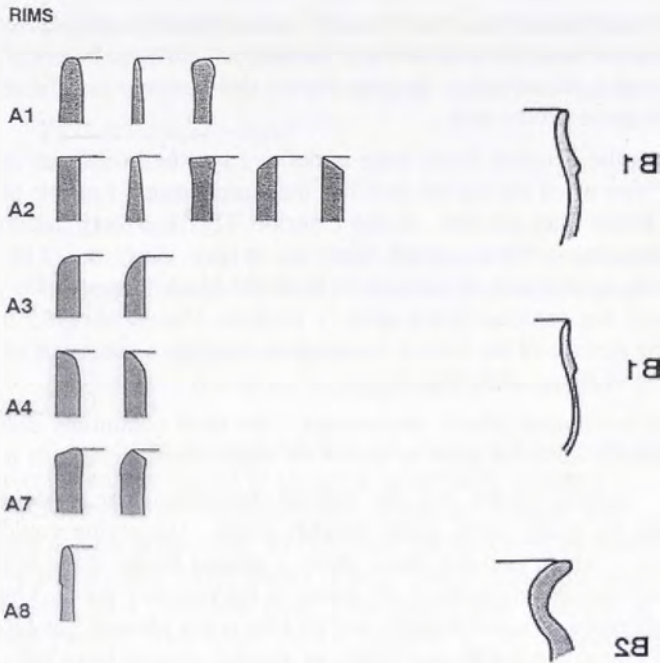


Fig. 2. Middle Nubian rim typology according to Nordström (1972).

Recessed rim type

In my analysis, I could identify another rim-type, which is peculiar of the Pan-grave pottery production: the recessed rim. This rim type is not present in the Nordström typology (Fig. 3).

The rim is characterised as a step on the rim of the vessel. This type of rim is in my opinion made using a spatula or a similar tool (perhaps even the potter's hands) on the vessel's rim, probably in order to take out the excess clay. This decreases the rim thickness and creates a recessed step.

Decoration and surface colour

Also as regards the decoration it is possible to extrapolate elements that can be used in defining and distinguishing the Pan-grave pottery from the rest of the Middle Nubian pottery production.

The decoration (both the "plastic" and "non-plastic" kind) in the Pan-grave pottery is usually on the upper body, less frequently on the whole of the exterior surface. Some examples have also a geometric decoration on the base.

Rim top decoration (notched rim) is present only on the four-horn dishes, which may have decoration on both the external and the internal surface (Fig. 4, Type PIi). The black-topped technique – as non-plastic decoration – is the most common in the Pan-grave production.

In most cases the external black zone is defined by the set-off rim or by the recessed rim. Even when the vessel only has the simple direct rim, the black area seldom goes lower than the rim, on the exterior. This is a very important characteristic in Pan-grave black-topped ware as, in my view, it is, in the majority of the cases, an element of distinction from the black topped pottery of the C-Group, where the external black area is present, almost always, in an irregular way on the surface of the vessel, sometimes covering a great part of the external surface (Fig. 4, Types PIV; Fig. 5).

The incision is – among plastic decorations – the most commonly used in the Pan-grave repertoire, so much as to be one of the main characteristics of it.

The pottery analysis shows that the incised decorations are made with single-pointed tools, in many cases quite roughly made. The stylus could be made from wood or – which is much more likely – animal bones made hollow and sharpened, many examples of which are found in the funerary goods. On the contrary, the use of combs or multi-pointed instruments is not present – as far as we know – in the Pan-grave tradition. Combs or similar objects have not – to date – been found in Pan-grave tombs.

Impression as a plastic decoration is much less frequent in the Pan-grave production and usually is in combination with criss-cross incisions. It is made with a stylus which can be used vertically, pressing only the tip of the tool in the still fresh clay (dotted impressed), or slightly leaning, pressing also part of the stylus on the vessel wall (drop-impressed) (Fig. 6b, c).

Among the impressed decorations, there can be found some made with rope impressions. The rope impressions usually run at the edge of the rim band or they limit bands filled with incised decoration on the upper body. This kind of decoration seems to be copied from Middle Kingdom/SIP Egyptian production but in this case with a decorative – rather than technological – intention (Fig. 6a). The decoration by impression is focused mostly on the rim band, making dotted lines with an effect identical to the more classical incised line, or on the base of cups in order to create geometric motifs. Only on the Four-horn plate types may usually have more elaborated impressed decoration.

The decorative motifs in the Pan-grave production are characterised by infinite variations. For on the main goal of this study, i.e. to highlight Pan-grave decorative traditions and possible cultural marks, it was necessary to proceed assembling the decorations in large groups, extrapolating common characteristics

or those more evident in each design. This work highlighted the elements which are at the base of the decorations made with both the incision and the impression technique, as well as those done with both techniques together :

- Incised Herring – bone
- Incised Criss-cross
- Rows of incised lines
- Incised Panel
- Incised/Impressed Band filled with incised criss-cross or others
- Irregular geometrical incised pattern filled with incised lines
- Incised spiral
- Dotted/rope impressed lines
- Quadrant filled with incised/impressed lines or others

It has to be pointed out that the “herring-bone pattern” decoration in the Pan-grave culture (motif 1) shows to be strongly different in comparison with the so-called “chevron” decoration that is present, instead, only in the Kerma and C-Group pottery production. In fact, both are executed by incisions but in the Pan-grave pottery this motif shows a long central line from which smaller diagonal lines start, as a palm leaf-type. This central line is absent in the Kerma and C-Group pattern. The latter shows, instead, a “V” shaped design composed of incised lines with alternate direction (Fig. 7). This is another important diagnostic trait of the Pan-grave production that could be used to make distinctions in the Middle Nubian pottery.

The chronological analysis of the development of the decorative techniques and design models has given significant results in the study of the pottery of Nubian cultures in general. For the Pan-grave culture, on the contrary, it would be extremely complex to have a chronological examination of the decorative development. These people, in fact, appear and disappear in the Nile Valley in less than 200 years. The chronological range of their pottery production is very short and it does not show basically any development both in decorative technique and motifs.

We tried therefore to infer decorative models from the Pan-grave tradition, obtaining some interesting observations, but linked – for now – only to regional differentiations.

Surface treatment

Finally, the Burnishing technique is the surface treatment that most commonly appears in the Pan-grave production and it could be crucial in order to distinguish Pan-grave from C-Group and Kerma pottery. In fact, burnishing

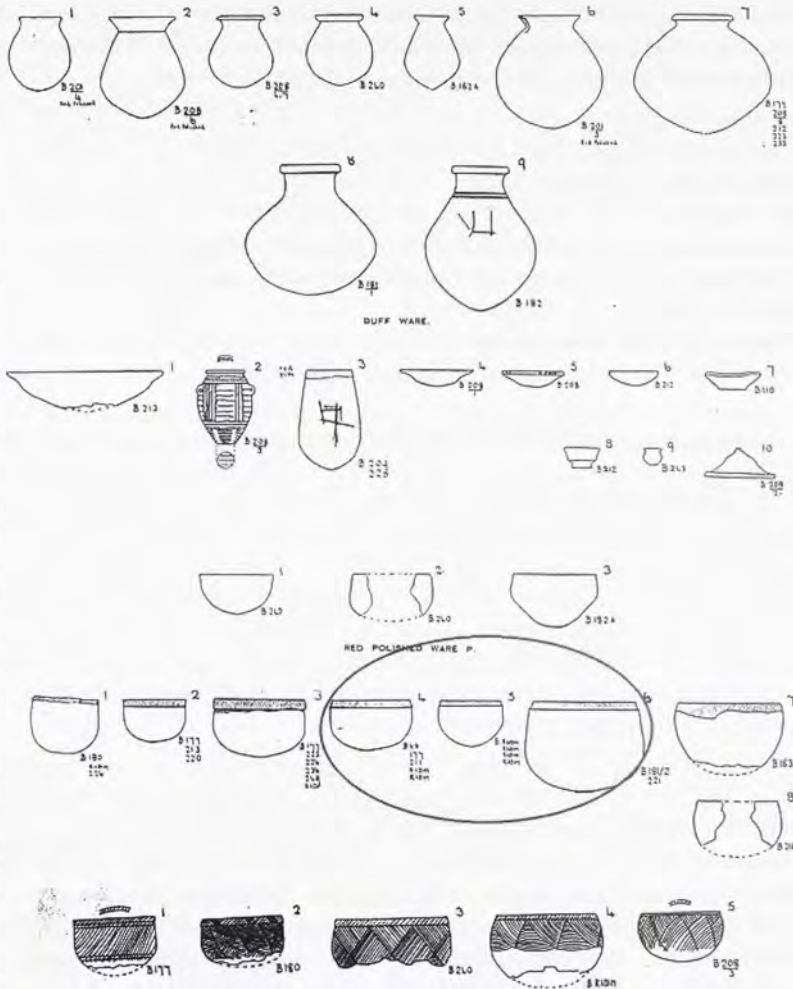


Fig. 3. Examples of Pan-grave bowls with recessed rims from Balabish (Wainwright 1915).

PI I



47/0:18



47/3:1



47/51:4



47/31:3B



47/82:4



246/40:01

PI m



246/87:01

PIV a2



170/13:3



47/77:2

PIV a4/6



179/38:01



170/30:4



47/83:3a



47/98:2

PIV a7



47/74:6a



410/1:2



95/0:2



95/133:1



47/57:5

PIV b2



47/1:4



170/31:4



95/46:2

PIV b4



47/152:1



47/77:1



410/21:2a



170/48:1



47/35:1



170/5:1



47/15:1

Pangrave, Types PII-PIVb4.

Fig. 4. Pan-grave pottery from SJE concession (from Nordström 1989).

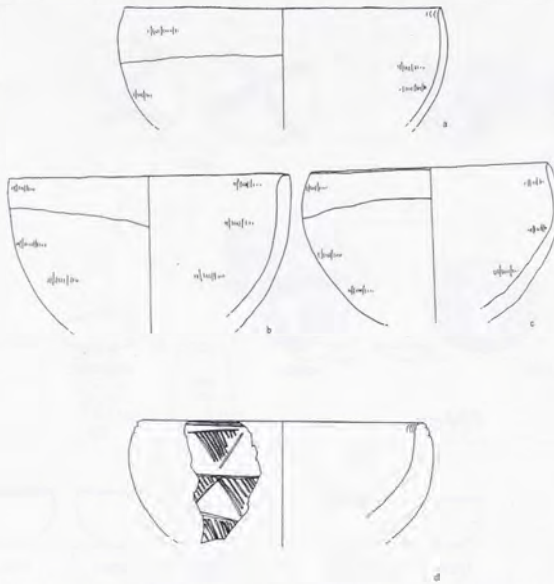


Fig. 5. C-group bowls from Hierakonpolis HK27C (from Giuliani 2001a),

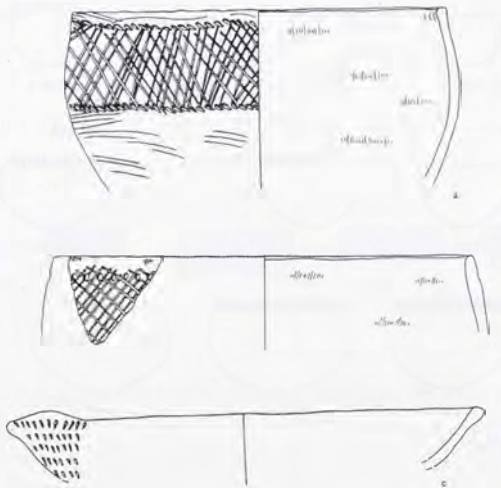


Fig. 6. Pan-grave pottery from Hierakonpolis, HK47 (from Giuliani 2001a).

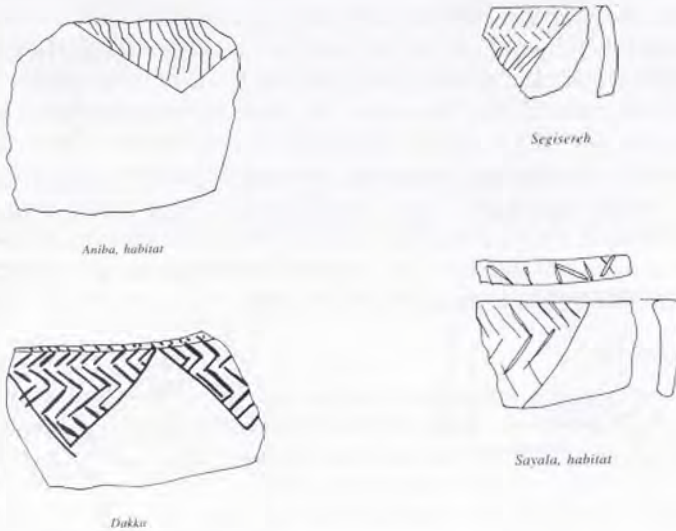


Fig. 7. Examples of “chevron” decoration in the C-group pottery (from Gratien 2000).

marks on the walls of the Pan-grave vessels are, for the most part, rather wide and drawn quite roughly, so much that every stroke is easily detected apart from the others with the naked eye. Often the external wall of the vessel has burnishing lines with an oblique and regular stroke, from the top (rim) downwards (base). The burnish on the inside is usually less regular. Lines in this case go both downwards and upwards, with an orthogonal trail of bands of oblique lines, on top of the vertical ones.

In C-Group production, on the contrary, burnishing lines are much more compact and regular both on the outside and the inside and they can hardly be distinguished by the naked eye. In the Kerma production the burnishing technique reaches such a refined degree that it can be defined as polishing.

Summary

To sum up, the systematic analysis of the whole Pan-grave pottery production and the comparison of it with the other Middle Nubian pottery highlighted the individuality of Pan-grave pottery production.

Generally speaking, the Middle Nubian pottery production appears to have rather few diagnostic features. Shapes, decorations and surface treatments came originally from the same background and from a common cultural tradition. It is therefore evident that more than ever we need to investigate the find material in detail in order to understand what differentiates each one of these Middle Nubian cultures from each other, rather than what they have in common. In my opinion, as regards the Middle Nubian pottery, the analysis of decoration alone cannot be used conclusively in attributing an artefact to a specific culture. I believe that the definition of major diagnostic traits highlighted in this work, such as the burnishing technique, the rims typology and the decorative patterns and features, give us in the majority of the cases the possibility to recognize and to distinguish a Pan-grave artefact from a C-group and Kerma one.

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Nicola Harrington

MacGregor Man and the development of anthropomorphic figures in the Late Predynastic Period

The fact that the black basalt statue (Figs. 1 & 2) commonly known as MacGregor Man (Ashmolean Museum, Oxford, no. 1922.70) features in a volume on the forgery of Egyptian antiquities (Fiechter 2005: 157) is significant in that it represents another stage in the debate over the figure's genuineness that began with Edouard Naville's first publication of it in 1900. He noted the statue's similarity to the ivory figurines in Reverend William MacGregor's collection, though he doubted that all the artefacts derived from the same tomb. E. J. Baumgartel (1969-70: 10) in her appraisal of the statue failed to find parallels for the sheath, cap, or beard, and therefore considered it to be a forgery. However, other scholars have noted that at the time the piece was acquired (ca. 1898–1900), the ivories that offer close parallels for its style were not widely known, providing "little opportunity for a master forger to absorb their iconography and create MacGregor Man" (Baines & Whitehouse 1999: 69; cf. Williams 1988: 39).

The main argument against the figure is the lack of precedents in stone (e.g. Payne 1993: 12; Baines and Whitehouse 1999: 68). The discovery of parts of a life-sized indurated limestone statue in Locality 6 at Hierakonpolis (HK6) in 2000 that could be securely dated to Naqada IIAB (ca.3600-3500 BC) provided evidence that complex large scale stone human figures were carved at an earlier date than had previously been assumed (Harrington 2004). With this evidence and the redating of the Min colossi (Kemp 2000; Dreyer 1995: 56), there is now an opportunity to review the position of anthropomorphic figures from Naqada II to the beginning of the dynastic period.

Predynastic human representation

Human representation in stone and ivory is attested at least as early as Naqada I (ca. 4000-3600 BC) with the appearance of tusk figures in burial assem-



Fig. 1 and 2. Two views of MacGregor Man. Courtesy of the Ashmolean Museum.

blages (e.g. Griffiths 1975: 314, fig. 144; Pierini 1990: 55-57, nos. 358, 359; Figure 2), and with "tags" (amulets) early in Naqada II (e.g. Payne 1993: 237, fig. 81, nos. 1959, 1960). Most of the tusks with bearded heads are hollow (Nowak 2004: 895), which may suggest that they were used as stave finials, and might thus have formed part of the regalia of male leadership. If this is the case, it may be significant that at some sites including Nag ed-Deir, undecorated tusks were mostly found in female burials (Podzorski 1993: 124). Only one unprovenanced hollowed stone tusk figure seems to be known: this has prominent ears but no beard, and has been dated stylistically to Naqada I (Swansea W150; Griffiths 1975: 313). Male heads in stone also appear on maceheads (Fig. 3) and stone vessels, and occasionally decorate cosmetic palettes (Petrie 1920-1: pl. XL, nos. 127, 128; pl. XLIII, no. 1; cf. Spagnotto 1998: 181, no. 115).

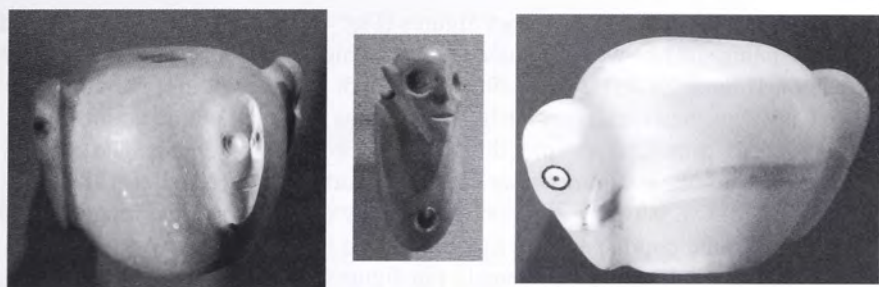


Fig. 3. Two piriform maceheads and a tag or amulet with human heads. MMA 10.176.55 (pink limestone); MMA 10.130.1187 (pink limestone); MMA 10.176.56 (travertine).



Fig. 4. Hippopotamus ivory tusk figure. Naqada I/II. MMA 23.2.31. Courtesy of the Ashmolean Museum. *Not to scale.*



Fig. 5. Ivory male figure, Naqada I (?). Brooklyn Museum, Charles Edwin Wibour Fund 1935.



Fig. 6. Side view of MacGregor Man, showing cylindrical profile.

From Naqada I onwards, ivory figures (Fig. 4-6) depicting males with bald heads and penis sheaths were produced (e.g. Baumgartel 1960: figures 1-5; Petrie 1920-1: pl. II, nos. 23 and 24; Needler 1984: 345, no. 275, pl. 67; Naville 1900: pl. V). Clay figurines with short curly hair, sheaths, and without depictions of the feet were also produced around this time (Ucko 1968: 13-15). The slightly pointed chins of these figures may indicate short beards (Needler 1984: 344; Ucko 1968: 76-77), but they are iconographically distinct from the long-bearded heads on tusks and combs, and the tapering of the face is not necessarily realistic or gender-specific, as shown by female pin figures (e.g. Ucko 1968: 17, fig. 19, no. 25; 27, fig. 28, no. 37; Petrie 1920-1: pl. II, nos. 6, 9, 29). The function of these pieces is unclear: while some derive from the tombs of males and could be regarded as status markers or fertility-related figurines (e.g. Ucko 1968: 77, no. 14), at least one was found in association with a female burial (Ucko 1968: 97).

Ivory figures of Naqada IIIAB provide the most direct parallels for the features of MacGregor Man. The Gebel el-Araq knife handle depicts a battle, probably between groups loyal to regional rulers of Upper Egypt, where the knife was supposedly found. The warring factions are identified by caps or shaven heads and long penis sheaths, which reach almost to the knees, versus men with long hair and shorter sheaths (Asselberghs 1961: no. 58, pl. XLI). In both cases, the scrotum is visible on either side of the sheath with the knot above the belt reaching navel level, features shared by MacGregor Man (testicles are clearly indicated, not "tassels" as stated by Payne 1993: 13). The same sheath type is also found on ivories from the Main Deposit at Hierakonpolis (Quibell 1900: pl. VIII, nos. 1, 3), and one was among those acquired with MacGregor Man (Naville 1900: pl. V; cf. Grimm & Schoske 2000: 36, no. 46), but the faces are clean shaven (Baines & Whitehouse 1999: 67), and so are only partially comparable to the basalt statue. Faces with the latter's distinctive hair and beard type are uncommon and date to the end of the predynastic period (e.g. Baines & Whitehouse 1999: 68, no. 1.21; Quibell 1900: pls. V, [no. 2], and pl. VII, no. 2). Other iconographic parallels for the statue may be found on ceremonial greywacke palettes, such as the reused 'Queen Tiy' palette (Cairo JE 46148; Bothmer 1969-70: fig. 5), but the closest match for the distinctive merged lines that join the eyebrows to the nose are the raised relief Bat heads (Fig. 7) on the Narmer Palette (e.g. Asselberghs 1961: no. 168, pl. XCIV). This unusual facial feature alone seems to be a fairly secure dating criterion for MacGregor Man.

Early statuary

Prior to the discovery of the Naqada IIAB statue at Hierakonpolis there was scant evidence for the production of stone statuary in the predynastic period, and nothing of the size of MacGregor Man (39.5cm from the cap to the knees) in such a hard stone (e.g. Stocks 2003: 17) was known. It is possible that a range of

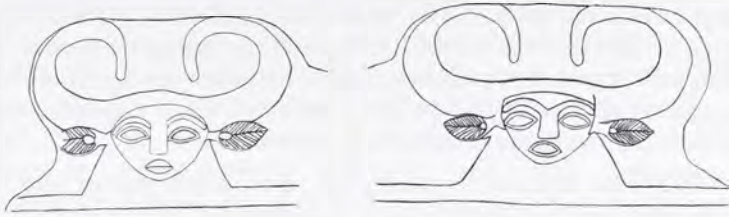


Fig. 7. The Bat heads on the recto of the Narmer Palette, which dates to Dynasty 0.

materials including wood or mixed media were used for some early statuary, which would leave little trace in the archaeological record, an exception being the First Dynasty(?) bearded face of a composite statue (Berman, Doxey & Freed 2003: 56-57), and the feet of statues from the funerary temple of Qa'a at Saqqara, also of the First Dynasty (Emery 1961: 27). A limestone head from Hierakonpolis with the same beard style and prominent upper lip as the basalt statue dated to Dynasty 0 (Quibell 1900: 6), bears stylised hair or a woollen cap which merges with the beard and covers the ears (Ashmolean E.294; Quibell 1900: pl. V, no. 1). Two life-size limestone statues of a kneeling man found on the east side of the temple at Hierakonpolis near the Main Deposit date to the same period (Quibell 1900: pl. II, no. 1; Quibell and Green 1902: pl. I); of the second, Quibell and Green (1902: 35) stated: "The face is curious: the eyes are prominent; the beard, which is broken, was wide and not of the narrow and short form of later time; the whiskers are marked in slight relief, as in later statues, so as to look like a band supporting the beard". The profile, including the projecting lips and distinctive beard line provide close parallels to MacGregor Man (see also Fay 1999: 116, figs. 57-58), and the incised lines depicting strips of cloth that cover the genitals are similar to those worn by the captive on the reverse of the Narmer palette (e.g. Asselberghs 1961: no. 168, pl. XCIV; cf. the Scorpion Macehead; Fay 1999: 144, fig. 52).

Another limestone statue from the temple site is an almost life-size, extensively damaged striding figure (Ashmolean E.3925; Eaton-Krauss 1999: 70, no. 1.23), considered by its excavators to be "of the most archaic and crude type" (Quibell & Green 1902: 15). The elongated right arm terminating in a clenched fist with the thumb extended is reminiscent of the colossi of Min, the hand of which was also pierced to hold an emblem. Although the head of the striding statue is missing, the raised surface on the upper chest indicates that a long, wide beard was originally present (Eaton-Krauss 1999: 70). The figure wears a robe that probably reached the ankles similar to the figure on the obverse of the Battlefield Palette (e.g. Asselberghs 1961: no. 151, pl. LXXXVI) and several Naqada III ivories (Fay 1999: 139-141), and the left arm was folded across the chest in a

gesture similar to the individual in front of the king on the Narmer Palette (e.g. Asselberghs 1961: no. 169, pl. XCV). These parallels suggest that the limestone torso may have represented an official, but as the statue was found in a secondary context (Eaton-Krauss 1999: 70), it is not possible to determine whether it derived from the walled town, the temple, or a tomb.

The Second Dynasty limestone and schist seated statues of Khasekhem were also discovered at Hierakonpolis (e.g. Spencer 1993: 68, fig. 47; Tiradritti 1998: 45). These statues are particularly pertinent to the discussion of MacGregor Man because of the manner in which the lines of the crown and the hair below it are defined on both of them: MacGregor Man's cap and hair merge into a single entity, but in both cases the ears are set well back on the head. The line demarcating the edge of Khasekhem's crown runs to the centre of his ear, leaving a small gap beneath for the short cropped hairstyle to emerge that partially covers the neck, most evident on the schist statue (Quibell 1900: pl. XLI; alternatively, this could be part of the crown, as depicted later; cf. e.g. Nebkheperre Intef; Polz 2003: 15). The modelling of the hair and crown, which is also apparent on a First Dynasty(?) ivory royal figure from Abydos that is swathed in a jubilee robe (British Museum EA 37996; Spencer 1993: 75, fig. 52), marks a further stage in the development of the rendering of human form in three dimensions, from the early ivories, through MacGregor Man, towards the establishment of royal and elite iconography during the Old Kingdom (Fig. 8)



Fig. 8. The Third Dynasty statue of Netjerkhet (Djoser) in the serdab of his funerary complex at Saqqara (plaster cast of the original limestone sculpture in Cairo, JE 49158). The continuity from early iconography is apparent in the king's long beard and compact form.

The Munich torso of a man carved in a strongly banded stone, for which a date in Dynasty 0 is suggested on stylistic grounds (ÄS 7149; 11.2cm high; Grimm 1998: 226-7), is similar in form to MacGregor Man and the predynastic ivory males, though its muscular chest and long hair or wig are more suggestive of the Old Kingdom. It is essentially a flattened cylinder, with arms pressed against the sides, palms resting on the thighs, and a large, unusually shaped sheath fastened by a band around the waist. It bears a faintly incised serekh on the chest, possibly of a catfish, but this is not visible in published photographs (Grimm 1998: 226; Grimm and Schoske 2000:33, cat. 40), and may be a later addition. The long hairstyle is comparable to the Gebel el-Araq knife handle or the First Dynasty tag of King Den from Abydos (Spencer 1993: 87, fig. 67), though by this point the kilt had mostly superseded the penis sheath as a mark of status (cf. Djoser; F. Friedman: 1995: 3, figs. 2a, 2b). The closest parallels for the sheath are the captive on the Narmer Palette, an ivory figurine of a bound prisoner (Quibell 1900: pl. XII, no. 5), and the statue of a knife-wielding "deity" (?) dated to the Third Dynasty (Brooklyn 59.192; Cody 1999: 43, no. 6), though in spite of its archaic style, the back pillar places it in the early Old Kingdom. If genuine, the banded stone torso is probably later than MacGregor Man.

Reconstruction of the statue from the Tomb 23 complex in HK6 is at present far from straightforward, because it was smashed into thousands of pieces in antiquity, and only a few hundred fragments have been recovered. Of these, a nose, two ears, part of the base, two circles (eye sockets?), and a rounded piece that may be part of a penis sheath (Harrington 2004; cf. Jaeschke 2004), indicate that the figure was life-size, and suggest that it represents a male in a form comparable with and probably based on ivory figurines. Renée Friedman (2005: 7) compares the ears of this statue to those of MacGregor Man and observes that while the equally lobe-less HK6 ears are carefully shaped (Fig. 9 and 10), they were not drilled, although the nostrils were drilled using a similar technique to that employed on contemporaneous ivory figures. Little remains of the basalt statue's nose, but one may assume that the nostrils were also drilled. Parts of two ceramic funerary masks were excavated from the same tomb as the HK6 statue, but the ears are more lifelike and completely different in style (Friedman 2005: 7); this distinction may relate more to the function and iconographic origins of the artefacts than the materials from which they were created.

The most puzzling feature of the basalt statue, and one that has been raised as part of the argument against its authenticity, is the damage that the nose and ears have sustained (Fig. 11). The destruction is deliberate and must have taken considerable effort; the nose was carefully chipped away using a narrow chisel-like blade without damaging the surrounding area, and tool marks are clearly visible on the upper surface of the ears. A reconstruction of the nose is

possible based on the slight remaining projection; parallels for its size may be found on commemorative palettes including the Battlefield Palette (e.g. Malek & Forman 1986: 22-23). The purpose of the statue's mutilation is not clear: it is possible that if MacGregor Man represented a local ruler it would be a target for



Fig. 9. The front/right side of MacGregor Man. showing one of the drilled, protruding ears, and the damaged nose. Courtesy of the Ashmolean Museum.

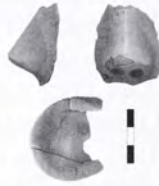


Fig. 10. The nose and right ear of the Locality 6 statue from Tomb 23 at Hierakonpolis. Further pieces of the ear have been found since these photographs were taken (R. Friedman 2005: 7).
Courtesy of the Hierakonpolis Expedition.



Fig. 11. Side view of MacGregor Man with a reconstruction of the nose, and arrows showing the location of slightly abstract incised lines around the ear. Courtesy of the Ashmolean Museum.

opponents, as seems to have been the case with the Locality 6 figure. The energy expended in obliterating parts of the statue would be further justified if it was believed that this would symbolically harm the individual in the afterlife. The breaks at the neck and waist may have occurred at the same time. Whatever the reason for the curious disfigurement of the statue, ancient destruction is perhaps more plausible than modern “antiquating”, which could have been achieved with less industry.

Eaton-Krauss (1999: 70) has suggested that the Hierakonpolis limestone statue stood on a deep plinth partially buried in the ground to provide stability. This may have been the case for all early statuary including MacGregor Man, as

back pillars were an Old Kingdom innovation, while several of the ivory figurines on which stone figures are likely to have been modelled possess a tang beneath the feet, presumably for insertion into a base of a different material (e.g. Spencer 1993: 31, fig. 15, EA 32142; Naville 1900: pl. V, no. 1; cf. Adams 1974: pls. 44-45, no. 360). Kemp (2000: 230) in his initial reconstruction of the Koptos colossi provided the statues with feet and heavy pedestals, but later changed this as he believed that he was "allowing [himself] to be too strongly influenced by the tradition of Pharaonic statuary". He instead used standing stones from the temple mound at Hierakonpolis as a guide, and suggested that the colossi terminated in a "long plain stump which would have been sunk in the ground" (Kemp: 2000: 228-230). However, this method of reconstruction involves treating the statues as pillars, not as human figures; with the exception of pin-figures, most representations of the human form included the depiction of feet during the predynastic period.

The early iconography of deities

Naville (1900: 68) thought it very unlikely that MacGregor Man represented a king, and did not raise the possibility of the statue's depicting a deity. It is reasonable to suggest that at this formative stage in Egypt's history, only gods or highly influential individuals, such as kings, would merit the time and resources involved in the production of stone statuary. The later iconography of anthropomorphic deities, including Min, Osiris and Ptah, who were depicted standing and as though bound in white cloth, is likely to evoke early forms of statuary in ivory or bone. This explanation provides answers to some of the questions raised by Hornung (1982: 107).

Most of the earliest depictions of gods in human form show a body without separate limbs. The use of this iconography certainly does not reflect a lack of artistic skill, but must have some other, as yet undiscovered, meaning. Mummy form, which is depicted in a similar fashion, cannot have been the model because mummification was not practised until several centuries later. The archaic figure of a god shows no more and no less than necessary to evoke an image in human form. Should we see here a deliberate restraint, in which no more is said about the gods than is absolutely necessary?

The latter suggestion could be applied to the only extant statues of a god prior to the Old Kingdom, the colossi of Min from Koptos (Payne 1993: pls. II and III). In his description of the colossi, Williams (1988: 39) notes features similar to those of the basalt statuette: "The crown is smooth as though the head were wearing a close fitting cap, which is actually indicated by a line that curves from the temples onto the forehead where it disappears into the destruction." On the basis of the one surviving head, he also notes that the figures had protruding

ears (Williams 1988: 39; Payne 1993: pl. I), though they were lobed unlike those of MacGregor Man. The date of the colossi is uncertain, but probably no later than Naqada IIIA (Kemp 2000: 226; cf. Payne 1993: 12-13) and thus slightly earlier than the basalt figure. While it seems improbable that MacGregor Man represented a god or deified king given its resemblance to the people of Upper Egypt as depicted elsewhere and the find location attributed to it, such a statue is hardly likely to have been created for anyone of lower status than a local ruler.

Conclusion

In light of the statue discovered at HK6, and the fact that all officially excavated human figurines of the First and Second Dynasties were found in tombs (Baumgartel 1968: 8), there seems little reason to suggest that MacGregor Man derived from a temple rather than a funerary context, or that it should be separated from the ivories with which it was said to have been unearthed (cf. Baines & Whitehouse 1999: 69). It is carved from basalt, a particularly hard stone that required quarrying and transportation (Aston, Harrell & Shaw 2000: 23), which indicates the high status of the owner, who was probably an Upper Egyptian leader in Dynasty 0. It is possible that the statue was originally positioned in a mortuary complex, in a similar way to the HK6 statue around four centuries earlier and the images of officials and kings several centuries later (Barta 1998: 65-67). Stylistically, the statue can be dated to Nagada IIIB. It seems highly unlikely that MacGregor Man is inauthentic; as Williams comments (1988: 39): "If [it] was forged, the forger must have been prescient."

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Ulrich Hartung

Some remarks on a rock drawing from Gebel Tjauti

After the first volume of the very well documented and presented rock inscriptions and drawings from the Theban Desert Road Survey was published (Darnell 2002, 2002a; Friedman & Hendrickx 2002), a stimulating discussion arose focusing on one of the tableaux (Kahl 2003; Hendrickx & Friedman 2003). On the basis of the suggested interpretation, recently a quite detailed historical scene was presented (van Wetering 2005) which is, to be sure, hardly substantiated by any archaeological evidence. Although the interpretation of the rock engraving suggested by J.C. Darnell, R. Friedman and S. Hendrickx is very convincing and plausible on first glance, there are some details which give rise to doubts, if this is in fact the only way to understand the tableau. The aim of this paper is not to deny the proposed interpretation – it may be well right – but to point out that other possibilities of interpretation may not to be ruled out completely. The uncertainties of the suggested interpretation should be kept in mind before further far-reaching conclusions are built on it.

The focus of interest is Rock Inscription 1 (Darnell 2002a: pl. 9-11), on which several falcons, storks and other signs as well as four male figures are depicted. Two of them carry sticks and a third one, bald-headed, holds a mace in his left hand and leads a long-haired prisoner with arms tied behind his back by a rope (Fig. 1). Interpreting the tableau, the authors and other colleagues widely agree that most of the separate drawings and signs belong together as part of one and the same composition which celebrates, perhaps even in scenic order, a victorious military event (Darnell 2002: 132, 142; Friedman & Hendrickx 2002: 14, 17; Kahl 2003: 49; cf. also Wilkinson 2000: 386, Campagno 2002a: 689; Gilbert 2004: 109). As some of the depictions may be paralleled by ink inscriptions on pottery jars and incisions on bone labels from the late predynastic tomb U-j at Abydos, the Gebel Tjauti tableau was dated approximately to that time, i.e. to Naqada IIIA1 (Friedman & Hendrickx 2002: 11, 16; Kahl 2003: 49). Focusing

on the falcon above the scorpion in the lower register, Friedman and Hendrickx understood the tableau to be a depiction of a victorious campaign of a king from Abydos (perhaps even the owner of tomb U-j) against Naqada (Friedman & Hendrickx 2002: 17; Hendrickx & Friedman 2003: 95). Kahl identifies the bucranium behind the prisoner as an emblem of the goddess Bat, i.e. the symbol of the later 7th Upper Egyptian nome. He considers the scorpion and the falcon in the lower register as evidence for an involvement of Hierakonpolis. Therefore, he concludes that this is a victory of a ruler from Hierakonpolis against his counterpart from Hu (Kahl 2003: 49; against this interpretation Hendrickx & Friedman 2003: 95-100).



Fig. 1. Gebel Tjauti Rock Inscription 1 (after Darnell 2002a, pl. 11).

Apart from this different interpretation, as important it is, a closer look at some details reveals some more general questions concerning the homogeneity and the dating of the tableau, most of which were indeed also noted by the authors. The suggested interpretation is based on the assumption that all separate

depictions are part of a homogenous, planned composition and were incised more or less contemporaneously. This idea seems to be confirmed by the arrangement of the drawings within two strips or "registers", one below the other, and the fact that all depicted creatures are looking in the same direction. Only the antelopes in the right portion of the upper register seem to belong to an older phase of representations (Friedman & Hendrickx 2002: 11), and one of the falcons is considered as a possible later addition (Friedman & Hendrickx 2002: 11-12). Although it may well have been the case that the entire picture was executed nearly at the same time, it may not be ruled out that the drawings were incised successively. It is not possible to distinguish between 5000 years old incisions which were executed within a time-span of 50, 100 or even 200 years on the basis of the patina. The orientation of the incisions is also no argument for their contemporaneousness. The antelopes are looking to the right likewise, and they are even incised at a similar depth (Hendrickx & Friedman 2003: 11). Furthermore, a closer inspection of the images in detail reveals many more stylistic differences than similarities. This does not only concern the depictions of the humans, but also the falcons in the right upper portion of the panel. In this case, the different shapes and internal patterns of the birds in connection with their arrangement could indicate different aspects of kingship (Friedman & Hendrickx 2002: 14) but one must not exclude the possibility that they were incised at different times by several artists.

Stylistically, this group of falcons is difficult to connect with the storks depicted beneath, and with the entire lower part of the tableau. The group of the two storks beside a building(?) appears very homogeneously by itself, although the overlapping of the signs seems to indicate a more successive rather than contemporaneous incision (Hendrickx & Friedman 2003: 11-12). In contrast to the upper register with its well arranged and dispersed placement of the elements, the lower part of the panel appears overcrowded and much more ambiguous. This is certainly partly due to the bad state of preservation of some of the signs, but the narrow arrangement of signs around the prisoner scene and the unlucky positioning of the stork between the upright figures is embarrassing within the frame of a planned composition. The bevelled posture of the stork may be explained by clumsy workmanship; but would an artist not try to avoid such a density of signs, if space is available, in order to make his drawing clearer and more impressive, especially if it is such an important scene like the seizure of an enemy? Therefore, the narrow arrangement of the figures may be accidental, and we are indeed looking at remains of more than one layer of depictions. The bucranium on a pole (which is cut by the rope of the prisoner), the mountain(?) sign, and some elements which are no longer identifiable may well have belonged to an earlier phase. If the stork with the snake was also an element of

this earlier layer remains uncertain – at least there are no stylistic similarities to both storks depicted in the upper register.

With these observations taken into consideration, it seems not unlikely that the tableau was not a homogeneous composition but in fact “only” a gathering of signs and drawings which have been incised successively during a longer span of time. Nevertheless, during subsequent additions, the rock artists in some cases may well have been aware of drawings which were already present, and may have even used them as elements of their own messages which they wanted to transmit.

If so, as a consequence, we have not to search for a distinct date of the inscription but for a time-span. The detailed analysis of the Gebel Tjauti drawings by Friedman and Hendrickx revealed that most of the signs are already known from earlier times, such as Naqada IIC/D or even from late Naqada I (Friedman & Hendrickx 2002: 11-16). For example, the male figures holding a stick have been compared to the wall painting from Tomb 100 at Hierakonpolis, which dates to Naqada IIc, and their close similarity is stated. The scene with the prisoner parallels paintings on C-ware jars dating as early as Naqada I (Friedman & Hendrickx 2002: 13, 16). On two jars from Abydos (Fig. 2 and 3), like on the Gebel Tjauti tableau, a bald or short-haired conqueror (often adorned with feathers) is depicted with a mace, leading long-haired, nude and fettered prisoners on a rope. The upright position of the prisoner from Gebel Tjauti is similar to C-ware depictions, whilst later the prisoners are more often depicted in kneeling or sitting positions symbolising their total defeat. This posture is not only represented in the painted tomb at Hierakonpolis, but also on several decorated knife handles and other ivory objects (cf. Whitehouse 2002: 429, fig. 1; 434, fig. 4 and 5; Dreyer 1999: 220, fig. 10; Petrie 1901: pl. IV, 20). Indeed, the position of the prisoner is not an unequivocal argument for dating, as standing or walking prisoners are found also in later times (cf. Quibell 1900: pl. XII, 4; pl. XV, 1, 2, 4; Petrie 1901: pl. IIIA, 1 and IV, 12; 1953: pl. E).

Another sign important for the interpretation of the tableau should also be mentioned, and this is the scorpion. Its representation on the rock tableau resembles those of earlier rather than later depictions (Friedman & Hendrickx 2002: 15, note 74). All early representations known so far show the scorpion seen from above (e.g. Fig. 4a and b [Naqada I]; Fig. 4c-e [Naqada IIC/D]), like on the Gebel Tjauti tableau, whilst in later times the insect is mostly depicted from the side (e.g. Fig. 5; cf. Hendrickx, Huyge & Adams 1997/1998: 25-31, for a collection of further evidences). Therefore, the two drawings which are important for the significance of the tableau seem to be stylistically much closer to early representations than to the Naqada III date suggested by the authors.

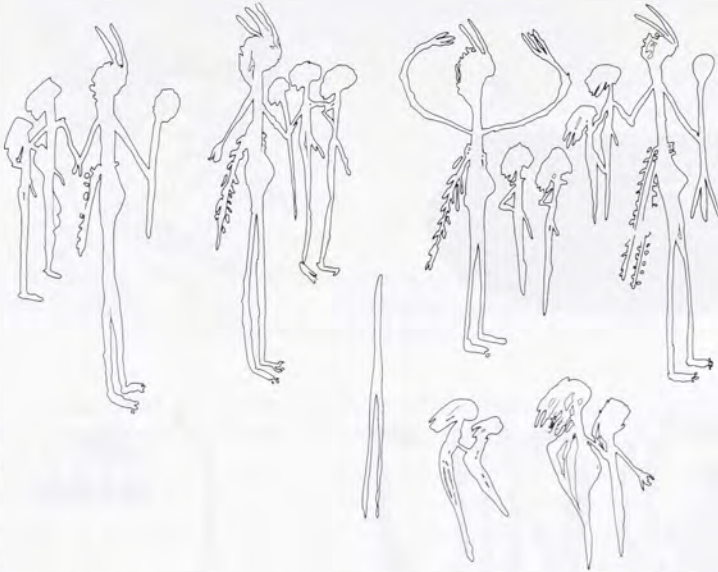


Fig. 2. Drawing on a C-Ware jar from tomb U-239 at Abydos (after Dreyer et al. 1998, fig. 13).



Fig. 3. Part of a drawing on a C-ware jar from tomb U-415 at Abydos (after Dreyer et al. 2003, fig. 5).

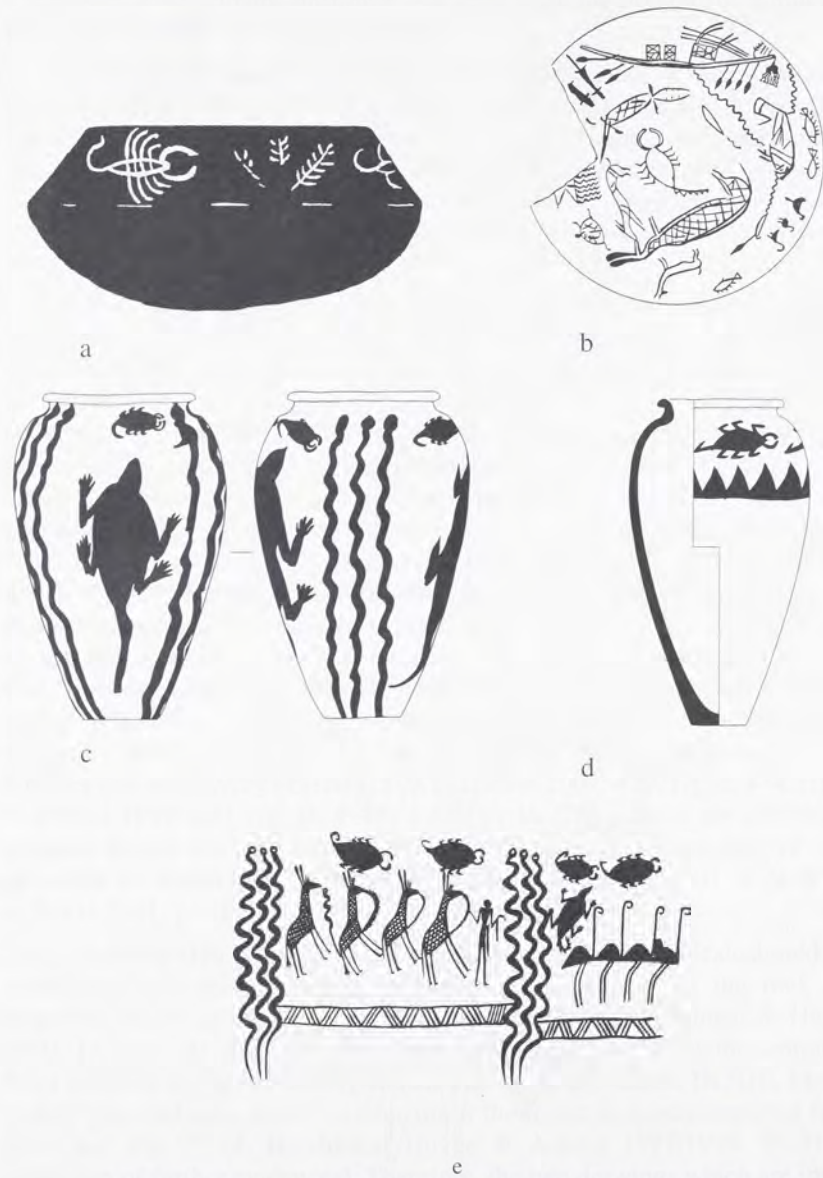


Fig. 4. Representations of scorpions on C-ware (a, b) and D-ware jars (c-e)
 (a: after Petrie 1921, pl. XXIII, C66M; b: after Petrie 1920, pl. XXIII, 2;
 c, d: after Payne 1993, fig. 49, 918 and 919; e: after Scharff 1931, 150, fig. 58



Fig. 5. Depictions of scorpions (a: ink inscription on a W-ware jar from tomb U-j at Abydos, after Dreyer 1998, 47, fig. 33a; b: incision on a stone vessel from the Main Deposit at Hierakonpolis, after Kaplony 1968, 17, fig. 4).

On the other hand, the similarity of the bucranium on a pole and of the falcons (one of them depicted above the scorpion) with depictions on bone labels and ink inscriptions on vessels from tomb U-j is striking. Additionally, on the bottom side of the overhang of the tableau, an elephant on mountains is depicted (Friedman & Hendrickx 2002: 17; = Gebel Tjauti Rock Inscription 28, Darnell 2002a: 72; see also Friedman 2002), a sign that is also known from U-j. All these signs may be read as early royal names (Dreyer 1995: 52-56; 1998: 178) or at least interpreted as powerful symbols of the ruler. Additionally, the Gebel Tjauti tableau may be compared to the depictions from Gebel Soliman near Buhen, where not only prisoners and killed enemies are figured, but also a serekh with falcon is present. First dated to the reign of Djer (Arkell 1950: 28-30; against this dating already Helck 1970: 85), it was probably incised during the late Predynastic period (Naqada IIIB; Williams & Logan 1987: 263-264; Murnane 1987: 282-285, fig. 1A and 1B). It is understood to be a testimony of royal power and indicates the victorious presence of the ruler or a distinct victory in this region. Although in the Gebel Tjauti panel a serekh is missing, the parallels from tomb U-j suggest a similar function.

These parallels, especially the occurrence of royal names or at least symbols indicating royal power in the Gebel Tjauti tableau, and their combination with other drawings to an assumed conscious composition of programmatic royal iconography seem to have been decisive for the authors to date the depictions more or less contemporaneous to U-j at Abydos (Friedman & Hendrickx 2002: 11, 16). The question remains, if these arguments are sufficient for dating. Firstly, it has to be mentioned, that it is rather uncertain if the scorpion and the falcon on the lower right side of the tableau really indicate a royal name (Friedman & Hendrickx 2002: 14-15; Kahl 2003: 51; 2003a: 116-122, 127-129; cf. also Breyer 2002). Secondly, it is to consider that programmatic depictions celebrating the ruler or king are already known from the painted tomb at Hierakonpolis,

from decorated knife handles (among others, see Williams & Logan 1987: 253-272; cf. also the knife handle fragments from tomb U-127 at Abydos, Dreyer 1999: 205-208, 220, fig. 10a und b), and some elements of later royal iconography, like hunting scenes or the presentation of prisoners, are depicted already on C-ware jars. There is no doubt that representations of the powerful and victorious ruler have a long tradition and are not restricted to Naqada III only.

Altogether, it does not seem possible to determine the date of the inscriptions with certainty, neither the date of the entire rock drawing nor that of its elements. If it is not understood as a conscious composition, and considering the evidence that many motives are already known from earlier times, first of its drawings or sign groups – apart from the antelopes which are clearly older – may have been incised already during Naqada I, with subsequent additions until Naqada III.

Finally, another question concerns the general interpretation of the tableau. So far all scholars seem to agree that the Gebel Tjauti panel is a symbolic depiction of a military conflict between Upper Egyptian proto-kingdoms, either showing the victory of a ruler from Abydos (Friedman & Hendrickx 2002: 17-18) or from Hierakonpolis (Kahl 2003: 53-54). The background of this interpretation is the idea of a rivalry that existed between the three main proto-kingdoms of the Naqada-Culture situated around Abydos, Naqada and Hierakonpolis (Kemp 1989: 31-35, fig. 8), including the military conquest of neighbouring settlement centres. This picture was designed as a model to explain the predynastic developments in the Upper Egyptian Nile valley which finally led to the emergence of the Egyptian state. Although this idea has been generally accepted (among others see recently Wilkinson 2000: 382-386; Campagno 2002, 2002a; Gilbert 2004: 109), the archaeological evidence is still missing. The existence of several large settlement centres in Upper Egypt is well attested, but the archaeological record does not tell us anything about their relationship to each other. The same is true for the differences in the geographical and chronological distribution of elite tombs that are often cited as evidence of political development. Changes in the structure of cemeteries may mirror developments within a settlement or a region, but they do not reveal the reason for it. A military defeat would only be one possibility. The wealth and importance of a village, town or region could be just as much affected by other circumstances like economic disasters which, for example, could be caused by the shifting of trade routes or trade interests due to exhausted sources of raw materials.

Until recently, only little is known about the political organization of the settled Middle and Upper Egyptian Nile valley. Considering sealings, seal impressions (for example Hartung 1998) and depictions resembling later pharaonic iconography, it may be assumed that somehow centralized economic and admin-

istrative structures corresponding to a hierarchic system of political power, were already established in Naqada IIC/D. Therefore, if one supposes a military rivalry that led to such structures within the Upper Egyptian Nile valley, serious fights and struggles for political hegemony should be expected during the time preceding Naqada IIC. But also during early Naqada II such activities are not indicated by the archaeological evidence. Certainly, the Naqadians were not only a peaceful, sedentary tribe who cared for their fields and cattle but a violent community. Already from the Naqada I period we see representations of prisoners, and later the killing of enemies as well as people bringing tributes to the ruler. Traces of violence have been attested most recently by anthropological evidence (Dougherty & Friedman 2005).

On the other hand, the remains of the Naqada-Culture in the Middle and Upper Egyptian Nile valley provide a very uniform picture. This concerns not only the material culture but also the social, cultural and religious background of the society as far it is indicated by the archaeological records. Beside the local production of common pottery and stone implements which mirrors regional differences (for example Finkenstaedt 1980, 1985; Holmes 1989; Friedman 1994; 2000), there seems to have existed a common distribution network for more valuable products like stone vessels, palettes, fine worked flint knives, copper implements etc. These products, most likely manufactured in special workshops, were distributed throughout the entire Nile valley for the demands of the local elites. Furthermore, the similar arrangement and equipment of Naqadian tombs throughout the Upper Egyptian Nile valley is rather striking, as well as the occurrence of similar symbols and signs on painted pottery and as decorative motifs on various objects. This uniformity points to similar cultic practices and a common ideological and religious background for the entire area, which testifies a distinct Naqadian cultural and geographical identity. On the basis of this argument, it is highly questionable that the prisoners depicted on knife handles and other related objects are defeated people from the neighbouring village or town. In contrast to the ruler, these underdogs are always characterized as the "other", i.e. as foreigners with long straggly hair and/or beard, not belonging to the Naqadian community. It is quite unlikely that the same type of prisoner depicted on an object found at Abydos represented defeated people from Naqada or Hierakonpolis, and in Hierakonpolis captives from Abydos. Even if regarded as an enemy, a captured person from a neighbouring village or town would have been considered as a member of the same culture and not as a foreigner. Although the image of the naked, long-haired prisoner received an iconic meaning in later times, in the early depictions it is much more likely that the figured persons with their different appearance were foreigners who existed in reality. Frictions and occasional fights between Naqadians are not to be excluded, many of the common local issues were probably decided through the use of violence.

But for the entire polity, these struggles seem to have played only a minor role, at least they were not considered worth the depiction on elite objects. For this purpose, victories in conflicts with other ethnic groups may have had a more general importance, and were, as such, more suitable for the celebration of the power and the glory of a Naqadian ruler. Later evidence seems to confirm this consideration. Since Early Dynastic times, and especially in pharaonic depictions, the defeated are not only characterized as foreigners by their different appearance but often a name is added to indicate their non-Egyptian origin. In other cases, foreigners may be identified by special details of the drawing. For example, on labels from the reign of Narmer, men are shown bringing vessels in a devotional position (Petrie 1901: pl. IIIA, 2; IV, 6 and 15; Spencer 1980: pl. 50, no. 465). Although no name is added to these individuals they may be identified of Southern Levantine origin according to the shapes of the vessels they are carrying (Amiran 1969).

Unfortunately, in earlier representations neither names nor other helpful details are found. On the Abydos jars (Fig. 2 and 3), signs seem to appear beside the prisoners which might be symbols pointing to their origin. One of them resembles the later mountain sign, but the others are not identifiable. Therefore, the only possible approach to an identification is to consider the geographical location of the settled area, the historical situation and the connections between adjacent regions, as far as they are known. Apart from the assumed rivalry between Naqadians discussed above, there are only few possibilities. For Naqada I, military expeditions to Lower Egypt, or even into Palestine seem to be rather unlikely. Unfortunately, we neither have an idea about the interrelations of the Naqada-Culture to the Nile valley neighbours in the south, nor to remaining groups of the Badari Culture. Alternatively, we should look to other nomadic tribes which lived in the Eastern and Western Desert. Especially in extremely dry years, desert dwellers may have been forced to enter the Nile valley to survive. To find food for themselves and fodder for their herds they may have tried to loot fields or storage facilities in the Nile valley, accepting the risk of being captured. There may have been differences how the Naqadians as a sedentary community dealt with nomadic groups arriving from the Eastern or the Western desert. The Eastern desert was the source of most of the raw materials used by the Naqadians for luxurious products, like different kinds of rock, semiprecious stones, minerals, etc. The Western desert must have been of much less interest, as almost no raw materials were found there. The exchange of raw materials and agricultural products of the Nile valley was most likely the main basis of contact to the east, although less peaceful expeditions are not to be ruled out. Such economic relations may also have been helpful in cases of emergency. In contrast, people entering the Nile valley from the Western desert had not much to offer in exchange for food and survival. In this case, the contact may have been much

more violent. It was perhaps from this region, immediately adjoining the main settlement centres on the western bank of the Nile, where Naqadian village life was at times put at risk. Increasing aridity during the predynastic period may have greatly added to such conflicts. The necessity to defend the villages and towns of the Naqada-Culture against nomadic groups arriving from the desert (i.e. their protection against the “chaotic powers” of the desert which disturb and endanger the well-arranged sedentary life), would have been a problem that concerned the entire Nile valley. Consequently, victories against intruders, if true or not, would have been worth to be depicted on elite objects in order to describe and celebrate the power of a ruler. Therefore, it seems not unlikely, that the figured prisoners on the C-ware jars, and perhaps also on the knife handles, represent captured desert dwellers who were caught after they had entered the Nile valley.

Returning to the Gebel Tjauti tableau, we should consider the possibility that not a victory of a Naqada-ruler against a neighbouring counterpart is depicted but the capture of a desert dweller by a Naqada-chief. The drawing – maybe a tale of a real event or a propagandistic icon – could have been a mark to indicate the extent of the hinterland claimed by the Naqadians. It may have served as a warning against people who were going to penetrate into the area. The placement of the rock drawing at a prominent position on a path leading down from the desert plateau into a wadi open to the Nile valley would have been well-selected for such a purpose. The other signs of the tableau could have had a similar function, and especially the stork with the snake, symbolizing the defeat of the chaos, seems to fit well to such a purpose. The number and diversity of the signs may mirror chronological differences as well as the overlapping of several spheres of influence in the Gebel Tjauti region. Perhaps, Rock drawing 1 may even be regarded as a kind of predecessor to Rock drawing 2 (Darnell 2002a: 19-24) on which falcons and serekhs with falcons are depicted (Fig. 6). It dates perhaps to the reign of Narmer, and it has been suggested that it may have been a kind of land or border mark (Friedman 2002: 20, 24).

To summarize, despite the splendid documentation of the Gebel Tjauti rock drawings, their interpretation remains quite difficult. Although a convincing interpretation was suggested which fits well into our historical picture of the late predynastic period, some uncertainties remain. Other possibilities of interpretation cannot be strictly excluded and they should be at least kept in mind. When using rock art as evidence for historical conclusions, we have to be careful not to overemphasize the apparent clearness of information which such drawings provide.

Regrettably, Lech Krzyżaniak cannot contribute anymore to this discussion which, I am sure, would have found his interest.



Fig. 6. Gebel Tjauti Rock Inscription 2 (after Darnell 2002a, pl. 12).

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The sequence and chronology of the Protodynastic and Dynasty I rulers

Abstract

Investigations into the earliest rulers of Egypt can be traced to the turn of the nineteenth century. However, the process of state formation goes back at least 400 years prior to the establishment of Dynasty I. Examination of radiocarbon age measurements on wood, reed, and linen from the tombs dating to the reign of the kings of Dynasty I reveals discrepancies between older dates and more acceptable younger dates for the same king attributed to the recycling of older wood and settlement debris. Statistical analysis and calibration of the pooled mean of multiple age measurements that are statistically the same provide age estimates of 2995-2927, 2922-2886, 2906-2887, and 2819-2748 cal BC for Aha, Djet, Den and Qa'a - first, third, fourth and seventh (last) kings of Dynasty I, who succeeded King Narmer.

A Remembrance

Lech Krzyżaniak has been an inspiration to generations of scholars and his initiation of the Dymaczewo Conferences at Poznań in Poland have generated a myriad of research into prehistoric Northeast Africa. His presence and insights into the study of early civilization in the Nile Valley will be sorely missed, but the legacy he leaves behind is a monument to not only his achievements but those that created the first civilizations in Northeast Africa.

Introduction

The conceptualisation of ancient Egyptian rulers in terms of a linear sequence of dynasties, as done by Manetho (Wadell 1946) is unknown from the ancient Egyptian sources (Jiménez Fernández & Jiménez Serrano forthcoming), although it does bear a close resemblance to the groupings of kings on such King

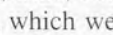
Lists as the Turin Royal Canon. However, the dynastic system has become the framework of Egyptian chronology. Working in this dynastic tradition of Manetho, Petrie (1900; 1901b: viii; 1902: 5) developed a scheme of the succession of the kings of the First Dynasty and some earlier rulers: Ka, Ro⁴, Zeser, Narmer and Sma (see Tab. 1). For the last king, Sma, Petrie (1902: 5, pl. IV, nos. 1-2) mistook the reading of the signs , which were translated by Griffith - in Petrie (1901b: 48) - "consort of the Double Domination" (*sm'.(t) nb.ty*). Odgon (1988: 73-74) and Ellis (1922: 77) concurred with this interpretation, contra the interpretation of Kaplony (1963, 1: 612-614), among others, who interpreted the signs to read *ZmA-nbwj*.

Table 1. The list of First Dynasty rulers from earliest to latest (Top to bottom) according to Manetho, King Lists and Petrie.

Manetho	King-Lists	Petrie
Menes	Meni	Narmer ⁵
Athothis	Teti	Aha
Kenkenes	Iti	Zer (Djer)
Uenephes	Ita	Zet (Uadji, Djet)
-----	-----	Den-Merneith
Usaphais	Zemti	Den (Udimu)
Miebis	Merbiape	Azab (Anedjib)
Semempses	Semsem	Mersekha (Sermerkhet)
Bieneches	Kebh	Qa (Qa`a)

The succession of the first rulers of Egypt has been the subject of debate ever since. One of the greatest sources of confusion being that archaeological discoveries, primarily at Abydos, brought to light the Horus names of the Dynasty I rulers, whereas Manetho and the king-lists used the names associated with the titles 'He of the Two Ladies' (*nbtj*) or 'He of the Sedge and Bee' (*nsw-bity*). Confusion has also arisen concerning the use of the terms "Dynasty 0" (kings ruling parts of Egypt during Naqada IIIB)⁶ and "Dynasty 00" (kings ruling parts of Egypt during Naqada IIIA). The term Dynasty 0 was first used by Quibell and Petrie in (Quibell 1900: 5ff) and Petrie in (Petrie 1901a) to categorise the names of the rulers at Hierakonpolis and Abydos prior to the Dynasty I kings. Edwin van den Brink (1992: vi, n. 1) introduced the term Dynasty 00 to refer to the rulers buried in Cemetery U at Abydos, whom he states were 'possibly the

predecessors of the Dynasty 0 Kings'. Rulers from various family lines, possibly ruling separate regions of Egypt concurrently, are now being included in these two proto-dynasties, they have become something of a dumping ground for ephemeral Protodynastic rulers.⁷

As more work is conducted in Egypt, particularly at Abydos, Hierakonpolis, Helwan, Saqqara, and in the Nile Delta, more names of rulers will emerge and the political and cultural nature of the period will become clearer. The original terms Dynasty 00 and Dynasty 0 correspond to Hendrickx's (1996; 1999) Naqada IIIA₁ & IIIA₂ and Naqada IIIB respectively. The terms Dynasty 0 and Dynasty 00 are too specific and uncertain. A more appropriate term for the period as a whole is the Protodynastic, as used by Adams & Ciałowicz (1997: *passim*). Therefore, all these rulers before Dynasty I are here referred to as Protodynastic rulers, because it avoids the idea of a unique line of succession at that period in Egyptian history.

The Quest for Menes

Menes was recognised by the ancient Egyptians as their first king in the Abydos King List and Turin Canon, and other king lists (Redford 1986). Herodotus attributes to Mina/Menes the draining of the plains of Memphis by means of a mud embankment, the foundation of the White Walls of Memphis and the building of a Temple of Ptah to the south of these walls (II, 99) and Manetho credits him with the Unification of the Two Lands. The question as to who was Menes has been the subject of much debate over the years, with Narmer and Aha emerging as the two most popular candidates (Gardiner 1961: 400-415).⁸

Earliest Rulers

Egyptian tradition on such monuments as the Turin Canon and Annals holds that before Dynasty I there was a series of mythical demi-gods – *Šmsw-Hr* (Followers of Horus).⁹ On the present limited evidence, several scholars have proposed various reconstructions of the sequence of the earliest rulers. Kaiser (1964: 95) identified the sequence of the kings during the transitional period from the end of the Protodynastic to Dynasty I as Ka (Sekhen), Narmer, and Aha, but almost thirty years later he placed Scorpion II between Ka and Narmer, changing the sequence to: Ka, Scorpion II, Narmer, and Aha. Needler (1984: 43) ordered the names of the kings in the following sequence: Scorpion (II), Iry-Hor, Ka, and Narmer.

Andelkovic (1995: 20) places the rulers of the Protodynastic in the following sequence: two unidentified rulers, Pe Hor, Scorpion I, Double Falcon, Ni Hor, Hat Hor, Iry Hor, Horus Ka, Hor Crocodile, Hor Scorpion II and Hor Narmer. Dreyer (1998: 178-180) using artistic and archaeological evidence,

reconstructs the succession of Abydene kings from the motifs that appear on Protodynastic monuments as: Standard of an Oryx (?), Mollusc, Fish (?), Elephant, Bull (=Bull head standard?), Stork, Canine, Bull Head Standard, Scorpion I, Falcon I, Standard of god Min plus a part of a plant, an unknown king?, an unknown king?, Falcon II, Lion, Double Falcon, Iry Hor, Ka, Scorpion II and Narmer.

Jiménez Serrano (2003a) considers that the royal sequence was as follows: Iry-Hor, Scorpion II, Ka, Narmer, and Aha (also see Trigger et. al. 1983: 50). Jiménez-Serrano's reconstruction is based on an inscription that Petrie (1903: 26, pl. VIII, no. 181) found on the back of a large tile in the temple area of Abydos. This inscription has four signs: the most important is the typical plant of Upper Egypt 7. Beside it, there is a row of signs in which Petrie recognised the sign M, which he interpreted as Ro (Iry Hor). Petrie interpreted the last two signs as one - a falcon, but in the photograph it is possible to detect an animal with three legs and a raised tail (which Petrie considered as the head). Jiménez Serrano (2003a: 97) concluded that it represents a scorpion observed from a lateral point of view. Petrie did not take into account the last sign that is clearly visible as a Ka sign T. Thus, the sequence is completed: Iry Hor, Scorpion II and Ka. Although no *serekh* has definitely been identified as belonging to Scorpion II (Wilkinson 1999: 56-7), Smith (1992: 244) regards the rosette or palmette motif above the figure of a scorpion on the Scorpion Macehead as reading "servant of the king" and sees it as signifying Scorpion II as a king.¹⁰ Scorpion II is also depicted as wearing other royal regalia, including the *Hedjet* (white crown) and bull's tail.

Raffaele (2002a; 2002b; 2003a; 2003b) has developed a tentative list of the regional rulers of late Naqada II and early Naqada III from inscriptions on the ivory and bone labels, and potmarks on ceramic vessels from Cemetery U and B at Abydos, combined with inscriptions on Naqada IID-IIIB seals, graffiti on the Koptos Colossi and symbols on the Tehenu Palette. This incomplete list includes for Dynasty 00: Oryx, Shell, Fish, Elephant, Bull, Stork, Canid (?), Cattle-head standard, Scorpion I, Falcon I, Min standard + plant, ?, Falcon II (?), Lion, and Double Falcon. The Dynasty 0 rulers he lists as: Nb (or R ?), Hedjw(-Hor), Pe + Elephant, Ny-Hor, Hat-Hor, Crocodile (the Subduer), Falcon + Mer (also read as 'Mer Djehwty'), Iry-Hor, Ka, Ny-Neith (Lower Egyptian king), Scorpion II, Narmer and from Qustul L2 Pe-Hor.

As Jiménez Serrano (2003a: 96-7) points out there are many problems with these sequences of rulers - they have not taken into consideration the possibilities that: 1) The many names of kings found in the different parts of the Nile Valley from Lower Nubia to the Delta probably represent kings from some of the other proto-states and polities other than Abydos/Thinis; 2) There is insufficient artistic/iconographic evidence for some of the kings (e.g. Lion) when compared

to others (e.g. Scorpion I); 3) That some of the symbols represent religious concepts related to kingship and interpret them as individuals (e.g. Double falcon).

Tomb U-j, the largest tomb in Abydos Cemetery U has been assigned to Scorpion I. However, the size and wealth of Tomb U-j cannot be taken as an indicator of the general wealth of the occupants in Cemetery U and should be seen as the individual agency of 'Scorpion I' and the position of importance reached by this regional ruler before the tombs returned to more typical size and wealth (see Castillos 2004 for the gradual increase in wealth at Cemetery U). Therefore, many of the tombs in Cemetery U dating to Naqada IIIA, although being smaller and less well endowed with grave goods, are actually chronologically later than Tomb U-j according to both the radiocarbon dates and the ceramic assemblages (Dreyer *et. al.* 2004). Another reason for this decrease in tomb size could be the separation of the tomb and the mortuary shrine (enclosure), with the early shrines being surrounded by a simple, easily destroyed palisade made of wattle and daub, rather than mud-brick as with the Dynasty I mortuary shrines (Hendrickx 2001). Between Scorpion I and Aha was a difference of 300+ years, a period of time in which Kaiser & Dreyer (1982: 268) suggest 10 or 12 generations ruled before Narmer. The elite tombs at Abydos for this period consist of: U-127, U-p, U-k, U-j (possibly Scorpion I), U-i (Falcon?), U-s, U-t, U-u, U-v, U-w, U-y, B40, B50, B0/1/2 (Iry Hor), B7/9 (Ka), and B17/18 (Narmer). Elite tombs of possible rulers at Hierakonpolis for the same period are: T100, T16, T22, T11, T2, T10, and T1 (possibly Scorpion II) (Adams 1995; 2000; 2001; 2002; Gundlach 1998; van Wetering: in prep.). That some of the rulers named above came from Hierakonpolis is a strong possibility, although assigning tombs to them is not at present possible. Until Loc. 33 is re-examined or/and names of rulers are found in the tombs currently being excavated at Loc. 6 the names of the rulers of Nekhen will remain the subject of much debate. The recent finding by Adams and Friedman of an elephant buried in T24, a tomb associated with the tomb complex of T23 may signify that this Naqada IIA-B ruler was to be identified with elephants or that this ruler had the name elephant or was identified by the elephant symbol (Friedman in press).



Fig. 1. Ka serekh (KHD4010) from Kafr Hassan Dawood (Wadi Tumilat, East Delta), found in Grave 1008 on vessel KHD0070 (drawn by B. Calcoen).

All the kings of the Early Dynastic (and later periods) had a Horus name and had the symbol of this god surmounting their *serekhs*, except Peribsen who

had the Seth animal and Khasekhemwy who had both Seth and Horus (see Fig. 1). Although many potential regional rulers have been identified, some have a Horus name, whereas others do not. Jiménez-Serrano (2003a) makes the distinction that only those with the three elements – Horus, hieroglyphs (name) and palace niche-façade – should be regarded as a classic *serekh*. The first examples of the classical *serekh* are those of Ka and Crocodile who ruled different regions of Egypt just before Dynasty I at the end of the Naqada IIIB period (Jiménez-Serrano 2003a: 113). Jiménez-Serrano (2003a) suggests that the different elements of the *serekh*, which developed in various areas of Egypt and Nubia, were first brought together in the Memphite region. The finding of one or two of these elements together seems to represent expressions of regional administration and political sovereignty. The significance of the classic *serekh* prior to Dynasty I may indicate a fusion of ideas and an extension of the field of influence of a polity – the Thinite polity into the East Delta region with vassal rulers or sub-kings still nominally controlling areas. These sub-kings may in that case use the classic *serekh* to either show their alliance with or independence from the high-king.

Regional Protodynastic rulers have been suggested through the finding of *serekhs*, although the name of the ruler in the upper compartment of some is as yet unreadable. On a ceramic vessel found in the East Delta a *serekh* surmounted by a falcon was identified with three *hd* mace signs in the upper compartment (Fischer 1963: 44, fig. 1, pl. VI a & c). This possible early ruler – *Hor-Hedjw* – is also recognised on vessels from Tura (Junker 1912: 46-47, fig. 57, nos. 1 & 2) where palace niche-façade signs with hieroglyphs have been found, although these are not surmounted by a falcon. Some authors have considered it the name of a late Protodynastic king (King A). The lack of the surmounted falcons on the *serekhs* from Tura and the use of maceheads as a generic sign of kingship or authority have led Wilkinson (1999: 56) to doubt their interpretation as a name of a king. Recently, Castel et. al. (1998: 71, photo 12 a-b) have proposed *Hor-Hewt* as a possible new ruler that lived during Naqada IIIB-C and who, according to these authors, could have ruled an area in the Eastern Desert. As the authors confess, this symbol, which was found on a vessel in the Wadi Um Balad in the Eastern Desert, is not a *serekh*, but a falcon on a horizontal line above the hieroglyphic symbol *hat*, which could make reference to the goddess Hathor, who was related to mountainous regions and copper mines; two other lines are also present giving the impression of the sign being in a rectangle. Another king was recognised by Wilkinson (1996), whom he designated as ‘King B’ (Wilkinson 1999: 56, fig. 2.3), as there are many difficulties to reading his name. This king is recognised in rock-cut inscriptions behind Armant depicting *serekhs* surmounted by falcons. Williams (1986: 149) read the name of *Hor-Pe* from a potmark found in tomb L2 at cemetery L of Qustul. Jiménez-Serrano (1999)

suggests that this supposed name may represent a schematic representation of a *serekh*. Dreyer (1999) considers *serekhs* surmounted with a double falcon, but no name in the internal compartments, as a name of a Protodynastic king, Double-Falcon. Although it may indeed be a name of a king, it could just as easily be related to a religious concept (i.e. Horus-Seth duality) or the representation of an alliance between northern polities. Kaiser & Dreyer (1982: 265-269) read the names of Hat-*Hor* and Ny-*Hor* on potmarks from different parts of Egypt (mainly, Lower Egypt). These could be regional rulers from Lower Egypt of the Naqada IIIB period, although as they have never appeared under the protection of the god Horus, they should not be called Hor(us), simply Hat and Ny (Jiménez Serrano 2000: 37). Another Lower Egyptian ruler is *Hor-Ny-Neith*, whose *serekh* with a falcon immediately to the left of it was discovered at Helwan in Tomb 257.H8 on a scalloped storage jar EM00-87 (Köhler & van den Brink 2002: 59-68, fig 2.1 & 2.2, pl. 2). Although the falcon does not surmount the palace niche-façade and hieroglyphs, it is clear that this ruler is associated with Horus. A recently discovered *serekh* surmounted by a falcon, is that of *Hor-Aa*, discovered at the rock art site of Darb Ain Amur near Kharga Oasis (Ikram & Rossi 2004); although the identification of the sign in the upper compartment is still speculative, it may represent a previously unknown ruler of the late Naqada IIIB period. A full catalogue of *serekhs* has been compiled by van den Brink (1996 and 2001a), while Jiménez Serrano (2001; 2003a), Hendrickx (2001) and van den Brink (2001b) debate the origin, types and significance of the *serekh*.

Unification and King-Lists

Throughout the Predynastic period there was a large degree of regionalism, with distinct cultures being identified in the different areas of Egypt, such as the Moerian in the Faiyum, Maadian with various characteristics in the Delta, and the Naqadian with differing characteristics in Upper Egypt (Hassan 1988; in press; Holmes 1989; Köhler 1995; in press; Midant-Reynes 2000; van Wetering & Tassie this volume). During this period, Upper, Middle and Lower Egypt had hierarchical societies characterised by social differentiation, consumption of prestige goods, interregional trade and craft specialisation (Castillos 1982; 1998; 1999; 2000; Hassan in press; Takamiya 2003). The rise of local élites is identified in the Naqada I phase by large well endowed graves at such Upper Egyptian cemeteries as: Abadiya, Naqada, Abydos and Hierakonpolis and in Middle Egypt at Wadi Digla (Castillos 1982, 1998; Köhler in press). Early symbols of kingship or religion, such as the red crown motif found on a Naqada ID-IIA pottery vessel from Grave 1610 at Naqada (Baumgartel 1970; Crowfoot Payne 1987; Petrie & Quibell 1896) also start to appear during this period. Hassan (1988) and Kemp (1989; 1995) trace the formation of state in Upper Egypt from Naqada I to Dynasty I, recognising the initial formation of minor polities, which then trans-

formed into larger polities. Although the local chieftains of the Badarian and Naqada I periods differentiated themselves with larger tombs and more grave goods, an elaboration and increase in size of local rulers tombs is first recognised in Upper Egypt during the Naqada IIB phase (Hierakonpolis T16 & T23) when a stratified society starts to appear (Castillos 1982; 1998; 2000).¹¹ During the Naqada II phase there seem to be eight major Upper Egyptian polities: Kawamil area, Abydos area, Abadiya area, Naqada area, Armant area, Gebelein area, Hierakonpolis area, and Meshali area (van Wetering in prep.).

Acculturation during the Naqada IIC period was marked by the spread of Upper Egyptian pottery into Lower Egypt. The Lower Egyptian material culture did not simply vanish and at sites such as Kom el-Khilgan, Minshat Abu Omar and Tell el-Iswid, Lower Egyptian pottery types remained prominent until at least Naqada IID (Köhler in press). During the Naqada IID-III A period petty kingdoms in Upper Egypt with separate cemeteries for the rulers are well documented (Kemp 1989; Wilkinson 2000b). Although large separate cemeteries have so far not been found in Lower Egypt, the on-going excavations at Buto and possibly Sais may well in the future reveal their presence. The three major polities - Abydos (Thinis), Hierakonpolis (Nekhen) and Naqada (Nubt) - vied for power in the late Predynastic and early Protodynastic Period when the other polities were already showing signs of the loss of their political independence (Campagno 2000: 49-52; Raffaele 2003b: 102-103). During the Protodynastic Period the struggle for Upper Egyptian hegemony continued between the polities of Thinis and Nekhen, Nubt already having been annexed (van Wetering in prep.).

Throughout the Predynastic and increasing in the Protodynastic the neighbouring regions maintained a trade network, exchanged prestige goods and gifts and engaged in peer polity competition, which led to dissemination of cultural values and religious beliefs (Köhler 1996; Takamiya 2004; Trigger 2003: 101). In most regions of Egypt there was increasing social complexity *c.* 3300 BC. Köhler (in press) suggests that unification was a complex, multi-linear process, and that the final stage of Thinite expansion, *c.* 3100-3050 BC, was secondary state formation on a territorial scale, after the state mechanism had already been installed in Upper, Middle and Lower Egypt, where proto-states were already in existence (see Campagno 2002: 52-60 on the meaning of proto-states). Right up until the threshold of Dynasty I, it appears that the line of regional Upper Egyptian kinglets ruling from Hierakonpolis, maintained a degree of control over the southern part of the country, whereas those ruling from Abydos/Thinis controlled northern Upper Egypt (van Wetering & Tassie this volume; Wilkinson 2000b: 392). As Scorpion II is only confidently recognised at Hierakonpolis (the recognition of a scorpion on a brick tile from Abydos is not universally accepted as representing Scorpion II), it is possible that he was the

last in a line of rulers from this polity, being buried in T1 (Brinks 1979: 148); although no tomb in either Hierakonpolis or Abydos has confidently been assigned to him.¹² In the Memphite region an independent polity may well have existed up until the reign of Ka; and in the East Delta one or two polities may have existed up till this time, as well. In the West Delta polities may have been centred at Buto and Sais, possibly coming under Thinite control during the reign of Narmer or possibly Aha.



Fig. 2. The Palermo Stone (drawn by A. J. Serrano).

For Dynasty I there is a lot more information that can be drawn upon, principally written evidence of lineages of rulers. The Annals or Palermo Stone (and its associated fragments) date to the beginning of Dynasty V (see Fig. 2). This document listed most of the preceding rulers, giving their length of reign, special events occurring in that reign and heights of Nile floods. Although not a complete record, having many lacunae and some omissions by the original

scribes, it is of prime importance, and although being compiled some 400 years after the end of Dynasty I, it is the oldest of the ancient Egyptian archives for the study of the Early Dynastic Period.¹³ The first register on the recto of the Annals lists the names of 23 Protodynastic kings (9 in the Palermo fragment), none of whose names are attested from contemporary records (Helck 1956; 1974). The kings of Dynasty I are listed in registers 2 and 3 on the recto of the Annals. It has been suggested that the first king listed in register 2 on the recto of the Annals was Aha (Barta 1981; Helck 1956; 1974; Kaiser 1961; Malek 1986), and they therefore equate Aha with Menes. As the beginning of the Annals is badly damaged this interpretation has been questioned, with the first person to suggest that the missing part of the Annals contained the name of Narmer being Petrie (1916: 117). Those who favour Aha as the founder of Dynasty I insert an ephemeral king, Athothis I, between Aha and Djer to make up the eight kings of Dynasty I and even assign him Tomb B40 at Abydos (Dreyer 1987: 39; Görsdorf, Dreyer & Hartung 1998a: 173). King Athothis I, as Cervelló Autuori (2003) has stated, could not be admitted as an historic king, because his name appeared in much later New Kingdom and Graeco-Roman sources (Gauthier 1907: 3-5). Also, as Wilkinson (1999: 67; 2000a: 186) states, there are no contemporary sources recording the name of this king and Athothis' insertion after Aha is due to a misreading of the Annals, and therefore the owner of Tomb B40 is probably an as yet unidentified Protodynastic ruler.

Although no original annals or prototypical *gmwt* (logs of events, particularly flood heights) from Dynasty I have so far been recovered, we are left with the adaptations - tablets and seal-impressions (Redford 1986: 86-88). The Abydos, Umm el-Qa'ab necropolis seal-impressions with the names of the Dynasty I kings from Narmer to Den found in Tomb T (Dreyer 1987: 33-36, Abb. 2, 3, Taf. 4-5, Taf. b, c; Scandone Matthiae 1992) and from Narmer to Qa'a from Tomb Q (Dreyer *et. al.* 1996: 71-73, Abb. 26) confirm the order of Dynasty I kings given in the Annals and inscriptions found at Saqqara (Lacau & Lauer 1959; 1961). The latter seal-impression, that of Qa'a, although omitting Merneith as recorded on Den's seal-impression, gives the complete line of eight Thinite kings of Dynasty I. Both of these contemporary necropolis seal-impressions start their line of ancestors with Narmer. The contemporary Egyptians certainly considered the rulers from Narmer to Qa'a as forming a political grouping owing to both their common origin (Thinis) and burial at Umm el-Qa'ab. Therefore, Narmer must have been a central figure of Egyptian history, and should be considered not only the first king of Dynasty I, but also the last king of the Protodynastic Period or Dynasty 0. Although Narmer may not have ruled over the whole of what was considered Egypt in the Old Kingdom and later periods, his monuments, such as the Narmer Palette, show him wearing the crowns of Upper and Lower Egypt.¹⁴ On the necropolis seal-impressions, Narmer's imme-

diate Thinite predecessor, Ka, although probably being buried in Cemetery B at Abydos (B7/9), is not named, indicating that he and other predecessors were not regarded as rulers of Upper and Lower Egypt by the kings of Dynasty I (see Tab. 2). Therefore, a pivotal event must have occurred during the time of Narmer for him to be regarded as a king of Upper and Lower Egypt; this event being probably the incorporating into his realm of land in Lower Egypt through a political treaty or conquest. If Narmer as a ruler of Thisis was able to extend his rule over parts of Lower Egypt, therefore being regarded by his contemporaries as the first in a line of kings, he could have been regarded as straddling both the Protodynastic and Dynastic periods. It seems clear, therefore, that Menes has to be identified with Narmer, as Cervelló Autuori (2003) has recently proposed.

Table 2. The succession of the kings of the First Dynasty and associated tombs and mortuary shrines.

Position	Reign	Abydos Tomb	Abydos Mortuary Shrine	Saqqara Tomb
1	Narmer	B17/18	Unknown ¹⁵	Unknown
2	Aha	B19/15/10	Enclosure H, I (?), J (?)	S3357 ¹⁶
3	Djer	Tomb O	Enclosure A	S2171, S2185, S3471
4	Djet	Tomb Z	Enclosure B	S3504
5 ¹⁷	Merneith	Tomb Y	Enclosure C (?)	S3503
5	Den	Tomb T	Enclosure C (?)	S3035, S3036, S3506, S3057, X
6	Anedjib	Tomb X	Western Mastaba (?)	S3038, S3111
7	Semerkhet	Tomb U	Western Mastaba (?)	Unknown ¹⁸
8	Qa'a.	Tomb Q	Enclosure G (?)	S3120, S3121, S3338, S3500, S3505

The necropolis seal-impression of Den lists his mother - Merneith - as one of his predecessors. Although Merneith was not actually a pharaoh, after her husband Djet died she acted as regent for her young son Den up until the time he was old enough to take up his full regal duties (see Fig. 3). Gould (2003) proposes that after the long reign of Den there are signs of weakness and a downturn in the fortunes of the kings of Dynasty I. After the reign of Qa'a, there

are some signs of political upheaval, with a possible brief power struggle (Gould 2003: 38-42). During this upheaval, there may be at least one, possibly four ephemeral rulers after Qa'a. The best attested and most likely king to have ruled after Qa'a, and before Hetepsekhemwy, is Sneferka, who is recognised from his *serekhs* found on vessels from Netjerikhet Djoser's Step Pyramid Complex, Tomb 3505 at Saqqara and another found on the surface at Saqqara (Gould 2003: 38-42; Raffaele 2003b). It is possible that Sneferka was a son of Qa'a, but died before completing his father's funeral arrangements, which were finally completed by Hetepsekhemwy (van Wetering *pers comm.* 2005). The other three ephemeral rulers: bird, Ba and Sekhet are probably Dynasty II or III rulers, although much more evidence is required to confidently place these rulers firmly in the dynastic sequence.



Fig. 3. Funerary stela of Queen Merneith, Cairo Museum (photo G.J. Tassie).

The burial place of the rulers of Dynasty I was most probably Abydos, Umm el-Qa'ab (see Cervelló-Autuori 2002 and Tavares 1999 for recent discussions on the burial place of the kings of Dynasty I – Abydos or Saqqara). With the capital of the newly formed nation state being located at Memphis (Campagno 2003), an elite cemetery was established at Saqqara (other separate Early Dynastic cemeteries were also established as well, see van Wetering 2004). In this cemetery at North Saqqara, tombs of contemporary high officials of Dy-

nasty I were located on the edge of the escarpment overlooking Memphis. It is almost certain that those interred in these large tombs were part of the extended royal family and their tombs may have acted as monuments of royal power (cenotaphs) in the landscape, along with possible mortuary shrines located in the area now occupied by the Step Pyramid of Netjerikhet Djoser (van Wetering 2004). Elite tombs of officials are also located at other Memphite cemeteries such as Helwan, Giza, Abusir, Abu Roash, and Tura, although these tombs are generally not so prominently placed in the landscape.

