Desert and the Nile. Prehistory of the Nile Basin and the Sahara

Papers in honour of Fred Wendorf

Edited by
Jacek Kabaciński, Marek Chłodnicki, Michał Kobusiewicz
and Małgorzata Winiarska-Kabacińska

POZNAŃ ARCHAEOLOGICAL MUSEUM

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MUZEUM ARCHEOLOGICZNE w POZNANIU

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Poznań 2018

Studies in African Archaeology
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Proceedings of the International Symposium organized by the Poznań Archaeological Museum and Institute of Archaeology and Ethnology, Polish Academy of Sciences for the International Commission of the Later Prehistory of Northeastern Africa, Poznań, 1-4 July 2015.

Reviewer of volume
Krzysztof M. Ciałowicz

Editor-in-chief of Poznań Archaeological Museum publications
Marzena Szmyt

Cover design
Ewa Wąsowska

Typeset by
Justyna Nowaczyk

Cover
Gail Wendorf, Mariffs Around the Fire, 9 X 12 in., oil on board

PL ISSN 0866-9244
ISBN 978-83-60109-60-1

61-781 Poznań, ul. Wodna 27
Tel. +48 61 852 82 51, fax +48 61 853 10 10
e-mail: muzarp@man.poznan.pl
www. muzarp.pl

Printed by
TOTEM.COM.PL sp. z o.o. sp. kom.
ul. Jacewska 89, 88-100 Inowrocław

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Preface

Between the 1st and 5th of July 2015 the tenth African Conference was held in Poznań. During the opening ceremony a letter from Professor Fred Wendorf, President of the International Commission of the Later Prehistory of Northeastern Africa, was read. Several days later, on July 15th, Fred passed away. This news was both unexpected and very sad, even though we knew he was not in the best of health. Still, hope is the last to die.

Fred Wendorf was like the Godfather to several generations of archeologists working in Northeastern Africa. Most of us had the privilege to know him, and some had the pleasure to work with him—getting to know him on both a professional and private basis. Therefore, it was obvious for us that another volume of proceedings of the Symposium had to be devoted to Fred Wendorf, to honour one of the most distinguished scholars to have ever worked on the prehistory of Northeastern Africa.

Members of the LPNEA Commission
and Editorial Board

I

Tribute to Fred Wendorf

Desert and the Nile.
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Studies in African Archaeology 15
Poznań Archaeological Museum 2018

Romuald Schild

FRED WENDORF, Jr.
31 July 1924 – 15 July 2015
The Founder of the Combined Prehistoric Expedition and for Several Decades its Guiding Spirit[1]

Prologue

Fred's curiosity in archaeology commenced in 1932 when walking over a cotton field near his home in Terrell, in East Texas, where he found an old Indian camp and collected a handful of stone arrowheads. This first discovery lead to further cotton fields reconnaissances and more or less systematic surface collections and recording of sites. Fred planned to study archaeology at the University of Arizona at Tuscon, a dream that he began to fulfill. At the age of eighteen, however, in 1942, he enlisted in the army and two months later was ordered to report for active duty. Early in 1944, Fred was commissioned a second Lieutenant in the infantry and came forward to join the 10th Mountain Division in the Ital-

[1] This obituary also draws on some opinions expressed by the author in the *Introduction* to the *Desert Days* by Fred Wendorf, Dallas 2008, *Brothers in Archaeology* by Fred Wendorf and Romuald Schild (Before Farming 2005/1: article 9:1-28) and *Obituary, Fred Wendorf , Jr*. (1924-2015), Sudan end Nubia 19 (2015):181-184. The author wishes to express his deep gratitude to Ms Anna Christine Bednar, a dear friend and his late brother's wife, who helped him to overcome several intricacies of written English.

ian front. A few months later, in early March 1944, while fighting the Germans in Northern Italy, near Bologna, he was critically injured by a shell fragment that entered his upper chest. As a result, he spent almost two years in army hospitals. Before leaving the hospital, though, he made arrangements to return to Tuscon. Thus, in early 1947, Fred returned to the University of Arizona at Tuscon and in mid 1948 received a BA degree with a major in anthropology and almost straight away entered graduate school in the Department of Anthropology at Harvard. In June 1949, Fred initiated his Ph.D. dissertation research project at the Petrified Forest National Monument in Eastern Arizona excavating the Flattop Site dated to mid Ist millennium AD. In March 1953, he defended the dissertation, which was published, also in 1953, by the Museum of Northern Arizona. However, already in July 1950, after concluding the Flattop Site field project, Fred became the Field Director for the first-ever salvage archaeology project carried out during the construction of a gas pipeline in New Mexico.

1. American antiquities

Fred Wendorf always believed that the most intellectually challenging research in his early professional years was the study, begun in November 1953 with Claude Albritton, Alex Krieger, and T. Dale Stewart, of a Final Pleistocene Paleoindian human burial at Midland, Texas, one of the oldest Early Man remains in the Americas. The associated extinct fauna certainly preceded the Folsom Paleoindian event (see the leading publication by Wendorf *et al.* 1955). The work at Midland led in 1956 to the five year Llano Estacado (Staked Plains) Project in the Southern High Plains of West Texas, which was devoted to the reconstruction of the Late Pleistocene and early recent vegetation and climatic history of the area (Wendorf 1961).

In the same year, Fred met Ralph Rounds, the owner of a large timber company operating in the mountains of New Mexico, near Taos, where the First US Dragoons' Cantonment Burgwin (1852-1860) had been originally located and whose remains Fred was able to pinpoint. The ensuing research eventually led to the reconstruction of the fort, the formation of the Fort Burgwin Research Center and finally to the setting up of the western campus of Southern Methodist University (Wendorf with Brooks 2007), where the *Fred Wendorf Information Center* was created in July 2004.

In 1970, the underwater exploration of a Spanish shipwreck near Padre Island concluded Wendorf's fieldwork on American antiquities. Several legal problems

Fig. 1. Fred Wendorf at the Combined Prehistoric Expedition camp at Nabta Playa, Season 2006 (photo: Maciej Jórdeczka)

resulting from this research led directly to the Abandoned Shipwreck Act of 1987 which protects historical shipwrecks in US waters.

2. The Combined Prehistoric Expedition

2.1. Nubian salvage campaign

1961 was the year that Fred Wendorf's Great African Scientific Adventure was set in motion. It changed his entire life, both private and professional. From this point on almost nothing was the same. The new Fred Wendorf was born again. It began quite innocently in the summer of 1961 with the reading of a newspaper story about UNESCO's plans to save the archaeological remains, located where the Aswan Reservoir would be created, from annihilation and the earmarking by the US Congress of considerable funds to assist American involvement in the venture. Jim Hester, a colleague of Fred's in the Museum of New Mexico in Santa Fe, suggested to him that their experience in managing large-scale salvage projects in the US would be a great asset in applying for the funds and suggested that the prehistoric occurrences along the Nile in Lower Nubia would be the goal of their involvement in the project.

In November 1961, Fred contacted J. O. Brew, his Ph.D. adviser at Harvard and then a member of the UNESCO Commission responsible for preparation of the Nubian Salvage undertaking. Professor Brew was willing to help; however, he pointed out that several prehistorians whom he had contacted were very skeptical about the presence of valuable stone age sites in the Nubian section of the Nile Valley and/or had cast doubt on the scientific interest that those sites may stimulate if found. Fred, however, was not discouraged by these negative opinions and convinced Brew that he would accept the challenge. Finally, Brew asked Fred to write two grant proposals: one concerning Egypt and the other for the Sudanese part of the future reservoir. The first would be addressed to the Foreign Currency Program at the U. S. State Department, acting under Public Law 87-332 voted by the Congress, and the second to the National Science Foundation. In June 1962, the funds were awarded. These were the first of a very long sequence of grants awarded to Fred Wendorf in the course of dozens consecutive years.

In the intervening time, in the winter season of 1961/1962, a group of very experienced prehistorians and Quaternary geologists directed by Ralph Solecki and Rhodes Fairbridge made an initial reconnaissance around Wadi Halfa, in the Sudanese section of the reservoir area. However, the leaders of the group, having important scientific interests in other parts of the world, decided not to pursue fieldwork in the area, and Solecki left the discovered Paleolithic sites at Fred's disposal. He also suggested that some of the members of the survey group might join the missions being organized by Fred, then director of research and associate director of the Museum of New Mexico in Santa Fe.

Finally, three expeditions were allotted for work on the Paleolithic in the Aswan Reservoir area: the Combined Prehistoric Expedition (CPE), until September 1965 officially called the New Mexico Museum Expedition; the Yale Expedition, conjointly supported by the Peabody Museum of Natural History, Yale University, and the Department of Geography, University of Wisconsin; and the third formed by the National Museum of Canada and the University of Toronto. A small group composed of three prehistorians on the staff of the University of Colorado also worked on the Paleolithic and Epipaleolithic localities on the west bank of the Nile in Wadi Halfa, Sudan.

The field concessions assigned to the CPE in Egypt extended on the west bank of the Nile from the New (High) Dam in Aswan to a point opposite Korosko and from Aniba to the Sudanese border. In Sudan, the concession on the east bank reached out from the Second Cataract to the Dal Cataract. On the opposite bank, it ran from the frontier to the head of the reservoir, close to the Dal Cataract.

At the invitation of Fred Wendorf, several scientists from seven countries (Belgium, Egypt, France, Poland, Sudan, United Kingdom and the United States) took part in the expedition. After the Lake Como conference in 1965 on the Prehistory in Aswan Reservoir, the mission began to be called the *Combined Prehistoric Expedition* (CPE). In 1964, Fred Wendorf left the Museum of New Mexico and joined the staff of Southern Methodist University. Later, in the late 60s, the American, Polish and Egyptian scientists formed the core of the Expedition; however, a score of researchers from around the world still participated in the venture, both in the fieldwork and the resulting laboratory studies. Respectively, three institutions: Southern Methodist University, Institute of Archaeology and Ethnology, Polish Academy of Sciences, and Geological Survey of Egypt, jointly sponsored the work of the CPE. Essentially, the NSF and US State Department provided financial support in the field throughout most of the seasons till 1999. In recent years, up until 2016, considerable support has come from the Combined Prehistoric Expedition Foundation, a private body of donors. In 1972, Romuald Schild became the Associate Director of the Expedition, serving in this role until the retirement of Fred Wendorf in 1999, who then assumed the Honorary Directorship of CPE, while Romuald Schild began to serve as the Director of the Expedition up to his retirement in 2007.

The CPE Nubia Campaign extended from the field season of 1962/1963 to the short season of 1967 at Jebel Sahaba, Sudan. The resulting two volumes, a monumental account of the CPE mission in the reservoir published in 1968 (Wendorf ed. 1968), is the first summary of the earliest prehistory of the Nile Valley between the High Dam, in the north, and the II_d Cataract, in the south. Until the research of the Nubia Salvage Campaign, the area was considered to be developmental boondocks. On the contrary, the study of numerous sites of various stylistic and technological affiliations, extending in time from the middle Holocene all the way back to the Lower Paleolithic, helped to define entirely new time/space entities with a distinctive approach to the surrounding ecological niches. On the other hand, a profound study of the local geomorphology helped to outline the chronological and environmental places of the prehistoric units. In addition to the studies in the Nubian Nile Valley, a few Middle Paleolithic and several early Neolithic occurrences were investigated, under the direction of Jim Hester (Hester and Hoebler 1969) in the small oases of Dungul and Kurkur in the South Western Desert of Egypt (1962-1965).

2.2. Upper Egypt and Fayum

After the Campaign, Fred Wendorf decided to continue the work in the Nile Valley downstream from Aswan. At the very beginning of the 1967 field season and on the very first day of the survey, the CPE found extremely numerous Paleolithic sites, partially buried in the Nilotic and eolian deposits in the lower Wadi Kubbaniya, a structural left bank tributary of the Nile Valley, located some 20 km downstream from Aswan. The sites contained frequent and large intriguing grinding stones. Fred decided to return to the wadi at a later time. However, the outbreak of war in June 1967 and the subsequent setting up of military installations in the vicinity of Wadi Kubbaniya closed the area to excavations until 1977. In 1978, the first field season was completed. The season appeared very promising and discoveries of supposed barley grains in Paleolithic beds seemed to be sensational (Wendorf *et al.* 1979; assembled by Wendorf and Schild, Close, ed. 1980) A later, direct AMS radiometric aging of the grains indicated that they were intrusive (Wendorf *et al.* 1984) and, at two standard deviations, early Predynastic to Dynasty I in age (about 4050 to 3000 calibrated years BCE). Obviously, a continuation of the work in the wadi was strongly advised. The CPE returned to Wadi Kubbaniya in the field seasons of 1981-1984.

Meanwhile, the CPE spent four field seasons in Upper Egypt, near Edfu and Esna (1967) and north of Luxor, at Dandara, Makhatma and Dishna (1968). A year later the CPE Mission carried out two field seasons on the northern ancient Lake Fayum shores (1969). Here, the CPE, for the first time in the Egyptian Stone Age research, reconstructed the Holocene fluctuations of the Holocene Lake Qarun and correlated them with human presence. The results of the Upper Egypt and Fayum research were published in 1976 (Wendorf and Schild).

Particularly, the CPE studies in stratigraphy and absolute chronology of the Late Paleolithic sites embedded in Nilotic sediments and the associated desert deposits in the Wadi Kubbaniya and Esna areas, north of Aswan, brought about new chronological placement of several Late Paleolithic entities and reversed our understanding of the Late Pleistocene Nile dynamics. On the other hand, the discovery of abundant charred floral macro-remains, and fossil faunas in the mouth of Wadi Kubbanniya have opened up exciting new vistas of Late Paleolithic economies. Results of the research conducted in the Esna and Wadi Kubbaniya areas were presented in several detailed reports (assembled by Wendorf and Schild 1986; 1989a; 1989b; Wendorf *et al*. 1997).

2.3. The Western Desert

Political circumstances developed in the aftermath of the six-day war between Israel and some of the Arab countries in June 1967 closed off most of the areas in the Nile Valley to foreign archaeological expeditions. The South Western Desert, however, was more or less open to work and except for brief excavations (1930-1932) in the Oasis of Kharga by Caton-Thompson and Gardner and in Kurkur and Dungul by Hester, it was still an unchartered territory as far as the Stone Age archaeology was concerned. Fred Wendorf decided to take the chance.

At the beginning, in 1972, only a few signs suggested that a new archaeological dreamland was buried there in the sands, spring vents, lacustrine carbonaceous deposits and clays of perennial and seasonal lakes. The Oasis of Dakhla was the first shot, promising, but not so exciting to us. Although the bases of two ancient, eroded spring vents yielded a huge, the largest in Egypt, lithic assemblages of the Late Acheulean stylistics (Schild end Wendorf 1977), that was not very unusual in Africa. A brief reconnaissance trip from Dakhla to the high, real desert south of Dakhla, led to the discovery of exposed numerous Early to Middle Paleolithic and Holocene sites. A trip to Bir Sahara East and Bir Tarfawi, which are small, uninhabitable oases, found a year or so earlier by one of the first desert geologists, our friend and co-worker Bahay Issawi, unveiled archaeological riches glittering in the sun on the exposed shores of ancient deep-water lakes in the Br Sahara and Bir Tarfawi areas.

There, in the heart of the South Western Desert, in the driest region on earth, laid uncovered and buried lithic artifacts, stones and bones of animals that today live thousands of kilometers to the south. Subsequent detailed work (1973, 1974, 1985-1988), disclosed a complex sequence of perennial lakes and springs with embedded archaeological and faunal remains (Schild and Wendorf 1981;Wendorf *et al.* 1993). Very many dates obtained with the help of an array of methods placed the lakes in the wet episodes coinciding with interglacials and interstadials of the Middle and Late Pleistocene, namely in the warm phases in Marine Isotope Stages 11, 9, 7, 5, and 4. These ages have shown for the first time that the Saharan so-called *pluvials* are not coeval with glacial advances in the Northern Hemisphere, a theory so much favored by archaeologists and Quaternary geomorphologists during most of the last century. The archaeofaunas, fish bones and copious remains of small vertebrates have proved the richness of the lake environments, which hosted crocodiles and Nilotic fish, while the surrounding savanna supported herds of antelopes, giant buffalos and rhinoceroses. No comparable materials have ever been recovered from the ancient lakes of North Africa.

In 1973, a casual stop on the way from Bir Sahara East to Abu Simbel in the Nile Valley led to one of the most important discoveries in the history of prehistoric archaeology of the Sahara, the discovery of Nabta Playa, a paleolake basin with hundreds of stone age sites, tumuli, stone structures and stelae, all associated with intricate stratigraphy and geomorphology. The evident richness and importance of the discovery convinced Fred to switch the CPE main efforts to the Nabta area, at least for some time. The early excavations at Nabta (1974-1975, 1977) and the successive surveys of most of the South Western Desert resulted in the excavations of numerous Neolithic sites at Kharga Oasis (1976), along the Kiseiba Scarp (1979-1980), at Bir Safsaf and Wadi Arid (1984-1985, 1990, 1991). A return of the CPE to Nabta (1990-1994, 1996-2000, 2002-2009) and the work at the foot of the nearby Gebel Ramlah (2001, continued until today with a team lead since 2009 by Jacek Kabaciński) completed the picture (Wendorf end Schild 1980; Banks 1984; Wendorf *et al*. 2001; Nelson end Associates 2002; Kobusiewicz *et al.* 2010).

The geoarchaeological research of the Combined Prehistoric Expedition along the Main Nile and in the South Western Desert established that after a long period of hyperarid climates roughly coeval with Marine Isotope Stages 4, 3 and 2, extending from about 70,000 years ago to about 14,000 years ago, the first human settlers appeared in the desert areas about 11,500 cal. years BP and, except for the minor hyper-arid spells, remained in this zone up to about 5500 - 5000 cal. years BP.

Perhaps the most important discoveries of the CPE in the Eastern Sahara are the ones linked to the prehistoric sacred places: astronomic installations as well as fields of offering and remembrance with various tumuli, groups of stelae and lines of menhirs. All of these extend in time from about 9000 cal. years BP to about 5000 cal. years BP and are concentrated in the area of Nabta Playa, the largest inland drainage basin in southeastern Egypt.

It is also the work in the South Western Desert that brought about a hotly debated hypothesis regarding the early domestication of wild cattle in the Early Holocene (e.g., Gautier 2007). In this vein, the CPE research has also led botanists working with the CPE teams to propose that the intensive collection, and perhaps the early domestication, of sorghum occurred in the upper Early Holocene (Wasylikowa *et al* 2001).

2.4. Ethiopia and Sinai

It seems obvious that in the account of various scientific achievements of Fred's and the CPE one cannot omit the investigations in East Africa and the studies of a multilayered Middle Stone Age sites in the Ethiopian Central Rift Valley, near Lake Ziway, which disclosed a long sequence of Middle Stone Age camps, the oldest of which, at Gademotta and Kulkuleti (1971-1973 seasons), dated to about 300,000 years ago, and are amongst the few most ancient Middle Stone Age occupations in the world. The report on these works (*Middle Stone Age Sequence from the Central Rift Valley, Ethiopia*) was published in 1974 (Wendorf and Schild). One also should remember Fred's initiatives leading to a two-season (1995-1996) salvage project in eastern Sinai, focused on Middle Paleolithic sites as well as Neolithic and Bronze Age villages and sacred constructions. A detailed report of these efforts was published in 1999 (Eddy and Wendorf, eds.).

3. Teaching, administration and honors

Nearing retirement, Fred Wendorf generously donated his vast collection of prehistoric artifacts from Sudan and Egypt to the British Museum. Besides the materials stored in facilities in Sudan and Egypt, the Fred Wendorf Collection is the world's largest assortment of Stone Age relics and human remains from the upper Nile Valley, the Aswan Lake reservoir, the Northern Fayum Depression, and the Eastern Sahara. In most cases, these archaeological areas have been almost completely wiped out by the ever-expanding reclamation.

Beyond the field and scientific writing, Fred Wendorf was a talented teacher and administrator. From 1956 to June 1976 he served as director of the Fort Burgwin Research Center as well as associate director of the museum and associate professor of anthropology at Texas Technological University at Lubbock (1956-1958). In September 1958, he accepted the position of director of research and associate director of the Museum of New Mexico in Santa Fe (1958-1964). In August 1964, Fred commenced his teaching and administrative employment at Southern Methodist University in Dallas, Texas, which ended with his retirement in 2002, when he became the Henderson-Morrison Professor of Prehistory, *Emeritus*. He is widely acknowledged as the founder of SMU's Anthropology Department.

In 1974, Fred was elected treasurer for the Society for American Archaeology and in 1978 became its president. From 1983 to 1987 and by appointment by President Ronald Reagan, he became a member of the Secretary of the Interior's Board for the National Park Service; in 1985-1987 he served as its chair. A year later he was appointed, again by President Reagan, to the Cultural Properties Advisory Committee (1988-1989). From 1995 to 1997 Fred served as president of the Society of Professional Archaeologists. In 1980, Fred was voted into the presidency of the International Commission of the Later Prehistory of North Eastern Africa.

The archaeological world has acknowledged Fred's outstanding ability for doing archaeology and bestowed upon him several numbers of its honors of great magnitude. Of all these, Fred was always proudest of his membership in the National Academy of Sciences of the United States of America. For my part, I am delighted with his membership in the Polish Academy of Arts and Sciences. One needs to also add to this record the Lucy Wharton Drexel Medal for Archaeological Achievements; an honorary Doctor of Sciences presented by SMU; and the Egyptian Geological Survey Award; to list but a few.

4. Closing remarks

As early as the 1980s, the renowned late African archaeologist Desmond Clark, enumerating Fred's archaeological accomplishments in the prehistoric archaeology of Africa, wrote that: 'There are few who can match his achievements' (Clark 1987). Twenty-eight years later another eminent prehistorian, John Yellen, founder and president of the Paleoanthropology Society and program director for archaeology at the National Science Foundation, stated that Fred Wendorf stands as a giant in his contributions to Northeast African archaeology and that "his contributions and insights also constitute a guiding framework." Fred's scientific approach to fieldwork, involving the support of many disciplines in order to understand the human settlement in the deserts and savannas of North Eastern Africa will continue to strongly inspire the methods of doing Stone Age archaeology for a long time to come.

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Scott Wendorf, Elizabeth Alexander and
Anna Christine Bednar

The Combined Prehistoric Expedition Foundation: a Model for Private Support of Archaeological Research

In the early 2000s, as the Combined Prehistoric Expedition (CPE) entered its fifth decade, the original directors of the CPE (Dr. Fred Wendorf of Southern Methodist University and Dr. Romuald Schild of the Polish Academy of Sciences) began to make arrangements to continue the legacy of the CPE. These arrangements included not only appointing successors to lead the CPE itself, but also creating a new means for financial support for archaeological research in the Neolithic and Paleolithic of North Africa. Together with a group of like-minded supporters, Dr. Wendorf and Dr. Schild created a small 503(c)(3) charitable fund-raising organization, the Combined Prehistoric Expedition Foundation (CPEF).

In some ways, the formation of the CPEF was part of a larger trend. In 2006, the *Wall Street Journal* noted "new players" in the world of archaeology: private individuals and foundations. Noting dwindling support from universities and government funds, the *Journal* recognized a "*growing number of bankers, entrepreneurs, and philanthropists who are playing a crucial role in archaeology*" by providing funding "*to study and preserve the relics of ancient civilizations from Latin American to Italy and Turkey, giving life to projects that would otherwise die.*" (Knecht 2006).

The CPEF can be viewed as a model of how a small private fundraising organization can succeed in supporting important archeological goals. In the years since its founding, the CPEF provided funding for:

- The excavation of the megaliths from Nabta Playa, and their movement, permanent installation, and public display at the Nubian Museum in Aswan. This project saved one of the world's earliest known archaeo-astronomical devices from almost certain looting or other destruction (Fig. 1-2). In addition, the CPEF provided grants to a number of graduate students to work at the site as part of their on academic studies
- The excavation of Neolithic cemeteries at Gebel Ramlah (Egypt), by Dr. Jacek Kabaciński. This project resulted in the discovery of large numbers of burial sites for adults, newborn children and infants, which were unprecedented in scope and complexity. Along with the excavations of the cemeteries, a settlement context was intensively studied, providing evidence of a long-lasting and intensive human presence along the shores of the Gebel Ramlah paleo-lake in the Neolithic (Fig. 3-5).
- Archaeo-botanical research at Wadi Kubbaniya in Egypt, directed by Dr. Kimball Banks and Dr. Maria Gatto. This project analyzed one of the most complete archaeological and paleoenvironmental records for the Late Paleolithic period in Northeast Africa, and documented the response of human groups to environmental change, providing a deeper understanding of the transition between hunter-gatherer strategies and food production.
- The purchase of equipment which allowed the CPE to continue its work in particularly harsh and inaccessible areas of the Sahara Desert. Foundation grants bought new vehicles for the CPE that replaced older, unreliable trucks and cars (Fig. 6), helped purchase tents, beds and necessary living equipment for the camp, and provided the funds to purchase solar energy cells which brought a modicum of electricity to the campsite. The use of solar energy not only provided some much needed light to the lab and dinner tent, but also allowed researchers to use computers to process, analyze, and catalogue artifacts rather than having to manually record the results of each field season.

Crucial to the success of the CPEF was an active Board of Directors. The Board was characterized by individuals with a sophisticated interest in archaeology, an appreciation of the urgency of protecting archaeological sites from looting and other destruction, and a generous spirit. In addition to Dr. Wendorf and Dr. Schild, members of the CPEF Board of Directors included:

Fig. 1. Nabta Playa. Neolithic calendar circle *in situ* (photo: M. Jórdeczka)

Fig. 2. Calendar circle and stelae after installation at the Nubian Museum in Aswan (photo: M. Jórdeczka)

Fig. 3. Gebel Ramlah. View from the south (photo: A. Czekaj-Zastawny)

Fig. 4. Gebel Ramlah. Cemetery for neonates. Excavation tent on the site (photo: A. Czekaj-Zastawny)

Fig. 5. Gebel Ramlah. Cemetery for neonates. Burial no. 20 (photo: A. Czekaj-Zastawny)

Fig. 6. Vehicles provided by the CPEF (photo: M. Jórdeczka)

- Elizabeth Alexander (Secretary/Treasurer)
- Dr. Kimball Banks
- Anna Christine Bednar
- Christopher Burrow
- Edward O. Boshell, Jr.
- Dr. Marlan W. Downey
- Dr. Jacek Kabaciński
- Richard E. Lombardi
- Clifford Miercort
- John Mockovciak III
- Scott Wendorf (Chairman, 2011-2016)

Although most of the Board members were not professional archaeologists, many became directly and personally involved in excavation, artifact analysis, and report drafting and review – in many cases choosing to spend considerable time on-site in North Africa, thousands of miles from their homes. This was of course in addition to "typical" charitable organization activities such as fund raising, letter writing, and tax compliance/administrative tasks.

For multi-institutional, multi-national projects whose lifetimes are measured in decades, an independent private foundation can provide a consistent and steady focal point for fundraising and planning. The CPEF was able to fill critical funding gaps in times of changing institutional research priorities, governmental permissions challenges, and uncertain academic career trajectories. At the same time, the Foundation's small size and relatively tight focus allowed it to be flexible and efficient – able to make grant decisions quickly as new opportunities arose.

A fund-raising organization also benefits from strong institutional relationships, both formal and informal. In the case of the CPEF, a key relationship was with the Institute for the Study of Earth and Man (ISEM) at Southern Methodist University. ISEM was itself started in 1966 with the purpose of supporting interdisciplinary research in earth science and archaeology. Dr. Wendorf was one of the original board members of ISEM, and was associated with ISEM his entire career. As Dr. Wendorf retired from active involvement with the CPEF, the President of ISEM, Dr. Louis Jacobs, signed on as an *ex officio* board member of the CPEF, and provided much-needed guidance during this challenging transition.

Private foundations will continue to be an increasingly important source of funding for archaeological research. The lesson of the Combined Prehistoric

Expedition Foundation is that a small circle of supporters can form and maintain a modestly-sized, independent, focused fundraising organization to make a significant contribution to archaeological research, publication, and preservation.

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Desert and the Nile.
Prehistory of the Nile Basin and the Sahara.
Papers in honour of Fred Wendorf
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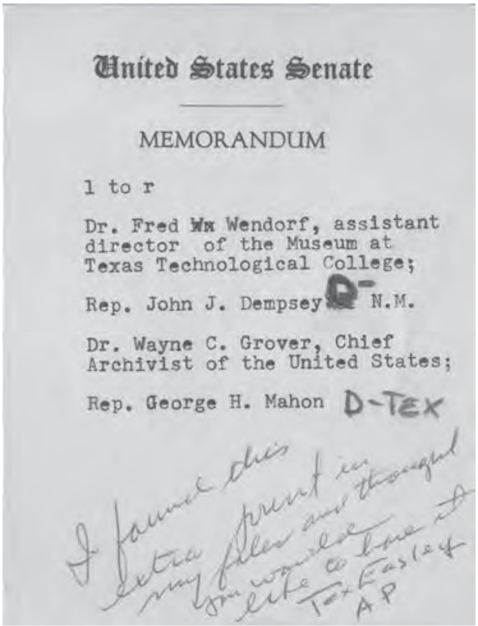
Poznań Archaeological Museum 2018

Fred Wendorf's Life in Sixteen Photos (*assembled by Gail Wendorf and Jacek Kabaciński*)

Fig. 1. Young Fred Wendorf, around 1944. At that time he was already enlisted to the army. Due to World War II he suspended his plans to study archaeology at the University of Arizona

Fig. 2. Lieutenant Fred Wendorf in military uniform in 1944, before leaving for Europe. He joined the 10th Mountain Division and during heavy fighting with the Germans in Italy he was seriously wounded in March 1944 near Bologna



United States Senate

MEMORANDUM

1 to r

Dr. Fred ~~Wm~~ Wendorf, assistant director of the Museum at Texas Technological College;

Rep. John J. Dempsey D- N.M.

Dr. Wayne C. Grover, Chief Archivist of the United States;

Rep. George H. Mahon D-TEX

I found this extra print in my files and thought you would like to have it
Tex Easley
AP

Fig. 3. US Senate Memo re 1958 photo

Fig. 4. Fred Wendorf, Rep. John Dempsey, Dr. Wayne Grover, Rep George Mahon, US Senate, 1958

Fig. 5. Early 1950's, New Mexico. Most of Fred Wendorf's early archaeological career was devoted to salvaging and protecting archaeological heritage. He was a pioneer of large-scale rescue excavations during the construction of highways, pipe-lines and reservoirs in the Southwest United States

Fig. 6. In front of the Laboratory of Anthropology, Santa Fe, New Mexico, 1960. Before moving to Southern Methodist University in 1964, Fred Wendorf was a Director of this laboratory and there his first Egyptian projects were carried out

Fig. 7. Fred Wendorf with Jim Hester from the Museum of New Mexico in Santa Fe, 1960. It was Jim Hester who convinced him to engage in the Aswan Dam salvage archaeological project

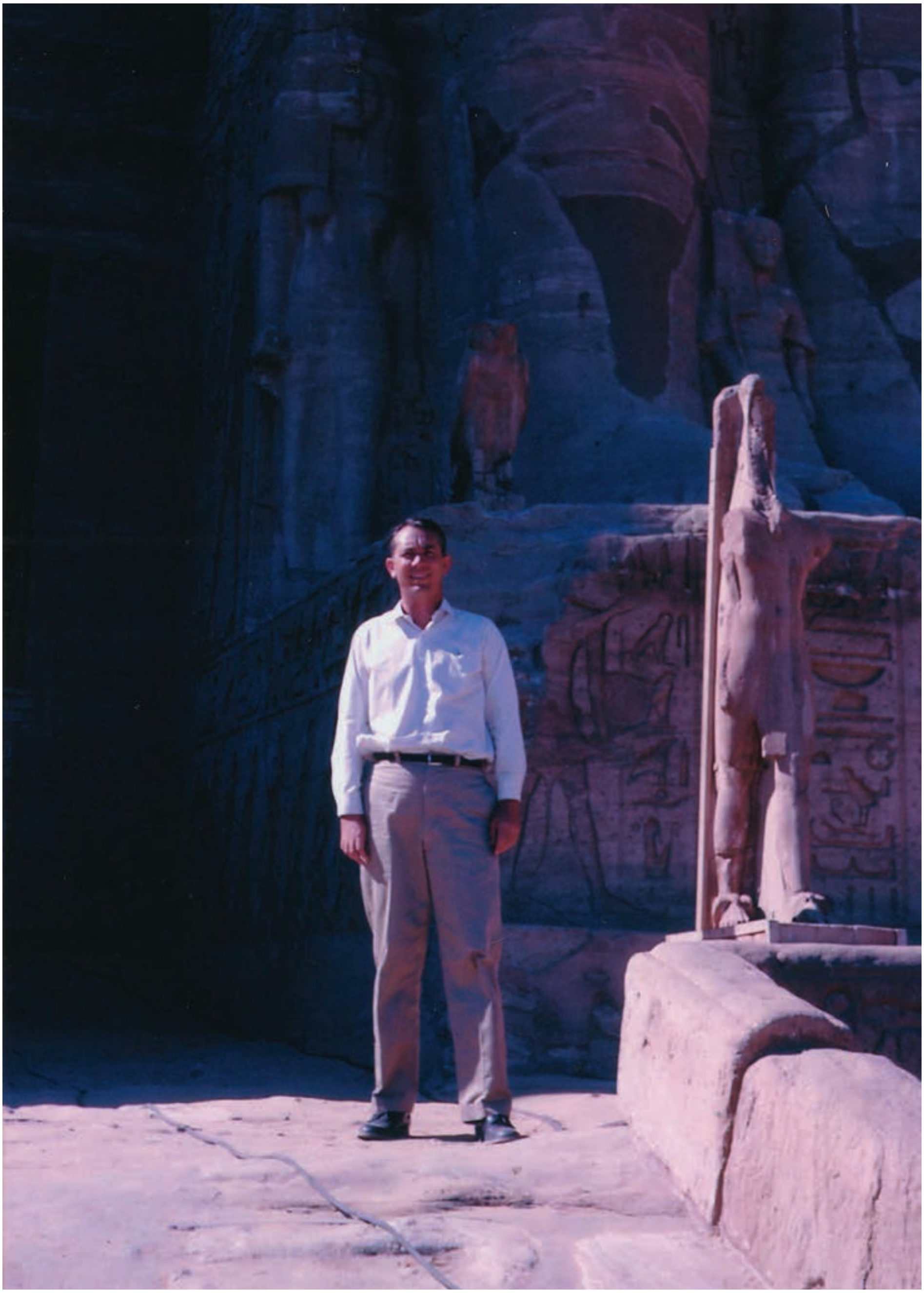


Fig. 8. Aswan, 1963. Fred Wendorf, the director of the Combined Prehistoric Expedition, at the entrance to the Great Temple of Ramesses II before it was dismantled and relocated

Fig. 9. Gebel Sahaba, 1965. Combined Prehistoric Expedition rescue excavations directed by Fred Wendorf recovered a Late Paleolithic cemetery often considered one of the earliest evidence of warfare

Fig. 10. Nile Valley, early 1960's. Fred Wendorf and CPE paleontologist Bob Slaughter

Fig. 11. Fred Wendorf and Egyptian geologist Dr. Rushdi Said. 1967

Fig. 12. Fred Wendorf and Eide Mariff, 2003. Members of Mariff's family from Asjut worked for decades for the Combined Prehistoric Expedition in the Nile Valley and the Western Desert

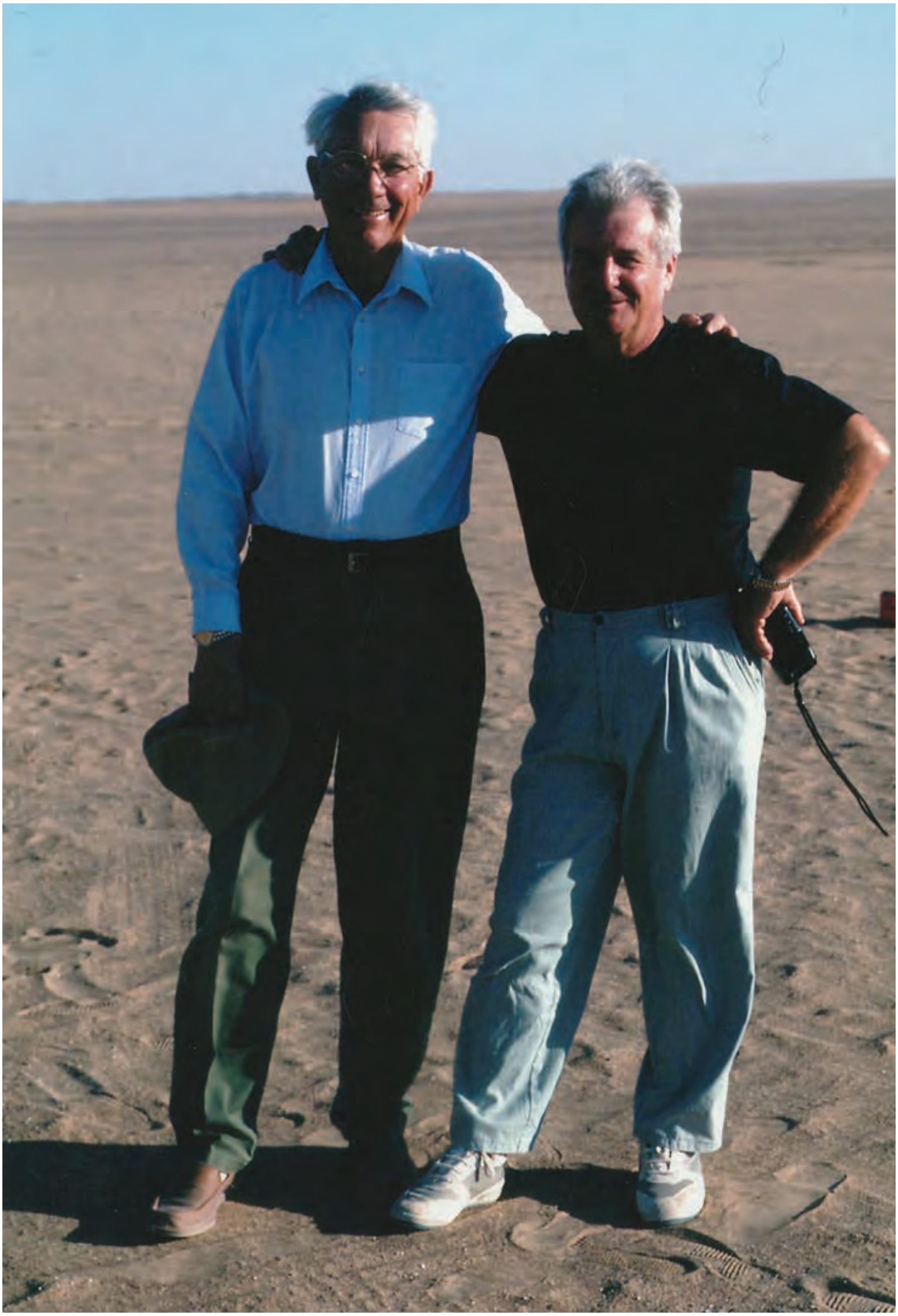


Fig. 13. Best friends. Fred Wendorf and Romuald Schild. Nabta Playa, 2008

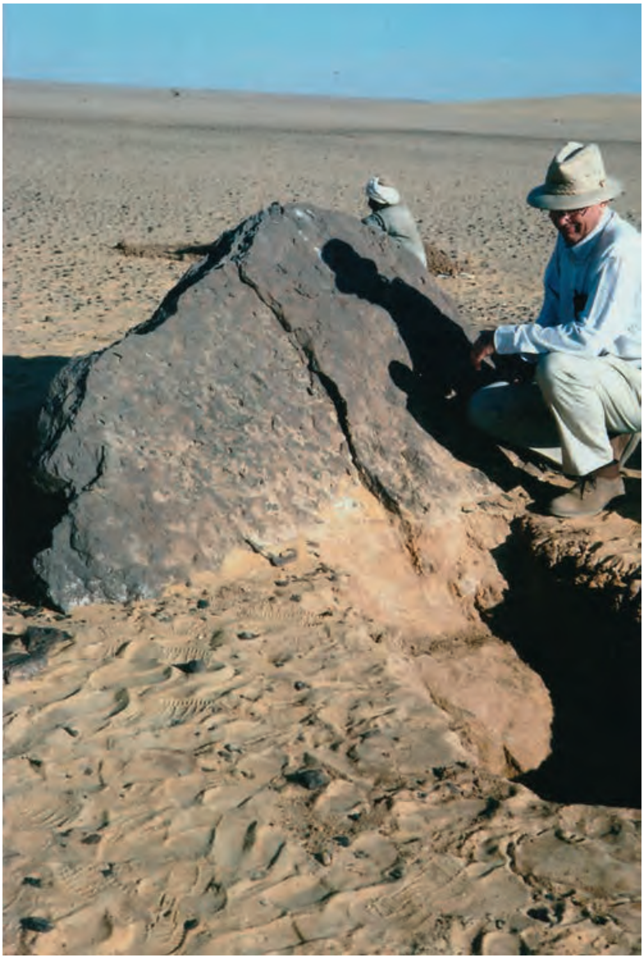


Fig. 14. Nabta Playa, early 2000's. Fred Wendorf recovering the megalithic stelae

Fig. 15. Desert camp in Nabta Playa, 2010. Fred Wendorf in his tent

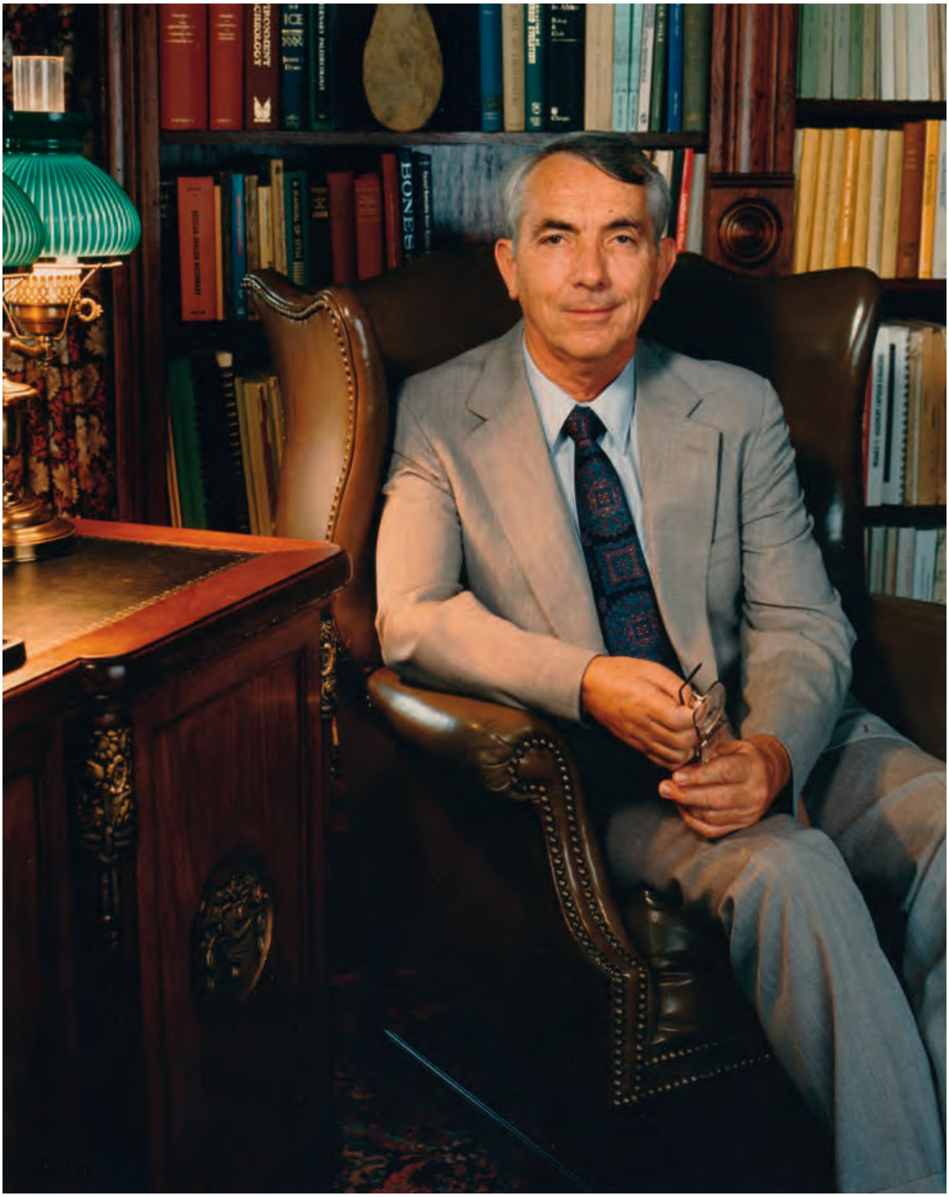


Fig. 16. Fred Wendorf in his house library

II

The Nile Valley

Desert and the Nile.
Prehistory of the Nile Basin and the Sahara.
Papers in honour of Fred Wendorf
Studies in African Archaeology 15
Poznań Archaeological Museum 2018

Ahmed Hamid Nassr

Early Stone Age Tools Variability in the Nile Basin: a New Investigation in the Eastern Desert of Lower Atbara River, Sudan

Introduction

It is widely accepted that the Early Stone Age (ESA) stone tools in the Nile Basin belong to the Large Cutting Tool tradition (i.e. bifacial flakes), of which the handaxes and cleavers are the main types. However, their technological development and dispersal across the Nile and the Sahara from southeast Africa remain controversial including when and where? The lack of Developed Oldowan and Early Acheulean technology make the situation complex to understand. Given that the Acheulean large bifacial stone tools (including choppers, cleavers and handaxes) discoveries at Olduvai Gorge, Olorgesailie, Koobi Fora, Omo, Awash, Hadar and Gona in Tanzania, Kenya and Ethiopia, respectively, suggest clear distribution and transition of early stone tools in the Upper part of the Nile basin. However the Acheulean assemblages in the lower part of the Nile Basin are different as they contain small hand axes at selected sites such as Arkin-8, Bir Sahara, Kharga Oasis and Dakhla Oasis.

The middle part of the Nile Basin is lacking evidence due to lack of research, with the exception of single discoveries from Khor Abu Anga and Abu Hugar. The combination of the discoveries of these three parts in the Nile basin is very informative and make it easy to understand the ESA of the Nile basin.

This paper presents results of recent archaeological investigations of ESA sites in the Lower Atbara River (Eastern Desert) region of the Republic of Sudan, which shed light on a new corridor that links earlier sites of southeast Africa with those in northern Africa. Sites were recorded from a variety of landscape settings and with different densities of artifacts. The central goal of this paper is to report the techno-typological characteristics of stone tools. The assemblages present two main cultural entities: Early Acheulean (large flakes cleavers, hand axes, and bifacial points) and Middle and Late Acheulean with MSA (characterized by lanceolates, prepared core products and Levallois flakes). Miscellaneous large cutting flakes are well represented, and flint and quartz are the dominant raw materials.

1. An overview of ESA in the Nile basin

The Nile basin is here defined by the territory encompassed by the Nile valley from the southern lake complexes in Tanzania and Kenya to the Mediterranean area in the north and the eastern and western deserts. The Upper part includes Tanzania, Kenya, Ethiopia, Uganda and South Sudan), the middle part of the valley is in central and eastern Sudan, and the lower part includes the Western Desert of northern Sudan, south Egypt, up to the Mediterranean Sea.

Fossil and archaeological discoveries from African prehistoric sites continue to improve our understanding of the geographic, chronological and environmental contexts of human evolution (Semaw 2000; Klein 2009; White *et al.* 2009). There is now a broader consensus on origin of modern humans in Africa and their subsequent colonization of the rest of the world at different time-periods (Klein 2009). The oldest records of culture (in the form of stone tools) have been known from East African sites (Upper Nile Basin); and Africa holds a continuous record of Paleolithic cultures starting with the earliest Oldovan tradition up to the Later Stone Age (Klein 2009; Semaw 2000; Rots and Van Peer 2006; Abbate *et al.* 2010). The invention and gradual diversification of stone tools are believed to have greatly contributed to the survival of early hominin and the emergence of complex cultures over time.

Despite the Nile basin is important place of our understanding the emergence and dispersal of early human, not all regions of the Nile basin have seen adequate Paleolithic research, nor were they exposed to similar field approaches and classification methods (Kleindienst 2006), hindering a balanced assessment of the contribution of each region to the study of human evolution. One of the leading theoretical issues in this study is the transition from ESA (mainly characterized by Acheulean stone tools, such as cleavers and hand axes) to Middle Paleolithic or Middle Stone Age traditions (characterized by the production of points and prepared core products). The timing and geographic contexts of this transition have not been resolved, but the answer is vital to assessing broader evolutionary issues, such as whether this transition was associated with the emergence of a new hominin lineage from upper Nile basin or if it was a result of climatic changes that compelled hominin in different regions of the Nile basin to employ new technological innovations (Clark 1988; Yellen *et al.* 2005; Shea 2008; Beyin 2013).

The very widespread distribution of Middle Paleolithic sites in the lower part of the Nile basin, across the western Desert, suggest that there were a long contact between the Nile basin and the Sahara, besides that the differentiation among the stone tools technology implies the existence of separate migration along routes across the Sahara as far as west of the Nile basin borders, with differences in adaptation. The main evidences of that comes from Dakhla Oasis, Kharga and Kurkur and other sites at ElGa'ab depression, Sai Island and Arkin-8 in northern Sudan (Chmielewski 1968; Wendorf and Schild 1980; Rose and Van Peer 2006; Tahir and Nassr 2015; Osypiński and Osypińska 2016).

In the Middle Nile basin the discoveries of central and eastern Sudan show some contacts with Eritrea and the Red Sea coastal zones, that is identified from the assemblage related to the Late Acheulean and MSA assemblages (Chmielewski 1987; Marks *et al.* 1987; Abbate *et al.* 2010; Beyin 2013), however the earlier objects show very few differences and their emergence was undertaken as the focal research target.

In his publication, Arkell (1949) indicated that the Acheulean stone tools in Khor Abu Anga were similar to the Kenya collections in southeast Africa (Upper Nile basin). The discoveries of ESA in northern Sudan (Kadanarti and Arkin-8) compared with central Sudan, which have been already compared with Kenyan sites (Chmielewski 1968; Chaix *et al.* 2000 ; Van Peer *et al.* 2003).

This study attempts to establish cultural contacts with the southeast Africa also, but from the eastern desert of Lower Atbara River. That is chosen from two reasons: firstly geographical location of the Atbara River is in open land with Eritrea and Ethiopia, both of which contain entry points to southeast and northern Africa, respectively. Secondly, the area remained largely untouched, with some rescue studies conducted on the upper parts of Atbara River (Khashm el Girba) revealed surface occurrences of Middle Paleolithic stone tools, which are different from the other Sudanese finds (Marks *et al.* 1987, Chmielewski 1987; Shinner and Chmielewski 1971; Abbate *et al.* 2010).

There are two potential factors confounding the question of ESA stone tools transition in the Nile basin: a) Taxonomic problems – different parts of the Nile basin have been exposed to different and inconsistent taxonomic terms, hindering systematic comparison of regional assemblages across the Early and Middle Paleolithic transition, and b) Absence of direct spatial association of ESA sites (sometimes far apart in space) making it difficult to develop regional culture-histories that represent all Paleolithic facets. Moreover, new taxonomic and analytic questions are constantly emerging with every new discovery (Stout *et al.* 2010), further complicating regional comparisons of Paleolithic assemblages and the large gaps of ESA sites in the middle and upper Nile basin.

2. ESA research in the Nile basin

One clear pattern from Paleolithic records in the Nile basin is that the archaeological sites presenting the ESA are rare, if they are compared to the Middle and Upper Paleolithic. The main sites in Tanzania, Kenya and Ethiopia regarded as the standard evidence of ESA development and change. The comparative research between Upper and Lower Nile basin are lacking, although some of the studies have concentrated on the Nile and the Sahara (Leakey 1951; Arkell 1949; Clark 1966; Wendorf 1968; Isaac 1977; Gowlett 1982; Stout *et al.* 2010).

Leakey (1931) started his research on East African paleoanthropology, which resulted in comprehensive archaeological discoveries at Olduvai Gorge, Isenya, Olorgesailie, Koobi Fora, Omo, Melka Kunture, Awash and Hadar. (Fig. 1). Many of technological terms and classification methods have been cited through work in the upper part of the Nile basin.

These are main references sources to be consulted in respect to the early pioneer investigations and they provide invaluable bibliographies and summaries of early explorations in the southeast Africa (Isaac 1977; Leakey *et al.* 1969, McBrearty 1988; Rote and Van Peer 2006). The discoveries of the Rivet Valley, Turkana basin, Wadi Awash, Afar, Hadar and Gona (Fig. 1) shed light on Acheulean technological development and associated stratigraphy (Clark 1982:238).

The early exploration survey by Sandford and Arkell (1928) in Sudan shed light on some important elements of the Paleolithic to the north. This was later supplemented by many Paleolithic sites discovered by Arkell (1949) in central Sudan. The surface collections of early stone tools described from the Upper Atbara River were very promising for the Sudanese Paleolithic, however there are no continued investigations. Numerous Acheulean assemblages were recorded from the rescue fieldwork by Chmielewski (1967), The oldest sites do not reveal hand axes, however; choppers were dominant (Chmielewski 1987:7). This revealed important information on area which was investigated by an Italian mission and some ESA with Pleistocene deposits recorded in the Middle Atbara River (Abbate *et al.* 2010). Likewise, Paleolithic sites were discovered on the Blue Nile such as Abu Hugar, which yielded a *Homo sapiens* skull from Singa, animal bones and MSA stone tools (Stringer 1979:82). The last was discovered on the Upper and Middle Atbara River and in the Bayuda Desert; the Affad depression makes the research necessary in the Eastern Desert of Lower Atbara River (Abbate *et al.* 2010; Masojć 2010; Osypiński and Osypińska 2016).

The question of the scarcity of Paleolithic sites and robust chronologies in Sudan archaeological records has not been satisfactorily answered. Moreover, the absence of ample ESA sites made it difficult to trace the origins of the MSA. The discovery of Early and Middle Stone Age assemblages from the Atbara region provides us a rare opportunity to investigate this important transition in one distinct region.

In lower part of the Nile basin, the work on prehistory began by 1890s, through general notes of single stone artifacts. More significant research discoveries started in late 1940s. In the late 1930s, stone tools were identified by Caton-Thompson (1952), and assigned an upper stage of the Acheulean from Kharga Oasis. The main Acheulean hand axes found in situ near Cairo, contain pointed hand axes with cortical butts (Huzzayin 1941:182). The Combined Prehistoric Expedition (CPE) located numerous Middle and Late Stone Age sites in the northern Sudan and western desert (Wendorf 1968; Klees and Kuper 1992). Renewed Paleolithic archaeological research began with the rescue operations prior to the construction of the Aswan High Dam, where Acheulean stone tools are abundant. Their technology and typology were described as Upper Acheulean, with hand axes and chopping tools as the main types, while cleavers were lacking (Wendorf 1968; Chmielewski 1968; Guichard and Guichard 1965).

Wendorf and Schild (1980) classified many Upper Acheulean and MSA assemblage from Dakhla and Kharga Oasis and Bir Sahara (Fig. 1). Also, Upper Acheulean and MSA sites were reported near the Radar River on a small paleo-lake at Bir Sahara and Bir Tarfawi (Wendorf *et al.* 1987). Moreover, the recent field works in the second cataract, Dongla Reach, El-Ga'ab depression, Fourth Cataract and Bayuda desert have reported several find-spots of MSA stone tool types (Rots and Van Peer 2006:364; Masojć 2010:66; Maier 2012:112; Osypińska 2012:219; Tahir and Nassr 2015:105).

The Cologne symposium in 1990 included presentations and publications on northeast African prehistory (Klees and Kuper 1992). The ESA stone tools were

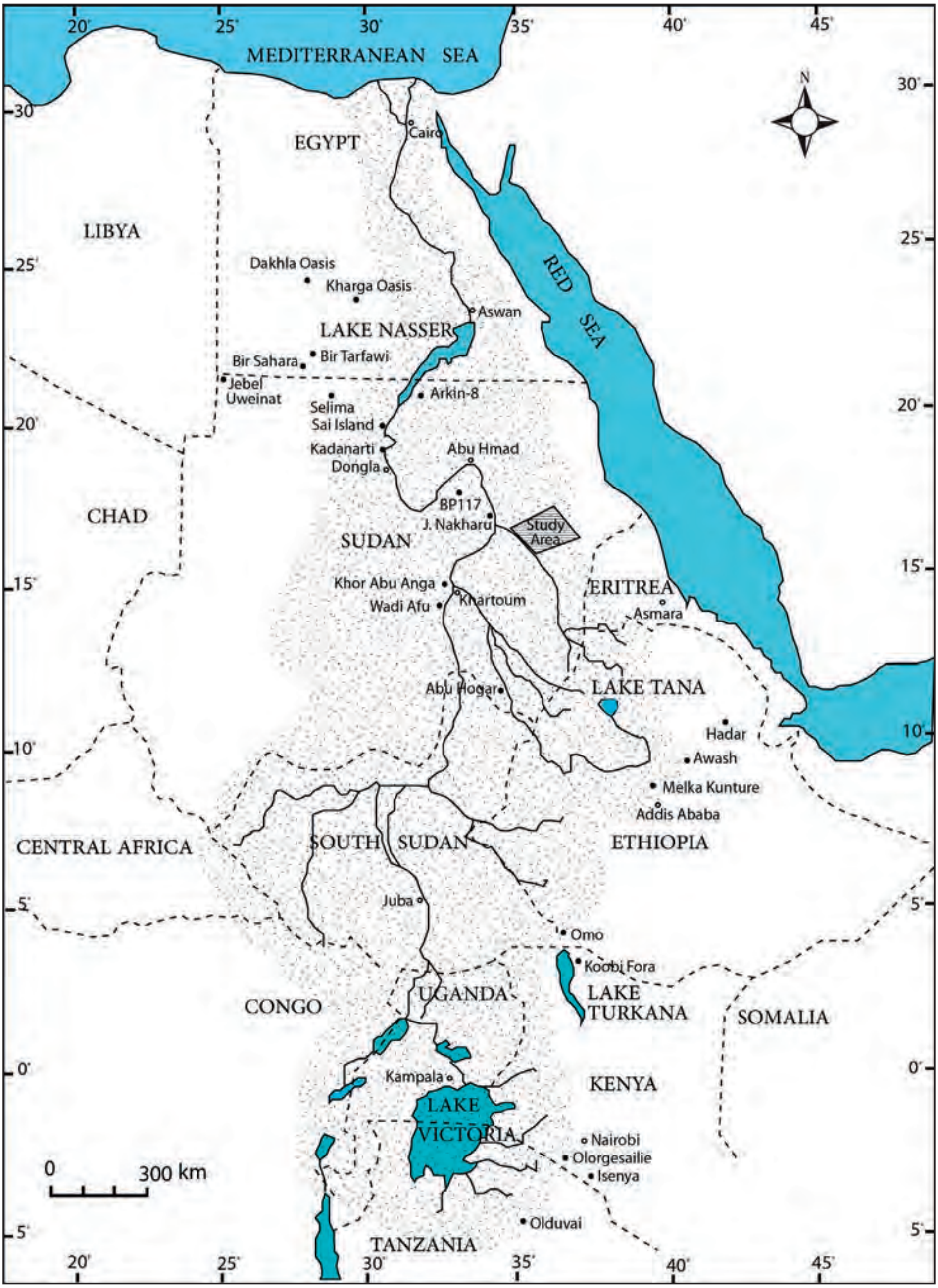


Fig. 1. ESA sites of the Nile basin mentioned in the text (illustration: A. Nassr)

described from regional similarities and connections between north and east Africa. The main problems of regional prehistory were discussed in the symposium and resulted in publications. Unfortunately the ESA evidence was sparse from the Western desert Oasis and the Nile in northern Sudan.

I am underscoring here that previous Paleolithic research in Sudan focused on later time periods and most of the assemblages were described by taxonomic terms borrowed from other regions of Africa. The Eastern Desert of Lower Atbara River remained largely unexplored. Therefore, the first step in our project in the Atbara region was to located new sites through systematic survey with the ultimate goal of filling existing gaps in chronology and geographic distribution of Paleolithic sites. The location of the Lower Atbara outside of the Nile valley makes it an ideal region to investigate local developments in Paleolithic technology and broader regional connections among the different prehistoric cultures and their makers.

3. Archaeological survey in the Eastern Desert of Lower Atbara River

This study is an updated version of my doctoral research, completed in the Department of Archaeology, University of Khartoum, in 2016. The area of study is located on the eastern bank of the Atbara River upstream and south of Atbara town to the Seidon province, about 60 km along the river and following the Abu Adar depression to the east at about 80 km (Fig. 2).

During late 2013, the area was visited by the author and his colleagues from Sudan and in winter 2014, archaeological survey was carried out along the right bank of Atbara River and the deeper water channels were explored 10 km into the eastern desert. Wadi Abu Adar was investigated up to 80 km to the east (Nassr 2014:107). In late 2014, sites were revisited by the author and his colleagues from Poland for a future join project (EDAR project).

A methodology was established from geological description, archaeological survey and test excavation to achieve the general goals of the study (Nassr 2014:108-120). Several methodological approaches have been applied in previous Paleolithic researches in the Nile basin. One common approach used here was to document and investigate the ESA sites and sampling stone tools for technological and typological classification. An overview of the literature and reclassification of Khor Abu Anga assemblages was done first. Stone tools were collected from six sites and the site of Jebel Elgrian (EDAR06) was studied as a case study.

The stone tools used for this study were collected from random surface collections, and test pits at the site of Jebel Elgrian. The assemblage was divided into main classes followed by subclass with the measuring of each sub-class. A description of stone tool technology and typology was compiled with a comparative discussion on the Paleolithic discoveries in the Nile basin.

That work is based on the historical research background of the Atbara area, such as Khor Elhudi notes by Arkell and Paleolithic sites in Upper Atbara River mentioned earlier (Arkell 1949:34; Chmielewski 1987; Marks *et al.* 1987; Abbate *et al.* 2010), as well as the Late Stone Age site of Abu Darbein (Haaland and Magid 1991:39).

The lack of topographical maps of the Eastern Desert of Lower Atbara River makes it necessary to devote a description of the landscape and the present natural conditions, in order to understand the archaeological site settings. The area consists of high gravel mounds and Hudi chert outcrops, mainly close to the river bank and flats in the desert to the east. The large depression is divided into small sections, draining from east to west such as Hudi, Abu Adar and Elhelgi, breaking deeply the embankment with some short water channels. These features reflect Pleistocene and Holocene topography. The Atbara paleo-lake in the east and Elhelgi paleo-depression parallel to the river are the main aspects of the area. Profiles of sediments and outcrops of silicate rocks observed over the banks of these water channels which flow from the eastern highland desert and mountains.

Five Paleolithic sites were discovered on the eastern bank of the river, and recognized from the expanses of debitage and a few finished tools. The assemblage represented Late Acheulean and MSA technological traditions. Classical Levallois scrapers and prepared cores are dominant (Fig. 2). A few artifacts show Levallois flakes and different types of blade industries. The sites were numbered EDAR01 – EDAR06 "Eastern Desert of Lower Atbara River". Site EDAR01 (ElHudi site) was noted early by Arkell in 1949, from where some Acheulean hand axes were collected (Arkell 1949:26). Stone tools were found on the high mounds and along the channel to the east. The artifacts include hand axes, choppers, simple bifacial points made on Levallois flakes and cores with worked faces.

The sites (EDAR02 – EDAR05) discovered on the small water channels in Alkarbab and Alagageer area (Fig. 2), are mainly MSA workshops of chert. Levallois flakes and cores with simple preparation are the main features and Mousterian points are rare. The assemblage are closely similar to the sites in northern Sudan and the Bayuda desert (Wendorf 1968; Masojć 2010:66).

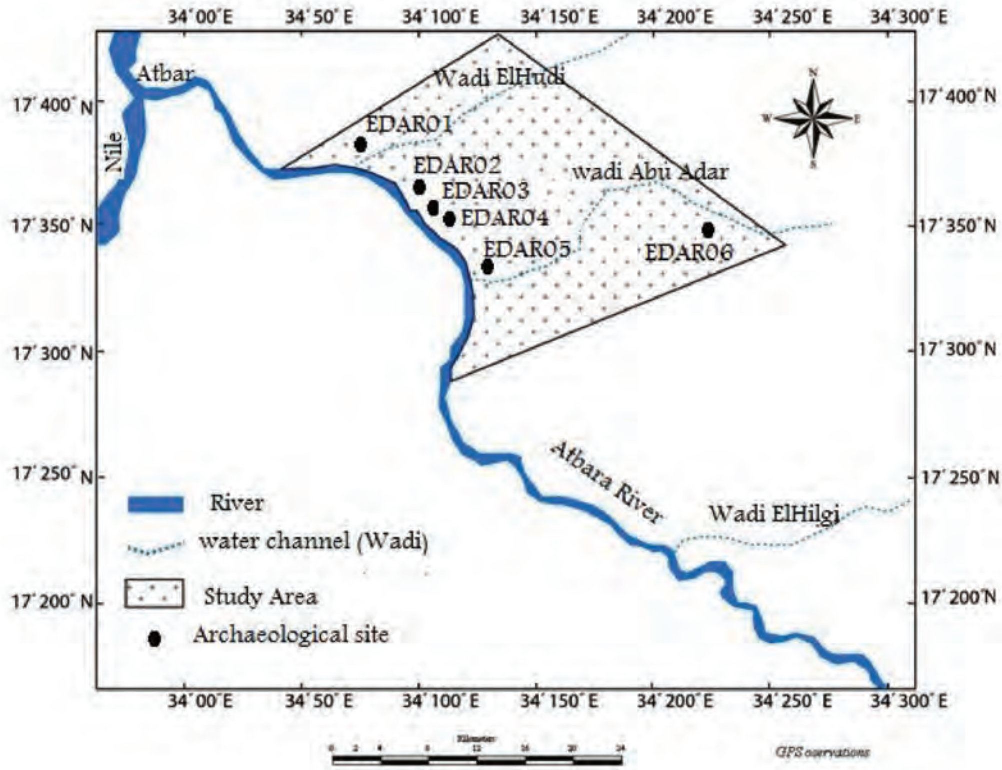


Fig. 2. Paleolithic sites discovered from the survey in the Eastern Desert of Lower Atbara River (illustration: A. Nassr)

The largest site discovered in the desert is the site of Jebel Elgrian (EDAR06), which shows an extraordinary number of large bifacial stone tools in surface context and extended over the one km from east to west and 600 m from south to north. The artifacts concentrated in multiple spaces overlooking the site, and among outcrops of quartz and chert rock in the eastern and northern parts of the site. In fact, this area may preserve evidence of groups of Acheulean camps extending from the mountains in the east to the depression in the west, stretching more than 10 km. Today, most of them were destroyed by gold mining trenches as evident from the trenches profiles and digging heaps.

Our methodological focus on the site (EDAR06) was from its location, setting and stone tools accumulated on the surface. The site is quite remarkable from the sheer amount of stone tools and debitage on the surface and with outcrops of quartz and chert. The landscape around the site seems to have been a beach on the margin of the paleo-depression, which is different from the sites on the riverbank. The presence of such a site so far away from the river channel was in agreement with the main hypothesis of the study, during the general survey in the area.

The primary result of the archaeological survey of the site revealed several major concentrations of choppers, cleavers, hand axes, picks; discs and other debitage were deposited over long successive Paleolithic periods, owing to the environmental conditions which allowed successive habitation. The diversity of stone tools suggest that the place most favored for settlement was either on a low rocky promontory, or on patches of sand, which generally occurred in the channel of seasonal streams draining into the depression. Such large accumulations of lithics are rare in Sudan, and seem to be similar to the Olorgesailie site in the Kenya Rift Valley (Isaac 1977; McHugh *et al.* 1988), based on the location, size and concentration of stone tools on the surface (Fig. 3).

Our method involved a systematic survey with two surface cleanings of a grid of 20 x 20 m and a test excavation. The collected assemblages included stone tools, core, flakes, blades, debitage and waste in large amounts. The surface cleanings were made in different parts of the site, starting from the eastern part where

Fig. 3. Stone tools concentration on the surface, looking from the west (photo: A. Nassr)

a scatter of large Acheulean tools were found. The western part had a higher concentration of MSA artifacts. The technological features of this material suggested that the site represents multiple ESA and MSA industries.

Fig. 4. Cleavers and hand axes stone tools in depth 150 cm (photo: Masojć)

One test excavation (3 x 3 m) was conducted at the centre of the site to recover stratified artifacts and to expose the bedrock. The dark soft soil yielded small hand axes and sharp flakes at the depth of 50 cm. Hard and compacted brown silt yielded a single flake at the depth of 50 – 140 cm. In this context, artifact were rare and the white silt with pebbles appears beneath the hard grey soil from 150 – 180 cm, where some hand axes and cleavers were also found. The basement rocks were encountered at a depth of 190 – 200 cm (Fig. 4).

While the test excavation revealed stone artifact at a depth of 150 cm, the poor sedimentary contexts and the absence of organic finds makes geological interpretations challenging. At the same time. The recovery of Acheulean bifacial beneath one and half meter of sediments might represent primary evidence of Paleolithic occupation. In addition, there are many hand axes observed in situ, in the destroyed profiles of mining trenches.

4. Early stone tools technology and typology from the Eastern Desert of Lower Atbara River

The stone tools presented here are from the assemblages that were collected from the six sites discovered from the first survey in the eastern Desert of the Lower Atbara River. The stone tools collected from sites closer to the river are closer to MSA technology, as the Levallois cores and flakes. All stone tools gathered from the site EDAR06 represent Acheulean and MSA technologies and have multiple cutting edges, indicating different activities, specially the bifaces.

The area preserves ample raw material which served as local sources for stone tool production, since different rock types were identified around the site. Green chert was exposed in the banks of the water channels and the mountain, which is massive and shows moderate to weak mineral foliation, dark, coarse, grained and highly sheared. The felsites rock is common also, and has a very dark tarnish in high green and concave, fine texture and very hard. Quartz and quartzite are dominant, and have linear shapes, are fine to medium texture and very hard.

The studied assemblages show a gradual technological development. The large bifaces are the dominant type and include prepared cores with extended forward scars of flake detachment and working edges. This indicates complex developed lithic industries at the site (Fig. 5), which seems to be from between the Early Acheulean and the early MSA technology, i.e. Sangoan and Levallois.

Fig. 5. Acheulean Large bifacial cutting flakes (photo: A. Nassr)

Large regular continual flaking on both faces are the main technological features of these stone tools, with sharp working edges and pointed ends (Fig. 6). The large tools were made on cores from cortical striking platform with straight working edges. Large flakes are common, being formed by the inter-section of two large flake scars and some specimens preserve wavy scars from foreword flaking detachment and negative retouch.

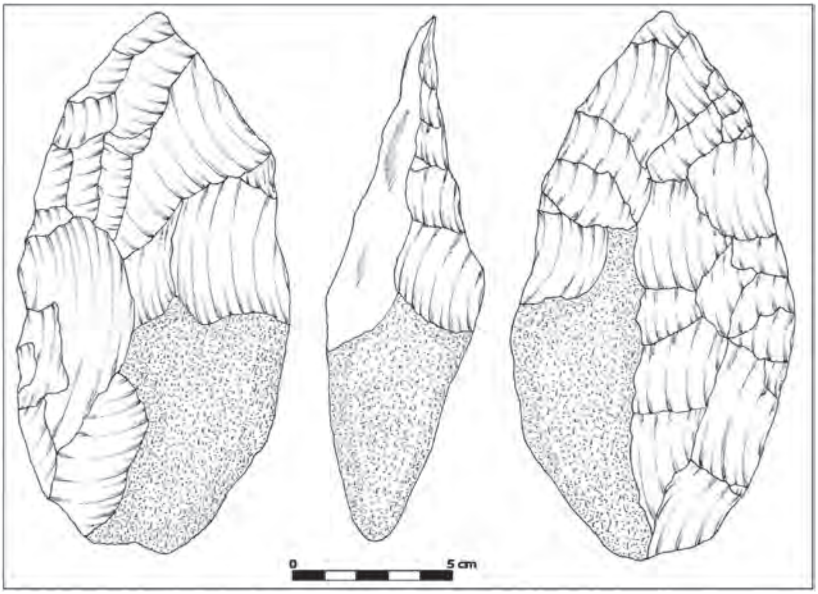


Fig. 6. Large flaking scars with sharp edges technology (drawing: A. Nassr)

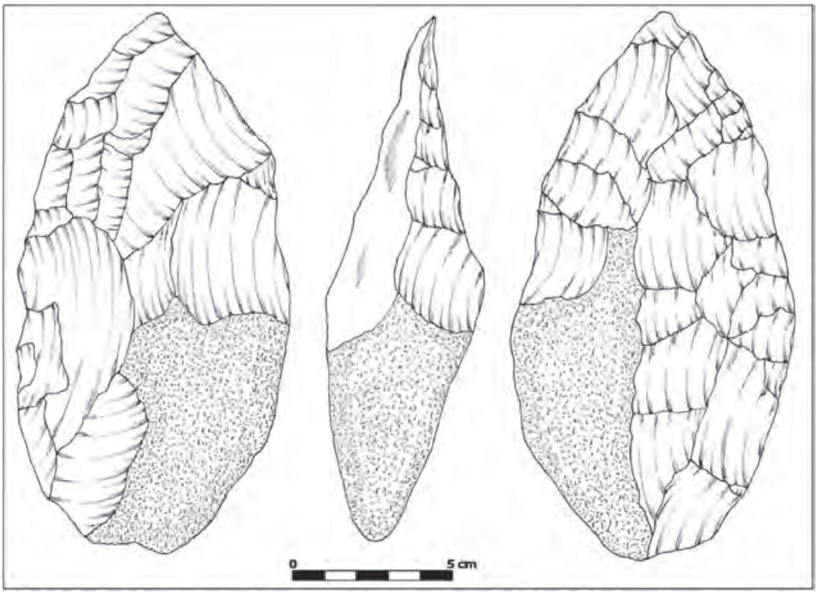


Fig. 7. Bifacial stone tools technology (drawing: A. Nassr)

The finishing of stone tools is affected by the texture of the stone raw material, i.e. fine vs. coarse. Some of the stone tools have a half cortical striking platform as evident on some of the hand axes, choppers and cleavers. The medium and small sized hand axes, cleavers and bifacial points are usually completely devoid of the striking platform and bifacial flaking (Fig. 7).

The main Acheulean stone tools are characterized by a typical large flake blanks for the production of choppers, cleavers, hand axes, and point. There are a few large tools made on cores. Moreover, some of the choppers, picks and hand axes are dihedral and have a flat striking platform and sharp elongated edges from the single removal. The number of flake scars are visibly greater on tools made of basalt and chert (Fig. 8).

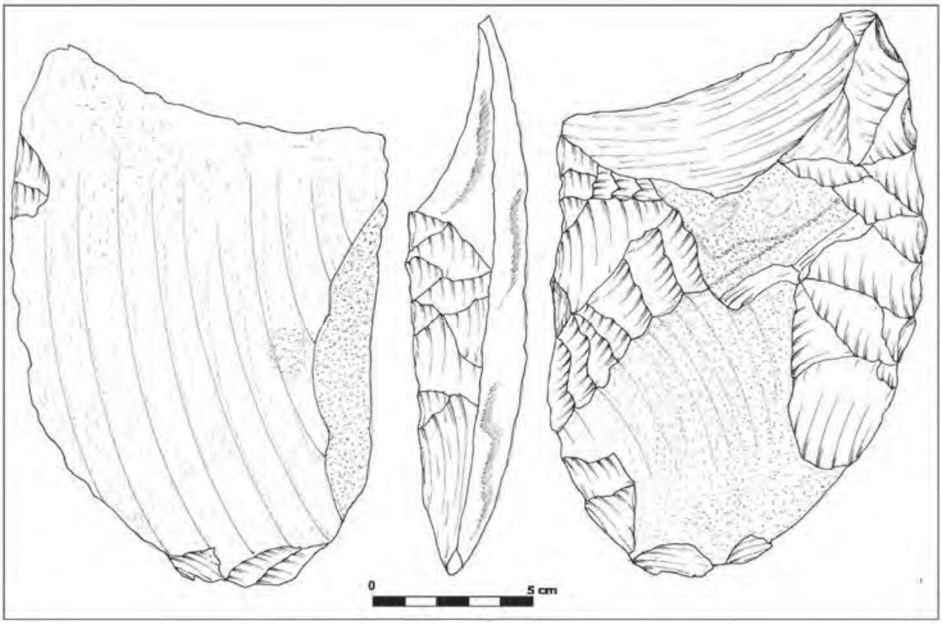


Fig. 8. Scars flaking detachment technology of cleaver (drawing: A. Nassr)

Some of the Late Acheulean and MSA stone tools were made on small flakes, which include bifacial points and Sangoan type hand axes. Others are made on Levallois flakes, prepared cores, blades and debitage such as small points and scrapers.

Unifacial stone tools are very rare. They are identified from large choppers, some flakes and small chips. The small points and picks indicate the use of special techniques for special functions. The cleavers and knives are distinguished by a butt worked as a handle and the tip ending with sharp edges and a dorsal face, which also indicates heavy duty usages (Fig. 9).

Fig. 9. Cleavers different size made on sharp curve end and flaking edges (photo: A. Nassr)

The main technological observation is that the large Acheulean tools were targeted for their cutting edges and preparation of pointed ends. The variability observed from the artifact size and raw materials unfamiliar in the known Sudan archaeological record. The large flake production, primary core preparations are similar to the sites from the Omo Valley and Bed II in Olduvai Gorge (Howell 1976; Leakey *et al.* 1969). The sharp cutting edges, the worked butt and sloping ends are closely matched with the evidence from Olorgesailie (Isaac 1977).

From a typological point of view, the assemblages show a large variation from the Acheulean to the MSA. From the typological classification based on the assemblage description, it shows different sizes and forms of choppers, while cleavers is the dominant type with different shape and edges. The hand axes are also a dominant stone tool, and which possess many subclasses: hand axes with a natural striking platform, hand axes with a borer end, elongated hand axes with a straight end, dihedral hand axes, foliate hand axes, small hand axes, hand axes with a cleaver end. Some of the hand axes are too large with a regular shape and continuing scars over the axis (Fig. 10).

Fig. 10. Different types of hand axes (photo: A. Nassr 2014)

The cleavers, discoids and large hand axes are similar to the ESA artifacts from the Awash Valley in Ethiopia and other sites in Kenya (Howell 1976; Isaac 1997). On the other hand, the small hand axes are similar to the material from Khor Abu Anga and some comparable sites in northern Sudan. There are also some tools unfamiliar in Sudan and quite similar to Ethiopian specimens such as large cleavers, hand axes and *hachereaux*, which are large cutting flakes (Semaw 2000; Sharon 2006). Also, some tools are similar to Sangoan types and Tumbian productions like heavy oval hand axes, retouched scrapers and bifacial points (McBrearty 1988:382).

Fig. 11. Late Acheulean and MSA stone tools (photo: A. Nassr)

Besides that, the stone tools made on flakes such as small cleavers, bifacial points, rounded scrapers and small points and the Sangoan types (Fig. 11) are related to the Late Acheulean and MSA in central and northern Sudan (Arkell 1949; Chmielewski 1968; Van Peer *et al.* 2003; Abbate *et al.* 2010). The Sangoan types here show similar characteristics to some Late Acheulean occurrences in Kenya and Khor Abu Anga and are typical of the MSA of Sai Island (Van Peer et al 2003:189).

The MSA technological tradition is reflected from the simple type of cores with working edges, Levallois flakes and debitage. Prepared small cores with two working faces are recognized including Mousterian points and possible arrowheads. Flakes, elongated blades, Rounded scrapers, points and Levallois flakes were the main types of the assemblage indicated MSA technology (Fig. 12).

The aforementioned data indicates a long occupation of the EDAR06 site in the desert and more than the other sites in the region. It also shows the develop-

Fig. 12. MSA, Levallois stone tools on the site surface (photo: A. Nassr)

ment of widespread ESA technology and the site reveals a new face of Sudan ESA and also added a new MSA dimension for research in Sudan. This discovery will encourage future Paleolithic research in the eastern desert of the Lower Atbara River.

Conclusions

Archaeological survey and test pits in the eastern desert of the Lower Atbara River yielded new prehistoric evidence in Sudan Paleolithic and added an important assemblage to the known ESA sites in the Nile basin. The sites close to the Atbara river channel (EDAR01- 5) are quite similar to the MSA evidence from northern Sudan. However, the site EDAR06 is comparatively more different than the known Sudan Paleolithic. These Acheulean and MSA stone tools, which are difficult to compare with the Sudan record, are more or less similar to the south-east African Paleolithic.

This study of ESA stone tools revealed the following observations:

1. Our knowledge of Sudan ESA is minimal, evidence of which is primarily known from central and northern Sudan and from the surface and eroded Acheulean bifaces stone tools types.
2. The archaeological survey and test excavation in the eastern desert of the Lower Atbara River has shed light on a new region for Sudan Paleolithic research, where Acheulean and MSA stone tools are dominant.
3. The archaeological sites discovered close to the eastern bank of the Atbara River are mainly represented by MSA stone tools, which also reflects the age and channel location of the river.
4. The site of Jebel Elgrian (EDAR06) in the eastern desert of the Lower Atbara River has added a new dimension of ESA stone tools in Sudan. The materials are similar to other Sudanese sites in some aspects but differ in the main characteristics.
5. The attributes of stone tools classified from the eastern desert of the Lower Atbara River are very informative regarding the regional diversity of ESA in the Nile basin. They are similar to the early ESA found in Ethiopia and Kenya and at the same time indicate how Sudan is important for the "Out of Africa" debate.
6. The hand axes are regarded as the most common ESA stone tools of in central Sudan and the choppers are the main types in northern Sudan. In both regions, there is a lack of cleavers. Central and northern Sudan presented characteristics similar to the Upper part of the Nile basin (such as the Kenyan sites). However, the eastern desert of the Lower Atbara River revealed different Paleolithic attributes from the site of Jebel Elgrian (EDAR06). Cleavers, hand axes and choppers are the most common types, and which allow us to make a reliable comparison with ESA sites in Ethiopia and Kenya. This is indicative of the variability within the ESA of the Nile basin.

7. The variation of stone tools technology and typology from the site (EDAR06) indicates developed stone tool productions and a long occupation far from the river during the Middle and Late Pleistocene.
8. The similarities of the site's (EDAR06) assemblage with other sites along the river indicate human movement and environment change from the desert to the river in later Pleistocene. It also shows possible cultural interaction with central and northern Sudan. Sites representing such cultural entities were thus far unknown in Sudan, resulting in inadequate knowledge of the regions Paleolithic potential. In addition, the work has helped fill major gap in the Paleolithic record of the Atbara region. In its initial stage, the study has made an important contribution to ascertaining the potential of the area for future systematic field investigations and extensive systematic surveys, and excavations and dating of the Sudan Paleolithic.

Acknowledgement

I am grateful to my colleagues Adballah, Mozamil, Hassan and my friend Amgad who passed away in 2014 for helping in the survey. Many thanks to my colleague Professor M. Masojć from Wrocław University and colleagues from Cologne University and Nairobi National Museum for their help in collecting literature and discussions. I also would like to express my thanks to my supervisor, Professor Mohammed-Ali and Dr. Parth for text revision.

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Desert and the Nile.
Prehistory of the Nile Basin and the Sahara.
Papers in honour of Fred Wendorf
Studies in African Archaeology 15
Poznań Archaeological Museum 2018

Sandro Salvatori, Donatella Usai and Andrea Zerboni

New Evidence from the Prehistoric Sites at Al Khiday and Al Jamrab, Central Sudan

Introduction

The relatively large Mesolithic mound named Al Khiday 3 (16-D-3; Fig. 1) has been often visited in the past years for surface survey, but only in the 2013 field season it was considered for a stratigraphic text excavation. This had the first aim of understanding its preservation condition, depth of deposit and archaeological potentialities. Apart for the upper part of the stratigraphy that resulted to be a colluvial deposit, as in other contemporaneous mounds along the White Nile and at Al Khiday 1 (16-D-5; Salvatori *et al.* 2011), an interesting anthropogenic stratification is here preserved.

A thick deposit of burned to fresh *Pila* sp. shells and intermixed ashy groundmass, a proper shell midden, and some other features related to firing activities were identified. A first geoarchaeological study of the sequence including thin sections analysis has also been done to confirm preliminary archaeological interpretation of the good state of preservation of the stratigraphy and the functional interpretation of excavated layers.

Few dozen of meters to the south of Al Khiday 3, is a vast scatter of Neolithic material pertaining to a single phase. A systematic investigation was forwarded at this site in order to understand whether, even if eroded, features of the Neolithic

Fig. 1. Map of the area under concession of the Italian Archaeological Mission with location of sites mentioned in the text

period could be located in the area. The material recovered is noteworthy, however the interpretation of the evidence is not straightforward.

The Palaeolithic presence in the area of Central Sudan was attested until now only by surface evidence, traces of which were detected also at Al Khiday (Salvatori *et al.* 2014; Usai and Salvatori 2006). A different situation was recorded at Al Jamrab (Fig. 1), an area crossed by Wadi Al Hamra, just 8 km west of Al Khiday. A first preliminary exploration at the site revealed an in situ stratified Middle Palaeolithic site that produced hand axes associated to a single or opposed platform core exploitation technology. The geomorphological sequence revealed at the site has been studied in detail.

1. The excavation at Al Khiday 3 site (16-D-3)

A sounding of 4x4 m was made at Al Khiday 3 for checking the preservation condition of the archaeological deposit and its chronological setting.

Most of the Mesolithic sites along the Nile have been reused in Post-Meroitic times and this, together with natural and anthropic disturbances, produced mixing and pedoturbation of the original anthropogenic deposits and Al Khiday 3 had not escaped this fate. In fact, the upper part of the stratigraphy is composed of two different colluvial layers (Colluvial Layer 1 and 2; Fig. 2): one (20 to 30 cm thick) made of silt, sand and small gravel, sometimes packed, rising the doubt that it is partially resulting from collapse of very late mud-brick structures; the other (30 to 40cm thick) made of a mixture of ashes, aeolian powder and silt, very loose and un-structured. Both include archaeological material of various periods, dating from the Mesolithic to the Meroitic period.

These two units, however, were sealing a rather thick, in situ shell midden deposit (SU1; Fig. 2): a nearly 40cm accumulation of *Pila* sp. shells, with a lot of specimens of quite big dimensions, including also a minority of *Aspatharia* and *Ostrea*. The deposit is intercalated by thin (3 to 5 cm) levels of pure silts, attesting small period of interruption in shells accumulation. It also contained scarce faunal remains and human artefacts, especially well preserved Mesolithic pottery. Horizontal pottery deposition also confirms the in situ status of the deposit itself. This pottery seems to be, at least, partly contemporary to the Middle Mesolithic II phase identified at Al Khiday 2 (Salvatori 2012; Usai in press).

The shell midden deposit had been disturbed by more recent graves whose burial-pit may have been cutting through the colluvial sediments (Fig. 3). Four of

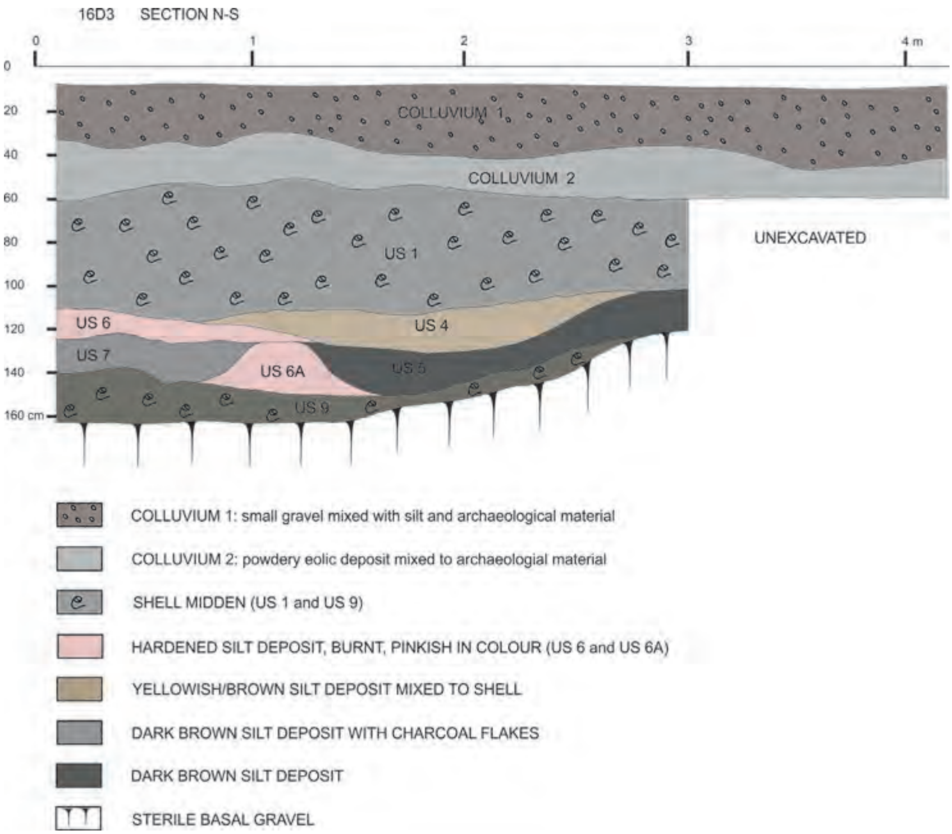

Fig. 2. North-south stratigraphic sequence at site 16-D-3

them were located but only two excavated, it is supposed they may be even Christian in age but this would need to be ascertained.

The shell midden deposit was overlapping a series of in situ deposits; among them a layer of silt mixed to small gravel that has certainly undergone heating (SU6; Fig. 2). Pinkish silt, often agglomerated and hardened, was found concentrated in the north-eastern corner of the trench. This included thin layers of burned silt and chunks of charcoal that have been sampled for ^{14}C dating. This soil concentration corresponds to a small depression whose interpretation is made arduous by the limits of the trench itself. However, few things were noticed that seem to suggest that the area could have been linked to some specific activities associated to pottery production: big nodules of yellow and red ochre, and a con-

Fig. 3. A disturbed burial with partially preserved skull identified on top of SU1, the shell-midden deposit

centration of pottery fragments with rounded side that could have been used for polishing the pots during their making. The bottom deposit (SU9; Fig. 2) is another shell midden, which also includes pottery, lithic and other artefacts, and it is richer in faunal remains.

1.1. The geoarchaeological analysis

From the geoarchaeological point of view, the sequence shows many analogies with the one studied at 16-D-5 (Zerboni 2011); it consists of an upper macro-unit composed of two distinct mixed layers, overlaying a well-preserved stratigraphic unit dating to the Mesolithic period. The upper units can be defined as a complex of mixing due to anthropic bioturbation and colluvial processes, acting after the Mesolithic exploitation of the site. These layers have an abundant fine matrix with interspersed bones, lithics and vertically tilted Mesolithic to Meroitic sherds. Beneath, we can identify a thick in situ deposit, grey in colour, very rich in shells and bone fragments; this layer is generally clast-supported, as the fine ashy matrix is generally poorly represented; it can be interpreted as a shell midden with fish bone fragments. The lowermost part of the sequence includes some layers displaying evidence for fire activity (calcitic ash and heated sediments) interlayered with lenses of clast-supported accumulation of *Pila* sp. shells.