Absolute Radiocarbon Chronology

With the amount of new data about various rulers of the Protodynastic, more accurate establishment of the succession of Dynasty I kings, and the refining of the Naqada III relative chronology (Hendrickx 1996; 1999; Köhler & Smythe 2004), it was essential that an absolute chronology for the period be established. Hassan (1980; 1984a; 1985) and Hassan & Robinson (1987) (and see also Hendrickx 1999) examined the absolute dates from Egypt, comparing them with Mesopotamian and Levantine dates and confirmed that there were different radiocarbon data for some of the kings of Dynasty I. Since these original studies in radiocarbon dating, more data, particularly from the re-excavation of the elite and royal cemeteries at Abydos by the German Institute (DAIK) team led by Günter Dreyer, has become available on the chronology for the elite class who ruled this region of Egypt during the Protodynastic and went on to be the kings of a unified Egypt (Boehmer, Dreyer & Kromer 1993; Görsdorf, Dreyer & Hartung 1998a; Görsdorf, Dreyer & Hartung 1998b, for a map of Cemetery B and Umm el-Qa'ab see Dreyer 1998 and for Cemetery U see Dreyer *et al.* 2004). This additional data requires a revision of the chronological dates of the Protodynastic and Dynasty I. The radiocarbon data from Hierakonpolis (see Hoffman 1982, Hoffman *et al.* 1993, Pazdur *et al.* 1993, Burleigh 1983, and Close 1988) and Naqada (see Hassan 1984a and 1985) has generally not been included, as only limited new Naqada III dates are available from these two sites.

Although there are now 38 age measurements for Dynasty I, there are several problems in radiocarbon age determination that do require a great deal of caution if they are to be regarded as reliable, precise estimates of the age target (Hassan 1989). One of the main problems is the variation of carbon isotopes in the atmosphere which requires the use of calibration programmes to calibrate the raw ^{14}C age measurements. The results are comparable using either the CALIB 5 or OxCal 3 radiocarbon calibration programmes (Reimer *et al.* 2004; Stuiver & Reimer 1993; Stuiver *et al.* 1998), but we have opted to report calibrated dates (Tab. 6) using the CALIB programme. The calibrated dates cited here are the most probable range of the age estimate within one sigma. The area under the probability curve covered by the range reported is given in parentheses. Different

measurements of the same event vary depending on the duration of the period, contamination, or wrong attribution, and material. A piece of wood from an old tree will yield a date older than the associated, momentary cultural event. An old object may be placed in a tomb providing an older date than the date of burial; samples from a period spanning 200-300 years will show variations within that range. The calibration curve that the ^{14}C determinations from these discrete events are measured against is not the same throughout history, as it has been

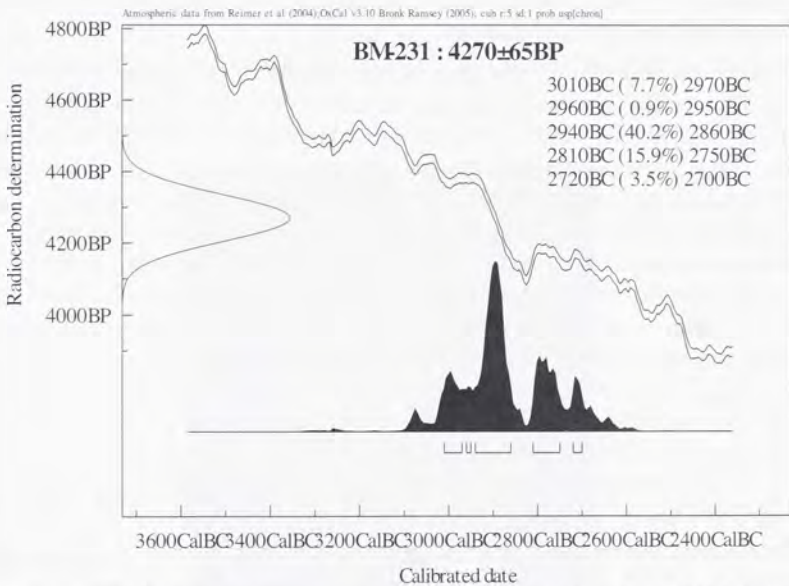


Chart 1. A single radiocarbon measurement (shown on the left) from Tomb 3035 showing various peaks measured against the OxCal calibration curve (going from top left to bottom right) and the likelihood of the measurements falling within that date.

affected by periods of atmospheric activity. The steeper the dendrochronology calibration curve, the smaller time range an event is likely to fall within. Unfortunately, the beginning of Dynasty I falls within a gentle part of the curve, thus giving a wide time span in which the discrete events can fall within, usually plus or minus 150 years. Instead of having one good peak, such as could likely be expected on a steeper part of the curve, especially when comparing good AMS radiocarbon dates, several peaks across a 300 year period are shown for many of the Dynasty I measurement (see Chart 1). Therefore, various steps have been taken to overcome these problems and to minimise errors from such factors. Firstly, we chose discrete events (preferably same tomb or occurrence) with mul-

multiple age measurements and checked if the measurements are within the range of one standard deviation at .95 probability. After, discarding aberrant dates, a pooled mean was calculated (Ward & Wilson 1978: 19) and then calibrated. The age estimate obtained was then assessed and interpreted in terms of its congruity with other measurements from the same event, its order with regard to preceding and succeeding events, and finally historical context and relative dating from ceramics.

Protodynastic Period

The German excavations have provided 16 radiocarbon determinatives for Cemetery U; as two fall outside the time range of this research (Naqada I) they have not been analysed. The Naqada IID tombs in Abydos Cemetery U were occupied by rulers who played an important role in the process of state formation (Dreyer 1998: 173-182). The eight dates from the Naqada IID graves from Cemetery U Abydos are: Tomb U-133 (Bln-4465), Tomb U-149 (Bln-4466) and (Bln-4493), Tomb U-207 (Bln-4494), Tomb U-210 (Bln-4467), Tomb U-547 (Bln-4463), Tomb U-224 (Bln-4672), and Tomb U-287 (Bln-4673) (Görsdorf, Dreyer & Hartung 1998a: 171, fig. 1-2). After comparing the results of the analysis, Bln-4467 was rejected because it was too late in comparison with the others. The result was 4656 ± 16 bp ($5.23 < 14.10$) with a calibrated date of Cal. BC 3498-3456 (0.82%).

For Tomb U-j the largest and most well endowed tomb in the cemetery, there are two data, Hd-13057-12953 and Hd-13058-12954 (Görsdorf, Dreyer & Hartung 1998a: 171, fig. 1-2). As there is a great difference between them (more than one hundred years), the younger date (Hd-13057-12953) was rejected, because the other one is closer to the radiocarbon date obtained from tombs U-a (Bln-4464), U-qq (Bln-4461 and Bln-4462), and U-pp (Bln-4671) (Görsdorf, Dreyer & Hartung 1998a: 171, fig. 1-2), which are all very close in time. For the relative dating of those tombs, see for example Dreyer (1992; 1998: 179), who concludes that these two tombs are slightly earlier than tomb U-j. All together (with Hd-13057-12953), the six dates are significantly different, thus we rejected Bln-4671 and Hd-13057-12953, because they show a great difference with the rest of the set. The final date for the period of Naqada IIIA₁₋₂ was: 4588 ± 17 bp ($9.11 < 9.49$) or Cal. BC 3352 (Cal. BC 3360-3345 with a probability of 1.0%).

For the Naqada IIIB-C period there are only three dates from tombs of local rulers, two from Abydos Cemetery B: Tomb B40 (Hd-12912 and Hd-12907) and one from Hierakonpolis HK6: T1 (WIS-1180). The pooled mean for the Naqada IIIB to beginning of IIIC was 4390 ± 55 bp or cal BC 3078-2967 (with a probability of 0.78%).

The Early Dynastic Period

Radiocarbon data for Dynasty I were some of the first to be examined using scientific dating techniques, with material from Emery's excavations at Saqqara (Libby 1955; Ralph 1959), particularly that from Tomb 3053, the tomb of Hemaka, a high official in the reign of Den being some of the first ever examined. However, although radiocarbon dating has been conducted on Egyptian material for over fifty years there are at present still no radiocarbon measurements for Narmer and Anedjib, and although Minshat Abu Omar Tomb 1590 is dated on pottery to the reign of Semerkhet, these dates have been rejected as being unreliable. The majority of the data for this period comes from Abydos Cemetery B and Umm el-Qa'ab, supplemented with data from Saqqara, and a limited amount from Tarkhan.

Aha - There are five age measurements for the reign of Aha. Three measurements on reeds are from the same tomb S3357 in Saqqara. They are statistically the same and provide a mean of 2995-2927 cal BC. Two other measurements from Abydos are also the same and provide a mean 3326-3232 cal BC. There is thus a marked difference between the two age estimates. The older age estimate is almost the same as that of the preceding Naqada IIIA1-2 period. Six measurements from this period (from four different tombs) are statistically different. Elimination of two measurements (Lab Nos. Bln-4671 and Hd-12953) provides a statistically consistent set of four measurements. The pooled mean of the four measurements is 3363-3345 cal BC. Even when all the five measurements are combined to give a pooled meaning, the resulting pooled mean gives a similar time range: 3363-3343 cal BC.

Djer-Merneith - One of the tombs believed to date to the reign of Djer-Merneith is S3503 at Saqqara, which contained a sealing of King Djer and also inscriptions of Merneith on stone vessels and jar-sealings. Significantly, no sealings of Djet or Den were found in this tomb and the architecture of this tomb places it at the beginning of Dynasty I, being similar to both those of Aha and other tombs of Djer's reign, such as S3471 (Emery 1961:66). Merneith was probably the daughter of Djer, wife of her half-brother Djet and mother of Den (Wilkinson 1999: 74). There are three measurements on reeds from tomb S3503 in Saqqara. One of the measurements (BM-229) is much older than the other two measurements, which give a mean estimate of 2942-2889 cal BC. Inclusion of the older date gives an estimate of 3094-3023 cal BC.

Djet - There are seven measurements from tomb S3504 in Saqqara dating to the reign of Djet, showing marked differences. Their pooled mean gives 2995-2927 cal BC. Opting to reject three aberrant measurements (P215, GrN-1109, BM321), the remaining four consistent measurements give a calibrated pooled mean of 2922-2886 cal BC.

Den - There are measurements from four tombs attributed to King Den. Eight measurements from Tarkhan on linen are statistically the same, yielding a calibrated mean of 2906-2887 cal BC. There are eight determinations on wood for Saqqara Tomb 3035. One of the measurements (C-267) is too young and must be rejected. We note that the young dates are on reeds by comparison to older dates on wood. By testing the dates on reeds (BM-230, UCLA 1202, and GrN-689, BM-27) we find that they are statistically the same, with a statistical average of 4310 ± 39 which calibrates to 2934-2888 cal BC. Two other tombs have only a single age measurement each.

Qa'a - There are two sets of measurements for the last king of Dynasty I. The three measurements from the Saqqara Tomb 3505 have one anomalous measurement (GrN-902). The other two measurements give a calibrated pooled mean of 2819-2748 cal BC. Inclusion of the aberrant measurements gives a mean of 2911-2872 cal BC. Two measurements from Abydos Bln-4680 and Bln-4681 are different. The pooled mean is 2911-2894 cal BC.



Fig. 4. Statue of Hotepdief showing the first three kings of Dynasty II. Memphis now in the Cairo Museum (photo G. Tassi).

For Dynasty II only a few radiocarbon dates exist, and none from the tombs of the kings. However, the continuing DAIK excavations at Abydos include the re-excavation of the tombs of Peribsen and Khasekhemwy, and those at Saqqara include the tomb of Nynetjer. The ongoing Dutch excavations at Saqqara have recently located more tombs of Dynasty II rulers (van Wetering 2004). These current excavations may provide radiocarbon age determinations for this important, and in comparison with Dynasty I, little known period of Egyptian history (Dodson 1996). One of the best documents (Fig. 4) to survive

from this period is the statue of Hotepdief, a mortuary priest who served in the mortuary cults of the first three kings of Dynasty II - Hetepsekhemwy, Nebra and Nynetjer. Although these rulers are listed in the Annals and later king lists, the internal chronology after these three kings up to the reigns of Peribsen, Sekhemib and Khasekhemwy is still the subject of much debate (Gould 2003: 47-51; Wilkinson 1999: 42).

Discussion

In interpreting these results, we first note that in all cases, aberrant age measurements are predominately older than other measurements. When measurements are tested statistically and aberrant measurements rejected, the pooled mean is younger than that of the mean of all measurements, except in the case of Den where two age measurements are significantly younger than others. The tombs attributed to Aha and Qa'a in Abydos are also older than those for the same kings' reigns in Saqqara. In Egypt, wood for royal purposes was usually imported and because of its limited availability within Egypt was often curated or recycled from older structures. In addition, debris (including mud-bricks with remains of reeds and straw) from older settlements or old refuse heaps were routinely quarried for building materials (Haas et. al. 1987). Recent age measurements obtained on materials from the pyramids provided estimates that average 374 years older than historical dates (Bonani et. al. 2001). However, Görsdorf, Dreyer & Hartung (1998b) think it unlikely that the wood in the tombs at Umm el-Qa'ab was reused, due to their import. It is relevant here that two sets of measurements on reeds and wood from the same tomb reveal that the dates on reeds were the same, while those on wood were widely divergent and older. This resolves also the apparent older age of the tombs from Abydos. Accordingly, we favour the rejection of older dates if they are shown to be statistically different from other associated measurements.

Archaeological remains reveal that there was a royal presence at Abydos during the Protodynastic period before the unification and the establishment of a national capital at Memphis and the elite necropolis located nearby at Saqqara. Accordingly, the Early Dynastic tombs at Abydos are likely to have included ancestral objects as well as ancient debris from Protodynastic settlements and tombs, which would have been available in the Abydos royal quarters (in Netjerikhet Djoser's pyramid complex many heirlooms were found dating to earlier rulers). By contrast, although an older settlement existed in the area of Memphis, no graves earlier than Dynasty I have so far been located at Saqqara. We may thus in the case of Aha accept a date of 2995-2927 cal BC based on three age measurements on reeds from Saqqara in favour of the older age estimate from Abydos based on two measurements on wood. Djēt is dated by four consistent measurements to 2922-2886 cal BC. The most reliable estimate is

that of king Den, where we have an excellent series on linen from Tarkhan, which provided an estimate of 2906-2887 cal BC, which is concordant with the four measurements on reeds which yield a mean of 2934-2888 cal BC. The age estimates for the last king, Qa'a, from Saqqara is estimated on the basis of two consistent measurements on reeds at 2819-2748 cal BC, which is younger than two divergent age estimates from Abydos, suggesting again that old wood is responsible probably for the apparent age of Qa'a at Abydos.

The older measurements on wood reported here are approximately 300, 240, 160, and 115 years older than monuments from the same period. The difference appears to become progressively smaller through time, around 300 in the case of Aha, 240 for Djer, 160 for Den, and 115 for Qa'a.

The pooled means of the statistically selected measurements given here show a satisfactory descending order in age from older to younger, and moreover, fit nicely (considering that the age estimates have a range of probability within one standard deviation) with the historical sequence of the kings and the duration of their reign as estimated from the Annals (see Tab. 3).

The dates from the reign of Djet (2922-2886 cal BC) are problematic. According to the calibrated results, he had to live after Den, but it is well attested that Den was the son of Djet and Queen Merneith (Dreyer et. al. 1996: 71-73, Abb. 26), his mother – Merneith - acting as his regent while Den was a boy (Dreyer 1987: 33-35; Schäfer 1902: 18, Zeile 3; Sethe 1903: 29, 47; Newberry & Wainwright 1914: 154-155). If the reign of Djet was short, his tomb could have been finished (or even built) during his son's reign. This argument explains the chronological dysfunction. It is also possible to conclude at this point that the reigns of Aha and Djer were longer than Djet's, a conclusion in accord with the averages given in the monuments. In the Annals, it shows that Den and Qa'a enjoyed long reigns, whereas, Djet only had a short reign. The evidence for the reigns of Anedjib and Semerkhet indicates that they had short reigns and that Anedjib, who probably came to the throne as an old man, had a hastily constructed tomb and that the provisioning for his tomb was not fully met in time (Gould 2003: 29-32).

Although the authenticity of the Cairo and UCL fragments of the Annals are questionable and it is uncertain if they were part of the same or similar monument as the Palermo Stone (O'Mara 1979; 1999; Jiménez Serrano 2004), the overall duration of Dynasty I is in accord with Manetho. The interval from the midpoint for Aha (2961 BC) and that for Qa'a (2784 BC) is 178 years, which compares favourably with 167-201 years calculated from the reconstruction of the Annals (Helck 1974; Kaiser 1961; Barta 1981). Manetho (Tab. 3) gives 150-166 years for the same time period. The length of Aha's reign from the Annals is about 34 years, and the mean from Manetho is 42 years, which places the begin-

Table 3. Reign lengths according to the different reconstructions of the Annals and Manetho.

King	Kaiser 1961	Helck 1974	Barta 1981	Average	Manetho A/E
Narmer	-----	-----	-----	-----	62/60
Aha	33	35	34	34	57/27
Djer	41	53	52	48/52	31/39
Djet	12	13	15	13	23/42
Den	47	42	51	47	20
Anedjib	8	11	11	10	26
Semerket	9	9	10	9	18
Qa`a	17	33	28	26	26
Total				189	253/252

ning of his reign at 2995 BC and 3003 BC, respectively. The higher estimate of the reconstruction of the Annals is about 50 years short of that given by Manetho who gives 252/253 years for the length of Dynasty I, a period of time that can be accounted for by the reign of Narmer. In the two most reliable summaries of the now lost *Aegyptiaca* of Manetho, Africanus gives Narmer 62 years, whereas Eusebius gives 60.¹⁹ Depending on whether the Annals or Manetho is taken as being correct, the most likely estimate for the initiation of Dynasty I under Narmer is between 3055-3065 BC (see Tab. 4). This radiocarbon age estimate is concordant with the recent historical estimates by von Beckerath (1987) and Kitchen (1991) of 2950 and 3000 BC, respectively.

The current analysis of radiocarbon age determinations for the periods predating Dynasty I reveal that the late Predynastic [Naqada II D1-2] dates to 3498-3456 cal BC in Abydos and 3469-3395 cal BC in the Naqada region. The subsequent Protodynastic [Naqada IIIA1-2] periods are here dated to *ca.*3350 cal BC (3360-2245 cal BC) for Naqada IIIA-B and 3078-2967 for the end of Naqada IIIB beginning of Naqada IIIC. The Annals lists the names of 23 Protodynastic kings. Some names of kings from this period are recognised (none matching the Annals) but the majority of them remain unknown (Raffaele 2002a; 2003b). Given a range from 8 to 47 years for the reign of Dynasty I kings, an average of

Table 4. Radiocarbon chronology of the Protodynastic and Dynasty I.

Culture / King	Available Date Cal BC	Time Span
Naqada II C-D	3498-3456	Late Predynastic
Naqada III A1-2	3352 (3360-3345)	Protodynastic A
Naqada III B-C	3078-2967	Protodynastic B
Narmer	-----	Dynasty I Early Dynastic Period
Aha	2995-2927	
Djer	2942-2889	
Djet	2922-2886	
Den	2934-2888	
Anedjib	-----	
Semerkheth	-----	
Qa'a	2819-2748	

27-30 years for the reign of the kings of the Protodynastic is not improbable. However, there is a strong possibility of many contemporaneous kings ruling different parts of the country at the same time. For the latter part of this period, we have the names and respective tombs of four kings, who preceded Aha: Iry-Hor (Tomb B0/1/2), Scorpion II (Tomb 1?)²⁰, Ka (Tomb B7/9), and Narmer (Tomb B17/18). If Scorpion II is omitted from this list as he may have been a contemporary of Ka and Narmer, ruling a different polity (probably Nekhen), and attribute each of the three remaining Abydene rulers 30 years of reign (from 3050 BC), there is 180 to 190 years left until the end of the reign of Scorpion I, if his reign started at 3352 BC and ended around 3320 BC. This number of 270 years accords well with the new relative chronology (see Tab. 5), which gives 300 years for the same period. Some of the people buried in tombs U-127, U-p, U-k, U-i, U-o, U-s, U-t, U-u, U-v, U-w, U-x, U-y, U-z, U-pp, U-qq and U-ww were probably relatives of Scorpion I, Iry-Hor, Ka and Narmer, and some must have been rulers of Thinis, a few prior to Scorpion I and others - at least four or five - between Scorpion I and Iry-Hor. The transition from the Late Predynastic to the Protodynastic period may be as a result placed at *ca.* 3400 BC. Although there are other earlier innovations that contributed to the rise of state, it appears that the forming of large polities did not occur until Naqada IIC/D (Wilkinson 2000b). The emergence of a unified state society in Egypt was accordingly preceded by about 400 years of dynamic political developments during the Protodynastic and late Predynastic periods, which in turn was preceded by regional kings in southern Egypt dating back to 3800 BC during the Middle Predynastic period (Raffaële 2002a; 2003b). The unification of Egypt was

consequently the result of a long protracted process of political evolution and regional development.

The concordance between radiocarbon dating after statistical testing and calibration and both the Palermo Annals and recent historical age estimates of the beginning of Dynasty I in Egypt (see also Hassan & Robinson 1987) demonstrates that historians/archaeologists must pay special attention to the problem of old wood and settlement debris, and that radiocarbon age measurements are to be regarded as what they are - probabilistic estimates with a margin of error thus requiring multiple measurements for each target event, testing for significant statistical similarity. The problem is not in radiocarbon dating, but in the misuse of radiocarbon age measurements.

Future Work

With the establishment of a new radiocarbon dating lab by l'Institut Français d'Archéologie Orientale (IFAO) in Cairo the possibility of obtaining new radiocarbon dates for the Predynastic, Protodynastic and Early Dynastic from the on-going excavations at such important sites as Hierakonpolis, Helwan, Saqqara, Abydos and the numerous Delta excavations (Kom el Khilgan, Tell el-Farkha, Minshat Ezzat, Tell el-Samara, Sais, Buto, etc.) becomes a reality. The dating of straw or reeds, which were used to help bind mud-bricks, allows such mud-brick built structures as tombs, mortuary shrines (enclosures), and temples to be dated. The results of this study have shown that the dates obtained from straw, reeds and linen are less likely to give a bias date than wood. Some of the most important structures to have age estimates for are the Gisir el-Mudir and the L-shaped structure at Saqqara, the Khasekhemwy 'Fort' *heb-sed* structure and Narmer 'Temple' at Hierakonpolis, the mortuary shrines at Abydos and Protodynastic and Early Dynastic tombs at all these sites. Dates are particularly needed for the Naqada IIIB-C period, e.g. for the reigns of Ka, Narmer and their direct predecessors and for Dynasty II and III. OSL (optical spectromic luminescence) dating also presents further possibilities for the dating of sites and monuments.

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Table 5. New Chronology for Early Egypt.²¹

		UPPER EGYPT	FAIYUM	DELTA
EARLY DYNASTIC PERIOD	3,050 – 2,613 BC			
Dynasty III	2,686 – 2,613	Naqadian IV-V		
Dynasty II	2,800 – 2,686	Naqadian IIID ₁ -IIID ₃		
Dynasty I	3,060 – 2,800	Naqadian IIIC ₁ -IIIC ₃		
PROTODYNASTIC PERIOD	3,350 – 3,060 BC			
Protodynastic B	3,200 – 3,060	Naqadian IIIB	Moerian II / Transitional	Naqadian IIIB
Protodynastic A	3,350 – 3,200	Naqadian IIIA ₁ ,A ₂	Moerian II	Naqadian IIIA ₁ ,A ₂
PREDYNASTIC PERIOD	5,500 – 3,350 BC			
Late Predynastic B	3,500 – 3,350	Naqadian IID ₁ -IID ₂	Moerian I	Transitional
Late Predynastic A	3,650 – 3,500	Naqadian IIC	Moerian I	Late Maadian
Middle Predynastic	3,750 – 3,650	Naqadian IC – Naqadian IIA – IIB	Moerian I	Middle Maadian
Early Predynastic B	3,900 – 3,750	Naqadian IA-IB	Moerian I	Omarian ~ Early Maadian
Early Predynastic A	5,500 – 3,900	Badarian ~ Tarifian ~ Tasian	Faiyumian	Merimidian

Table 6. Radiocarbon data for the Protodynastic and First Two Dynasties.

Lab Number	Provenance	Material	¹⁴ C yr bp	Calib. date BC One Sigma Range
Nagada II, Nagada				
WSU-2257	Nagada North Town, 78-165A	Charcoal	4990 ± 80	3808-3694 (0.65)
TX-2465	Nagada, South Town, SW	Charcoal	4920 ± 90	3800-3636 (0.94)
W-4347	Nagada, South Town, NW, Pit A, 10-15 cm BS	Charcoal	4600 ± 80	3517-3397 (0.45)
W-4349	Nagada, South Town, NW, Pit A, 35-40 cm	Charcoal	4730 ± 70	3632-3557 (0.46)
W-4360	Nagada, South Town, NW, Pit A, 65-70 cm	Charcoal	4680 ± 60	3474-3358 (0.79)
Nagada IID1-D, Abydos Cemetery U				
Bln-4466	Tomb U-149 (humic acid)	Wood	4691 ± 41	3465-3375 (0.74)
Bln-4493	Tomb U-149	Wood	4676 ± 44	3470-3394 (0.65)
Bln-4463	Tomb U-547	Wood	4688 ± 48	3468-3374 (0.73)
Bln-4494	Tomb U-207	Wood	4667 ± 40	3474-3422 (0.51)
Bln-4465	Tomb U-133	Wood	4624 ± 64	3519-3341 (1.0)
Bln-4672	Tomb U-224	Wood	4607 ± 48	3501-3429 (0.58)
Bln-4673	Tomb U-287	Wood	4591 ± 41	3376-3335 (0.48)
Bln-4467	Tomb U-210	Wood	4421 ± 43	3101-3004 (0.63)
Nagada IIIA1-2, Abydos Cemetery U				
Hd-13058-12954	Tomb U-j (Scorpion I)	Wood	4595 ± 25	3371-3351 (0.70)
Hd-13057-12953	Tomb U-j	Wood	4470 ± 30	3328-3217 (0.70)
Bln -4671*	Tomb U-pp	Wood	4679 ± 40	3469-3394 (0.65)
Bln -4461	Tomb U-qq	Wood	4528 ± 40	3236-3170 (0.42)
Bln-4462	Tomb U-qq	Wood	4608 ± 40	3497-3449 (0.50)
Bln- 4464	Tomb U-a	Wood	4526 ± 40	3236-3170 (0.42)
Nagada IIIB-C				
WIS-1180	Hierakonpolis 6, Tomb 1 (Scorpion II)	Wood	4300 ± 80	3018-2878 (1.0)
Hd-12912	Abydos Cemetery B, B40	Wood	4430 ± 60	3104-3022 (0.79)
Hd-12907	Abydos Cemetery B, B40	Wood	4440 ± 25	3111-3006 (0.48)
Dynasty I, Aha				
LJ-1490	Saqqara, Tomb 3357	Reed	4370 ± 50	3026-2913 (0.92)
BM-228	Saqqara, Tomb 3357	Reed	4500 ± 60	3197-3101 (0.45)
UCLA-1200	Saqqara, Tomb 3357	Reed	4300 ± 65	3018-2878 (1.0)
Hd-12926	Abydos Cemetery B, B19	Wood	4535 ± 40	3235-3171 (0.42)
Hd-12947	Abydos Cemetery B, B19	Wood	4505 ± 20	3238-3207 (0.23)
Dynasty I, Djer				
BM-229	Saqqara, Tomb 3503	Wood	4520 ± 65	Rejected
LJ-1459	Saqqara, Tomb 3503	Wood	4360 ± 80	3095-2894 (1.0)
UCLA-1201	Saqqara, Tomb 3503	Wood	4290 ± 60	2945-2867 (0.65)
Dynasty I, Djef				
P-215	Saqqara, Tomb 3504	Wood	4554 ± 91	3251-3099 (0.54)
GrN-1100	Saqqara, Tomb 3504	Wood	4360 ± 60	3027-2905 (0.90)
GrN-1109	Saqqara, Tomb 3504	Wood	4460 ± 55	3330-3215 (0.51)

BM-319	Saqqara, Tomb 3504	Wood	4225 ± 70	2813-2740 (0.42)
BM-320	Saqqara, Tomb 3504	Wood	4206 ± 80	2815-2672 (0.69)
BM-321	Saqqara, Tomb 3504	Wood	4496 ± 80	3347-3094 (1.0)
BM-322	Saqqara, Tomb 3504	Wood	4349 ± 70	3030-2895 (0.85)
Dynasty I, Den				
BM-230	Saqqara, Tomb 3035	Reed	4380 ± 65	3039-2912 (0.75)
UCLA-1202	Saqqara, Tomb 3035	Reed	4235 ± 60	2812-2850 (0.44)
GrN-689	Saqqara, Tomb 3035	Reed	4450 ± 100	3138-3011 (0.42)
BM-27	Saqqara, Tomb 3035	Reed	4100 ± 150	2877-2548 (0.87)
P-214	Saqqara, Tomb 3035	Wood	4447 ± 150	3195-3001 (0.49)
BM-323	Saqqara, Tomb 3035	Wood	4342 ± 70	3028-2892 (0.90)
C-267	Saqqara, Tomb 3035	Wood	4883 ± 20	3664-3645 (0.68)
TF-563	Saqqara, Tomb 3035	Wood	4550 ± 60	3238-3107 (0.65)
GrN-684	Saqqara, Tomb 3607	Wood	4450 ± 100	3334-3264 (0.41)
Hd-13056-12952	Umm el-Qa'ab, Tomb T	Wood	4495 ± 35	3334-3264 (0.41)
LJ-1448	Tarkhan, Tomb 2050	Linen	4388 ± 50	3031-2919 (0.79)
NPL-5	Tarkhan, Tomb 2050	Linen	4310 ± 90	3093-2868 (0.93)
UCLA-739	Tarkhan, Tomb 2050	Linen	4265 ± 80	2945-2857 (0.62)
Brm-20	Tarkhan, Tomb 2050	Linen	4224 ± 97	2819-2661 (0.62)
Brm-???	Tarkhan, Tomb 2050	Linen	4206 ± 68	2813-2737 (0.44)
A-569	Tarkhan, Tomb 2050	Linen	4200 ± 90	2817-2664 (0.68)
BM-248	Tarkhan, Tomb 2050	Linen	4160 ± 110	2885-2620 (0.98)
BM-203	Tarkhan, Tomb 2050	Linen	4150 ± 110	2879-2619 (0.96)
Dynasty I, Qa'a				
GrN-902	Saqqara, Tomb 3505	Reed	4385 ± 70	3090-2908 (0.48)
BM-231	Saqqara, Tomb 3505	Reed	4270 ± 65	2940-2861 (0.59)
UCLA-1203	Saqqara, Tomb 3505	Reed	4140 ± 60	2777-2630 (0.72)
Bln-4680	Umm el-Qa'ab, Tomb Q	Wood	4244 ± 41	2909-2867 (0.72)
Bln-4681	Umm el-Qa'ab, Tomb Q	Wood	4397 ± 42	3031-2925 (0.77)
Dynasty II				
BM-232	Saqqara, Tomb 3046	Reeds	4230 ± 65	2813-2743 (0.43)
UCLA-1204	Saqqara, Tomb 3046	Reeds	4190 ± 60	2813-2738 (0.47)
Lv-1050D	Elkab, Tomb 60	Charcoal	3910 ± 210	2666-2128 (0.92)
U-4	Ma'sara, Tomb 6	-----	3970 ± 150	2674-2278 (0.90)
UCLA-667	Ma'sara, Tomb 6	-----	3970 ± 80	2580-2340 (0.99)
A-520	Ma'sara, Tomb 6	-----	3810 ± 80	2349-2138 (0.87)
A-333	Buhen, Castle	Charcoal	4190 ± 60	2813-2738 (0.47)
A-344	Buhen, Castle	Charcoal	4090 ± 50	2696-2572 (0.69)

End Notes

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- ³ Mr G. J. Tassie is a doctoral candidate at UCL.
- ⁴ Re-named in the 1980s Iry Hor by Kaiser and Dreyer 1982: 232-235, although this interpretation has been refuted by Wilkinson (1993) who interpreted *iry* as goods belonging to Narmer, contra cf. Jiménez-Serrano (2004a: 102-3).
- ⁵ Originally Petrie (1901b) equated Aha with Menes, but later saw Menes as a composite figure embodying the deeds of both Narmer and Aha (1920; 1924) and placed Narmer as the first king of Dynasty I.
- ⁶ All cultural dates are based on Stan Hendrickx’s 1996 and 1999 revision of Kaiser’s 1957 original Stufen dates. Although the Hierakonpolis monograph is attributed to Quibell (1900), it has contributions from Petrie and it seems that together these two early Egyptologists developed the term Dynasty 0 for names of kings pre-dating Dynasty I (Raffaele 2003: 105). Also see van Wetering In Prep. for a fuller argument against the terms Dynasty 0, 00 and -1.
- ⁷ According to Raffaele (2002), the first ruler of Dynasty 00 was buried with the Gebelein cloth (early Naqada II), followed by the owner of Tomb 100, Hierakonpolis, Locality 33 (Naqada IIC), then owners of the elite tombs in Cemetery T, Naqada, the owners of tombs in Cemetery U, Abydos (Naqada IID - IIIA) and the contemporary tombs from Hierakonpolis Locality 6, particularly Tomb 11, and also the Lower Nubian tomb L24 at Qustul and tomb 137.1 at Seyala (Naqada IIIA) (Jiménez Serrano 2003b; Kemp 1973: 36-43; Raffaele 2002; Wilkinson, 1999: 52; Williams 1986: 149). Consequently, the time frame for Dynasty 00 has expanded back to Naqada IIC.
- ⁸ Both of these kings have had the *min* (→) symbol associated with their name - Aha on an ivory plaque from Naqada [JE31773] and Narmer on jar-sealings from Abydos (see Emery 1961: 21-37; Gardiner 1961: 400-415 and Hoffman 1980: 289-305 for a discussion of the philological and iconographic implications). A new reading of Narmer’s name interprets the *nar* sign as *min* (Ray 2004: 111).
- ⁹ The Palermo Stone does not classify the rulers before Dynasty I as the Followers of Horus, but lists kings with the red crown and others with the white; the first mention of the Followers of Horus is on the Dynasty XII, Koptos stela of Rahotep. In the Turin Royal Canon the divisions before Menes are split into the Great Ennead, led by Ptah, the Lesser Ennead, led by Horus, the Divine Spirits and then the House of Menes, Manetho splits these same divisions into Gods, Demigods, Heroes and Dynasty 1-5 (Redford, 1986: 13, 160-1, 233). Although the Followers of Horus are literally those who came after Horus – the Lesser Ennead, it is generally accepted that the Followers of Horus are the Lesser Ennead and the Divine Spirits (Demigods and Heroes).
- ¹⁰ Schneider (1997: 241-67) interprets this sign as a symbol of Seshat, the scribal goddess associated with foundation ceremonies and the recording of other rituals.
- ¹¹ Before this period Egyptian Predynastic society should be classified as a ranked society.
- ¹² Michael Hoffman, in Hoffman et. al. (1982: 45), suggested that he could have been buried in Tomb 1 at Hierakonpolis. However, Adams (1995: 51, n. 23) proposed that T1 could be a southern tomb of Narmer, or an official of his time. Dreyer (1990: 71) suggests that he could have been buried at Abydos in Tomb B50.
- ¹³ Concern over the authenticity of the various fragments of the Annals has been raised by O’Mara (1999a; 1999b), who suggests that the only reliable portion is the Palermo Stone (see also Jiménez Serrano 2004: 18-21 and Baud 2003 for further discussion). However, the recent finding of another abbreviated Annals version on a sarcophagus lid of one of Pepi II’s queens


in his pyramid complex at South Saqqara seems to confirm the ordering of the kings on the Annals (Baud & Dobrev 1995; 1997).

- ¹⁴ The exact meaning of wearing the two crowns during this period of history is uncertain and may have had more of a ritual rather than territorial meaning. The earliest attestations of the white crown are on a Naqada IID ivory label from Cemetery U, Abydos (Hartung 1998: 201, Abb. 8), a contemporary carved ivory knife handle of Upper Egyptian provenance and a decorated incense burner from Qustul, Cemetery L (Wilkinson 1999: 49). It is uncertain when the red crown was first transferred to represent Lower Egypt, but it probably originated from Nubt, and the white crown Nekhen (Hassan 1988: 174; Spencer 1993: 55-6; Wilkinson 1999:49-50).
- ¹⁵ The absence of a mortuary shrine for Narmer may be due to the fact that its likely position lies under the Coptic monastery or cemetery. Although 10 mortuary shrines have been discovered in the North Cemetery at Abydos, eight can be assigned to Dynasty I, of which three can be assigned to specific kings (Aha, Djer, and Djet) and two recently discovered ones (I & J) probably to queens of Aha. Three from Dynasty I remain unassigned. The remaining two belong to the end of Dynasty II and are assigned to Peribsen (Enclosure E) and Khasekhemwy (Enclosure F) (Bestock in press; Schaffer et. al. 1997: 32-40).
- ¹⁶ The owner of Tomb 3357 – Prince Het - possibly acted as a chancellor to both Narmer and Aha.
- ¹⁷ Merneith is given the same reign number as Den due to the fact that she acted as his regent.
- ¹⁸ There is no tomb at Saqqara assigned to the short reign of Semerkhet, probably because the high-official that served under him – Henuka – outlived him and died in the reign of Qa'a (Gould 2003: 32).
- ¹⁹ The Armenian version of Eusebius gives 30 years for Menes.
- ²⁰ Probably buried at Hierakonpolis, but see endnote 12.
- ²¹ The dates up to the end of Dynasty I are based on radiocarbon dates and the chronological sequence is based on: Adams & Cialowicz 1997: 5, Hendrickx 1996: 64, and Shaw & Nicholson 1995: 310-312. Maadian here equals the Lower Egyptian Cultural Complex, also termed Maadi/Buto. The Tasian, although a nomadic culture, is included here, as it is a distinct culture. The inclusion of Naqada IV and V has been suggested by Köhler 2004. The assistance of Joris van Wetering in compiling this chart must also be acknowledged.

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Stan Hendrickx

The dog, the *Lycaon pictus* and order over chaos in Predynastic Egypt

A scene figuring dogs engraved on a large black-topped beaker in the Brussels museum (Fig. 1)¹ has previously been considered by the author as a hunting scene, eventually with a funerary connotation and parallel to the hunting scenes figuring in the Old Kingdom mastabas (Hendrickx 1992), although a more symbolic interpretation, connected to the “order over chaos” theme was suggested soon after (Hendrickx 1995). Meanwhile, several authors have stressed the symbolic importance of Predynastic and Early-Dynastic representations of dogs and other canines (Baines 1993; Lopez 1995; Bianchi 1998; Bouvier-Closse 2001; Gransard-Desmond 2002, 2004) although the interpretations can differ greatly. The article by Baines is especially important as it explains the manner in which the meaning and importance of canines changed with the emergence of royal iconography. One of the purposes of the present contribution is to add elements to the interpretation by Baines and to explore their iconographic framework.

Predynastic representations of dogs

Representations of dogs occur occasionally on White Cross-lined pottery, which can be accepted to be more or less contemporaneous with the vessel from Brussels (Fig. 2; Tab. 1). Most of the dogs on White Cross-lined pottery are shown with collars from which occasionally part of a leash (?) hangs down, as on the beaker from Brussels. In the majority of examples a kind of knot or ring is indicated on the collars, which may have served for the attachment of leashes although on the plate in the Museum of Fine Arts at Moscow (Fig. 2; Tab. 1) the

¹ Brussels, Royal Museums for Art and History, Egyptian collection, E.2631. Provenance unknown, bought in Egypt in 1908.

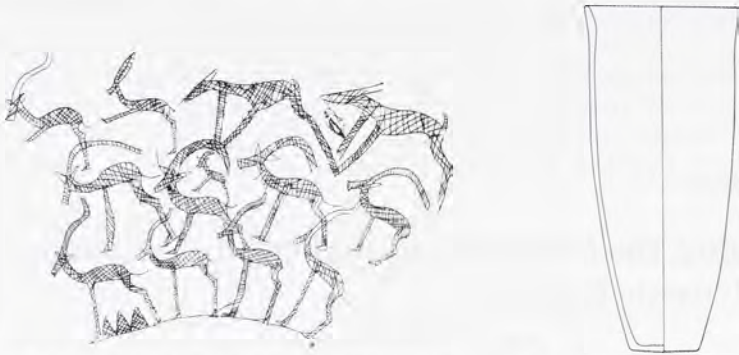


Fig. 1. Black-topped jar with incised decoration, Brussels E.2631 (Capart 1909 and Hendrickx 1992: fig. 5).

leashes don't seem to be attached to this element. The collars and leashes provide a link to humans although these are only very exceptionally represented themselves. On the Moscow plate a hunter can be seen, clearly identified by his bow, holding four dogs on leashes, while on a plate in Torino a similar hunter holds three dogs. Human representations occur also on the vessel from Abydos U-415 but the decoration of this jar is to be considered as consisting of two scenes (cf. Fig. 4).

Besides these two examples where hunters occur with the dogs and two examples in which dogs seem to be represented isolated, two types of scenes with dogs can be distinguished on the White Cross-lined pottery and the contemporaneous vessels with incised decoration (Tab. 1). The majority of the scenes are to be considered hunting scenes in which dogs are actively engaged against other animals, often surrounding them. Less frequent are rows of animal which include dogs. A row of animals running around a vessel obviously has no real "beginning" or "end", but on a vessel from Abydos (Ayrton & Loat 1911: pl. XVII; Fig. 3) the animals are placed vertically and at least two of the three (relatively short) animal rows end with dogs. This example, together with the evidence from the decorated ivories (cf. *infra*), allows the interpretation of the dogs as the "last" animals of the rows, also on the other vessels (Fig. 4). An similar alternative drawing can be made for the decorated jar from Hemamieh (Torino S 4749) published by Fattovich 1978: pl. II.

Further corroboration can be found in the regular hunting scenes where dogs are generally represented in the pursuit of - or immediately preceding an assault on- other animals. By considering the dogs the last animals of the rows, these scenes are only a variant of the more explicit hunting scenes.



Naqada. (Petrie 1896: pl. XXIX.91; Kantor 1953: 73, fig. 4D).



Naqada, tomb 1644, Oxford Ashmolean Museum 1895.482 (Payne 1993: n° 422).



Gebelein (?), Princeton Art Museum 30-491
(Kantor 1953: 73, fig. 4A).



Gebelein (?), Princeton Art Museum 30-493
(Kantor 1953: 73, fig. 4B).



London UC 15329 (Petrie 1921: pl. XXI.19N).



Moscow 2947 (Leclant & Huard 1980: 1).

Fig. 2. White Cross-lined vessels with representations of dogs.

Tab. 1. Dogs on Predynastic pottery.

Site	Museum	Type	Bibliography
White Cross-lined / Naqada I-IIA**			
Abydos U-415	Abydos	R	Dreyer a.o. 2003: 83, Abb. 6a *
Abydos	Unknown	R	Ayrton & Loat 1911: pl. XXVII *
Gebelein	Cairo	H	de Morgan 1896: pl. II,5
Gebelein (?)	Princeton AM 30-491	H	Kantor 1953: 73, fig. 4A *
Gebelein (?)	Princeton AM 30-493	H	Kantor 1953: 73, fig. 4B *
Gebelein (?)	Princeton AM 30-494	I	Kantor 1953: 74, fig. 5A *
Hu / Abadiya	Oxford Ash. E.2778	R	Payne 1993: n° 424
Naqada 1644	Oxford Ash. 1895.482	H	Payne 1993: n° 422
Naqada 1644	Oxford Ash. 1895.487	H	Payne 1993: n° 423 *
Naqada	Unknown	H	Petrie 1896: XXIX,91 *
Unknown	Bern, Bloch-Diener	H/ R	Page-Gasser & Wiese 1997: 23, fig. 4A *
Unknown	Brussels E.2316	H	Unpublished *
Unknown	Brussels E.2988	R	Unpublished *
Unknown	Cairo JdE 71603	H	Graff pers. com. *
Unknown	Genève D 1186	H	Wild 1948: fig. 3 *
Unknown	London UC 15329	I	Petrie 1921: pl. XXI
Unknown	London UC 15334	H	Petrie 1920: pl. XVII,69 *
Unknown	Moscow 2947	L	Houlihan 1996: 75-76 XX
Unknown	Torino S.1827	L	Donadoni Roveri & Tiradritti 1998: 142 * *
Unknown	Toronto 910.85.88	H	Hoffman a.o. 1988: 111, n° 4
Black-topped – Red-polished with incised decoration / Naqada I-IIA			
Abadiya U	Unknown	H	Petrie 1901: pl. XX,16
Abadiya U	Unknown	R	Petrie 1901: pl. XX,19
Unknown	Brussels E.2631	R	Hendrickx 1992
Decorated / mainly Naqada IIC-D			

Abydos	Ashm. E.2632	H	Payne 1993: n° 873
Abydos	Cairo JdE 72148	R	Habachi 1939 770, fig. 72
Hemamieh	Torino S.4749	R	Fattovich 1978: pl. II
Khozam (?)	Lyon 90000098	H	Marseille 1990: 59, fig. 310
Unknown	Toronto 9002.45	H	McHugh 1990: fig. 1
Incised / Naqada II (?)			
Unknown	OIM 10542	H	Williams 1989 *
Unknown	Berlin 14336	H	Scharff 1931: 170, n° 406, Abb. 68*

H = hunt

L = hunter with dogs on leashes

R = row

I = isolated dog

** (eventually dogs also occur on a few other White Cross-lined vessels. Abadiya B 88, Ashm. E.2784, Payne 1993: n° 390; Khozam (?), Berlin 22391, Scharff 1931: 118, n° 258; Bonn 172, Regner 1998: 126, n° 104)

* not included in catalogue Gransard-Desmond 2004: 76. Several other categories of this catalogue of canidae representations are to be supplemented, "Sceptre": München ÄS 1520, Grimm & Schoske 2000: 35; "Statuettes": Flint, Brooklyn 09.889.291, Needler 1984: n° 292; Flint, Hierakonpolis, Friedman 2000; Faience, Hierakonpolis, UC.11001, Adams 1974: n° 108; Faience, Ashmolean E8, Adams 1974: pl. 15; Faience, Cambridge E98.1900; Ivory, Hierakonpolis, UC 14872, Adams 1974: n° 330; Ivory, Hierakonpolis, UC 14861, Adams 1974: n° 331; "Stèles": Umm el-Qaab, Petrie 1900: pl. XXXII,10; Umm el-Qaab, Cairo CG 14603, Petrie 1900, pl. XXXII,12; Umm el-Qaab tomb T, Dreyer a.o. 1993: 61, pl. 13a; Cambridge 1395.1943, Kaplony 1963: fig. 717; unknown, Kaplony 1966: fig. 888; Cairo JdE 72601, Kaplony 1966: fig. 1022; cf. Flores 2003: 93, n. 8. For rock art, see among others Rohl 2000; Morrow & Morrow 2002. For animal remains, see Dreyer a.o. 2000: 86-89; Flores 2003 and Van Neer, Linsele & Friedman 2004.

Dogs are very exceptional on Decorated pottery, which is even more striking when the large number of decorated vessels compared to the number of White Cross-lined vessels is taken into consideration. This does however not necessarily mean that the representation of dogs lost its importance by the Naqada IIC period, the hey-day of Decorated pottery, but rather that the representations on Decorated pottery became more standardised than those on White Cross-lined pottery (Graff 2004: 771-772) and dogs apparently were not a regular part of the iconography used for these vessels. As the iconography of Decorated pottery seems mainly linked to funerary ideas (Graff 2003), this would therefore imply that dogs are no part of the iconography referring to the afterlife. The few

dogs on Decorated pottery are included in hunting scenes, and animal rows, much the same as their White Cross-lined predecessors, indicating that the ideas behind the original representations had not disappeared, but for one reason or another were no longer regularly confined to pottery. In this respect, it is not a surprise that in the Hierakonpolis "Decorated tomb", which has far more elaborate representations and also dates to the Naqada IIC period, dogs occur on the right hand side of the painted wall, again in hunting scenes, both with and without humans.

Dogs occur rather frequently on decorated ivories (Tab. 2; Ciałowicz 1992; Dreyer 1999; Whitehouse 1992, 2002, 2004; Droux in press.), but contrary to representations on pottery, they hardly ever occur in actual hunting scenes but nearly always at the end of animal rows (Figs. 5-8). The decorated ivories are generally accepted to date to the very end of the Naqada II and the beginning of the Naqada III period (cf. Dreyer 1999) and the difference to the decorative schemes on pottery may therefore be mainly chronological, implying that over time rendering the hunting capacities of the dog by placing the animal at the end of a line of animals was preferred. It is however to be stressed that we have already seen dogs at the end of animal rows from the Naqada IC-IIA period onwards (Tab. 1), and although the preference for the dog in this position in more recent periods is to be considered meaningful, we are not dealing with one type of representation replacing another one, but rather with two coexisting manners for representing more or less the same theme. But the "hunting" idea seems to have been more popular in the earlier period (Naqada IA-IIC ?) while with time passing (Naqada IID-IIIB ?) the "animal row" concept was preferred. Thus, the more anecdotic and to some extent realistic hunting scenes were largely replaced by a highly symbolic representation which is only meaningful within the context of a complex iconography. The only remaining anecdotic element is the raised front leg of the dogs or their "leaping" position, which can also often be observed in the hunting scenes. Also, by their attitude, the dogs on the Abu Zeidan knife handle (Fig. 6) and the Davis comb (Fig. 5) are the only "active" animals, which again corresponds well with the idea of hunting dogs.

To the group of ivories with animal rows should be added the Gebel et-Tarif knife handle (Fig. 9) on which four groups of two animals are placed vertically to the longitudinal axis of the handle. These can be considered as "abbreviated" animal rows - the Sayala mace handle (Firth 1927: 205, fig. 8, pl. 18a-c) represents a similar example of abbreviated rows- each of which is terminated by a dominating animal, one of them a dog. In this case the dog is in important company because the animals to which he is made equal are a panther, a lion and even a mythological animal.

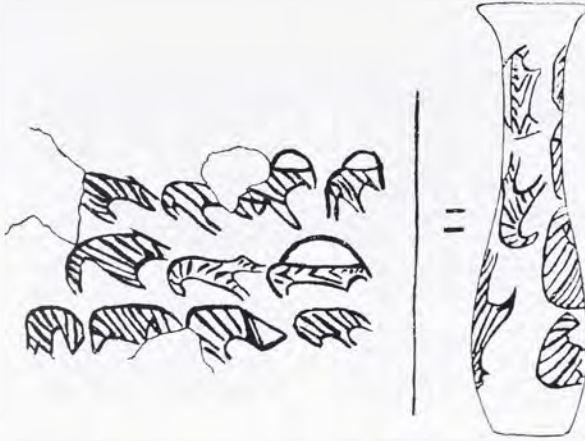


Fig. 3. Abydos, White Cross-lined jar. (Ayrton & Loat 1911: pl. XXVII.12).

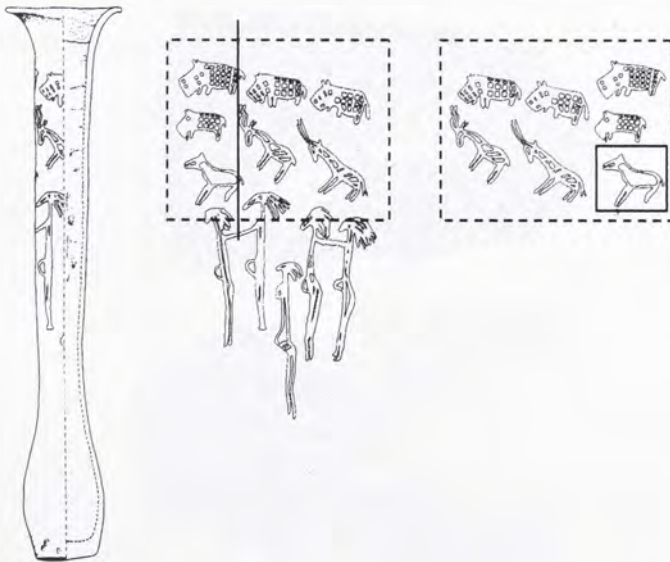


Fig. 4. Abydos, tomb U-415, White Cross-lined jar and alternative separation of representation (after Dreyer a.o. 2003: Abb. 6a).

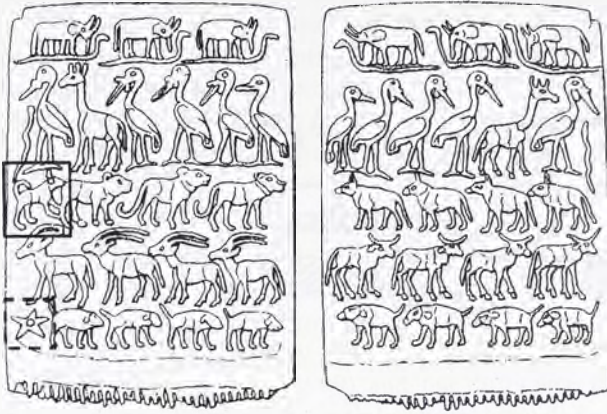


Fig. 5. Davis comb, New York, Metropolitan Museum 30.8.224 (Ciałowicz 1992: 251, figs. 6-7).

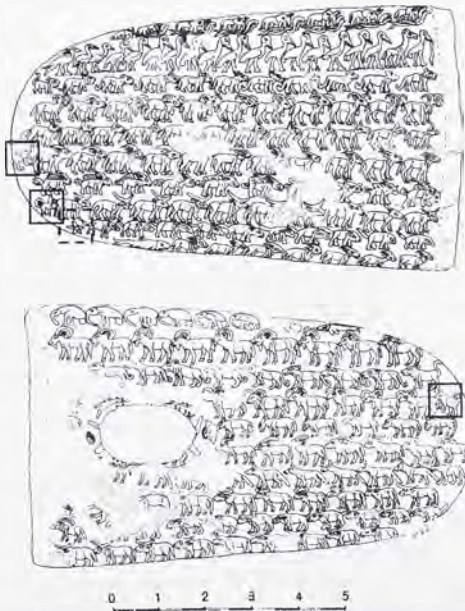


Fig. 6. Abu Zeidan knife handle, Brooklyn Museum 09.889.118 (Churcher 1984: 154).

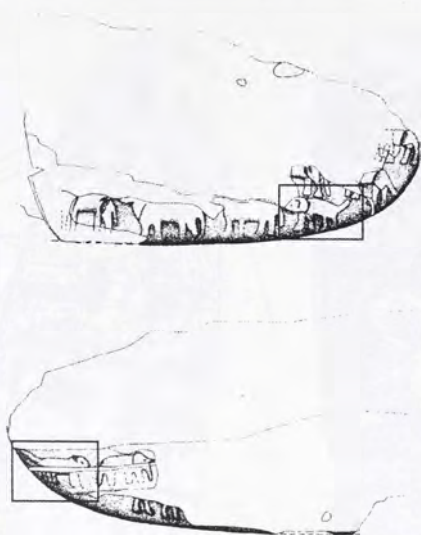


Fig. 7. Fragmentary knife handle, Abydos cemetery U, K 1262a (Dreyer 1999: 219, fig. 6).

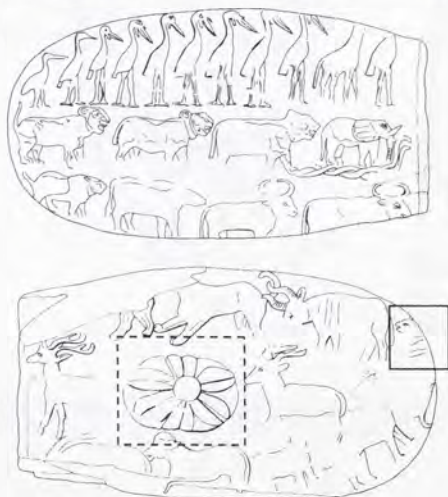


Fig. 8. Carnarvon knife handle, New York, Metropolitan Museum 26.247.1 (Ciałowicz 1992: 250, fig. 5; 255, fig. 8).

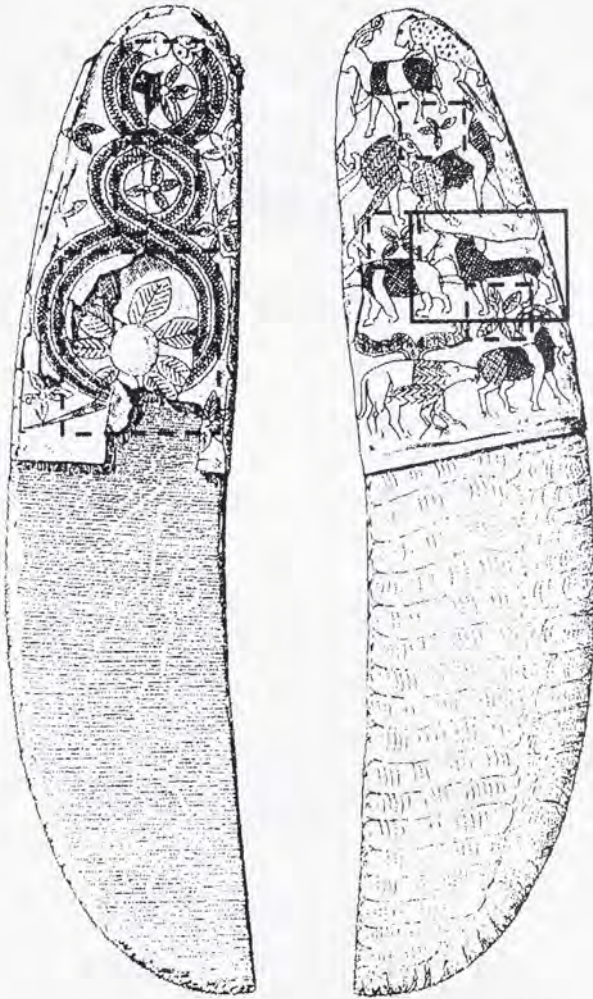


Fig. 9. Gebel Tarif knife handle, Cairo JdE 31362, CG 14285 (Quibell 1905: n° 14285).

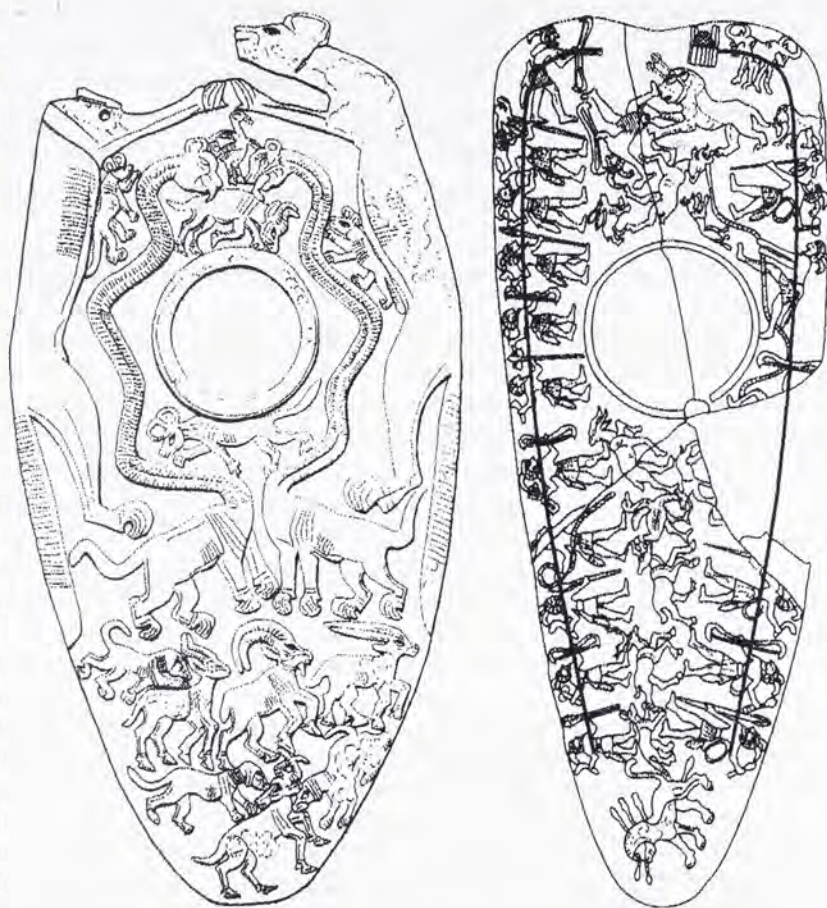


Fig. 10. Hierakonpolis palette, Oxford, Asmolean Museum 3924 (Baines 1993: 60, fig. 1) / Hunter's palette, London, British Museum 20790, 20792 / Paris, Louvre E.11254.

Tab. 2. Dogs on ivories and related objects (for abbreviations, see Tab. 1).

Site	Museum	Object	Type	Bibliography
Abu Zeidan 32	Brooklyn 09.889.118	Handle	R	Churcher 1984
Abydos U	Abydos K 1262a	Handle	R	Dreyer 1999: 219, fig. 6 *
Gebel el- Arak	Louvre E.11517	Handle	H	Bénédite 1916
Gebel et- Tarif	Cairo CG 14265	Handle	R/I	Quibell 1904/1905: n° 14265
Hierakon- polis	Ash. E.4714	Tube	?	Whitehouse 1992: 79 *
Tarkhan 1023	Cairo	Spoon	R	Petrie <i>et al.</i> 1913: pl. XIII.1-6
Unknown	BM 68512	Handle	R	Ciałowicz 1992: 249-250
Unknown	München ÄS 1520	Sceptre	?	Grimm & Schoske 2000: n° 44 *
Unknown	NY 30.8.224	Comb ²	R	Ciałowicz 1992: 251
Unknown	NY 26.247.1	Handle	R	Ciałowicz 1992: 250-255

Furthermore there are dogs on at least four decorated palettes, the so-called Two-Dog palette from Hierakonpolis (Fig. 10) (Baines 1993, Ashmolean E.3924) which will be discussed more in detail later on, the palette from Minshat Ezzat, discovered only a few years ago (el-Baghdadi 1999, Cairo museum), both of which show dogs in hunting scenes but without humans. The palette from Munagat (Fischer 1958), on which a sucking mother-dog with two cubs are represented, is unfortunately so fragmentary that the meaning of the scene can not be recognised, but because of its uniqueness it most probably falls besides the scope of the present article. Finally, a palette of doubtful authenticity in the Barber-Mueller Museum at Genève (Zimmermann 1991: 4) shows a dog in combination with a strange falcon emblem and is only mentioned here for the sake of completeness.

² This comb is traditionally known as the "Davis comb" (Fig. 5). Recently doubts have been expressed about its authenticity (Gransard-Desmond 2004: 23), which however are of little importance for the present study because the Davis comb only backs up the evidence of the Abu Zeidan knife handle, the authenticity of which is beyond doubt.

Dogs also figure rather frequently in rock art, both in Nubia (e.g., Hellström 1970) and the Eastern Desert (e.g., Winkler 1938; Leclant & Huard 1980; Rohl 2000; Morrow & Morrow 2002). Nearly all of the dogs are part of hunting scenes, generally without humans although these will occasionally occur. Although rock-art often poses chronological problems, stylistic parallelism nevertheless allows, at least an important part of the rock-art, to be dated in the Predynastic - Early Dynastic period (cf. Huyge 2002).

Hunting as elite behaviour

It is most remarkable that the majority of the Predynastic representations of dogs are part of hunting scenes. The possibility that the dogs in some scenes might be herding animals can be rejected because the large majority of the animals involved are not domestic, some of them even mythological. Gransard-Desmond (2004: 31-32) argues in favour of herding. His arguments are however far from convincing. At first he more or less forces ibex and oryx into the category of domestic animals and disregards the possibility that the bovines represented might be wild. Secondly he seems to consider hunting during predynastic times still as an important economic activity and neglects the possibility that Gautier's interesting theory on hunting as an element of social inequality might already be relevant before 3000 BC. It is merely a matter of establishing the moment when important social differences start to occur. Finally he considers clear hunting scenes as symbolic while the so-called herding representations would be realistic. Achilles Gautier (pers. com.) kindly informed me that the date of "5000 years ago" mentioned by him (Gautier 1990: 140) was only an estimation. He sees no archaeozoological objections to the breeding of hunting dogs already at the beginning of the 4th millennium BC, when social differences start to emerge.

The economic importance of hunting in an agricultural society such as 4th millennium Egypt is, however, to be considered marginal, especially after the initial phase of the Naqada culture, and generally represents less than 2% of food procurement (Vermeersch, Van Neer & Hendrickx 2004: 269, see also Huyge 2002: 192). In elite contexts however, such as the temple site HK29A at Hierakonpolis, exceptionally wild mammals make up nearly 16% (Linseele & Van Neer 2003). Also at Hierakonpolis, a remarkable wide range of wild animals occurs at the elite cemetery HK6 (Van Neer, Linseele & Friedman 2004). Hunting will have been part of the elite way of living allowing a more varied nourishment, but perhaps even more important, giving opportunity for the practise of weapons. Dogs obviously played an important role in hunting and in this manner are to be considered part of elite behaviour and symbolism (cf. also Baines 1993: 65). This seems to be confirmed by the presence of dog burials in the elite cemeteries. There are eighth burials including dogs in the nineteen heavily disturbed

burials from the HK6 cemetery at Hierakonpolis, dated to ca. Naqada IC-IIA (Van Neer, Linseele & Friedman 2004: 73-74); one of them, tomb 5, seems to have been a multiple dog burial, containing at least seven animals. A similar find has been made in a "pit" in the elite cemetery T at Naqada, where the remains of about twenty dogs were found by Petrie at the end of the 19th century (Petrie 1896: 26). Unfortunately no details have been published and the chronological position of this find remains unknown. All that can be said is that cemetery T seems to have been used continuously from Naqada IIB onwards, until the beginning of the 1st dynasty. This kind of multiple dog burials has not been found at cemetery U, the predynastic elite burial ground of Abydos, where only a single dog burial has been identified for certain (Dreyer a.o. 2000: 87). There are, however, several tombs, dating both to the earlier (Naqada IC-IIA/B) and to the more recent (Naqada IID-III) phases of the cemetery, in which dog bones occur, but they may have been buried with humans (Dreyer a.o. 2000: 87-88). For the 1st Dynasty royal tombs at Abydos finally, there are several dog burials, with funerary stela, among the subsidiary tombs surrounding the tombs of the kings (Flores 2003: 93).

It is however to be noted that burials of dogs also occur in less prestigious environments. At Adaïma for example, five dogs were found buried within the settlement (Midant-Reynes & Buechez 2002: 533-534; for further examples: cf. Flores 2003). The fact that matting could be used for these burials and that in some instances a water jar accompanied the dog indicates nevertheless the importance attached to these animals.

Another important observation is that result of the hunt, the prey, is not shown, although in rock-art lassoed animals or animals hit by arrows are known. Also, the dogs are never shown fighting animals, at the most of the attack is shown when they jump. The fact that dogs can attack and kill animals of the size of an ibex or oryx, especially when several dogs hunt together, is however beyond doubt. Therefore, the actual result of the hunt was not the primary concern of those making the images but rather the idea of hunting.

The end of the row

Returning to the small group of decorated ivories with animal rows, it is to be noticed that only a minority of the rows is ended by an animal different from the rest of the row (Tab. 3). But for those which are, not only dogs occur. Most interestingly, rows can also be ended by a fish, a bird, a rosette or an enigmatic representation which has been considered a catfish (Ciałowicz 1992: 249). The latter occurs only on the Pitt-Rivers knife handle, but the identification as a catfish is far from obvious because the last animal of the lowest row on the flat side of this object most probably represents a catfish, (considered a crocodile by

Ciałowicz 1992: 250.), especially when compared to the fish in the same position on the Abu Zeidan knife handle. The actual meaning of the enigmatic representation remains unfortunately unclear. Very tentatively a fossil could be suggested, because of the resemblance with the symmetrically repeated part of the Min emblem, which has been considered a fossil (Wainwright 1931), which however is doubted by Welvaert (2002). The bird occurs only once and is unfortunately represented in little detail and it is impossible to determine the species of the bird. The fish differ in shape but all of them might be catfish because of the extensions on their sides. No attempt will be made here for a possible symbolic interpretation of the catfish, but it is of course to be noted that it is part of the name of Narmer, but on the other hand we have to admit that the way in which the writing of the early royal names was established is still largely an open question.

Tab. 3. Elements at the end of animal rows on decorated ivories *

	Dog	Rosette	(Cat)fish	Bird	? (fossil)
Abu Zeidan handle	X	X	X		
Pitt-Rivers handle	X		X	X	X
Carnarvon handle	X				
Abydos K 1262a handle	X				
Davis comb	X	X			

* Eventually, dogs occur at the end of some animal rows on the decorated spoon from Tarkhan (cf. Table 2), but the difference with the other animals in a row is not very distinct.

The rosettes are at present the most significant element at the end of rows. They can be recognised by the slightly oval shape of their leaves and especially by the small circle in the middle, assuring that we are not dealing with stars. For a number of the examples in Tab. 4, the circle in the middle is not present, but the slightly oval shape of the “leaves” in for example the Gerza palette nevertheless allows an identification as rosette and not as star. The often suggested relationship with Hathor as sky goddess is anyhow not relevant because it is not Hathor that is represented but Bat (Fischer 1962; Hendrickx 2002: 292-298), a cow goddess without association with the sky. The rosette can also be found in another position on decorated ivories besides at the end of animal rows (Tab. 4). It occurs several times in combination with entwined snakes on two very similar knife handles (UC 16294 and Berlin 15137) and on the Gebel et-Tarif knife han-

Tab. 4. Objects with rosette

Site	Museum	Type	Bibliography
Ivories			
Abu Zeidan 32	Brooklyn 09.889.118	Handle	Churcker 1984
Gebel et-Tarif	Cairo JdE 31362	Handle	Quibell 1905
(?) Tarkhan 1925	Cairo	Spoon	Petrie 1914: pl. I, II.5
Unknown	Berlin 15137	Handle	Scharff 1929: 82, n° 111
(?) Unknown	NY 26.241.1	Handle	Williams & Logan 1987
Unknown	NY 26.247.1	Handle	Ciałowicz 1992: fig. 5,8
Unknown	NY 30.8.224	Comb	Ciałowicz 1992: fig. 6-7
Unknown	UC 16294	Handle	Petrie 1920: pl. XLVIII.3-4
Stone vessel			
Hierakonpolis	UC 16245	“Hathor” bowl	Burgess & Arkell 1958
Qustul L24	Chicago OIM 24069	Incense burner	Williams 1986: pl. 34
Palettes			
Gerza	Cairo JdE 34173	Gerza palette	Petrie 1912: pl. VI.7
Hierakonpolis	Cairo JdE 14716	Narmer palette	Quibell 1900: pl. XXIX
Maceheads			
Hierakonpolis	Oxford E.3632	Scorpion mace	Quibell 1900: pl. XXVIa
Hierakonpolis	Oxford E.3631	Narmer mace	Quibell 1900: pl. XXVIb
“Ostrakon”			
Hierakonpolis	Hierakonpolis	Sherd	Hendrickx & Friedman 2003
Seal			
Abydos U-210	Abydos	Seal impression	Hartung 2001: Abb. 41,c
Abydos U-j	Abydos	Seal impression	Dreyer 1998: 109, Abb. 72,c
Amulet			
Helwan	Cairo	Amulet	Saad 1951: pl. 39
(?) Matmar 2645	Oxford 1931.390	Button-bead	Payne 1992: n° 1730
Figurine			
(?) Naqada ?	Berlin 13810	Bulls head	Scharff 1929: 39, n° 61

** On five objects, indicated with (?), it can be doubted whether the rosette is actually represented. The starlike shapes on the knife handle in the Metropolitan Museum and the bulls head from Berlin can be considered rather certain as rudimentary renderings of the rosette. The Tarkhan spoon and the Matmar bead are far less certain.

dle where on the other side the rosette seems to be connected with the dominating animals. However, these examples don't add much for the meaning of the rosette motive. For this we have to turn to the objects such as the Scorpion macehead, Narmer macehead and Narmer palette. In this context, the rosette already attracted a lot of scholarly attention (e.g. Baumgartel 1966; a full discussion of previous literature Winter 1994; Schneider 1997). In the just mentioned cases where the rosette is to be considered as a hieroglyph, Schneider (1997) argued for a reading as *nb* against the generally accepted *hr* (Kahl 1994: 55) or the previously proposed alternative *sš* (Winter 1994). However, all readings refer one way or another to the king and the rosette is unanimously accepted as a royal emblem. This is corroborated by the Qustul incense burner and probably also by the Metropolitan museum knife handle, where the rosette can be seen in combination with the representation of a king. There can hardly be a doubt that the rosette at the end of animal rows is also a symbol of authority, be it perhaps not yet royal authority.

All of the elements at the end of the animal rows are to be considered the controlling elements over already orderly disposed wild animals, and even mythical animals as recently shown by Huyge (2004).

Lycaon pictus

Tab. 5. *Lycaon pictus* on decorated palettes.

Site	Museum	Bibliography
Hierakonpolis	Oxford Ash. 3924	Baines 1993
Munagat	New York MMA	Fischer 1958
Unknown	Paris Louvre E.11052	Bénédite 1904
Unknown	Brussels E.6196	Hendrickx 1994
Unknown	New York MMA 28.9.9	Fischer 1958
Unknown	Cairo, Michailidis collection (?)	Fischer 1958
Unknown	London BM EA.20790, 20792 / Paris Louvre E 11254	Spencer 1980: 79, n° 575

The presence on Predynastic decorated palettes of the African hunting dog or *Lycaon pictus* (Tab. 5) has already been recognised for a long time (Fischer

1958; Asselberghs 1961; Lopez 1995). Representations of *Lycaon pictus* have never been attested for certain on other monuments than decorated palettes. However, they may eventually occur on decorated ivories, cf. Hierakonpolis, UC 14864, Drenkhahn 1987: 61, right side of the lower row; Donadoni Roveri and Tiradritti 1998: 231, n° 196, lower row.

Representations of this animal can easily be distinguished from those of dogs because of the rounded ears instead of the pointed or hanging ears of dogs and the long, hanging tail opposed to the generally curled dog tails. The difference with other canines such as the fox is equally easy to notice. There are several palettes and fragmentary palettes on which the *Lycaon pictus* occurs on a large size at the edges of the palette (cf. Asselberghs 1961: pl. 70-96; Ciałowicz 1991). This so-called heraldic position of the animals is probably inspired by the way in which the Lycaon hunts (all details after Estes 1991; Kingdon 1997). They are cooperative hunters, hunting in packs led by the alpha male. The selected prey can be chased over distances of several kilometres while being surrounded. The kill itself is spectacular, the prey sometimes being disembowelled while still running and torn apart while still alive. Most remarkable also are the social structure and concerns of these animals. Young, wounded or sick animals will receive regurgitated food after a successful hunting party. Aggression between pack members is almost entirely lacking, with the occasional exception between females over breeding rights. Also important to notice is that *Lycaon pictus* is very reluctant to go into water, where they would be an easy prey for crocodiles. In the Egyptian perspective this implies that they are linked to the (low) desert, where they will find among others antelopes, one of their favourite preys. They are anyhow well adapted to the desert because they need little water. For the ancient Egyptian the Lycaon must certainly have been the ultimate desert hunter. They may also have been impressed by the group spirit of these animals and their social structure.

Similar to the representations of dogs, the Lycaon does not actually hunt on the palettes. He is nevertheless to be considered the “controlling” element on the palettes, especially compared to the chaotic animal world on the palettes themselves, for which the Hierakonpolis palette is the most obvious example. The symbolic aspects of this have already been recognised in the past, with a first major breakthrough by Asselberghs (1961: 166-192) but for the present article, the not so very different interpretations of Kemp (1989: 46-53) and Baines (1993) referring to the “containment of unruly in the universe” will be followed.

Hunters and *Lycaon pictus*

At this point, a comparison between the Hierakonpolis palette and the Hunters palette is to be made (Fig. 10). In the same manner as the large size

Lycaon do on the Hierakonpolis palette, the composition of the Hunters palette is framed by the rows of hunters at both sides of the palette (Baines 1993: 63), indicating also the vertical position in which the palette is to be looked at (Tefnin 1979: 223) (Fig. 10). However, this is not the only connection between the Hierakonpolis and the Hunters palettes. The hunters have tails attached to their belts which are identical in shape to those of the Lycaon. A parallel for the hunters with tails can be found on an ivory cylinder formerly in the private collection of Ludwig Borchardt (present whereabouts unknown; Borchardt 1931: Tf. I; Scharff 1931). The tails of *Lycaon pictus* are striking by their length of about 30 cm, their full shape and especially the differences in colour, generally consisting of ochre at the base, black in the middle part and white at the tip, but many variations occur. These colour differences are rendered by lines in the tails, both of the Lycaons and those worn by the hunters on the Hunters palette. Gransard-Desmond (2004: 50) seems to consider the tails on the Hunters palette as those of foxes, following Leclant & Huard (1980: 119). Their arguments are not explicitly stated, but Gransard-Desmond also identifies the animal on the Köfler-Truniger fragment as a fox (Gransard-Desmond 2004: 51, fig. 38), as well as the two canines on the Hunters palette (Gransard-Desmond 2002: 68), which have tails resembling those of the hunters. However, already the identification of the animals as foxes is not as obvious as stated by Gransard-Desmond, especially when compared with the palette from el-Ahaiwa tomb 226 (Reisner 1936: 378, fig. 188, Berkeley 6-19071), the most detailed representation known of a fox for the Predynastic period, which looks very different. (Although Houlihan 1996: 81 considers the animal as “probably a jackal”). The canines on the Hunters palette are slim in shape and have long legs of equal size, which does not correspond with foxes. Also the profile of the snout has a rather oblate shape and is not pointed as that of a fox. All of these characteristics fit rather with the Lycaon, but the pointed ears do not. These do indeed resemble much more those of foxes, which is probably the main argument for Gransard-Desmond to consider them as such. On the Kofler-Truniger fragment, however, the head of the animal considered to be a fox is missing. There are significant differences between the shapes of the tails of the animals and those worn by the hunters. The tails of the eventual foxes are longer and less thick and fluffy than those of the hunters, for which also the lines drawn in them are more striking. The tail of the animal in the upper part of the palette even has an asymmetric profile with a slight curve, making it very different from those worn by the hunters. On the other hand, the tails of the Lycaon on the predynastic palettes are always entirely symmetrical. For all of these reasons and also because of the compositorial parallelism between the two Lycaon delimiting the Hierakonpolis palette and the two rows of hunters having the same function for the Hunters palette, the tails worn by the hunters are to be considered as those of the Lycaon.

Apparently the hunters identified themselves to a certain degree with the animal or more likely, as already mentioned, with the manner in which the animal hunts and eventually also in its social characteristics. As hunting is no fundamental part of the economy and because eating meat of wild animals was part of the ritual at the Hierakonpolis temple site, the reason for this identification can hardly have been hunting magic, or if this practice nevertheless should have occurred, than it should be considered only part of a broader context. In general, the symbolic function of the hunters will have been more or less identical to that of the Lycaon on the Hierakonpolis palette, and therefore referring to order over chaos, or the containment of unruly as it is called by Kemp.

Males with tails attached to their belt occur already a long time before the Hunters palette. They can already be seen on two White Cross-lined jars found in tombs U-239 (Dreyer a.o. 1998: 114, Abb. 13) and U-415 (Dreyer a.o. 2003: 81, Abb. 5) of the elite cemetery U at Abydos dating to the transition between Naqada I and II. In the context of the Abydos jars, it can be suggested that on the unprovenanced vessel in Brussels (E.3002, Hendrickx 1998), the row of small circles at the right side of the legs of the two males with raised arms may eventually represent the tail. Furthermore, a tail is certainly worn by the hippopotamus hunter on a bowl in the Metropolitan museum (MMA 12.182.15, Behrmann 1989: Dok. 24f). The scenes on these jars are almost unanimously accepted as victory scenes.³ It is to be stressed that only the victors are wearing tails. The lack of details does not allow state that they wear Lycaon tails, and this even seems rather unlikely given the absence of with certainty identified representations of the animal before the Naqada IID-III period where the decorated palettes are to be placed. But, for what is worth, on a palette in Stockholm (Medelhavsmuseet E.M.6000, Asselberghs 1961: pl. XLVI), a canine - Gransard-Desmond (2004: 21) considers the animal as a hyena, which is well possible.- in a hunting scene can be seen with a tail similar to those worn by the victors on the roughly contemporaneous jar from tomb U-239 at Abydos. Whatever the nature of the tail, its symbolism connected to power dates already from at least about 3700 BC and will of course still be present in the dynastic representation of the king.

³ See however Garfinkel (2003: 233-248), who considers the representations on the jar from U-239 and Brussels E.3002 as a dancing scenes. The presence of clearly identified prisoners leaves however no doubt. Eventually the possibility of victory dance could be considered, although this does not seem very likely given the further development of the iconography (see Hendrickx 2002).

Conclusions

The conclusion reached by Tefnin (1979) that the “hunt” on the Hunters palette can not be considered a rendering of daily life can be expanded to all representations of hunts and in the context of the present article, all representations including dogs. This does not mean that there is no relation with reality, only that reality was taken as starting point for developing an iconography by which much more complex ideas could be addressed.

Obviously both the dog and the *Lycaon pictus* have been used as indication for control over wild animals, mainly desert animals, referring to the maintenance of order over chaos. Both animals are linked to man, which is obvious for the dog, but also for the Lycaon with whom the hunters on the Hunters palette identified themselves (see also Baines 1993: 69). But the dog and the Lycaon can not be regarded as equals. They occur for example both on the Hierakonpolis palette, where they are clearly differentiated, and Baines (1993) clearly showed the symbolic difference between the kinds of animals.

The theme of order over chaos seems to be present already from at least the late Naqada I period, which is not surprising since the second important power issue, namely military power, also occurs from that moment onwards. Over time there seems to have been an evolution in the iconographic context in which the dog was represented, from a preference for actual hunting scenes to dogs controlling orderly arranged rows of animals. However from the beginning both representations occur next to each other and continue to do so.

The iconography discussed in the present article is to be placed in the context of preformal art as defined by Kemp (1989). The Lycaon no longer occurs in the formal iconography of pharaonic Egypt, (for a possible exception, see Lopez 1995) the reasons of which have been discussed by Baines (1993: 69) and the iconographic variety relating to canines, and especially dogs, will strongly diminish (Baines 1993: 69-70). The development of formal iconography is intimately linked with the emergence of kingship, and compared to dogs, only less “common” animals such as the bull and the falcon found their way into the royal iconography. Dogs do of course continue to be represented, also in hunting scenes, but already the representations themselves differ from the Predynastic examples. The exquisite disk decorated with dogs hunting gazelles from the tomb of Hemaka (Cairo JdE 6279, Emery 1938: 29, n° 307), dating to the reign of Den, clearly illustrates this. One of the dogs is chasing a gazelle while the other holds an apparently already killed gazelle, lying down, by the throat. Act and result of the hunt are shown in a manner unknown for the Predynastic period. This does not necessarily imply that we are dealing with a pure narrative about hunting, but the eventual symbolism, which should be studied in the context of the Old

Kingdom representations, must have changed at least partially from that of the Predynastic period.

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S.O.Y. Keita

Early Farmers from El-Badari: Aboriginals or "European" Agro-Nostratic immigrants to the Nile Valley? Craniometric affinities considered with other evidence

Abstract

The appearance of agriculture in the Nile Valley occurs some two thousand years after its emergence in Europe and the Near East. It has been suggested that migrants brought farming and the Afro-Asiatic language family into the Nile Valley, after the dispersal of speakers of the Nostratic language grouping, whose region of origin has been postulated to be southern Europe. The issue of migration is explored by a multivariate phenetic analysis of crania of farmers from the district of el-Badari, site of the earliest agriculture in Upper Egypt. Comparison samples are from Europe and tropical Africa based on the results of previous work, in which the morphometric pattern of epipaleolithic crania from the region affiliated with non-elongated tropical African groups. UPGMA and neighbour joining clustering algorithms were generated from matrices of Mahalanobis distances, and an analysis undertaken of the order of intra-group distances between each of the series. The sample from el-Badari is found to be more broadly similar to the tropical African series, while not being identical. These results are not supportive of population replacement or major migration with genetic swamping from Europe, as an explanation for the emergence of agriculture in the Nile Valley. The conclusions based on the morphometric analysis, receives some additional support from archaeological and linguistic evidence.

Generally, less emphasis is now placed on substantial population migration or replacement as an explanation for culture change in "prehistory ." One notable exception to this development is to be found in theories addressing the



Fig. 1. Location-map el Badari

spread of agriculture, especially in Europe (see demic diffusion in Ammerman & Cavalli-Sforza 1984; Sokal et al. 1991). Similarly, it has also been suggested that migrants from Europe spread farming, along with a Nostratic language branch (ancestral Afro-Asiatic), into the Nile Valley (Barbujani & Pilastro 1993). This view can be called the agro-Nostratic hypothesis. 'Nostratic' is the name given to any of several versions of a hypothetical genetic linguistic macro-grouping consisting of several well accepted language families (see Ruhlen 1991). Extensive European colonization of, or migration into northwest Africa, the Nile Valley, and greater northeastern Africa in the late Pleistocene or early Holocene was once suggested by biological anthropologists (see e.g. Seligman 1930; Coon 1965). It is implied in much genetic and non-specialist work in which suprasaharan Africa is somehow transported to "Eurasia"; such a perspective denies indigenous in situ evolution and culture to Suprasaharan and Saharan

Africa. It in effect de-Africanises a part of Africa due to outmoded non-evolutionary theories, and the inability to accept African biocultural variation.

There are two reasons, both based on archaeological evidence, for considering mass migration as a factor in explaining the appearance of food production in the Nile Valley. First, the emergence of agriculture in the Nile Valley does occur nearly two thousand years after its establishment in Europe and the Near East (Hassan 1988). Second, the core domesticates found in the Nile Valley are the same as in Europe and the Near East: wheat, barley, ovacaprines, and cattle; these are not generally believed to have had the appropriate wild progenitors in Africa, with the exception of cattle (Wendorf et al. 1987, Wendorf & Schild 1994; but see Clutton-Brock 1989 for a different view on cattle). The geographical pattern of early horticulture in the Nile Valley is not inconsistent with this migration thesis. The oldest documented food production sites are in northern (Lower) Egypt and date from 5200 BCE to 4600 BCE (Hassan 1988; Kobusiewicz 1992; Wetterstrom 1993). Evidence for agriculture is next attested further south, in el-Badari, a district in northern upper Egypt, and dates to approximately 4400-4000 BCE; the associated lithics, pottery and other artifacts constitute the "Badarian," the first defined unit in the predynastic cultural sequence which shows continuity with dynastic Egypt (Arkell & Ucko 1965; Hoffman 1988; Hassan 1988).

One approach, although limited, with which to explore the possibility of migration in earlier times, is through analysis of craniometric affinities. Previous studies have not specifically addressed the immigration of farmers from Europe into the Nile Valley. However, Brace et al. (1993) find that a series of Upper Egyptian/Nubian epipalaeolithic crania affiliate by cluster analysis with groups they designate "Sub-Saharan African", or just simply "African" (from which they incorrectly) exclude the Maghreb, Sudan and the Horn of Africa), while post-Badarian southern predynastic and a late dynastic northern series (called "E" or Gizeh) cluster together, and secondarily with Europeans. In the primary cluster with the Egyptian groups are also remains representing populations from the ancient Sudan and recent Somalia. Brace et al. (1993) seemingly interpret these results as indicating a population "relationship" from Scandinavia to the Horn of Africa although the mechanism for this is not clearly stated; they also state that the Egyptians had no "relationship" with "Sub-Saharan" Africans, a group that they nearly treat (incorrectly) as monolithic, although sometimes seemingly including Somalia which directly undermines aspects of their claims. "Sub-saharan" Africa does not define/delimit authentic Africanity.

The later dates, specific domesticates, and lack of local wild antecedents make a case for food production having been largely (but not wholly) derivative in the Nile Valley from the Near East; and these observations, coupled with the

interpretations found in some linguistic and human biological studies, allow for considering the possibility of large-scale migration into the Nile Valley in the immediate post epipalaeolithic period. Here we present a narrowly focused study of early Badarian crania, designed to explore the question of Nostratic population replacement, or migration into the Nile Valley consonant with the time of the earliest agriculture attested in Upper Egypt. European series are used as the Nostratic representatives, given Europe's proximity to Egypt. The results of the analyses are discussed with findings from archaeology and linguistics in order to assess the likelihood of the agro-Nostratic hypothesis for the Nile Valley.

Materials and Methods

Eight series were used in this analysis, including three from Europe and four from tropical Africa (Table 1). European and non-Nile Valley African groups are used as comparative material based on Brace et al.s (1993) comments on the affinities of an Upper Egyptian/Nubian epipalaeolithic series. Twenty-five male Badarian crania were culled from a larger series (n~60) housed at the Duckworth laboratory, Cambridge University. The sample size was optimized using reasonable estimation techniques Howells (1973).

The subject was approached from an exploratory perspective, using different variable sets and techniques to examine the structure of the data. Analyses were carried out using fifteen and eleven metric variables (Table 2). Anatomically, the variables were chosen in order to represent the major embryological areas of the skull, in a balanced fashion, and for their likely genetic basis (see Keita 1988). The smaller set eliminates measurements that cross the major developmental regions of the cranium and/or which have less demonstrated heritability. The number of variables was selected to maximize biostatistical validity, and conforms to findings which indicate that this is likely best achieved when the variable set is numerically smaller than the number of cases (individuals) in the smallest sample (see Sjøvold 1975; Van Vark 1976; Corruccini 1978). Also no simple ratios, proportions or indices were used in order to be consistent with the best practice advocated by biomathematicians. The Mahalanobis distance technique only makes use of the unique contribution of each variable because it in effect eliminates correlations between variables, unlike Penrose or Euclidean distances.

Mahalanobis distances were calculated using the SAS statistical package (SAS Institute 1992). The resulting matrices were manipulated to explore the place of the Badarian series in relationship to the others. This was carried out in two ways. A sequential display, called a distance hierarchy (Keita 1983), was constructed by placing in order of progressive dissimilarity, all other series from

Table 1. Cranial series used

<u>Designation</u>	<u>Locale</u>	<u>Number</u>
Berg	Hungary	56
Bushman	Southern Africa	41
Dogon	Mali	47
Norse	Norway	55
Teita	Kenya	33
Zalavar	Hungary	53
Zulu	South Africa	55
Badarian	Upper Egypt	25

Table 2. Variables

<u>15 set</u>	<u>11 set</u>
Glabello-occipital length	same
Basinasion length	same
Basibregma height	--
Maximum cranial breadth	same
Bizygomatic breadth	same
Biauricular breadth	same
Minimum cranial breadth	--
Basion-prosthion length	same
Upper facial height	same
Nasal height	same
Orbit height	--
Orbit breadth	--
Nasal breadth	same
Bimaxillary breadth	same
Cheek height	same

Table 3A. D² matrix 11 variables

from POP	Berg	Bushman	Dogon	Norse	Teita	Zalavar	Zulu
Berg	0						
Bushman	23.59377	0					
Dogon	19.48910	8.17140	0				
Norse	5.15374	18.18366	18.21260	0			
Teita	23.52637	11.20639	8.65231	13.49573	0		
Zalavar	3.99291	15.33975	13.78928	0.90011	10.78592	0	
Zulu	23.24636	10.64561	3.94152	15.41540	3.78664	12.26495	0
Badarian	21.69216	6.13146	9.88218	13.27768	6.00010	9.68540	7.60615

Table 3. D² matrix 15 variables

from POP	Berg	Bushman	Dogon	Norse	Teita	Zalavar	Zulu
Berg	0						
Bushman	36.74497	0					
Dogon	38.28162	19.26284	0				
Norse	10.78136	29.98679	33.56878	0			
Teita	34.78863	17.64547	12.55126	18.67868	0		
Zalavar	9.37956	28.01987	28.56992	5.13509	19.00213	0	
Zulu	44.92925	21.57363	8.90887	31.64631	9.43921	23.68180	0
Badarian	28.72911	12.51195	12.85704	18.79617	8.33989	13.19330	10.47652

each one of the groups. This summation device facilitates the assessment of samples' relative similarities to each other, and provides one view of the overall structure of the taxonomic matrix. It facilitates seeing the most similar pairs of series. Cluster analyses were also performed using algorithms for the unweighted pair group method using arithmetic means (UPGMA) and neighbour joining (NJ) methods (Kumar et al. 2001). Both approaches are used because different clustering techniques are notorious for yielding different results using the same

data. An exploration using multiple approaches is more likely to lead to useful conclusions and the generation of new hypotheses.

Results

The Mahalanobis distances between all of the series were unlikely to be due to chance at the five percent level, with nearly all having lower probability values (usually $p < 0.001$). An examination of the distance hierarchies reveals the Badarian series to be more similar to the Teita in both analyses, and always more similar to all of the African series than to the Norse and Berg groups (Table 3, Fig. 2). Essentially equal similarity is found with the Zalavar and Dogon series in the eleven variable analysis, and with these and the "Bushman" in the one using fifteen variables.

11 Variables

Badarian: Teita, Bushman<Zulu<Zalavar, Dogon<Norse<Berg
 Berg: Zalavar<Norse<Dogon<Badarian<Zulu, Teita, Bushman
 Bushman: Badarian<Dogon<Zulu<Teita<Zalavar<Norse<Berg
 Dogon: Zulu<Bushman, Teita<Badarian<Zalavar<Norse<Berg
 Norse: Zalavar<Berg<Badarian, Teita<Zulu<Bushman, Dogon
 Teita: Zulu<Badarian<Dogon<Zalavar<Bushman<Norse<Berg
 Zalavar: Norse<Berg<Badarian<Teita<Zulu<Dogon<Bushman
 Zulu: Teita, Dogon<Badarian<Bushman<Zalavar<Norse<Berg

15 Variables

Badarian: Teita<Zulu<Zalavar, Dogon, Bushman<Norse<Berg
 Berg: Zalavar<Norse<Dogon<Bushman, Badarian<Zulu<Teita
 Bushman: Badarian<Dogon<Zulu<Teita<Zalavar<Norse<Berg
 Dogon: Zulu<Teita<Badarian<Bushman<Zalavar<Norse<Berg
 Norse: Zalavar<Berg<Teita<Badarian<Zulu<Bushman<Dogon
 Teita: Zulu<Badarian<Dogon<Norse, Zalavar<Bushman<Berg
 Zalavar: Norse<Berg<Badarian<Zulu<Teita<Dogon<Bushman
 Zulu: Dogon<Teita<Badarian<Zalavar<Bushman<Norse<Berg

Fig. 2. Distance hierarchies.

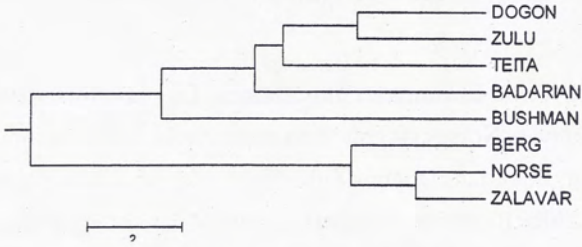
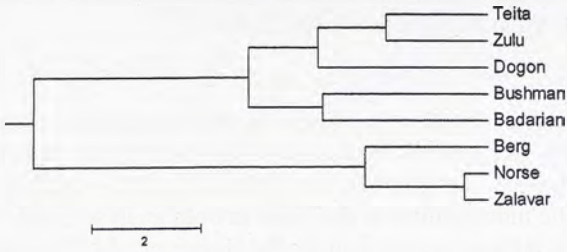


Fig. 3. UPGMA dendrograms: 11 and 15 variables.

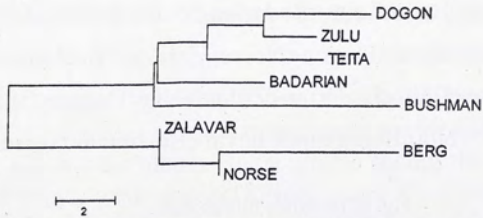
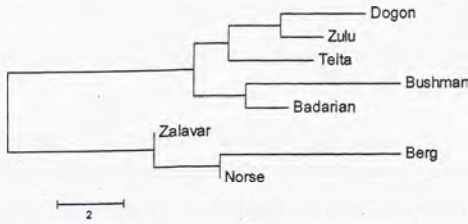


Fig. 4. Neighbor joining dendrograms: 11 and 15 variables.

The Badarian series clusters with the tropical African groups no matter which algorithm is employed (Fig. 3 and 4). The clustering with the "Bushman" can be understood as an artifact of grouping algorithms; it is well known that a series may group into a cluster that does not contain the series to which it is most similar (has the lowest distance value). An additional twenty dendrograms were generated using the minimum evolution algorithm provided by MEGA (not shown). In none of them did the Badarian sample affiliate with the European series. In additional analyses the "Bushman" series was left out; the results were the same (not shown).

It is interesting that the distance hierarchies and cluster analyses show the European series to always be closer to each other than any is to anyone of the African series, and to have generally lower distance values between themselves than did the African groups. Also the individual European series are not consistently found to be more similar to one particular African series, or similar in the same order.

Discussion

The results are not supportive of European agriculturalists colonizing el-Badari in the early to mid-Holocene. The Badarian series evinces greater phenetic affinity with the tropical African comparative groups, and notably the east African Teita. This affinity is relative, and not to be taken as indicating identity. This finding can only be interpreted as showing a particular broad similarity in the morphometric space circumscribed by the particular groups used. The Badarians were a local Saharo-Nile Valley population, based on archaeological and other data (see below). Phenetic affinity assessed in the exploration of historical questions is best placed in context with other information that in toto indicates the likely probabilities of a bonafide historical connection (see Dutta 1984; Harrison 1984; Rouse 1986). Chance resemblance, parallelism and micro-convergence may also be possible explanations for biological similarity.

In other analyses these early crania from el-Badari have shown a greater resemblance to southern Nile Valley series and some from tropical Africa (including the Horn), than to northern dynastic Egyptians (see e.g. Mukherjee et al. 1955; Keita 1983; 1993). However, these studies were not designed to examine the question of European (Nostratic representatives) migration as the source of early Nile Valley farmers. At another level, the morphometric patterns of Egyptian crania in general, although highly variable, generally exhibit a position intermediate to stereotypical tropical Africans and Europeans in multivariate analyses (see review in Keita 1993). In one study by Howells (1973), the previously mentioned late dynastic northern Gizeh series, which dates to and after the period of historically known incursions from Europe, clusters with

either "Africans" or "Europeans" (the same series used here) depending on method. The matrix of Mahalanobis distances (organized into a distance hierarchy) indicates that this series [Gizeh] was not exclusively more similar to various European or African series for the traits utilized. A careful consideration of these results leads one to consider the issue of variation in Africa, beyond stereotypical racio-typological models and geographical typological thinking (see Hiemaux 1975, Keita 1993, Keita & Kittles 1997, Kittles & Keita 1999).

Simulation studies can also help in assessing the likely probability of ongoing significant migration into the region. Harrison (1984) reports on a model positing a linear array of twenty populations, and for which only sequential migration is allowed; he finds that it would take a neutral gene 500 generations (~10,000 years) at a migration rate of fifty percent (per generation) to reach equilibrium in the populations, thereby rendering them 'similar'. In this simulation movement was modeled as bi-directional in all but the terminal groups. If polygenic craniometric "traits" are considered, and treated as neutral (or 'trivially adaptive') at more realistic rates, with only unidirectional movement, it would take considerably longer to achieve equilibrium, unless there was direct migration to the terminal locale under consideration. Ten thousand years do not separate the epipalaeolithic from the Badarian, or the latter from the subsequent periods in the Nile Valley. (And there is no evidence for direct migration.) Also there would be more than twenty local populations to be considered. Harrison's (1984) simulation results support, indirectly, the findings here, and also the view that Nile Valley craniofacial variation, along with that of Sudan and the Horn of Africa, likely owes more to indigenous microevolution. Their findings of a relative northeast African quadrant-European craniometric similarity more likely reflect various processes and biographies more ancient than wholesale Holocene migration from Europe/Anatolia via a Nostratic-speaking group. This comment would also apply to the broad similarity in molecular genetics of a subset of Nostratic-speaking populations observed by Barbujani and Pilastro (1993). The dendrograms of Brace et al. (1993) would seem to illustrate in the main a facet of indigenous African diversity observed elsewhere: a subset of African series evincing similarity to non-African groups not primarily due to gene flow, analogous to individual Africans (even with the socially-constructed stereotypical "African" morphophenotype) being found throughout mtDNA of trees of world samples. A synthesis of molecular, palaeontological, and ecological evidence indicates that indigenous continent-wide African biogeographical variation should be tremendous (Keita & Kittles 1997, Kittles & Keita 1999).

Non-biological data can profitably be included in this discussion, although biology, language family and culture are not intrinsically linked, or causally related. Information from each category can provide evidence for population

movement and contact in selected circumstances. Collectively, if broadly congruent, data from multiple disciplines can more convincingly make a case for migration (Rouse 1986). The time framework for postulated movement, however, will clearly influence how these different sources of evidence are to be used, and the level of specificity. Given the agro-Nostratic hypothesis, it is of interest to review the results of linguistic studies.

While it is known that languages can be spread by relatively small groups and that communities will sometimes change languages easily (Nichols 1997), language family distributions that date to before expansionist states, empires or ideologies likely reflect more than trivial population movement in relationship to population density. Recent studies in historical linguistics do not support an agro-Nostratic hypothesis which postulates Afro-Asiatic speaking farmers coming into the Nile Valley from Europe. There are several reasons. The date of ancestral Afro-Asiatic is likely to be as much as 15,000 BP (Ehret 1979; 1984; personal communication; Fleming 1974 personal communication), and possibly more. Conservative estimates place the date at 12,000 BP. There is no archaeological evidence for agriculture consonant with these dates. More importantly, reconstruction of ancestral Afro-Asiatic (irrespective of its date) using all of the family's members does not reveal terms for plant or animal domestication (Ehret 1979, 1984, 1995, personal communication). In other words speakers of undifferentiated Afro-Asiatic cannot be shown to have been food producers, but were apparently intensive users of wild grasses. The dates and reconstructions fit with the archeological findings of intensive plant use in the Upper Nile Valley (see Wetterstrom 1993).

The evidence is also consistent with Africa being Afro-Asiatic's place of historical differentiation and source of spread (see Greenberg 1966, 1973, Bender 1975; Diakonoff 1981; Ehret 1984; Ruhlen 1991; Blench 1993). The location of ancestral Afro-Asiatic was likely in the northeast quadrant of Africa, in or near the Horn, but also possibly the Sahara, based on the principles of 'greatest diversity' and 'least moves' (cf. Bender 1975 & Ehret 1984, with Nichols 1997). Five of the six branches of this family are only found in Africa (Omotic, ancient Egyptian, Chadic, Cushitic, and Berber). Semitic alone is found in Asia (Greenberg 1973; Diakonoff 1981). Omotic, found only in Ethiopia, has characteristics likely to be relatively similar to those in ancestral Afro-Asiatic. At the time of postulated movement into Africa from Europe (of a Nostratic branch) there is evidence for substantial movement out of Africa, specifically the northern Nile Valley, into the Levant (Bar Yosef 1987). (This archaeological 'signal' may connect the movement of pre-proto-Semitic speakers into the Near East.)

"Culture history" based on linguistics is also not consistent with simple migration and colonization, given the later dates for agriculture in the Nile Valley. It is

substantively significant that the words for the 'foreign' major domesticates in Old Egyptian are not loans from Indo-European (or even Semitic or Sumerian) (Baines, personal communication). Even in early Semitic-speaking Mesopotamian cultures (for which we have written records) some of the words for important domesticates were apparently Sumerian loans (Diakonoff 1981).

The agro-Nostratic hypothesis is also undermined taxonomically. The evidence better supports Afro-Asiatic being a sister, not daughter, of Nostratic (Ruhlen 1991). Dates given for common Nostratic are the same or younger than those assigned to common Afro-Asiatic, making the sibling relationship more plausible if any of these chronologies are valid (cf. Barbujani & Pilastro 1993 and Ehret 1984, Blench 1993). Another issue beyond the scope of this paper is the question of the basic validity of the Nostratic construct, which has not won wide acceptance among historical linguists, due to the problems inherent in linguistic reconstructions of such implied time depths (see Ruhlen 1991, Nichols 1997).

The archaeology of neolithic and predynastic Egypt does not support mass migration from Europe. The earliest evidence for farming in the Nile Valley indicates that local people incorporated Near Eastern domesticates into an indigenous foraging subsistence strategy (Wetterstrom 1993). Settlement patterns and artifacts do not suggest the wholesale settler colonization of the Nile Valley by a community of alien origin. In northern Egypt the earliest sites evincing food production at Fayum and Merimde show some Near Eastern, but not European, influence during the earlier part of the neolithic; chronologically later neolithic artifacts from the same sites indicate a strange regional African (Saharan/Western Desert) influence (Kobusiewicz 1992). The Badarian, in Upper Egypt, is culturally interpretable primarily as a synthesis of indigenous Saharan and Nilotic traditions which incorporated some Near Eastern domesticates perhaps adopted from northern Egypt (Hoffman 1979; Hassan 1988), and apparently did not have a single simple antecedent (Holmes 1989). Kobusiewicz (see this volume) notes sites with Badarian-like pottery, hut older, in the southern eastern Sahara, at a site near the Sudanese border.

Additional analyses using 22 variables (perhaps too many), and including additional material from Sudan, late dynastic northern Egypt (Gizeh), Somalia, Asia and the Pacific islands, showed the Badarian to be most similar to a series from the northeast quadrant of Africa, and then to other Africans.

In summary, and viewed wholistically, the evidence gleaned from linguistic, archaeological, and biological research does not support the migration of Nostratic farmers from Europe to explain either the emergence of agriculture in the Nile Valley, at least in upper Egypt, or the presence of the Afro-Asiatic language family in the Nile Valley and greater Africa. The evidence indicates

early Egypt to foundationally belong to a northeast African biocultural descendant community. Future work will help further clarify issues relevant to the exploration of this subject. These issues include the range of indigenous human variation in the early and mid-Holocene Nile Valley and surrounding regions, the archaeological correlates of migration, and the emergence and development of Afro-Asiatic in the Nile Valley.

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S.O.Y. Keita

The interpretation of variation in skull porosities by burial position in the Dynasty I royal cemetery complex in Abydos, Upper Egypt

One of the goals of palaeopathology (and human biology in general) is to describe and explain the patterns of disease in relationship to social position. There is an easily envisioned and documented relationship between social status and health, if the former determines access to nutrients, the overall environmental quality, and the ability to provide and receive medical care (Crooks 1995). It has long been understood that other factors such as occupation, age and sex may have health implications.

This paper presents the results of a comparative palaeopathology study of remains from subsidiary burials associated with the Dynasty I Egyptian kings Djer and Djet (Uadji), the second and third, or third and fourth kings of the dynasty, depending on who is regarded as the first ruler: Narmer or Aha (Wilkinson 1999). Porous defects, broadly called porotic hyperostosis, were studied in the crania of groups buried in the two separate areas of the royal cemetery complex in Abydos, Upper Egypt. The primary goal was to compare and contrast the group frequencies of affected individuals, and explore the possible social meanings of the observed pattern. The study is one of adults buried in a royal context and not of demographically complete groups.

Dynasty I was the first half of the Early Dynastic or Archaic period of ancient Egyptian history (Spencer 1993; Wilkinson 1999). The Early Dynastic is the bridge between the later predynastic, when kings first emerge in Egypt, and the Old Kingdom, well known because of the pyramids. This epoch is significant because during this time state power and institutions were consolidated. Annals were initiated during the First Dynasty, by its likely first king Aha. The political center of the country was moved to Memphis in the north, by a dynasty from the

south, where the clear precursor of dynastic culture developed. The Early Dynastic can be seen as a distinct phase in Egyptian history, and included the custom of burying retainers with the kings. This practice was apparently stopped for unknown reasons at the end of Dynasty I, and its origins are just as mysterious. The custom may reflect beliefs about the maintenance of courtly order in the afterlife, and known primarily from Dynasty I. King Aha, the likely first king of Dynasty I, also had subsidiary burials possibly including his wife, along with a cohort of young individuals estimated to be between twenty and twenty-five years of age, suggesting that the latter did not perish of natural causes (see Dreyer et al. 1990; Dreyer 1993, Spencer 1993, Wilkinson 1999). It is not known if these persons volunteered to serve the king in the afterlife, or if they were coerced. These retainers, a sample of who are studied here, were part of a unique short-lived tradition in the long history of ancient Egypt. One of this effort's goals is to learn something about the possible social origins of these people via an exploration of one aspect of their biology.

The Cemetery Complex

The royal cemetery complex at Abydos holds all of the graves of the rulers of Dynasty I (Kemp 1966, 1967), whose physical remains unfortunately no longer exist. Predynastic kings and elites were also interred at Abydos, a holy place to the ancient Egyptians, and a possible locale of origin for these Dynasty I kings, who were buried in perhaps what was regarded as an ancestral home, instead of in northern Egypt (Spencer 1993; Wilkinson 1999). The main part of the cemetery, called Umm El Qaab, contains the actual tombs of the rulers and associated burials (Petrie 1900). These subsidiary graves are those of court functionaries, as indicated by stelae, who are generally regarded as having comprised the rulers' personal entourage (see Kemp 1966; Trigger 1983; Spencer 1993). However, the idea that they were simply servants or slaves has been contested in the past (Thomson & MacIver 1905; Petrie 1925). Approximately one mile away are another set of burials arranged essentially in squares (Petrie 1925) which outline once existing structures called „funerary palaces“ or funerary enclosures (Kemp 1967; O'Connor 1989). These graves can be identified with the reigns of particular rulers by associated goods (Petrie 1925). Their occupants were apparently a mixture of artisans and lower court officials such as a „seal bearer.“ In either case in life the individuals in both areas would have been of lower rank, just above ordinary people. Both sets of individuals – the royal tomb and funerary enclosure groups – are believed to have been interred at or near the time of the rulers' deaths, but the actual number for which this is true is unknown (Hoffman 1979), except perhaps in the case of Aha.

Vault Porosities

„Porotic hyperostosis“ is generally used to describe porosities in the outer table of the cranial vault associated with a widened diploic space, and has varying degrees of severity (Hillson 1978; Ortner & Putschar 1981; Goodman et al. 1984; Larsen 1997). The classical heuristic depictions of porotic hyperostosis show grass large bilateral vault porosities in notably thickened parietal bones, and usually in children, but this is only the most severe manifestation. Porous lesions in the orbital roof(s) are usually called *cribra orbitalia*. These porosities are not believed to be a disease in themselves but rather a marker indicating that a physiological insult has occurred.

The classic defects, whether in vaults or orbits, are stated to be caused by a compensatory expansion of the marrow in the flat skull bones (Larsen 1997), which is most easily explained as a response to the decreased longevity of red blood cells and altered iron metabolism, as found for example in thalassemia major and sickle cell anaemia. In most archaeological samples the cause of the lesions is usually hypothesized to be due to dietary iron deficiency (Sanford et al. 1983; Stuart-MacAdam 1985, 1992; Larsen 1997). However, experimental data make it possible to be more certain about the causes of these lesions, when the aetiology is not thought to be hemolytic anaemias. Rats chronically bled show a much greater marrow response than those given an iron-deficient diet (Burkard et al. 2001). By extrapolation this means that chronic blood loss associated with parasitic diseases such as schistosomiasis and hookworm are likely to cause the marrow response that causes vault porosities. Theoretically iron loss from diarrhea, also found associated with various infectious diseases could trigger a significant marrow response. Reflex mechanisms that lower serum iron in some bacterial infections might sometimes be a factor also (see Kent & Weinburg 1989; Stuart-MacAdam 1992).

The aetiologies of anaemia have to be considered in the contexts of crowding, poor general nutrition, weaning stress and overall disease burden, including chronic infections (Kent 1986; Palkovich 1987), and the handling of sanitation (see e.g. Dixon 1972). It would be short-sighted to simply reduce the issue to one of an abstract iron deficiency anaemia, except in the most severe cases of blood loss. The quality and disease ecology of the total environment, and their total impact on physiology have to be considered.

The anaemias associated with chronic and inflammatory disease (see Abshire 1996) could also be indirect aetiologies or contributors, as could malnutrition, which lowers insulin growth factor -1 (IGF-1), a known erythropoetic (blood stimulating) factor (Erickson & Quesenberry 1992; Cohick & Clemmons 1993; Adamo 1995). Using the phenomenon of catch-up growth as a model, it is possible that as a part of recovery from chronic disease and malnutrition that an

accelerated marrow response would occur with resulting porosities, but this idea remains to be explored. Vitamin D deficiency can also be associated with porous vault lesions and some diploic widening (Ortner & Putschar 1981, but see Larsen 1997 for a different opinion on diploic expansion). Genetic anaemias, as stated, may also cause defects, but the recovery of a notable number of affected adult individuals from an ancient adult sample would be expected to be relatively rare due to low incidence, disease related early mortality, and the general pre-adult mortality associated with early societies. Sickle cell anaemia has been diagnosed by molecular means in predynastic remains that exhibited porotic hyperostosis (Marin et al. 1999).

Other defects and causes have to be considered in the evaluation of vault porosities. Localized lesions confined to the periosteum may indicate primary periostitis, and are usually related to trauma or proximal scalp infections. If symmetrically widespread and restricted to the periosteum lesions may indicate vitamin C deficiency or secondary periostitis, the latter being understood to reflect a general inflammatory response to a non-local process. Poor vitamin C intake is less well documented as a cause (Ortner & Putschar 1981). In the Nile Valley secondary periostitis would likely be a part of the response to parasitic infection, given the endemicity of schistosomiasis and hookworm (Stephenson & Holland 1987; Tanaka 1989), even if the infection is not severe enough to provoke grossly detectable diploic expansion.

Vault porosities thought to be related to iron deficiency are hypothesized to initially manifest only in childhood and do not occur in individuals who first become anaemic as adults, based on deductions from cross sectional research (Stuart-MacAdam 1985). Unfortunately there are no confirming longitudinal or experimental studies, hence this remains a working hypothesis. (Periostitis could occur at any time.) It is known that skeletal lesions do not occur or are not severe in all anaemic individuals, even children with sickle cell disease. Hence from a clinical perspective it would be advantageous to incorporate the idea of a continuum of bony lesions, and record a range of porosity manifestations so as to capture as many as possible of those affected.

The assessment of adult crania is made challenging by remodelling, but this does not usually obscure that a given individual was affected; it could, however, hinder understanding the severity of the initial lesions. It is assumed that quantitative and qualitative variations in adult skull cohorts reflect the relative differences that would have been found in childhood—assuming the lesions related to anaemia to only occur at this time; the simplifying assumption is that there are no great differences in remodelling rates between surviving groups. There is a caveat. Inter-group variability in adult frequency (percentage of skulls with lesions) could also be affected by group differences in pre-adult mortality,

assuming that the samples under consideration are from distinct and „real“ populations (or strata); this demographic information is not known for this material, which in part likely is of people from northern Egypt (see Keita 1992). The royal context of the material used here has likely implications for interpretation.

Lesions in early Egypt would most have likely been related to anaemia, either from parasitic, genetic and/or dietary related causes in the context of a challenging socio-ecological environment with a high biological challenge. It is likely that blood logs from schistosomiasis and hookworm are primarily responsible, or have the major role for these lesions. Secondary periostitis would also be expected. Vitamin D deficiency can reasonably be excluded as a frequent cause because of the high solar radiation. Given the concern here for examining the pattern of pathology in relationship to social position, a childhood aetiology of the lesions – if this assumption is correct – would be advantageous, because it may reflect aspects of social origins. Early childhood lifestyle and life-history are more likely to reflect aspects of social life such as rank or status because of the vulnerability of children (Nestel 1990), and ties to their parents' social position. Social status in adulthood may not be the same as that held in early life, even in an ancient monarchical society. This study offers the opportunity to examine lesions believed to reflect a health insult of childhood, in two groups of adults with broadly different roles at the royal court.

Material

The material studied consists of adult crania from the burials around the tomb of King Djer primarily, and from the lower cemeteries (funerary enclosure sites) of Kings Djer and Djet as far as can be ascertained. The available remains represent a fraction of court functionaries, the „populations“ actually interred (see Petrie 1925). Djer's tomb was flanked by 318 subsidiary graves, and his funerary enclosure by 269. King Djet's retainer burials numbered 174 and 161, respectively. Sex was determined by standard anatomical criteria, and considering the names of individuals when known, as well as the range of variation in Egyptian skeletal populations. It is suggested that the royal tomb sample has 27 males and 17 females, and the enclosure tombs 38 males and 10 females. ANOVA showed no differences by sex and the subgroups. In principle sex subsamples can be combined to obtain a group impression, if this is desired, because the lesions do not connote diseases that are biologically sex-linked. The total sample sizes were 44 and 48 for the two locales respectively. The royal tomb material is stored in the British Museum of Natural History. Cambridge University houses the funerary enclosure/palace sample.

Due to various kinds of damage not all structures of interest were present or complete in each cranium. The sample sizes by structure are below:

	Royal Tomb	Funerary Enclosure/Palace
Orbits (roofs)	37	45
Vaults (all)	44	48
Vaults (most complete)	37	42

The second grouping of vaults refers to those having all three bones complete or nearly so.

Methods

The standard method of approach is based on macroscopic observation with the naked eye. For this study porosities were assessed in two ways. Vault, but not orbital, porosities were graded from 0-6 following Hillson (1978). The grade is used as a variable called the vault porosity score (VPS) and noted as below:

- 0 - no porosities
- 1 - scattered fine porosities
- 2 - larger porosities
- 3 - some linked porosities
- 4 - "canal like" linked porosities
- 5 - small trabecular outgrowths from outer table
- 6 - marked trabecular structure on the outer table

This approach acknowledges a continuum of porous lesions. All defects were noted. It is important to reiterate that the goal was to capture all individuals who had been likely affected physiologically, in order to get a more accurate picture of the frequency of affected individuals. A more clinical perspective is justified given that not all individuals with anaemia have skeletal manifestations.

Lesions were mapped for each vault onto a schematic that included the coronal, sagittal and bregma sutures. VPS was recorded for the most anatomically severe lesion wherever found, which was usually the parietals. The number of kinds of superior vault bones affected was recorded as the extent score (ES), range 0-3. (Parietal involvement was only counted once.) Two dichotomous variables were devised. The first designates vaults with any lesion porosity scores of one or more and is called VPP1. The second enumerates vaults with lesions of porosity scores of two and greater (VPP2), and is of more interest in this study, because previous experience has shown that this variable was more often associated with same parietal thickening. VPP2 serves as a kind of screen, facilitating the recording of lesions perhaps more likely related to lesions beyond periostitis. Cribra orbitalia was scored as present or absent.

Parametric ANOVA, Mann-Whitney and contingency table analyses were carried out. The five percent probability level was chosen for significance.

Table 1. Dichotomous variables, comparisons

Series	N	Frequencies (%)		
		VPPI	VPP2	Cribra
Royal Tomb	(44,37)	77.3	47.7	35.1
Funerary Enclosure	(48,45)	45.8	14.6	11.1
χ^2		9.53	11.91	6.84
ρ		0.002	< 0.001	0.008

Table 2. Means and Standard Deviations, Comparisons

	N	VPS		N	ES	
		Mean	SD		Mean	SD
Royal Tomb	44	1.74	1.18	37	1.97	0.93
Funerary Enclosure	48	0.74	0.76	42	0.98	0.92
Comparisons						
ANOVA ρ	< 0.001	(F = 23.64)		< 0.001	(F = 22.82)	
Mann Whitney ρ	< 0.0001	(Z = -3.85)		< 0.0001	(Z = -4.20)	

Results

A range of lesion quality was observed. Noticeable although not necessarily severe parietal thickening was usually observed with the higher grade lesions; thus the second variable (VPP2) tends to restrict the count to those vaults having lesions closer to „porotic hyperostosis“ as originally described (see Angel 1964, Ortner & Putschar 1981), although mild. Skulls with extreme classic lesions were not found, an observation made about other Egyptian material by Hillson (personal discussion). Same crania had what might be described as pitting not porosities, perhaps representing remodeling or other tissue activity. The royal tomb and funerary palace samples have lesion frequencies above ten percent in all dichotomous variable categories (Table 1). Lesions with a porosity score of one were not generally associated with visible thickening and could be due to periostitis. The level of porosity-defined lesions is noteworthy in the two samples. The frequency of individuals having any degree or kind of vault lesion is greater than forty-five percent.

Contingency table analyses indicate significant inter-group frequency differences (Table 1). The royal tomb group is observed to have three times more affected individuals than the funerary palace sample for cribra and higher grade vault lesions (VPP2). Those from around the royal tombs have one and a half times the observed lesions (VPP1), found in the funerary palace folk. The percentage of crania having a vault porosity score of one, obtained by subtracting VPP2 from VPP1, is nearly the same for both groups, approximately thirty percent. This suggests a general background of biological challenge resulting in lesions largely restricted to the periosteum.

The average porosity score and extent of porosity lesions per individual for the royal tomb vaults, is twice that of the funerary palaces (Table 2). Although the standard deviations indicate high within sample variability, the central tendency differences are statistically significant.

The results are consistent across measures in suggesting that the individuals recovered from around the funerary palaces sustained less childhood physiological challenge productive of skull porosities. Fewer individuals were affected, and those who were had less anatomically severe lesions.

Discussion

Although both series evince noteworthy levels of pathology, the royal tomb sample has more severe lesions and a higher frequency of affected individuals with a vault porosity score of two or more. Strictly speaking it can only be said that a group difference in vault porosity frequency and severity exists in the recovered material. Therefore any interpretive scenarios are admittedly speculative.

As a starting point, and tentatively accepting Stuart-MacAdam's (1985) interpretation, it is worth noting that there is a difference in two adult groups for a lesion hypothesized to occur in childhood. In a hypothetical society with high social mobility, one could reasonably expect no difference between adult groups for a childhood lesion. In one without such equality such differences might be expected to „cluster“ in adulthood groups, assuming that the social position of children and adults was somehow connected. If porosities associated with diploic expansion do represent a childhood lesion then they can be seen as an osteobiographical tool that allows the social „tracking“ of individuals or groups in some selected circumstances.

Does the inter-group difference *itself* imply that those from the two subsites are true samples from distinct „populations“ within which individuals are connected by a „principle“ like class, caste or ethnicity? Or is it artifactual? This is a relevant theoretical and statistical question, with implications for other research in similar circumstances. Stated another way, do the recovered site

differentiated individuals represent true samples, either random or non-random, of actually existing entities („populations“), or are they non-statistical fragments of the general population? This must be kept in mind in any interpretive effort. There is no evidence that the crania preserved by the excavators represent a special selected sub-set of the burials.

The reason for the disparity between these „groups“ may reflect institutionalized social structure. However, in order to knowledgably explore this possibility there would have to be a clear understanding of Early Dynastic social hierarchy and differentiation within strata. Unfortunately precise documentation for these is lacking. The emic status of either group is not known. There seem to be no later Egyptian references to internal social ranking in this early period, or to the custom of having current court functionaries buried at the time of the rulers (Baines, personal communication). The results of studies of later dynastic Egyptian society are consistent with there being four broad strata (Trigger 1983). By extrapolation the Early Dynastic individuals interred around the royal tombs and funerary palaces would have ranked below the ruler and royal family, nobles and high officials, and just above the „peasants.“ (The exceptions would be wives, if in fact they were interred, even in the case of Aha.) Grave goods and stelae have been interpreted as marking the royal tomb occupants as having primarily been the rulers' personal retinue, and as noted largely of servile status. The funerary enclosure group was composed apparently of minor officials and artisans as indicated by titles and the presence of fine copper tools (Petrie 1925). Some scholars, working in a presentist mode based on later periods, would interpret these individuals as a group as having higher status (Baines, personal communication). However the interpretation of status from funerary remains is always difficult (Ucko 1969).

Several biosocial models are consistent with the findings. If the funerary enclosure group consists of individuals from a strata or „population“ with higher ascribed status, then the results fit current normative expectations, namely that better health tracks with higher social status, all other things being equal. These individuals in childhood would have theoretically been at less risk for disease challenge, especially for chronic conditions related to nutrition. In this case the usual interpretation of the royal tomb group as simply servants would be accepted. This is attractive but builds in the assumption that court „servants“, companions of the king, were recruited from the „poor.“ A 'class' explanation works no matter when the lesions appear in life, or their aetiology(ies), and only requires that the defects represent evidence of a pathological condition. For example if the lesions were acquired in adult life, then it would suggest that those buried around the king did work which placed them at greater risk.

If the royal tomb folk were in origin from a group of ascribed higher status then the results would require a less straightforward explanation. One of these would be that the higher status permitted the parents to invest more in sick children; thus more of them survived to adulthood, if the diseases in question were life threatening. A higher lesion frequency in an adult cohort in this instance would indicate a higher survival of challenged individuals who are missing from the other group, in which „better health“ is actually an illusion. This is an example in one sense of what has been called the osteological paradox (Wood et al. 1992). The adult status of the royal tomb occupants in life may deserve further enquiry. It may be important to consider the burial adjacent to the rulers as being significant, irrespective of titles. The concept of status may need rethinking for Early Dynastic Egypt. If the lesions occurred in adulthood, some special exposures due to custom or ritual might have to be invoked to explain why a group with higher status had more pathology, unless the group was endogamous and the lesions are related to genetic conditions. The osteological and other paradoxes make it difficult to know if the pathology can be used to construct an interpretation, since the ontology of any models may be inappropriate.

Another interpretation is plausible and employs the concepts of phyles described from ancient Egypt (Roth 1991), and hereditary occupational castes linked to kings or elites, the latter even known from more recent societies (see Levzion 1973 and Tamari 1991). The evidence suggests that phyles were clan-like hereditary based work associations associated with kingship (but not exclusively), and may have developed from predynastic totemic clans. Symbolically in the Early Dynastic world it is conceivable that phyles or phyle-associated groups would have been expected to assist the king in the afterlife. The royal tomb and funerary enclosure groups may be of the same social rank, but horizontally differentiated by the professions of the households into which they were born or recruited as young children, thereby participating in the work associated with these domiciles or homesteads.

Young artisans (and other non-farmers) would have been less exposed to parasitic infections and their nutritional sequelae than agriculturalists or share fishermen exposed to Nile alluvium. There is positive evidence for childhood occupation differences; the footprints of children approximately six years of age have been preserved in plaster at some elite Early Dynastic building sites (Baines, personal communication), and children are seen in paintings of farming activities. An occupational model would explain the group difference if the royal tomb folk were drawn from farmers, and the funerary enclosure sample connoted artisans or at least non-farmers, both perhaps connected to the kingship, assuming that the lesions are of childhood origin. Differences would stem from occupation irrespective of class status. It is not unreasonable to postulate that the

personal retinue of the king would have been a part of a household unit that also farmed, and that the adults in the household as children helped in food production, thus sustaining a higher exposure to parasites, than the children of non-farmers. Although there is no described direct evidence that the samples in this study were from phyles, the individuals represented did perform broadly different kinds of work. Although it is known that phyles in the Old Kingdom rotated different kinds of work, they may have initially more confined to one occupation.

Another possibility is that the royal tomb people comprised a hereditary companion servant caste, fed from infancy a ritually prescribed, but nutritionally deficient diet, and perhaps secluded from the sun, in a kind of *purdah*. However, there is no known documentary evidence for such a practice, or reference to it in later texts (Baines and Roth, personal communication). Also there are no long bones to assess for rickets.

The occupational model receives additional but indirect support from an analysis of linear hypoplasias on the first and second molars. One would expect markers of severe physiological stress to track with each other. However, there is no statistical difference between the royal tomb and funerary enclosure samples for this lesion at any level. The frequency of individuals having first molar defects was 35.0 and 36.4 percent respectively [$n = 22$ (RT) and 40 (FE); Chi square = 0.012; $p = 0.914$]; and for the second molar 42.1 and 41.7 percent [$n = 24$ (Re) and 38 (FE); Chi square = 0.001; $p = 0.973$]. The average number of lesions for each tooth in the two groups was also statistically insignificant ($p > 0.05$). These findings would seem to show that the group contrast in porosity lesion frequencies does not reflect a difference in overall (general) insult to physiology. Otherwise it could reasonably be expected that the royal tomb sample would have had more linear hypoplasias; in fact if true this would lend somewhat more support to an explanation of a status difference in origins, since a general and specific indicator of childhood stress would both have high values. Instead a difference is only seen for the variable that can most easily be associated with a particular lifestyle/ecology and disease risk.

There is some other supportive evidence as well. A Dynasty I Thebaid sample from a non-royal context was evaluated for the prevalence of vault porosities ($n=36$). The percentage of VPP1 lesions was 63.9%, and 47.2% for VPP2. The prevalence of cribra was 37.1%. These percentages are no statistically different from those in the royal tomb sample ($p > .05$). These individuals were from a non-royal context, and likely peasant farmers. In any case they were non-royal. The fact that the porosity pattern of the non-royal group and one from a royal context are indistinguishable could be interpreted as suggesting similar kinds of childhood exposure. As it has been argued parasitic diseases would have

been greatest in those most exposed to the Nile and its alluvium, and engaged in work requiring such exposure.

The recovery of more data from predynastic and dynastic contexts may provide the information with which to make better social inferences about these findings. No definitive conclusions are possible at this time. However, based on a synthesis of the available evidence some variant of the model incorporating horizontal occupational differentiation, with or without the concept of hereditary caste, would seem to have more power in explaining the differences than a simple hierarchical class model, using the hypothesis that the lesions are of childhood origin.

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Candelaria Martín del Río Álvarez

Predynastic Hairpins and Combs from the Necropolis of Naqada: Preliminary Conclusions

Recent works show the importance of items of everyday life, left in the background by previous generations of Egyptologists. They have, nonetheless, the possibility of providing a large quantity of information about all activities of ancient Egyptian life. Personal care objects are an example of those aspects. Although toilette utensils found at historical sites have already triggered an important range of studies, there is a great gap of knowledge about its predynastic counterparts, which result in great difficulty in determining the function of different objects found in the archaeological register.

Although a considerable amount have appeared in funerary equipment in predynastic tombs, hairpins and combs have never been the subject of academic research (Martín del Río Álvarez & Almenara Rosales 2004). They show a great range of decorative features, among which, theriomorphic designs play an important role. There are a great variety of patterns, and they show us the deep interest that the first Egyptians had in the animal world, and their preferences for certain species in different periods. Another interesting aspect would be the identification of the function of each one in the environment of personal care, and we should add their symbolic meaning to an ideological and social context. For this reason, it is necessary to make a study, in which the first step would be the creation of a corpus for these objects, that would facilitate their chronological organisation and typological classification.

One of the biggest problems in carrying out this corpus, as is usual in works of this type, is the difficulty to ascribe an exact chronology and origin of pieces kept in Museum storerooms. This is because the great majority come from clandestine or unreliable excavations that were carried out between the end of the 19th century and the beginning of the 20th, arriving at these institutions as private donations. To find a solution to this problem, and to obtain a first chronological

classification of some pieces, thus allowing us to make a comparison with other sites or objects with unknown provenance, we have decided to focus the first part of our enquiry on sites with reliable information.

The present study collects preliminary conclusions obtained from the analysis of the Naqada cemetery, excavated mainly by W.M.F. Petrie in 1885. We have chosen this site because of the great quantity of material found there, and of studies printed by Petrie and other authors. Nevertheless, we have taken into account the particular limitation of works that were carried out at the end of the 19th century, and we have introduced new chronological parameters and researches. We understand that this test is only indicative, since the study of a unique site influences results because of its temporal limits and the repetition of material typologies associated with a specific geographic environment.

In reference to specific literary sources used in this analysis, we have focused on texts by William M. F. Petrie, including his excavation diaries, and supplements of the same excavation made by Elise Baumgartel and Joan Crowfoot Payne (Baumgartel 1970; Payne 1987; 2000). Following these sources, we found 192 objects, of which 172 come from different museums collections. The greatest number of pieces came from the Petrie Museum (University College London) and the Ashmolean Museum Oxford, and to a lesser extent, from Musées Royaux d'Art et d'Histoire Bruxelles, Staatliche Museen Berlin and the Manchester Museum.

At the moment of working with this material, we encountered two specific problems. Firstly, we had to take into account the general state of preservation of some pieces, and as to whether or not they concealed some form of decoration, or if fragments belonged to objects already assigned for study. Furthermore, a so called hair-comb has been removed from the present work, because it is an item with a double function, it needs further analysis that will be carried out later. Secondly, manufactured material is not always precisely described in catalogues. Therefore, with the absence of more specific information, we decided to unify bone and ivory as a single study variant. In terms of chronology, as we have found relative dates using Petrie's SD, Kaiser (1957) or Hendrickx (1996; 1999) systems, we decided to unify them under the latter.

Naqada Cemetery presents a good point of reference for this analysis, although we should take its particularities into account. As its extensive chronology occupied all phases of predynastic time (NI – NIII), we should sum the total quality of its numerous tombs, which present interesting and diverse funerary goods, with "exotic" or "luxury" items, such as stone vases, copper goods, ivory artefacts, and semiprecious stones, like lapis lazuli (Hendrickx & Bavay, 2002) mixed together with ordinary items of daily use.

With respect to the representation of funerary goods in 1310 tombs excavated, we found 123 that contained hairpins and combs. There are more hairpins than combs, and usually one to three pins or combs per tomb were found. The appearance of both items in the same burial was unusual, as they were found together in only 13 tombs. Nevertheless, curiosities have appeared, such as in tomb number 162. Here we found five combs but only one pin. On the other hand, there were eight pins and no combs in number 1224.

Chronologically, combs appear in great number in NIC, with 16 examples, following NIIB y NIIC, with 9 each; while in NIII, there were none. From a total of 88 combs, only 14 presented problems in defining shape, due to their poor state of preservation. As to the others, 22 are undecorated and the rest have diverse designs. Among them, the most relevant is the theriomorphic motif (birds and mammals) which is represented on 27 items. Geometric and anthropomorphic designs are the least represented. From a chronological point of view, zoomorphic designs appear in all phases, with special reference to NIC, in which we found 9 examples – 6 birds and 3 mammals. Geometric designs appeared in NIIA, and anthropomorphic appeared only in NIIB.

As far as the measures, it has been detected that the average for the smaller is between 4 and 6 cm length, those of intermediate size measure between 6 and 10 cm, but the great ones between 10 a 17 cm. The great ones usually display designs that make them be attractive pieces

We found that the designs varied. The simplest in design are those whose bodies are rectangular, quadrangular, pointed or rounded. They are without any decoration at all. A few appeared with a notch on both sides of its body, or with incised lines over the teeth. We located curious examples exhibiting rows of teeth on both sides of the main body, and some authors suggest that they were used to remove lice, just like those used today. Despite, the majority present rather complicated designs, with geometric elements, such as rhomboidal and rounded segments, which were used as base for zoomorphic elements. Sometimes, birds appear in pairs forming a V with an individual in each vertex, or double pair may be placed one above the other. Nevertheless, representations of single birds are the most common. With respect the mammals, *bovidae* are the most common, among them two hartebeests (*Alcelaphus bucelaphus*) (Ash.1895.942 and Ash.1895.933) and one dorca gazelle (*Gazella dorca*) (Ash.1895.943) could be identified (Fig. 1c). On the other hand, anthropomorphic combs are special features that represents heads of bearded men, with eyes, brows and modelled ears, and lines of incisions in the neck area that appear to imitate necklaces (Fig. 1b). Only two examples of this type appear in the cemetery.

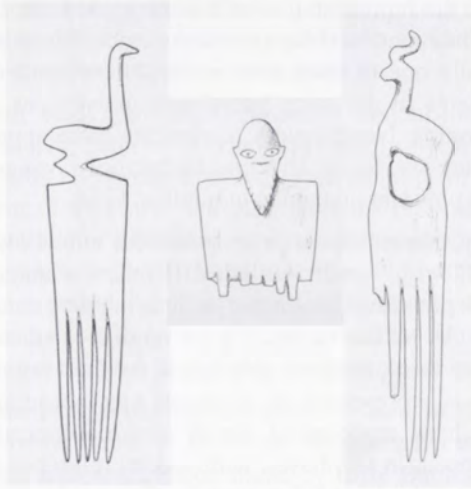


Fig. 1. Three examples of combs from Naqada. a) Ash. 1895.936, burial N1815. b) Ash. 1895.939, burial N268. c) Ash. 1895.943, burial N1687.

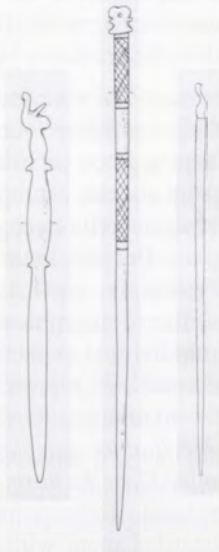


Fig. 2. Three examples of hairpins from Naqada. a) Ash. 1895.950, burial N1503. b) Ash. 1895.952 burial N1774. c) Petrie's type 47 (Naqada and Ballas, 1896: LXIII).

Hairpins are very fragile material, often appear broken into small pieces, which means that the appearance of numerous fragments, sometimes belonging to several units, make the identification of complete items for statistic purpose very difficult. For this reason, we only included those which came from an assigned tomb or formed a describable element as far as decoration is concerned. Needles have representation in all the phases, although they display a remarkable increase in NII and a drastic reduction in NIII.

Regarding its section, the round one predominates over the flat one in 75%, and with respect to its chronological frame, the last one is represented in outstanding form in NIC, and in a lesser number in the final phases of NII, disappearing in NIII. Those of round section are present in all the phases, although they are not identified in NIB and NIIA.

For its decoration, and in spite of the fragmentation, it is necessary to emphasize the high percentage of decorated hairpins that have appeared. Of 50 classifiable units, only 7 of them do not display decoration. The designs follow the same rank that the combs but with slight changes. Theriomorphic is the most common, counting up to 33 pieces. Next comes are the geometric, with 10 examples. The anthropomorphous one does not appear represented in the hairpins.

With respect to the zoomorphic, we have to emphasize the birds, with 29 units, whereas the mammals are only present in four cases. As a novelty, reptiles appear once, in a hairpin of flat section and very simple design, whose top shows a serpent in a slithering attitude (UC5265). Its tomb was dated in NIC.

Both birds and mammals are usually very schematized, which disables, in most examples, an identification of the exact type of represented animal. The case of the mammals is still more complex, because most of the designs display horns, including in some of them the head and the ears of the animal. Among the birds, some hawks and waterfowl have been identified. With respect to the geometric design, it usually goes accompanied by an animal figure, although there are some examples where it is the main design. In the needles of circular section, the most common is incised decorations (spiral and crossed line) at the top, normally under the carved animal (Fig. 2). In those of flat section they are usually separated segments, rhomboid or rounded, on which the theriomorphic decorative motif is based.

As far as the dimensions, its calculation is quite difficult because of the fragmentation degree that most of the pieces display. In some cases they have lost their ends and only a detailed recognition of each unit could give us a certain approach of its real measurement. However, with the data gathered in complete units, it has been detected that the average is between 14 and 16 cm, both for

those of flat section and round. The only case that does not respond to this average is a round hairpin that presents 20.3 cm (AM1895.952; Fig. 2b). In spite of this, and given the problem mentioned before, we cannot put forward a reasonable hypothesis and hope to have a greater number of complete units that confirm or not that average.

Conclusions

Considering that this article is a first step in the analysis of hairpins and combs in the site of Naqada, and that its results must be compared with data coming from other cemeteries, we have arrived at diverse remarkable points.

First, the site of Naqada, as it has already been indicated, displays a high number of tombs with funerary goods that could be defined as "rich", given the variety and amount of objects which they presented, as well as the inclusion of an important "exotic" or unusual number of items. Among them, the presence of copper objects and flint, personal ornaments made in semiprecious stones, several ivory elements, stone vases, etc. is emphasized. Next to these, it appears a great number of ceramic pots which have high quality. Therefore, if we consider that hairpins and combs appear in a reduced number of tombs and they do not seem to be a common element among funerary goods, we could establish that they were considered prestige objects.

On the other hand, the high number of combs and decorated hairpins seems to indicate that the predynastic Egyptians liked to decorate these objects. In fact, from our present point of view, we could be surprised with these elaborated designs. Though the decoration of the needle could be justified as an element with double function, the first one of holding the hair on and the second one as a hairdo ornament, whereas for us the comb is a functional object without ornamental necessity. Nevertheless, the pieces found in the site show an elaborated design and an exquisite execution, which along with their size, could demonstrate their use as items to hold the hairstyle with an ornamental reason. Petrie (1896: 47; 1927: 24) presented this suggestion already, and Keimer formulated a theory in 1952, in which he suggested that the combs of long teeth served like decorated elements in the masculine hairdo (Keimer apud Midant-Reynes 2000: 196; Nowak, 2004: 900). Therefore, it could be possible that the combs of long teeth could be useful to show some type of status or social position. The problem is the shortage of anthropological information that we have about the occupants of the burials, and therefore the difficulty to associate sex and typology of comb in the funerary goods.

Finally, to emphasize the role that animals had in the decorative range of combs and needles. In Ancient Egypt, nature had a great weight in daily life. The Nile and animals -harmful or not - which lived in their banks got to have such a

close relation with the human community, that they ended up taking part of its complex pantheon. No wonder the importance of the ecological element form of artistic expression, and therefore zoomorphic decorations supplanted other designs and got to form true iconographies associated power and religion. Such associations are clear at the historical time when we found the vulture or the serpent used as protective elements of the royalty, the hawk used to represent the pharaoh, and a great number of animals identified with gods. Although this seems clear for the society that followed the II Dynasty, diverse authors are trying to solve the great gaps they came across for the pre and protodynastic periods. To establish the difference between a decorative or ideological pattern in a design is something that needs further discussion; and so what it may seem a mere risky decoration of a bird or a mammal, could mean an important ideological reflection of a religious element or social status.

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Tell el-Masha‘la: A Predynastic/Early Dynastic Site in the Eastern Nile Delta

Archaeological investigation was conducted at Tell el-Masha‘la (Fig. 1) in the eastern Delta by a University of Toronto team, under my direction, from 2002 to 2004. The first season (2002) consisted of a pilot project of three weeks in length, while the second and third seasons (2003 and 2004) were each of six weeks duration. It is now understood that this denuded and flattened tell, which once bore evidence of later historic occupation, is now represented largely by a settlement sequence of Predynastic and Early Dynastic age. A limited area of this deposit has yielded a small number of burials within the early habitation areas. There is no evidence of burials having been amalgamated into a cemetery proper. The artifact assemblage, its distribution, and its extensive depth, attest to a relatively homogeneous population living on the site for a lengthy span of time during the Predynastic/Early Dynastic period. The ceramic corpus consists largely of Rough Ware made of chaff tempered Nile silt, with domestic types dominating the assemblage. The lithic material, although abundant, is surprisingly undiversified, consisting primarily of flint bladelets. Blades and microblades have also been found at the site, but these industries are not as well represented as the bladelet industry. A ground stone tool assemblage consisting of meager numbers of grinding implements and hammerstones has also emerged from the site.

The Nature of the Settlement Remains

Most of the Predynastic/Early Dynastic deposit at Tell el Masha‘la lies at a depth of 2.0 m to 2.5 m below the surface of the tell, well beneath an overlying cap of largely sterile sand. Only within the top ten centimeters of the surface is any later cultural material to be found, this representing part of a severely eroded occupation, likely Roman in date, and not distributed evenly across all areas of

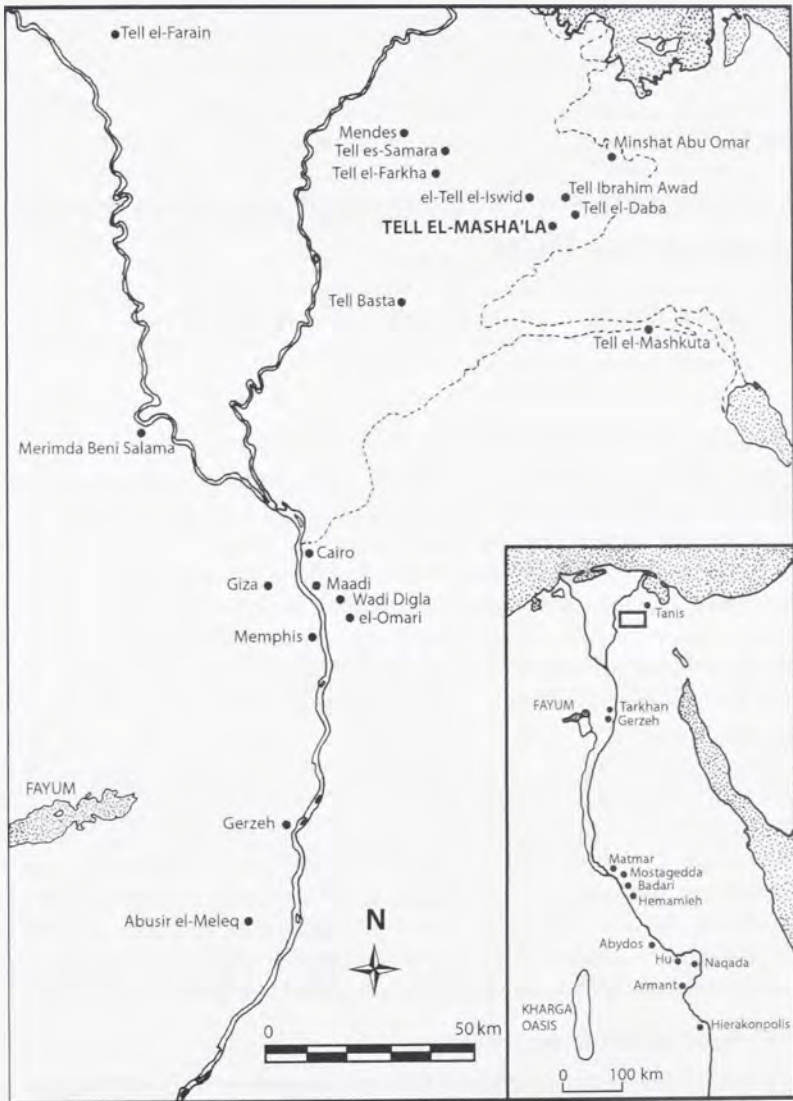


Fig. 1. Map showing the location of Tell el-Masha'la and surrounding area.

the tell. There is no evidence whatsoever of any cultural continuity between this Roman occupation and any previous or subsequent historic period. A small corpus of ceramic material has been recovered of the Roman occupation, which has not yet been studied in detail and which will not be discussed here.

As for the exact nature of the Predynastic/Early Dynastic settlement and its areal layout, this is not an easy matter to define. There is disappointingly little evidence for the organization of living spaces across this site, such as houses (or other types of structures), postholes, storage pits, or activity areas. This is surprising given the considerable depth of the deposit and the uniformity of its distribution across the entire existing tell. The basal depth of the cultural sequence has not been reached through excavation, but up to two meters of cultural deposit has been removed in some trenches, often until the rising water table forced the abandonment of further efforts. Even at this depth, there is still no indication of an end to the thickness of the deposit, and only further excavation below the water table, or auger drilling will provide the much needed information regarding the thickness of this occupational sequence. What is more remarkable perhaps is the extreme homogeneity of this cultural deposit. Despite its thickness, there is little change in soil matrix, little variation in its cultural constitution, and therefore not enough variation in its stratigraphic make-up that would indicate either a multi-phase occupation or a major change in the population that once occupied this site. It appears likely that this cultural sequence, capped and sealed so securely beneath its sandy layer, was formed by a group of ancient settlers who likely lived in this location relatively unchanged for a long, albeit finite period of time. The thickness and homogeneity of this settlement deposit provides new support for the likelihood of stable and peaceful populations living throughout the Delta during the Predynastic period, with little cultural evolution. The sites of Maadi and Wadi Digla are already known to show such a lengthy single-phase occupation (see Rizkana & Seeher 1989: 38-39).

Furthermore, the overall condition of the material remains at Tell el-Masha'la reflects, in character, a high degree of fragmentation within the habitation deposit. The categories of finds scattered within the deposit include: chipped flint tools, a limited amount of debitage, ground stone tool fragments, charcoal, various species of animal bone, an abundance of pots sherds, fish remains, and fragments of shell. There is a notable scarcity of whole objects of any kind (with the sole exception of bladelets, discussed below), and this extends to include whole vessels, which are very sparsely represented in the archaeological record despite the occurrence of substantial amounts of broken sherds across the site. The consistent blackness of the matrix in which most of the cultural material is found stands in sharp contrast to the overlying light yellow and largely sterile sands, and also testifies to the once active population that formed the site. The

types and distribution of the aforementioned cultural debris suggest that a number of varied domestic activities must have taken place in predynastic times, although in what precise contexts these may have occurred (inside houses, open air activity areas, etc.) are obscure given the general lack of defined living and work spaces. It can be assumed, for instance, that bladelets were manufactured on or near the site, from the presence of both cores and finished tools, but there are no activity areas to show where this process might have taken place. There is also no clear association between bladelets and their cores. Some butchered animal bone has been recovered, but again there is little evidence of the process of butchering itself.

Small Fortified Pits

Rare evidence of cultural process may be seen in the occurrence of small fortified pits (Fig. 2) distributed throughout the settlement area, which seem to represent a specific type of organized domestic activity. Other than the limited occurrence of burial pits or graves, they are amongst the few indisputable features to emerge from the site. Twelve of these small pits have been found at various locations across the site, specifically, along the western boundary, in the central part of the tell, and at the southeastern corner. It will be noted by their wide distribution that the pits do not seem to be restricted to one area of the tell, perhaps reinforcing the assessment of this settlement as a spatially homogeneous unit. All pits are small and circular with a diameter range of 22.5 cm to 35 cm at their surfaces, but they narrow with depth, so that in section they resemble deep bowls with rounded bases. Their mean surface diameter is 29.6 cm. Their depths range from 13 cm to 44 cm, with a mean of 25.7 cm. Some pits occur singly, while others appear in small clusters (see Fig. 2), but in no instance do the clusters resemble posthole patterning, as they are not in any linear, circular, or other geometric formation. It will be seen by the evidence collected from inside and around these pits that they were likely cooking pits, or more precisely, locations where food may have been prepared, cooked, and perhaps consumed.

There appears to be three different versions of the same basic pit type: (1) those with clay-lined interiors (Fig. 2.2, 2.3, and 2.5), where a thin layer of clay covers all or nearly all of the inside surface, (2) pottery-lined interiors without clay (Fig. 2.1 and 2.6), where layers of potsherds are very tightly compacted against the base and walls of the pit, and (3) a combination of a clay lining in the top portion of the pit, and potsherds lining the lower pit, including the base (Fig. 2.4). In the clay-lined pit (Type 1) the lining appears as a thin clay ring in plan, usually measuring about one centimeter thick at the top, but reaching two or three centimeters in thickness toward the bottom in most cases. In one rare instance (not shown) the lining measured five centimeters thick in a small portion of the base only. In the pits employing sherd linings (Types 2 and 3), the extent

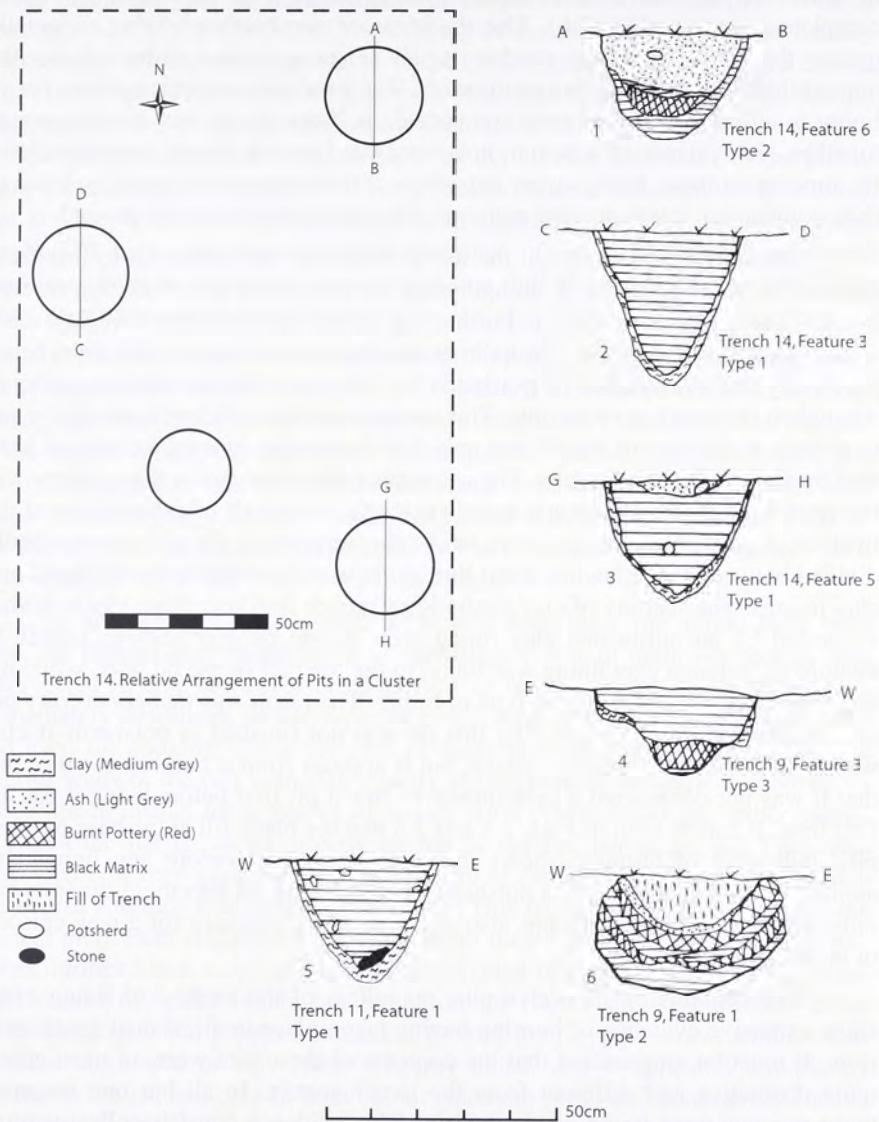


Fig. 2. Small fortified pits.

to which the pit is lined varies from partial coverage (Fig. 2.1 and 2.4), to more complete coverage (Fig. 2.6). The thickness of the potsherd lining is usually greater than the clay lining, reaching up to seven or eight centimeters, but the normal thickness is about five centimeters. The potsherds comprising this type of lining in all cases are extremely compacted, as if the sherds had been cemented together. No evidence of a mortar, however, was found in these conglomeration. In some cases these linings were extremely difficult to trowel apart, and due to their compaction it was an easy matter to lift them whole out of the ground.

It could be presumed that the use of both clay and potsherds to line these features provided a means of strengthening the pits, as all pits were dug directly into the sandy matrix of the site. Furthermore, it may be surmised that clay was a scarce commodity at Tell el-Masha'la or one that was not easily attainable, hence prompting the substitution of potsherds for clay in some instances in order to strengthen the interiors of the pits. This seems especially evident in linings begun in pottery at the base of the pit and only finished in clay toward the top, as testified by three of the twelve pits. The assumption that clay rather than pottery was the preferred choice of lining is based on the fact that half of the pits (six of the twelve) show a clay lining only, while the remaining six pits were equally divided between those having sherd linings only and a combination of sherd and clay linings. The scarcity of clay for building and/or finishing these pits is further suggested by an unfinished clay lining seen in one pit (not shown; Trench 9, Feature 2), where a clay lining was found in the top part of the pit only, while the bottom portion was bare of any type of lining. The result was that about forty per cent of this pit was unlined. Why this pit was not finished in potsherds if clay was not available remains a mystery, but it appears from a number of other pits that it was not considered a prerequisite to line a pit first before using it for the first time. It can be seen in Figs. 2.1 and 2.6 that the black fill at the base of these pits, indicative of burning, shows that they were used before any lining was applied. Then it appears that a potsherd lining was placed into these two pits not only to fortify them but perhaps also to create a fresh surface for a new episode of burning/cooking.

The contents of all twelve pits, regardless of the method of lining used, show extensive evidence of burning having taken place in all of their small interiors. It must be emphasized that the contents of these pits were, in most cases, quite distinctive and different from the trench matrix. In all but one instance, burnt remains were found inside the pits. This evidence consists collectively of ash and charcoal within the interior matrices of the pits, a darker matrix inside the pits rather than outside, burnt animal bone, fish remains, animal teeth fragments inside the pits, and burnt pottery, also in their interiors. The burnt pottery may be characterized as two types: (1) small, fragmentary, and blackened pot-

sherds inside the pits, possible evidence of the pots themselves that were used in cooking, and (2) the compacted sherd lining of the pit itself, which was usually brick-red in colour, thus resembling burnt or fire-reddened brick. There can be little doubt that considerable burning took place inside these ancient pits, but the presence of burnt faunal remains inside them testifies specifically to the cooking of food, specifically meat and fish. Only by dry sieving the matrix of the pits in many instances were small bits of burnt faunal material recoverable. It is likely that the butchering of small game prior to cooking may have occurred at the location of these pits because of the presence of small flint fragments found inside and outside six of the twelve pits. Some flint fragments were so small that many were recoverable only by sieving.

Further evidence to be considered in the proper interpretation of these pits is the appearance, in two instances, of blackened circular patches of soil containing fish bone and animal bone fragments immediately adjacent to the pits and at the surface level of the openings. This suggests that the contents of these pits (or perhaps the pots that were used with them) were emptied out for re-use after one or more cooking episodes. Additional evidence for this sequential use and re-use is seen in the layering of certain pits that were not emptied out, but, redressed or re-fortified for further use, as is particularly evident in Fig. 2.6.

In attempting to assess more accurately how these pits might have been used, the present-day Egyptians from the village (some of them workers on site) were asked if they had ever seen this type of feature, and to my surprise they immediately described similar types of pits, which in recent memory they built and used for cooking. Their versions of these pits are larger, but they line the interior walls of the pits with clay exactly as observed in the ancient contexts. A fire is made inside, using pieces of wood, dried cotton stalks and other plants, and then the pot is placed directly on top of the fire inside the pit. They also described how they make a hole at the bottom of the pit on the north side to catch the breeze and thus feed oxygen to the fire. (This feature was not observed in the ancient pits). Furthermore, when asked where they obtained the clay for the pits, I was informed that today clay could be collected in limited quantities by scraping the sides of nearby canals, but that before the High Dam was built, clay could be obtained in much greater abundance. One of the Egyptian crewmembers also obtained a sample of clay from a nearby canal, and it appeared remarkably similar to the ancient clay in both colour (medium grey) and consistency (heavy and fine grained).

Were it not for this strong ethnographic parallel and the immediate familiarity of these features to the modern inhabitants of the site, one might be tempted to seek alternative or varied uses for the predynastic pits, but since the ethnographic account 'fits' the archaeological evidence suggesting cooking features,

there seems little reason to question the function of these pits any further. The small size of the ancient pits should be taken as an indication that small cooking vessels were used in the predynastic pit fires, and also, the limited size of both pits and cooking vessels might suggest that cooking was done on a small scale as would suit one or two individuals or perhaps a small family group. Depending on what was cooked, the small pits in limited numbers may indicate, further, that large quantities of certain types of food (meat or fish, for example) were not readily available for cooking and consumption at any one time.

Adding to the probability that the pits were cooking installations is the fact that some of the whole vessels at Tell el-Masha'la have been found to have blackened bottoms on the exterior, as if they had been placed directly on top of a fire. Numerous blackened potsherds have also been found across the site, which likely attests to the use of pots in small pit fires. As for the source of the clay for these pits in predynastic times, little may be said at present, except that clay was likely as limited or as inaccessible a resource in ancient times as it is today. It has been said of the clay used in similar pits at el-Tell el-Iswid (also a fine grey clay) that it was 'apparently specially selected' (van den Brink 1989: 59). At Buto, where a large number of these pits have been found, the same fine grey clay has been noted, both inside some of the pits and in an apparent stockpile in one area of the site (see von der Way 1997: 64, Fig. 19).

It should be noted that in addition to el-Tell el-Iswid and Buto, two other sites in the Delta contain similar features in Predynastic/Early Dynastic deposits: Maadi (Rizkana & Seeher 1989: 59-61; Menghin & Amer 1932: 20), and Merimde Beni Salama (Junker 1930: 208, Pl. III; Junker 1933: 54, Fig. 3). The Type 1 and Type 3 pits as described above are represented at Merimde Beni Salama (cf. Junker 1933: Fig. 3), and the Merimde pits are compatible in size and shape with the Tell el-Masha'la pits. At Maadi, similar features have been termed 'mud holes' (Rizkana & Seeher 1989: 59), and these too, are undoubtedly consistent in size, shape, and construction with the Tell el-Masha'la fortified pits, even to the varying use of clay and potsherds for lining these pits. The function of the Maadi pits, however, has not been determined with certainty, and a number of functions have been proposed, ranging from postholes to stationary mortars, in the case of the sherd-lined pits. Only one of these features, it seems, has been assessed as a cooking pit on the basis of '...having been burnt red and filled with ashes' (Rizkana & Seeher 1989: 60). In fairness to the proposed theories of postholes and mortars, they have been considered for the Tell el-Masha'la pits but rejected. As noted above, there is no patterning of the pits at Tell el-Masha'la to indicate posthole use, as is the case at Buto (von der Way 1997: 68, Fig. 28), where the building of huts with these small pits is strongly indicated by the patterning of the holes. As noted, there are also a far greater

number of pits at Buto (about 150) than at any other site, as would be expected in the construction of huts. At Tell el-Masha'la, the bowl shape of the pits do not suit their use for postholes, as one would expect more vertically descending pits if this were the case. Furthermore, at Tell el-Masha'la there is no evidence of wood of the required diameter that would fit these holes (or indeed of any wood-based constructions).

As for the mortar theory, this might be applied to one or two of the Tell el-Masha'la pits, were it not for the universal evidence for burning in all of the pits, be they clay-lined or sherd-lined. Furthermore, as we have seen, all pits but one at Tell el-Masha'la contained burnt organic and inorganic materials in and/or around them, but even the single empty pit showed the telltale red burnt lining. It seems, however, that at Maadi, the stationary mortar theory for the sherd-lined pits is partially convincing and should not be discarded, based on the facts that (1) separate hearth features, quite different from the 'mud-holes' were found, which were evidently used for burning/cooking, and (2) in one instance a sandstone grinder was found inside one of the sherd-lined pits (Menghin & Amer 1932: 20), indicating that some grinding might have taken place inside the pit in question. At Tell el-Masha'la separate hearth features have not been found, thus supporting the evidence that small fortified pits were used exclusively for cooking and burning. Furthermore, grinding implements were not found in association with any pit at Tell el-Masha'la, giving no reason to suggest their use as mortars. Taking into consideration all of these varied indications of functions for these small pits, it seems logical to assume that they had no single universal use across contemporary sites in the Delta. In fact, the combined evidence from the four sites suggest that the pits may have served different functions in different regions, and perhaps, at least in the case of some of the Maadi pits, varying functions during the lifetime of any given pit.

Human Burial

In three seasons, only seven Predynastic/Early Dynastic interments were uncovered within the Tell el-Masha'la settlement, thus attesting to the sparse nature of the burial remains. As already noted (Rampersad 2003: 185), burials at this site are restricted to its western borders, and all were found consistently at depths of 2.0 m to 2.5 m below the surface of the tell. The appearance of the burials is typical of predynastic remains throughout Egypt at this time, although there are a few noteworthy characteristics of the Tell el-Masha'la interments. All bodies were in a contracted position and lying on their left sides (examples, Figs. 3 and 4). There was little degree of consistency in the extent of bodily contraction; some were more tightly contracted than others, and in two cases, the remains were so badly displaced that it was difficult to judge the original degree of contraction. The preferred orientation for the body, in five of the seven exam-

ples, was for the placement of the head at the north, feet at the south, and eyes 'looking' toward the east. In two of the seven burials the bodies were slightly skewed from this preferred direction (e.g. Fig. 3), with the head and feet to the northwest and southeast respectively. It is important to note that most inhumations lacked evidence of a grave pit. Only two discernible grave pits were found: one was an oval feature measuring 1.10 m x 0.62 m, with a depth of 0.30 m, while the other was a rectangular grave with rounded corners, measuring 1.96 m x 1.02 m, with a depth of 0.76 m. Both of these pits, found in the 2003 field season, contained interments. These pits were very noticeable as blackened fill within the lighter coloured sand, and there was no evidence whatsoever of these features having been fortified or embellished in any manner after having been formed. The logical conclusion is that the pits were hollowed out of the sand, and the bodies placed directly into them.

During the excavation of all burials, the bone was found to be extremely fragile due to a very poor state of preservation. The left side of most individuals, i.e., the side upon which the bodies were placed initially, was largely disintegrated into the sand. The right sides of most individuals were fragmentary, often resulting in less than half of the total burial remaining for study. In the 2004 field season, preliminary osteological analyses conducted on the bodies *in situ*, and subsequent to lifting, showed advanced stages of weathering in most bones, to the extent that the interiors of long bones in particular, had disappeared, and were replaced entirely by sand. Cracking and splintering of bones was an almost universal feature of most of the burials. Root marks were also commonly observed on bone cortices. Of the teeth that were available for examination, some were found to have cavities ranging from pin-sized (in the case of one possibly young individual), to slightly larger abscesses. It was not uncommon to find teeth with completely worn cusps or enamel, leaving the dentine exposed in some cases. Other than varying degrees of tooth damage, no evidence was found otherwise for pathologies or trauma in any individual.

Ageing and sexing of the bodies was attempted during the 2004 season, with limited results, due to the fragmentary nature of the remains and the lack of enough diagnostic bone (pelvis, skull) and teeth. Ageing and sexing was attempted in two stages, first while the bodies were still in the ground, and then again subsequent to lifting. After lifting, the problem of studying the bones was compounded by the fact that the remains had fragmented further during the process of lifting. This was especially detrimental in the analysis of skull suture fusion, for example. In four of the seven cases, however, individuals have been identified tentatively as female, one of these being the body shown in Fig. 4. The gender of the other three individuals remains indeterminable. As for age, one in-



(Vessels not to scale;
See Fig. 5.6 and 5.5)

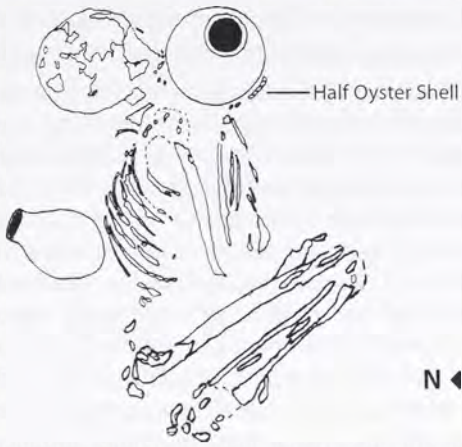


Fig. 3 - top; Fig. 4. - bottom. Burial with clay mask on skull, possible Sub-adult female; trench 18, feature 1.

dividual (not shown) was estimated to be between 15-35 years old on the basis of the dental analysis. In addition, the individual shown in Fig. 4 is assessed as a possible sub-adult, but no age determination could be made.

Finds in direct association with any remains were either scant in some cases, or non-existent in others, with only one exception of a burial with intact grave goods (Fig. 3). The items in this burial consist of two whole vessels, one before the face of the deceased, and another behind the spine. The overall aspect of this burial is strikingly similar to those found at the three sites of Maadi, Wadi Digla, and Minshat Abu Omar. In addition, three fingers of the right hand of this individual (Fig. 3) were placed carefully into half an oyster shell, which lay partly beneath the vessel near the individual's face. The fingers of the hand were upturned. Given that the bones of this individual were just as badly weathered and fragile as other burials, it is fortunate that the vessels survived intact. The interment itself seems to have been minimally displaced, however, which may account for this fact. In at least one other instance (Fig. 4), a strong argument may be made for the likelihood that vessels were placed close to the body, but in this burial the pots were subsequently crushed and displaced. In this loosely contracted interment a large sherd can be seen behind the spine in a manner reminiscent of one of the whole vessels in Fig. 3. In addition, sherds were found underneath the cranium, indicating the possible placement of a second vessel near the face. Many sherds were also located beneath the pelvic and thoracic regions, giving rise to the question of whether there might have been a third vessel. Two oyster shells were found in association with this body, one 0.5 m east of the skull, and another near the scapula immediately west of the body. It is assumed that these items underwent post-depositional displacement, as did the entire burial, but the parallels with the burial seen in Fig. 3 seem to be clear. It should be emphasized that these two interments show the largest number of grave inclusions found with any individual to date. Whether or not these two individuals were more important members the community, remains an open question, and cannot be answered based on the small number of burials found thus far. In short, the question of social stratification at Tell el-Masha'la can only be posed tentatively given the present data.

An interesting feature of the burial seen in Fig. 4 is the solid lump of clay that was, without doubt, deliberately buried with the deceased. It was found adhering to the middle parietal region of the skull, and its constitution and colour appear exactly the same as the clay found in the small fortified pits discussed above. Another burial showed this feature, that being the interment in the aforementioned oval grave pit (not shown), in which a similar large chunk of clay was placed immediately below the lower mandible of the individual. The puzzling

questions of why clay was placed in these burials, and what its significance (if any) near the vicinity of the face might have been, remain unanswered.

Another noteworthy feature of five of the seven burials was the occurrence of very thin white patches clinging to the bones in varying amounts over the entire body, including the skull. Close examination in the field revealed that the patches appeared to have a tightly woven appearance, and it is surmised that a type of fabric, likely linen, was used to wrap the deceased prior to burial. This covering over the bone was not only readily discernible in the field during excavation, but it was later confirmed during the post-excavation analyses of the bones. The probability of a burial shroud having been used is reasonable based on the fact that the fabric covers all areas of the bodies, including the skulls, fingers, and toes. If the fabric were clothing it likely would not have been used over the entire body in this fashion. Bodies wrapped in textile are known from Predynastic contexts elsewhere in Egypt, particularly at Tarkhan, where at least two bodies were described as 'bundled in cloth' and 'wrapped in a large quantity of cloth' (Petrie et al. 1913: 9, 10, and Pl. XXVII, 902). In these cases, however, linen is not specified. In addition, a single predynastic grave at Maadi has yielded a coarse linen shroud over the body, and the individual was subsequently wrapped in both skin and matting before burial (Rizkana & Seeher 1990: 19, Grave MA 37, Pl. II). Furthermore, at Minshat Abu Omar, several graves show possible or probable evidence for textile in the form of staining in the ground surface of the grave, but not in the actual preservation of textile (for examples see Kroeper & Wildung 1994: 4, 38, 43, 73, and 149; 2000: 64). At Minshat Abu Omar, also, linen is not specified, but as at Maadi and Wadi Digla, matting and skins were used more commonly than textile in burials. The questionable possibility of the use of matting in the Tell el-Masha'la graves occurs in only one instance, where red staining was evident underneath the deceased. The equally likely possibility of pigment (ochre?) having been used on the body should not be ruled out, as is suggested especially by the fact that the red staining was not uniformly distributed underneath the deceased, but only beneath the head, chest and pelvic regions. A significant point to draw from this discussion is that in burial samples much larger than that of Tell el-Masha'la (i.e., Maadi, Wadi Digla, and Minshat Abu Omar), the use of fabric is quite rare, whereas its use seems overrepresented in the small corpus of seven burials at Tell el-Masha'la.

The Ceramics

As noted previously (Rampersad 2003: 182 and Figs. 4, 5), the dominant types and subtypes in the ceramic assemblage at Tell el-Masha'la consist of domestic chaff-tempered Rough Ware, largely in the form of bowls and jars, as follows: (1) shallow elliptical bowls, (2) open mouthed deep bowls, (3) closed mouthed deep bowls, (4) necked jars with varying rim types and globular bodies,

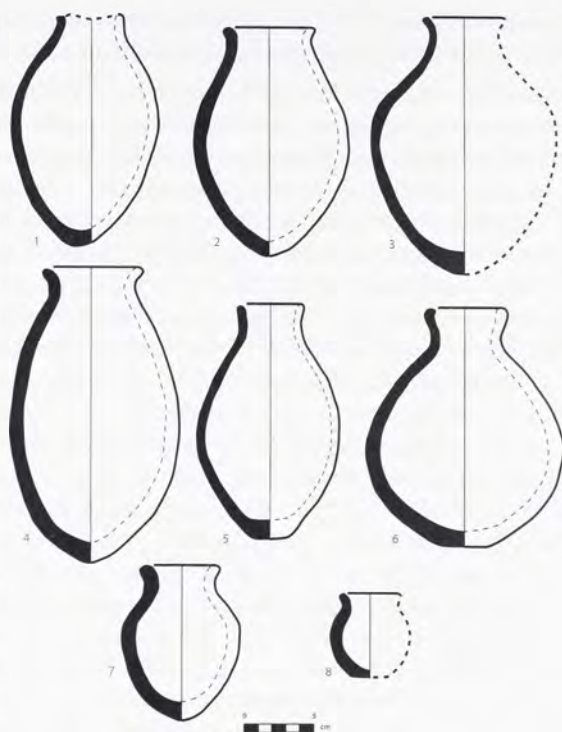


Fig. 5. Whole ceramic vessels.

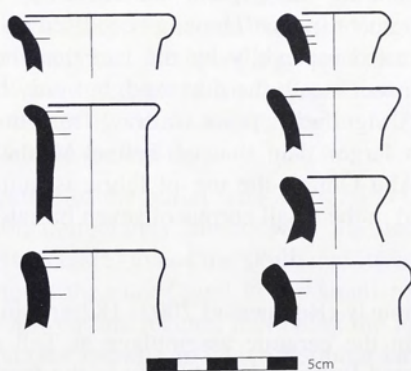


Fig. 6. Miniatur vessels.

(5) globular jars with short necks or without necks, (6) large thick-walled vessels, and (7) wide pan-like vessels with thick walls. An analysis of fabric types on the entire corpus was begun in the 2004 field season and is ongoing. Of about one thousand sherds examined thus far, the following general categorization of fabrics has been observed in accordance with the Vienna System (Arnold et. al. 1993: 168-182): Nile B2, 78%; Nile C, 12.6%; Nile A, 4.0%; Nile B1, 3.0%; Nile E, 2.0%; possible Nile D, 0.1%, and Marls, as yet unspecified by fabric type, 0.3%. Not surprisingly, the chaff tempered fabrics, Nile B2 and Nile C together comprise over 90% of the assemblage. It should be emphasized that these percentages represent about one-third of the entire assemblage only, and that a sub grouping of the main categories of silt wares has yet to be conducted for this site. These results are based on a field inspection of the sherds, using a magnification of 10X from a hand-held lens.