Some samples for micromorphological analysis have been collected from the well-preserved Mesolithic layers; in particular, very interesting is the observation under the microscope of the shell midden (SU1). The deposit of SU1 consists of a huge concentration of shell fragments and few large and small bone fragments (mostly fish), included in a poor fine matrix. The latter consists of two different materials (Fig. 4): a less represented, very loose, clay+amorphous organics matrix and a dominant micritic (micro-calcite) matrix. The first corresponds to

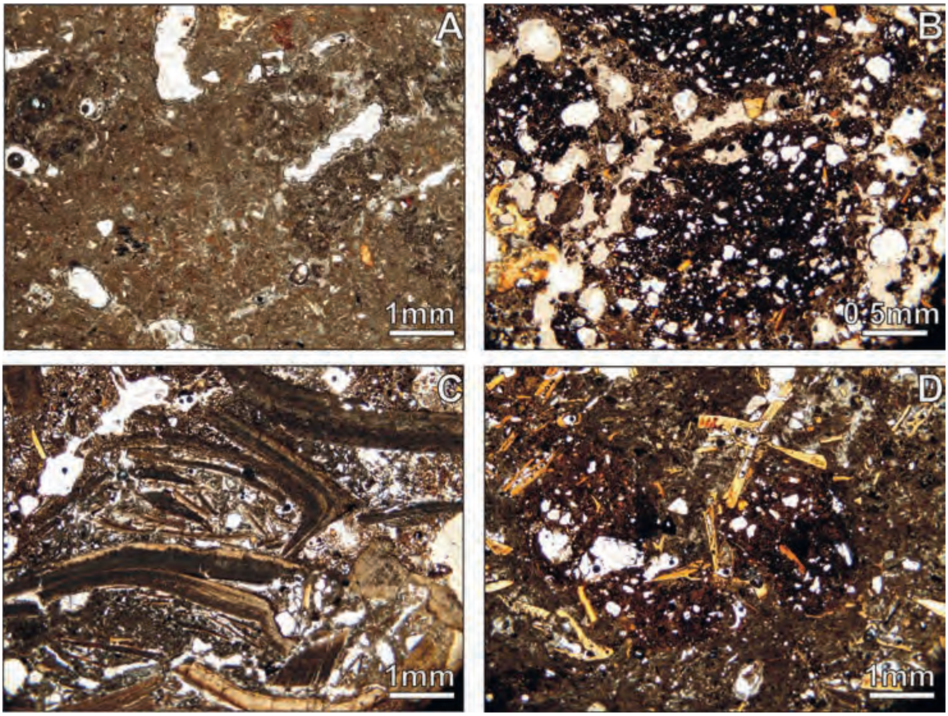

Fig. 4. Photomicrographs of the shell midden of SU1: A – wood ash-rich matrix; B – clayey micromass with abundant amorphous organic matter; C – detail of a shells accumulation (shells occasionally show in situ breakage); D – concentration of bone fragments

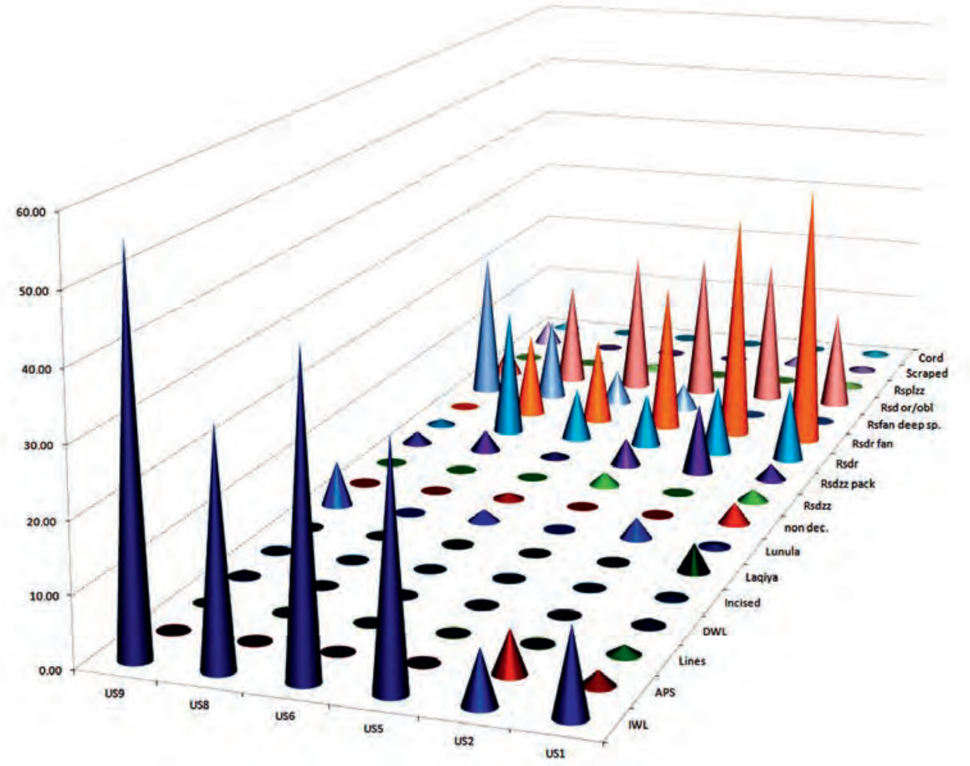

Fig. 5. Graphic showing distribution of pottery decoration types along the stratigraphic sequence of Al Khiday 3 (16-D-3)

the reworked sediments of the area (Fig. 4A), while the latter originated after the re-crystallization of wood ash. Moreover, the ashy matrix (Fig. 4B) is very rich in microcharcoals and phytoliths (single, in bundles or in chains), which displays in many cases evidence for heating (bubble phytoliths). The coarse fraction of US1 consists of few quartz grains and heated pedorelicts and very common to abundant bone and shell fragments; these in many cases display evidence for heating and are effected by calcium carbonate-bearing pedofeatures (Fig. 4C-D).

On the basis of these data, it seems reliable to interpret the SU1 as a midden, originated since the accumulation of shells, bones and ash after the cleaning of domestic fireplaces. Moreover, the micromorphological study confirms that this layer was found in situ; in fact, in many cases elongated features (shells, bone fragments, charcoal lenses) are oriented according to planar layers and display in situ breakage, which are characteristic of occupational trampling (Fig. 4C). A further

Fig. 6. Fragments of pottery from SU9, pertaining to the Early Mesolithic phase; it includes Lunula (A-B) and Incised Wavy Line fragments (C-D)

Fig. 7. Fragments of Laqiya pottery from Al Khiday 3

shell midden-like deposit is located at the bottom of the sequence (SU9) and displays almost the same properties, but it includes a larger quantity of fish bones.

1.2. The analysis of the pottery

Regardless the limited size of the test trench and some anthropic disturbances the sequence of 16-D-3 site is consistent with that recovered from 16-D-5 and 16-D-4 sites (Fig. 5; Salvatori 2012: Figure 15). Stratigraphic Unit 9 pottery is characterized by Lunula (Fig. 6A-B) and Incised Wavy Line decoration types (Fig. 6C-D) well at home in the oldest layers at 16-D-5. The C^{14} determination from SU9 (Beta-376245: ^{14}C dated 7980± 50 uncal. BP) confirms the chronological position of those distinctive decoration types. Pottery from SUs 8, 6, and 5 shows a progressive transition from the Early to Middle Mesolithic as known at 16-D-5 (Salvatori 2012). SUs 4 and 2 pottery is comparable to the Middle Mesolithic phases at 16-D-4 and finally SU1 (Beta-376244: ^{14}C dated 7300 ± 30 uncal. BP) covers the end of the VII millennium cal. BC and is characterized by an increasing presence of Laqiya decoration type (Fig. 7) that makes its first appearance in SU4. This decoration pattern continued to be in use also later as suggested by its abundant presence in the un-stratified colluvial layer 2.

The pottery distribution along the 16-D-3 sequence follows the same trend we documented at 16-D-5 with an abrupt disappearance of the Lunula decoration, a progressive decreasing of the IWL and Rocker stamp deep and spaced fan and the increasing of Rocker stamp dotted zigzag packed, Rocker stamp drops and the appearance at the end of the sequence of Alternately Pivoted Stamp decoration motives (Fig. 5).

The use of ochre coating is here attested all along the sequence while some sherds from SU1 show ochre painting applied with a brush (Fig. 8). Most of pottery is from micaceous clay and tempered with feldspar and crashed quartz (IWL, Rocker stamp dotted zigzag packed, APS) and with different amounts of sand together with calcite and ochre particles often with addition of vegetal materials (all other types). Temper recipes are highly variable in the quantity of added materials and in the size of sand granules suggesting a household production.

In addition to pottery, it is noteworthy the presence in SU9 of a number of sandstone grinders often bearing traces of ochre (Fig. 9), hammers, fragmentary rings, side scrapers, yellow and red ochre pebbles and several sherds reused as polishers (Fig. 10) supporting the suggestion of an activity area.

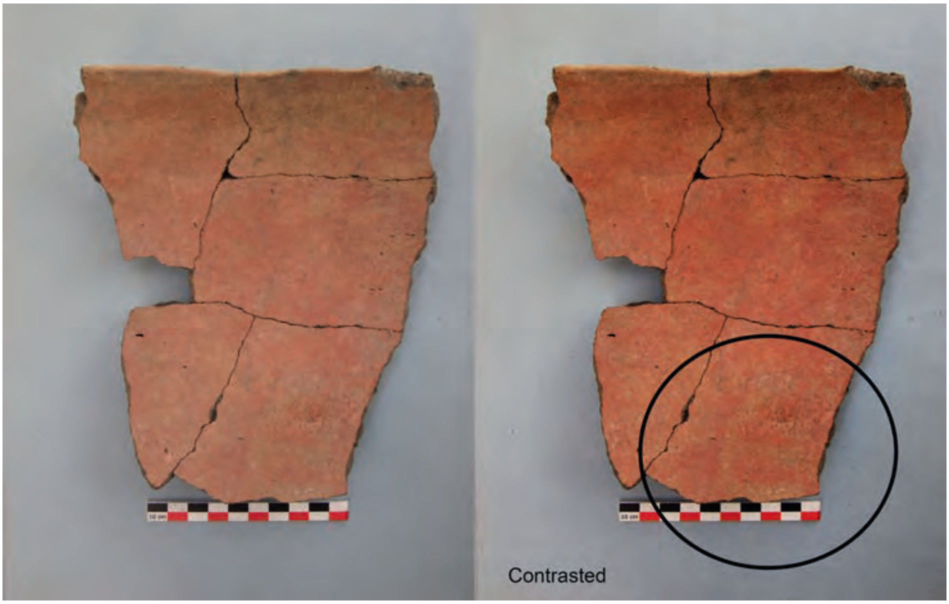

Fig. 8. A – fragments of pottery decorated with a rocker stamp pattern showing in the internal surface a sort of painting, or red colour applied with brush strokes (see contrasted Photo B)

Fig. 9. Sandstone grinding stone bearing traces of red ochre

Fig. 10. Potter's polisher made from fragments of pottery

2. Systematic and extensive excavation at the Al Khiday Neolithic site 16-D-6.

The site was discovered in 2009 and it is located ca. 50m SW of Al Khiday 2 cemetery (16-D-4). It appears as an immense scatter of pottery, lithics, grinding stones and faunal remains and has a single-phase occupation. It has been widely disturbed by animal trampling because a group of herders occupies this area as seasonal encampment. Two trenches were opened: Area 1 and Area 2 (Fig. 11).

A first rectangular area of 5x15m, Area 1, was located where the denser concentration of Neolithic material was observed on the surface and disturbance was assumed to be limited. A grid of 1x1m was established and archaeological material visible on the surface was gathered to keep under control the distribution of the material in relation with possible eroded features. This material was connected to a thin layer of yellowish-ochre sand covering all site surfaces. Under this crust a light-brown silt deposit was brought to light where numerous concentrations of pottery, lithics, grinding stones and faunal remains were observed (Fig. 12). Possible post-holes were identified some showing a sort of alignment (Fig. 13). This silty deposit was identified almost everywhere, but it tended to be rather thin in the southern part of the area. To keep the distribution of the material constantly under control the excavation of this deposit, SU1, proceeded by square meters. This stratigraphic unit never exceeded 20cm in thickness being, as already mentioned, extremely thin in the southern part of the area. No other feature was

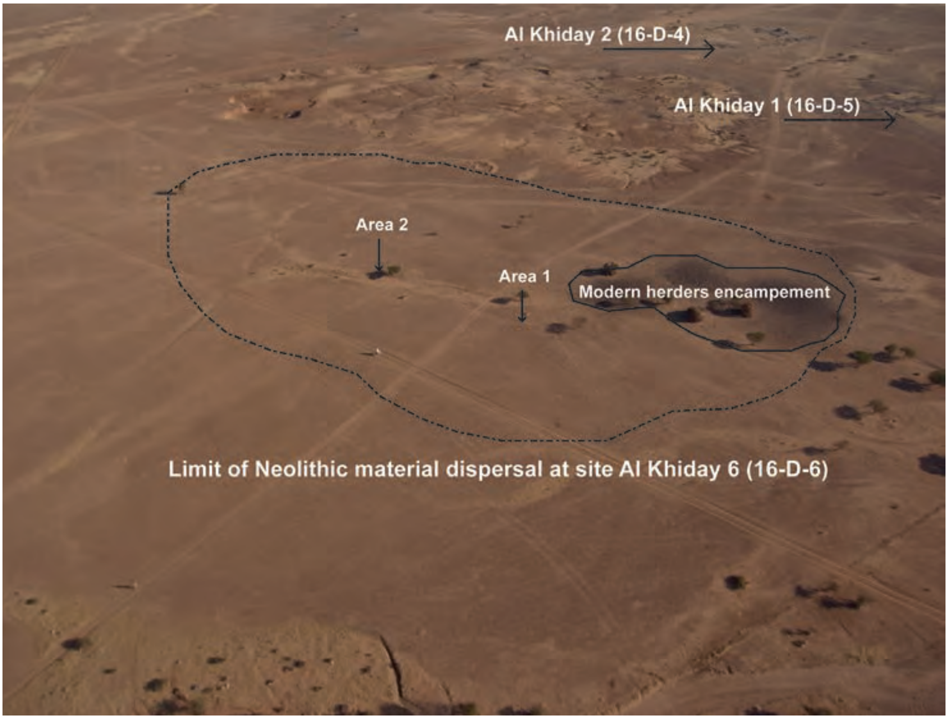

Fig. 11. Kite photo of the area of Al Khiday Neolithic 16-D-6 site (Al Khiday 6)

clearly visible in this SU, but several concentration of pottery quite often refitting in quite big pot portions (Fig. 12). In the first squares, in the northern part of the excavated area, once removed the silty deposit a circumscribed burnt area was located, SU3. All over the area under SU1 a sandy-clay reddish-brown deposit was brought to light, some of the post-holes identified at US1 level were cutting through it.

Afterwards another trench, 5x10m, was opened few meters to the N-E of Area 1 and labelled Area 2. A dense scatter of archaeological material was noticed also in this area, part of it eroding on a slightly sloping edge because of a small *khor* incising the surface. Some post-holes were identified also in Area 2 and a small fireplace containing ashes and a fragment of a grinding stone. Collection of archaeological material was done, also in this area, according to an established grid of 1x1m.

Other operations were forwarded at the site to test the reliability of identifying any other possible feature connected to the Neolithic occupation: regular square areas, nearly 5x5m, were scraped haphazardly within the site extension. The sys-

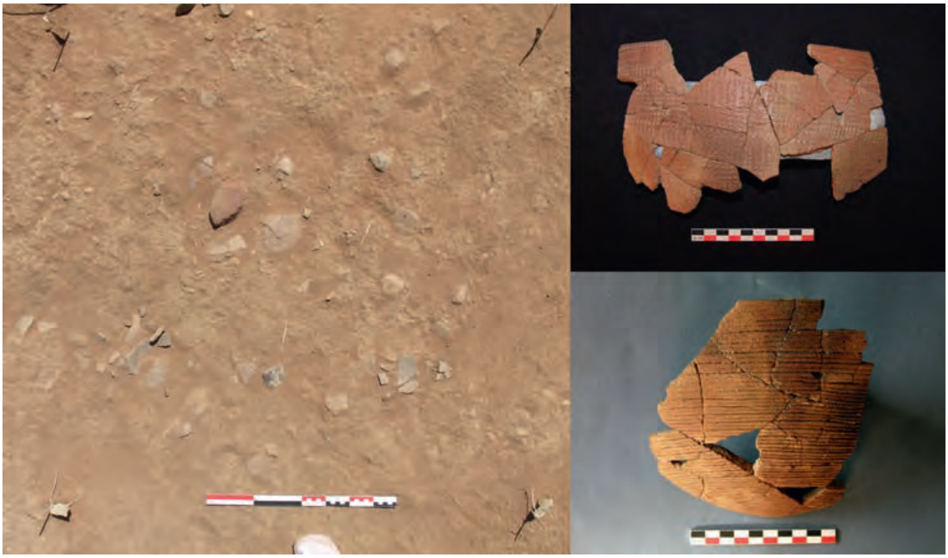

Fig. 12. One of the concentrations of pottery located in Area 1 and two of the reconstructed incomplete pots here recovered

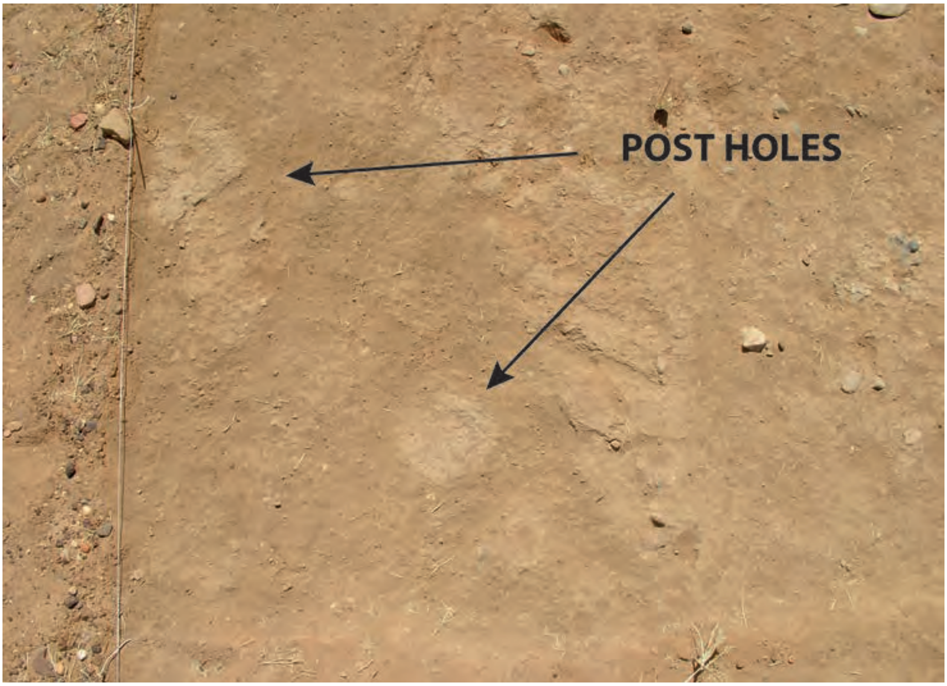

Fig. 13. Two of the several post-holes identified at Area 1

Fig. 14. The grave recovered in the north-eastern corner of Area 1 at Neolithic site Al Khiday 6 (16-D-6)

tematic excavation and these scraped surfaces proved that the site has suffered from quite a strong erosion and apart from post-holes and the concentrations of archaeological material nothing more has been preserved.

However, more operations at the site are planned in the future to better understanding the origin of the immense scatter of Neolithic archaeological material. In fact, a complete grave was found in the NW corner of Area 1 (Fig. 14) and other possible remains of human skeletal material in Area 2. If the area had also been used as a cemetery, this would better explain the circumscribed concentrations of pottery fragments, often refitting, localised in both areas. Apart from the identified post-holes and a small fireplace containing a fragment of a grinding stone, nothing much related to a living surface was located in the area, not even at a very eroded stage of preservation.

3. Geoarchaeological investigation at Palaeolithic site 16-B-3, Al Jamrab

3.1. The stratigraphic context

Some in situ Palaeolithic artefacts were identified during the geoarchaeological survey carried out in 2012 in the area west of the Al Khiday sites. This very surprising evidence, at moment unique for central Sudan, was discovered along the Wadi Al Hamra (Fig. 15). Therein, the wadi cut exposes a very interesting stratigraphic section of the pediment east of the Jebel Maddaha in the vicinity of the Hillat Al Jamrab (Fig. 16A-B). The abundance of lithic artefacts dotting the exposed surface suggested planning a more detailed investigation, including the opening of a test trench to check the archaeological potential of the deposit.

During the 2014 field season, a long part of the Wadi Al Hamra was surveyed in detail and the bed of the river and the banks were both checked by foot to locate the main concentrations of Palaeolithic artefacts. The most indicative have been photographed and in some cases collected for drawing and studying. The geologi-

Fig. 15. View of the area of Wadi Al Hamra; dashed line indicates dispersal of lithic material

cal formations outcropping along the wadi have also been observed, in order to identify the layers or strata displaying the highest concentration of archaeological remains.

The stratigraphic sequence appears discontinuous as along the wadi recent fluvial activity have removed part of the sedimentary sequence. A second feature, which made difficult the interpretation of the geological context hosting Palaeolithic artefacts, is represented by the many discontinuities in the stratigraphy and the recent cover of fluvial sand. The latter made impossible to follow the stratigraphic record along the wadi, while the occurrence of stratigraphic discontinuities put in contact sedimentary units, which are not in continuity. The stratigraphic sequence, reconstructed on the basis of many field observations, consists at the top of a layer of laminated aeolian sand. Below, we notice a thick and well-cemented layer (up to 1 m) of red fluvial/alluvial sand, showing a high degree of weathering at its top, which is richer in clay and manganese nodules. An erosional surface represents the boundary to the subsequent layer of grey fluvial silt and sand; this sediment is moderately to weakly cemented and displays evidence for a long standing of the water table. A layer of greenish, hydromorphic silt and clay follows; it is deeply cemented by the occurrence of calcium carbonate nodules, locally greater than 1 cm. This kind of sediment was formed in a low-energy environment, possibly by decantation in a marsh or lake; it has many analogies with the Upper Pleistocene lacustrine formation described in the region by Williams *et al.* (2015). The lower boundary of this layer is wavy, possibly due to an erosive event affecting the following deposit, which includes at its top the Palaeolithic artefacts. This unit consists of fluvial sediments displaying an upward fining trend; in the lower part a gravel-bearing (clast to matrix supported) deposit is present, becoming sandy to clay toward the top. This unit has to be considered as originating by the same fluvial process, with progressive decreasing energy. Moreover, the upper part of the layer, where artefacts are entombed, is represented by a concentration of calcium carbonate and Fe/Mn-rich concretions, cemented by calcium carbonate (Fig. 16C-D-E). The upper part of this layer consists of a paleosol, developed under environmental conditions wetter than today and it can be interpreted as the topographic/occupational surface at the time of the Palaeolithic occupation of the region. The lower boundary of this unit is also wavy, due to the occurrence of an erosive surface at the top of the following deposit, which is represented by deeply weathered sandstones. This unit possibly corresponds to an Early Quaternary (or earlier?) paleosols developed on the sandstone outcropping in the region due to pedogenesis under pluvial environmental conditions.

Samples for OSL dating have been recovered from the stratigraphy; they are under measurements, but results are not yet available, however some preliminary chronological suggestions can be advanced based on the stratigraphic observations made in the area. The same stratigraphic sequence observed at Al Jamrab is exposed (with different thickness and in many cases discontinuously preserved) at Al Khiday. Therein, the grey-greenish fine sediments have been recently interpreted as the result of lake sedimentation occurred in the Pleistocene (Williams *et al.* 2015). Many lakes were active in the central Sudan in the middle and upper Pleistocene; the one (or ones) active between Al Khiday and Al Jamrab after the Palaeolithic exploitation of the region can be dated, according to the results of some OSL analysis, at least between 70 and 40 Kyr BP (Williams *et al.* 2015). We may consider the oldest of the OSL dating (69 Kyr BP) as a limit ante quem for the exposure of the topographic surface of the paleosol and therefore for its occupation during the Palaeolithic. This deposit may correlate to the green olive clays that Williams *et al.* (2003) identified at Esh Shawal, which were left by the big White Nile lake that extended over the basin in the late Middle and Late Pleistocene period (Usai in press); for that reason, the Palaeolithic occupation of the region may be ante-dating this formation.

3.2. The excavation at Al Jamrab

After a preliminary inspection of the wadi a first test trench c. 2x2m was opened, starting from the left bank of the wadi and in a point where the red fluvial/alluvial sand (sterile deposit), that can be as thick as 1m, had been naturally eroded and didn't exceed 20cm. A surface deposit of laminated aeolian sand and residual stones was covering the 20cm thick layer of red to grey alluvium. Once this last one had been removed, the erosive surface of the paleosol was brought to light. A deeply cemented layer of carbonatic concretions represents the paleosol and it lies upon the deeply weathered sandstone of the bedrock. A second test trench was excavated on the left bank of the wadi, where erosion had almost completely brought to light the paleosol and a concentration of artefacts was visible on the sloping front.

The interpretation of the Palaeolithic occupation of central Sudan offered by archaeological evidence form Al Khiday and Al Jamrab may shed new light on one of the most intriguing issue of the Palaeolithic of northern Africa: the dispersal of the modern humans in the Middle-Late Pleistocene.

The lithic assemblage recovered, considering surface and in situ collection, includes several hand-axes, cores, and 83 pieces of débitage (Table 1). Débitage

Table 1. Al Jamrab. Data on flakes and blades

	Flakes	Blades
Unidentifiable	11	
From spc	42	
From opc	3	
From 90°c	7	
From mpc	16	1
Total	79	1
Unidentified platform	5	
Flat platform	51	1
Dihedral platform	4	
Pointed platform	1	
Faceted platform	4	
Total	65	1
Sandstone	64	
Mudstone	13	1
Chert	1	
Quartzite	1	
Total	79	1

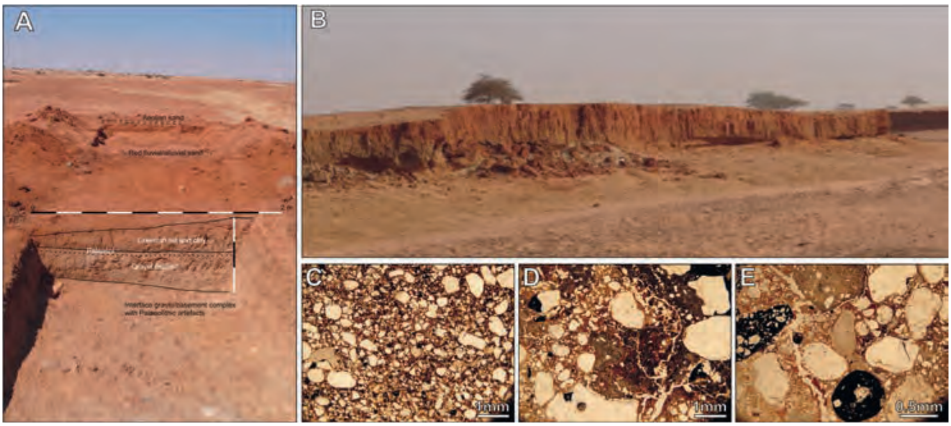

Fig. 16. A – the stratigraphic section excavated at Al Jamrab and (B) a view of the geological section exposed along wadi Al Hamra. Photomicrographs represent: C – the rubified clay and interspersed quartz sand of the paleosol; D – detail of a strong Fe-bearing impregnation; E – quartz grains and iron nodules cemented by calcium carbonate

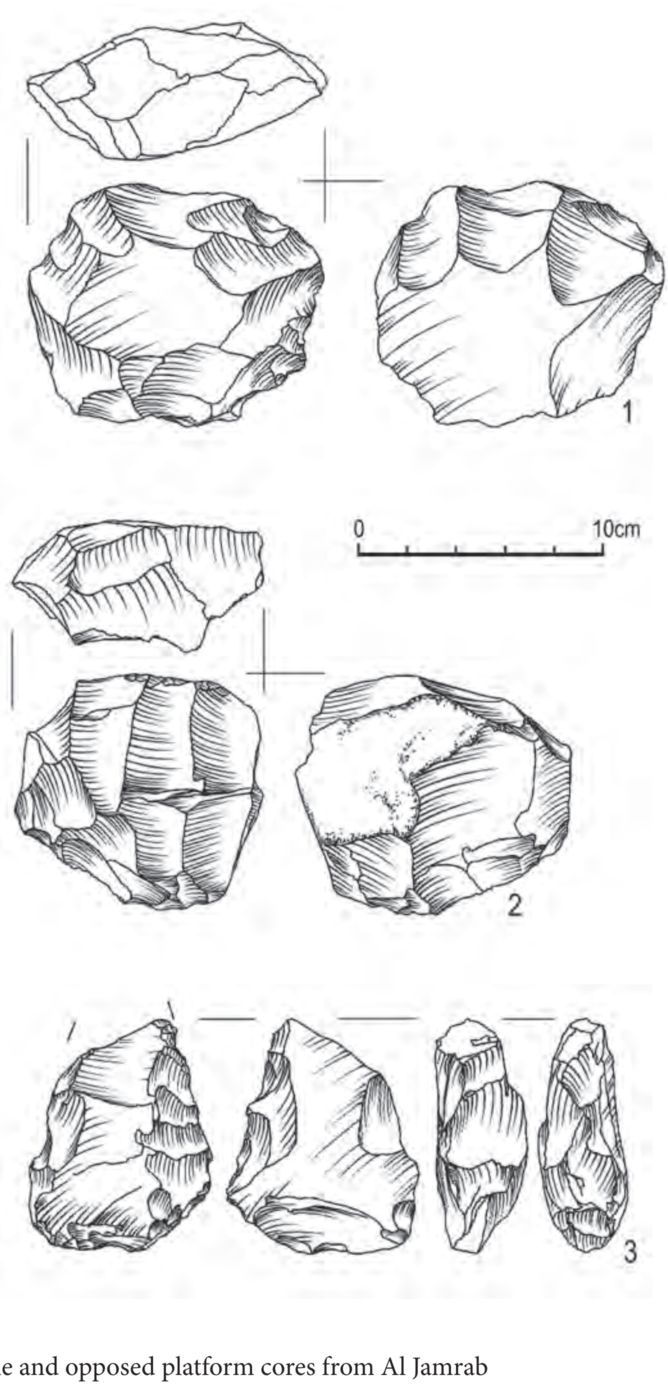

Fig. 17. Single and opposed platform cores from Al Jamrab

Fig. 18. Hand-axe from Al Jamrab

Table 2. Al Jamrab. Metrical data of flakes

Flakes	**Length mm**	**Width mm**	**Thickness mm**
Minimum	12.00	17.06	4.36
Maximum	68.64	80.42	30.87
Average	37.25	35.94	10.73
N° of pieces	40	71	71

accounts for a total of 80 pieces of which only one is a blade. Flakes (Table 2) are mainly from single platform core (N°=42), multiple platform flakes and ninety-degree core follow (respectively N°=16 and N°=7); most flakes display a flat platform (N°=51), dihedral and faceted platforms are poorly represented. Only one of the flakes can be possibly related to the Levallois technology, but in general flakes with centripetal scars are scarce. The single blade recovered is from multiple platform core, has a flat platform and is made of mudstone. Cores are of different types, discoidal, single and opposed platforms (Fig. 17). Important findings at Al Jamrab are handaxes (Fig. 18) and a cleaver. Denticulates, retouched pieces and heavy-duty tools were also recovered.

Material sometime has a white carbonatic film crust (due to post-sedimentary pedogenetic processes), but lithics generally when this is absent look not-abraded with fresh edges.

At moment, stratigraphic correlations with OSL-dated sequences and available elements are considered un-sufficient to define properly the Al Jamrab lithic assemblage; except that an Early Middle Palaeolithic/Middle Stone Age attribution seems the most probable if observations on stratigraphic relationships are considered together with the presence of hand-axes and apparent absence of strict Levallois technology. Relevant well preserved Palaeolithic contexts were recently recovered in the north of Sudan at Sai site 8-B-11 (Rots and Van Peer 2006; Van Peer 2004; Van Peer *et al.* 2003) and in the Atbara, in the Kashm El Girba Synthem (Abbate *et al.* 2010), with late Acheulean to Middle Stone Age artefacts in clear chronological sequence.

4. Concluding remarks

The work at Al Khiday is providing continuous updates on the Mesolithic period of Central Sudan. Among the important results, widely illustrated in previous papers, some are: the discover of a Mesolithic structured village, with "houses" and other features, i.e. pits of different functional destination (Salvatori *et al.* 2011, 2014; Usai in press); the recovery of data regarding plant gathering, one of the activity frequently associated with these populations, but until now attested only by the presence of grinding equipment or at best by seeds'pottery impressions (Buckley *et al.* 2014); an internal evolution stigmatised by the pottery production (Salvatori 2012).

Characteristic elements in the earliest pottery production of this location in Central Sudan is the Lunula type pottery and associated types which are basically unknown in other sites explored until now[1].

The excavation at the Mesolithic Al Khiday 3 mound has incremented our knowledge of the general sequence with a phase, dating to the end of the VII millennium BC, characterised by the Laqiya type pottery, firstly recognised in the Wadi Howar region (Jesse 2000, 2003). The work at this site has also implemented our knowledge of the subsistence economy. In fact the identification of the shell midden deposit enlarged our perception of the importance of molluscs as an element of the diet of Mesolithic people. Phytoliths present in the shell midden deposit hopefully will provide a wider insight on the vegetation and eventually on the plant consumed in that period.

The meagre results of the investigation at the Neolithic site 16-D-6 need careful interpretation and we do not think it is yet time to afford any conclusive statement. At moment we can just affirm that it provided and interesting set of archaeological material to be studied. The faunal remains, in particular, will serve to

[1] Some examples of Lunula type pottery were found by Arkell at Khartoum Hospital (Arkell 1949: Pl. 77.2)

complete the sequence of animal exploitation from the Mesolithic to the Neolithic that can be reconstructed thanks to the exceptional well preserved sequence revealed at Al Khiday sites.

Among the positive recent results of the work in the region we can certainly includes the discovery of Al Jamrab (16-B-3) Palaeolithic site. Cultural and chronological interpretation of the site are left pending until OSL dates will be available as well as other materials from continuation of the archaeological activity. In fact, our impression now is different from that gathered from preliminary observations based only on surface collections. The overall material is not enough for associating the lithic assemblage to any of the specific cultural facies of the late Early Palaeolithic or Early Middle Palaeolithic; moreover, the exploration at the site has been too limited for fully understanding the formation processes and chronology of the paleosol preserved at Al Jamrab.

Acknowledgments

We gratefully acknowledge the Sudanese Department of Antiquity and the Italian Embassy in Khartoum for their continuous support in organizing our research. The field project has been supported by Ministero degli Affari Esteri (Contributi per le Missioni Archeologiche all'Estero) entrusted to DU, and University of Milano (Fondi Speciali per le Ricerche Archeologiche 2015) entrusted to AZ. University of Padova (G. Artioli, L. Maritan, I. Angelini, G. Dal Sasso) and Parma (P. Iacumin) greatly contributed to the analytical processing of materials and data.

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Desert and the Nile.
Prehistory of the Nile Basin and the Sahara.
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Kimball M. Banks, Donatella Usai, J. Signe Snortland,
Linda Scott Cummings and Maria C. Gatto

Food for Thought: the Late Paleolithic of WK26 Site, Wadi Kubbaniya, Egypt

Introduction

Wadi Kubbaniya, about 15 km north of Aswan, Egypt, is the largest wadi in Upper Egypt flowing out of the Western Desert. Archaeologically, the wadi is unique as it is probably one of the most intensively investigated prehistoric areas in Upper Egypt (Fig. 1). The Combined Prehistoric Expedition (CPE) spent four field seasons here between 1978 and 1983, documenting the late Pleistocene environments and human occupations. The CPE investigated 27 locales, most of which date to the Late Paleolithic, between 20,000 and 12,000 BP, and are distinguished by the presence of numerous grinding implements; the remaining locales date to the Middle Paleolithic (Wendorf *et al.* 1980; 1986; 1989a; 1989b).

In 2014 the Combined Prehistoric Expedition Foundation and the Aswan-Kom Ombo Archaeological Project (CPEF/AKAP) investigated WK26, another Late Paleolithic occupation in the wadi. Like the other sites WK26 consists of a lithic accumulation but what distinguishes it is the presence of hearths, postholes, storage features and a possible living floor. Based on radiocarbon dates and stratigraphy, WK26 dates to the end of the Late Paleolithic Kubbaniya sequence and few sites of this period have been investigated in this area of Upper Egypt. The composition of the site provides an insight into settlement and subsistence at the end of the Late Paleolithic.

Fig. 1. The location of Wadi Kubbaniya and WK26 site

1. The Late Paleolithic in Wadi Kubbaniya

During the Late Paleolithic an extensive dune field stretched along the northeast side of this impoundment and about 2 kilometers upstream from the wadi mouth. Throughout, occupations were associated with the seasonal overflow from Nile floods, the overflow forming shallow, intermittent lakes that extended for several kilometers up the wadi. The CPE recorded at least 9 such transgressions during the Late Paleolithic; the last being the Upper Kubbaniyan Silt, which dated between 13000 and 12400 BP (Wendorf and Schild 1989). Late Paleolithic people camped among the dunes and the fronting plain bordering the field and down towards the wadi mouth. This dune field contains the most prominent and extensive evidence of human occupation and paleoenviroments in this portion of the wadi. The evidence consists of fossilized plant casts, deflated hearths, dense scatters of lithic artifacts and bone, and numerous grinding implements; these implements were what attracted the attention of the CPE.

The CPE excavations defined the Late Paleolithic Kubbaniyan industry and documented the presence of other Late Paleolithic industries and, in turn, the complexity of the environment and human occupation during this period. Results of that work are documented in four comprehensive publications that also synthesize 15 years of work in Upper Egypt and Nubia (Wendorf *et al.* 1980; 1986; 1989a and 1989b). Nowhere else in this portion of Upper Egypt or Nubia does such a complete archaeological and environmental record exist in such a limited area for the Late Paleolithic period.

2. WK26 site

WK26 is situated across the wadi from the Late Paleolithic dune field the CPE explored. The site consists of sparse artifacts on playa silt covered by a thin sheet of dune sand. Based on radiocarbon dates and stratigraphy, WK26 dates to the end of the Late Paleolithic Kubbaniya sequence and is associated with the Upper Kubbaniyan Silt (Wendorf and Schild 1989). Few such sites have been investigated in this area of Upper Egypt. Hearths, postholes, possible storage features, and faunal and floral remains provide an insight into settlement and subsistence at the end of the Late Paleolithic.

The site was initially identified in 2012 with the discovery of an Ounan point, circular endscrapers, handstones and grinding stones, and an ashy area on top of playa silt (Fig. 2). This ashy area was dated to 12060 ± 50 BP. The site is higher in elevation than the Late Paleolithic dune field, and the radiocarbon date and position suggest it is associated with Wendorf and Schild's (1989) Upper Kubbaniyan Silt. Because few sites of this age have been identified in the wadi, excavations were undertaken.

Fig. 2. WK26 as first encountered and artifacts on the surface

Two areas – A and B/C – were excavated (Fig. 3). Area A measured 10 x 10 meters and was centered on the ashy area found in 2012. Area B/C was located north-northeast of Area A and measured 10 x 17 meters, oriented east-west. Both areas were excavated to a depth of approximately 30 centimeters and, to the extent possible, by stratigraphic layer. With respect to elevation, Area A was slightly higher than Area B/C

Two trenches were excavated to understand the stratigraphy. Trench 1, which was 20 meters long and 1 meter wide, connected these areas; it began at the southeast corner of Area A and extended down the north side of Area B/C. This trench was dug to identify the stratigraphic relationship between areas A and B/C. Trench 2 spanned the 10 meters at the north end of Area A and was also 1 meter wide. This trench was placed to examine the stratigraphic relationship of the playa silt and the dune sand in Area A.

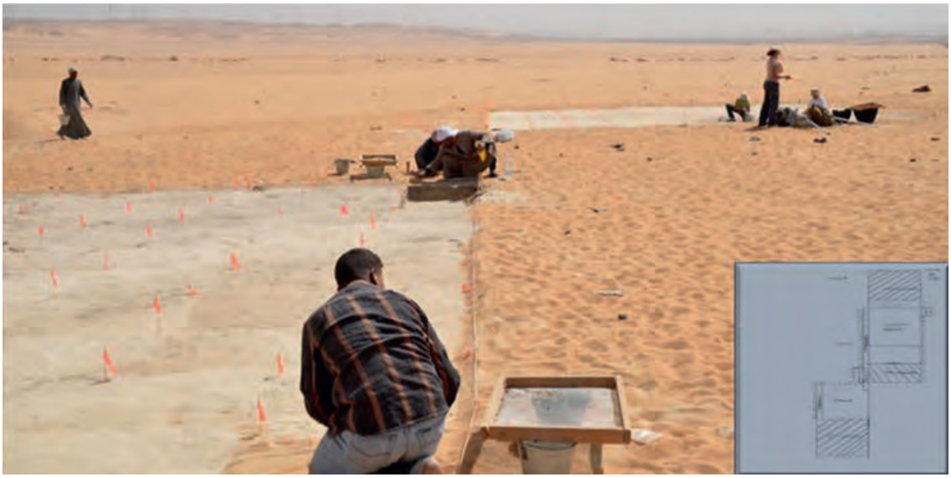

Fig. 3. Excavation units at WK26; Area A in the foreground

2.1. Stratigraphy

Area A

The stratigraphy begins with a coarse, 10YR7/2, dune sand, designated Layer 1, which varies from 5 to 10 centimeters thick and overlay playa silt across most of the block. Artifacts were sparse and consisted mostly of debitage, including microflakes. The rare faunal remains consist almost exclusively of fish with rare small mammal remains, probably rodent. Layer 2 comprises unconsolidated playa silt. This silt is up to 20 cm thick and, given the elevation of the site, probably corresponds to Wendorf and Schild's Upper Kubbaniyan Silt (Wendorf and Schild 1989). The silt is light gray, varying in color from 10YR5/1 to 10YR8/1 and increases in thickness to the north; the silt is barely discernable at the south end of the block. The increase to the north indicates the silt extends north of Area A; an ash lens and a fire-cracked rock at the same level as the hearths in the profile in the profile of north side of Trench 2 suggest that the site also continues to the north.

The silt is thicker in the northeast quadrant of the block and contains numerous fossil shell casts, probably from *Corbicula* and/or *Pisidium*, root casts, and krotovina; the profile at the east end of Trench 2 indicates that these items extend to a depth of 40 cm. The top of the silt in the northwest quadrant is distinguished by orange-red, 5YR7/6-6/6, irregularly-shaped patches of loosely consolidated silt that appears to have been burned. The sediments here also lack shell casts, root casts, and krotovina. The difference between the northeast and northwest end of Block A suggest that occupation here was adjacent to a body of shallow water.

Because of time constraints, the excavations in Area A did not extend below the playa silt except for Trench 2 at the north end of the block. The stratigraphy in Trench 2 shows the silt is underlain by sterile dune sand that is at least 80 cm thick. This dune sand is broken by two bands of more organic-rich sandy silt that are less than 10 cm thick and contain rare charcoal flecks. The upper band is between 40 and 50 cm and the lower is at 60 cm below surface. Charcoal was collected from both but neither sample was large enough for AMS dating. No artifacts were found in either.

Area B/C

Like Area A, Area B/C is covered by the same yellow sand, Layer 1, characterized by larger grains of sand that give way to sands of much finer texture. This layer produced abundant lithic material, scant faunal remains, and a few grinding implements. Layer 2 is a white dune containing the remnants of several features. In the central portion of the area, a thin sheet of remnant playa silt separates the two layers. Features appear to have been excavated through this silt. Area B/C is slightly lower than Area A and this remnant silt suggest that any silt originally present for the most part have since eroded away.

The profile of Trench 1, which bordered the north side of Area B/C and extended to the southeast corner of Area A lacked evidence of the playa deposit noted in Area A and the underlying thin layers of more organically rich sand observed in Trench 2. Instead, the profile consisted of unconsolidated dune sand. The absence of playa silt here and the sparseness in Area B/C intimate that any silt that was present in this area of the site have eroded away except for thin remnants. Conversely, given the complexity of the profile at the east end of Trench 2 and the thickness of the playa silt here, the playa may have been situated to the north of Area B/C and only occasionally covered this area.

2.2. Features

WK26 is distinguished by the presence of numerous features – hearths, pits, postholes, and ashy and organic stains – in both areas A and B/C. The number and variety was greater than that among the Late Paleolithic sites in the dune field across the wadi. Features identified there included ash stains and hearth remnants but nowhere in the number, variety, and density as at WK26. The features at WK26 suggest a level of occupation and site use different from that observed across the wadi.

Surface Features

Surface features consisted exclusively of hearths, noted as dispersed scatters of fire-cracked rock, 2 to 3 meters in diameter. Some were inverted mounds but the majority were distinguished as single, scattered layers of rock. Ash was not evident in any and associated artifacts were sparse to non-existent.

Area A

Area A contained 27 features: two hearths, three ashy areas, one stained area possibly organic in origin, one natural depression, the remnants of a pit, and 19 postholes (Fig. 4). The pit was in the southeast quadrant, extended through the playa silt, and had an ashy fill but lacked artifacts. The ashy areas were irregular smears in the sand containing rare charcoal flecks.

The two hearths consisted of adjacent clusters of mounded fire-cracked rock that measured 1.5 x 2 meters, two to three layers high, irregular in plan view, and intermixed with ashy sediments and charcoal flecks. The hearths were embedded in the playa silt, just above the underlying dune sand, and surrounded by a large black, ashy stain. Within this stain and just southeast of the hearths is a brown stain, possibly organic in origin. An ash lens and at least one fire-cracked rock in the north wall of Area A at the same level as the hearths, suggest the presence of a third hearth to the north.

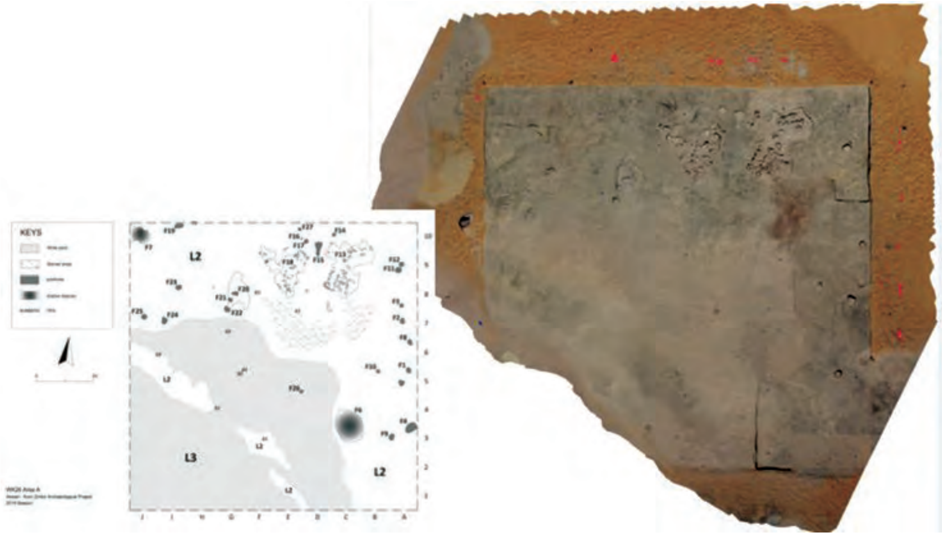

Fig. 4. Area A – note the features

The postholes were scattered across the playa silt. These features were generally irregularly shaped, 10 to 15 cm across, and extended approximately 7 cm into the playa silt. The postholes tended to be lighter in color and more compact than the surrounding silt. Four postholes lay between the two hearths, five to the west, and seven to the east and south. Their arrangement and distribution suggest that these could be the remnants of three or four structures, possibly windbreaks or drying racks, or a combination of these.

Area B/C

Area B/C contained 18 features that comprised ashy areas, remnants of pits, and at least one posthole. Ashy areas were the most prevalent and consisted of smears of ash in the dune sands. Depths of pits varied but were generally shallow – no more than 15 cm deep – and the ashy areas may represent the last vestiges of pits. All features appear to be the eroded remnants although being in dune sand made identification of their boundaries difficult.

Features 1, 12 and 14 were of particular interest. Feature 1 was about 1.5 meters long and about 15 cm deep at most, and consisted of a dark-to-black oval ring in the white dune sand. Excavation recovered lithic artifacts, a grinding stone, and a shell (Fig. 5).

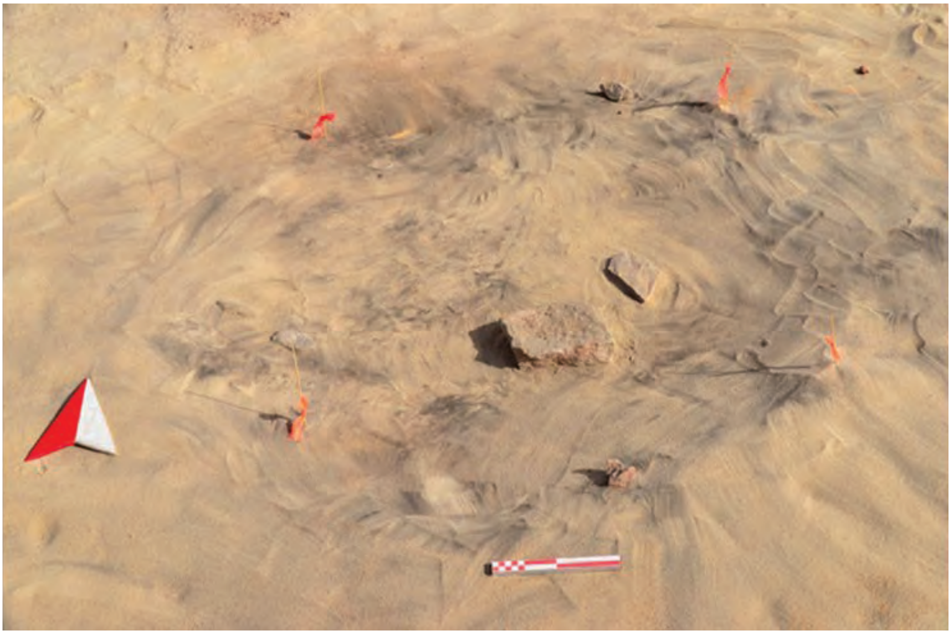

Fig. 5. Area B – excavated feature with broken grinding stone

Feature 12 was located adjacent to the southern edge of Area B/C where wind erosion had partially exposed a grinding stone. The stone sat in a circular area of dark-to-black sands rich in charcoal flecks and lithic material. The deposit was ephemeral and 5 cm thick at its maximum.

Feature 14 exhibited two small circular posthole-like depressions side-by-side. One depression was deeper than the other and filled with an organically-rich brown deposit. A flat piece of sandstone was found inside the smaller depression; it may have been used as a wedge.

Most of the other features in Area B/C were more or less circular areas of dark brown to black thin ashy deposits that were archaeologically unproductive. As Feature 1 and these ashy areas demonstrate Area B/C has suffered erosion that has removed much of these features. Erosion has affected Area B/C more so than Area A and determining the function of most of the features is difficult as is whether the features reflect one or multiple occupations.

2.3. Artifact Assemblages

The site is not artifact-rich. The assemblage from both areas comprise less than 2,000 artifacts but includes debitage, cores, retouched tools, and grinding implements. Egyptian flint, followed by chert, predominates. The lithic technology, at least in Area A, revolves around the removal of flakes from single platform cores, although cores are not prevalent (Table 1).

Table 1. Cores from WK26

Cores	**Area A**	**Area B/C**
Single Platform	10	
Opposed Platform		
90 Degree Platform	1	2
Multiplatform		3
Initially Struck	1	1
Whole Pebble		1
Total	12	7

Table 2: Retouched tools from site WK26

Retouched Tool Class	**Area A**	**Area B/C**		
Tools		Total from Layers	Total Featu-res	Total Area B/C
Scrapers	2	17	4	21
Burins		2		2
Backed and ouchtata bladelets	1	38	8	46
Notches and denticulates	1	8	1	9
Truncations	1	17	4	21
Geometric microliths		19	5	24
Piece esquille		1		1
Continuously retouched pieces		3		3
Retouched flakes/blades	7	13	2	15
Unidentiable Retouched Fragments		25	2	27
Total	12	143	26	169

Tools are nine times as prevalent as cores although cores are more prevalent in Area A compared to retouched tools. The retouched tools include end-scrapers,

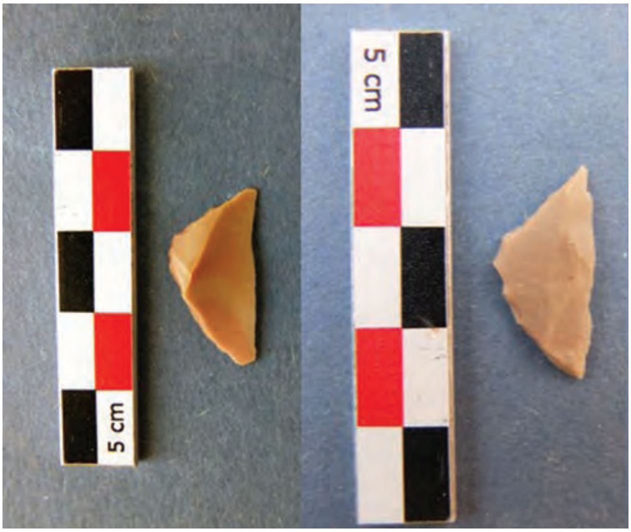

Fig. 6. Examples of large isosceles triangles

backed and Ouchtata elements, truncations, geometric microliths, and retouched elements; the same tool classes as found across the wadi (Table 2). Most of the backed elements, 64%, are partially backed with Ouchtata retouch. The truncations exhibit a pattern to their morphology as 72% are truncated at the proximal end and most often from the left side. A distinguishing feature of the geometric microliths are large isosceles triangles which are most often truncated from the right side (Fig. 6). These triangles appear to be a distinguishing feature of the assemblage.

Handstones and grinding stones were scattered across the surface and several were recovered *in situ*. Morphologically, slab from the surface differ from those subsurface. The grinding stones from the surface are purposefully shaped, oval in plan, have distinct grinding surfaces, and resemble Neolithic or more recent slabs (Banks 1980; 1982). The stones from subsurface are irregular to square in plan and thin and rectilinear in cross-section (Fig. 7). Grinding surfaces are distinct and well used; one stone had been ground all the way through. The morphology of these stones contrasts with the blocky nature of stones in the dune sites (Banks 1980; 1982). All WK26 slabs are silicified sandstone. The raw material source may have been from nearby hills. The handstones, both surface and subsurface, are generally quartizitic sandstone cobbles, circular to oval in plan and with either one or two grinding surfaces. Ochre was identified on a number of grinding stones and handstones.

Fig. 7. Example of a grinding stone

2.4. Faunal Remains

Mention has been made of the possible *Corbicula* and/or *Pisidium* shell in Area A. Overall, faunal remains were sparse and consisted mostly of small slivers and bone fragments. A cursory field examination indicates that most are fish remains, with identifiable fragments being Nile catfish (*Clarias*). Other remains appear to be from small rodents; a lagomorph, and some birds, including the remnants of a bird bead, and a fragment of an ostrich eggshell bead. No large mammal remains were identified.

2.5. Floral Remains

Grinding faces of six implements were washed to recover phytoliths, pollen, and starch (Scott Cummings 2014). This was the first use of a pollen wash technique in investigating sites at Wadi Kubbaniya. Four implements were found "face down" on the surface at WK26 and two were subsurface. Pollen from members of the mustard and amaranth families suggest seed processing. Phytoliths typical of festucoid grasses predominate followed by a few chloridoid and panicoid phytoliths. Identified charcoal remains include *Tamarix* and a broad-leaved flowering tree or shrub. Two of the four stones from the surface yielded phytoliths that indicate cutting by a threshing sledge or trampling. These surface stones could not be dated. Several "modified" sheet phytoliths had been burned, indicated parching grass seed or cereal prior to grinding. One surface grinding stone also contained a phytolith with torn edges, typical of stems cut with sickles. Another surface grinding stone without dendritic phytoliths exhibited a phytolith from a palm suggesting processing dates.

One of the subsurface handstones recovered from Area B yielded phytolith sheet elements exhibiting cuts suggesting post-harvest processing. These sheet elements are still under study. The second subsurface grinding stone from Area B had ochre, few phytoliths, but pollen from the mustard family (Brassicaceae) goosefoot (*Chenopodium)*, and marshelder (Low-spine Asteraceae).

2.6. Radiocarbon Dates

In addition to the date of 12060 ± 50 BP recovered in 2012 from an ashy area, charcoal from the hearths in Area A and two features in Area B recovered in 2014 was dated to 13,100 BP ± 35, 13478 BP ± 35, and 13553 BP ± 34, respectively. That the dates from Area B are slightly older than that from Area A is consistent with the almost complete absence of silt in Area B. Area A appears to have been occupied a bit later than Area B. Combined with the 2012 date, the site dates to the end of the Late Paleolithic sequence and the Upper Kubbaniyan Silt and associated with high stands of the "wild Nile" (Paulissen and Vermeersch 1987; 1989; Butzer 1997; Vermeersch and Van Neer 2015).

Conclusions

Several factors distinguish WK26 site from the dune field sites across the wadi. One was predominance of fish over other faunal remains, particularly larger herbivores. Although fish predominate at the sites across the wadi, the almost complete lack of evidence for large herbivores further distinguishes WK26 from the majority of the other sites (Gautier and Van Neer 1989). Second were the number and variety of features; a few features were identified across the wadi but nowhere comparable to the number and variety at WK26. Third were the distinctive large backed and truncated isosceles triangles. Fourth was the morphology of the grinding stones; those at WK26 were thin and rectangular, with shallow grinding surfaces, while those across the wadi were blocky with more distinct surfaces. The stones in the dune field sites were quarried from the valley edge overlooking the dune field; those from WK26 probably came from nearby outcrops. Finally, plant remains at WK26 were recovered via a pollen wash, which is the first use of this technique at Wadi Kubbaniya.

The presence of hearths and post molds embedded in playa silt along with fish remains, suggest WK26 was occupied during drier seasons. The variation in the depth and composition of the silt between the northwest and northeast end of the block suggests that occupation at Block A was at the edge of a shallow body of water. The profile at the east end of Trench 2 – the krotovina and *Corbicula* and/or *Pisidium* – suggest a marsh environment. The occupation appears to have been located so its occupants could harvest fish from this pool. The apparent paucity of contemporary sites elsewhere in the wadi may reflect that occupation was possibly sporadic and as part of a settlement round that extended outside the wadi.

WK26 underscores the settlement and subsistence complexity and typological diversity of the Late Paleolithic in this portion of Nubia/Upper Egypt. Wadi Kubbaniya is the only place investigated to date where this diversity is exemplified to such an extent. Although most of the sites are associated with the Kubbaniyan industry, other sites are related to a greater or lesser extent with another five industries. The differences in lithic typology and technology, including the presence/absence of grinding implements, can be interpreted as demonstrating that the Late Paleolithic was a period of diversification and regional differentiation.

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Desert and the Nile.
Prehistory of the Nile Basin and the Sahara.
Papers in honour of Fred Wendorf
Studies in African Archaeology 15
Poznań Archaeological Museum 2018

Annett Dittrich

Between Two Rivers – Early Holocene Landscapes on Mograt Island (Sudan)

Introduction

Mograt Island is located at the first great Nile bend close to the town of Abu Hamed from where it can be reached by a regular ferry service. With a length of 31 kilometres along the east-west axis and a width of up to 6 kilometres Mograt is the largest island on the Nile, covering an area of 102 km² (Ritter 2008). Mograt Island's prehistory has first been recognised on the impressive granite boulders at al-Saihan[1] covered by numerous rock carvings dating from the prehistoric to the medieval and Islamic periods (Fig. 3). For this reason the site was visited since the early 20th century along with the major fortresses at the island of which Ahmed (1971) gave a first overview. Although Jackson (1926: 23ff.), Crawford (1954: 6) and Ahmed (1971: 14-15) doubted a prehistoric component for the rock art, there are indications for this such as the depictions of wild extinct animals and of cattle (cf. the unpublished doctoral thesis of F. H. B. Khalid, University of Lille, 2009).

[1] Commonly spelled 'Sihan', however, the project decided to adopt the transliteration rules of the Sudan Notes and Records.

However, systematic surveying of archaeological sites including the study of prehistoric remains was carried out by the Humboldt University Nubian Expedition (H.U.N.E.) as early as in the years 2006 (Näser 2006; Lange 2012) and 2008 (Näser 2008).[2] In the course of surveying, the island was mapped in detail (Ritter 2008; 2014, folded map). In 2008, one of the identified early Holocene settlement sites was partly excavated (MOG064; Schulz 2008) resulting in numerous finds that were brought for analysis to the Humboldt University of Berlin. These finds were re-studied in preparation to the actual Late Prehistoric Survey. The latter is a sub-project of the Mograt Island Archaeological Mission launched in 2013 and directed by Claudia Näser.[3] So far, two field seasons of the Late Prehistoric Survey were conducted in early 2014 (Dittrich and Gessner 2014) and in late 2014/15 (Dittrich *et al.* 2015) the preliminary results of which will be presented here.

Methodically, the survey comprised GIS-based surveying and test-excavating in order to (1) locate prehistoric sites and palaeoenvironmental indicators in their actual environment, (2) understand site evolution and successive events of sediment aggradation/deflation in general, and (3) reconstruct Holocene environments from a diachronic perspective to learn more about how insular landscapes and strategies of human interaction with them may have changed over time. This approach further encloses satellite image interpretation, palaeoecological studies of soils, fauna and flora as well as multiple dating methods. So far we have recorded the outlines of 42 new and 5 known early to mid-Holocene[4] sites (Fig. 1); this number could be increased by another 23 sites of the H.U.N.E. 2006 survey where late prehistoric finds occurred as secondary or as stray finds. As a first result it can be said that the island seems to hold sufficient prehistoric remains to study the Holocene sequence of environmental change and its impact on human subsistence in detail.

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2 Prior to this survey, a team of the University of California had collected "flint nuclei, choppers, scrapers and flakes" from "gravel-strewn hills" during a short visit in 1949 (Field 1949: 73). Two Neolithic sites briefly mentioned by Kleppe (1982: 147) were recorded during a tour of the University of Khartoum in 1977.

3 For general information on the project visit www.mogratarchaeology.com.

4 The terminus mid-Holocene is used here to refer mainly to the period of the 6th and 5th millennia BC which comprises both the transition from the Mesolithic to the Neolithic as well as the proper Neolithic in the Middle Nile valley (cf. Dittrich 2011; 2015).

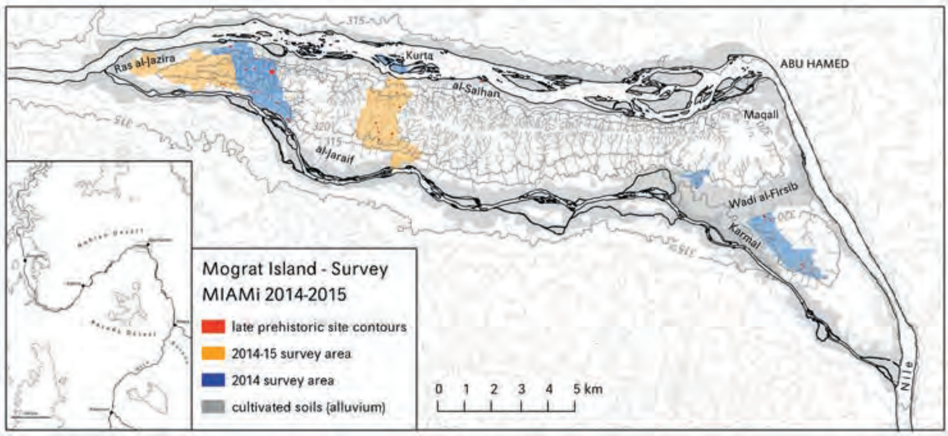

Fig. 1. Mograt Island. Late prehistoric sites surveyed in the seasons 2014 and 2014/15

1. The geomorphology of Mograt Island – accessing prehistoric landscapes

1.1 Geology and topography

Geologically Mograt Island belongs to the Precambrian crystalline basement complex known as the Bayuda Massif (Whiteman 1971; Stern and Abdelsalam 1996). Therefore, the course of the Nile is mainly confined to deep cracks in the local tectonics but in some parts the southern Nile branch has developed true meanders. Today the latter which is the smaller Nile branch remains subordinated and in some years carries only a very low volume of water (Ritter 2008). The actual survey has shown, however, that this area is largely characterised by thick late Pleistocene and Holocene alluvial deposits (Fig. 2b). They consist of silts and sands discharged by the Nile during more active periods in terms of sediment loads and well before the southern branch cut down its bed to the present level (cf. Williams 2009). These deposits are often cemented through the subsequent precipitation of calcium carbonate which is also visible in calcified coatings of numerous former plant roots. The Holocene sediments are of great interest as they were deposited in more permanent closed-off palaeolakes that existed during the 10th and 9th millennia calBC as well as in extensive seasonal swamps until at least the 6th millennium calBC (Dittrich and Gessner 2014; Dittrich et al. 2015). Being more susceptible to erosion at the northern Nile bank, similar alluvial deposits can be found there only as relics in protected areas.

The patchy topography induced by deep khors cutting their way through the basement finds its continuation in the cataract landscapes at the Nile river where numerous outcrops form small islands. Many of them are densely overgrown, but their size and appearance change with each flood posing a problem to their accurate mapping (Ritter 2014). The northern and main Nile branch is characterised by rapids and whirlpools often found between these islands (Fig. 2a). The rapid fall of the Nile river level of roughly 18 m over a distance of 27 km explains why Mograt has been considered a proper cataract in the past (Lyons 1909: 48; Chélu 1891, pl. 8).[5] Most of these islands are quite persistent as they consist of Precambrian basement to which periodically fresh alluvium is added. Therefore in some parts of Mograt the islands which are reached by small boats play a major role for agriculture. In general, due to the geological settings the cultivation of land appears patchy and rather opportunistic, including the layout of small terraces and fields between outcrops as well as numerous irregular patches of non-irrigated *sallūka* land (Fig. 2a; for the importance of *sallūka* for early Neolithic farming cf. Dittrich, in prep.). So far, one of the major islands named Kurta (Fig. 2a) was included in the prehistoric survey.

The major crest of Mograt island which is identical to its watershed is running from east to west and clearly visible at satellite images due to its present use a the main car track (cf. Fig. 11 below). Highly dendritic wadi courses starting from this line drain surface water to the northern and the southern Nile branch while they follow ancient passages along the tectonics of the basement (Fig. 2c). The lower wadi courses, however, have been significantly altered since the Holocene as they frequently cut through the already mentioned alluvial deposits that must have blocked the valley floors from time to time, thus redirecting the water flow.

Mograt's great antiquity is attested by the frequent exposure of the Precambrian basement consisting of metamorphic rocks such as schists, gneisses and granites (Whiteman 1971: 39). Granites seem to be exposed only along the margins of the long stretched western part of the island, while the eastern part shows a different and more brittle basement structure (Stern and Abdelsalam 1996, Fig. 2). Due to the relative stability of granite rock surfaces, they frequently provide evidence for prehistoric grinding hollows – so-called 'handmills' – as well as rock art (Fig. 3) but also for traces of a former water passage such as whirlpools marking for instance the former Holocene cataract-like landscape along the Wadi al-Firsib and the southern Nile branch (cf. Dittrich and Gessner 2014: 131, figs. 1, 5, 6).

[5] It also explains why Mograt Island has actually been chosen as the location for a new dam.

Fig. 2. Present landscape features of Mograt Island: a) view over the rapids near Kurta Island (left) at the northern Nile branch, note the durra planted by *sallūka* (digging stick) in the front; b) transition of *hammada* (front) to the early Holocene alluvial deposits discharged by the southern Nile branch (behind the palm groove) at site MOG116; c) a *khor* confined to the tectonics of the granite massif at central northern Mograt; d) basement outcrop covered by pebble deposits (*serir*) at central Mograt

The central part of Mograt's present surfaces has been stabilised only recently by being covered by dynamic stony pavements (*serir, hammada*), as typical for desert landscapes (Laity 2008). The *hammada* as a weathering phenomenon above ridges of the Precambrian basement complex appears as a dark coloured angular pavement often showing a desert varnish (Fig. 7 left). On the contrary, the components of the large gravel plains (*serir*) which mainly consist of well-rounded quartz, chert, including Hudi chert, and chalcedony pebbles have been constantly redistributed all over the island during more recent periods; thus they frequently cover older alluvial deposits or rest directly on outcrops (Fig. 2d). As the *serir* layer filled in cracks and other depressions, the surface of central Mograt has turned into a large plain (cf. Figs. 23, 26). Recent manual digging for obtaining construction material which randomly brought up fresh-looking artefacts, has

Fig. 3. Mograt Island, al-Saihan. The characteristic 'woolsack' granite boulders carved with animals, humans, boats and symbols some of which may date back to prehistory, to the right a more recent rock-gong

further dotted this plain with huge fields of pits. During all prehistoric periods, the pebbles have been employed as raw materials for the knapping of lithic tools (cf. Dittrich *et al.* 2015, tab. 6).

1.2 Site preservation

In the course of the survey it proved useful to record the relationship between site formation, surface type, the relative height according to the Nile level as well as the density and structure of artefacts as the main parameters of site preservation. It seems appropriate to describe the sites from the angle of different surface types including the granite outcrops, the pebble or *hammada* plains, as well as the alluvial silt and sand deposits at the Nile terraces (Dittrich and Gessner 2014, tab. 1; Dittrich *et al.* 2015, tab. 5). One reason for this is that the capability of the listed environments to hold stratigraphic information as well as to preserve ecofacts and artefacts differs extremely.

Given that Mograt appears flat and largely featureless without any significant mound or hill, late prehistoric sites are mainly defined by artefact and ecofact concentrations in plain areas or at older terraces sometimes covered by alluvial deposits. Different states of site preservation as observed for various parts of the island can be explained by differing erosional patterns in connection with prevailing wind directions, channelling through surface water and the ongoing exposure of the more durable basement or cemented terraces from which soils and finds were often washed down. To distinguish sites worth a more detailed investigation we were mainly looking for the presence of large immobile artefacts like grinding bases or handmills carved into rock surfaces that hint to former settlement activities and are not just relocated material, or single finds.

Despite this objective, the relocation of prehistoric artefacts is a common phenomenon on Mograt Island. Recent geomorphological research has provided insights into the complex modifications of the landscape along the northern Nile bank where the preservation of sites is extremely poor (Dittrich *et al.* 2015: 133). There the hard rocks of the basement stand out as highly weathered ridges (*yardangs*) parallel to the river, while through wind abrasion as the most important erosional factor in the place the shallow valleys in between are emptied. Additionally, surface water as well as the northward draining wadis seem to be responsible for the washing of most of the artefacts along with softer sediments down the northward slope of the river bank. Larger particles and artefacts, however, have been sometimes piled up at the leeward side of the ridges that formed natural

Fig. 4. Finds and sediments are trapped in hollows inside the bedrock which occurs just below the surface at a test trench close to the northern Nile bank (MOG114)

barriers to this movement (Fig. 4). Taken to its extremes, artefact concentrations resting directly on the bedrock cannot be studied by the method of excavation anymore (e.g. site MOG124, Dittrich *et al.* 2015, Fig. 22). As a result prominent sites do exist in certain places where – often secondary, yet somehow stabilised – artefact accumulations and favourable topographic conditions protecting them from wind and water activity converge which, however, does not necessarily reflect the full range of sites and their spatial extents or inter-site relationships in the past.

1.3 Mapping Mograt's antiquity

Mograt Island appears first on Western maps of the early 19th century when the travel route through the Nubian Desert to enter the Nile valley again at Abu Hamed became an alternative to the crossing of the Bayuda desert (Ritter 2014). Mograt can be thought of as divided into three parts (Fig. 1): western Mograt the landmass of which very much narrows towards the tip of Ras al-Jazira, central Mograt with the rock art site of al-Saihan at the northern bank and large alluvial plains at the southern bank (e.g. al-Jaraif), and eastern Mograt which includes the characteristic bend of the island and the main town of Maqall. The latter part appears as the actual cataract area on early maps (Chélu 1891, pl. 8).

One of the main study interests of the Late Prehistoric Survey project is the former human interaction with past landscapes which involves the access to its relics in the present landscapes. As landscapes we understand not only the island's specific topography or geology, or, more generally, nature and its capability to transform over time. Landscapes are always social constructions, providing cultural-spatial orders for humans, animals and plants as well as for the deceased and for the spirits. This order is established by defining living spheres with various rights and resources, transitional spheres such as tracks and rivers, or spheres of memory that can also act as liminal spheres to access transcendental forces (e.g. rock art sites, specific rock formations, burial sites). All of these spheres are actively created and maintained by a society. As humans have probably never entered an 'empty' landscape, during each period new links between humans and their environments were imposed on existing links. In this sense, landscapes do not only constitute palimpsests in an ideological way – meaning the cultural superimposition of various rights and rules – but also palimpsests in a strict material way – the superimposition of material remains (artefacts, ecofacts) of various periods and activities (cf. Bailey 2007).

For the practical determination of the past insular landscapes it is also necessary to have a look at the maximum Holocene Nile level. The present level of the southern Nile branch is 302–305 m a.s.l. before inundation at western Mograt according to Google Earth terrain data. From the deposits recorded so far (see below) it can be assumed to have reached at least 12 m above the present level. A graphical simulation of the maximum Nile level for the late Pleistocene and early Holocene periods was created by using a Digital Elevation Model based on SRTM data (Fig. 5). It can be noticed that the colouring of the Holocene alluvial basin gradually changes from light in the east to dark in the west which reflects the rapid fall of the river level. By the rise of the Nile level the liveable part of the island would have be limited to its core that rises another 20.0 m above this level, but by the activation of the palaeochannel marked by the Wadi al-Firsib Mograt Island became divided into two major palaeoislands (Fig. 6 lower, left). While assuming a maximum Nile level of 320 m a.s.l., the smaller southern palaeoisland would have still extended over an area of 5.2 km², but together with the larger palaeoisland (36.5 km²) the landmass significantly shrank to roughly 40 per cent of Mograt's present dimensions.

Currently the dry course of the Wadi al Firsib is turned into fields thanks to a large-scale irrigation scheme. On the northern limits there are numerous gran-

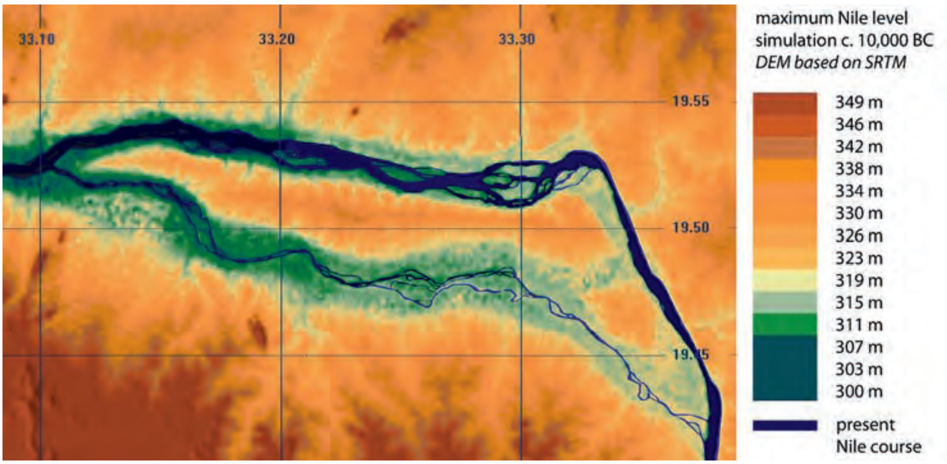

Fig. 5. Mograt Island. Maximum Holocene Nile level simulation assuming the alluvial plain to be extended to a height of 315–320 m, the gradual change of colours to dark to the west is due to the rapid fall of the river level to this direction (data based on SRTM)

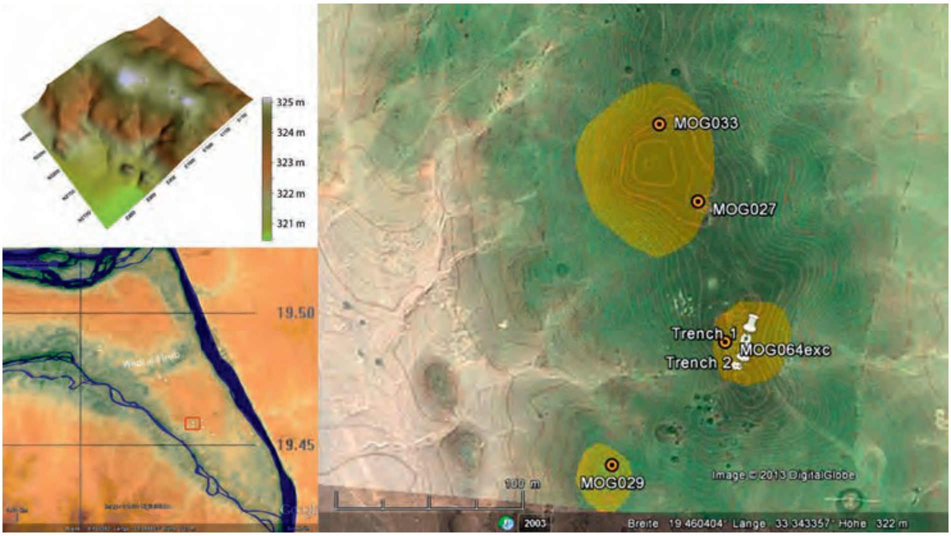

Fig. 6. Mograt Island, eastern part. Early to mid-Holocene sites at the al-Karmal plateau (right) according to local elevation (top, left) which in the Nile level simulation marks the shoreline of the southern palaeoisland (lower, left; sites are marked in white) (local DEM: G. Rees)

ite outcrops which bear traces of a former cataract-like landscape. When compared to the maximum Nile level simulation all of the late prehistoric sites located in the vicinity of the Wadi al-Firsib are clearly lying within the limits of the two palaeoislands (Fig. 6, lower, left). Additionally, the four sites on the northern side of the palaeochannel indicate a horizontal stratigraphy, with the most southern one being the most recent one (late Neolithic), suggesting that the wadi gradually ceased to flow during the mid-Holocene (Dittrich and Gessner 2014, Fig. 1). However, to further reconstruct the prehistoric landscapes of Mograt and to study the chronology of events that shaped them in greater detail it is necessary to focus on much smaller areas and site clusters.

2. Study area I: Eastern Mograt

If the focus is set to the al-Karmal plateau as the major basement ridge of the southern palaeoisland it becomes obvious that the late prehistoric sites are located on the highest part of the plateau overlooking the alluvial plain by about 5 metres (Fig. 6). The surface of the plateau is densely covered by the detritus of the metamorphic basement, mainly gneiss and schist, as well as patinated quartz gravel forming together a dark-coloured *hammada* pavement. Over a large area this pavement is mixed with artefacts of various prehistoric periods. The finds are more densely concentrated at the sites MOG027/MOG033, MOG029 and MOG064[6] (Fig. 6), but since they are very close they can hardly be considered as separate settlements.

Today, the most characteristic landscape feature are the numerous tumuli which are strewn over the plateau and excavated and studied within the scope of the sub-project 'Bronze Age burial sites' (Schulz 2008; Weschenfelder and Rees 2014; Weschenfelder 2015a, 2015b). As prehistoric artefacts are regularly present in the fill of the tumuli's superstructures, their construction must have caused considerable disturbance of older occupational remains. Additionally, the varying degree of patination on excavated slab stones which marked some of the tombs indicates the former level of soil cover.

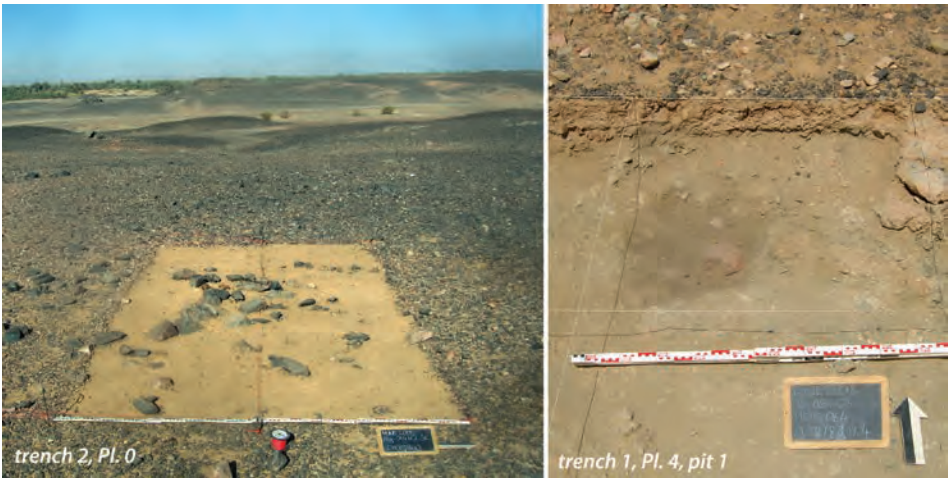

Fig. 7. Mograt Island, al-Karmal plateau. Trenches 2008-1 and 2008-2 at MOG064 during excavation (photos: R. Schulz)

[6] The former were recorded during the H.U.N.E. 2006 season (Näser 2006; Lange 2012) while MOG064 was recorded and test-excavated during the H.U.N.E. 2008 season (Näser 2008; Schulz 2008).

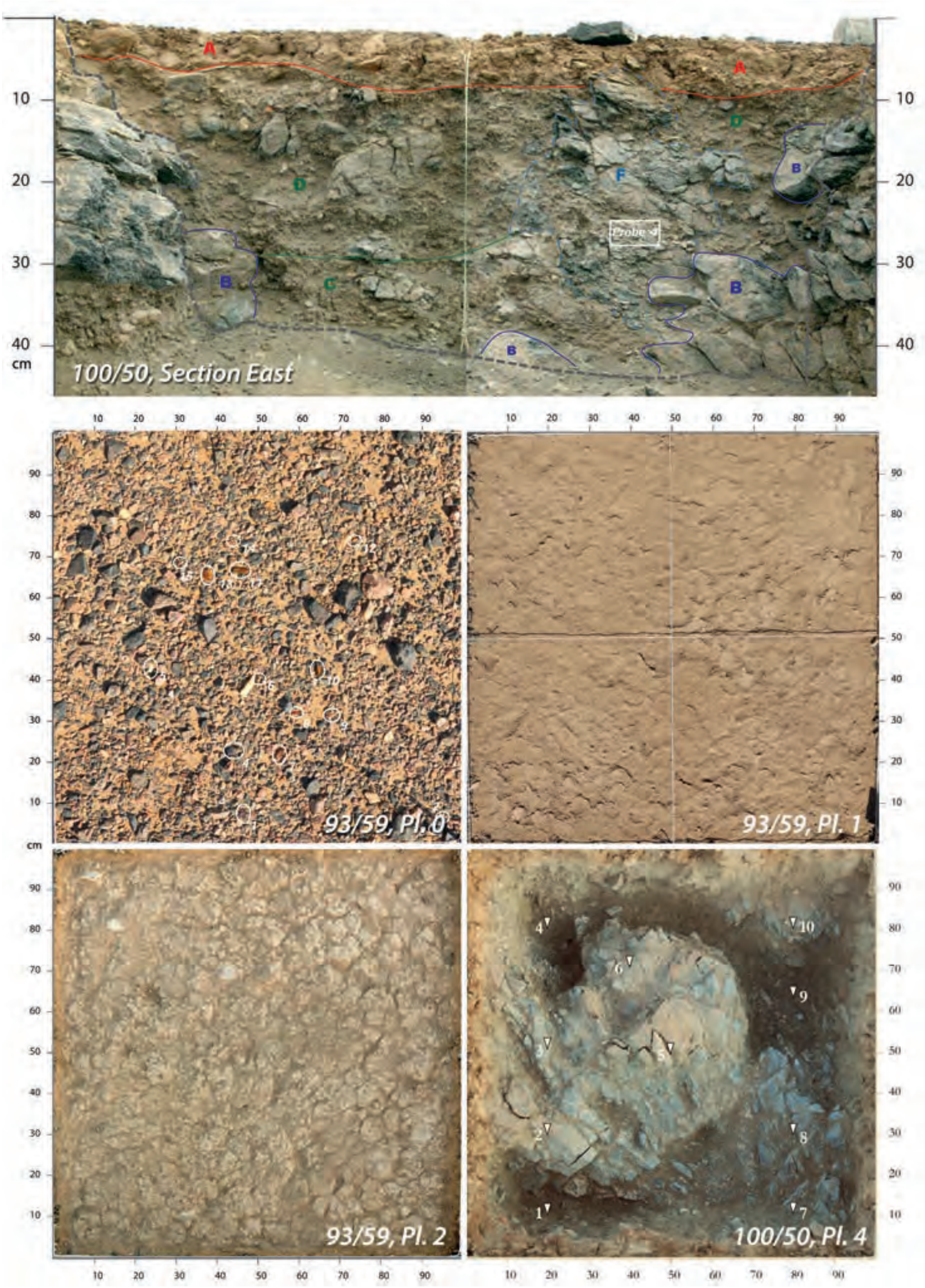

Fig. 8. Mograt Island, al-Karmal plateau. Section and plana sequence at the two geological test trenches 2014-93/59 and 2014-100/50 (photos: J. Schäfer)

Table 1. Radiocarbon dates available for late prehistoric sites at Mograt Island

site/ sample no.	**material/ species**	**context**	**height above local NN in m**	**lab no.**	**conven-tional 14C age**	**calibrated 14 C age (2nd sigma)**	**calibrated 14 C age (1st sigma, rounded)**
MOG000-33	shell of *La-nistes* sp. (mature)	WP 189	0	Poz-75369	7590 ± 50 BP	6570–6374 calBC	6480–6410 calBC
MOG064-22	shell of *Pila* sp.	trench 1, sq. 32/83, pl. 3-4, cont. 1	-0.20–0.40	Poz-63632	6870 ± 50 bp	5877–5661 calBC	5830–5710 calBC
MOG064-21	shell of *Li-micolaria cailliaudi*	trench 1, sq. 32/82, pl. 3	-0.20–0.30	Poz-63630	7325 ± 35 bp	6245–6077 calBC	6230–6100 calBC
MOG064-10	shell of bivalve/ *Aspatharia* sp. ?	trench 2, sq. 27/68, pl. 2	-0.10–0.20	Poz-63628	8300 ± 35 bp	7484–7192 calBC	7450–7320 calBC
MOG064--SF01	ostrich eggshell bead frag-ment	trench 2, sq. 28/67, pl. 3	-0.20–0.30	Poz-62767	9060 ± 50 bp	8427–8208 calBC	8300–8250 calBC
MOG064-13	shell of *Zootecus insularis*	trench 2, sq. 29/67, pl. 2	-0.10–0.20	Poz-63629	18630 ± 80 bp	20753–20385 calBC	20600–20450 calBC
MOG102-26-11-2	shell of *Etheria elliptica*	trench 1, sq. C, pl. 0–10 cm	-0.10	Poz-75231	6515 ± 35 BP	5549–5377 calBC	5530–5470 calBC
MOG102-26-2	ostrich eggshell workpiece fragm.	trench 1, sq. D, pl. 10–20 cm	-0.10–0.20	Poz-75368	6530 ± 40 BP	5609–5381 calBC	5530–5470 calBC
MOG105-25-2-2	shell of *Pila* sp. (mature, large)	trench 1, extension (grey se-diment)	-0.10–0.80	Poz-72519	6440 ± 40 BP	5479–5331 calBC	5470–5380 calBC

site/ sample no.	material/ species	context	height above local NN in m	lab no.	conventional 14C age	calibrated 14 C age (2nd sigma)	calibrated 14 C age (1st sigma, rounded)
MOG105-24-6-1	shell of *Lanistes* sp. (immature)	trench 1, sq. C, pl. 0–10 cm	-0.10	Poz-72516	6540 ± 40 BP	5613–5386 calBC	5530–5480 calBC
MOG105-24-8	ostrich eggshell bead fragment	trench 1, sq. D, pl. 0–10 cm	-0.10	Poz-72515	6650 ± 40 BP	5639–5511 calBC	5620–5550 calBC
MOG105-25-2-1	shell of *Bellamya unicolor* (?)	trench 1, extension (grey sediment)	-0.10–0.80	Poz-72518	7190 ± 40 BP	6205–5989 calBC	6080–6010 calBC
MOG105-24-6-2	shell of *Zootecus insularis*	trench 1, sq. C, pl. 0–10 cm	-0.10	Poz-72517	8060 ± 50 BP	7176–6815 calBC	7120–6840 calBC
MOG107-05	shell of *Lanistes* sp.	silt stratigraphy, north wall	2.54	Poz-63636	8975 ± 35 BP	8291–7984 calBC	8270–8020 calBC
MOG107-02	shell of *Lanistes* sp.	silt stratigraphy, south wall	2.23	Poz-63633	9030 ± 40 BP	8300–8213 calBC	8280–8250 calBC
MOG107-04	shell of *Cleopatra bulimoides*	silt stratigraphy, lb 2, north wall	2.33–2.43	Poz-63634	9680 ± 40 BP	9261–8856 calBC	9250–8960 calBC
MOG116-35-2	shell of Nile bivalve (indet.)	SE section, m 20	3.33	Poz-72520	9800 ± 50 BP	9360–9200 calBC	9300–9250 calBC

2.1 The al-Karmal plateau sites (MOG064, MOG027)

In 2008, two test trenches have been excavated at the site MOG064 (Fig. 7; Schulz 2008). Trench 2008-1 covered 4 by 4 squares and a total area of 16 m². While trench 2008-2 reached only half of this size it produced the major part of finds of altogether more than 5000 lithic artefacts, 400 potsherds as well as few grinders, ostrich eggshell beads, mollusc shells and heavily fragmented animal bones. Since also Middle Palaeolithic artefacts were among the lithics it was thought that the site could provide a clear stratigraphy (Schulz 2008).

The aim of the 2014 survey season was to (1) verify the presence and density of Palaeolithic and early to mid-Holocene finds, (2) study the geomorphology of the plateau as well as (3) assess its capability to provide a stratigraphic relation of Palaeolithic and Holocene finds. Several test trenches of the size of 1 x 1m were excavated in the vicinity to study the stratigraphy of the area (Fig. 8).[7] At the H.U.N.E. site MOG027 systematic surface find mapping (71 m²) and collection (39 m²) were conducted to study the full range of artefacts dating from the Middle Palaeolithic to the Kerma period (Dittrich and Gessner 2014: 134f., Fig. 3-4). Furthermore, during the 2014/15 season soil samples have been taken out of the still visible trenches at MOG064.

When the top *hammada* layer was removed in each of the geological test trenches, a silt layer of aeolian origin appeared. Characteristically it shows a columnar structure due to shrinking processes which are comparable to loess (Laity 2008: 164–165). These silts cover just the upper 8 cm, and rest directly on top of heavily weathered bedrock (Fig. 8). The consistence of the latter varies to a large degree but there is a zone of at least up to 40 cm below the surface where it is quite brittle and weathered to the size of silt, sand and gravel, additionally mixed with wind-blown and water-rolled material.[8] As the *hammada*'s development oscillates between deflation, surface wash through rains, as well as aeolian sedimentation (Laity 2008), it fosters the vertical movement of artefacts resulting in statistical biases when excavated in stratigraphic layers. In the excavated trenches 2008-1 and 2008-2 there was a high amount of surface finds due to uplifting processes, contrasting with few or even absent finds at the aeolian silt layer, deeper down again followed by increasing frequencies. As the decay of the basement progresses from the top down, the separated lower finds get buried more deeply over time, in case

7 Test excavations as well as the study of Palaeolithic artefacts were carried out by J. Schäfer, Berlin (Schäfer, unpublished report).

8 Next to the camp house at al-Karmal a trench for a pit drainage was dug into the brittle bedrock which was easily removed by means of a *toria* down to a depth of approximately 6 m.

of trench 2008-1 down to 70 cm, while at trench 2008-2 artefacts ceased already at a depth of 30 cm. For trench 2008-1 the excavators described a 'cultural layer' which consisted of loose sediment with traces of secondary burning on potsherds (Fig. 10: GE15; cf. Schulz 2008: 58, Fig. 6). Most clearly it occurred as the fill of a pit roughly 45 cm in diameter (Fig. 7 right) from which a shell was dated (Tab. 1: MOG064-22). As it was later confirmed through the excavation of grave pits in the vicinity, such artificial diggings but also natural cracks are capable to act as sediment traps. However, the dry sieving of two sediment samples from the pit at trench 2008-1 gave no indication of charcoal or any other macroremains.