Much of the site's indigenous Rough Ware is characterized by red to dark red-brown burnishing (Munsell 2.5YR 4/8, 5YR 3/3 and 2.5YR 3/4), and is thus representative of the Naqada II Delta tradition. The meager collection of eight whole vessels from the site (Fig. 5) is typical of the coarse wares common throughout the settlement. All the vessels shown in Fig. 5 are chaff tempered. Note that two are half vessels only (Figs. 5.3, 5.8). As already seen, two pots (Figs. 5.5 and 5.6) came from a burial context (cf. Fig. 3), while the remaining six were found within the habitation debris. Both vessels from the burial were found to have fabric types of Nile B2, while the remaining six await classification. The more globular of the two vessels (Fig. 5.6) from the burial bore a trace of brown slip and burnish on the exterior at the neck. Two vessels from the settlement area (Figs. 5.3 and 5.7) bear a similar application of burnishing at the neck, which extends onto the shoulder of the vessel in Fig. 5.3. The pot in Fig. 5.7 is especially conspicuous for its blackened base, with a large area of burning extending from the base to the middle of one side of the vessel, as if it had been placed directly on or over a fire. Note, in addition, the asymmetrical appearance of the vessel shown in Fig. 5.1, due to the fact that the base is off-center. The rim of this vessel is slightly eroded.

Miniature vessels (Fig. 6), which hitherto comprised a very small proportion of the corpus, are now represented more abundantly, although they still constitute a small category. Consistent with the majority of the assemblage, most are of Nile B2 temper. A new and chronologically significant form is a fine and thin ware (Fig. 7) that bears a heavy red slip on interior and exterior surfaces, and is also burnished both inside and out. The cores of this ware, however, are dark grey to black in colour, often with significant amounts of mica inclusions. It can be seen from the three sherds depicted here that carination occurs at the shoulder of the vessels. Of the thin ware sherds analysed for fabric type thus far, most

have been found to be predominantly Nile A. In the general absence of stratigraphic differentiation within the settlement, this ware is important in providing some evidence for continuity in the occupation from the Late Predynastic to the Early Dynastic period, as elsewhere in the Delta (Tell el-Farkha, for example), it is known in, and dated from Naqada IIIa-c1 contexts and later (see Jucha 2003: 265). Forms almost identical to the three examples shown here have been documented at Buto (cf. Köhler 1998: 126, Pl. 31).



Fig. 7. Fine Red Ware (NileA).

Tell el-Masha'la has further yielded a small selection of sherds bearing incised, impressed, and punctate motifs, which occur one to three centimeters below the rim in most observed cases. Incised and impressed motifs were made into the wet clay, and are restricted generally to a single impressed horizontal line (Fig. 8.1), finger impressions around the rim of the vessel (Figs. 8.2 and 8.3), or impressed dots, also around the rim (Fig. 8.4). Frequently, finger impressions or dots were combined with a single impressed line, with the latter placed just above the impressed motifs, as seen in Figs. 8.2 and 8.4. In addition, sherds have been found with holes pierced completely through the vessel wall just below the rim (Fig. 8.5). It is assumed that these holes were made not for decoration but for the practical purpose of suspending the vessels (over a fire?), however, this assumption is not supported by any direct evidence.

Although it was hoped that Tell el-Masha'la would yield a good collection of potmarks, this has proven not to be the case. Only the following two examples have been uncovered: (1) a quadrangular marking formed of four single lines, all of which extend outward beyond their intersecting corner points (Fig. 8.6), and (2) a pair of lines arranged perpendicularly to each other and having the appear-

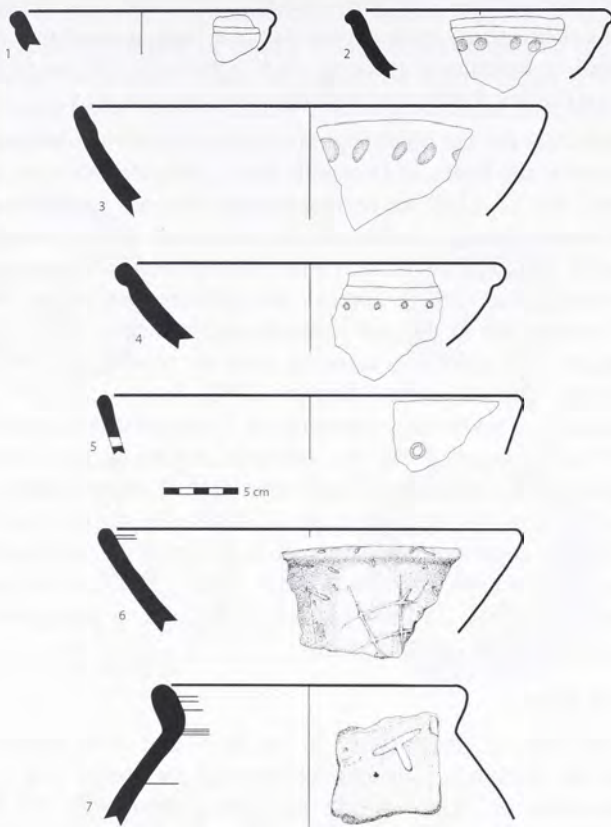


Fig. 8. Decorated rim sherds and potmarked sherds.

ance of a capital 'T' (Fig. 8.7). It is interesting to note that each marking occurs on a different vessel type at Tell el-Masha'la, the first having been made on a simple bowl, and the second on a jar. In the case of the jar bearing the 'T' marking, the rim of the sherd was broken above the potmark, however, the adjoining rim fragment was found, allowing for the accurate reconstruction of the pot's profile as shown in Fig. 8.7. As for the fabrics of these two vessels, neither represents the predominant Nile B2 type seen in the remainder of the domestic ware corpus. The sherd with the quadrangular marking is of the Nile C type, while the sherd bearing the 'T' marking is of Nile E. The sections of both sherds show a poor degree of firing, with colours ranging from brown to orange-brown at the

interior and exterior surfaces, and grey to black at the cores. As for the rendering of the potmarks themselves, both appear to have been incised into the wet clay with a blunt tool or instrument (reed or stick?), with the 'T' having been made with a somewhat thicker implement than the quadrangular sign.

Close parallels for the quadrangular mark are known from contemporaneous contexts outside the Delta, at Diospolis Parva, Naqada, Abydos, and Tarkhan (see Arnett 1982: Pl. XI, b1-8, for representations of these various marks). In the Delta, a few similar markings are known, but one in particular from Minshat Abu Omar (Kroeper & Wildung 2000: 21, vessel 800/10) bears a close resemblance to the one under discussion here. It appears that this marking on the Minshat Abu Omar vessel was applied to the pot's surface before firing. The second Tell el-Masha'la potmark (Fig. 8.7) also seems to have its nearest parallel with a mark from Minshat Abu Omar (Jiménez-Serrano 2003: Table 2, p. 249). As for the function or meaning of these early potmarks at Tell el-Masha'la, little can be said at present. The occurrence of the two different marks on two different vessel types might perhaps be seen as an indication that '...these early symbols had more than one meaning' (Arnett 1982: 6). Undoubtedly, despite the large corpus of potmarks already collected from sites all over Egypt, we do not have enough records of potmarks in association with their vessel types, as van den Brink has recently pointed out (1992: 267), and thus it is difficult to make valid assertions about the function of these early markings.

Small Ceramic Discs

A curious type of object found in the 2003 and 2004 seasons is the flat clay disc with or without a hole pierced through its center (Fig. 9). To date, thirty-nine examples of these objects have been found at Tell el-Masha'la, ranging in size from 2.2 cm to 4.5 cm in diameter. The average diameter is 3.1 cm, while the average thickness is 1.1 cm. Only six discs of the thirty-nine have openings pierced through the center of the object. All discs are made of the same coarse red ware that is typical of Tell el-Masha'la pottery, and it is likely that they were fashioned out of discarded potsherds. In many instances, the curvature of the vessel from which the disc originated is seen on one flat side of the discs, and is especially noticeable in the larger examples (see the profile of Fig. 9.3). The outer circumferences of these objects are worn and smoothed, indicating that they were deliberately shaped, although it is difficult to ascertain from a visual examination alone what tool was used in this task. Close inspection of the pierced discs shows that the holes were made by boring through both sides of the object, or more specifically, the opening was begun on one side, drilled most of the way through, and then finished from the other side. A good example of this method of workmanship can be seen in an unfinished disc (Fig. 9.4), which shows that piercings were begun on both sides but not completed. It is likely that

the production of this disc was abandoned because it was found to be too small to withstand a piercing without breaking. There is no doubt that the pierced discs are slightly larger in diameter than the unpierced examples, by 0.5 cm to 1.5 cm, and this may well have been a practical necessity to allow the object to withstand having an opening.

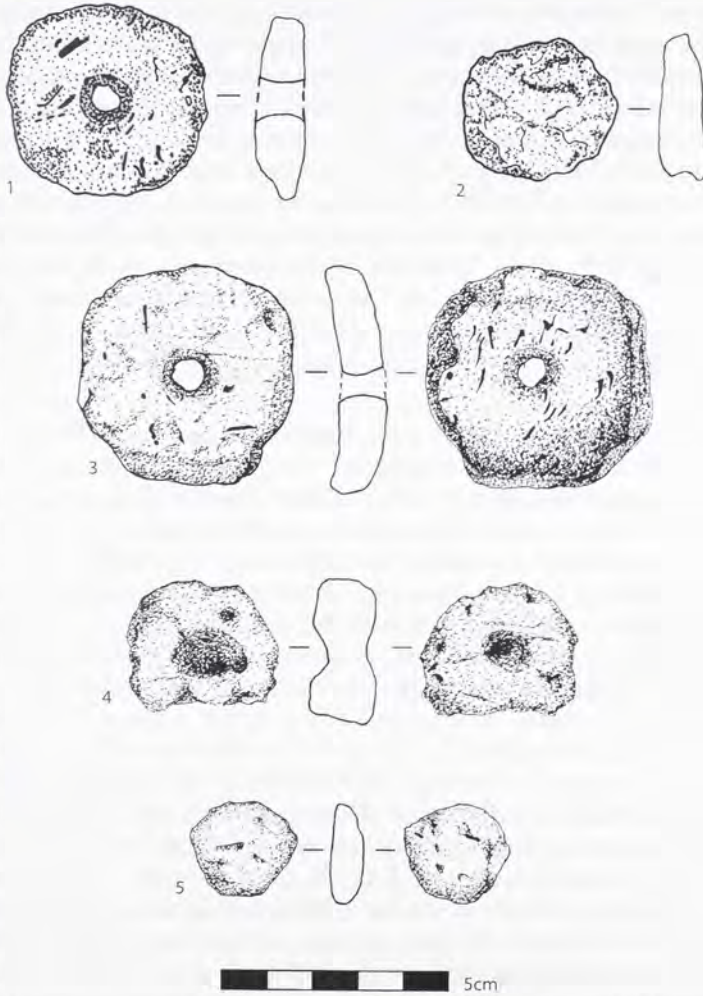


Fig. 9. Small ceramic discs.

The function of these objects at Tell el-Masha'la is still open to debate, as no material was found in direct association with any disc to indicate a particular use. Like most of the other cultural material, they have been found scattered amidst the settlement debris, mixed with broken sherds, faunal and other remains. Initially it was surmised that the discs with holes might have been strung and worn on the body (as ornamentation?), but given the availability of more attractive materials for use as pendants (oyster and other shell, for example), this explanation seems unlikely. It also does not account for the discs without holes. Perhaps all were used as tokens or gaming pieces, in which case the piercing of the discs may be explained as a stylistic preference rather than as a functional necessity. Gaming pieces are known from predynastic times in Middle and Upper Egypt, although they are not precisely of the same appearance as the Tell el-Masha'la examples. Tarkhan, for example, has yielded gaming pieces of ivory that are round and flat on the bottom, but with a dome-shaped top (Petrie et. al. 1913: Pl. XIX, 3) however, flatter pieces are known (Petrie et. al. 1913: Pl. XIV, 38 and 39). The latter are compatible in size with the Tell el-Masha'la discs, ranging from 1.2 cm to about 2.5 cm. It is possible that the Tell el-Masha'la discs could be impoverished versions of ivory game pieces from Middle Egypt.

Three other sites in the Delta, Maadi (Rizkana & Seeher 1989: Pl. 2, 12-13), Merimde Beni Salama (Eiwanger 1984: Pl. 63; 1988: Pl. 60; 1992: Pl. 94), and Buto (von der Way 1997: Pl. 68, 164, 202) have yielded ceramic objects similar or identical to the Tell el-Masha'la discs, but at these sites too, it seems difficult to account for the function of both versions of these objects (pierced and unpierced), especially for those discs having holes. In some instances at Maadi, discs without holes were found *in situ* as pot covers (Rizkana & Seeher 1989: 12), but unfortunately, no *in situ* evidence exists for the use of pierced discs. Pierced discs at Maadi are assumed to have had a somewhat different function from unpierced discs, given the impracticality of having a pierced lid covering a vessel (Rizkana & Seeher 1989: 12). Similarly, for the Buto discs, a multi-functional approach assesses the pierced discs as spindle whorls, and the unpierced discs as gaming pieces (von der Way 1997: 202). Any possibility that the Tell el-Masha'la discs might be spindle whorls has been ruled out, on the basis that (1) the appearance of Predynastic and Early Dynastic spindle whorls is usually different, as they are generally thicker and heavier than these ceramic discs, and (2) in the Maadi and Merimde Beni Salama settlements, spindle whorls have been found in addition to these ceramic discs (Rizkana & Seeher 1988: Pl. 94-96, 52-53; 1989: 12; Eiwanger 1984: 54). Other proposed functions offered for the Maadi discs include net sinkers, and buttons for tying down nets or skins. Although these uses would account for the holes, none is supported by direct evidence at Maadi. This function cannot be considered for the Tell el-Masha'la

examples because of the virtual absence of nets, skins, or other materials that might have required securing. It should be noted that one of the Maadi examples bears two holes through the centre, resembling a modern button, while another has two small notches in the outer circumference. None of these features have any parallels in the Tell el-Masha'la discs.

Despite the apparently incontestable evidence from Maadi for the use of some unpierced discs as pot covers, it is difficult to imagine that the Tell el-Masha'la discs would have been used in the same manner simply because of their much smaller size. Some of the Maadi discs appear to have diameters of over ten centimeters, which is not nearly approximated at Tell el-Masha'la. At Buto also, the pierced discs are considerably larger than the Tell el-Masha'la examples. If the Tell el-Masha'la discs were used as jar stoppers, they would have been restricted to the miniature class of vessel or to jars with very small rim diameters of less than five centimeters. Since these types of vessels are very sparsely represented in the ceramic corpus, this would make the number of discs (as pot covers) seem rather redundant.

In short, the variations in size and style (pierced/unpierced, notched/unnotched, etc.) between sites make it difficult to find a universal use (or uses) for this object type. These differences, although slight, may indeed indicate varied uses for these objects between sites. It is also quite possible that these discs may have had multiple functions at all sites where they have been found. The only explanation that would allow for all the variation seen in these discs is the 'gaming piece' theory, where a non-utilitarian or non-economic use for such objects would permit any amount and type of variation in their form. If this were the case, perhaps one should consider the use of the discs as pot covers at Maadi a secondary or alternative use, second only to their primary function as game pieces or another type of item, for that matter. These considerations, while interesting, must be regarded as tentative until more can be learned about these objects.

The Flaked and Ground Tool Industries

Contrary to the initial expectation of finding a diversified tool kit at Tell el-Masha'la, the site has shown a marked lack of diversification in its flaked lithic assemblage. After three seasons, the same two tool types predominate: the bladelet and the microblade, although it is now certain that the microblade was not as abundant as the bladelet, and hence not as economically important as originally thought. Increasingly fewer numbers were found from 2002 to 2004. The number of whole bladelet tools (Fig. 10) has by now exceeded one hundred, with a much larger sample of broken bladelets having been recovered. All are made from pebble flint, and are remarkably consistent in size and shape, being

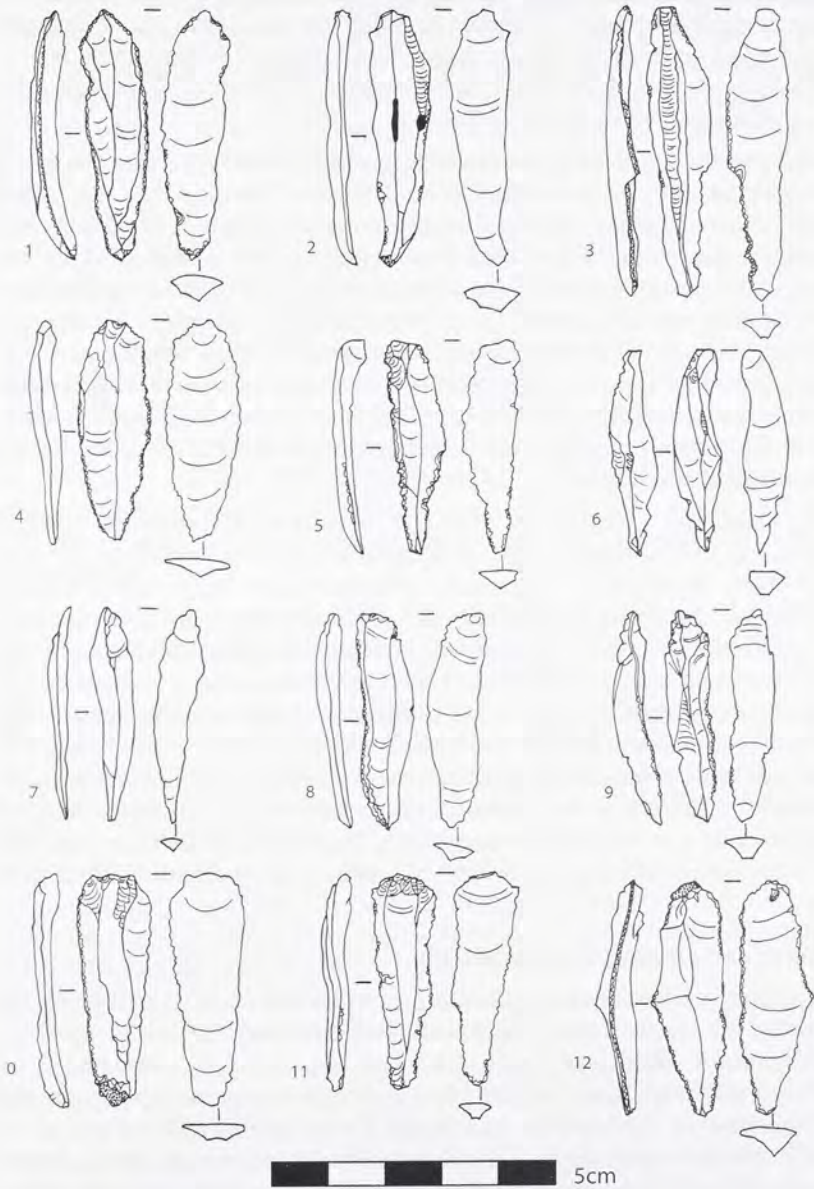


Fig. 10. Flint bladelettes (drawings by Margaret Maitland).

between 3 cm and 5 cm in length and about one centimeter wide at the center of the blade.

The economic function of the bladelet on this site is still not precisely known, but in other Egyptian contexts (see Baumgartel 1960: 42) they are thought to be small knife blades that might have been hafted into wooden handles for use as cutting tools, perhaps in a hunting context. Other uses for the bladelet especially for fishing, snaring, and the processing of food must also be considered for this site. Their use in the exploitation of a very limited resource base is proposed here as a reasonable explanation for the predominance of this single tool type at Tell el-Masha'la. In order to determine confidently what this resource base may have been, two studies are now necessary:

(1) a use-wear analysis of the tools, and (2) a faunal analysis of the remains of all species collected thus far. It can be stated with certainty that the faunal assemblage is characterized by a variety of mammalian species, whose remains, while abundant, are very fragmentary. Sheep and/or goat are definitely present, and pig may possibly be represented, and thus it is likely that domesticated animals were kept and slaughtered for consumption. As has been noted, many of the faunal remains are burnt, undoubtedly evidence of animals, as well as fish, having been cooked prior to consumption.

Turning now to the evidence for the manufacture of bladelets and microblades, it is disappointing to note that the archaeological record is not very forthcoming. Several good examples of bladelet cores (Fig. 11. 1-5) were discovered for the first time in the 2003 field season, attesting to a local production for some of the bladelets. Still problematic, however, is the low number of cores found in relation to the high number of bladelets, a situation that creates more questions than it solves. Does it signify, for example that only some bladelets were manufactured on site, while others were manufactured off site, or perhaps imported? Or is the archaeological record simply not representative in terms of numbers of cores once present on the living site? Furthermore, no activity or work areas have yet been uncovered to show where the bladelets might have been produced, and although a small number of flakes have been recovered, the site is strangely lacking in debitage and activity areas for flint or chert knapping.

Evidence for the ancient ground stone industry at Tell el-Masha'la has increased moderately throughout the three field seasons, especially in terms of the diversification of tool types known. Grinding implements, however, are not abundant at this site. In addition to hammerstones (Figs. 11.6 and 11.7), we now have upper grinding stones (Figs. 12.1 and 12.2) and lower parts of grinding kits (Fig. 12.3), although no whole examples of either upper or lower grinding stones have been found. The predominant stone type used for all ground stone implements was sandstone, but some quartz or quartzite examples have been found.



Fig. 11. Flint cores and hammerstones.

It is assumed that the upper and lower grinding tools were used for the processing of grain or perhaps the processing of pigments, although neither grain nor pigment has been recovered from the site. If grain was cultivated or processed at this site, it is surmised that it was not a significant economic factor, due to the rather low frequency of grinding implements and the complete absence of agricultural tools such as sickles. It can now be stated with certainty that Tell el-Masha'la likely was not an agriculturally based community in Late Predynastic/Early Dynastic times.

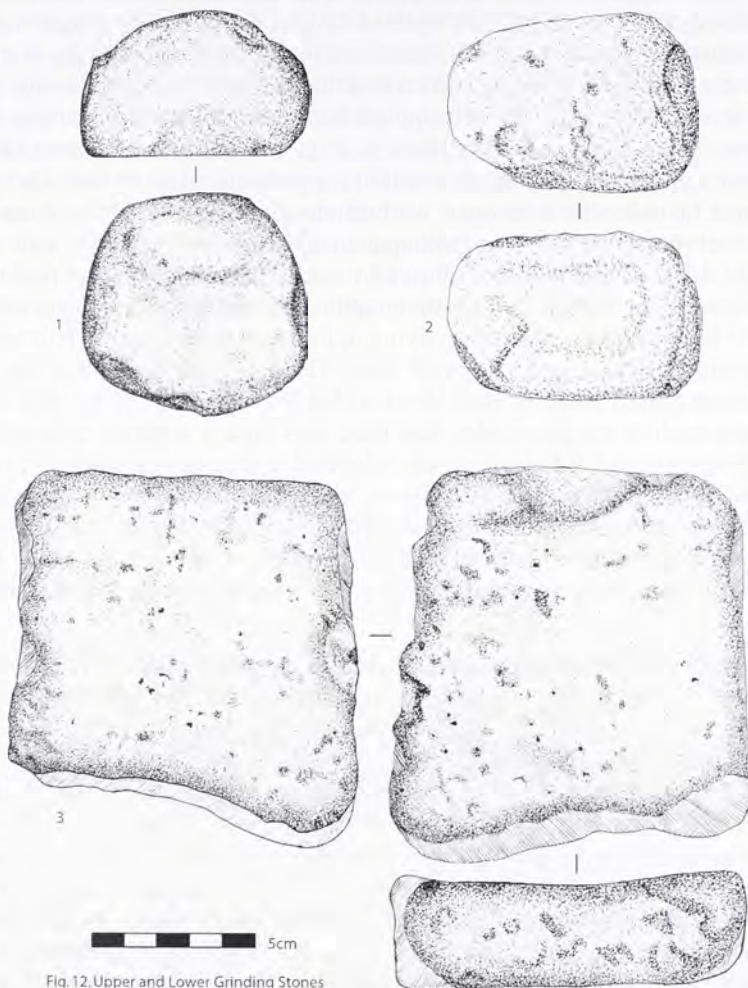


Fig. 12. Upper and Lower Grinding Stones

Fig. 12. Upper and Lower grinding stones.

Conclusion

Many characteristics of the Tell el-Masha'la culture indicate its affinity with the Buto/Maadi complex, not only in terms of the bladelet tools, but also

with regard to the ceramics and the nature of the settlement, insofar as it is understood. Although it was initially suggested that the black settlement layer might represent a destruction level (Rampersad 2003: 185), this is no longer thought to be the case. The reasons for this stem from the lack of certain types of evidence that one would expect from a sudden or forced abandonment of the site, particularly large amounts of whole or complete items still left in their living spaces. As we have seen the site is characterized by fragmentary evidence, many categories of which are very sparsely represented in the archaeological record. There is also no direct or indirect evidence of warfare or natural catastrophic events, and as such, the black layer can best be characterized as a midden-like deposit with the remains of a culture that once thrived there over an extended period of time. Furthermore, the virtual lack of stratigraphic differentiation at the site testifies to a single homogeneous population living in this area apparently with little cultural development for a lengthy span of time. There is little doubt that the ancient population buried some of their dead within their settlement, but this situation does not exclude the probability that there was once a separate cemetery on the tell. The area now left for excavation is located at the extreme southeast corner of this vast *gezira*, which is today almost completely built up by the expanding village of Tell el-Masha'la. It is quite likely, therefore, that the scarce number of burials found bordering onto the western portion of the tell, lie at the extreme edges of a larger burial ground further to the west, now inaccessible to the excavator.

The Late Predynastic/Early Dynastic age of the site is by now better attested from the ceramic analysis, which, although still in its early stages, allows for a tentative dating of the site from Naqada II to Naqada IIIc1. Subsequent to the Naqada II phase when the coarse red ware is predominant, certain ceramic forms, and some features of the pottery, emerge as chronologically significant, particularly the miniature vessels, which are generally protodynastic types, dating from the end of the Naqada II phase to the beginning of Naqada III. In addition, the fine burnished red ware, and features such as potmarks, do not appear in the Delta until Naqada IIIa, and extend to Naqada IIIc1. It seems evident that these ceramic traits are the latest to emerge at the site, and that the occupation did not extend much further in time than Naqada IIIc1. There is little evidence at present to support an age for the site as late as Naqada IIIa2 if, for example, we consider the complete lack of cylindrical wavy-handled marl jars, which are characteristic of this period at other sites in the Delta (e.g. Tell el-Farkha, Tell Ibrahim Awad, and Buto). Furthermore, by the very low frequency of Naqada III ware types, and sherds bearing the Naqada III traits, it may be surmised that the Naqada III phase at Tell el-Masha'la was of short duration, relative to the Naqada II period.

Acknowledgements

Mention must be made of all members of the Supreme Council of Antiquities in Cairo and at Tell Basta who have facilitated the work at Tell el-Masha'la, especially Mr. Magdy El Ghandour, and my antiquities inspectors over the past three seasons: Ahmed Said el-Kharadly, Mohammed Soliman Sayed Ahmed, and Anwar Ahmed Abdel Samad. Special acknowledgement is given to Amira Khattab and Amir Hassan A. Hamid at the American Research Center in Egypt (Cairo) for the valuable assistance with my work applications over the past few years. I am also especially grateful to E. van den Brink and A.J. Spencer, who provided me with important and unpublished information about Tell el-Masha'la prior to the first (2002) field season. My sincere thanks to Ms. Margaret Maitland for drawing some of the lithic material included in this report.

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Edwin C.M. van den Brink and Eliot Braun

South Levantine Influences on Egyptian Stone and Pottery Production: Some Rare Examples

Memories of Lech by Edwin van den Brink

My first memories of Lech are while my colleagues and I conducted the AUSE survey when in the mid-eighties we visited the expedition working at Minshat Abu Omar. Lech, year after year and always full of good humor and good will, enthusiastically and energetically would explain to our team what was uncovered at that particular point of the excavation on the gezira. Afterwards he would accompany us to the excavation house where Karla would usually show us the most recent finds uncovered in the graves. This viewing was then followed by lengthy discussions and exchanges of opinion, symposium-style in the true meaning of the word, that is accompanied by lots of food and liquid refreshments. Our team always left MAO feeling uplifted in intellect, spirit and body, and yes ever so slightly sad to abandon that small oasis of friendship and shared interests. We could then appreciate Lech's profuse knowledge, enthusiasm and dedication to his colleagues and students. He will not be forgotten by those who had the pleasure and privilege to know him and preserve his memory.

Introduction

Recent excavations at Tell el-Farkha in the eastern Nile Delta have revealed a group of eight calcite stone vessels from a single cache. The vessels were found upside down, probably where they had been placed in a single container of some organic material (possibly a reed basket) now decayed. The cache, derived from a settlement context on the eastern Kom, is dated to Nagada IIIB (Cialowicz & Chlodnicki, pers. comm.) by its 'sandwiched' archaeological context. It lies beneath graves of the Early Dynastic period and is superimposed on Naqada III building levels. While most of the stone vessels are of well known Egyptian morphological types (Fig. 1), one smallish jar (inv. Nr. E/05/12N3, reg.

no. 435) stands out as a rare, diminutive 'copy' of an idealized, south Levantine EB I storage jar, complete with two well-defined ledge handles (Figs. 2, 3). As noted below, the Tell el-Farkha specimen is an addition to a small, select collection of stone vessels of clear south Levantine morphological inspiration, produced in contemporary (royal?) workshops in Egypt.

Egyptian Stone Vessels of South Levantine appearance

The earliest Egyptian stone vessel industry began in Naqada I and seems to have reached a first floruit in Naqada III when it was producing a large variety of shapes and forms (e.g. el-Khouli 1978; Aston 1994), many copies of Egyptian ceramic prototypes. Some of these were obviously copied from ceramic types already influenced in details and additions by south Levantine pottery morphology that introduced such appurtenances as lug-handles, tubular-handles and ledge-handles, which initially appeared on vessels imported from the Southern Levant during the second half of the Naqada II. Such additions were apparently appealing to Egyptian potters who imitated them and transmogrified them into highly stylized renditions, quite different from their prototypes.

Today such examples of pottery are amongst specialized groups, identified first by Petrie who labeled them "D-, F- and W-wares". In their turn, these foreign handle templates also found their way into the repertoire of Egyptian stone vessels (e.g. el-Khouli's [1978] Class II jars, A: cylinder jars with serpentine handles). Such stone vessels exemplify Egyptian adaptation and co-option of foreign ideas, i.e. hybrid types, translated into stone, similar to those found in pottery vessels.

There is, however, another extremely rare class of stone vessels that appears to represent an effort by Egyptian workmen to directly copy south Levantine morphological types rather than to reproduce south Levantine influenced types. One such example is the Tell el-Farkha stone jar. In the opinion of the writers of these lines it is a true copy of a south Levantine ceramic prototype translated into stone, rather than a copy of an Egyptian type ceramic vessel that had previously borrowed some south Levantine morphological aspects. Two aspects of this vessel that allow for such a precise characterization are, its overall morphology which is definitively non-Egyptian, and its broad ledge handles that were not perforated. Ledge handles on the majority of Egyptian stone vessels of this period are vestigial (i.e. narrow, decorative elements) and often pierced (cf. el-Khouli 1978).¹

¹ Piercing of ledge handles is only very rarely applied to contemporary Southern Levantine pottery vessels. The few known examples are always single piercing (see, for example, van den Brink 2002: 295, Fig. 19.5), and contrast with the always double piercing noted on relevant Egyptian stone specimens.



Fig. 1. Finds from Tell el-Farkha. Photo by Anna Biel.



Fig. 2. Tell el-Farkha wavy-handled pot of stone. Inv. Nr. E/05/12N3.reg. no. 435. Photo by Anna Biel.

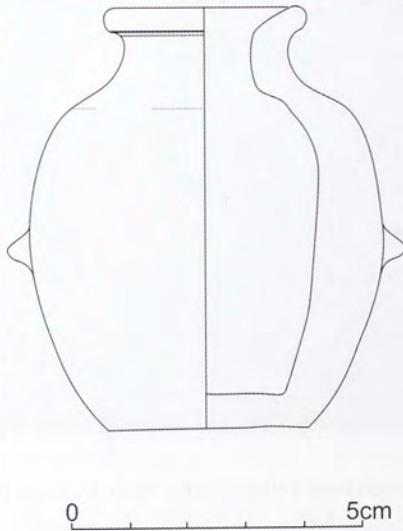


Fig. 3. Tell el-Farkha wavy-handled pot of stone. Inv. Nr. E/05/12N3.reg. no. 435. Drawing by Anna Longa.



Fig. 4. Knobbed bowl. Munich ÄS 5985.

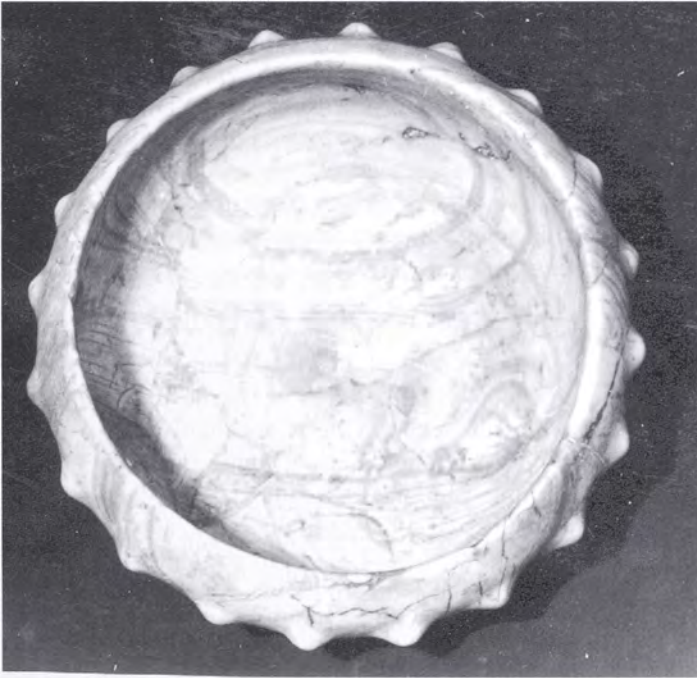


Fig. 5. Knobbed bowl. Munich ÄS 5985.

Two additional vessels in the rarified assemblage of south Levantine copies by Egyptians are a small bowl from Tell el Dab'a (Daqahlia Province, eastern Nile delta; Abd el-Moneim 2000: 152-153, Figs. 2b, 3) and another one acquired on the antiquities market. The former, well provenienced from an excavation, and dated by its (grave) context to the beginning of the First Dynasty (Abd el-Noneim 2000: 151), is a hemispherical bowl of basalt adorned with a single, continuous, horizontal row of evenly spaced conical protuberances below its rim. That bowl shares the highly distinctive morphology of numerous ceramic vessels from more or less contemporary contexts in the southern Levant as well as a few examples from Egypt. The purchased vessel is of similar appearance, and purportedly derived from a Delta site. It was fashioned of hard yellow limestone and now resides in the Egyptian collection of the Ägyptisches Museum München (Figs. 4-5).

Yet another example of Egyptian stone vessel production of a south-Levantine shape may be a partially preserved calcite holemouth jar from the south Levantine site of et-Tell/Ai (Amiran 1970: Fig. 1; Pl. 39). Although this obvious Egyptian import was found in a temple dated to the EB III period (late 3rd millennium BCE), this vessel, and few Egyptian stone bowls found in the same temple, were almost certainly heirlooms that as Amiran (1970: 172-173) has demonstrated, should be dated more or less to the period of the First Dynasty. The jar from Ai is made of horizontal segments, as are at least two stone vessels from the Tell el-Farkha cache. Although there is no more information as to the ultimate source of this export, it is not impossible it originated in a similar workshop as the specimens from Tell el-Farkha.

South Levantine knobbed bowls in stone and pottery

Stone examples of knobbed bowls (Braun 1990: Type IV) from the southern Levant are equally rare; only two somewhat similar examples are known to the authors of this paper. One is apparently a re-worked, fenestrated, pedestaled bowl of the Chalcolithic period, found in a cave at Megiddo (Braun 1990: Fig. 4.3A), seemingly in an EB I context. The other is a minuscule fragment, a rim with the distinctive conical protuberance, apparently from EB I levels at Beth Yerah (Braun 1990: Fig. 4.4). Both examples are made of basalt, a material commonly used in the southern Levant from Neolithic times for the production of bowls (van den Brink et al. 1999), so there is no reason to suspect an Egyptian origin for either object.

These knobbed bowls appear to be based on ceramic proto-types, mostly from advanced EB I phases in the northern region (Braun 1985). Pottery proto-types have similar conical protuberances just below their rims. The pottery types may be of different colors and show considerable variation in overall form. In the

north examples tend to have simple, incurving walls with rounded rims and flat bases (e.g. Braun 1990: Fig. 4: 5). Others, known only from fragments (e.g. Braun 1985; Zuckerman 2003: Fig. 23.15-20) probably were shallow, almost hemispherical in form with incurving, tapered rims. Their colors vary from gray to almost black or red and are sometimes associated with specialized production such as Gray Burnished Ware or 'Crackled Ware' that is often mottled with red and black patches, or painted red (Braun 1989). Examples may be burnished or un-burnished.

Additional examples of EB I bowls with similar conical knobs are known from mortuary contexts in the southern region. They are rare and show considerable variation in form. One published example from Tell en Nasbeh (Wampler 1947: Pl. 52.1124) is a flat-based, deep bowl with slightly inverted, tapered rim. Somewhat unusually, the conical protrusions are at the very top of the rim. One of them is pierced vertically. Another specimen, from Ai/Et Tell (Marquet Krause 1949: Pl. LXXIV.1055), is also flat-based and deep, but has a broad, everted rim. Its protrusions, placed midway down the wall of the vessel give it the impression of carination and make it more similar in morphology to northern examples of Gray Burnished Ware with flattened protuberances. A third, unpublished bowl, on public display in the Israel Museum, is from a tomb context at Azor, a cemetery that is noted for yielding a considerable quantity of Egyptian imports. It is somewhat unusual because it has one, flat, pierced protuberance in place of a conical knob. Such handles are not uncommon on other bowls of the Late EB I horizon in the southern region. These southern examples are made of buff or light brown clay and appear to be produced locally. Additional ceramic examples, of fabrics more similar to the southern types, are known from Egyptian contexts (see Abd el-Moneim 2000: in particular Fig. 4f-g).

Another unusual object, this time of pottery, adds a little emphasis to what appears to be a desire on the part of an Egyptian potter to directly reproduce vessels of morphological types preferred by their south Levantine neighbors. While there are many examples of Egyptian pottery vessels influenced by south Levantine decoration, only one example of a deliberate copy (albeit somewhat idealized) of a south Levantine morphological type in pottery is known to the writers of these lines. It is a somewhat diminutive vessel (Fig. 6-7) recovered in a clear Late EB I context at Tel Halif Terrace (see also Levy et al. 1997: 34). Of unusually light colored clay with a finely polished surface, this jar was checked petrographically for the origin of its fabric. It turned out to be demonstrably Egyptian and obviously an ancient export to the homeland of this style of vessel (sic!).

In conclusion it can be said that the Tell el-Farkha and Tell el-Dab'a stone jars presented above, in conjunction with the pottery jar found at Tel Halif Terrace, form part of a highly rarified collection of artifacts produced in Egypt



Fig. 6 and 7. Vessel from Tel Halif Terrace.

during Naqada III, according to south Levantine morphological templates. They represent extraordinarily rare and unusual examples of the intrusion of foreign influences into the very traditional spheres of Egyptian stone and ceramic vessel production. They can be considered additional examples to support the view developed by Wilkinson in his paper „Reality versus Ideology“ (Wilkinson 2002).

Acknowledgements

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Joris van Wetering and G. J. Tassie ¹

Considering the Archaeology of Early Northeast Africa: Interpretation & Methodology

Abstract

This paper investigates the problems and priorities in the archaeological research of early Northeast Africa (4,000 – 2,500 BC). The interpretation of the archaeological data is examined, highlighting the problems of the classification of the various cultural units and their interrelation. The use of modern remote sensing and Geographic Information Systems (GIS) in the location of sites is explored, as are advances in new excavation practices. The value of human remains in studying past societies is also considered. The last section of this paper expounds upon how research in the region can progress.

Introduction

This study owes much to the accomplishments of Lech Krzyżaniak, particularly his work relating to the early settlement at Minshat Abu Omar in the East Delta, his research on the prehistory of Egypt, and, most importantly, the proceedings of the Dymaczewo Conferences at Poznań, Poland. These Dymaczewo Conferences have resulted in so many important studies, which are essential for any research pertaining to the archaeology of Northeast Africa.

In honouring Prof. Krzyżaniak, the authors follow in his lead by considering some of the current problems within the archaeology of early Northeast Africa (Krzyżaniak 1980). The focus of this study is on the methodology used and the interpretation applied to archaeological data in Egypt and Nubia, with a geographic viewpoint on the Nile Delta and Valley up to the Fourth Cataract and a temporal viewpoint from 4000 BC to 2500 BC (Fig. 1).

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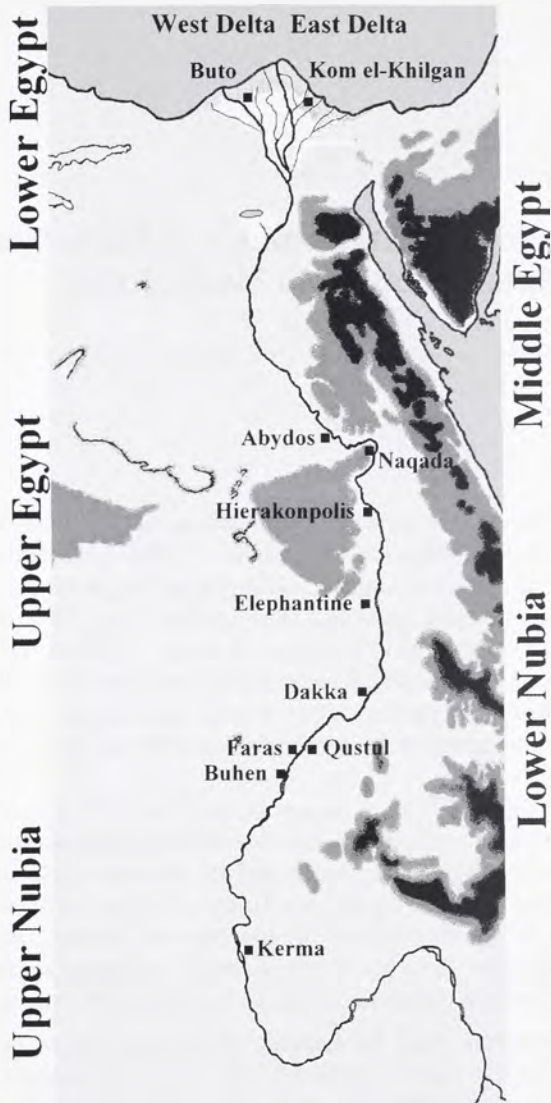


Fig. 1. Northeast Africa with sites mentioned in the text (Map based on Kemp 2006: 9).

Considering Archaeological Interpretation

Our knowledge about development in early Egypt and Nubia is primarily based on mortuary data as the majority of the known sites as well as the most

extensively investigated sites are cemeteries. The gathering and use of the available data, however, is beset with many problems which have significant implications for the way early Egypt and Nubia are interpreted. It would not be feasible to discuss all these problems, as such, here selected ones are discussed from both Egypt and Nubia, so to reflect Krzyżaniak's statement that it is essential for understanding the developments taking place in Egypt that they be compared to the early developments in Nubia (Krzyżaniak 1980: 25).

Cultural Terminology

In Egyptology, the material remains of a social entity like the Naqadian has been variously described using terms such as Naqada culture or Naqada Period or Naqada Phase. Unfortunately most of these terms are not mutual exclusive and sometimes confusing. Here the following terminology is used.

A cultural complex is a group of cultural units emanating from a defined region, such as the Lower Egyptian Cultural Complex, which comprises of the Omarian and the Maadian units and possible, if indeed a cultural unit, the Merimidian unit. Preference is given to synchronised terms Merimidian – Maadian – Naqadian, etc. in favour of generally used terms as Naqada and Maadi-Buto when describing the cultural unit. For Naqada because there is the probability of confusion, not only in relation to the actual site Naqada but also to the specific local site terminology used by the excavations in the Naqada area: late Naqada (Hassan 1999: 555). For Maadi-Buto, because this unit has the potential to be regionally driven and as such to let the name reflect regional type-sites might lead to, for example, Maadi – Buto – Tell el-Farkha unit. Identification of the unit as Maadian leaves open the possibility of adding regional variants: for example Maadian unit: Buto variant or Maadian unit: Maadi variant or Maadian unit: Farkha variant if it turns out that respectively the West Delta, the Memphite region, and the East Delta have regional variants of the same cultural unit.

The Upper Egyptian Cultural Complex includes the Badarian and Naqadian cultural units, whereas the Lower Nubian Cultural Complex includes the Abkan, Nubian A and Nubian C cultural units (see below), and the Upper Nubian Cultural Complex includes the Kerma cultural unit. The grouping of the various cultural units into complexes indicates both regional developments and affinities.

A cultural unit² is a cultural assemblage, primarily defined by ceramic groupings, that recurs consistently over a restricted area and although it can

² The authors prefer cultural unit instead of culture as culture is defined as the set of ideas, beliefs, values, etc. passed from individual to individual (Darvill 2002) and these characteristics are singularly difficult to make visible in the archaeological record. Material Culture has for the same reason been rejected as this will quickly be abbreviated to Culture.

develop over time, is the material trait of a particular group of people. These cultural units include the Naqadian, Maadian and Nubian A units although it must be stressed that most of the cultural units mentioned above are defined almost completely on the typological development of ceramic mortuary data. There is the probability of regional diversity with a cultural unit.

A cultural phase is a distinct time period subdividing a cultural unit, such as early Maadian phase, middle Maadian phase and late Maadi phase for the Maadian unit and the Naqada I, Naqada II and Naqada III phases of the Naqadian unit, which in turn are further subdivided, such as Naqada IIC phase or Naqada IIIA phase.

In Egyptology, there is a tendency to equate a cultural unit or the material culture of people with the actual people which has led one researcher to state that 'the lack of analytical context is the reason why we sometimes find pots wandering through Egypt to "carry", "trade" or "battle" the Naqadian culture into the Delta and even beyond' (Guksch 1992: 9). Past people are indeed the perceived research subject, but actually it is the development of traditions these people had, as represented by residual vestiges or artefacts that are the realistic focus of any archaeological investigation (Shennan 2004: 12). Below, the cultural development is discussed, e.g. the movement or spread of cultural units as well as the merits of having such strictly defined units in both geographical and temporal terms.

This study will focus on the Maadian, Badarian, and Naqadian units in the formative period of Egyptian history and the partially contemporary Nubian A unit in Lower Nubia as well as the period after the perceived end of that unit at around 2900 BC. The material remains as identified at Merimde Beni Salame in the southern West Delta is above mentioned as Merimidian unit (Friedman 1994: 896), this might be seen as presumptive based on the amount of data. To date, two sites are known with this material remains: Merimde Beni Salame (West Delta) and Sodmein Cave (Eastern Desert, near the Wadi Hammamat), although it is only from the first that general information is available, at Sodmein cave pottery resembling that found at Merimde Beni Salame was found (Hendrickx & Vermeersch 2000). A possible third site with Merimidian 'unit' material might be Minshat Abu Omar / MAO where a programme of auguring around the extant tell provide information on early occupation layers with late Predynastic – Early Dynastic settlement layers (contemporary with the cemetery investigated on the extant tell) and a Neolithic settlement layer that seems to date to the same period as the material at Merimde Beni Salame although the non-diagnostic sherds of indefinable form did not provide much comparative information (Krzyżaniak 1992, 1993).

Until more information is available the Merimidian is identified as cultural unit but the possibility that Merimde Beni Salame represents an early peripheral development to events taking place in the (west) Delta proper, maybe even being an early phase of the Maadian unit, is kept open.

The Nubian A unit started its existence as 'A-Group' devised by Reisner in his classification of Nubian material (A-Group - B-Group - C-Group to X-Group), he discovered during the First Archaeological Survey of Nubia / ASN (Reisner 1910a, b). From the beginning, three issues have constrained the analysis of material of the Nubian A unit:

- a. it was very much defined from a northern perspective by Reisner who investigated sites with this material in the area between Aswan and the southern edge of the Dakka plain;
- b. the sites extensively investigated were mostly cemetery sites and these formed the main basis for defining the evolution of the materiality whereas the settlements were only cursorily described. Notwithstanding the enormous contributions Reisner made to Egyptology and archaeology in general, one can not escape the fact that he lived in times when objects were still valued from an art-historical perspective and as such his financial contributors wanted something in return, cemetery sites were more rewarding in this respect;
- c. Reisner viewed Nubia as generally inferior to Egypt in its cultural, social and political development and this is reflected in his interpretations, especially his terminology.

The division of Nubian cultures into "Groups" is an example of the third issue because either consciously or not, the "groups" classification projects an image of small (band-type), less-civilised entities that are not capable of aspirations to high civilisation. More than a 100 years of research into the Nubian A unit has shown that this Nubian society was certainly not inferior to early Egyptian society. As such, following Trigger (1965: 44), the "A-Group" identification will be abandoned in favour of the term Nubian A unit, which is divided into three main phases and these again are subdivided. Smith (1966) has argued convincingly against the B-Group defined by Reisner (1910a), this notwithstanding there are strong indications of continued occupation in Lower Egypt (contrary to O'Connor 1993a: 4-6; Fattovich 1999: 80) between the end of the Nubian A3 phase and the appearance of the Nubian C unit (defined by Reisner as C-Group). The cultural development of that period and the relation of the material remains in relation to the preceding and succeeding cultural units is still undefined and is discussed below.

Chronological Considerations

Since its inception by Petrie (1899; 1901b), the relative chronology for Predynastic and Early Dynastic Egypt has been refined and revised (Needler 1984; Kaiser 1957; Hendrickx 1996; 1999) and the inherent problems have been discussed at length (Hendrickx 1996: 36-43). Two issues relevant to cultural development are highlighted here: regionalism and the predominance of ceramic mortuary data.

The construction of the relative chronology (Petrie framework and Kaiser revision) tends to obscure the regional differences between cemeteries in Upper Egypt, as well as differences between cemeteries in Upper, Middle and Lower Egypt. According to Friedman (1994: 51), the acceptance of one local sequence of burial practises (at el-Zawayda, Naqada region) to be representative for burial practises from Lower Egypt to Lower Nubia without any investigation of other local sequences is a major flaw in the chronology devised by Petrie. Even within Upper Egyptian cemeteries there is to a certain degree regional diversity, for instance the White-cross-lined ware of the Naqada I phase (Friedman 1994: 12, 54). The ceramic mortuary material is in general very homogeneous with only vague hints pointing at regionalism in ceramic traditions, whereas the ceramic settlement material has much clearer indications of such traditions up until the late Predynastic Period; Naqada IIB-C phase (Friedman 1994: 9-10). The lack, however, of a chronological framework to identify and date settlement context seriously limits the integration and interpretation of settlement information, and has led to a one-sided perspective on social, political, and economic developments from cemetery information instead of a balanced perspective from both settlement and cemetery data (Friedman 1994: 3, 6).

Here the most recent revision, the so-called Hendrickx revision (1989; 1996; 1999), which is based on the local sequences of several Upper Egyptian cemeteries, is used as it rectifies problems apparent in the Kaiser revision. However, it is still a chronological scheme designed to date mortuary contexts, not settlement contexts. To accurately date ceramics and lithics within a settlement context, the current chronological scheme (also see Hassan et al., this volume) has to be augmented:

- a. with detailed lithic chronological data (Holmes 1989; Schmidt 1992; 1996; in prep.) as it is methodologically unsound to date lithic development based on ceramic data (Friedman 1994: 13) and,
- b. to complement mortuary data, with detailed ceramic data with chronological markers from settlement contexts (Friedman 1994).

The chronology of (lower) Nubia is based on comparative dating of Egyptian material in Nubian contexts and, by extension, suffers the same problems. Here too, the focus is on mortuary data.

Badarian Material in Upper Egyptian Settlements

The most enigmatic issue relating to Upper Egypt is the appearance in large amounts of pottery that is classified as Badarian in near-contemporary settlement contexts. As indicated by Friedman (1994: 48) hardly any settlement that contains Naqada IA phase pottery does not also include a Badarian component, either rippled pottery or Brunton's Smooth Brown ware. By examining the area between modern el-Ballas and Armant, which is relatively well-known through many limited excavations and two extensive surveys that have covered the majority of the region, this issue can be addressed. Here as elsewhere, the time-honoured practice of naming sites to the nearest modern village/town has been applied and this, as elsewhere, has resulted in a confusing situation.

The sites located on the east bank of the Badari region were randomly grouped according to nearest modern town by Brunton (1927; 1937; 1948; Brunton & Caton-Thompson 1928) to facilitate publication. These groupings are still in use (Hendrickx & van den Brink 2002: 353-357, 374-376, figs 23.3, 23.9) and this has led to statements, like *at Armant and Matmar (in the latter site ...* by Castillos (2005: 24) implying that Matmar is an actual site with a specific function (either settlement or cemetery) where a development can be analysed. Nothing has ever been found at Matmar which is located in the floodplain and the sites which are grouped under Matmar are located on the edge of the low desert and consist of 5 settlements and 11 cemeteries. These sites should be grouped as communities consisting of settlement and cemetery (or several if it can be attested that a community abandoned a certain site, settlement or cemetery, and continued occupation nearby at another site) and the development of these communities should be analysed not a random grouping of sites that have no link between them.

All sites of the Naqada area are usually grouped under Naqada and Ballas (Hendrickx & van den Brink 2002: 360, 377-378, fig. 23.4, 23.10), whereas few of these sites are actually located near to either of these modern towns. The same holds true for the Armant area, where several sites are grouped under Armant (Hendrickx & van den Brink 2002), whereas Armant is about 6 km from the low desert strip where most sites are situated (it is even possible that in early times the River Nile flowed between Armant and the low desert). This has led to confusing statements by researchers (e.g. Wilkinson 1999: 352) and a misrepresentation of the settlement / cemetery patterns in the Naqada and Tarif regions of Upper Egypt. Fig. 2 shows the settlement and cemetery sites of these regions, some being re-named so as to avoid grouping sites under a single name that is not associated with that site. At several sites in the Naqada and Tarif regions Badarian material has been found:

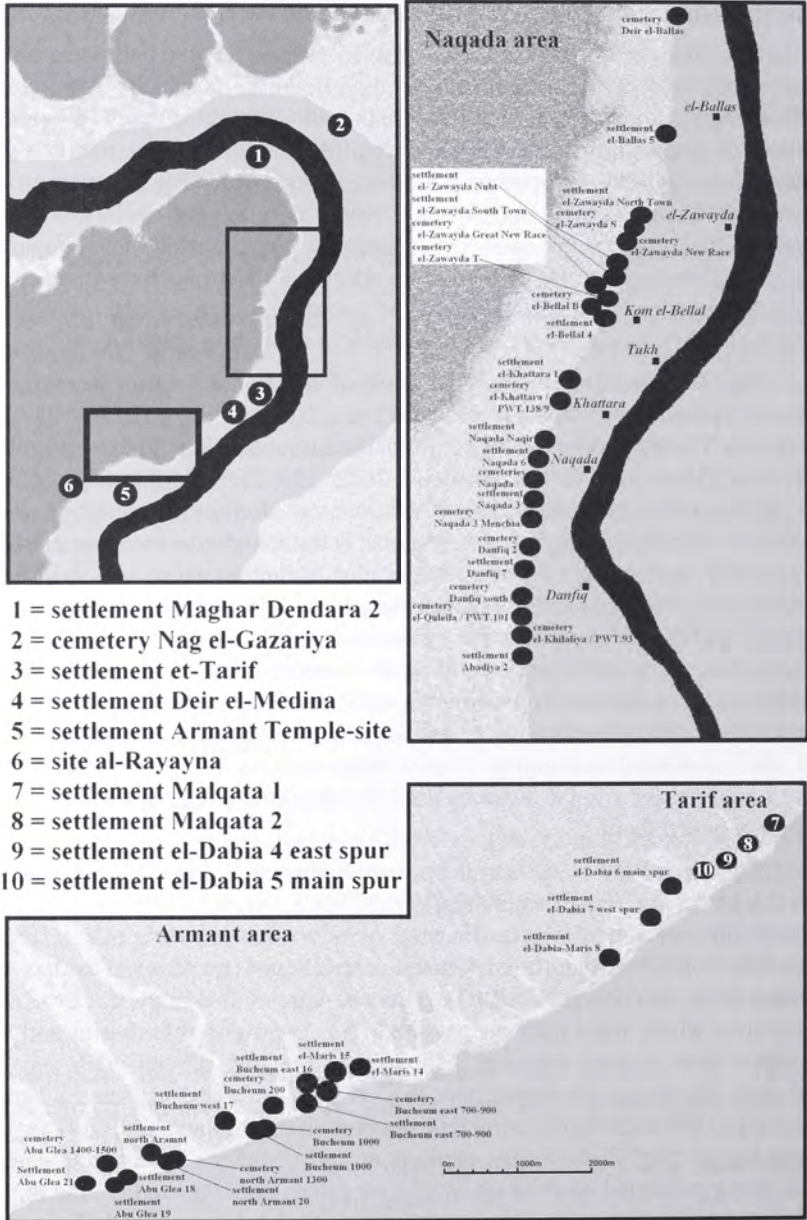


Fig. 2. Sites of the Naqada – Tarif regions in Upper Egypt (Map based on Kemp 2006: 9).

- Sites with only Badarian material: Maghar Dendera 2 and possible Armant Bucheum East 700-900 although the paucity of information on these sites prevents explicit definition.
- Sites with large amounts of Naqadian material and some Badarian material: Nag el-Gaziriya; Ballas 5; Kom Bellal 4; Khattara 1; Naqada 6; Naqada 3; Danfiq 7; et-Tarif; Armant Bucheum 1000; and Abu Glea 21.
- Undefined site with Badarian material: Wadi al-Rayana.

If it is assumed that the Badarian unit preceded the Naqadian unit in Upper Egypt (Ginter & Kozlowski 1996: 134), an explanation is needed for the situation where the Badarian unit is dominant in Upper Egypt but almost no sites, especially cemetery sites, of that period have been found. If this was the case, an occupation pattern of different sized settlements and cemeteries can be expected. Settlements can be obscured by modern buildings or buried in the floodplain but the state of research in Upper Egypt would mean that if Badarian cemeteries existed in this area, some would have been found. To date, no cemetery site can be definitively identified as belonging to the Badarian unit.

The information from the cemetery at Nag el-Gaziriya is somewhat sketchy as it was excavated by the Egyptian Antiquities Service but remained unpublished except for a short description by Kaiser (1961: 20). The cemetery had both Badarian and Naqada IA phase ceramic material (Kaiser 1961: 20-21; Friedman 1994: 357; Hendricks & van den Brink 2002: 360); however, the relation between both ceramic assemblages is unclear. Either the cemetery belongs to the Naqadian unit and the Badarian material was placed in certain graves as non-local fancy objects imported from Middle Egypt or the cemetery is unique as the only known Badarian one in Upper Egypt. Based on the available information no conclusive statement can be made but possibly the publication of the nearby cemetery of Nag el-Hai might provide some insight into the frequency, if any, of Badarian objects in a Naqadian cemetery in the (northern) Naqada region. At present the unpublished field documentation of the Nag el-Hai excavations is being studied by F.A. Hassan, G. Tassie & J. van Wetering, in preparation for publication.

Therefore, despite the presence of settlements belonging to the Badarian unit (Maghar Dendera 2, and possible Armant Bucheum East Settlement 700-900/1800) these facts seem to argue against assuming that the cultural units succeeded each other, whereby the Badarian unit is earlier in both Middle and Upper Egypt and it is replaced by the Naqadian unit (see also Holmes 1989: 176-188; *inter alia* Friedman 1994).

If it is assumed that the Badarian unit in Middle Egypt was regionally distinct and partially contemporary with the regionally distinct Naqadian unit in

Upper Egypt, which by the end of the Naqada I phase replaced the Badarian unit in Middle Egypt (inter alia Holmes 1989; Friedman 1994), an explanation has to be sought for the amount of Badarian material in Upper Egypt (seemingly as import goods). If the settlement at north Hammamiya is indeed typical, the change-over from the Badarian to Naqadian unit in the Badari region took place during the Naqada IC-IIA phase (Friedman 1994: 353-354). Large amounts of Badarian material have been recovered from Naqadian settlements: at Armant Bucheum Settlement 1000 the lowest level seems to have ca. 30% Badarian material (Mond & Myers 1937: 169-171; Friedman 1994: 358). To identify this material as belonging to a non-local cultural unit and thus in some way transported to the settlement from elsewhere is problematic. Unfortunately the state of publication prevents detailed description, but it seems Badarian material was found in contexts that seem to post-date the Naqada I phase in the Naqada region.

The Polish mission working between Luxor and Armant encountered the problem of dating settlements with a chronology based on mortuary data, and as a result the statements about Abu Glea settlement 21 and other settlement sites investigated (Fig. 2) are somewhat non-specific. Settlement sites 17/83 (Armant Bucheum west), 18/83 and 19/83 (Abu Glea east), 20/83 (north Armant), and 21/83 (Abu Glea) are contemporary to each other and 5140-5030 years BP or end of the Fourth millennium BCE (Ginter et al. 1985: 31, 41). This seems to imply late pre-Dynastic Period with a time range of 3500 to 3300 BC. This is confirmed by Ginter et al. (1996: 171) who state that the early phase of the Naqadian unit, thus Naqada I phase, is represented at cemetery 1400-1500 (at north Armant) but not represented at the settlements dated to the Naqadian unit, seemingly implying that those settlements are dated to the Naqada II phase. However, this again is contradicted by the excavators (Ginter et al 1985: 40; Ginter & Kozłowski 1996: 98), and by Hendrickx & van den Brink (2002: 379) who all point at Naqada I phase occupation at settlement 21/83 (at Abu Glea) and settlement 1000 (at Armant Bucheum)³. If this is confirmed it argues against assuming that the Badarian unit did not exist in Upper Egypt as a distinct unit.

If the current cultural classification into distinct units cannot explain the presence of Badarian material at Upper Egyptian sites; one has to allow for the possibility that the classification is wrong. With the information currently available, definitive statements cannot be made but maybe the material identified as Badarian is not at all Badarian but local material which is not included in the typologies that define the cultural units. Another possibility might be connected with the different functionality of sites in the Nile Valley. If it is correct to

³ As noted by R. Friedman (1994: 58 - note 8), it is unfortunate that the exact point of their excavated material within the "Naqadian" is left vague by the excavators.

assume that socio-politically important settlements were located on the narrow west bank and the hinterland of these settlements was located on the wider east bank (Fig. 3), it could be argued that the material remains of these functionally different settlements also show differences. The east bank hinterland would have had small agricultural villages / hamlets as well as larger villages / towns that functioned as market places, river-side villages would have provided transport for goods to the west bank where besides the large political centre / large town, several smaller agricultural villages / hamlets were situated along the edge of the low desert. If this assumption is correct, it might be that the material remains now identified as distinct regional units, Badarian and Naqadian, are instead part of the same materiality with differential cultural *fehlt was???* displayed in certain settlement and cemetery contexts. It should be noted that all the Badarian unit sites in the Badari region are located on the east bank, to date no exclusively Badarian site has been found on the west bank in this region and that most of the Naqadian unit: Naqada I phase sites were investigated prior to the discovery and definition of the Badarian unit by Brunton in the 1920s (Fig. 3).

Any explanation of the issue, however, should take the situation between the Badari region and the Naqada region into account as, significantly, based on the information currently available no Badarian material has been found in this area of Upper Egypt and this contrasts greatly with the amount of Badarian material found in the area south of Dendera.

Whatever is inferred, to present a solution to this issue is presently beyond our capability. The lack of solid information concerning the excavations conducted in the Naqada and Tarif regions hampers any such solution; especially the west bank sites in the Naqada region seem singularly struck by this. The excavations of Petrie and Quibell are published to the standards of their time and the excavations carried out by Hays, Hassan and Barocas are only published in preliminary reports or reports not widely accessible (Petrie & Quibell 1896; Hays 1976; 1978; 1984; Hays & Hassan n.d.; Hassan 1981; 1984; 1988; 1999; 2001, n.d.; Hassan et al. 1980; Hassan & Matson 1989; Hassan, Hays & Gallagher n.d.; Banks & Hassan n.d.; Barocas 1989; Barocas et al. 1982, 1989; Fattovich n.d.; Di Maria 2001). The excavations in the Armant region are relatively well published, although it is unfortunate that Mond & Myers n.d. is not easily available as it might clear up some of the ambiguity surrounding the settlements, especially Armant Bucheum East Settlement 700-900 / 1800, in the Armant area with Badarian material (Friedman 1994: 365, note 22), as well as possibly shed some light on the Badarian presence within Armant Bucheum Settlement 1000 and the Badarian ceramic material found at al-Rayayna. Wadi al-Rayayna, located east of modern Ezbet al-Rayayna (in the same wadi as tombs 1213 and 1214), consists of an unspecified number of sherds of the Badarian unit, discovered in

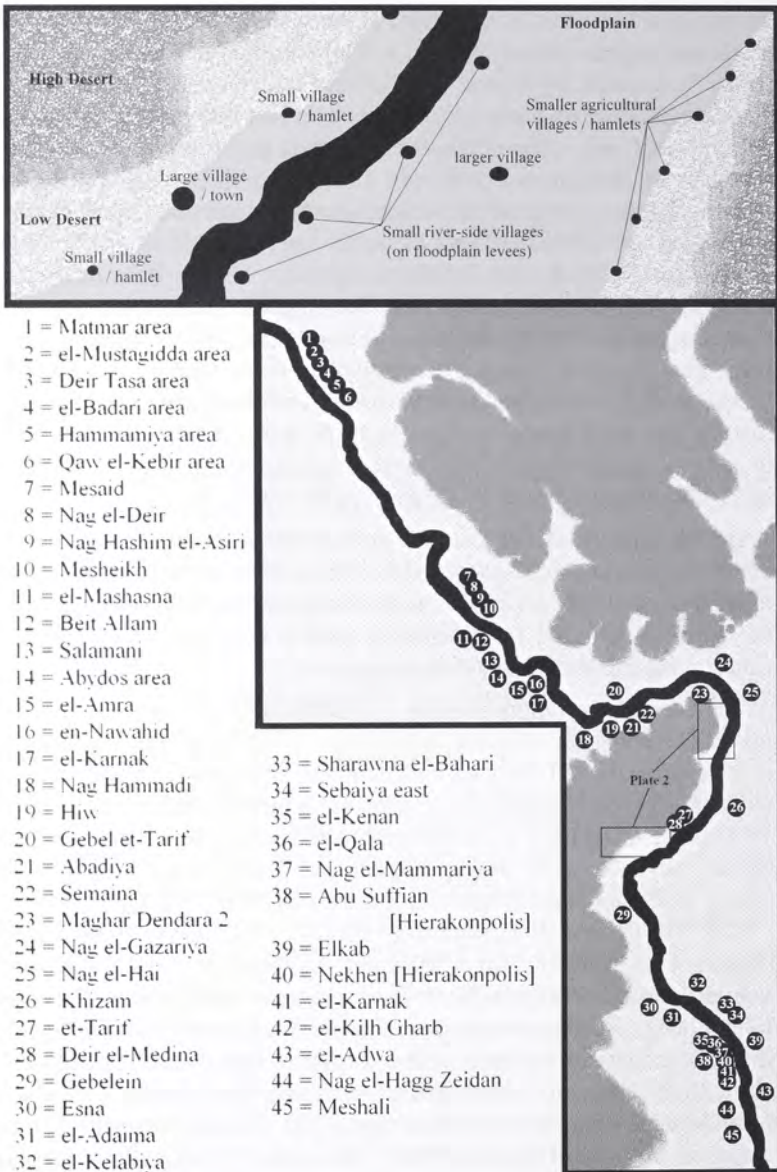


Fig. 3. Hypothetical reconstruction of Nile Valley floodplain with map of Upper Egypt showing sites dated to the Badarian unit and the Naqadian unit: Naqada I phase (Map based on Kemp 2006: 9).

an *ex situ* context in a wadi-bed (Mond & Myers 1937: 8, pl. II; Friedman 1994: 365 - note 22).

As it seems highly unlikely that any of these sites can be re-excavated or in any way re-investigated in the field, the only way open for a better understanding of the Badarian presence in the Armant area is to research the unpublished documentation (including Mond & Myers n.d.) and ceramic material that seems to be kept at Manchester Museum and other places (Mond & Myers 1937: 188-189).

Settlement Analysis in Egyptian and Nubian Archaeology

Many publications on the subject of early Egyptian state formation begin with a statement along the lines that many settlements have been excavated in Lower Egypt whereas mainly cemeteries were investigated in Upper Egypt, then the study usually focuses on mortuary analysis. The statement seems to presuppose that in Upper Egypt hardly any settlements have been excavated while settlements in Lower Egypt are well-known, as well as implying that settlement analysis within Egyptian archaeology is not yet feasible.

The first part of this implication is misleading as only a few settlement sites in Lower Egypt have been extensively investigated. Settlement information from Tell Ibrahim Awad and el-Tell el-Isuid South is derived from small-scale excavations within the settled area, which although providing interesting stratigraphical information, do not provide an insight into the horizontal development of the settlement. At Tell Ibrahim Awad, the temple area of the settlement has been extensively investigated, and although this has provided valuable diachronic information on temple structures and development, it has not provided synchronic information on how the temple related to the settlement. The early archaeological methods used to excavate settlements, as well as the way they have been published has made analysis of settlements, like Maadi very difficult. The recent excavations at Buto and Tell el-Farkha are now providing necessary insights into the diachronic and synchronic developments of settlements as well as detailed stratigraphic information and settlement assemblages.

At several settlement sites in Upper Egypt, excavations are on-going and are providing detailed information, such as Hierakonpolis (Nekhen), Adaïma and Elephantine Island. At a number of these settlement sites, large areas are being exposed and studied. There are many older excavations, which provide a measure of information, re-evaluation of those sites (based on published and if available unpublished documentation) is rewarding and essential. Surveys in both Upper and Lower Egypt have provided information on settlement patterns in particular regions; although the surveys in Lower Egypt have mainly been concentrated in the northern East Delta (see also below).

While the second part of the aforementioned statement is partially true, advances in excavation methodology (Tassie in press b, Tassie in press c, Tassie & Owens in press) make the controlled excavation of early settlements, not only feasible, but essential. Exemplary settlement excavations are currently being conducted at Buto (Hartung et al. 2003), Hierakonpolis (Friedman et al. 1999; 2002), and Tell el-Farkha (Chlodnicki 2004), to name a few. For, any solid socio-political analysis of early Egyptian society needs to incorporate both settlement and cemetery data to reflect all facets of that society.

Most of the current settlement information comes from sites located on the edge of the floodplain or low desert, hardly any settlement information is available for the floodplain itself. The majority of the known settlement sites are quite small and do not display much complexity, only a few large settlement sites with distinct complexity are known to be located at the edge of the low desert. At Hierakonpolis, it can be assumed that the large wadi fan of the Wadi Abu Suffian, jutting out into the floodplain, provided an ideal location for large-scale settlement. At el-Zawayda South Town, the settlement is located on a spur, but it cannot be excluded that part of the settlement was indeed in front of the spur in the floodplain. Both the temple sites at Koptos (Petrie 1896) and Armant (Mond & Myers 1940: 29-30, pls. I, III, XLVI) point at possible large settlement sites in the floodplain. As such, it has to be recognised that there is a strong possibility that most of the known settlement sites are peripheral, either small-scale permanent settlements or seasonal encampments, whereas, the large and more complex settlement sites were situated within the floodplain, either on old levees or other elevated locations (Friedman 1994: 21, 33). It is impossible to investigate the whole floodplain, although drill-coring projects, maybe with limited excavations, should be attempted in Upper Egypt to provide comparative information of floodplain settlement patterning (see below).

The lack of detailed settlement data concerning; diachronic and synchronic development, stratigraphic sequences, and settlement assemblages, especially ceramic, are restricting our ability to assess settlement data. The available information needs to be integrated and a framework defined to not only add new detailed data, which is now coming from both Upper and Lower Egypt, but this new information to function as comparative material to better assess older settlement excavations and their published record (Friedman 1994: 6).

As is the case in Egypt, settlement analysis in Nubia is problematic because compared to the many known cemeteries between the First Cataract area and the Second Cataract area, only 64 settlements have been found (Rampersad 2000: 89). A look at the map with settlements (Rampersad 2000: fig. 1) clearly shows that many settlement sites are missing, despite the extensive surveys carried out within the area now flooded. Many early settlement sites have not

been located or were missed and as such settlement sites are severely underrepresented within the archaeological landscape (Trigger 1965: 54). According to Nordström (1996: 17), the situation in Lower Nubia before the Nubian Rescue Campaign of the 1960s was that 'only a small fraction of the finds originated from settlements, i.e. house structures or camp-sites.' He states that 'thorough attempts were made during the campaign of the 1960s to search for coexisting habitation remains in order to rectify this bias' and that the campaign resulted in a 'considerable increase in A-Group cemeteries'. However, this bias still exists as there were few missions that purposely searched for Nubian A settlements and indeed when found, extensively excavated that settlement. Despite the known paucity of settlement information, few of the settlement sites found within the Joint Scandinavian Expedition concession (Nordström 1972) were completely excavated (area ranges from 10 m² to 12,000 m²), most were partially excavated (area between 5% and 15%, more rarely 20% to 40%) although surface collection of artefacts always took place. The fact that no settlement site of each type (large open space – small camp-site – rock shelter – hill habitation, e.g. between boulders) was completely excavated, makes analysing the sampled habitation sites very difficult. To compound the difficulty of analysing Nubian A settlements, almost all the settlement sites, with few exceptions, are only published in preliminary reports (Rampersad 2000; Gatto 2003).

Sites in the Northern East Delta

In the last thirty years an enormous amount of new information concerning settlement and cemetery sites has become available from the Nile Delta (Fig. 4) as well as, on a general level, regional settlement patterns concerning the Predynastic and Early Dynastic Periods (e.g. van den Brink 1993). Most of these new sites were located during several surveys conducted in the Northeastern Delta region (see below). This is also the region where most of the current evaluation and excavation work is concentrated in response to the Supreme Council of Antiquities (SCA) appeal and mandate. With the exceptions of Buto, Sais, and Kom el-Hisn almost all known sites outside of the Northeastern Delta were discovered and investigated many years ago. As such, there is a disparity in the information from the Delta, with the majority of data coming from the Northeast Delta. In this region projects have recently commenced at Kom Khilgan (Midant-Reynes et al. 2004), Tell el-Ma'sala (Rampersad 2003), and Tell el-Ginn (Watrín 2003). These projects will certainly add valuable information concerning the region however, the problems of focussing on one particular area of the Delta should not be overlooked. Most importantly the current focus on the Northeastern Delta should not lead to a situation where the regional situation of this part of the Delta is transposed on to the entire Delta due to lack of information regarding other regions. Although attention is at present

- | | | | |
|------------------------------|------------------------|---------------------------------|---------------------|
| 1 = Tell el-Dab'a / el-Qanan | 15 = Tell Gandiya | 18 = Tilul Moh. Abu Hassan | 21 = Tell el-Khasna |
| 2 = Mendes / Tell el-Rub'a | 16 = Tell Gherier | 19 = Tell Abu Dawud | 22 = Tell Fag'i |
| 3 = Tell el-Zragy | 17 = Gezira es-Sangaha | 20 = Ezbet el-Tell / Kufur Nigm | |
| 4 = Gezira el-Faras | | | |
| 5 = Tell es-Samara | | | |
| 6 = Minshat Ezzat | | | |
| 7 = Tell Gezira el-Faras | | | |
| 8 = Tell el-Ain | | | |
| 9 = Tell Abu Shi'eisa | | | |
| 10 = Kom el-Khilgan | | | |
| 11 = Tell el-Farkha | | | |
| 12 = Kom Om Sir | | | |
| 13 = Umm el-Zaiyat | | | |
| 14 = Tell el-Diba | | | |

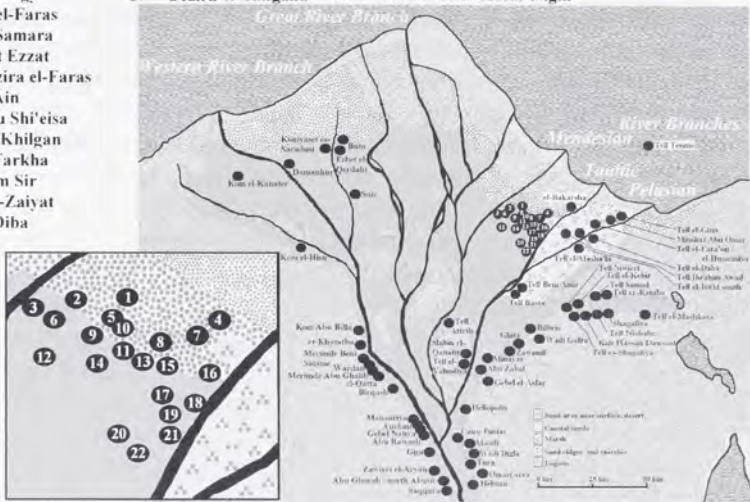


Fig. 4. Sites of Lower Egypt (see www.e-c-h-o.org/khd for detailed description) showing the clustering of investigated sites in the northern East Delta (Map based on Kemp 2006: 9; Butzer 2002: 88).

focused on the Delta it needs to be stressed that the problems of the Delta, where many sites are in danger of destruction, particularly from urban and agricultural expansion, are also present in the Valley where modern development is quickly encroaching into the low desert. As such, by definition, almost all archaeological fieldwork in the Nile Delta and Valley is rescue archaeology. Although a number of regional surveys are on-going, hardly any new ones are specifically aimed at investigating early supra-regional settlement patterns in any part of the Nile Delta. This is especially disheartening as compared to the 1980s when the extensive surveys in the northern East Delta took place (see below) and several tell sites were visible and accessible, today few actual tells are still visible in the modern landscape, many having been levelled for use as agricultural land or covered by modern occupation.

In the late 1990's the site of Minshat Ezzat was 'discovered' because part of the gezira was removed by a local farmer and the site of Kafr Hassan Dawood was identified in the 1980s due to a planned land reclamation project. In 2005, a survey took place in the Minufiyeh province, south of Tanta which showed that hardly any large tells were still extant in the areas investigated (in order to select

a survey area, survey director Dr. Joanne Rowland and both authors drove around the area south of Mansoura in 2004).

Middle Egypt, Buffer Zone or Not!

From an archaeological point of view the early development of Middle Egypt is Terra Incognita, as only a few sites are known in the area south of the Faiyum region and north of the Badari region (Fig. 5). This has led to confusing statements about this area; according to Brewer (2005: 106) Middle Egypt was a buffer zone between the Maadian unit in Lower Egypt and the Naqadian unit in Upper Egypt. Several sites have indeed been found in this area (Hendrickx & van den Brink 2002: 352-353, 373) but hardly anything is known about these sites as most have only been surveyed (de Morgan 1897: 29; Kaiser 1961: 26-40). Also, the lack of any kind of investigation in the last 30 years must be taken into account (the recent discovery of an Early Dynastic cemetery at Deir el-Bersheh, Hendrickx pers. comm, is an exception to that.). All known sites (including those in the Badari region) are located on the east bank, as such the lack of west bank sites severely hampers full analysis of the regional settlement pattern. As the political landscape of Upper Egypt clearly shows, the early political centres were situated on the west bank (van Wetering in prep. a) and it is likely that the same holds true for Middle Egypt. According to Hassan (pers. comm. 2005) the narrowness of the west bank in Middle Egypt makes it very susceptible to sand dune movements from the Western Desert, a phenomena also noted by Embadi (2004: 114), therefore it is likely that early sites are buried beneath a thick layer of sand showing few, if any, surface traces. This implies that the available information relating to Middle Egypt is in no way representative and as with other parts of the Nile Valley, the modern population pressures are making archaeological research more difficult and threatening to destroy many sites. The statements, like the one by Brewer, relating the paucity of sites in Middle Egypt to an ancient situation are therefore problematic as many indications point at early occupation of this region.

Lower Nubia: 3000-2500 BC

When the Nubian A unit was defined (from a perspective of northern Lower Nubia) all indications pointed at an end of the Nubian A3 phase (around 2900 BC) due to the military campaign(s) directed by Egypt against the Nubians. With more and more information becoming available, from the Nubian Rescue Project and recent excavations in the surrounding deserts and Upper Nubia, it is time to re-examine the end of the Nubian A unit and define what happened during the Egyptian incursions, how this affected northern Lower Nubian and southern Lower Nubia differently, and what took place in Lower Nubia after 2900 BC. Here, a socio-political development model is suggested for Nubia from around 3000 BC to 2500 BC.

- 1 = es-Saff
- 2 = Qasr Sagha area
- 3 = Kom Aushim area
- 4 = Kom el-Asl area
- 5 = Ezbet George
- 6 = Kafr Tarkhan
- 7 = Gerza / Gerzeh
- 8 = Meidum
- 9 = Seila / Gebel er Rus
- 10 = Gisrel Hadid (J, FS3-5)
- 11 = Abusir el-Meleq
- 12 = Gadallah
- 13 = el-Lahun
- 14 = el-Harageh
- 15 = Kiman Faris
- 16 = Medinet Madi
- 17 = Ghurob
- 18 = Sedment
- 19 = Nazlet Awlad
es-Sheikh
- 20 = Qarara
- 21 = Sawada
- 22 = Zawiyet
el-Maiyutin
- 23 = Awlad Nuweir
- 24 = Sheikh Timai
- 25 = es-Sheikh Ibada
- 26 = Deir el-Gabrawi
- 27 = Arab Miteir
- 28 = Deir Bisra
- 29 = Matmar area
- 30 = el-Mustagidda
area
- 31 = Deir Tasa area
- 32 = el-Badari area
- 33 = Hammamiya area
- 34 = Qaw el-Kebir area
- 35 = Akhmin
- 36 = es-Salamuni

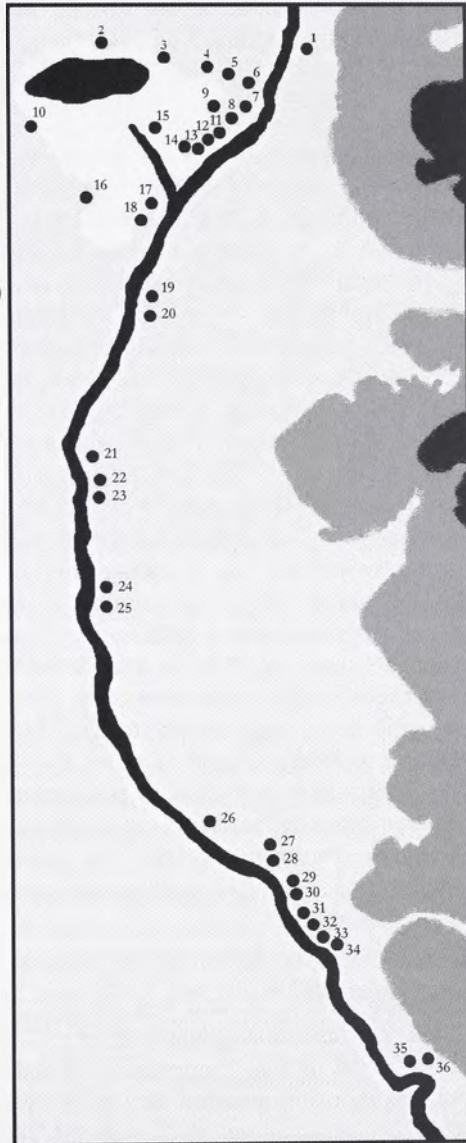


Fig. 5. Sites of Middle Egypt, those located along the palaeobeaches to the north and southwest of the lake are too numerous to individually label and so have been grouped in regions (Map based on Kemp 2006: 9).

The focus is here on the social developments. The political developments will be discussed in more detail by Joris van Wetering (in prep. b) but as political actions have social ramifications, here the political developments are discussed as a background to the cultural developments.

During the Nubian A2 phase a political landscape with several emerging polities can be argued, albeit on the basis of inconclusive information, which changed during the Nubian A3 phase into a political landscape dominated by the polity centred on Faras and Qustul (van Wetering in prep. b) contrary to the assumptions by Nordström (1998) and Jimenez-Serrano (2003: 262-263, fig. 5) that during this phase, control of this territory was divided between the rulers buried at Cemetery 142 in the Sayala area and those buried at Qustul. During the Protodynastic Period (3200-3000 BC), 3 large-scale polities existed in Upper Egypt and Lower Nubia these polities are identified as proto-Kingdoms: the proto-Kingdom of This-Abydos in Northern Upper Egypt, the proto-Kingdom of Nekhen [Hierakonpolis] in southern Upper Egypt, and the proto-Kingdom of Faras-Qustul in Lower Nubia (van Wetering in prep. a-b).

It can be assumed that the relations between Upper Egypt and Lower Nubia were both hostile and peaceful, with the proto-Kingdom of Nekhen viewing the proto-Kingdom of Faras-Qustul as both a necessary economic partner and as a military opponent. Prior to the Unification of the Two Lands, the three proto-Kingdoms most likely kept each other in check (with This-Abydos focusing on Middle-Lower Egypt to secure the northern trade route to the southern Levant). After this political event, the political landscape changed drastically with the powers of This-Abydos fusing with those of Nekhen, thus creating a united kingdom of the Two Lands (van Wetering in prep. a). During the reign of King Narmer internal dynamics and consolidation of the territory took precedence but certainly from the reign of King Aha, Egypt took steps to remove a political rival and economic opponent as indicated by a label from this reign that depicts campaigning in (Lower) Nubia (Wilkinson 1999: 71). It is not clear if Egypt carried out one massive campaign or several campaigns, each penetrating further south but the political centre at Faras-Qustul was almost certainly the primary target. The indications of destruction there, dated to Dynasty I (Williams 1986: 183), seem to be evidence that the Egyptians indeed reached Faras-Qustul. These military incursions led to a disruption of political development in Lower Nubia (Edwards 2004: 74), although not the complete eradication of Nubian society in (northern) Lower Nubia, as is sometimes assumed (O'Connor 1993a: 6; Fattovich 1999: 80). It appears that there were groups of people, be they the populace who stayed or refugees from the elite that survived to continue the cultural traditions, at least for a certain time. Rather the Egyptian campaigns led to the removal of the ruling elite of Nubian society that formed the backbone of

political life as these were most likely specifically targeted by the Egyptians. Also, these events would probably have led of mass movement of Nubian people, fleeing their homes and homeland as northern Lower Nubian, at least up to Faras-Qustul, would have been severely affected. The refugees would have made their way upstream (into southern Lower Nubia) and into the deserts (Bonnet 1997: 38). Sites with material resembling that of the Nubian A unit has been found in the Western Desert: Laqiya region - Wadi Shaw (Lange 1998; 2003) and Eastern Desert: Wadis Allaqi and Gabgaba. Some of these groups that fled upstream, to southern Lower Nubia, even went past the Third Cataract, into the fertile Kerma basin (Bonnet 1997: 38; Fattovich 1999: 79).

The slim evidence of a population in northern Lower Nubia points to a less complex society, which was less stratified and hierarchical than the preceding Nubian A society (Smith 1991: 101). Its existence attested by the occupation at sites that used to be main centres: Faras-Qustul (Williams 1989: 121-133; Honegger 2004: 45), Aniba (Gratien 1995: 54) and Kubban near Dakka as well as other sites: Shellal, Meris, Qurta (Rampersad 2000: 90) and Toshka (Williams 1989: 121-133) That certain, albeit very few burials can now be identified as belonging to this period (Williams 1989: 126) attest to such a less complex society although their visibility is due to the relatively richness of these burials in relation to the majority of poorer burials which cannot be differentiated within the archaeological record. The presence of Egyptian imports (post-dating early Dynasty I) are the main indicators of the date of these burials, which might have belonged to local (community) chiefs. The few indications of this period are, therefore, as much the result of the way this area has been excavated and published as it is a representation of what actually happened there. In southern Lower Nubia, the situation is different with settlements showing continuous occupation from the Nubian A to Nubian C unit: Maghendohli Settlement 11-M-7; Maghendohli Cemetery 11-H-15; Saras West Settlement 11-L-14 / S.5; and possible Saras West 11-Q-72 (Gratien 1995: 54). Despite the problems inherent in interpreting the sites in southern Lower Nubia, it seem that the Nubian A unit sites continued in this region (Gratien 1995: 55), probably because this area was beyond the range of the Egyptian incursions.

The dispersal of Nubian people resulted in a cultural landscape where the resettled population in the Western Desert, southern Lower Nubia / Batn el-Haggat, Eastern Desert continued to display the cultural traits of the Nubian A3 phase (possibly with a certain degree of regional diversity), the same is true of the remaining population of/in southern Lower Nubia (Fig. 6).

From about 2950 BC to 2700 BC, the Egyptian Dynasty. I and II state most likely tried to prevent any redevelopment of local polities or any strong social entity in both northern and southern Lower Nubia. This was probably pursued

- | | | |
|------------------|-----------------------|-----------------------|
| 1 = Elefantine | 11 = Aniba | 21 = Saras west area |
| 2 = Shellal | 12 = Toshka | 22 = Saras plain area |
| 3 = Meris | 13 = Abu Simbel | 23 = Sai Island |
| 4 = Gerf Hussein | 14 = Faras | 24 = Arduan Island |
| 5 = Dakka area | 15 = Qustul | 25 = Tumbus |
| 6 = Qurta | 16 = Buhen | 26 = Kerma area |
| 7 = Sayala area | 17 = Halfa Degheim | 27 = Gism el-Arba |
| 8 = Mediq | 18 = Gemai | 28 = Kawa area |
| 9 = Afiya | 19 = Maghendohli area | |
| 10 = Tomas | 20 = Murshid area | |

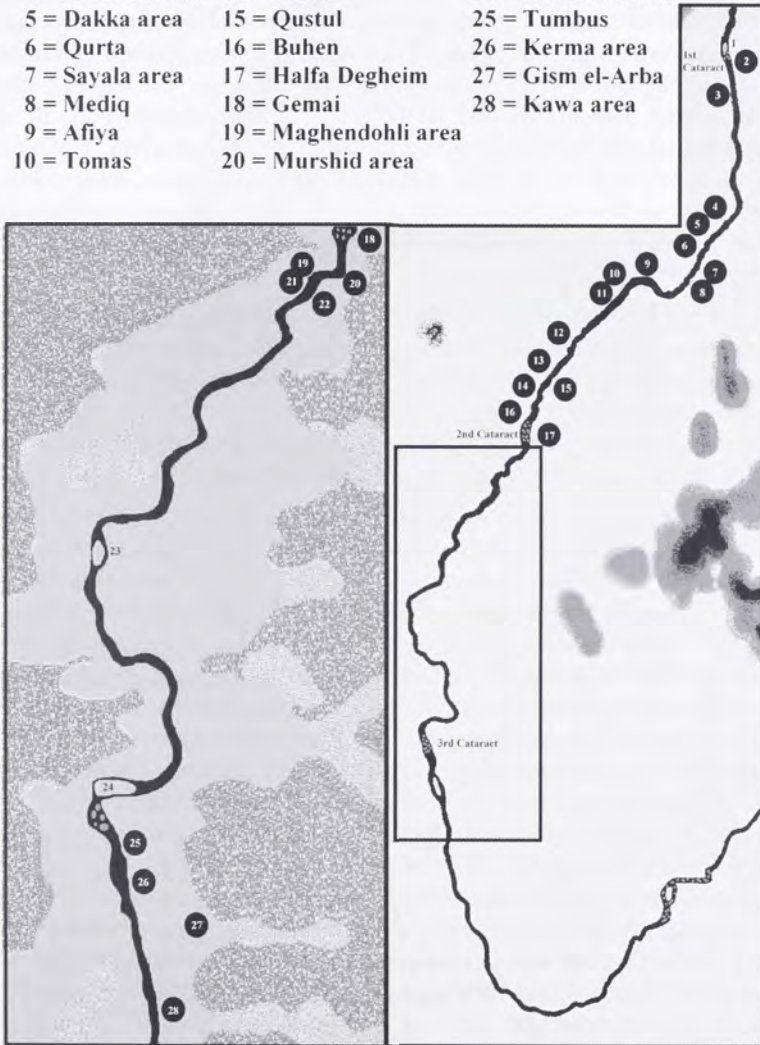


Fig. 6. Nubia with selected sites of the Nubian A unit and sites with material dated to the period 3000/2900 to 2400 BC (Map based on map inside front cover of: Sudan & Nubia. The Sudan Archaeological Research Society Bulletin 1, 1997).

through regular military raids in northern Lower Nubia and posturing, threatening towards southern Lower Nubia if not actual raiding. Beside the political aim, these raids would have benefited the economic aspirations of the Egyptian state, extracting tribute and booty like cattle, prisoners / forced labourers, gold, copper, and commodities needed for religious and ceremonial activities. During earlier times when certain animals were still abundant in Egypt, their products: ivory tusks from elephants, leopard and other animal skins, ostrich egg-shells and feathers, ebony, incense (Bonnet 1997: 38) became essential parts in religious and ceremonial events. The changing climate (see Hassan 1988; 1997a) resulted in the disappearance of these animals and the loss of these commodities. This necessitated the flow of these commodities as import goods from the south with the Nubians as producer of certain commodities and as facilitator / middle-men for commodities from further south.

During Dynasty III and possibly by the end of Dynasty II, the pattern of long-distance Egyptian control through raids changed to one of more direct control as projected by fortified outposts of the Egyptian State at strategic locations: Dakka area (Kubban / Ikkur), Tomas, Aniba, Toshka and Buhen. Unfortunately this pattern is still very sketchy with limited evidence from Buhen and a lot of ambiguous information from other locations.

Approximately 800 m north of the Middle Kingdom fortress at Buhen, a large settlement was investigated by Emery during the Aswan Dam Archaeological Project. The settlement 'has a length of at least 300 m parallel to the river and a width of about 45 m so at least an area of 13,500 m² but neither at the northern, nor eastern side were the extremities of the settlement uncovered due to modern disturbance. The settlement lay parallel to the river with a possible quay while the landside was fortified with a 2 m thick wall (most likely this wall surrounded the settlement on all sides except the waterfront). There is no information available about the entrance to the compound. The settlement plan (Fig. 7) shows a large stone-build structure (app. 10 m by 20 m) with six rooms and in front of it, at least three smelting ovens for copper, situated near the river quay and around it (landside) smaller structures made of stone and/or mud-brick. The plan, unfortunately, shows only a small area of the settlement which consisted of house-structures, a garden, work-structures and storage facilities. As such, the primary purpose of this settlement was to operate as an economic acquisition hub although the thick wall also points at fortification, for both 'Projecting Egyptian Power' to the locals and as protection against them. At Buhen, copper smelting seems to

⁴ The description of the Old Kingdom fortified settlement at Buhen is based on the preliminary reports by Emery (1963; 1965: 11-114) and his popular publication on Nubia (Emery 1981: 99-100) as well as a research article by Gratien (1995) who had access to the, unpublished, final report prepared by O'Connor (in prep.).



Fig. 7. Lower Nubia with sites showing Egyptian presence, with enlarge plan of the fortified settlement at Buhen, Old Kingdom (Plan based on Emery 1963: pl. XXVI).

have been a central task but as there are no known copper mines nearby, it seems that the raw copper was brought to the settlement from either mines south of Buhen or from mines in the desert and as it seems highly unlikely that the Egyptians living at Buhen ventured out so far, the raw copper must have been brought via local, Nubian trade contacts to Buhen where it was handed over to the Egyptians, either through trading or coercion / threat of force. The assumption by Lange (1998) that Wadi Shaw in the Western Desert could have been providing goods to Buhen is interesting; however, the distance of about 400 km between both sites makes direct contact very unlikely. At Buhen the first stage of copper manufacture was carried out, creating copper ingots, which were then shipped to Egypt.

The existence of several layers of mud-brick structures under the stone structures point to a substantial occupation period for the Buhen settlement, the earliest confirmed layers dating to Dynasty IV based on 'Meydum Ware' pottery and sealings with the names of kings. The dating of older layers is contentious as Trigger (1965: 79) and Fattovich (1999: 80) follow Emery in his assumption that the thickness of the bricks points to a date in Dynasty II, whereas Gratien (1995: 47) considers such a date too early. The presence of an occupation layer consisting of stone revetment walls about 1.5 m below the Old Kingdom layer does however, indicate a long occupation span at Buhen. The preliminary state of publication does not allow verification of Emery's (1965: 129) statement that Dynasty I pottery was found, although Gratien does not identify pottery pre-dating Dynasty IV. The recently identified Pre-Kerma pottery (Honegger 2004: 45), which is dated to the late phase 2800- 2400 BC allows for such an early dating but, unfortunately, does not confirm it.

According to Gratien, 95% of the pottery consisted of 'Meydum Ware' and other Old Kingdom pottery with a limited amount of Nubian pottery. This Nubian ceramic material shows great similarity with or is influenced by the earlier Nubian A unit and later Nubian C unit ceramic material but also has vessels that do not easily fit in the ceramic corpus of those units. Some of these vessels might then possibly be identified as ceramic material belonging to the period between Nubian A and Nubian C while some have been identified as belonging to the ceramic corpus of the Upper Nubian Kerma unit: Late Pre-Kerma phase (Honegger 2004: 45). For better insight into this important settlement, we have to wait for the final report publication (O'Connor in prep.).

The distance between Buhen and Elephantine is too great to assume that ships regularly sailed between them without stop-over stations. Therefore, it is more likely to assume that Buhen was just one of hubs in a network of Egyptian fortified settlements (Gratien 1995: 49) allowing ships to stop-over at protected 'ports' and be provisioned with fresh food. These hubs acted as interaction points

with the local population, first stage production of raw goods, and outposts of the Egyptian State to project military power in an area considered by the Egyptians as their sphere of influence¹⁷ and for receiving intelligence about the state of local affairs. It is possible that the fortified settlements also controlled local riverine activities and extracted a form of tribute / tax from passing non-Egyptian ships.

As shown by Buhen, the most important task was economic, to acquire (raw) goods from the direct environment of the hub, the surrounding Nubian Deserts and up- and downstream from the hub. These goods were then shipped to Egypt via the Dakka area (Kubban / Ikkur), Tomas, Aniba, Toshka and Buhen where indications of Old Kingdom settlement have been found. As already stated, the indications for an Old Kingdom presence at some of these sites is indirect and again contentious. Both Firth (1912: 22-25) and Steindorff (1937: 2-6) proposed that precursor structures existed at or near the Middle Kingdom fortresses at Ikkur and Aniba, thus a situation similar to Buhen. The amount of Old Kingdom material found in and around the Kubban fortress does also suggest some sort of Old Kingdom occupation. Emery assumed a small Egyptian garrison was stationed at Kubban (Emery & Kirwan 1935: 2-3, 26, 58). Kubban and Ikkur are located on opposite sites of the Nile near Dakka, it is, therefore, more likely to assume that the Old Kingdom material at both Kubban and Ikkur came from the same fortified settlement. The actual excavation of the Middle Kingdom fortress, however, did not show any Old Kingdom layers and both occupation layers were dated to the Middle Kingdom (Emery & Kirwan 1935: 26-44). This led Säve-Söderbergh (1941: 30-36) to reject the assumption that some of the Middle Kingdom fortresses had an Old Kingdom precursor because all constructions were clearly of Middle Kingdom date. This study does, however, not diminish the significance of the Old Kingdom material found at the aforementioned sites. The Old Kingdom material at Kubban is predominantly dated to Dynasty IV and V but both earlier and later material was found, and it was predominantly used as architectural filling and foundation material, usually mixed with Middle Kingdom material (Emery & Kirwan 1935: 26, 58). The few early indications consisted of an intrusive vessel (Emery & Kirwan 1935: 58) and 'Meydum Ware' pottery that might date as early as Dynasty III (Gratien 1995: 46). It seems extremely unlikely that the Middle Kingdom builders brought Old Kingdom filling material with them to construct their fortress, as such it is more likely that somewhere near (not necessarily underneath) these Middle Kingdom fortresses (with Old Kingdom material) a fortified settlement existed, similar to the situation at Buhen where the early structure was about 800 m away from the later structure.

The evidence of Old Kingdom material at most sites dates to Dynasty IV and later, as such the riverine network must have been already intensively used during the Old Kingdom. It seems to have been abandoned during Dynasty V, although the Old Kingdom occupation at Tomas seems to have continued, and this abandonment falls in the same period as the intensification of indigenous occupation, identified at the Nubian C unit (Gratien 1995: 49). The start of this riverine network according to Gratien (1995: 49) occurred during Dynasty IV but as shown above there are indications at Buhen to suggest an earlier start, maybe not during Dynasty II but most likely during Dynasty III. It might even be possible to correlate the development of the fortress at Elephantine Island and the start of the riverine network. The existence of a fortress during Dynasty I and II could point at the absence of a regulated information network in Lower Nubia, informing the Egyptian State what is going on in there. At some stage during late Dynasty II to early Dynasty III, the need for a fortress is superseded and the fortress is demolished (Seidlmayer 1996: 113). If at the same time, a network of fortified settlements existed or was being constructed in Lower Nubia, this would function as an early alarm system for the Egyptian border, informing the state officials at Elephantine what was going on and as such the need for strong fortifications there was diminished. It is not clear how far south the network extended, Buhen need not necessarily have been the most southern outpost. As such, Egyptian political influence in northern Lower Nubia evolved from being indirect through campaigning / raiding during Dynasty I and II, to direct through its fortified settlements from Dynasty III to V.

The situation in southern Lower Nubia which was most likely outside the Egyptian sphere of influence is still very unclear. Most Nubian A sites in this region are still only known through preliminary reports, for many of these sites only their location is known (Rampersad 1999: 82-84). As indicated the Nubian A3 phase sites of this region are of great importance for modelling the period just prior to and preceding the Egyptian military campaign(s) during early Dynasty I in Lower Nubia. Here and in the Western Desert (Liqiya region) it needs to be realised that sites with seemingly Nubian A3 phase material remains might date to the period after the Nubian A3 phase.

Two settlements located on the Saras Plain are of great significance, for Nubian archaeology as well as the Nubian A unit and the period between the Nubian A3 phase and the appearance of the Nubian C unit. Unfortunately, both sites have as yet not been published and as such a detailed description is lacking. Settlement 11-L-14 / S.5 shows possible continuous occupation from the Nubian A2 phase (and possibly even preceding this phase) to the Nubian C unit contemporary to Dynasty V (Mills & Nordström 1966; Rampersad 1999: 82-83). Settlement 11-Q-72 has a stratigraphy of six occupation layers which at certain places

has a depth of at least 2 m (Mills 1968: 201-202). A detailed description of the stratigraphic sequence of both these settlements will provide much needed settlement data to off-set the dominance of cemetery data in the chronology of Nubia.

In Upper Nubia, an incipient polity was forming around Kerma and maybe also at other places (van Wetering in prep. b). The arrival of refugees from Lower Nubia, some of whom probably belonged to ruling elites of Nubian A unit society, most likely not only created tension in Upper Nubian society as well as provided political stimulus, both would have accelerated Upper Nubian state formation. During the late Pre-Kerma phase, Upper Nubian pottery is found at what must have been important local settlements in Lower Nubia: Faras and Saras (Honegger 2004: 61), thus indicating a degree of interaction between Upper Nubia and Lower Nubia during the existence of the Egyptian riverine network. Outside the range of Egyptian influence / coercion, the polity at Kerma could evolve and slowly mature into a political rival and economic competitor of Egypt, during the early Kerma phase (van Wetering in prep. b).

A marked difference has been noted by Geus (1998) in Nubian A unit material found at middle Pre-Kerma phase sites (Kerma) with that found at late Pre-Kerma phase sites (Sai Island). By the late Pre-Kerma phase, the local population (Nubian A unit: A3 phase) had been pushed out of northern Lower Nubia and the presence of Nubian A unit material in Upper Nubian sites should therefore be identified as that of a resettled population that is in the process of integrating itself in their new surroundings. These people probably started to emulate the way of life (and the material culture) of the indigenous peoples (Kerma unit: late Pre-Kerma phase) to acculturate themselves more with the local residents. The Nubian A unit site at Arduan Island / Kilgel east MLG017 (Edwards & Osman 2002) and the Nubian A unit cemetery at Kerma (Fattovich 1999: 79) might be identified as refugee sites, belonging to that initial stage shortly after the Egyptian incursions into northern Lower Nubia and the end of the Nubian A3 phase there.

It seems other Nubian A unit sites were found by the Mahas survey north / down-stream of Arduan Island (Osman & Edwards 1992: 64).

During Dynasty V, Egyptian presence in Lower Nubia seems to diminish, thus creating a new situation for local development. The resident population seems to flourish in both political and economic sense and consequently becoming visible again in the archaeological record. Complementing this process, it seems people from Upper Nubia relocated to Lower Nubia (Edwards 2004: 88). Decades ago, the material culture appearing in Lower Nubia around 2400 BC was identified as Nubian C unit without adequate insight into the developments further south (Edwards 2004: 77). Instead of a distinct regional unit, the initial stage of the Nubian C unit: C1a-b phase should be identified as a northern expan-

sion of the Kerma unit: early Kerma phase (Edwards 2004: 77-78, 88). This can therefore best be seen as a period of Egyptian retreat that stimulated local communities which had been in contact to Upper Nubia, to development of socio-political entities while at the same time people from Upper Nubia were resettling in Lower Nubia to exploit the new opportunities the Egyptian retreat offered and who, in turn, stimulated local socio-political development. This process would be visible in many ways in the archaeological record and would show as already noted by Gratien (1995: 49) that the relationship between the locations of key settlements of the Nubian A unit and those of the Nubian C unit points to a cultural continuum although the geographical limitations of the Nubian Nile Valley must not be underestimated.

The apparent cultural continuity between Nubian A unit and the period thereafter suggests that the current strict cultural diversion might obscure long-term Nubian developments. It therefore seems that a new cultural framework is needed to define the continuation of the Nubian A unit, the interaction with the Pre-Kerma phase of Upper Nubia and the development of the Kerma-influenced material culture appearing around 2400 BC. For the time being, it should be acknowledged that the Nubian A unit continued and Nubian A unit sites need not necessarily date to the Nubian A3 phase, especially those outside northern Lower Nubia. Nor should the material culture of sites outside northern Lower Nubia be used as defining the material remains of sites in the flooded areas of Lower Nubia as the dispersal of the Nubian people might have resulted in distinct regional developments, each showing the traits of the parent material culture: Nubian A unit although not necessarily the same cultural traits.

If the Egyptian state had not intervened in the way it did, it is likely that a state would have developed in Lower Nubia with Faras-Qustul as its capital with strong interaction networks in northern Sudan, Sub-Saharan Africa and the oases, and the Horn of Africa as well as with Egypt. The course of action undertaken by the Egyptian state did, however, not bring Nubian state formation to an end. State formation now centred on Kerma in Upper Nubia where between 2600 and 2200 BC a state developed (van Wetering in prep. b). The Egyptian state throughout its history might not have wanted a strong political-economic power on her southern border but the needs of Egyptian society stimulated it anyway, albeit always just outside the military reach of the Egyptian state, growing in political strength and declining in relation to the decline and rise of strong centralised administration in Egypt. This is not to say that Egypt dictated the agenda by 'allowing' Nubia to flourish at certain times, but rather Nubia pushing Egypt to create opportunities at certain times, whereas, at other times the roles were reversed.

Considering Archaeological Methodology

The various regions of Egypt and the Sudan bring their own peculiar problems for investigations, and even within the various regions there are variations in conditions. The preservation rate for objects and structures varies enormously from north to south and so each site requires its own research design and sampling strategies, which must be tailored to the requirements of each individual site (Tassie & Owens in press). The various areas within Northeast Africa also pose their own logistical problems. Many sites in northern Sudan are located far from any modern facilities, whereas those in the central Nile Delta are often near built-up areas but beneath several metres of alluvium and situated below the water table. All these factors have to be considered and surmounted when investigating prehistoric sites in Northeast Africa.

Archaeological investigations of the prehistoric cultures of Northeast Africa can be traced back to the turn of the nineteenth century with scholars such as Petrie (1896; 1900, 1901a-b; 1902; 1903; 1920), De Morgan (1896; 1897), Quibell (1898; 1900; 1913; 1923), Amélineau (1899; 1902; 1904; 1905), Petrie & Quibell (1896), Randall-MacIver & Mace (1902), Quibell & Green (1902), Garstang (1903), Ayrton, Currely & Weigall (1904), Reisner (1908a) and Mace (1909) finding material that was obviously older than that of the known dynastic civilisation. Throughout the twentieth century great advances were made, notably by Ayrton & Loat (1911), Engelbach (1923), Petrie & Brunton (1924), Brunton & Caton-Thompson (1928), Caton-Thompson & Gardner (1934), Brunton (1927; 1937; 1948), Emery (1938; 1939; 1949; 1954; 1958) and Said (1947; 1951). Although the Archaeological Survey of Nubian rescue campaign (Firth 1912; 1915; 1927; Reisner 1910a; 1910b) uncovered many important sites, it is in the 1960s that exploration of prehistoric Nubia really starts to increase with the UNESCO Nubian Rescue Campaign (Nordström 1972) and (Williams 1986). From the 1970s onwards exploration of prehistoric Northeast Africa really starts to flourish (see above for discussion of these excavations), although the advances in deep de-watering techniques must be noted at Tell el-Fara'in (Buto) by von der Way (1986; 1987; 1988; 1989; 1991; 1992; 1997) Faltings (1997; 1998), Faltings et al. (2000), Faltings & Köhler (1996), Schmidt (in prep.), Köhler (1998), Zimmerman (2002) and Hartung et al. (2003). In the area of radiocarbon dating, building on the original work by Libby (1955), Hassan (1980; 1984a; 1984b; 1985; 1989), Hassan & Robinson (1987), Hassan & Matson (1989) and recently Hendricks (1999) have refined the absolute dating of the period. This has been supported by refinements in Petrie's (1899; 1901b) pottery seriation by Kaiser (1957) and Hendrickx (1996; 1999). Many advances have also been made in the areas of the past environment, bioarchaeology and human ecology, subsistence strategies, craft and craft specialisation, cult, ideology and art,

regional and foreign trade and relations, population and settlement patterning, and the beginnings of writing, many papers on these subjects being published in the Poznan Proceedings. These various areas of interest all go to help explain state formation in Egypt and Nubia. In the latter half of the twentieth and beginning of the twenty-first century there have been many theories including Baumgartel (1947; 1960; 1970a; 1970b), Massoulard (1949), Wilson (1955; 1960), Emery (1961), Carneiro (1970), Krzyżaniak (1977; 1989), Janssen (1978), Hoffman (1979; 1982), Castillos (1982; 1998; 2000), Endesfelder (1984), Fattovich (1984), Wildung (1984), Hassan (1988; 1992; 1997a; 1997b; 1998), Bard (1987; 1992, 1994a, 1994b; 1996; 2000), Trigger (1987; 1993; 2003), Kemp (1989; 1995), Wenke (1989; 1991; 1997), Kaiser (1990), Enrödi (1991), Mortensen (1991), O'Connor (1991; 1993a), Seeher (1991), Dreyer (1992; 1998), Hendrickx (1994), Köhler (1995; 1996; in press), Gatto & Tiraterra (1996), Wilkinson (1996; 1999; 2000), Savage (1997; 2000; 2001), Baines & Yoffee (1998), Gundlach (1998), Baines (1999), Midant-Reynes (2000), Campagno (2000; 2002), Ciałowicz (2001), Haanen (2002), Hendrickx & van den Brink (2002), Proussakov (2002), Raffaele (2002; 2003a; 2003b; 2005), Jiménez-Serrano (2003; 2004) and Wengrow (2006). However, to be able to answer some of the questions arising from these studies, such as how did the rise of state effect settlement patterning, the populations health and diet, regional material assemblages and ideology, trade relations, movement of population, when did the rise of state first begin and when did the different stages of state formation end, further research needs to be conducted. To facilitate research into these various areas, new techniques and methodologies have been and still are being developed.

Remote Sensing and Predictive Modelling

Research into settlement patterning in Northeast Africa has been influenced by Adams (1965; 1981) and Adams & Nissen's (1972) surveys of the Diyala and Sumerian Plains in Iraq. In Egypt, studies into settlement patterning in the Abydos-This region (Patch 1991; 2004), Hierakonpolis region (Harlan 1985) and the East Delta (van Wetering & Tassie 2003) have investigated the roles and interactions of the various sizes of settlements. Although many reconnaissance surveys have been conducted, the rate of destruction of sites is increasing due mainly to agricultural intensification and urban sprawl and in the area of the Fourth Cataract the building of a huge hydro-electrical dam (Tassie in press a; in press d). The west bank of the Nile, particularly in Middle Egypt has suffered encroachment from sand dunes, burying sites, which not only protects them, but makes their location through surface survey nearly impossible. It is also important to understand how the floodplain was utilised in the past (Friedman 1994: 33), only then can we fully interpret early society and its dynamics.

Therefore, the need to find more efficient ways of locating, evaluating and recording archaeological sites is increasing. Although pedestrian survey will never be replaced, new innovations for examining archaeological distributions are refining the way these surveys are being conducted. Technological advances, particularly in remote sensing (satellite images) and recording techniques (geographic information systems – GIS), are making it easier to locate, record, analyse and interpret human behaviour at a whole range of scales. Also, many satellite images are now in the public domain or relatively cheap to acquire, making their use by archaeologists a cost-effective method for surveying large areas.

Much of the original research done by Adams and his colleagues in Iraq is forming the basis of an innovative project by the Centre for the Archaeology of the Middle Eastern Landscape (CAMEL) at the Oriental Institute, University of Chicago. This project is combining the data from pedestrian surveys with remote sensing methods, such as satellite imagery and aerial photographs. Along with additional geoarchaeological studies of the buried landscapes and environmental change, combined with textual information on human land use it is allowing reconstructions of demographic histories, economic landscapes and the various ways people related to the landscape (Wilkinson 2003: 1). A modelling (GIS with crop and demographic models) programme has been constructed to simulate how the Bronze Age Near Eastern societies provisioned themselves with food and how long-term strategies varied with climatic fluctuations (Wilkinson 2003: 1). The project will eventually cover the area from Greece in the west to Afghanistan in the east and from the Black Sea in the north to the Horn of Africa in the south (Harms 2005: 1-2).

Sarah Parçak is currently studying various aspects regarding the environment around and location of archaeological sites in the Sinai, Delta and Middle Egypt as seen in satellite images and aerial photographs (Parçak 2005; in press). This study is examining the effects of climatic change, alterations in riverine regimes, coastal expansion and changes in floral and faunal resources over time. Parçak has analysed satellite imagery data through Corona, SPOT, Landsat, ASTER and Quickbird images, in conjunction with existing archaeological survey data and maps. In the Delta the study is primarily concentrating on the settlement patterning in the regions surrounding the Mendesian Branch, particularly around Mendes and Tell Tebilla, but also covers the whole Northeastern Delta. All the known sites were plotted onto the satellite imagery data, and a 93% success rate was obtained in locating 119 of these previously identified sites. She then applied these location techniques to previously unknown sites and discovered 44 new sites at a 90% success rate. During the summer of 2003 ground-truthing was conducted at 62 new and little known sites thought de-

stroyed, conducting interviews with the local inhabitants, photographing the area, assessing the landscape and artefact scatters. The examination of surface pottery from these sites revealed that they date from the Old Kingdom, Late Period and Roman era. These sites, along with the already known sites were plotted on maps of the ancient East Delta, especially in relation to geziras, marshes, canals, river branches, and the ancient coastline. The results of this survey will also be used to calculate archaeological site loss, the anthropology of site destruction and the general implications for Egyptian archaeology (Parçak in press; also see Mumford 2002, Pavlish et al. 2003). In the Sinai work was concentrated on locating modern waterways that have been in use since antiquity. These water sources are where most sites cluster. In Middle Egypt, in an area 15 x 30 km on the West Bank across from Amarna, 70 archaeological sites, 43 of which were previously unattested, have been located and ground-truthed (Parçak 2005). As well as fieldwalking these sites, geophysical sub-surface survey and drill coring were used to evaluate the archaeological remains. Pharaonic remains were only found at one of the sites, all the other sites were primarily Roman to Late Antique, even to a depth of 5-6 m below surface. The location of earlier sites will need to use more industrial coring equipment than a hand auger used in the programme, which has a maximum range of 6-7 m below surface. Parçak's survey in Middle Egypt has shown that 10% of the sites visited were open tell sites, 13% were beneath modern fields, 20% lay beneath modern cemeteries, and 63% were beneath modern towns (Parçak 2005: 9).

Multi-spectral satellites sample many different windows of the electromagnetic spectrum, picking up variations not usually discernable in normal aerial photographs. Near and middle infra-red bands are strongest in picking up moisture retention in vegetation communities, thus allowing the location of buried archaeological sites that absorb moisture more readily than the surrounding landscape. As Parçak is demonstrating the location of sites through this method on the Nile floodplain and low desert is proving very successful, however, due to the transitory nature of many high desert sites (Friedman 2002) and the general lack of moisture in the desert environment it is more difficult to discern sites in the near and middle infra-red bands. Technological, theoretical and methodological advances may in the future allow for better detection of high desert sites. Parçak, in co-operation with the SCA, is conducting a teaching programme to disseminate this latest survey technique to Egyptian antiquity officials and hopes to expand her programme to the rest of Egypt. This innovative CHM tool is relatively quick and cost-effective in relation to pedestrian survey in locating new and little known sites for further evaluation, as well as assessing the landscapes surrounding known sites.

When using fieldwalking to evaluate a tell, particularly when surveying for the earlier phases there are certain limitations. Studies have shown that surface collections of sherds on mound sites are significantly biased in favour of the later periods, by as much as 10 to 1 (Miller-Rosen 1986). This is not only a result of stratigraphic replacement, but also due to erosion of earlier materials. This bias in favour of the later periods is also true of off-mound sherd distribution. The underrepresentation of the earlier periods and overrepresentation of the later periods can be slightly mitigated by scraping the surface by 5 cm to collect potsherds. However, the Predynastic, Early Dynastic and Old Kingdom sherds will only be expected if the level of these occupations is less than 5 m from the surface (Hassan, Tassie & van Wetering 2005). At the famous Predynastic West Delta site of Tell el-Fara'in (Buto), not a single early potsherd has been found on the surface, the surface scatter is of Late Period and Graeco-Roman sherds (U. Hartung, pers. comm. 2005). This is due to the fact that the Predynastic layers are located about 10 metres below the surface. However, sites in the Abydos-This survey were located in the low desert not only by a surface scatter of Predynastic potsherds, but the shape of the graves in the Naqadian cemeteries could still be located (Patch 2004: 909). The retention of early potsherds and lithics on the surface is also noted in the Faiyum in the area to the north of Lake Qarun (Caton-Thompson & Gardner 1934). Therefore, when conducting fieldwalking to gain the site signature, it is essential that the type of landscape is considered and on tell sites and areas of heavy alluviation it is particularly important that it is complemented by further evaluation techniques, such as coring, shovel tests and trenching (Tassie & Owens in press), otherwise the site cannot be assessed for its full archaeological potential, especially the site stratigraphy. It is essential when locating sites through satellite images that not only fieldwalking is conducted to ground-truth potential sites, but that a full evaluation at each site is conducted to gain a truer picture of the diachronic settlement patterning and understand the full site signature of each individual site. Once sites have been evaluated targeted excavation of sites can then be conducted, focusing on those sites most in danger of being destroyed or likely to answer particular research questions (Tassie & Owens in press).

Once sites have been located using satellite imagery it is essential to use deep location techniques to evaluate the sites, to locate the earliest levels of occupation buried deep beneath Nile alluvium and subsequent occupation debris. Although many of the sites located through satellite imagery and evaluated by hand auguring by Parçak are only producing relatively recent archaeological remains, many of the surveys mentioned above found that the *fehlt was? oder: there ????* was a predilection for these later sites to be located on earlier sites – often Predynastic to Early Dynastic sites were found to be located beneath Late Period to Roman sites, with a hiatus of settlement in between. It is essential that

professional cable percussion drill coring rigs, which can retrieve cores 50+ m in length, are used when evaluating sites located through remote sensing. Although these rigs cost more money to hire and have to be operated by professional drill corers, this extra cost is money well spent, for it is the only means of locating and retrieving deeply buried cultural material. The usual geophysical techniques – magnetometry and resistivity – are also limited in their scope, for they can usually only detect anomalies up to a depth of 3 m below surface, although in ideal desert conditions can detect archaeological deposits at depths of 10 m below surface (Clark 1996: 36). Although Ground Penetrating Radars (GPR) have been around since the 1970s, modern advances are making this technique more viable for locating deeply buried archaeological deposits. A particularly effective =effective?? GPR, is the LOZA, a portable enhanced power ground penetrating monopulse radar, which in wet clay can penetrate up to 9 m and in limestone is effective up to 40 m below surface. The real-time data can be viewed directly on a computer screen and stored for later interpretation. A three-dimensional model of the sub-surface deposits can then be reconstructed.

Although predictive modelling existed before the development of GIS (using paper maps and databases), because of the ability of GIS to inventory and display a wide-range spatial data it is an ideally suited computer-based technology to recreate past landscapes and predict ancient settlement patterning. The landscape as opposed to environment in terms of usage is socially constructed: it consists of mosaics of temporally and spatially dynamic resource patches in which ecological, geomorphological, and cultural systems operate at various scales (Church et al. 2002: 146). To understand the various activities conducted in the landscape and that modified the environment it is necessary to construct various models that are appropriate to the domain of activity (Hassan 2004). The landscape was shaped and organised for economic, social, religious, symbolic or cultural reasons; it also helped in the construction of myths and history as well as shaping human behaviours (Wilkinson 2004: 334). Sites (cemeteries, settlements and activity locations) are not independent entities, but are components of a system – and their locations are dependent upon the locations of other components in that system, including other sites (Ebert 2000: 131). Predictive modelling needs to be used conservatively to avoid the trap of becoming too environmentally deterministic, but are a useful tool for calculating the locational preferences for settlements, cemeteries and other activity areas. Therefore, to understand past landscapes it is important to understand not only the ecosystems and geoarchaeology of the area being studied, but also the cultural record (Wilkinson 2004: 334).

Modern versions of both commercial and open-source GIS software provide significant spatial database and predictive modelling functionality. For

predictive modelling to be effective it is essential that remote sensing data and computer simulation modelling are combined in the GIS programme (Church et al. 2000: 147). Elevation, slope and aspect are also important independent variables. Available elevation data, such as sampled data points and contour lines, which have to be digitised, are likely to be incomplete or in a form unsuitable for the calculation of slope and aspect. Therefore, interpolation algorithms (the procedure of estimating the value of properties at unsampled sites within the area covered by existing point observations) must be applied to construct a usable digital elevation model (DEM), which recreates a three-dimensional digital representation of the past landscape (Hageman & Bennett 2000). Simulation modelling of the past ecology allows for the past ecological landscape to be created (Costanza & Voinov 2004). The information needed to be entered into the simulation model includes floral and faunal data, palynological data, climatic data, geomorphological data, hydrological data and a temporal dimension. For various regions of Egypt and Nubia there is environmental data available, however, very few simulation models of past eco-systems have been built. Studies of macro flora and fauna have generally been site-based (Boessneck & von den Driesch 1992; von den Driesch & Boessneck 1985; De Roller 1992; Moens & Wetterstrom 1988; Thanheiser 1990; 1992a; 1992b; 1996; Yokell 2004) as have pollen studies (Bottema 1992; Saad & Sami 1967). Wickens (1975) has analysed the available environmental data for the Sudan, however, little work on creating ecological simulation has been conducted in the region. Although environmental data was collected on a regional-scale in the Delta by Stanley et al. (1996), it is essential the more large-scale regional environmental sampling is conducted using cable percussion drill coring rigs to extract cores up to 50 m long. The environmental data retrieved from these cores can then be used in creating ecological simulations for the various regions and periods of history.

Predictive models should put human use of an area into the past environmental context. It should not only define those environmental variables or combination of variables that would attract human use and thus predict site location, but also address post-site formation processes that may obscure or destroy sites (Church et al. 2000: 146). The cultural landscape includes such utilitarian qualities as proximity to water, mineral and food resources, seasonality of resources, accessibility and defensibility, distance and ability to travel between sites, and also ritual and cognitive qualities. The use of archaeological survey and excavation data on the preferred location of sites in different regions and time periods is important in validating hypotheses generated by models, but should not form the basis for model-building (Church et al. 2000: 149). Other variables to be included in the multiscale dynamics and their relationship to human agency include geomorphology, the temporal dimension, scale, and climate. The General Ecosystem Model (GEM) (Fitz et al. 1996) has been designed to simulate a

variety of ecosystems using a fixed model structure. The generic nature of the model is designed so to alleviate the need to keep remaking models for various ecosystems. However, the GEM is insufficient in covering all of the possible varieties of ecosystem processes and attributes (ecotones) when going from one ecosystem to another (Voinov et al. 2004: 43).

Geoarchaeological work has been conducted in many parts of Northeast Africa and for many regions the geomorphological processes are well recorded (Butzer 1976; 2002; Hassan 1997 1997a oder 1997b??). In the Delta Butzer (2002: 89-90) has shown that for the period of state formation not only did the coastline look very different to that of the present (in various areas ca. 50 km further to the south than present), but that the riverine system was a lot more complex than the present with two main branches and five to six minor branches existing. In the Memphite region Jeffreys & Giddy (1992: 6-7) have shown that the River Nile has gradually moved eastwards, moving right over the ancient city of Memphis. This eastward movement of the Nile has also been located in the area of ancient Thebes. Using the three technologies under a theoretical umbrella it should be possible to predict the location of sites, which must be ground-truthed and evaluated in the same way as locating sites through the use of satellite images. Two related areas of GIS application are viewshed and cost surface analysis, which can aid in interpreting the cognitive landscape and site catchment (Gaffney et al. 1996). These analytical tools can measure the visibility of monuments in the cognitive landscape and measure the cost of traversing the landscape to obtain resources in the site catchment area.

As satellite images have been taken since the early 1960s they provide an invaluable cultural heritage monitoring tool for archaeological sites, examining their changing states of preservation or loss. The expansion of agriculture and the development of roads, suburbs, land reclamation and other forms of land use have all accelerated since the early 1960s, thus threatening the finite archaeological remains (Tassie in press a; in press d). The examination of different satellite images taken of an area over a period of time is ideally suited for the long-term monitoring and assessment of archaeological sites. This type of reconnaissance is particularly useful once the date and size of a site is already known from pedestrian surveys (Wilkinson 2003: 6). Once the extent and date of a site is known, it is a relatively easy task to monitor the recent life history or total demise of archaeological sites and also to establish when they are under threat from encroaching developments or when they start to be looted (Wilkinson 2003: 6).

Excavation Strategies

Excavation is a costly and time consuming enterprise, to make it more cost-effective sampling strategies should be used. The sampling strategy is based upon the research design, and is shaped to provide answers to the objectives

within the constraints of logistical issues (i.e. material survival, technology, bureaucratic negotiations, budget, etc). The strategy should be designed to provide the information required according to the nature of the site, and the level of survival of archaeological remains (Tassie & Owens in press). The use of drill-cores, test pits and trenches in evaluating a site is often supplemented by geophysical prospecting (ground penetrating radar [GPR], magnetometry, resistivity) to allow targeted excavation. On large settlement sites such as Buto and Pi-Ramesses geophysical techniques are used to create detailed ground plans of individual buildings and other settlement features of the mud-brick walls, stone elements, sand foundations for columns, and negative trenches (Pusch 2000: 146). Targeted excavation can then provide the stratigraphy, date, and function of selected areas, which can provide answers relevant to the research design or have been formulated due to the results of the geophysical survey.

Many sites have been identified through survey, such as those in the Northeastern Delta. As aforementioned, at present there is an imbalance in our knowledge of the Delta, with early sites being grossly underrepresented in the Central and West Delta. There are two main reasons to account for this: 1) the imbalance in intensive survey between the East and West Delta, and 2) the greater accumulation of silt in the Central and West Delta, burying the earlier sites (Butzer 2002). In 2005, the Geology Department of Cairo University conducted a drill-coring programme in the area of Banha using a cable percussion drill coring rig, and found early potsherds at a depth of 17 m below surface (M. Hamden, pers. comm. 2005). The UCL/Cairo University geoarchaeological survey of the Faiyum (Hassan et al. 2004: 25-26) while investigating the geological nature of the Hawara Channel located a thick layer of Dynasty I potsherds at Gadallah, 5.5-6.5 m beneath the surface. A multi-disciplinary approach to locating sites buried by several metres of alluvium or sand is one of the most time and cost-effective methods. Combining surveying programmes with the disciplines of geology and geography or just greater dissemination of information and greater access to data and material facilitates more efficient use of the time, money and valuable resources.

Once deeply buried sites have been identified, these sites need further evaluation. Another problem with many Predynastic sites in the Nile Delta is that they are below the water table, as well as several metres of alluvium. The use of dewatering pumping equipment, at sites such as Tell el Fara'in and Sa el-Hagar (Sais) has enabled the earliest levels to be investigated (von der Way 1997; Wilson & Gilbert 2003). However, the depth of the buried Predynastic sites in the central Delta has so far prohibited any excavation in the region. Deep excavation and dewatering has been conducted in other parts of the world. At Coppergate in York, England, excavation of 9 m of stratified layers was under-

taken, many of the lower levels being waterlogged (Renfrew & Bahn 1991: 482-483). To ensure safety for the excavators and drain the area of water a cofferdam of sheet piling was constructed around the large open-area to be excavated and pumps were kept running for 24 hours per day. Although other methods have been used for deep excavations, such as stepping the sides of the trenches (Renfrew & Bahn 1991: 93), this technique is unsuitable when dewatering is also required. Excavating in a box-grid is also an unsuitable technique to use when excavating deep waterlogged deposits as the securing of the baulks to prevent them collapsing into the excavation area would obscure much of the archaeology and would be more costly than using open-area excavation. Therefore, if open-area excavation is to be used, single context recording should also be employed (Tassie in press b; in press c). Moreover, open-area excavation and single context recording is by far the most effective method of excavating whether the site has deeply stratified deposits or not.

Bioarchaeology

Humans are bound by the constraints of their biology, environment and culture. A stress or change in any of these spheres ultimately results in an individual response to cope with the changed condition. These changes/adaptations are ultimately reflected in the health, mortality, and genetics of the population (Brace et al. 1993; Lovell & Johnson 1996). The transition to state ca. 3350-3050 BC produced social, occupational, and ecological changes that had serious implications for the health, diet and microevolutionary genetics of the Nile Valley and Delta populations (Podzorski 1990). Human behaviour is both influenced and predicated by biology. It is fundamental that any explorations of the emergence of the state documents what changes in biology and culture occurred, how these changes affected individuals and how populations adapted to these changes in conditions. The majority of threats to human health do not occur randomly but are correlated with patterns of human activity, which is important for our understanding of the impact of social developments on diet and health (Rose et al. 1993; 1998).

Analysis of the skeletal material may help elucidate if there was demicdiffusion from Upper Egypt to Lower Egypt during the transitional period of cultural change ca. 3650 BC (see below for further discussion). By conducting Stable Isotope Analysis on the teeth of an individual it will indicate the region in which he or she was born, whereas conducting it on the bones will indicate where they lived in the last ten years of life. The results may show that men moved into the region or that it was women who moved, or that the whole populations moved from the Valley to the Delta. However, it may show that there was no change in the population, indicating that it was purely a change in materiality and not people (Bentley et al. 2002; 2003a; 2003b; 2004; n.d.; Price et al. 2001;

2002). DNA studies are promising to be able to better explore patterns of kinship, exogamy and residence (Jones 2004: 44-5). DNA studies can also help elucidate if there were multiple or unitary domestication of animals and plants (Jones 2004: 44). However, the preservation rate of skeletal material, particularly at such Delta sites as Kafr Hassan Dawood (KHD), may prevent these types of studies, as diagenetic processes may have completely destroyed the organic material in the bones (Lovell 2000: 40). Due to the wide variation in local burial conditions and the fact that smaller samples are now required (the KHD samples were taken in 1995), it is imperative that samples are taken and tested so that these promising areas of investigation may enlighten our knowledge of the demographic nature of Northeast Africa and understand the movement of people during this critical period of state formation.

The peopling of Egypt has been a long debated point, using qualitative and quantitative methods of comparing 36 dental morphological variants. Irish (in press) has investigated three particular points of interest:

1. The origins of the Badarian population?
2. The population genesis of the Naqada population, indigenous or a new 'Dynastic Race'?
3. Was the unification of Egypt due to internal developments from the Naqada culture?

Many scholars based on interregional cultural similarities have suggested that the Neolithic populations of the Western Desert came into the Nile Valley ca. 5,000 to 4,500 BC and mixed with the Nilotes (Hassan 1988; Holmes 1989; Midant-Reynes 2000). Irish (in press) examined a Neolithic population from Gebel Ramlah in the southern part of the Western Desert and compared the results with those from Badari. He found there to be significant differences, but concluded that the Western Desert population was closest to early Upper Egyptians, including those from Badari, that the differences could be accounted for by the fact that the Badarians were a mixture of indigenous Nilotes and people moving into the region from the oases a lot farther north.

The Badarian and Naqadian samples showed a great similarity and indicate a direct relationship amongst these two groups and also those from Hierakonpolis (Irish in press). This confirms the hypothesis of Arkell & Ucko (1965) and goes against the 'Dynastic Race' theory proposed by Petrie (1939) and Baumgartel (1970a, b). However, these bioarchaeological results are contrary to non-metric (Prowse & Lovell 1996) and metric (Keita 1996) traits observed on the skulls of the same Badari and Naqada populations, which showed the populations to have significant differences, however, see Zakrzewski (this volume) for a fuller discussion of craniometric evidence..

There seems to have been great biological affinity between the populations of Naqada and Hierakonpolis based on dental trait concordance (Irish in press). Both of these sample populations show great affinity with Dynasty I and II samples from Abydos. The samples from Abydos showed no significant differences to those from Dynasty I Tarkhan, indicating continuity in population from the Predynastic, through the Protodynastic and into the Early Dynastic Period (Irish in press). This deduction again goes against the 'Dynastic Race' theory. Moreover, Zakrzewski (this volume) has shown that there was a gradual increase in stature of the Predynastic population, particularly in the long bones, until it reaches its apex in the Early Dynastic Period.

This line of enquiry is showing some very promising results, however, samples from only five early sites were used, and none from the Delta. A much larger sample base is required to have more confident results and the disparity between the cranial and dental results also needs to be explained. Because of the potential that bioarchaeology is offering to explain various aspects of state formation, when excavating a cemetery site or where human remains are likely to be discovered, it is essential that a bioarchaeologist is a member of the archaeological team (Owens et al. in press).

Archaeology in Egypt and the Northern Sudan: Looking Forward

It should be recognised that early Egypt was 'put on the map' from a Dynastic Egyptian point of view, meaning it got endowed with the splendour and power of the state that Egypt was to become during the Old, Middle and New Kingdom Periods. From this pedestal on which early Egypt was placed, researchers like Reisner went south and put early Nubia on that same map, albeit in an inferior position compared to early Egypt. This point of view has influenced the way relations between early Egypt and its southern neighbour were modelled and also how the Nubian A unit was interpreted. With the amount of information presently available for Northeast Africa, it is possible and necessary to reassess the contemporary interactions and social and cultural developments throughout the Nile basin. The cultural and political developments in Upper Egypt and Lower Nubia stimulated events in surrounding areas, particularly Lower-Middle Egypt and Upper Nubia but also farther afield. These developments did not take place in splendid isolation but were part of the Nilotic-African cultural landscape.

Nor should it be assumed that the North was dominant in relation to the South, only after the Unification of the two northern polities did the northern union of Egyptian polities gain sufficient advantage to act against the southern polity. Whereas before the unification it seems an evenly balanced power situation existed which prevented one polity to attack and annex another one. After the unification the balance of power changed in favour of the north and

resulted in a decisive action by the northern union (under the leadership of the First Dynasty kings) against the rival polity in the south that competed for the same resources, to eliminate the middle-men (van Wetering in prep. a-b).

As Edwards (2004: 67) points out, it is only now after years of intensive fieldwork in other parts of the Sudan and East Africa that the other necessary viewpoint can be added to modify that Egyptocentric perspective of the Nubian A unit. This long identified unit has been central in interpreting Nubian development, as archaeological researchers interpret the unknown by contrasting it with the known. The A unit became the principal unit to which new units farther south were measured against and used to interpret cultural development in Lower Nubia. With more and more information becoming available for the Nile basin and surrounding areas, the Nubian A unit is in accord with the wider Nilotic-African perspective as a local Lower Nubian development important in its own right but also peripheral to development to the south (Edwards 2004: 67). Therefore, it is essential that the early development in Egypt and Lower Nubia is re-examined in this light, un beholden to later events along the Nile River. The dominant role acquired by Egypt during the Protodynastic Period and formalised at the beginning of Dynasty I with the formation of the united kingdoms of Egypt had an enormous effect on the Nile basin. The state formation process in Lower Nubia was brought to a halt and a similar but more incipient, state formation process in Upper Nubia was stimulated, this cycle of Egypt stimulating Nubian power beyond her sphere of power is a recurring feature of Egyptian-Nubian interaction.

Defining Cultural Development

The characterisation of cultural traditions, including spatial extent and temporal changes mainly uses the culture history approach, which emanated from the European and American traditions (Shennan 2004: 4-5). This approach equated culture with material assemblages and saw distinctive artefact types chronologically, geographically and contextually associated with these cultures (Shennan 2004: 4). These cultural units became the building blocks on which archaeology was built. In the archaeology of Northeast Africa these building blocks were called Naqadian, Maadian, Badarian, Nubian A, etc., which were defined strictly on the basis of mortuary data and which were clearly defined in time and space. Problems of definition in separating adjacent or successive cultures are inherent in this system. As shown above, the Badarian unit and the Naqadian unit of Upper Egypt are maybe too strictly defined in relation to each other's mortuary data, whereas those defined boundaries are not reflected in the settlement data of Upper Egypt. As argued by Shennan (2004), more fluidity in cultural boundaries is required to reflect the nature of society that produced the materiality and account for the discrepancies found in the archaeological record.

This culture history legacy has become entrenched in archaeology and although it has been a useful tool for ordering material remains, recent advances in analytical archaeology now propose a new evolutionary approach that regards the diachronic patterns in materiality at different hierarchical levels and cultural practices associated with them as central to archaeological investigation (Shennan 2004: 17). Using quantitative analysis of the frequency of various attributes of the materiality (Shennan 1997) these diachronic patterns will be better understood and result in more reliable interpretation of the data if combined with other kinds of studies (Ellis 2006: 246). The achievements of Petrie, Reisner and others, although admirable, was done with the quantity and quality of archaeological data available to them at that period, it is now time to review the cultural landscape of Northeast Africa. The amount of available archaeological data has grown enormously in the last few decades, and re-assessing the internal dynamics, constituent parts and boundaries of the cultural units using new advances in archaeological theory and analysis is essential in light of the problems highlighted above.

Shennan (2004: 9) notes that there are core cultural traditions whose components adhere over time, providing the basic cultural framework that has a major influence on social life without organising everything, so there exist peripheral cultural elements not closely tied to the core. Cultural transmission can occur through imitation or teaching, inheriting cultural traits from peers of parents, as a system of inheritance (Boyd & Richerson 1985: 283). There can be wilful modifications or improvements made in the transmission of culture from one generation to the next, due to either an individual's agency and own experiences or interaction with other groups (Shennan 1996: 286). Another way that change can occur is a copying error, where one person unwittingly does something in a different way. These new cultural traits will then be passed on to the next generation, who may modify it again in their own way causing cultural drift. For changes to be accepted and absorbed into society, the new elements must be compatible physically and symbolically with the already existing elements of culture or run the risk of being rejected as being incomprehensible (Lemonnier 1993). These new elements may be externally borrowed through diffusion or the whole may be just a reorganisation of elements already present, rarely do people come up with straight inspiration, rather it is normally a case of transpiration [constant development] (Lemonnier 1993).

This evolutionary theory could account for the regional variation found within the archaeological record of Northeast Africa, especially when one does not equate a particular population in time and space with a particular cultural unit but instead identify a population throughout the Nile Valley that adapts to local situations, and limitations. Therefore, creating a more fluid materiality with

distinct features but also strong similarities whereby it might be possible to view the distinct features that define the boundaries between Naqadian and Badarian as mortuary differences, whereas the similarity found in the settlement data conforms more to the core cultural traditions. The lack of excavated sites in Middle Egypt to assess the interaction between the Upper Egyptian Cultural Complex and the Lower Egyptian Cultural Complex is in this regard a huge disadvantage that should be rectified.

The appearance of the Naqadian unit in Lower Egypt is often described in a way of what was in Upper Egypt is now also in Lower Egypt (Friedman 1994: 919) but this obfuscates the dynamics going on in the whole Nile Valley at this period; as the way of life in Upper Egypt also changed significantly during the Naqada IIB-C phase (Friedman 1994: 862-863). This period should probably be seen as a dynamic phase of intensive interaction between neighbouring communities throughout the Nile Delta and Valley, although each with their regional adaptations. Technological advances during the Naqada IIB-C phase created new, better, faster ways of producing goods used in daily and ritual life, and this knowledge spread through the neighbouring communities, emulating the new ways of their neighbours. This process of cultural acculturation is the transference of ideas, beliefs, traditions and sometimes artefacts by long-term, personal contact and interaction between communities or societies which sees the adoption of a different materiality through assimilation by prolonged contact (Darvill 2002: 2). This diffusion or spread of ideas, material items, or cultural traits from one culture or society to another does not necessarily imply a movement of people, for the aforementioned can move through trade and other forms of contact (Darvill 2002: 121). Acculturation may also be the result of emulation, which is a theoretical framework to explain cultural transmission and cultural change tracing the rise and decline in popularity of styles, forms, functions and fabrics; emulation patterns can illuminate the social dynamics in which they are at work (Cannon 1987; Miller 1982; Shennan 1996: 283). Emulation can take the form of copying of material styles and forms by cultures with 'inferior' styles and forms. In periods when Egyptian society expanded, the faster these changes occurred, opening the way to more effective changes on their material world including faster rates of emulation (Cannon 1987).

This acculturation process is observed at several settlement sites in Lower Egypt: Tell el-Farkha; Tell Ibrahim Awad; Tell el-Iswid South; and Buto (Tell el-Fara'in) (Hendrickx & van den Brink 2002: 370-371), where a transitional layer or layers is visible in the archaeological record indicating a gradual change-over from one (Maadian) cultural unit to another (Naqadian) unit. Instead of a clear break, which would suggest other dynamics at play, the progressive admixing of materiality suggests a gradual transference of traditions, ideas and

objects through interaction. Our knowledge of the mortuary development in Lower Egypt is still very sketchy, with few cemetery sites having been extensively investigated and published. To date, no indisputable mortuary information is available that shows the gradual cultural transition indicated from settlement sites.

At four cemetery sites; Minshat Abu Omar (MAO); Kom el-Khilgan (KeK); Sedment and el-Harageh (Hendrickx & van den Brink 2002: 348-352), indications of the cultural change-over seem to be present, whereas at a third cemetery site; Tell el-Farkha (TeF), such indications can be expected. At the cemetery site of Kafr Hassan Dawood (KHD) (Hassan et al. 2003), indications of Naqada II phase occupation are present but no indications of material of the Maadian unit have been found. At MAO, the first cemetery extensively excavated in Lower Egypt (as such comparisons were primarily made with Upper Egyptian cemeteries), initial analysis indicated that all burials dated to the Naqadian unit, from Naqada IIC-D phase onwards (Kroeper & Wildung 1996; 2000). However, the recent re-analysis by Köhler (in press) indicates that in the earliest phase cultural traits of the Maadian unit are visible. As almost the entire cemetery was investigated, it can be excluded that there were earlier burials (predating the Naqada IIC-D phase) dated to the Maadian unit. The likelihood of such early burials seems to be validated by the presence of early settlement occupation on the tell, however, the dating of the earliest occupation layer is difficult as only non-diagnostic sherds of indefinable form were found, which led to a general dating of the Neolithic Period (Krzyżaniak 1992; 1993), possibly connected to the Merimidian and Maadian Periods. It therefore seems that the cemetery with Naqadian unit burials, albeit with a small amount of Maadian traits, was spatially separated from an earlier cemetery with Maadian unit burials (of which no trace was found on the extant tell at MAO).

At KeK a cemetery is in the process of excavation with Maadian unit burials, the earliest of which date to the Wadi Digla phase II and the later to the Naqada IIC-D phase (Midant-Reynes in press). In the later phase there is a small amount of Naqadian unit material. Some, although not all, of these burials are cut by later Naqadian unit graves of the Naqada IIIA-C/D phase, possibly indicating reuse of the cemetery. Although the relationship between these latter phases is still unclear, and as such no definitive statement can be made, the ongoing excavations may elucidate if there is a break in mortuary practices at KeK (Tristant & De Dapper in press). If indeed the cultural change-over occurred during the Naqada IIC-D phase, when at MAO already Naqadian unit burials are present (albeit with Maadian traits), then it seems that this specific cemetery shows a time-lag in relation to the change-over at settlements and with the MAO cemetery. It should be noted that the KeK cemetery is quite small and does not

belong to a high status community. Interestingly, during the Naqada III phase, the low-middle status cemetery at KeK seems to be connected with an, as yet, uninvestigated site on a large gezira across the ancient river branch and possibly also associated with the high status cemetery at Tell es-Samara. No settlement remains dated to either the Naqada III phase or Maadian unit phase have so far been located on the KeK gezira where the cemetery is located.

At Sedment (Faiyum region), a similar situation exists with the Maadian unit cemetery and nearby but spatially separated cemetery with Naqada III phase burials. Whereas at el-Harageh a small cemetery with Maadian unit burials (Cemetery D-S) exists with Naqadian unit Cemetery H burials dated to the Naqada IIC-D phase. It is, however, unclear, if the Maadian unit cemetery is actually a cemetery, as only circular pits containing objects, but no traces of human remains were found, this led Williams (1982) to suggest that this was a barter place similar to ones found in Nubia. The cemeteries at el-Harageh should show indications of the change-over, and it is therefore essential that the material from this site is reanalysed. At the site of Abusir el-Malek there is a high percentage of black-polished vessels (Adams & Ciałowicz 1997: 19), possibly indicating the presence of a Maadian unit component, though again this cemetery needs to be reanalysed. In this regard, the on-going reanalysis of the cemetery remains at Gerza, which are also dated to the Naqada IIC-D phase, will hopefully provide new information (Stevenson in press).

At TeF, where the settlement shows continuity between the Maadian unit and the Naqadian unit, indicating a gradual acculturation, the cemetery may also be expected to reflect this dynamic (Chłodnicki 2004). The associated cemetery has not been fully excavated, and the earliest graves excavated so far date to the Naqada III phase. The on-going investigation at TeF will hopefully provide incontrovertible evidence of the dynamics at play during this period of acculturation.

The gradual change in materiality as shown in settlement sites argues against large-scale demic-diffusion, whereby people from Upper Egypt migrated to Lower Egypt and displaced the indigenous Delta population. The tendency of spatial separation between the Maadian unit and Naqadian unit cemeteries at certain sites, however, does point at a cultural, and possibly an ethnic, break between those interred in the separate cemeteries. As already stressed, more information is needed, not only from on-going excavations but also from known, but poorly published sites though re-investigation of the material found there.

Similar to the situation in Lower Egypt, the cultural change-over from the Abkan unit to the Nubian A unit in northern Lower Nubia shows evidence of continuation of settlement occupation within the same settlement whereas the cemeteries, each with distinct cultural burials are spatially separated. At east

Aksha, three sites provide a rare glimpse into the cultural development as both the settlement and cemetery context of a community during the change-over has been investigated here. Settlement Nag' el-Gezira 303 has two occupation layers, the lower one dated to the Abkan unit and the upper one to the Nubian A3 phase whereas cemetery Nag' el-Gezira 321 has at least eight graves and several disturbed pits, all graves are dated to the Abkan unit and cemetery Nag' el-Gezira 298 has 18 burials dated to the Nubian A2-3 phases (Nordström 1972: 140-51). The settlement seems to show a continuous occupation from the late Neolithic Abkan cultural unit to the Nubian A unit: A3 phase, and about 1 km south of the settlement two cemeteries, one with burials dated to the Abkan unit and the other one with burials dated to the Nubian A2-3 phases. The absence of Nubian A1 phase material in both the settlement and the cemetery is not unexpected as the Abkan unit in the north of northern Lower Nubia is partially contemporary with the Nubian A1 phase in the southern part of northern Lower Nubia. The lower layer of the settlement is dated to the Abkan unit while the upper layer is dated to the Nubian A3 phase; the associated cemetery has material dated to the Nubian A2 phase, so it seems likely that Nubian A2 phase material was also present at the settlement. There is about 500 m between the cemeteries and no evidence that they form one large cemetery, so either social or environmental reasons determined the change of burial location whereas the settlement location remained stable. Based on the available information, the cultural development of this community in northern Lower Nubia also points at cultural emulation.

Detailed analysis of the archaeological data makes it possible to detect how the process of acculturation / emulation in both Egypt and Nubia occurred; the use of stable isotope analysis and DNA studies may be able to answer the questions relating to the continuation of family ties in a cemetery context (see above). Whereas, further diachronic analysis of the styles, forms, fabrics and functions of the material assemblage, particularly at sites with transitional phases, may also help to understand the causes of this change in materiality. However, it is essential that the excavation of material is done using strict stratigraphic control, so that the exact provenience of the material is recorded and establish sequence and event, the best system to enable this is single context recording => Satz???? (see Tassie in press b; in press c; Tassie & Owens in press).

Issues in the Archaeology of Early Egypt and Nubia

Many regions of Egypt and Nubia have been extensively surveyed, locating not only early sites but the whole diachronic range of archaeological sites. The northeast Faiyum (Caton-Thompson & Gardner 1934; Puglisi 1967; Wendorf & Schild 1976), Delta (Bietak 1975; Brewer et al. 1996; van den Brink 1988; van den Brink et al. 1986; Chlodnicki et al. 1998; Coulson 1988; Holladay

et al. 1982; Spencer & Spencer 2000; Wunderlich 1988), and the area around the Second and Fourth Cataracts (Adams 1961; 1962; 1964; Emery 1930; 1931; 1981; Firth 1912; 1915; 1927; Nordström 1972; Reisner 1910a; 1910b; Säve-Söderbergh 1962; 1963; 1964; 1968; 1997; Smith 1962; Tassie 2005) have been the focus of large pedestrian surveys. However, there are still areas that have barely been investigated, such as the area to the northwest of Lake Qarun in the Faiyum, where further Epi-Palaeolithic and Neolithic sites are most probably located, complementing those to the northeast of the lake. The area between Gebel es-Silsila and the First Cataract, the Kom Ombo Plain (the narrow valley and wadi mouths), which was an important border-zone between two cultural complexes and competing polities has also received little investigation, apart from the site of Fatira. The new British Museum - University of Milan Survey (Gatto 2005) is an important step in the full-scale pedestrian surveying of this region of southern Upper Egypt, and will no doubt lead to a better insight into the Nubian-Egyptian interaction in this important border-zone. The location of early sites in the West and Central Delta and Middle Egypt is still required. The present view of settlement patterning for Egypt and Nubia is still largely an artefact of reconnaissance survey. In Egypt and Nubia nationwide surveys need to be instigated and the recent Egyptian-Sudanese protocol on antiquities needs to be widened to cooperation on archaeological methods. This survey of North-east Africa could take the form of a mosaic of regional surveys under the auspice of a steering committee, with the cooperation of the international community. The use of satellite imagery could help pinpoint areas for large-scale pedestrian survey. Surface collection alone is not enough to locate deeply buried early sites, sub-soil detection techniques also need to be implemented. This information then needs to be stored in local and national sites and monuments records (SMRs) and made available to researchers to interrogate (Tassie in press d).

The call by Nordström (1998) to widen and improve the research on the Nubian A unit is being answered by such researchers as Gatto, Rampersad, Takamiya and others who have analysed the Nubian A unit or important aspects of it. Research, however, is only as good as the quality and quantity of the data so the more data there are at the researcher's disposal the better. Notwithstanding the admirable job Nordström has done in publishing archaeological data (Nordström 1972) and strong research (Nordström 1996, 1998), his own field-work, the survey conducted by the Sudan Archaeological Service⁵, is still only

⁵ See Sudan Archaeological Service / SAS preliminary reports by Adams 1961, 1962, 1964; Adams & Nordström 1963; Mills 1965; 1968; Mills & Nordström 1966; Nordström 1962; Verwers 1961; 1962. Dr. Adams has recently published final reports on the SAS survey on periods post-dating the prehistory, it is hoped the sites with Nubian A material found will soon be published.

available in preliminary reports. The publication on the Scandinavian Joint Expedition / SJE fieldwork in relation to early sites is one of the cornerstones of research on the Nubian A unit (Nordström 1972), but it should not be unique for being one of the few published final reports of fieldwork carried out during the UNESCO Nubian Rescue Project. It is hoped that Nordström will complete the writing up of his fieldwork in a further monographs and papers so that researchers have more sources of information to work with (contrary to preliminary reports which frequently lead to more questions than answers!). Also, it has to be stated that researchers who take up the job of publishing other's work, however admirable, often do not have the full array of knowledge at their disposal that the actual fieldworkers had, and as such it is always preferable that the actual fieldworkers are involved in writing the final report. And writing the final reports is nothing if not urgent, because as Säve-Söderbergh (1997: 24) so eloquently put it with *'before all those who worked in the field have passed away'*, time is running out for those who have a detailed knowledge of what was found and how it was found. That knowledge needs to be put on to paper so it can be used by the current pool of researchers for its *'paramount important synthesis of the cultural, socio-economic and political history'* is empowered by this information (Säve-Söderbergh 1997: 22).

As pointed out above, a better geographical, chronological understanding of the Nubian A3 phase and the period directly after it is needed in both the core area of Lower Nubia and the Batn el-Haggar area, as well as in the surrounding deserts. This is not only required for a better understanding of the situation in Lower Nubia, especially the Batn el-Haggar area, but also to get a better insight into the interaction between the Nubian A unit and the Pre-Kerma phase of Upper Nubia. At this time, every site with material of the Nubian A unit in Upper Nubia is classified as Nubian A3 phase, whereas there is a strong possibility that the sites are to be dated to the period after the Nubian A3 phase. The same applies to northern Lower Egypt, Saras region where besides Nubian A2-3 phase occupation, later occupation is likely to exist which might resemble the Nubian A3 phase material remains. To assess this situation, detailed publication of what has been found at sites is needed; especially the results of excavations in northern Lower Egypt. Also it is very likely that information about and possible even artefacts from unknown sites with early Nubian material found during the Aswan Dam Rescue Project are stored in archives, waiting for fuller investigation.

Concluding Remarks: the Future of Archaeological Investigation

The establishment of the Dymaczewo Conferences at Poznań in Poland as a forum for research into prehistoric Northeast Africa has facilitated both progress and growth in this area of investigation as illustrated by the establishment of the Origines Conference (at Krakow in 2002 and Toulouse in 2005),

which focuses on state formation processes in Egypt. These meetings of prehistorians, archaeologists and other scholars provide good forums for discussing many of the current issues concerning the investigation of early Northeast Africa. Therefore, within these forums the leading scholars need to devote special workshops to agreeing on terminology to clarify certain issues. Terms such as Neolithic, Early Bronze Age, Predynastic, Protodynastic, Naqada Culture and Dynasty '0' are being used indiscriminately in publications, neither is there agreement on the terminology for the different stages of state (see van Wetering in prep. a for arguments to discard the Dynasty '0', '00' and '-1' terminology). A particular area that is showing promising signs of advancing our understanding of early state economics and trade is the research into early writing and iconography. Although reading the potmarks on Naqada III ceramic vessels is not presently possible, the current research being conducted by Breand (in press), Jucha (in press) and Tassie et al. (in press) is promising to advance the initial work by van den Brink (1992) and Kroeper (2000). The work of Kahl (1994, 2001a; 2001b), Kahl et al. (2002, 2003a; 2003b), Regulski (in press) is running parallel to these studies on pre-formal writing and may in a few years lead to the full decipherment of these early hieroglyphic writings. The workshop on potmarks, which is to present and discuss its findings at the next *Origines* Conference due to take place in London in 2008 has brought together specialists from different disciplines, is a step in the right direction (Tassie 2005). The informal discussion held at Krakow and to a lesser extent at Toulouse between the participants need to be formalised in workshops on specific topics of which the result can be presented at future *Origines* and *Dymaczewo* Conferences.

Egyptology has been criticised for not fully embracing mainstream archaeological methodology and analysis, or as Christian Guksch puts it '... in Egyptology an isolationist position [is detectable] with regard to results and models . . . from other sciences and a shying away from synthetic statements as if Egyptologists share the ancient Egyptian's fear to travel beyond the realm and to die on foreign soil' (1992: 10). Whereas this statement eloquently reflects the state of affairs for Egyptology as a whole, the research on early Egypt and Nubia has had many brilliant researchers, such as Michael Hoffman, Fekri Hassan and Lech Krzyżaniak who led the way in the 1970s and applied current theoretical interpretation to their work. Although Wengrow (2006) still criticises the lack of theory used in the archaeology of Northeast Africa, the situation is now very different thanks to these pioneers. Many young scholars have been trained in the use of mainstream archaeological methods, theory and practice, with a distinct division arising between them and those classically trained in history and philology. More universities need to offer courses in Egyptian and Nubian archaeology, and within Egypt and the Sudan academies need to be established to teach cutting edge archaeology and heritage management at postgraduate level. It

is essential if the discipline of archaeology is to progress in Northeast Africa that both foreign and young Egyptian and Sudanese archaeologists cooperate and disseminate knowledge in the application of modern field, analytical and interpretive techniques.

This paper has shown the potential ways in which the study of early Northeast Africa can progress, highlighting areas that need further research, and field techniques that can be implemented. The loss of Lech Krzyżaniak will be felt but hopefully those he trained will continue and together with those already working in the field and those starting their studies, the study of this region of Africa will move forward and contribute much to mainstream archaeological method, theory and practice.

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Human Skeletal Diversity in the Egyptian Nile Valley

Abstract

This paper examines the biological diversity found within a series of Middle and Upper Egyptian Predynastic skeletal populations. Computed adult stature is shown to increase significantly through the Predynastic to reach a maximum in the Early Dynastic period. This stature increase is shown to be the result of significant change in the length of the distal limb segments.

Stature increase can be the result of changes in growth pattern or the result of changes in population composition. The second portion of this paper therefore considers the craniometric evidence for changes in population affinity through the Predynastic period.

Introduction

Many studies have considered the evidence for changes in Egyptian funerary ritual and mortuary architecture (e.g. Bard 1994; Castillos 1998; 2000a; 2000b; Ellis 1992; Grajetzki 2003; Meskell 1997; Richards 1997). There have, by contrast, been few studies that have attempted to use the actual skeletal evidence in order to answer the same questions as to population diversity and temporal change (as summarised in Smith 2002). The biological characteristics of modern Egyptians have been shown, through DNA, blood groups, serum proteins, to exhibit a north-south cline with similarities to sub-Saharan and Levantine groups (Fox 1997; Krings et al. 1999; Pääbo & Di Rienzo 1993).

The present study attempts to readdress the balance of studies towards osteology and to examine the biological changes associated with the development of a complex social hierarchy within a series of time-successive Egyptian Nile Valley skeletal populations. This study assumes indigenous state formation processes.

Human growth, infection and social hierarchy

Human growth is an outcome of complex interactions between genes and the environment, of which nutrition and infection are the most important components. The development and intensification of agriculture usually leads to an increase in the prevalence and intensity of infectious disease, linked to the associated increase in population density and sedentism (e.g., Cook 1984; Meiklejohn et al. 1984) and may lead to a reduction in the size and robusticity of the adult population (Angel 1972; Larsen 1984), or a reduction in other specific skeletal dimensions (Angel 1984).

Individuals with relatively poor diets suffer proportionally more from the effects of infection, such as poor individuals relative to highly ranked ones in complex state societies. With the development of this complex social ranking, preferential access to food might also develop, and thus might be reflected in each individual's skeletal biology. A series of studies have indicated that, in most past societies, elites were taller, healthier or better fed than the poorer members (Allison 1984; Angel 1984; Cohen 1989; Cook 1984; Haviland 1967; Schoeninger 1979; Steegmann & Haseley 1988), although others have found little or no difference between commoners and elites (White et al. 1993). If the former are correct, it therefore follows that adult stature can be a reasonable indicator of childhood condition.

Previous Studies

A variety of osteological studies of Predynastic and early Dynastic Egyptian skeletal material have been undertaken. Sadly, many of these studies were typological or descriptive, and so cannot be employed for comparative purposes.

Few studies have analysed postcranial material from Egyptian populations. Mean adult statures for Predynastic males have been computed as 170.0 cm (Robins 1983) and 157.5 cm for females (Robins and Shute 1984). For all of the Dynastic period, the mean male statures obtained range from 165.8 cm to 168.4 cm, whilst females range from 155.8 cm to 157.5 cm (Grilleto 1979; Masali et al. 1966; Robins, 1983; Robins & Shute 1983, 1984; Volante 1974)

By contrast, many more studies have been undertaken on the Predynastic cranial material (discussed in Keita 1996 and Smith 2002, and hence only briefly summarised here).

Most early (and now discredited) studies concluded that there were two population groups inhabiting Egypt throughout the Predynastic period, and that the northern group (the Lower Egyptian type) replaced the more Negroid southern type during the Dynastic period. Many of these early cranial studies allow for

some population admixture with neighbouring areas (e.g. Derry 1956) and use this to explain the increased variance seen in metric variables through time.

More recent studies continue to show a geographic variation in morphology within Egyptian samples. This variation may be due to migrations of people up and down the Nile Valley. For example, Keita (1990; 1992), employing discriminant function analysis, noted the overlap of southern Egyptians and some southern African series.

The Badarian sample frequently appears to be relatively distinct. This could be due to their very gracile nature (Gaballah et al. 1972), with very little development of the muscular relief, so they have often been considered to have a generally "feminine" character (Strouhal 1971: 2). Stoessiger (1927: 121-123) described the group as being distinct from later Predynastic populations through being more dolichocephalic and prognathic, being somewhat narrower in the parietal region, and by having shorter faces (and a lower nasal index). In contrast, Strouhal (1971: 2) considered them to have high nasal indices. He also described them as narrow, average height skulls with average to narrow upper faces and a rather broad nose, with marked prognathism. It is interesting to note that these biometrical studies led the investigators to consider the Badarian sample to be homogeneous, whilst the excavators (Brunton and Caton-Thompson) considered them to be heterogeneous (Strouhal 1971: 3).

Although the Badarian crania are considered by biometricians to be homogeneous, this homogeneity may break down by the later Predynastic period, and has certainly broken down by the early Dynastic period, e.g. the cranial material from the Royal Tombs sample at Abydos had a markedly heterogeneous appearance (Keita 1992: 248).

Materials and Methods

The selection of skeletal material was mainly pragmatic. For most periods, all available material was assessed, although complete skeletons were preferred over crania alone, and complete crania were selected in preference to fragmentary material. Care was taken to maximise samples from all available time periods. The sampling was also limited by the selection of the material that had been removed from Egypt and thus available for study in museum and university collections. This means that the material may not be completely representative of the cemetery population, but it should be noted that the cemetery population may itself not be truly representative of the living population (Wood et al. 1992).

Three collections were studied; the Duckworth Collection of the Department of Biological Anthropology in Cambridge, the Egyptian collection of the Natural History Museum in London and the Marro Collection of the Department of Anthropology and Biology in Turin.

A series of four time period groups were studied, dating from the Badarian to the early Dynastic. The temporal groups were: Badarian, early Predynastic (EPD), later Predynastic (LPD) and early Dynastic (EDynastic). The use of EPD and LPD was undertaken as the samples could not be securely dated to Naqada periods and so were split into these two broader temporal periods.

Samples were studied only if they could be reliably dated to one of the periods. Analysis was limited to adult individuals, with maturity being determined on the basis of spheno-occipital fusion, full epiphyseal fusion and complete eruption of the third molars.

Table 1. Skeletal Samples Employed

Time Period	Site(s)	<i>N</i> (total)	<i>N</i> (♂)	<i>N</i> (♀)
Badarian	El-Badari	49	22	27
EPD	Abydos, El-Amrah & Gebelein	80	39	41
LPD	El-Amrah & Hierakonpolis	72	31	41
EDynastic	Abydos & El-Amrah	97	55	42
Total		298	147	151

Following Howells (1973; 1989), all individuals were assigned a sex, rather than being classified as being 'sex unknown'. The sex of each individual was primarily determined from analysis of the pelvic region, by assessing the size of the pubic angle, the size of the greater sciatic notch, the curvature of the sacrum, noting the presence or absence of ventral arc and subpubic concavity, and the relative lengths of the inferior ramus of the pubis and the distance from the pubic tubercle to the acetabulum. Postcranial sex was compared with the cranially determined sex. Cranial sex was assessed from the degree of supra-orbital and glabellar projection, the squareness of the anterior portion of the mandible, the flaring of the gonial region, the robustness and level of muscle development in the nuchal region, and other features, such as the general size of the cranium with respect to others in the sample. The size of the mastoids was considered, but all the Egyptian cranial material studied has relatively inflated mastoids as compared to other populations. For individuals for whom cranial material alone was available, comparisons were made with individuals of known sex to increase the reliability of the sexing method.

Following sexing, each long bone was measured individually following Martin and Saller (1957) and Bräuer (1988) using a portable field osteometric board. The sample consisted of 462 long bones. Where long bones were bilaterally present, mean measurements were calculated and used in the analyses.

For craniometric measurements, the techniques described by Howells (1973 1989) and Lahr (1996) were employed. A spreading calliper was used to take the measurements where both landmarks for a single measurement had to be instrumentally determined, such as maximum cranial breadth (XCB). A digital sliding calliper, with direct data entry to a portable computer, was used to measure directly from one landmark to another, e.g. upper facial height (NPH). A coordinate calliper was employed for the measurement of chords, subtenses and fractions, e.g. OCC, OCS & OCF. Measurements from the transmeatal axis were made using a radiometer, such as nasal radius (NAR).

Description of Samples

Material from several cemetery sites was pooled for most periods, so as to diminish the effects of bias due to familial groupings or social ranking. This was not possible for the earliest period, the Badarian, where all the material originates from the period type-site of el-Badari. The EPD material was obtained from Abydos cemetery ϕ , El-Amrah and Gebelein. The LPD material was all from El-Amrah and Hierakonpolis. The EDynastic material mainly originated from Abydos, with some deriving from the Tombs of the Courtiers cemetery, while El-Amrah provided a small sample. The Tombs of the Courtiers sample consists of individuals who may have been funerary priests (Hoffman 1979), minor palace functionaries, members of the royal harem, or artisans (Trigger 1983). This sample therefore may be wealthier and healthier than the average Egyptian EDynastic person. The remainder of the Abydos EDynastic material was derived from Cemetery χ , and may represent a poorer section of Abydos society. The strong links between the town itself and the royal court mean that the EDynastic period material included in this study may be somewhat unrepresentative of the national Egyptian population of the time, as the sample may represent favoured individuals and families.

Data Analysis

The Statistical Package for the Social Sciences (SPSS, version 11.0) was used for the data analysis described below. All variables were tested for normality using P-P and Q-Q plots (Sokal & Rohlf 1995: 118), with a normal distribution being observed in all the variables selected for analysis.

Stature, raw long bone lengths and ratios (indices) were analyzed using univariate analysis of variance, employing a type I (hierarchical or nested) model (Sokal & Rohlf 1995: 272-309), with post-hoc tests, for differences among the

various time periods, while correcting for sex. The model allows differences between the sexes to be analyzed first, and after the effects of sex are removed, to assess for statistically significant differences among the various time periods. Thus, in all the postcranial analyses that follow, the independent variable in each ANOVA is the time period (i.e., population group, such as Badarian or EPD). Throughout the analyses an α -level of 0.05 was employed.

Due to the rather small sample sizes of some time periods under consideration and the relatively fragmentary nature of the crania during these periods, initial cranial analyses were performed on pooled sex samples.

The multivariate analyses undertaken are principal components analysis (PCA) and discriminant function analysis (DFA). PCA is a form of factor analysis that aims to identify the underlying factors (variables) explaining the pattern of correlations within the set of observed variables. It can therefore be employed to ascertain which variables are of greatest importance in explaining the variance seen within the ellipse of data points in multidimensional space.

By contrast, the purpose of DFA is to assign group membership from a number of predictors, thus in this study it has been used to assess whether cranial variables can be used to predict the time period group membership of the cranial sample. The main aim is, therefore, to find the dimension or dimensions by which the groups differ and then derive classification functions from this to predict group membership. DFA forms a string of functions and judges whether the groups it predicts from these functions match the imposed groups within the data. Thus, in DFA, the raw measurements for each individual are converted into functions relating to cranial dimensions. A coefficient (weighting) is given to each measurement (variable) and the individual's actual measurement is multiplied by this coefficient. The sum of these weighted measurements comprises the individual's 'discriminant score'. The number of discriminant functions obtained is always one fewer than the number of groups imposed on the data (4 time periods and hence 3 functions).

Stature and Body Morphology Results

Stature was computed using equations derived by Robins and Shute (1986) specifically for Egyptian populations. The computed adult statures are shown in Fig. 1. Table 2 presents the hierarchical ANOVA results for computed mean stature by time period. Males are shown to be significantly taller than females in all time periods and, overall, a significant change in stature occurs across the time periods studied.

Raw long bone lengths were also analysed in order to assess whether any portion of the body showed statistically significant change in size using the same hierarchical ANOVA method (Table 3). This table indicates that most change in

length occurred within the distal segment of each limb, although there was also some change in humeral length. Ratios of long bone lengths were also analysed to assess for change in body plan, but only the femoral-fibula ratio ($100 \times \text{XLF}/\text{XLG}$) exhibited statistically significant change through the time ($n = 24$, $p=0.023$).

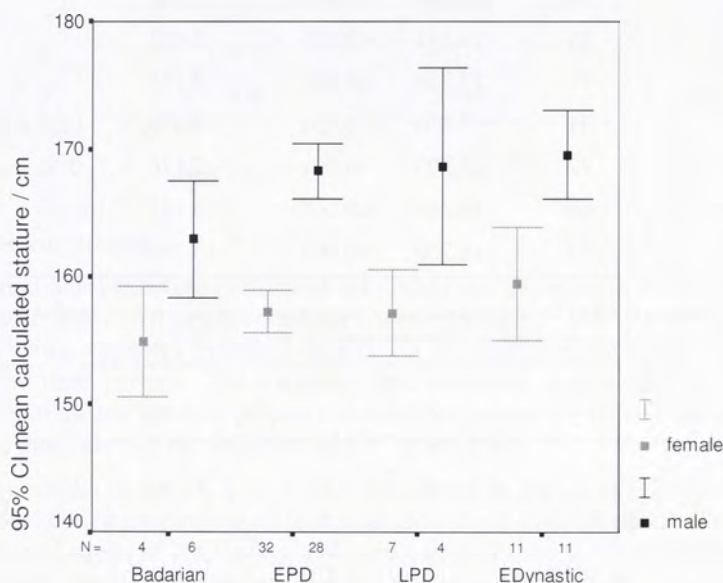


Fig. 1. Average computed adult stature by time period for each sex. Mean values, sample sizes and 95% confidence intervals are shown.

Table 2. ANOVA results for computed mean stature by time period, employing hierarchical model correcting initially for sex.

Source	Type I Sum of Squares	df	Mean Square	F	<i>p</i>
Sex	2786.075	1	2786.075	107.346	< 0.001
Time Period	234.323	3	78.108	3.009	0.034
Sex * Period	22.085	3	7.362	0.284	n.s.
Error	2465.638	95	25.954		
Total	2724908.210	103			

$R^2 = 0.552$

Table 3. ANOVA results for long bone lengths by time period, employing hierarchical model correcting initially for sex.

Measurement	N	Sex		Time period	
		F	p	F	p
XLF	55	20.888	<0.001	1.771	n.s.
LBF	55	24.181	<0.001	2.052	n.s.
LCT	77	22.346	<0.001	3.153	0.030
XLG	41	7.830	0.009	2.439	0.05 < p < 0.10
XLH	72	25.503	<0.001	2.176	0.05 < p < 0.10
XLR	60	18.361	<0.001	3.112	0.034
XLU	53	16.750	<0.001	3.291	0.029

Where XLF is maximum femur length, LBF is bicondylar femur length, LCT is complete tibia length, XLG is maximum fibula length, XLH is maximum humerus length, XLR is maximum radius length, and XLU is maximum ulna length.

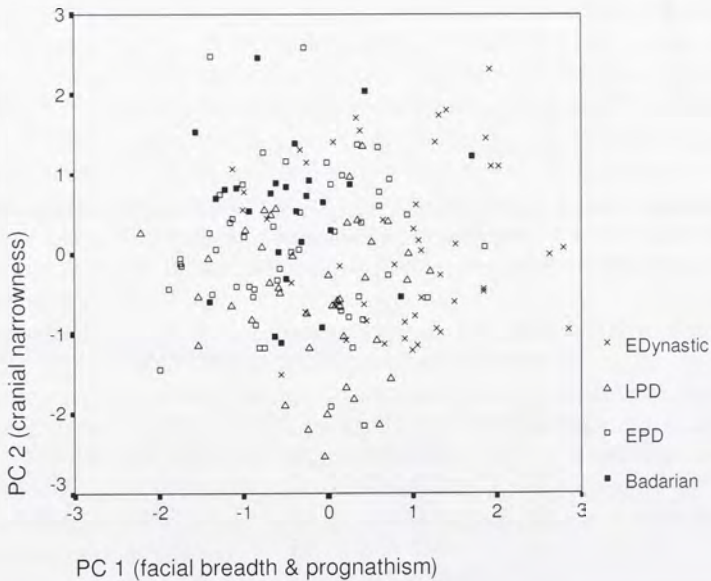


Figure 2. PCA results – plot of first two principal components, sexes pooled.