The micromorphological and geochemical analysis of two soil samples taken in 2014 proved a very high mineral content mostly of minerals of igneous origin of the basement, and besides that, organic contents as well as traces of bioturbation.[9] In large contrast to the actual environment, the organic contents indicate a former dense vegetation cover. Also the observed bioturbational features must have resulted from biological activities in more humid conditions. The presence of iron oxide pedofeatures, a product of wetting and drying, further supports this suggestion. From this we would conclude that the *hammada* is one of the oldest surfaces present at Mograt characterised by the constant decay of bedrock and subsequent deflation of former top soils of which only very few components still persist. While the *hammada* surface contains an interesting and wide chronological spectrum of finds it does not provide sediments directly linked to one of the archaeological periods in question. In fact, Holocene stratigraphy seems largely absent. Nevertheless the sites are important archives storing a palimpsest of different events the exact order of which remains stratigraphically so far unknown. With this in mind, we tried to tackle the local chronology of palaeoenvironmental and cultural events by (1) establishing a radiocarbon data series as well as by (2) studying typological features of lithics that allow for a diachronic assessment of the local knapping strategies.

During excavation, numerous conchifera shells have been found that could be employed for the purpose of radiocarbon dating (Tab. 1).[10] Landsnails such as *Zootecus* sp. and *Limicolaria* sp. hint to the former presence of humic soils and grassland and have been dated to the 21st and 7th millennium BC. The late Pleistocene dating

[9] This analysis was carried out by S. Neogi, Cambridge (Neogi, unpublished report).

[10] The impact of the hard water effect remains unclear. The similar dates of MOG102 for terrestrial material (ostrich eggshell) and an aquatic species (*Etheria elliptica*) suggest it to be negligible or at least consistent on a regional level (Tab. 1: MOG102-26-2 and MOG102-26-11-2). However, it must be kept in mind that it could cause dates to appear up to 400 older than dates run according to the laboratory standard, i.e. that of charcoal (see discussion in Dittrich 2011: 51-53, 56).

Fig. 9. MOG064. Lithic finds. 1, 2) triangles; 3, 4, 7) lunates; 5) trapeze; 6, 8) backed points; 9, 12) double backed points; 10) backed point (microgravette type); 11) blade end-scraper; 9, 11) surface finds; 1, 2, 3, 5, 6, 7, 10) trench 2008-2, pl. 2; 4, 8) trench 2008-2, pl. 0; 12) trench 2008-2, pl. 1 (all chert, except 7, 8: agate, drawings: M. Ehlert)

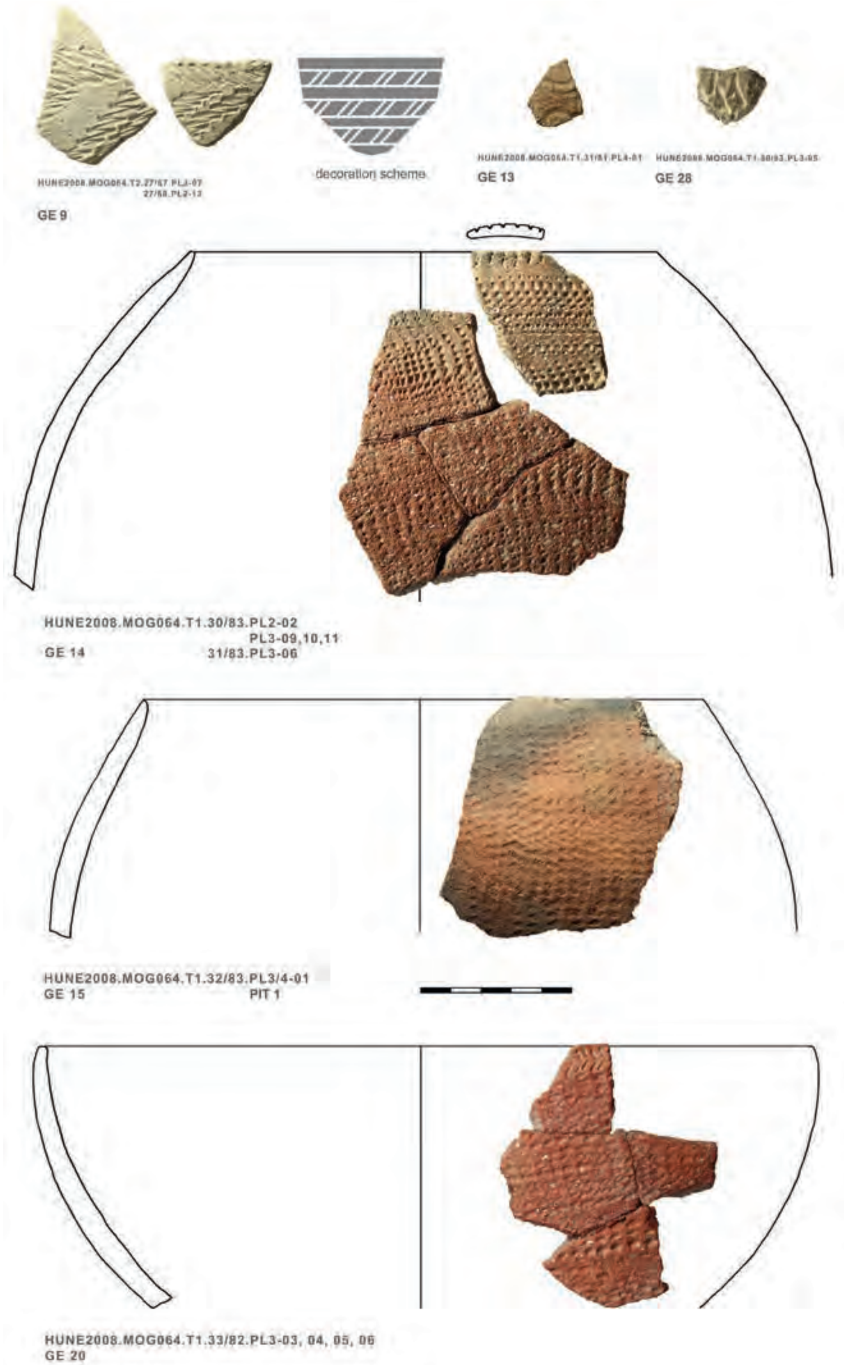

Fig. 10. MOG064. Pottery finds. GE9) surface + trench 2008-2, pl. 2–3; GE13) trench 2008-1, pl. 4; GE14, 20, 28) trench 2008-1, pl. 2-3; GE15) trench 2008-1, pl. 3-4, pit 1

of *Zootecus* sp. from planum 2 at trench 2008-2 would underline that relics of this period further suggested by traits of blade technology are indeed present. Human activity is attested by ostrich eggshell bead manufacture dated to about 8,300–8,250 calBC which must have been a period when the Nile level reached one of its maxima and the plateau became attractive as settlement area. This is corroborated by observations at western Mograt (see below). It is assumed that a significant amount of the lithic finds among them the backed point tradition frequently found at the plateau should be dated to that period. These tools are indicators to hunting in the open savannah. After these events, human activity is indirectly dated through a Nile mussel that must have been brought to this spot around 7450–7320 calBC. From the pit feature at trench 2008-1, containing rocker-stamped pottery and undiagnostic flakes, *Pila* sp. shells were dated to 5830–5710 calBC. Since these shells stem only from adult specimen, they were selectively collected and probably deposited as kitchen refuse. Human presence is finally dated through three charcoal samples to about 3020–2900 calBC (Weschenfelder and Rees 2014: 153). These charcoal finds derive from a grave pit filling in one of the late Neolithic graves excavated in 2014 (see also Weschenfelder 2015a).

The diagnostic lithic artefacts are mostly made from chert reaching high proportions of 60%, sometimes also from agate (c. 7%), and other more opaque stone varieties.[11] The proportion of quartz is relatively low (19.5%) when compared to other sites at Mograt Island. The tools made from chert and agate comprise endscrapers on blades (Fig. 9.11), backed points (Fig. 9.6, 8, 10), double backed points (Fig. 9.9, 12), lunates (Fig. 9.3, 4, 7), triangles (Fig. 9.1, 2) and trapezes (Fig. 9.5), retouched blades as well as different types of perforators and scrapers. The characteristic endscrapers on thick blades would rather point to an Upper or Late Palaeolithic date. Their occurrence is consistent with that of few blades exceeding microlithic dimensions as well as of cores showing a more developed scheme of preparation and reduction. The latter pertains also to a number of backed tools. The tanged backed point (Fig. 9.10) which typologically resembles a microgravette or Sauveterre point (Barrière *et al.* 1969) as well as the long backed points should be assigned a Late Palaeolithic date or very early date within the Holocene sequence. Differently from this tradition, the occurrence of geometric microliths might correspond to the human presence dated by shells to the late 8th millennium calBC. Besides the indicators for the Upper and Late Palaeolithic, there is also

[11] Statistics and drawings of the lithic finds were done by M. Ehlert, Wrocław; the publication is in preparation.

a constant proportion of up to 4% of Middle Palaeolithic finds, represented by Levallois cores and flakes struck from chert pebbles.[12] Discoid cortex platform cores, cortex backed flakes turned into borers as well as irregular and concave scrapers are assumed to date from the Neolithic period.

The pottery fragments from the surface of the trenches were usually very small and eroded. Out of the larger fragments from the excavated levels jars and bowls can be reconstructed (Fig. 10: GE14, 15, 20), while few fragments belonged to pointed bases. Refittings of fragments from different plana were common. The presence of mica temper was always associated to that of rocker stamp decoration (Fig. 10: GE14, 20) and corresponding rim decorations include herringbone patterns as well as simple parallel strokes. Few small and reworked fragments of a quartz tempered fabric showed an incised wavy-line decoration (Fig. 10: GE13) indicating that these finds might have been deposited during earlier periods. 39 fragments – one of them clearly points to the reconstruction as a carinated vessel type – belonged to a fine sandy fabric bearing a banded decoration (Fig. 10: GE9). This decoration consists of small zigzags executed with a plain edge tool. Plain zigzags occurred also in another variety (Fig. 10: GE28). The fine grey fabric reminds of that of similar carinated bowls excavated in the area of the Fourth Cataract and also the way of combining horizontal with diagonal bands is known from there (Dittrich *et al.* 2007, Fig. 1.14, 15; 2.8).

From the pottery finds in the vicinity, namely from site MOG027, further patterns are known such as incised wavy-line which appears in banded patterns rather than as complete fillings (Dittrich and Gessner 2014, Fig. 20.1–3). Other patterns include the so-called wolf-tooth decoration which is actually a variety of plain zigzags (ibid. Fig. 20.5, 9), double-pronged tool impressions (ibid. Fig. 20.8) and a peculiar pattern which we would preliminary call 'fish-scale' (ibid. Fig. 20.7) and which is so far known only from the Fifth Cataract area (cf. Alkhidir, this volume). It was probably made by means of a roulette. Concluding also from the presence of different fabrics, these decorations are suggested to date from the Mesolithic to late Neolithic periods.

To sum up, the al-Karmal plateau bears the chronological record of several prehistoric events when human interest was directed to this elevated spot which

[12] As this proportion does not vary between surface finds and that of trench 2008-1 it is likely that MOG064 does not bear an *in situ* Middle Palaeolithic knapping site (as supposed by Schulz 2008: 58), but Levallois cores and flakes might have been collected during the Holocene together with other raw materials brought from the pebble plains or wadi beds to the site. There are clear traces of re-use on Levallois artefacts (Ehlert, unpublished report)

in the long-term changed from a living sphere, manifest in various activities such as cooking or the manufacture of tools and beads, to a sphere of memory, manifest in numerous burials. At the same time the environmental record indicates various climatically more favourable episodes of sustaining humic soils and grassland vegetation before the present desert pavement developed.

3. Study area II: Western Mograt

During the 2014 and 2014/15 seasons surveying work was also conducted at western Mograt (Fig. 1, 11). The systematic prospection covered full transects from the northern Nile bank, including Kurta Island, to the southern Nile bank. Out of the mappings there emerges a clear pattern of sites located more or less along the river banks and of a second group of sites located along the main crest of the island which is always the highest ridge of the island and still the shortest way to cross it from east to west (Fig. 11).

3.1 Hajar al-Nur – The lake site (MOG107) and the settlement site (MOG106)

These two sites are located near a small homestead called Hajar al-Nur at the southern Nile bank roughly 100 m to the north of the actual river branch (Fig. 12). They consist of two distinctive landscape features. One is a very well preserved alluvial mound (MOG107, Fig. 13) which is the product of continued sedimentation at the early Holocene alluvial plain or, more precisely, inside a basin once filled by an ephemeral lake. From the contour lines it is possible to preliminary reconstruct the extensions of such a lagoonal lake limited by outcrops of the basement along a wide NE-SW orientated crack crossed by a wadi today (Fig. 12, top right). This wadi cut its way through the Holocene deposits, thus exposing their stratigraphy down to the basement (figs. 14, 15). The second site is a very dense surface concentration of lithics, grinders, potsherds and few poorly preserved animal bones on a flat mound (MOG106) which is situated between the Holocene lake relics and the present southern Nile branch. Part of its surface was recently removed by machinery probably in quest for deposits containing gold.[13]

[13] In fact, the clearly visible patterns of recent sediment extraction at the nearby stratigraphy for the same purpose indicate that it is the lowest Pleistocene pebble layers that are most likely to contain the precious metal.

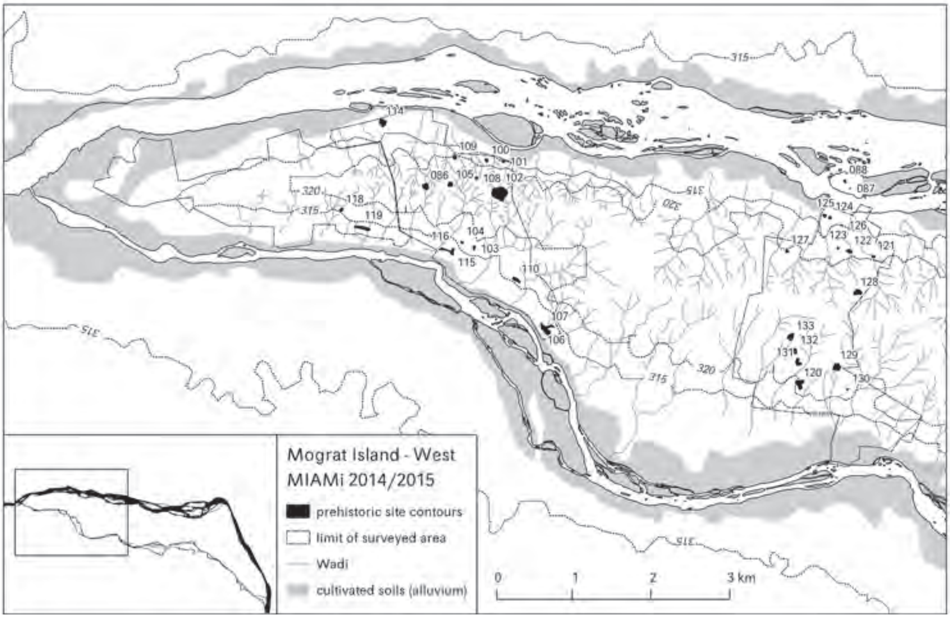

Fig. 11. Mograt Island, western part. Surveyed area and contours of late prehistoric sites (top), satellite image (below, Corona 1965, colours inverted)

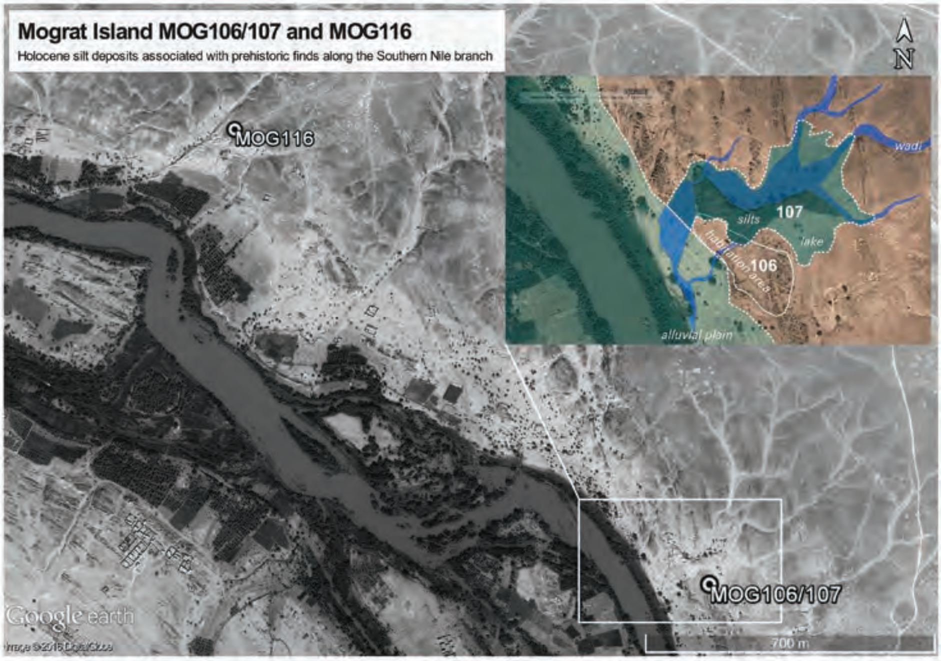

Fig. 12. Mograt Island, western part. Satellite image with the location of the sites MOG106/107 and MOG116 along the southern Nile branch (Google Earth) and the assumed extension of the early Holocene lake (top, right)

Fig. 13. Panorama view of sites MOG107 (silt bar, centre) and MOG106 (right, in front of the car) enclosed by a wadi bed, behind the trees to the right flows the southern Nile branch

During the first season the stratigraphy of MOG107 was recorded in detail over a height of 3.50 m (Fig. 15; cf. Dittrich and Gessner 2014: 138ff.). From the stratigraphic observations two distinct phases of sedimentation were evident and could be roughly associated with the early Holocene and the Pleistocene or earlier periods. In the lower part it revealed gravels and sands of an older Nile terrace that contained few rolled Palaeolithic artefacts (Fig. 15.H–L). As a major discontinu-

Fig. 14. Working at the stratigraphy of MOG107, the arrow marks the upper lakebed the softer sediments of which are more eroded, the section was cut by the course of a wadi (right)

ity the gravels are overlain by fine calcareous silt and sand accumulations which characterise the upper part (Fig. 15.A–G). During the second season we decided to complete the recording with more detailed soil studies and to take samples for studying soil micromorphology and carrying out geochemical analysis (Dittrich *et al.* 2015: 123ff.).

The thin sections obtained from the upper part of section (Dittrich *et al.* 2015, Fig. 3, tab. 1: samples 1–2) show horizontally laminated silts, identified mainly as quartz, mica and tourmaline and are interpreted as the result of repetitive flooding events and water logging conditions.[14] Due to indicators for extensive bioturbation, it can be assumed that soil fauna was most active between the flooding events when the sediments had dried out. Soil formation processes seem to have been well underway. This is suggested by limpid clay coatings of particles which are characteristic of stable and densely vegetated land surfaces. Thus, the area might have been of interest not only because of its proximity to aquatic resources

[14] This analysis was carried out by S. Neogi, Cambridge

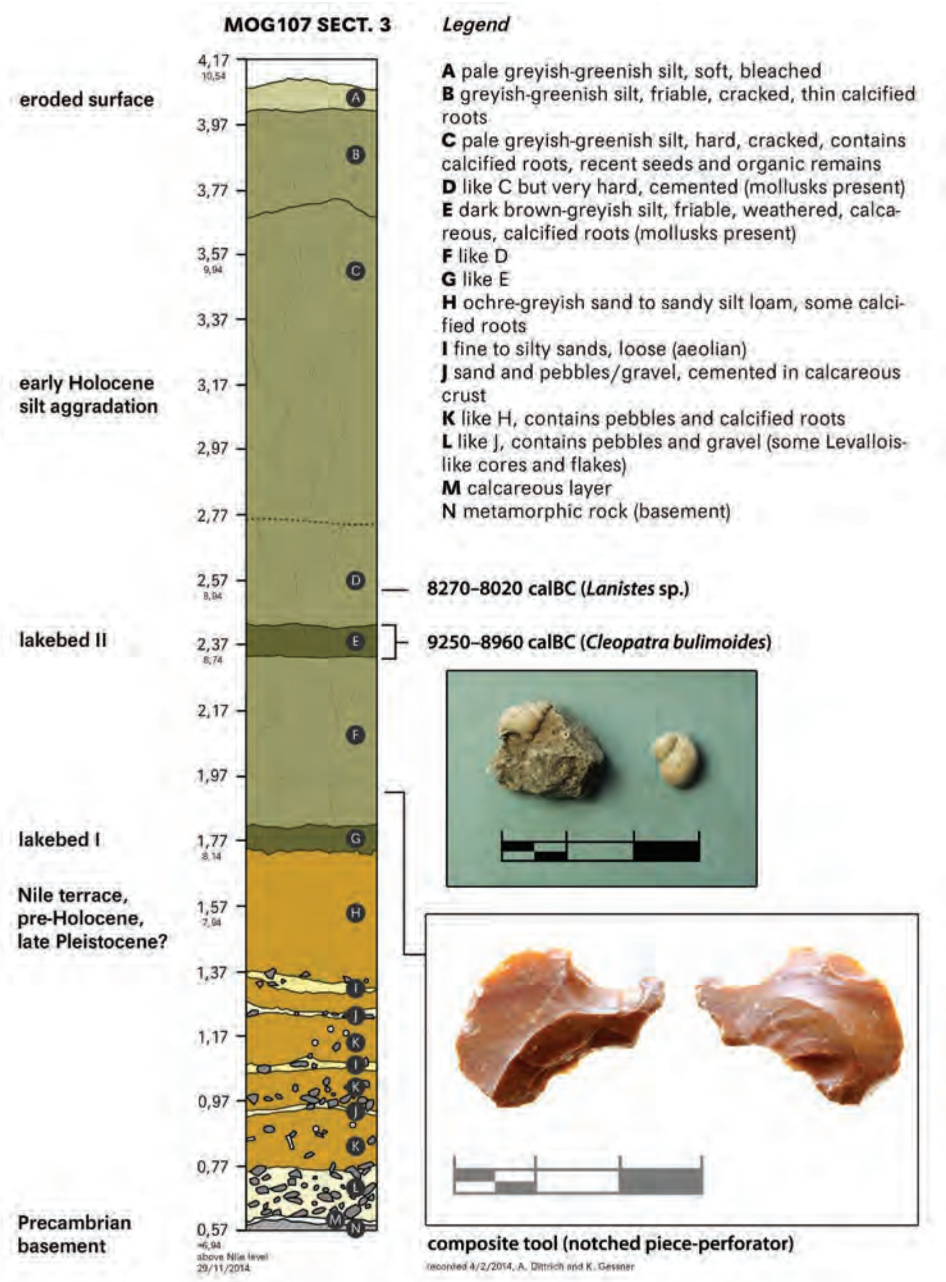

Fig. 15. MOG107. Stratigraphic record with the positions of radiocarbon dated mollusk shells and of a singular tool find

but also to plants growing during interim episodes. As post-depositional events, redoximorphic features such as iron mottles indicate a fluctuating water table later followed by the drying-up which led to the subsequent precipitation of calcium carbonate. Embedded within the silts were two dark brown layers with higher organic content (Dittrich *et al.* 2015, tab. 1: sample 2) which were interpreted as lakebeds (Fig. 15.E, G). This was further suggested by the inclusion of mollusc shells.

These shells have been attributed to the freshwater snail species *Cleopatra bulimoides* (Fig. 15), the carinated shells of which strongly point to the prevalence of lacustrine environments (Van Damme 1984: 23; Tothill 1946: 160, Fig. 9). The other identified species is the apple snail *Lanistes* sp. which is a typical inhabitant of alluvial plains grown with an acacia-tall-grass community and being flooded for a significant part of the year (Tothill 1946: 159). Thus, the radiocarbon dates of the respective shells indicate two events dated to 9250–8960 calBC suggesting more permanent lacustrine environments and to 8270–8020/8280–8250 calBC pointing to seasonal flooding of the lake followed by the fast growth of grasses. Interestingly, the *Lanistes* sp. date closely matches that of an ostrich eggshell bead excavated at the al-Karmal plateau at eastern Mograt (Tab. 1: MOG064-SF01). Therefore, one of the objectives of the 2014/15 season was to search for a stratigraphic connection between the early Holocene lake (MOG107) and the nearby settlement (MOG106) and to identify artefact types dating from that period out of the mixed find assemblage.

During the second season several trench sections along an axis of altogether 41 m were excavated to provide a section through the mound of MOG106 on which the majority of surface finds is resting (figs. 16, 17; Dittrich *et al.* 2015: 126ff.). One important question is whether the mound could have supported a shoreline habitation close to the lake, since the present height of the mound (c. 9.4 m above present Nile level) appears much lower than the highest lake level as indicated by the preserved height of silty deposits (c. 10.7 m above the present Nile level).

Indeed, at the lakeside end of trench 1, the two significant lakebed strata of the adjacent site MOG107 were again identified, with upper limits of c. 8.7 m and c. 9.0 m above the present Nile level (Fig. 17 left). They gradually slope to the north towards the centre of the lake basin. Combining the evidence of the four excavated sections, the mound is part of an older Nile terrace probably of Pleistocene age and consists of hard deposits such as calcified silts and sands as well as cemented pebble layers that rest on the local basement. If the early Holocene lake and the

Fig. 16. MOG106. Overview of trench 1 exposing the cemented deposits which formed a stable ground which was occupied during the early Holocene while a lake existed behind (marked by the dark silt deposits of MOG107)

supposed shoreline settlement existed at the same time, more than 1.5 m metre of top soils and deposits at the settlement area must have disappeared since the Holocene due to deflation. This is corroborated by the fact that the artefact density within the surface levels was extraordinarily high suggesting significant deflation of former top soils. In fact, only the bedrock ultimately delimiting the lakeshore (Fig. 17 left) as well as the hard and clay-cemented sediments of the terrace were preserved and exempted from later erosion. Thus, the supposed link between lake and settlement can hardly be proven in stratigraphic terms as the sediments in question and therefore stratigraphic units are missing. The only evidence is just one early Holocene tool, a composite perforator-notched piece, which the stratigraphy of MOG107 revealed itself (Fig. 15 lower, right).

It was only at the opposite end of the mound of MOG106 that indications for a stratigraphic order of artefacts were observed even though they were embedded in a colluvial (secondary) context (Fig. 17 right). The upper layer contained large pieces of rocker stamped pottery, cobble stones and prismatic quartz cores that

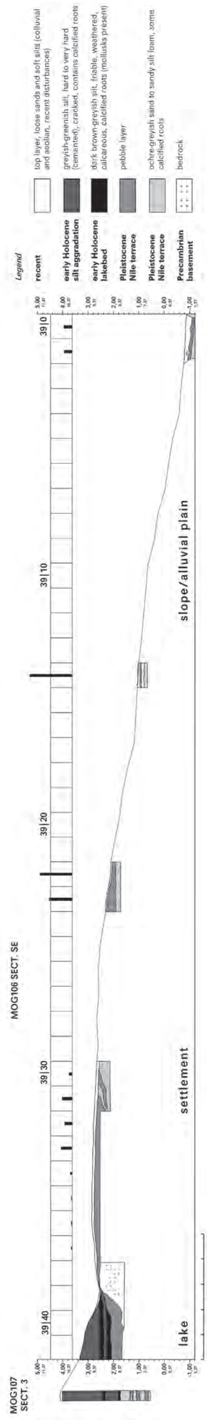

Fig. 17. MOG106, trench 1, SE section. Stratigraphic relation between the early Holocene settlement area and the radiocarbon dated alluvial deposits at neighbouring site MOG107 (left); the vertical bars above the section mark the frequency of lithic finds

must have been brought there from nearby rock fields (Dittrich *et al.* 2015, Fig. 7). This find assemblage appears very similar to that of the stratified Neolithic layer of site MOG116 (see below). By contrast, the lower layer contained small blades and microlithic implements made from chert. Chert artefacts – often clearly exceeding microlithic dimensions of 3 cm –, namely narrow blades and backed implements as well as elongated single platform cores were also frequent at the middle part of the slope (Fig. 17 centre), where they had most probably weathered out of an older layer (Dittrich and Gessner 2014, Fig. 21: 1, 4–7, 22; Dittrich et al. 2015, Fig. 8). Judging from the sample of a test trench, however, the majority of lithics were made from quartz (c. 68%) suggesting a chronological shift in raw material preferences. The detailed study of artefacts will be the scope of further research. As a preliminary assumption, the two different lithic strategies could signify two different subsistence strategies, changing from a lakeshore occupation during the early Holocene to a Nile terrace occupation close to arable soils during the mid-Holocene after the lake had finally dried up (Dittrich, in prep.).

3.2. Gharghara – The stratigraphy (MOG116)

In a distance of only about 2 km from MOG106/MOG107 a second stratigraphy providing an extensive Quaternary record resting on the Precambrian basement was located (Figs. 12, 18). The site lies at the mouth of a wadi near the single homestead named Gharghara[15], approximately

[15] 'Gharghara' (arab.) means the noise of the water in a current when flowing between stones and is related to the English word 'to gurgle' or the German 'gurgeln'.

Fig. 18. MOG116. Overview of the alluvial deposits as cut by a wadi, the silts at left were dated to the 9th millennium calBC (now partly destroyed by bulldozing), to the right lies the section excavated in 2014, behind it are the cultivated fields on top of the mid-Holocene alluvium

220 m inland of the present southern Nile channel and – when recorded in early 2014 – it still consisted of a loose surface find concentration. However, by the end of 2014 the local landowner intended to create a new terrace for plant cultivation which would require the bulldozing of the entire silt deposits as well as the removal of stones and artefacts from the surface.

In the course of the following rescue excavation, the SE section along the wadi passage was cleared at a total length of 24 m (Figs. 18, 19 top, 20; cf. Dittrich *et al.* 2015: 129ff.). During the cleaning an artefact-rich layer varying in thickness between 10 and 20 cm was found. As the layer slopes significantly towards the direction of the southern Nile branch, more recent alluvium has later been deposited on top of it, reaching a thickness of up to 2 m in the area currently excavated (Fig. 20). In the middle parts of the section, finds had weathered out of the stratigraphy which had first given the impression of a mere surface site. From the stratigraphic observation it can now be suggested that the largest portion of the site is still deeply buried underneath the more recent silts and will thus remain preserved.

To the north, a pit excavated from the surface level down to a maximum depth of 1.2 m was exposed by the section (Fig. 20 left). Its walls had been lined with clay which had been burned red through exposure to a high-temperature fire. The pit cut through silty sediments that contained two lakebed horizons, the absolute levels of which (c. 9.10 and c. 9.30 m above the present Nile level) closely resemble those of site MOG107 (see above). A Nile bivalve shell found in the lower one gave

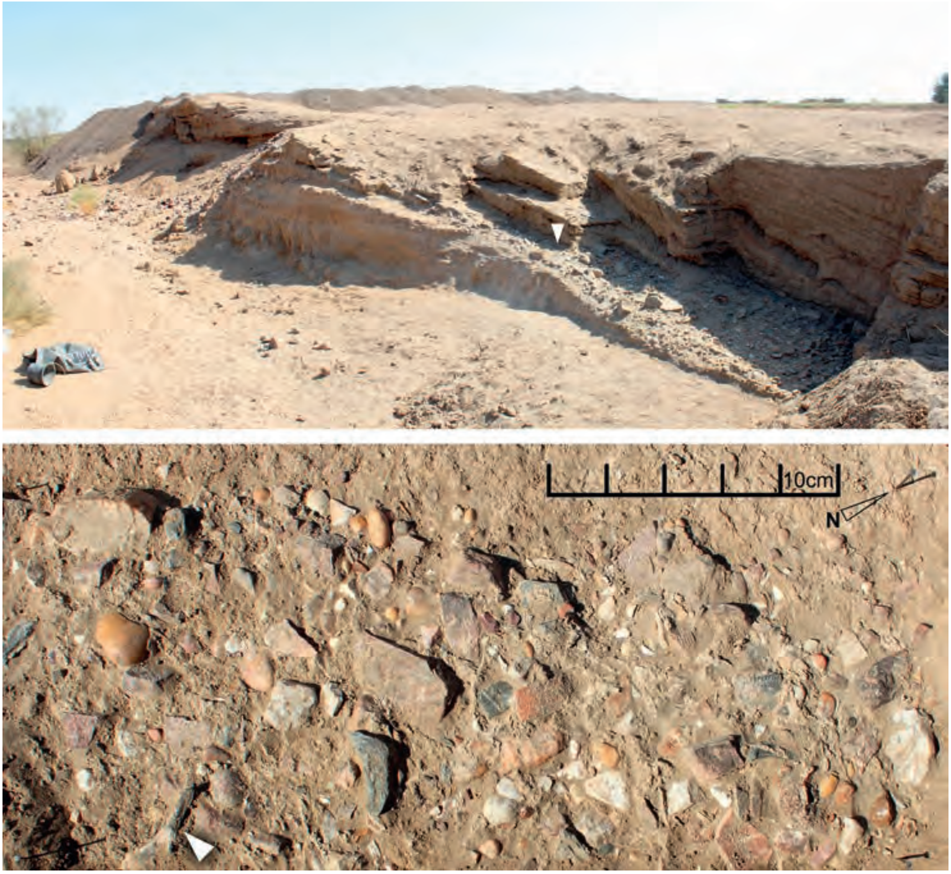

Fig. 19. MOG116, SE section. Overview of excavated area (above) and detail of cleared planum 1 (below, arrows mark the *in situ* findspot of the cattle ulna)

a date of about 9300–9250 calBC which further suggests a lake formation event similar to that recorded at MOG107 (Tab. 1). Unlike the latter site, however, there was no insular mound so that the area was entirely flooded and human occupation on top of the silts became possible only at a much later point in time.

During the clearing of the section a large bone later identified as the humerus of a hippopotamus (Dittrich *et al.* 2015, Fig. 12) was found and the surrounding area cleared down to Planum 1 was enlarged to roughly 9 m² (Fig. 21). The surface of the layer consisted of numerous slab and cobble stones originating from ridges of weathered quartz and metamorphic rock located nearby. They had been brought to the site most likely in order to support huts or tents or to be used as

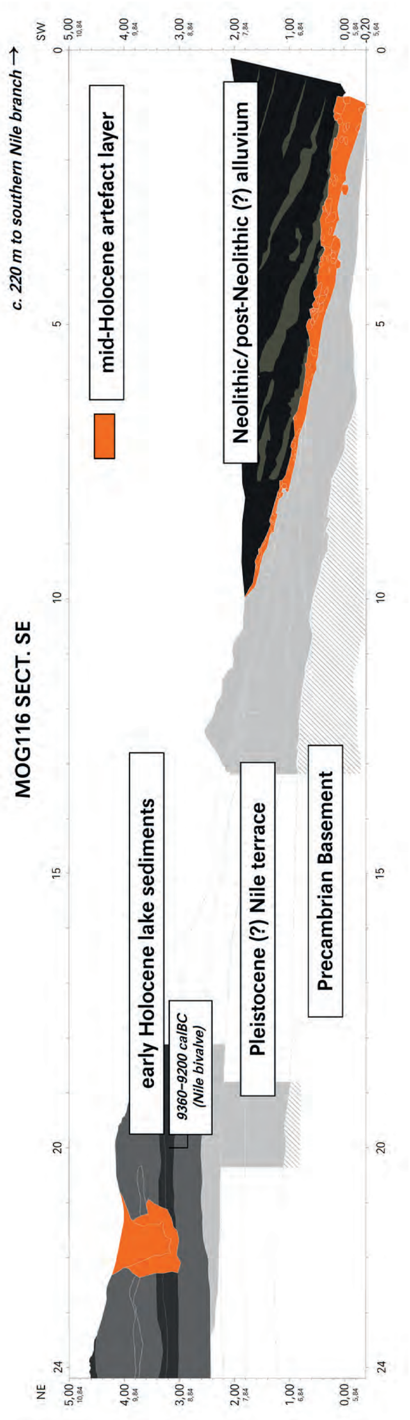

Fig. 20. MOG116, SE section. Chrono-stratigraphical interpretation

anvils. The removing of the archaeological remains from an area of not more than 2.4 m^2 generated extraordinary high amounts of finds, most of which are lithics amounting to nearly 10000 pieces. A few grinders and hammer stones were present in the excavated area. Among the finds were also 2.5 kg of lumps of burnt clay that originated from former fire places and fire pits. As no pits were found in this part of the section, it seems likely that these finds had eroded down from the higher terrace.

Animal bones, though all of them fossilised due to the presence of calcareous environments, were quite rare and include fish, crocodile, gazelle, bovidae, hippopotamus and unidentified Mammalia (Dittrich *et al.* 2015, tab. 3). However, a recent analysis of previously unidentified bovidae gave as result that one molar belonged to an adult sheep or goat (*Ovis*/*Capra* sp., Fig. 24e) while the left ulna found and recorded in planum 1 can be attributed to domestic cattle (*Bos taurus*, Fig. 19 lower, Fig. 24f).[16] Judging from their position, single occurrences and worn condition, the cattle ulna as well as the hippopotamus humerus could have been used as tools. Other organic materials such as small bones, mollusc shells, eggshell or seeds were conspicuously missing, and so far no radiocarbon date could be obtained.

Among the flaked material, quartz was exceptionally frequent reaching proportions of up to 85%. Most of the quartz and the coarse-grained Hudi chert had just been sliced into so-called wedges and flakes without preparing a platform which seems typical for the Neolithic period. Due to the high calcareous content of the silty sediments, pottery fragments were often corroded giving pot surfaces a rough and gritty appearance. Thus, only few of them still bear traces of a brown burnish. Pottery decorations consist almost exclusively of rocker stamp patterns including very fine and thin dots, spaced zigzags as well as a plain zigzag variety (Fig. 22, top row, second). They are combined with impressed rim decorations or rims modelled in a wavy style (Fig. 22 top row, left), further suggesting a Neolithic date for this layer (cf. Nordström 1972, Fig. 121.22–31 as well as the discussion of the Nubian Neolithic in Dittrich 2015: 53f., Fig. 17).

The significance of this stratified site lies in the fact that the find layer was sandwiched between two different stages of Nile sediment aggradation. The lower stage was preliminarily attributed to a Pleistocene Nile terrace overlain by early Holocene lake sediments – a situation almost identical to that recorded at the site MOG107. However, the Holocene deposits must have been sharply undercut and

[16] The author is indebted to V. Linseele, Brussels for these identifications.

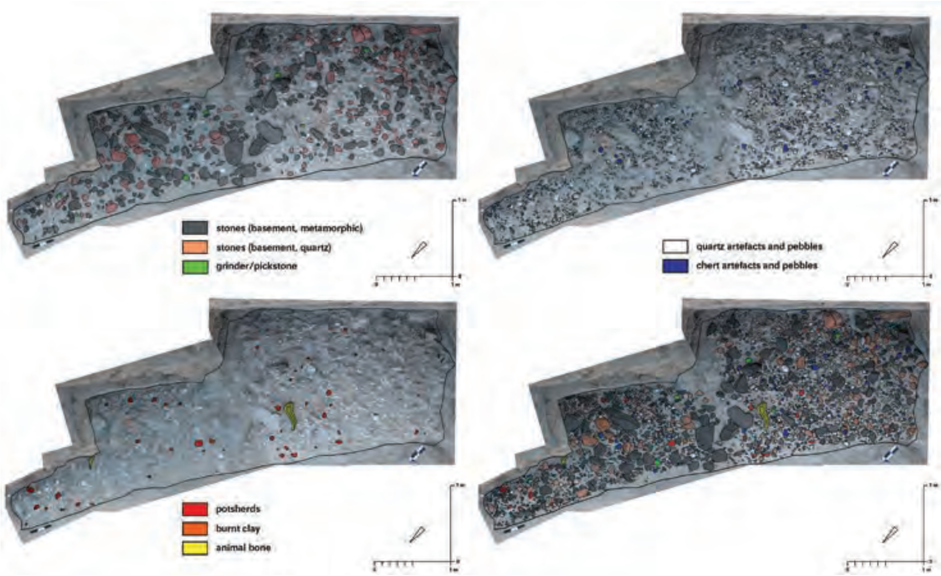

Fig. 21. MOG116. Orthophotographic record of planum 1, artefact classes and bones are marked by different colours (CAD drawing: K. Geßner)

Fig. 22. MOG116. Pottery finds from the mid-Holocene occupational layer (2014 excavation)

Fig. 23. MOG086. Overview of test trench 1 where light aeolian silts overlay pebble deposits embedded in dark red sediment

thus removed by a Nile meander or tributary before the artefact-rich layer could have slipped down from the top of the earlier lake sediments during a landslide (Fig. 20).[17] Obviously, dramatic changes of landscapes still occurred during the mid-Holocene period. The presence of domestic animals as well as of a quartz flaking industry places this occupation event firmly within the Neolithic period, and would suggest a dating to the 5th millennium BC or, when compared to the inland sites (see below), even slightly earlier. Finally the artefact layer was sealed by up to two metres of post-Neolithic/late Holocene alluvium. Interestingly, these deposits are part of a large alluvial formation covering the southern plains of Mograt (e.g. al-Jaraif) which suggests a late Holocene date for the arable soils still under cultivation (cf. Dittrich, in prep.).

3.3. Inland sites at the watershed (MOG086, MOG102, MOG105)

A further pattern of occupation was observed at the plains of the central island's crest where medium to large surface sites are located (Fig. 11). Today the landscape appears desert-like and entirely uninhabited (Figs. 23, 26). Four sites (MOG086, MOG102, MOG105, MOG108) were identified during the 2014 survey by the presence of stone slabs, grinders, fragments of grinding bases, potsherds and lithics, all of them intermingled with the dense pebble cover of the *serir* plain (Dittrich and Gessner 2014: 136f., tab. 1, Fig. 8, 9). During the 2014/15 survey four sites of this type were found at the central part of the island where the watershed plain is even more extended (Fig. 11: MOG128, MOG129, MOG132, MOG133, cf. Dittrich *et al.* 2015, tab. 5).

At three of the sites (MOG086, MOG102, MOG105) test trenches were excavated which revealed an almost identical stratigraphy (Fig. 23). After the removal of the surface artefact and pebble layer and below an accumulation of wind-blown silts, two brownish to reddish iron-rich soil horizons mainly composed of small pebbles were recognised. So far, no structures were observed in the pebble matrix. However, bones and shells seemed to be much better preserved than those found in the calcium-rich layers at the Nile terraces (compare Fig. 24, top and lower row). The zooarchaeological identification resulted in the following species: catfish (*Synodontis* sp.), crocodile, Nile monitor, ostrich, dorcas gazelle (Fig. 24a), hippopotamus (Fig. 24b), bovidae and other unidentified small to large mammalia

[17] A similar situation was reported by Arkell (1947, 173) for the site of Khartoum Hospital. Arkell assumed that the majority of finds that were found in a sloping position had eroded down together with the soft sediments from the former elevated settlement area.

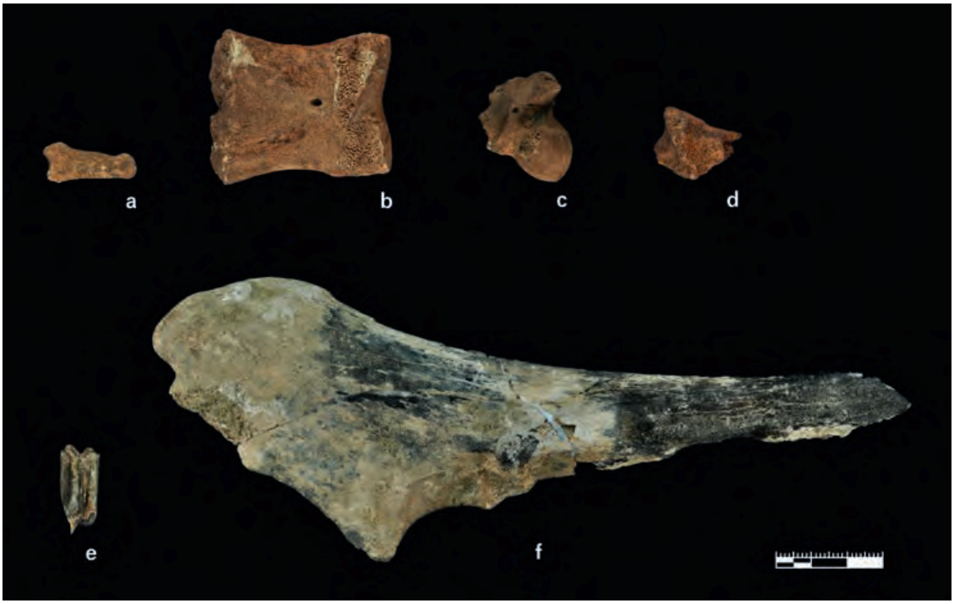

Fig. 24. Animal bone finds. a) *Gazella* cf. *dorcas*, phalanx 1; b) *Hippopotamus amphibious*, phalanx 1; c) *Ovis/Capra* sp., femur fragment; d) *Ovis/Capra* sp., tibia fragment; e) *Ovis/Capra* sp., molar; f) *Bos taurus*, left ulna (a–d: MOG086, test trench 1; e–f: MOG116, SE section, pl. 1–2, photos: N. Nolde)

Fig. 25. MOG086. Pottery finds from test trench 1

(Dittrich *et al.* 2015, tab. 3). The re-examination of bovidae remains of MOG086 confirmed a femur and a tibia of domestic sheep or goat (*Ovis*/*Capra* sp., Fig. 24c, d).[18] Mollusk shells are to be attributed to gastropods such as *Pila* sp., *Lanistes* sp., *Zootecus insularis*, *Bellamyia unicolor* (?) and to the Nile oyster (*Etheria elliptica).* As the size of *Pila* sp. and *Lanistes* sp. varies from small immature to very large specimen they probably lived nearby and were not selectively collected by humans as it was the case at MOG064 (see above). But also the presence of aquatic and semi-aquatic species such as the Nile oyster, catfish, crocodile, and hippopotamus is very interesting since these sites are situated a few kilometres inland and are out of the reach of maximum Holocene Nile level (cf. Fig. 5).

It was only at site MOG105 that the environmental aspect of those camp-sites could be studied in more detail. It turned out that the test trench was actually located partly inside a shallow surface depression (Fig. 26) the filling of which appeared as a grey soft sediment the base of which could not be reached (Fig. 27). The shape of the base points to artificial digging and considerable reworking of the sterile reddish pebble deposits. The excavation of the mixed sediments produced a significant quantity of artefacts and ecofacts including also small fragments of a human skull. Three soil samples have been taken (Fig. 27.S1‑S3). As identified from the thin sections, the silt-sized greyish-white deposits are the product of the dissolution and reprecipitation of calcium carbonate deriving from the local bedrock (Dittrich *et al.* 2015, tab. 1).[19] Not only do these processes suggest the presence of water, a fluctuating water table is furthermore indicated by the presence of iron mottles. There is evidence for organic material as well as intense activity of earthworms and similar soil fauna, visible mainly in the form of soil mixed with excreta and by the breakdown of the organic matter. From this emerges a picture of a rain-fed shallow water pond that was surrounded by dense vegetation sustaining a humic top soil. The presence of few recent and drought-resistant plants indicate that the spot is still capable to store rain water.

The pottery finds of the three sites show striking similarities in the presence of rocker stamp decorations sometimes arranged into bands or dotted wavy-lines (Fig. 25; Dittrich and Gessner 2014, Fig. 20.11, 13-16). Rims are sometimes decorated with strokes (Fig. 25 top row, right) or modelled in a wavy-style (Dittrich and Gessner 2014, Fig. 20.12) which resemble those of the site Gharghara (MOG116, Fig. 22 top row, left). Among the lithics there is a significant amount of

[18] Again the author is indebted to V. Linseele, Brussels for this identification.
[19] Analysis was carried out by S. Neogi, Cambridge.

cortex backed flakes just sliced from cores without preparing a platform and randomly turned into partly backed tools, scrapers or perforators (Dittrich and Gessner 2014, Fig. 21. 9, 10, 14, 16, 20). However, finds from the actual test trenches still have to be analysed in detail.

Judging from the finds and their position it appears as if these sites corresponded to each other and were occupied almost contemporaneously. Altogether seven radiocarbon dates for the sites MOG102 and MOG105 partly confirm this

Fig. 26. Overview of site MOG105 at the watershed during test excavation, the large shallow depressions in the surface are clearly visible

assumption (Tab. 1). Five of them cluster conformely at the 2nd sigma calibration sequence between 5620 and 5380 calBC[20] despite that four different materials including terrestrial, aquatic and semi-aquatic species have been used as samples that were expected to date quite different events. Human activity is dated by an ostrich eggshell workpiece with a borehole which is further evidence for the lo-

[20] The long span is due to the overlap of the two adjacent wiggle spaces of 5650–5500 calBC and 5500–5300 calBC (cf. Dittrich 2015, Fig. 4), although four of the five dates strongly indicate an event that occurred shortly before 5500 calBC.

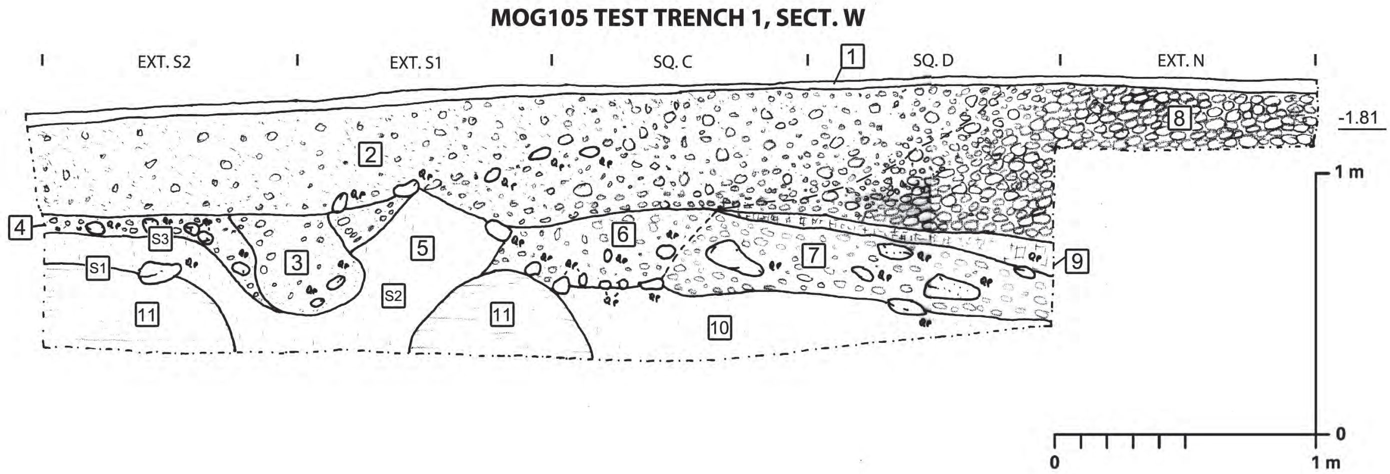

Fig. 27. MOG105, test trench 1, W section. The tightly packed sterile pebble deposits (8, 7) are disturbed and reworked towards the centre of the depression, filled with laminated silts (11) and fine whitish sediments (2–6) which contained numerous finds and indicators for the alternation of humid and dry episodes (S1-S3: soil samples; drawing : M. Ehlert)

cal manufacture of beads (Tab. 1: MOG102-26-2). The diversity of the gastropod fauna present at all of the dated sites indicates conditions varying from grasslands to seasonal swamps between 7120 and 5380 calBC. The study of soil micromorphology produced evidence for intense earthworm activity, which is characteristic for humic topsoils as well as evidence for the alteration between wet and dry conditions (Dittrich *et al.* 2015: 135). Such soils would surely have supported the growth of savannah grasses, but also of any cultivated plant, although no evidence for them exists so far. All of the sites found at the watershed plains provided sound evidence for grinding activities as well as indirect evidence for the watering of hoofed animals, namely by traces of trampling seen in the high degree of fragmentation of pottery finds. Whether the two bones of domestic sheep or goat from site MOG086 were deposited during the human occupational event multiple dated at 5500 calBC, which would seem likely in the view of the recently revised evidence for domestic caprines from Egypt (Linseele *et al.* 2014, Linseele in prep.), can only be decided upon the results of more extensive excavation work. Apart from this, the major evidence comes from aquatic and semi-aquatic species as one would expect it to be the case for an island. As it can be observed today, fish is a common option while the number of herded animals is generally low and confined to the household level. In summary, the sites following the watershed scheme mark a mid-Holocene transitional corridor, which ‑ depending on its water storing capacities ‑ was probably visited only seasonally, but immediately lost its attractiveness when rainfalls started to cease.

4. Conclusions: settlement and land-use patterns – preliminary observations

If we sum up the preliminary results for the late prehistory of Mograt Island there are at least five different landuse patterns:

(1) plateau occupation at the southern palaeoisland (Upper/Late Palaeolithic, early to mid-Holocene)
(2) upper Nile terrace and shoreline occupation along ephemeral lagoonal lakes (early Holocene)
(3) upper and middle Nile terrace occupation in proximity to early Holocene alluvium (mid-Holocene)
(4) inland occupation near the watershed around shallow pools of periodically stored rain water (mid-Holocene)

(5) lower Nile terrace and granite massif occupation overlooking alluvial plains, mainly indicated by grinding activities and the presence of rock art (late Holocene)

Schemes 1 and 2 are clearly connected to higher Nile levels dividing Mograt into two palaeoislands and turning ephemeral basins into lagoonal lakes. Such lakes have to be assumed for all of the elongated incisions along the early Holocene shoreline at western and central Mograt as well as at the opposite right Nile bank (Fig. 5). These incisions are identical to the passages of major wadis coming from inland. This situation differed from the tectonics of eastern Mograt favouring plateau occupation. While additionally at this part of Mograt numerous small islands emerged at the southern end of each of the palaeoislands (Fig. 5), the islands presently flanking western and central Mograt do not seem to have existed.

Mid-Holocene sites are either located at the upper and middle Nile terraces (3), still indicating a much wider alluvial plain than today, or around the rain-fed reservoirs that have to be assumed for the island's crest far from the river banks (4). Both locations would have benefitted from the presence of arable alluvial soils as a leftover of the early Holocene lakes, swamps and ponds. Only late Holocene and Kerma period sites which are often connected to granite outcrops at the lower Nile terraces (5) seem to refer to a narrowed alluvial plain indicating the stabilisation of annual Nile floods at a lower level. However, this rough pattern still has to be rendered more precisely through future studies. Also a number of questions are still open as for instance nothing can be said so far about the spatial relation to burial sites of each period.

Acknowledgements

I am indebted to the director of the Mograt Island Archaeological Mission Prof. Dr. Claudia Näser for initiating the Late Prehistoric Survey as well as for her kind permission to study the finds of the H.U.N.E. 2006 and 2008 missions. Furthermore I would like to thank my colleagues Kerstin Gessner, Maciej Ehlert, Sayantani Neogi, Hassan Mustafa Alkhidir and Nadine Nolde for their collaboration as well as our logistic partners in Sudan. The 2014 and 2014/15 field seasons as well as post-excavation work have been generously funded through the Qatar Sudan-Archaeological Project and specific analyses have been made possible in close cooperation with NCAM Khartoum.

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Desert and the Nile.
Prehistory of the Nile Basin and the Sahara.
Papers in honour of Fred Wendorf
Studies in African Archaeology 15
Poznań Archaeological Museum 2018

Elena A.A. Garcea and Giulia D'Ercole

What Do We See When We See a Decoration? An Overview on the Pottery from Sai Island and Esh Shaheinab

> "I have been fortunate to live an interesting life, go to strange places, do interesting work, and learn about the past." (Wendorf 2008: 339)

Dedication

Fred Wendorf was severely wounded to his arm in Italy, our country, during World War II in a fight against the Nazi regime and the fascist oppression. We take the opportunity of this book in his honour to express our everlasting gratitude to all young people like him, who fought to liberate our country from dictatorships. The first author of this paper met him the first time in 1988, at the Dymaczewo Conference, one of the numerous that she attended in the following years. She always keeps a vivid memory of Fred's remarkable stories and admirable actions on the battlefields in Italy. The second author of this paper regrets she never had the honour to meet him, but still had the privilege to take part in a Poznań conference in 2011 and appreciate the magic atmosphere of these meetings.

Introduction

This paper presents an overview on the ceramic productions of prehistoric (Khartoum Variant, Abkan, and Pre-Kerma), Pharaonic, and ethnographic assemblages from Sai Island, in northern Sudan, dating from the eighth millennium BC until the present, and prehistoric (Early Khartoum, Neolithic, and Late Neolithic) assemblages from Esh Shaheinab, 50 km north of Omdurman, in central Sudan (Fig. 1, left). The paper discusses the first criteria used to classify Nubian and Sudanese pottery, which were mostly based on visual observations of surface decorations, and extends its analysis to broader considerations of the entire *chaînes opératoires* by comparing five temporally different productions (Mesolithic, Neolithic, Late Neolithic, Pharaonic, and ethnographic) from two culturally and geographically distinct areas, northern Sudan and central Sudan.

In agreement that pottery manufactures are indicative markers of cultural identities (e.g., Rice 1996; Gosselain 2000; Roux 2013), Sudanese ceramics have provided effective means to observe the evolution with continuities and discontinuities in pottery making traditions and to discern distinct cultural orbits and their social networks and boundaries (e.g., Caneva and Marks 1990; Welsby 1997; Garcea 1998; 2006a; 2006b; Gatto 2002a; 2006; Keding 2006; Lange and Nordström 2006; Garcea and Hildebrand 2009; Jesse 2010; Winchell 2013; D'Ercole *et al.* 2015; 2017a).

Pottery making in Sudan was initiated by hunting-fishing-gathering groups with a precocious production, although not the earliest on the African continent (see below). The earliest dates of Sudanese pottery have been recently obtained from an excavation in the Amara West district, just north of Sai Island, and are from about 8600 BC (Garcea *et al.* 2016). This age is almost contemporary to the earliest dates of pottery found at Sorourab 2 in central Sudan, which average around 8700 BC (Hakem and Khabir 1989). This pottery is slightly younger than the oldest African ceramics, which notably have been dated from the end of the tenth millennium BC at Ounjougou, in Mali (Huysecom *et al.* 2009), from the early ninth millennium BC at Adrar Bous and Tagalagal, in the Nigerien Sahara (Roset 1982; 1987), and from the late tenth/early ninth millennium BC at Bir Kiseiba, in the Egyptian Western Desert (Connor 1984).

Due to a lower energy of the water flow in the middle Nile River, small islands formed between the cataracts of the river, one of them being Sai Island, which lies in a gold-rich area between the Second and the Third Cataract (Fig. 1, left). This island had a central strategic role from early prehistory until Ottoman times, thanks to its protected position, and was constantly related to Lower Nubia in Egypt and the Levant to the north, the Sahara to the west, and East Africa to the south-east (Geus 1998; 2004; Budka 2011; 2015; Garcea 2012).

Macroscopic, stylistic and archaeometric analyses of the ceramic assemblages from Sai Island were undertaken on both prehistoric (Garcea and Hildebrand 2009; D'Ercole 2015; D'Ercole *et al.* 2017a; 2017b) and New Kingdom productions (Budka 2011; 2014; 2015; D'Ercole *et al.* 2017a). For comparison, additional analysis was made on modern ceramics from a currently active pottery workshop in the nearby village of Abri (D'Ercole *et al.* 2017b).

Fig. 1. Map of the Nile Valley with Sai Island, Esh Shaheinab and the other sites mentioned in the text (modified after D'Ercole *et al.* 2017b, Fig. 1)

In central Sudan, the pottery sample comes from Esh Shaheinab (Fig. 1, left), which is the well-known site excavated by Arkell (1953) in the 1950s and re-excavated by Haaland (1982) in the late 1970s. This site gave the name to the 'Shaheinab Neolithic', although the excavations also yielded Early Khartoum and Late Neolithic occupations and provided considerable quantities of pottery, which EAAG restudied at the National Museum in Khartoum in 2001. While petrographic, mineralogical, and chemical analyses of the ceramic assemblage from this site are still under way, the available data regard macroscopic observations on pastes, vessel shapes, surface treatments, and decorations (Garcea 2006a; 2006b). Additionally, functional data from absorbed organic residues, in particular lipids, in the vessels, using chemical and isotopic techniques on a sample from both Sai Island and Shaheinab are currently in progress.

1. What do we see when we see a decoration?

Saharan and Sudanese decorated pottery drew the attention of scholars of all times to such an extent that decorations have been among the priority objectives in typological classifications especially concerning prehistoric pottery, which usually occurs in fragmented sherds and, therefore, vessel shapes or rim diameters can be rarely detected. Several past studies elaborated typologies of decorative styles, motifs, or design structures from both the Sahara (e.g., Camps Fabrer 1966; Bailloud 1969) and the Sudan (e.g., Nordström 1972; Hays 1976; Mohammed Ali 1982; Chłodnicki 1984).

The first development of these traditional typologies of the 1960s and 1970s evolved into a hierarchical system of classification of decorated pottery, starting from decorative techniques (rocker impressions, alternatively pivoting stamp, simple impression, incision) and proceeding to higher levels that consider decorative implements, and then, progressively, elements, motifs, and structures (Caneva 1983; 1988; 1995; Caneva and Marks 1990; Caneva *et al.* 1993). This system resulted to be open and flexible (Garcea 1998; 2005, see also Gatto 2002b) and could be successfully applied to other contexts than the Sudanese one, namely the Libyan Sahara (Caneva 1987; Garcea and Sebastiani 1998; Garcea 2001a), the Nigerien Sahara (Garcea 2008; 2013), and the Atlantic Sahara (Commelin *et al.* 1992).

A further methodological elaboration implied that the hierarchical system of classification of decorations was to be conceived as a component of the steps undertaken in the entire production sequences, where decorations are an integral part of the finishing process within the *chaîne opératoire* and all the other manufacturing steps are equally important and functional to detect and define social identities, regional boundaries, and cultural processes (Garcea 2001b).

The pottery productions that we studied from Sai Island cover a very long chronological framework, spanning from about 7600 BC to the present and including the foraging culture associated with the Khartoum Variant period (7600-4800 BC), the earliest pastoral culture, locally called Abkan (5500-3700 BC), the emerging complex societies of the Pre-Kerma period (3600-2500 BC), the 18th Egyptian New Kingdom (1539-1077 BC), and a presently active workshop in the village of Abri, just north-east of Sai Island (Fig. 1, right.). The studies of these ceramic assemblages included observations on fabrics, surface treatments, and decorations by mineralogical (X-ray powder diffraction analysis: XRPD), petrographic (SEM observations, and thin sections with a polarized light microscope: OM), and chemical analyses (trace elements by X-ray fluorescence: XRF, and Instrumental Neutron Activation Analysis: INAA) (Garcea and Hildebrand 2009; Garcea 2012; D'Ercole 2015; D'Ercole *et al.* 2015; 2017a; 2017b).

The site of Esh Shaheinab is mostly known for its Neolithic evidence, which has been dated between about 4580-4460 BC and 4500-4380 BC (Haaland 1982; 1987). However, Early Khartoum pottery was also recovered in undisturbed layers below the Neolithic occupation, as well as in some mixed surface material. Furthermore, some Late Neolithic pottery was also found at the site (Arkell 1953; Garcea 2006a; 2006b).

In addition to macroscopic examinations, petrographic, mineralogical, chemical, and functional (organic residues) analyses have been able to: (a) provide a diachronically extensive perspective on the very long tradition of pottery production in Nubia, (b) cross-check and validate or discard the results from single analyses, (c) delineate cultural and technological processes, and (d) demarcate social identities and regional boundaries, in northern and central Sudan.

2. Khartoum Variant and Early Khartoum pottery

The earliest pottery at Sai Island is associated with the Khartoum Variant cultural complex (Shiner 1968b) for its presumed similarities with the Khartoum 'Mesolithic', although it later appeared to have more affinities with the Nabta-Kiseiba area, in the Egyptian Western Desert, than the Khartoum province (Gatto 2002b; Jesse 2002; Garcea and Hildebrand 2009).

One of the Khartoum Variant sites on the eastern side of Sai Island, 8-B-10C, was extensively excavated beneath gravel bars lying on the early Holocene fluvial terrace (Fig. 1, right). The excavation covered an area of 105 m^2 and revealed two upper levels with a complex settlement organisation, indicating a substantially permanent occupation. Level 1 yielded hut floors, post holes, rubbish pits and hearths and was dated between about 5050 and 4800 BC. Level 2 revealed another architectural complex with post holes, suggesting an earlier phase of occupation with a similar hut system and a permanent use of the site, dating between 7600 and 7200 BC (Garcea *et al.* 2016).

The spatial distribution of the artefacts from Level 1 was plotted in relation with the architectural features of this level and the pottery appeared to be concentrated outside the hut floors, on the eastern side of the excavated site, in different places than the lithic débitage and tools, which are more frequent between the huts (Garcea 2012).

The pottery from this site was coarse-grained with poorly sorted inclusions and locally made with residual clay sediments originated from weathered metamorphic rocks of the still outcropping Precambrian Basement Complex (Table 1, Fig. 2: a). Tempering materials mainly comprised quartz, K-feldspar, and biotite mica (Fabric QKfs) (Table 1, Fig. 3: a). Chemical analyses indicated an assemblage rich in Potassium oxide (K_2O), rubidium (Rb), and yttrium (Y), which appeared to be clearly distinct from the later assemblages. The high frequencies of K_2O and Rb, in particular, are related to the importance of K-feldspar (D'Ercole *et al.* 2017b). Furthermore, Instrumental Neutron Activation Analysis (INAA) showed a progressive increase of elements, such as Scandium (Sc), Chromium (Cr), and Iron (Fe), which are related to the heavy minerals included as detrital components of Nile alluvia and were less frequent in the Khartoum Variant productions also due to the presence of large grains of quartz and feldspar from residual clay sediments in these ceramics (D'Ercole *et al.* 2017a).

Surface decorations are frequent and are made with the rocker technique, producing typical dotted wavy line motifs and packed zigzags while firing techniques are very basic, consisting simply in the use of bonfires or pit fires (Garcea 2012; D'Ercole 2015) (Table 2, Fig. 4: a-d). In spite of the great attention paid to decorations of the Khartoum Variant pottery, raw materials derived from opportunistic collections of clayey sediments, resulting in poorly sorted grain sizes in the pastes with no intentional addition of tempering materials, except for sand, which was naturally present in the residual clay deposits.

Table 1. Comparative outline of the techniques of raw material procurement and preparation in the different periods at Sai Island

Period	**Site**	**Raw material procurement**	**Preparation**
Khartoum Variant (7600-4800 BC)	8-B-10C	Mainly Fabric QKfs: residual clay (Precambrian Basement Complex suite) K-feldspar, metamorphic rocks, coarse Qtz rich-specimens + biotite and Fabric Q: Qtz-rich--specimens	No intentionally added tempers
Abkan (5500-3700 BC)	8-B-76	Mainly Fabric QPl: secondary, alluvial sediment (Nile clay) Plagioclase, fine Qtz-rich-specimens + volcanic rocks, heavy minerals and micritic calcite aggregates	Organic tempers (charcoal, wood ash)
Pre-Kerma (3600-2500 BC)	8-B-52A 8-B-10A		Organic tempers (herbivore dung and vegetal fibres)
New Kingdom (1539-1077 BC)	SAV 1		Organic tempers (herbivore dung and vegetal fibres: chaff, grains, glumes, seeds)
Modern	Abri workshop		Organic tempers (herbivore dung)

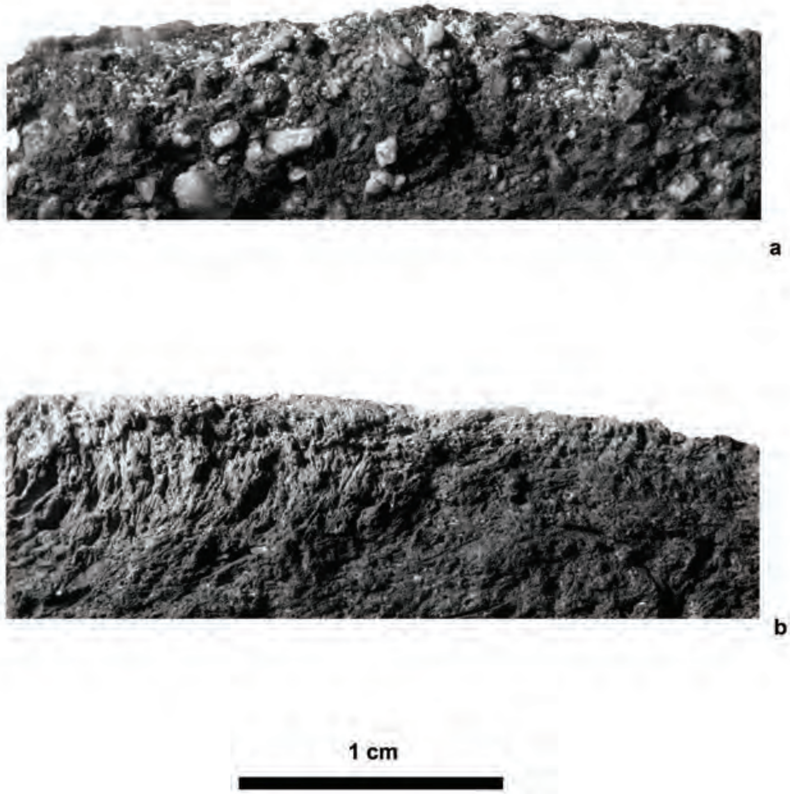

Fig.2. Sherd sections. a: Coarse-grained Khartoum Variant sherd with abundant angular inclusions of quartz and K-feldspar; b: Pre-Kerma sherd tempered with abundant organic material (Photos: R. Ceccacci)

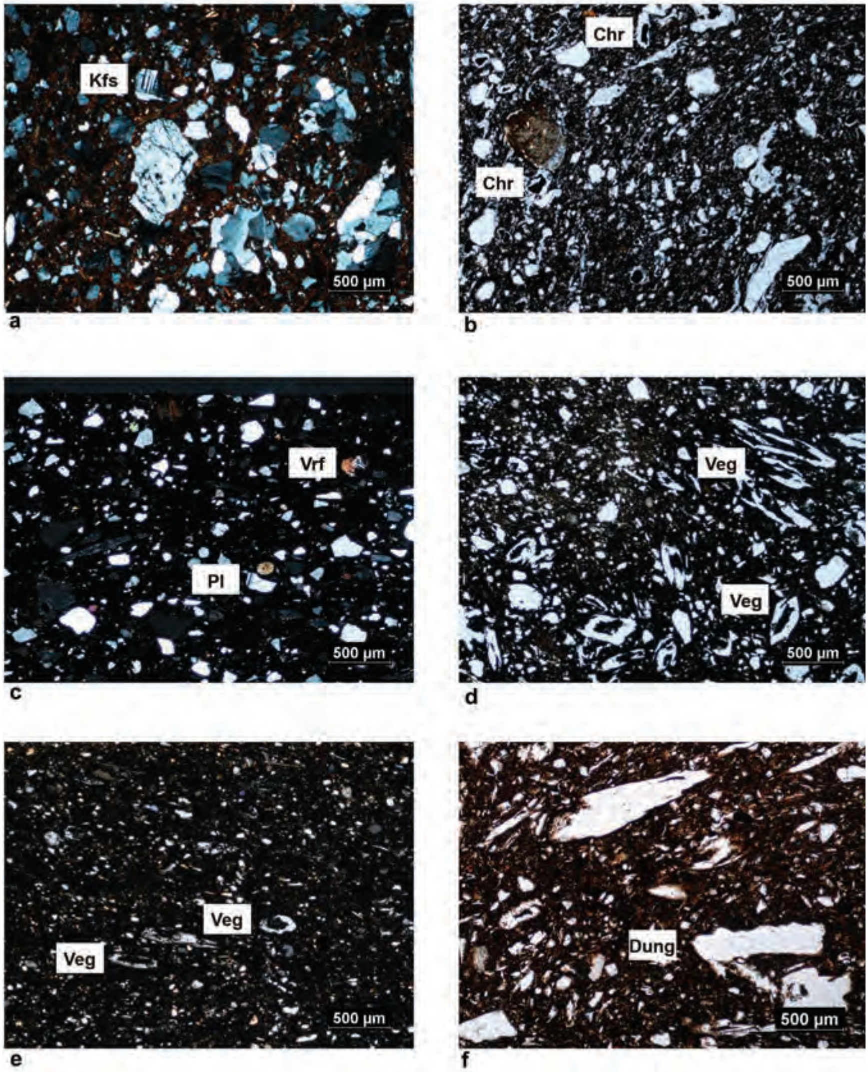

Fig. 3. Microphotographs of thin sections. a: Khartoum Variant pottery rich in K-feldspar (Kfs), quartz and biotite mica; b: Abkan pottery tempered with small charcoal particles (Chr); c: Pre-Kerma pottery from Site 8-B-10A with abundant quartz, plagioclase (Pl) and volcanic rock fragments (Vrf); d: Pre-Kerma pottery from Site 8-B-52A tempered with abundant organic plant remains (Veg); e: New Kingdom 'Nubian style' pottery with very fine quartz inclusions and organic plant remains (Veg); f: Modern pottery from Abri tempered with herbivore dung that was totally burnt. Photos a and c are in cross-polarised light; photos b, d-f are in plane-polarised light (Photos: G. Eramo and G. D'Ercole)

Table 2. Comparative outline of the techniques of production, finishing, and use in the different periods at Sai Island

Period	**Site**	**Production**	**Finishing**	**Use**
Khartoum Variant (7600-4800 BC)	8-B-10C	Coiling technique; open bowls and jars; wall thicknesses from 6 to 10 mm; plain or smoothened surfaces; rocker stamping (zigzags and DWL); milled and notched rims	Bonfire in oxidizing atmosphere	Food preparation, storage
Abkan (5500-3700 BC)	8-B-76	Coiling technique; globular bowls and straight walled jars; wall thicknesses from 3 to 8 mm; smoothened, rare burnished surfaces; undecorated, black-topped vessels; milled and notched rims	Bonfire in short oxidizing atmosphere	Food preparation, consumption, transport
Pre-Kerma (3600-2500 BC)	8-B-52A	Coiling technique; large storage saucer-shaped and ovoid jars, open bowls; wall thicknesses from 4 to > 10 mm; burnished and polished surfaces; rocker and alternately pivoting stamping		Storage
	8-B-10A	Coiling technique; bowls, open vessels; wall thicknesses from 4 to 8 mm; burnished and polished surfaces; impressed and incised decorations		

Period	Site	Production	Finishing	Use
New Kingdom (c. 1539-1077 BC)	SAV 1	Coiling technique; large storage jars, cooking pots, cups and beakers; burnished and polished surfaces; geometric and rocker-stamped decorations, mat/basket impressions	Bonfire	Storage, food preparation, consumption
Modern	Abri workshop	Slow wheel and coiling technique; storage jars, plates, bowls, incense burners; undecorated, incised wavy line decorations	Kiln and bonfire	Storage of water, food preparation, ritual and ornamental function

Khartoum Variant pottery is spread over a wide area, extending north to Nabta and Kiseiba, Wadi el Akhdar, Great Sand Sea, Abu Tartur, Abu Ballas, and Dakhla Oasis, and south to El Barga near Kerma (Garcea and Hildebrand 2009). At this time, human groups were mainly semi-sedentary, but their influence expanded over a culturally uniform area, although they did not probably compete for external resources and therefore did not need to establish strong social relations with other groups in the central and upper Nile Valley, or the Western Desert. The uniform culture shared a rather conservative system of generalised features in common, that was based on practically permanent exploitation of water and food resources. It suggested that large cultural units were related within a social loose network and successfully persisted over the onset of the harsher climatic conditions that occurred towards the middle Holocene, in association with the dry and cold 8.2 BP (ca. 6300 BC) event.

Preliminary isotopic data on organic residues showed that the samples from the Khartoum Variant site 8-B-10C appeared to be used to contain carcass fats of both wild ruminant and non-ruminant animals (Dunne personal information).

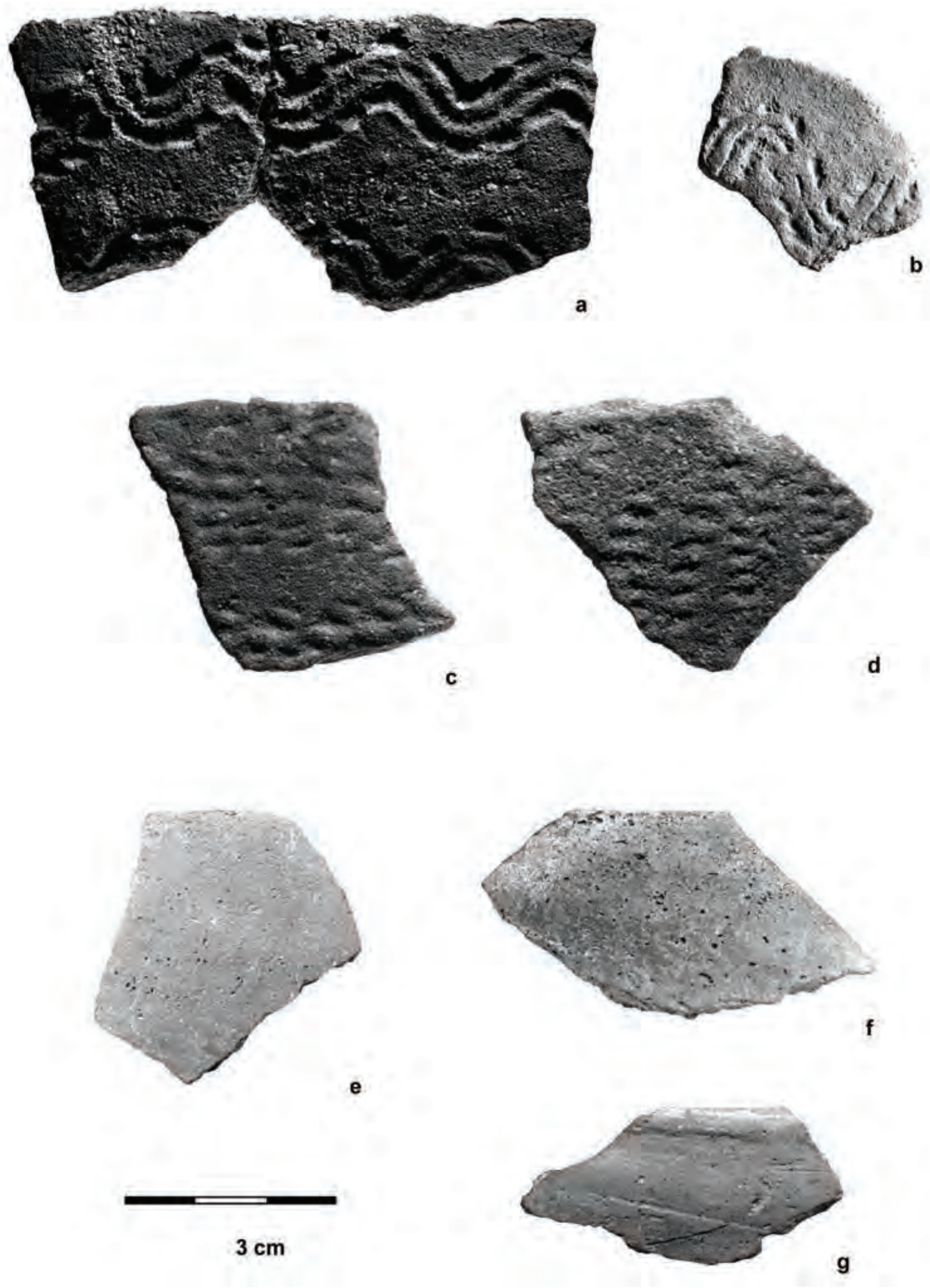

Fig. 4. Potsherds from Sai Island. a-d: Khartoum Variant; e-g: Abkan (Photos: R. Ceccacci)

Moving south, to central Sudan, the Early Khartoum pottery from Shaheinab clearly resembles the ceramics from the site of Khartoum Hospital, the other well-known site excavated by Arkell (1949). This pottery was mostly medium-grained and contained frequent mineral inclusions (Table 3). The vessels were very thick, with a mode of 10 mm, and their surface decorations were technically similar to the Khartoum Variant ones, being made with the impression technique to make packed zigzags and dotted wavy lines (Fig. 5, Garcea 2006a; 2006b). At Shaheinab, decorations always covered the entire surface, which was not the case of the Khartoum Variant assemblage, and the motifs and decorative structures were different, particularly in the shape and composition of the dotted wavy lines.

Fig. 5. Early Khartoum potsherds from Esh-Shaheinab (Photo: R. Ceccacci)

Table 3. Comparative outline of the macroscopic technological features in the different periods at Esh Shaheinab

Period	**Raw material procurement**	**Preparation**	**Production**
Early Khartoum	Predominantly medium-grained clay texture	Tempering with occasional flat fibres	Coiling technique; wall thickness around 10 mm; rocker stamping (zigzags and DWL)
Neolithic (4600-4400 BC)	Predominantly fine clay texture	Tempering with common tubular fibres (dung)	Coiling technique; wall thickness around 5 mm; rocker (packed vees and dots), APS (paired lines and DWL) and simple stamping, incision
Late Neolithic	Exclusively fine clay texture	Tempering with frequent tubular fibres (dung)	Coiling technique; wall thickness around 5 mm; rocker (zigzags), APS (paired lines) and simple stamping, incision; undecorated

3. Abkan and Khartoum Neolithic pottery

The Abkan period derives its name from the type-site near Abka in the Second Cataract of the Nile (Shiner 1968a). With regard to the subsistence economy, this period is distinguished from the Khartoum Variant for the initial practise of animal husbandry.

Site 8-B-76 at Sai Island was selected for excavation. It is located on a southwest slope towards a currently inactive floodplain occupied by a modern village (Fig. 1, right). A 27 meter transect was laid out along the slope and consistent horizontal and vertical stratigraphies could be observed and were supported by a differentiated ceramic distribution. The ceramics on the surface showed that Khartoum Variant sherds predominated in the higher part of the slope, whereas Abkan sherds occurred at lower elevations, toward the current course of the Nile. Such a lateral shift of the archaeological deposit suggested that the older settlement lied inland with respect to the present Nile, whereas the Abkan occupation followed the accretion of the island. The trench confirmed that the north-easternmost units uniquely contained Khartoum Variant ceramics, the south-westernmost unit exclusively included Abkan ceramics, while the central portion of the stratigraphic profile yielded a sequence of Khartoum Variant levels below Abkan ones. The Abkan complex was dated between around 5500 and 3700 BC (Garcea *et al.* 2016).

Mineralogical and petrographic analyses showed that the Abkan pottery was quite different from the Khartoum Variant one. Pastes were porous and brittle and included small mineral and organic tempers, particularly small particles of charcoal and wood ashes (D'Ercole *et al.* 2015) (Table 1, Fig. 3: b). Quartz prevailed in the pastes, whereas K-feldspar and mica were rare. The chemical composition indicated a prevalence of CaO, like in the following Pre-Kerma assemblage, suggesting a higher content of plagioclase (Table 1). Also rubidium (Rb) had lower values than in the Khartoum Variant. The shift in the use of raw materials that could be observed from the Abkan productions onwards indicated that sediments of Holocene alluvial origin were preferred instead of residual clay sediments (D'Ercole *et al.* 2017b). Differences also occurred in the sizes of the pots, which were lighter and with thinner walls (Table 2). Unlike in the Khartoum Variant period, surfaces were burnished; they were occasionally black topped, undecorated, except for a few sherds with oblique incised lines on the lip, and sometimes rippled. Vessels were fired in bonfires in short oxidizing atmosphere (Table 2, Fig. 4: e-g, Garcea 2012; D'Ercole 2015; D'Ercole *et al.* 2015).

Comparable Abkan pottery appeared in a more restricted area with respect to the extent of the previous Khartoum Variant sites (Garcea and Hildebrand 2009). With the onset of a nomadic pastoral economy, different local regional identities developed in various parts of Nubia and Sudan. Even though hunting, fishing and gathering were still practised, and even though the shift toward food production was slow and uneven, the radical cultural changes between the Khartoum Variant and the Abkan horizons occurred with a drastic social and economic shift, where animal husbandry appeared as an efficient mean to further defer the previously adopted foraging strategies of delayed-return resources. As social complexity started to grow, social networks became stronger and social units became geographically smaller. At Sai Island, the Abkan had insignificant affiliations with the southern Shaheinab traditions and even lesser with the Saharan early pastoral cultures and the areas in the Egyptian Nile valley.

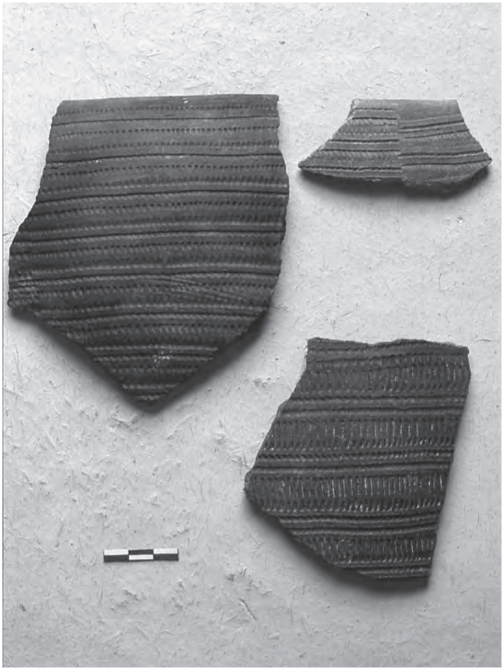
Fig. 6. Neolithic potsherds from Esh-Shaheinab (Photo: R. Ceccacci)

The Neolithic occupation at Shaheinab was later than at Sai Island, being dated between about 4580-4460 BC and 4500-4380 BC (Haaland 1987). The corresponding pottery production exhibited fine-grained textures with vegetal, probably dung, tempering material, some burnished surfaces, and, unlike the Abkan pottery, a wide range of decorations, including impressed decorations made by alternately pivoting and rocker stamping (Table 3). However, the latter employed different implements compared to the previous period, which had unevenly serrated edges, producing bands of vees and dots (Fig. 6, Garcea 2006a; 2006b).

Preliminary isotopic data on organic residues from some Neolithic samples from Shaheinab provided chromatograms with high C16 and C18 fatty acids, which are typical of a degraded animal fat profile (Dunne *et al.* 2012). They also showed the use of both ruminant and non-ruminant fats (Dunne personal communication).

The time of these developments corresponds to the 'marginalization phase' by Kuper and Kröpelin (2006), which features the formation of regionally diverse and specialised cultural enclaves. At the same time, early pastoralism was able to stimulate a system of long-distance trade and exchange among different cultural groups, supporting the introduction and spread of domestic animals and plants imported from the Near East (Garcea 2016).

4. Pre-Kerma and Late Neolithic pottery

In the subsequent period, the Pre-Kerma culture was defined at Kerma when an earlier settlement was found below a cemetery of the Kerma period (Bonnet 1988). The Pre-Kerma period paved the way to the rising Kerma kingdom (c. 2500 BC) and maintained relations with the already established Egyptian kingdom

(Bonnet 1991). On Sai Island, Sites 8-B-10A and 8-B-52A (Fig. 1, right), a habitation and a granary complex, respectively, best represent the Pre-Kerma period, which spans between about 3600 and 2500 BC and anticipates the emergence of the Kerma kingdom (Hildebrand and Schilling 2016).

The habitation site at 8-B-10A revealed a thick deposit of 1.5 metres and the granary complex confirmed an intensive use of the island during this period, as its more than 130 storage pits suggested (Garcea and Hildebrand 2009; Hildebrand and Schilling 2016). They contained both wild and domestic plant seeds, including barley and emmer wheat, which indicated the practise of a mixed, agro-pastoral economy. The barley was directly dated to around 2700 BC (Geus 1998), corresponding to the Late Pre-Kerma period. These plants were imported from the Near East, most likely by trading with A-Group populations settled in Lower Nubia, as the presence of A-Group pottery in some of the granary pits indicated (Hildebrand 2006-2007; Garcea and Hildebrand 2009).

From a petrographic, mineralogical, and chemical point of view, the Pre-Kerma pottery is comparable to the Abkan productions, being made with a secondary clay of alluvial origin, but including higher quantities of organic tempers, consisting of both dung and plant fibres (Table 1, Figs. 2: b and 3: d, D'Ercole 2015; D'Ercole *et al.* 2015; 2017b). As mentioned earlier, Instrumental Neutron Activation Analysis (INAA) showed high values of higher transitional oxides in this pottery, such as Scandium (Sc), Chromium (Cr), and Iron (Fe), which are related to the heavy minerals included as detrital components of Nile alluvia (Fig. 3: c, D'Ercole *et al.* 2017a). Red coated, black topped, and ripple wares are common and impressed geometric motifs are new types of decorations, which are typical of this period, in addition to rocker and alternatively stamped decorations. As in the Abkan, vessels were fired in bonfires at short oxidizing atmosphere (Table 2, Fig. 7: a-d).

Pre-Kerma pottery extended north to the Second Cataract, where it overlapped with the A-Group complex. It also appeared to the south beyond the Fourth Cataract (Garcea and Hildebrand 2009). During the Pre-Kerma period, small adjacent groups, but with distinct cultural identities, developed more intense interactions and emerging elites controlled long distance trade of exotic goods. They operated within large, tightly interwoven networks with precise social and economic roles along the Nile valley. Sai Island, being located on the frontier of the A-Group and the Pre-Kerma cultural spheres, was in a strategic position and established relations with both areas and beyond, that is, the spheres of the Egyptian kingdom to the north, and the Kerma kingdom to the south. It may also be possible that a fur-

Fig. 7. Potsherds from Sai Island. a-d: Pre-Kerma; e-f: New Kingdom, 18th Dynasty, 'Nubian style' (Photos: R. Ceccacci)

ther push of A-Group peoples at the beginning of the 3rd millennium BC could have been triggered by Egyptian military campaigns in Lower Nubia (Garcea in press).

The Late Neolithic pottery from Shaheinab is technologically comparable to the local Neolithic production with fine-grained textures and the use of dung as tempering material (Table 3). Surface treatments are different, though, showing frequent burnished surfaces, and different and more standardised decorations than in the Neolithic (Fig. 8, Garcea 2006a).

Fig. 8. Late Neolithic potsherds from Esh-Shaheinab (Photo: R. Ceccacci)

5. New Kingdom pottery

At the beginning of the Egyptian New Kingdom, with the rise of the 18th Dynasty around 1550 BC, military troops advanced southwards into Upper Nubia, in northern Sudan. While Sai Island previously was the northern outpost of the kingdom of Kush, Egypt's rival, it was soon conquered by the Egyptian forces. By the mid-18th Dynasty, around 1450 BC, the island became one of the most important Egyptian centres in Upper Nubia and the place of foundation of a fortified town, built on the north-eastern bank of the island (Fig. 1, right, Budka 2014; 2015).

At the time of the Egyptians' arrival, local pottery was still made according to the traditional Nubian and Kerma techniques of pottery hand-making which was derived from the previous productions (Tables 1 and 2) and was in contrast to the Egyptian ceramics that were wheel-made (Budka 2011; D'Ercole *et al.* 2017a). From a petrographic, mineralogical, and chemical point of view, the locally made New Kingdom pottery thrown on the wheel was manufactured with the same raw materials as the Pre-Kerma and Kerma productions and included herbivore dung and vegetal fibres as tempering material (Table 1, Fig. 3: e, D'Ercole *et al.* 2017a).

The most common vessel types from the Kerma tradition are cooking pots, large storage jars, and black-topped fine ware fired in bonfires. Surfaces were decorated with incised geometric motifs and rocker-stamped decorations, as in the previous periods, in addition to mat and basket impressions (Table 2, Fig. 7: e-f, Budka 2014).

6. Ethnographic pottery

The modern sample comes from a pottery workshop in the village of Abri, on the eastern coast of the Nile River, north-west of Sai Island (Fig. 1 right, D'Ercole *et al.* 2017b). The family of potters in the Abri workshop is of Egyptian origin and moved to Sudan in the 1910-1920s, where they practice this job since several generations (D'Ercole *et al.* 2017b).

As raw material, they use alluvial silty sediments that they collect on the Nile banks. These sediments are rich in plagioclase, resulting in high values of CaO, and quartz, originated from the sand naturally present in the sediments (Spataro *et al.* 2014). As tempering material, the Abri potters add herbivore dung, usually from donkeys to make large jars, and from small livestock for small pots (Table 1, Fig. 3: f). Mineral tempers are not intentionally added to the paste. Vessels are fired in either a kiln they have in the workshop, or in bonfires (Table 2, D'Ercole *et al.* 2017b).

The main productions are large jars for storing water, which are made on the slow wheel (Fig. 9). Smaller jars, bowls, and plates are also occasionally made with the coiling technique. Small jars and bowls are usually used for keeping milk and yogurt cheese, and for cooking and serving food. These potters also make flower pots and incense burners (D'Ercole *et al.* 2017b).