Table 4. Amount of variance explained in the extracted PCs, sexes pooled.

Component	Eigenvalue	% of Variance	Cumulative %
1	7.287	36.436	36.436
2	1.928	9.642	46.078
3	1.507	7.537	53.615
4	1.263	6.315	59.930
5	1.069	5.343	65.273

Craniometric Results

Initial analyses were performed on pooled sex samples in order to maximise sample sizes. All cranial variables were tested by ANOVA in order to ascertain which variables exhibited significant changes in mean values between the various time periods. The variables that exhibited statistically significant differences in means between at least two time periods (at $p \leq 0.001$ and with $n \geq 200$) were then selected for inclusion into PCA and DFA.

The results of the PCA ($n = 167$) are shown in Fig. 2 and Table 4. This figure indicates certain patterns of morphological trend through time, such as the narrow cranial vaults of the Badarian sample and the broad facial morphology of the EDynastic sample. These two components account for 46% of the cranial variation seen in the samples studied.

The results of the DFA are displayed in Fig. 3 and Table 5. Overall 70.1% of the crania are correctly classified into their original temporal period. These results indicate that distinct morphological differences exist between the samples. The crania that are misclassified are generally placed into one of the temporally-adjacent groups, suggesting that there is population continuity through time.

Analyses were also undertaken on single sex groups using the same methods described above. Following Keita (1990; 1992; 1996), only the results for males will be discussed here. The classification results for the DFA using cranial variables found to exhibit statistically significant differences between at least two time periods (at $p \leq 0.001$ with $n \geq 100$) are shown in Table 6, below.

Overall 72.5% of the male crania ($n = 91$) were correctly classified into their original temporal group.

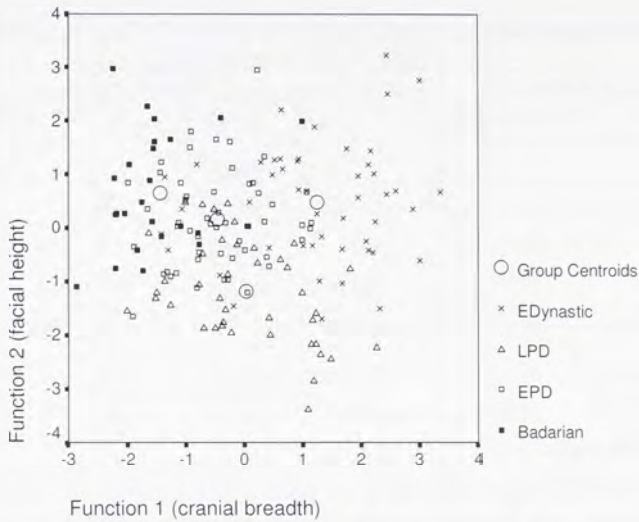


Figure 3. Plot of first 2 DFs, sexes pooled.

Table 5. Percentage of crania correctly classified by time period, sexes pooled.

Original Group	Predicted Group Membership			
	Badarian	EPD	LPD	EDynastic
Badarian	57.7	30.8	7.7	3.8
EPD	7.7	71.2	9.6	11.5
LPD	2.4	19.5	73.2	4.9
EDynastic	8.3	8.3	10.4	72.9

Table 6. Percentage of crania correctly classified by time period, males only.

Original Group	Predicted Group Membership			
	Badarian	EPD	LPD	EDynastic
Badarian	54.5	18.2	18.2	9.1
EPD	13.0	65.2	13.0	8.7
LPD	.0	19.2	76.9	3.8
EDynastic	.0	6.5	12.9	80.6

Discussion

The development of intensive agriculture and the formation of hierarchical social organization occurred almost simultaneously along the Egyptian Nile valley. If these processes occurred as indigenous development with total population continuity, then biological changes found within the skeletal populations must be due either to functional and adaptive plasticity, or to microevolution in response to changing selective pressures. An increase in skeletal variability can therefore be assumed to be the result of a great increase in population size, a massive increase in social hierarchy with associated differential access to resources, or due to migrations of groups or individuals within the overall population.

The present study has shown that a significant increase in computed adult stature occurred within the samples studied between the Badarian period and the Early Dynastic period (Fig. 1 and Table 2). This suggests that as food resources became more reliable, with greater organisation of food production, that any growth retardation or inhibition associated with the development of agriculture was reduced or removed. By implication, this suggests that the Badarian sample may have suffered from some mechanism, such as unreliable food supply, that inhibited certain periods of childhood growth.

Recent research has indicated that sexual dimorphism in computed adult stature increased through the Predynastic periods, to reach a maximum in the LPD, following by a decline during the Early Dynastic (Zakrzewski 2003: 223). The coefficient of variation in computed stature is, by contrast, greatest during the EPD (Zakrzewski 2003: 223-224). These results suggest that differential access to resources may have developed during the Predynastic periods, with initial social hierarchy developing in the EPD, followed by more complex ranking, including differential gender relations during the LPD. Thus, during the Predynastic population postcranial variability increased dramatically, with this variation being both an increase in sexual dimorphism, and also being within each sex.

The craniometric research presented here indicates that there were distinct morphological groups within the Egyptian Predynastic population, but that these groups do exhibit morphological similarities with each other. The Badarian sample has again been shown to be relatively homogeneous, supporting previous studies, whilst the EDynastic sample has been shown to be more heterogeneous, but characterised by broad faces. The morphological groups found, therefore, may represent either temporal variation or geographical variation, and thus indicates that there was not the "total population continuity" postulated. The change observed from the Badarian period through the Predynastic periods thus probably reflects increased gene flow via exogamy or migration along the Nile

Valley (as postulated by Hassan 1988) and mirrors the results obtained by Keita (1996). The change between the LPD and the EDynastic, however, appears more fundamental and could reflect even greater migration of individuals along the Nile Valley. The analyses also indicate greater cranial diversity through time, which may be the result of the associated population increase.

The results however do indicate that Egyptian populations should not be considered as a homogeneous entity, but rather should be viewed as local groups with reasonably distinct identities. This research has also indicated that the State formation process cannot simply be modelled as an entirely indigenous development, but rather that neighbouring groups (both from elsewhere along the Egyptian Nile Valley and from nearby regions) appear to have also interbred and mixed with the local population.

Conclusion

This paper has demonstrated that high levels of skeletal variability developed during the Egyptian Predynastic. It has shown that the Badarian population was relatively homogeneous morphology, and has contrasted them with the more heterogeneous nature of the EDynastic sample.

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Marek Chłodnicki

Tell el-Farkha – stratigraphy of the Eastern Kom (N)

Excavations in the north-western part of the Eastern Kom started in 2001. Trench E94d was located in an area where the upper layers were destroyed by sebakhin. We hoped that we would very quickly reach the gezira sand and clarify the stratigraphy of that part of the site. But very soon we were stopped by the remains of a mud-brick construction (Chłodnicki & Ciałowicz 2003: 86). In 2002 and 2003 the trench was extended to an area of 150 m² (trench E93 and E94ad; Fig. 1) and in 2004 the gezira sand was reached over the whole surface. This part of the kom differs from the southern one in that here there were no traces of a cemetery.

The excavations permit us to reconstruct the settlement and architectural phases in that part of the site. The lowermost settlement remains consisted of pits and post-holes and a series of furrows ranging in width from 20 cm to nearly 50 cm, demarcating a number of rooms. These linear features cover virtually the whole surface of the trench. The largest of the rooms outlined measures ca. 3 x 4 m, while the smallest has a surface area of barely more than 1 m² (Fig. 2). These structures, like those found in the Central and Western Kom (Chłodnicki 2005: 359; Ciałowicz 2005: 375) are contemporary with Naqada IIC-IID1).

The layer of silt over the gezira sand has a depth of 50 cm. A few small pits filled with lumps of pug and sometimes large amounts of pottery, as well as single layers of mud-bricks making up indistinct formations were discovered whilst excavating a silt deposit. Most of the trench was, however, occupied by layers of alluvium and backfill. Besides potsherds a miniature clay figurine of a hawk was found (Fig. 3). A shallow pit (10 cm deep) measuring 1.5 m in diameter was particularly interesting on account of its fill, which consisted of a brown soil intermixed with silt. This pit contained hundreds of flint and agate debitage. The number of agate fragments is quite unusual as, thus far, relatively few instances of it have been noted at this site. The pit was also found to contain



Fig. 1.



Fig. 2.

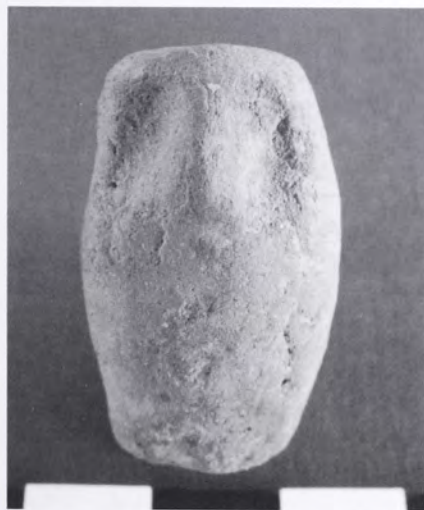


Fig. 3.

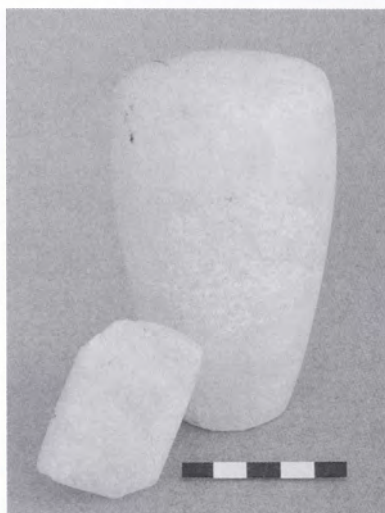


Fig. 4.



Fig. 5.

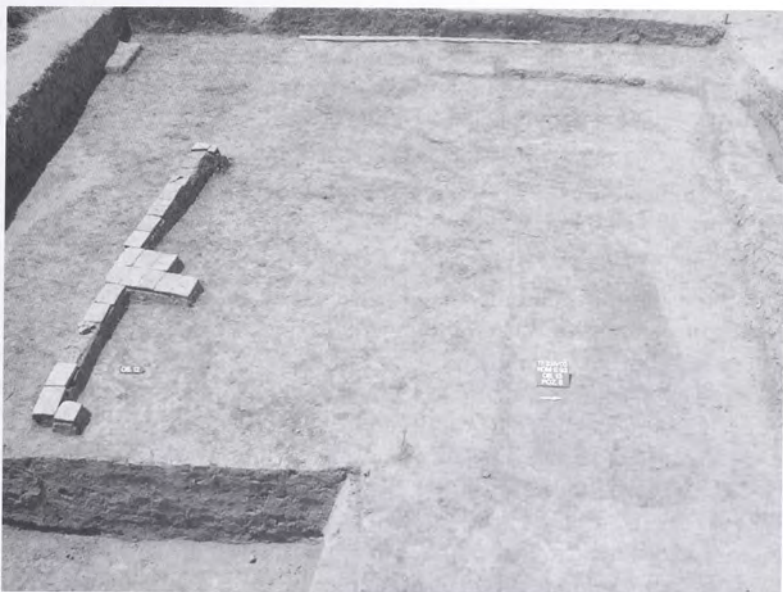


Fig. 6.



Fig. 7.

a flint knife and two unique quartz objects: a very well worked artefact in the shape of a truncated cone, which served as a hammer, and an elongated (broken) hexagonal object (Fig. 4). Judging by the pottery recovered from the pit it is probably associated with Naqada IID2 times.

Above that level described above, a solid mud-brick building was erected. Inside the trench only the northern part of the construction was preserved. A wall visible in the southern section of the trench indicated that the construction continues to the south.

Exposing this building was very important for the architectural history of the site. In contrast to other buildings excavated on the site, whose walls are oriented NE-SW, these walls are oriented exactly along a N-S and E-W axes. Most of the walls are two mud-bricks thick, although some walls have a width of 1.5 or 1 mud-bricks only. The rooms are of different sizes. The biggest is about 7 by, at least 5 m (we don't know yet the extension of the building to the west, Unit 52); the other rooms are from 6 x 3 m (Unit 49) to 3 x 2 m (Unit 49) and only 2 x 2 m (Unit 38). Inside the larger rooms the remains of ovens with pots inside were discovered. All pots are of the same kind, the bottom broken and preserved to different heights. This building (Fig 5) is the best preserved in levels 20-22 (Chłodnicki & Ciałowicz 2005: fig 12). From level 19 upward destruction of the building was observed. In level 18, the northern walls closing rooms 49 and 64 are no longer existing. In level 16 the northern wall closing room 52 has disappeared. In level 15 only room no. 36 with its surrounding walls is still preserved as well as remains of the northern wall no. 54. In level 13 the last remains of the building disappear. In the southern section of the trench a wall is visible up to level 8, its height there being more than 1.5 m. The material recovered here does not differ significantly from that found anywhere else in the settlement and the pottery is typical for Phase 4 of Tell el-Farkha. It shows that the building was erected in Naqada IIIA1. At present it is difficult to interpret this complex of rooms. The solution to the problem may lie in the part of the building to the south of this trench (Chłodnicki & Ciałowicz 2005: 63-66).

Above this building another construction was built (level 12-8). Its orientation NE-SW is similar to other buildings in Tell el-Farkha. It consists of several irregular rooms, surrounded by walls, mostly 1.5 bricks wide. The best outline of the building is visible in level 9. In a wall of the building (Unit 16) fragments of rectangular graywacke palettes were discovered (Chłodnicki & Ciałowicz 2005: fig. 14).

In levels 7-8 the walls of the building are cut by two parallel rectangular features, measuring about 5 x 2 m. In one of them (Unit 12), remains of a floor made of red-brick tiles was discovered (Fig. 6). The tiles measured roughly 20 x 34 cm and were about 4 cm thick. They have been made specifically as floor

tiles, as is evidenced by their smoothed upper surfaces and rough undersides. An almost complete row of tiles at the south end of the room and some in the middle have survived. The rest of the room was filled with rubble of crushed tiles; a thin red stratum indicates that tiles have been removed there. The second one Unit (Nr. 13) was framed by thin mud-bricks and filled inside with red rubble; it may originally also have had a floor of red-brick tiles. The function of the floor is unknown. The interpretation is difficult, because the surrounding walls were demolished and the ground levelled. Red bricks do not occur either on the site of Tell el-Farkha itself nor on other Early Dynastic sites in the Nile Delta.

Directly above the features another unique building was established (Unit 1). It is roughly circular, and measures around 8 m in diameter. It consists of a wall two brick thick; the brick courses were variously arranged in different wall levels. The best preserved wall is in the eastern portion of the trench and survives to a height of about 50 cm, in contrast to the western end where it remains to a height of 20 cm only. Originally, the entire floor of the building was probably made up of panels whose sides measured approximately 60 cm. The western part of the floor is not preserved, whilst the eastern section survives to a depth of 1-10 cm (Fig. 7). The pottery recovered from inside the building was fairly non-diagnostic, consisting mostly of bread moulds datable to Naqada IIIc-d. The finds do not appear to bear any relation to the function of the building, and probably represent a backfill layer dating from the later phase of the tell's use. Similar ceramic material was also found outside the building. The building has no parallels in Egypt so its interpretation is difficult. Geophysical research on the Central Kom shows us a rounded structure of similar dimensions, located on the north-western edge of the kom. Maybe future excavations can help us to solve the problem of interpretation.

The surviving upper layers (A-C,1-4) comprise backfill deposits containing loose pottery dating to the Early Dynastic and the beginning of Old Kingdom times. No clear mudbrick constructions, only remains of some bricks, pits and fireplaces were discovered. Particularly noteworthy among the material of the upper layers are sealings with hieroglyphic inscriptions, dating to the First to Second Dynasty, and a complete copper bracelet (Chłodnicki & Ciałowicz 2005: fig. 14, pl. XVII.2-3). In the trench we found stone beads, upper and lower grinding stones, flint sickleblades as well as fragments of flint knives and animal bones.

The pottery finds indicate that this area was settled by members of the Lower Egyptian culture and, after the short break in Nagada IID2 times, was intensively settled after the Nagada IIIA period. On the surface, some relics which may be of early Old Kingdom date, were found.

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Krzysztof M. Ciałowicz

From Residence to Early Temple: the Case of Tell el-Farkha

Nine years of excavations at Tell el-Farkha revealed numerous structures and architectural remains unknown till now from Northern Egypt. Most important things were discovered on the Western Kom. The enormous quantity of artefacts (chiefly pottery), extensive evidence of settlement structures and a stratigraphic complex of layers reaching 4-5 m below the present ground surface provided sufficient evidence to distinguish five main chronological phases of occupation of the Western Kom at Tell el-Farkha (Ciałowicz & Jucha 2003). The beginning of human presence at Tell el-Farkha is connected with the middle stage of Lower Egyptian civilisation which is contemporary with Naqada (IIb?) IIC-d1 according to Kaiser (1957), or IIC-IID1 according to Hendrickx (1996).

The Western Kom was abandoned during our Phase 5, which is characterized by an assemblage typical of transitional Naqada IIIb/IIIc1 (terminal IIIB-IIIc1), that is, the rule of Dynasty 0 and early 1st Dynasty. Central and Eastern Koms were occupied longer, until the beginning of the Old Kingdom.

Already present in the lowermost strata are numerous round and oval pits (measuring 1.2 – 2.2 m. in diameter), often intersecting each other, containing a black fill with a modest amount of small potsherds. These are probably the remnants of storage pits. Bigger pits, sometimes lined with silt, may have served as dwellings. Very characteristic are concentrations of small, round or oval pits (0.2 – 0.3 m in diameter) lined with silt, occasionally fired red. Very similar settlement features found at other Lower Egyptian sites are explained as either cooking installations or as postholes (van den Brink 1992; von der Way 1997). Both interpretations seem likely, though in some instances the pits in question may have served as holders for large storage vessels with pointed ends.

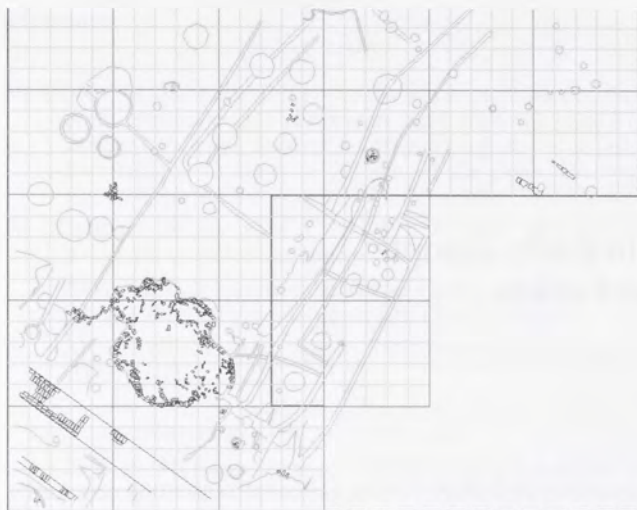


Fig. 1. Plan of a Lower Egyptian building (in the middle the youngest brewery).

Higher up the stratigraphic sequence, in layers still dating from phase 1, a series of furrows (0.1 – 0.2 m wide) forming rectangular ground plans were recorded next to the aforementioned pits. These most probably represent the remains of structures built of organic materials.

The discoveries belonging to phase 1 at Tell el-Farkha are surprising and unparalleled on the whole. While fragmentary structures of the kind discussed above are known from other sites in Lower Egypt (e.g. Maadi or Buto), nowhere have they been preserved in such a good condition and nowhere are they just as big. The traces of a Lower Egyptian (Fig. 1) structure were discovered extending over practically the entire excavated area (ca 500 m²). They were covered with a thick layer of silt, which hindered explorations considerably, but which is proof of relatively frequent flooding of the gezira at Tell el-Farkha (before human activity resulted in a significant raising of its level) and of periods, difficult to estimate in length, when the site was abandoned. The building, which like all the later ones was oriented to the northeast, must have had walls of organic materials. All that remains of the structure are relatively narrow furrows (from 0.12 – 0.3 m wide) filled with a brown soil or silt (perhaps from a Nile flooding). Explorations revealed two or even three phases of rebuilding. The interior division into many small compartments is noteworthy (the smallest was 1.4 x 0.8 m in size), as well as the many pits lined with mud (from 0.2 to 1 m in diameter). Some of them, especially those within the outline of the furrows, must have been of

structural importance, serving to mount the posts that had once supported the walls and roof. Others found inside the rooms could have served as vessel stands. The biggest of these pits, sometimes bearing obvious evidence of burning through and yielding D-shaped bricks, could have been used as fireplaces. The complex interior division may be due to the fact that parts of the house, clearly of a domestic character, could have been separated away from the other areas by low walls made of organic substances or silt.



Fig. 2. Lower Egyptian breweries and traces of construction.

West of the main building is a large space with the walls made of similar materials. Almost all of the area excavated was covered by furrows forming rectangular spaces in which lots of post holes, mud stands for pots and other features were found. On the west section of the trench four breweries were discovered (Fig. 2).

Of greatest importance is the fact that they form a distinct chronological sequence. The earliest brewery was at some point destroyed by Nile flooding. It has to be borne in mind that the gezira on which the inhabitants lived at the time

did not rise greatly above the level of the river. The annual flooding of that Nile would thus have resulted in the relatively frequent destruction of many settlements in the Delta. Following a period which is difficult to assess unequivocally a second structure was built, and when this was in turn submerged beneath Nile silt deposits another building was raised. In the last building a vat was preserved as well as some mineralized residues representing different stages in brewing process.

The Tell el-Farkha structures represent the oldest breweries ever to be found in the Nile Delta, and are probably contemporaries of the brewery discovered several years ago in Hierakonpolis (Geller 1992). These are probably the oldest breweries in the world. However, unlike the discovery at Hierakonpolis, the Tell el-Farkha excavations revealed an entire complex of successive breweries, suggesting that this site must have been an important beer production centre during the second half of the 4th millennium BC

The discovery of this complex defies the previously held beliefs that prior to the emergence of the Naqada culture the inhabitants of the Nile Delta represented a largely unstratified society, living in primitive, sunken-floored dwellings or shelters. The above described building seems to be a very large house. Maybe it is a proof that Lower Egyptian society was much more stratified than was supposed until now, and that this place was connected, for instance, with a local chief.

Exactly on the same spot the next inhabitants of the Western Kom at Tell el-Farkha raised the most fully developed of all the buildings excavated to date in this area. At a depth of ca. 2.10 m below ground level (ca. 5 m a.s.l.) the outlines of a mudbrick structure became evident under two layers, of which the bottom one was undoubtedly a layer of burning with black, occasionally red burnt soil and lighter ashes. On top of this was a layer of steel-grey clay practically sterile as regards archaeological artefacts; its thickness varies from a few centimetres in the south to over 20 cm in the north. The layer is indubitable proof of the structure having been burnt at some point and then flooded by the waters of the Nile.

The building had at least two constructional phases. To judge by the preserved ceramic evidence, the older stage starts some time in the end of phase 2 and lasts into phase 3 (terminal Naqada IID2- IIIA1/IIIA2). The later stage is to be dated to phase 3, while the catastrophic fire and the flood should presumably be placed at the end of this phase or in the early part of phase 4 (probably during Naqada IIIA2). The younger structure has a size that may be termed almost monumental and comprises a wall 2.5 m thick following a NE-SW direction as is common for Tell el-Farkha (Fig. 3). At the southern extreme it ends in a big roun-

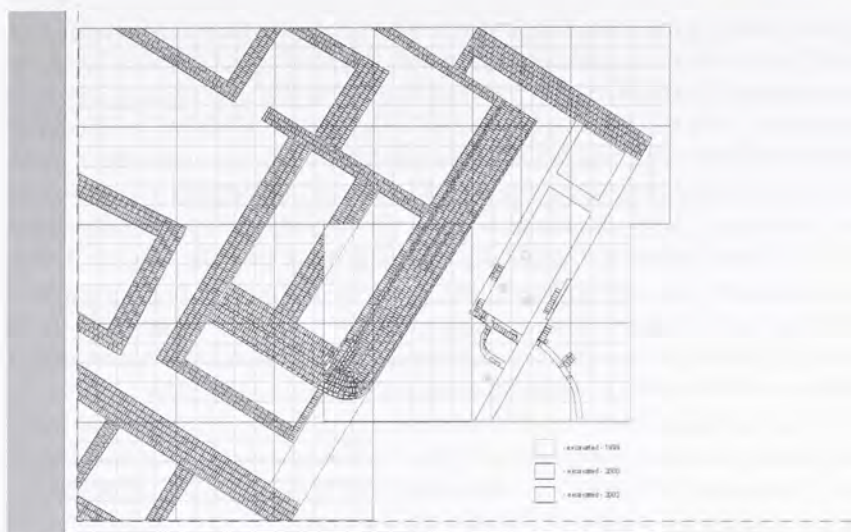


Fig. 3. Plan of a Naqada residence.

ded corner. The wall was actually made of two differently constructed sections. The inside part was erected of yellowish brick with an obviously considerable amount of sand, set in a dark-grey mud mortar. The outside face is definitely of mudbrick bonded in a light yellowish mortar tempered with sand. Inside the building there was a much damaged floor of bricks.

The structure in question should be considered in connection with a building discovered in 1999, featuring a considerable concentration of finds and storage vessels found standing still in place. Not only were the two structures recorded on the same absolute height, but also parts of the earlier excavated building have been noted in the pits opened in 2000.

A rectangular space was found to adjoin a thick (0.8 m) wall running NE-SW for 11.7 m in its northwestern part. This room was almost 7 m long and had 0.5 m-thick walls on the west and south. Successive floors were made of clay and most probably covered with a kind of lime mortar. Inside this space, especially in the southern part, there were considerable quantities of artefacts – numerous potsherds, but also two complete storage vessels with conical bottoms, standing in pits lined with thick coatings of mud. A third vessel was fragmentarily preserved and there were six small vases, two with fish bones, lying on the floor, next to a flint knife and the flat ledge of a big stone vessel. A structure with rounded corner (1.2 x 1.5 m) abutted the room on the south; it was surrounded with a low brick wall equal in width to the thickness of one length of brick (ca. 0.3 m). A similar wall surrounded a semicircular space (ca. 4.6 x 4 m) adjoining

the main wall on the southeast. To the north of it, a few groups of bricks lying in all different directions could perhaps reflect the presence of a floor. The walls of this complex have been preserved to a height of 0.4 – 0.5 m; they were constructed of layers of brick well visible in place, bonded in a kind of lime mortar and founded on an obvious layer of destruction.

The continuation of the complex was discovered in 2000 to the north of it. It is an almost square space (ca. 4.5 x 5 m) with two storage vessels standing inside it. West of this construction a continuation of the main wall surrounding the previously described monumental structure was found. Neither of the big vessels had a bottom, and they stood one in a lump of pure clay and the other in a bowl. A concentration of finds was observed, including whole little vessels. The evidence clearly points to a sudden abandonment of the complex.

In the seasons 2002-2003 we continued the work. The main goal was the west part of the Naqadian structure. There under a layer of silt we found the next level, composed of white and red ashes and black burned soil. Beneath the outline of walls a Naqadian building became evident.



Fig. 4. Western part of a Naqada residence.

Regular arrangements of mudbricks forming a clearly visible outline of a building appeared underneath the layers of destruction (Fig. 4). The edifice was

of significant size, divided into several inner compartments. Huge walls (2 m thick) draw attention as they separated the building from a southern additional room of later date, where two fire places with pots standing in them were discovered. Numerous postholes dug within one of the rooms along with a wall surrounding them from west, are to be dated to the same period, that is the last phase of the structure's occupation. It is very likely that the posts had been supporting a roof or an upper storey ruined in unknown circumstances. Both, the rooms with fire places and the posts, were raised before the edifice's final devastation.

The inside plan and dimensions of the whole building became more visible in the lower strata hiding remains of the complex related to the age of its maximal extend and splendour. The inner room (partly excavated in 2000) was 7 x 2 m in size. Within it a badly damaged brick floor was found. The so-called "western room" was situated to the west behind a wall ca. 0.8 m wide. Both compartments were limited by a northern room of similar measurement, with a thick separating wall, too. In the last compartment remains of fire places and hearths were registered. An internal courtyard was uncovered further to the west and it was enclosed by several rooms. Nevertheless, their size and mutual relation are difficult to estimate as long as partd remain unexcavated. The monumental dimensions of the edifice are particularly significant, since (including the sectors examined during former campaigns) it covered an area over 500 m². Huge mudbrick walls (2.5 – 1 m wide) separate most of the compartments.

Judging by the hitherto collected data the complex constitutes the largest construction of this type, which has ever been discovered in Egypt in Naqada context. The edifice's significance as well as its inhabitants is – at least currently – difficult to unequivocal evaluation. Probably, the works' completion at the western part of the kom will make it possible. However, one should emphasize some potential solutions. Numerous findings like so-called counters, fragments of clay undecorated seals and also some pieces of foreign (Palestinian) pottery vessels were discovered, likewise in season 2000, within the characterized structure. That seems to produce evidence that the people of Tell el-Farkha were considerably engaged in commercial activities. Furthermore, it indicates that we are dealing here with a residence combined with stores, of a Naqadian supervised trade between Upper Egypt and the Delta and Palestine. The building, as it has already been mentioned, was destroyed in a fire. It is hard to estimate whether it was a result of natural catastrophe (flood, earthquake) or an intentional human action. Taking into consideration the latter one should stress that it is scarcely provable. However, the epoch when the disastrous fire happened deserves a closer look. The catastrophic event is to be dated to Naqada IIIA2, the period when existence of earliest proto-kingdoms in Upper Egypt can be assumed. The

first richly equipped burials recorded in southern necropolises demonstrate the final stage of the elites' formation process.

The largest and most significant tomb (U-j) was found in Abydos. Its outstanding features clearly support the dignity and royal power of the person who had been buried in it (Dreyer 1998). The oldest hieroglyphs which were found there suggest not solely a considerable development of social organization but administrative and bureaucratic control over many aspects of life. The discovery of over 400 vessels though originating from Palestine, but clearly ordered by Egyptians and then deposited in tomb U-j, supports the postulated crucial importance of goods imported from the Levant that is the role of trade itself. More or less contemporary, although almost completely plundered, are the tombs recently unearthed in Hierakonpolis (Adams 1996). There is other evidence uncovered at the latter site which indicates its colossal significance for the formative processes of the Egyptian state (Adams 1999). It is very likely that both centers were competing in various fields, the substantial one could be the issue of controlling trade routes leading to the Sinai and Palestine. Located along this route, Tell el-Farkha presumably was an important place for commercial exchange and supervised and controlled the north-eastern trade route itself. It is possible that the final destruction of the described complex found in Tell el-Farkha was a result of conflict between the two centres of emerging kinship, but this is unfortunately rather hard to specify. Accepting this theory, it should be strongly stressed that it remains also in close relation to a conflict on a regional scale, but connected to the Naqada culture, and can therefore, not be taken as evidence for an Upper Egyptian conquest of the Nile Delta.

When considering the reasons of the devastation of the Naqada building at Tell el-Farkha, natural factors also should be noted. The fire could have started accidentally or as a result of regional earthquake. Evidence confirming the latter possibility was found in layers dated to the terminal (fifth) occupational phase at the Western Kom and while uncovering the structure in question, as well. The space stretching out to the south and north-east from the main building was covered with pieces of collapsed walls frequently lying on their side and covering numerous small artefacts. In this context crushed pottery storage vessels and table ware can be mentioned as well as flint or stone tools and fragments of cosmetic palettes. One of the most interesting finds is a skeleton of a pig, undoubtedly killed by a falling wall.

Directly on top of the described construction, on the layer of destruction mentioned above, the remains of another large building, dated to our phases 4 and 5 (Naqada IIIB-IIIC1) were found. Just below the surface a small deposit of figurines and vessels made of faience, clay and stone was discovered. Of special interest are two figurines of baboons and a representation of a prostrate man with

long hair and beard and wearing a penis-sheath; the features of his face are distinctly archaic (Fig. 5). Another clay figurine found nearby represents a naked standing man, long-haired and bearded. The manner of execution of this figurine points to its Predynastic origins. Another group deserving emphasis is a set of five egg- and barrel-shaped clay rattles with engraved decoration. One should also mention models of piriform maces, miniature vessels made of different materials, a zoomorphic vessel representing a water bird (duck or goose), clay double-vases, faience beads, part of a faience figurine of a crocodile and objects that are game counters in all likelihood. Some objects of the deposit, like the baboon figures and the prostrate man, were deposited presumably in the last phase of the building's use, at the very end of Dynasty 0 or the beginning of Dynasty I. Others date to earlier periods, with the oldest being the zoomorphic vessel and the figurine of a standing man.

The deposit was uncovered within massive walls (Fig. 6) marking off a relatively small room that was part of a building of considerable size (at least 25 x 15 m). The said structure is made up of a series of rooms, which grew over a certain period of time or were rebuilt and developed after natural disasters of cataclysmic consequences. One such event may have been a fairly mild earthquake which resulted in the collapse of walls of part of the rooms lying southeast and northwest of the area where the deposit was discovered. The debris covered many items, including large storage vessels, thin-walled red bowls and cosmetic palettes of greywacke. To judge by the geometric forms of these palettes, they were made in the third phase of the Naqada culture.

The differences in the material used to produce bricks deserve note. It is either silt with sand or considerable amounts or silt practically devoid of sand. Varied care was put into the execution of the walls, presumably due to different room function. Brick size remains more or less constant at ca. 0.15 x 0.3 m throughout the period. In a few cases the bones of wild cattle (shoulder and long bones) were found set into the wall instead of bricks.

Another observation that should be emphasized is the functional differentiation of particular rooms and the related differences in the thickness of walls and wall execution techniques. The main walls and those surrounding the deposit are the thickest, reaching ca. 1.2 m. The NW corner of the space with the deposit and the west wall had been intersected by a trench excavated by the Italian expedition in 1988-89. Walls either one, one-and-a-half or two bricks thick (from 0.3 to 0.6 m) surround other rooms that are of distinctly domestic character. Small hearths were discovered chiefly in the small units, enclosed by thin walls that separated them from the neighbouring spaces. An especially large concentration



Fig. 5. The figurines from the first deposit: baboons, prostrate man and fragment of a crocodile.



Fig. 6. Plan of an administrative-cultic centre (part discovered in 2001).

of these hearths was discovered in the north-western part of the complex. Occasionally, bottomless vessels were found standing in the hearths.

In the 2006 season the area on the West of the building was opened. The most important discovery made in this area was a long room (8 x 3.3 m) in the north-western corner of the new trench (Fig. 7). The space was surrounded by



Fig. 7. Room with deposit - discovered in 2006.

0.45 m thick brick walls (1.5 brick) and was oriented NW-SE. In the middle of the room a concentration of eight vessels was found (Fig. 8). Of special interest is a so called Nubian vessel – a bowl decorated with punctured dots and incised triangles and a pot-stands with triangles cut in its body. Both vessels (and probably other found together) are considered (by many scholars) as connected with cult or some rituals. Few centimetres below (but still in the same level and in the same room) two stone vessels and a kind of container for ink were found. The latter was a thin pottery slab, 7 cm wide, with three round containers (about 4.5 cm in diameter) filled with a black substance, probably a scribe's palette.



Fig. 8. Cultic pots discovered in 2006 (in situ).



Fig. 9. The jar with deposit in situ.



Fig. 10. A few objects from the deposit discovered in 2006.

Just at the Eastern wall of this room a small jar (23 cm high) was found (Fig. 9). It was decorated with punctured dots and incised decoration: 2 quadruped animals (gazelles?) and an ostrich. It was covered by a small bowl. Inside the jar 62 small objects were found (Fig. 10), evidently a deposit of cultic items. The deposit was composed from two figurines of children, seven figurines of women (Fig. 11), five figurines of men (Fig. 12), six figurines of dwarfs (Fig. 13), 12 figurines of different animals. Especially interesting are four cobra-snakes, the oldest known uraei until now. All of them were made from hippopotamus tusks. In the jar were also 19 models of different items (p. ex. knife, boats, mirror, pieces of games, cylindrical seal, tablets, boxes), and 10 miniature vessels, made of different materials: hippopotamus tusks, stones, Nile silt, faience and copper. Both deposits (connected undoubtedly with the Dynasty 0 and beginning of Dynasty I) and other items found in the building allow to interpret it as an administrative-cultic centre. It probably played a great role not only for Tell el-Farkha itself, but also for the region (at least part of the Eastern Delta) at the beginning of Dynasty I.



Fig. 11. The figurines of a woman and a child.



Fig. 12. Two figurines of men.



Fig. 13. Figurines of dwarfs.

The deepest layers of the building-plan is much simpler, but probably it is still a place of ceremonial importance. In one of the last layers a large (almost 0.3 m long) falcon shaped greywacke palette was found. The main walls are still very thick and rooms narrow and long. It is possible that in the centre was a kind of inner courtyard.

The layers excavated in this area have yielded a noticeable quantity of small finds, including the objects from the deposit just mentioned. Other objects connected with the temple area are worth mentioning: cosmetic palettes, some examples of wavy-handled pottery or imported pottery with lug handles, whole vessels, mostly of small size, sickle blades and fragments of flint knives, flint scrapers, numerous pieces of querns, stone grinders and pestles, mud-seals used to close all kinds of containers (some with impressions of cylindrical seals), stone pendants (amulets) in the shape of a duck and of a stylized female figure. A highly schematic figurine of a ram was discovered north of the deposit, but within the thick wall surrounding the complex. One of the most interesting finds was a cylindrical jar with 187 fin-bones of fish, some with the thicker end broken

off, others whole. Even without further processing, the fin-bones with their sharp serrated edge constituted excellent material for making harpoon heads (e.g. for fishing) or even arrowheads for bird hunting. The bones may have been collected as valuable raw material or deposited in the sacred area. Immediately next to the jar half of a clay boat model was discovered.

To summarise: at the Western Kom at Tell el-Farkha we deal with three large buildings, erected at the same place but from different chronological periods. First, the older one was evidently a house; the second connected with the Naqada culture was probably a residence of important men, maybe the governor of one of the earliest Egyptian princes or even kings. The third was probably an administrative-cultic centre, raised on the same spot as the earlier residences. It is worth to stress that it is much bigger than for instance the Satet temple at Elephantine. Most probably the different spaces (rooms) served different functions. Both rooms with deposits could be some kind of chapels or sacred places, others seems to be connected with daily life. In some of them could have been workshops in which the cultic objects were produced; in another the local chief (king's administrator?) could have resided. He probably had a strong relation with the first Egyptian kings (serekhs of Iry-Hor, Ka and Narmer were found at the cemetery).

The complexity and monumental character of the administrative-cultic centre and the Naqada residence becomes evident especially when we compare these buildings with houses known from the Central Kom. Excavation of the central tell in 2001 enabled the uppermost extent of settlement from Dynasty I, contemporary with the last layers of temple from Western Kom. A layout of buildings different from that in younger phases was noted here, although the NE-SW orientation of these buildings is still the same. Exploration revealed a compact group of architectural features consisting of a number of small rooms (from 2 x 2.5 m) and larger ones with corner stoves. Walls are constructed with three or four parallel lines of bricks.

Work on the Central Kom yielded a considerable amount of finds, predominantly potsherds, though a number of complete vessels were also found. Other materials included a large tool assemblage, among others a deposit of flint sickle blades – a harvester's kit – concealed within a wall.

In the deepest, older layers we still can observe simple settlement structures, with narrow and long rooms located around courtyards, sometimes constructions supported by posts with many traces of ovens – inside and outside of walls and next to silos at the courtyard.

The situation is almost the same in the deepest levels dated to our phase 4 (contemporary with the beginning of the administrative-cultic centre and with the

destruction of the Naqada residence). There are many relatively small compartments, long and narrow, grouped around the courtyards forming the rests of quite big houses with many ovens and workshops.

The data acquired thus far clearly indicate that in the Late Predynastic and Early Dynastic periods the Central Kom functioned as a utility area serving the residential and temple sectors of the settlement located on the western tell.

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Tell el-Farkha Necropolis in 2003

The necropolis of Tell el-Farkha has been excavated by the Polish expedition since 2001 (Chłodnicki et al. 2002). The pottery analysis indicates that the part of the cemetery examined in 2001-2003 is to be dated to dynasty 0 and the First Dynasty, what corresponds to the age of flourishing building activity noted at the site. During the first three campaigns (2001, 2002 and 2003) the fieldwork on the cemetery was concentrated on an area of 400 m², resulting in the discovery of a dozen or so graves. Three of these were explored in 2001 (Chłodnicki & Ciałowicz 2001), the succeeding five in 2002 (Ablamowicz et al. 2004), while in the 2003 season the remaining two.

The hitherto recovered burials show considerable structural diversity. There are simple oval pits totally devoid of offering goods; rectangular mudbrick constructions with one-brick-wide walls; relatively rich graves with several chambers and still other large graves with thick mudbrick walls and massive superstructures. Most of the bodies were buried in a constricted position on their left side with the head towards the north-east. The anthropological analysis allows to define their sex and have a general idea about their age but more specified conclusions are difficult to draw because of the poor state of the bones' preservation (Kaczmarek & Skrzypczak in prep.).

Grave no. 4 (Fig. 1), a big two-chamber-tomb (13 x 2 m). It had been constructed for a 30-40 years old man, whose body was found in the bigger southern chamber lying on a kind of mudbrick-catafalque in a contracted position on his left side with the head turned to the north-east. The skeleton was unearthed in a position not entirely anatomical: crushed and dislocated skull, vertebrae in front of the face, phalanges thrown round the body. The deceased was offered a stone bowl and 36 pottery vessels (jars of medium dimension and rather small bowls) mostly concentrated in the smaller, northern chamber. Both rooms had been covered with mats, remains of which were unearthed in form of white fibres.



Fig. 1. Grave no. 4.



Fig. 2. Grave no. 5.



Fig. 3. Grave no. 6.



Fig. 4. Grave no. 7.

Grave no. 5 (Fig. 2) was the first fully excavated two-chamber-construction (4.65 x 2.25 m in size) discovered in Tell el-Farkha. The grave had been robbed already in antiquity. The plunderers set fire to the matting and other perishable material in the main chamber, but some pottery vessels, apparently considered worthless, had been thrown outside. They were found east of the grave on a level close to that of the burial itself, suggesting that the grave was above surface at the moment of looting. The smaller southern chamber was found with pottery and had apparently not attracted the attention of the looters. One vessel was found in the eastern wall of the construction and four others in a kind of passage in the wall separating both chambers. A significant amount of charcoal concentrated in the north-eastern corner of the southern chamber suggests that there have been some objects made of organic material, which are at present impossible to identify. Thanks to the burning of the main chamber, the human remains were found in slightly better condition compared to the other graves. The deceased was identified as a 30-35 years old man, that had been placed in a contracted position on his left side and his head turned to the north.

Grave no. 6 (3.45 x 2.56 m wide) had been build for a 10 to 12-year-old child. The tomb (Fig. 3) differs from the other graves of Tell el-Farkha by its almost square shape and massive brick walls 0.5 m wide. A brick cover (0.5 m thick) placed on top of the grave had additionally secured the whole of this absolutely undisturbed structure. The deceased had been placed on a kind of catafalque made of dark mudbricks and was surrounded by pottery vessels. The body (found lying in a contracted position on its left side, the head pointing to the north) and the vessels had been covered with a mat. Judging by value of the grave goods, the child must have been a member of a significant and wealthy family, which could afford to offer a necklace consisting of small red carnelian beads combined with white limestone beads and a triangular stone pendant covered by a thin golden leaf. The layers overlying the grave revealed among numerous thick and rough potsherds also an interesting seal impression and one more stone pendant of a teardrop-shape.

Grave no. 7 (Fig. 4) draws attention due to perfectly preserved mats covering the whole burial, but also some curious structural solutions. The tomb consists of an elongated rectangular burial chamber (3.8 x 1.6 m), lined with a single row of mudbricks, from its eastern side connected to a system of so-called "annexes" (small mudbrick chambers creating additional space for grave goods). 40 pottery vessels have been found in this grave, despite the fact that it was already robbed in antiquity. This caused a certain disorder which is especially noticeable in the position of crushed pots unearthed in the "annex". The largest jars had been placed in the southern part of the chamber, the smaller vessels in the northern part and in one of the so-called "annexes" as well as around and

beneath the bodies. The “annex” with 16 pottery vessels deserves a closer look because here were also found small fragments of a stone jar (possibly from the same vessel broken into pieces). One may accept that some kind of jewellery, unfortunately robbed, was present as well, because of the recovery of a tiny fragment of a gold leaf and four carnelian beads. Interesting is that the grave comprised numerous animal bones and also a rhinoceros rib with a probably worked edge. The whole burial – a 25 to 35-year-old female and an 8 to 9-year-old child lying on their left side, their heads turned to the north with their offerings – had been covered with well preserved mats, one of them over the bodies and their grave goods, the two others lining the walls and the bottom of the construction.

Grave no. 8, on the contrary, contained no offerings at all. In a round pit (1.3 m in diameter) the bottom lined with two circular layers of sand-and-mud-bricks, had been buried a man aged over 20 and 1.68 m of height. The skeleton was so tightly contracted that a tight binding of the body seams to be the only possible explanation. The grave was situated in a small space between the south-western corner of grave no. 7 and the north-eastern corner of grave no. 4, almost immediately below the present surface.

Grave no. 13 is a pit burial with untraceable edges. It revealed no offerings, either, but still should be regarded as quite intriguing due to the orientation of the deceased's body. The skeleton identified as belonging to a 25 to 35-year-old female was found in a strongly contracted position on her right side the head pointing – what surprises the most – to the west. The only reliable justification of this untypical case seems to be this burial's connection to the later phase of the settlement in Tell el-Farkha.

All the hitherto mentioned graves of Tell el-Farkha were occupying nearly top layers of the mound, whereas the research on lower levels yielded an unexpected discovery. In 2002 at the bottom of the earlier examined grave no. 2 a wall, slightly deviant in its course, became visible. The puzzling construction was labelled grave no. 10. During the 2002 season only one massive mudbrick corner (1.06 x 1.17 m wide) was unearthed still preserved to the impressive height of 2 m with inner space, and covered by a mudbrick roof which was additionally protected by brick-rubble. There were four pottery jars found inside the structure in a so-called “chamber”. During the following field campaign the so-called roof level on the surface of the previously delimited trench was exposed revealing a construction of monumental size erected with great precision and splendidly preserved – most likely – for funeral use. There is no doubt that there has been discovered the biggest edifice of this kind related to the Early Dynastic period known from the Nile Delta. The presently unearthed part of the structure is 7 m wide and 8 m long, the entire size of the building is still hard to estimate.

The stratigraphy of the kom indicates that the above-mentioned graves had damaged the big structure, having been dug into its upper layers. Small walls – hardly perceptible at the beginning of the exploration process – were becoming clearer and thicker with every succeeding layer. The enclosing rooms filled up with brick-rubble became more distinct they, until they all transformed into an arrangement equal to the hitherto recovered corner. The eastern edge of the construction deserves particular attention, as it consists of an amazingly regular wavy outline. Structural details of the edifice (solid, thick walls build of regular, one-sized bricks with spaces in between filled with rubble) are clearly visible on a cross-sections. In the northern trench from season 2003 the rubble filling by the big construction's walls is marked with a distinct bright patch, where the younger, Early Dynastic graves were found. The form of the edifices' exterior wall is noteworthy. It consists of an inner and outer part, clearly separated by a joint, tightly fitting, forming the already mentioned wavy outline. A few fire-places sunk into the walls of the building should be regarded as of a younger date.

Finding the answers to the many questions concerning this interesting structures must wait for future field seasons. Judging by the unearthed corner there are still 2 m left to the level of the big construction's foundations, unfortunately, it is difficult to say how large the area really is.

Hypothesis are not be easy to verify because of the thickness of the layers concentrated over the ceiling of the construction, frequently packed with smaller, but also interesting burials. A good picture of this situation is the, only in part excavated, grave no. 14, which revealed two pottery vessels and a human skull inside one of them. So the composition as a whole creates a complicated, though intriguing mosaic.

And finally it is worth to mention some of small find recovered in the cemetery: an owl-shaped piece of clay, a small stone pendant surmounted by the representation of a hawk and the handle of a ceremonial knife of hippopotamus bone beautifully carved. It should also be noted that the layers overlying the uppermost burial structures are full of potsherds, mainly bread moulds and so-called "cornets", as well as fragments of grinding stones, grinders, amulets, pendants and seal impressions, which may indicate some kind of funerary cult practised at Tell el-Farkha.

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Egyptian-Southern Levantine Interaction in the 4th and 3rd Millennium B.C. - A View from Tell el-Farkha

Introduction

The problem of Egyptian-Southern Levantine contacts in the 4th and 3rd millennium BC has been a hot research subject since 1955 when Y. Yadin (1955: 1-16) published his controversial paper on The Earliest Record of Egypt's Military Penetration into Asia. Since then the number of Egyptian artifacts on Southern Levantine sites dated to Chalcolithic and EBI and Southern Levantine artifacts on Egyptian sites dated to Pre- and Protodynastic period has been constantly growing. The new discoveries cause fierce discussions among scientists and make them revise or put new interpretations of the nature of these interactions on (Fig. 1; eg. Anđelcović 1995; van den Brink 1992: 345-476; Levy & van den Brink 2003: 3-38).

The discoveries made during the last few years, especially in the Nile Delta (eg. Tell el-Farkha, Buto, Maadi) and Israel (eg. Lod, Tell es-Sakan, Nahal Tillah) have shown us that the nature of Egyptian-Canaanite¹ contacts from its beginning in 4th millennium was more complex than expected in the beginning (Braun 2003: 174-189; 2004: 507-517; Faltings 2003: 165-170; Hartung 2004: 337-356). New studies on this subject propose dynamic interpretations and introduce a division into different phases of development of Egyptian-Southern Levantine relationships (Levy & van den Brink 2003: 18-21; de Miroshedji 2003: 39-47; Watrin 1998: 1215-1226). In my opinion the most accurate division was proposed by T. Levy and E. van den Brink (2003: 18-21; Fig. 2).

It is based on the cultural dynamics of both regions: Pre- and Protodynastic Egypt and Chalcolithic and Early Bronze Age I South Levant; in addi-

¹The South Levant and Canaan will be used interchangeably.

MILITARY CONQUEST	Yadin 1955; Oren 1973; Yevin 1960; 1968)
TRADE	Amirian 1970; 1974; Ben-Tor 1982; 1986; Gophna 1987; 1992)
COLONY	Andelcovic 1995; Brandl 1992; Gophna 1992; Porat 1986/7)
SYMBOLIC ORGANIZATION	Dessel 1991; 2001; Joffe 1991)
DYNAMIC INTERPRETATION	de Miroschedji 2003; Harrison 1993; Watrin 1998; Levy & van den Brink 2003;)

Fig. 1. Different theories explaining Egyptian-Southern Levantine Interactions.

ELI 1	Lower Egyptian Maadi-Buto culture	Chalcolithic Southern Levant	c. 3900 BC
ELI 2	Lower Egyptian Maadi-Buto culture	EB IA Southern Levant (Wadi Gaza Site H; Afridar, Area G)	c. 3650 BC
ELI 3	Upper Egyptian Nagada IIc-d culture	Early EB IB (Azor Burial cave)	c. 3650-3300 BC
ELI 4	Nagada IIIa2 (U-j/MAO)	Middle EB IB Southern Levant (Tel Erani, Str. C)	c. 3300 BC
ELI 5	Nagada IIIb-c1	Late EB IB Southern Levant (post Tel Erani C)	c. 3100 BC
ELI 6	Nagada IIIc2-3	Eb II Southern Levant	> c. 2900 BC

Fig. 2. The phases of Egyptian-Levantine Interaction (ELI) proposed by T. Levy and E. M. C. van den Brink (2003:tab.1.7).

PHASE 1	NAGADA II C - II D1	ELI 2
PHASE 2	beginning NAGADA II D2	ELI 3
PHASE 3	NAGADA II D2 (III A1?)	ELI 4
PHASE 4	NAGADA III A1-III B	ELI 5
PHASE 5	NAGADA III B-III C1	
PHASE 6	DYNASTY 1-2	-
PHASE 7	DYNASTY 3-5 (?)	-

Fig. 3. Chronology of Tell el-Farkha and its correlation to Egyptian-Levantine Interaction phases.

tion, it shows a very wide political, social and economic context of each proposed Egyptian-Levantine Interaction phases. For the purpose of my analyses I co-relate ELI phases with occupational phases at Tell el-Farkha (Fig. 3).

It is based on the cultural dynamics of both regions: Pre- and Protodynastic Egypt and Chalcolithic and Early Bronze Age I South Levant; in addition, it shows a very wide political, social and economic context of each proposed Egyptian-Levantine Interaction phases. For the purpose of my analyses I co-relate ELI phases with occupational phases at Tell el-Farkha (Fig. 3).

A view from Tell el-Farkha (1998-2003)

Tell el-Farkha is considered as a very important point in the settlement system of the Nile Delta in Pre-, Proto- and Early Dynastic period (Fig. 3). Although we are still going on to understand organization of the site and its chronology, there is no doubt that it took part in Egyptian-Canaanite interactions (Chłodnicki et al. 2003: b63-119; Chłodnicki 2004: 357-370; Ciałowicz 2004: 371-388).

Although the number of Southern Levantine pottery fragments found on the site until 2003² is not great, they were registered among materials of the first five occupational phases. Their lack in layers dated to late Early Predynastic and Old Kingdom periods (phases 6 and 7) could be caused the lost of its significance of the settlement in the Nile Delta settlement system.

During pottery analyses I followed the description of EB I pottery made by Eliot Braun³ (2002) and his regional periodization of EB I by ceramic horizons (Fig. 4).

North	South	Date BC	Egypt
Latest Chalcolithic			Nagada I
„Lost Horizon”	Latest Chalcolithic	to ca. 3500	Nagada II
Early EBI	Initial/Early EBI	ca. 3500	Nagada IIIa-b
Developed EBI	Developed EBI	ca. 3300	Nagada IIIc-d/Dyn 0
Late EBI	Late EBI	Ca. 3000	Dynasty 0/I

Fig. 4. Regional periodization of Early Bronze Age I by Ceramic Horizons (Braun 2002).

² All sherds considered as imports from the South Levant found after 2003 are still under analysis.

³ I would like to thank Eliot Braun from Israel Antiquity Authority for offering access to his unpublished manuscript of Early Bronze Age I pottery.

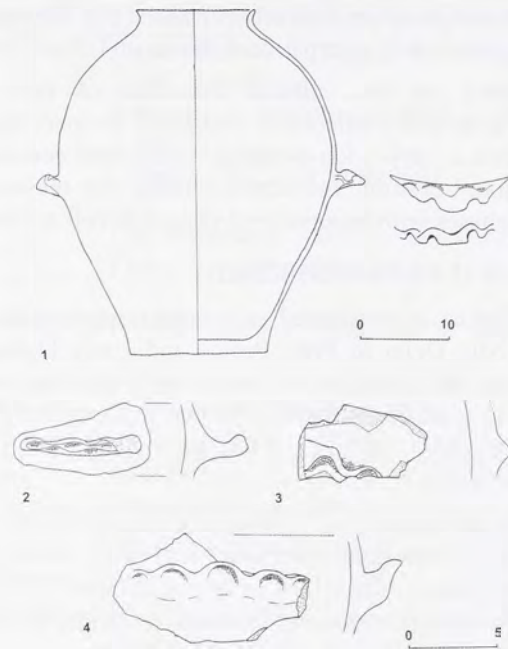


Fig. 5. Southern Levantine pottery at Tell el-Farkha (1, 4 – Kom W, drawings by M. Jucha; 2,3 – Kom C, drawings by A.Mączyńska).

Southern Levantine pottery at Tell el-Farkha

In a group of Southern Levantine pottery the most numerous are thumb indented ledge-handles with piecrust like edge often referred to as “synonymous” with Early Bronze Age in the South Levant (Amiran 1969: 36, pl. 8; Braun 2002). One of them was discovered among materials of phase 1 connected to middle Lower Egyptian Culture⁴ (ELI 2) (Fig. 5.2).

The matrix and color of the clay was different from alluvial Nile or marl clay. It was light yellowish-brown in color and as a temper medium round grains of quartz were added (ca. 20%) (Mączyńska 2003: 220). Analogous ledge handles are known from numerous EB I sites such as Ai (Marquent-Krause 1949:

⁴ According to the division of Lower Egyptian culture proposed by K. Ciałowicz (Chłodnicki et al. 2002:66-67).

pl.XXXVII:1432), Beth Shan (Fitzgerald 1935: pl. II:5), Jericho (Garstang 1935: pl. XX), Lachich (Tufnell 1958: 149, pl.11:28-32). Furthermore, in the transitional layer between Lower Egyptian and Nagada cultures (phase 2 – ELI 3) an almost complete jar with two ledge-handles, typical for secondary phase of Early and Late Southern EBI was found (Fig. 5.1). Analogous vessels are known from many sites in the South Levant, eg. Horvat 'Illin Tahtit (Braun 2002: fig. 18/22, 19/8). Another fragment of pottery found in layers of phase 2 is a bowl made of very soft cream clay with stains of red paint on the outer surface (Fig. 6).



Fig. 6.



Fig. 7.

Its fabric is completely different from Egyptian. It was made of soft, cream-colored clay with coarse crushed pottery added as a temper (Jucha 2001: 232). This form was rather popular in whole EB I and it is difficult to date it back precisely. Additionally, from the same layers a few sherds made of very soft clay tempered with coarse mineral temper (ca. 10-15%), reddish yellow in color were found. Their fabric is similar to that of the jar from phase 2 mentioned above (Fig. 7).

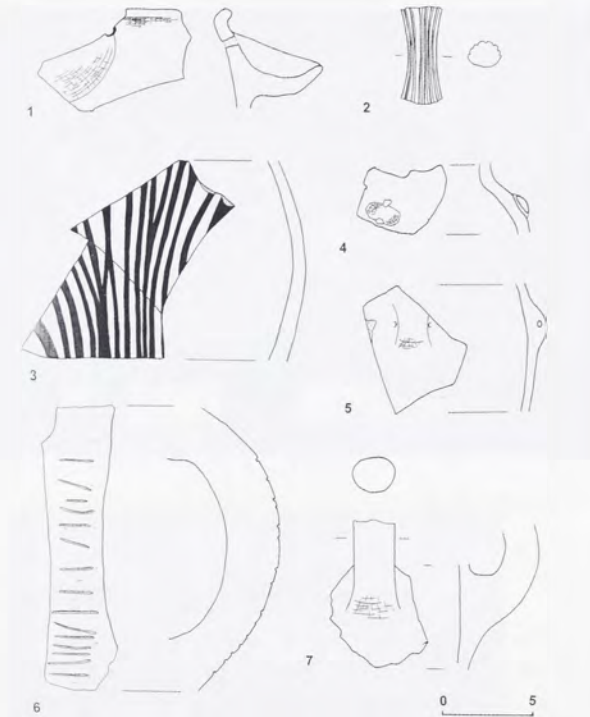


Fig. 8. Southern Levantine pottery at Tell el-Farkha (1, 3-5 – Kom C; 2, 6, 7 – Kom E, drawings by A.Mączyńska)

As far as pottery of phase 3 is concerned, until 2003 only imported ledge handles were registered. However in this period beside Levantine handles there are Egyptian handles as well (Fig. 5.3-4) (Jucha 2001: 232, tab. 106.1-3). It is a result of adaptations of foreign forms to local pottery tradition. Although this

process has not been explained so far, locally made handles confirm a new stage of Egyptian-Southern Levantine interactions (Braun 2005: 141-142).

The most numerous findings of Palestinian ware came from layers dated back to Nagada III period (phase 4-5). Apart from ledge handles well represented in older layers, new forms of vessels were registered. A fragment of a jar with a spout – a bowl-like top, pierced by a narrow hole was discovered (Fig. 8.1). Although in most cases these types of jars were painted with net pattern, on this fragment there are no traces of such decoration. Similar jars are known from Tell el-Fara'ah in the north, Ai and Palmahim Quarry in the south during middle southern EBI (Amiran 1969: pl. 11/25; Marquet-Krause 1949: fig. LXVII:4.932). Another fragment of a jar is decorated with distinctive a type of pattern called "Pajama style" (Fig. 8.3). It became popular in Middle Southern EBI and continued into EB II. The surface of this fragment was coated with bright white lime and then painted with narrow, vertical red stripes. Vessels decorated with this kind of pattern are known from Tel Erani C in Israel (Kempinski & Gilead 1991: fig. 12:16,18) and in the U-j Tomb at Umm el-Qaab in Egypt (Hartung 2001: Taf. 64).

The pottery from Erani C horizon is easily identifiable also by special decoration on handles (Braun 2002). At Tell el-Farkha two such pieces – a small longitudinally segmented handle (Fig. 8.2) and a handle with horizontal slashes (Fig. 8.6) – were registered. The first handle was made of brown clay with small grains of quartz as a temper. The paste of the other one was tempered with straw and mid-sized quartz (both 10%). Similarly decorated handles were found in Nahal Qanah (Gopher & Tusk 1996: fig. 4.31:19) and Hartuv 2 (Mazar & de Miroschedji 1996: fig. 19:19).

Beside materials typical for the southern horizon of EBI some findings from the northern EBI were found too. The most interesting findings include three rims, a fragment of a neck and a fragment of a body belonging to storage jars found in the same trench, all decorated with a grain wash decorative technique (Fig. 9.6-8). All are brown in color and tempered with medium sized grains of sand. This type of vessels was the most popular in the Middle Northern EBI (at En Shadud), but it also continued on into late Northern EBI (Braun 1985: fig. 20:8-9,11,13; 2002: fig. 8:1-4;).

A teapot spout covered with red slip and burnished found in the same layer is also typical for the Late Northern EBI (Fig. 9.5). Teapots with similar spouts are known from Tel Kitan (Braun 2002: fig. 11:9,13). Sometimes the surface of such vessels is decorated with a burnished net pattern, which was very well elaborated in this period. Only one sherd from Tell el-Farkha bears this decoration. It is a fragment of a shallow bowl with almost vertical walls. Its internal and external surfaces are burnished in a net pattern (Fig. 9.4).



Fig.9. Southern Levantine pottery at Tell el-Farkha (1- Kom W, drawings by M. Jucha; 2-8 – Kom C, drawings by A. Mączyńska).



Fig. 10.

During the excavation at Tell el-Farkha some fragments of Palestinian sherds popular during whole EB I period were found too. An almost complete amphoriskos with a long neck, a pear-like body and a flat base and only one preserved lug handle was discovered in the building 115 on Western Kom dated to phase 5 (Fig. 9.1; Fig. 10) (Jucha 2003: 193, fig. 13:8). This form is typical for the Southern EBI horizon, but it is impossible to date it relatively because similar vessels are known mostly from tomb deposits (Ai) (Braun 2002; Marquet-Krause 1949: LXVII.41.986; LXXI.770).

Among other unstratified EB I pottery there are fragments of two loop handles (Fig. 8.7; 9.3), gray in color, made of compact clay tempered with very small amounts of fine and medium sand, a lug handle reddish yellow in color made of very soft paste tempered with calcareous temper (Fig. 9.2), two small lug handles made of compact clay brown in color with very small grains of sand as a temper (Fig. 8.4-5). A few sherds of a holemouth jar tempered with calcite well represented in the Southern Levantine EBI were found too. All these fragments were found among materials of phases 4 and 5.

Summary

To summarize the above, it is quite certain that the settlement at Tell el-Farkha and its inhabitants were involved in the exchange with the South Levant from its beginning in the Nagada IIC to the end of Nagada III period when the settlement was partly abandoned. At the current state of our research we cannot say how these relationships were organized. The findings do not suffice for saying what goods were exchanged and how. The pottery presented above was imported not because of its fabric, shape or decoration but mostly because of its contents. Additionally, we have to remember that the exchange had to include (included?) not only material items but also ideas and information. These subjects are really difficult or even impossible to study on the basis of material alone remains of human activities in the past. The problems with identifying ethnicity from pottery were presented by E. Braun (2005: 140-154). On the other hand we cannot leave all collected data unexplained. When studying Egyptian-Southern Levantine contacts it is possible to use all interpretation and models proposed so far to "sketch" one of the possible explanations. All findings from Tell el-Farkha seem to be interesting for all who are involved in Egyptian-Southern Levantine interaction studies. But we still do not have enough evidence to make an interpretation satisfying for everyone. The model proposed below is based on the findings from Tell el-Farkha and published data concerning organization of Egyptian-Canaanite contacts (Andelcović 1995; Braun 2003: 173-189; de Miroschedji 2003: 39-57; Levy & van den Brink 2003: 3-38). Further works with new discoveries could confirm, deny or modify it.

At the beginning of the settlement in N IIC-IID1 period (phase 1 - ELI 2) the exchange with the Southern Levant had to be rather a private enterprise of a group of people, without a central place of exchange and without or with only a few intermediaries. Number of imports from this period is very limited, but it could result from only partial excavation of the site. Additionally, at Tell el-Farkha no traces of presence of foreign people as in Buto or Maadi have been found so far (Faltings 2003: 165-170; Hartung 2004: 337-356). Still, we cannot exclude this possibility until excavation works are completed.

When the rise of chiefdoms begun after the "expansion" of Nagadan culture to Lower Egypt, the exchange started to develop towards a wider scale. From the end of NII the exchange had to be getting more and more centralized. In this period Egyptians started to control exchange and a set of exchange networks (phase 3 – ELI 4). Although this process is not well visible based on Southern Levantine findings at Tell el-Farkha, some other features registered on the site indicate important changes connected with political and/or economic organization.

The Nagadan mud-brick complex discovered at the Western Kom in 1999 and 2000 with its, for this period, enormous size, many small findings used for counting purposes (pellets, cons), undecorated seals and a few Palestinian ledge-handles found inside could be connected with commerce. It is interpreted as a place of residence of a great man – the governor or administrator for one of Egypt's early princes or kings, who was responsible for trade with the South Levant and Upper Egypt. Although this theory still requires more evidence, we cannot exclude that Tell el-Farkha was an important commercial center taking part in Egyptian-Canaanite exchange (Chłodnicki & al. 2002: 71-72, Ciałowicz 2004: 379-380).

In phase 4 and 5 (ELI 5) of Tell el-Farkha, numbers of imported items grew. For the first time we registered imports from Northern EBI on the site. It refers to the expansion of Egyptian influences in the South Levant and Egyptian exploitation of this region. In the course of Dynasty 0 the Egyptian colony in Canaan was established. During this period the most intense interaction can be seen, especially in late EBI. It is not only seen at Tell el-Farkha but also on other sites in Lower and Upper Egypt (Buto, Minshat Abu Omar, Hierakonpolis Umm el-Qaab). Moreover, we have to remember that this is the period when the Egyptian State emerged and many important social, political and probably ideological processes took place. At Tell el-Farkha on the same place as the Nagadan residence of phase 3 on the Western Kom, a new building was erected. According to all findings from this area (figures, rattles, miniature vessels, beads) dated to Dynasty 0 and the beginning of the First Dynasty, it is interpreted as an adminis-

trative center connected with a temple or a shrine which had to be involved in exchange with the South Levant (Ciałowicz 2004: 384-385).

In late Early Dynastic Period (EB II) the organization of Egyptian-Canaanite contacts changed and the maritime trade route probably became prevailing over the Northern Sinai route (de Miroshedji 2003: 45). It is very clearly seen at Tell el-Farkha where the exchange stopped in the middle of the First Dynasty. In the same period the settlement was partially abandoned. Its social, political and economic function was taken over by other settlements in the vicinity (eg. Mendes). This event is still not clear and we hope that during the next couple of seasons it will be explained.

Finally, I would like to state that all my observations should be treated as preliminary. They are still being studied and additionally they depend on the results of our next excavations at Tell el-Farkha. I hope that further works and more advanced analysis of raw materials, especially fabric of imported pottery will help us to answer many questions and confirm hypotheses concerning Egyptian-Levantine interactions.

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Barbara E. Barich

The Archaeology of Jebel Gharbi - Contributions to the Knowledge of the Pleistocene-Holocene Transition in Northern Libya

Introduction

All the Libyan region has produced meaningful documents testifying the presence of human settlements since the early phases of prehistory, how it is clearly shown by the Acheulians and Levallois industries found in several Libyan areas. Yet the knowledge of the whole country is not complete and, although many regions have been fully explored through systematic research, there are others about which we only possess scanty information. For this same reason the last phase of the Pleistocene could only be reconstructed thanks to a few important sites located in northern Libya, near the coast, which were discovered and dug around the half of the last century and they still have to be further investigated.

The cave of Haua Fteah in Cyrenaica is of paramount importance among the above mentioned sites: it was excavated by Ch. McBurney from 1951 to 1955 and it has produced a very long stratigraphic sequence that covers all the phases of the Late Pleistocene (starting from OIS 5, before 130.000 years ago, McBurney 1967). The sequence of Haua, between 40 to 34,000 bp, bears evidence of the 'Dabban'— an industry named after the cave of Hagfet et Dabba (McBurney & Hey 1955). Such industry marks the beginning of the Late Stone Age (or Late Palaeolithic) and it is characterized by burins, small backed blades, truncations and chamfered burins. The Dabban industry, similar to the first blade-burin industries of the Nile Valley (i.e. Nazlet Khater, Vermeersch 2000), was certainly developed by anatomically modern man and it strictly pivoted around the Jebel Akhdar.

About the 16,000 bp a new industry appeared within the sequence of Haua and within the nearby site of Hagfet et Tera (Petrocchi 1940). Because of its similarity to the Iberomaurusian culture (namely the ex-Oranian culture), McBurney called it 'Eastern Oranian' industry. As a matter of fact the above industries have techno-typological similarities, such as the great importance that both attached to backed blades, which sometimes have microlithic size and are the 98% of a whole tool set.

During the Oranian the climate underwent a remarkable change: the temperature lowered and the aridity increased; both phenomena brought about the depopulation of the territories. On the coast, instead, the settlement took place without interruptions. Human groups probably hunted *Ammotragus*, while in areas that were closer to the desert, such as Hagfet et Tera, they hunted gazelle. Other hunted animals were equides (i.e. *Equus zebra*), cattle, rabbits and terrestrial mollusks.

This horizon is followed by the complex that McBurney called 'Lybico-Capsian', which probably led to the next Neolithic production-based economy. Such kind of economy has been identified in the VIII and VII layers of the sequence. Nonetheless there are still many uncertainties due to the particularly circumscribed research carried out in the past. This kind of research was too limited to answer all the interrogatives about such a critical phase of the prehistoric development (i.e. about the relationship with the previous layers, the chronology and the origin of domesticates).

From the early nineties of the last century, the University of Rome 'La Sapienza', began to carry out a research project directed by the author. Our project's aim is to widen the knowledge of the Jebel Gharbi region, located in the subcoastal belt south-west of Tripoli. After an initial phase aimed at defining the geomorphological characteristics and the main episodes of the cultural sequence (Barich et al. 1995; 1996), in 1997 the project has undertaken a new research cycle actually meant to bring to light the occupation model between the end of the Pleistocene and the Holocene.

Jebel Gharbi means 'western mountain' and its name bears an implicit reference to its eastern counterpart, the Jebel Akhdar (the green mountain), where the cave of Haua Fteah is located. Although information related to the prehistory of the Jebel was very limited¹, the aim of the project was to establish its relations with the Haua sequence. After over fifteen years we have been successful despite

¹ McBurney and Hey (1955) were the authors of a preliminary geomorphological reconnaissance of some areas of the Jebel. Later, during the eighties of the last century, a project sponsored by the UNESCO was carried out by Barker and collaborators in the southern sector of the mountain (Barker et al. [eds] 1996).

all the difficulties we have come across in rebuilding a sequence made of data scattered over a wide area.

The Jebel Gharbi lies between the southern boundary of the Gefara (i.e. the coastal plain), and the northern boundary of the Tripolitanian Plateau (Fig. 1). In particular, the Jebel ends with an escarpment cut by a network of deep valleys draining towards the Gefara. Our investigation has followed a territorial approach and has been carried out along the Ghan and Ain Zargha *widian*, that is the two main water streams, namely two strategic communication routes within the Jebel.

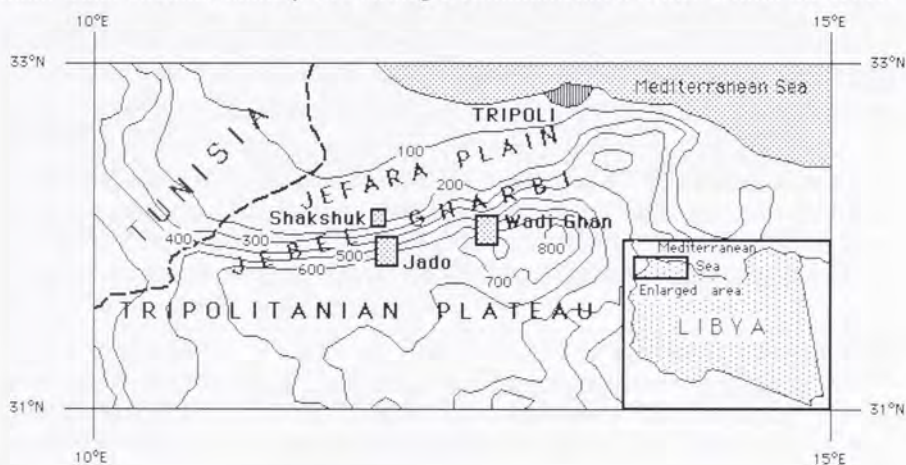


Fig. 1. Location map of Jebel Gharbi.

One of the best achievements in the Jebel Gharbi Mission is a chart of absolute chronology based on forty datings which were obtained through radiometric methods, either using charcoal samples, or carbonate formations and aeolian sands.² They have allowed for highlighting the different phases of the sequence and to clear up the Mousterian/Aterian relation. Furthermore they match the above-mentioned Cyrenaic sequence as well as the wider horizon of the Maghrebi history (Tab. 1).

The most ancient human occupation documents of the Jebel go back to the Early Stone Age. They are Acheulian artefacts –bifacial handaxes and spheroids– found on the Wadi Ain Zargha terraces at Ginnaun (Barich et al. 1995; 1996).

² They have been analyzed through the Radiocarbon, Uranium/Thorium (U/Th) and Optically Stimulated Luminescence (OSL) methods.

Table 1: Jebel Gharbi (Libya) – ¹⁴C chronology of the main occupation phases.

Phase	Location	¹⁴ C dating	Site	Sample
Neolithic				
	Wadi Ghan	3670 ± 50	Lower Terrace	Beta - 154550
	Shakshuk East	5400 ± 40	SJ - 02 - 67 High (Ain Soda area)	Beta - 167092
	Shakshuk West	6120 ± 100	SJ - 00 - 58	Beta - 154540
	Wadi Bazina	6370 ± 40	SJ - 00 - 59	Beta - 154552
	Wadi Bazina	7030 ± 50	SJ - 00 - 59	Beta - 154551
	Shakshuk East	7290 ± 60	SJ - 02 - 67 Lower (Ain Soda area)	Beta - 167093
Final LSA				
	Wadi Ghan	11,110 ± 40	SJ - 99 - 41	Beta - 157690
	Shakshuk East	11,360 ± 55	SJ - 00 - 55 East (Hearth)	Poz - 215
	Shakshuk East	11,570 ± 70	SJ - 00 - 55 East (faunal collection)	Beta - 167096
	Shakshuk East	11,570 ± 40	SJ - 00 - 55 East (faunal collection)	Beta - 185498
	Shakshuk East	11,690 ± 40	SJ - 00 - 55 East (faunal collection)	Beta - 185499
Upper LSA				
	Wadi Ghan	14,820 ± 60	SJ - 99 - 41 (Upper hearth)	Poz - 214
	Shakshuk	16,750 ± 60	SJ - 00 - 56	Beta 157689
	11 km W of Shakshuk, (upper series)	18,760 ± 50	Lacustrine formation (55 - 00 - 59) Wadi Bazina	Beta - 154554
	11 km W of Shakshuk, (upper series)	26,330 ± 80	Lacustrine formation (55 - 00 - 59) Wadi Bazina	Beta - 154555
Lower LSA				
	Jado – Ras El Wadi	27,310 ± 320	SJ - 98 - 12 (upper calcareous crust)	Beta - 154576
	Shakshuk	25,410 ± 150	SJ - 00 - 56 Extension 2 (below Aterian tools)	Beta - 185497
	Shakshuk	27,800 ± 430	SJ - 00 - 56 Extension (Base)	Gda - 196
	Shakshuk	24,620 ± 400	Ain Soda	Beta - 167094
	Shakshuk	24,740 ± 140	SJ - 00 - 55 West (test 2)	Beta - 157687
	Shakshuk	25,480 ± 400	SJ - 00 - 55 West (test 2)	Beta - 167099
	Shakshuk	30,870 ± 200	SJ - 00 - 55 West (test 2)	Beta - 157688
MSA				
	Shakshuk West	43,520 ± 2110	Road	Beta - 167098
	Shakshuk West	44,580 ± 2430	SJ - 02 - 68 Test 4	Beta - 167097

Also prominent are the remainings of the Final Pleistocene, showing epipaleolithic hunter-gatherer situations, while the presence of a true Late Paleolithic is not to be excluded (Garcea & Giraudi in press). The same Wadi Ain Zargha region is also one of the main areas of epipaleolithic settlement. From the headwater – Ras El Wadi – to the mouth, located in the Gefara plain, more than twelve sites have been identified.

Ras El Wadi

The sequence of Ras El Wadi, starting from the middle-upper section associated with Aterian industry, reveals an overall dry climate with occurrences of rainfalls. The final part of the Aterian deposit shows a thin interbedded crust, indicating increase in humidity and high evaporation rate (Boдрато et al. in press).

Beginning from the interbedded crust, the Ras El Wadi profile does not show any hiatuses. The crust is surmounted by a paleosol and colluvial silts containing Later Stone Age, Epipalaeolithic and maybe also Upper Paleolithic artifacts. It is clear that the top of the sequence formed during a quite humid phase, with no erosion of the slopes.

Epipalaeolithic findings at Ras El Wadi are plentiful, showing the relevance of the peupling of the whole area in the final Pleistocene phase (Barich 1995; Barich & Conati Barbaro 2003). Sites are located on terraces and alluvial fans overlooking the river at about 20 meters above its bed. These terraces face East and represent a strategic location from which the access to the water sources could easily be controlled. The plateau could be reached quite easily from the Gefara plain, which starts directly from the foothills, only a few kilometres away.

The area is currently characterised by a quite scattered shrub vegetation, excepting rare grass cultivations and olive and fig trees. In the past, the zone may have been, instead, much in demand for its vicinity to the main source of water, the Wadi Ain Zargha, which runs a few tens of meters lower, and to other less important springs. Archaeological sites can most likely be attributed to repeated occupations in the area by nomadic groups, hunter-gatherers, possessing microlithic-sized debitage and blade tools. Although mainly exposed on surface, the artefacts showed fracture and retouch that were still quite fresh. Therefore, one might think that they reflected the original situation nearly enough, and that they had only undergone dislocations and horizontal shifting as an effect of the erosion of the soil that contained them. Because of the lack of charcoal remains no radiocarbon dating is available so far for this area.

On the whole the lithic assemblage can be compared with the Haua Fteah Epipalaeolithic horizon, from the so-called Eastern Oranian layers (XV-XI) to the Libyco-Capsian one (X). In particular, while SJ-90-13 and SJ-00-26A

collections easily correlate the Iberomaurusian contexts, site SJ-00-26 can be better compared with the Capsian examples. However, in light of what was already argued by Close (1986) and Lubell et al. (1992) about a possible Iberomaurusian-Capsian continuity, distances among the assemblages could be better explained with a change of emphasis in the subsistence economy, than with a replacement in population.

As for the main technological traits, the average between debitage products and cores is always high and cores show an almost constant presence of preparation. This evidence, and the high presence of core-trimming elements, together with the high number of primary flakes, denote a marked manufacturing activity in loco (Barich & Conati Barbaro 2003). Among tools, endscrapers and burins have an equal importance within the various lithic complexes, with generally very low percentages; truncations occur twice as much as burins and geometrics (ca.8.7%) and the straight form prevails with a rather accurate manufacture. Backed bladelets are the most characteristic component (with the arch-backed type – Tixier Type 056 – as the most documented one) (Tixier 1963), but their absolute percentages show discrepancies among the various assemblages. In fact, some of the sites (e.g. SJ-90-13, SJ-98-26A, SJ-98-31) have a very high backed index (more than 80%), but at Site-98-26 it reaches only 16.6%. Backing is preferentially obverse, while only a few examples exhibit inverse backing generally obtained with abrupt deep retouch. The recorded geometric microliths are exclusively crescent-shaped products, and in a limited quantity within the various assemblages. The manufacture is quite accurate with a prevailing use of *sur enclume* pressure retouch. Notches and denticulates, if on one hand represent a relatively amorphous group, in some of the assemblages are one of the most numerous classes (up to more than 20%).

Ain Shakshuk

One more settlement area has been identified at the foothills of the Jebel, near the modern town of Shakshuk. The area is located between the Gefara plain and the alluvial fan belt. It shows a lower terrace as well as aeolian sediments. The aeolian deposit presently appears deeply cut by gullies that probably developed during the second half of the Holocene. Shakshuk is next to a series of perennial water sources springing from the bedrock with such a considerable flow that they can sustain extensive cultivations of palm trees. The geological setting and the characteristics of water-bearing strata in the area between the Jebel Gharbi and the Gefara plain (Kruseman & Floeghel 1980; Singh 1980), show that such water sources in the bedrock could be connected to subterranean waters fed hundreds of kilometres south of the Jebel Gharbi.

Site SJ-00-56, which has been discovered near one of the above mentioned areas of water deposits, seems very interesting. Being located near a permanent spring, close to the Sel river mouth, in view of the Gefara plain, the site must have benefited from a very favourable microclimate. The destination of the site hasn't been completely understood, so far. It could have been a hunting camp-site with abundant stone implements, fauna and charcoal remains. However, the great amount of debris collected from the relatively small area of the excavation, and the almost unique presence of debitage products among the lithic artefacts, could indicate a specialized use of the site as a workshop. In the faunal remains, an equid, probably a wild ass, seems to dominate. Regarding this fact, it seems noteworthy that in Haua, both in the early and the late Eastern Oranian layers, equids are among the most represented species together with *Ammotragus*, gazelle, hartebeest and bovids.

Site SJ-00-56 has revealed quite an important stratification belonging to a single phase of occupation. The soil is made up of very dark organic sediments containing a large quantity of charcoals and ashes. A sample collected from the soil gave the date of $16,750 \pm 60$ bp. All the collected materials belong to a clear Epipalaeolithic horizon: the blade index is very high and the microliths (i.e. little cores, blades, bladelets), which are numerous, are especially made of chert. On the other hand larger artefacts are made of quartzitic sandstone or sandstone.

Neolithic documents in the Gefara

The question of the neolithization of the Libyan coast belt hasn't been well investigated yet, and this is where the future efforts of the Jebel Gharbi mission are being directed. Even in the case of the neolithization the Haua Fteah Cave is to us a most certain testimony and a starting point for interpretation. The layers from VIII to VII of the above mentioned sequence testify for a shift towards a Neolithic tradition dating back to between 6800 and 4800 bp. This tradition shows traits of pottery technology and lithic industry that have been related to the Neolithic of Capsian Tradition (McBurney 1967) which is also well-known in the western region of Algeria. Nonetheless the above attribution must be confirmed, because the very same presence of a Capsian tradition within Haua stratigraphy has been questioned. In fact scholars have interpreted it as a local development of the Iberomaurusian Epipalaeolithic tradition.

Anyway, even accepting the idea of continuity in the territory occupation, there are still many elements to explain. A major one is the remarkable transformation of the economic pattern, which, at Haua Fteah, testifies the presence of domestic sheep, goat and probably cattle, all of which are intrusive elements in that area. All things considered, an update of the data about the Neolithic of northern Libya is strictly necessary. Under this respect, the

hypothesis of cultural exchange, along the northern coast, formulated by McBurney (McBurney & Hey 1955: 268), and recently reaffirmed by Barker (2003: 151-62), needs to be evaluated together with the hypothesis of possible interactions with the Neolithic contexts of Merimde and Fayum, which were the first cultures in North Africa to know the Asian domesticated prototypes. Let us not forget that McBurney precisely compared various ceramics appearing at Haaq Fteah and those illustrated by Caton Thompson (Caton Thompson & Gardner 1934) for the Fayum A culture.

During the last field campaigns in the Jebel Gharbi, several deposits from the Holocene have been surveyed close to the southern boundaries of the Gefara plain, not far from the Plateau slopes where the analysis of satellite images had pointed out the presence of water deposits, sometimes associated with 'playa' fossil mud formations. One of these water reservoirs is the Uadi Basina, which flows near the Jebel foot and shows several terraces. On top of the highest one there are many dune formations covering Neolithic deposits that embed remains of hut foundations, grinding stones and ostrich egg-shell sherds. Apart from grinding stones, which show the presence of plant exploitation practices, many other tools found seem not to have a clear functional purpose. Site SJ-03-83 is a plain area of about 65,000 square meters within which twenty-five fireplaces associated with lithic artefacts have been found. No charcoals have been collected, but at the moment a C14 dating is being carried out on the ostrich egg-sherds.

There are two other types of documents that can be associated with the late Neolithic occupation: the tumulus structures, which allow us to establish a connection with the Mediterranean Europe, and the many specimens of rock art, known both in the Tarhuna and in the Nalut regions. The best known sites are Ataf Ben Dalala (Jelinek 1977-82) and Abiar Miggi (Jelinek 1982; Neuville 1956). Other rock art engravings, still unpublished, have been identified by means of the surveys carried out during our field campaign in El Auenia (the Roman town known as Auro) and during the one on the hill slopes near the town of Nalut. Some of these images, mostly engraved on the upper part of calcareous blocks, show animal-like subjects which can be easily associated to the pastoral Neolithic, whereas others could be related to an even older occupation.

The C14 results obtained from Uadi Basina and from Shakshuk (Tab. 1) show that the Neolithic horizon of this Jebel area spanned from 7000 to 5000 radiocarbon years bp. At El Aouitia, not far from Sabratha, a Holocene horizon has been pinpointed under aeolian deposits. Several areas of the Gefara are indeed characterized by the presence of mobile dunes which took shape during the dry intervals of the Middle and Late Holocene. The same phenomenon has been observed in the region located west of Bir Ghanam, where the valley, which was a likely setting for Neolithic occupations, appears filled with aeolian sands.

The formation of such sands is to be related to the Jebel Gharbi last known arid oscillation. This phase has been first acknowledged by Giraudi (2005) and it spans from the late Holocene up to the Roman age. Both the surface sand deposits and the scattered traces of occupation during the aridity period could explain the difficulty our team has come across in finding out the Holocene occupation. It has appeared, indeed, that the economic model that developed then, suitable for an arid climate, was mainly of pastoral type. Nonetheless several Egyptian sources make us think that the breeding of animals was sided by the cultivation of cereals and grain (Mitchell 2005: 56). A correct evaluation of the role played by the botanic species of that area allows us to imagine the type of world the Romans came in touch with.

Seemingly the Neolithic of the northern Libyan area was mainly agropastoral. Its sites were scattered between the Gefara plain, where base-camps and cultivations were located, and the valleys within the plateau where animals grazed. There must have been some seasonal kind of exchange along occasional paths that later became established routes along the most important rivers: the Ain Zargha, the Uadi Sel, the Basina and the Uadi Ghan.

Conclusions

The Epipalaeolithic occupation of Jebel Gharbi was based on hunting and on the exploitation of plants. It took place between two arid periods, namely the second and third phase out of the four recognized by Giraudi in his paleoclimatic reconstruction (Giraudi 2005). In particular the third phase, after 13,000 years ago and in relation with the *Younger Dryas*, might have caused the rarefaction of the occupation, forcing it within the limits of areas in which water sources could be found (i.e. Shakshuk and Josh). As a result of this fact, the following agropastoral Neolithic occupation doesn't show any connection with the previous settlement pattern at the moment; on the contrary it shows innovative traits – pottery and domesticates – which require further investigation.

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Elena A. A. Garcea and Carlo Giraudi¹

Earthquakes and Tectonic Dynamics Favouring Late Pleistocene Human Settlements in the Jebel Gharbi, Libya

Introduction

The Jebel Gharbi (also known as Jebel Nafusah) is located in the northern part of the Tripolitanian plateau, 60 km from the Mediterranean coast at Gharyan to the east, and 135 km at Nalut to the west. A series of water courses drain from the jebel toward the Jefara plain to the north. The two largest ones are the Wadi Ghan to the east, and the Wadi Ain Zargha in the middle part of the jebel.

Some information on the archaeology on the mountain range is available since the 1940s, thanks to the archaeo-geological investigations by McBurney and Hey (1955), who concentrated their fieldwork in the Wadi Ghan. Since the early 1990s, the Italian-Libyan Archaeological Project, has started a new research plan aiming at reconstructing sedimentary and anthropic sequences, and studying their interrelations (Barich 1995; Barich et al. 1995; 1996; 2003a; 2003b; in press a; in press b; Barich and Giraudi in press). Among the various members of the project, one of the present authors, Elena Garcea, is responsible of the early prehistory, and the other, Carlo Giraudi, is in charge of the geomorphology and geoarchaeology of the study area.

Our fieldwork combines geoarchaeological and site surveys with systematic artefact collections and test excavations. Research has concentrated on the eastern and central parts of the mountain range, in the Wadi Ghan and Wadi Ain Zargha respectively, and has recently extended to the foot of the northern scarp of the mountain, around the area of the modern village of Shakshuk and its

¹ C. Giraudi wrote the paragraphs on Geology, E.A.A. Garcea wrote the Introduction and the paragraphs on Prehistory, and the two authors together wrote the Concluding remarks.

surroundings, where a series of water springs appear. The Shakshuk area proved to be particularly rich in prehistoric sites and Upper Pleistocene geomorphological features (cf. Barich et al. in press a; Garcea 2004; in press). Furthermore, we identified clear sets of evidence of active tectonic faults capable to produce ground displacement during earthquakes; the faults and related fracture field also act as a preferential underground drainage network and feed some water springs which can still sustain the human settlement system of the area. This allowed us to extend the geomorphological framework of Shakshuk to other parts of the mountain range, where evidence of faults and water springs exists, but could not be interpreted within such a detailed scheme connecting geological events and human adaptations.

This paper aims at presenting two major results of our research. The first is to demonstrate that there were strong earthquakes and serious tectonic dynamics during the late Upper Pleistocene in the Jebel Gharbi, and the second is to show how these events created the conditions that favoured human occupation by Aterian and Later Stone Age/Upper Palaeolithic populations.

1. Wadi Ghan

1a. Geology

The first study area was located in the upper Wadi Ghan valley, in the central-eastern side of the jebel, around 550 m a.s.l., east of the modern town of Gharyan (Figs. 1, 2).

Some very clear alluvial terraces, covered by loess, appear at different heights from the bottom of the valley (McBurney & Hey 1955; Giraudi 1995; Barich et al. 1996). MSA artefacts were found on the higher alluvial terrace, formed by boulders and gravel in a sandy matrix (Fig. 3a). Therefore the terrace predates such artefacts. The second terrace is mainly formed by alluvial boulders and gravel in a silty sandy matrix containing MSA artefacts, and is covered by a thick calcrete horizon, also containing MSA artefacts. A series of aeolian sediments, heteropic with the alluvial ones, lie on the calcrete: the sequence starts with a reddish aeolian sand covered by loess formed by silt, containing Aterian and LSA artefacts. A thin, discontinuous calcrete layer is interbedded.

A second aeolian sandy layer, light-pink in colour, overlies the loess and is covered by a later loess deposit containing Epipalaeolithic/Iberomaurusian artefacts.

A lower terrace consists of alluvial silty sand and includes a thin grey charcoal-bearing layer. The charcoal has been radiocarbon dated to $11,110 \pm 40$ (Beta-157690/13,180 to 12,980 and 12,940 to 12,910 Cal BP).

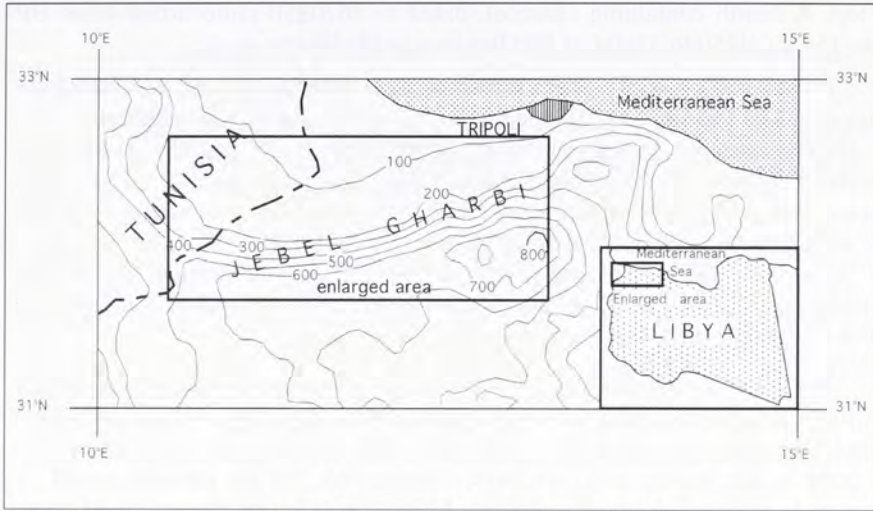


Fig. 1. Map of the study area.

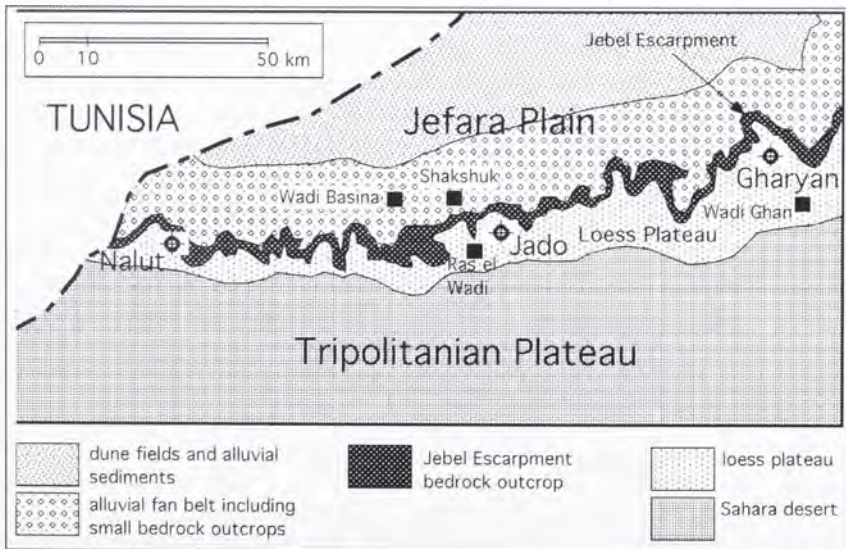


Fig. 2. Main morphological and geological features of the Jebel Gharbi.

The lowermost terrace is made of alluvial sandy gravel becoming sandy at the top. A hearth containing charcoal, dated to 3670 ± 50 radiocarbon years BP (Beta-154550/4150 to 3860 Cal BP) lies interbedded in the sand.

In the middle Wadi Ghan, tectonic faults were active during the Upper Pleistocene. In this area, magma ascended along the faults and outpoured lava. An alluvial deposit containing some generalised Early Middle Stone Age materials comprises two interbedded lava flows. The faults are 120° , 130° , 150° directed, that is, the same direction of the Hun Graben fault system that produced very strong earthquakes and surficial faulting in 1935 (Capitanio et al. in prep.). The activity of the fault system of the Hun Graben is marked by several earthquakes registered in its northernmost sector, with high energy release up to $MW = 7.1$ (Ambraseys 1984; Suleiman & Dosers 1995).

The numerous faults and fractures in the area opened aquifers by fissure into the impermeable bed: rain water could filter into the fissures and drain toward the springs. Climatic shifts strongly affect this type of water springs: in dry periods, the spring may not have disappeared, but its capacity could be consistently reduced. Alluvial sediments filling the valley or erosion could move upstream or downstream the position or the water outsprings between a few tens and a few hundreds of metres. Human settlements are situated both upstream and downstream of the present location of the springs.

1b. Prehistory

As the deposit in the middle Wadi Ghan with lava flows contain rolled Early Middle Stone Age artefacts, they accumulated after the deposition of the Early Middle Stone Age archaeological material and before the Aterian, which appears on top of the sediments with interbedded lava flows. Aterian occupations can be dated to an age $< 100,000$ years (cf. Garcea 2004; Barich et al. in press a). As noted before, Later Stone Age materials lay in a soil above this series.

Four Aterian sites were identified in the Wadi Ghan, SG-99-40, SG-99-41, SG-99-46, and SG-00-61. They are located along the banks of the wadi and are included in colluvial sediments. Two surface collections were performed, respectively at Site SG-99-41 ($32^\circ 03' 23'' N / 13^\circ 04' 41.1'' E$) and Site SG-00-61 ($32^\circ 04' 25.7'' N / 13^\circ 05' 43.6'' E$). Near the former, a few Later Stone Age artefacts could be recognised.

2. Ain Zargha (Ras el Wadi)

2a. Geology

Some stratigraphic series, containing alluvial, colluvial and aeolian sediments with interbedded artefacts of various cultural phases, were found on a

slope incised by gullies near Ain Zargha (Giraudi 1995; Barich et al. 1996; 2003a; 2003b).

The stratigraphy of Ras el Wadi, near the modern town of Jado, has been deduced from the exposures and can be divided into two units (Fig. 3b):

- The lower unit is formed by calcretes, alluvial deposits, a soil and a layer made of colluvial and loess sediments: some MSA artefacts were found in this unit; a layer of reddish aeolian sand lies at the top.

- The upper unit consists of a lower colluvial silt and loess layer pedogenized at the top, including a thin, discontinuous calcrete, which developed during the pedogenesis and was dated $27,310 \pm 320$ radiocarbon years BP and $30,000 \pm 9000$ years BP with the U/Th method (Barich & Giraudi in press); the silt deposits are heteropic with the first loess observed on the nearby plateau. Aterian artefacts underlie the calcrete, while LSA artefacts were collected above the calcareous crust and on the soil. The soil with LSA artefacts underlies the upper colluvial silt and loess layer; these sediments are heteropic with the younger loess observed on the nearby plateau: both of them were pedogenized and the calcrete on the loess, which developed during pedogenesis, was dated to $18,020 \pm 190$ years BP by the radiocarbon method (Beta-154575/21,610 to 20,090 Cal BP). The younger aeolian reddish sand layer, which is the last sediment exposed by later gulling, lies on this soil.

The spring of the Wadi Ain Zargha, near Ras el Wadi, is connected with a weak outlet of an aquifer layer included in the bed. The aquifer was fed far away, south of the jebel. As percolation rates were quite slow and regular, it is very much likely that climatic changes did not affect this spring flow. The human settlements are located just upstream of the spring of the wadi.

2b. Prehistory

Early Middle Stone Age, Aterian and Later Stone Age artefacts were found inside the Ras el Wadi sedimentary sequence. Five Aterian sites were located in this area which surrounds the water spring of Ras el Wadi (Barich et al. in press b). Surface collections were made at two of them, SJ-98-27A ($31^{\circ}55'03.6''\text{N}/12^{\circ}00'08.1''\text{E}$) (cf. Barich et al. 2003a; 2003b; Garcea 2004) and SJ-98-28 ($31^{\circ}55'08''\text{N}/12^{\circ}00'10''\text{E}$). The latter evidenced a remarkable concentration of Aterian artefacts. The density of artefacts indicated an average of 10 flaked pieces per square metre. It is likely that this distribution resulted from strong deflation activities, which removed the fine sediment and left the heavy stone pieces on the spot. The fresh and unweathered condition suggested that no post-depositional rolling occurred. Therefore, although vertical movements repositioned the artefacts, no important horizontal displacement must have taken place.

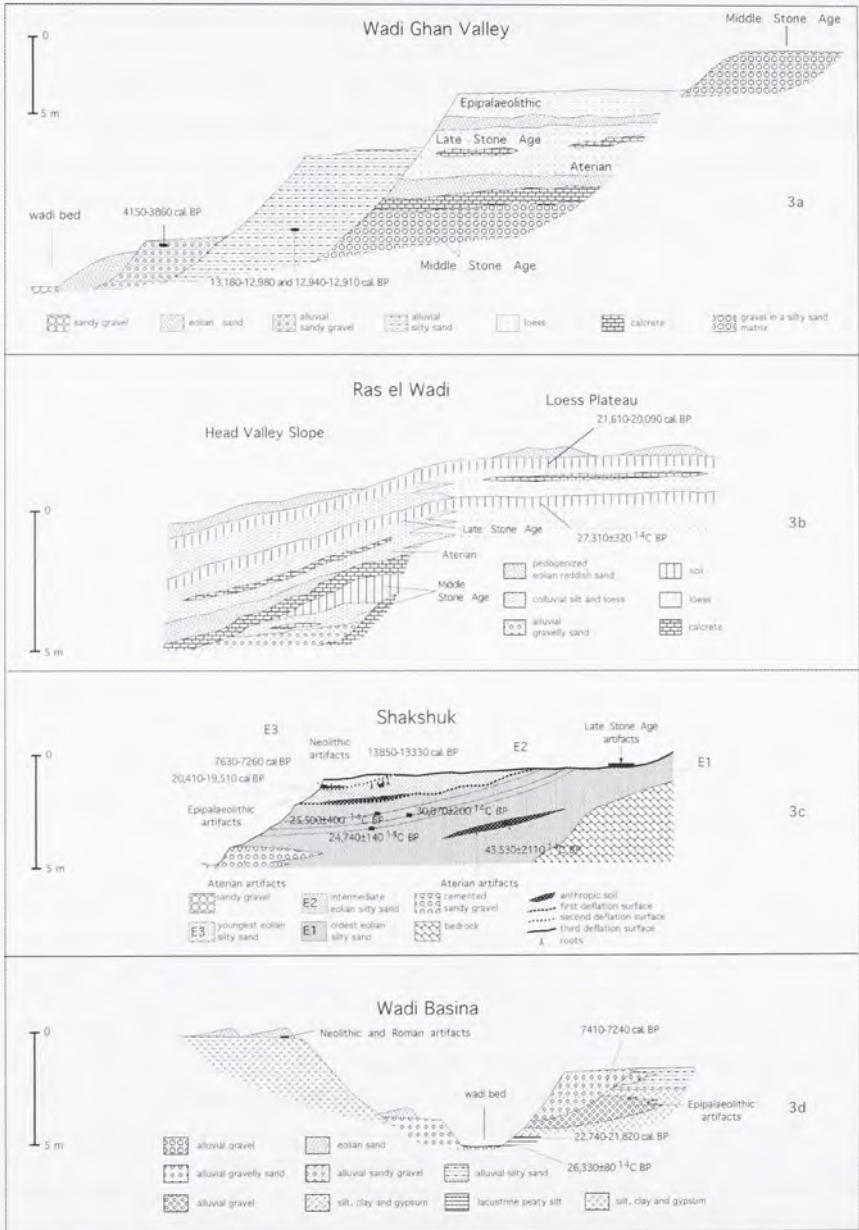


Fig. 3. Quaternary stratigraphies at the Wadi Ghan, Ras el Wadi, Shakshuk, and Wadi Basina.



Fig. 4. Retouched tools from Site SJ-98-27A: 1-2. Levallois cores; 3. Retouched Levallois flake; 4. Limace; 5. Tranchet.

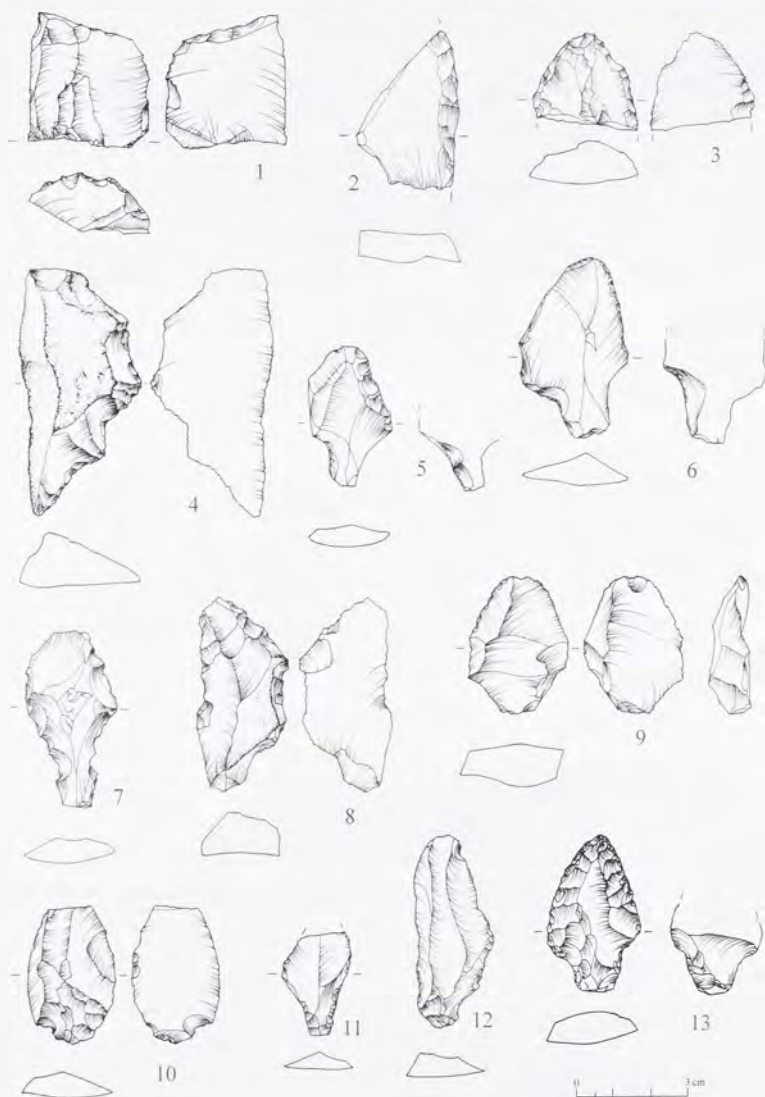


Fig. 5: 1. Retouched tools from Site SJ-98-27A: Truncation; 2. Simple straight sidescraper; 3. Convergent sidescraper; 4. Denticulated flake; 5. Tanged sidescraper on a Levallois flake; 6. Tanged retouched Levallois flake; 7. Tanged denticulate on a Levallois flake; 8. Tanged denticulated flake; 9. Tanged flake; 10-11. Broken tanged points; 12. Tanged denticulate on a Levallois blade; 13. Tanged point.

Most of the assemblage was made of different types of flint (grey-whitish, grey, pale yellow, red, banded, translucent brown-grey). Such a variety of flints seems to be a peculiar feature of Ain Zargha and does not occur in other areas of the Jebel Gharbi. On the other hand, quartzite was occasionally exploited and limestone was rarely used.

Nodules of grey-whitish flint are the only locally available type of flint as they erode out of the limestone beds. The main sources for raw material exploitation are not located in the central part, but in the western mountain range (cf. Mrazek & Svoboda 1986). Brown and red flints have their main source in the Nalut Formation. Thus, it is likely that various groups from different parts of the jebel often visited this area.

The tool-kit of Site SJ-98-28 is very similar to that of Site SJ-98-27A, in the same area (Figs. 4, 5). It mainly comprises sidescrapers, notched and denticulated flakes, endscrapers, and tanged tools. Tanged pieces are often small, denticulated or with a continuous retouch. Some of them are only retouched on the tang.

The Ras el Wadi area also yielded a Later Stone Age/Upper Palaeolithic site, SJ-90-12 (31°55'08"N/12°00'23"E). The artefacts were included in a paleosol that can be referred to the same soil identified in the sedimentary sequence mentioned before. As we said, it postdates a calcareous crust dated 27,310±320 BP (Beta-154576).

3. Ain Shakshuk

3a. Geology

Ain Shakshuk is a small water spring in the modern village of Shakshuk, near a number of perennial springs, in the Jefara plain. It is part of a series of springs elongated between the Wadi Sel, to the west, and the Ain Soda spring, to the east. These springs rise at the intersection of the described faults. Also in this case, they opened aquifers by fissure into the impermeable bed, as the surrounding area is mainly made of alluvial, porous, permeable sediments on the bedrock, it is likely that the fissures also drain the ground water that pours in permeable sediments during precipitations. Climatic shifts may influence the capacity of these springs, even though it is unlikely that they can dry during arid times; the intersections between the faults that drain water from quite extended underground areas are able to guarantee a certain input of water.

The Wadi Sel is a small wadi draining from the Jebel Gharbi into the Jefara, a few hundred meters from Ain Shakshuk. An exposure on the right bank of this wadi shows aeolian sediments with interbedded archaeological materials.

Because of the presence of water table and capillary flow, the sediments are moist up to a few centimeters below ground level and deflation is not active.

We could observe three stratigraphic units in this area (Fig. 3c). The oldest one is of silty sand, aeolian in origin, heteropic at the bottom with cemented sandy gravel and alluvial sediments containing Aterian artefacts. A dark-grey anthropic soil with Aterian artefacts is interbedded in this unit. A number of thin charcoal-bearing aeolian layers appear towards the top. The soil was dated $43,530 \pm 2,110$ radiocarbon years BP (Beta-167098) while the charcoal horizons with a Later Stone Age artifact are $24,740 \pm 140$, $30,870 \pm 200$, and $25,500 \pm 400$ radiocarbon years old (Beta-157687; Beta-157688; Beta-167099).

The top of the first unit is formed by a nearly flat or undulating surface also evidenced by stone lines and remnants of an archaeological soil containing Epipalaeolithic artefacts dated to $16,750 \pm 60$ years BP (Beta-157689; $20,140-19,510$ cal BP). This surface is very similar to the present one and was produced by deflation after $24,740 \pm 140$ years BP.

The intermediate unit is formed by silty sand, aeolian in origin, which covers the deflation surface and is younger than $16,750 \pm 60$ radiocarbon years BP. The youngest unit is also formed of silty sand, and covers an archaeological soil containing Neolithic artefacts.

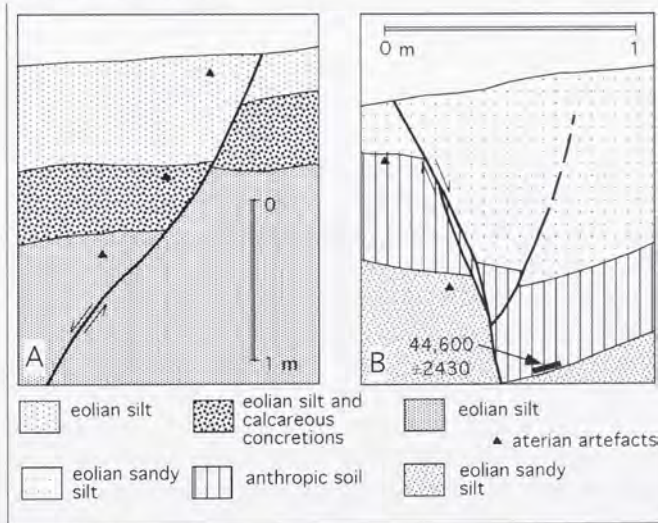


Fig. 6. Faults displacing late Pleistocene sediments near Shakshuk. A: direction 60° ; B: direction 125° .

At the Wadi Sel, some faults appear with directions 68° and 125° (Fig. 6). The faults were active during the late Upper Pleistocene as they displaced a

paleosol dated $43,530 \pm 2,110$ and $44,600 \pm 2,430$ years BP. The displacement of the soil occurred during one or more high magnitude earthquakes linked to the north-western boundary of the Hun Graben fault system (Capitanio et al. in prep.). The activity of the fault system of the Hun Graben is marked by several earthquakes registered in its northernmost sector, with high energy release up to $MW = 7.1$ (Ambraseys 1984; Suleiman & Dosers 1995).

3b. Prehistory

A test excavation was dug on the right bank of the Wadi Sel, at about 5 m from the bottom of the wadi, at Site SJ-02-68 ($32^{\circ}00'55''N/11^{\circ}57'07''E$). It brought to light a sequence with: (1) a layer with charcoal, corresponding to the Epipalaeolithic site (SJ-00-56) excavated near-by (Barich & Lucarini, this volume), (2) a sandy layer with an endscraper reworked on a Mousterian core and a crested bladelet, (3) a layer with charcoal and ashes, which included a Levallois flake, and (4) a sandy layer with several artefacts, including a denticulated truncation. Layer 3 evidenced a fault caused by the seismic activity mentioned above (Fig. 6b). It was dated to $44,600 \pm 2,430$ BP (Beta-167097). The artefacts in Layers 3 and 4 can be attributed to the Aterian. They correspond to two different phases of occupation of the site within the Aterian horizon, which preceded the faulting and tectonic activities. Layer 2 may be associated with a Later Stone Age/Upper Palaeolithic settlement of the site.

The Shakshuk deposit with archaeological artefacts consists of a sequence with Early Middle Stone Age, Aterian, and Later Stone Age artefacts, respectively in the lower, middle, and upper parts of an aeolian deposit.

Another test pit was excavated at Ain Shakshuk West, Site SJ-00-55 Test 2 ($32^{\circ}01'05.9''N/11^{\circ}57'10.7''E$). The upper part (0/-50 cm) of the deposit comprised a sequence of alternating aeolian and ashy layers with some charcoal and no archaeological artefacts. The lower part of the sequence (-50/-90 cm) was formed by layers of light brown clay, alternated to thin ashy lenses. One elongated blade appeared 55 cm below the present surface. An AMS dating analysis gave a radiocarbon age for this layer at $30,870 \pm 200$ years BP (Beta-157688), but it is possible that the blade is in secondary position. In fact, the regular series of alternating aeolian and ashy layers with a very fine matrix and no archaeological artefacts or coarse gravel suggest that deflation redeposited only fine and light sediments. A younger age of $24,740 \pm 140$ years BP (AMS analysis: Beta-157687) for the lowest part of the formation supports this hypothesis. Even though there is an inversion in the chronological sequence with older sediments above earlier ones, we can still infer that the Later Stone Age developed from the period between 30,000 and 24,000 years ago.

A further sondage was excavated in the area of Ain Shakshuk West, at Site SJ-00-56 Extension 2 (32°00'59"N/11°57'07"E). It uncovered a stratigraphic sequence with a Pleistocene formation including, on top, some intrusive Epipalaeolithic industry, and, at -150 cm below the surface, a few late Aterian artefacts, including a backed cortical flake and a Levallois flake. This sequence is similar to the previous one excavated in the Wadi Sel, near Shakshuk, although it is less characterised.

4. Wadi Basina

4a. Geology

The Wadi Basina is located about 10 km west from Shakshuk. Three terraces have been found along the Wadi Basina banks, in the Jefara alluvial plain (Figs. 2, 3d). The exposure produced by lateral erosions of the wadi shows a series of sediments pertaining to a small playa. The older ones are formed by silt, clay and gypsum, evaporitic in origin, and form the first terrace. A lacustrine peaty silt lies at the base of the deposit on the second terrace. It was radiocarbon dated 26,330±80 years BP (Beta-154555) at the bottom and 18,760±50 BP BP (Beta-154554/22,740-21,820 Cal BP) near the top. These deposits underlie sandy silt, clay and gypsum sediments in which a body of alluvial gravel, containing Epipalaeolithic artefacts, is interbedded. The younger deposits forming the terraces are made of alluvial sandy gravel.

The third terrace is made of alluvial gravelly sand. Small dunes covering Neolithic and Roman (I - III centuries AD) pottery lie at the top of both the older and the younger terraces.

The Wadi Basina has small springs connected with the outlet of water from phreatic zones where the permeable sediments of the alluvial fans become thin and overlap with impermeable, evaporitic sediments. As the alternating fresh water and evaporitic sediments show in the adjacent playa, the shift in the carrying capacity of the springs must have been quite considerable in the course of the time. The drainage basin of the phreatic zone corresponds to the catchment of the Wadi Basina. Therefore, the precipitations on the Jebel Gharbi and on its northern side have strongly affected the spring flows.

4b. Prehistory

A water spring appears in the upper course of the Wadi Basina. There are some Aterian artefacts in the area surrounding the spring. They are scattered on a stone pavement formed by strong deflation on the higher terrace.

Concluding remarks

To conclude, we can note that the seismic activity attested to in the Upper Pleistocene is still related to present-day events. In fact, during the 1930s and

before, there were strong earthquakes in the desert, a few tens of kilometres south-east of Gharyan, in the eastern part of the Jebel Gharbi, which produced a faulting activity along the faults that are part of the same tectonic system that we described for the late Upper Pleistocene. Near Gharyan, two water springs with drinkable water had been located at Caf-Tobbi and at Mimun, as early as the first archaeological explorations (Fabbri & Winorath-Scott 1965).

A particularly interesting and unique aspect regarding the adaptational dynamics to the environment of the Jebel Gharbi came to light during our recent fieldwork. Beginning from the late Upper Pleistocene, tectonic faults produced a number of earthquakes of high magnitude. The geomorphology of this mountain range attracted human populations and favoured their settlements, as it could offer a series of fresh water springs. Outlets of underground aquifers could flow through the fissures created by tectonic faults.

To sum up, in the Wadi Ghan, the existence of lava flows with rolled Early Middle Stone Age materials below the deposit with Aterian industries indicates that a chronological hiatus separated the two cultural complexes. Precipitations still feed water springs through the fissures and, consequently, depend on the local climatic conditions that can increase the springs in humid periods and reduce them in dry times. Therefore, it is not surprising that Aterian, and even more so, Later Stone Age sites are not as frequent as in the central part of the Jebel Gharbi.

By contrast, at Ras el Wadi in the Wadi Ain Zargha, an aquifer, located south of the jebel, regularly fed the outlet of the water spring, assuring water resources even during dry times. Human settlements are concentrated upstream of the spring and the variety of flints used for lithic industries suggests that various groups from different parts of the jebel visited and settled in the area.

Moving down the jebel, in the Jefara, the series of water springs comprised between Wadi Sel and Ain Soda, in the Shakshuk area, shows that precipitations may have increased their flows, but the numerous intersections of the fault system guaranteed the outlet of underground water even in arid periods. Aterian sites are numerous and well-documented in this area. They exhibit two stratigraphically different horizons that precede a Later Stone Age phase, including typical Aterian and later, still Aterian, complexes.

The geomorphology of the Wadi Basina was not favourable to human settlements in the Upper Pleistocene. There are small water springs that depend on rainfall and probably dried during arid times, until the final Pleistocene, when a lacustrine sediment formed between 26,000 and 18,000 years ago. Few Aterian artefacts are scattered on a stone pavement indicating deflation activities before the formation of the lacustrine horizon.

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Friederike Jesse

Pastoral Groups in the Southern Libyan Desert: The Handessi Horizon (c. 2400 – 1100 BC)

Introduction

The southern Libyan Desert has long been an archaeological no-man's land. Research started rather late: the first expeditions crossed the region and reported archaeological finds only in the 1920s and 1930s (Hinkel 1979). Early on, however, it was noted that the pottery found by the "11. Deutsch-Innerafrikanische Forschungs-Expedition, DIAFE XI", led by Leo Frobenius and Hans Rhotert on the north bench of Wadi Howar in 1933, was similar to the pottery of the Nubian C-Group (Hölscher 1955: 55).

Intensive fieldwork only started in 1980, when the University of Cologne began its B.O.S. ("Besiedlungsgeschichte der Ost-Sahara") research project, followed, since 1995, by the interdisciplinary ACACIA ("Arid Climate, Adaptation and Cultural Innovation in Africa") project (Kuper 1981, 1986, 1988, 1995; Richter 1989; Schuck 1989; Keding 1997, 1998, 2000, 1998-2002; Hoelzmann et al. 2001; Jesse 2003, 2005; Jesse et al. 2004; Lange 2005). More than 2400 archaeological sites are now known in the southern Libyan Desert (Fig. 1). As a result of this research, it has been possible to establish a cultural sequence beginning in the 6th millennium BC (Keding 1998; Hoelzmann et al. 2001; Keding & Vogelsang 2001; Jesse 2004). The final cultural horizon, starting at the end of the 3rd millennium BC, was simply called the „Geometric Pottery Horizon“ after the typical geometric patterns used to decorate the vessels. Birgit Keding distinguished two chronological phases based on differences in the pottery styles: they were called, provisionally, „fine geometric“ and „coarse geometric“ (Keding 1998: 10). New research under the aegis of the ACACIA project (Jesse et al. 2004; Lange this volume) clearly indicates that the pottery was subject to regional differentiation within a wider northeast African technocomplex of the 3rd

and 2nd millennia BC that is characterised by geometric patterns (cf. Manzo 1999). To better account for these regional differences in the southern Libyan Desert – and because the term „Geometric Pottery Horizon” was always considered as only provisional – the name „Handessi Horizon” is now proposed: „Handessi” (hándasijj) is an Arabic word for „geometric”. The term Handessi A would therefore replace the former „fine geometric” pottery horizon; Handessi B the former „coarse geometric” pottery horizon. The main features of this regional cultural complex are outlined below.

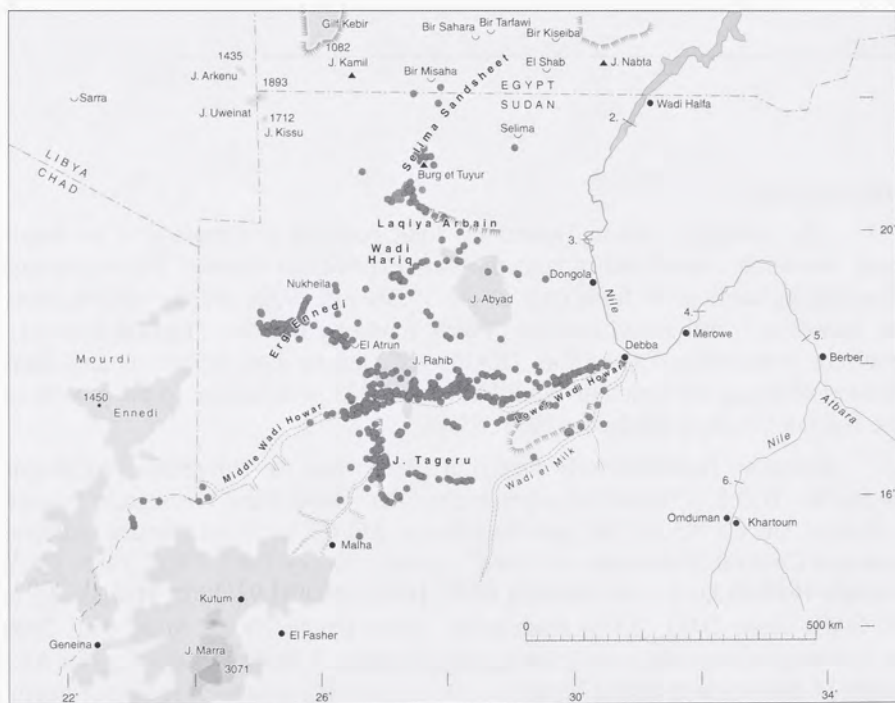


Fig. 1. The southern Libyan Desert with the sites discovered by the Cologne research projects B.O.S. and ACACIA.

The ecological background

The 3rd and 2nd millennia BC were marked by increasing aridity in the whole region but a Sahelic type of vegetation (*Acacia* desert scrub and thorn savannah) still persisted (Neumann 1989: 146-150) and allowed human settle-

ment in areas like the Laqiya region, Wadi Hariq and Middle Wadi Howar. Tundub (*Capparis decidua*), *Acacia* sp., *Tamarix* sp., *Maerua crassifolia* and a few remains of *Salvadora persica*, cf. *Grewia tenax* and *Boscia* cf. *senegalensis* were identified among the charcoal samples from the Laqiya region (Neumann 1989: 134-135). In Wadi Hariq, charcoal samples attributable to that period only allowed the identification of *Acacia* sp. and *Tamarix* sp. (Jesse et al. 2004). In Lower Wadi Howar, there were also *Acacia* sp., *Tamarix* sp. and single examples of *Capparaceae* and *Ziziphus* sp.

The bones of various wild (e.g. giraffe, gazelles, addax, wild ass) and domestic (cattle, sheep, goat, donkey and dog) species have been identified (Van Neer & Uerpmann 1989; Berke 2001; Jesse et al. 2004; Pöllath this volume). Whereas in the Laqiya region wells already had to be dug at around 2000 BC (Francke 1986a: 138), temporary pools of water still existed in Middle Wadi Howar. Fishing in shallow water is attested for the Djabarona area in the 2nd millennium BC (Peters et al. 2002).

Handessi Horizon sites – geographical distribution and layout

Handessi pottery has so far been found on nearly 400 sites. These are concentrated in areas that are still ecologically favourable: Middle Wadi Howar, Jebel Tageru and the valley systems of Wadi Hariq as well as the Laqiya region (Fig. 1). Middle Wadi Howar, in particular, must have been densely populated as can be seen from the large number of sites in this area (Keding 2004: 104). They are mainly found on the banks and, especially, in the wadi bed (Keding 1997: 37). Most of the Handessi Horizon sites are known from survey reports; excavations have been carried out at about 20 sites in the Laqiya region (Camp 49; Francke 1986a and b), Middle Wadi Howar (Djabarona 84/1, 84/4, 84/19, 96/2, 96/3, 96/5, 96/119 and 96/120; Günther 1995; Keding 1997, 1998-2002; Prill 2000) and Wadi Hariq (Wadi Hariq 97/5, 97/7, 01/1 and 01/4; Jesse et al. 2004; Lange this volume).

The sites differ in shape but they all have a more or less dense scatter of archaeological material on the surface: concentrations of bones and/or pottery are visible, and concentrations of lithics can often be interpreted as knapping areas. Excavation revealed features such as hearths, but no traces of post holes or other kinds of dwelling were found (Keding 1997: 38; Jesse et al. 2004). In the Laqiya area, at Camp 49 (Wadi Shaw 82/31), excavation revealed stratigraphic sequences of about 60 cm or more. Several hearths, indicated by ash lenses, were found during the excavations. The repeated use of this site over at least 200 years is confirmed by radiocarbon dates (Francke 1986a: 137-138; Francke 1986b: 18-20) (Tab. 1). A large well was dug at Camp 49 (Wadi Shaw 82/30) at around 2000 BC (Schuck 2002: 253) (Tab. 1) and rectangular stone structures nearby

have been interpreted as watering places for the animals (Francke 1986b: 16; Schuck 1989: 427). Smaller sites, such as a pottery concentration at Djabarona 96/2, represent special purpose sites; in this case an interpretation as a vessel depot, probably used for the storage of food, is favoured (Prill 2000).

Table 1: The radiocarbon dates of the Handessi Horizon.

The dates were calibrated using CALPAL (Cologne Radiocarbon Calibration & Palaeoclimate Research Package), Version 2004, by Bernhard Weninger, Olaf Jöris and Uwe Danzeglocke, Radiocarbon Laboratory, University of Cologne).

Site	Material	Lab.No.	14C-years bp	Years cal BC	Context
Djabarona 84/1	bone	KN-3523	3250±60	1530±70	
Djabarona 84/4-1	bone	KN-3962	3130±250	1370±310	grave
Djabarona 96/2	pottery	UtC-9882	3760±41	2170±80	
	pottery	UtC-9883	3779±41	2210±60	
	pottery	UtC-9886	3700±50	2090±70	
	bone	UtC-9887	3668±42	2050±70	
Djabarona 96/3*	pottery	UtC-9885	3339±40	1610±60	
Djabarona 96/5-2	bone	KIA-12419	3335±300	1650±390	cattle
Djabarona 96/119	bone	UtC-5941	3320±60	1600±70	
	charcoal	UtC-5942	3294±38	1580±50	
Djabarona 96/119-10	pottery	UtC-9884	3496±41	1820±60	
Wadi Hariq 97/5-11	bone	KN-5318	3560±150	1920±200	donkey
Wadi Hariq 97/7-1	charcoal	KN-5327	3675±40	2060±70	hearth
	charcoal	KN-5447	3785±40	2220±60	hearth
Wadi Hariq 01/1-1	faeces	KIA-17543	3385±25	1690±40	hearth
	charcoal	KIA-17510	3355±25	1640±40	hearth
Wadi Hariq 01/4-1	charcoal	KIA-17508**	3430±25	1720±30	hearth
Wadi Shaw 82/29-3	charcoal	KN-3411	3700±50	2090±70	hearth
Wadi Shaw 82/29-11	charcoal	KN-4281	3970±90	2470±140	
Wadi Shaw 82/30	charcoal	KN-4327	3620±70	1990±100	
Wadi Shaw 82/30-1	charcoal	KN-3099	3410±170	1740±210	well
Wadi Shaw 82/31	charcoal	KN-3172	3330±110	1630±130	hearth

Wadi Shaw 82/31-1	charcoal	KN-3082	3910±280	2400±390	hearth
	charcoal	KN-3139	3870±60	2340±90	hearth
	charcoal	KN-3084	3790±60	2230±100	hearth
	charcoal	KN-3185	3650±120	2030±170	hearth
	charcoal	KN-3148	3540±120	1890±160	hearth
Wadi Shaw 82/31-2	charcoal	KN-3439	3850±55	2320±90	hearth
	ostrich eggshell	KN-3143	3820±55	2280±90	
	charcoal	KN-3362	3820±55	2280±90	hearth
	charcoal	KN-3169	3670±55	2050±80	hearth
	charcoal	KN-3105	3660±55	2040±80	hearth
Wadi Shaw 82/31-3	charcoal	KN-3100	3880±60	2350±90	hearth
Wadi Shaw 82/32-9	charcoal	KN-3146	3520±120	1860±160	hearth
Wadi Shaw 82/32-9	charcoal	KN-4282	3950±70	2440±110	hearth
Wadi Shaw 83/110-14	bone	KN-3354	3860±150	2320±210	grave
Wadi Shaw 83/110-15	bone	KN-3460	3900±60	2370±80	grave
Wadi Shaw 83/110-18	bone	KN-3438	3410±180	1740±220	grave 18/2
	bone	KN-3437	3200±120	1470±140	grave 18/1

* Charcoal from a hearth (Djabarona 96/3-1) has been dated to 1472±45 bp (UtC-5584).

** The sample has given two rather different results: 3430±25 bp (fulvic acids, 2.2 mg C) and 1610±35 bp (humic acids, 0.6 mg C).

Compared to the number of settlement sites, burials are rare. In Wadi Howar, the deceased were simply buried within the settlement area; no superstructures were visible. So far, only interments attributable to the Handessi B phase have been excavated. The dead were buried in a flexed (with a north-south orientation) or elongated (with an east-west orientation) position. Grave goods were not common. Actual cemeteries have not been found, although the location of the interments at Djabarona 96/120 perhaps indicate the first use of formal burial grounds (Jesse & Keding 2002).

In the Lahiya area, stone tumuli cover the burials. The dead were buried in a flexed position. Four graves, which can be attributed to the Handessi Horizon by their C14 dates (Tab. 1), have been excavated. The grave goods consisted of personal adornments, mostly beads made of ostrich eggshell. The remains of organic material indicate that the deceased were either buried with a leather wrapping or were placed on a piece of leather (Schuck 2002).

Chronology

The stylistic analysis of the pottery has already distinguished two phases (cf. Keding 1998: 10-11): “fine geometric”, now called Handessi A, and “coarse geometric”, now called Handessi B. The available radiocarbon dates confirm this sequence (Tab. 1; Fig. 2). Handessi A started at about 2500 BC in the Laqiya region and appeared a little later in Wadi Hariq and Wadi Howar. In the Laqiya region, settlement activities ended at around 1600 BC. Handessi B followed Handessi A from about 1800 BC in Wadi Hariq and Wadi Howar, but no trace of Handessi B has yet been found in the Laqiya region, certainly due to the deteriorating ecological conditions there.

A rather late date of 1500 BC (KN-3523; Tab. 1) for Handessi A pottery at Djabarona 84/1 (Keding 1998: 10; Keding Ms) indicates a certain complexity and the probable coexistence of several groups in Middle Wadi Howar during the Handessi B phase. Another totally different pottery style, characterised by a red ware and geometric decorations limited to a small band in the rim zone, was found at Djabarona 96/5 (Keding 1997: 38) and dated to about 1650 BC (KIA-12419, Tab. 1). This, too, points to a rather complex situation in Middle Wadi Howar during the 2nd millennium BC.

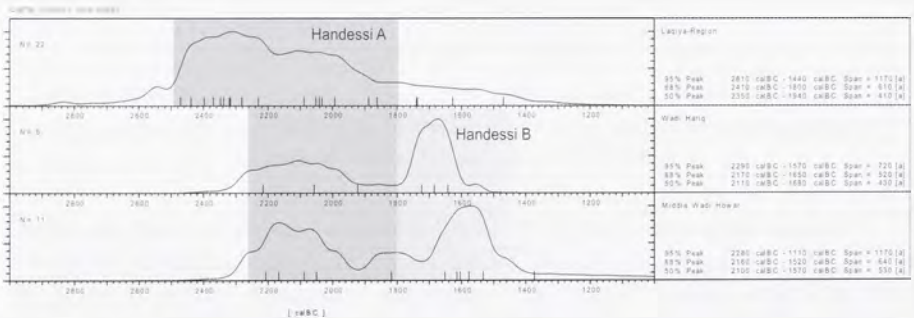


Fig. 2. Probability distributions of the radiocarbon dates of the Handessi Horizon. The dates were calculated and plotted using CALPAL (Cologne Radiocarbon Calibration & Palaeoclimate Research Package), Version 2004, by Bernhard Weninger, Olaf Jöris and Uwe Danzeglocke, Radiocarbon Laboratory, University of Cologne.

The archaeological material

Pottery

New decorative patterns appear with the Handessi Horizon: geometric ornaments and, later – in the Handessi B phase – mat impressions. There is a great variety of vessel forms (globular forms but also curved profiles) and a

change in the type of temper can be observed: organic material was commonly used, often combined with sand (Keding 2000: 99; Keding & Vogelsang 2001: 274). Impression is still the most important decoration technique. Compared to previous periods, rocker stamping decreases while simple impression or mat impression becomes more important (see Günther 1995: 128-129; Jesse in press). Incision and impression are often combined.

Handessi A is characterised by decoration limited mostly to the upper part of the vessel, the top of the rim and the general rim zone (Fig. 3). Decoration on the body is seldom seen. The rim-top decoration can be quite varied (incised vertical lines, incised criss-cross patterns, vertical or oblique impressions; Francke 1986b: 81; Prill 2000: 62). The decoration of the rim zone typically consists of simple impressions made with a single-pronged implement, which result in one or more bands of triangular impressions, bouton decorations (bouton: small lumps protruding on the exterior of the vessel due to punctuations that almost perforate the wall), incised patterns (e.g. criss-cross) and simple comb impressions (Keding 1998: 10; Prill 2000; Francke 1986a: 138 and 142, fig. 2.3-4; Jesse et al. 2004). If there is any decoration on the body, it is often a complex geometric design such as hanging triangles filled with impressions or other geometric forms (see Francke 1986a: 142, fig. 2.1; Prill 2000, plate 10.2 and plate 16).

In general, rocker stamping is not a major decorative technique on Handessi A pottery. However, at Djabarona 84/1, zigzag patterns made by rocker stamping with either a comb or a spatula, are an important type of wall decoration (Prill 2000: 76-77).

Clay was used to make objects of art as well as vessels. In the Laqiya region, a small figurine of a bovid was found: this is, however, a unique piece so far (Francke 1986a: 138 and 142, fig. 2.2).

The later phase, Handessi B, is marked by a larger range of vessel forms (e.g. curved profiles are more often found), complex geometric patterns and, most prominently, by the appearance of mat impression (Keding 1998: 11) (Fig. 4). The rim zone is still the most important zone of decoration, although rim-top decoration is rare (Günther 1995: 144). Geometric patterns, e.g. hanging triangles filled with impressions, are a common decoration (Keding 1998: 11, plate 6). Mat impression is mostly found on the vessel body; in some cases applied from the rim downwards (Günther 1995: 141; Jesse et al. 2004: 143, fig. 15). Decoration on the interior of the vessel is frequent (Keding 1998: 11). Here, oblique rows of simple comb impressions are found as are incised or impressed criss-cross patterns or herringbone patterns.

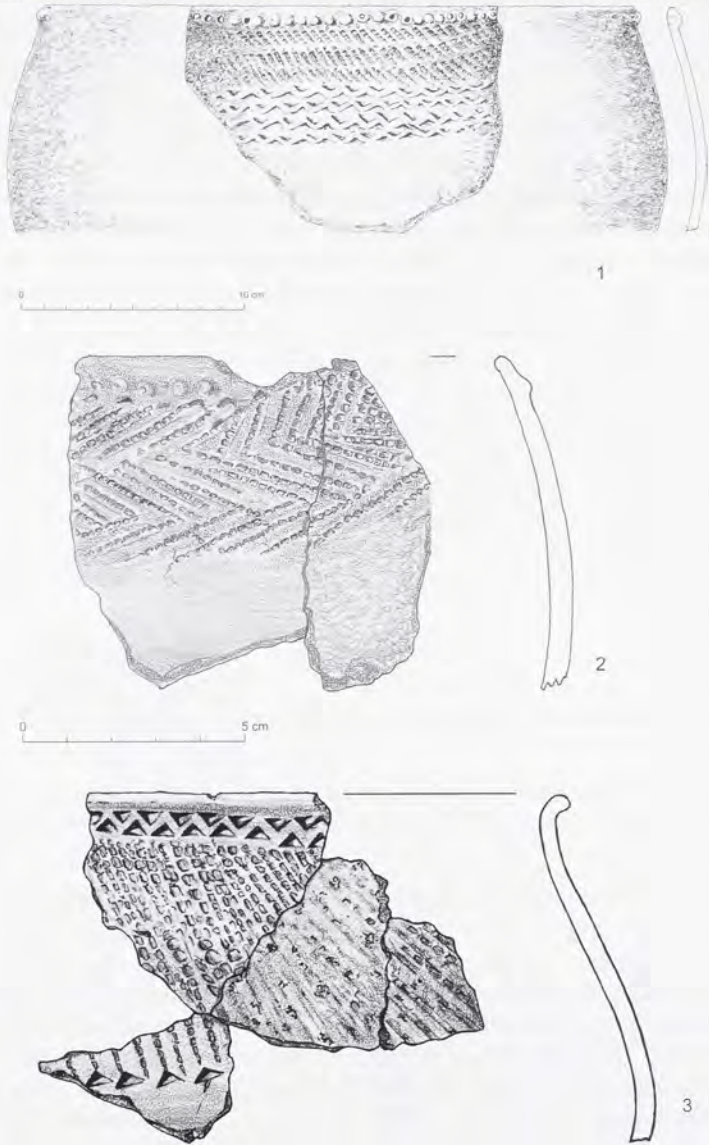


Fig. 3. Pottery of the Handessi Horizon: Examples for Handessi A.: 1 – Wadi Shaw 82/31; 2 – Wadi Hariq 97/7; Djabarona 96/2 (Middle Wadi Howar).

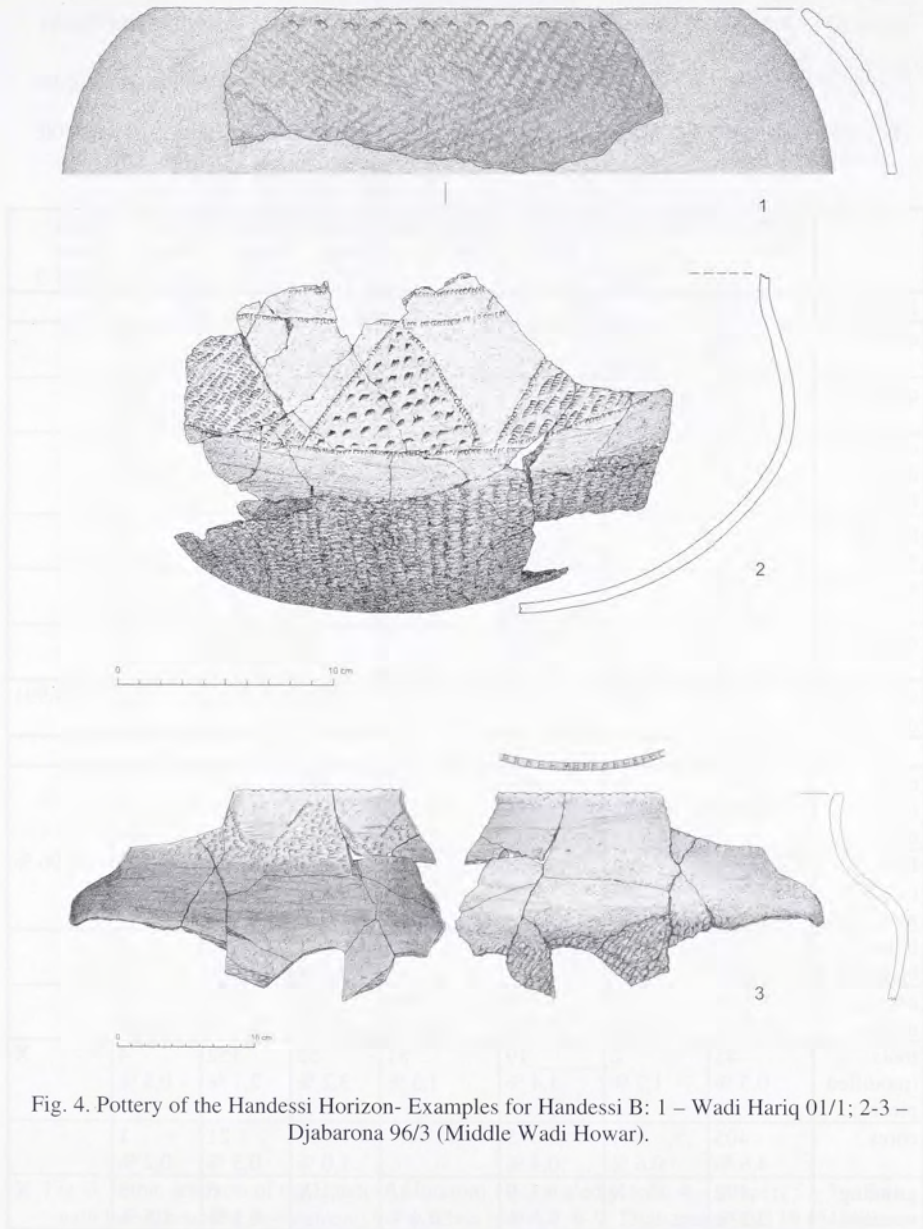


Fig. 4. Pottery of the Handessi Horizon- Examples for Handessi B: 1 – Wadi Hariq 01/1; 2-3 – Djabarona 96/3 (Middle Wadi Howar).

Table 2: Lithics of the Handessi Horizon: The distribution of raw materials and blanks.

For site Wadi Hariq 01/1-1 tools, cores and grinding material hav also been counted among the blanks, therefore the sum total of the percentages given exceeds 100 %.

(For sites Djabarona 84/1, 96/3 and 96/119 see Keding in prep; Djabarona 96/2 see Prill 2000: 25-32; Wadi Hariq 97/7 see Lange this volume; Wadi Shaw 82/31 see Francke 1986b: 20).

	Djabaron a 84/1	Djabaron a 96/2	Djabaron a 96/3-1	Djabarona 96/119	Wadi Hariq 97/7-1	Wadi Hariq 01/1-1	Wadi Hariq 01/4-1	Wadi Shaw 82/31-2
Handessi	A	A	B	B	A	B	B	A
quartz	8392 96,0 %	143 91,1 %	830 59,4 %	533 13,7 %	373 23,1 %	212 3 %	64 12 %	
quartzite	109 1,3 %	6 3,8 %	267 19,1 %	2728 70,2 %	1172 72,4 %	6281 88,4 %	403 75,8 %	
chalce- dony, flint	33 0,4 %	5 3,2 %	22 1,6 %	35 0,9 %	58 3,6 %	44 0,6 %	40 7,5 %	
petrified wood	-	-	6 0,4 %	8 0,2 %	-	524 7,4 %	15 2,8 %	
sandstone	204 2,3 %	-	42 3,0%	568 14,6 %	2 0,1 %	-	1 0,2 %	
others	2 0,02 %	3 1,9 %	231 16,5 %	17 0,4 %	15 0,9 %	56 0,8 %	9 1,7 %	
sum total of it	8740	157	1398	3889	1620	7102	532	24.991
chip (< 10 mm)	2932 4,6 %	33 21,0 %	454 32,5 %	1417 36,4 %	447 27,6 %	1031 14,5 %	466 87,6 %	ca. 96 %
flake (> 10 mm)	4117 47,1 %	66 42,0 %	718 51,4 %	1842 47,4 %	851 52,5 %	4203 59,2 %		
blade, bladelets	-	7 4,5 %	-	-	3 0,2 %	10 0,1 %	-	
angular debris	1049 12,0 %	48 30,6 %	193 13,8 %	564 14,5 %	228 14,1 %	1858 26,2 %	53 10 %	
tools (modified pieces)	45 0,5 %	2 1,3 %	19 1,4 %	51 1,3 %	52 3,2 %	152 2,1 %	4 0,8 %	X
cores	405 4,6 %	1 0,6 %	5 0,4 %	-	17 1,0 %	21 0,3 %	1 0,2 %	
grinding material	192 2,2 %	X	9 0,6 %	15 0,4 %	X	6 0,1 %	8 1,5 %	X

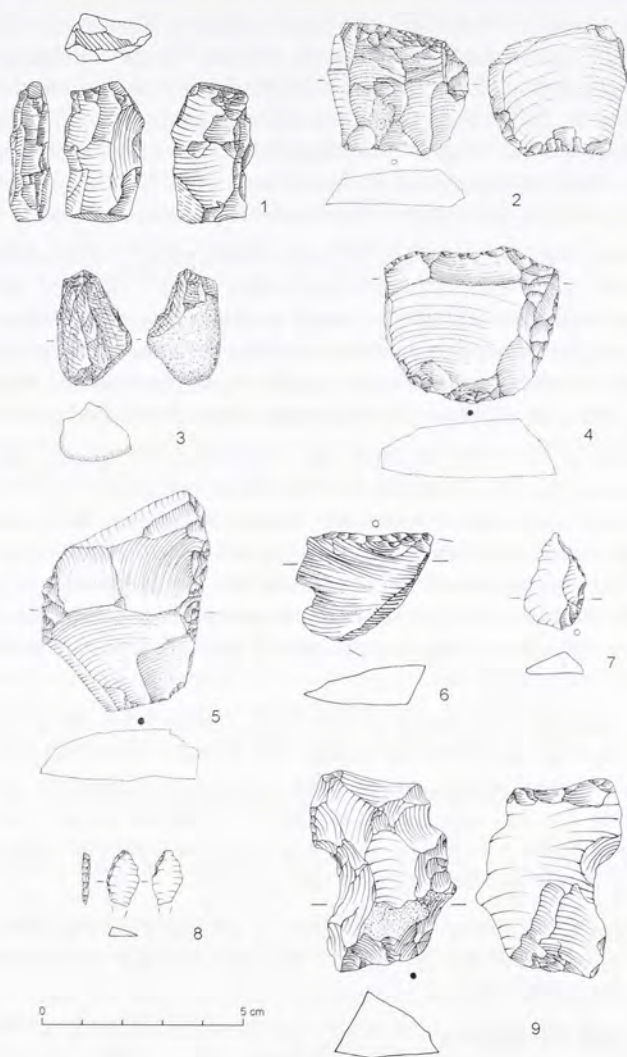


Fig. 5. Lithic artefacts of the Handessi Horizon: 1 – 3 scaled pieces; 4 – scraper; 5 – 7 pieces with lateral retouch; 8 – segment; 9 – notched piece. 1, 6-9: Djabarona 96/119 (Middle Wadi Howar); 2-5: Wadi Hariq 97/7.

Lithics

Compared to the pottery, the stone industry is not very elaborate. It is a flake industry. Quartz and different sorts of quartzite are the dominant raw materials (Tab. 2), all of which are easily available in the various parts of the southern Libyan Desert. Some regional specialisation can, however, be observed. In Middle Wadi Howar, quartz was mainly used (except at Djabarona 96/119) whereas quartzite was preferred in Wadi Hariq (Tab. 2). This can be explained by the locally available and thus easily obtainable stone in each case.

Actual tools are rare (Tab. 2) and consist mostly of splintered pieces and simply retouched pieces. Scrapers, microliths, borers, notched and denticulated pieces have only been recorded in small numbers (Fig. 5). Compared to the generally limited presence of chalcedony and flint in the assemblages, worked pieces are quite often made of these higher quality raw materials. At Wadi Hariq 01/1, petrified wood was often used for the production of modified pieces.

As far as the lithic artefacts are concerned, no changes are visible over time. It appears that the Handessi people did not consider it necessary to modify the blanks to make more elaborate forms as unretouched pieces obviously fulfilled the same purposes as retouched ones. The archaeologist's notion of a tool must thus be broadened up to account for the use of simple flakes without any further modification. Sites of the contemporaneous Kerma Culture in the Nile Valley also show low proportions of worked pieces (Caneva 1990: 137; Bracco & Gratien 2002: 48).

The general appearance of the lithic industry on the Handessi Horizon sites with its high frequency of quartz and lack of retouched tools has not yet encouraged detailed studies of the lithic technology. However, the data assembled in Table 2 – and especially the kind of modified pieces recorded for each site – show that there might be some regional and certainly some specific intra-site features that would be worthy of more attention.

Grinding material is present (Tab. 2) and was certainly also used to process plant food. Some lower grinding stones have perforation holes, indicating that they could be transported.

Economy and subsistence

The Handessi Horizon as a whole indicates a pastoral way of life based on the herding of cattle and small livestock. Sheep and goats were added to the herds as a reaction to increasing aridity (Berke 2001: 245; Keding and Vogelsang 2001: 274). Of all the livestock, cattle are the most important: cattle bones can represent up to about 50 % of the identifiable mammal bones on the sites whereas sheep and goats make up only about 20 % (Berke 2001: 250 and Tab. 2-

3; Jesse et al. 2004: 153 and 144, Tab. 7). Dogs and donkeys are also attested (Van Neer & Uerpmann 1989: 330, Tab. 3 and 332, Tab. 5; Berke 2001: 246-247, 252). The latter certainly served as work and pack animals. The use of donkeys in caravans was already described by the Egyptian noble Herkhuf in the famous accounts of his journeys to Nubia (Berke 2001: 245; see also Manzo 1999: 11). Hunting was practised, with giraffe and gazelle being the principal wild species found in the faunal material (Van Neer & Uerpmann 1989: 330, Tab. 3; Berke 2001; Jesse et al. 2004). Bones were even used as fuel (Berke 2002). In Middle Wadi Howar, fishing in shallow water is attested by the bones of Clariidae and Tilapiini (Peters et al. 2002: 328, Tab. 1 and 333, Fig. 4).

The imprints of plants on pottery found in Middle Wadi Howar and Wadi Hariq permit the identification of various species of wild grass, e.g. *Cenchrus* sp. (on sherds of the Handessi B site at Djabarona 96/119), which is a grass better known as “cram cram” (Keding & Vogelsang 2001: 274). Its seeds are edible but, today, they are only used in times of need as a complex process of preparation is required before the grains can be used as food.

Thus, a pastoral way of life characterises the Handessi Horizon. The needs of the animals, especially water and pasturage, dominated the lives of the Handessi groups. A very mobile way of life can be supposed, with extensive transhumance cycles in either a north-south direction or an east-west direction that incorporated the Nile Valley. Wadi Hariq, for example, was frequented by the Handessi pastoralists in – or shortly after – the rainy season as is indicated by the high proportion of foetal and peri-/neonatal bones of cattle and small livestock in the faunal assemblages (Jesse et al. 2004: 156; Pöllath this volume).

The place of the Handessi Horizon in 3rd and 2nd millennia BC Northeastern Africa

The southern Libyan Desert is well embedded in a large technocomplex that existed in the 3rd and 2nd millennia BC in northeastern Africa (see Manzo 1999). The appearance of Handessi A pottery in the southern Libyan Desert at around 2500 BC in the Laqiya area and a little later in Wadi Hariq and Wadi Howar can probably be explained by external influences. In Wadi Howar, no continuity with the preceding Leiterband Horizon is visible (Keding 1998: 10; Keding & Vogelsang 2001: 274). Here, the stimulus certainly came from the northeast, the Nubian Nile Valley and the Laqiya region. Incised decoration and complex geometric patterns are recorded for the Nubian cultures of the 3rd and 2nd millennia BC and the triangular impressions and bouton decorations of Handessi A also find their counterpart in C-Group and Kerma ceramics (e.g. Bietak 1968; Gratien 1986). Contacts between the desert dwellers – probably the “Temehu” mentioned in several Egyptian texts – and the cultures in the Nile

Valley can be supposed (Francke 1986b: 127; Jesse et al. 2004: 158). Egyptian pottery found in the Laqiya region indicates the existence of exchanges between the two regions (Francke 1986b: 119-120). Contact with the Nile Valley – via the Laqiya region and Wadi Hariq further to the south, to Wadi Howar and Jebel Tageru – can be seen, especially with regard to the decorative patterns on the pottery. The slightly later appearance of Handessi A in Wadi Howar might be explained by such contacts.

In the Handessi A phase, an extensive network of contacts seems to have covered the whole of the southern Libyan Desert (Fig. 6). In the Laqiya region, permanent settlement must have come to an end at around 1600 BC (see Francke 1986b: 127) as no Handessi B has been found there. The increasing aridity was certainly a reason for the shift of the settlement areas to the south.

The development from Handessi A to Handessi B cannot yet be sufficiently explained as far as pottery styles are concerned. A new component appears with the arrival of mat impression. Mat impression is present on utility vessels from the Kerma Moyen period onwards, i.e. from about 2000 BC (Gratien 1986: 397), but the stimulus may also have come from the west. This question is still awaiting further research. The network of contacts shifted (Fig. 7), obviously excluding the Nile Valley and the Laqiya region. Close contacts can be seen, however, between Wadi Hariq and Middle Wadi Howar, again especially as far as the decorative patterns on the pottery are concerned.

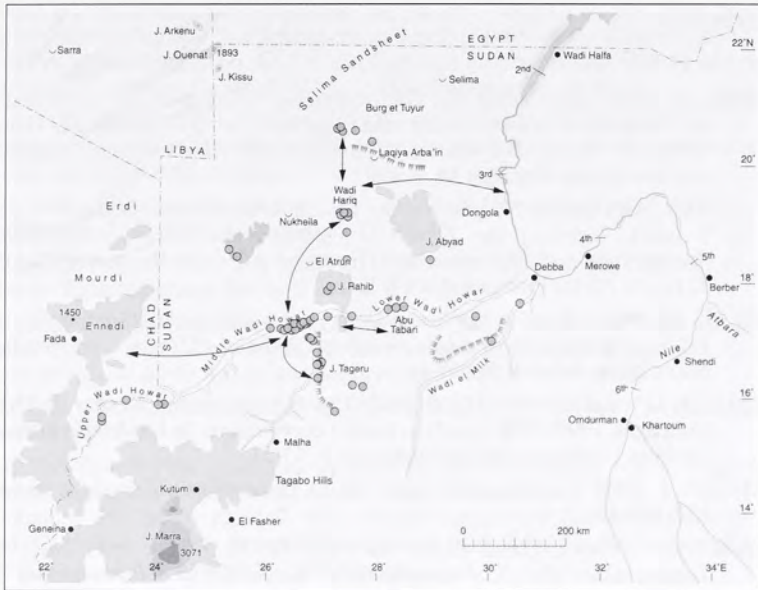


Fig. 6. Networks and contacts during the times of Handessi A.

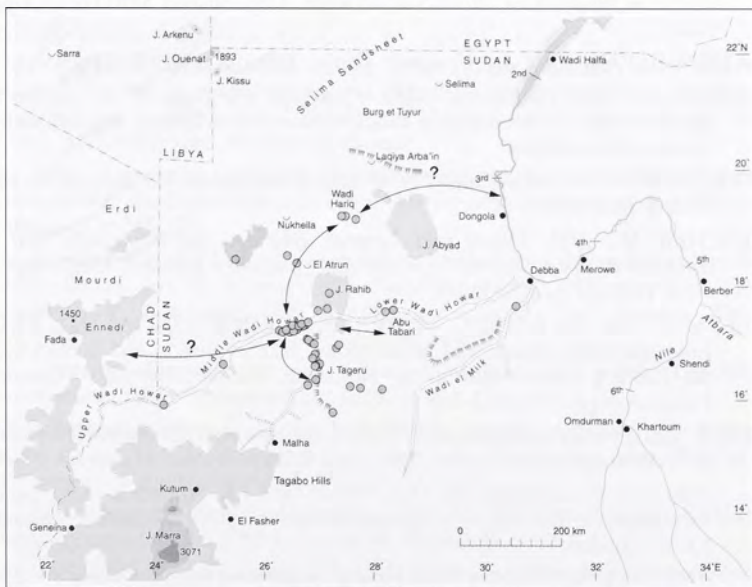


Fig. 7. Networks and contacts during the times of Handessi B.

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Paolo Biagi¹

The Levalloisian assemblages of Sindh (Pakistan) and their importance in the Middle Palaeolithic of the Indian subcontinent

1. Preface

The scope of this paper is to illustrate a series of Levallois assemblages and isolated finds discovered in Sindh (Pakistan), and to discuss their provenance and their relationships with other Middle Palaeolithic assemblages of the Indian Subcontinent. There is no doubt that the Middle Palaeolithic of the study region is no longer represented by “an enigmatic group of stone industries’ which fall, typologically and stratigrafically, between the hand-axe industries on one side and the microlithic industries on the other” (Allchin 1959: 1). Nevertheless, there are still many problems to solve concerning the interpretation of the assemblages of this period, at least in Sindh. This is mainly due to 1) the scarcity of systematic research, and consequent finds, 2) the absence of multi-period stratified Palaeolithic complexes, 3) the limited number of published collections, and 4) the paucity of Middle/Late Pleistocene environmental data. These are the main reasons why we have to revert to other territories in order to understand the chronology and the cultural significance of the Levallois industries of Sindh.

Middle Palaeolithic assemblages are known only from a few well-defined regions: the Rohri Hills, in Upper Sindh, Ongar (and the Laki Range), south of Hyderabad, and the Mulri Hills, Deh Konkar and Landhi, near Karachi, close to the Arabian Sea coastline (Fig. 1). The first of these three territories was discovered during the second half of the 1800s (Biagi 2006a). Systematic investigations began in 1975-1976, when the Cambridge Archaeological Mission in Sindh

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reported the preliminary results of the study of a few Palaeolithic assemblages recovered on the top of the Rohri Hills (Allchin 1976; Allchin et al. 1978). The second was repeatedly visited by A.R. Khan (1979a) who, in 1972, and mainly in 1973, made systematic collections in this area, which led to the recovery of an incredible amount of flint artefacts. The third, to which a few characteristic, isolated tools are related, is a region investigated by A.R. Khan (1979b) during the 1970s, from which the same author reports a few Levallois tools from three distinct sites.

2. The Middle Palaeolithic in the Indian Subcontinent

If we revert to one of the basic works dealing with the study subject, and take into examination the environmental picture that is commonly provided for the Middle Palaeolithic of the Lower Indus Valley, and more generically the Great Indian Desert, this period is supposed to have "seen a more humid climate with dune stability and with through-flowing rivers in the Thar Desert" (Allchin et al. 1978: 309), although "the long Middle-Palaeolithic humid phase was preceded and followed by arid phases of some severity. The variation in environmental conditions that these changes imply must have been such that during an arid phase the central parts of the Thar and the Indus Plain, excepting possibly the area within daily reach of the river, were virtually uninhabitable" (Allchin et al. 1978: 310).

Regarding the general typological characteristics of Middle Palaeolithic assemblages of South Asia, the above-mentioned authors state that they "have many of the basic technological characteristics of the Mousterian industries of Europe and Western and central Asia, particularly the extensive use of flakes struck from prepared cores, and the methods of preparing the cores; but they each have a distinct overall South Asian character which distinguishes them as a group in addition to their regional characteristics which differentiates them from one another within the group. Therefore it does not seem desirable to call them Mousterian" (Allchin et al. 1978: 314). It is important to point out that, throughout the entire above-mentioned volume, the term Levallois is utilised in a very generic and rather improper way, only for the description of "a carefully prepared discoidal or ovoid core from which a single flake is struck leaving a shallow flake scar and horse-shoe shaped border. This is not really distinct from the many groups of discoidal and ovoidal cores in the South Asian context. The terms are largely synonymous, but the term Levallois is sometimes used, particularly for finely worked cores of this kind, as it has become an established and widely used term among archaeologists, and serves to avoid tedious repetitions" (Allchin et al. 1978: 107-108).

Even the most recent papers on the subject are rather generic in describing the characteristics of this period. According to Pal (2002: 79) it “may be divided in at least three developmental phases (i) the early Middle Palaeolithic with artefacts of the Acheulian tradition (ii) middle Middle Palaeolithic with artefacts made on flakes detached from prepared cores and discoidal cores and (iii) late Middle Palaeolithic with a blade element in the artefact assemblages”. Also this latter author never mentions the presence of Levallois industries from any of the Indian sites reported in his text. In this respect, Petraglia et al. (2003: 20) are more detailed when they report “although certain researchers have adopted the term “Levallois” to describe Indian assemblages, tools often do not conform to multiple flake reduction sequences characteristic of core and flake debris found towards the West”. More recently James and Petraglia (2005: S9) stated “flake-based artifact assemblages consisting of prepared cores, retouched flakes, and diminutive bifaces generally characterize the Middle Palaeolithic of the subcontinent”.

Along the fringes of the Great Indian Desert in Rajasthan, a poor Middle Palaeolithic industry is known from a well-defined context within the stratigraphic sequence of dune 16R at Didwana, where it is stratified between Early and Late (Upper) Palaeolithic assemblages in Litho Unit III, whose central part has been TL-dated to $163,000 \pm 21,000$ yrs BP and Th/U-dated to $144,000 \pm 12,000$ and $150,000 \pm 10,000$ yrs BP respectively (Misra 1989). Although these dates are only indicative, Misra and Rajaguru (1989: 311) suggest that the Middle Palaeolithic of dune 16R is to be ascribed to a period between 150,000 and 50,000 yrs. According to Goudie et al. (1973: Table 8), the Middle Stone Age of this region took place during a “major wet phase” represented by a “major phase of deep weathering”. This fact is also evidenced by the Indian Thar Desert sequence of Pushkar, some 100 km south of Didwana, where the Middle Palaeolithic tools recovered from Hokra “may be said to fall within the range of the Mousterian tradition” (Allchin and Goudie 1973: 361).

It is important to point out that the typical Levallois technique is not represented at any of the Middle Palaeolithic assemblages so far discovered in the Great Indian Desert of Rajasthan.

3. The Levallois assemblages of Sindh

3.1. The Rohri Hills

They consist of limestone terraces that elongate just to the south of Rohri, in Upper Sindh, between the Thar Desert, in the east, and the Indus Valley, in the west (Fig. 1.1). They represent the most important raw material chert deposits of the Indus Valley so far discovered, which were exploited throughout a period between the Early Palaeolithic and the Bronze Age. Allchin (1976: 479) pointed

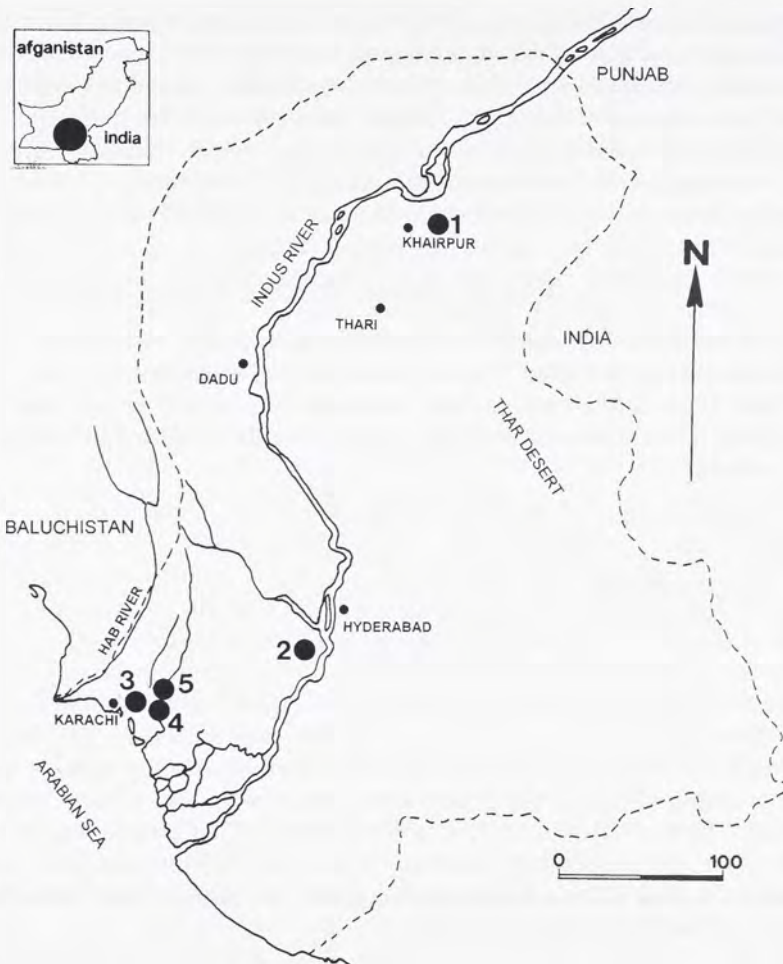


Fig. 1. Distribution map of the sites mentioned in the text: Rohri Hills (1), Ongar (2), Mulri Hills (3), Landhi (4) and Deh Konkar (5) (location approximate) (drawing by P. Biagi).

out the importance of the Middle Palaeolithic workshops of the hills and described the main characteristics of the flake assemblages of this period, which are obtained from “chert nodules of appropriate size as cores, with a minimal amount of preparation, often without removing the cortex”. Nevertheless, the research carried out between 1993 and 2001 by the Joint Rohri Hills Project,

revealed very little evidence of Middle Palaeolithic tools. According to Negrino and Kazi (1996: 30-32), who subdivided the Rohri Hills Palaeolithic assemblages into five main series, on the basis of the limited stratigraphic evidence and the different patina observed on the tools, their Middle Palaeolithic Series 5, is represented by very few, isolated artefacts, among which are Levallois flakes and one bifacial tool. Furthermore they attribute their Series 4, which is represented by Late Acheulian handaxe workshops, well attested at Ziarāt Pir Shabān (Biagi et al. 1996), most probably to the beginning of the Middle Palaeolithic. Nevertheless, a few pseudo-Levallois flakes, with a flat platform, are known from the isolated hill of Unnar (Biagi & Cremaschi 1988: fig. 8), which belongs to the same limestone formation, just to the southwest of the Bronze Age site of Kot Diji.

3.2. Ongar

The hill of Ongar is located a few kilometres south of Jamshoro, more precisely “about 8 miles north of Jhirak, and a mile or 2 south-west of Jhuga Pir” (Blandford 1880: 148), along the western side of the Indus River (Fig. 1.2). It belongs to a group of flat-topped hills of Eocene formation (Raza & Bender 1995), very rich in seams of flint nodules that were exploited throughout different periods of the Palaeolithic, from the Acheulian up to the beginning of the Late (Upper) Palaeolithic. The research carried out by A.R. Khan in the summer of 1973, led to the collection of a rich Levallois assemblage that, according to the above-mentioned author (Khan 1979a: 81) “was found in situ from the gravel terrace” close to the Miharo village, along the eastern slope of the hill. Although the surveys conducted by the author in 2005 did not lead to the discovery of any rich assemblage in this part of the hill (Biagi 2006b), the industry collected by A.R. Khan, now in the stores of the Museum of Prehistory and Palaeogeography of Karachi University, includes several typical Levallois tools. Among these are: discoidal Levallois cores with centripetal flake detachments (Fig. 2:1-2; Fig. 3:1-4), different types of side and transverse scrapers on Levallois flake (Fig. 3:5; Fig. 4:4.6-8.10-11), unretouched Levallois flakes (Fig. 4:3.5) and blades (Fig. 4:1-2) and one ‘Mousterian’ straight point obtained with simple, deep, invasive retouch, covering the entire dorsal face (Fig. 4:9). Many of these latter tools have a faceted platform (Fig. 4:3.6-11), sometimes of “chapeau de gendarme” type (Fig. 4:6.8-11).

According to A.R. Khan (1979c: 64), one transverse scraper, on a flakelet with faceted platform (Fig. 5:6), was collected “by Mr. Ishaq Ghaznavi, an officer of Geological Survey, from the slope of Laki range”. Although the description is very generic, and the Laki Range elongates in a south-north direction, roughly from the Baran River to Sehwan (Blandford 1880: Plate II), this tool most probably comes from a place not too distant from Ongar.

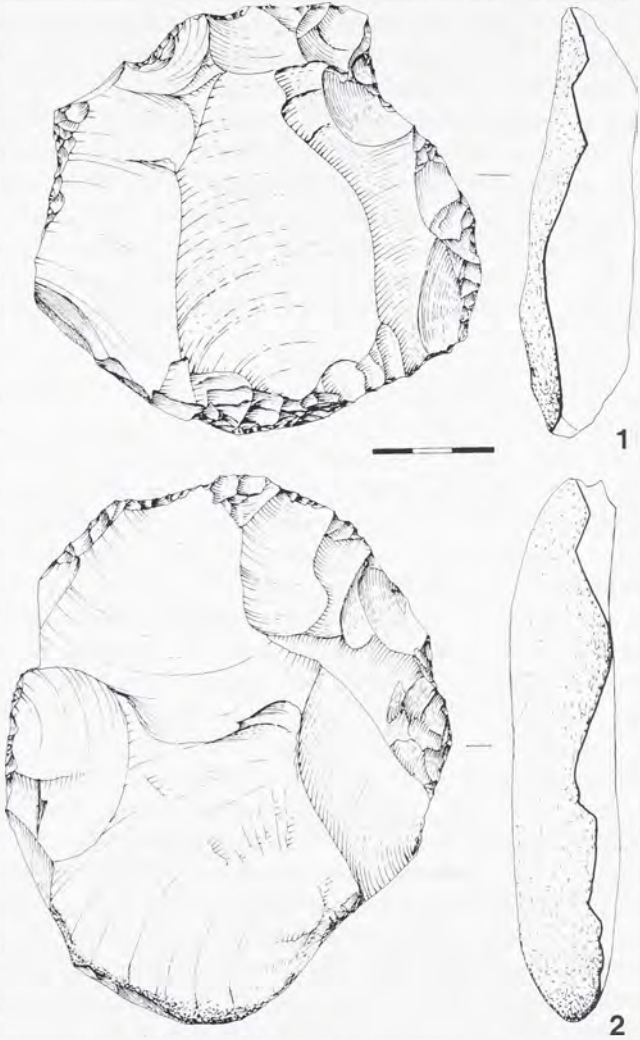


Fig. 2. Ongar: Levallois cores (1 and 2) (drawings by P. Biagi and G. Almerigogna).

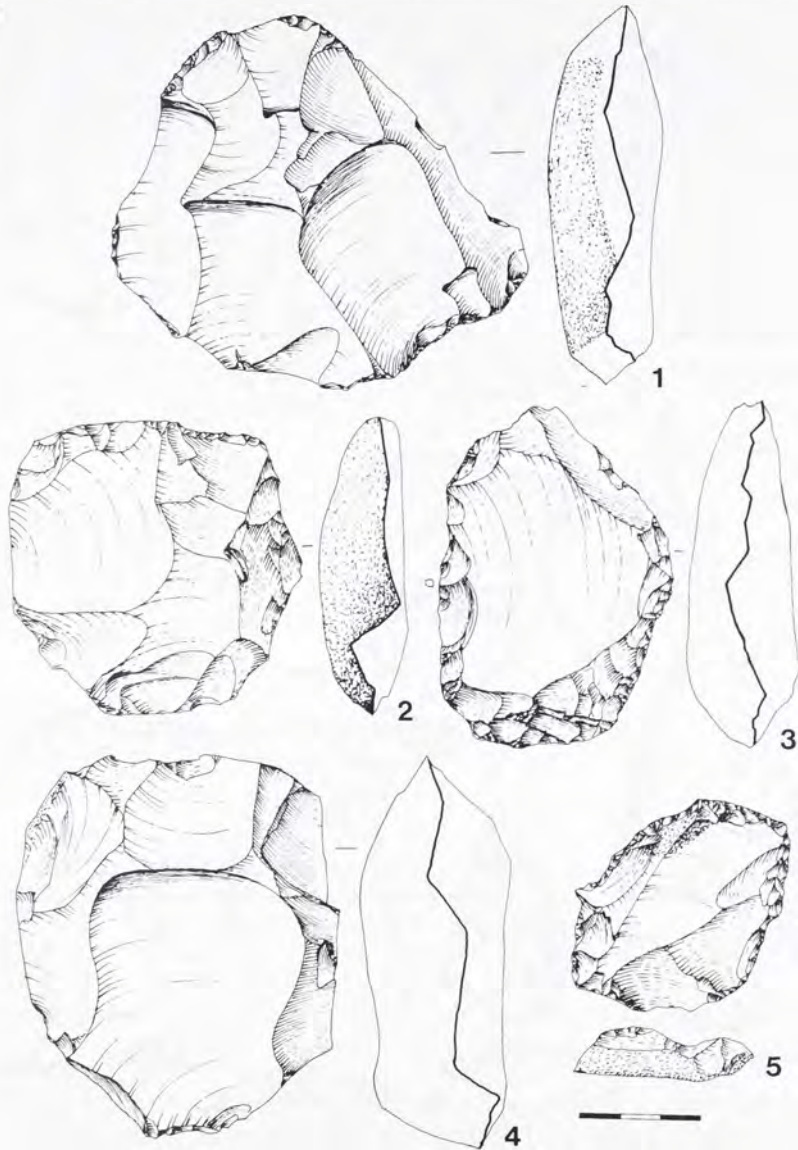


Fig. 3. Ongar: Levallois cores (1-4) and scraper (5) (drawings by P. Biagi and G. Almerigogna).