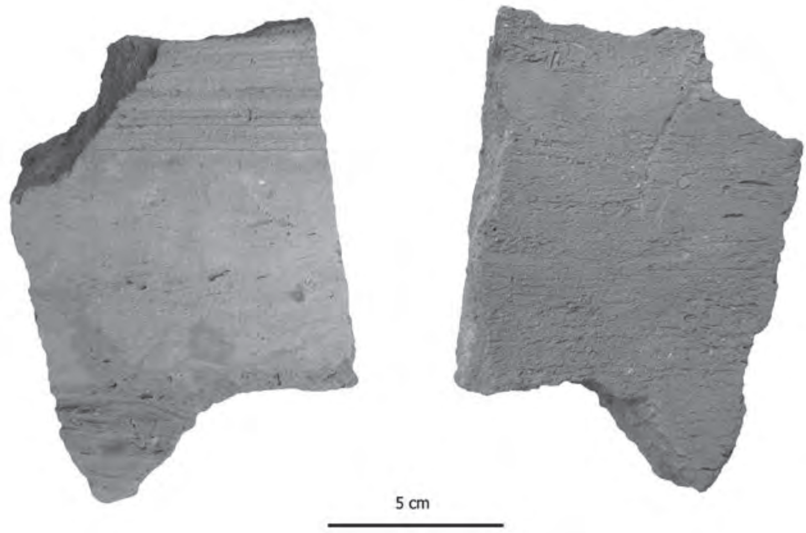

Fig. 9. Modern potsherd from the workshop in Abri (Photo: N. Trotti)

Altogether, the different types of vessels made in the Abri workshop are used to serve different functions in everyday life (water jars, cooking and serving bowls and plates), in ritual and ceremonial events (incense burners), as well as in funerary practices (small bowls) (Table 2). They are mostly for the local market in the village and the neighbouring areas, but they are occasionally carried to more distant places, including Khartoum.

Concluding remarks

Technological comparisons between temporally and geographically different ceramic assemblages from the Khartoum Variant and Early Khartoum productions until present ethnographic manufactures have allowed to describe and distinguish similarities and differences in manufacturing traditions over ten millennia in northern Sudan and central Sudan. The cultural and technological processes that emerged revealed distinct social identities and marked regional boundaries.

This case study confirms that the recognition of continuities and discontinuities are effective means to describe cultural practises and to identify social identities (*sensu* Roux 2008). Continuities seem to be a peculiarity of Nubian pottery, particularly beginning from the Abkan productions up to the Pre-Kerma and present time (D'Ercole *et al.* 2017a). By contrast, major discontinuities occurred at the shift from Khartoum Variant and Abkan manufacturing techniques in most stages of the *chaîne opératoire*. They can be summarised as follows:

1) *Raw material procurement*: Pleistocene residual clay with K-feldspar and metamorphic rocks *vs.* Holocene Nile alluvial clay with plagioclase, volcanic rocks, and heavy minerals;
2) *Preparation*: no intentional addition of tempering material *vs.* addition of organic tempers;
3) *Production*: large unburnished bowls and jars *vs.* diversified shapes, burnishing, and different decorative techniques and motifs.

A discontinuity in the manufacturing techniques from the Early Khartoum to the Neolithic productions could be also observed in the assemblages from Shaheinab, in central Sudan, alongside technical continuities from the Neolithic to the Late Neolithic productions.

These technological changes could be related to both macroeconomic and social changes, including a new food-producing economy, the contribution of livestock providing new tempering material, such as dung, and a greater social complexity. With the diversification of economic activities, ceramic containers were likely to serve more different functions in order to satisfy new internal and technological social adaptations. This required a progressive acquisition of new technological skills by potters, i.e., the ability to make containers with thinner walls and different surface treatments, and, apparently, a new taste on visual aspects of the walls, decorations and colour of the pots.

From the Abkan and Neolithic periods, pottery making was the result of consolidated manufacturing skills that did not need further radical technological changes in successive productions, but visual stylistic discontinuities increased both geographically and chronologically. Altogether, the resulting data have been able to provide new insights on the cultural dynamics and economic relations in the region from the eighth to the second millennium BC, and on the role of Sai Island with other social groups in Upper and Lower Nubia, as well as the Sahara.

They also offered new evidence on the spread and occasional overlapping of different cultural traditions.

Acknowledgments

Fieldwork at Sai Island was conducted thanks to an agreement between the Sudan's National Corporation for Antiquities and Museums (NCAM) and EAAG, who was entrusted of the Research Unit for the Later Prehistory within the Sai Island Archaeological Mission (SIAM) of the University of Charles de Gaulle-Lille 3 by Francis Geus in 2004. She is grateful to NCAM and its General Director, Abdelrahman Ali Mohamed, for their constant support and invaluable assistance, to the SIAM project director at the time of the excavations, Didier Devauchelle, and to its field directors, Florence Doyen and Julia Budka. The Pharaonic material presented in this paper is courtesy of Julia Budka (LMU Munich, Germany), whom we gratefully thank for sharing her data with us. The analyses of the Pharaonic material and Instrumental Neutron Activation Analysis of the assemblages from all periods, including both prehistoric and Pharaonic samples, were exclusively funded by her Budka's European Research Council Starting Grant no. 313668 "AcrossBorders". GDE was affiliated to the AcrossBorders project from 2013 to 2016.

EAAG is also grateful to Hassan Hussein Idris, former Director General of the National Corporation for Antiquities and Museums, for granting her access to the collections from Esh Shaheinab stored in the National Museum.

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Desert and the Nile.
Prehistory of the Nile Basin and the Sahara.
Papers in honour of Fred Wendorf
Studies in African Archaeology 15
Poznań Archaeological Museum 2018

Mohammed Alfatih Hayati

Technical Characteristics of the Mesolithic Pottery in El Goz Sites (Central Sudan)

Introduction

Pottery industry represents the greatest achievements of human in the Mesolithic. It emerged during the Late Paleolithic in Asia before 12700 years ago (Rice 1999: 14); and appeared in Europe during the eighth millennium BP, shortly before the agriculture (Elizabeth and Barry 1988: 216). Pottery has been associated with cultural changes and daily activities. Paleolithic man did not know pottery commonly which means that he did not rely on it. Pottery have spread on settlement sites during the Mesolithic (Elamin and Mohammed-Ali 2004: 103-104) and if we want to follow up pottery industry in the Sudan during that period, we find that all the sites which witnessed the emergence of this industry were located near streams or pools, whether on the banks of the Nile or the valleys. Sites with pottery appeared during the early Holocene rainfalls (Hoelzmann *et al.* 2001: 193) in the tenth millennium BP and this is a date of the beginning of the pottery industry in Sudan (Khabir 1987: 378).

1. El Goz Sites

The British diplomat H. Glencarin Balfour-Poul who worked as an employee in the period of English government was the first who mentioned the term (the Goz Culture). During his stay in Sudan he visited a number of regions in Central and Western Sudan and between the years 1945-1954 he was in the area of the Gezira, on the eastern and western banks of the Blue Nile (Balfour-Poul 1952). He used *Goz culture* term for mound shape sites that were found in that area.

In the framework of this study we will focus on the Mesolithic pottery from a number of sites, namely: Wad Shanaina, Shekaira Al-Wadi, Goz Abdul Salam, Goz Kabaro, Goz Al-Rehaid, and Wad Egaibish (Fig. 1). Through the pottery samples collected from these sites it became clear that there is a diversity of forms as well as similarities.

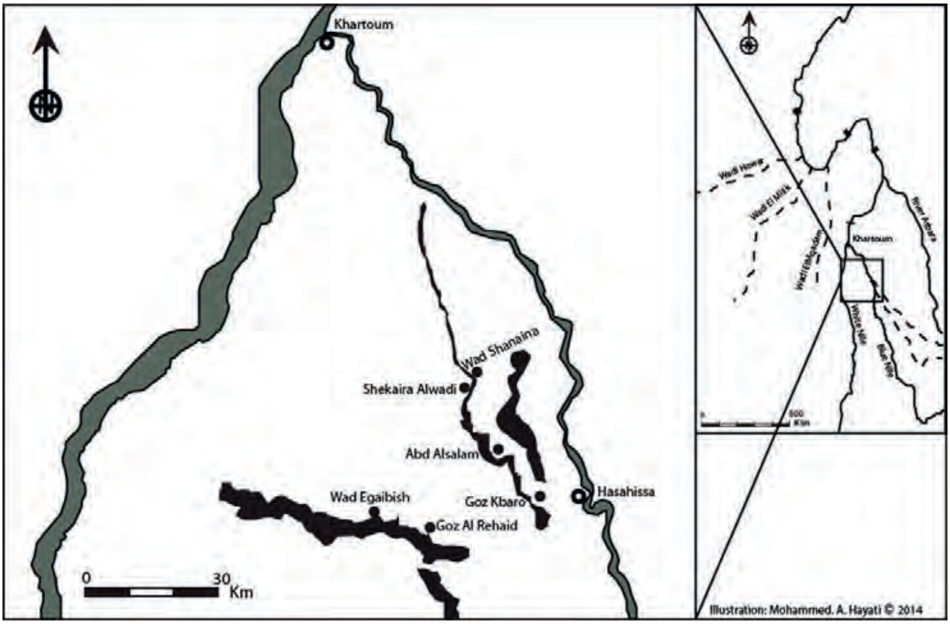

Fig. 1. Map showing the location of sites mentioned in the text

2. El Goz Pottery

Pottery paste

A paste is the important feature of the pottery. Obviously the environment and the nature of the soil are reflected in the pottery. The Gezira area is characterized by gray clay soil that tend to black. This soil is the basic component of the paste (El-Hassan and Mohammed Ali 2008: 12), however, there were some other organic and inorganic elements added to the mud to make it sticky and solid. Within organic materials we found animal dung, bones, crushed shells and plant seeds.

The inorganic admixtures contain crushed stones, mainly quartz, clearly visible on the surface of pottery. Quartz was crushed and grinded, and added to the mud in order to increase the hardness of the paste, to make vessel construction easier, to increase high temperature resistance and to prevent the absorption of liquids (Klein *et al.* 2004: 248). Sand was added to the paste rarely in the Mesolithic and addition of sand to the paste was one of the main characteristics of pottery industry during the Neolithic (Mohammed-Ali 1987: 128).

Vessel forming and surface treatment

As the Mesolithic pottery was hand-made, the traditional methods played a key role in the formation of the pot. Among the collection, we have never found a complete vessel or even a large sherd dated to the Mesolithic in El Goz sites, however the prints of hands produced during the manufacturing process are very clear on the surface of the pottery sherds.

During the study of pottery we observed that:

1. Pottery walls tend to be very thick ranging from 1.5 cm to 3.0 cm;
2. The surface was treated by hand or by rag. Polishing of pottery surface was usually made with hands;
3. Most of the samples were characterized by rough and non-polished surface;
4. There are some cases when the surface was painted with a layer of animal dung paste, perhaps to increase the cohesion;
5. Except of some wavy-line decorated vessels, no colorants have been used on the surface, and the colors that appeared on the pottery reflect the multiple processes of the firing.

Decoration

Pottery decoration is one of the issues that preoccupied the thought of the researchers due to its importance and position for the pot-maker as well as its usefulness in reading the technical memory of the manufacturer (chain operatoire). Decoration is one of the main variables in pottery and perhaps one of the first variables that attract the beholder before any other variable.

The Mesolithic pottery has been decorated with some type of tools such as combs, incising tools and other decorative ways (El-Hassan and Mohammed-Ali 2008: 22). Ancient man used various tools such as wood combs, catfish spines and shell combs (Arkell 1949: 81; El-Hassan and Mohammed-Ali 2008: 22).

There were few methods for the implementation of the decoration, including impressions on the surface of the pot by a stick, rod or finger print. In the second method incising was performed by placing the tool on the surface of the pot and it was towed to keep a shallow incising on the wall of the pot, varied in size and shape. The pressuring and incising are the oldest methods of decoration (El-Hassan and Mohammed-Ali 2008: 23). Other techniques of decoration include: (a) combing (passing the comb made of wood or catfish spine, on the surface of the pot before it becomes full dry); (b) carving and cutting with the help of a simple wooden tool (El-Hassan and Mohammed-Ali 2008: 24); (c) rocker technology. In this case relatively long, teeth-like comb tool was used, moved in a swing mode on the surface of the pot to produce continuous zigzag or dotted lines.

3. The main characteristics of Mesolithic pottery decoration

Wavy Line motifs

This type of decoration is present in various forms (Hayati 2011: 44-48) and this decorative pattern had been formed in different ways. Pottery decorated with *classic waves* are the most prevalent in the Central Nile (Mohammed-Ali and Khabir 2003: 38). *Angular wavy line* variety is rare, being reported from sporadic Mesolithic sites. Together with *mild waves*, it gives the impression of carelessly made work (Mohammed-Ali and Khabir 2003: 38), like the pattern of *wavy lines with arch-shaped motifs*

Fig. 2. Pottery with Wavy Line motifs from Wad Shanaina

(Fig. 2-3), occasionally non continuous, in addition to *serpentine waves*. This wavy line variety was occasionally coated with a bright red slip made with a type of red ochre (Fig. 4). Finally, we found composite motifs, where the comb was used for making more or less straight lines which meet other sets of wavy lines at an angle. However all these motifs are sporadic in most of the study sites.

Fig. 3. Pottery with Wavy Line motifs from Shekaira Al-Wadi

Fig. 4. Pottery with Wavy Line and Dotted Wavy line motifs from Goz Al-Rehaid

Dotted Wavy Line motifs

Dotted wavy lines resulted from the development of *wavy line* pattern. That type of decoration spread in the Central and Northern Sudan as well as in the valleys connected to the Nile such as Wadi Howar (Jesse 2003: 101-103). *Dotted wavy lines* had different patterns and shapes (Fig. 5-6), but they were similar in different regions of Central Sudan (Marks *et al.* 1968: 321; Haaland 1995: 161). Three types of motifs were distinguished (Mohammed-Ali and Khabir: 2003: 43)

Fig. 5. Pottery with Dotted Wavy Line motifs from Wad Shanaina

Fig. 6. Pottery with Dotted Wavy Line motifs

which spread in different areas in Central Sudan (Arkell 1949, Plate: 72; Caneva 1983. Fig. 15: 1-13; Mohammed-Ali 1991: 69. Fig, 3-5: d-f): (1) *deep dotted lines* with same spacing of waves. Examples come from the Mesolithic sites of Saggai (Caneva 1983, fig. 15: 1-13); (2) *shallow dotted waves*. This motif was found on Khartoum Hospital site (Arkell 1949, plate 72); (3) *dotted wavy lines with sharp angles*. It has been identified on a few sites from the Central Nile and the Sahara (Mohammed-Ali and Khabir: 2003: 45).

Zigzag Motifs

This type of decoration, chronologically late, was done by a rocker technique (Fernandez *et al*. 2003: 206). It appeared during the second phase of the Mesolithic and represents the stage of basic transition from the Mesolithic to the Neolithic. This type of decoration has two basic variants: *continuous zigzag lines* and *dotted zigzag lines*. Both motifs were spread in El Goz area (Fig. 7).

Fig. 7. Pottery with Zigzag and Dotted Wavy Line motifs from Goz

Conclusion

It seems that pottery of El Goz area carry the same features that characterized Mesolithic pottery of Central Sudan. It is clear that pottery production was impacted by local raw material as the paste contained local materials (clay, impurities, etc.) available in the area at that time.

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Desert and the Nile.
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Lenka Varadzinová, Ladislav Varadzin, Lenka Lisá, Jan Pacina and Petr Pokorný

Exploration of the Site of Sphinx (SBK.W-60), Jebel Sabaloka (West Bank): Findings of the 2014 Field Campaign

Introduction

In the autumn of 2014, the Czech interdisciplinary expedition directed by the Czech Institute of Egyptology (Faculty of Arts, Charles University in Prague) resumed its fieldwork at Jebel Sabaloka (West Bank) explored for remains of prehistoric occupation since 2011. The attention of the mission focused on the site of Sphinx (SBK.W-60), one of this region's most significant Early Khartoum/Mesolithic settlements located on a granite outcrop in an embayment in the northwestern slope of the *jebel* (Fig. 1A, B).[1]

[1] The field campaign lasted from 15th October till 4th November 2014. The research team consisted of: Aleš Bajer (geologist), Murtada Bushara (inspector), Kristýna Kuncová (student of archaeobotany), Lenka Lisá (geologist, micromorphologist), Jon-Paul McCool (geoarchaeologist), Jan Novák (archaeobotanist – wood, charcoal), Jan Pacina (surveyor, GIS specialist), Adéla Pokorná (archaeobotanist – macro-remains), Petr Pokorný (palaeoecologist, biologist), Lenka Suková (research director, archaeologist), Ladislav Varadzin (field director, archaeologist), and four students-trainees – Safaa Ahmed Mohamed and Reemah Abdelrahim Kabashi (National Corporation for Antiquities and Museums of the Sudan) and Hanaa Mohamed Hafiz and Huyam Mohamed Alamin from the University of Bahri in Khartoum. The drivers and the cook of the expedition were Osman Abdalla, Salih Mohamed Salih, and Mahmoud Almahi Altayeb of Tumbus Tourism Co. Ltd.

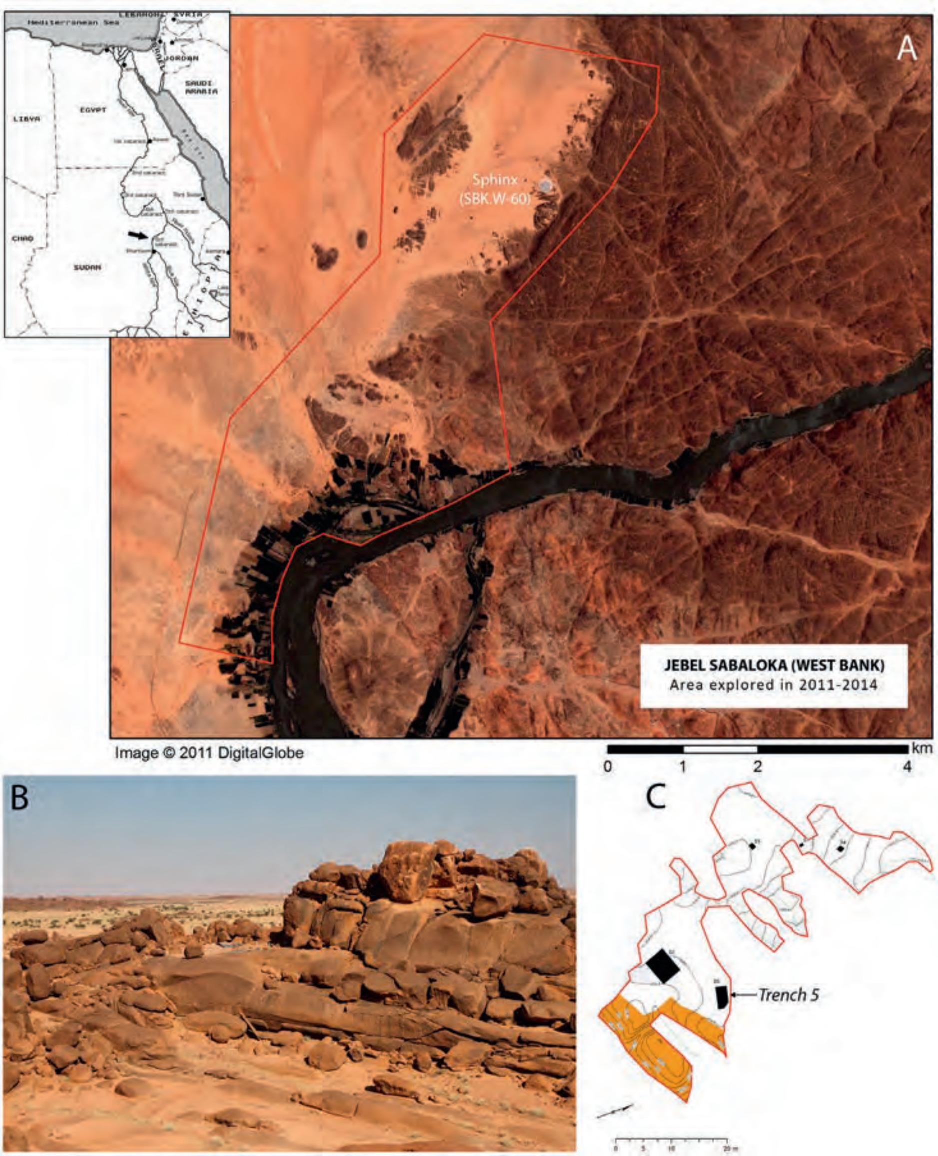

Fig. 1. A – Site of Sphinx (SBK.W-60) at Jebel Sabaloka (background: Google Earth 2011; map adapted from Adams 1977); B – Southern part of the settlement platform at Sphinx, from southeast (photo L. Varadzin, 2014); C – Contour plan of the settlement platform with the location of trenches excavated between 2011 and 2014; Trench 5 is indicated by an arrow (author J. Pacina, 2014)

Four main aims were set for the 2014 field campaign based on the previous research at the site of Sphinx (see Suková and Varadzin 2012; Suková *et al.* 2014) and with regard to the generally known problems of exploration and the state of preservation of prehistoric deposits in central Sudan (already Arkell 1949: 4; most recently e.g. Salvatori 2012). They were: 1) to identify settlement layers and contingent sunken settlement features and to determine the stratigraphic relations between those and the burials in the southern part of the settlement platform, AMS ^{14}C dated tentatively to the 8th millennium cal. BC (Suková *et al.* 2014; Varadzinová Suková *et al.* 2015); 2) to investigate the post-depositional processes that have affected the original stratigraphic image and the depositional history of the site; 3) to elaborate the methods and procedures for exploration of this and other prehistoric sites in the geomorphologically and geologically rather specific area of Jebel Sabaloka (Almond and Ahmed 1993); 4) to verify the extent of the burial ground in the southern part of the site; and 5) to collect further evidence for the understanding of the former human occupation of the site.

This paper is based on the poster communication presented at the 2015 Dymaczewo conference. It provides a brief overview of the source empirical observations and findings of the 2014 field campaign that contribute to the topical discussion on the character of prehistoric deposits in central Sudan and on the possibilities and limits of their archaeological exploration (for more detailed overview and discussion, see Varadzinová Suková *et al.* 2015).

1. Methods

To attain the aims set for the 2014 field campaign, Trench 5 of 7.5 m^2 was excavated by the north-eastern edge of the southern part of the settlement platform, i.e. on the opposite side of the supposed burial ground as compared with Trench 2 where 24 burials had been uncovered in 2012 (Fig. 1C; see Suková and Varadzin 2012). The excavation took 18 working days of 8–10 hours each and engaged two archaeologists and four trainees aided in the course of exploration by three geologists (sedimentologists, micromorphologists), four archaeobotanists, and one surveyor. The trench – originally of 6 m^2, later extended to 7.5 m^2 – consisted of seven squares (SQ) of 1 × 1 m (A–G) and one sector of 0.5 m^2 (H). During excavation – both in squares and later across the whole trench (Fig. 2A, B) –, colour, texture, and compactness of deposits (regularly highlighted by a water sprinkler; Fig. 2C–E) were used to differentiate stratigraphic units (SUs). The traditional

Fig. 2. A – Trench 5 at an early stage of excavation, with Squares B, D and F excavated down to MU2 within the differentiated SUs; B – Trench 5 during excavation, with Squares A–F excavated down to MU3 within the differentiated SUs; note the varied colours that appear to represent individual deposits or features; C – MU3 in the differentiated SUs in Square D after excavation; D – MU3 within the differentiated SUs in Square D, moistened with water; E – MU3 within the differentiated SUs in Square D, partially dried (all photos: L. Varadzin, 2014)

stratigraphic method was combined with excavation of the individual SUs by a series of thin horizontal cuts (mechanical units – MUs), with the MUs always subordinated to the respective SUs (i.e. they always respected their extent). The SUs and MUs in each horizontal section were documented in detail prosaically and by means of drawings and a series of photographs (e.g. Fig. 2C–E). When recording finds, a special attention was paid to the vertical and inclined position of stones and artefacts which may indicate, inter alia, the presence of sunken features (cf. Fig. 2C–E). All finds were localised precisely according to their SQ/SU/MU. All excavated deposits were dry-sieved using a 4-mm mesh to obtain artefacts and ecofacts. Ca. 30 % of the fine fraction (under 4 mm in size) was flotated or sampled for archaeobotanical remains (macro-remains, charcoal, pollen, phytoliths). Where necessary, direct samples were collected from carefully selected spots for further archaeobotanical analyses (see Sereno *et al.* 2008) as well as for geoarchaeological study. Kite Aerial Photography and terrestrial photogrammetry were used with the aim to produce 3D models of the entire site and the trench and to obtain ortophotographs of selected find situations (e.g. Fig. 4B; see Pacina 2015).

2. Archaeological findings

In the course of excavation of Trench 5, altogether 18 types of deposits were differentiated based on the differences in colour, texture, and/or compactness, and were designated tentatively as stratigraphic units (SU1–SU18; Fig. 2B; 3A, B). Some of these were further subdivided based on finer differences into between two (e.g. SU9A–SU9B) and five (e.g. SU11A–SU11E) subunits.

The excavated trench was found to contain eleven burials (B.25–B.31 and B.33–B.36)[2] that concentrated in the western and southern part of the trench (Fig. 4A–C). The deceased were laid in a more or less contracted position, head oriented to east or northeast. Some graves interfered with one another, implying separate (successive) events of interment (Fig. 4B). The skulls of B.33–B.36 found in the south-western section of Trench 5, on the other hand, indicated interment of four individuals into one and the same burial pit at one and the same time (Fig. 4A). However, this will have to be verified by further exploration at the place where we assume to find the post-cranial parts of the skeletons (see Varadzinová and Varadzin 2017). No grave goods were found to accompany the deceased, with

[2] Another human burial (B.32) was found by the southern edge of the southern part of the settlement platform where it had been exposed in an erosion line enlarged during heavy rain storms in 2013 and 2014. It was only recorded, but not investigated during the 2014 field campaign.

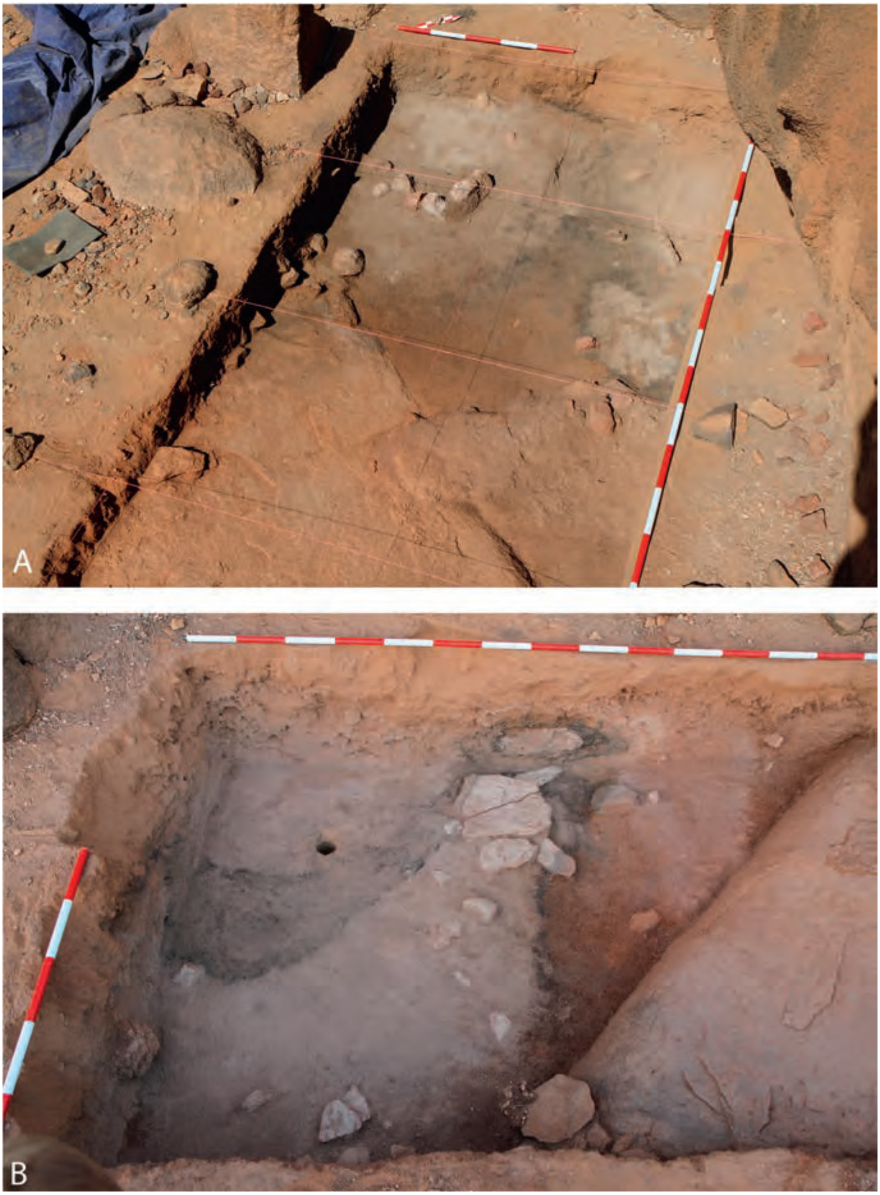

Fig. 3. A – Trench 5 during excavation, view from east; note feature F.1/14 in the west (top left) corner of the trench and the varied colours mostly representing pseudo-layers or pseudo-features; B – North-western part of Trench 5 at another stage of excavation; note the trunk-like formation across the trench which had come into existence through precipitation of manganese oxides (both photos: L. Varadzin, 2014)

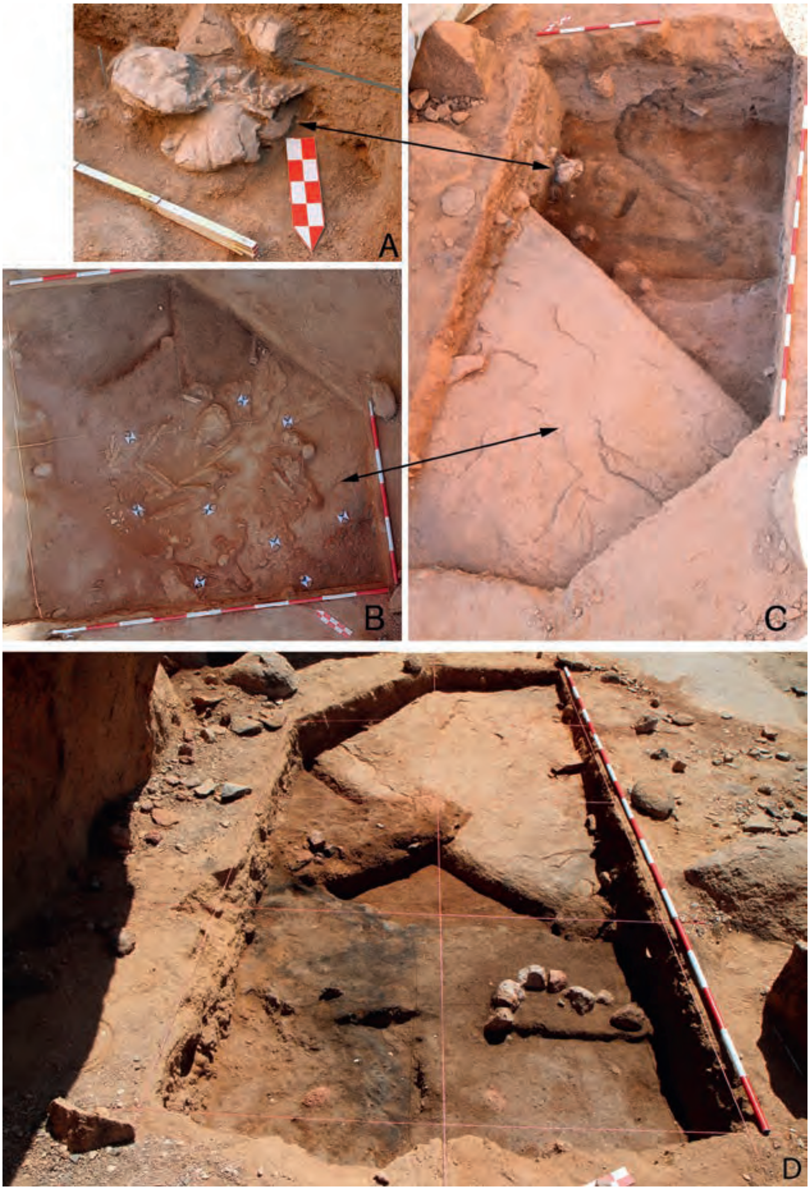

Fig. 4. Jebel Sabaloka (West Bank), site of Sphinx (SBK.W-60): A – Skulls of burials B.33–B.35 in the south-western profile of Trench 5; B – Burials B.25–B.29 uncovered on the large granite boulder ca. 15–35 cm below the present-day surface; C – Trench 5 after excavation, view from southeast; D – Feature F.1/14 during excavation (photos: A, C, D – L. Varadzin, 2014; orthophoto: B – J. Pacina, 2014)

a possible exception of three shells of Nile bivalves collected from behind the head of B.33 at the bottom of the supposed quadruple burial (cf. Arkell 1949; Caneva 1983; Haaland and Magid 1995; Honegger 2014). The new burials constitute further evidence in support of the hypothesis on the existence of a large burial ground in the southern part of the site (see Suková *et al.* 2014). Interestingly, in the course of excavation it became evident that – with one exception (SU7) – practically none of the SUs corresponded to the supposed grave-pits of the explored burials.

In the south-western part of Trench 5, feature F.1/14, obviously of anthropic origin, was uncovered in a depth of ca. 40 cm below the present day surface. It was formed of medium-sized granite stones arranged in a semi-circle with a diameter of ca. 50 cm. Again, outlines of none of the 18 types of deposits (SUs) overlapped with this feature (Fig. 4D).

Several hundreds of pottery fragments datable to the Mesolithic period only (Incised Wavy Line, Dotted Wavy Line, Rocker Stamp), thousands of pieces of lithics from the same period, nearly one hundred upper and lower grinders (mostly broken), other finds including bone industry, pigment, mica, ostrich eggshell fragments and beads, mammal and fish bones, molluscs, and varied botanical remains were obtained through direct collection or dry-sieving of the excavated deposits.

In our field laboratory starch grains and phytoliths were detected on the working surfaces of grinders. This finding is of particular significance for addressing the issue of representation of vegetal component in the diet of the late prehistoric populations in the Middle Nile – one of the key issues of the Sudanese prehistory (cf. e.g. Haaland 1995; critically Usai 2014; also Buckley *et al.* 2014).

3. Observations on post-depositional processes

So far, no evidence of re-occupation of the site during post-Mesolithic times has been brought to light through the hitherto excavation in the southern (as well as in the central and northern) part of the settlement platform. However, while later anthropic disturbances (sensu e.g. Caneva 1983; Salvatori 2012 – tumuli or other graves created at prehistoric sites) appear to have avoided the Mesolithic deposits at Sphinx, the following observations attest that the site has not escaped post-depositional alterations through a number of non-cultural processes:

1) The surface of the site is covered by a more or less consolidated layer consisting of weathered granite and a large amount of artefacts datable to the Mesolithic period; 2) Nearly continuous bands of horizontal weathering lines were detected on the boulders delimiting the settlement platform at a height ranging

from 30 to 90 cm above the present-day terrain (Fig. 5A, B); 3) There are sunken features – feature F.1/14 and eleven burials in Trench 5 – whose fills could not be differentiated in most cases from the deposits into which they had been laid; 4) A massive mobilisation of leachable elements like Ca, Fe or Mn had taken place in the area of Trench 5 in the past, bringing about the presence of precipitated calcium carbonate unevenly distributed throughout the trench, total decalcification of shells of molluscs in some positions within the trench, and marked precipitation of manganese oxides forming a bizarre trunk-like feature running across the trench (Fig. 3B; 6); 5) The study of morphology, structure, and chemical properties of each of the 18 differentiated types of deposits in the course of excavation proved beyond doubt that most of them are the result of post-depositional, especially geochemical processes and, therefore, cannot reflect the real stratigraphic development; 6) Last but not least, traces of extensive and, at the same time, intensive post-depositional bioturbation by rodents and insects were detected during excavation of Trench 5.

4. Interpretation

Several interdependent (but still separable) N-transformations (Schiffer 1987) appear to have altered the site in the past.

Severe wind and water erosion has lowered the level of the Early and Middle Holocene terrain by 30–90 cm – this is indicated by the bands of weathered lines detected on the boulders – and brought along the accumulation of coarse fraction (including the varied artefacts and ecofacts) on the surface of the site.

Homogenisation of the deposits preserved underneath the consolidated surface layer caused by pedogenesis (bioturbation, illuviation, etc.; see Holliday 2004) has obliterated the interfaces of anthropogenic layers and sunken features – including eleven burials and feature F.1/14 in Trench 5 – to such an extent that traditional archaeological methods involving observation by naked eye, touch, and/or pressure are insufficient for their detection.

Severe geochemical processes involving massive transfer of certain solutions (carbonates, manganese and iron oxides, etc.) have caused the disappearance of possible *layers of ash* (i.e. potassium carbonate), on the one hand, and the appearance of *pseudo-features* and *pseudo-layers* easy to be confused (at least in the initial phase of excavation) with original anthropogenic deposits, on the other hand (see Fig. 3A, B; 6). For this reason, the different colour and/or compactness of deposits does not always represent original anthropogenic contexts (for a more detailed discussion of the varied post-depositional processes, see Varadzinová Suková *et al.* 2015).

Fig. 5. A – Weathering lines (or grades) on the rock separating the southern and central parts of the settlement platform at Sphinx (photo L. Varadzin, 2015); B – Survey of the weathering lines/grades in the southern part of the settlement platform (photo: L. Varadzin, 2014)

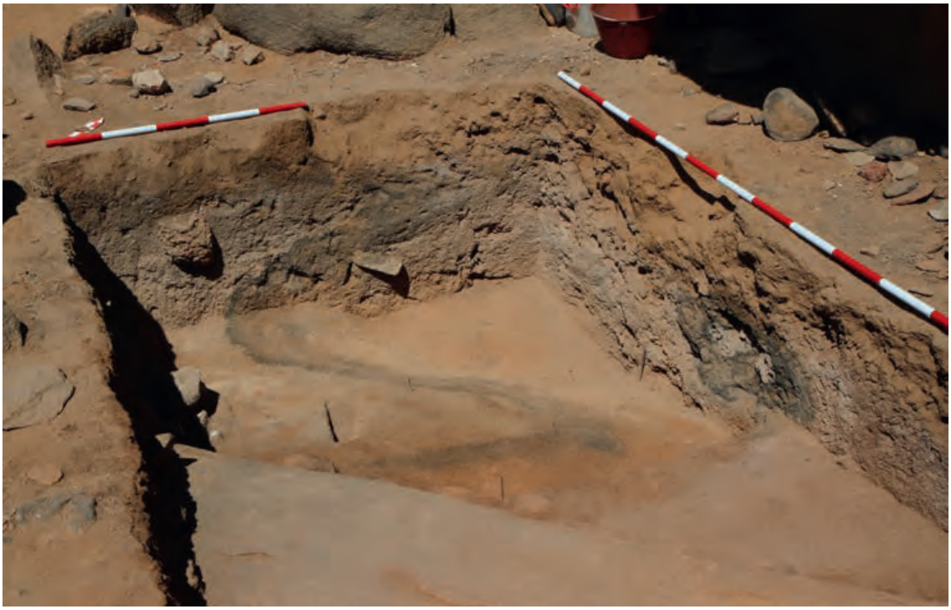

Fig. 6. Base of Trench 5, view from south; note the trunk-like feature formed by precipitation of manganese oxides which penetrate beneath the surface of the intact eluvium (photo: L. Varadzin, 2014)

5. Implications

In addition to a number of important archaeological finds, the exploration of Trench 5 at the site of Sphinx at Jebel Sabaloka in 2014 brought to light several findings and observations of methodological significance. It proved true that at least at Jebel Sabaloka conventional stratigraphic excavation method involving observation by naked eye and touch is not sufficient for exploration of original prehistoric deposits. For this reason, it is indispensable to co-opt the traditional method of stratigraphic excavation by other, parallel procedures (various adjustments of excavation by mechanical units).

The observations deriving from exploration of one trench at one site in the peculiar environment of Jebel Sabaloka, presented in this brief paper (for more detailed overview and extended discussion, see Varadzinová Suková *et al.* 2015), cannot be schematically generalised, in their specific form, for other prehistoric sites in central Sudan. Nevertheless, they no doubt contribute to the recently re-opened discussion on the character of cultural deposits of prehistoric date in central Sudan and on the possibilities and limits of their archaeological exploration.

Acknowledgements

Our sincere thanks are owed to the National Corporation for Antiquities and Museums of the Sudan for the assistance and support rendered to our team in connection with the Sabaloka Research Project since 2009. The fieldwork at Jebel Sabaloka in 2014 was carried out thanks to the support of the Charles University Scientific development programme No. P14: Archaeology of non-European areas, Sub-project: Ancient Egyptian civilisation research: cultural and political adaptations of the North African civilisations in Antiquity (5000 BCE – AD 1000) and by "PAPAVER – Centre for Human and Plant Studies in Europe and Northern Africa in the postglacial period", reg. no. CZ.1.07/2.3.00/20.0289, co-financed from the European Social Fund and the national budget of the Czech Republic. This paper is published thanks to the support of the Programme for the Development of Fields of Study at Charles University, no. Q11: Complexity and Resilience: Ancient Egyptian Civilisation in a Multidisciplinary and Multicultural Perspective, and the internal programme of the Institute of Geology of the Czech Academy of Sciences, no. RVO 67985831.

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Attila Király

Digital Data and Holocene Lithic Industries in the Sudanese Nile Valley: a Case Study

Although I only met him once, Fred Wendorf has a basic impact on everything I know about archaeology. During my undergraduate years in Miskolc, Hungary, it seemed impossible to gain data about Palaeolithic Egypt until I found a Wendorf, Schild and others article in the Science journal (Wendorf *et al.* 1976). Their names guided me from publication to publication deep into the Northeast African prehistory. Fred Wendorf is and will be an unwavering foundation of our discipline. With this essay I thank him for all the inspiration and knowledge he gave to me.

Introduction

The prehistoric remains from the fourth catarct area of the Nile stand in a vacuum. The uneasy taphonomic situations and the transit location between conventional research areas make these remains difficult to assess in the prevailing chronological and cultural schemes. Grasping the knapped lithics in these frames of reference posits a real challenge, because these artefacts are underrepresented in the discourse about Holocene prehistory of the Sudanese Nile Valley. The Merowe Dam salvage era offers an opportunity to have a fresh look at the role of lithic industries, and the ways how lithic data can be managed. In the case of the

Merowe Dam Archaeological Salvage Project (MDASP), it is hard to escape from the comparsion with the UNESCO High Dam salvage expedition. Both enterprises were realized by international cooperation, conducted at a less known territory in archaeological terms and produced an astonishing amount of new data. One huge difference for the MDASP is its standing on the shoulders of giants. The past fifty years witnessed the elaboration of a Northeast African prehistory with a distinct scientific community.

This remarkable scholarly background is now further strengthened by novel ways of communication, i.e. through "The Internet". Thoughtful management, sharing and co-creating of digital content already play an important role in scientific practice, and eventually, in the production of scientific knowledge. Through digital media, archaeologists are increasingly and inevitably engaged in a cooperative system of stakeholders, which affects many existing norms of disciplinary behaviour. One of the grand challenges for archaeology is not just the use of software or the Web, but to understand their effects on the very core of its method, and to create a cyberinfrastructure for its own.

In my opinion, knapped lithics are a good match for digital care. Current methods in lithic analysis can be extremely data-consuming, in order to take reasonable statements about the archaeological record. For adequate conclusions and cooperation, great quantity and good quality data are essential, hence lithic experts are on the verge of a consensus about the standards of data creation. The logic of digital data processing favours these types of standards, besides, the capacity of digital storage and transfer seems endless. In order to broaden the role of lithics from cultural markers to a versatile record of past human behavior in the fourth cataract area, I hypothesize a need for detailed and structured data about them that can be reused along diverse theoretical considerations. This need can be fulfilled by digital data publication, as one alternative among many others. Through a case study I present the manifold requirements of an effective publication which facilitates data for further research.

1. Lithic artefacts in the Holocene prehistory of the Middle Nile Valley

Lithics are not pivotal players in the discourse about Holocene prehistory of the Sudanese Nile Valley. The regional cultural frames are built upon the relationship between absolute dates and ceramic material (e.g. Dittrich 2015; Garcea and Hildebrand 2009; Gatto 2002a; 2002b; 2006; Honegger 2014; Jesse 2002; Sadig 2010; Salvatori 2012; Salvatori and Usai 2007; Usai 2014). In many cases, lithics only complement these relationships, by typical retouched tools or technology derived morpho-types, as cultural markers. There are indications about the use of lithic tools as projectiles and insets, but so far we know little about debitage products that testify the lion's share of variability in a lithic assemblage (Becker and Wendorf 1993; Caneva and Zarattini 1983; Honegger 2009; Kobusiewicz 1996). We do not have a detailed understanding about the economic and social aspects of lithic production. The recent years saw an explicit need for these informations, accompanied by publications with a more technological orientation and analytical accent (e.g. Dittrich 2011; Dittrich *et al.* 2007; Garcea 2003; Jakob 2010; Kabaciński 2003; Kobusiewicz 2011; Osypiński 2010; 2011; Usai 2005; 2006; 2008).

The present imbalanced assessment of lithic artefacts arose from a host of factors. The first phase of research concentrated on the cultural-chronological outline of the area which was approached through the pioneer ceramic studies of Arkell, Myers and Reisner. Ceramics are recognized as a highly informative record of the past, with a design that changes faster than lithics (Garcea and Hildebrand 2009; Salvatori 2012). The vast distribution of wavy line ceramics over North Africa, the early appearance of ceramic technology and domestication in the Sahara directed the focus of research on questions about interregional contacts. The lithic implements of the Sudanese Nile Valley had got less attention in that discourse (Dittrich 2013; Usai 2006; 2014). Moreover, many publications about the Holocene prehistory of Sudan continued to display the exploratory phase of scientific research, because many areas were just discovered from an archaeological point of view. These publications were and are not intended to unravel lithic technological organization, their aim is to report proceedings. Lastly, the special taphonomic and stratigraphic situations warrant caution about the integrity of lithic assemblages (Dittrich 2015; Salvatori *et al.* 2011; Usai 2014; Wengrow *et al.* 2014). There are many variables to consider before we can recognize the temporal resolution of the preserved remains of a site/layer/concentration.

Lithics constitute the most durable and one of the most numerous artefact category from prehistoric times well until the Meroitic era. Our understanding about lithics today rest on a modest segment of the total variability that can be recorded. This segment approached by heterogenous classification schemas that forged in a gradual discovery of prehistoric Sudan. Complex technological analyses offer a more comprehensive understanding of local lithic traditions, site formation and intersite relations, with a more systematic, high resolution approach to lithic variability (Andrefsky 2009; Barton *et al.* 2004; Hiscock and Tabrett 2010; Holdaway, Wandsnider 2006; Lycett 2015; Scerri *et al.* 2015). To achieve this aim, there is a need for substantial, standards-aligned datasets to share.

2. Digital archaeology and data publication

The prime mover behind the knowledge economy and society today is communication, which is accelerating at an unprecedented pace with the help of Web 2.0 and 3.0 (Boulton 2012; Cerroni 2007). The only 12-years-old Web 2.0 is not a new technological instrument but a novel attitude to digital communication. Instead of a one-sided dissemination tool (Web 1.0), the Internet can be used as an instrument for sharing, discussing and co-creation of contents (Dunn 2011; Limp 2011; O'Reilly 2005; Oikarinen and Karasti 2014). In our everyday world this means social media, blogs, comments, wikis and piles of cat videos. In the scientific method, this is the way of knowledge production.

Knowledge is a preformative act, as it is only embodied in practice (Boast and Biehl 2011). For this reason, generation of knowledge is possible only through engagement with other agents – other people and things, and this engagement must involve data sharing between people. In the field of lithic studies, François Bordes basically transformed our knowledge about the past, only through a transformed practice of lithic data presentation (i.e. with his typology). In 2016, we are facing such substantial changes. The almost infinite possibility to collect, arrange and communicate scientific data evokes René Descartes' bedrock call of science:

„I am calling the best minds to progress further than me, each one according to his bent and ability, in the necessary experiments, and [they] would communicate to the public whatever they learned, so that one man might begin where another left off; and thus, in the combined lifetimes and labours of many, much more progress would be made by all together than anyone could make by himself." (Descartes 1993; translated to English by the author).

The Web 2.0 communication provoked a rapid and pervasive change in the expectations, methods and publication habits of the scholarly community (Austin *et al.* 2015; Boulton 2012; Emanuel 2015; Jamali *et al.* 2009; Kansa 2011; Larivière *et al.* 2015; Morgan end Eve 2012; Oikarinen and Karasti 2014; Richardson 2013; Stodden *et al.* 2013; Wallis *et al.* 2013). E-publishing is gaining ground in opposition to printed media, and this trend is more pronounced in the younger age cohorts of academics. In practical terms the next generation of scholars will acquire scientific information almost exclusively online. Social media also have a growing impact; beside popular channels as Facebook or Twitter, there are specific professional applications (Academia, ResearchGate, Mendeley, Figshare, OrcID etc; Lupton 2014; Perry and Beale 2015). The scientific community is in the online state of a „constant conference". Researchers, institutions, publishing companies and other stakeholders begin to perceive science as a cooperative system with an emphasis on effective communication through digital technologies (Destro Bisol *et al.* 2014). This system of knowledge production is also interlinked with policies and funding. In the EU, it is part of the Digital Agenda for Europe, one of the flagship initiavtives of the Europe 2020 strategy (European Commission 2012).

A grand challenge for archaeology in 2016 is not to accept or avoid these facts but to build a *cyberinfrastructure* in accordance with the special needs and possibilities characterising this field of inquiry (Borgman 2015; Dallas 2015; Hole 2012; Huggett 2015; Kintigh *et al*. 2014). Archaeologists use digital techniques for a long time in their research, from GIS to virtual reconstructions. The majority of archaeological data are also born and stored in digital form, but these data are almost never made public. Apart from skill-related, legal and organizational issues, this practice seems to contradict the scientific method *per se* (Austin *et al*. 2015; Destro Bisol *et al*. 2014). In ideal case, researchers publish their theories together with the data on which theories are built. This allows other scientists to replicate research in order to test associated theories, and to re-use data in novel ways. Data sharing thus is an essential part of the process.

The amount and complexity of archaeological, hence lithic data are growing continuously. Data publication was largely restricted in the printed academic discourse, but it is possible to share in its entirety through digital means. Paraphrasing Angela Close from 1989, this possibility does not take away our problems with data but highlights and rearranges them (Close 1989). We have to redefine what the (published) archaeological data mean; how can we structure and manage them from a professional point of view; what are our technical choices for representation and sharing; lastly, how can we resolve the attribution, curation and preservation of digital data.

2.1. Data in archaeology

There is not a clear-cut definition for archaeological data, nor some supreme court to decide. Pragmatically data are structured information not economical to subdivide in the given structure (Atici *et al*. 2012; Borgman 2015; Van Pool and Leonard 2011). Archaeological narrative represents almost inseparable unity of data and interpretation. From the very moment of their discovery, physical residues of the past are selected, arranged and interpreted by multiple parties. Hence, archaeological data is contextual, contingent and patchy (Dallas 2015). If we accept the scientific method in archaeology, we would give the same epistemological credit for the first and the *n*-th narrative about the past. The main reason for our discredit is that the *n*-th researcher is more distant from the „raw data", because she/he has to work with the results of former published interpretations. This create a confusing data diversity, but scientific method, for the sake of the Descartian benefits, promotes data integrity. Paradoxically, multifaceted interpretation is secured only if data have some distance from their creators' dispositions. This very delicate act of data isolation, basically, standardization is typically a task for expert communities (Atici *et al.* 2012; Costa *et al.* 2013; Dallas 2015; Kansa *et al.* 2014; Limp 2011). This problem is well known in areas where communication is intense. Experts of Wavy Line ceramics reached great progress in integrating methods and terminology, creating baseline standards of study (Garcea and Caputo 2004; Gatto 2002a; 2002b; 2006; Jesse 2002; Mohammed-Ali and Khabir 2003; Salvatori and Usai 2007). The standards are constructed on the material reality of the sherds, reflect the specific archaeological agenda but not comitted to one theoretical position. The trait of „tightly packed zigzag" can be used for a variety of purposes. This consensus on standards is the most important element of archaeological data.

2.2. Data publication

Informal data sharing is typically a one-to-one action embedded in personal conversation (emails). Digital data sharing as publication enhances this practice in order to distribute consistent, standards-aligned datasets for reuse by a wider audience. *Data publication* conforms to disciplinary standards, formal requirements of academic discourse and technical requirements of online dissemination (Kansa *et al.*2014; Kratz and Strasser 2014). Creating such datasets requires extra efforts with some necessary steps presented on Fig. 1.

The dataset is accompanied by documentation that helps other researchers from the same field to use the data. It consists of contextual informations and higher-level theories about the project; data ontology or creation methods as middle-level theory; practical description of variables as low-level theoremes. Currently there are three basic forms of documentation: attached file; separate publication in a data journal (e.g. Journal of Open Archaeology Data); or in a more familiar reverse oreder, where documentation is the published article and dataset is the supplement. Digital repositories attach machine-readable metadata to the

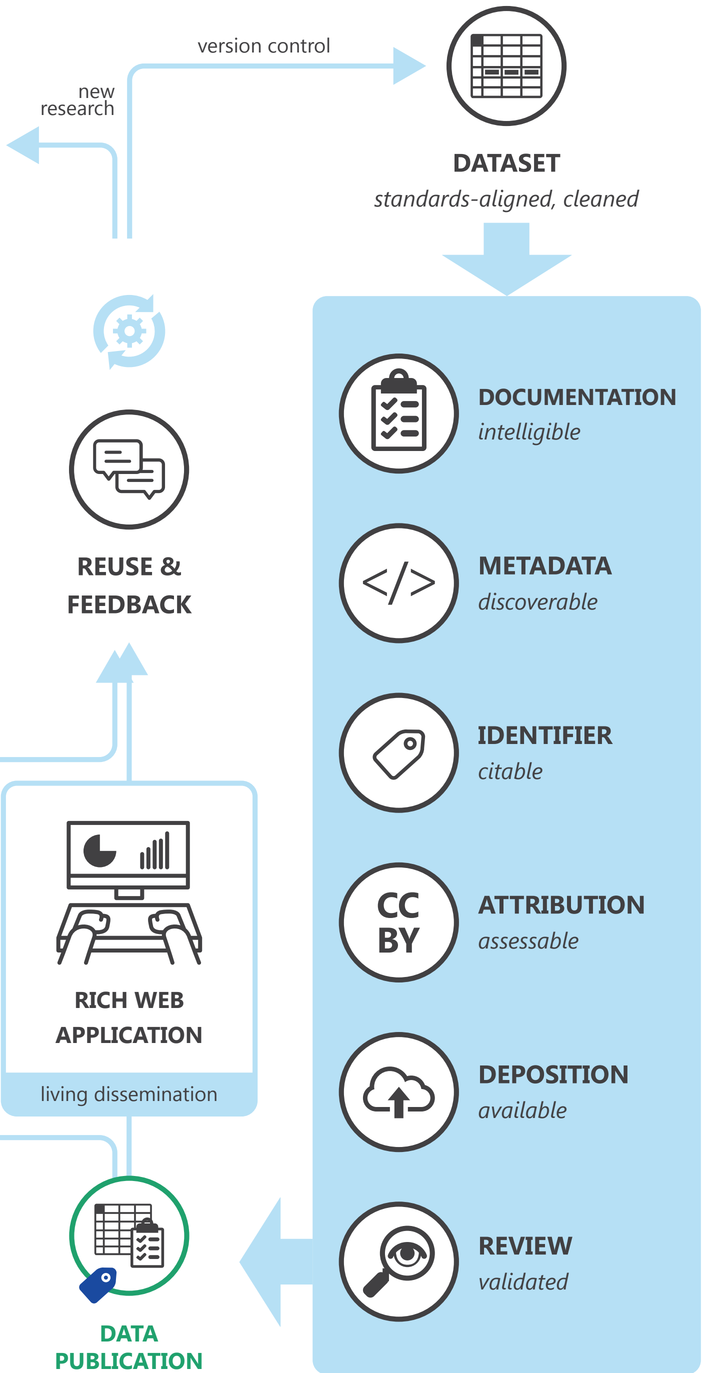

Fig. 1. Main steps of digital data publication

hosted content to make them discoverable by search engines. In most of the cases, these metadata can be manipulated by humans, for example, through tagging. One of the most important feature is citation, which can be secured online by Digital Object Identifiers (DOI-s), in order to implement publication in the academic discourse (doi.org). Online data dissemination and archiving are provided by non-profit, for-profit organizations and public institutions as well. Copyright options can be set by the provider or by the uploader. In the case of datasets an open license is advised which allows to use and manipulate the data. Today we can encounter two distinct ways of dissemination (Costa *et al*. 2013). (1) Static datasets released as stable resources, the files can be manipulated after downloading. This method is comparable to the paper based academic publication scheme with a big difference in storage capacity. Living datasets (2) offer interactive, so-called rich web applications to manipulate, visualize and expand the original content (Limp 2011).

Scientific and instrumental conditions of data publication have a distinct relationship. People use data not read them, thus instruments of use affect recognition, methods of data creation, eventually, interpretation. Archaeological observation usually involves phenomena, not a sole phenomenon. Therefore, analysis basically means organization and classification irrespective of the subject and theory of a given project. Digital instruments have been proven helpful exactly in this kind of work. They made a great contribution to the „scientific boom" in archaeological practice and the materiality turn in archaeological theory we are witnessing today (Killick 2015; Kristiansen 2014).

Print-based academic discourse requires highly filtered and abstract data presentation in order to save space for narratives at all. Online data publication does not supersede this requirement, but creates a problem that is exactly the opposite of scantiness: there is too much space, petabytes of information appear more of an obstacle than help. Web 2.0. takes advantage on quantity and offer personal filtering and abstraction tools. One single database can be repurposed many ways, and many separate databases can be aggregated as one to extract new informations. This degree of control over other people's data is unprecedented, giving the opportunity for multiple interpretation on the same sources. All these advances rely on interoperability, an agreed modularization of observations on archaeological phenomena. Methods of lithic studies evolved in this direction during the past decades: standardization of taxonomy, decoupling observations from the level of lithic tool to attributes, and statistical representation of data.

3. Outline of lithic data management history

Knapped stone tools are part of the whole human story, it is the main source of information concerning the million-years long preceramic era. Data about stone tools therefore have to comply a wide diverse set of theoretical systems, nevertheless, physical qualities of rocks and the act of knapping constrain the range of observable phenomena tight. Lithic data management, or systematics, became more comprehensive, more modular and more versatile to overcome these constraints throughout the years. The modern era of lithic research history begin with the typological work of François Bordes (Bordes 1979). During the sixty years since his *Typologie du paléolithique…* a wide array of methods formed and exist beside each other today. The monothetic, essentialist, teleologic, structuralist etc models apply *a priori* discrete categories for classification. Polythetic, constructionist, evolutionist, analytic etc. models have a bottom up approach. The observed variation serves criteria for pattern recognition (Read 2007; Tostevin 2011; Van Pool and Leonard 2011; Wylie 2002).

The Bordian method originally was a genuine solution for a communication problem. Instead of single artefacts as lead fossils, Bordes recognized the importance of comparsion between distributional patterns in lithic assemblages. This approach demanded huge datasets that was impractical to publish in print, therefore some kind of data shrinking was needed. This need was fulfilled by the concept of type, basic statistics and standardized forms of data presentation: cumulative diagrams, bar graphs, and consistent artefact drawings.

The essentialist view of type postulated a concept of a finished tool in prehistoric minds that can be detected by the skillful prehistorian. Although Bordes never defined the term, his writing made clear that type was a heuristic cherry picking of different morphological and technological traits: „One has to see a great number of implements, classify them, see them again several times, before one acquires a »typological eye«" (Miller and Bordes 1972).

Classic typologies, among them Tixier's work from 1963, defined the analytical units of pattern recognition in typical tools (Tixier 1963). Lithic variability beyond secondary modfied typical tools almost never reached the public, i.e. scientific publication. Soon the scholarly community perceived data *per se* as typical tools and Bordian indices, because these were the primary structured informations appeared in the printed media. This dilemma was addressed by Steward and Seltzer more than 75 years ago: constructing typology in the reality is a conclusive act of intensive research, but other scholars usually begin their research according to an existing typology (Steward and Setzler 1938).

The lively discourse referenced as the Binford–Bordes debate lead the American Reduction Sequence (RS) approach and processual archaeology in general, into the mainstream of lithic studies (e.g. Binford 1973; Bisson 2000; Bordes and Sonneville-Bordes 1970; Rolland and Dibble 1990; Tostevin 2011). The debate centered on the meaning of lithic variability, emphasizing that production and use are dynamic processes, during that form and functions of lithic implements change. Classic types are snapshots of change created by irresolute boundaries along a complex morphological-tehnological continuum. From a processual point of view typology draws a static picture about stone tools, compressing the long history of preparation and use into one sole timestamp (cf. Bailey 2007: 207). Some types in Bordes' schema in fact represented different states of the same process which shook the credit planted in the concept of type as an intentional, finished tool. Technological research, experimental archaeology and later traceology made clear that between use and design there is a complex set of relations (Andrefsky 2009; Hiscock and Tabrett 2010; Holdaway and Douglass 2012).

This functional argument opened up a rupture concerning the aims of stone tool research. Classic culture-historical interpretation of the past was supplanted by research programs that asked for realities of living, subsistence, and social relations of past communities. The RS approach, the French technological school, not least the Schild and Wendorf dynamic technological system compiled a different methodology, when they centered their research on technology and assemblage formation (e.g. Bar-Yosef and Van Peer 2009; Carr and Bradbury 2011; Soressi and Geneste 2011; Lycett and Chauhan 2010; Schild and Wendorf 1977; Tostevin 2011). The scope of analysis included whole assemblages irrespective the degree of modification on a piece. Consequently, the basic unit of research scaled up from artefacts to characteristic traits (*témoins*) or attributes. This resolution shift enabled polythetic classification. After Wittgenstein's game analogy, a stone implement takes only one physical form but according to its attributes can be part of different aggregates simultaneously: microlith by its size, flake by dimensions, sidescraper by location of retouch and grave offering by its context of deposition (Fig. 2). This broad and layered scope of data management followed by new representation techniques. An unambiguous taxonomy and meticulous rules of drawing set foot with the spread of the *chaîne opératoire* concept (Inizan *et al.* 1999). RS approaches adopted quantitative statistical methods and visualization to handle aggregate stone tool data (e.g. Lycett 2015; Magnani 2014; Scerri *et al.* 2015; Van Pool and Leonard 2011).

Current relativism in archaeological theory put emphasis on probability instead of objective facts about the past (e.g. Skibo and Schiffer 2008; Wylie 2002).

The growing amount of research data are impenetrable for the human eye, hence the articulation and confidence of interpretations are crucial today. Heuristic typologies can direct our attention towards relevant trends but the confidence of such interpretations can not be judged. Statistical analytic tools have the means to provide us with tested, statistically significant phenomena and this significance is alluring for the archaeologist. By the 2010s, lithic data management reaching a general consensus along technological organization, attributes (including morphometric data) and quantitative analyses. This approach is in concert with the criteria of digital data sharing as outlined above.

4. Case study: HSAP 057 data publication

HSAP 057 was a surface site at the fourth cataract area of the Nile, explored by the Hungarian Sudan Archaeological Project in 2007 (Király 2008). Its discovery and parameters are characteristic in the area, its lithic assemblage has been chosen as a case study of digital data publication. With this case I intend to present data documentation, the process of publication and the possibilities of curation after publication.

The site was discovered during an extensive survey in January 2007. The present author conducted a systematic collection and test excavation between february 17-24, 2007 (Király 2012). Its spatial coverage was well delineated on the flat plateau of a small gneiss-granite djebel, a common situation in the vicinity (Osypiński 2014). Less than half of the 300 m^2 plateau was free from human sized cliffs. On this free area all the findings here were piece plotted on drawings and the surface was photo-documented by 1 m^2 squares. Because of logistical difficulties only 627 pieces, approximately one fifth of the plotted lithics were collected for further study. Ceramic material consists of 102 sherds that were collected all, other types of artefacts were absent.

Ceramic material have a similarity with Late Mesolithic of the Middle Nile Valley (nomenclature *sensu* Salvatori and Usai 2007): predominantly mineral temper; only decorated sherds; covering and banded decoration, mostly tightly packed zigzag applied by serrated implements, with a few dotted wavy line sherds; lack of incised decoration. Lithics can conform more described industries from the Nubian Middle Neolithic and the Middle Nile Valley Late Mesolithic (nomenclature *sensu* Salvatori and Usai 2007): substantial quartz debitage but few „tools"; many backed implements, mostly lunates on flakes and double backed perforators; cores with one striking platform or sliced cores; dominance of flakes. Overall the site has a late mesolithic-early neolithic character, placing the occupations in the Middle Holocene chronozone, possibly the second half of the 6th millenium, 5500-5000 BC.[1] Study of the lithic material is underway by the author.

4.1. Research questions (high-level theory)

1. What patterns of lithic technological organization can be observed? One of the main question of my study is what human behaviors can be detected in the lithic variability at HSAP057. I am interested mostly in raw material use relative to reduction methods and the criteria of blank selection for further modification.
2. How coherent is the assemblage in spatial and temporal terms? HSAP 057 was a palimpsest of past human activities. Material patterning on the surface was shaped by anthropogenic, geomorphological and other taphonomic processes over millenia. The main question is that what time interval is represented at the assemblage/site level of aggregation.
3. How can I achieve a versatile and reusable database? Working at the fourth cataract region made me clear that the „sites" are arbitrary units in the lihtic-littered landscape, imposed by different research agendas of different working groups. This patchy process of discovery is natural and necessary although the distribution of past human activity is continuous and contingent (Barton *et al.* 2004). Surface distribution of artifacts in arid areas are result of exceedingly complex cultural and natural processes that can not be fully comprehend on site-level. Moreover, lithic economy typically unfold as a multilocal history. Interpretation of one chipped stone assemblage is more efficient if the researcher has the opportunity to navigate across artifact, site and region scales. In order to achieve this, comparable datasets are needed without interfering the particular standards set by individual research agendas.

4.2. Lithic artefact as data (middle-level theory)

I applied a socio-ecological and behavioral archaeological approach to link research questions with artefacts (e.g. Barton *et* al. 2004; Skibo and Schiffer 2008). According to Skibo and Schiffer, human life consists of innumerable interactions with other people and millions of artifacts. Archaeological artefact *is* behavior –

[1] In Király 2012: 175 the date estimation was published as „second half of the 5th millenium BC" because the error of the author.

interaction and its impression in the physical world, the only way that past behavior is accessible to us. Archaeological artefacts parttaking countless interactions since their production, with humans, natural phenomena and other objects as well. This history of an artefact called *behavioral chain*.

Knapping as interaction leaves traces (*témoins*) in the matter. One gesture usually execute one notable detachment with a negative scar on the surface of the block. Series of detachments form a layered topography of negative scars and other stigmata, which can be read as a knapping method. As knapping advances, this topography begin to spread over on all the pieces that is detached from the original block of stone. Use and taphonomic processes cause further stigmata, even thousands of years later than the first detachments. From an epistemological point of view, lithics are aggregates of traces with distinct ontologies. If the aim of lithic analysis is to infer past human behavior, basic unit of measurement has to be the *témoin*, which consists of an attribute (*sensu* Clarke 1968) and its location: on the artefact, at the site, in the region.

The topography of attributes is a valuable asset for the archaeologist because human behavior can be modularized to single interactions, the traces of interactions can be arranged in a relative temporal sequence, and the sequence is detectable over many artefacts. Lithic attributes thus have distinct spatio-temporal

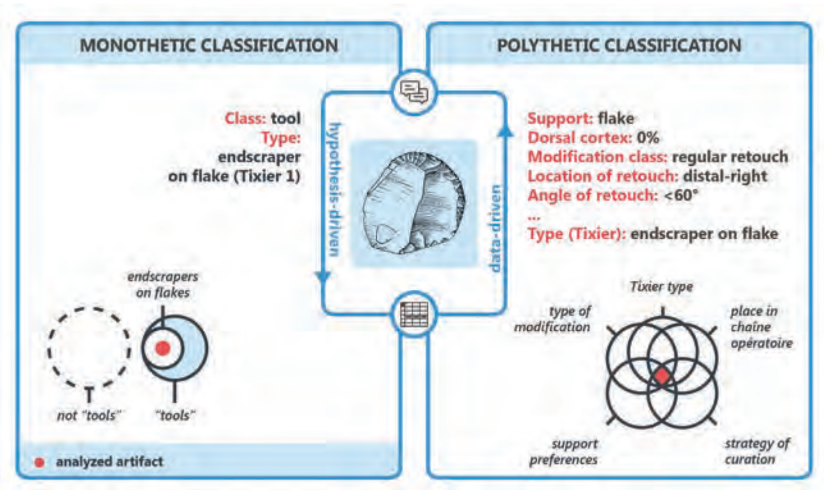

Fig. 2. Monothetic and polythetic classification systems, theory and data driven research models, and their complementary relationship, exemplified by a hypothetical lithic artefact

scales of interpretation with different qualities: extent of an artefact, concentration of artefacts, sites, regions. One single negative scar with certain characteristics can be interpreted as a detachment with a soft hammer; distinct pattern of negatives on a piece can be indicative for a Levallois method; abundant occurence of primary flakes in an assemblage can point on-site decortication; absence of primary flakes from nearby sites suggests that the first site is a local workshop area. Raw material, morphometric and technological data can captured on every single item irrespective of its stratigraphic position or the size of the sample. With the attribute system, these data from mixed surface assemblages can be handled together with data from more secure archaeological contexts.

4.3. Data ontology (low-level theory)

Data collection was determined by three criteria. I surveyed the stone tool research literature for the range of possible analyses, that I compared against the research questions and the character of the assemblage itself. Unit of data capture was the attribute which represent a higher resolution than the units commonly found in published reports about holocene prehistory of the Middle Nile Valley. This resolution was needed because of the technological character of my research and the diverse terminology observed in the reports. In the database, instead of „micropoinçons" there are pieces with dorsal cortex; having converging distal and proximal ends; left and right sides bear secondary modification in their entire length; type of modification is backing. Based on the attributes every user can assemble groups of artefacts according to her/his classification system. The attributes designate technological and morphological traits according to Inizan *et al*. (1999). This publication, beside its analytical strengths offers a multilingual nomenclature.

The database presently contains 131 different attributes (variables), data capture on the 627 pieces required approximately 180 hours (Fig. 3). According to the third research question above, emphasis was placed on versatility. At the present state of inquiry we do not know exactly what attributes are significant in the understanding of lithic assemblages from the fourth cataract region. I registered much more variables than usually needed, to test their significance, and to faciliate tests along different research questions as mine.

Variables along nominal and ordinal scales are attributes that can not be quantified by macroscopic observation, or their quantification would be inefficient. Examples are severity of platform edge damage, intensity of ventral ripples on flakes. The independent grouping variables are nominal too, like debitage catego-

RAW MATERIAL OBSERVABLE DATA

Petrology; nodule form; cortex color; cortex texture; color; texture; patterns, bioclasts, inclusions; brightness; translucence; heat modification; secondary cortex; polish; roundedness

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POSITIVES (CORES, CORE FRAGMENTS AND CHUNKS)
METRIC AND OBSERVABLE DATA

Knapping method; knapping technology; length, width and thickness by maximum dimension; number of non-cortical striking platforms; number of debitage surfaces; number of flake scars; number of flake scars on debitage surfaces

CORES STRIKING PLATFORMS

Length, width, circumference; type of striking platform; angle between striking platform and debitage surface

CORES DEBITAGE SURFACES

Length, width, circumference; degree of damage, weathering, cracks, scaled area; scar count; scar pattern; number of attached striking platforms; number of scars with non-feather termination; dimensions of biggest and last negative

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NEGATIVES (DETACHED PIECES) OBSERVABLE DATA

Debitage class; breakage class; break type; form; form of cross-section; position of dorsal cortex; dorsal scar count; dorsal scar pattern; propagation; termination; point of force; location and number of bulbs; type of bulb; presence of cone of percussion; accentuated ripples; type of talon; talon damage; damage on the ventral proximal and dorsal proximal area

NEGATIVES (DETACHED PIECES) METRIC DATA

Length, width and thickness by maximum dimension, by debitage axis, by morphological axis; outline length; Mass; width and thickness at proximal, mesial and distal sections; bulb length; bulb thickness; talon width; talon maximum depth and depth at the middle; theoretical talon depth; exterior and interior angle

NEGATIVES (DETACHED PIECES) ZONAL-LOCATIONAL DATA

Dorsal cortex coverage; non-modified edge length and steepness; type, location and steepness of edge alteration (non-retouch); type, location and steepness of edge modification (retouch, backing etc.)

NEGATIVES (DETACHED PIECES) BACKED IMPLEMENTS

Type of support; shape of proximal and distal ends; side of backing; direction of backing; shape of backed and non-backed edge; shape of piece in lateral view

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Fig. 3. Selection of attributes recorded on the Mid-Holocene lithic assemblage from HSAP 057, fourth cataract area, Sudan. Source: Király 2016

ry, talon type and different raw material characteristics. Interval scale variables are the metric data that I recorded along all the main orientations in use.

4.4. Process of data publication

Data publication followed the static dissemination model. I pursued criteria for intelligent openness which means that data must be: discoverable, accessible, intelligible, assessable and re-useable (Boulton 2012). During preparation I corrected the inconsistencies with the OpenRefine software (openrefine.org). The cleaned set converted to a Microsoft Access file, with an attached documentation file. The two files together constitute the database for publication. Assessment has been secured with a Creative Commons Attribution 4.0 international license (creativecommons.org). I chose the Figshare repository for archiving, identification and dissemination (figshare.com). After uploading, metadata was created about the content. The uploaded data was reviewed by the editors, and the repository provided a persistent identifier (DOI) for the sake of citation (Király 2016).

4.5. Data curation and version control

The deposited data file is not manageable online, it has to be downloaded to work with it. The author can replace the file without modifying the metadata. Figshare ensures version control, previous versions are stored under separate DOIs. Users can comment the dataset or request the author for modification. This repository offers a free-of-charge membership plan for private individuals.

5. Summary and future prospects

Lithic analysis is an exceptionally data-consuming endeavor, because understanding the production and use of stone tools requires to survey whole assemblages. This magnitude of data cannot be represented in the print-based academic discourse. Apart from compact statistical visualization techniques, researchers increasingly use digital dissemination tools, that do not impose volume restrictions. Data sharing can result standards-aligned, aggregate datasets, wich improves the ability to reproduce distinct conclusions and generate new knowledge. Digital communication is zealously promoted by different stakeholders around the scientific enterprise. Online data publication can comply with the formal standards of academic publication. Several workflows are available, according to preferences and institutional protocols imposed on the author. With the case study I presented a method which is free of charge and does not demand special IT skills.

Stone tools attest great potential in the understanding of Holocene prehistory along the Middle Nile Valley. Particularly interesting problem is the development of lithic technological organization relative to subsistence practices and changing ceramic traditions. Intensive fieldwork during the past decades provided a massive amount of new informations. However, published data about lithics are often preliminary and difficult to compare due to their terminological diversity.

Standards-aligned digital data publication and attribute based studies of knapped stone artefacts repesent a viable option to improve discussion about lithics in the Holocene Middle Nile Valley. The HSAP 057 database certainly will need revisions and additions. Data about retouched implements are insufficient, there are too many nominal variables, more efficient tools will enhance the data resolution and so on. Digital communication of data creates an opportunity to address these issues, prompting a discourse on the methodological foundations of our research.

Addendum

Since the submission of the manuscript a new study was released in this topic with similar methodological approach and conclusions (Marwick 2017).

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Desert and the Nile.
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Papers in honour of Fred Wendorf
Studies in African Archaeology 15
Poznań Archaeological Museum 2018

Louis Chaix and Jacques Reinold

Animals in Neolithic Graves: Kadruka and Kadada (Northern and Central Sudan)

All around the world, animals have played an important role in the funerary rituals, as well as (Eliasberg 1992; Kenney 2004) or Europe (Bodson 1999; Bede *et al.* 2014).

In North-East Africa, the ritual deposit of animals in human graves is attested since the end of the Pleistocene in Egypt (Wendorf 1968). During the Ancient Holocene, many graves found in Egypt and Sudan contains whole animals or parts of animals (Chaix and Honegger 2015; Morey 2006; Gräslund 2004; Flores 2003; Nielsen and Petersen 2003; Paris 2000 ; Stager 1991; Bonnet and al. 1989 ; Chaix 1989).

During the Middle Neolithic, between 5000 and 4000 BC, many cemeteries were dug, delivering human graves with animal deposits or single animal graves. Two examples are presented below(Fig. 1).

1. Kadruka

In the Northern Sudan, around 50 km south of the 3rd cataract, the site of Kadruka lies on the right bank of the Wadi el Khowi, a fossil tributary of the Nile (Reinold 1994a, 2001, 2004). Remains of settlements were found, often on flat ground, with scattering remains due to the strong erosion. On the other hand,

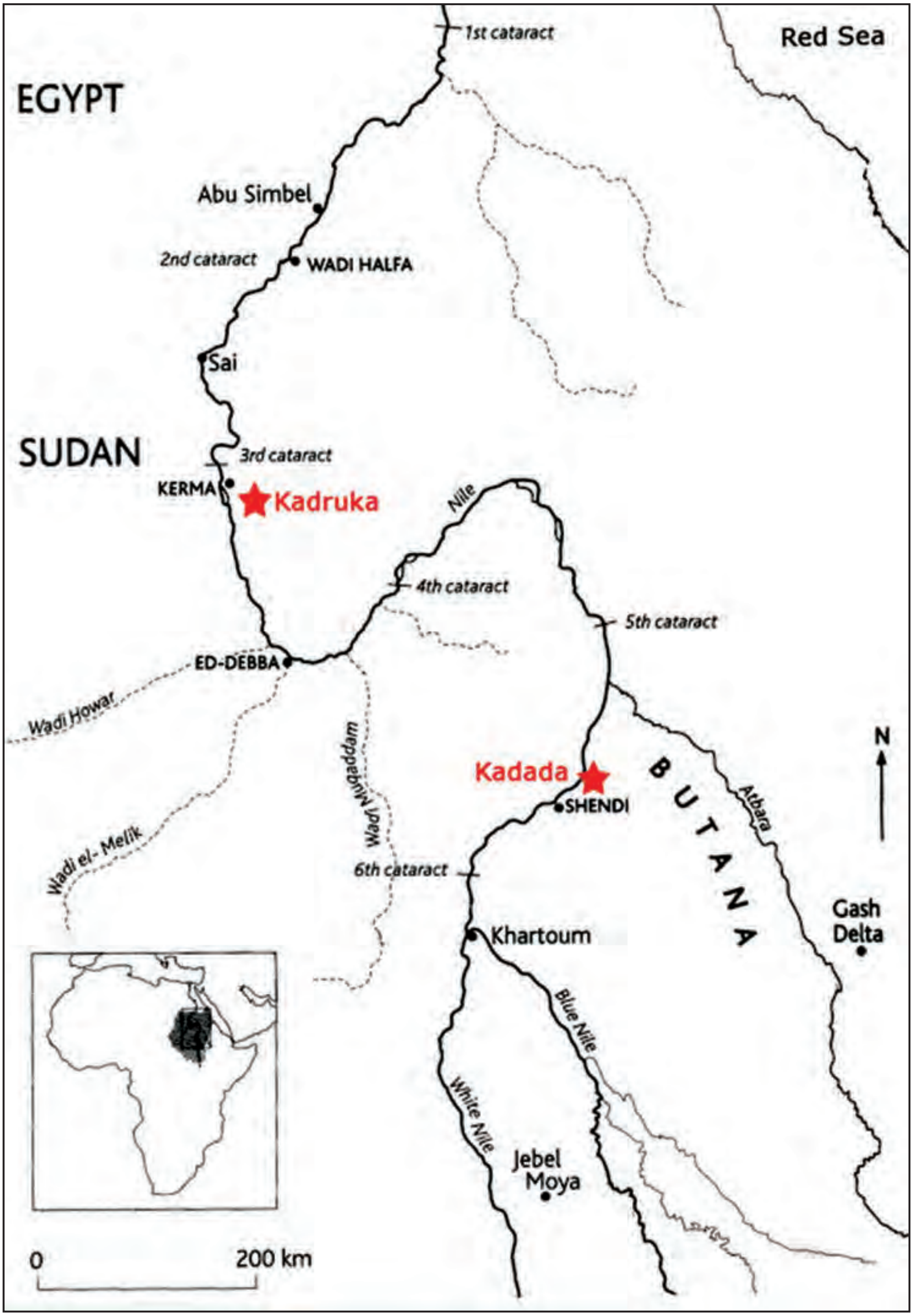

Fig. 1. Map with the situation of Kadruka and El Kadada

cemeteries were dug into hillocks, the depth of the pits allowing their better preservation. In such Neolithic contexts, the localisation of the tomb can be translated into the social position of the dead within the community (Reinold 2004: 42) (Fig. 2).

The necropolis of KDK 21 is the oldest, dated between 5910±60 BP and 5850±70 BP (4944-4537 cal BC). The main tomb is of a women with a man as "mort d'accompagnement" (Testart 2004). Some dogs are buried in small pits: one on the top of the hillock and four others, each with two dogs, at the four cardinal points (Fig. 3). Despite the bad preservation of the skeletons, some remarks can be made:

– The dogs are oriented east-west with the head at the west, like humans; they are lying on the left side.
– Rare measurements indicate small and slender individuals, less than 50 cm at the wither (Fig. 4).We have no indication about the sex.

In some graves, bucrania of domestic cattle were deposited, inside the grave, with a clear relation with the dead (Fig. 5) For some measurements, like the least breadth between the horncore bases, skulls from Kadruka are significantly bigger than those from the later site of Kerma, around 2500 BC (Chaix 2007) (Fig. 6). Some graves delivered artefacts made of animal bones or ivory: hippopotamus incisors used as a box for make-up or bracelets, chisels made from sheep metapodials (Reinold 2000) (Fig. 7).

2. El Kadada

Around 425 km south-east of Kadruka, in the Central Sudan, the necropolis of el- Kadada lies on the right bank of the Nile (cf Fig. 1). The graves are dated between 3700 and 3200 BC; pits are excavated in a coarse fluviatile gravel, explaining the bad preservation of the bones (Reinold 1994b). Excavations led in 2009 delivered many Neolithic graves with various animal deposits (Fig. 8).

In El- Kadada, contrary to Kadruka, all animals are deposited inside the human graves.

Four categories were found : whole dogs, whole kids, bucrania and artefacts.

For a total of 38 graves studied, 10 contains one or two dogs (Tab. 1). The distribution of the graves with dogs do not show any concentration and no linkage with the dimensions of the graves. As we can see (cf. Tab.1), there is no clear relations between the number of dogs and the sex of the dead.

The position and orientation of these dogs is variable. In the grave 86/144, with two main dead lying on the ground of the pit and two "morts d'accompagnement",

Table 1. List of the graves containing one or more dogs

DOGS		
Grave no	**Dog's age**	**Human dead**
85/117	> 12 months	one adult man
85/125	4- 5 months	?
86/94-95-96	> 3 years	one adult man, one adult woman, one undetermined adult
86/105	6 - 9 months	?
86/107	> 2 years	one young man (18-19 years old)
86/115	20- 24 months	one undetermined adult
86/128-131	5 - 6 months	one adult man, three young men (18, 18 and 15 years old)
86/128-131	> 8 months	
86/136	< 5 months	one undetermined adult
86/144	> 18 months	three adult women, one adult man
86/144	> 2 years	

Table 2. List of the graves containing one or more kids

KIDS		
Grave no	**Kid's age**	**Human dead**
85/117	8-10 months	one adult man
85/127	3-4 months	one young women (18-19 years old)
86/101	7-8 months	one adult man
86/104	1-2 months	?
86/105	7-8 months	?
86/105	8-10 months	?
86/132	12-14 months	
86/132.1	4-6 months	one adult woman
86/132.2	5-6 months	
86/144	7-8 months	one adult man

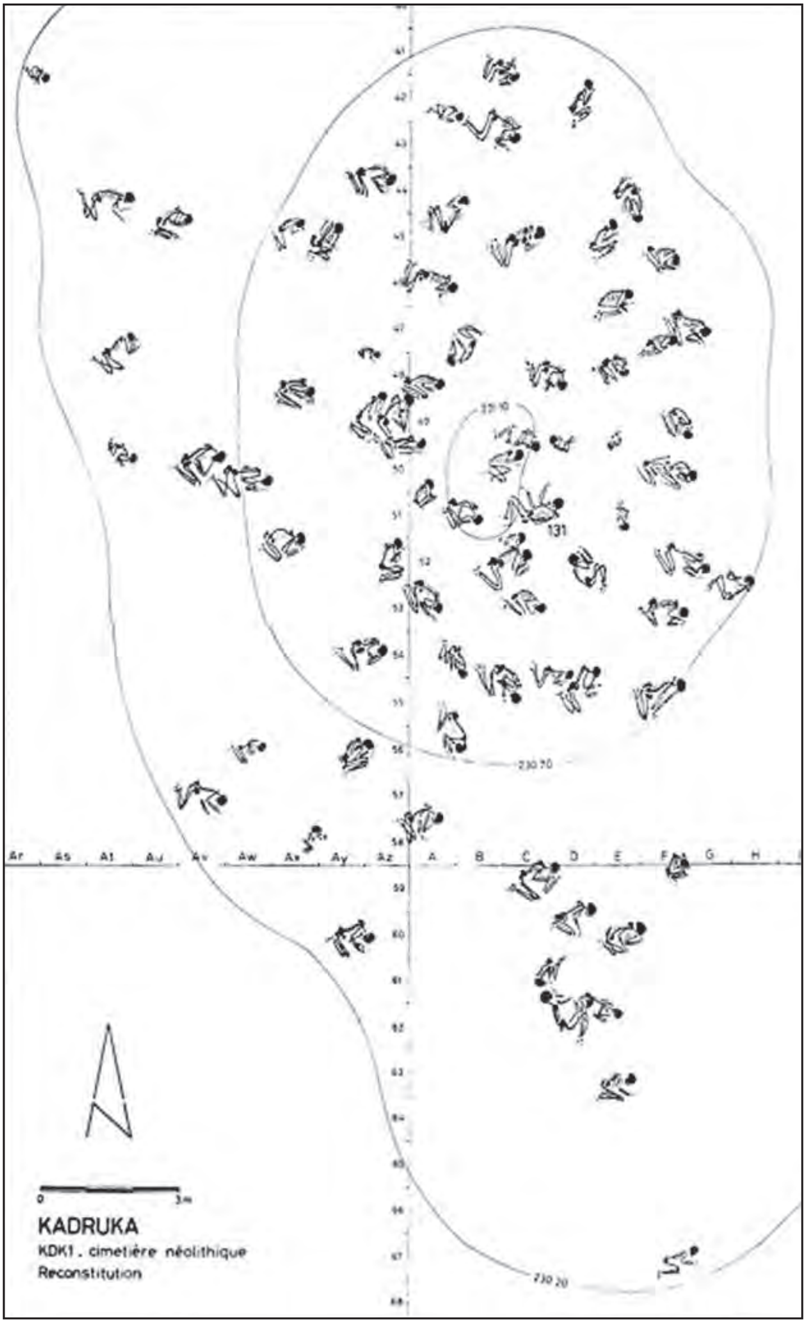

Fig. 2. Kadruka. Neolithic cemetery (KDK 1) showing the organisation of the necropolis around the grave of an important person, a man buried with a lot of furniture (after Reinold 2004: 44)

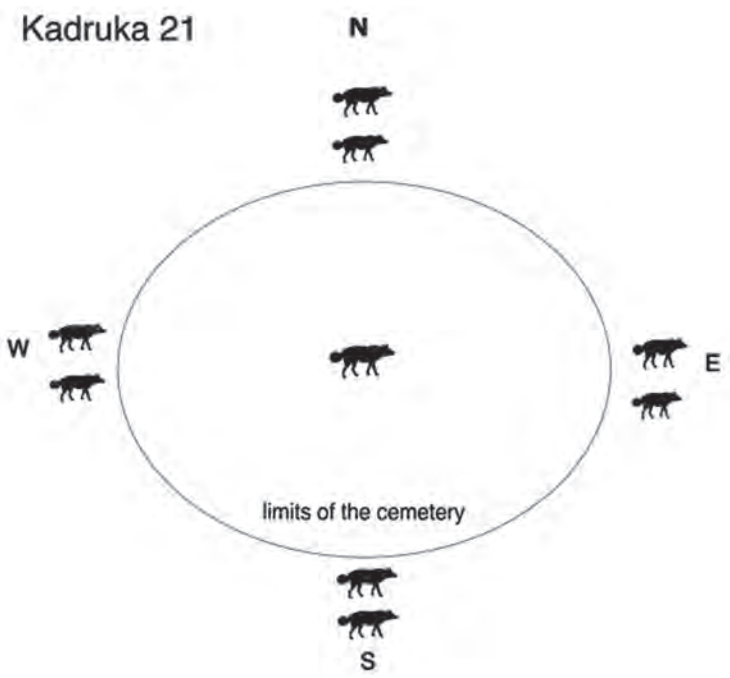

Fig. 3. Kadruka. Neolithic cemetery (KDK 21) with a schematic distribution of dogs, in the center of the hill and at the four cardinal points of the necropolis

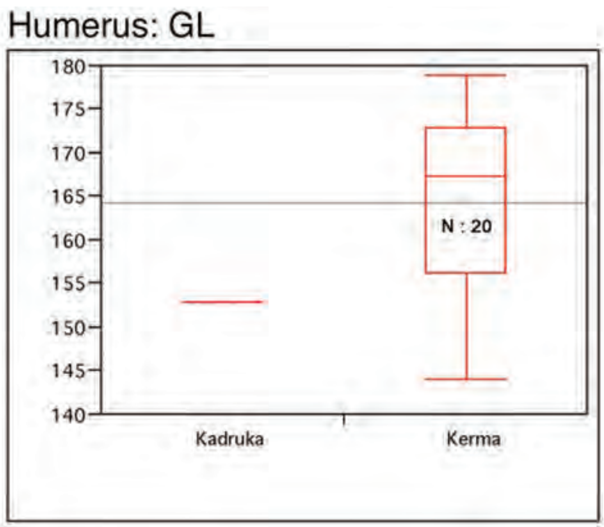

Fig. 4. Kadruka. Diagram showing the position of the humerus (Greatest length) of the dog from Kadruka compared with those from Kerma

Fig. 5. Kadruka (KDK 1). Grave 131 of the principal dead of the necropolis, with various deposits and the presence of a bucranium "(in red)" (after Reinold 2000: 73)

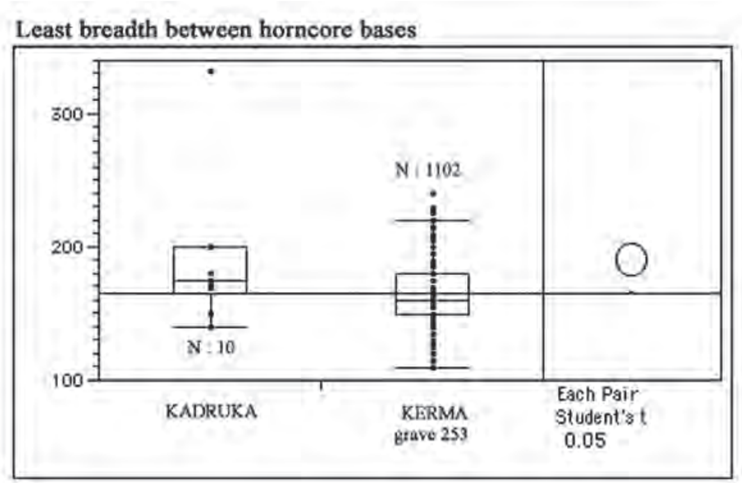

Fig. 6. Kadruka. Diagram showing the big dimensions of the breadth between the bases of horncores, compared with those from Kerma

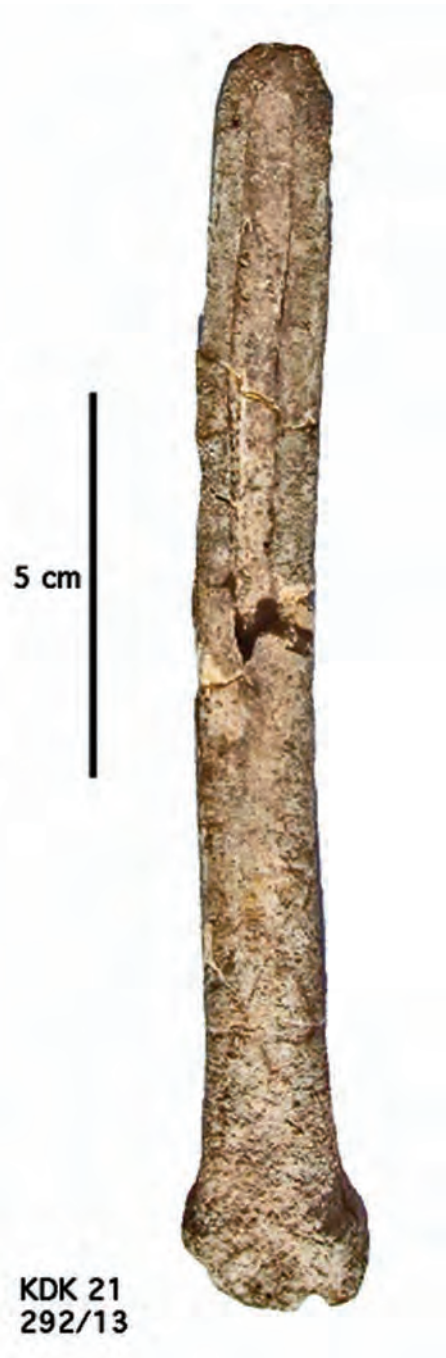

Fig. 7. Kadruka. Chisel made from a tibia from a sheep

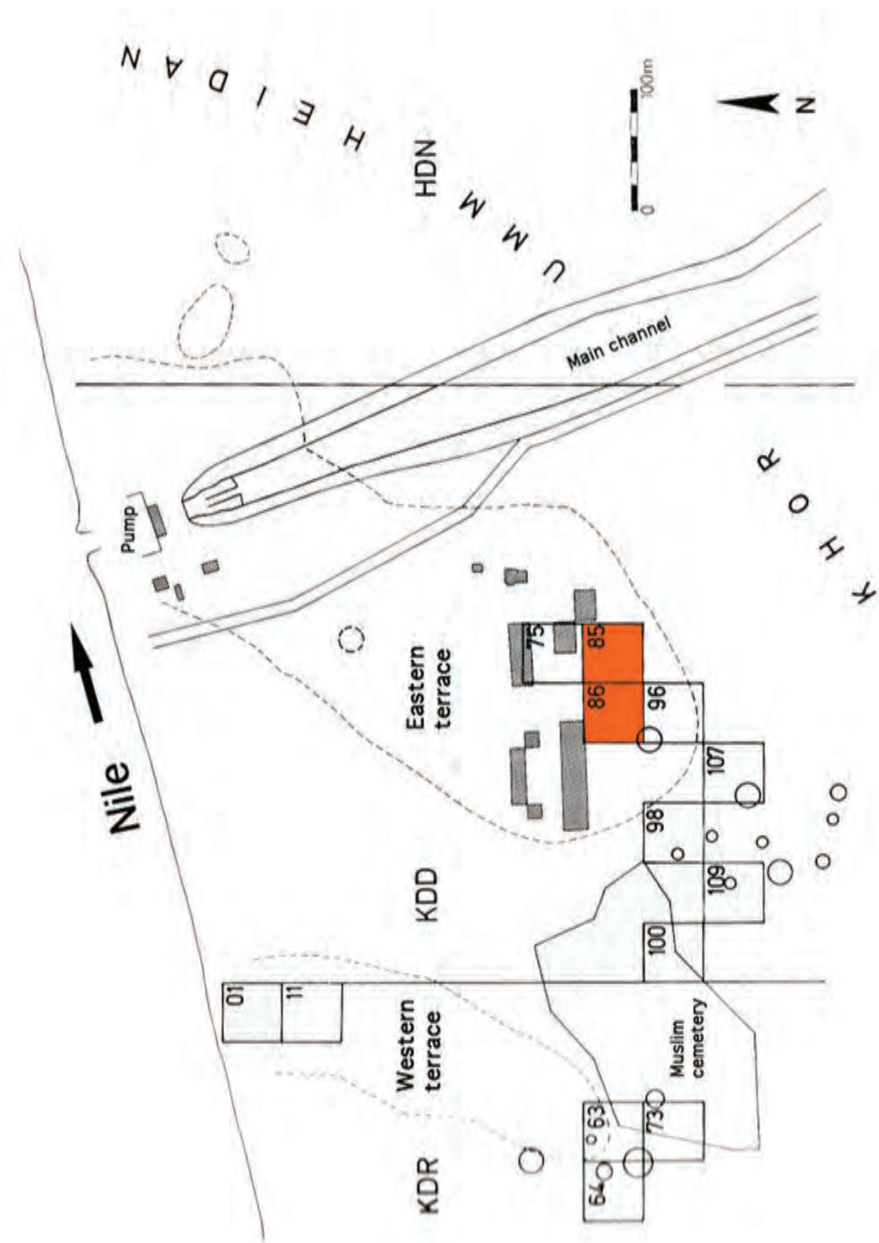

Fig. 8. El Kadada. Plan of the sectors excavated by Jacques Reinold in 2009 (in red). These sectors delivered animal skeletons and faunal remains presented here

Fig. 9. El Kadada. The dog of the grave 144. This curled individual is deposited on the south wall of the pit, in a semi-vertical position

one in the north and the other to the east, one dog is put on the southern wall of the pit, oriented west-east, with the head to the west and curled up (Fig. 9). Another dog, badly preserved, is put to the west of the first dog. Ages of the dogs varies between puppies (4 months old) to adult dogs (more than 3 years). Metrical data indicate small and slender individuals, significantly different from the dogs from Kerma, around 2500 BC (Chaix 1999) (Fig. 10).