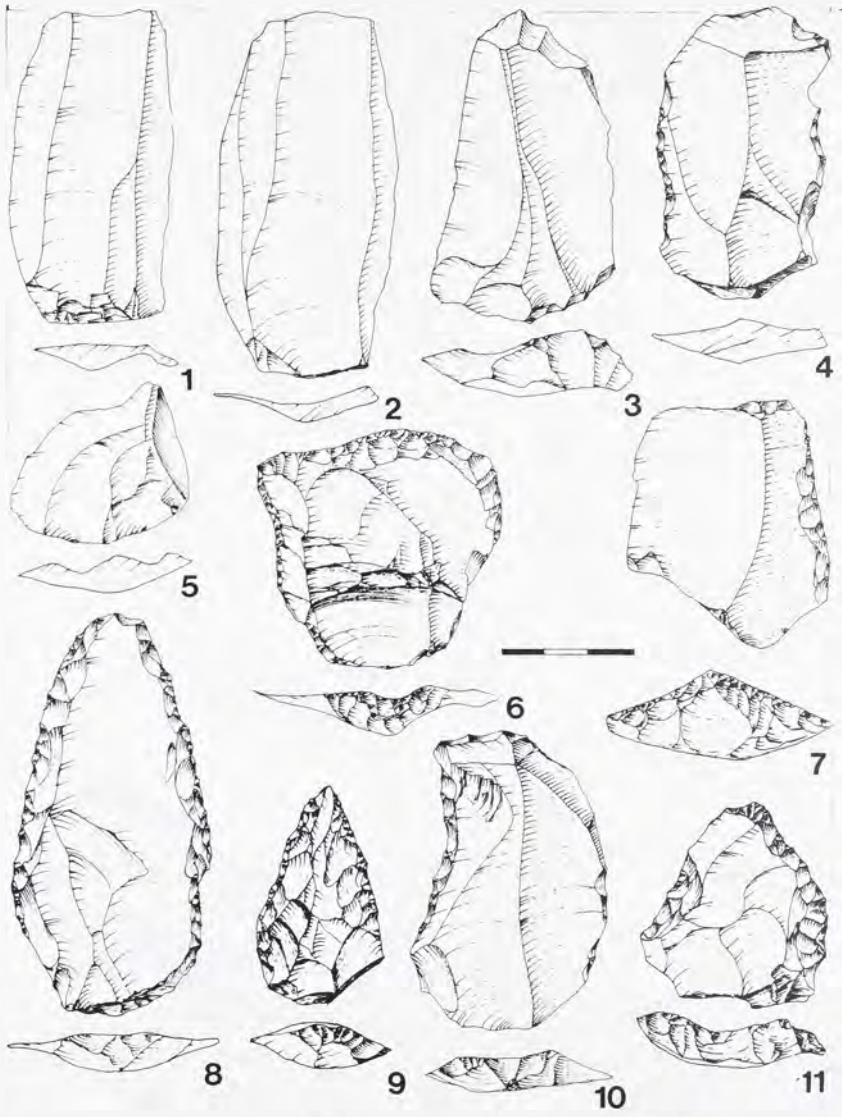


Fig. 4. Ongar: Levallois blades (1 and 2), flakes (3 and 5), scrapers (4, 6-8, 10 and 11) and 'Mousterian' point (10) (drawings by P. Biagi and G. Almerigogna).

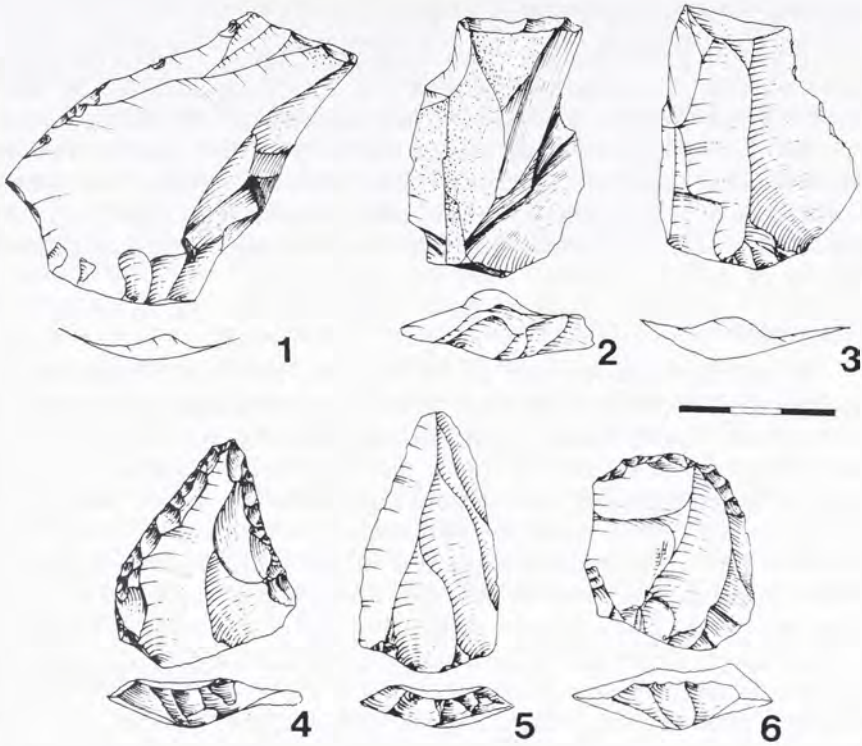


Fig. 5. Mulri Hills 3 (MH3): Levallois flakes (1-3); Deh Konkar: retouched Levallois point (4); Landhi: Levallois point (5) and Laki Range: transversal scraper on Levallois flakelet (6) (drawings by P. Biagi and G. Almerigogna).

3.3. The Karachi Gulf

The Levallois tools from this area are represented by a few specimens, three of which come from site MH3, in the Mulri Hills (Fig. 1:3). They elevate just to the south of the Karachi University Campus and consist of sedimentary bedrocks of the Miocene Gaj Formation (Zaidi et al. 1999), crossed by many faults. On their surface A.R. Khan (1979c: 64) discovered many sites, most of which have been attributed to the Mesolithic (Biagi 2005). The Levallois tools

from this area are represented by three unretouched flakes, with a white patina, one of which has a prepared platform (Fig. 5:1-3).

A straight point, obtained with a simple, deep, direct, bilateral retouch on a Levallois flake with a faceted platform (Fig. 5:4), is reported by A.R. Khan (1979b: 13) "on the edge of a gravel terrace near field n° 194 at Deh Konkar, near Got Jalab" (Fig. 1:5). Some 2 miles northwest of Rehri, not far from the present shoreline facing the Kadiro Creek, the same author found "one isolated panshaped point...in the gravel near the old cliff south of Landhi" (Fig. 1:4). This object is a typical, unretouched Levallois point with a faceted platform (Fig. 5:5).

4. Discussion

According to the few data to date available, the Middle Palaeolithic of Sindh is still of problematic definition from both chronological and typological points of view, mainly because of the reasons mentioned in the preface of this paper. Nevertheless there are a few points that are of major importance regarding the Levallois component of some of these complexes. They are: 1) Some of the assemblages from Lower Sindh are represented by a high number of Levallois tools. This fact has never been recorded from any of the Indian Subcontinent Middle Palaeolithic sites east of the Indus River. This phenomenon is clearly recognisable in the Ongar industry collected by A.R. Khan in the 1970s; 2) As far as we know, all the typical Levalloisian assemblages and isolated tools are from sites located in Lower Sindh; 3) Point 2 might be due to the fact that no systematic survey aimed at the discovery of Palaeolithic sites has ever been carried out north of Hyderabad; 4) Nothing is known of the Middle Palaeolithic of Balochistan (Smith 1986: Fig. 7). The only Palaeolithic sites of this country are those attributed to the Ladizian, in south-east Iran (Hume 1976); 5) If reliable, the supposed presence of a Neanderthal skull, reported by S.M. Ashfaque (2004: 153) from a cave in the Khirthar Range, although never examined by the above-mentioned author, would be of major importance for a better understanding of the Middle Palaeolithic of the region and the spread of the Neanderthal populations, whose south-eastern boundary is far from being well-defined (Petraglia & Alsharekh 2003: 680).

It is important to point out that the Middle Palaeolithic Levallois assemblages so far known from a territory geographically close to Sindh, come from south-east Arabia (Petraglia & Alsharekh 2003: 675). Here they are known as far as the coastal zones of Dhofar (Cremaschi & Negrino 2002: 328) and its neighbouring east Yemen (Amirkhanov 1991: 220); some of these latter come from well-defined contexts (Amirkhanov 1994). Other Middle Palaeolithic assemblages "dominated by small (30-80 mm), biconvex bifacial tools ranging in

shape from foliate to ovate” are known in the interior of the Oman Peninsula (Rose 2004: 552), although their chronology might not be necessarily contemporaneous to that of the Levallois complexes, a problem already pointed out by the above-mentioned author (Rose 2004: 553).

To conclude, the discovery of typical Levallois industries in Sindh is of major importance for the understanding of the Middle Palaeolithic of the western regions of the Indian Subcontinent and (hopefully) the definition of the eastern-most boundaries reached by the Neanderthals. They are unique in this respect and do not find any close parallel with the Middle Palaeolithic assemblages of the Great Indian Desert. North of Sindh, Levallois flakes are reported by De Terra and Paterson (1939: 308) from the Late Soan Sequence. Further to the north they are common in the former Soviet Central Asia and Afghanistan Middle Palaeolithic assemblages (Dupree et al. 1970; Ranov & Gupta 1979: 63). Moving westwards, the most important complexes are those of the Zagros Mountains (Dibble & Holdaway 1993), while most of the Iranian Plateau is still very poor in sites of this age (Smith 1986: Fig. 7). One of the few exceptions is Jahrom, in Fars, the assemblage from which is characterised by the absence of the Levallois technique and the presence of numerous tools of Late (Upper) Palaeolithic character (Piperno 1972: 195). This latter industry seems to find some parallels in the late Middle Palaeolithic assemblage from Kuturbulak in Uzbekistan (Szymczak 2000).

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Christopher Ehret

Linguistic stratigraphies and Holocene history in Northeastern Africa

For the whole of the Holocene, greater northeastern Africa has formed a zone of ongoing encounter between speakers of Nilo-Saharan languages and speakers of Afrasan (Afroasiatic) languages. The history of cultural change among each grouping of peoples and the history of inter-familial contacts over this long period left its mark in myriad ways in the vocabularies of the Afrasan and Nilo-Saharan languages. We can access the early eras of this history by laying out the linguistic stratigraphies of both families. With this base established, we can then situate the appearance of new vocabulary of subsistence (or other areas of culture) in the stratigraphy, according to when it first came into use. We can similarly identify the words adopted from languages of one family into languages of the other, situate the times and directions of the particular word borrowings within the stratigraphy, and seek out the cultural and sociolinguistic significance of different individual loanwords as well as sets of loanwords.

From these varied bodies of evidence several important conclusions emerge. The most important of all is that both families, the Afrasan (Afroasiatic) family as well as Nilo-Saharan, originated in Africa. This issue needs very strong emphasis, considering how widely scholars still hold the presumption that, somehow, Afrasan had an Asian homeland. This view has its roots in old, unexamined Western views about Africa. Much recent work in biological anthropology continues to start off with this presumption and, as a result, scholars too often still allow this view to shape, a priori, the interpretation of the DNA evidence.

A second discovery is that, from the very early periods, cultural and technological influences have flowed in both directions, from Nilo-Saharans to Afrasans as much as from Afrasians to Nilo-Saharans. In addition, the regions extending from the Red Sea westward along the line of climatic transition in the

central Sahara have formed a long-term zone of shifting language family boundaries and inter-familial influences. Finally, the areas between the Red Sea and the Nile have been especially affected by major episodes of population and language replacement over the course of the Holocene era. These findings have major implications for future work on the archaeology and the biological anthropology of the peoples of northeastern Africa in the Terminal Pleistocene and Holocene eras.

To uncover this history, we must first build linguistic stratigraphies for each family.

Afrasan Linguistic Stratigraphy and its Implications

On the African origin of the Afrasan language family

The cumulative work of many scholars on the historical reconstruction of the Afrasan language family, from Greenberg (1955) to very recent publications (Diakonoff 1998; Ehret 1999a, b), makes an overwhelming case for situating the origins of Afrasan, and nearly all of the history of the peoples who spoke languages of the family, in Africa (Ehret et al. 2004). Only Semitic, itself a relatively late offshoot of an otherwise African sub-branch of the family, has an Asian history at all.

The Africanness of the Afrasan family is evident first and foremost from a simple look at the geographical locations of the six universally recognized, deep divisions of the family. Three of the six are, in fact, not just African, but wholly sub-Saharan African. These are Cushitic, the languages of which are spoken from just north of the Ethiopian highlands to as far south as central Tanzania; Omotic, located entirely in the Ethiopian highlands; and Chadic, found far to the west, in the countries of Nigeria, Niger, Cameroon, and Chad. A fourth division, Berber, consists of languages of North Africa and the Sahara; a fifth, comprised of ancient Egyptian and its descendant form, Coptic, was spoken in the midst of the eastern Sahara. Just a single branch of the six, Semitic, is basically Asian.

Knowing the subgrouping of a language group allows us to make inferences as to the most probable location of the common ancestor language of the group as a whole. To do this we apply the principle of parsimony to the linguistic geography of the languages involved. We say that the best explanation for the locations of the languages in later times is the history that requires the fewest movement of peoples to account for those locations. Let us apply this principle to the six major divisions of Afrasan, one by one, and then to the family as a whole.

Cushitic divergence and history

Cushitic has four distinct subdivisions, Beja, Agaw, Eastern Cushitic, and Southern Cushitic (see list 1 for the particular languages of each). The view followed here is that these four distinctive groupings fall into two primary branches, one consisting of Beja alone and the other comprising Agaw and Eastern and Southern Cushitic (Hetzron 1982).¹ The evidence of shared phonological innovation strongly indicates that Eastern and Southern Cushitic form a combined, tertiary East-South Cushitic branching (Ehret 1987). The overall scheme of Cushitic relationships can be depicted as a tree:

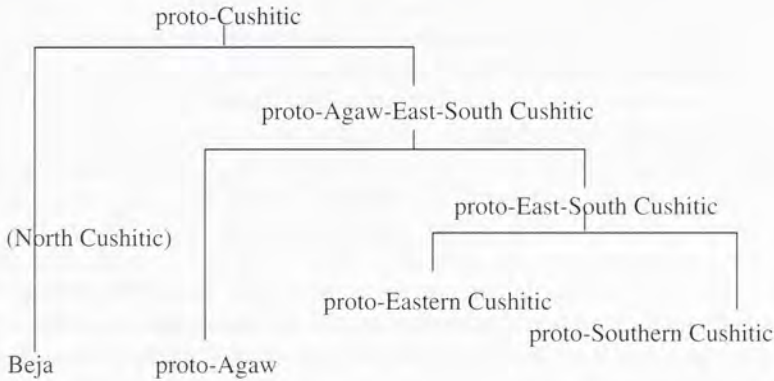


Figure 1. Family Tree of Cushitic Sub-branch of Afroasiatic

Applying the principle of parsimony of explanation, the simplest and most straightforward accounting of early Cushitic history depicts a successively southward advance of Cushitic speakers in four major early stages. The original Cushitic speech territory lay in either of two adjacent areas, the southern Red Sea hills, where the Beja have long resided, or the northern edges of the Ethiopian Highlands, where the lands of the rest of the Cushites begin. The proto-Cushitic society diverged into daughter societies either because the distant ancestors of the Beja moved northward into the Red Sea hills or because the ancestors of the proto-Agaw-East-South Cushitic community spread southward along the

¹ Some scholars have gone so far as to remove Beja entirely from Cushitic, but the shared innovative evidence in lexicon makes the case for its membership in Cushitic a solid one (e.g. Ehret 1987).

northern edges of the highlands. At the second stage, the proto-Agaw-East-South society itself diverged into two daughter societies. The proto-Agaw emerged in the far northern Ethiopian highlands; the proto-East-South Cushites settled in more easterly parts of the highlands, probably especially moving south along the Ethiopian rift valley (Ehret 1976). Finally, the Southern Cushitic offshoot of the proto-East-South Cushites moved still farther south, into Kenya and eventually Tanzania. Archaeological correlations show that the Southern Cushitic stage of this expansion, into Kenya, began in the mid- or later fourth millennium BC (Ambrose 1982), so the earliest stage of Cushitic expansion could lie as much as several thousand years earlier than the fourth millennium.

Omotic prehistory

The Omotic division of the Afrasan family has two primary branches, North and South Omotic. The South Omotic branch is today restricted to the farthest southern part of the Ethiopian highlands. The northern branch, in contrast, extends across a much wider part of southwestern Ethiopia. There is indirect evidence, in the form of loanwords in the Agaw languages, indicating that other Omotic languages, of possibly a third branch, were once spoken considerably farther north in the highlands (Ehret 1976, 1995). The simplest history, taking into account only the extant languages, would place the proto-Omotic origins in the farther southern part of the Ethiopian plateau, with the North Omotic emerging as a northward and northeastward extension of Omotic peoples across the southern half of the highlands. But the loanword evidence suggests a broader association of Omotic peoples with the highlands as a whole at a still earlier point in time.

Chadic, Berber, and Egyptian Language History

The Chadic languages today cover a large expanse of territories running across the southern parts of the Lake Chad basin in the central Sudan belt of Africa. Scholars who have worked closely and extensively with these languages divide them into either three or four primary branches (Newman 1977; Jungraithmayr and Shimizu 1981), spread out east to west across this expanse of lands. Either subclassification depicts essentially the same broad history. The proto-Chadic language was spoken most probably somewhere in the areas west and southwest of modern-day Lake Chad. At the proto-Chadic period, on the order of about 7,000 years ago, a much vaster Lake Mega-Chad occupied the heart of the basin. The initial period of Chadic divergence into either three or four daughter societies would have spread Chadic communities all across the areas immediately west and south of that lake, from the plains north of the Jos Plateau on the west, to the Mandara Mountains in the middle, to as far east as the Guerra Mountains.

The Berber languages at the earliest stage of their so far traceable history were most likely spoken in central North Africa. Two different eras of major Berber expansion can be discerned from the linguistic record (Ehret 1999a, b). The earliest stage spread the ancestors of the Znaga to the western Sahara and of the Kabyle to northern Algeria, with the ancestral speech community of the remainder of the Berbers, which we might call the proto-Libu (i.e., Libyans), taking shape in some other part of central and western North Africa. An eastern outlier of this period of Berber expansion is likely to be reflected in the Middle Kingdom Egyptian records of warfare with peoples who attacked from the west around the close of the third millennium BC. The second period of Berber expansion, involving peoples of the Libyan grouping of Berbers, lay probably in around the late second millennium and the early first millennium BC, when renewed attacks on Egypt from the west are recorded. Only after this period, and possibly not until the coming of camels to the region around 2000 years ago, did the Tuareg spread into the central Sahara.

The Egyptian language, as far back as we can trace, was spoken along the Egyptian Nile. A single language, although characterized at different periods by significant dialect differences, it gives us no internal evidence for a wider history of expansion than what we know from the written record.

Semitic language history

The sole Asian division of the Afrasan family, Semitic, itself gave rise in later times to two African offshoots – a) Arabic, which has spread into North Africa, the Sahara, and parts of the eastern Sudan since 638 AD; and (b) Ethiopic, a group consisting of about 15 languages spoken today in Ethiopia and Eritrea, which all derive from a South Arabian language brought into the northern Ethiopian highlands in about the sixth and fifth centuries BC (Fleming 1968; Ehret 1988).² But the original split in Semitic was a dual one, separating Eastern Semitic, consisting of Akkadian in all its versions, from Western Semitic, comprising all the rest of the branch (Hetzron 1974, 1975).³ The subclassification of Semitic into Akkadian (Eastern) and Western branches locates its original center of divergence in the ancient period along a line that fell between Syria-Palestine and northern Mesopotamia. The most parsimonious history of Semitic has two alternative forms:

² Some scholars have offered impressionistic assertions that the proto-Ethiopic language might have been spoken in the Horn well before the sixth century, but Ehret 1988 and Fleming 1968 both have shown that there is no good reason to think that this Semitic offshoot reached there much if at all earlier than the epigraphic records indicate.

³ There remain alternative views to Hetzron's on how Western Semitic diverges, but his arguments and data continue to make a more compelling and—and this is crucial—a more comprehensively integrated case than any competing view.

(1) Proto-Semitic was spoken in northern Mesopotamia. Its speakers broke into two speech communities when one of those communities, ancestral to the Western Semites, moved away westward into Syria-Palestine.

(2) Proto-Semitic was spoken in Syria-Palestine. Its speakers broke into two speech communities when one of those communities, ancestral to Akkadian, moved away eastward into northern Mesopotamia.

Because of the many indications that non-Semitic languages predominated in Mesopotamia and all around its northern and eastern flanks in the pre-state eras – and that Akkadian therefore was originally intrusive to that region – the second solution seems by far the more probable of the two. The Syria-Palestine regions, as the part of Asia nearest and more directly connected to Africa, also make much better sense as the proto-Semitic territory, considering the solely African locations of all the rest of the Afrasan family. If it is eventually confirmed that the early Byblos language belongs to the eastern branch along with Akkadian, this would further consolidate the case for an original Syria-Palestine homeland for proto-Semitic.

Locating proto-Afrasan

So the linguistic geography of the Afrasan languages as a whole is resoundingly African. Even if the six major divisions of the family – Omotic, Cushitic, Chadic, ancient Egyptian, Berber, and Semitic – formed coequal primary branches of the family, each equidistantly related to each other branch, an inherently improbable situation – the inference of an African origin for the family would be overwhelmingly supported. An African homeland would more than meet the requirement of parsimony in such an instance: just a single population movement out of Africa would be required to account for the distribution of the branches. If an Asian origin were postulated, on the other hand, an immensely improbable five separate movements of peoples, all through one narrow isthmus or across the Red Sea to Africa, would have to be postulated.

The only basis on which the hypothesis of an Asian origin for Afrasan could be entertained would be a subclassification in which Semitic formed one of two primary branches of the family, and the other branch included the whole rest of the family. The old name Hamito-Semitic on the surface might seem to imply such a division. But no one who has worked widely on the family any longer considers this idea even remotely likely. The wide acceptance nearly everywhere today, even among the majority of Semiticists and Egyptologists, of the names Afroasiatic or Afrasan for the family came about because of the general recognition that Semitic does not constitute a primary branch all by itself and that the family is primarily an African one.

But the problems with an Asian origin for the family are far greater than even these considerations might suggest. Different lines of investigation – based on grammar, lexical innovation patterns, and a mix of grammatical and lexical evidence – have led several scholars separately to the conclusion that there actually is a particular division of Afrasan which may indeed form a primary branch of the family all by itself. That group is Omotic, the division of Afrasan located farthest south in Africa, in terms of the overall distribution of its languages, of any of the six divisions (Fleming 1969, 1983; Bender 1975; Ehret 1980). We now have available, in addition, a proposed overall classification of the interrelationships of the six divisions, based on the history of sound change in the family and backed up by further evidence of pronominal, lexical, and grammatical innovation. Again according to this classification, Omotic stands off from the rest of the family (Ehret 1995).

I. Omotic

(phonology: merging of proto-Afrasan (PAA) labiovelars with velars except before vowel *i; asymmetrical devoicing of two PAA voiced affricates (*j > *c, *dz > *ž); pronouns: innovation of *ta/*ne 1st/2nd person singulars)

II. Erythraic

(phonology: merging of PAA voiced and voiceless affricates into a single voiced and a single voiceless consonant; development of co-occurrence constraint disallowing two different labial consonants in same root; grammar: change to the marking of grammatical gender in nouns in place of only natural gender in PAA; pronouns: innovation of new masc./fem. 3rd person singular pronouns, of a new 3rd person plural pronoun, and of new 2nd person subordinate pronouns)

A. Cushitic

(phonology: PAA *b > *m preceding *n as the 2nd consonant in a root; unusual rule, devoicing of PAA *g to *k following *d or *w in the same root)

B. North Erythraic

(phonology: reduction of the vowels from a system of ten long and short vowels [*i, *ii, *e, *ee, *a, *aa, *o, *oo, *u, and *uu] to a system of one back, one front, and three central vowels [*u, *i, *a, *· and *ɨ])

1. Chado-Berber

(morphology: innovated pronoun shapes [Newman 1980])

2. Boreafrasan

(phonology: development of extensive array of co-occurrence constraints against any sequence of sibilants in the same root; collapsing of velar and palatal nasals with *n; loss of lexical tone; grammar: shift of any still productive verb extensions from stem-final to stem-initial position)

Figure 2. Outline Classification of Afrasan (Afroasiatic) with Diagnostic Innovations

The subclassification of the Afrasan (Afroasiatic) family has the above outline (fig. 2). The version presented here has been recently undated (on the basis of Newman 1980 in combination with as yet unpublished new findings). Summary notes on unique innovations supporting each branch, sub-branch, and sub-sub-branch accompany the outline:

A tree of the proposed Afrasan branch relationships involved here provides a clearer sense of its historical implications (fig. 3):

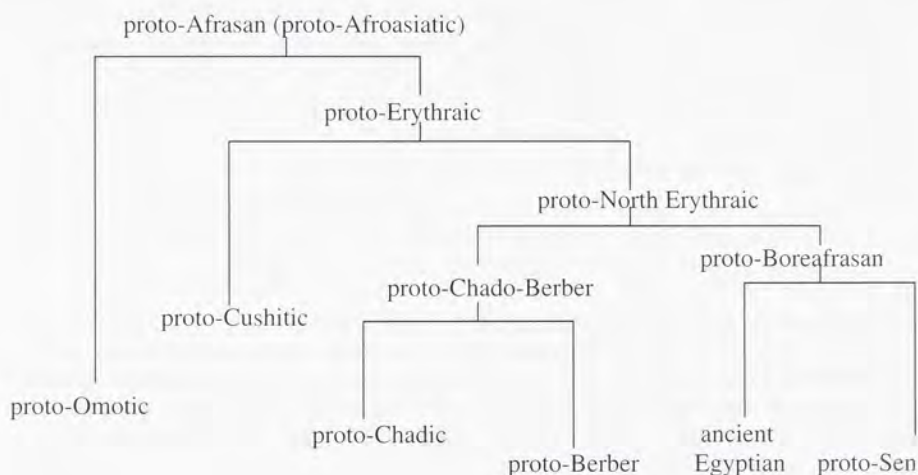


Figure 3. Family Tree of Afrasan Branch Relationships

The history implied by this linguistic stratigraphy begins with the proto-Afrasan speech community inhabiting a region no farther north than the southern half of the eastern Sahara. The primary divergence between Omotic and all the rest of the family allows two equally probable histories. One history places the proto-Afrasan community in the Ethiopian highlands. Afrasan then diverged into two branches, one ancestral to Omotic and a second, Erythraic, whose speakers spread northward into the areas of Africa west of the Red Sea. Alternatively, the proto-Afrasans initially lived immediately north of the Ethiopian highlands, and the ancestral Omotic society then diverged from the proto-Erythraic community by moving south into the highlands.

The overall scheme of relationships requires that at later periods the Erythraic peoples commenced a series of successively wider expansions, while the Omotic speakers remain restricted to Ethiopia. The Cushitic relationship tree (Figure 1) indicates that the Cushitic peoples spread by stages farther south through the Horn of Africa. The proto-North Erythraic speakers in contrast moved northward, most probably to the areas surrounding Egypt, diverging subsequently into proto-Boreafrasan and proto-Chado-Berber. Early Chado-Berber speakers, from the modern language distributions, would have emerged by an expansion westward across the Sahara. The subsequent resettlement of one branch of Chado-Berber southward accounts for the Chadic languages of the Chad Basin. The Berber languages derive from the Chado-Berber languages that continued to be spoken across North Africa. Boreafrasian also gave rise to two groups of people. One descendant group would have remained in the Egyptian regions and evolved into the later ancient Egyptians. The other group of early Boreafrasian speakers would have moved at some point across Sinai into the Levant; their descendants in language would have been the Semitic speakers of the past 6,000 years.

Future work may well revise or overturn parts of this picture; other parts are likely to last. The strongest claim here is that Omotic and Cushitic are indeed the two earliest divergences within the family. The evidence is pervasive that Egyptian, Semitic, Berber, and Chadic are significantly closer related to each other than they are to either Cushitic or Omotic, and that Omotic above all, and Cushitic to a lesser extent, stand off from the rest of the family. What this means is that the most probable lands of the proto-Afrasans lay not just in Africa, but specifically either in the southeasternmost parts of the Sahara, along the west side of the Red Sea, or farther south, in the Ethiopian highlands.

Dating Early Afrasan History

There is another kind of evidence, cognate counts in a 100-meaning list of basic vocabulary, that can be brought to bear on the problem of Afrasan subclassification and history. It is not determinative evidence by itself, and in any case the time depth of differentiation within the Afrasan family is so great that the rates of lexical retention between languages of distant branches of the family are exceedingly low. Nonetheless, these data conform roughly in their indications to the other evidence of subclassification. Most important, they bring us to an abrupt awareness of just how long ago the proto-Afrasan language must have been spoken.

A sample of lexical retention counts is provided here, drawing on the evidence of several languages from each of the major divisions of the Afrasan family. To give some reflection of the degree of diversity within each division, the languages were chosen from distantly related subgroups in each.

Because the Afrasan figures are so low, two points need special emphasis. First of all, the determination of what is cognate and what is not is based on the rigorous establishment of regular sound correspondences across the family (Ehret 1995). Neither impression nor guesswork is involved here. In addition, the knowledge of the regular correspondences allows one to avoid counting word borrowings as if they were true cognates. Failure to separate out borrowings can lead to a false inflation of the scores of Arabic with many of the Berber languages and of those between a number of the Cushitic and Omotic languages.

Ari (South Omotic)

8	Mocha (North Omotic)										
1	0	Iraqw (Southern Cushitic)									
2	1	8	Cadale Soomaali (Eastern Cushitic)								
0	1	2	10	Yaaku (Eastern Cushitic)							
1	2	6	9	5	Awngi (Agaw Cushitic)						
1	2	4	7	5	7	Beja (Northern Cushitic)					
0	0	2	0	2	1	0	Ngizim (West Chadic)				
0	1	1	1	1	1	1	9	Matakam (Central Chadic)			
0	1	1	1	1	1	0	7	5	Tuareg (Berber)		
0	1	1	1	1	1	0	6	5	30	Kabyle (Berber)	
1	2	3	2	1	2	2	3	3	6	5	Middle Egyptian
2	2	2	2	1	2	1	3	4	4	3	6 Sudan Arabic (Semitic)
2	3	1	2	1	3	2	3	4	3	3	5 26 Tigre (Semitic)

Figure 4: Matrix Sample of Representative Afrasan Cognate Retention Figures

Secondly, the reader needs to know just what it is that this kind of lexicostatistics does count (fig. 4). The focus of the exercise is not simply the counting of cognates, as many works seem to imply, but rather the counting of a particular category of cognates, namely, lexical retentions. What one counts up is the number of times, in the 100-meaning list, in which a pair of related languages have retained the very same root word with the very same meaning ever since their earliest ancestor languages diverged out of their common proto-language. In both Ari of the Omotic branch and Iraqw of the Cushitic branch, for instance,

well over half of the items on the 100-meaning list can be traced back to proto-Afrasan roots (Ehret, MS), yet only one of the 100 has retained its original meaning down to the present in both languages. The rest have changed their meanings over the millennia since the proto-Afrasan period – so far in the past did that period lie. The direct cognate, for example, of Ari word *gooli* “tail,” an item on the 100-meaning list, is Iraqw *gwalay* “female genitals,” different in meaning although clearly the same root.

One caveat: the Egyptian figures come from a version of the language spoken almost 4,000 years ago, so that it had less time for lexical change than the other cited languages, all of them spoken today. For this reason the Egyptian cognate retention counts are skewed higher with the other languages than if we had a modern-day descendant of Middle Egyptian to draw our data from. In particular, if we adjust our figures to account for this time difference, the Middle Egyptian percentages of cognate retention with Chadic, Berber, and Semitic drop down to around 2 per cent, and with Omotic and Iraqw, down to an average of 1 per cent.

We can better view the implications of this sample if we extract from it the ranges of cognate retention between the various deep divisions of the family. In this matrix we give the Middle Egyptian figures, as adjusted to account for the fact that those figures come from 4,000 years ago rather than from the present (the adjusted numbers are marked with asterisks; fig.5):

Omotic					
0-2	Cushitic				
0-1	0-2	Chadic			
0-1	0-1	5-7	Berber		
1	1	2*	2*	Egyptian	
2-3	1-3	3-4	3	2-3*	Semitic

Figure 5: Adjusted Inter-Group Median Percentages of Cognation Retention

The figures between the deep divisions are too low and close together to allow a detailed hierarchy of relationships to emerge, such as can be argued from other kinds of evidence. But taken at face value, they do reveal one thing: three distinct levels of Afrasan relationships appear in the numbers. Chadic and Berber share distinctly more lexemes in the basic list, confirming the probability of their forming a Chado-Berber sub-branch of North Erythraic (see outline and tree of relationship above). Chado-Berber, Egyptian, and Semitic divisions fall in the next range, with their figures with each other no lower than two per cent. Cushitic and Omotic appear consistently more distant, both from each other and

from the combined Chadic-Berber-Egyptian-Semitic branch, with their percentages of shared retentions of the same proto-roots with the same meanings running, in the great majority of cases from zero to two per cent. The Semitic languages chosen for the sample tend to run about a percentage point higher across the board with the other groups, so that figures as high as three per cent between Tigre and Omotic and Cushitic can be found. But the pattern is nevertheless preserved.

The lexical retention counts, in other words, conform to the conclusion reached from other, better kinds of evidence – that out of the earliest periods of divergence of Afrasan there arose three deep divisions of the family, Omotic, Cushitic, and North Erythraic (Chadic-Berber-Egyptian-Semitic). Just one branch, North Erythraic, then gave rise to languages to all the languages the northern half of the Sahara. Once again, the evidence strongly places Afrasan origins and the first stages of differentiation within the family no farther north than the southern half of the eastern Sahara.

The most striking insight these data give us, however, is that the proto-Afrasan language must have been spoken a great many thousands of years ago. Consider the Indo-European family: the percentages of cognate retention in the 100-meaning list between its most distantly related, modern spoken languages center around the middle and high teens, with one language, Armenian, dropping lower because of the numerous non-Indo-European loanwords in its basic vocabulary, to around 10 per cent with the rest. The most commonly accepted archaeological correlations date the early Indo-European society to around the fourth millennium BC or somewhat earlier.⁴ The retention counts between the most distant Afrasan languages, far lower, at 0-3 per cent, must therefore surely reflect a time span thousands of years longer than proto-Indo-European's generally accepted 6000 years. Just how many thousands of years is an issue one can dispute. But if, just for the sake of argument, we treat the formula used in glottochronology as if it made sense so far back in time, we discover that figures of 0-3 per cent, with a median of about one or two per cent, should correspond to a time span of somewhere in the range of 15,000 years between the time the proto-Afrasan language was spoken and now.

⁴ The only alternative claim, originated by Colin Renfrew, ties Indo-European to the first spread of agriculture into Europe 2000 to 3000 years earlier than that. This possibility is flatly contradicted by the evidence of the reconstructed proto-Indo-European vocabulary of technology (wheels, horses) and agriculture and by the evidence of pre-Indo-European substrata in each of the European branches of the family. These substrata include borrowed non-Indo-European words relating to agriculture, directly demonstrating that Indo-European languages spread into regions where farming was already established.

Linguistic Stratigraphy, Subsistence, and Dating

But we have a better and more direct way of establishing time spans of linguistic history. We can work out the linguistic stratigraphy of early Afrasan subsistence practices, and we can compare those findings to uncover plausible archaeological correlations. The basic framework of a linguistic stratigraphy is provided by the subclassification (fig. 6) of the family (see also the tree of relationship above):

- I. Omotic
- II. Erythraic
 - A. Cushitic
 - B. North Erythraic
 - 1. Chado-Berber
 - a. Chadic
 - b. Berber (Amazight)
 - 2. Boreafrasan
 - b. Egyptian
 - c. Semitic

Figure 6: Outline Classification of Deep-Level Divisions of Afrasan

Were the Early Afrasans Cultivators?

What sequences of subsistence developments took place among early Afrasan speaking peoples? At the proto-Afrasan period, a substantial body of root words (as reconstructed in Ehret 1995, Ehret MS, and Orel and Stolbova 1995) shows the earliest Afrasan communities to have utilized grasses and/or grains for food (table 1).

Table 1: Proto-Afrasan and proto-Erythraic Subsistence

1. *maa “grain” [Omotic: Mocha *māwo* “cereals”; Cushitic *maay “grain; hard particle” (So. Cush. “granary”); Chadic: E. Chadic *may “sorghum”; Egyptian *mymy* “seed corn of emmer (?)”; Semitic *my “grain, seed grain, whole grains”]
2. *t’eff- “grain” [Omotic: Gonga *t’eepp- “wheat”; Cush: Agaw *tab-/taf- “t’ef”; EC: Soomaali *dheef* “food, sustenance”]
3. *ʕeyl- “grain, cereal” [Omotic *il- “flour”; Cushitic *ʕeyl- “grain, cereal”; Egyptian *inyt* “kernels”]
4. *ḥaw-/*ḥay- “grain (gen.)” [Cushitic *ḥay- “grain (gen.)”; Chadic: Ngizim *āw* “grain (gen.); Egyptian *ḥw* “food”]

5. *buz- “flour” [Cushitic: Soomaali *budo* “flour”; Chadic: Bole *buḍu* “flour”; Omotic: Gonga *buddino “flour” is a probable loan from Cushitic]
6. *dzayj- “(coarse?) flour” [Omotic (Bench *žaču* “millet flour”); Egyptian *zww* “dust”; Semitic (Arabic *jadīd* “coarse flour”)]
7. *baayn- “grindstone” [Omotic; Chadic; Egyptian]
8. *-xuum- “to separate ears of grain” [Omotic: Zays *huum*- “to winnow”; Egyptian *hms* “ear of wheat” (Coptic *hms*, *hēms*)
9. *k^waʔ- or *-k^waaʔ- “grain (coll.)” [Cushitic: So. Cush.: Kw’adza *kw’aʔateto* “granary” (stem plus So. Cush. n. suffixes); Egyptian *ḳ33* “grains (?)”]
10. *zar- “grain, grass seed” [Omotic *zar- “seed”; Chadic (Ngizim *?ari* “grain with bran removed”); Semitic: PS *zrʕ “to sow; seed”]
11. *boor- “grain sp.” [Cushitic: Dullay *boor-t- “barley”; So. Semitic *br(r) “corn, wheat” (A. *burr*)]
12. *dar- “sorghum (?)” [Omotic: Chara *dara* ; EC: Afar *daro* ; Berber: Tamazight *ɔdɔ ra* “corn” (root *dər-, with unexpected vowel outcome, however)]
13. *muš-/miš- “kind of grain” [Cushitic *mušʔŋ-/mišʔŋ- “sorghum”; Egyptian *msy* “kind of grain”]
14. *daadl- “grain sp.” [Cushitic: Oromo *daad’a* ; Egyptian *dḏl*]
15. *ʕaag- “grain” [Cushitic: PSC, Beja; Egyptian; Chadic: Ngizim]
16. *baz- “grain” [Cushitic: PEC *baz(z)- “flour”; Egyptian *bdt* “emmer, spelt”; Semitic: Arabic *bazr*, *bizr* “seed, grain”]
17. *sowʕ- “grain, cereal” [Cushitic: Highland East Cush. *soʔ- “barley”; Chadic *səw- “sorghum”; Semitic *səʕ(ʕ) “wild grain” (Arabic “vetch; wild wheat”)]
18. *puzn- “loaf” [Cushitic: HEC, Oromo *budden- “flat bread”; Egyptian *pzn* “a loaf”]
19. *faʕ- or *faaʕ- “cooked grain” [Cushitic: So. Cush. *faʕ- “porridge”; Egyptian *pct* “a cake or loaf”]

Two other of terms of reference to the subsistence use of grains can be reconstructed to the ancestral North Erythraic language:

Table 2: Additional Grain Subsistence Terms in proto-North Erythraic

20. *ɣunz- or *ɣ^winz- “sp. of grain” [Chadic: Hausa *gundu* “Pennisetum” (Chadic *ɣ > Hausa /g/); Egyptian *hnd* “kind of cereal”]
21. *law “grain (coll.)” [Chadic: some C. Chadic *law “sorghum”; Egyptian *š* “garden”; Semitic: Arabic *šauna-t*, pl. *šawānī* “granary, barn” (< *lawn, stem plus *n n. suff.)]

But despite the size of this body of evidence, not one word certainly diagnostic of cultivation can be reconstructed for the early periods of Afrasan history. No words for a cultivated field and no words for tools specifically and only used in cultivation, such as the plow, appear in the data. A variety of verb roots of reference to digging can be identified, but none specifically and universally applies to cultivation.

One old Afrasan root, *-mar- "to dig," has been cited by various scholars as a candidate for such a verb of cultivation (notably Greenberg 1964). It gave rise to a proto-Chadic root word that distinctly meant "cultivated field." But in the Semitic languages and Egyptian it occurs as a noun for a digging implement, either a hoe or a digging stick, a tool not diagnostic of farming because gatherer-hunters before the eras of agriculture also commonly used such digging implements. And above and beyond that problem, its Cushitic reflex, seen in the Southern Cushitic noun *mara?- "burrow, den" (verb stem plus a Southern Cushitic noun-forming suffix *-V?-), directly implies that the root originally applied to the digging of a hole and not to farming.

Alexander Militarev (2003) in a recent article has made the opposing claim, that the proto-Afrasans were food producers. There are two fatal problems with his arguments and data. The first is that the actual meanings of the reflexes he cites for each of his roots contradict his claim. The reflexes each include words that do have agricultural meanings in some languages or subgroups of Afrasan, but in each case the same roots have non-agricultural meanings in other languages, undermining the claim of reconstructed agricultural meanings for the roots. The second fatal objection is that Militarev's proposed roots mostly can be shown not to be valid phonologically regular reconstructions. All but perhaps one of the purported roots are visibly composite in origin. That is, they combine into one root the reflexes of from two to as many as four or five distinct and separate early Afrasan roots (Ehret, forthcoming).

The complete lack of determinative evidence of cultivation in the early Afrasan strata contrasts sharply with the picture for later periods. In each of the proto-languages of the major divisions of the family root words distinctly indicative of farming occur. In the subgroups of deepest time-depth, the words are not numerous, but they consistently name aspects of cultivation. The proto-Cushitic language contained a verb meaning "to cultivate, till" and a noun for "cultivated field" (Ehret 1979, 1999a, b), while proto-Chadic had, as just noted, the word *mar "cultivated field." The subsistence vocabularies of the proto-Berber and proto-Semitic languages provide still stronger evidence that their speakers were indeed farmers (for Semitic, see Diakonoff 1981). (The proto-Omotoc vocabulary has not yet been adequately enough studied to include its data in the picture.)

To sum up, throughout the early stages of Afrasan history, the lexical evidence is exceedingly strong that grains or grasses played a key role in subsistence. At the same time, however, there is no evidence before the proto-Cushitic, proto-Chadic, proto-Berber, and proto-Semitic languages that these sources of food were anything but wild plants. The answer to the question asked by the title of this section seems to be, "no", the early Afrasans were not cultivators.

Were the Early Afrasans Herders of Domestic Animals?

But if the early Afrasan were not tillers of the soil, might they still have been raisers of livestock?

The diagnostic evidence for postulating herding is a little different in nature from that indicative of cultivation. Again the reconstruction of certain verb roots is important, including roots with such meanings as "to drive to pasture" and "to drive to water." And there is a herding noun equivalent to the term for "cultivated field," namely a word for "livestock pen." But in addition, the domestication of an animal can be identified from the existence of certain breeding terms. It is not enough to reconstruct separate words for the male and female of a particular animal, distinct from the generic term, because gatherer-hunter peoples often themselves make these distinctions for especially important meat animals. What is diagnostic of herding, however, is the presence of the particular breeding terms for "castrated male" and for "young female animal that has not yet born young" (e.g., heifer, Färse). Milking is another activity requiring domestication for its success. The diagnostic terms in this semantic field are verbs for "to milk" and nouns for such things as "sour milk," "buttermilk," and "butter." The noun "milk" is, of course, non-diagnostic by itself, as are also verbs with the meaning "to produce milk," since all mammals, including humans, make milk.

None of these several kinds of term diagnostic of livestock raising can be certainly reconstructed back to the early stages of the Afrasan family. Only at the proto-Cushitic, proto-Chadic, proto-Berber, and proto-Semitic stages, separately in each division, did such vocabularies come into certain existence. Proto-Cushitic, for example, had verbs for "to milk" and "to herd" and nouns for "sour milk," "heifer," "ewe-lamb," and "livestock pen," among others (Ehret 1987, 1999a,b).

But there is one other kind of evidence that can be diagnostic of herding, and that is the presence of terms naming animals that were domesticated elsewhere and were not native in their wild state to the areas where those terms are used. In the case of the Afrasan languages of Africa, such animals would be the goat and the sheep, both domesticated in far southwest Asia. A number of possible old Afrasan terms for goat and sheep have been proposed (Orel and

Stolbova 1995). Most of these turn out not to be valid reconstructions or to have more probably referred originally one or another species of antelope or other wild ungulate.

Nevertheless, after weeding out the inapplicable cases, a few terms do remain that consistently refer to either goats or sheep. We can divide them into two groups. The first group contains three terms that each very probably does derive from a single original root word, but fail the test of fully regular sound correspondence in either their vowels or their consonants. Their distribution in the Afrasan languages must thus be attributed to borrowing spread:

Table 3: Terms for Domestic Stock Widely Spread by Borrowing.

22. *book- or *boox- "he-goat" [Cush: Beja *book* "he-goat"; Chadic: PCh *bkr "he-goat," Matakam *bɔx* "goat"]
23. *b-g- "sheep" [Cush: Agaw *bəg-; Semitic: Ethiopic *bəgg- is a loan from Agaw; Omotic: Gonga *bag- is also a probable Agaw loan]
24. *gayd- "goat" [proto-Semitic *gdy "goat"; Berber *i-ɣayd "kid"; Berber *t(a)-yat "goat" could be a separate borrowing of this same root]

Item 22 is a Wanderwort, having diffused from the Chadic languages of the Chad Basin as far south by 3000 BC as southern Cameroun, where it was adopted into the proto-Bantu language as *-boko "he-goat" (Ehret 1998: 105). It also appears in Indo-European: German *bock*, English *buck* "he-goat, male deer, etc.," and Armenian *buc* "lamb." Item 24, found in just the Semitic and Berber subgroups of the Afrasan family, seems similarly to have been a Wanderwort, with a northward expansion as well, accounting for proto-Indo-European *ghaido-"he-goat" (the source of the English word *goat*).

Table 4: Domestic Animal Terms of Uncertain History.

25. *ndzil- "ram" [Chadic: CCh *(n)zəl- "ram (?); Eg. *zr* "ram," *zr.t* "ewe"]
26. *karr- "young sheep" [proto-Semitic *krr "male lamb"; Berber *-krärr -/*-krär = "sheep"]

The second group of such items (table 4) consists of just two roots, which, as far as we can tell (we lack evidence of the Egyptian stem vowel in item 25), do show regular sound correspondences throughout. Both refer to sheep. They may indeed demonstrate the adoption of sheep very early among North Erythraic people. An alternative explanation, however, better in keeping with the borrowing spread of the generic term *b-g- for "sheep" (item 23 above), is that

these two words dispersed, too, by borrowing, but in this case without happening to have left visible phonological evidence of that fact.

The latter of these two terms then spread farther south, where it was adopted into some of the Nilo-Saharan languages (Ehret 1993).

To sum up the evidence for livestock raising, there is no firm basis for thinking that the Afrasan peoples kept livestock in the early eras of their history. Several terms for goats and sheep have distributions that best fit with their having been terms that diffused from one Afrasan group to another along with the spread of those two animals from Asia into Africa, beginning by or before 6000 BC. But as was true for cultivation, the clear evidence for herding appears only at the proto-Cushitic, proto-Chadic, proto-Berber, and proto-Semitic periods.

Early Nilo-Saharan Language History

Stratifying Nilo-Saharan History

Having laid out the evidence for the early Afrasans, we proceed now to consider the Nilo-Saharan speakers and their roles in early northeastern Africa.

A recent, detailed Nilo-Saharan family stratigraphy has been published elsewhere (Ehret 2001). We present a simplified version of that stratigraphy here (Figure 7), with the lower-level internal subgroupings within the Central Sudanic, Koman, Saharan, Maban, and Eastern Sudanic divisions of the family left off. The dating scale along the right side of the chart rests on proposed archaeological correlations of the ninth to seventh millennia BC for the Northern Sudanic, Saharo-Sahelian, and Sahelian stages in the linguistic stratigraphy (Ehret 1993) and separately on correlations of developments of the last two millennia BC for the Nubian and Rub strata (Thelwall 1982; Ehret 1983, 1998, 2003a). The correlations of the ninth to seventh millennia seem, if anything, even more securely founded in the light of the most recent reevaluations of the eastern Saharan archaeology (Wendorf and Schild 1998, 2001). The intervening stages of Nilo-Saharan divergence have been given proposed rough dates in the stratigraphy according to their relative lexicostatistical distances (see Bender 1971, Thelwall 1982, Ehret 2000 for these figures). Question marks following these interpolated dates denote their lack as yet of proposed specific correlates in the archeological record. The dates, the reader will note, are not necessarily proportionally spaced along the righthand side, because of the necessity of fitting more salient nodes into the tree during some eras than in others.

Early Nilo-Saharan subsistence

The evidence for the timing of the emergence of food production is strikingly clear and consistent in the Nilo-Saharan stratigraphy. For the proto-Nilo-Saharan and proto-Sudanic stages, no food production can be reconstructed.

The proto-Northern Sudanic language, in contrast, contained vocabulary indicative of the raising specifically of cattle, along with lexicon requiring the use of grains as food, but not diagnostic of their having been cultivated. The succeeding stage, proto-Saharo-Sahelian, added vocabulary of cultivation along with lexicon indicative of more extensive cattle raising and also, for the first time, terminology descriptive of large, complex sedentary homesteads, including granaries and round houses. The still later period, proto-Sahelian, added further words to the agricultural and cattle-herding lexicon, as well as a set of words relating to goats and sheep (for these data, see Table 5 below).

The linguistically-attested steps in the shift of Nilo-Saharans to a food-producing economy are exactly those of the archaeology of the earliest cattle-raisers of the southern eastern Sahara between 8500 and the sixth millennium BC^o- first, cattle raising and ephemeral settlements; then, as of the later eighth millennium, larger more sedentary settlements with granaries and round houses and *prima facie* evidence of possible cultivation; finally, sometime after 7000 BC, the appearance of sheep and goats.

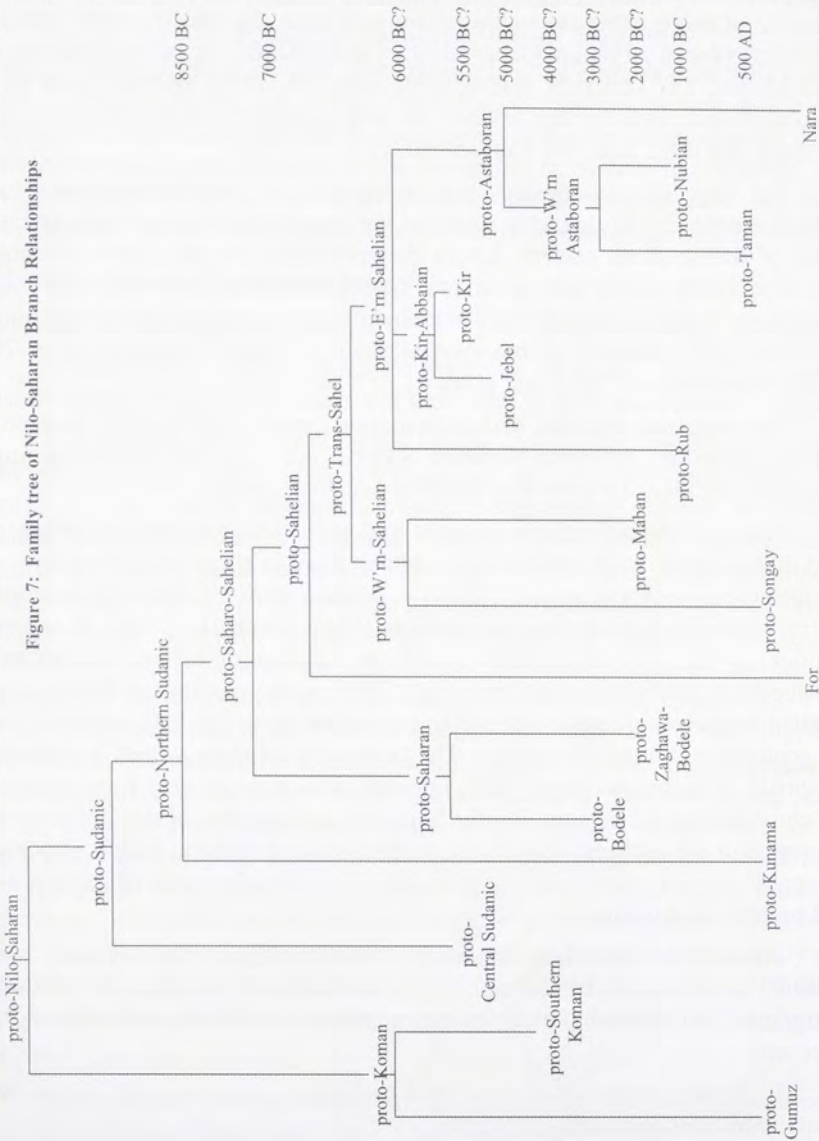
The evidence that the earlier two strata, proto-Nilo-Saharan and proto-Sudanic, preceding the proto-Northern Sudanic era were pre-food-producing is not simply negative. Two positive kinds of evidence exist.

First, in proto-Northern Sudanic and proto-Saharo-Sahelian, every root word diagnostic of food production for which there is a known etymology – and this means the majority of such terms – derives from an earlier root word of originally non-food-producing connotation (Ehret 2000a, b; 2001). These word histories, in other words, directly reveal the re-adaption of old vocabulary to describe new knowledge and practice. This pattern continued in the proto-Sahelian language, except for the adoptions at that period of loanwords for sheep and goats from Afrasan languages. The borrowing of these words demonstrates the spread of these animals to Nilo-Saharans who were already food producers. The chronological placement, i.e. the linguistic stratigraphy, of this evidence is in keeping with the archaeology of the southern eastern Sahara, which also places the spread of sheep and goats subsequent to the development of cattle raising (and probably cultivation).

Second, the two deep branches of Nilo-Saharan, Koman and Central Sudanic, which diverged before the proto-Northern Sudanic period in the stratigraphy, each developed its own vocabularies of food production by two processes:

1. deriving their own new food-producing terms out of earlier Nilo-Saharan non-food-production lexicon;

Figure 7: Family tree of Nilo-Saharan Branch Relationships



2. *borrowing* key food-producing words from descendant languages of proto-Northern Sudanic.

This latter kind of evidence reveals that the Koman and Central Sudanic development of food production rested on the prior creation of this kind of economy by the Northern Sudanians and their descendants.

For the proto-Sudanic period, preceding the Northern Sudanic era, a small set of data relating to the economy and technology of the proto-Sudanic period has been given tentative identification. It consists of three verbs, one meaning apparently “to grind (a tool)” and the others for “to grind (grain)” and “to heap up (especially grain),” and a very, very provisionally proposed noun for a jar or pot of some kind. These terms direct our attention to some of the things we might look for in seeking to identify the archaeology of the immediate pre-cattle-raising ancestors of the proto-Northern Sudanians. They may already have been collectors of wild grains or grasses and would already have been making ground stone tools, and they may possibly have been experimenting with pottery making (see Table 5).

Table 5: The Development of Nilo-Saharan Food-Production Vocabulary

Sudanic stage (uncertain space of time before 8500 BC)

1. *hî or *hih “to grind (grain)” [CSud; Kunama]
2. *we:y “to whet, grind (blade)” [CSud; Kunama; For; E’rn Sahelian (Kir-Abbaian [KA]; Daju, Nilotic)]
3. *pið “to gather (especially grain)” [CSud; Saharan; For; E’rn Sahelian (Astab; Nubian; KA: Nilotic)]
4. *DoS “water pot (?)” [CSud; Kunama] (this item is a very tentative proposal)

Northern Sudanic stage (9th/8th millennium BC)

(lexicon diagnostic of livestock-raising)

1. *nðow “to milk” [Kunama; E’rn Sahelian (Astab; Tama; KA: Gaam; proto-Kuliak)]
2. *şu:k “to drive (domestic animals)” [Kunama; Saharan; E’rn Sahelian (Astab; Nubian)]
3. *ya:t “to water (livestock)” [Kunama; Saharan]
4. *se or *şe “grass used as fodder” [Kunama; Saharan]

(subsistence lexicon, non-diagnostic of food production)

5. *ya:yr “cow” [Kunama; Songay; E’rn Sahelian (Astab; Nara; KA: Gaam, S’n Nilotic)]
6. *Way “grain” [Kunama; For; E’rn Sahelian (Astab; KA)]
7. *ke:n “ear of grain” [Kunama; Songay]
8. *p’el “grindstone” [Kunama; E’rn Sahelian (KA: W’ern Nilotic)]

(lexicon of other material culture)

9. *sa:p *or* *sa:B “temporary shelter” [Kunama; Songay; E’rn Sahelian (KA: W’rn Nilotic)]
10. *ted “to make pot” [Kunama; Maban (Maba); E’rn Ssahelian (KA: W’rn Nilotic)]

Saharo-Sahelian stage (later 8th millennium BC)

(lexicon diagnostic of cultivation)

1. *dip^h “to cultivate” [Saharan; Songay; E’rn Sahelian (KA: Gaam)]
 2. *tɔ:k(ɔ:p) “to cultivate” [Saharan; Songay; E’rn Sahelian (Kuliak)]
 3. *{h}ayp^h “to clear ground in cultivation” [Saharan; Songay; E’rn Sahelian (Rub; KA: Gaam)]
 4. *k^hay “to clear (weeds, stubble)” [Saharan; Songay; E’rn Sahelian (KA: Nyimang; W’rn Nilotic)]
 5. *dɔmp “cultivated field” [Saharan; E’rn Sahelian (KA: Temein; W’rn Nilotic)]
- (grain preparation lexicon, non-diagnostic)
6. *ɲak *or* *ɲaG “to grind (grain) coarsely” [Saharan; E’rn Sahelian (KA: W’rn Nilotic)]

7. *p^heθ “to winnow” [Saharan; Songay; E’rn Sahelian (KA: Nilotic)]

(other material culture lexicon: residential)

8. *boreh “thornbush cattle pen” [Saharan; E’rn Sahelian (Kuliak)]
9. *k^hal “fence” [Saharan; Songay; E’rn Sahelian (KA: W’rn Nilotic)]
10. *Dɔɲ “yard, enclosure of homestead” [Saharan; For; E’rn Sahelian (KA: Daju; E’rn Nilotic)]
11. *dɔr “open area of settlement” [Saharan; E’rn Sahelian (Astab; Nubian; KA: Gaam, Nyimang, Nilotic)]
12. *p^her *or* *per “granary” [Saharan; For]
13. *dɔpk’ol “circular roll of grass which supports roof of round house” [Saharan; E’rn Sahelian (KA: W’rn Nilotic)]

(additional livestock terminology, diagnostic of livestock-raising)

- (8. *boreh “thornbush cattle pen”)
14. *yokw “to herd” [Saharan; Songay; E’rn Sahelian (Kuliak; KA: Nilotic)]
15. *ɲgeɫ’ “to milk” [Saharan; E’rn Sahelian (KA: W’rn Nilotic)]
16. *t^ha “milk” (n.) [Saharan; E’rn Sahelian (Astab; Nara; KA: W’rn Nilotic)]
(derivation < PNS root for “white” implies milk in quantity, hence diagnostic of milking)

Sahelian stage (7th/6th millennium BC?)

(lexicon diagnostic of sheep and goat raising)

1. *ay “goat” [For; E’rn Sahelian (KA: Temein, Daju, Surmic)]
2. *ɟent “he-goat” [Songay; E’rn Sahelian (Kuliak)]
3. *Wer “sheep” [For; E’rn Sahelian (Astab; Nubian; Kuliak; KA)]
4. *meɲk^h “ram” or “sheep” [Maba (“sheep”); E’rn Sahelian (KA: Nilotic (“ram”))]
5. *Wel_ “ram” [For; E’rn Sahelian (Kuliak; KA: Daju)]

6. *k'er "ewe-lamb" (?) [Songay ("female kid"); E'rn Sahelian (KA: Bertha, Temein, E'rn Nilotic)]
7. *ɸaw "lamb" (?) [Maban; E'rn Sahelian (Astab: Nara; KA: Nilotic)]
8. *θagw "young male goat or sheep" (?) [Songay; E'rn Sahelian (KA: Daju, Nilotic)]
- (additional cattle terminology)
9. *Tɛ or *Teh "cow" [Maban; E'rn Sahelian (Astab.: Nubian, Taman; KA)]
- (additional cattle terminology, diagnostic of cattle-raising)
10. *oWiŋ "bull" [For; E'rn Sahelian (KA: E'rn Nilotic)]
11. *ma:wr "ox" [Maban; E'rn Sahelian (KA: Kir)]
12. *yagw or yaɸw "young cow (heifer?)" [Songay; E'rn Sahelian (Astab: Nubian; KA: S'rn Nilotic)]
- (additional crop lexicon)
13. *uT "a kind of calabash" [Songay; E'rn Sahelian (Kuliak)]
14. *k^hul "a kind of gourd" [Songay; E'rn Sahelian (KA: Nilotic)]
15. *Kedeh "bottle gourd" [For; E'rn Sahelian (KA: Nilotic)]
16. *buɸ "edible gourd" [For; E'rn Sahelian (KA: Surmic, Nilotic)]
- (additional lexicon diagnostic of cultivation)
17. *p^had "to cultivate" [Songay; For; E'rn Sahelian (KA: S'n Nilotic)]
18. *t'um "to sow, plant" [Songay; E'rn Sahelian (KA: Gaam)]
19. *p^ha:l "bush, uncultivated land" [For; E'rn Sahelian (Astab: Nubian; KA: Nilotic)]
- (food preparation lexicon, non-diagnostic of food production)
20. *p'ent'uh "winnowing tray" [Songay; E'rn Sahelian (KA: W'rn Nilotic)]
- (other material culture lexicon: residence)
21. *hwe "house" [Songay; E'rn Sahelian (Kuliak; KA)]
22. *ka: or *ka:h "enclosure (for cattle?)" [Songay; E'rn Sahelian (Astab: Nubian; KA: S'n Nilotic)]

What have not been properly investigated as yet are the fish and fishing lexicons of early Nilo-Saharan. The little we can propose as yet about the material culture of the proto-Sudanic stratum allow the possibility that the proto-Sudanians were the instigators of the spread of the Aquatic economy of the tenth to eighth millennia across the Sudan belt. In this scenario the Northern Sudanians could be understood as an offshoot of the proto-Sudanic community that chose an alternative subsistence response to the changing climate of the era – adapted to the dry eastern Saharan areas away from the more favored river and lake environments where their sister peoples of the Sudanic branch predominated. In this way we could parsimoniously account for the shared pottery traditions and other features common to both the Aquatic peoples and the Eastern Saharan cattle-raisers.

Summing up the Linguistic Inferences on early Nilo-Saharan and Afrasan History

The Afrasans

The now very extensive evidence we have from the stratification of language history from greater northeastern Africa places two families of languages, Afrasan (Afroasiatic) and Nilo-Saharan, anciently in these regions. (There may well once have been other language families there, but if so their languages have all become extinct in the face of the expansion of these two families.) The presence of both these families goes back to pre-food-producing eras, well before 10,500 B.P.

The Afrasan family originated in all probability in either of two locations: in the northern Ethiopian highlands or in the areas immediately north of the Highlands. There is an interesting bit of supporting zoological vocabulary evidence for placing them in the Horn: their reconstructed lexicon shows that at the Erythraic stage of their history, they knew of the donkey, PAA *kwer-, and a second equine species, proto-Erythraic *for- (Ehret, MS). The second term denotes a zebra in Cushitic languages, but an onager in Semitic, so either meaning might seem plausible as the original. But in fact there appears to have been only one zone of with a high probability of early Afrasan settlement, in which two species of wild equine coexisted in the late Pleistocene, namely, the steppe climate areas of the northern and eastern Horn of Africa, where the territories of the wild donkey and the zebra overlapped.

The evidence of reconstructed subsistence lexicon shows that the proto-Afrasans and their Erythraic descendants must particularly have emphasized the collection of wild grasses and/or wild grains. Just this kind of economy was present in the Terminal Pleistocene in or near the regions where the linguistic arguments best place the proto-Afrasans. Wild grass collecting goes back before 15,000 BP in the Nubian Nile regions and has been claimed to be present in the same period around Diredawa on the northern edges of the Ethiopian highlands. What is lacking currently is knowledge of subsistence in the highlands themselves in the Terminal Pleistocene. But since this period was arid, with probably much more extensive areas of grassland in the highlands than in the early and mid-Holocene, it would not be at all surprising if we were to discover that wild grass or grain collection was practiced there as well.

The unassailable lexical evidence of food production among Afrasan peoples goes back only to the proto-periods of the major existing subgroups of the family, the proto-Cushitic, proto-Chadic, proto-Berber, and proto-Semitic periods. If we consider the chart of inter-branch Afrasan cognate retention percentages, the branch with the deepest internal time depth is Cushitic. The lowest

percentage range in Cushitic, representing the time since the first divergences within Cushitic took place, centers on a median of 5-6 per cent. The range of deepest cognation in Northern Sudanic, with a median slightly lower at around four per cent (Ehret 2000b), indicates that the proto-Cushitic period fell perhaps slightly later than proto-Northern Sudanic. If as the proposed archaeological correlations postulate, the proto-Northern Sudanic period lay in the ninth and early eighth millennia BC, then the proto-Cushitic period not unreasonably might be placed at around the eighth millennium. This datum implies that we should not expect the earliest archaeological evidence of livestock raising among Afrasans to go back much before 8000 BC.

Overall, four successive periods can be identified in the linguistic stratigraphy of the earliest periods in Afrasan history –

1. proto-Afrasan
2. proto-Erythraic
3. proto-North Erythraic
4. a. proto-Boreafrasan
4. b. proto-Chado-Berber

The reconstructed lexicons of subsistence in each successive stratum reveal the Afrasan peoples, all through these successive periods, to have possessed grindstones and made a strong subsistence use of grasses or grains, but there is no probative evidence at any of the periods indicating the cultivation of those plants. These stages of history, in this scholar's view, most likely belong to successive eras in the period between the last glacial maximum and 8000 BCE. I reach this conclusion partly on the basis of what I see as strongly plausible archaeological correlations for the initial breakup and expansions of the proto-Chado-Berber, stratum 4b in the linguistic stratigraphy, as argued in the next paragraph. If correct, these correlations would place the close of stage 4b in the ninth millennium BCE. The context of the prior divergence of the proto-Erythraic group, brought about by a spread of North Erythraic communities (stratum 3) northward toward Egypt, remains an issue. Possibly the proto-North Erythraic group followed the Nile corridor north; possibly they followed a Red Sea hills route. In either case their original northward spread needs to be dated well before the ninth millennium BCE.

The Boreafrasian sub-sub-branch has an apparently somewhat deeper stratigraphic time depth than Chado-Berber, probably on the order of about 2000 years more (the adjusted cognate retention chart [Figure 5] shows 2-3 per cent for Boreafrasan [Egyptian versus Semitic] compared to Chado-Berber at 5-7 per cent). The proto-Chado-Berber extension across northern Africa indicated in the

linguistic evidence has a strong parallel in the archaeological establishment of the Capsian cultures, at first pre-agricultural and grain-collecting, across those areas from 10,000 BP onward. That correlation, if sustained, would project the earlier split up of proto-Boreafrasan to around 12,000 BP, and indicate that we should look for the pre-proto-Semitic speakers in an archaeologically-attested settlement of people coming from northern Egypt into the Levant around that period. In light of this dating, the Mushabi culture seems a particularly plausible candidate for the culture of the pre-proto-Semitic speakers, providing the original proposals about its African provenance (Bar-Yosef 1987) hold up. (Proto-Semitic, of course, was a much later descendant version of the original pre-proto-Semitic language and was spoken at around the sixth or fifth millennium BC; Diakonoff 1998).

The Nilo-Saharan

The Nilo-Saharan family clearly originated in the Middle Nile Basin, east of the Ethiopian highlands. The distribution of the extant descendant languages of the three earliest branchings – Koman languages along the eastern side of the basin, Central Sudanic in the far southwest of the basin, and early Northern Sudanic (as argued here) in the southern eastern Sahara – places the proto-Nilo-Saharan in the heart of the basin, probably (considering the aridity of climate in the Terminal Pleistocene) in areas south of the confluence of the White and Blue Niles (Ehret 2003b).

The hunting-gathering and fishing lexicon of early Nilo-Saharan remains to be adequately studied, so there is much still to learn in this case. It appears from the reconstructed lexicon that, by the period of time immediately preceding the proto-Northern Sudanic node of the Nilo-Saharan tree, some Nilo-Saharan may already have begun to collect wild grains. This development may well have been a result of encounters by the forebears of the Northern Sudanians with Afrasan peoples east of the Nile, as they spread north into the Sahara following the advancing tropical rainfall belts after the end of the Younger Dryas. That is a matter worth future investigation. The lexical data hints that we may eventually discover that the first making of pottery in the Sahara and Sudan traces back to the period before 10,500 B.P. as well.

If we examine the linguistic stratigraphy of the Northern Sudanic division of Nilo-Saharan, we discover two main stages in the spread of food-producing ways of life. In the first era, extending from perhaps before 8500 down to the seventh millennium BC, cattle raising took hold, followed by the development a more sedentary living style, with round houses and granaries, and a probably more varied food production that included the cultivation of sorghum and eventually gourds. But the number of societies that evolved out of this beginning remained very few – as of the seventh millennium, just three, the pre-Kunama,

the proto-Saharans, and the proto-Sahelians, can be identified (see Nilo-Saharan tree of relationship) – and so for up to 2500 years the geographical spread of this new economy must have remained relatively restricted.

The second era, which began with the break-up of the proto-Sahelian society, would have been marked, in contrast, by a rapid radiation of new societies out over very large regions. Referring to the Nilo-Saharan family tree, one can see that a succession of divergences followed. The proto-Sahelian language gave rise to the ancestral For and proto-Trans-Sahel; proto-Trans-Sahel in turn diverged into Western and Eastern Sahelian divisions; and Western Sahel then broke up into Songay and Maban branches. At the same time Eastern Sahelian diverged into three branches, Astaboran, Rub, and Kir-Abbaian; and Astaboran and Kir-Abbaian then each further broke up into subgroups. All these divergences have been argued to have taken place between the late seventh and early fifth millennium BC (Ehret 1993). The distribution of the descendant languages of this series of rapid divergences ended up as far apart as the Songay (Western Sahelian) in the areas east of the Niger Bend and the Nara (Eastern Sudanic/Astaboran) at the edge of the Ethiopian highlands.

The history of the divergence and spread of Nilo-Saharan food producers thus has an excellent overall fit with the archaeology of the establishment and spread of the new economy. The first divergences within Northern Sudanic imply a long-term, relatively restricted occurrence of the earliest stages of food production in the eastern Sahara. The era of the wide spread of cattle raising across the southern half of the Sahara, around the sixth millennium, is just the period in which the linguistic evidence would situate the great radiating out of the speakers of the descendant languages of the Sahelian sub-sub-branch of Northern Sudanic across those same regions.

Histories of Contact

The second fundamental contribution of linguistic stratigraphy studies is what they can tell us about cross-cultural encounter. With this point we return to some issues raised at the very beginning of this article. The long presence of Nilo-Saharan and Afrasan language families, in adjacent territories across large expanses of northeastern Africa, certainly should be directly attested in multiple periods of word borrowing from one family to the other. In addition, there should be examples of later language expansions overlaying earlier spreads of languages belonging to the same family, apparent in intra-familial word borrowing. Both kinds of histories abound. The Nilo-Saharan materials relating to both inter-familial and intra-familial contacts in the southern and eastern Middle Nile Basin have received considerable attention (Ehret 1983, 2001, 2003a). Our studies of similar phenomena in the northern Middle Nile Basin and surrounding regions

are much less advanced. Nevertheless, we can give preliminary identification to several important periods of inter-familial contact involving Afrasan and Nilo-Saharan speakers, as well as to intra-familial contacts among Nilo-Saharan speech communities.

Intersocietal Interactions

The earliest contacts clearly identified so far in our studies were of the proto-Sahelians with probably two different Afrasan-speaking peoples. These encounters would date to roughly the seventh millennium BC, if the proposed archaeological correlations hold up (table 6). The first two root words (1 and 2) in the list that follows are of the kind that normally reflects considerable bilingualism and intimate cross-cultural interactions. The adoption of a new word for “three” is particularly arresting, because the adoption of numerals usually goes along with a significant amount of word borrowing in other areas of culture. So the presence of these two loanwords strongly suggests that we will eventually discover more such Afrasan loans in proto-Sahelian. The borrowing of the word for “three” in particular – because it was maintained in Chadic, but not in Cushitic, Egyptian, Berber, or Semitic – favors the conclusion that these contacts were with the linguistic forebears of the Chadic branch of Afrasan before they moved south out of the Sahara.

Table 6: Afrasan loanwords in proto-Sahelian (PSah)

(loanwords indicative of general cultural impact)

- | | | |
|---|----------------------|---|
| 1. | *har “rain; to flow” | Proto-Afrasan (PAA) *har- “flow” |
| 2. | *hinzah “three” | PAA *xaynz- “three” (Chadic; <i>not</i> in Cushitic) |
| (loanword reflecting culturally specific adoption of new item of culture) | | |
| 3. | *ay “goat” | Beja <i>ay</i> “goat” (< proto-Cushitic (PC) *ʔaz- “sheep, goat”; *z > y /V_ is a specifically No. Cushitic change) |

The third root, meaning “goat,” represents an entirely different contact history, of spread by diffusion from the east, specifically from a very early language of the North Cushitic branch. This branch of Cushitic has a single representative still spoken today, Beja. The spread of this word most probably accompanied the spread of the animal from very early North Cushites to the proto-Sahelian livestock raisers.

Important early influences flowed the opposite direction as well. The Red Sea Hills may have been a region of recurrently shifting ethnic and linguistic boundaries during the middle Holocene. The very early North Cushites would most likely have inhabited the southern half of that zone in the period

immediately preceding the fifth millennium BC. But intriguingly, the extant North Cushites of the present day, the Beja, appear to have emerged out of a later re-expansion across the region. Beja contains a notable set of Nilo-Saharan loanwords of the kind that often reflect the spread of the borrowing language into the lands of the source language, with people gradually, over a number of generations, giving up their earlier language in favor of the borrowing language. The loanwords in this case, like the proposed Chadic set in proto-Sahelian, include everyday verbs and numerals. Again as for the proto-Sahelian borrowing set, we can expect that future study will reveal the presence of more such loanwords. The particular source of the loans in Beja was clearly a Sahelian language: the borrowed numeral for “five” pins this source language down to the Kir-Abbaian sub-branch of the Eastern branch of Sahelian. This evidence tells us that at some period in the last 5000 years BC, a Kir-Abbaian people inhabited large parts of the southern Red Sea hills region. Then North Cushitic-speaking people, the ancestors in language of the Beja, re-expanded and assimilated these particular Kir-Abbaians into their society.

Table 7: Sahelian (Kir-Abbaian?) loanwords in Beja

farr/fafar	“to jump/to jump, hop”	Proto-Saharo-Sahelian (PSS) *p ^h à:r “to jump (about)” (proto-Nilo-Saharan (PNS) *p ^h à:r “to run about, run away”); shows PSS semantic shift. Beja also has <i>bír</i> “to fly,” but this is a distinct root: it is the regular Beja reflex of PAA *pur-/*-pir- “to fly”
foor	“to flee”	PNS *p ^h ōr “to flee”
gara	“fenced-in homestead”	PNS *gà:r “to encircle, enclose (in a fence)” (as in Gaam (Kir-Abbaian) <i>gar</i> “enclosure”)
as-	“five” (preserved today in Beja only as the base of numerals 6-9)	Proto-Kir-Abbaian (KA) *as “five,” from PSah *has “fingers” (loss of *h and meaning innovation, “five,” are specifically Kir-Abbaian changes)

Eastern Sahelian influences on the ancient Egyptians

Another notable early case of Nilo-Saharan loanwords spreading to Afrasan languages is in ancient Egyptian. The borrowed words so far identified in this instance tend to be terms for items of material culture. They can be taken, in other words, to reflect the spread of the items named by the words from Nilo-Saharan to ancient Egyptian culture. Where we do have diagnostic evidence, it appears that the source language of the loans in ancient Egyptian belonged specifically to the Eastern Sahelian group (case in point, *sar, “thorn fence of

cattle pen”). The loanwords include terms relating to crops of Sudanic origin, but also cattle-raising terms, suggesting that Egyptian ideas about cattle may be beholden as much or more to southern, Sudanic influences as to North African or Levantine influences. The phonology of at least two of the loanwords (original *r > ancient Egyptian 3) places the time of borrowing very early in Egyptian history, most probably in the pre-dynastic era.

Table 8: Eastern Sahelian loanwords in ancient Egyptian

<i>bdt</i>	“bed (of gourds, etc.); <i>bddw-k3</i> “watermelon” (Late Eg. <i>bdt</i> “cucumber, gourd”)	proto-Sahelian (PSah) *buḏ “edible gourd”
<i>s3</i>	cattle byre” (< *sr)	proto-Eastern Sahelian (PES) *sar “thorn fence of cattle pen”
<i>mrw</i>	“bulls”; <i>mry</i> “fighting bull”	PSah *ma:wr “ox”
<i>pḡ3</i>	“bowl” (< *pgr)	PSahSah *po:Kur “wooden vessel”
<i>ds</i>	“jar”	Proto-Sudanic *DṓS “waterpot (?)” (capital D and S represent consonants of alternative possible reconstructions)

Future studies in this vein will surely find more examples of material cultural influences in ancient Egypt coming from the south. When we undertake such studies, we must not neglect the possibility that we will uncover Nilo-Saharan loanwords in other semantic areas of ancient Egyptian vocabulary, reflective of other kinds of south-to-north influences.

The spread of later-introduced crops and animals

A variety of later diffusionary spreads of crops and animals took place across northeastern Africa. The full consideration of this topic is not possible here. But as a teaser, we might mention three interesting results the language evidence provides us already with respect to domesticates introduced from outside the continent:

1. wheat and barley spread south from Egypt to Ethiopia and Eritrea via the Red Sea hills, not from Arabia (this means the spread took place by the fourth or early third millennium, before the full drying of the Sahara) (Amatruda 1971; Ehret 1979);

2. wheat and barley, on the other hand, apparently did not advance from Egypt to the Nubian stretches of the Nile, but instead came there indirectly from

the east via Cushitic-speaking peoples, probably those of the northernmost Ethiopian Highlands (and so possibly only in the last 2500 years); and

3. camels, curiously, reached the Beja not directly from Semitic-speaking nomads, but from the sedentary Nile Nubian communities, showing that Beja camel raising did not develop probably any earlier than 2000 years ago. (Whether they were previously nomadic raisers of goats and sheep before they added camels to their repertoire is another matter).

Table 9: Eritrean/Ethiopian Cushitic loanwords in Nile Nubian

*illee	“wheat”	PAA *ʕeyl- “grain plant, cereal” (Beja <i>e/a</i> “dry grass, hay”)
*serin/m	“barley”	Beja <i>seram</i> “barley”; Agaw *sərn- “wheat”; regional Eastern Cushitic: Saho, Soomaali *sern- “wheat”; Egyptian <i>š.r.t, šry</i> “barley”

Table 10: Nubian loanword in Beja

kam	“camel”	Nile Nubian *kam, pl. *kamli; Nubian speakers analyzed original root *kml as consisting of sing. *kam- plus Nubian pl. in *l; Beja adopted the Nubian singular form as their word for the animal
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Deciphering Meroitic

A further topic ripe for renewed investigation from a linguistic historical perspective is the problem of the relationship of Meroitic, revisited in the light of what we have discovered here. The linguistic stratigraphy of Nilo-Saharan history shows the whole of the northern Middle Nile Basin to have been primarily the domain of Eastern-Sahelian-speaking peoples for most of the past 7000 years. The Eastern Sahelian group at the very beginning of this span diverged into three branches, two of which, Astaboran and Kir-Abbaian, have direct relevance to this problem. The Astaboran languages spread across southern edges of the Sahara region, probably in the fifth millennium BC, from as far west as the areas just east of Darfur, where the proto-Western Astaboran society is most probably to be placed (Thelwall 1982), to as far east as the edges of the Ethiopian highlands, where the Nara were located in later times (see Nilo-Saharan family tree for these relationships). The central parts of the Middle Nile Basin were occupied equally early, if not earlier, by the expanding Kir-Abbaian

group. That the Meroitic language was spoken in the middle of the regions long inhabited by these two primary groupings of Eastern Sahelian peoples means that the very first hypothesis we ought to test out is that Meroitic belonged to one or the other of these two Eastern Sahelian branches.

We can say more on this point. Meroitic was a language of great cultural and political importance. Languages of that kind of importance leave behind loanword evidence of their former existence in a region. Dongolawi Nubian, spoken in the old Napatan heartland, contains just such a substratum of word borrowings, not specifically attributable at this point to Meroitic, but most definitely from another, now extinct Eastern Sahelian language (table 11).

Here again our most parsimonious point of departure would be the hypothesis that these loanwords came from Meroitic. The publication of *A Comparative-Historical Reconstruction of Nilo-Saharan* (Ehret 2001) gives us the kind of very large etymological dictionary we need, with an abundance of language-specific data, for testing out this hypothesis.

Table 11: Loanwords in Dongolawi from an Extinct Eastern Sahelian language

<u>Loanword</u>	<u>Expected Shape in Dongolawi</u>	<u>Nilo-Saharan root</u>
na:r "river bank"	*ga:r (this regular reflex occurs in Nobiin)	*ŋgwa:d "side; river bank"
te:b "to stand, stand still, remain, stay"	*de:b	*tē:b "to rise up" ((PES semantic innovation, "rise up" > "stand (in place), stay"))
wa:s "to boil"	*wa:s	*wá:š "to bubble" (PSah semantic innovation, shift of meaning from "bubble" to "boil")
hung "to kneel"	*uŋg	*hūŋg "to bend (intr.)" ((PSah semantic innovation, semantic shift from "bend" (in general) to "kneel, bend down"))
girgid "gums (of teeth)" (< pre-Dongolawi *girgirt-, redup. root plus *t n. suff.)	*nid (< *nirt) (the regular Nobiin reflex <i>nīit</i> means "tooth")	*ŋjār "exposed flesh" ((PES semantic innovation, "exposed flesh" > "gums (of the teeth)"; *t n. suff. is also a specifically Eastern Sahelian addition to the root)

Summing up

The long-term histories of the Afrasan and Nilo-Saharan language families make two very important points about human history at the intersection of Africa with Eurasia. The points are crucial because they force re-examinations of long accepted Western and Middle Eastern views on history that simply cannot be sustained any longer:

1. Afrasan (Afroasiatic) is an African family every bit as much as Nilo-Saharan. Its origin region lay well south in Africa and nearly all of the history of the Afrasan-speaking societies played out in Africa. Only one offshoot of the family left the continent.

2. Both languages families began their earliest periods of expansion within northeastern Africa well before the development of food production. Those expansions were driven by other factors of subsistence, environment, and technology, and not by the possession of herding or cultivation.

For both families, their subsistence strategies, as attested in the reconstructed lexicon, have strong echoes in the archaeology of subsistence change between 15,000 and 6000 years ago across greater northeastern Africa. We do not have to look farther afield to find the archaeological correlates of their linguistic stratigraphies.

The early Afrasans, from the evidence of their reconstructed lexicon of subsistence, stand out in particular as having been utilizers of wild grasses (and eventually wild grains). In later periods, from the ninth to the sixth millennium BC, the different branches of the family appear separately to have turned to food production, and to different kinds of animal raising and different crops, depending on the different climatic zones they inhabited, and the different influences they had come under, by that time.

The Nilo-Saharans before the Northern Sudanic period in their history can be less certainly identified with any particular kind of gathering and hunting. But from the proto-Northern Sudanic stage onward, the history of subsistence lexicon shows these particular Nilo-Saharans to have been central participants in an African creation, first, of cattle raising and, then, of cultivation of Sudanic crops. Contemporaneously across much of the southern Sahara, however, other Nilo-Saharan speakers pursued a highly productive food-collecting system based on aquatic resources. We can identify the aquatic-based people as probable Nilo-Saharans because of their close cultural relationship, notably in ceramic styles, to the earliest cattle raisers, here identified with the proto-Northern Sudanic society. The proto-Northern Sudanic cattle keepers, as suggested earlier, could be considered a regional offshoot of the aquatic Nilo-Saharans, differing in subsistence practices because they moved into lands with little surface water and

poor access to aquatic food sources and so were forced to develop a new way to make effective use of those lands.

From at least the early middle Holocene, we are already able to identify some of the cases of inter-familial and intra-familial contacts among Nilo-Saharans and Afrasans. An Eastern Sahelian people, notably, influenced pre-dynastic Egyptian material culture. Other Eastern Sahelians became a major component in the demic ancestry of the North Cushitic (Afrasan) Beja peoples of the Red Sea hills region. Diffusion of material culture also sometimes passed the other direction, as we see in the case of the spread of goats (and presumably also sheep) from southwest Asia, via Afrasan peoples of the eastern Sahara, to Nilo-Saharans of the southern half of the Sahara region as early as the seventh millennium. The potential of this kind of study for attaching detail and complexity to the course of cultural and economic change and interaction among societies is immense, as a number of studies of African history farther south are already beginning to show (Vansina 1990, 2004; Ehret 1998; Schoenbrun 1998; Klieman 2003).

This article seeks to raise a strong challenge to archaeologists and historians and to physical anthropologists to resituate the geography of our thinking about the histories of the peoples of northeastern Africa. These peoples were fundamentally African; they were not intruders from outside the continent, contra long-held Western ideas about these regions. Along the way we have offered a provisional overall scheme of human change in greater northeastern Africa over the long term of the Holocene, and a first look at some of the more specific elements in the story from the perspective of the linguistic evidence. We have also pointed to further directions in which we can take this kind of work. A notable example would be the contribution that the data of reconstructed Nilo-Saharan may be able to make to the deciphering of Meroitic.

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