Seven tombs delivered skeletons of caprines (Tab. 2). Most of them are kids (*Capra hircus* L.), attested by their dental characters (Halstead *et al.* 2002) (Fig. 11).

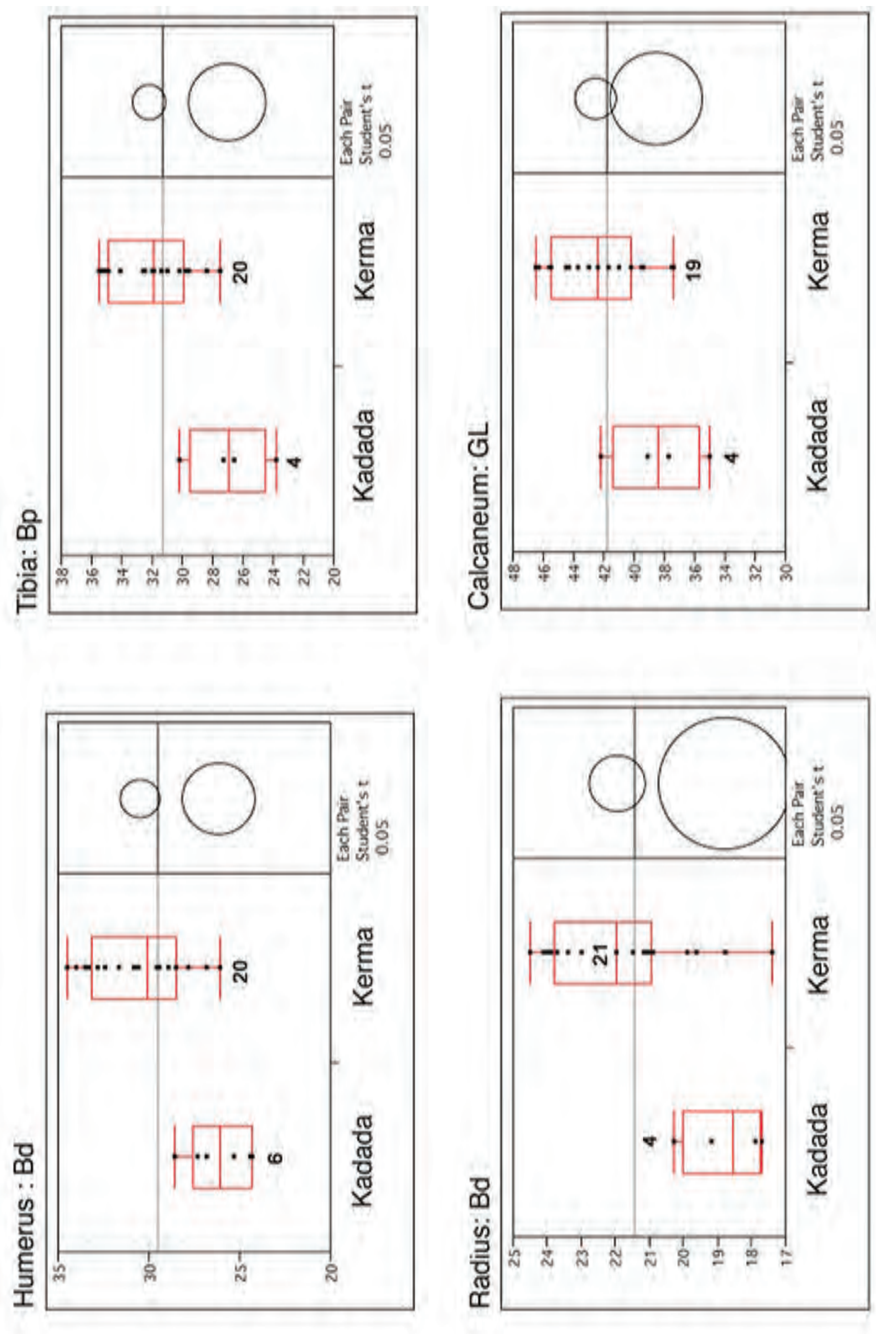

Fig. 10. El Kadada. Diagrams showing the low dimensions of the dogs from El Kadada compared with the same measurements for the dogs from Kerma.(Bp: proximal breadth; Bd: distal breadth; GL: greatest length)

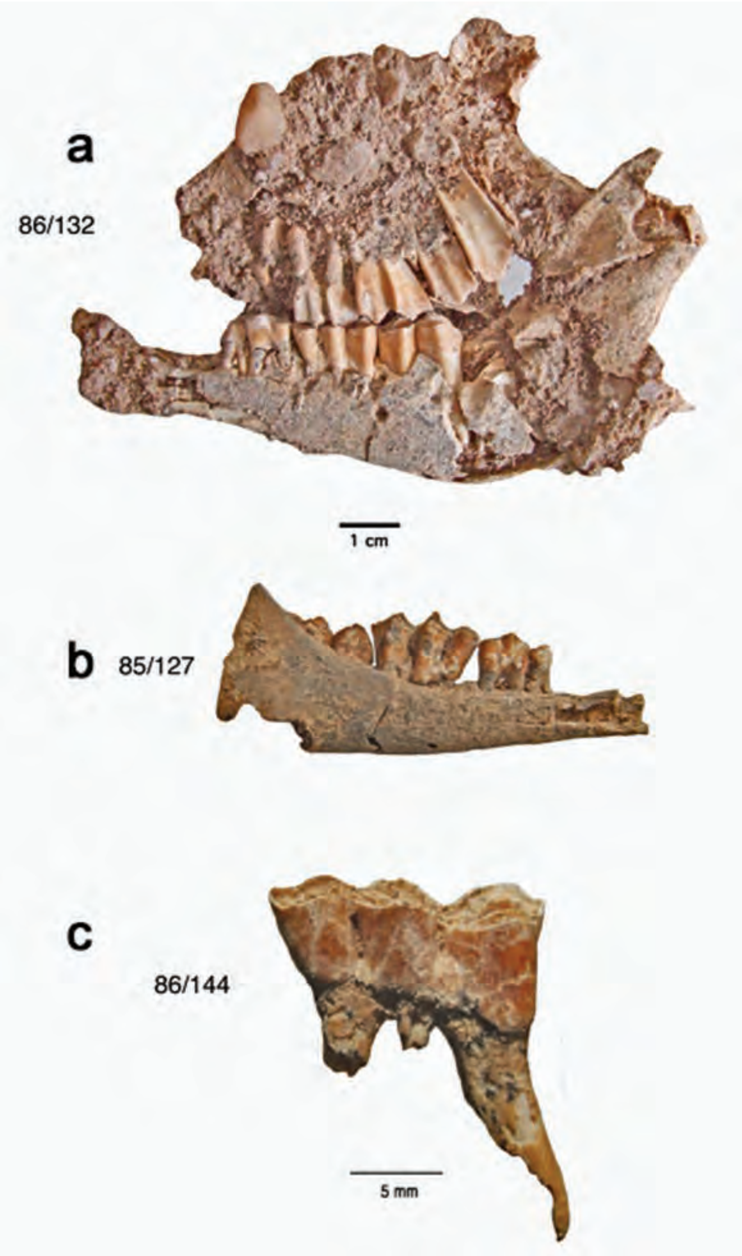

Fig. 11. El Kadada: a – left portion of skull, b – right mandible, c – left lacteal D4 of young goats (*Capra hircus* L.) showing their typical morphological features (after Halstead *et al.* 2002)

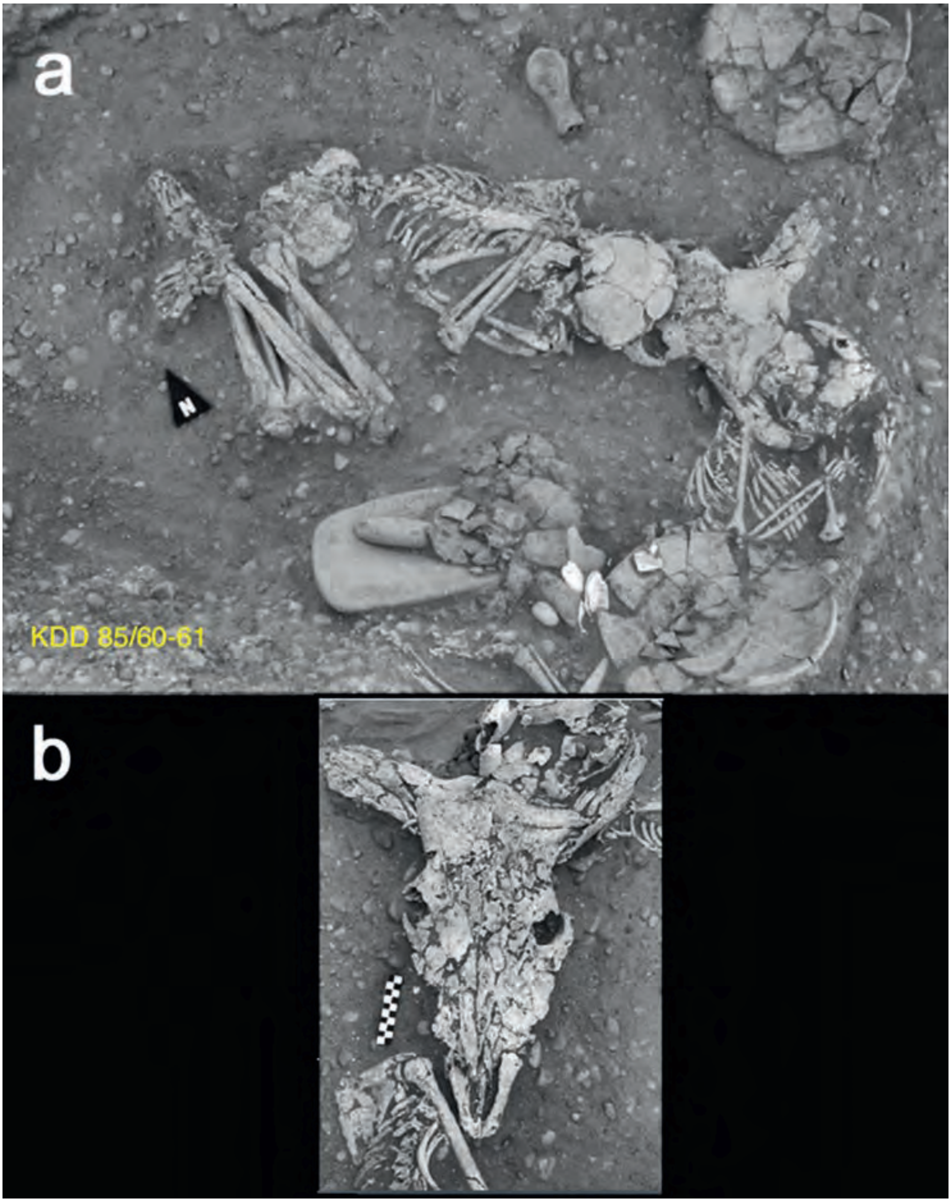

Fig. 12. El Kadada: a – view of the grave 60/61 with a bucranium under the head of the principal dead, covering the head of an adolescent; b – view of the cattle cranium after removing the principal human skeleton

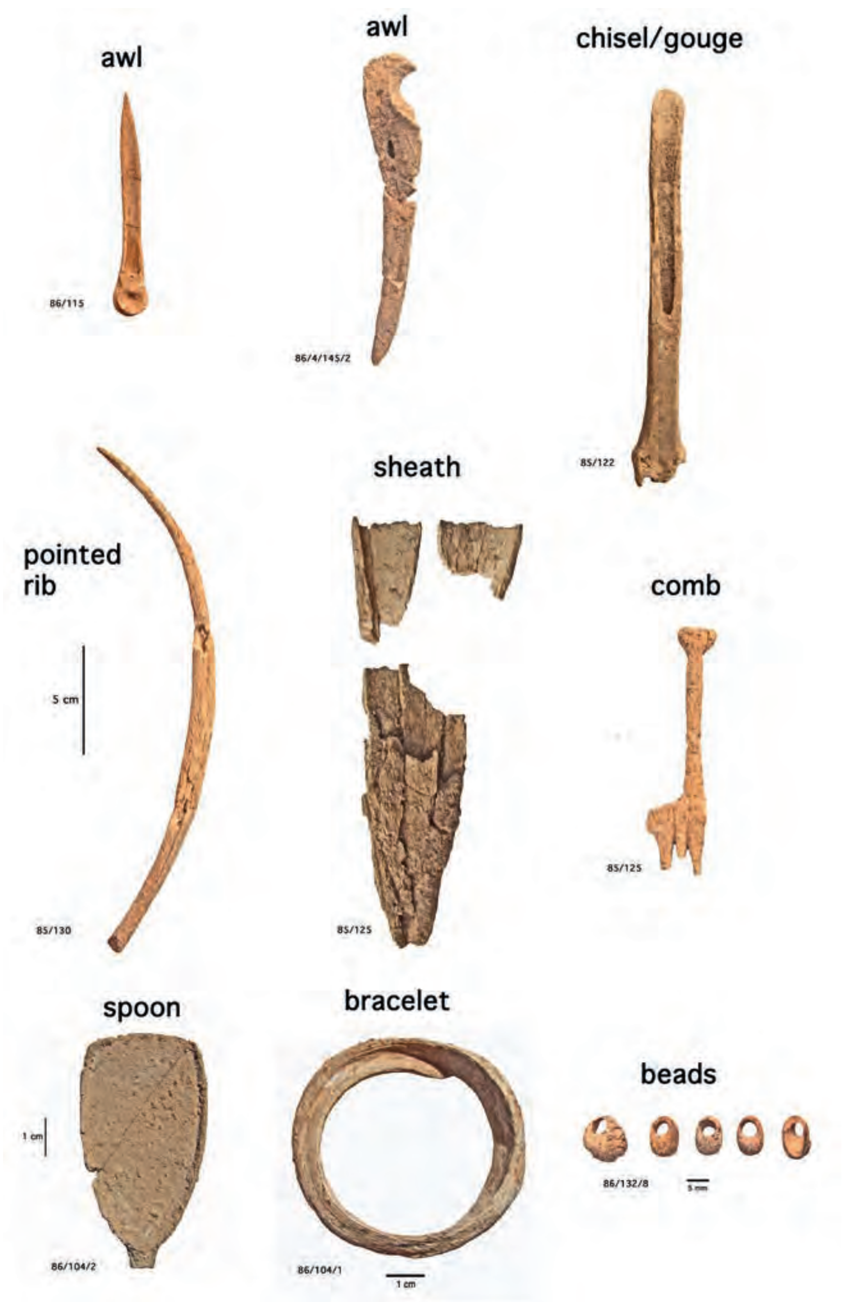

Fig. 13. El Kadada. Various artefacts made of animal bones, teeth and marine shells

In four cases, kids and dogs were buried together. The position and orientation of the kids is variable. Some skulls show horned animals. Ages are distributed between one month and one year. It is interesting to note that the settlement of El Kadada delivered more sheep than goats (7 sheep for one goat) (after Gautier 1986).

Two graves contains bucrania. It is a clear difference with the northern part of the cemetery (sector 75) were numerous tombs (N:15) delivered such a pieces. In the case of grave 85/60-61, a complete skull is deposited under the head of the principal dead, above the head of a "mort d'accompagnement" (Chaix 1989) (Fig. 12). Bucrania from the campaign 2009 are in a very bad state of preservation and do not allow any measurement.

Some tombs show the presence of parts of animals like an hippotamus rib, a gazelle horncore and crocodile dermic plates.

Finally, a lot of artefacts made of ivory, teeth and bones were found in different graves (Fig. 13). Cattle ribs were cleaved and sharp pointed; they were probably used as cards. Chisels are made from dogs' radius and caprine's tibia, when awls comes from caprine's metapodials and carnivore's ulna. One piece is made from a right ulna of a cheetah. Many objects are of ivory (bracelets and shovels), other bracelets comes from big marine gastropods (cf *Charonia*).

Finally, 10 lower third molars of dogs were used as beads (grave 86/126).

To conclude this short contribution, we can see that the data obtained from two Neolithic cemeteries in different areas of the Sudan, testify the importance of animals in funerary rituals, particularly dogs. This animal was probably very useful for the Neolithic pastoralists during their life and a companion after the death (Reinold 2005).

At El Kadada, we have no explanation about the kids buried in the graves when the animal economy is mainly based on sheep. Their signification is yet unknown.

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Desert and the Nile.
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Hassan Mustafa Alkhidir

Jebel El-Khazna – a Late Prehistoric Site in the Fifth Cataract Area

Introduction

The Fotwar area is located at the extreme south of the Fifth Cataract and north of El-Bauga. It is bounded on the south side by El-Jul area and to the north by Al-siliamania area. From the eastern side of the Nile it is bordered by Mebierieka and El-Swiageat and to the western side lies the extended range of the Bayuda Desert Mountains (Fig. 1).

The Nile and steep valleys of surrounding area are the main natural features of the Fotwar area and typical for the Fifth Cataract landscape. The fact that due to its geographical location Fotwar and its surroundings contain mountains as well as plains can be regarded as privileged as it ensured the availability of fertile land and a multiplicity of natural resources. In addition, this area stimulated cultural interaction between the inhabitants of the Nile valley and those of the desert. These inter-regional contacts can be assumed from the prominent position of the Jebel El-Khazna in the landscape as well as from the archaeological materials found at the site. Furthermore, the area of the Fifth Cataract is a very important study area for its geographical location between Central and Northern Sudan, which have been studied independently from each other in the past. Besides, this region is currently subjected to human disturbance manifested in the planned construction of the Al-Shereik dam, which could negatively contribute to the ar-

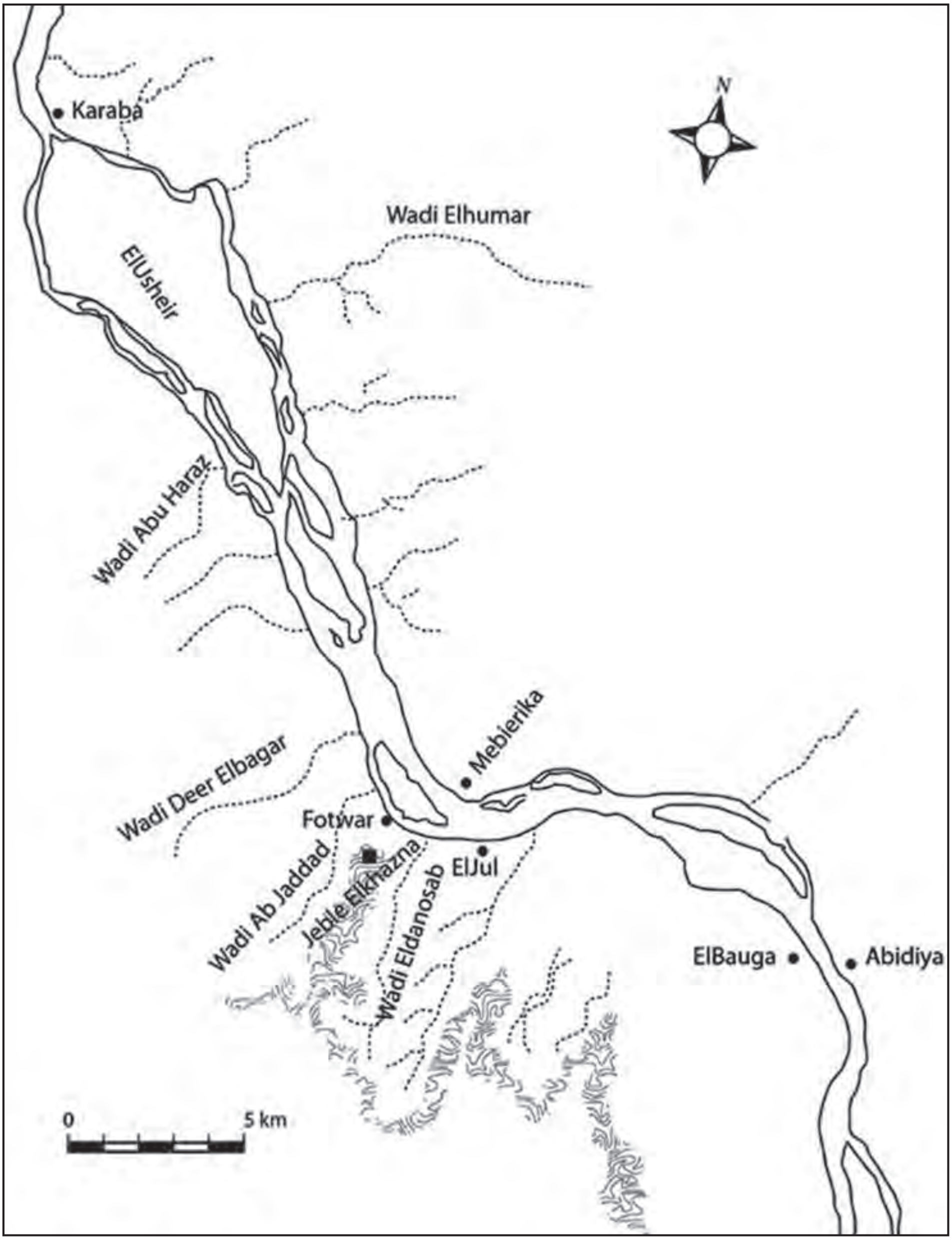

Fig. 1. Fifth Cataract area (acc.to Edwards and Elamin 2000)

chaeological heritage of this landscape given the lack of archaeological studies in the region (Edwards and Elamin 2000: 46).

In December 2011 an archaeological survey was carried out at Fotwar area by the author on behalf of the Archaeological Department of Shendi University. During this survey important archaeological sites were discovered, among them Jebel El-Khazna and other sites dating back to different periods. As a continuation to this study, the Department of Archaeology of the University of Khartoum conducted test pit excavations at the Jebel El-Khazna site to collect archaeological materials, to investigate this site in detail and to study the role of the environmental resources in the area. The Jebel El-Khazna site is located at the southern end of Fotwar, near Um Bala village at a distance of 660 m to the west of the Nile. Eldnosab wadi passes to the south, and to the north-west it is bounded by Khor Um Buwa. The site rises at a height of 353 m a.s.l. and 6 m above its surrounding, covering an area of 360 x 240 m (Fig. 2), with longer axis oriented north-south. The site is situated about 22 km north of the known Paleolithic site of Jebel Nakhro (Arkell 1949: 12). The site's surface is build of the Nubian sandstone formation. Traces of grinding and rock drawings have been found there as well.

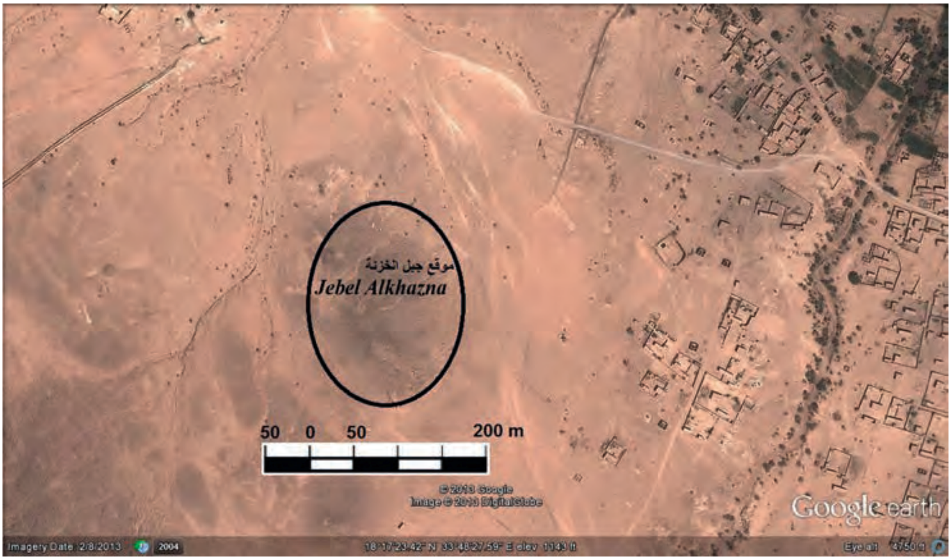

Fig. 2. Aerial photo of the Jebel El-Khazna site

1. Field work

In order to collect material from the surface at the eastern and western part of the site we decided to explore surfaces of two squares (3 x 3 m), while in the third square was excavated to recognize site stratigraphy. The latter was situated in the western part of the site and measured 1.50 x 1.50 meters horizontally and 0.45 meters in depth. The field work yielded a variety of archaeological materials such as stone tools, potsherds and organic remains that have been classified as follows:

2. Stone tools

A large amount of lithic materials has been identified, including finished and unfinished tools and scattered small debitage that can be considered as the evidence of a workshop. The assemblage contains 113 tools, different in shape and type, made out of various raw materials such as quartz, rhyolite, basalt, agate, Nubian sandstone and granite. The raw materials found at the site are quite similar to

Fig. 3. Lithic tools

those reported from the Neolithic site of Shaqadud in the western Butana (Marks and Mohammed-Ali 1991: 23). The typological classification revealed different types of scrapers, burins, hammer stones, borers, denticulated pieces, and geometrically-shaped tools like crescents and lunates (Fig. 3), which are typical for Neolithic industries. Furthermore, the tools were retouched at one side – except for some bifacial scrapers – while some tools had sharp edges, which is similar to Qalaat Shanan tools regarding the form and the retouch of edges (Nassr 2012: 10).

Grinders have been found in different levels from the test pit. One grinder found on the surface could be an early indication for stone ring grinders. Besides, a disc grinder with a diameter of 70 mm was collected, similar to those known from Shaheinab which Arkell had described as mace heads (Arkell 1953: 50). One

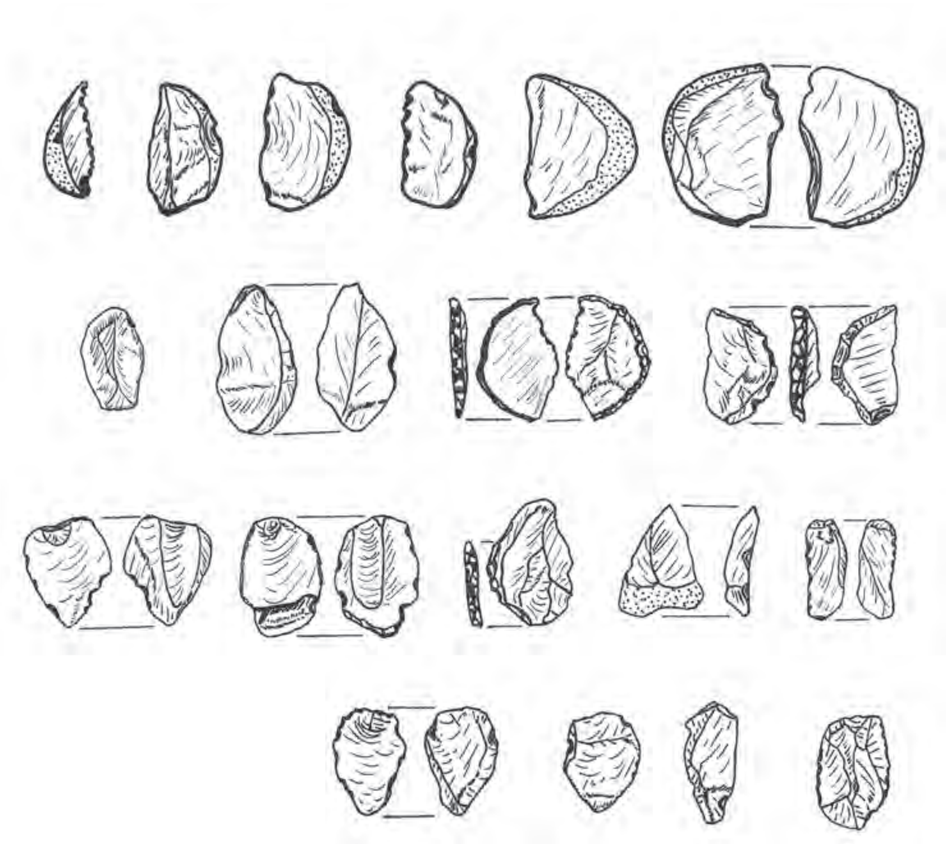

Fig. 4. Stone tools

flint gouge with a sharp end on one side, measuring 55 mm in length and 40 mm in width was found (Fig. 4). It is identical to the Shaheinab gouges that have been described as tools used for carving wooden canoe boats. (Arkell 1953: 25).

3. Pottery

It appears that for pottery manufacturing locally available resources such as clay of different kinds, quartz sands and the black valley soils (containing mica) were used. We have classified our finds into three different kinds of pottery: fine smoothed ware, hard ware and friable ware. depending also on the burning techniques. Accordingly, we have concluded that these kinds of pottery resemble Neolithic pottery found by Mohammed-Ali (1991: 63-66) at the multi-phase site of Shaqadud in the western Butana.

A representative sample of the pottery finds is shown on Fig. 5. For a relative dating we would suggest that although the pottery types from Jebel El-Khazna

Fig. 5. Decorated potsherds

vary in shapes and sizes they are generally similar to those found at Shaheinab site (Arkell1953: 87-88). The study also revealed differences in the firing temperatures. Of 692 identified potsherds 417 are burnished while 275 unburnished. The resulting different colors – among them black, grey, and red, can be explained by the apparent development of the pottery manufacturing techniques similar to those at al-Kadada site in the Shendi region (Geus1984: 32).

A great variety of decoration was recorded: out of total 692 potsherds only 30 pieces without decoration were found. The comb impressed decorations comprised dotted straight and wavy lines as well as curved such as the large dots and complex lines. This type of decoration is in accordance to the general features of Neolithic pottery decoration in Central and Northern Sudan, e.g. at the Kadruka site (Reinold 2001: 37).

Another kind of decorations are curved lines and zigzags impressed with a plain edge tool. Some decorations consisted of a combination of incised lines and dots, with different patterns of large dots, dotted wavy lines, single dots or incise parallel dots (Fig. 5). The incised line decoration is comparable to types known from the sites of Shaheinab (Arkell 1953: 70-72) and Shaqadud (Mohammed-Ali 1991: 68-72) while the single dots with curve line decorations and impressed patterns composed by large and small dots (Fig. 5) are similar to pottery decorations that have been identified in the Shendi area (Sadig 2010: 178).

Besides, there are some indications of earlier pottery (Late Mesolithic and Early Neolithic), similarly to late prehistoric sites noted along Atbara River, namely Aneibis, Ed-Damer and Abu Darbein (Haaland and Magid 1995:42).

4. Organic remains

A large amount of organic materials was excavated at the site and included bones of different size as well as mollusk shells and ostrich eggshells. While it seems that some of the bones belong to big and small ruminants, we have also excavated fish bones such as thorns, heads and thick ribs. The bone materials we found are very similar to those excavated from Al-Gaab basin in Northern Sudan (Tahir 2012: 107). Organic remains included also large quantities of shells of different shapes, size and type, among them specimen of *Pila wernei*, conical in shape (Fig. 6). Some shells have single perforations made to extract eatable content of the shell. This treatment resembles what Arkell observed at shells from the site of Shaheinab (Arkell 1953:23-24). Other shells, that appeared to be larger in size and more elongated, most probably belong to the species *Spathopsis rubens* (Fig. 7).

Fig. 6. Shells of *Pila wernei*, note the piercing hole at the left specimen

Fig. 7. Shells of *Spathopsis rubens*

Other organic remains included circular beads with more than 1 cm in diameter made of ostrich eggshells and may have been used as personal ornaments. These finds also find equivalents in beads types excavated by Arkell at Shaheinab (Arkell 1953:22).

Conclusions

The inhabitants of the site of Jebel El-Khazna were economically depending on local natural resources such as plants and animals which in turn reflects the cultural homogeny between the Nile and the desert. Comparison of the archaeological materials with that of other Neolithic sites in the Nile valley showed that the site Jebel El-Khazna most probably belongs to the Neolithic period and may hence be regarded as one of the most important site of the late prehistoric period that has recently been discovered in the Fifth Cataract area. Furthermore, its resemblance of Neolithic settlements known from Central and Northern Sudan proves large expansion and wide spread of such sites at that time. It seems Jebel El-Khazna may constitute a suitable area to facilitate and enable cultural comparison between Central and Northern Sudan. The biggest problem threatening the archaeological heritage in this area is presently caused by humans: plans for the construction of Al-Shereik dam. During Neolithic times, Jebel El-Khazna was used as a permanent settlement over a certain period of time, during which different activities have been carried out, as shown by numerous archaeological remains excavated from a depth of 45 cm only. Our future plan is to expand archaeological investigations in this area to obtain further data.

Acknowledgments

I would like to express special thanks to Ahmed Hamid Nassr and Mohammed Alfateh Hayati. They have encouraged me and supported my work, including field activities. I am especially grateful to Dr. Annett Dittrich for useful correction of this text and comments. I also would like to thank Hashim Alkhidir and Gemma Tully for their review and language corrrections. Many word of gratitude go to University of Shendi and University of Khartoum and National Corporation for Antiquities and Museums (NCAM) for many years of support.

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Agnieszka Mączyńska

On the Transition Between the Neolithic and Chalcolithic in Lower Egypt and the Origins of the Lower Egyptian Culture: a Pottery Study

Introduction

During the 4th millennium BC, the first traces of significant cultural, social and economic processes including changes in subsistence strategies, social stratification and craft specialization can be observed in archaeological assemblages of the Nile Valley and the Nile Delta. They seem to be of great importance as they laid the foundation for the emergence of the Egyptian State. In the period in question Upper and Lower Egypt were inhabited by fully agricultural societies with a household mode of production. They adapted to the local conditions and created their cultural tradition consisting of material, social, economic and symbolic practices. In the archaeology of the Predynastic period, the societies settled in the south are referred to as Naqada culture. For the northern societies a few different terms are used, including 'Maadi-Buto culture' (e.g. von der Way 1992; Midant-Reynes 2003; Buchez and Midant-Reynes 2007; Hendrickx 2006; Levy and van den Brink 2003), 'Lower Egyptian culture' (e.g. Ciałowicz 2001; Mączyńska 2003; 2011; 2013) and 'Lower Egyptian cultural complex' (Tassie 2014). These two cultural units were separated by an uninhabited "buffer" zone without any traces of occupation in that period. The cultural division of the Predynastic societies, forcing them into a rigid framework of two distinct archaeological cultures, has serious consequences on understanding of the occupation of Egypt in the 4th millennium BC. Over the last 20 years researchers have focused mostly on relations between southern and northern societies, a cultural change often called the Naqada expansion or Naqadan-Lower Egyptian transition and the mechanisms of the emergence of the Egyptian state (i.e. Köhler 2008; Mączyńska 2011; Buchez and Midant-Reynes 2007; 2011). The origins of the Egyptian Chalcolithic societies of the 4th millennium BC lie outside the mainstream of that research. Although most researchers were aware that the ancestors of the Lower Egyptian cultural complex should be looked for in the Neolithic among the Merimde and el-Omari cultures, the poor state of research on this period in the whole of Egypt did not encourage detailed analyses (Mączyńska 2017).

For many years I have been involved in the research on the 4th millennium BC in Lower Egypt, including the Chalcolithic Lower Egyptian culture (LEC). In my publications I presented the state of research and focused mostly on interregional relations between Egypt and the Southern Levant or between Lower and Upper Egypt in this early period (Mączyńska 2004; 2008; 2011; 2013; 2014; 2015). In the recent years my scientific attention was attracted by the Neolithic. As a results of my research on the Neolithic pottery from Lower Egypt I proposed a hypothesis on the existence of a single cultural tradition in Lower Egypt in the Neolithic. The hypothesis was presented at the conference "Egypt at its Origin 5" held in the IFAO in Cairo in April 2014 (Mączyńska 2017). In my studies I have noticed strong cultural links between ceramic assemblages of the Neolithic and Chalcolithic periods in the region. For this very reason I chose to return to researching the Lower Egyptian prehistory and to focus on and explore the transition between the Neolithic and Chalcolithic and the origins of the LEC.

The key objective of this paper is to identify the missing links between the Neolithic and Chalcolithic societies of Lower Egypt on the basis of pottery studies and to present a hypothesis on the origins of the LEC. Pottery was chosen as the main source-base for the analyses presented in this paper as it is the most abundant class of material recovered through archaeological excavations on the Neolithic and Chalcolithic sites and has a great research potential to provide a wide array of information. However I am aware of the limitations of my pottery research. The studied features (i.e. fabric, vessel shapes and surface treatment) are very generic and more detailed analyses have not been carried out. I consider my research as an introduction to a more detailed exploration of this still little known part of the Egyptian prehistory. I really hope that my hypothesis can be either disproved or confirmed in the course of further research.

Moreover in this paper I refer to a new dynamic concept of the archaeological tradition to which the pottery tradition belongs (i.e. Pauketat 2001; Lightfoot 2001; Osborne 2008) and to the factors triggering change or ensuring continuity in the pottery production, proposed by P. Rice (1984).

1. State of research on the transition from the Neolithic to the Chalcolithic in Lower Egypt

In the recent years our knowledge of the LEC has improved thanks to the ongoing excavations at Tell el-Farkha, Sais and Tell el-Iswid. Unfortunately, at none of them the earliest occupation of that complex was registered and the studies have not brought any evidence to enrich the state of research on the beginnings of the LEC. Although at Sais the Neolithic and Chalcolithic occupation was identified and according to the excavators the LEC settlement overlays an earlier Merimde settlement, a 200 years long gap in the occupation between levels dated to Merimde and LEC was observed (Wilson *et al.* 2014). Nonetheless, Sais still seems to be a key site in understanding the transition between the Neolithic and Chalcolithic as the end of Merimde occupation at this site coincides with the oldest layer at Buto (Schicht Ia) (Tassie 2014: 361).

The oldest remains of the LEC presence so far have been registered on the sites at Maadi and Wadi Digla, Heliopolis and Buto (Fig. 1-2; Rizkana and Seeher 1987; 1990; Debono and Mortensen 1988; von der Way 1997). They probably represent only a small share of the actual early Chalcolithic occupation in Lower Egypt. Vessels found at Giza, Tura, el-Staff and Mersa Matruth A/600, identified as belonging probably to the early LEC without a clear and secure archaeological context, confirm a view on a wider extent of the LEC occupation (Bates 1915; 1927; Mortensen 1985:145-147; el-Sanussi and Jones 1997: 241-253; Kaiser and Zaugg 1988:121-124; Habachi and Kaiser 1985:43-46). Obviously, this scarcity of evidence does not make the studies on the origins of this cultural complex any easier. Additionally, a lack of evidence dated to the period between the Neolithic el-Omari culture and the Chalcolithic LEC makes the understanding of the transition between these two periods even more difficult. Despite this, most scholars believe that the beginnings of the Lower Egyptian culture are linked to the influence of multiple early Neolithic cultural traditions, including Merimde and el-Omari (i.e. Levy and van den Brink 2003: 10; Tassie 2014: 362). Moreover some scholars are convinced that the origins of the LEC are also closely linked to another Chacolithic unit – the Moerian, distinguished on the basis of excavations

Fig. 1. Map of Lower Egypt in the Chalcoithic period

in the region of Qasr el-Sagha (Fig. 3). K. Schmidt (1993: 273) and then N. Shirai (2010: 50) linked the Moerian flint assemblage to the LEC. According to N. Shirai (2010: 51) "it seems more probable that these two cultures were actually a single culture and different aspects of a single culture were misinterpreted".

Without doubt, new excavation projects in Lower Egypt focusing on the Prehistoric occupation could help us to understand the relations between the Neolithic Fayumian, the Moerian and the LEC occupation in the region. It is worth mentioning the UCLA-RUG-UOA Fayum project and the TOPOI project "The Neolithic in the Nile Delta", which have not only focused on re-studying old ma-

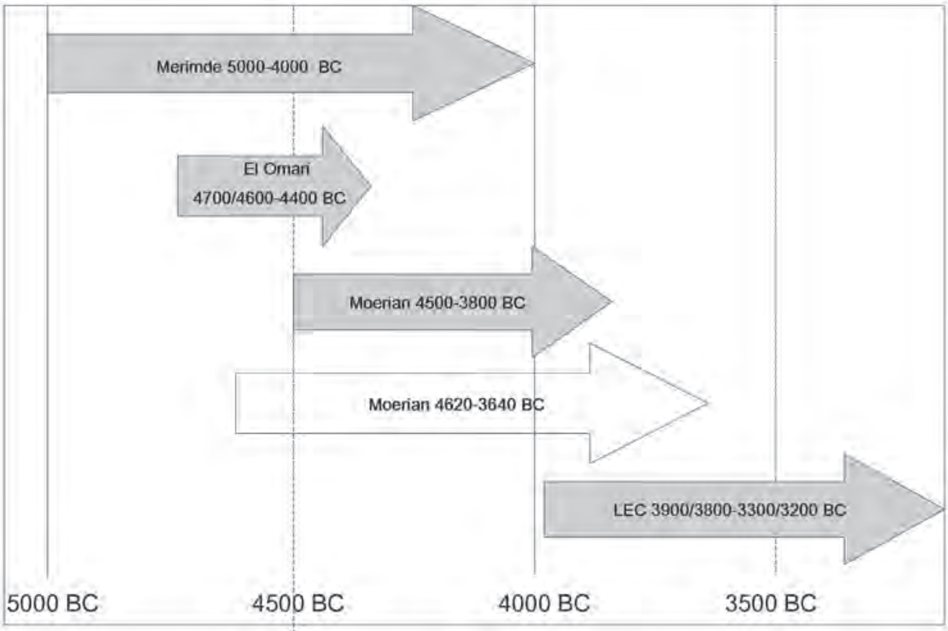

Fig. 2. Chronology of the Lower Egyptian Neolithic and Chalcolithic units (grey arrows according to Hendrick 1999; white arrows according to Shirai 2010)

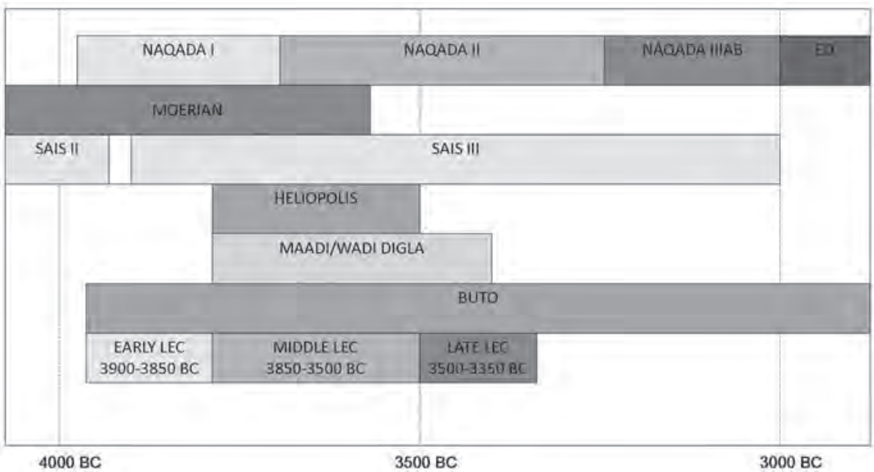

Fig. 3. Correlation of the chronology of the cultural units and the sites in the 4th millenium BC in Lower Egypt

terials, but have also revealed new data thanks to surveys and new excavation (Rowland and Tassie 2015; Rowland and Bertini 2016; Holdaway & Wendrich 2017; Holdaway *et al.* this volume).

Our knowledge on the transition between the Neolithic and Chalcolithic in Lower Egypt and on the origins of the LEC remains poor. The lack of data does not encourage further studies on these two topics. Although most researchers realize that the roots of the LEC should be looked for in the Neolithic, the issue has not been investigated so far. Without doubt, evidence from new excavation projects could be helpful in understanding the cultural situation of this region in the 5th and 4th millennium BC. In my opinion however, some already available data – if analyzed in detail – could help improve our knowledge of the origins of the early Chalcolithic societies of Lower Egypt.

2. Lower Egyptian culture

In my work "The Lower Egyptian communities and their interactions with Southern Levant in the 4th millennium BC" published in 2013 I presented a detailed overview of the LEC in order to provide a background helpful in understanding the relations between the societies of Lower Egypt and the Southern Levant in the period in question. Since then, our knowledge of the LEC has changed. Recent publications of the results of new excavations at Tell el-Iswid (Midant-Reynes and Buchez 2014) and Sais (Wilson *at al.* 2014) contributed new evidence into the discussion. However, our familiarity of the oldest LEC occupation is still based on the results of archaeological works published over 20 years ago (Rizkana and Seeher 1987; 1990; Debono and Mortensen 1988; von der Way 1997).

2.1. Pottery

Studying the oldest LEC pottery is not easy. The analyses of the Maadi ceramic assemblage are based almost solely on complete vessels collected from excavations in the first part of the 20th century (Rizkana and Seeher 1987: 23). As a result, this biased assemblage presents only a fraction of the pottery tradition of the society settled at Maadi. Materials from recent DAI excavations at this site are still awaiting publication[1]. U. Hartung (2004: 339) confirms a more variable character of pottery coming from the German excavations. Also pottery from the graves at

[1] The materials from Buto were published in 2017 after submitting this paper (Hartung *et al.* 2017).

Maadi, Wadi Digla and Heliopolis can be only partially useful in analyzing the ceramic assemblages of the LEC, because of the funeral context in which it was registered. Only the pottery of the oldest Buto layer was studied and published by T. von der Way (1997) in compliance with modern archaeological standards.

Despite limited availability of evidence I decided to study the oldest LEC pottery and compare it to the Neolithic pottery known from Lower Egypt. In my studies I relied on the results of my previous research on the LEC pottery (Mączyńska 2008; 2013) and my recent analyses of the Neolithic pottery from Lower Egypt (Mączyńska 2017). As the ceramic assemblages I am interested in have been analyzed and presented using different methods and in addition detailed data is not always available, in my research I will focus on generic features of the pottery: technology (including fabric) and ware and morphology (including vessel shapes). I am aware that my analyses may seem too basic or too simple in the context of modern theoretical and methodological approaches to ceramic materials. However, this analysis should be treated as preliminary, or even as a first step to further research on the transition between the Neolithic and Chalcolithic in Lower Egypt.

2.1.1. Technology

The earliest LEC pottery was hand-made of local Nile clay tempered with mineral and organic fillers – sand and straw, chaff or even dung. On each site crushed calcite was also identified, but probably as a natural inclusion in the clay or in the sand. Additionally, at the Buto site the pottery of Schicht I contains crushed shells as temper (von der Way 1997: Abb. 44). Pottery surface could be covered by slip and smoothed or burnished. Firing condition were simple and vessels were fired in hearths and simple kilns, at quite low temperatures with little control. After firing, vessel surfaces were hardly ever uniform and ranged from red to reddish brown, brown, and to black, showing variously colored stains. Pottery not covered by slip was rough despite earlier wet smoothing, with many voids caused by burning out of coarse organic temper.

A general overview of the occurrence of wares on LEC sites is difficult to present because of the quality of available data. Similarly, a comparison of ware occurrence between sites is not easy because of varying ware definitions used by scholars[2]. Although similar systems were used in the ceramic analyses at the Maadi settlement and the cemeteries located in nearby Maadi and Wadi Digla,

[2] For details see Mączyńska 2013: 117-120, tab. 17.

different characters and functions of these assemblages could lead to misinterpretation (Rizkana and Seeher 1987; 1990). In my opinion, after taking all these issues into consideration only some general tendencies could be observed in ware occurrence (Fig. 4). First of all, the dominance of pottery with slip over pottery with rough surface on the early sites can be recognized and is accompanied by an increase in rough pottery over time (Rizkana and Seeher 1987: 23-32; Debono and Mortensen 1988: 25; von der Way 1997: 84-88). As the data from the later LEC sites (Tell el-Farkha, Tell el-Iswid, Sais) shows that most of the younger ceramic assemblages are classified as rough ware (for details see Mączyńska 2013: 118; table 17; 2016a), this change in pottery production could have started even earlier. In the opinion of R. Friedman (1994: 905-906), an increase in rough ware could be easily noticed from Naqada I to Naqada II period in the whole of Egypt and is connected with developing specialization. Although in the early Chalcolithic in Lower Egypt the household mode of production dominated and there is no clear evidence implying the presence of workshops, an increase in the amount of rough ware could be linked to the overall increase in pottery production at the time. Rough ware vessels were quicker, cheaper and more efficient to produce than red slip ware vessels. As a result, vessels with rough surface and without

Fig. 4. Percentages of wares at the sites of early phase of LECC

Pottery	Maadi[1]	Buto[2]	Maadi – cemetery[3]	Wadi Digla I[4]	Heliopolis[5]
red slip	ca. 60%	25,2%	46,7%	34,62%	6,21%
black slip	ca. 35%	13,6%	53,3%	55,22%	
smoothed	–	51,7%	–	–	86,21%
yellow slip	ca. 2%	5,5%	–	0,82%	7,58%
others	3%	4%	–	–	–

1 Complete vessels only; red slip – wares Ib and II; black slip – ware 1a; Rizkana & Seeher 1987: fig. 5.

2 The collection of pottery of Schichts I and II; red slip – ware 1c; black slip – ware 1c; smoothed – ware 1a; von der Way 1997: Abb. 52.

3 red slip – wares Ib and II; black slip – ware 1a.

4 red slip – wares Ib and II; black slip – ware 1a.

5 Only 36% of the collection of Heliopolis graves was studied by F. Debono and B. Mortensen (1988).

slip became more numerous over time. It is easy to observe that the repertoire of pottery forms at Neolithic sites is rather unimpressive. However, the number of vessel shapes in the Chalcolithic became higher than in the Neolithic, e.g. at Sais (Wilson *et al.* 2014: 118; fig. 113-114). In addition, a change from multifunctional open vessels to closed vessels with more restricted functions can also be noticed at later Neolithic and early Chalcolithic sites. All these tendencies could be linked to an increase in pottery making and to greater demand, but in my opinion they were also a first step in the process of specialization.

It is also worth mentioning some observation of researchers working with early LEC sites. I. Rizkana and J. Seeher (1990: 78) noticed the dominance of red to brown slip over black slip (ware Ia) in the beginning of the cemetery of Wadi Digla (phase I), together with an increase in pottery covered by black slip (ware II) in the later phase of that cemetery. The authors also mentioned the dominance of black pottery in graves of the younger cemetery at Heliopolis as a representation of the same change in pottery production, despite the fact that slip was registered only on 6.2% of all vessels from graves published by F. Debono and B. Mortensen (1988: 24). At Maadi settlement, red slip pottery dominates over black slip pottery (Rizkana and Seeher 1987: 23-25, fig. 5). At Buto, color change could also be observed among the ceramics in the two first layers dated to LEC. Grayish black pottery (ware Ib) dominates in Schicht I, while reddish-brown vessels (ware Ic) are typical for the later phase of the LEC occupation on the site (von der Way 1997: 86-87). However, this change concerns only the clay surface color, while the slip color remained unchanged in both wares.

Fig. 5. Correlation of the vessel types of the Buto, Maadi and Heliopolis assemblages

Buto	Maadi	Heliopolis
G1a.2	3	
G1a.3	4a	
G1b.2	1a-c, 2	Ia-b
G1b.3	4B, 1a-b	II
G1b.4	1a	V
G2b.2	miniature jars	XII
G3a.1	5a, 5c	VIIb
G3a.3	1c, 6b	
O1a.4	1b	
O2.3	2a, 2b	
O3b.2	2a, 2b	
O3b.3	2, 3	

The changes in slip or clay colors are difficult to interpret. The color of vessel surface including slip depends on firing conditions and the potter's skills to control them. It is possible that some colors could be more or less preferred by certain groups of vessels' users. Interestingly, imitations of Upper Egyptian black topped vessels with clearly defined surface colors were produced at Maadi (Rizkana and Seeher 1987: 27; Mączyńska 2016a). They should be treated as exceptional production of pottery in response to some special demand. To conclude, surface colors of vessels were probably not a chronological marker for the early LEC.

In my opinion, the pottery making process of the Neolithic Lower Egypt bears a strong resemblance to that of the Chalcolithic. At Merimde III and Sais I the local Nile clay was used to make vessels. At Merimde straw and sand were added to clay as temper. Moreover I. Rizkana and J. Seeher (1987: 25) mentioned the opinion of J. Eiwanger about the presence of dung temper in Merimde pottery. At Sais I, untempered Nile silt was the dominant raw material (Wilson *et al.* 2014: 94, tab. 29). The use of clay without intentionally added fillers is also characteristic for Merimde I, contemporary with Sais Ia (Eiwanger 1984: 18-24). However, untendered pottery is dominant also in Sais Ib, contemporary to the el-Omari culture and to later Merimde phases, as well as in phase II, when it bears traces of both traditions – the Neolithic and the Chalcolithic. Local raw materials other than the Nile clay were used for making pottery only by the el-Omari and Moerian cultures (Debono and Mortensen 1990: 25; Ginter and Kozłowski 1983: 67). Analyzing this stage of pottery production, the process of adaptation to the local environment and its resources can be easily recognized. Physical distance to resources is one of the factors influencing pottery production. People from Wadi Hof, from the region of Qasr el-Sagha, Merimde and Sais used clays easily available in their respective area. According to F. Debono and B. Mortensen (1988: 36) who also registered some sherds made of Nile silt on el-Omari sites, local potters probably also knew this clay, but did not use it because of the distance. The use of local resources could also be reconsidered as a reason for the presence of crushed shell temper in the pottery of layer I at Buto, located not far from the sea shore (von der Way 1997: 87-88). It is still not clear if the use of untempered pottery at Sais could be interpreted resulting from adaptation to local condition. So far, it is the only site with untempered pottery dated to the later Neolithic and probably the early Chalcolithic.

Studies of pottery from the Neolithic and early Chalcolithic sites also show some similarities in the occurrence of different wares. From Merimde II on, one notices a decline in fine polished ware and an increase in smoothed surface vessels which could be classified as rough ware[3]. In Merimde III red slip dominates over

[3] Definition of rough ware according to Mączyńska 2013: 118, tab. 17.

grey and black (Eiwanger 1988: 15-18, Abb. 7; 1992: 14-19, Abb. 4-6; Mączyńska 2017 a). A similar tendency could be noticed among materials of the el-Omari culture with dominance of smoothed pottery over polished. For both wares brown color of slip is the most common (Debono and Mortensen 1988: 27-33, tab. 2). At Sais in the Neolithic layers Ia and Ib the predominance of fine untempered ware can be easily noticed (Wilson *et al.* 2014: 94, tab. 29). However, in the Predynastic layers (Sais III) fine ware decreased and fine to medium tempered ware accounts for approx. 85% of all pottery. Coarse pottery at Sais accounts for less than 5% in all phases. The tendency to change from fine ware to medium or rough ware could also be visible at Sais. Additionally, over time it is easy to observe a general decline in pottery covered by red, brown or black slip, accompanied by an increase in uncoated pottery. Moreover, in the case of the Sais site red-slip polished vessels are the most common in phase I, whereas in phases II and III more brown-slip polished vessels were registered (Wilson *et al.* 2014: 92-99; Tabs. 29, 32). On the Moerian sites only rough ware was registered but due to a small sample of ceramic material this observation could be misinterpreted. Moreover, this site being younger, the ceramic assemblage is more associated to the Chalcolithic. Moerian pottery colors range from red and brown to black, without any dominant coloration (Ginter and Kozłowski 1983).

Taking into account these data it is easy to notice the same growing trend in smoothed/medium rough ware and a decrease in fine polished ware, both in the Neolithic and Chalcolithic. This change was probably caused by the development of pottery production including more efficient methods, an increased number of vessel shapes or improvement in potters' skills. Furthermore, we cannot exclude a greater demand for ceramic vessels in societies becoming more and more dependent on agriculture. In my opinion these tendencies could constitute an initial step in the specialization process, which ultimately led to the emergence of pottery workshops in the later Predynastic period in Egypt.

The presented evidence also shows that there was no convergence in pottery color between the periods in questions. It seems probable that users' preferences/demand and potters' skills influenced the range of colors registered on the sites in the Neolithic and the Chalcolithic. A good example can also be observed in the el-Omari culture, where potters mixed clay with ochre, easily available locally, to obtain red, reddish-brown color, not natural for the calcareous clay, but typical for the Nile silt (Debono and Mortensen 1990: 25; Hamroush and Abu Zied 1990: 117–127).

2.1.2. Morphology

Pottery shapes registered on Neolithic and early Chalcolithic sites are not easy to analyze because of the quality and quantity of the data mentioned above. The ceramic assemblage from Maadi consists mostly of complete vessels, which is unique on settlement sites excavated according to modern standards. The occurrence of vessel shapes in graves of the cemeteries at Maadi, Wadi Digla and Heliopolis also represents only part of the ceramic repertoire used on the settlement sites. Pottery from these cemeteries could be helpful, but only when its special context is taken into consideration. Without doubt, the assemblages from LEC sites share some types of closed and open vessels (von der Way 1997: 89-94). Unfortunately, due to the partial character of the assemblage from the Maadi settlement any quantitative comparisons of the type occurrence with the materials from Buto are difficult or even impossible. Despite these difficulties I decided to use whatever evidence is available to compare pottery shapes not requiring detailed figures. Figure 5 presents some parallel types of vessels from Buto, Maadi and Heliopolis. Unfortunately, as most of them could be with or without slip it is hard to notice a close correlation between wares and types from both sites, even though such correlation is present for Maadi and Buto separately (Rizkana and Seeher 1987: 33, fig. 33; von der Way 1997: 94, Taf. 5).

Pottery types found in graves at Maadi, Wadi Digla and Heliopolis could be easily recognized on both known settlement sites as they were utilitarian vessels before they were put in graves as offerings. The traces on vessels from the graves confirm their earlier household use. By comparing the occurrence of different shapes in graves on these three cemeteries it is possible to notice some small differences and similarities (Fig. 5). At Heliopolis, 10 different types could be recognized among grave offerings, with types I and II being the most common (Debono and Mortensen 1988: 25-29). Among burial offerings from the Maadi cemetery only vessel 5 types are known (1a, 3b, 4a, 4b and 5a) with type 5a, similar to Heliopolis types I and II, being the most prominently represented (Rizkana and Seeher 1992: 27, fig. 9). At Wadi Digla the shapes registered in graves are more numerous than at Maadi (10 types). However type 5 vessels were also the most common offering (Rizkana and Seeher 1992: 78-88). Both differences and similarities between the cemeteries could be caused by many reasons including chronology and factors unknown to researchers, such as group preferences or symbolic meanings.

To conclude, it is impossible to present any general view of the settlement pottery characteristic for the early LEC phase. I am able to identify only some parallels in pottery shapes, which makes all comparisons with Neolithic assemblages

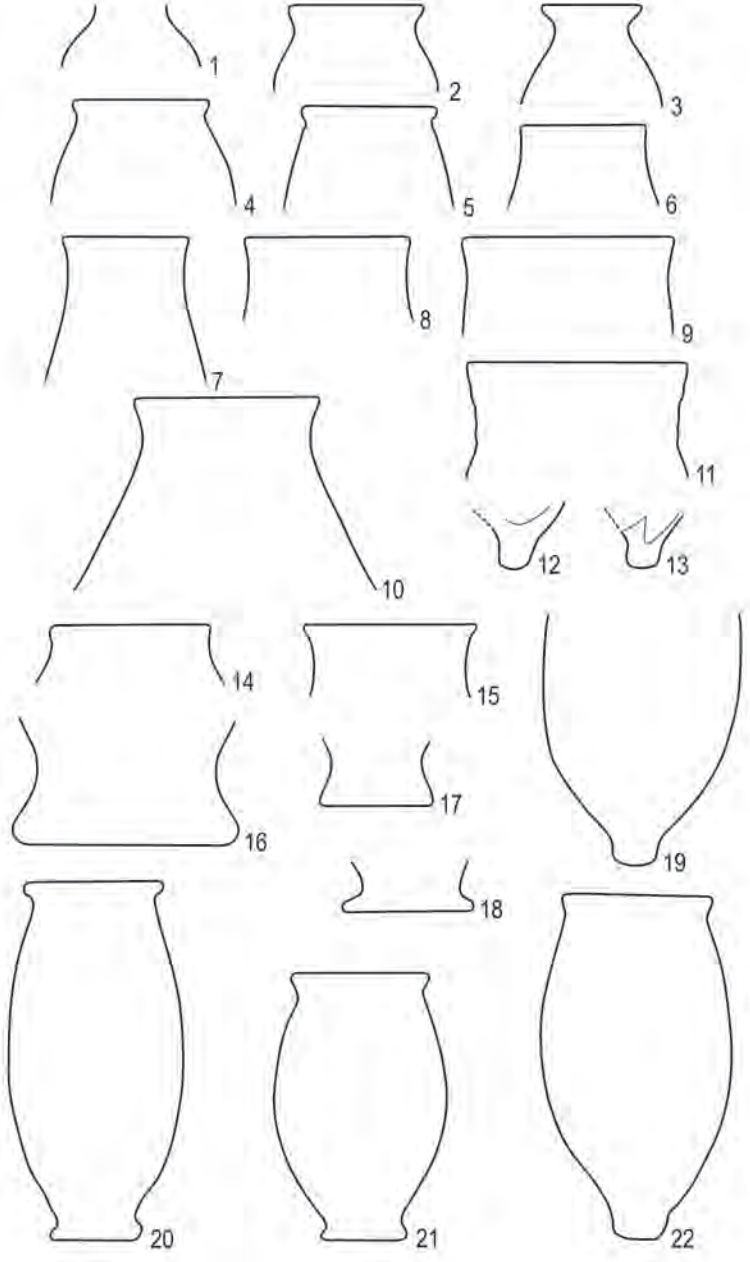

Fig. 6. Vessel forms of the the Lower Egyptian Neolithic and Chalcolithic sites: 1-2 – Qasr el-Sagha; 3-5, 9, 11, 16-18 – Buto; 6-8, 12 – Merimde III; 10, 13, 14-15 – el-Omari; 19-22 – Maadi (Debono and Mortensen 1988; Ginter and Kozłowski 1983; Eiwanger 1992; Rizkana and Seeher 1987; preparation: A. Mączyńska; drawings: J. Kędelska; not in a scale)

difficult. However, taking into consideration their chronological and territorial proximity, this situation is likely to have resulted from the character of archaeological assemblages. In my opinion all known sites – settlements and cemeteries – bear some affinity to each other in terms of pottery shapes, which allows one to treat them as belonging to a common pottery tradition.

The similarities between Chalcolithic and the Neolithic pottery shapes were noticed by researchers working on the materials from Maadi. According to I. Rizkana and J. Seeher (1987: 64-66) parallels in pottery from Maadi and Merimde sites can be found in the younger phases of Merimde. The researchers indicated similarities in the fabric (chaff temper), surface treatment (grey and black-burnished pottery) and vessel shapes (jars with ogival rims, bowls of type 1a and b; ring bases, double-vessels). However, this comparison was made exclusively on the basis of pottery from Merimde published by H. Junker (1929) and H. Larsen (1962) and did not include the materials published later. It is worth mentioning that J. Eiwanger (1992: 75) also indicated general similarities in vessel forms between both sites. I. Rizkana and J. Seeher (1987: 63-64) also compared Maadi pottery to el-Omari materials published by F. Debono and B. Mortensen (Debono 1948; 1956). Similarities in fabric and pottery shapes found by them allowed to treat the el-Omari culture as "a direct predecessor of Maadi, probably only a few centuries older." (Rizkana and Seeher 1987: 64). According to F. Debono and B. Mortensen (1990: 39) the pottery from Maadi and el-Omari represents the same late Neolithic pottery tradition. A few vessel forms (oval basins and small red jars) indicate a connection between both sites. Moreover, in the researchers' opinion local black-topped ware known from Maadi and el-Omari fits well the local development of that tradition. In my opinion however, black-topped vessels from el-Omari culture should be revised as they could be also interpreted as cooking pots blackened by fire or soot.

In my opinion some other similarities could be notices between jars with S-shaped profile known from Buto (Fig. 6:9, 11; special forms; von der Way 1997: Taf. 36:7, 10), Merimde III (Fig. 6:6-8; Eiwanger 1992: Taf. 18) and el-Omari (Fig. 6:10; 14-15; group 2; Debono and Mortensen 1990: Pl. 2: 1-12). Moreover small jars with a simple rim everted to the outside from Buto (Fig. 6:3-5; von der Way 1997: Taf. 2; types G1a.3, G1b.1-3;) resemble a vessel registered at Qasr el-Sagha (Fig. 6:1-2; Ginter and Kozłowski 1983: fig. 34: 7-8). In both periods ring bases appeared at: Merimde III (Eiwanger 1992: Taf. 19); Maadi (Fig. 6:20-21; Rizkana and Seeher 1987: pls. 1-4) and Buto (Fig. 6:16-18; von der Way 1997: Taf. 34: 8-13). It worth mentioning that ring bases are also present among Fayumian pottery (Caton-Thompson and Gardner

1934). Also pointed bases known from phase III of Merimde and el-Omari (Fig. 6:12-13; Debono and Mortensen 1990: pl. 14; Eiwanger 1992: Taf. 40) were registered on the Maadi site (Fig. 6:19, 22; Rizkana and Seeher 1987: pl. 5: 2, 4, 6).

In the context of possible cultural continuity between the Neolithic and the Chalcolithic in Lower Egypt it is also important to mention materials from Sais where the occupation from both periods was registered with a 200-year gap between them. Sais remains to be the most likely site for understanding the transition between the Neolithic and the Chalcolithic. Although phase I is dated to the Neolithic, phase II reflects a mixture of the Neolithic and LEC materials, which could be helpful in understanding the cultural change on the site. However, in the opinion of P. Wilson the overall character of Sais II is Neolithic with younger materials integrated into it (Wilson *et al.* 2014: 109, 159-174). The available evidence does not allow one to answer the question whether there was a single transition between these two periods or the site was resettled after a period of abandonment. Pottery shapes known from Sais I and II have their analogies on the Neolithic sites at Merimde or el-Omari (Wilson *et al.* 2014: 109-125). Although for each phase has its unique repertoire of vessels form, some of them are represented in all Sais phases, thus indicating a long tradition of their use (Wilson *et al.* 2014: 101-125, figs. 113-114). Among open forms, conical bowls with a direct rim or bowls with concave interiors should be mentioned. They are typical for both the other Neolithic sites in Lower Egypt and the later sites of the Predynastic period. Other vessel shapes – bowls with thickened and everted rims should be also focused on as they are not known in the Neolithic context of other sites. This shape first appears in Sais I, occurs among materials of Sais II, but is the most typical for Sais III. According to the researcher this type could be a precursor of later forms characteristic for the Predynastic occupation of the site. The same goes for big vats and platters. The number of closed forms in the Neolithic layers of the site is limited to 2 types only, occurring also in younger layers of the site – the most numerous ovoid jars/rounded bowls (type 12 – 40% of diagnostic sherds) and few examples of broad jars. In the layers of Sais II and III the number of vessel types increased among both closed and open types. Since the problem of continuity on the sites is not fully explained, it is difficult to interpret the presences of some forms among materials from all phases. Their extended use could have resulted from a simple mode of production, multifunctional character or being part of the local pottery tradition transmitted through generations in this region. Despite the possible gap in its occupation, the site could have been resettled by groups belonging to the same or a similar cultural tradition including pottery production.

Lower Egypt could have been settled by groups adapted to local conditions, sharing certain characteristics, and pottery production could have been one of them. Available evidence on the Chalcolithic occupation in this region is poor and does not seem to reflect the actual situation in the past, but rather the state of research. Some small discoveries in northern Egypt indicated a denser settlement pattern in both the Neolithic and the Chalcolithic. It is worth mentioning the presence of the so called lemon-shaped jars in the ceramic assemblage registered by Z. Hawass in 1976 at Merimde Beni Salame (Fig. 7:8-10; Hawass *et al.* 1988: fig. 3:12–14), similar to vessels known from Maadi (Fig. 7:5-7; Rizkana and Seeher 1987: pls. 6-7). This particular vessel type known from many Lower and Upper Egyptian sites of Naqada II period is sometimes treated as cultural markers of LEC (Buchez and Midant-Reynes 2007; 2011; Köhler 2008; 2014; Mączyńska 2016a). Despite unclear cultural affinity, the presence of lemon-shaped jars at Merimde, a site best known for its Neolithic occupation, implies that the occupation of the Chalcolithic societies in the north was wider than indicated by known LEC sites. Moreover, it seems likely that the settling preferences of the Neolithic and Chacolitic groups were similar. In this context two jars registered by E. Caton-Thompson and E. Gardner (Fig. 7:3-4; 1934: LII:7-8) in the region of Fayum similar to Maadi type 4b should also be mentioned (Fig. 7:1-2; Rizkana and Seehre 1987: pls. 8-9) . Although they are not linked to the Neolithic occupation, they could also indicate the presence of the Chalcolithic occupation in this part of Lower Egypt. This observation could be important in the light of the Moerian finds in this region and the possible links between the Moerian and the LEC. An analysis of the ceramic assemblage of the Moerian sites could reveal some features known from Maadi pottery. A jar with a vertical neck and a slightly everted rim (Fig. 7:11; Ginter and Kozłowski 1983: fig. 36:4) resembles jars of Maadi type 5c (Fig. 7:14; Rizkana and Seeher 1987: pls. 22–23). A conical vessel body from the QSVIIA/80 could also be a fragment of this type of jar (Ginter and Kozłowski 1983: 35). The links between the Moerian and LEC can also be noticed in the flint assemblage (Shirai 2010: 50; Schmidt 1993: 273).

Finally, in the research on the links between the Neolithic and the Chalcolithic, pottery from other sites not clearly affiliated to LEC could also be useful. According to Williams (1982: 216-219; 221) pottery found in some pits and graves at Sedment-Mayana/Sedmen J revealed the coexistence of features associated with cultural traditions of the Neolithic and Chalcolithic. Small jars with a short vertical neck or an everted rim (Fig. 7:17-20; Williams 1982: fig. 3; Kaiser 1985: Abb. 3: 6–10) are similar to those of Groups I and III of the el-Omari site (Fig. 7:15-16; Debono and Mortensen 1990: 37),

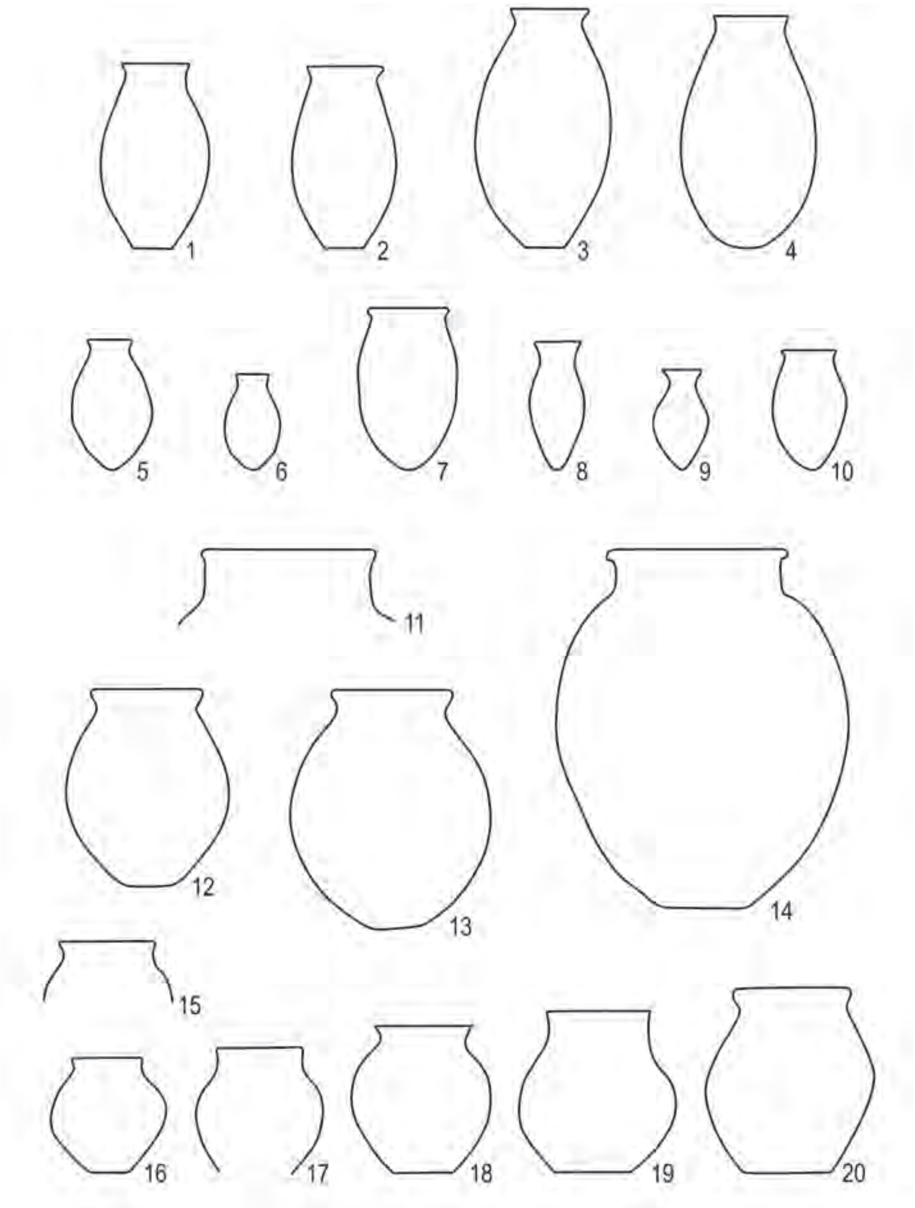

Fig. 7. Vessel forms of the the Lower Egyptian Neolithic sites: 1-2, 5-7, 12-14 – Maadi; 3-4 – Fayum; 8-10 – Merimde Beni Salame; 11 – Qasr el-Sagha; 15-16 – el-Omari, 17-20 – Sedment J (Caton-Thompson and Gardner 1934; Debono and Mortensen 1988; Ginter and Kozłowski 1983; Hawass *et al.* 1988; Rizkana and Seeher 1987; Wiliams 1982; preparation: A. Mączyńska; drawings: J. Kędelska; not in a scale)

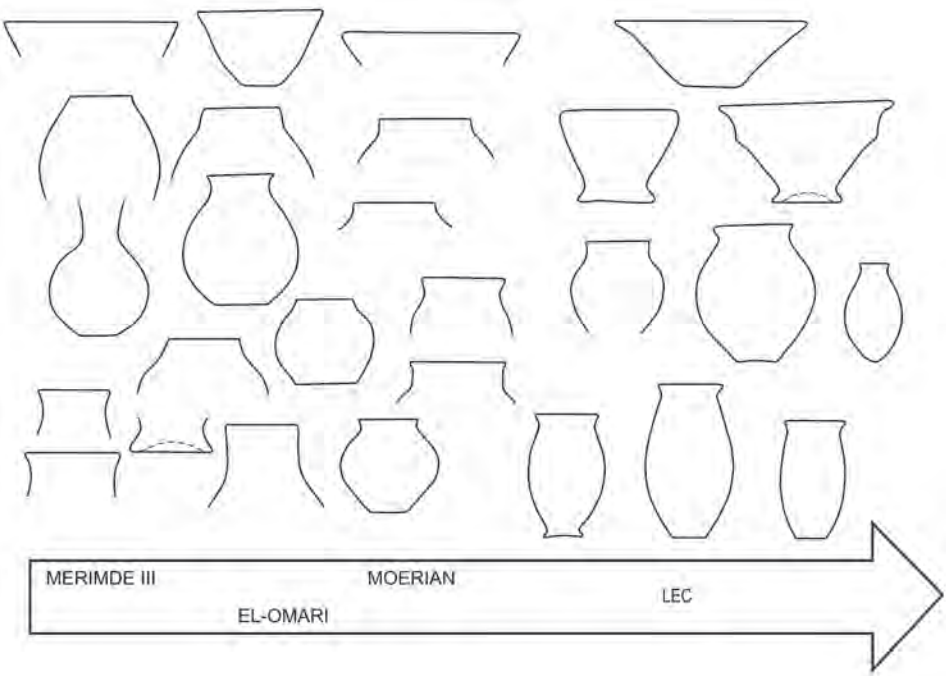

Fig. 8. Development of vessels shapes in the Neolithic/Chalcolithic period in Lower Egypt (preparation: A. Mączyńska; drawings: J. Kędelska)

vessels from QSVIIA/80 (Ginter and Kozłowski 1983: fig. 35: 3, 6) and Maadi small globular jars of type 5a (Fig. 7:12-13; Rizkana and Seeher 1997: pls. 12–19). Additionally, a bottle with a long neck similar to those from Merimde III was found (Williams 1982: fig. 2, 4:22; Kaiser 1985: Abb. 3: 22). At Sedment-Mayana/Sedmen J there are also conical bowls, occurring at Lower Egyptian sites from the Neolithic times through the entire Predynastic period (Kaiser 1985: Abb. 3: 2–3).

To conclude, although the Neolithic and Chalcolithic assemblages present different ranges of forms, some of them could be identified in both periods. Most parallels could be identified among open forms from both periods, as they were multifunctional utilitarian utensils. Among jars these parallels seem to be rarer. In the Neolithic assemblages open forms prevail over closed forms. In the latter part of the Neolithic we can observe an increase in the number of closed forms. At Maadi, more than 90% of preserved vessels are jars, but this situation results from the partial character of the whole Maadi assemblage, consisting mostly of complete vessels. At Buto I and II both forms are represented in similar numbers (von der Way 1997: 88). The emergence of new closed forms resulted from the development of the pottery tradition, well visible among the Sais ceramic assemblage.

3. Transition from the Neolithic to the Chalcolithic in Lower Egypt: cultural change or continuity?

The stages in the pottery making process, including procurement of raw materials, followed by forming and firing vessels depended *inter alia* on the quality of and distance to resources, social structure and organization, subsistence system, climate, degree of sedentariness, population density and demand (Arnold 1989; Orton *et al.* 2010: 114, tab. 10.1). The available evidence does not show any significant environmental or climatic changes in Lower Egypt between the 5th and the 4th millennium BC. However, some local changes influencing the settlement pattern can be observed (e.g. abandonment of Merimde after phase I or possible abandonment of Sais during phase 2). Although these changes forced people to move, they probably did not seriously affect their way of life. People continued to make pottery in a similar way using the same raw materials as clay or temper. Without doubt potters gained more experience and their skills improved through time. They were able to make more elaborated vessel shapes and to control firing conditions to obtain the desired surface color. The pottery tradition including potters' know-how and pottery making techniques could be transmitted, learned, invented, created or inherited from generation to generation. The changes that the pottery tradition underwent over time and space, influenced by many cultural factors, account for differences between Neolithic and Chalcolithic pottery. By analyzing the pottery tradition of the Neolithic and early Chalcolithic we are able to track partly its development over time and also to notice some constant elements. On the one hand, the use of local resources, simple mode of production and firing, restricted repertoire of forms typical for household mode of pottery production are typical for both periods. The use of some vessel shapes in both periods could also be an element of the common pottery tradition. On the other hand, the increase in rough pottery accompanied by the decrease in polished pottery covered by slip and the increase in the number of vessel shapes in the Chalcolithic could be treated as changes and steps in the tradition's development. Analyses of the pottery tradition of the Neolithic and Chalcolithic show its dynamic character very clearly. In my opinion, the common cultural tradition linked both periods and the available data indicates the continuity of the pottery tradition between the 5th and the 4th millennium BC.

In the studies on the continuity of the pottery tradition some observations concerning the relation between pottery production and cultural change made by P. Rice (1984) could also be helpful. The researcher proposed a list of factors influencing stability and/or change in pottery production, including recourses, efficiency, diet, ritual or ceremonial behavior, values, social/economic status/ organization and market demand (Rice 1984: 241-255, tab. 2). According to P. Rice, pottery does respond to cultural change, but this response is 'subtle and gradual'. Moreover, changes in pottery do not reflect cultural change in a reliable and predictable manner (Rice 1984: 234 after Ehrlich 1965: 13 and Grieder 1975: 850).

In my opinion the cultural boundary between the Neolithic and Chalcolithic is artificial and was distinguished only on the basis on archaeological records. The same goes for the existing framework of archaeological cultures. Neither reflects the actual cultural situation in the past and they are merely an archaeological interpretation of the remains of past societies (see Mączyńska 2017). We can observe the continuity of the pottery tradition between both periods.

In my research on the Neolithic and early Chalcolithic pottery I chose to identify and analyze the factors proposed by P. Rice that account for continuity or change in pottery assemblages. According to her, adaptation to resources is one of the reasons for stability (Rice 1984: 241-244; 2005: 462). Clay, temper and fuel are fixed locally and potters adapt to their properties. All innovations involve the risk of failure, which is why potters are quite conservative and less likely to innovate. Changes can be caused by various situations: exhaustion or inaccessibility of e.g. clays, temper, availability of new resources, forced resettlement of potters, environmental change or natural disaster. The availability of local resources promoted stability in the pottery-making system in the Neolithic and early Chalcolithic. Moreover, pottery manufacturing efficiency / technique known in the period in question also promoted stability. The household mode of pottery-making, in which vessels were made for domestic purposes seems to have been resistant to change. Production and firing techniques were simple, requiring only basic skills.

It is worth analyzing two other factors closely related to each other – diet and demand. Utilitarian vessels are very often described as being the most resistant to change as they have little or even no symbolic meaning (Rice 2005: 45). The mode of their use and their content change little, even during and after a cultural change. The most change-resistant are water and cooking vessels, which make the majority of the ceramic assemblages on the Neolithic and early Chalcolithic sites. Their fabrics and shapes depend mostly on their function. In my opinion, the similarity of the Neolithic and early Chalcolithic utilitarian ceramic assemblages resulted from their similar function. Moreover, the change in the number of used forms and the well visible development of vessels from open towards closed forms in the later Neolithic and early Chalcolithic could result from changes in function, diet and demand. Evidence from Chalcolithic sites shows that LEC economy was fully based on farming and animal breeding (Mączyńska 2013: 101-106), while in the Neolithic wild recourses were still an important supplement in the diet. The more differentiated repertoire of forms on younger sites could reflect a shift from multifunctional vessels towards containers used for specific functions/products. The limited number of vessel shapes in both periods could influenced the use of utilitarian vessels as grave offerings. Burial customs in both periods were very simple with only single grave goods (or with no grave goods altogether), which probably had been previously used by the dead or their relatives.

To conclude, when analyzing the pottery-making system of Neolithic and Chalcolithic societies, it is easy to recognize the stability of the system. In my opinion, mostly stability promoting factors could be identified. Our limited knowledge on the early Prehistory of Lower Egypt does not allow us to analyze other factors proposed by P. Rice, such as ritual or ceremonial behavior and values. However, my research on the later phases of the LEC pottery shows that the pottery tradition changed as new change-promoting factors emerged in the later part of the 4th millennium BC (Mączyńska 2016b).

4. Conclusion: the origins of the LEC

In my opinion the origins of the LEC are closely linked to the Neolithic societies of Lower Egypt. For many years in the archaeology of Lower Egypt there was a time gap between el-Omari culture and LEC, with no finds dated to that period. The recent excavations at Sais showed that the end of Merimde occupation is dated to 3900 BC, when LEC occupation at Buto started. However, it is still really difficult to propose any hypothesis on the beginning of LEC occupation in this region. According to G. Tassie (2014: 361), LEC occupation did not appear simultaneously in the whole of Lower Egypt and it radiated from the western Delta. However, since only a few sites are known, data interpretation is far from easy. The territorial and chronological proximity of the Neolithic and Chalcolithic settlers in Lower Egypt allows one to link them to the same cultural tradition. The ancestors of LEC should be looked for within the Neolithic societies of Lower Egypt.

The pottery tradition is part of a cultural tradition and its analyses could give answers to questions concerning its continuity between the Neolithic and the Chalcolithic. My analyses show that ceramic assemblages from both periods differ, but they also indicate some common characteristics which could be explained as a result of a common cultural background of the societies occupying the region in question in the 5th and 4th millennium BC (Fig. 8). The adaptation to and the use of local resources, simple pottery making techniques, limited number of vessels shapes and household mode of production can all be observed in both periods. Moreover, looking beyond the pottery tradition it is not difficult to notice that the societies from both periods also shared some other technologies (e.g. flint production), practices (e.g. burial custom), social structure (egalitarianism) and economy (farming and animal breeding) (Mączyńska 2013; 2017). This Lower Egyptian cultural tradition developed over time and underwent dynamic changes. As a result, the Neolithic and Chalcolithic societies have their unique characteristics distinguishing them from each other. On the one hand, the Chalcolithic produced more differentiated ceramic assemblages, buried their dead in separate areas outside settlements and relied fully on agricultures. But on the other hand, they still made vessels in the same way and used a few of the same shapes, equipped the dead with only a few offerings used before in household activities. They also cultivated and ate the same cereals and kept and used the same animals.

I am aware that my observations are tentative and should be confirmed by further studies on materials other than pottery, including more detailed analyses of social, economic and symbolic systems. However, the first step is always better than no step at all. I hope that my analyses can provoke a discussion on the cultural situation in Lower Egypt in this early period. It requires going beyond the secure framework of archaeological cultures, which makes it difficult to understand early occupation of Egypt. We have to keep in mind that the Neolithic and Chalcolithic societies were the ancestors of the Ancient Egyptian and the foundation of the Egyptian state were created in these very periods.

Acknowledgements

This paper was prepared as part of the 'The development of the early Neolithic societies in Lower Egypt during 5th millennium BC and their interactions with the Southern Levant' project financed by National Science Centre (No. 2014/13/B/HS3/04874).

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Desert and the Nile.
Prehistory of the Nile Basin and the Sahara.
Papers in honour of Fred Wendorf
Studies in African Archaeology 15
Poznań Archaeological Museum 2018

Dorian Vanhulle

Preliminary Observations on Some Naqadian Boat Models. A Glimpse of a Discrete Ideological Process in Pre-pharaonic Arts

The boat is ubiquitous in Naqadian artistic productions, where it embodies various ideological concepts (Williams *et al.* 1987; Hendrickx and Eyckerman 2010: 127-133). Although this fact is well known, many questions remain open. An holistic approach that encompasses all the data available concerning the boat, both as a means of transport and as an iconographic motif, can shed some light on the process that leads it to express important ideological notions during the 4th millennium B.C.[1]

Because it would be impossible to consider the whole subject in these few pages, it is necessary to narrow it down to a more specific discussion. This paper presents preliminary observations concerning several boat models and suggests some possible correlations between this production and other categories of sources. Then, it briefly discusses the diachrony of the process mentioned above, which is both ideological and artistic.

[1] This research was the subject of a PhD thesis conducted at the Université libre de Bruxelles under the supervision of Dr Laurent Bavay.

1. Boat Models from the Predynastic Period

Generally considered to be an offering to the dead, allowing the deceased to travel to and in the other world (De Morgan 1920; Petrie 1920: 8), or even to be mere toys (Vandier 1952: 149; Hayes 1965: 107 *contra* Kromer and Badawi 1980: 270), boat models are most often poorly published and badly dated. Despite some exceptions (Brunner-Traut 1975; Kromer and Badawi 1980; Vinson 1987: 162--177), they were mainly studied for the information they provide on naval architecture (Reisner 1913: xvii-xviii, 20-21, Fig. 88-90, pl.VI.4814-4816; Landström 1970: 11-25; Merriman 2011).

Among the 250 exemplars documented in the context of our PhD, 194 are in baked clay, 8 are in unbaked clay, 7 are in wood, 1 is in basketry, 30 are in ivory and 10 are in various stones. Models that have been manufactured in these last two materials are not older than Naqada III and are typical of the Early Dynastic Period. This paper focuses on some models currently kept in the Petrie Museum in London, in the Museum of Archaeology and Anthropology in Cambridge and in the Ashmolean Museum in Oxford[2].

2. Models from the Petrie Museum: a new category of ceremonial barque?

UC16287[3] (Fig. 1) is made of baked clay. It is flat bottomed and the upper half of the hull is hollowed. The prow is strongly incurved and a horizontal element protrudes from its extremity. The stern is slightly incurved and its extremity is directed outwards. It looks like a schematic “S”. The clay is of a reddish-brown colour and the object shows some traces of exposure to the fire. UC16288[4] (Fig. 2) is very similar to UC16287, albeit larger and completely hollowed. Its outer surface is smooth and still covered with an ochre slip. Despite the fact that the extremity of the prow is now lost, what can still be seen of it confirms that the horizontal

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2 We would like to express our gratitude to P. Hedvisq (curatorial Assistant at the Petrie Museum, London), L. McNamara (assistant Keeper for Ancient Egypt and Sudan at the Ashmolean Museum, Oxford) and I. Gunn (collections Manager for the Museum of Archaeology and Anthropology, University of Cambridge) for giving us access to those models and for their kind welcome.

3 ca 11,5 cm long, ca 2,5 cm wide, ca 4,5 cm high (Petrie 1920: 42, Pl. XLVII.4; Petrie 1933: 6, Fig. 16; Kromer and Badawi 1980: 263, Fig.1.3; Merriman 2011: 141.9).

4 ca 24 cm long, ca 6,10 cm wide, ca 9,4 cm high (Petrie 1920: 42, Pl. LXVII.5; Petrie 1933: 6, Fig. 17; Kromer and Badawi 1980: 263, Fig. 1.4; Merriman 2011: 142.10).

Fig. 1. Model UC16287 (photo: D. Vanhulle)

Fig. 2. Model UC16288 (photo: D. Vanhulle)

feature also existed on this model. The stern is also higher than the prow and "S-shaped". UC16289[5] (Fig. 3) is smaller than the previous ones and, at first sight, quite different. Its body is rounded. However, the general features are similar since one extremity is completely incurved and flattened at its apex. The stern has not survived but its base suggests that it rose vertically. Traces of exposure to fire after the original baking are also visible on this exemplar.

[5] ca 8,3 cm long, ca 1,9 cm wide, ca 1,8 cm high (Petrie 1920: 42, Pl. XLVII.6; Kromer and Badawi 1980: 263, Fig.1.2; Merriman 2011: 139.2).

Fig. 3. Model UC16289 (photo: D. Vanhulle)

These models are generally identified as papyrus rafts since such a curvature of their extremities cannot be obtained with wooden planks (Berger 1992: 108; Merriman 2011: 31-34). The fact that two of them are hollowed, thus presenting lateral fenders, does not preclude this interpretation: "rafts can have sides so long as flotation was due to a raft bottom, and the sides were only fenders and had no hydraulic pressure" (Merriman 2011: 10-11, paraphrasing Petrie 1933: 5). Almost all models are flat bottomed, probably in order to enable them to stand by themselves (Merriman 2011: 22). This feature is therefore not a strong indicator of whether a model is the reproduction of a wooden boat[6] or a papyrus raft.

A peculiar model, kept in Berlin (ÄMP 13834, Fig. 4) and thought to be from Naqada (Grimm and Schoske 2000: 28, n°25), shows similar characteristics. It has two perforations, one near each extremity. A vaulted cabin rests directly on the gunwales and a square window has been cut into one of its sides. Three ithyphallic figures stand in the boat, two at the front looking forward and one at the back, perhaps originally holding a steering oar. A cracked cream plaster covers the model and the gunwale is underlined in red. Four transversal red lines have been

[6] It is now beyond any doubt that the Naqadian sickle-shaped boat, which was flat bottomed, was a wooden structure (Landström 1970: 19-22, Fig. 57-59; Ward 2006; Tristant *et al.* 2014).

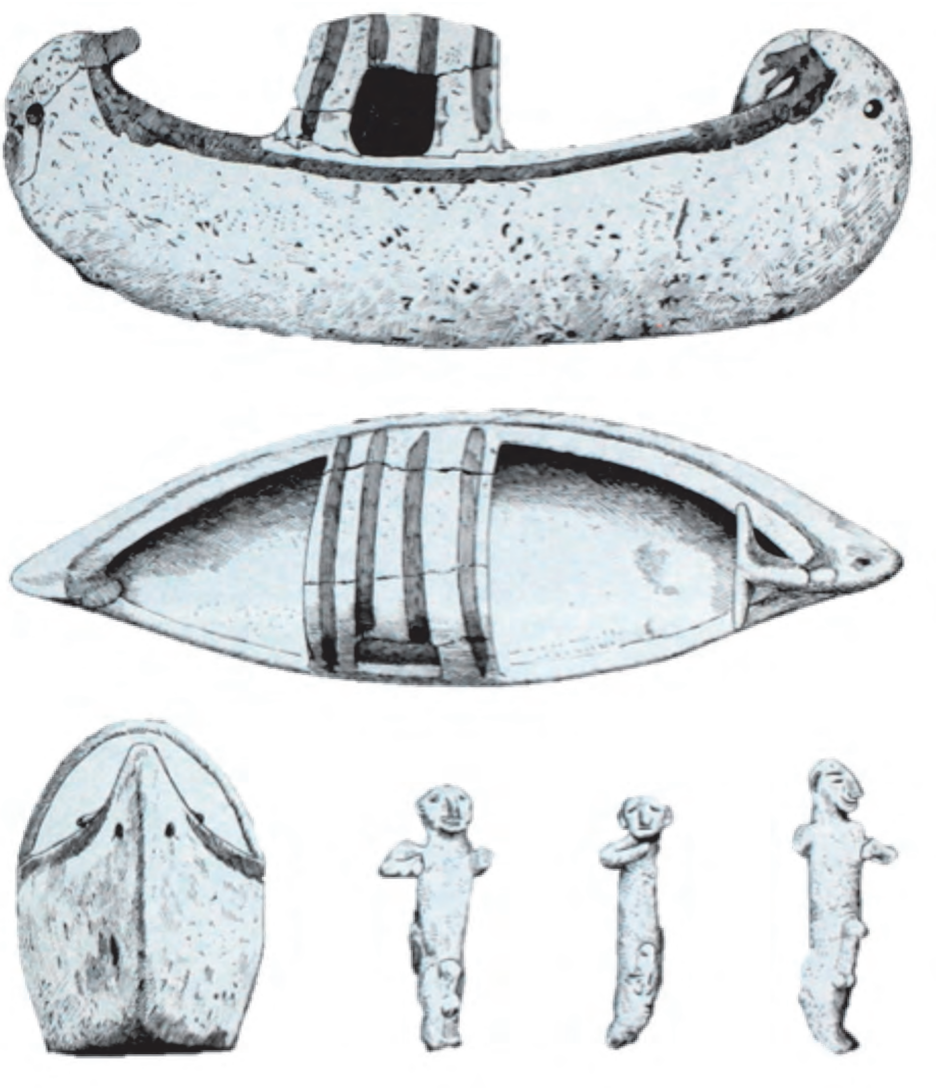

Fig. 4. Model ÄMP 13834 (after Göttlicher 1971: pl. VIII)

painted on the outer top of the cabin. This plaster is quite uncommon and the only exact parallel that we know of is on another object kept in the Ägyptisches Museum of Berlin (n°13832/3). It shows a female figure emerging from a pot, perhaps imitating an egg (Grimm and Schoske 2000: 30, n°31). This figure is identical, from a stylistic point of view, to the three men in the model.

Although the authenticity of this model is questionable[7], the red edging that underlines the gunwales is not unique[8] and the presence of perforations is common on Predynastic models. Moreover, some details are similar to those described above: the prow is completely incurved and the extremities of the horizontal, slightly convex, element that decorates it are in contact with the gunwales. The S-shape stern, although less obvious on this exemplar, is similar. All these observations argue in favour of the authenticity of this model.

This general typology is also characteristic of boat-shaped palettes known from the Naqada Ic to the Naqada IId period (Petrie 1921: Pl. LIV.28D, 28N, 29-31; Regner 1996: 15, n. 40). The most detailed examples show a sickle-shaped boat supporting a central cabin from which the lateral pillars are higher than the rooftop[9]. This kind of cabin also exists in rock art (for example: Berger 1992: Fig.1-2, 5.3-7, 9.26, 10.38, 10.44, 12.265; Morrow *et al.* 2000: 170.E; Rohl 2000: 19.6, 19.9) and is particularly linked with incurved sickle-shaped boats and incurved square boats. The prow of these two categories of barque is decorated with fronds (Lankester 2013: 71, Fig. 5.1). Despite the fact that these palettes are schematic, the prow and stern recall those of the models. Indeed, the prow is rounded and completely incurved while the other extremity shows a small appendage that could well represent a flattened "S-shaped" stern.

Boat engravings from the Eastern Desert are numerous and often compared with boat images depicted on other media (Rohl 2000: 4-8; Judd 2009: 79-81; Lankester 2013: 11-15). However, rock art has its own specificities and exact parallels are rare (Wilkinson 2003: 69). Incurved sickle-shaped boats exist in every wadis of the Eastern Desert, but they are particularly numerous in Wadi Barramiya and Wadi Abbad (Weigall 1909: 156-159, 162, Pl. XXIX-XXX ; Winkler 1938: Pl. XV, XXXV.26; Judd 2009: 109-111; Lankester 2013: 74-84, 100-107, tab. 5.10; Rohl 2000: 18.5-6, 19.16, 20.16-17, 21.9, 21.16-17, 22.5; Morrow *et al.* 2010: 32.G, 70.B, 169.A, 170.E, 171.I, 173.B, 174.E-F, 223.F). Four examples of this type of boat also exist in the Theban Western Desert (Darnell 2011: 1154, 1158, Fig. 2, 5),

7 We are thankful to R. Kuhn (Ägyptisches Museum und Papyrussammlung, Berlin) for the fruitful discussions that we had about this object.

8 Archaeological and Anthropological Museum of Cambridge: Z 17094; Phoebe Apperson Hearst Museum of Art, Berkeley: 6-4927; Petrie Museum, London: UC10805; Ashmolean Museum, Oxford: AMO 1895.609; University of Pennsylvania Museum, Philadelphia: E.1436 ; Musée des antiquités nationales, Saint-Germain-en-Laye: MAN 77.754.

9 For example, Metropolitan Museum of Art, New York: 07.228.156; the Oriental Institute Museum, Chicago: OIM E11054; the Brooklyn Museum: 07.447.613; Musée des antiquités nationales, Saint-Germain-en-Laye: n°77.719r.

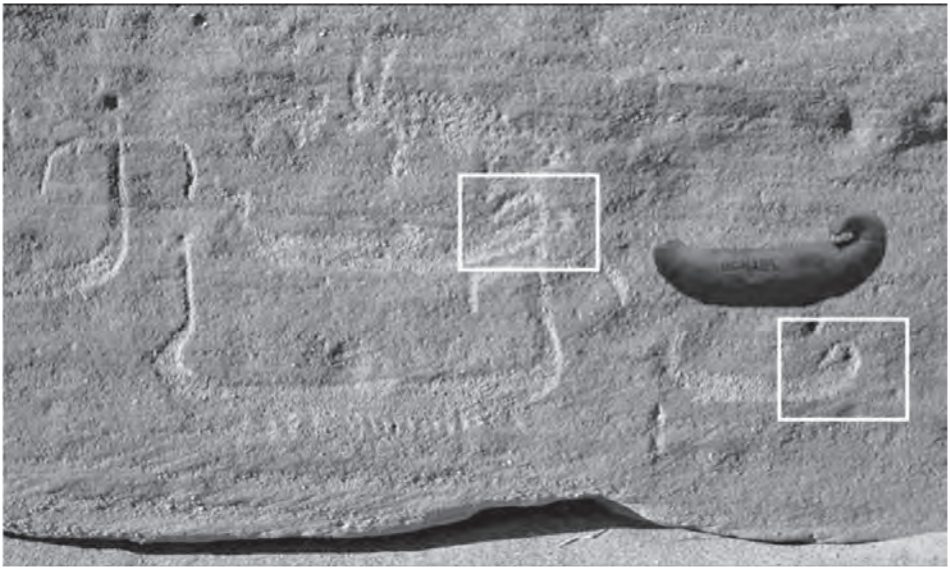

Figure 5. Boat engravings from Wadi Abu Mu Awwad (after MORROW *et al.* 2010: 121.E; photo: Geoff Phillipson)

while one can be seen in Wadi el-Hôl (Winkler 1939: 17, Pl. XV.1), one in Wadi Rizeigat (Winkler 1939: 17, Pl. XV.2) and four others in a small wadi of the West Bank, around 5 km north of Aswan (Winkler 1939: 18, Pl. XVII.1-3).

Their sterns present the S-shape configuration while their prows are vertical or slightly incurved. Two fringes, generally associated with fronds or horns, protrude from the summit of the prow. It could be argued that this motif corresponds to the horizontal feature identified on the models. The way the prow is depicted in rock art, more vertical than incurved and with the fronds showed frontally, may be the result of an artistic convention. Two engravings can even be directly related to the models described above: one in Wadi Umm Salam shows the horizontal element fixed to an incurved prow, the other lies in Wadi Abu Mu Awwad and shows a boat identical to UC16289 (Morrow *et al.* 2010: 62.B, 121.E; Fig. 5).

Three frond boats can be seen at HK61 in Hierakonpolis (Berger 1992: Fig. 1-2; Hardtke 2012: Fig. 3). Their prow shows a triangular outgrowth from which emerge two fronds. The visual similarity with horns, added to the frequent association of bovids with these boats from Hierakonpolis, suggests that prows were decorated with an animal head (Berger 1992: 109). This downward curvature recalls indeed the horns of the "bull's head" amulets (Petrie 1914: 44, Pl. XXXVIII.212a-m; Hen-

Fig. 6. Boat engraving from Wadi Qash compared with a clay box from el-Amrah (photo: Janet and Paul Robinson)

drickx 2002: 285-287). However, recent works are challenging this interpretation: "these protrusions could also be explained in other ways, such as by branches or palm fronds as shown on some Naqada II vessel" (Hardtke 2012: 337).

Hierakonpolis engravings bear similarities with C-Ware decorations and may occupy a date range of Naqada I and Naqada IIB (Hardtke 2013: 112). Arguably, this chronological range can be narrowed down, as desert sites in Hierakonpolis do not seem to be older than Naqada IC[10]. It fits with the first appearances of the boat in iconography, notably on a well-known C-Ware plate (Egyptian Museum, Cairo: CG2076; Graff 2009: 218, n°74) and on a Nagada IC-IIA clay box from el-Amrah (Ashmolean Museum, Oxford: E.2816; Payne 2000: 79-80, Fig. 32.600).

[10] Potential traces of a Badarian occupation have been found in Nekhen (Hoffman et al. 1986: 180, fig. 2), but the area of HK61, HK64 and the nearby elite necropolis HK6 do not seem to be older than Naqada IC (Hardtke 2013: 112).

The raft visible on this box is similar to both the models and most of the frond boats known in rock art (Fig. 6).

The peculiar prow of the models mentioned above looks like the extremity of a papyrus bundle that is bent inward and maintained in place by a rope. In all probability, it is a light material that bends under its own weight. We tentatively propose that palm fronds and large mats that decorate the prows of the wooden sickle-shaped boats depicted on D-ware are reminiscences of the frond prows of papyrus rafts (Petrie 1920: 18-19; Aksamit 1981: 168, Fig. 29; Graff 2009: 174.N8-N9)[11]. It should also be mentioned that some engravings of this classical sickle-shaped boat show two protrusions at the extremity of the prow that could possibly simulate horns (for example: Huyge 2014: Fig. 2; Hendrickx *et al.* 2012: 1074, Fig. 7).

An atypical example of this category of boat can be seen on a jar kept in the British Museum (BM 36326, Graff 2009: 383, n°569; Fig. 7). It shows an S-shaped stern with a vertical elongation and an incurved prow with some kind with garlands or a mat that hang down from its summit. Next to that prow is a kind of

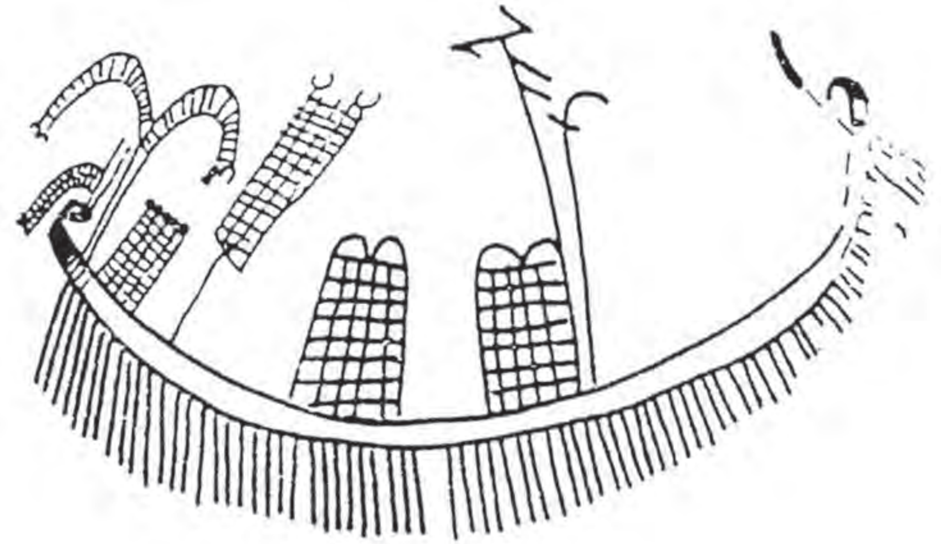

Fig. 7. Boat image on a D-ware vase (after Graff, 2009: 383, n°569)

[11] These palm branches have been identified as a cover for the look-out (Petrie 1901: 15-16; Boreux 1925: 16, 33) or as proto-sails (Petrie 1920: 21; Thomas 1923: 97; Le Baron Bowen 1960). J. Aksamit challenged these theories (Aksamit 1981: 160). It could merely be a symbolic and apotropaic vegetal adornment, as seen in other maritime, riverine or coastal cultures around the world (Hornell 1945).

Fig. 8. Fragment of a stone vase with boat depictions (after Scharff 1929: pl. 22.109)

tree from which protrude two large fringes that hang down with curves similar to those seen on frond boats. It is interesting to note that the Eastern Desert rock art offers comparisons: the frond of some sickle-shaped boat is depicted as an inverted "U" while their stern is incurved and then vertically elongated (Morrow *et al.* 2010: 120.B-D). This shape of the stern finds a parallel in a Naqada IId stone vase fragment (Grimm and Schoske 2000: 37, n°47; Fig. 8). All these details constitute typo-chronological clues, testifying to the evolution of this very specific raft. Because Hierakonpolis exemplars show this kind of vertical elongation of the stern, nothing precludes that they belong to the Naqada IIC-D period.

We are thus perhaps facing a specific type of barque that appear on every Naqadian artistic media between Naqada IC and Naqada IID. Its typology evolves but the papyriform[12] nature of the barque, the presence of fronds and the S-shape stern remain characteristic. Minor differences between each representation can potentially be explained by geographical and/or chronological variations. The function of this boat is difficult to assess. Because of its longevity, the nature of

[12] The term papyriform refers to a wooden boat that imitates a papyrus raft (Boreux 1925: 235-421; Landström 1970: 22-25).

the media on which it appears and their contexts of use, a ceremonial role seems likely. This means that, despite the emergence of wooden boats, papyrus rafts remained the archetype of the divine and ritual barque. This is still true during the Pharaonic period, since the Pyramid Texts mention the "Great Reed-Float" on which sails the god Ra and the defunct king (Erman 1893: 79-82; Breasted 1917: 174-176; Boreux 1925: 5).

3. A model in the Museum of Archaeology and Anthropology (University of Cambridge) and the "Decorated-ware models" category

Model Z 17094 is made of baked clay (Fig. 9)[13]. It is sickle-shaped and hollowed. As it is crafted in a cream fabric and decorated with ochre lines, it strongly recalls D-ware productions. The extremities are slightly upraised and cylindrical. One of them, most probably the stern, is higher than the other[14]. Vertical lines are painted in ochre on the external surface: seven on one side, around twelve on the other. The gunwales, along with the prow and the stern, are roughly underlined in ochre. Several traces of the colour, most probably unintentional, are visible on the inner surface. Two inventory marks can also be seen on the object: H.526 is inscribed in black on the bottom while A.52B can be read in red ink on one side. It appears that A.52B is an abortive numbering system applied by the museum,

Fig. 9. Model Z 17094 (photo: D. Vanhulle)

[13] ca 28,5 cm long, ca 11,2 cm wide, ca 6,6 cm high.
[14] The higher extremity is generally the stern (Boreux 1925: 55).

possibly by F.W. Green[15], at an unknown date. The model, which is said to come from Kom el-Ahmar, has been offered to the museum by the Egyptian Research Account in 1899. The date is consistent with the works of F.W. Green at the site: „during the winter of 1897-8 excavations were conducted for the Egyptian Research Account at Kom el Ahmar (...) The share of the objects found that was brought to England was exhibited at University College in July, 1898. Mr. Green continued the digging in the winter of 1898-9, and a second exhibition was held in the following summer" (Quibell and Green 1902: 24).

At least six models can be related to the D-ware ceramic production of Naqada IIC-D[16]. They share the same characteristics and their propinquity with the sickle-shaped boat is obvious. The red lines painted on them are generally thought to describe the ropes that tied papyrus bundles (Petrie and Quibell 1896: 25, Pl. XXXVI.80-81a-b; Petrie 1933: 4-5, Figs. 6, 8-9; Casson 1971: 12, Fig. 7; Vinson 1994: 11). However, G. Reisner and B. Landström considered that these models were the reproduction of wooden boats (Reisner 1913: xvii-xviii; Landström 1970: 22). This association of a flat bottom with two lateral walls is indeed consistent with what we know of Predynastic wooden boat construction (Ward 2003: 21, Fig. 5.4; 2006; Tristant *et al.* 2014). Other structural details strengthen this conclusion, such as the central plank that appears in low relief at the bottom of some of these models (Vinson 1987: 167, Fig. 79; Rizkana and Seeher 1987: 47-48, Fig. 65.1, Pl. V; Steffy 1994: 273-274; Merriman 2011: 17, 208-210, n°182-185).

Two models (ÄMP 13801 and E.1436) show a red painted square at the centre of their outer hull. This square also appears on the sickle-shaped boats of the famous Painted Tomb of Hierakonpolis (Quibell and Green 1902: Pl. LXXV) while parallels can be found in Wadi Hammamat (Rohl 2000: 129.5) and at Nag el-Hamdulab (Hendrickx *et al.* 2012: 298-299). What this square depicts is still a matter of discussion. It could be the representation of the gangplank that allows access to the boat from the dock (Boreux 1925: 38), or a trapdoor situated between the cabins. Indeed, several ivory models show small depressions, either near one of their extremities or in front of their central structure[17]. Moreover, W. Emery

[15] We are deeply grateful to I. Gunn for this information.

[16] Petrie Museum, London: UC10805 (Merriman 2011: 152, n°37); Ashmolean Museum, Oxford: AMO 1895.609 (Payne 2000: 24, Fig. 17, n°88; Merriman 2011: 209, n°183), AMO 1895.622 (Merriman 2011: 211, n°186); University of Pennsylvania Museum, Philadelphia: E.1436 (Merriman 2011: 151, n°35); Ägyptisches Museum, Berlin: ÄMP 13801 (Merriman 2011: 208, n°182); Museum of Fine Art, Boston: 03.1381.

[17] Ashmolean Museum, Oxford: E.96, E.97, E.98, E.4666.

considered that the beer jars he found inside the boat grave of Mastaba S.3506 were held in "cargo holds" (Emery 1958: 38, 42).

Two of these models come from Ballas, two from Naqada and one from Abadiyeh. This is not surprising since it is generally thought that D-ware ceramics were produced in the vicinity of those particular sites (Gilbert 1999: 31-32). Their size, greater than the vast majority of Predynastic models, and their overall quality suggest that this is a prestigious production.

4. The Model E.86 from the Ashmolean Museum in Oxford: a prototype of the great royal barque?

Only a few ivory models have been found in tombs (Merriman 2011: 156, 212, n°56, n°189; Tristant 2012: 32, Fig. 19). Most of them come from pre-formal (Kemp 2006: 113) temple deposits at Tell el-Farkha, Tell Ibrahim Awad, Abydos and Hierakonpolis (Dreyer 1986: 37-50, 80; Bussmann 2010: 243, 291, 337, 342, Pl. 93/Fig. 5.51-5.57, Pl. 192/Fig. 5.681). 24 models in ivory and two in stone have been discovered in the Main Deposit of Hierakonpolis. Despite their great importance, information about them has never been properly published.

E.86[18] is papyriform (Fig. 10). The prow is vertical while the stern is incurved. Both of them are pierced at their summit, probably for the fixation of an extension. A small transversal perforation situated at the summit of the prow allows the insertion of a small peg. On each side of the deck, a bundle that goes from the top of the prow to the top of the stern reproduces the gunwale. Although this is

Fig. 10. Model E.86 (photo: D. Vanhulle)

[18] We are thankful to P. Pomey for his very useful comments on this model.

Fig. 11. Guard-rails on model E.86 (photo: D. Vanhulle)

Fig. 12. Cabin door of model E.86 (photo: D. Vanhulle)

not the case for E.86, almost all ivory models have small vertical incisions regularly spaced at the emplacement of the gunwales. They probably designate the ropes that solidly tied the bundle to the planking. On most of these ivory models, cross-shaped incisions are visible on the extremities and on structures such as the cabin. Such details can also be seen on the boat depicted on the Narmer Palette and on the Plover Palette (Asselbergh 1961: 336-337, Pl. 90.159).

Two guard rails or girders[19] flank each side of the central section of the deck (Fig. 11), which is slightly upraised. A circular hole is pierced at the extremity of this central section, near the stern. Its purpose could have been to support a mast or a pole. Immediately before the stern are four smaller perforations arranged in a square, probably for the installation of a canopy. Between this canopy and the deck lies a shallow rectangular depression. The cabin is quite damaged but an off-centre door can still be seen (Fig. 12). Another interesting feature is the nodes sculpted along the gunwale until the top of the bow. No such nodes can be observed after the cabin nor before the girders. They are thus absent on one half of the model. Similar depictions of nodes can be observed in Early Dynastic sculpture, for example on a First Dy-

[19] B. Landström and A. Merriman use the terms "side shelves" to describe this feature (Landström 1970: 28, Fig. 86.6 ; Merriman 2011: 18-19, Fig. 2.40-2.41), while Ch. Ward prefers the term "stringers" (Ward 2000: 54-55, fig. 16).

nasty breccia basket from Abydos (ÄMP 17968: Grimm and Schoske 2000: 68, n°144).

E.86 shows many realistic features. This strongly suggests that such a boat has existed and that the artist that manufactured the model was familiar with it. What is very interesting is the strong relation between E.86 and the famous cedar barque of Khufu (Jenkins 1980; Lipke 1984; Mark 2009; 2011). Indeed, girders can be seen at exactly the same emplacement on Khufu's boat (Fig. 13). Towards the prow, this line of girders stops just before a small canopy supported by several thin pillars (Fig. 14). Between the gunwales and the girders, there is no decking and the thwarts (or deck beam) are apparent. A gangplank allows passengers to cross this shallow space and to reach the deck (Fig. 15). The cabin of the barque has two off-centre doors, one on each side. The front side of the model's cabin is almost completely damaged so it is impossible to ascertain the existence of a second door. Last but not least, the prow and stern of the barque are separated pieces fixed to the main structure, exactly like the now lost prow and stern of the model.

Fig. 13. Girders on Khufu's barque (photo: D. Vanhulle)

Fig. 14. Canopy near the prow of Khufu's barque (photo: D. Vanhulle)

Fig. 15. Gangplank of Khufu's barque (photo: D. Vanhulle).

On Khufu's barque, the rows are attached to the girders thanks to large rope knots. Would it be possible to correlate these knots with those carved on the model? This interpretation would seem plausible and even encouraged by the fact that the rows are limited to the front half on both boats. However, the knots on the model continue up to the summit of the prow. This makes this hypothesis less likely to be correct, since rows cannot be found at this location. Another possibility would be that these knots reflect the complex ligatures that tied the girders directly to the thwarts. But, again, this is seriously challenged by the fact that, on the model, these girders stop where the knots begin. We tend to believe that this feature, which can after all be something very different than knots, should be related to the adornments that decorate the inner side of the prow on sacred boats such as the solar barques and the *Ḥnw* barque. These adornments also appear in Naqadian iconography, particularly on the frond boats discussed above and on the boat of Djet's comb (Egyptian Museum, Cairo: JE47176).

5. Additional observations

On their own, these models do not bring much information. No single example looks exactly like another and they all vary in dimensions, overall quality and style. What can be witnessed, however, is the evolution of boat models: their production tends to be progressively more standardised and to correlate with canonical representations in the iconography. There is thus a common evolutional process that can be followed on every media during the whole 4th millennium B.C.

The incurved sickle-shaped boat is the first obvious example of an official category of boat. It appears during Naqada I and evolves until the end of Naqada II. During Naqada IIC-D, models of greater dimensions were produced by the same workshops that manufactured the D-ware ceramics. They imitate the classical sickle-shaped boat of that period and show some technological details such as deck beams, added to strengthen the structure where the sides join to form the extremities, or the central plank.

There is a consensus on the fact that D-ware are closely related to funerary practices (Graff 2009: 121-124), but it would be simplistic to limit their use to this sole function. The fact that these ceramics bear traces of use and that they were found as far apart as Lower Nubia and the Sinaï suggests that they were not created solely to be placed in tombs (Gilbert 1999: 30-31). Models and D-ware are not rare in a domestic context (Buchez 1998: 86), notably in Naqada (Di Pietro 2011a; 2011b) and Adaïma[20]. Models should be considered, along with figurines and other miniatures, as *ex-voto.* This could be corroborated by the discovery of C-ware and D-ware fragments, but also of bovid and anthropomorphic figurines, in a ceremonial building at el-Mahasna (Anderson 2011: 14-19). Although more analysis is needed, we tentatively propose that these valuable ceramics were used during community events, such as ritual or cultic ceremonies, before being deposited in a grave. Because funerary practices and beliefs are closely linked with the cultic domain, the iconography of the D-ware can be relevant in both contexts (that is to say, community events and funeral ceremonies). This can also explain the fact that most of Predynastic models ended up in tombs.

During Naqada III, models are mainly made from prestigious materials such as ivory and stone. As already pointed out, almost all ivory models come from cultic deposits. Because structural details, such as the vertical or cross-shaped incisions, are always make following to the same techniques, it is reasonable to postulate the existence of specialised workshops. The development of carpentry and naval architecture goes back to the Predynastic period (Vinson 1987: 28-39; Ward

[20] Fragments of 66 models have been found in domestic context, along with numerous D-ware fragments (Midant-Reynes and Buchez 2002: 454, n. 37, Pl. 2.26-2.28 ; Chr. Lorre and S. Hendrickx, *comm.pers.*).

2000: 25-38) and models show that many technical and technological achievements have been reached by the Early Dynastic Period. It is hardly surprising then to note strong similarities between model E.86 and Khufu's barque.

6. Conclusions

Only a holistic approach allows the identification of the common thread between apparently very different categories of objects. All artistic productions related to the depiction of boats undergo the same increase in complexity during the 4th millennium B.C. These productions convey different notions depending on their contexts of use: the boat can embody the Order that prevails on Chaos when depicted alone or in hunting scenes, but it can also designate political and religious power when used in naval processions (Hendrickx and Eyckerman 2010: *op. cit.*). These naval processions, which appear on the Gebelein painted linen (Ciałowicz 1997), on the painting from the Tomb 100 at Hierakonpolis (Quibell et Green 1902: 20-21, Pl. LXXV-LXXIX), on ivory knife handles (Williams *et al.* 1987; Delange 2009) and on the Qustul incense burner (Williams 1986: 108-112, 138-147, 360, Fig. 171, Pl. 34) are indeed considered to depict a royal jubilee (Williams *et al.* 1987).

Models testify to the progressive establishment of cultic practises, at first during ceremonial events, then during official ceremonies conducted in temples. Their production was perhaps limited to the household at first, then quickly became more professional: a high-quality production for the elite emerged by the Naqada II C-D period. Ultimately, most of them ended up into tombs.

The consistency in the way the boat is represented in each category of material grows stronger in the course of the 4th millennium B.C. Two main types appear, namely the sickle-shaped boat and the papyriform boat. With its archaic style and its vaulted cabin, the latter seems to be the equivalent of the sacred and processional barque of the Pharaonic period. Detailed examples show that this cabin has what seems to be a door placed to the left of its central axis. This structure most probably represents a shrine and confirms the sacred nature of this kind of barque (Hendrickx *et al.* 2012: 300). We tend to think that frond boats were the first representatives of this category of ceremonial barques.

During most of the 4th millennium B.C., the boat was the allegory of political and religious power, of control and of wealth. It played a central role in the Naqadian ideological system since it embodied the notion of "Order out of Chaos" in the iconography, which will later give birth to the fundamental concept of Ma'at.

By analysing the use of the boat in Naqadian arts, it is possible to follow the evolution of a complex ideological system that ultimately set the basis of the Pharaonic civilisation. Things changed with the first personifications of the king as the ruler of the Two Lands. The boat was then not needed anymore to express complex ideological notions since they were embodied by the king. Nevertheless, the boat continued to express royal power in rock art during the first reigns of the First Dynasty: official engravings commissioned by the State have indeed been discovered in remote areas such as the South Sinai Peninsula (Tallet and Laisney 2012; Tallet 2015) and the Gebel Sheikh Suleiman (Tallet and Somaglino 2015). They testify the control of a specific territory by the new Egyptian State thanks to the depiction of a boat in association with a *serekh*. By the Old Kingdom, the boat starts its timeless function in iconography: a means of transport for men, kings and gods, on earth and in the sky, in this world and in the other.

Acknowledgement

Our gratitude goes to Anja Stoll and David Lorand for their comments on a first draft of this paper. We are also deeply indebted to Janet and Sarah Robinson, who had the important task to revise the English.

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Desert and the Nile.
Prehistory of the Nile Basin and the Sahara.
Papers in honour of Fred Wendorf
Studies in African Archaeology 15
Poznań Archaeological Museum 2018

Ulrich Hartung

Cemetery U at Umm el-Qaab and the Funeral Landscape of the Abydos Region in the 4th Millennium BC[1]

Introduction

Throughout pharaonic times, Abydos in northern Upper Egypt played an important role in religious beliefs and funeral rituals (e.g. O'Connor 2009; Effland and Effland 2013). Presumably during the Old Kingdom, Abydos became the centre of worship of the god Osiris whose tomb had been identified with that of the 1st Dynasty king Djer at Umm el-Qaab, a place located ca. 1.5 km to the west of the cultivation in front of impressive limestone cliffs. Situated on a slightly elevated rise in the southern part of a large recess of the limestone plateau – the so-called bay of Abydos – Umm el-Qaab overlooks the entire flat desert of the region. It is surrounded by a broad wadi which originates in the cliffs in the southwest and ends in the cultivation near the Osiris temple (Fig. 1). Since the excavations of E. Amélineau (Amélineau 1899-1905; 1899a) and W.M.F. Petrie (1900; 1901; 1902: 3-8), the site has been known as the location of the Early Dynastic royal tombs. Further excavations were carried out by E. Naville and T.E. Peet in 1910/11 (Naville 1914: 35-39), and during the last 30 years Umm el-Qaab was the focus of re-excavations by the German Archaeological Institute Cairo[2] (see as

[1] The following is an adapted English version of a paper written in German in memory of Werner Kaiser (see Hartung 2014/2015).
[2] Friendly supported by the Deutsche Forschungsgemeinschaft (DFG).

a summary e.g. Dreyer 2007). Immediately to the north of the royal tombs, Amélineau exposed about 150 Predynastic graves (Amélineau 1899: 75-81) and 32 further tombs were excavated by Peet (1914: 14-16) who labelled this graveyard Cemetery U. As part of the German Institute's work at Abydos from 1985-2001, this cemetery was completely excavated.

1. Predynastic settlement remains and cemeteries at Abydos

The archaeological record for settlement at Predynastic Abydos is rather meagre. Although later activities in pharaonic times might have affected the early remains, even a comprehensive survey carried out in the early 1980s (Patch 1991; 2004) identified only a few additional Predynastic sites at Abydos that had not already been known. Settlement remains (Fig. 1) are restricted to a battery of kilns, probably connected to a brewery, north of the monastery of Sitt Damyana (Peet and Loat 1913: 1-7), some vague structures in the area of the later Osiris temple (Petrie 1902: 9-10, 27; 1903: 1, 21; see also Kemp 1968: 151-155), a small area with remains of huts, fireplaces and further kilns of a brewery behind the temple of Seti I (Peet 1914: 1-10) and to the area around the pyramid temple of Ahmose at Abydos-South (Randall-McIver and Mace 1902: 76). At the northern edge of the bay of Abydos settlement evidence was discovered near the village of Salmany (Patch 1991: 426) and a place probably used for flint knapping in the north-west on the low desert (Patch 1991: 423). No precise date for these remains can be given: The brewery in the north might date to the late Predynastic, in the area of the Osiris temple only some scattered late Predynastic finds came to light, and for the remnants behind the temple of Seti I a Naqada IID/IIIA1 date can be assumed (Peet 1914: 4-5; Patch 1991: 437). The settlement near the Ahmose pyramid seems to have been in use during Naqada I and early Naqada II[3]. Most recently, further early settlement traces (Naqada I?) have been encountered to the north-west of the Seti I temple[4].

These scanty archaeological remains are complemented by several cemeteries, most of them excavated already over 100 years ago (Fig. 1). In 1899/1900 D. Randall-MacIver excavated ca. 170 graves in two small cemeteries (Φ and X)

[3] I would like to thank Steven Harvey for the possibility to look at the corresponding material from his excavations at Abydos-South, and Rita Hartmann for the dating of the pieces.

[4] Many thanks are due to Yasser Mahmud from the inspectorate of Baljana for showing us the place.

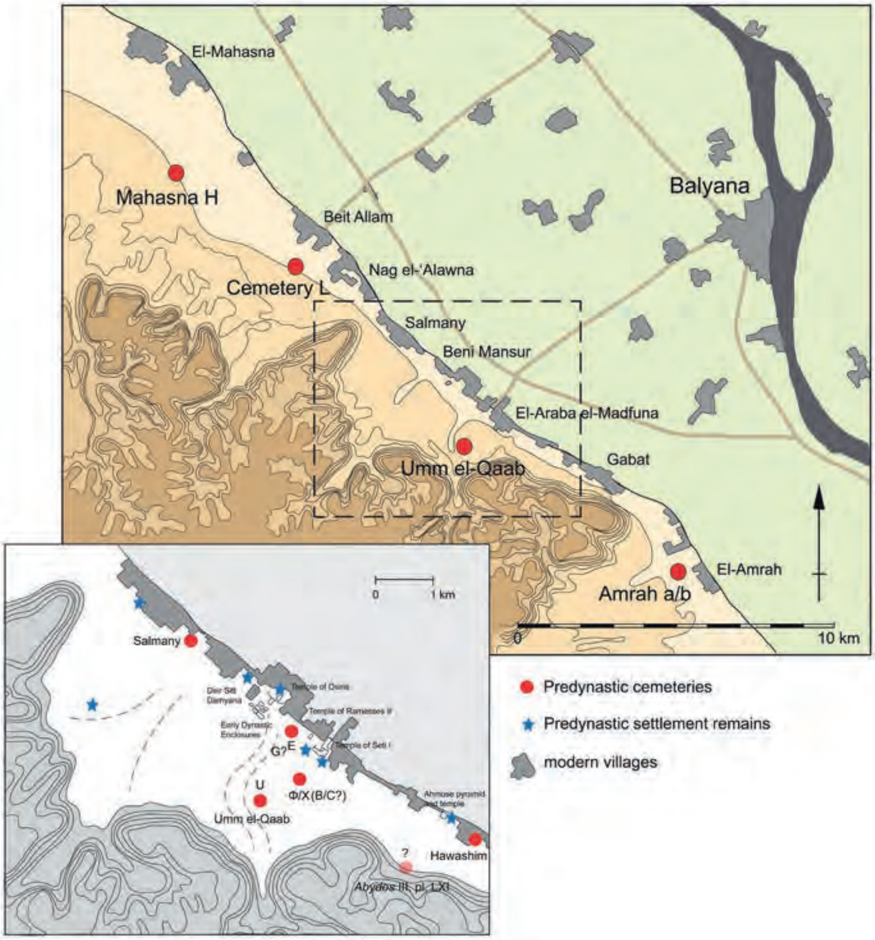

Fig. 1. Predynastic archaeological remains in the Abydos region

which he estimated to have contained not more than 180 graves each (Randall-McIver and Mace 1902: 51, 53-55; for some additional grave inventories see Petrie 1901a: 11-12). Further Predynastic burials are mentioned by W.M.F. Petrie in an already looted Cemetery G which yielded otherwise mainly graves of later periods (Petrie 1902: 34-35). In 1908/09 some tombs were exposed by E.R. Ayrton and W.L.S. Loat who published only some selected finds labelled to be from Cemeteries B and C (Ayrton and Loat 1911: 2 and pl. XXVII), which might be identical with Cemeteries Φ and X excavated previously by Randall-McIver. In 1909-1912 T.E. Peet excavated 164 Predynastic graves in Cemetery E, situated not far from the cultivation north of the temple of Ramesses II. Only 55 graves were published (Naville 1914: 12-17; Peet 1914: 17-19) but tomb cards for more than 90 unpublished graves are preserved in the Lucy Gura Archive of the EES[5]. The total extent of this cemetery cannot be estimated. Six further graves excavated by H. Frankfort in 1925/26 (Frankfort 1930: 213-215) may also have belonged to it, and perhaps even the graves mentioned by Petrie. At the northern fringe of Abydos near the village of Salmany 132 graves were excavated in 1966/67 and published by A. El-Sayed (1979: 249-301) who had already previously exposed a small cemetery with Early Dynastic and late Predynastic burials south of Abydos near the village of Hawashim (El-Sayed 1979: 259-260). A further Predynastic cemetery is indicated on a plan in the mouth of a small wadi near the tomb of Ahmose at Abydos-South (Ayrton et al. 1904: pl. LXI), but it is not mentioned in the text and the survey conducted during the 1980s could not prove its existence definitely (Patch 1991: 384-385).

Thus, at the beginning of the 1980s a total number of ca. 1000 graves (including ca. 180 graves excavated by Amélineau and Peet in Umm el-Qaab) could be estimated for Abydos, situated in several cemeteries and covering the entire Predynastic period. Of these, approximately 700 had been excavated, but only ca. 270 fully published or at least mentioned with their tomb numbers. Hence, the known total number of burials at Abydos, and associated with it, the probable population density, differs not much from the neighbouring regions. Immediately north of the bay of Abydos (Fig. 1), Cemetery L at Beit Allam/Nag el-Alawna might have consisted of 200-300 graves (Garstang 1903: 5; Patch 1991: 397-398). Cemetery H at Mahasna (Ayrton and Loat 1911; see also Eyckerman and Hendrickx 2011) situated about 10 km to the north, is estimated to have contained ca. 600 tombs, of which approximately one half were excavated (Ayrton and Loat 1911: 3) but only 135 published. To the south of Abydos the cemeteries "a" and "b" at El-Amrah consisted of more than 1000 tombs (Randall-McIver and Mace 1902: 3), whilst a third unexcavated and badly plundered graveyard nearby may contain further tombs of the latest Predynastic period (e.g. Patch 1991: 378-381).

Summarizing this evidence, the fairly moderate settlement remains at Abydos are complemented by a relatively small total number of graves, in a quantity that seems not much different than in the neighbouring regions. Abydos appears to be, especially when compared with Naqada or Hierakonpolis, much more of a pro-

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5 I thank J. Kyffin for her help and the Lucy Gura Archive in general for providing access to this material.

vincial settlement than an important centre with a large population and flourishing economy. These observations stand in contrast to the existence of the Predynastic ruler's tomb U-j (Dreyer 1998) and other elite burials in Cemetery U and to the political significance assumed for late Predynastic Abydos as a reason for the location of the Early Dynastic royal tombs at Umm el-Qaab. Are there any other considerations which could explain the choice of the 1st Dynasty kings to favour this place? The results of the investigations in Cemetery U might perhaps shed some light on this question.

2. Cemetery U

The work by the German Institute at Umm el-Qaab was initiated by W. Kaiser as a re-examination of the Early Dynastic royal tombs but soon extended to the Predynastic Cemetery U situated immediately to the north of them. The latest tombs in Cemetery U adjoin directly those of Dynasty 0 and the tomb complex of Aha. Despite the looting and the previous excavations, many of the graves still contained remnants of their inventory from which conclusions can be drawn regarding their original funerary equipment. The approximately 600 graves of Cemetery U cover almost the entire 4th millennium, from early Naqada I to Naqada IIIB. From Naqada IIIA onwards, all tombs are brick-lined. The chronology of the pit graves has been established by R. Hartmann on the basis of a seriation of about 200 graves. Complemented by further typological studies, Cemetery U provides a total number of ca. 250 pit graves – sufficiently well-dated for further studies – which can be assigned to two chronological main phases of use of the cemetery, each with several sub-phases (Hartmann 2011; 2011a; 2016). The first main phase corresponds to Naqada I until Naqada IIB of the conventional chronology (see e.g. Hendrickx 2006), the second main phase to Naqada IIC until Naqada IID2, and the brick-lined tombs constitute a third phase dating to Naqada IIIA and IIIB[6].

Although Cemetery U covers the entire Predynastic period, it was not used with the same intensity during all the phases. Fig. 2a reveals its unbalanced usage with a large number of early tombs (see Appendix 1), a diminishing number of burials during Naqada IIB, almost a hiatus in Naqada IIC, a slight increase again during Naqada IID (Hartmann 2016: 197-207 and table 25) and a moderate

[6] The publication of the tombs with brick lining is in preparation by G. Dreyer and E.C. Köhler as volume V of the Umm el-Qaab series of the German Archaeological Institute Cairo.

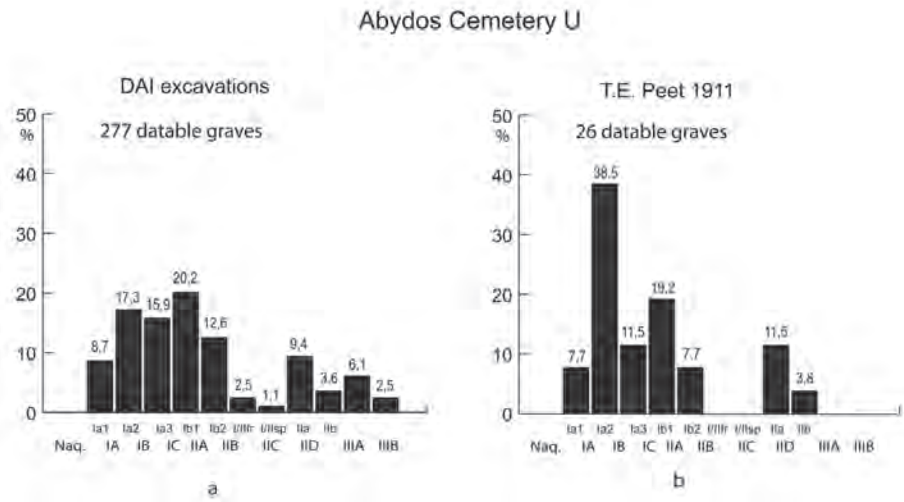

Fig. 2: Chronological distribution of graves in Cemetery U, a: Excavations by the German Institute, b: Excavations by T.E. Peet (cf. Appendix 1; the upper line below the diagrams indicates the chronological phases of Cemetery U, the lower line the traditional chronology of the Naqada culture)

number of graves during Naqada III[7]. An additional 150 graves can be attributed to the first main phase, i.e. to Naqada I until Naqada IIB, but cannot be assigned precisely to a particular sub-phase and are therefore omitted. The tombs excavated previously by Peet yield a corresponding chronological distribution (Fig. 2b) despite their small number. Only Naqada IIIA/B burials are missing as Peet did not excavate any tombs with brick lining.

The utilization of the space within Cemetery U was not continuous in one direction. Until Naqada IIB the graves were located within several separated groups (Fig. 3), presumably burial areas of families or clans, which grew together only during the course of time (cf. also e.g. Buchez 2011: 33-35). From Naqada IID onwards a completely different pattern occurs. The graves were now arranged exclusively around the central part of the cemetery (see already Hartmann 2011: Figs. 10 and 11). The brick-lined tombs of Naqada IIIA1 still follow this schema but afterwards the graves were built loosely in rows shifting more and more to the south, ultimately this trend being continued by the tombs of Dynasty 0 and the burial complex of Aha.

[7] Due to the restricted space basic data of the tombs (dating and size) can only be given for the early Naqada I graves which are crucial for the topic of this paper (Appendix 1 and 2).

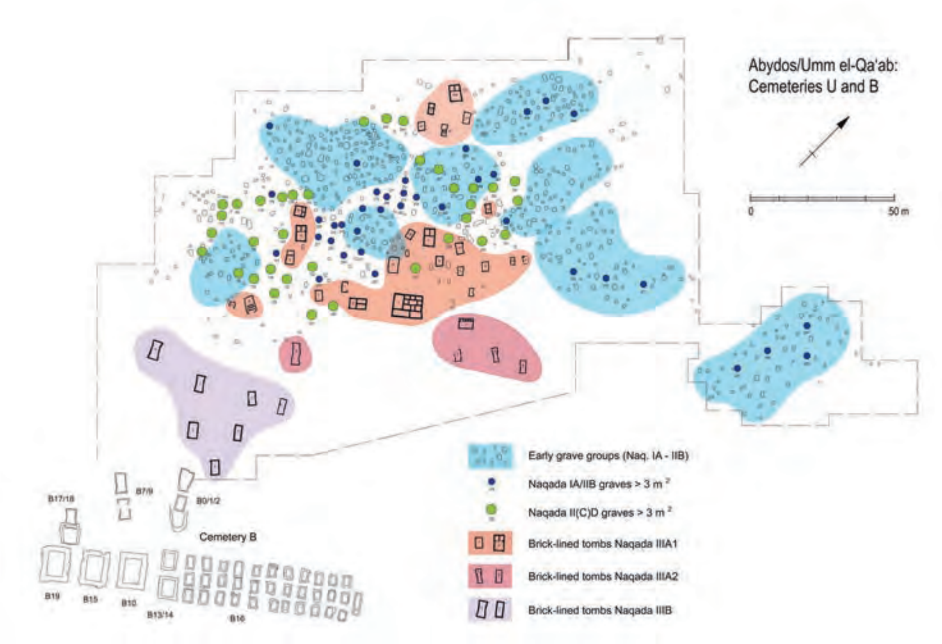

Fig. 3: Spatial distribution of graves in Cemetery U

Despite the looting of the cemetery and two previous excavations, Cemetery U yielded a surprising number of finds, which clearly indicate the presence of elite tombs from earliest times onwards[8]. Beside prestige items, such as flint knifes, stone vessels, mace heads, ivory objects and imported jars (e.g. Hartung 2001; Hartung 2010; 2011; 2016), C-ware vessels from Naqada I tombs (e.g. Köhler in Dreyer *et al.* 1998: Fig. 12 and 13; Hartmann in Dreyer *et al.* 2003: Fig. 5-7) and Naqada IID ivory carvings (e.g. Dreyer 1999) with depictions of hippopotamus and desert hunt, the presentations of prisoners and tribute bringers provide a sequence of motives which are forerunners of the later pharaonic iconography (e.g. Hartung 2010; cf. also Hendrickx 2010; 2011; Hendrickx and Eyckerman 2010; 2012). Seal impressions (Hartung 1998; 2001: 216-238), inscribed jars and labels (Dreyer 1998: 47-91, 113-145) underline the connections of the tomb owners to the administrative network and official magazines from which parts of the tomb equipment seem to have originated since Naqada IID.

[8] The full publication of the tomb inventories is in preparation by the author of this paper as volume III of the Umm el-Qaab series of the German Archaeological Institute.

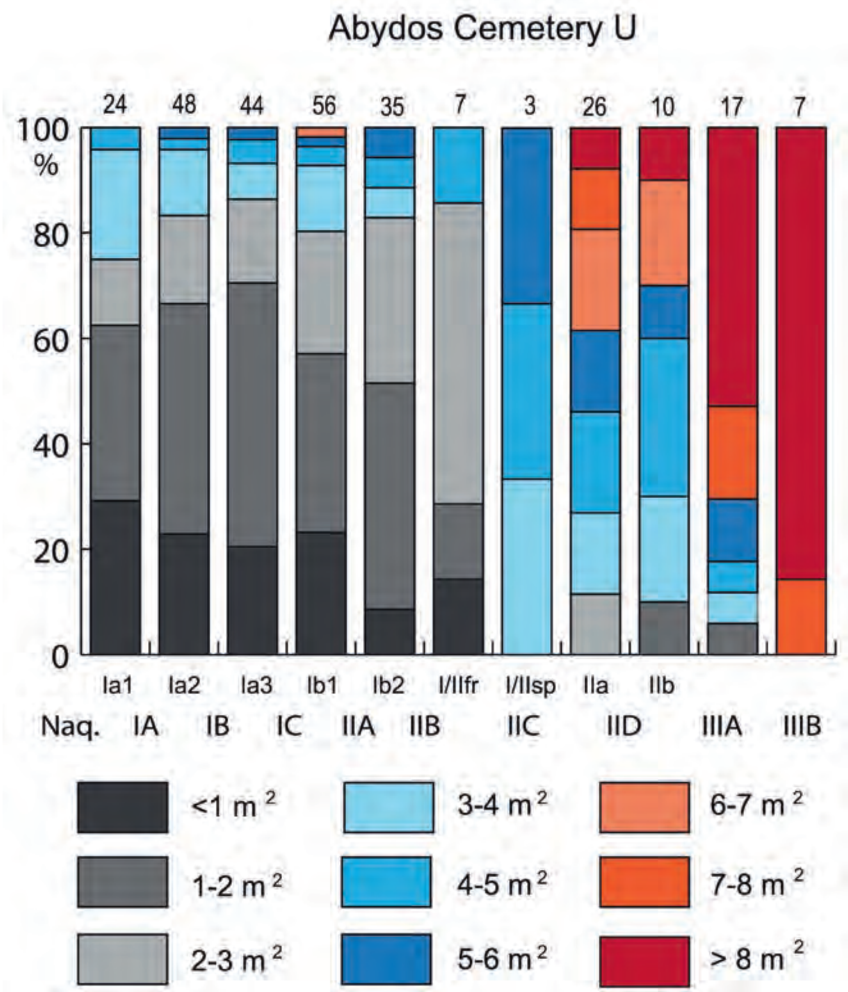

Fig. 4. Grave sizes in Cemetery U during different chronological phases (cf. Appendix 1; the upper line below the diagram indicates the chronological phases of Cemetery U, the lower line the traditional chronology of the Naqada culture; the number above the columns refers to the total number of graves of each chronological phase)

The presence of elite burials is also reflected in the size of the tombs. As a parameter for the effort made by the community for the burial, grave size constitutes a social indicator which is widely unaffected by looting. Already during the early phases of Cemetery U a clear social stratification can be observed (Fig. 4). In addition to a large number of smaller graves, several tombs of more than 3 sq. m are present from the beginning, and from Naqada IB onwards graves of even more than 5 sq. m occur (cf. Appendix 1). From these large tombs derive, among other things, clay figurines of hippopotami and bulls (Hartung 2011: 470-472), and also the remarkable C-ware jars with figural decoration. Whilst some individual large tombs are found within the particular grave groups, most of them cluster in the middle of the cemetery (Fig. 3). During the second chronological main phase of the cemetery (Naqada II(C/)D) a different picture emerges. The graves are now almost exclusively larger than 3 sq. m, and often more than 6 sq. m. They are arranged, as mentioned above, around the centre of the cemetery, i.e. around the large tombs of presumable Naqada I/early Naqada II chiefs. The brick-lined Naqa-

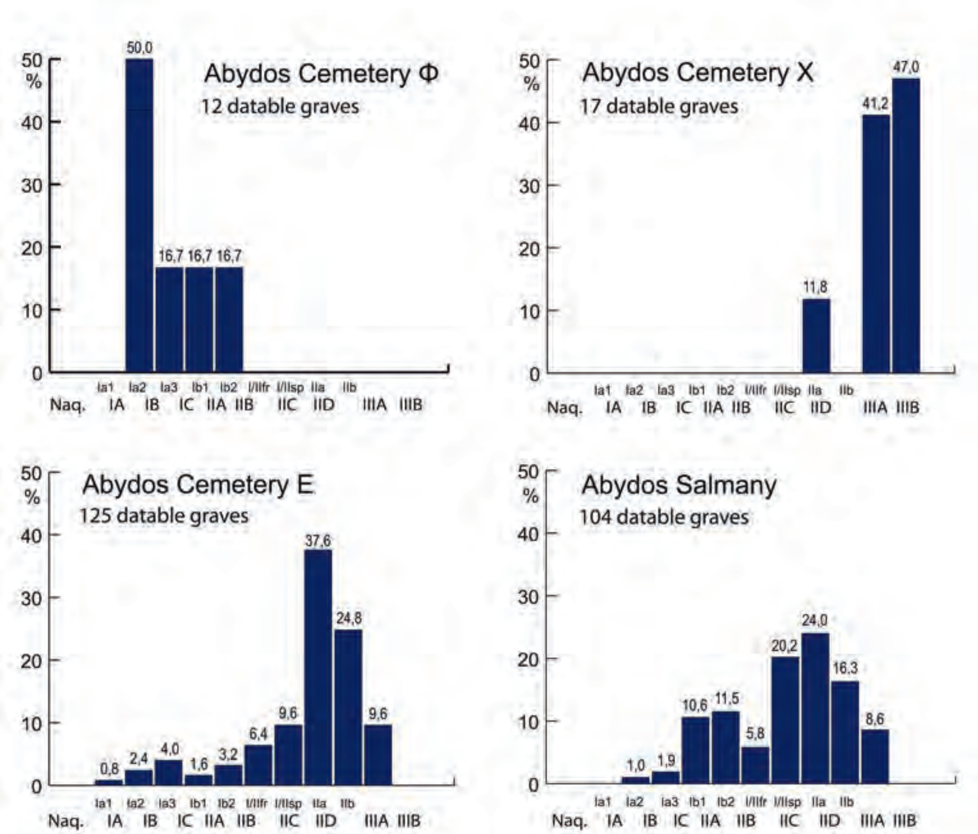

Fig. 5. Chronological distribution of graves in cemeteries at Abydos (cf. Appendix 1; the upper line below the diagrams indicates the chronological phases of Cemetery U, the lower line the traditional chronology of the Naqada culture)

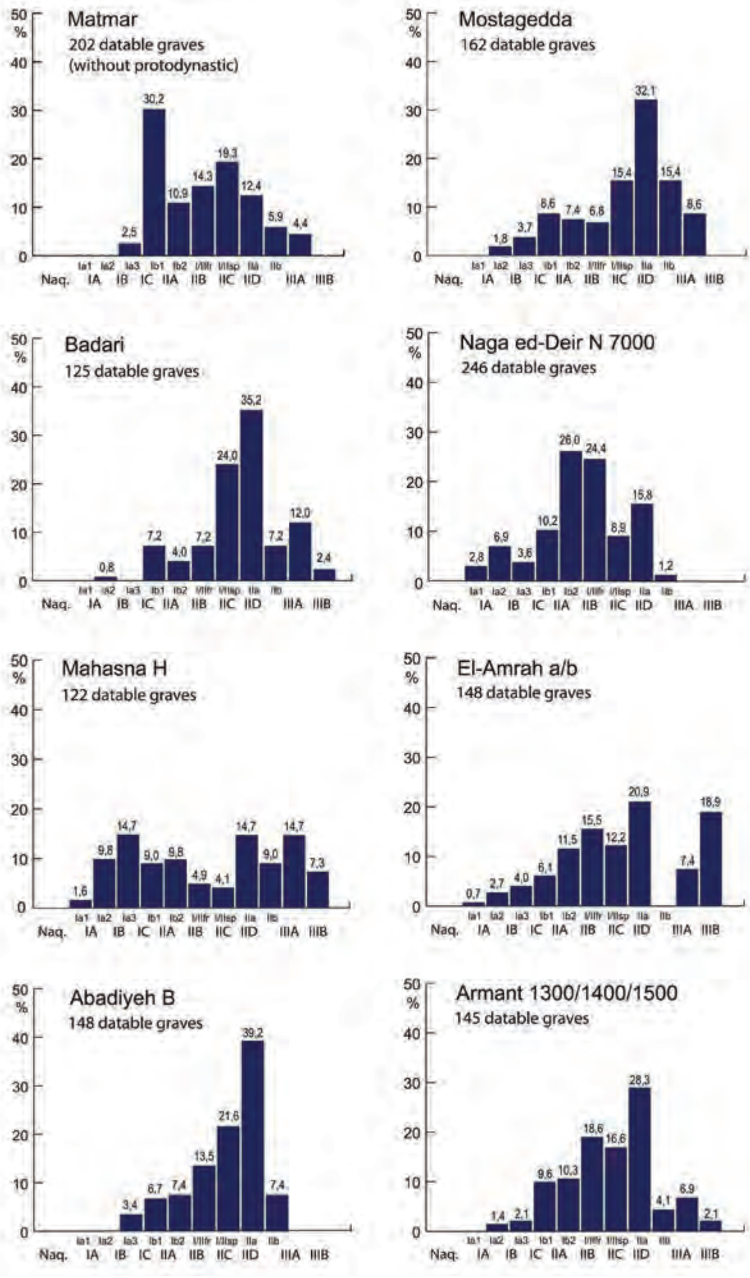

Fig. 6. Chronological distribution of graves in other cemeteries (cf. Appendix 2; the upper line below the diagrams indicates the chronological phases of Cemetery U, the lower line the traditional chronology of the Naqada culture)

da IIIA/IIIB tombs exceed mostly 10 sq. m with U-j of more than 60 sq. m as an exception. There can be no doubt that Cemetery U was the burial place of several socially stratified groups and their chiefs during Naqada I and early Naqada II, but from Naqada IID onwards the cemetery seems to have been used exclusively for burials of the highest elite.

3. Cemetery U and other Predynastic cemeteries

The comparison with other Predynastic cemeteries – as far as it is possible with respect to the limited records of old excavation reports – reveals some noticeable differences.

At Abydos (Fig. 5, cf. Appendix 1 and Hartmann 2016: table 25) only Cemetery Φ has predominantly early tombs whilst in Cemetery E and in Salmany the climax of use dates to around Naqada IID. Cemetery X was used exclusively during the latest part of the Predynastic. The general trend visible in Cemetery E and Salmany – which stands in contrast to the chronological distribution of graves in Cemetery U (and Φ) – seems to be typical for most of the other Predynastic cemeteries. A corresponding picture (Fig. 6; cf. Appendix 2 and Hartmann 2016: table 26) can be observed in the cemeteries of Middle Egypt (Brunton and Caton-Thompson 1928; Brunton 1937; 1948), Naga ed-Deir (but with a rather large number of early graves, see Lythgoe and Dunham 1965; Friedman 1981), el-Amrah (Randall-McIver and Mace 1902), in the Abadiyeh-Hu region (Petrie 1901a)[9] and in Armant (Mond and Myers 1937). Only Mahasna appears to be an exception with a fairly balanced distribution and a relatively large number of early tombs. All the other cemeteries were apparently increasingly used only from late Naqada I onwards. Near Naga ed-Deir, the cemetery at Mesaed (Reisner 1936: 1-4, 371-377) seems to have contained a number of early Naqada I burials, and a small cemetery at Abadiyeh (Cemetery C) is mentioned by Petrie (1901a: 34) as the oldest cemetery he had excavated, but in both cases only little information was published. Although other early graves or even cemeteries may have been overlooked by the early excavators or have not yet been discovered, the overview on the basis of the current state of research reveals a clear concentration of early Naqada I tombs in the region of northern Upper Egypt, including

[9] I thank Alice Stevenson to provide the possibility to use the Petrie slips (by courtesy of the Petrie Museum of Egyptian Archaeology, University College London) as additional grave inventories.

Abydos, Mahasna and Naga ed-Deir (Fig. 7). Hence, this region must have been the main area of occupation of the earliest Naqada culture, perhaps apart from smaller groups of people which might have locally gained a foothold elsewhere (see, e.g. Vermeersch *et al.* 2004). This evidence corresponds with the spread of the Naqada culture from northern Upper Egypt to the north and the south proposed by W. Kaiser already during the 1950s (see Kaiser 1956: Abb. 5; 1957: Taf. 26). The new evidence from Cemetery U allows us to refine the picture chronologically and shows that Abydos, with the largest (so far known) number of early Naqada I burials[10], was the presumable core area of this development.

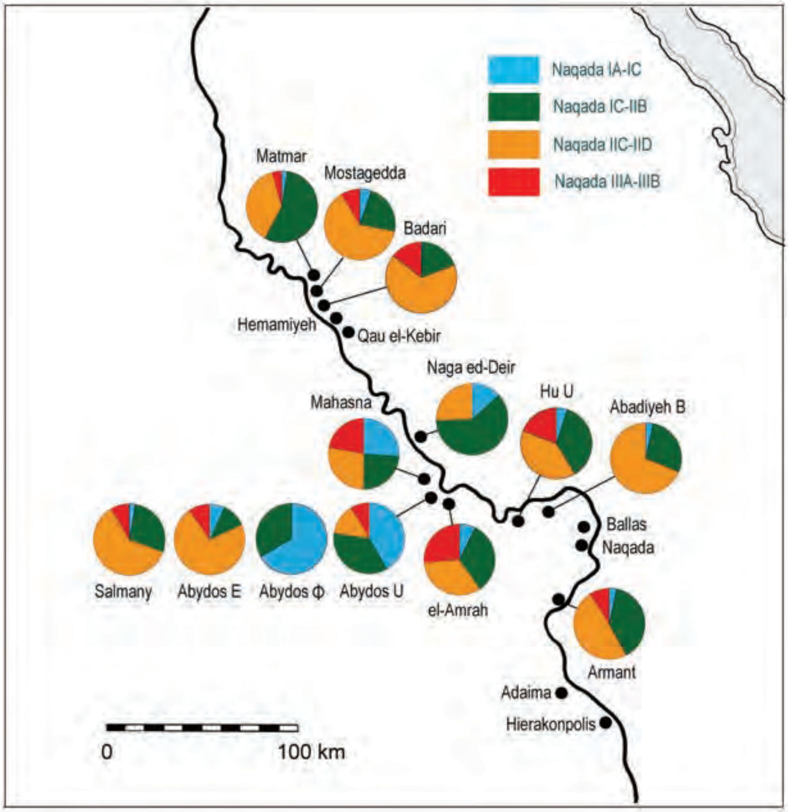

Fig. 7. Chronological position of selected Upper Egyptian cemeteries

[10] The minimum number of 116 Naqada IA-IB/C graves in Cemetery U and 20 additional burials in other cemeteries at Abydos (see Appendix 1) face at least 32 early graves at Mahasna, 33 at Naga ed-Deir and 11 at el-Amrah, but only 21 contemporaneous graves in all Middle Egypt and, e.g., 14 graves in the Abadiyeh/Hu region and 5 early burials in Armant.

The comparison of grave sizes in different cemeteries reveals still another feature of Cemetery U. Although this comparison must remain incomplete as many old excavation reports give no measurements of the graves, nevertheless, some information is available. In Abydos (Fig. 8 and Appendix 1), for the cemetery at Salmany and for some individual tombs of Cemetery E grave sizes are indicated. At Salmany most of the graves measure 1-2 sq. m, with only 5 graves measuring 2-3 sq. m and only one grave (grave 110, dating Naqada IID) more than 3 sq. m. Early graves do not exceed 2 sq. m. The sizes of the graves correspond to their fairly poor equipment in general (El-Sayed 1979: 260-273). Although in Cemetery E several graves were equipped with a large number of pottery vessels, only one grave larger than 2 sq. m is indicated (E 4580) which dates to Naqada IIIA1 (Peet 1914: 14). For only two early graves measurements (of less than 1 sq. m) are given. The presence of other larger tombs would probably have been noted by the excavator. Beyond Abydos (Fig. 8 and Appendix 2), at el-Amrah, measurements are widely missing, one early grave (b 144) measures 1 sq. m and two Naqada IID graves between 3 and 5 sq. m are described as typical for this later time (b 154 and 221, Randall-McIver and Mace 1902: 8). Also in the well documented cemeteries of Armant early tombs do not exceed 1 sq. m whilst larger tombs (3-4 sq. m) date not before Naqada IID (e.g. 1446, 1468, 1494, 1541 (4.2 sq. m), 1542, 1560 and 1580; Mond and Myers 1937: 27-31). The same evidence is found in Middle Egyptian cemeteries (Brunton and Caton-Thompson 1928: 42-61, pl. XXX-XXXIII; Brunton 1937: 69-91, pl. XXIX-XXXI; Brunton 1948: 12-23, pl. IX and X). Exceptional is grave 1805 (Naqada IA/B) at Mostagedda with a size of 2.6 sq. m. In Naga ed-Deir four early graves measure 2-3 sq. m (7016, 7045, 7130, 7179, 7394), and altogether only 20 graves are larger than 3 sq. m, one of them dating to Naqada IIA/B, the others to Naqada IIC/D (Lythgoe and Dunham 1965; Friedman 1981: Appendix III; Delrue 2001: 42-45). The Naqada IIC/D grave 7540 (13 sq. m) has to be especially mentioned as it is larger than contemporaneous graves in Cemetery U. Mahasna seems to be an exception again with individual large early tombs (e.g. H29, H30, H33, H45, three of them double burials) and noticeably, lacking large Naqada IID tombs (Ayrton and Loat 1911: 10-19).

The cemeteries at Naqada also seem to start moderately during Naqada I (e.g. Bard 1994: 80-85, 97-102, 119-120; Hartmann 2016: Table 26), with earlier tombs generally smaller than 3 sq. m. Large tombs, some of them brick-lined, are found especially in the elite Cemetery T. At least two of them, namely T 4 (6.8 sq. m) and T 5 (10.9 sq. m) are larger than corresponding graves at Abydos and date to Naqada IIC, i.e. to the span of time which is almost not represented in Cemetery

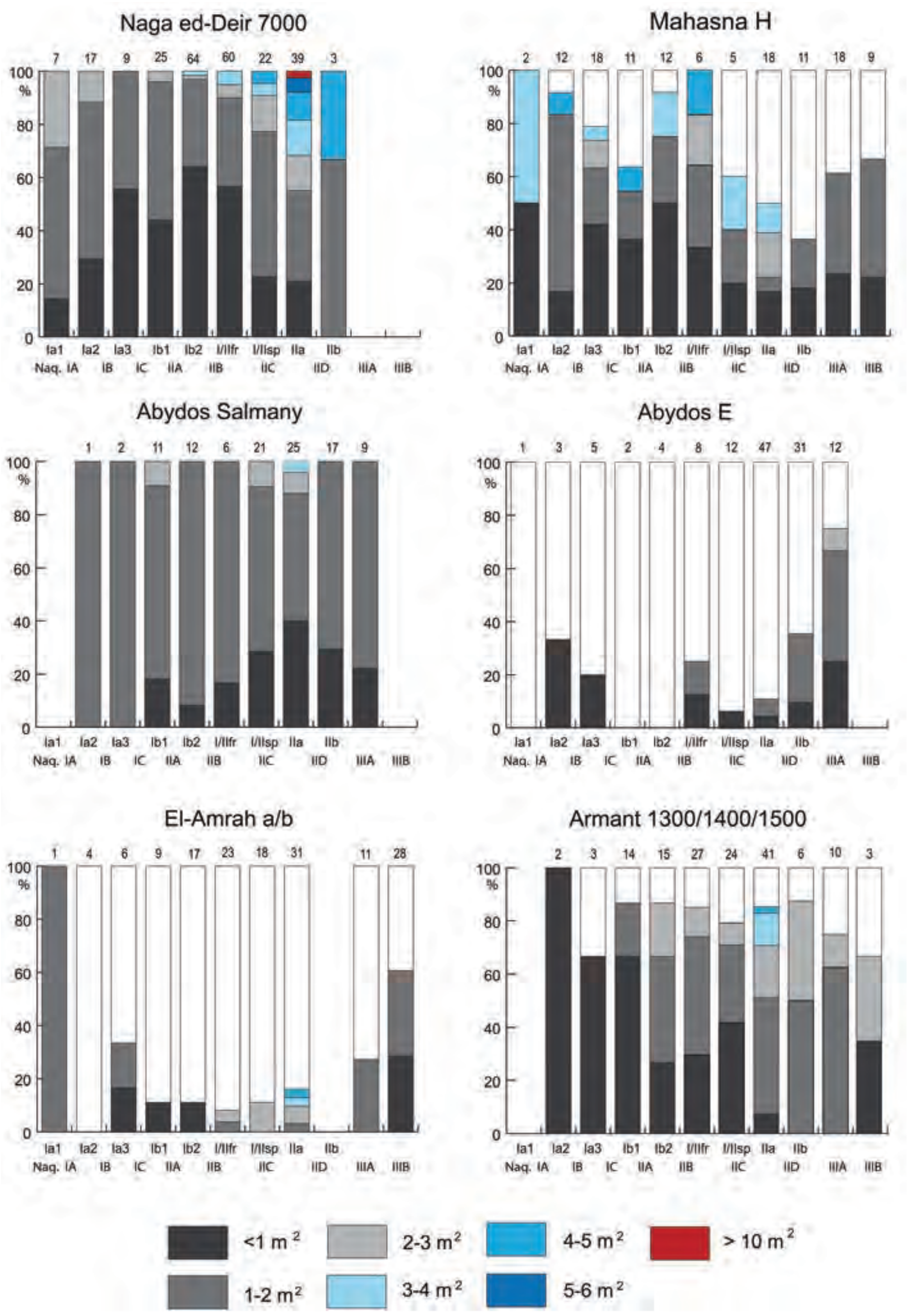

Fig. 8. Grave sizes in selected Predynastic cemeteries (cf. Fig. 4 and Appendix 1 and 2)

U. Slightly later large tombs (e.g. T10 with 5.13 sq. m, T11 with 7.81 sq. m or T16 with 4.14 sq. m) match the range of Naqada IID grave sizes in Cemetery U (Petrie/Quibell 1896: pl. LXXXII; see also Kemp 1973: 38-43; Kaiser and Dreyer 1982: 242-245).

At Hierakonpolis, as far as it is known today, substantial activities apparently did not start before late Naqada I (see e.g. Friedman 2008: Table 1). The recent excavations in the elite cemetery of this period, HK6, revealed impressive funeral complexes with superstructures made of wood and matting, and exceptional hitherto unknown finds such as multiple burials of humans and wild and domesticated animals (e.g. Friedman 2004: 131-168; 2008: 11-20; 2008a: 1157-1194; Friedman et al. 2011: 157-191; Droux 2014). The complex is only partly excavated so far and its significance is not yet completely clarified. The elite character of the construction is obvious, but it eludes the comparison with other "traditional" cemeteries, including Cemetery U. During Naqada IIC funeral activities of the elite seem to have shifted especially to HK31, where a group of other tombs seems to have surrounded the decorated tomb 100 (with almost 15 sq. m) (e.g. Quibell/Green 1902: 20-22; Kaiser 1958: 187-192; Case/Payne 1962; Payne 1973; Kemp 1973: 36-38; Adams 1974: 86-93; Kaiser and Dreyer 1982: 242-245; Friedman 2008: 10-11, 23). Only during Naqada III, the HK6 complex was re-used as an elite cemetery (e.g. Adams 2000; Friedman 2008: 23-26) with grave sizes (e.g. Friedman 2009) comparable to those of contemporaneous tombs at Abydos.

Although in large parts incomplete, the presented comparison reveals at least tendencies. Beside the largest number of early (Naqada IA/IB) tombs so far known, Cemetery U seems also to provide a larger number of big and richly equipped early Naqada I graves than any other of the contemporaneous cemeteries. Only at Mahasna individual early tombs of similar size and wealth are found. However, the size and equipment of the graves during the second chronological phase of Cemetery U, i.e. during Naqada IID, and those of the later brick-lined tombs also find only few parallels in other cemeteries. The revival of Umm el-Qaab as an outstanding burial place of the elite during this time must have had an important reason.

Conclusions

The evidence from Cemetery U allows to draft at least a rough picture of the development at Abydos in the course of the 4th millennium: The prominent, slightly elevated area of Umm el-Qaab was obviously chosen by connected groups of early Naqada I settlers as the collective burial place for their clans and chiefs. A little later, and probably connected to the growth of the area used for agricultural activities and habitation, places situated closer to the cultivation came into use as additional graveyards, such as Cemetery Φ and the oldest graves of Cemetery E and Salmany. However, elite burials seem to be absent from these small cemeteries. Beyond the bay of Abydos, the establishment of Cemetery L near Beit Allam, and probably also of the cemeteries at Naga ed-Deir and El-Amrah probably reflect the same development. In contrast, the isolated and slightly elevated location of Cemetery H at Mahasna, within the next recess of the limestone plateau to the north of Abydos, resembles the situation in Umm el-Qaab and might have been a primary cemetery of other arriving groups.

Until early Naqada II Umm el-Qaab remained the main burial place of Abydos. As no changes in the original pattern of grave distribution can be observed nor do additional grave groups occur in the course of time, Cemetery U seems to have been reserved for burials of old-established – i.e. probably locally dominant – families or clans until early Naqada II.

The diminishing number of graves in Cemetery U during Naqada IIB, and especially the lack of a large number of Naqada IIC tombs may indicate that the cemetery (and the old clans?) became gradually less important during this time. In contrast, graves of this time can be found in remote Salmany and in a moderately growing number in Cemetery E, which now starts to replace Umm el-Qaab as the main cemetery of Abydos. However, in contrast to Naqada and Hierakonpolis, elite tombs are missing so far at Abydos during this time.

The otherwise known archaeological remains at Abydos (see above) fail to offer an explanation for the return of funeral activities at Umm el-Qaab from Naqada IID onwards. Even considering that settlement remains might have been overlaid, destroyed or not yet discovered, any evidence of sudden economic or political growth is missing at Abydos. If not traceable directly by settlement remains, such a development would have been surely reflected in the equipment of graves, especially in a considerable number of well-equipped middle class burials. But this seems to be not the case. Although there are several well-equipped Naqada IID/IIIA graves in Cemetery E, neither their number, their size, nor their wealth especially exceeds those of the tombs in neighbouring cemeteries, e.g. in el-Amrah or Naga ed-Deir. The evidence from Umm el-Qaab remains isolated, and the transformation of Cemetery U into an exclusive elite cemetery must have had another background. If Umm el-Qaab was (one of) the first large burial place of the Naqada culture after its arrival in the Nile valley, the location where the earliest Naqada chiefs were buried must have been of outstanding interest for the cultural identity of the descendants. The intention to tie in with this tradition in order to obtain legitimacy and magical protection from the ancestors might have been an essential reason for the Naqada IID elite to return to this place. A burial close to the chiefs of the forefathers would symbolize roots and identity. The same idea probably formed the background of the re-use of the elite complex of HK6 during Naqada III (Friedman 2008: 23), and it can still be observed later in pharaonic times. The presence of the old graves of Cemetery U and – embedded in oral tradition, religious beliefs and cultic activities – its mythification might have given Abydos a special significance as a kind of social-funeral centre of the Naqada elite, independent from the actual economic importance of Abydos or any political rivalries.

This same basic idea of legitimacy through connection with the remote ancestors might still have been active and accepted at the beginning of the Early Dynastic period and could have been the impetus for the kings of the 1st dynasty to build their tombs in Umm el-Qaab far away from their political business in Memphis (cf. Kemp 1966: 19-22). It must also be considered that already during Naqada IID, when this development was initiated, the individuals buried in Cemetery U need not necessarily have come from Abydos. They may have resided in Naqada, Hierakonpolis or elsewhere (cf. Kemp 2006: 91). The connection to the location of the tomb of Osiris at Umm el-Qaab during pharaonic times seems obvious. Noticeably, the situation of pharaonic Abydos resembles the Predynastic evidence. Abydos remained a marginal provincial town throughout its history and was at the same time the most important centre of funeral cult in pharaonic Egypt.

It is not possible to say whether the physical presence of the spirit of the ancestors was in itself sufficient to initiate the reactivation of the old burial tradition at Umm el-Qaab, or if other factors, e.g. the particular landscape, may have also played a role. Afterwards, the royal tombs provide some evidence that the large wadi which surrounds Umm el-Qaab, especially its outflow from the cliffs of the limestone plateau, was considered to be the mythical entrance to the afterlife. Niches in the south-western corners of the burial chambers, a special annex of the tomb of Dewen and gaps in the rows of subsidiary tombs are orientated towards this wadi entrance and might have been installed to help the dead king to leave the tomb and to find his way to the netherworld (Dreyer *et al.* 1990: 78; Dreyer 2007: 200-201; cf. also Effland and Effland 2013: 10-12). It cannot be excluded that this mythical role of the wadi entrance has a longer tradition and is of Predynastic origin.

However, if the funeral significance of Abydos during Predynastic times is accepted, one would expect indications of cultic activities and funeral ceremonies. Against the background of recently uncovered evidence for the production of beer, bread and meat at Hierakonpolis, probably for the provision of funeral festivities (e.g. Friedman 2008: 23; Takamiya 2008: 187-202; Baba 2013; 2014; van Neer and de Cupere 2014), the remains of breweries are striking which represent – but perhaps only accidentally – a prevailing part of the known settlement remains at Abydos (see above and Fig. 1). They could have been connected to funeral ceremonies with regard to Cemetery U, which took place already in Predynastic times near the cultivation as in case of the Early Dynastic royal tombs in Umm el-Qaab and their funerary enclosures (as a summery see O'Connor 2009: 159-181). Individual finds from the area of the later Osiris Temple might even indicate a Predynastic forerunner of this temple.

The present state of research does not allow more than tentative conclusions but the results of the excavations of Cemetery U in conjunction with even the limited information from previous excavators may perhaps help to illuminate Egypt's remote past.

Acknowledgment

I am greatly indebted to Renee Friedman for valuable comments and for spending her time to improve the English.

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Appendix 1.
Dating and grave sizes of early Naqada I tombs from the Cemetery U and other cemeteries at Abydos

Cemetery U Phases	**Naqada IA**	**Naqada IB**	**Naqada IC**
	Ia1	**Ia2**	**Ia3**
Abydos U (DAI excavations)	129 (0,8); 143b (0,7); 249 (2,5); 280 1,1); 287a (0,9); 300 (2,5); 324 (1,5); 350 (1,8); 367 (3,6); 368 (3,0); 380 (1,5); 391 (1,6); 395a (0,6); 397 (2,3); 419 (1,0); 447 (1,2); 468 (3,3); 468a (0,6); 500 (4,8); 505b (0,8); 519a (1,0); 603 (1,9); 623 (3,1); 627 (3,3)	129a (0,9); 138 (2,3); 142 (2,0); 143a (0,7); *146 (1,4); 148 (1,1); 178 (4,6); 235 (3,5); 250 (3,3); 253 (1,4); *277 (3,4); 282 (1,4); 284a (1,4); *288a (1,0); 291 (3,4); *294a*(1,2); 303 (3,3); 306 (2,1); 307 (2,5); 329a (1,6); *341 (2,2); *345 (1,1); 348 (1,2); *381*(1,7); 389 (2,5); *390a (0,5); *392b (0,9); 407 (0,4); 415 (3,3); 417 (2,6); *423* (1,9); *501 (1,0); 503b (0,7); 506 (1,3); *506c (1,0); 507a (1,2); 507b (1,0); 529a (2,3); 531 (1,9); 532 (0,8); *533 (0,9); *535 (1,3); *539 (1,3); 559 (1,6); *628 (1,4); *629 (1,1); 637* (2,0); 647 (5,8)	141 (5,6); *152*(1,3); 168 (1,4); *215* (1,3); *232 (3,9); 237 (1,9); 239 (4,2); 248 (1,3); 252 (1,5); 263 (2,3); 265 (3,1); 268 (0,8); *275 (1,3); *284 (1,7); *295* (0,8); 332 (4,0); 339 (2,6); *381a*(0,9); 383 (1,2); 384 (2,3); 408 (2,2); *412 (1,0); 416 (2,6); 420 (0,6); *425*(1,7); 432 (2,7); *442* (1,2); *448*(1,9); *451* (1,3); *473*(1,4); 502 (0,9); 505 (1,0); 505d (1,4); *508*(2,4); *511*(1,0); *530*(0,8); 541 (1,8); 548a (1,1); 549 (1,6); 551 (1,6); 556 (1,4); *558*(1,0); *613*(3,0); 653 (0,9)
Abydos U (Peet excav.)	3 (2,0); 27	1; *9; 11; 13 (1,6); 16 (1,6); 20; *24; *29; 30; *32*	*14*, *15*(0,5); 21
Abydos Φ		3; 22; 23; 31; 55; 60	*44; 29
Abydos E	179	*132; 163 (0,5); *182	44; *120*; *127*; 168 (0,9); 181
Salmany		*45 (1,7)	25 (1,7); *43*(1,2)

Dating of tombs is based on seriation and additional typo-chronological analysis of pottery types by R. Hartmann (2016: Table 25 and 26). If long life spans of vessel types do not allow the precise dating of a grave into one of Cemetery U sub-phases, possible chronological range has been averaged and the grave is indicated by *grave-no.*; in the case of only two possible sub-phases the tomb has been assigned to younger phase and marked by *grave-no. Grave sizes (in brackets) are given in sqm and are taken from corresponding publications

Appendix 2.
Dating and grave sizes of early Naqada I tombs from selected Upper Egyptian cemeteries

	Naqada IA	**Naqada IB**	**Naqada IC**
Cemetery U Phases	**Ia1**	**Ia2**	**Ia3**
Matmar			*2608*(1,0); *2654*(1,4); *2673*(1,4); *2688*((0,6); *2725*(0,7)
Mostagedda		*1805 (2,6); *1878 (0,8); *1896*(0,5)	*1836*; *1843*; *1858*(0,8); *1865* (0,3); *1892*(1,0); *5210*
Badari		*3828*(1,1)	
Hemamieh		*1666*; *1713; *1743*	
Qau el-Kebir		*120 (0,8); *133*(0,6)	*130*(0,8)
Naga ed-Deir N 7000	7014*(1,6); 7036 (1,2); 7130 (2,8); 7179 (2,8); 7260 (1,3); 7365 (1,3); 7627 (0,9)	7016 (2,6); 7037 (1,5); 7045 (2,0); 7047 (1,4); *7052*(0,7); *7061*(0,8); *7124 (0,3); 7128 (1,9); *7134*(0,5); 7155 (1,8); *7269 (0,8); *7274 (1,0); 7375 (1,8); 7377 (1,6); 7394 (2,5); 7429 (1,6); *7626*(1,1)	7004 (1,4); 7015 (0,8); *7143*(1,3); *7189*(0,8); *7229*(1,0); *7362*(0,7); *7364*(0,9); *7393*(1,2); *7439*(0,7)
Mahasna H	26 (0,9); 30 (3,3)	5 (0,5); 29 (4,5); *35*(1,9); *36 (1,7); 37 (1,1); 40 (1,1); *46 (0,8); 53(1,3); 90 (1,6); *96*; *99 (1,1); *134 (1,2)	10 (1,1); *13; *14; 17; *19*(0,7); *20* (0,7); *24*(0,9); 32 (1,3); 34 (0,6); 39; 42 (2,3); 45 (3,6); 49 (2,4); *50 (1,1); *52* (0,8); 55 (0,6); 88 (0,9); 135 (1,0)
El-Amrah	b144 (1,0)	a90; b117; b202; b212	a85; a86; a104; *b127; b132; b184
Hu U		*229*; *266*; 272; 336; 338	*142; 160; 280: *399
Abadiyeh B			37; *88*; 123; 143; 148
Armant		1414 (0,7); 1432 (0,8)	1417; 1427 (0,7); 1457 (0,5)

Desert and the Nile.
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Papers in honour of Fred Wendorf
Studies in African Archaeology 15
Poznań Archaeological Museum 2018

Taichi Kuronuma

Goods Placement in Predynastic Burials: A Case Study from the Cemeteries in the Naqada Region

Introduction

The studies of burial customs of the Naqada Culture in the 4th Millennium BC allow tracing social development which influenced the emergence of the Early State (Fig. 1). Burials of the Naqada Culture were first discovered in the cemeteries at Naqada during 1894-95 by Petrie (Petrie and Quibell 1896). Subsequently more than 200 cemeteries have been excavated or surveyed to date (Hendrickx and van den Brink 2002). Through these investigations, typical and regulated mortuary characteristics have been observed. The contracted posture of burials with the head directed south and face directed west, or quantitatively wealthy and varied burial equipment, are typical characteristics of Upper Egyptian burial custom (e.g. Castillos 1982). Quantitative analyses of burial equipment have contributed to the understanding of social stratification (e.g. Bard 1994).

Despite recent research into Predynastic mortuary customs, many aspects remained unsolved. The placement of goods in burials is one such example, and is investigated here to better understand mortuary regulations and practices. Four cemeteries in the Naqada region of Upper Egypt are the subject of this analysis, since the Naqada region embraces a relatively large amount of documented graves, which are recorded in archival field notes and publications (Baumgartel 1970; Petrie and Quibell 1896).

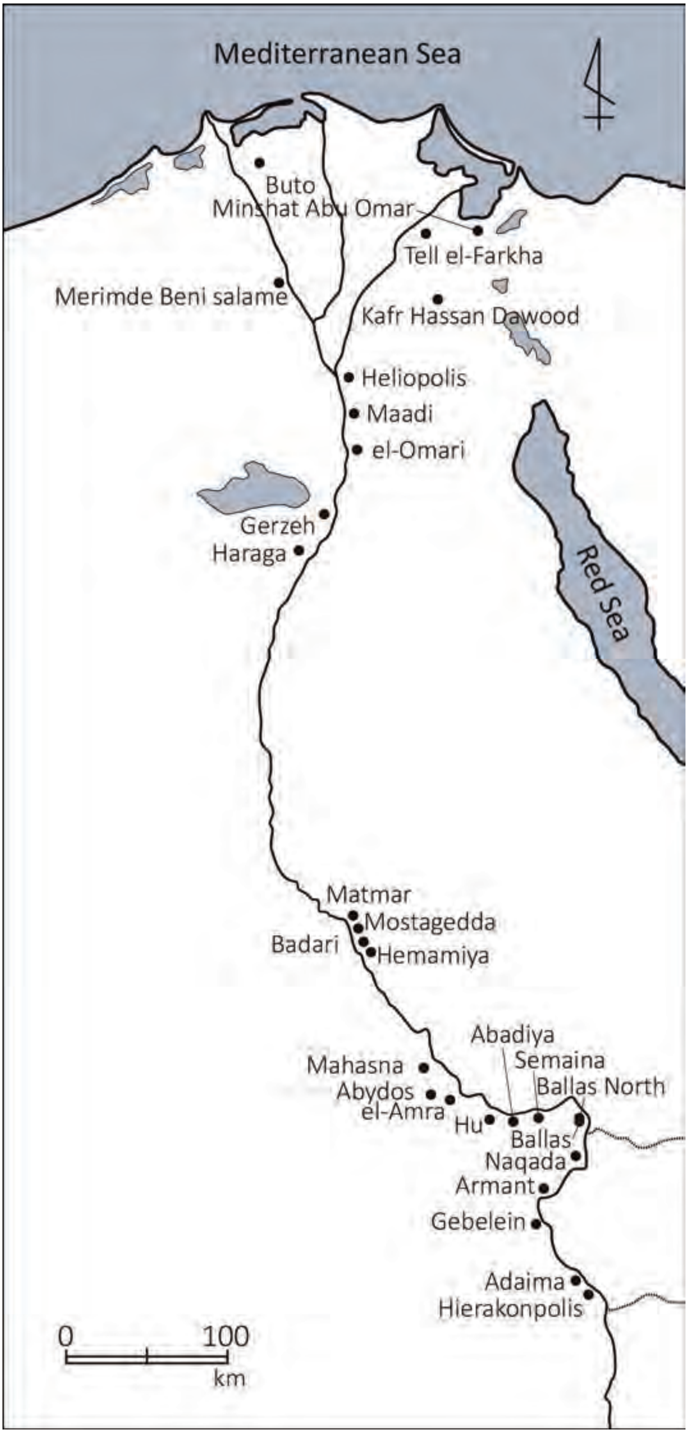

Fig. 1. Predynastic cemeteries along the Nile

1. Research background

1.1. Mortuary archaeology in Predynastic research – a brief summary

The investigation of mortuary practices is one of the common research themes applied to the Naqada Culture. Many aspects such as the classification of tombs or style of interment were examined in the early-twentieth century (Murray 1956; Petrie 1920; Reisner 1936).

After the 1980s, research into Predynastic social stratification became more frequent. One landmark example is the study by Bard (1994) who conducted a cluster analysis for the Cemetery 1400-1500 at Armant and three cemeteries (Main, B, and T) at Naqada. Its results suggest the complexation of social stratum after mid-Naqada II.

From the mid-1990s, Predynastic mortuary archaeology diversified due to the increase of information from new interdisciplinary excavations such as at Hierakonpolis (Friedman 2008). In addition, developments in methods and theory applied to mortuary archaeology enabled the investigation of new questions (cf. Parker Pearson 1999). For example, Jones (2007) analysed body manipulation in Hierakonpolis HK 43 Cemetery which was possible due to the human remains which were carefully retrieved with modern excavation techniques. Further, social identity and relationships in the Predynastic were discussed by Stevenson (2009a; 2009b) who analysed the field records of the excavation of the el-Gerzeh cemetery.

Despite numerous studies applying various theoretical perspectives and methodological approaches, there are still obscurities regarding Predynastic burials. More research based on detailed observation, analysis, and interpretation are necessary. Furthermore, re-evaluation of old excavations through archival records can also contribute to the unsolved points under discussion. Predynastic burial goods placement is one such point.

1.2. Past research on the goods placement in burial

Since interred goods closely relate to the buried person, understanding goods placement in burials is important to observe mortuary regulations. However, for the Naqada Culture, detailed research has not been adequately attempted except in some examples. There are two directions in past research referring to goods placement. One is the placement of particular goods type, and the other is the general description of the well preserved graves. As an example of the former, Regner (1996) gathered the information on the placement of palettes in the Predynastic graves. Examples of burials in Lower and Upper Egypt were analysed and it was found that palettes were widely distributed around the buried person, especially around the head, hands, and pelvis. Furthermore, Roth (1992) studied the placement of fish-tailed knives in burial to examine the functional and historical relationship with the Dynastic psš-kf knives which were used for the 'Opening of the mouth ritual'.

For the latter case, general descriptions of the typical goods placement in well preserved graves are mentioned in many works. The oldest known example from Predynastic Egypt is the report on the observed placement regulations in the cemeteries at Naqada (Petrie and Quibell 1896). Since then, some books mention the typical goods placement and its development (e.g. Adams 1988: 17). Grajetzki (2003) mentioned typical Predynastic goods placement in comparison with Dynastic mortuary customs.

Contrary to the examples in the above overview, the fragmentary state of detailed information prevents macroscopic analyses into the comprehension of goods placement by cemetery. This paper aims to overcome this issue by integrating published and unpublished information sources.

2. Materials and methods

2.1. Research area and cemeteries to be analysed

For the analysis of burial goods placement, four cemeteries in the Naqada region were chosen. These are three cemeteries at Naqada (Main (NM), B (NB), and T (NT)) excavated by Petrie and his team (Petrie and Quibell 1896), and the cemetery in Deir el-Ballâs (Bâllas North (BN)) excavated by Lythgoe (Podzorski 1994) as part of the Hearst Expedition. Other Predynastic and Early Dynastic cemeteries were found in this area such as Ballas excavated by Quibell (Petrie and Quibell 1896) on the west bank of the Nile, or Khizam (e.g. Hendrickx 1992) on the east. However, the records of these cemeteries are too fragmentary for the current analysis[1].

Though the published reports of the cemeteries at Naqada contain only partial records of graves and no final reports were published for BN, unpublished records

[1] Archaeological sites in the Naqada region are listed by Hendrickx and van den Brink (2002).

of these cemeteries are fortunately preserved in museums. The supplements for Petrie's excavations by Baumgartel (1970) and Payne (1989) provide the list of the interred goods per grave, which are stored in museums[2]. Sketches of grave plans are lacking, but some exist in Petrie's notebooks which are now held by the Petrie Museum of Egyptian Archaeology, University College London. Therefore, for Petrie's excavations, the analysis of goods placement is possible[3].

For BN, Podzorski (1994) comprehensively integrated the field records, and objects information held in Phoebe A. Hearst Museum of Anthropology of University of California, Berkeley, and other places. Grave plans of each burial were presented, which makes the analysis possible for BN.

2.2. Methods of analysis of goods placement in burial

The analytical methodology used here is based on the works of Regner (1996) and Stevenson (2013). These authors used 10 areas for goods placement around the body, however the area around the body is divided into 14 areas here, encompassing around the buried person and along the grave outline (Fig. 2, Table 1).

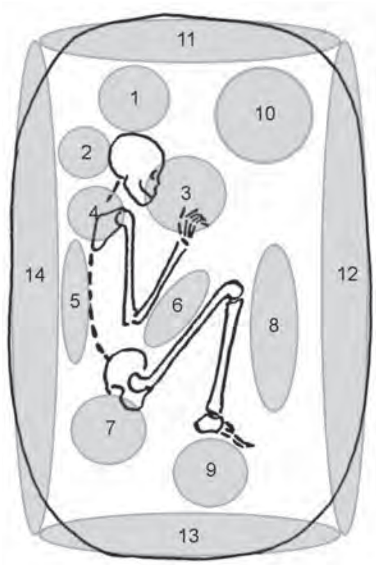

Fig 2. Model of placement areas in Predynastic burial (Regner 1996 Abb. 39, modified)

[2] Information in the catalogues of three museums (e.g. Regner 1996) whose information had not been combined in Baumgartel's list were integrated.

[3] Unfortunately, the field notes that survive cover less than half of the excavated graves.

Goods were counted by type by placement area. The goods consisted of 7 different types: pottery, stone vessels (SV), stone artefacts (SA), palettes, beads/pendants (B/P), ivory, and shells. Other unlisted goods are included in 'miscellaneous'. In the case of analysis for the cemeteries at Naqada, only goods discernible in the Petrie's notebooks were counted. The supplementary lists of Baumgartel and Payne were also crosschecked during this counting. For BN, the author followed Podzorski's descriptions.

Table 1. Placement area for burial

No.	Desciption
1	Above head
2	Behind head
3	In front of face and around hands
4	Neck and shoulder
5	Behind back
6	Before body, between arms and upper legs
7	Around pelvis
8	In front of legs
9	Below feet
10	Before upper body
11	Along grave outline above head
12	Along grave outline before face
13	Along grave outline below feet
14	Along grave outline behind back

2.3. Timeframe and selection of tombs

Based on the pottery typology and its seriation, the relative chronological timeframe of the Naqada Culture was suggested by various authors such like Petrie (1920), Kaiser (1957), and Hendrickx (2006). Payne (1992) also proposed a local chronology at Naqada. Hendrickx's chronology is used here, merged it to four periods: Naqada I, Early Naqada II, Late Naqada II and Naqada III. This modification aimed to include as many graves as possible, particularly those with a wider chronological range, and to facilitate the diachronic observation. Under this chronological setting, graves with exact or almost exact chronological position were selected, and not all of the graves were analysed as a consequence.

3. Results

Tables 2 to 5 show the amount of goods from each chronological phase, with the sum and percentage of each goods type by placement area, separated by cemetery. The sum of each good type by cemetery is also provided.

3.1. Naqada I (Table 2)

Pottery: Most potteries were placed along the grave outline, especially in areas 11 and 12. Contrarily, some pottery was also placed around the body, especially in areas 1, 3, 5 and 6. These results could be seen at NM and BN, but the number of goods per area at BN were max. 4 or 5 (area 11 or 12). Therefore, it is too small for evaluation for BN. NB shows a similar pattern in the dominant placement along the grave outline, but few potteries were placed around the buried person.

SV: Amounts are few in all cemeteries but they tended to be placed around the buried person, especially in areas 1 and 6 at NM and BN.

SA: No flint lithics could be identifiable at NB and BN. In NM, flint lithics were placed both around the buried person and along the grave outline. The amount in the latter area is slightly larger than that of the former, but evaluation is difficult due to the small number of flint lithics.

Palette: No palettes were identified at NB. Palettes were placed around the buried person and along the grave outline at NM, but the former placement area was dominant. Three palettes in area 7 should be mentioned. At BN, a sole example was also placed near the buried person in area 6.

B/P: No goods could be identifiable at NB and BN. At NM, B/P were placed in both near the buried person and grave outline, but the former areas occur in a higher proportion than the latter. B/P were also dispersed in areas 3, 5, 6 and 9.

Ivory: No ivory goods could be identifiable at NB and BN. At NM, area 3 was the dominant placement (72.4 %, 21 objects). Also, there were 6 objects in area 1.

Shell: Mainly placed near buried person in areas 1, 3 and 6 at NM and BN. At NB a sole example was placed in the step part of the grave.

3.2. Early Naqada II (Table 3)

Pottery: Most of the pottery were placed along the grave outline. This could be identified at NM, NB and BN, but was obscure at NT. Pottery were also confined around the buried person in this period, in particular at NM in areas 1, 3, 6, 8 and 9, while they were dominant in areas 6 and 9 in NB and 3, 6 and 9 at BN.

SV: No stone vessels could be identified at NT. The placement along the grave outline is observed at NM. Several stone vessels at NM were observed in areas 3

Table 2. Placement of the goods in burial in Naqada I (SV = stone vessel, SA = stone artefact, B/P = beads/pendants)

NM N = 55

Area	Pottery		SV		SA		Palette		B/P		Ivory		Shell		Miscellaneous	
1	5	1,3%	3	50,0%	1	8,3%	1	8,3%	0	0,0%	6	20,7%	1	20,0%	2	13,3%
2	2	0,5%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
3	7	1,8%	0	0,0%	0	0,0%	1	8,3%	2	16,7%	21	72,4%	1	20,0%	1	6,7%
4	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
5	5	1,3%	0	0,0%	0	0,0%	0	0,0%	1	8,3%	0	0,0%	0	0,0%	0	0,0%
6	6	1,6%	1	16,7%	0	0,0%	1	8,3%	2	16,7%	0	0,0%	2	40,0%	1	6,7%
7	0	0,0%	0	0,0%	4	33,3%	3	25,0%	1	8,3%	0	0,0%	0	0,0%	1	6,7%
8	1	0,3%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
9	10	2,6%	0	0,0%	0	0,0%	0	0,0%	1	8,3%	0	0,0%	0	0,0%	0	0,0%
10	8	2,1%	0	0,0%	0	0,0%	3	25,0%	0	0,0%	2	6,9%	0	0,0%	2	13,3%
11	147	38,5%	0	0,0%	0	0,0%	1	8,3%	2	16,7%	0	0,0%	0	0,0%	2	13,3%
12	103	27,0%	1	16,7%	4	33,3%	0	0,0%	1	8,3%	0	0,0%	1	20,0%	3	20,0%
13	37	9,7%	1	16,7%	2	16,7%	2	16,7%	2	16,7%	0	0,0%	0	0,0%	3	20,0%
14	51	13,4%	0	0,0%	1	8,3%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
Total	382		6		12		12		12		29		5		15	

NB N = 2

Area	Pottery		SV		SA		Palette		B/P		Ivory		Shell		Miscellaneous	
1	2	22,2%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
2	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
3	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
4	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
5	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	2	66,7%
6	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
7	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%

8	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
9	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
10	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
11	3	33,3%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	1	33,3%
12	1	11,1%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
13	1	11,1%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
14	2	22,2%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
Step	0	0,0%	1	100,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	1	100,0%	0	0,0%
Total	9		1		0		0		0		0		1		3	

BN N = 5

Area	Pottery		SV		SA		Palette		B/P		Ivory		Shell		Miscellaneous	
1	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
2	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
3	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	1	33,3%	0	0,0%
4	1	8,3%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
5	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
6	1	8,3%	1	100,0%	0	0,0%	1	100,0%	0	0,0%	0	0,0%	2	66,7%	4	100,0%
7	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
8	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
9	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
10	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
11	4	33,3%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
12	5	41,7%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
13	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
14	1	8,3%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
Total	12		1		0		1		0		0		3		4	

* No data for NT

Table 3. Placement of the goods in burial in Early Naqada II (SV = stone vessel, SA = stone artefact, B/P = beads/pendants)

NM N = 148

Area	Pottery		SV		SA		Palette		B/P		Ivory		Shell		Miscellaneous	
1	30	2,9%	0	0,0%	0	0,0%	2	3,9%	3	14,3%	8	11,1%	2	13,3%	1	1,5%
2	3	0,3%	0	0,0%	0	0,0%	3	5,9%	3	14,3%	17	23,6%	0	0,0%	6	9,2%
3	17	1,7%	3	12,5%	5	21,7%	17	33,3%	7	33,3%	14	19,4%	10	66,7%	12	18,5%
4	0	0,0%	0	0,0%	0	0,0%	0	0,0%	1	4,8%	0	0,0%	0	0,0%	0	0,0%
5	7	0,7%	0	0,0%	0	0,0%	1	2,0%	0	0,0%	0	0,0%	0	0,0%	1	1,5%
6	16	1,6%	6	25,0%	2	8,7%	4	7,8%	3	14,3%	7	9,7%	0	0,0%	8	12,3%
7	4	0,4%	0	0,0%	2	8,7%	1	2,0%	0	0,0%	0	0,0%	0	0,0%	1	1,5%
8	16	1,6%	0	0,0%	1	4,3%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
9	33	3,2%	1	4,2%	3	13,0%	2	3,9%	0	0,0%	3	4,2%	0	0,0%	5	7,7%
10	54	5,2%	0	0,0%	0	0,0%	3	5,9%	0	0,0%	1	1,4%	0	0,0%	2	3,1%
11	332	32,2%	5	20,8%	0	0,0%	6	11,8%	3	14,3%	13	18,1%	1	6,7%	10	15,4%
12	287	27,9%	1	4,2%	0	0,0%	2	3,9%	1	4,8%	0	0,0%	0	0,0%	2	3,1%
13	146	14,2%	8	33,3%	5	21,7%	7	13,7%	0	0,0%	8	11,1%	2	13,3%	6	9,2%
14	63	6,1%	0	0,0%	5	21,7%	2	3,9%	0	0,0%	0	0,0%	0	0,0%	9	13,8%
Recess	21	2,0%	0	0,0%	0	0,0%	1	2,0%	0	0,0%	1	1,4%	0	0,0%	2	3,1%
Step	1	0,1%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
Total	1030		24		23		51		21		72		15		65	

NB N = 7

Area	Pottery		SV		SA		Palette		B/P		Ivory		Shell		Miscellaneous	
1	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0	0	0,0%	0	0,0%
2	1	1,2%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0	0	0,0%	0	0,0%
3	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0	0	0,0%	0	0,0%
4	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0	0	0,0%	0	0,0%

5	2	2,5%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0	0	0,0%	0	0,0%
6	4	4,9%	0	0,0%	1	50,0%	0	0,0%	0	0,0%	0	0	0	0,0%	0	0,0%
7	1	1,2%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0	0	0,0%	0	0,0%
8	2	2,5%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0	0	0,0%	0	0,0%
9	4	4,9%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0	0	0,0%	0	0,0%
10	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0	0	0,0%	1	20,0%
11	15	18,5%	1	50,0%	0	0,0%	1	50,0%	0	0,0%	0	0	0	0,0%	0	0,0%
12	26	32,1%	1	50,0%	0	0,0%	0	0,0%	0	0,0%	0	0	1	100,0%	0	0,0%
13	21	25,9%	0	0,0%	0	0,0%	1	50,0%	0	0,0%	0	0	0	0,0%	2	40,0%
14	5	6,2%	0	0,0%	1	50,0%	0	0,0%	0	0,0%	0	0	0	0,0%	2	40,0%
Total	81		2		2		2		0		0		1		5	

NT N = 2

Area	Pottery		SV		SA		Palette		B/P		Ivory		Shell		Miscellaneous	
1	2	5,7%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
2	0	0,0%	0	0,0%	0	0,0%	1	33,3%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
3	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
4	0	0,0%	0	0,0%	2	100,0%	1	0,0%	0	0,0%	0	0,0%	0	0,0%	1	20,0%
5	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
6	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
7	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
8	1	2,9%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
9	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
10	19	54,3%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
11	11	31,4%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	2	100,0%	0	0,0%	4	80,0%

12	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
13	1	2,9%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
14	1	2,9%	0	0,0%	0	0,0%	1	33,3%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
Total	35		0		2		3		0		2		0		5	

BN N = 21

Area	Pottery		SV		SA		Palette		B/P		Ivory		Shell		Miscellaneous	
1	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
2	0	0,0%	0	0,0%	0	0,0%	0	0,0%	4	57,1%	0	0,0%	0	0,0%	1	12,5%
3	7	7,9%	0	0,0%	0	0,0%	2	20,0%	1	14,3%	1	25,0%	0	0,0%	3	37,5%
4	0	0,0%	0	0,0%	0	0,0%	0	0,0%	1	14,3%	0	0,0%	0	0,0%	0	0,0%
5	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
6	3	3,4%	0	0,0%	0	0,0%	1	10,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
7	0	0,0%	0	0,0%	0	0,0%	3	30,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
8	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	1	12,5%
9	2	2,2%	0	0,0%	3	100,0%	2	20,0%	1	14,3%	3	75,0%	3	37,5%	1	12,5%
10	2	2,2%	0	0,0%	0	0,0%	1	10,0%	0	0,0%	0	0,0%	0	0,0%	1	12,5%
11	24	27,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	5	62,5%	0	0,0%
12	40	44,9%	1	100,0%	0	0,0%	1	10,0%	0	0,0%	0	0,0%	0	0,0%	1	12,5%
13	11	12,4%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
14	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
Total	89		1		3		10		7		4		8		8	

and 6 and also in 11 and 13. At NB and BN, no stone vessels were placed around the buried person but only along the grave outline.

SA: Objects were placed around the buried person and along the grave outline. The amount of the flint lithics at NM became larger, and dispersed in various areas (3, 6, 7, 8 and 9). In other cemeteries, flint lithics were placed in areas 4 in NT, 6 at NB and 9 at BN.

Palettes: Palettes in NM could be both around the buried person and along the grave outline, but compared to Naqada I, an increase in area 3 was recorded. However, in the other cemeteries the placement areas differ. Dominant placement around the buried person occurred at NT and BN. By contrast, palettes were placed along the grave outline at NB (areas 11 and 13).

B/P: No goods could be identified at NB and NT. At NM and BN, most of the B/P were placed in various areas around the buried person, similar to Naqada I.

Ivory: No goods could be identified at NB. At NM, though the dominant number around the buried person were similar to that from Naqada I, placement along the grave outline also increased especially in areas 11 and 13. Placement at NT was only in area 11 and at BN was separated from the buried person.

Shell: Compared to Naqada I, placement in area 3 increased. Placements in other areas continued, but along the grave outline became dominant at BN.

3.3. Late Naqada II (Table 4)

Pottery: Similar to Early Naqada II, most were placed along the grave outline. This was identifiable at NM, NB, and BN, however the increase in areas 9 and 10 is noticeable, except at BN. The placement around the buried person confirmed in this period but pottery slightly decreased in number in areas 3, 5, 6 and 7. The placement areas with several potteries were divergent and increased at NM in areas 1, 2, 3, 6, 8, 9 and 10. Similar results are observed between NM, NB, and NT, but goods along the grave outline was common at BN.

SV: No stone vessels could be identified at BN. The result was similar to that of Early Naqada II, and increasing utilisation of area 10 is noticeable at NM. At NT the pattern was similar to NM where objects were more dominant around the buried person than along the grave outline. Small numbers of stone vessels made it difficult to observe any pattern at NB.

SA: No flint lithics could be identifiable at BN. In contrast to Early Naqada II, the dominant placement areas were along the grave outline (areas 11 and 12) at NM. But at NM, flint lithics were also placed around the buried person, especially in areas 3, 6, 9 and 10. It was also common at NB (area 9) and NT (area 3).

Table 4. Placement of the goods in burial in Late Naqada II (SV = stone vessel, SA = stone artefact, B/P = beads/pendants)

NM N = 103

Area	Pottery		SV		SA		Palette		B/P		Ivory		Shell		Miscellaneous	
1	46	3,7%	0	0,0%	0	0,0%	0	0,0%	1	25,0%	3	17,6%	0	0,0%	1	2,2%
2	18	1,4%	1	5,3%	0	0,0%	1	2,9%	0	0,0%	3	17,6%	0	0,0%	3	6,5%
3	6	0,5%	0	0,0%	4	11,4%	1	2,9%	0	0,0%	1	5,9%	1	50,0%	3	6,5%
4	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	1	50,0%	0	0,0%
5	5	0,4%	0	0,0%	0	0,0%	2	5,7%	0	0,0%	1	5,9%	0	0,0%	1	2,2%
6	13	1,0%	2	10,5%	4	11,4%	4	11,4%	0	0,0%	4	23,5%	0	0,0%	9	19,6%
7	2	0,2%	0	0,0%	0	0,0%	2	5,7%	0	0,0%	0	0,0%	0	0,0%	1	2,2%
8	24	1,9%	1	5,3%	0	0,0%	0	0,0%	0	0,0%	1	5,9%	0	0,0%	0	0,0%
9	210	16,7%	2	10,5%	5	14,3%	3	8,6%	0	0,0%	0	0,0%	0	0,0%	7	15,2%
10	83	6,6%	8	42,1%	2	5,7%	1	2,9%	0	0,0%	0	0,0%	0	0,0%	1	2,2%
11	211	16,8%	1	5,3%	9	25,7%	6	17,1%	1	25,0%	4	23,5%	0	0,0%	7	15,2%
12	296	23,5%	3	15,8%	11	31,4%	10	28,6%	2	50,0%	0	0,0%	0	0,0%	9	19,6%
13	224	17,8%	1	5,3%	0	0,0%	1	2,9%	0	0,0%	0	0,0%	0	0,0%	3	6,5%
14	115	9,1%	0	0,0%	0	0,0%	2	5,7%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
Recess	1	0,1%	0	0,0%	0	0,0%	1	2,9%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
Step	3	0,2%	0	0,0%	0	0,0%	1	2,9%	0	0,0%	0	0,0%	0	0,0%	1	2,2%
Total	1257		19		35		35		4		17		2		46	

NB N = 11

Area	Pottery		SV		SA		Palette		B/P		Ivory		Shell		Miscellaneous	
1	3	2,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
2	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%

3	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
4	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
5	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
6	1	0,7%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
7	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
8	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
9	18	11,8%	0	0,0%	2	100,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	1	100,0%
10	18	11,8%	1	50,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
11	29	19,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
12	31	20,3%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
13	30	19,6%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
14	23	15,0%	1	50,0%	0	0,0%	2	100,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
Total	153		2		2		2		0		0		0		1	

NT N = 13

Area	Pottery		SV		SA		Palette		B/P		Ivory		Shell		Miscellaneous	
1	12	3,1%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	1	50,0%	0	0,0%
2	1	0,3%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
3	2	0,5%	5	41,7%	3	100,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
4	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
5	7	1,8%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
6	0	0,0%	3	25,0%	0	0,0%	1	16,7%	0	0,0%	0	0,0%	0	0,0%	1	12,5%
7	6	1,6%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	1	12,5%
8	1	0,3%	0	0,0%	0	0,0%	1	16,7%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
9	99	25,8%	1	8,3%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%

10	48	12,5%	1	8,3%	0	0,0%	2	33,3%	0	0,0%	1	50,0%	1	50,0%	4	50,0%
11	32	8,3%	1	8,3%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
12	69	18,0%	1	8,3%	0	0,0%	1	16,7%	1	100,0%	1	50,0%	0	0,0%	1	12,5%
13	76	19,8%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
14	31	8,1%	0	0,0%	0	0,0%	1	16,7%	0	0,0%	0	0,0%	0	0,0%	1	12,5%
Total	384		12		3		6		1		2		2		8	
BN	N = 9															
Area	Pottery		SV		SA		Palette		B/P		Ivory		Shell		Miscellaneous	
1	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
2	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
3	0	0,0%	0	0,0%	0	0,0%	1	100,0%	0	0,0%	0	0,0%	0	0,0%	2	50,0%
4	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
5	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
6	2	4,2%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
7	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
8	2	4,2%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
9	2	4,2%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
10	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
11	11	22,9%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
12	17	35,4%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	1	25,0%
13	8	16,7%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
14	1	2,1%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
Step	5	10,4%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	1	25,0%
Total	48		0		0		1		0		0		0		4	

Palettes: Compared to Early Naqada II, the number in area 3 decreased, though the number in other areas did not changed markedly. Similar placement occurred at NT but the results were obscured at NB and BN due to the small sample size.

B/P: No B/P could be identifiable at NB and BN. At NM, the amount of B/P was small but occurred both around the buried person (area 1) and along the grave outline. At NT the sole example was placed in area 12.

Ivory: No ivory was identified at NB and BN. Though the placement along the grave outline could be observed at NM, most were distributed around the buried person, particularly in areas 1, 2 and 6. However, the case at NT was different and ivory were placed in either area 10 or 12.

Shell: No shell was identified at NB and BN. In NM and BN, shells tended to be placed around the bodies, especially in areas 1, 3 and 4, but 1 example was observed in area 10.

3.4. Naqada III (Table 5)

Pottery: Similar to Late Naqada II, most of the pottery were placed along the grave outline or slightly separated in particular areas such as 9 or 10. This was observed at NM, NT, and BN. At NB, no pottery was placed around the buried person but in several cases were placed along the grave outline as such in area 11.

SV: No stone vessels could be identified at NB. The result was similar to Late Naqada II, but the frequency of stone vessels around the buried person decreased at NM and NT. At BN, SV were placed in areas 7, 8, 10, and 11, contrary to the total absence in previous period.

SA: No flint lithics were identified from any cemetery.

Palettes: No palettes were identified at NB. Palettes at BN were spread widely around the buried person and along the grave outline. However, in other areas, particularly area 6, were dominant at BN. Placement at area 4 was common at NM. However, at NT, a palette was identified in area 11.

B/P: No B/P could be identified at NB and NT. BP was placed around the buried person, especially in area 1 at NM, and 6 and 7 at BN.

Ivory: The only ivory was identified at BN where it was in areas 9 and 11.

Shell: No shell was identified from any cemetery.

3.5. Summary of the results

The following patterns for the placement by goods type appeared:

Pottery was placed both around the buried person and along the grave outline through all periods, though the goods along the grave outline were generally

Table 5. Placement of the goods in burial in Naqada III (SV = stone vessel, SA = stone artefact, B/P = beads/pendants)

NM N = 28

Area	Pottery		SV		SA		Palette		B/P		Ivory		Shell		Miscellaneous	
1	2	1,3%	0	0,0%	0	0,0%	0	0,0%	1	100,0%	0	0,0%	0	0,0%	0	0,0%
2	3	1,9%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
3	8	5,1%	1	33,3%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
4	0	0,0%	0	0,0%	0	0,0%	2	100,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
5	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
6	5	3,2%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
7	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
8	5	3,2%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
9	4	2,6%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
10	19	12,2%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
11	28	17,9%	1	33,3%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
12	41	26,3%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
13	22	14,1%	1	33,3%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
14	17	10,9%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
Step	2	1,3%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	1	100,0%
Total	156		3		0		2		1		0		0		1	

NB N = 2

Area	Pottery		SV		SA		Palette		B/P		Ivory		Shell		Miscellaneous	
1	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
2	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
3	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%

4	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
5	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
6	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
7	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
8	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
9	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
10	1	11,1%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
11	5	55,6%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
12	2	22,2%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
13	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
14	1	11,1%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
Total	9		0		0		0		0		0		0		0	

NT N = 10

Area	Pottery		SV		SA		Palette		B/P		Ivory		Shell		Miscellaneous	
1	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
2	2	2,1%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
3	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
4	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
5	4	4,2%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
6	4	4,2%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
7	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
8	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
9	9	9,5%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
10	10	10,5%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%

11	18	18,9%	0	0,0%	0	0,0%	1	100,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
12	21	22,1%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
13	9	9,5%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
14	18	18,9%	2	100,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
Total	95		2		0		1		0		0		0		0	

BN N = 164

Area	Pottery		SV		SA		Palette		B/P		Ivory		Shell		Miscellaneous	
1	16	2,6%	0	0,0%	0	0,0%	1	5,6%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
2	3	0,5%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
3	17	2,8%	0	0,0%	0	0,0%	1	5,6%	0	0,0%	0	0,0%	0	0,0%	2	6,9%
4	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
5	6	1,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
6	13	2,1%	0	0,0%	0	0,0%	8	44,4%	1	50,0%	0	0,0%	0	0,0%	4	13,8%
7	16	2,6%	2	40,0%	0	0,0%	2	11,1%	1	50,0%	0	0,0%	0	0,0%	11	37,9%
8	5	0,8%	1	20,0%	0	0,0%	1	5,6%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
9	30	4,9%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	1	50,0%	0	0,0%	2	6,9%
10	46	7,5%	1	20,0%	0	0,0%	3	16,7%	0	0,0%	0	0,0%	0	0,0%	3	10,3%
11	157	25,7%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	1	50,0%	0	0,0%	4	13,8%
12	155	25,4%	1	20,0%	0	0,0%	2	11,1%	0	0,0%	0	0,0%	0	0,0%	1	3,4%
13	93	15,2%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	1	3,4%
14	48	7,9%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%
Step	6	1,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	1	3,4%
Total	611		5		0		18		2		2		0		29	

dominant. Minor placement areas tended to be observed in the cemetery composed of many graves such as NM. This probably reflects the presence of burial with slight deviation from mortuary regulations about pottery placement.

Stone vessels were placed around the buried person through all periods, but from Early Naqada II they were also along the grave outlines. From Late Naqada II, their placement differentiated by cemetery. For example, areas separated from the buried person (9 and 10) and along the grave outline became dominant at NM, but the dominant goods were still placed around the bodies at NT.

Flint lithics were placed both around the buried person and along the grave outline, but the dominant area changed by period. In Early Naqada II, dominant placement was around the buried person, though in Naqada I and Late Naqada II, that was along the grave outline.

Palettes were also placed in both areas around the bodies and along the grave outline, but latter areas did not change much aside from minor differences.

Beads and pendants were small number, and it is difficult to indicate the tendency of placement. However, they were frequently found around the body.

Ivory and shells were generally placed around the bodies. For ivory, areas 3 and 6 were especially dominant areas for placement in Naqada I, but after Early Naqada II placement in areas 9 and 10 also occur. For shells, after Late Naqada II, the placement along the grave outline is also observed.

The results show the diversity of placement by goods type, but strong differences by cemetery was not observed. Tendency of the goods placement in burial was generally similar in the Naqada region.

4. Discussion

4.1. The evaluation of patterns of goods placement by type

At first, it can be considered that the placement area of the goods reflects the function the goods originally had. For example, B/P, ivory, or shell tended to be placed around the buried person as a reflection of ornamental function. Such functional reflection can also be seen in the case of pottery and stone vessels. Pottery was placed around the buried person and along the grave outline. Large storage vessels such as Petrie's R81 or R84 (Petrie and Quibell 1896: pl. 38) were placed along the grave outline, but small pottery tended to be placed around the buried person. The tendency of stone vessel placement around the buried person seems to concur with previous observations by Adams (1988). Certainly, this pattern relates to their relative rarity and social meaning connected to the status of the person. Unlike the other object types, it is difficult to recognise the same principle for placement of flint lithics and palettes. According Roth (1992) their placement area was spread around the buried person. This argument is partially confirmed in this analysis, but microscopic analysis of individual lithic tool types is necessary for further insight. The tendency and meaning of the placement of palettes was discussed by Baduel (2008), and the result of this analysis generally follows the results of that study. According to Baduel, palettes functioned as adornments in Naqada I, but in Naqada III their function changed into a similar category as pottery. It is suggested that this change was affected by the evolution of make-up practices such as the emergence of the make-up box. From the analysis in this paper, a similar pattern of palette placement is suggested. However, due to the reduction of burial activity in the Naqada III period at Naqada, more evidence is required to support the suggestion of Baduel.

4.2. The possible reasons for the difference of goods placement between periods and cemeteries

Differences in the placement of goods were observed between periods, though not to a necessarily large degree. One of the reasons is the enlargement of the average grave volume in the later Naqada periods (cf. Castillos 1982). Larger graves provided more room for burial goods. The increase of the pottery in areas 9 and 10 strongly relates to larger grave volume. Therefore, in later Naqada periods, interring the dead with a large amount of pottery seemed to have importance as a mortuary custom. Contrary to the increased frequency of pottery, the amount of other goods types such as stone vessels, flint lithics, beads and pendants, or palettes did not drastically change. Instead of a change of frequency in these objects, their significance may have been that they form a set of material culture with which people were interred. Mortuary practice changed between periods, as demonstrated by the possible change of palette function, even if the range of material culture included in burials did not.

It can be suggested that objects interred with the dead did not only perform the role of sustaining them in the afterlife (Reisner 1936), but also as a demonstration of social status connected to those placing the grave goods. Aside from the general similarity of goods placement among four cemeteries from the analysis in this paper, minor differences of goods placement which also appeared in the results may indicate the subtle mortuary customs between the cemeteries.

5. Concluding remarks

Only the broad understanding of the meaning and function of goods or burial equipment could be suggested through the analysis of the pattern of the goods placement in burials. For further study, analyses by more refined categories such as size of vessel, lithic tool types, or other attributes may provide further insights. An object-based approach is also useful for investigating the burial contents and characteristics. Comparison with the recent excavations at Abydos or Hierakonpolis may enable the interpretation of other minor aspects of Predynastic mortuary practices. The re-evaluation of old excavations may also provide another avenue to contribute to Predynastic mortuary research.

It is undeniable that the graves and grave goods analysed in this paper are highly affected by natural and artificial post depositional process. Many beads and pendants, ivory, and shells could not be identified from notebooks, since small objects can easily move and be affected by the plundering and disturbance of the graves. This problem is difficult to overcome, but the reconstruction of post depositional process as part of site formation process (Schiffer 1972) may help the analysis of goods placement.

Predynastic burials are not only the evidence of social stratification, but also mortuary activity by people in the Predynastic. Macroscopic and microscopic analysis allow to reconstruct more detailed Predynastic mortuary aspects as the archetype of Dynastic mortuary customs.

Acknowledgement

I would like to express my gratitude to Dr. Alice Stevenson (Institute of Archaeology, University College London) for her permission to access and use Petrie's field records held in the Petrie Museum. I would also like to thank Mr. Joris van Wetering who provided intriguing information on the cemeteries in the Naqada Region. Many thanks are due to Dr. Joshua Emmitt (The University of Auckland) who kindly improved my English and gave me valuable comments. Finally, I would like to thank my supervisors Prof. Masahisa Yamada and Associate Prof. Masami Izuho (Tokyo Metropolitan University). Any faults or misunderstandings in this article are of my own responsibility. This study was financially supported by the Takanashi Foundation for Historical Science in the years of 2013 and 2015, Tokyo, Japan.

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Poznań Archaeological Museum 2018

Grazia A. Di Pietro

Investigating Intra- and Inter-site Variability of Late Predynastic – Protodynastic Settlements of Egypt

Introduction

Over the past forty years archaeological investigations in Egypt have amassed a considerable amount of new data on settlements of the Predynastic period (*c*. IV millennium BC). The first compendium reviewing the old, renewed and new research on habitation sites along the Lower Nile Valley and the Delta for this period was published more than ten years ago (Tristant 2004). Since then, further valuable data has been provided by continuing settlement' excavations (*e.g*. Kopp 2006; Chłodnicki *et al*. 2012; Midant-Reynes and Buchez 2014; http://www.hierakonpolis-online.org, amongst many others). Despite these research efforts, some crucial questions long posed about the nature, layout and structure of Predynastic settlements in both Upper and Lower Egypt remain unanswered, for example: „*What is the typical size of houses? How are they positioned in relation to each other, or the site as a whole?* […] *Are elite residences clustered in one restricted area of a settlement, or scattered and surrounded by lower classes* […]? *What is a typical Predynastic settlement*?" (Anderson 2006: 263–264).

It is not so infrequent the case that such habitation sites preserve scanty architectural remains or consist of only shallow occupational debris, thus our ability to discern within their material culture remains any significant variability is still quite limited, as well as our understanding of how the latter might have been related to other domains, *e.g.* socio-economic structure, administrative control, cultural interaction, *etc*. Given such circumstances even the smallest details of the artefactual vestiges, their physical attributes as well as their location, density, distribution and diversity, must be used to try to infer a site's status, function, sociocultural complexity and to catch some glimpses of its internal structure.

The study reported here represents an attempt to use data on pottery from two distinct Late Predynastic – Protodynastic settlements for elucidating the range of ceramic-related activities and their relative importance in the respective contexts, with the aim of gaining information on the internal differentiation and general character of these sites. More specifically, the focus of this investigation is on charting functional variability at the intra-site and inter-site level via quantitative methods.

Unpublished ceramic data from approximately coeval[1] settlement contexts[2] from within two sites of equal status have been studied. These sites are Nekhen and Naqada „*South Town*" (or Zawaydah), which might be considered first rank settlements in their respective regions (Hierakonpolis and Naqada) in the wider period under examination[3] (Fig. 1). As for Nekhen, this study involves ceramics recovered within a 10 x 10 meter square called 10N5W[4], which lies not far from the temple of Horus (Fig. 1C), and was stratigraphically excavated by Michael A. Hoffman in 1984 (Hoffman 1986; 1989). For Naqada, the pottery[5] derives from

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1 The relative chronology suggested for the contexts under investigation (see further below) is based on the presence/absence of stylistically distinctive pottery types and comparative ceramic data drawn from other settlements of Upper Egypt.
Besides deriving from nearly contemporaneous contexts, pottery assemblages selected for analyses are assumed to be large enough to be statistically reliable and representative of the pottery population; cfr. Millett 1979: 39.

2 At least initially, known functional differences amongst these settlement contexts, suggested by elements different from the pottery (*e.g.* architectural features or small finds; see further below), have been "put in brackets" and the pottery assemblages were used to investigate any evidence of variability.

3 For the status of Naqada during the latter part of the Predynastic – Protodynastic period see: Fattovich *et al.* 2007: 53.

4 The entire pottery assemblage from the 1984 excavation at Nekhen 10N5W was sorted and recorded by Barbara Adams in 1984 and partly re-examined by Michael A. Hoffman in 1987. The relevant archive was kindly made available to me by Renée F. Friedman (Director of the Hierakonpolis Expedition). Moreover, between 2012 and 2014, I had the opportunity to re-analyse a sample of this material, which is currently stored in Egypt. Both archival data drawn from the examination conducted by Barbara Adams and data collected by me have been used in the present study.

5 The analysis of the ceramic material collected during the first field seasons at Zawaydah/Naqada (1979–1983) was carried out by Rodolfo Fattovich (Barocas *et al.* 1989: 298–300). The unpublished documentation and data from these analyses, presently kept at the University of Naples "*L'Orientale*" in Italy, were kindly made available to the me by R. Fattovich. Furthermore, as part of my doctoral research project, in 2008 and 2009 I re-analysed a sample of the pottery assemblage from this excavation still stored in Egypt (Di Pietro 2016).

the settlement labelled Zawaydah (Fig. 1B), which is situated on a gravel terrace at the edge of the low desert and was excavated by an Italian expedition directed by Claudio Barocas, Rodolfo Fattovich and Maurizio Tosi in 1977–1986 (Fattovich *et al*. 2007 with references).

Some interesting differences, potentially related to functional diversity, have been identified within and between the ceramic assemblages of these sites.

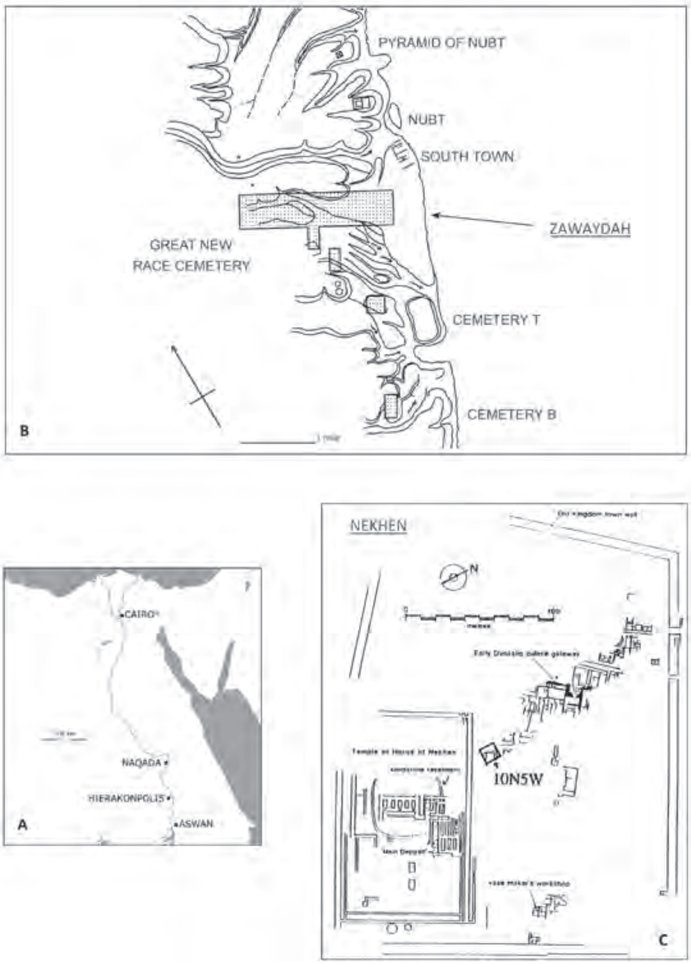


Figure 1. A. Map of Egypt with sites considered for the analyses
B. Sketch map of the site of Naqada (source: Petrie and Quibell 1896: pl. IA with modifications; digitised by the writer)
C. Map of the site of Nekhen with indication of the square 10N5W (source: Adams 1995: 66, fig. 23)

Details of the methods adopted, analyses performed, results and potential significance of this investigation are discussed in the following sections, along with some recommendations for future research.

1. Methods

1.1. Preliminary remarks

Before detailing the methods used in this study, it is necessary to highlight some of the assumptions and limitations of the present work.

One of the key assumptions is that ceramic material was deposited relatively near its primary area of use in both of the contexts taken into consideration. For Nekhen this assumption is based on the description of the relevant archaeological units and stratigraphic information provided by the excavator, while for Zawaydah it is more problematic due to extensive disturbance suffered by the site. This issue is more extensively discussed below (see: Discussion).

The contexts examined from the two sites were excavated using slightly different archaeological procedures. This disparity imposes caution on the interpretation of the analyses conducted on their respective ceramic assemblages. However, the recovery techniques employed were quite similar[6] and most of the ceramic samples have been re-examined by the writer using standard recording procedures.

Another problem relates to the fact that in different archaeological contexts the deposits might have undergone different formation processes, that, as far as the pottery is concerned, might result in different degrees of fragmentation (cfr. Schiffer 1996: 282–284). Any discrepancy concerning this aspect (*i.e.* an assemblage being more broken than another) is considered to compromise the validity of results of comparisons between assemblages, especially when „sherd count"[7]

[6] For Zawaydah, the archaeological deposit of the contexts considered here for the analyses was sieved. For Nekhen, at least two of the archaeological units examined (# 153 and # 156) derive from sieved deposits, while information on the collection strategy is missing for the third context (# 173).

[7] As a measure of pottery quantification, the "rim sherd count" has been employed in the present study. Although more reliable measures exist (*e.g.* "estimated vessel equivalents" or EVES and "sherd weight" (Orton 1993: 175; Orton and Hughes 2013: 206–208), whose use is desirable especially when conducting inter-assemblage comparisons, for the assemblages studied here none of these methods could have been used consistently for practical reasons. Indeed, at least two of the most common pottery types (cfr. shape classes coded as 1-1b5 and 1-1o in

is used as a measure of quantification (Orton and Hughes 2013: 35, 206–207). In order to test the comparability of the available pottery assemblages and before performing any analysis, the so called parameter of „*brokenness*" (defined as „*the average number of sherds into which each pot in the assemblage has been broken*"; Orton 1985: 114) was calculated[8] and assessed for each of the samples. The levels of brokenness did not differ significantly across assemblages from distinct sectors at Zawaydah[9] nor between the assemblages here considered for Zawaydah and Nekhen[10]. Therefore, this factor should not affect significantly results of the inter-assemblage comparisons conducted in this study[11].

1.2. Establishing ceramic functional categories

The ceramic material[12] constituting the study sample, previously examined and classified, was assigned to a series of broad functional categories[13]. Attributions to these categories and inferences about a plausible primary function for the shape classes identified were based on a set of criteria, ranging from a consideration of known morphotechnological characteristics (cfr. Rice 1987: 207–232) to suggestions and evidence of use discussed in previous studies on Predynastic ceramics (Friedman 1994: 240–262; Hendrickx 1994: 80–94; Hendrickx *et al*. 2002; Bu-

the Hierakonpolis system; Friedman 1994) have an elliptical orifice, so that no EVEs could have been calculated for them. Furthermore, since only diagnostic sherds were preserved for the assemblages under study, weight estimates would have been pointless.

8 The parameter of brokenness was calculated by using the formula "nos. sherds/EVEs", devised by Orton (1985: 114). In particular, as "nos. sherds" all rim sherds deriving from concentric pottery types (*i.e*. excepting rim sherds with elliptical orifices; cfr. above) were considered. As for the "nos. EVEs" or "estimated vessel equivalents", it was calculated as sum of rim-EVEs. The EVE value of a single rim-sherd, that represents the portion of the rim that survives of the vessel, was measured by means of a rim chart (cfr. Orton and Hughes 2013: 210), for example, the EVE value of a rim representing 25% of the original vessel orifice was expressed as 0.25.

9 The index of brokenness for the pottery deriving from four distinct sectors at Zawaydah ranges between 9.83 and 15.11. The lack of any statistically significant pattern in the data has been assessed via a T-test.

10 The overall level of brokenness of the pottery from ZWE (see further below) is similar to the level of brokenness of the pottery from Nekhen Structure 84-III (cfr. below). The pertinent values are 12.13 and 11.99 respectively.

11 Usually when conducting inter-assemblages comparisons a minimal assumption is made that "*the relativities between the lifespans of different types remain constant between different but comparable assemblages*"; Orton and Hughes 2013: 204.

12 Only data on rim sherds or vessels with reconstructible profiles was taken into account.

13 The main interest here has been on the function of the vessels as containers (cfr.: Rice 1987: 210), and not on their potential function as display items or, more generally, their symbolic meaning (cfr. Orton and Hughes 2013: 260–261).

chez 2004; Anderson 2006: 56–57, 59–61, table 4.2). These potential functional categories and the reasons for inclusion of the main ceramic shape classes in them are summarized below.

A. Vessels used for food preparation (with or without heat) Fig. 2, 1–2: two main shape classes have been included into this category, namely large basins with thick walls and rough shallow platters[14]. Considering their size and the strength provided by their walls, the former might have been used primarily as grinding or mixing bowls (cfr.: Rice 1987: 227; Friedman 1994: 243). For the latter a function as bread baking pans is usually suggested based on traces of soot and heat discoloration which they sometimes show (Friedman 1994: 722; cfr. also Hendrickx *et al.* 2002: 296, Tab. 5, type R1g3).

B. Vessels mainly connected with food serving (Fig. 2, 3–8): a series of platters and shallow bowls in a different array of fabrics have been included into this category[15] (cfr. Fig. 2, 3–5). The relative shallowness that characterizes such vessels would have allowed their contents to be immediately visible and accessible, while their moderate size and weight would have favoured their handling and movement (cfr.: Rice 1987: 225–266; Friedman 1994: 243). Small and medium sized bowls made of marl or untempered Nile silt are generally considered serving vessels, because both their fabric and slipped and/or polished surfaces made them particularly resistant to breakage from impact (Friedman 1994: 257; Hendrickx 1994: 82). For this reason they are included in this category as well (Fig. 2, 6–8)[16].

AB. Vessels for food preparation/serving (Fig. 2, 9–11): into this category a range of medium size bowls made of straw tempered Nile silt fabric with diverse shape profiles and surface treatments have been included[17]. Their unrestricted shape and limited size and weight hint at a serving function for them (cfr. above

[14] These correspond to the subjective shape classes coded as 1-1n and 1-1o1 in the latest version of the Hierakonpolis system (Friedman 1994), to which the reader is referred for a full description. Specific subtypes of the subjective classes 1-1b, 1-1g, 1-1h, 5-1g, 12-1h, but characterized by large diameter and thick walls have also been included into this functional category.

[15] Pertinent subjective shape classes in the Hierakonpolis system are coded as 1-1b5 (characterized also by an elliptical orifice; cfr. Fig. 2, 3) and 5-1b2 (cfr. Fig. 2, 5); see Friedman 1994.

[16] Remains from beakers, although they might have been mainly residual elements in the assemblages under study, have been considered as having mainly a serving function when originating from relatively small vessels (cfr. Friedman 1994: 262). They have been considered within the functional category of storage containers when originating from large vessels (cfr. Friedman 1994: 641; Anderson 2006: 61).

[17] Pertinent subjective shape classes in the Hierakonpolis system are coded as 1-1a, various subtypes of 1-1b (except for 1b2 and 1b5), 1-1f (Fig. 2, 9), 1-1e, 1-1g (Fig. 2, 10), 1-1h (Fig. 2, 11), 1-1j; cfr. Friedman 1994.

category B)[18]. For bowls with a tronco-conical shape a function as bread moulds has also been suggested due to characteristics, such as their rough exterior, smoothed interior and relatively thick walls, considered typical of bread moulds (Hendrickx 1994: 91; cfr. also Wengrow 2006: 87–88, 94). The straw tempered fabric out of which these bowls were made would have been fit for the suggested purpose, since it is recognized as having good heat transfer and thermal shock resistance properties (Friedman 1994: 258–260 and bibliography; Buchez 2004: 22)[19].

C. Vessels mainly used for storage (both long-term and temporary) Fig. 2, 12–14: *pithoi* as well as large jars with a direct rim[20] have been included into this class, mainly based on their morphology, which is suited for holding a variety of contents, as well as their size, which made them too heavy to be moved (cfr.: Rice 1987: 226; Friedman 1994: 244). The lack of a pronounced rim, that would have ensured tight closure, and the relatively wide orifice of the hole mouth jars suggests unsuitability for their use in transport. They are included in this category for this reason.

CD. Vessels used for storage/transportation (Fig. 2, 15–18): small and medium sized jars with modelled, everted or ledge rim, necked jars, as well as bottles[21] might have served well in a storage function[22], since their prominent rims and

[18] It must be noted that bowls might have been used not only for food consumption, but also as lids for large containers.

[19] It is interesting the fact that what appears to be later versions of these bowls, as observed by the writer within pottery from several desert settlement localities at Hierakonpolis, have a higher sand content in their fabric. Sand is known as a high thermal conductor (Friedman 1994: 260) and might potentially support the hypothesis that such vessels were used in connection with food processing with heat.

[20] Pertinent subjective shape classes in the Hierakonpolis system are coded as 2n and 2a (cfr. Friedman 1994). Although here a primary storage function is suggested for these vessels, alternative uses are attested as well: *e.g.* in some specific contexts "*pithoi*" might have been used as vats in which beer was brewed (Friedman 1994: 656–657). Hole mouth jars made of straw tempered Nile silt (1-2a) might have also been used as cooking vessels; cfr. Buchez 2004: 22–24, 41, fig. 6; Friedman personal communication, May 2016.

[21] Cfr. subjective shape classes coded as 2b (cfr. Fig. 2, 15), 2c (cfr. Fig. 2, 16), 2d (cfr. Fig. 2, 17), 2e (cfr. Fig. 2, 18), 2f, 2k in the Hierakonpolis system; cfr. Friedman 1994.

[22] Empirical data on the storage function of at least one type of jar, that is a modelled rim jar with flat base made of straw tempered Nile silt fabric, exists; see: Baba 2009: 7.
On the other hand, it cannot be ruled out that some jars made of straw tempered Nile silt fabric and characterized by a large orifice, slight modelled rim and low shoulder (cfr. subjective shape class 1-2b1 in the Hierakonpolis system) and, presumably, a conical bottom, might have also been used as cooking pots (cfr. Friedman 1994: 531), as suggested by a number of complete jars bearing evidence of soot staining from fire on their external surface, recovered at the Cemetery Hk43 at Hierakonpolis; Friedman personal communication, May 2016.

necks would have facilitated tight closure of their mouth and protection of their contents. Their moderate size would have also allowed them to be moved with relative ease (cfr.: Rice 1987: 226; Friedman 1994: 245).

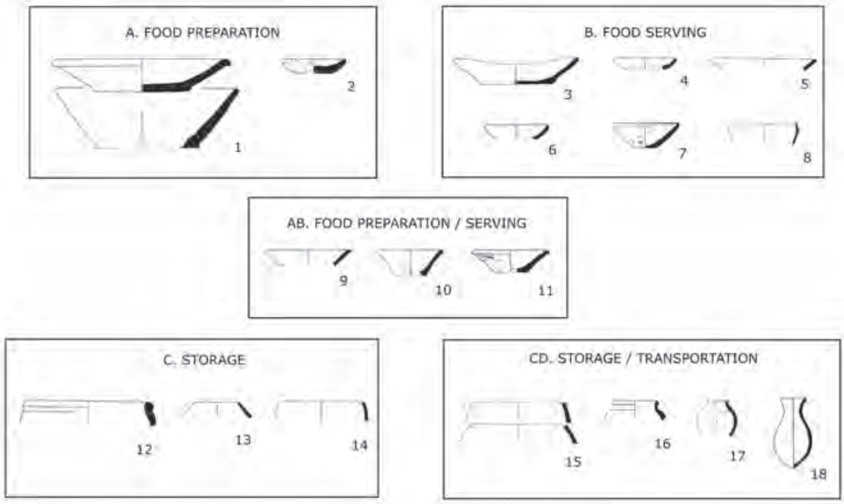


Figure 2. Tentative ceramic functional categories (A-D) and main subjective shape classes (1-18) attributed to them

Legend: 1 = 1-1n; 2 = 1-1o1; 3 = 1-1b5; 4 = 3-1b; 5 = 5-1b2; 6 = 2-1a; 7 = 2-1e; 8 = 5-1e; 9 = 1-1f; 10 = 1-1g; 11 = 1-1h; 12= 1-2n; 13 = 2-2a; 14 = 1-2a; 15 = 1-2b; 16 = 5-2c; 17 = 1-2d; 18 = 1-2e (source of drawings and subjective shapes nomenclature: Friedman 1994: 282–295)

It is clear that the foregoing functional categories remain tentative. The many problems surrounding the determination of the function for archaeological ceramics have already been pointed out in a number of studies. For example, vessels might have had multiple uses at the same time or vessels with specific functions might have been re-used for different purposes (secondary usage), once they were no longer suitable to fulfil their primary capacity (*i.a.* Rice 1987: 209, 210–211, 232–233; Orton and Hughes 2013: 247–248, 258). For the present study, to these limitations and other issues highlighted in the notes (cfr. notes nos. 13, 18, 20, 22) must be added the fact that shape classes have been mainly determined based on fragmentary material.

Despite these difficulties, an attempt has been made to assess the range of human activities conducted within the areas of the sites here considered, as reflected by the associated ceramic assemblages. In other words, the focus of this investigation has not been to establish the specific use of the individual vessels or shape classes, but rather to try to recover potential functional information from the pottery assemblages considered as a whole (cfr. Orton and Hughes 2013: 246).

1.3. Comparison of ceramic assemblages

The composition of each of the ceramic assemblages selected for this study was compared and, in particular, the proportions of the different functional categories in these assemblages have been compared (cfr. Orton and Hughes 2013: 34). More specifically, according to a method devised by Robert D. Drennan, these proportions have been used as estimates of the population proportions of the corresponding site's sectors from which the pottery has been collected. The estimated population proportions, to which error ranges were attached for different levels of confidence (80%, 95% and 99%), were compared via a graphical technique known as „bullet plots" (Drennan 2009: 181–182, 191; Johnson 2013).

Different scales of spatial resolution were considered for these analyses: what can be defined as a micro-scale, *i.e.* within a single structure (cfr. „*micro level*"; Clarke 1977: 11), a middle scale, within a single settlement (cfr. „*semi-micro level*"; *ibid.*: 11–13) and a macro-scale, involving a comparison between distinct sites in a large region (Upper Egypt). Results of these analyses and tentative interpretation are reported in detail below.

2. Analysis and results

2.1. Intra-site variability at Nekhen

Intra-site investigation for Nekhen was focused on ceramic material[23] retrieved over the floor of one of the structures excavated by Michael A. Hoffman in the square 10N5W (Fig. 1C). Here, beneath remains interpreted as a Protodynastic „shrine", cleared in 1969 (Hoffman 1971–1972: 36–37, 41, 44–45, figs. 8–9), a building consisting of three major rooms was excavated in 1984. Room A is described as a large fenced courtyard. Room B was a small oblong fenced enclo-

[23] The pottery sample taken into consideration includes all rim sherds and vessels with reconstructible profile for which an attribution to one of the subjective shapes as described in the Hierakonpolis system (cfr. previous notes) and to the broad functional categories outlined above was possible.

sure on the western end of Room A and was considered to have functioned as an animal pen (Fig. 3). Room C was a rectangular shed which formed the southern end of the building and was defined by a mudbrick wall on its southern side, while on the north it joined the fenced courtyard (Room A). This complex was labelled collectively as „Structure 84-III". It included a variety of domestic features such as ovens, pot basins and a possible grinding pit. A large number of potsherds and several reconstructable vessels were also found over its floor (Hoffman 1984: 5).

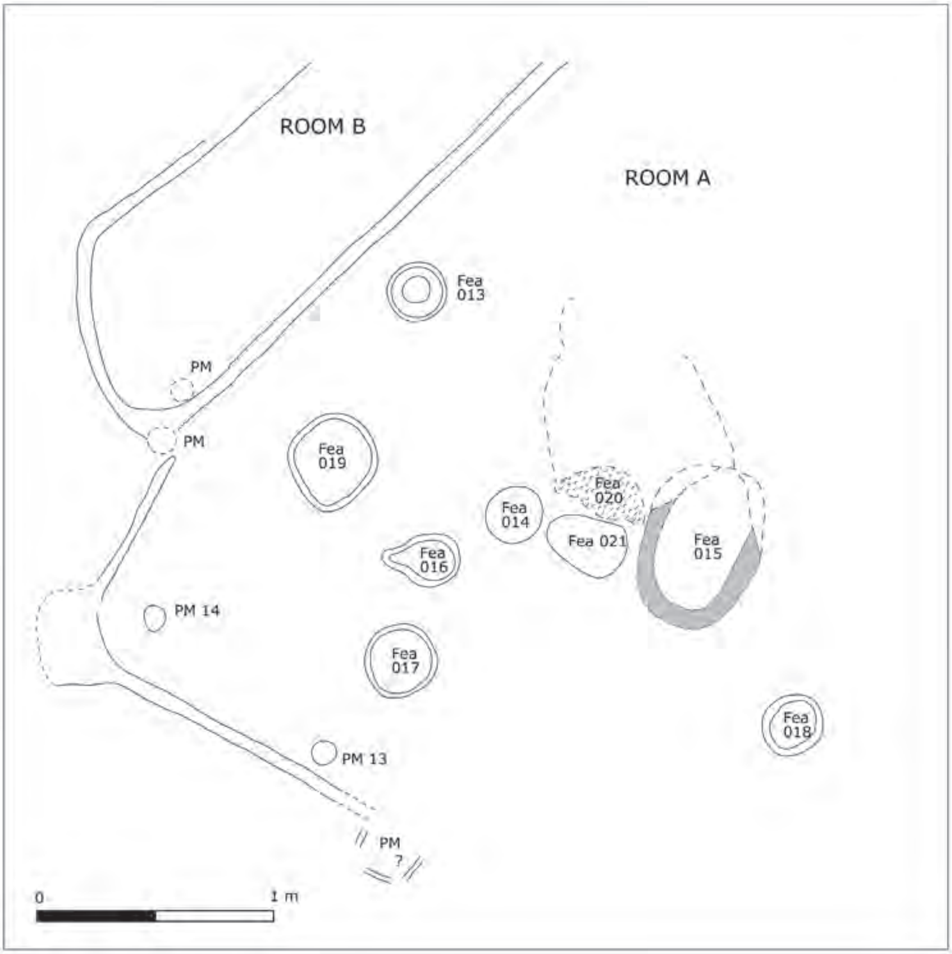


Figure 3. Plan of Structure 84-III (Rooms A and B) at Nekhen, square 10N5W (Courtesy: Hierakonpolis Expedition; digitised by Elli Petrocheilou)

The pottery assemblage associated with this structure[24] can be dated approximately to the Naqada IID2-IIIA1-2 phase. Its composition in terms of fabric and shape classes is quite homogeneous throughout the entire complex, however proportions of some of the functional categories described earlier are somewhat different within the two major parts of the building (Room A and Room C), potentially hinting at a differentiation in the use of space. In particular, in comparison with Room A, the ceramic assemblage of Room C includes a significantly lower proportion of vessels used for food preparation (category A) and a higher proportion of vessels used for serving and storage (categories B and C respectively; see Fig. 4)[25].

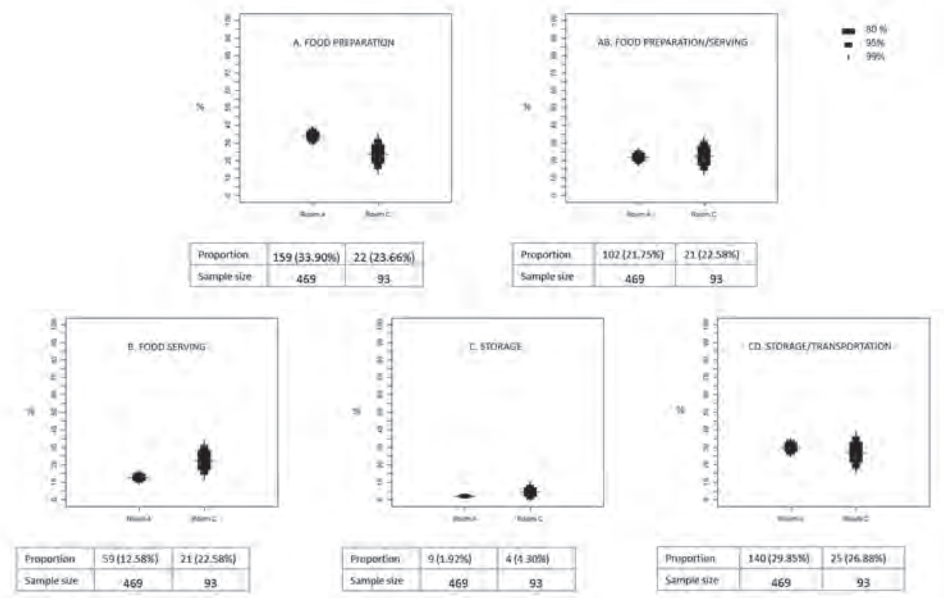


Figure 4. Comparison of the proportions of distinct ceramic functional categories within the pottery assemblage from two rooms of Structure 84-III at Nekhen 10N5W

[24] In particular, the pottery reported to have been collected over the floor within Structure 84-III was considered for the present study (Find units # 153, 156, 173).

[25] Vessels attributed to the other two broad categories AB and CD occur in almost the same proportion in both Room A and Room C.

2.2. Intra-site variability at Zawaydah/Naqada

Similar analyses were conducted for the pottery assemblage from the settlement excavated at Zawaydah/Naqada by the Italian Expedition and, in particular, that from the main trench (ZWE) located in the eastern portion of the terrace[26], south of the area known as Petrie's „*South Town*" (Petrie and Quibell 1896: 50, 54, pls. IA, LXXXV). In this part of the settlement the pottery can be roughly dated within the Naqada IIC-IID and Naqada IIIA phases (Di Pietro 2016), thus it is approximately coeval with the contexts examined at Nekhen. Pottery from four different sectors of the trench ZWE were considered and in particular from the east-central sector, labelled EC, the south-eastern sector (SE), the west-central sector (WC) and the south-western sector (SW) (Fig. 5). The comparability of the ceramic sub-assemblages collected from each area was first assessed (*i.e.* their level of brokenness calculated; cfr. above) and their composition in terms of fa-

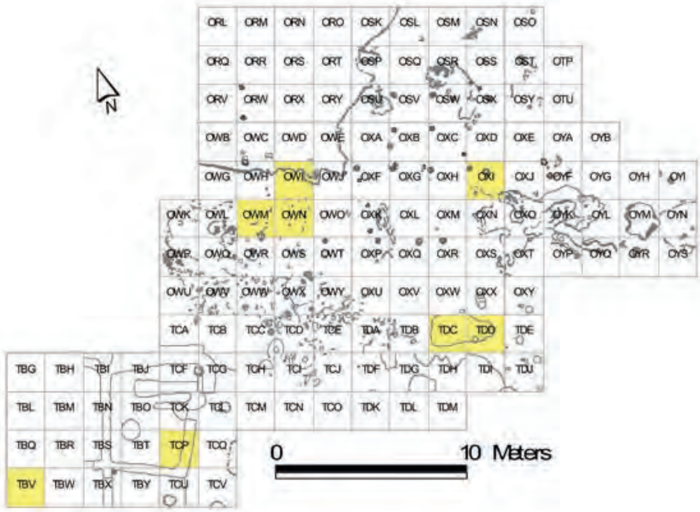


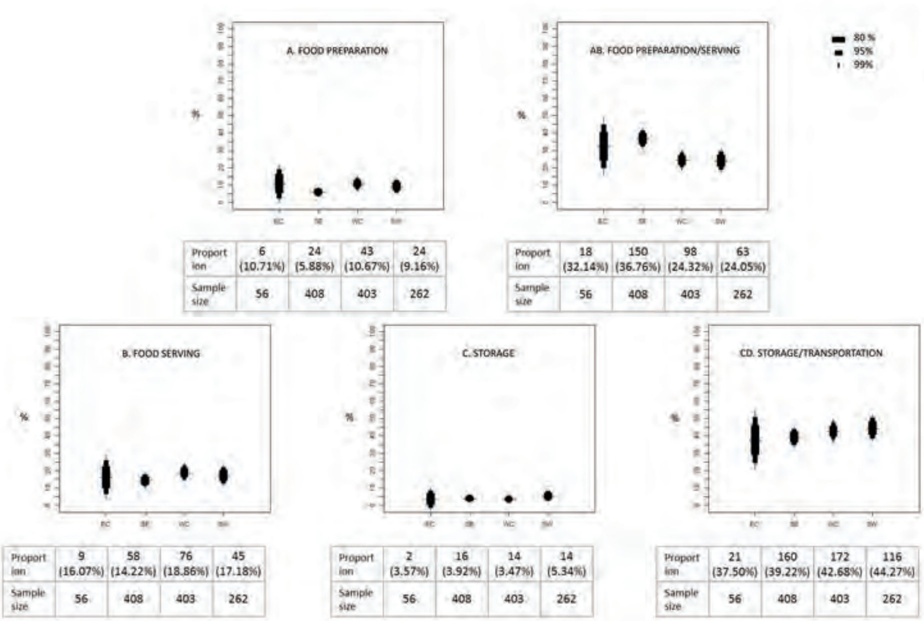
Figure 5. Planimetric map of ZWE. Squares from which the pottery sample considered derives are highlighted by a yellow filling (Courtesy: IUO Italian Archaeological Mission at Zawaydah; digitised by the writer)

Note: east-central sector (= OXI); south-eastern sector (= TDC, TDD); west-central sector (= OWI, OWM, OWN); south-western sector (= TCP, TBV)

[26] By the time of the Italian investigations, the terrace of Zawaydah had been greatly disturbed due to natural and anthropic factors (cfr. Fattovich *et al*. 2007: 47–48). As a result of the site's condition, all of the stratigraphical connections had been lost; nevertheless, it was assumed that the archaeological deposits had maintained the parameters of planimetric distribution (Fattovich *et al*. 2007: 48).

brics, shape classes and functional categories was examined in order to detect any possible significant intra-site variation.

In contrast to what was observed for the pottery from Structure 84-III at Nekhen, at Zawaydah the proportions of the main functional categories are approximately homogeneous in all of the four sectors taken into account. Most of the differences observed fall within the 80% confidence level and therefore are not very significant (see Fig. 6). Only the south-eastern sector stands out for a lower proportion of vessels of categories A and B (5.88% and 14.22% of the assemblage respectively), in comparison to sectors lying in the western portion of ZWE (9.16–10.67% and 17.18–18.86% of their assemblage respectively). A slightly higher proportion of vessels of the category AB is represented both in the east-central and the south-eastern sectors, than in the western part of the site[27]. Pottery belonging to the other two functional categories (C and CD) appears quite homogeneously distributed in all the four sectors of the trench ZWE.



A. Food preparation

Proportion	6 (10.71%)	24 (5.88%)	43 (10.67%)	24 (9.16%)
Sample size	56	408	403	262

AB. Food preparation/serving

Proportion	18 (32.14%)	150 (36.76%)	98 (24.32%)	63 (24.05%)
Sample size	56	408	403	262

B. Food serving

Proportion	9 (16.07%)	58 (14.22%)	76 (18.86%)	45 (17.18%)
Sample size	56	408	403	262

C. Storage

Proportion	2 (3.57%)	16 (3.92%)	14 (3.47%)	14 (5.34%)
Sample size	56	408	403	262

CD. Storage/transportation

Proportion	21 (37.50%)	160 (39.22%)	172 (42.68%)	116 (44.27%)
Sample size	56	408	403	262

Figure 6. Comparison of the proportions of distinct ceramic functional categories within the pottery assemblage from four sectors at ZWE (Zawaydah/Naqada)

27 The latter difference might be due to chronological rather than functional reasons since in this category mainly mould made bowls are present (cfr. further below).

2.3. Inter-site variability: Zawaydah/Naqada and Nekhen

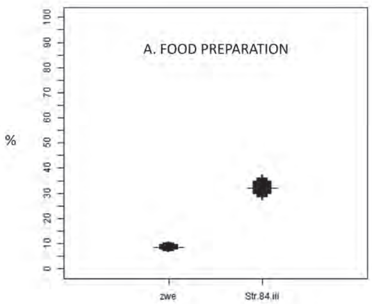
The general character of the ceramic assemblage from Zawaydah/Naqada was further scrutinised by means of the same procedure detailed above. A specific research question was whether and to what extent this assemblage could be considered an „ordinary domestic assemblage" or might have had a „special" composition, also due to the fact that other artefactual remains (*e.g.* figurines and other miniatures, seals and clay sealings) found at the site of Naqada suggest that particular activities, administrative and ritual/ceremonial in nature, were taking place in the Late Predynastic period at the site (Di Pietro 2017). The pottery from Nekhen Structure 84-III, being nearly contemporaneous with the Naqada assemblage and deriving from a context of domestic nature, provided an ideal chance for comparison and contrast, by which the nature of the assemblage from Naqada could be assessed.

When comparing the entire ceramic assemblage of the trench ZWE at Naqada with the ceramic material from the domestic building 84-III at Nekhen, an interesting diversity in terms of the proportions of functional categories emerges (see Fig. 7). The greatest difference between the two assemblages is in the proportion of vessels used for food preparation (category A), which is considerably higher in Structure 84-III (32.21% of the total assemblage), than at ZWE (8.59%). The other marked difference is the higher proportion of vessels of the category CD (storage/transportation) at ZWE, where they account for 41.54% of the total assemblage, in contrast to 29.36% in Structure 84-III. This difference might suggest a larger circulation of „goods" at ZWE, in comparison to a „domestic" context such as the one reflected by the assemblage of Structure 84-III. Finally, the assemblage at ZWE is characterized by a significantly higher proportion of vessels assigned to the broad category AB („preparation/serving vessels"; 29.14% of the total assemblage), than the Structure 84-III assemblage (21.89%).

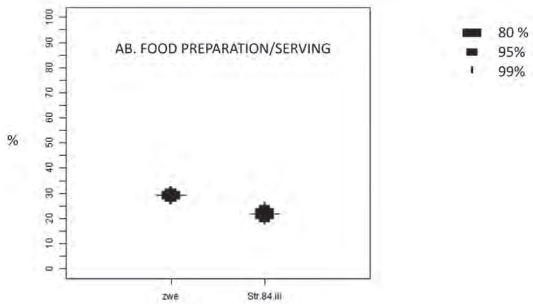
3. Discussion

The analyses conducted on pottery assemblages from two discrete settlement contexts of Late Predynastic-Protodynastic age and sub-assemblages within them, based on the comparison of proportions of distinct functional categories, let to discern potentially significant functional variability both at level of a single site and between sites.

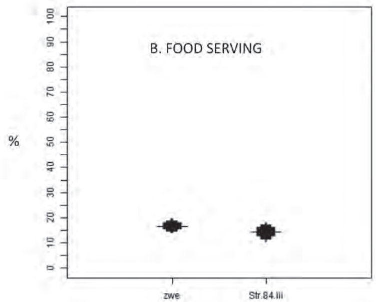
As for Nekhen, the ceramic evidence related to Structure 84-III might suggest a diversification of spaces within this building and, in particular, a division



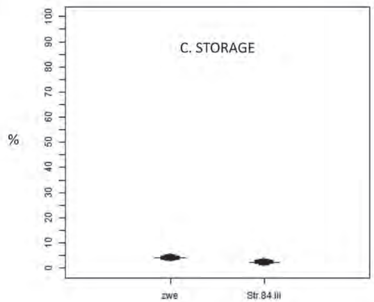
Proportion	97 (8.59%)	181 (32.21%)
Sample size	1129	562



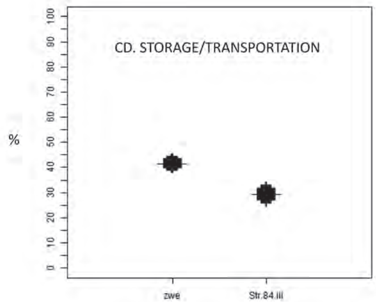
Proportion	329 (29.14%)	123 (21.89%)
Sample size	1129	562



Proportion	188 (16.65%)	80 (14.23%)
Sample size	1129	562



Proportion	46 (4.07%)	13 (2.31%)
Sample size	1129	562



Proportion	469 (41.54%)	165 (29.36%)
Sample size	1129	562

Figure 7. Comparison of the proportions of distinct ceramic functional categories within the pottery assemblage from ZWE (Zawaydah/Naqada) and Structure 84-III at Nekhen

into two major parts: one primarily designed for food preparation (Room A) and another where mainly activities connected with storage (and serving?) occurred (Room C)[28]. The architectural features of these two rooms would potentially fit the suggested functions: the former, being identified as an open area (a courtyard delimited by a shallow trench, which presumably once held a fence of organic materials), might have been suited for activities linked to food processing, especially with heat. While Room C, being partially defined by a more permanent architecture (a mudbrick wall on its southern end), might have served well a storage function or might have been a sort of utility-room for keeping vessels used in other areas. The suggested relationship between architecture and use of space requires further testing by means of a larger investigation. Furthermore, it cannot be excluded that other processes (*e.g.* refuse disposal patterns; cfr. Schiffer 1996: 281) might have produced the observed differences in pottery distribution.

At Zawaydah/Naqada, the lack of pronounced differences in the proportions of the various ceramic functional categories in the different areas of the trench ZWE might suggest that although a range of activities involving the use of different types of pottery were being conducted at the site, none of them were clustered in any particular location. The possibility that disturbance might have blurred activity areas at the site must be also taken into account. However, the pattern of small finds indicates that the archaeological deposit at Zawaydah maintained the parameters of planimetric distribution to a certain degree, that is the archaeological materials did not move too far from the place where they were originally used and/or discarded (Di Pietro 2017).

Although the ceramic analyses did not provide any clear indication of intrasite functional variation within ZWE, the same type of approach on a larger scale proved useful in elucidating the character of the Naqada ceramic assemblage as a whole in comparison with coeval assemblages, such as the one from Nekhen Structure 84-III[29]. In contrast to the latter, the composition of the pottery assemblage at Zawaydah suggests lower levels of food production, especially that involving the use of rough and shallow platters (included in the functional category A;

[28] The interpretation of Room B as an animal pen was suggested by M. A. Hoffman and was based on other sets of criteria (presumably faunal material and dung remains found at this spot).

[29] Besides the ceramic assemblage from Nekhen Structure 84-III, assemblages from other settlement localities at Hierakonpolis (*e.g.* Hk25, Hk29A) have also been compared with the assemblage from Naqada. This larger investigation reveals further differences in the composition of the examined assemblages, which deserve separate discussion for the complexity of the subject.

cfr. above) and a higher level of goods movement by means of middle / small sized jars (included in the category CD).

The third major element that distinguishes the composition of the ceramic assemblages under study, that is the functional category AB which occurs in higher frequency at ZWE, deserves further discussion. At both ZWE and within Structure 84-III the major component of the category AB consists of a particular type of tronco-conical bowls made of straw tempered Nile silt fabric[30], for which a function as „bread moulds" is suggested by some scholars (cfr. above). This specific shape class is also characterized by a relatively standardized size[31] and an untreated exterior surface bearing straw impressions, which suggest a manufacture by means of a straw filled mold[32]. This type of pottery has an intriguing similarity[33] with what are known as „*bevelled-rim bowls*", which are found in several administrative and temple contexts in Mesopotamia and surrounding regions (Middle-Late Uruk, *c*. IV mill. BC) and are supposed to have been employed to distribute alimentary rations, meals or bread to workers dependent on a centralized institution (Goulder 2010: 355 with references). It is also remarkable that the context of recovery of this type of vessels at the Naqada settlement parallels one of the commonest location where bevelled rim bowls are found in the Near East,

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30 Cfr: subjective shape classes coded as 1-1b6, 1-1f (Fig. 2, 9), 1-1g (Fig. 2, 10), 1-1h (Fig. 2, 11) in the Hierakonpolis system; Friedman 1994.

31 The mean values of rim diameter and height of these bowls range between 12.5 x 5.5 cm, calculated for the assemblage of ZWE, and 15 x 6 cm, calculated for the assemblage of Structure 84-III.
An attempt has been done to assess the variability of the rim diameter (the only measurement variable that could be recorded consistently across the ceramic assemblages examined) of different categories of vessels by means of the "coefficient of variation" (see: Orton and Hughes 2013: 147-148). Rim diameters of the bowls under discussion resulted to have a lower coefficient of variation (*i.e*. to be more standardised), than rim diameters of other categories of vessels in the assemblages under study.

32 The shape of the rim of these bowls can be direct, slight everted, modelled or ledge.

33 Besides the analogous type of manufacture by the means of a mould, some other features which are common to both the bowls under discussion and the so called "*bevelled-rim bowls*" are: a heavy organic tempered fabric, straight sides and flat base, relatively thick walls, crinkled exterior vs. smooth interior surface (cfr.: Goulder 2010: 354, table 2). As far as the size is concerned, a close comparison between the Predynastic rough mould made bowls and the bevelled-rim bowls is arduous due to the very few vessels with reconstructible profile available in our sample and, on the other hand, the high variability of the bevelled-rim bowls size (Goulder 2010: 355 and bibliography). In general, if we consider only the measurements of the large corpus of bevelled-rim bowls from Susa and Khuzistan, published by Gregory A. Johnson in 1973 (Johnson 1973: 189-195), one could suggest tentatively that the Predynastic mould made bowls fall in the lower end of the bevelled-rim bowls' size range.

i.e. administrative buildings (Goulder 2010: 356, table 3, 359): according to the evidence provided by the small finds, at ZWE a sort of administrative-ritual/ceremonial complex might have stood (Di Pietro 2017). Based on these analogies and the different composition with respect to other coeval and functionally different contexts (cfr. above: Structure 84-III), the hypothesis that the Naqada assemblage could reflect to some degree administrative activities performed at the site, with the very high proportion of mould-made vessels potentially related to some kind of re-distribution (of local resources in form of meals?), is here suggested[34].

However, the possibility that also other factors (*e.g.* chronology, amongst others[35]) might have contributed to the distinctive composition of the ceramic assemblage at Naqada cannot be completely discarded. In particular, certain types of pottery, including the aforementioned mould made bowls, tend to increase in frequency over time, as part of general developments of pottery production during the Late Predynastic – Protodynastic period (cfr. Di Pietro 2012: 13).

Conclusion

The study presented here, based on archaeological pottery assemblages of coeval or nearly coeval contexts and analyses of their composition by means of quantitative methods, has allowed to identify subtle and potentially significant variation at intra- and inter-site level in two major settlements of the Late Predynastic – Protodynastic phase. These are suggested to elucidate the use of space across a site, at least at a micro-scale level (cfr. Structure 84-III at Nekhen), and inter-site differentiation and to be relevant for improving our knowledge of societal organisation in the period under study.

On the other hand, it is acknowledged that in order to further advance our understanding of functional variability of settlements, in Egypt as well as in other regions, the use of more sophisticated analytical techniques (*e.g.* analyses of artefacts and ecofacts integrated by chemical analyses of soil matrices; cfr. Wilson *et al.* 2008) are required. Visible and invisible residue analyses or systematic use-wear studies (Skibo 2013; Rice 2015: 425–431 with references) are also desirable

[34] This suggestion does not exclude the possibility that in other contexts the same type of bowls might have served other functions.

[35] Factors affecting variability of archaeological ceramic assemblages are reviewed in Rice 1987: 300–301; 2015: 218–219. Cfr. also Orton and Hughes 2013: 264.

to elucidate pottery function at the level of the individual vessel. Pottery can then provide more valuable information about the function of the site or part of the site where it has been retrieved (Orton and Hughes 2013: 246–259). Finally, besides considerations of use and activity, variability and diversity of archaeological pottery (or, more in general, artefact) assemblages should be further assessed in relation to other factors, such as socio-economic status of a site, specialisation of craft production, environmental features (cfr. Rice 1987: 300–301; 2015: 218–219) and variation thereof over the course of time.

Acknowledgements

My gratitude goes to the late Claudio Barocas, Rodolfo Fattovich, Maurizio Tosi, Michael A. Hoffman and Barbara Adams, whose data I had the privilege to access and use and to those who made their work available to me: Prof. Rodolfo Fattovich (University of Naples "L'Orientale", Italy), Prof. Rosanna Pirelli (University of Naples "L'Orientale", Italy) and Dr. Renee F. Friedman (University of Oxford / Hierakonpolis Expedition).

The research leading to this paper has been part of the project titled „*CASEPS. Comparative Archaeological Study of Egyptian Predynastic settlements*", conducted at the UCL Institute of Archaeology, London, UK, under the supervision of Professor David Wengrow (2013–2015). The project has received funding from the People Programme (Marie Curie Actions) of the European Union's Seventh Framework Programme (FP7/2007–2013) under REA Grant Agreement No 329601.

The major part of the data from Nekhen has been collected in 2012, thanks to a grant of the „*Michela Schiff Giorgini Foundation of the United States*" and gracious permission of Dr. R. F. Friedman, and subsequently as part of the project „*CASEPS*".

For processing the data the software R (http://www.R-project.org/) has been used, together with a code developed by Mr. Brooks Johnson (http://bullet.brooksjohnson.me/), whose help for generating relevant graphs included in the paper is acknowledged.

Dr. R. F. Friedman kindly corrected the English and provided valuable comments on a previous draft of the present paper. Any remaining errors and shortcomings are my sole responsibility.

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Papers in honour of Fred Wendorf
Studies in African Archaeology 15
Poznań Archaeological Museum 2018

Wojciech Ejsmond

Gebelein in the Predynastic Period: Capital or Provincial Centre? Review of Evidence

Centres such as Abydos, Hierakonpolis and Naqada have received much attention in academic discussions due to their wealth of archaeological evidence and their significance in Egyptian religion. Preservation of archaeological data and discoveries are a matter of hazard and their interpretation might be misleading. As Thucydides wrote:

"Suppose the city of Sparta to be deserted, and nothing left but the temples and the ground-plan, distant ages would be very unwilling to believe that the power of the Lacedaemonians was at all equal to their fame. And yet they own two-fifths of the Peloponnesus, and are acknowledged leaders of the whole, as well as of numerous allies in the rest of Hellas. But their city is not built continuously, and has no splendid temples or other edifices; it rather resembles a group of villages like the ancient towns of Hellas, and would therefore make a poor show. Whereas, if the same fate befell the Athenians, the ruins of Athens would strike the eye, and we should infer their power to have been twice as great as it really is. We ought not then to be unduly sceptical. The greatness of cities should be estimated by their real power and not by appearances." (Thucydides 1900).

What if both the lack of religious authority of some centre during pharaonic times, and its modest appearance and poor state of preservation makes it look insignificant? Then we are left with indirect evidence and suspicions. This could be the case of Gebelein.

Gebelein is an archaeological site complex located about 28 km south-west of Luxor on the west bank of the Nile. The current Arabic name el-Gabalein ('two hills') has the same meaning as the ancient name of the place – Inerti. The two mounts formation dominates the area, running from north to south. This raised massif is furrowed by numerous peaks and valleys. It is a place of great strategic value. The two hills enable control of the navigation on the Nile as well as land routes connecting the valley with the oasis of the western desert and along the river. It is possible to go directly from Gebelein to Hierakonpolis, Naqada, Hiw and Abydos/This by valley and desert routes (Fig. 1).

The western mount comprises of a stone quarry, rock-cut tombs, remnants of mastabas, numerous shafts and pits with burials dating to different periods. At

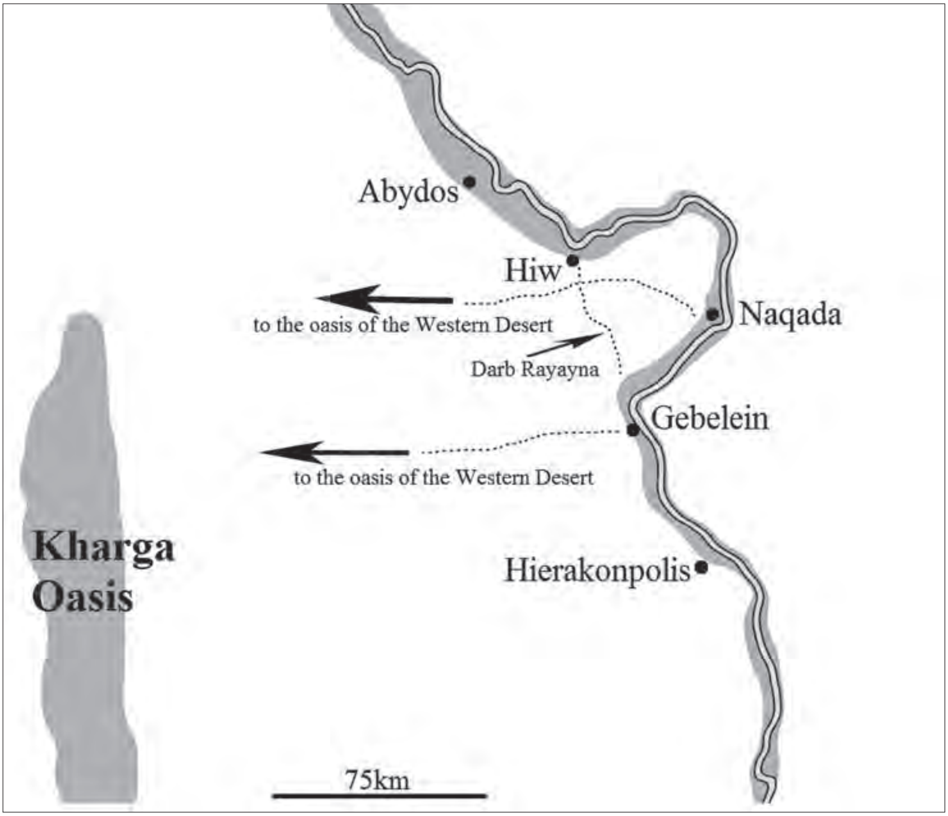

Fig. 1. Location of Gebelein, other main centres and ruts mentioned in the paper (made by W. Ejsmond)

the top of the eastern mount, a temple of Hathor once stood and the city of Per-Hathor (Pathyris in Ptolemaic times) was located on its western slope down to the area between the two hills. This mount is also the location of burials and other archaeological features (Ejsmond 2016: 15-19).

At Gebelein there are sites representing all periods of Egyptian history. The place played an important role in ancient times. Strategically located stronghold, an important administrative (capital of the Pathyrite nome during the Ptolemaic Period, till c. 88 BC) and trade centre was located at Gebelein – inhabited by Egyptians, Nubians and Greeks (Fiore-Marochetti 2013). It is a matter of some controversy whether or not rulers of some local proto-state were buried in the local necropolis during the Predynastic Period (Cervelló Autori 1996; Wilkinson 2000; Campagno 2002; Ejsmond 2015). This may suggest that an early state capital was situated in the area.

Recently, new archaeological field works has been initiated at Gebelein, which resulted in the acquisition of new data (Ejsmond 2013; Ejsmond *et al.* 2015a; Ejsmond *et al.* 2015b; Ejsmond *et al.* 2018). Studies on artefacts which came or are said to come from Gebelein also shed a new light on this place (Ejsmond 2015; 2016). Therefore, the aim of the paper is to present results of the recent studies and discuss relevance of Gebelein in the context of early history of ancient Egypt.

1. State of research

There is an awareness of the general processes such as changes of settlement pattern (Mortensen 1991), development of social stratification (Castillos 1998; Wengrow 2006) and regional differentiation of the material culture in the Naqada complex (Holmes 1989; Friedman 1994; Köhler 2014). There are some written sources referring to that times like the Palermo Stone (Wilkinson 2000), preserved fragments and extractions from *Aegyptiaca* by Manetho, but they are not very informative or reliable. In recent times, there is a development in archaeology of the Predynastic Period in Upper Egypt. There were some new surveys in southern Egypt, like Moalla area (Manassa 2011), Naqada region (Tassie *et al.* 2012), the Aswan – Kom Ombo Archaeological Project (Gatto *et al*. 2009) and archaeological missions are working at Hierakonpolis (Friedman 2011), El-Qab (Claes *et al.* 2014) and Abydos (Dreyer 2011), to name just the most important sites.

Archaeology of Egypt in the Predynastic Period is in large part the archaeology of necropoleis. New researches in the Delta changed this disproportion of sources and more data are available from settlements, e.g. Tell el-Farkha (Ciałowicz 2011), Buto (Hartung *et al.* 2009), and Tell Ibrahim Awad (van Haarlem 2000). Still, the analyses of tombs and graveyards are the prime source of information on social and political processes that took place in the Nile valley, especially in the Upper Egypt. Spatial distribution of large and richly furnish tombs, sometimes with elements of royal iconography, provides information on locations of the most important cemeteries where the local elites and rulers were buried (Kaiser and Dreyer 1982; Wilkinson 1996; 2000). It is generally believed that there were three main centres with necropoleis of royal character – Hierakonpolis, Naqada and Abydos (e.g. Bard 2015: 113-114). It is thought that there was an ephemeral proto-state with its capital near Hiw (Kaiser and Dreyer 1982: 242-245; Hikade 2010). Gebelein was a place of research of many scholars, who were more interested in the pharaonic times and the results of their excavations of dynastic as well as Predynastic sites were barely published (e.g. Fraser 1893; Steindorff 1901; Schiaparelli 1921; Farina 1929, 1937; Bergamini 2005). The sites of Hierakonpolis, Naqada and Abydos were excavated at the end of the 19th century and very beginning of the 20th century. Archaeologists came back to these sites later on. Recent researches at Hierakonpolis and Abydos produced many extraordinary discoveries, which furthered our understanding of early Egyptian history (Friedman 2011; Dreyer 2011) and there is ongoing research on earlier acquired materials from Naqada (Tassie *et al.* 2012).

Gebelein is the least known of such important centres in Upper Egypt. The place was the subject of research for several scholars who were excavating its Predynastic sites [1]. Unfortunately, they did not publish any sufficient account of their works. Existing publications are extremely general. Usually, they do not contain any illustrations, plans, drawings and sufficient descriptions of the locations of the excavations what makes them difficult to understand even with a good knowledge of Gebelein's topography. Due to lack of publications of the results of previous works the site complex is poorly known and often neglected in studies on early history of ancient Egypt and therefore possibly underestimated. Both necropoleis and settlements are found at Gebelein what make the area significant for research on both kinds of sites. Its location among Hierakonpolis, Naqada, Hiw and Abydos-This makes it crucial in the understanding of the Predynastic Period.

[1] For reconstruction of earlier works see: Ejsmond 2013, and for the most important accounts of the excavations of the Predynastic sites see: Anonymous 1930; 1935; 1937; Lortet and Gaillard 1909: 229-230; Budge 1920: 359.

The opinions concerning significance of Gebelein can be summarise by presenting two main point of view. For example, Toby Wilkinson (Wilkinson 2000) is close to see Gebelein as an independent political centre in contrast to Josep Cervelló Autori (Cervelló Autori 1996; Campagno 2002: 56-57). The latter scholar suggests that there is no evidence for the existence of powerful local elite, which would rule from Gebelein independently and the Gebelein linen should be consider as a result of influence from Hierakonpolis and not as an expression of power of an independent, local ruler. It must be noted that many objects from Gebelein have not been published yet, as well as results of previous excavations and the topography of the centre is poorly known in the literature. In effect Predynastic Gebelein is often unjustly ignored in discussions (see for example: Bard 2015: 113-114; Kemp 2006, 74-78). Therefore, the current research was launched.

2. Archaeological Sites at Gebelein

Several Pre – and Early Dynastic sites are located at Gebelein. They are concentrating in two areas (Fig. 2). The first group is the best recognise one in terms

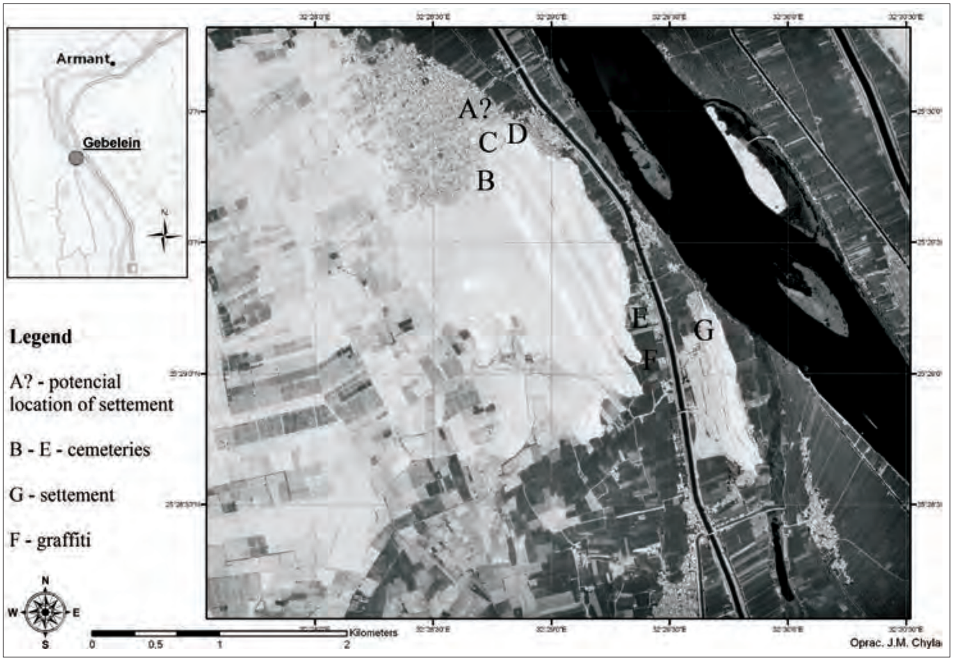

Fig. 2. Location of archaeological sites at Gebelein (base map by J. Chyla, locations of the sites by W. Ejsmond)

of archival data as well as current archaeological surveys. It is located at the northern slope and foothill of the western mount. It is hard to say whether or not there was one large necropolis running along the slope or several small ones. In the unpublished field journal by Virginio Rosa, who was conducting the field research in 1911 for Ernesto Schiaparelli, there are some information on Predynastic cemeteries on the north-eastern and north-western corners of the western mount (Rosa 1911: 25-26 and 56; B and D in Fig. 2). Unfortunately, there is no detailed description of the sites and findings[2]. Between those two cemeteries there was another necropolis, used during Naqada I and possibly later as well, now completely destroy (Ejsmond and Chyla in press; Ejsmond *et al.* 2018; Ejsmond 2013); C in Fig. 2). Preserved documentation and publications are not very specific about the site. Circa 300 skeletons have been excavated there and sent to Turin during just one season (Marro 1929; Donadoni Roveri 1990: 25). In this area, the famous 'Gebelein linen' was found (Ejsmond 2013: 39). Northern foothill of the western mountain is subject to expansion of the el-Gherira settlement, which has already destroyed the northern limits of the burial grounds. Therefore, it is impossible to establish the northern extent of the cemeteries and determine if they are close enough to each other to consider them as one large necropolis comprising smaller group of tombs.

Such density of burials indicates that some settlements should be located in the vicinity. Indeed, Predynastic settlement, ‚of which the stratum of ashes remains', has been mentioned north from the slope of this mound (Donadoni Roveri 1990: 23; Schiaparelli 1921; Rosa 1911: 25-26) (A? in Fig. 2). In more less the same area, a *kom* is located on the late 18th century map (Jacotin 1826: pl. 5) but there is no information on its dating. In pharaonic times, a town of Sumenu, where the god Sobek was worshipped, was located north from the western mountain. Unfortunately, there is no evidence on the exact location of Sumenu in such early period. The earliest attested instances of the deity related to Sumenu and the name itself is an Early Dynastic Period[3] inscription from Saqqara[4]. Therefore, Sumenu existed

[2] Preliminary analysis of the pottery from the cemetery on the western corner of the mount indicates the Naqada III dating of the site. Pottery collected from eastern corner of the mount is dated to Naqada I-III.

[3] Crocodiles occur in many times in early inscriptions but it is difficult to say if such depictions refer to animal, god or name of a place, see: Regulski 2010: 130; Kaplony 1963: e.g. Abb. 48, 339, 910.

[4] Tomb 3121 (Emery 1953: 116-120, but image and description are not published there. Drawling of the artefact and inscription in Kaplony 1963: Taf. 150, no 865). The inscription mentions Sobek and *ima* tree – the sacred plant of Sobek lor of Sumenu (for Sobek and *ima* tree

already in such early time, possibly even earlier, and it can be speculated that aforementioned cemeteries were the burial grounds of people from Sumenu.

The second group of archaeological sites is located between eastern and western mountain (Ejsmond 2013: 39-41). This area has been heavily damaged and only small part of a cemetery located at the eastern foothill of the western mount survived until today (E in Fig. 2). According to a very general statement by Jaques de Morgan (J. de Morgan 1907: 41-42), there was a cemetery dated to the Predynastic times at the eastern foot of the western mountain (opposite location of ancient Pathyris) and Predynastic pottery acquired by the Cairo Museum at the end of the 19th century proably came from this place. It represents white-lined and decorated wears[5]. It is possible that the still existing part of the necropolis is the last surviving evidence on the location of the Predynastic burial ground. It is also likely that the well-preserved natural mummies discovered by Alfred Wallis Budge were found somewhere in this area (Ejsmond 2013: 40). Concentration of Predynastic rock arts has been discovered south from the cemetery (F in Fig. 2). It comprises of dipinti and graffiti showing animals, e.g. gazelles, giraffes, dogs etc. Jacques de Morgan mentioned some Predynastic settlement opposite the cemetery on the western foothill of the eastern mountain (G in Fig. 2). In pharaonic times, the town of Per-Hathor (in Greek Pathyis) was located there and a limestone block dated to late Early Dynastic Period was found there by the Italian Mission (Curto 1953). Second limestone block of unknown provenience was attributed to Gebelein on the basis of the material used and similarity of execution to the aforementioned one (Stevenson Smith 1949: 137). Partly preserved scenes were depicted on both, probably showing ritual of temple foundation (Morenz 1994). Similar distribution of archaeological sites in this part of Gebelein is presented by Louis Lortet and Claude Gaillard (1909: 34, 225-226). They also mentioned that predynastic burials occur at the north-western foot of the eastern mountain, under the pharaonic settlement of Per-Hathor.

Henri de Morgan, who visited Gebelein during his survey of this part of Egypt in 1907, mentioned that he found two Predynastic settlements at Gebelein, but he did not gave any description of their location (H. de Morgan 1912: 49; Needler 1984: 70). Therefore, it is unknown whether or not he was referring to abovementioned settlements.

see: Kuentz 1929: 157-158).

5 E.g. JE 26531, 25633, 26528.

3. Selected Findings

Several important artefacts came or are said to come from Gebelein (Fig. 3). The Gebelein linen is the best known of them and its provenance is certain (A in Fig. 3). It was found in a tomb in the northern burial ground, next to some human body and is dated to Naqada Ic-IIa period on stylistic grounds (Adams and Ciałowicz 1988: 36). Depictions of boat procession with a person in a crown is suggestive of its royal nature. An analogical depiction was painted in the Decorated Tomb at Hierakonpolis. The grave is dated to the Naqada IIc and is interpreted as a burial of a local, Hierakonpolitan king (Huyge 2014: 93). By similarity

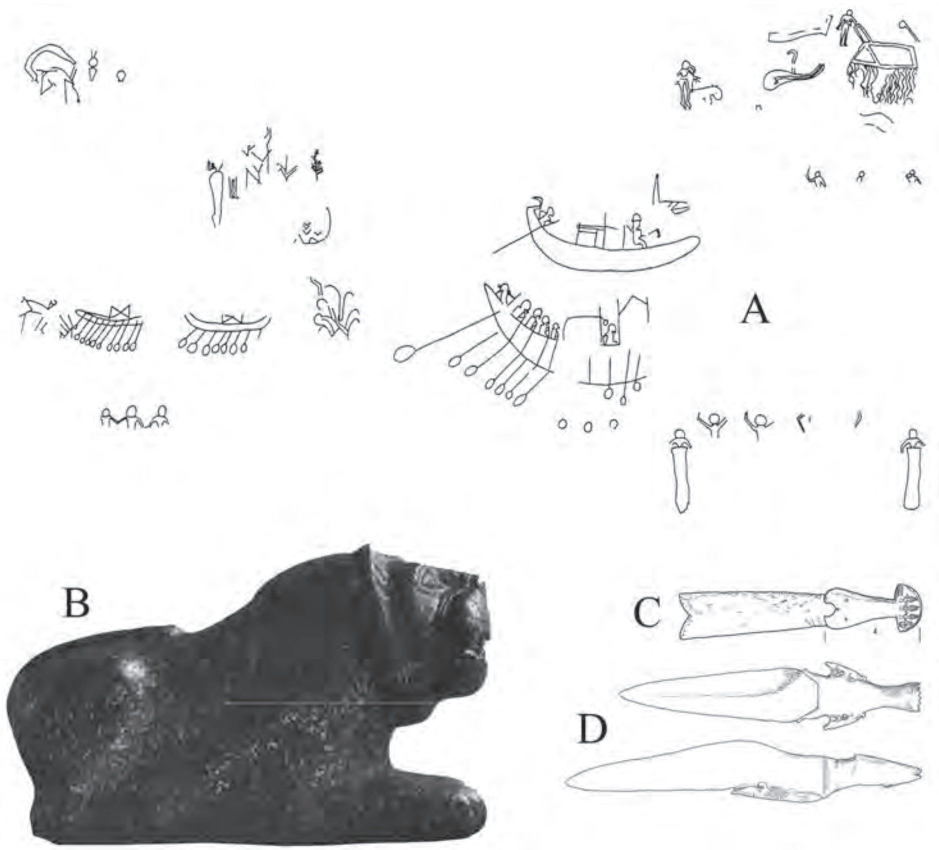

Fig. 3. Selected findings from Gebelein: A – Gebelein linen (Turin supp. 17138); B – lion figurine (Berlin 22440); C – fishtail knife with golden handle (Cairo CG 34210); D – two stone knives (Lortet and Gillard 1909: 167-168)

of the depictions, both artefacts could be considered as elements of a furnishing of a ruler's tombs, since they bear elements of royal iconography or, as Bruce Williams and Thomas Logan calls it 'early pharaonic cycle' (Williams *et al.* 1987). It can be suggested that the northern necropolis at Gebelein (C in Fig. 2) was the elite cemetery where, among other elite members, local rulers had their burials.

A set of artefacts was acquired by James Quibell in 1900 from an antiquity dealer in Qena, who said that it came from Gebelein (Quibell 1901). It consists of several stone knives, wooden staff with gazelles in a row[6], decorated pot and one fragment of furniture in the shape of bull's/cow's leg, probably part of some bed or chair. There is some controversy concerning the authenticity of a golden handle of one of the knives (Aksamit 1989). This knife (C in Fig. 3) requires comments due to its shape and the decoration of its handle. The flint blade is in a fish-tail form. Such instruments are said to be predecessors of *psš-kf* knifes used during the opening of the mouth ceremony (van Walsem 1979). Decoration of the handle shows a navigation scene, which is typical for the decorated pottery known from the funerary context. It is thought that the scenes with boats are related with the beliefs concerning afterlife (Graff 2009: 121). Therefore, the connection of the afterlife scene with the knife related with the funerary ritual is very interesting. The whole set seems to be genuine and should be dated to late Naqada II or early Naqada III period. It has been proposed that the set could be interpreted as furnishing of some local ruler's tomb (Ejsmond 2015).

Two stone knives (47 and 55cm long) has been acquired by Louis Lortet and Claude Gaillard from a local person during their excavations at Gebelein (D on Fig. 3). Handles of both artefacts are ornamented by depictions of crocodiles (Lortet and Gaillard 1909: 232-233). A stone model of a boat with representation of crocodile head at one end was also unearthed at Gebelein[7]. The town of Sumenu was located between Gebelein and el-Rizeiqat and as the cult place of Sobek, it is tempting to believe that abovementioned artefacts are the earliest instances of the cult of this deity in the Gebelein region.

Figurines of all sizes were found at Gebelein. The most frequent are stone statues of lions (e.g. Petrie Museum UC 15191-4, the biggest of them: L15 – H8,8 cm). When the context of such statuettes is known, they accompanied the deceased king and his close retainers (Davis 1981: 42). Medium size figurines could be re-

[6] The only analogical artefact come from the Main Deposit at Hierakonpolis (Ashmolean Museum, E311).

[7] Lyone, Musée des Confluences 90000095, Emmons *et al*. 2010: 75.

garded as votive objects placed in temples (Bussmann 2010: 62), such as coming from Gebelein the New York (MMA 66.99.2, 25 cm long and 12 high) and Berlin (22440, 31,5 cm long) (B in Fig. 3) specimens. Also, one big statue of lion (MFA Boston 1980.73, estimated size of original of the complete sculpture was 45 x 50 cm (Davis 1981: 35), probably furnishing or/and architectural decoration, was found in the place. Analogical sculptures are known from Hierakonpolis and Koptos (Davies 1981; Cooney 1953: 2; Bussmann 2010: 201-203). The reconstructed size of Gebelein large figurine is comparable to Hierakonpolis lion (see: Bussmann 2010: 201-203.). The dating of such sculptures is difficult and they can be attributed to the Predynastic as well as Early Dynastic Period. This suggests the existence of some important temple in the area during these times. In the dynastic times, Gebelein was a cult place of Hathor. She was sometimes represented as lioness. Lions in ancient Egypt usually represented the king as well. Hathor was a celestial mother deity who appeared as a cow suckling a king and as a wild lioness. Sometimes she is considered as mother or wife of Horus (Arnold 1995:17; Wilkinson 1994: 140; Lesko 1999: 83-88) and therefore of the king in symbolic way. The earliest record (11th/12th Dynasty) of any specific cult in the temple on the top of the eastern mound at Gebelein is that of Hathor, Lady of Dendera. Lady of Dendera was strongly associated with royal ideology of power (Fiore Marochetti 2010: 23-25).

In context of state religion, it is worth mentioning that a statue of falcon symbolising Horus was also discovered at Gebelein. Its size is 15,8 x 9,5 x 23,4 cm, which suggests that it was used as a cult image (Cooney 1975: 5-14; Baumgartel 1967-68). There was one more such sculptures coming from Gebelein, but it is lost now (Davis 1981: 41).

There are two aforementioned limestone blocks from the temple dated to the end of the Early Dynastic Period (Stevenson Smith 1949: 137). Such artefacts are rare. Contemporary analogies from the Khasekhemwy's reign or approximate time are known only form two temples: Hierakonpolis (Quibell 1900, pl. II) and el-Kab (Sayce and Clarke 1905: 260-261), which are essential places for state religion. Therefore, Gebelein must have played an important role at that time to receive a temple with decoration in stone. One can speculate that the aforementioned figurines and Hathor cult were related with royal self-promotion but one should remember that sculptures of lions occur also in temples not related with cult of Hathor, e.g. Min temple at Koptos or Horus temple in Hierakonpolis, and therefore they cannot be considered as indication of her cult.

These a artefacts are the most exceptional examples, which testify that Gebelein was centre with very rich elite and was an important cult place. Many more antiquities were found here but they were not published, e.g. numerous stone pallets, mace-heads, decorated pottery, small ornaments etc.

4. Discussion

The hypothesis on the role of Gebelein as an independent power centre can be supported by a number of arguments.

First group of evidence concerns mainly natural setting of Gebelein and is very generic and of speculative nature:

1. A large and diverse potential of food sources (fields, areas of the low desert, mountains and swamps with hunting area) and the availability of a raw materials – flint outcrops and quarries (Ejsmond 2016). Located at Gebelein was a stone quarry, which according to Barry Kemp, Andrew Boyce and James Harrell, provided stone for sculptures in the Predynastic and Early Dynastic temples at Koptos and Hierakonpolis (Kemp *et al.* 2000). This allowed for the self-sufficiency of the region and the export of the raw materials. Therefore, Gebelein had natural resources for its development.
2. Strategic location at the crossroads of the waterway and land routes (Fig. 1) enable their control and was an additional factor which places Gebelein in a privileged position in relation with other centres.
3. Whitney Davis have suggested that some aspects of the material culture at Gebelein seems to be different from the material culture in other regions of Upper Egypt (Davis 1981: 42)[8]. It is natural for material culture to not be identical along the Nile. It is a matter of the degree of these differences, which suggests cultural diversities or uniformity. Nevertheless, the difference of material culture among centres in Upper Egypt is considered to be a result of the political independence of the regions or the basis for development of such independences (Friedman 1994: 923-4). This issue requires further considerations, particularly the relevance of the material culture in relation to political or cultural differences.
4. Existence of diverse furnishing of Predynastic burials proof the existence of social stratification. This suggests an advanced development of the local population.

[8] This requires further research because this idea was predicated on limited group of artefacts.

Second group is of archaeological nature and give more direct conclusion:

5. Earlier works yielded opulent findings[9]. Local workshops required an elite class who would provide them with materials and a market for their luxury goods. Wealth could be result of economic or political position of Gebelein or mixture of both. Existence of a rich elite class is a testament to the significance of the centre.
6. Spatial distribution of the archaeological sites at Gebelein show that it had a cloister of settlements and cemeteries, like Naqada and Hierakonpolis. Such concentrations in light of settlement pattern in Upper Egypt indicates developing centres which were seats of power during the Predynastic Period (Patch 1991: 334-340).
7. In the magazine of antiquities in Moalla there is a pot dated to middle or late Naqada III that come from Gebelein[10] with two hieroglyphic signs: a bird (possible interpretations are Gardiners' sign (Gardiner 1994: 467, 472, 493) G1 (Egyptian vulture) or G5 (falcon) (Regulski 2010: 117-119, 416-425) and O4 (Regulski 2010: 155 and 539) which shows a ‚reed shelter in fields'. It indicates use of writing at Gebelein which make it possible that it was some seat of bureaucracy at the earliest known stage of development of writing along the Nile.
8. Interest in Gebelein by later rulers (visible in construction works in the local temple and votive objects) and the wealth of this centre attested by rich burials dated to the Old Kingdom may be result of its former role as a power centre which declined to state of provincial administrative town (Ejsmond 2016: 7-11).
9. Equipment of a tomb (the set purchased by J. Quibell), which wealth is comparable to the wealth of burials from the same time at the royal necropoleis at Abydos and Hierakonpolis indicates royal burials in the area.
10. The representation of a king during a ritual and/or triumph on Gebelein linen indicates the existence of a Predynastic ruler's grave at Gebelein who used royal iconography. Rulers of proto-states were buried relatively near their capitals, e.g. Hierakonpolis, Naqada.

[9] Museum of Egyptian Antiquities in Turin and Cairo Museum has the biggest collections of Predynastic artefacts from Gebelein. Unfortunately, most the objects are not yet published.

[10] The artefact will be published elsewhere.

5. Conclusion

Although the current project has yielded new results and information on the site complex challenges still face Gebelein. Many artefacts have not yet been published, and the local archaeological sites are either heavily destroyed or under great threat. Therefore, the debate on the significance of Gebelein must be based on limited quality and quantity of data. Attested artefacts from the place make it clear that there was something more than ordinary provincial settlements. The discussion right now revolves around the issue, whether or not Gebelein should be consider as independent political capital or it was provincial centre which depended on other capital?

The perfect situation to prove that there was a royal necropolis at Gebelein and therefore possibly a capital city in the area would be discovery of a royal necropolis. Without that the situation is speculative. The Gebelein linen is an argument for royal burial in this place but without archaeological context, its relevance in the discussion is limited. The set of artefacts purchased by J. Quibell is also of limited value for such considerations due to their uncertain provenance. Should we consider any cemetery with rich burials and yielding artefacts with elements of royal iconography as a necropolis of proto-state capital? It is not enough and some evidence from settlement would be very helpful. Such ideal situation would be difficult to reach in Egypt because one of the biggest issues of Predynastic Upper Egypt's archaeology is relatively small number of preserved and researched settlements in contrast to large number of cemeteries. Therefore, the necropoleis still forms the main body of evidence in study of the Predynastic Period. It is difficult to formulate the answer concerning the political significance of Gebelein (as well as any other centre) based only on the archaeological evidence.

In conclusion, the present arguments for the important role of Gebelein provide indirect grounds for Gebelein to be considered as a seat of power during the Predynastic Period, which at some point lost its position in late Predynastic Period, possibly at the turn of the Naqada II and III times.

Acknowledgements

The author would like to thank the Polish Centre of Mediterranean Archaeology – Cairo Branch, its former director Dr Zbigniew E. Szafrański and Prof. Karol Myśliwiec from the Polish Academy of Sciences for their support in organisation of the field research at Gebelein. The research was financed by the University of Warsaw Foundation and Consultative Council for Students Scientific Movement of the University of Warsaw. The author would like to thank colleagues who took part in the recent research at Gebelein and without whom the project would not have taken place: Julia M. Chyla, Piotr Witkowski, Daniel Takács, Marzena Ożarek-Szilke, Dawid F. Wieczorek, Michał Madej, Cezary Baka, Adam Grylak, Aneta Skalec, Marcin Jakub Ordutowski and Lawrence Xu-Nan.

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Desert and the Nile.
Prehistory of the Nile Basin and the Sahara.
Papers in honour of Fred Wendorf
Studies in African Archaeology 15
Poznań Archaeological Museum 2018

Robert Kuhn

A Wooden Statue and Early Bronze Objects? A Critical Review of Tomb 1052 in the Necropolis of Abusir el-Meleq

Between 1905 and 1906 the German Egyptologist G. Möller excavated about 900 tombs in the Pre- and Early Dynastic necropolis of Abusir el-Meleq, a project financed by the Deutsche Orient-Gesellschaft (DOG) (Möller 1906; Möller 1907; Scharff 1926). Möller died in 1921 without finishing the publication. It was than his successor at the Museum in Berlin, A. Scharff, who was carefully studying the notebooks and notes left by G. Möller. Even-though A. Scharff published his manuscript in 1926 including a tomb catalogue, a full and detailed analysis of the whole necropolis is still lacking.

It is one of the main objectives for the next years to revise critically the known information provided in the field diary and tomb lists, as well as apply new approaches and techniques of natural sciences to get a somehow new view on certain aspects of this important Predynastic necropolis.

In the following I will focus on some context problems of the feature numbered as 1052 by G. Möller and uncovered during his second season in Abusir el-Meleq in 1906.

The so-called tomb no. 1052 was a 60 cm deep pit measuring 1,8 m x 1,2 m, having quite vague borders, which seem to be not very clear in the moment of

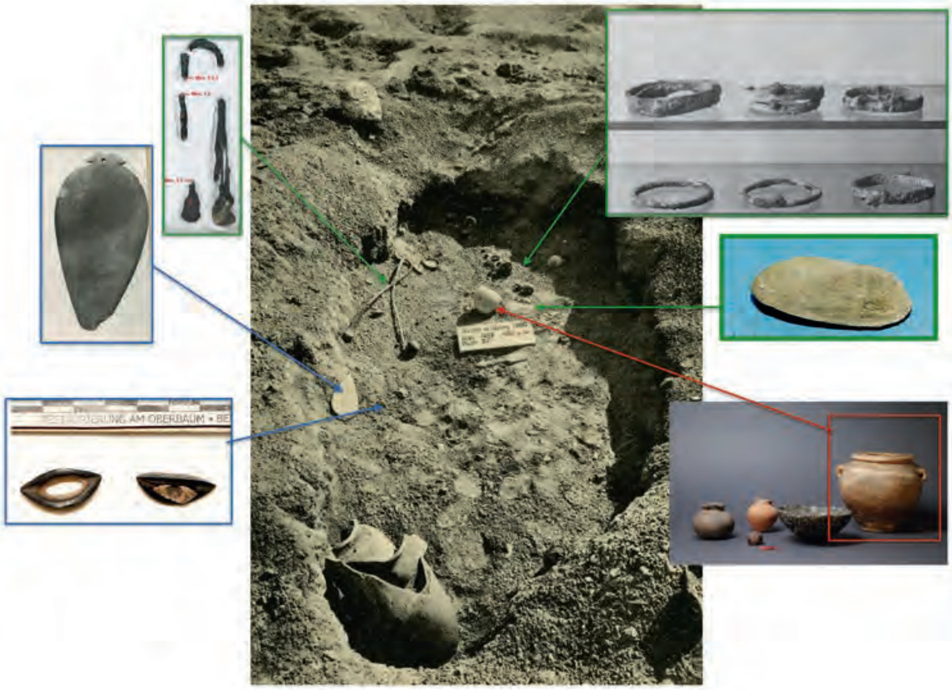

Fig. 1. Photograph of context 1052 at Abusir el-Meleq and finds in the collection of the Berlin Museum (after: Scharff 1926, pl. 2)

excavation. In this context, at least 37 objects were recovered (cf. Scharff 1926: 154–155; Kuhn and Hertel 2017). Furthermore, 4 stone vessels, 7 pottery vessels, 1 miniature mace-head, several cosmetic items and jewellery made of molluscs and diverse stones, a large number of metal objects were also documented. Uncovering of the whole context took at least two days and was then photographed with all the objects again in their „original" position (Fig. 1).

So far it is believed that the feature 1052 of Abusir el-Meleq is an example of an archaeological closed find. A further look on the objects as well as the still ongoing investigation using natural sciences created some doubts concerning the previous interpretation.

A slate palette (ÄM 19048) and two eye inlays (ÄM 19051) made of a black stone were uncovered near a badly corroded ca. 70 cm long copper stick recurved in the middle (ÄM 19046; For a first examination see: Di Matteo *et al.* 2015). In the so-far unpublished diary it is also stated that G. Möller found a lot of charcoal, which he could not save by virtue of bad preservation. Furthermore, he assumed in his diary that these pieces could belong to a burnt wooden statue (Möller 1906). Interestingly, A. Scharff, in his publication was much more vague and wrote very short in his tomb catalogue: „rest of burnt wood with inlayed eyes" (Scharff 1926: 155). Even though we don't know the exact position of the wooden fragments and none of them survived until today, it is an important find. Reviewing the metal objects from context 1052 we could now also ascertain some tiny pieces of burnt wood at the copper stick – fragmented yet still preserved. Albeit we don't have any hint on the appearance of the whole statue, Tell el-Farkha figurines come into one's mind, which might also have had a wooden core (Ciałowicz and Chłodnicki 2007: 1-15; Ciałowicz 2012: 201-243). It has to be stated, that the reconstruction is highly speculative, and no foils and metal coverings were found during the excavation of context 1052 at Abusir el-Meleq. Bearing in mind that slate palettes are often found near the head of the dead (Regner 1996; Kuhn 2013), we might reconstruct the position of the burnt statue oriented along west-east axis and lying parallel to the recurved copper stick (Fig. 2; cf. Kuhn and Hertel in press).

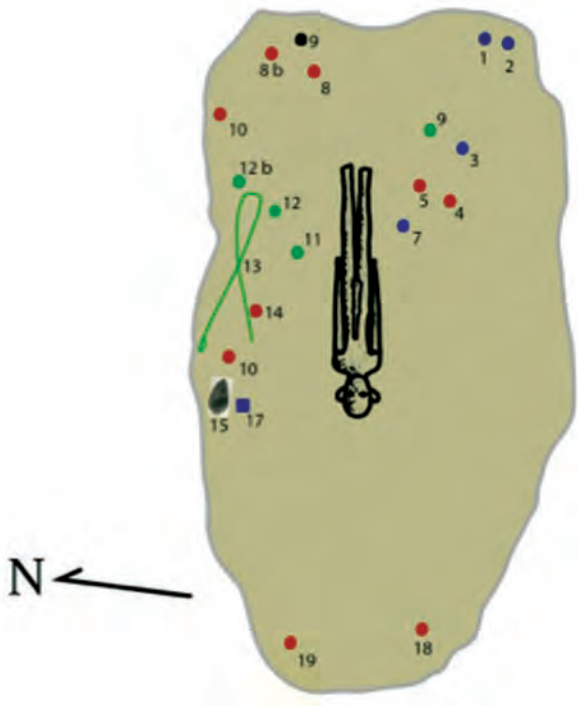

Fig. 2. Assumed Reconstruction of context 1052 at Abusir el-Meleq (drawing: R. Kuhn)

The figurine was destroyed by fire but very little damage and discolorations can be observed. The remaining pottery and stone vessels, as well as the palette show just scarce traces of soot and discolorations. In any case this figurine shows a fascinating aspect of the necropolis of Abusir el-Meleq. Their possible parallels are so far the two Tell el-Farkha figurines coming from a probably cultic or hidden deposition in the settlement of the Eastern Kom and another figurine bought by C. T. Currelly in Thebes (Ciałowicz 2012: 204).

The most remarkable are metal objects found in „tomb" 1052: 3 vessels made of copper[1], metal beads, the recurved copper stick, and nine bracelets. All these objects weigh together about 2 kg, contrary to low percentage of Predynastic tombs containing metal objects at Abusir el-Meleq, among which maximum of 1-2 copper objects were found (cf. Scharff 1926; Kuhn and Hertel 2017).

As some analysis of other metal objects are still on-going, I will focus in the following on bracelets. These were already classified by G. Möller during the excavation as being made of bronze. All the bracelets were badly corroded, most of which could be cleaned and exposed by I. Hertel, restorer at the Berlin Museum. The cross-sections of five examples are round, or flat and rectangular. Four bracelets are quite remarkable: despite corrosion, G. Möller has already seen that two bracelets had figurative applications. ÄM 19033-1, with a long-rectangular cross-section, shows 3 figurines of crocodiles and ÄM 19034 shows the application of a snake (Fig. 3). A third bracelet (ÄM 19035-2) seems to be a ring made of two twisted wires, but actually the whole is made by casting in *cire-perdue* technique[2]. The same production method can be assumed also for the other bracelets[3]. For a long time these objects were regarded as marvellous examples of the know-how of the early Egyptian metallurgists (e.g. Möller 1924: 51; Scharff 1926; Baumgartel 1960: 21; Dębowska-Ludwin 2014: 113). Indeed these objects are real beauties, but are they also early Egyptian?

[1] ÄM 19043-ÄM 19045. One of the objects, the highly corroded vessel ÄM 19045, was examined at the Rathgen-Laboratory to find out its composition. XRD and μ-RFA analysis showed that the piece consists of almost pure copper. I thank Dr. I. Reiche and S. Schwerdtfeger from the Rathgen-Laboratory for their kind support and collaboration.

[2] The imitation of the "strip-twist-technique" is especially known from Roman times: Ogden 1982: 56; Andrews 1990: 97 – some earlier examples were found in the tomb of Tut-Ankh-Amun: cf. Ogden 1982: 51.

[3] For the ones with zoomorphic applications, already G. Möller assumed a connection with the *cire-perdu* technique: Möller 1924: 16.

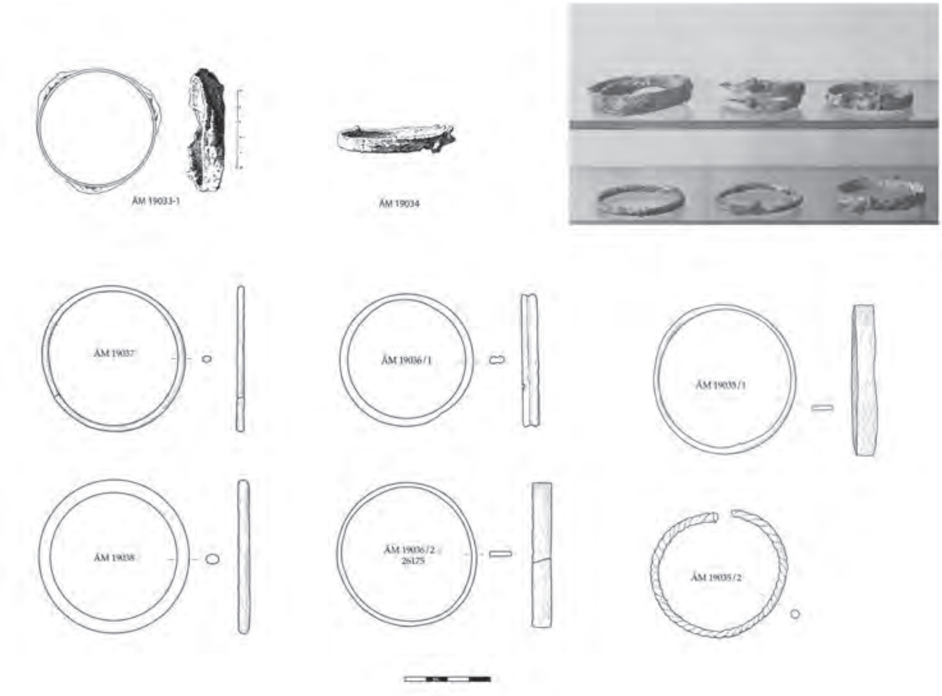

Fig. 3. Bracelets from context 1052 from Abusir el-Meleq (after Scharff 1926, fig. 20); photograph from the archive of the Ägyptisches Museum und Papyrussammlung Berlin; drawings: R. Kuhn)

The first doubts appear when looking at the production technique. Until today it is very difficult to define, when actually the *cire-perdue* process was used for the first time in Egypt. Even though most of the scholars argue for an invention during the Middle Kingdom (Vassilika 1997: 291–302; Hill 2004: 9–16; Fitzenreiter 2014: 86), the artefacts found in different necropolises such as Minshat Abu Omar, Kafr Hassan Dawood as well as Tell el-Farkha, suggest alternative solutions (Czarnowicz 2012; Rehren and Pernicka 2014: 245; 250; Hassan *et al.* 2015: 84-85). Lead-rich alloys for bracelets can surely just be explained by the innovation of the melting process. The *cire-perdue* process might have been already used, perhaps on a smaller scale, for applications of knobs like the one known from Minshat Abu Omar (cf. Wildung and Kroeper 2000: 170, pl. 52). Nevertheless the so far known early Egyptian objects possibly made with the *cire-perdue* technique consist mostly of copper.

In 1978 J. Riederer from the Rathgen-Laboratory in Berlin analysed several metal objects from the Berlin Museum with the Atomic Absorption Spectroscopy (AAS). In this study, he also studied the bracelet with the crocodile (Riederer 1978). This research confirmed G. Möller observations: it is a real bronze with a very high amount of lead – (68,97% of copper and almost 24,61% of lead; cf. Riederer 1978; tab. 1). Already in the late 1990's other bracelets were tested as well, using X-Ray Fluorescence (XRF). The analysis showed again that also the rest of the bracelets consist of bronze and again a very high proportion of lead could be found. The highest amount of 28,12% of lead was identified for bracelet ÄM 19038 (see Fig. 4). This is of course a very remarkable result, as it allows us to speak of lead-bronzes or lead-rich-alloys (along the terminology cf. Riederer 1987: 108). For the very small number of early Egyptian metal objects analysed so far, the highest weight-percentage of lead ranges usually between 4 and 5%

Objekt	Cu	Sn	Pb	Zn	As	Fe	Ag	Ti	Bi	Ni	Mn	Sb
	Kupfer	Zinn	Blei	Zink	Arsen	Eisen	Silber	Titan	Wismut	Nickel	Mangan	Antimon
19033-1	68,97	0,31	24,61	0,03	2,82	-	0,06			0,02		3,18

AAS (Riederer 1978)

Objekt	Cu	Sn	Pb	Zn	As	Fe	V	Ti	Bi	Ni	Mn	Sb
19033-1	69,803	-	22,861	0,039	0,537	-	0,047	0,152	0,069	-	-	6,151
19033-1	62,886	-	27,333	0,037	1,591	-	0,032	0,204	0,145	-	-	7,366
19033-2	93,041	0,03	4,716	0,087	1,26	0,122	0,065	0,091	0,097	-	0,051	0,242
19034	83,213	-	12,096	2,764	-	0,088	0,015	0,077	0,12	-	0,049	0,984
19035-1	69,962	-	22,495	1,828	0,49	-	0,031	0,123	0,413	0,077	-	4,133
19035-2	73,358	0,547	22,095	-	0,806	0,439	0,44	0,971	0,158	-	-	0,862
19036-1	90,32	-	6,179	0,438	0,434	0,122	0,076	0,083	0,233	-	0,108	1,769
19036-2	85,993	-	11,336	0,482	1,058	0,065	0,078	0,079	0,344	-	-	0,313
19037	84,072	-	11,583	-	2,87	0,068	0,098	0,19	0,049	-	0,04	0,747
19038	65,828	-	28,12	-	3,299	-	0,051	0,084	0,245	-	-	1,784

XRF (Ecclestone)

Fig. 4. Results of the AAS Analysis undertaken by J. Riederer in 1978; 2) XRF-Analysis of the bracelets made by M. Ecclestone using Niton XL3t GOLDD

(cf. Rehren and Pernicka 2014: 242-245), but for most of the objects a much lower amount of 1–2% is recorded (e.g. Spencer 1980: 88; Cowell 1987: 96-118). In his overview of Egyptian metallurgy J. Ogden showed that such a high percentage of lead in Egyptian bronze objects is rarely to be found in the New Kingdom and is much more common in Greco-Roman Period (Ogden 2000: 154-155; Martinot and Weber 2009: 444).

The metal analyses and the technical aspects lead us to the hypothesis that the bracelets are not of early Egyptian date. Interestingly, the necropolis of Abusir el-Meleq was re-used during the Hyksos-Period as well as during the Late Period and Greco-Roman Times (Rubensohn and Knatz 1904; Scharff 1926; Kuckertz and Schmidt 2013: 45–49). During the excavation, Möller found indications of Hyksos, as well as Greco-Roman disturbances in several of the Predynastic burials (Möller 1907; Scharff 1926: 12–13; 84–105).

The two bracelets in discussion fit well into the Greco-Roman Period. Even though a detailed comparison of the casted figurines (crocodiles and the snake) is not possible by virtue of corrosion, the visible details are very typical of the Fayum region during this time period (cf. Verner 1927). It is usually a crocodile connected to the god Sobek as well as snakes that are found on bracelets made of gold and bronze (CG 52094; 52123; cf. Verner 1927), in addition to objects in the form of votive figurines and statuettes (Kakosy 1965: 116–120; Brovarski 1984; Aubert and Aubert 2001: pl. 48).

Summarizing the above mentioned aspects, the so far accepted interpretation for the context 1052 as an archaeologically closed find and a tomb has to be questioned. Both Möller and Scharff stressed the fact that no human remains were found during excavation (Scharff 1926: 155). Instead, presumably a wooden statue embellished with inlayed eyes was deposited with several objects of the material culture such as pottery, stone vessels, small knives made of carnelian, a slate palette made of greywacke, copper vessels and a copper stick. The whole arrangement is of course tomb-like, as it is characteristic for the period of early Naqada IIIA/B. The dimension and outline of the original deposit isn't clear and seems to have been vague already during the excavation. In comparison with the other tombs found in the Predynastic necropolis the pit might have been also rectangular in form (Fig. 4).

On a stratigraphically higher level, where the bracelets were found – albeit – no measurement was recorded. Möller reports in his field diary the find of the bracelets for the first day, while most of the inventory reported for the tomb was found during the second working day, presuming they were also stratigraphically in the lower layer. Therefore it is highly likely that the bracelets can be connected with a younger occupation of the necropolis during the Greco-Roman Period. During this time the outlines of the former Predynastic tombs were surely not visible anymore and so it is possible that while digging a new burial pit, the Predynastic context of 1052 was disturbed. So far it appears that the younger material was found mostly in the south-eastern corner of the context. The latter might indicate just a partial disturbance of the Predynastic context in this area. This later disturbance could be also a reason for the „washed" outlines of the „tomb".

Obviously this interpretation and different possible scenarios are highly speculative and still leaves us with a lot of questions. Considering the whole Predynastic inventory the 1052 feature has a tomb character – even though a very well equipped one and might be interpreted as a ritual deposit of a votive figurine for the temple. It is not clear whether the Greco-Roman disturbance can be connected with the fire or whether it goes back to the early phase. I would rather suggest that destruction of the statue took place during the Predynastic times.

At the end, there are much more questions and speculations than answers – but this shows also the potential of reviewing this site and re-examination of old archaeological materials, stored for almost 100 years in our museums, with the help of new methods.

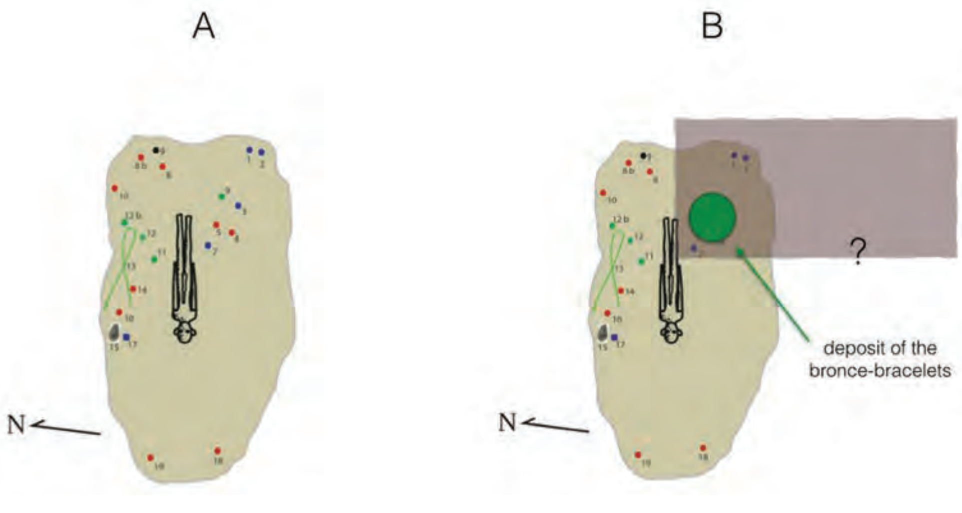

Fig. 5. Hypothetical Reconstruction of the context 1052 at Abusir el-Meleq: A – Predynastic deposit; B – disturbance in Greco-Roman Times (In-Lay R. Kuhn)

Acknowledgements

For their generous help and their support I have to thank Prof. Dr. F. Seyfried, Director of the Ägyptisches Museum und Papyrussammlung in Berlin as well as Mrs. I. Hertel, our conservator for metal objects. They gave me the opportunity to study the objects and helped to find solutions for further analysis such as the Rathgen-Laboratory as well as the BAM in Berlin. I am grateful for the help provided by Dr. I. Reiche, Director of the Rathgen-Laboratory as well as to Mrs. S. Schwerdtfeger, who made a lot of further research possible. Dr. B. Illerhaus, Dr. A. Staude and G. Di Matteo provided further possibilities of research such as a Micro-Computed Tomography of some other objects of the tomb context, which helped to understand some aspects much better. For their on-going support and help and their interest in this case, I am most grateful. Further thanks go to Mr. M. Ecclestone who allowed me to work with the results he has got after analysing the objects in the Berlin Museum using XRF-measurements. Furthermore I wish to express my thanks to Dr. E. El-Khalifa for proofreading the English version of the paper.

Last but not least I am grateful to Prof. Dr. J. Kabaciński for the invitation and possibility to show our first results during the Poznań conference „Desert and the Nile. Late Prehistory of the Nile Basin and the Sahara".

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Desert and the Nile.
Prehistory of the Nile Basin and the Sahara.
Papers in honour of Fred Wendorf
Studies in African Archaeology 15
Poznań Archaeological Museum 2018

Natalia Małecka-Drozd

The Old Kingdom Upcountry Settlement Aarchitecture in the Nile Delta – the Case of the 3rd-4th Dynasty Building at Tell el-Murra

Introduction

The current state of research on Egyptian settlements clearly indicates a gradual decay of the Nile Delta sites from the Early Dynastic period until the end of the Old Kingdom (Małecka-Drozd, fortcoming). The amount of settlements with attested architectural remains significantly decrease at least since the early Old Kingdom. Simultaneously, a decline of quality of buildings discovered on some of the sites which enjoyed prosperity in the Predynastic and Early Dynastic periods is noticeable (van den Brink 1993; Małecka-Drozd 2014). One of the sparse excavated sites with architectural remains dated to the Old Kingdom is Tell el-Murra.[1]

Tell el-Murra is located in the northeastern part of the Nile Delta, in the Sharqiyyah Governorate, *markaz* Kafr Saqr. A particular relevance of the area was con-

[1] The excavations between 2010 and 2012 were financed by funds from the Ministry of Science and Higher Education, Poland, and the National Science Centre, Poland, grant no. 2195/B/H03/2009/36. Since 2014, the project has been financed by funds from the National Science Centre, Poland, which were allocated on the basis of decision number DEC-2013/09/B/HS3/03588.

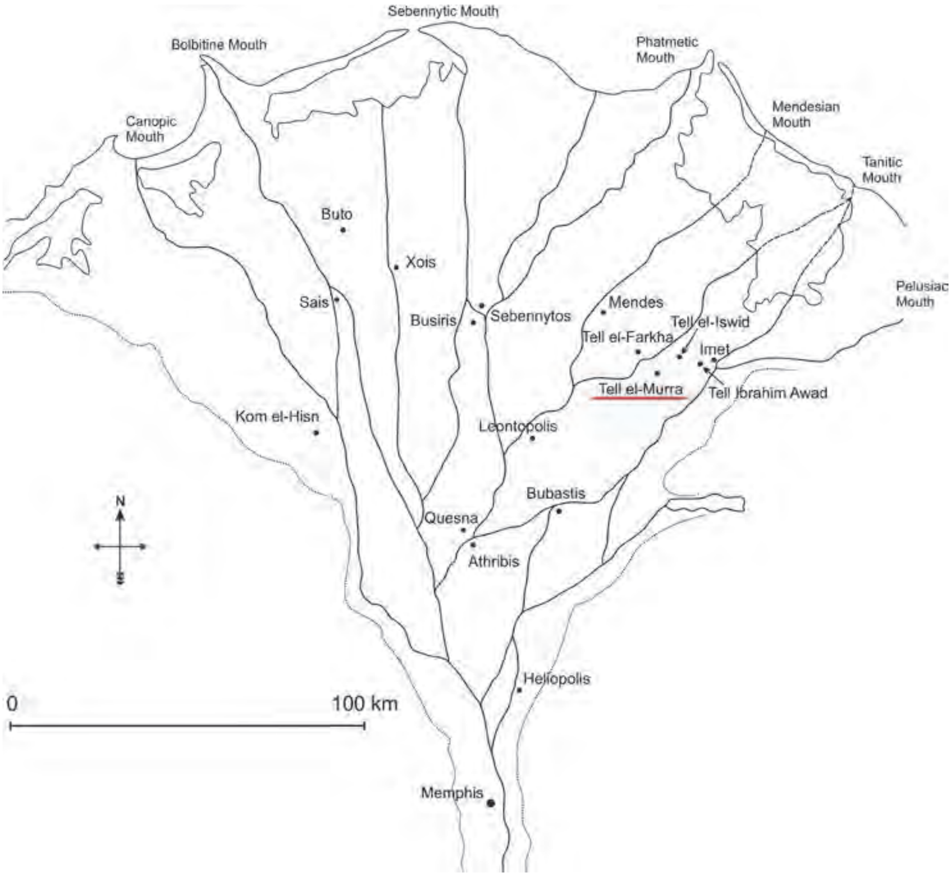


Fig. 1. The Nile Delta settlements during the Old Kingdom

firmed by numerous sites dated for the Late Predynastic and Early Dynastic periods (Fig. 1), recognized during former research (van den Brink 1993; Hendrickx and van den Brink 2002: 370-371; Jucha 2009; 2011). The site is situated only ca. 10 km to the east from the important Predynastic and Protodynastic centre at Tell el-Farkha, excavated since 1998 by a Polish expedition (Chłodnicki *et al.* 2012) as well as ca. 8 km to the south-west from Tell el-Iswid, where French expedition has carried out its research since 2006 (Midant-Reynes and Buchez 2014). Even closer – less than 4 kilometers – distance was attested between Tell el-Murra and other sites from the same period (Jucha 2016; Jucha and Bąk-Pryc, forthcoming). These include Tell el-Akhdar (about 3 km away) (Jucha 2012), Tell Mashala (about 3 km away) (Rampersad 2006), Tell Gabarra (about 3.9 km away) (Rampersad 2008; 2015-2016), Tell el-Gherier (about 1.7 km away) and Tell Ginidba (about 3.5 km away) (Chłodnicki *et al.* 1992; van den Brink 1993: 294, tab. 3). One of the most important reasons for the development such a dense settlement network were the ancient Tanitic branch of the Nile and its distributaries flowing through this area as well as the important trade route from Egypt to the northern Sinai and Palestine, crossing the northeastern Delta (Oren 1973; van den Brink 1993: 294-297; Jucha 2010b: 379). It is appeared that Tell el-Murra was one of the settlement that have benefited from these favorable conditions.

Tell el-Murra has remained virtually undisturbed with only certain sections having been levelled by agricultural activity. The main part of the mound still rises about 3-4 m above fields and only its fringes are situated on the field level. Probably because of barren character of its soil (in Arabic *murra* means "bitter"), the entire tell has not been taken by agriculture so far. The mound spreads about 250 m from north to south and about 180 m along its east-west axis, covering an area of approximately 4.5 ha (Fig. 2). In the course of research that has been continued since 2008 (Jucha 2009; 2010a; 2010b; Jucha and Buszek 2011; Jucha

Fig. 2. Tell el-Murra, view from the west. Photo: M. A. Jucha

et al. 2013; 2014; 2015; 2016; 2017; Jucha and Bąk-Pryc 2017), a few test trenches was founded in various parts of the mound: S1 in its northeastern part, S2 in its southern end, S3 in its southwestern part and S4 in its eastern part. It allowed to establish an overall chronology of the site.

First settlers at Tell el-Murra were connected to the Lower Egyptian Culture, the one which was widespread throughout the Nile Delta during the most part of the Predynastic period. So far, no traces attesting to the existence of the Naqada II remains have been found. However, already during Naqada III, which corresponds to the Protodynastic and Early Dynastic periods, larger part of the site was covered by the settlement. At that time, two zones can be distinguished on the site: the settlement in the northern and eastern parts of the mound and the cemetery in its southwestern area. With the end of the Early Dynastic period, populated and exploited area of the site decreased one more time. The Old Kingdom traces were revealed only in northern and eastern parts of the tell. By all indications, the settlement was abandoned after the 6th dynasty, at the end of the Old Kingdom, i.e. ca. 2200 BC (Jucha 2010a; 2010b; Jucha *et al.* 2013; 2015; 2016; 2017; Jucha and Bąk-Pryc 2017).

1. Old Kingdom architecture

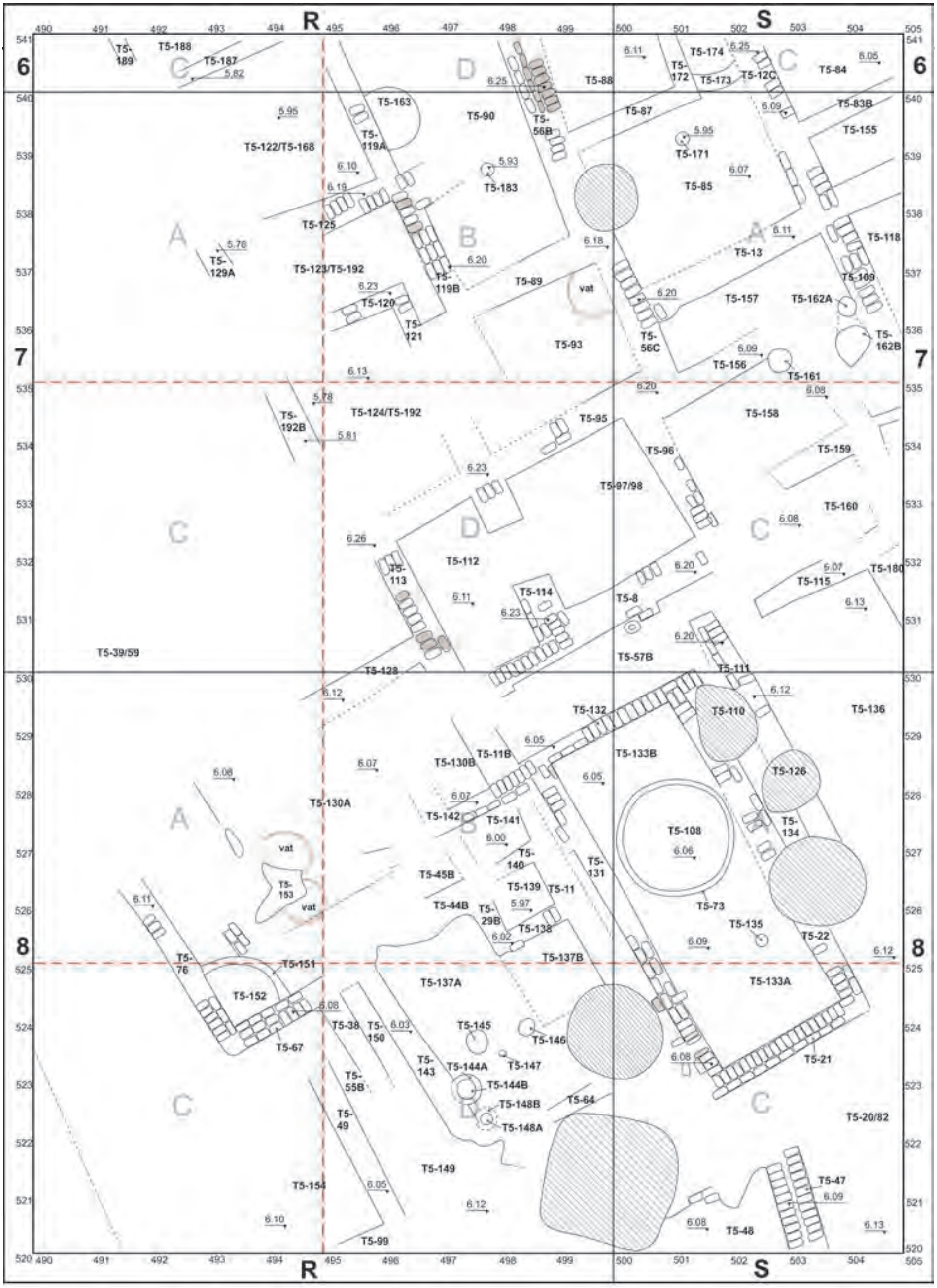
The Old Kingdom remains have been revealed within two test trenches: S1, explored in season 2010 (Jucha *et al.* 2013) and S4, explored in season 2011 (Jucha *et al.* 2014). However, the greatest part of the settlement architecture dated to that period was provided by works within trench T5. This trench is situated in the northeastern part of the tell, directly north of the former test trench S1. The work was already initiated there at the end of 2012 archaeological season but was restricted only to the area 10 m by 10 m (are R7) and exploration of the surface strata. Since the beginning of the subsequent 2013 season, the excavated area was enlarged to the dimensions 15 m by 21 m and the trench T5 included ares R7, R8, squares S7AC, S8AC and southern ends of squares R6CD and S6C (cf. Figs. 4 and 5). According to pottery assemblage collected during three seasons of excavations (2013-2015) two main chronological phases were recognized: the early Old Kingdom (mainly 3rd and 4th dynasties) and the late Old Kingdom (5th and 6th dynasties) (Kazimierczak 2016: 121-127). Several sub-phases were furthermore observed in the early Old Kingdom phase, basing on the observation of changes in the layout of buildings. There are remains related to the very end of the Early Dynastic or the very beginning of the Old Kingdom, slightly later relics

Fig. 3. Trench T5 with remains of the buildings dated to the 3rd-4th dynasties (photo: M. A. Jucha)

– probably dated to the beginning of the Old Kingdom (3^{rd} dynasty presumably) and, the latest among them, structures dated to the 3^{rd}-4^{th} dynasties. Contrary to that, the late Old Kingdom seems to be represented only by a single settlement phase.

The most complete and the best recognized are structures dated to the latest part of the early Old Kingdom (3^{rd}-4^{th} dynasties). Relics of at least one large building complex and fragments of two others located next to it occupies an area almost the entire size of trench (Fig. 3) at Levels 7-20 (altitude 7.00-5.70 m)[2]. Preliminary analysis of revealed structures allow to consider few rebuildings within the area (Fig. 4-6). Set of rectangular rooms, courtyards and corridors are oriented along the NW-SE axis. Walls (from around 0.15 up to 0.60 m wide) were constructed in quite a careful manner of mainly bright, sand tempered bricks of conventional size (ca. 12 – 15 by 25 – 30 cm), however mud bricks occurred as well. Mud plaster was covering the walls in at least few compartments. In some places, narrow

[2] All attitudes are in meters above sea level.



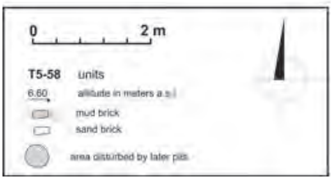


Fig. 4. Earlier stage of the 3rd-4th dynasty building complex

(ca. 7 – 10 cm wide) bricks were attested as well. These were probably ordinary bricks but laid on their sides. They may be used, at least in some cases, to construct brick thresholds. Furthermore, single examples of limestone threshold (Fig. 7a) and yoke (Fig. 7b) were also found. Poor preserved pieces of limestone, which were recognized all around the trench, may suggest that more stone elements have been originally used to complete the described structures.

The greater part of the trench was occupied by a one, quite vast building complex, which appeared to be reorganized two or three times. However, due to the continuous occupation of the area, the clear distinction between stages remains somewhat vague. The best preserved are the lowest relics of the building complex, corresponding to its earliest stage of occupation (Fig. 4). It was better recognized in the northern part of the trench, where structures where explored up to their bottom at the Levels 19-20. Southern part of the trench has been already explored only up to the Level 17, however it is possible to establish an overall plan of that part of the building complex. Set of small, rectangular to square compartments were located around three main rooms, some of which may be consider as courtyards (T5-85, T5-90, T5-133). In case of all of them, small postholes have suggested that some kind of a roof constructed possibly of light materials covered at least part of their area. Within the biggest compartment, a courtyard T5-133, located in the southern part of the building complex, an oval pit with mud encasement (T5-73/T5-108) was revealed. This structure might be connected to some storage function with grain as the most probable product to store. Nevertheless, its chronological association, at the present stage of research, is not yet obvious. Some evidences may indicate that it supposed to be rather related to the later stage of the building complex (cf. T5-73 within courtyard T5-32, Fig. 5). West of the courtyard, there were two small compartments (T5-141 and T5-139) and one bigger, located further south (T5-137A/T5-137B). Within the latter space, traces of a few small, rounded structures (T5-144A/T5-144B, T5-145, T5-146, T5-147, T5-148A/T5-148B) were revealed. Some of them could have been a kind of mud supports for vessels put into them. At least one (T5-147) should be rather recognized as relic of the posthole. It may suggest that the area was also partially covered up with a roof constructed possibly of light materials. North of the courtyard T5-133 there was a small, narrow room (T5-57B). Further north of it, there was set of rooms that have surrounded possible courtyards T5-90 and T5-85. In one of the compartments (units T5-97/98) a large amount of burnt earth, ashes and pieces of pottery (mainly bread moulds) have been revealed. Since no traces of burning have been visible outside the room, these traces may be combined with

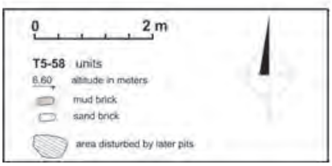


Fig. 5. Later stage of the 3rd-4th dynasty building complex

some cooking activity in the compartment. The other rooms are more difficult for interpretation, however the range of the findings (see below) may suggested the other economic activities.

The traces indicating a reorganization within the building complex were revealed above Levels 15-16 (6.20 – 6.10 m), however its general layout has not been changed. The range of a potential rebuildings that have occurred in structures located in the northern part of the trench are difficult to recognize due to their bad state of preservation. Western part of the complex (squares R7AC, R8A) was completely vanished (Fig. 5). Within its central part (squares R7D and

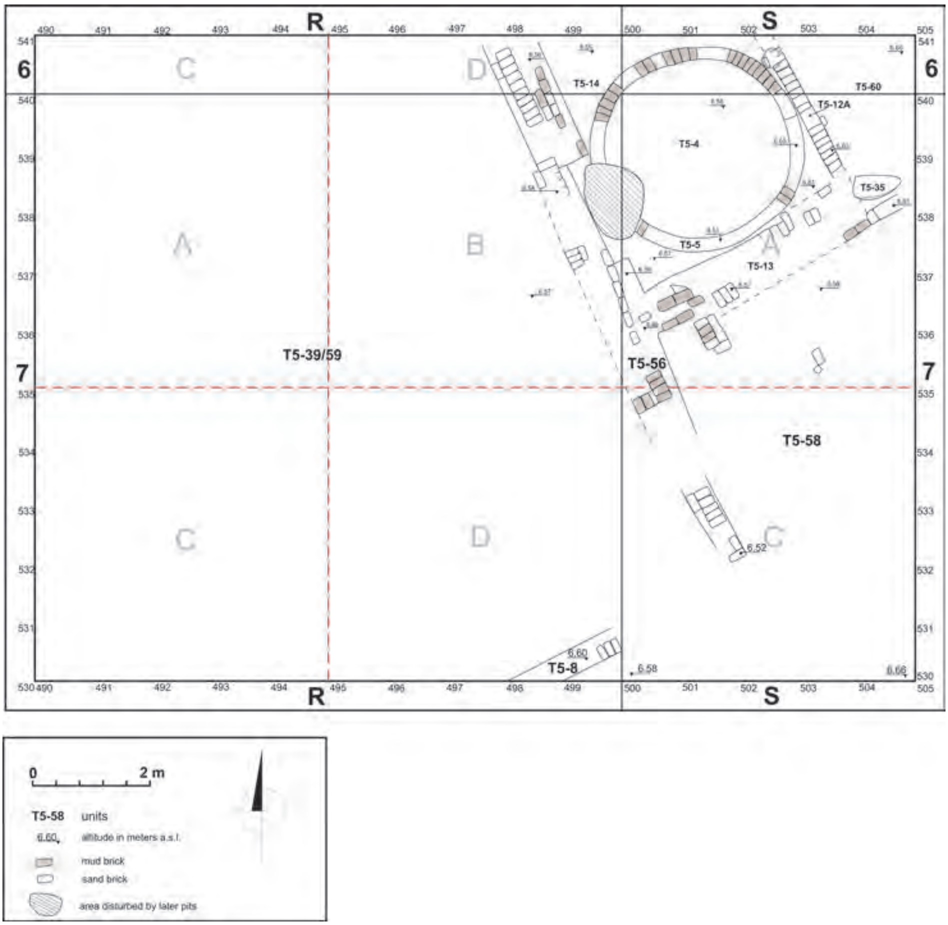


Fig. 6. The latest rebuildings within northern part of the 3rd-4th dynasty building complex

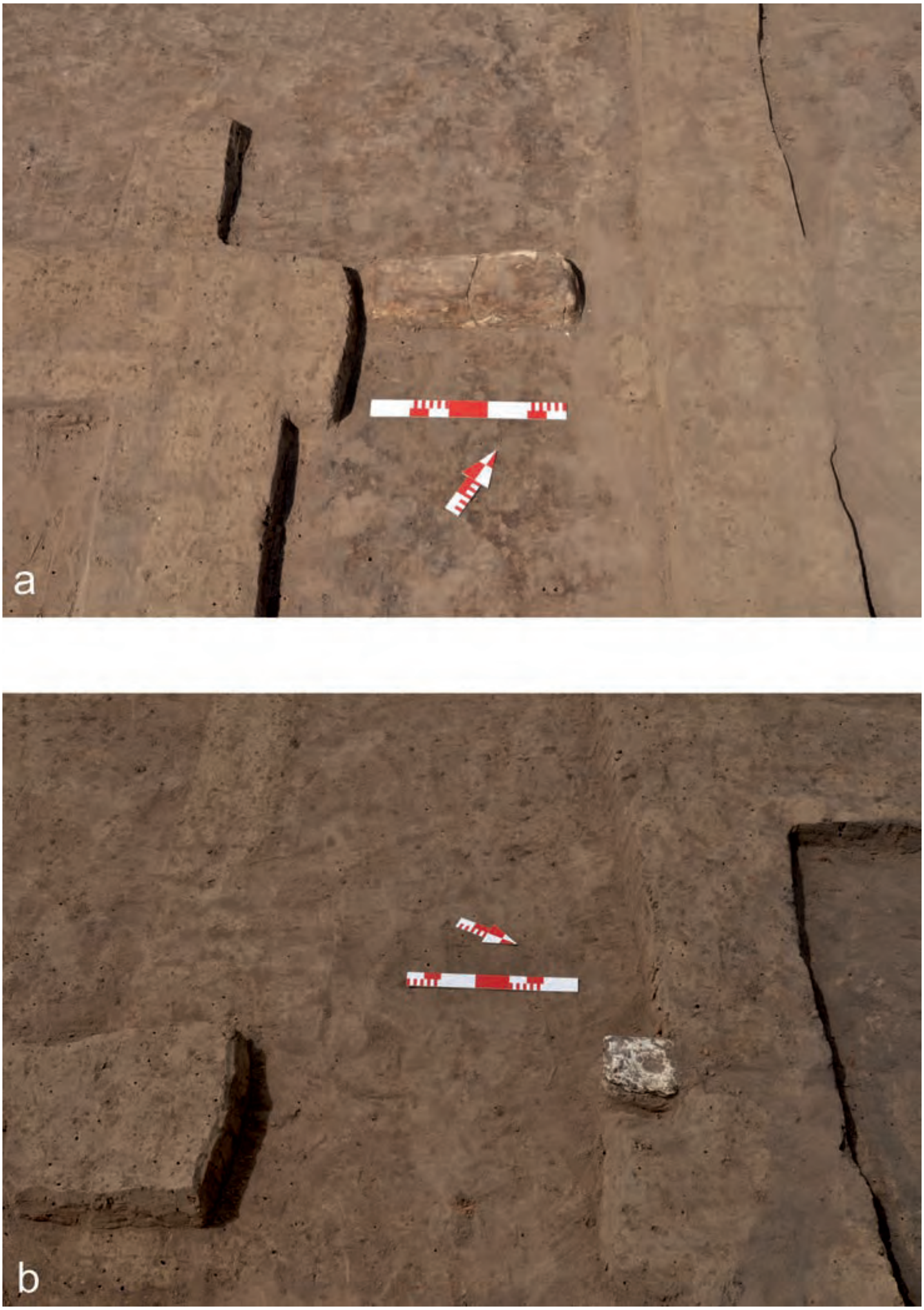


Fig. 7. A) Limestone threshold from the later stage of the building complex; B) Limestone yoke from the earlier stage of the building complex (photo: M. A. Jucha)

S7C), east of the room T5-97/T5-98, a single space disturbed by animal holes have occurred (T5-58). Only small rebuilding was attested also further north, where probable courtyard T5-85 has come with a new access from the north-east (T5-85A). Definitely, more of the alterations might be seen in the better preserved, southern part of the building complex. The main feature at the later stage of occupation is about 6 m long corridor (T5-40D), disturbed at its southeastern end by the late Old Kingdom pit. The corridor is approached from the north-west by a doorway with limestone threshold, which might be a main entrance to this part of the building complex that time. North-east of it, there is a large, rectangular courtyard (T5-32/T5-57) with big mudbrick silo located at its northern end (T5-17/26). South-west of the corridor, there is a rectangular compartment (T5-43) with layers of burnt soil and shallow pits filled by ash (T5-102A/T5-102B) located along its south-western wall. At least one access to the room was recognized as leading from the north by a small corridor T5-45. This approach was probably somehow related to the western, currently vanished, part of the building complex.

The last reorganization was revealed only within the northern part of the complex, at Level 11 (6.60 m). Fragment of the rectangular courtyard T5-14, with large silo (T5-5) situated at its southern end, was discovered directly above the room (or possible small courtyard) T5-85 (Fig. 6). The area south and west of this younger courtyard was heavily destroyed by animal burrows. Due to that, there is no possibility to recognize if the layout of these parts of the complex was rebuilt as well. On the other hand, it is appeared that southern part of the structure was used without major changes until the end of the existence of the entire building complex.

The southern fringe of the trench T5, at least at Levels 12-17 (altitude 6.50-6.00 m), was occupied by structures which were separated from the large building complex described above by a kind of narrow lanes (Fig. 5). Their walls were oriented on the axis slightly shifted to the east with respect to the above-mentioned structures. Among them, fragment of a possible building (walls T5-66, T5-49 and T5-99) located in the southwestern part of the trench T5 was recognized in a very limited way. A section of the building in the southeastern part of the trench was better preserved. Two walls (T5-46 and T5-47) formed a corner, probably of a room (T5-48), which continued to the south under the unexplored area and might be somehow related to the structures discovered within test trench S1 (Jucha *et al.* 2013).

2. Preliminary interpretations

Among 3rd-4th dynasty structures, that were discovered so far within trench T5, the best recognized is layout of the largest building complex (cf. Fig. 4 and Fig. 5). It is appeared to be designed as an actual multiplication of the basic elements occurring within the Egyptian houses: the courtyard or main room, adjoining by smaller compartments that might surrounded it from all sides (cf. Roik 1988: Abb. 3-4; Ziermann 2003: Abb. 32; Kemp 2006: il. 77). At this moment of research, there is some ambiguity which concerns the exact relationships between individual compartments and passages. Were they create the same, large edifice or are part of several adjacent buildings? Currently, the most likely is appeared to be the first of these interpretations. The significant is, however, the size of the complex: its remains during the earlier stage occupied an area up to about 209 m^2 (cf. Fig. 4). Moreover, since structures are continued further to the north and east into the unexcavated parts of the tell, the actual area of the building complex seems to be even larger. For comparison, the excavated part of the 4th dynasty Royal Administrative Building in Heit el-Gurob at Giza Plateau occupied an area of larger than 1300 m^2 (Lehner 2015: Fig. 2), the standarize priest house in the neighboring cult complex of Queen Khentkaues had about 180 m^2 (Hassan 1943: il. 1) and a typical Old Kingdom two-story house at Elephantine – about 60 m^2 (Ziermann 2003: Abb. 32). According to that, if Tell el-Murra building complex is part of a single edifice, it is appeared to be something more than an ordinary private estate. However, its precise function and the role that it played within the settlement may be recognized so far only in a limited way.

Undoubtedly, the large building complex and adjacent remains of other buildings were associated with various economic activities, what was confirmed by the nature of the revealed structures as well as associated findings. At least two or three silos located within rectangular courtyards attested that grain was stored inside it. Two openings that have been visible in the bottom parts of one of the silos (T5-17/26, Fig. 5) allow to recognize it as the most popular type of the Old Kingdom granary (Badawy 1954: 58-59). The function of the grain storing might be also related to a pit lined with mud (T5-73/T5-108) that was located within one of the courtyards (cf. T5-133, Fig. 4). Similar structures discovered recently in Edfu have been already recognized as kinds of grain containers (Moeller and Marouard 2012-2013: 116). A number of mill-stones and grinders, which were discovered within some compartments, provided evidence that grain had been milled into flour already there as well.

A considerable amount of pottery have attested that various food products might be stored and processing in the area (Kazimierczak 2016: 123-127). There are for instance Meidum bowls (Kazimierczak 2014) and beer jars, which may indicated on some liquid and semi-liquid meals (cf. Hendrickx *et al.* 2002: 278ff). The most common forms were, however, bread moulds. They were related, among others, to the layers of ashes and pits of strongly burnt soil that were revealed within few compartments. These may suggest baking activities that could have been undertaken in some of the rooms of the Tell el-Murra buildings complex, i.e. units. T5-43 (layers of ash T5-36, T5-102A/T5102B), T5-48 and T5-97/98 (Fig. 4-5). A good reference for them are similar remains that have been recognized in Heit el-Gurob at Giza Plateau (Lehner 1992: Fig. 8; 2002: 57 ff). Quite small, rectangular rooms with rows of shallow ash pits along one of its wall have been already identified as bakeries.

Another category of finds that occurred in large quantity within almost all compartments were flints. These included mostly sickle blades but also several knives and their fragments were attested. Besides an amount of stone flakes revealed in some rooms, at least one knife made of stone was confirmed as well. In addition to the findings attesting the most common economic activities, some number of personal adornments were discovered within the buildings remains. There are a few faience and bone beads, two fragments of stone bracelets and two copper pins, were noted as well. Interesting findings were also small examples of arts. There are: a faience head of a baboon, a frog made of bone as well as a fragmentarily preserved clay figurine of a pregnant woman, with the sexual characteristics marked by dots within the frame made by an incised line (Jucha *et al.* 2016: Figs. 31-33). The way in which it was marked clearly refers to similar finds dated from the Predynastic to the Early Dynastic and the Old Kingdom periods in Egypt (cf. Kemp 2006: 113-142).

Unfortunately, no epigraphic material was found at the site so far and the ancient name as well as more detailed history of the settlement located at Tell el-Murra is not known. Based on its size and location in the northeastern Nile Delta, Tell el-Murra might be just one of the many others settlements flourished within this densely populated area during the Predynastic period. Its development was continued during the Early Dynastic period and probably the entire area of the site was inhabited then (see above). It is appeared that the settlement was diminished in size at the beginning of the Old Kingdom, however, the it was continued to exist until the end of the III millenium BC (Jucha and Bąk-Pryc, forthcoming). During the 3rd and 4th dynasties, settlement at Tell el-Murra was an integral part of the national economy system. Agriculture was the primary sector of it and the period of the Old Kingdom was not an exception to this rule. Crops was the main currency in which taxes were collected and then forwarded to the state administration's agents. Moreover, it was the Nile Delta that has been perceived then as a major reservoir of agricultural products during the period. In this case, there is no surprise that the vast majority of the archaeological remains in exposed part of Tell el-Murra settlement was related to the crops storage and their later processing.

The nature of the large building complex and accompanying findings indicate that links between the settlement and the outer world were not just confined for paying taxes. Tell el-Murra was not self-sufficient settlement and some products and resources had to be provided from the outside. Therefore, there had to be an adequate surplus to provide trade exchange to the other parts of the country. The important evidence for the existence of such an exchange is limestone occurring at the site, for which the nearest sources are located beyond the Nile Delta. Its intentional transfer to the small settlement in the northeastern Nile Delta had to be cost-effective to be able to exist. It also applied to the other products and raw materials commonly attested at the site, for example flints and small sandstones as well as – more scarce – copper. The possible existence of a production zone, associated with the manufacture of tools made of these materials, remains an open question. It might be located in the unexcavated part of the settlement.

Excavations at Tell el-Murra have already provided the unique possibility to recognize the Old Kingdom provincial settlement in the Nile Delta. Thanks to the current research, we have obtained first data for its chronology, layout and architecture, as well as first insights into upcountry economy during the age of pyramids. Works in the area of trench T5 have not provided until now any traces of more residential rooms or compartments and we can only assumed that they had to be located in the unexcavated part of the tell. Due to the thickness of the walls, their possible presence at the upper floor is appeared to be precluded. In this case, the 3rd-4th dynasty building complex is appeared to be purely an economic area within a bigger layout, mansion presumable. The issue of its possible connection with a regular settlement buildings or some kind of estate remains open. The lack of the epigraphic material as well as still ongoing analysis of the revealed material do not allow at the moment to precise the identification. On the basis of the scale of the explored structures as well as their quality, such a mansion may be assumed as an important element of the Old Kingdom settlement landscape at Tell el-Murra. However, only further works and extension of the excavations to other parts of the site may complement our knowledge about the functions of the settlement during the 3rd and 4th dynasties.

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Desert and the Nile.
Prehistory of the Nile Basin and the Sahara.
Papers in honour of Fred Wendorf
Studies in African Archaeology 15
Poznań Archaeological Museum 2018

Marek Chłodnicki and Krzysztof Grzymski

Kerma Culture in Letti Basin (Dongola Reach)

Letti Basin is located between the Third and the Fourth Nile Cataract in the so called Dongola Reach (Fig. 1). This fertile land was a perfect place for settlement since Palaeolithic times. Middle and Late Palaeolithic, Neolithic, Napatan, Meroitic, Post-Meroitic and especially Christian sites were identified there. It was only in the 1980s that the traces of the Kerma culture were also discovered in the area.

For the long time the southernmost known site of the Kerma Culture was Bugdumbush, to the north of the Letti Basin (Gratien 1978: 21). Although now we know that the Kingdom of Kerma extended further up the Nile beyond the 4th cataract our knowledge of what was going on in the 20 km long Letti Basin during the Kerma period was very limited. Similar situation exists around the Old Dongola, south of the Letti Basin. When compared to the finds from the Kerma Basin to the north and to those from the area between Karima and Abu Hamed further upstream, the material from the Letti Basin is very scant (Gratien 1978; Welsby 2003; Chłodnicki 2007; Osypiński 2007).

The present publication was provoked by a discussion during the Nubian Conference in Neuchâtel, September 2015, when the subject of the Kerma culture was brought up with suggestions that we know nothing about this culture in the Letti Basin. In fact, this is not the case, although our knowledge is admittedly very limited. The presence of the Kerma material in the region was known since the 1970. It was known mostly from the surface collection although one site has been exca-

Fig. 1. Location of the Kerma sites in Letti Basin

vated but, unfortunately, the results have not been published. Additionally, when these finds were briefly mentioned they did not attract much attention because they were published in a journal not commonly read by the nubiologists (Kobusiewicz and Krzyżaniak 1975). The site in question was Kadakol where in 1970 Lech Krzyżaniak, member of the Polish Archaeological Mission of Old Dongola made some prehistoric research.

Kadakol, site 1 was located on the mound rising about 3 m above a flat terrain measuring about 200 x 250 m. The materials were scattered over the whole mound but it was decided to demarcate 17 squares 5x5 m arranged into 2 connected strips. The material was systematically collected within the squares. From the surface of 425 sq meters, a collection of several hundreds of potsherds and over one thousand stone pieces was obtained (Kobusiewicz and Krzyżaniak 1975: 181, fig. 2).

The material used for the production of the implements was mostly quartz (73%), but chert was also popular (25%). Some artifacts were made of agate (1%) and fossil wood (0,2%). Different types of cores and implements were identified in the collection: groovers made of chert and quartz, notches, toothed implements, massive retouched flakes, small retouched blade-like flakes, flakes with natural back, one point of Qadan type, two segments made of sandstone and chert, and an arrowhead. However, 95% of the collection was a debitage. The stone and flint material is characterized by an exclusively chipping technique, a general degeneration of the flint working technique and a predominant percentage of quartz used as a raw material (Kobusiewicz and Krzyżaniak 1975: 182-185, fig. 5-6).

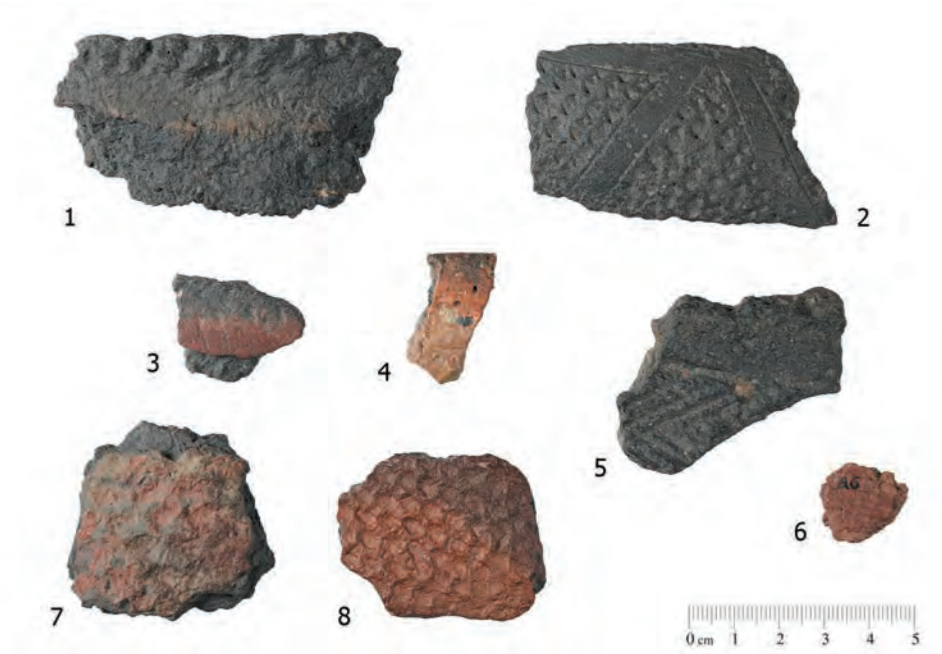

Fig. 2. Pottery from the Kadakol 1 (Bugbugakutti) (photo: P. Silska)

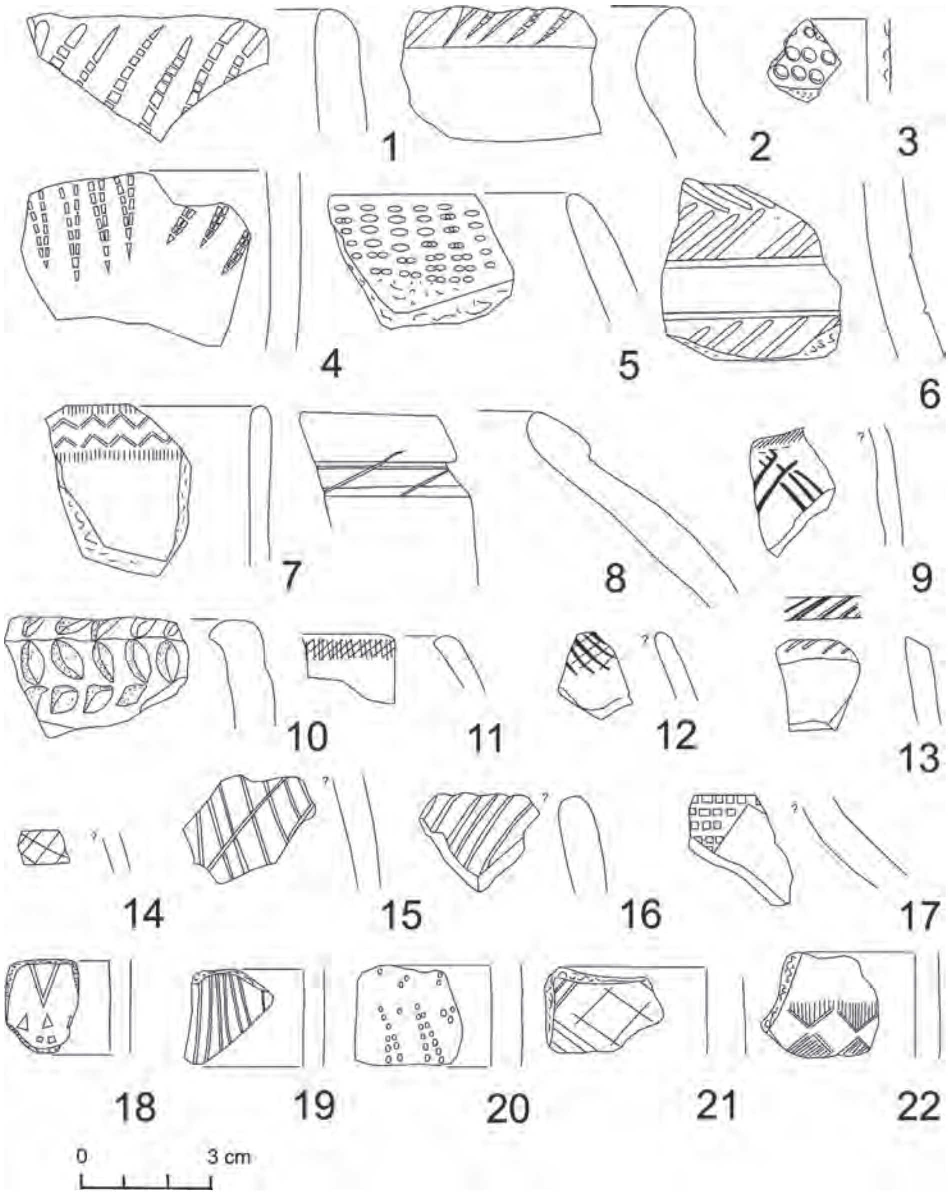

Fig. 3. Pottery from the ROM survey. 1-7. ROM 29 (1-2 – after Gratien 1994, fig. 1); 8-9 ROM 54 (after Gratien 1994, fig. 5), 10-22 ROM 79 (10-17 after Gratien 1994, fig. 2-4) (other drawings M. Chłodnicki)

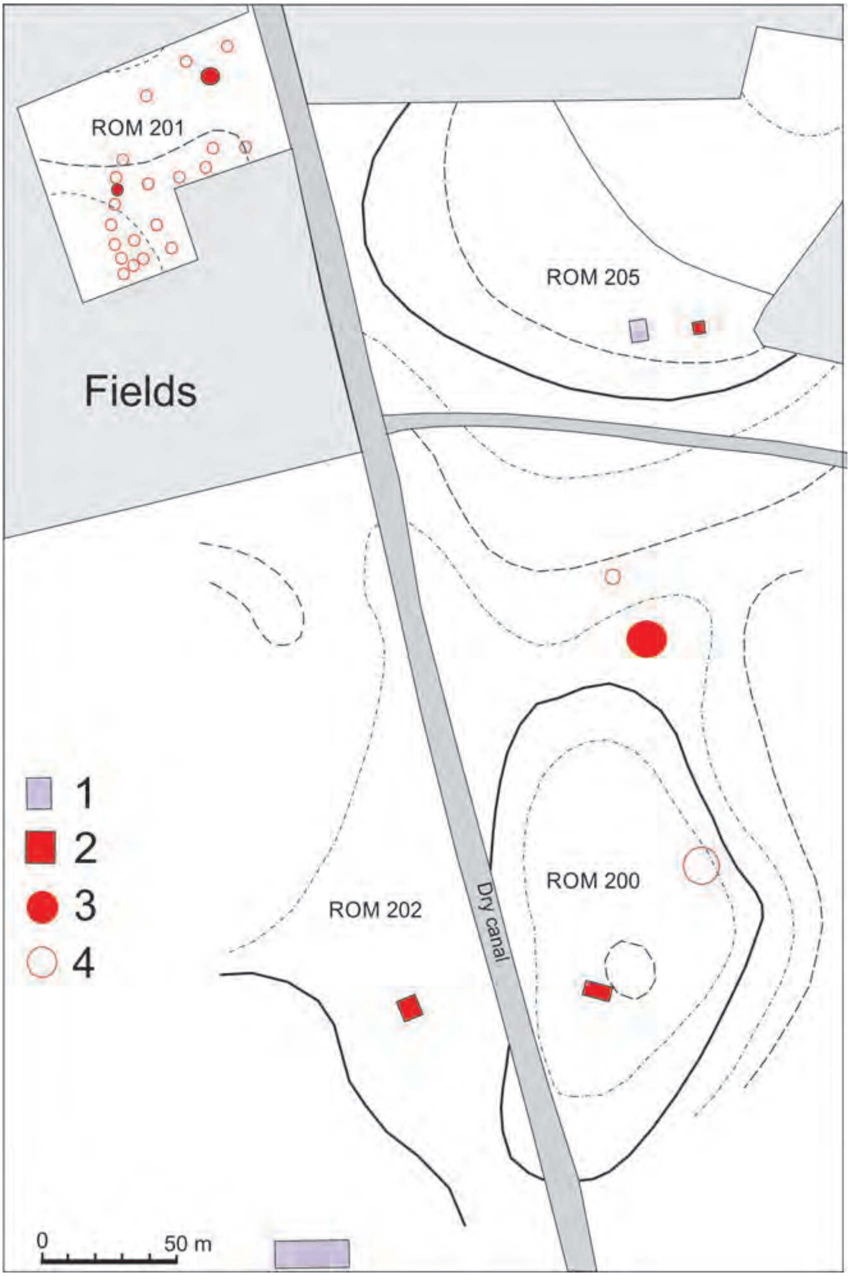

Fig. 4. Location of the sites ROM 200-205. 1 – buildings, 2 – archaeological trenches, 3 – excavated tumuli, 4 – other tumuli

Stone grinder and pottery were also collected from the investigated squares. The pottery was heavily eroded; the drawings and photos of a few sherds were published. The pottery was made of clay strongly mixed with chaff and sand temper. Material comes from the big pots, sometimes decorated with impressed patterns, mostly (90%) of the so called basket impressions. Sometimes red slip is preserved on the surface (Kobusiewicz and Krzyżaniak 1975: 181-182, fig. 3-4).

At the time of the publication the authors had problems with identifying the cultural affiliation of the Kadakol material. Firstly, it was not clear if it was a single or multi-phase settlement, and the secondly, there were no distinct parallels to it except for some slight affinities to the Cataract Tradition and the Abka industry. Lech Krzyżaniak noticed some similarity to the Kerma culture but was very careful not to say more about the chronological framework of the site. He described the site as a camp of the group of population living off fishing and hunting, dated between 2700-1800 BC. We must remember that at that time the Kerma culture was known only to the north of the Letti Basin (Kobusiewicz and Krzyżaniak 1975: 185).

We can now say that the material is characteristic to the Kerma flint industry but after the visit the site in 2002 we are also sure that this is a multi-phase site. The pottery collected on site confirmed for us that material which could be dated to the Early and Middle Kerma was there as one element of a multicultural site. Fortunately, part of material collected by Lech Krzyżaniak was stored in the Poznań Archaeological Museum. In this sample we also found small pieces decorated with zigzag made with rocker technique and a fragment of the vessel with black top (Fig. 2: 3-4).

Brigitte Gratien in her monograph of the Kerma culture, mentioned a wide tumuli cemetery dated to Kerma classic located in Bugdumbush, to the north of Letti, as the southernmost known site if that culture (Gratien 1978: 21). It is probably the same site discovered by Millet and Mills in 1978 in Zereib, north of Bugdumbush where they noted over a thousand graves with stone and bone fragments, and Kerma sherds scattered around (Grzymski 1987: 30).

In 1985 the expedition of Royal Ontario Museum, directed by Krzysztof Grzymski began the systematic investigation of the Letti Basin. Already in his first report Grzymski stated that:

„From the scholarly point of view perhaps the most interesting discovery was the existence of a number of Kerma sites in the Letti area. These are the most southerly sites presently known and further research is certainly worthwhile. We did not have the resources nor the time to excavate any of the Kerma sites, but we certainly hope that this will be done in the near future" (Grzymski 1985: 39).

Unfortunately no photos or drawings of the material were published at the time but some of the potsherds discovered by the Canadian team were later published by Brigitte Gratien (1994: 68-71) (Fig. 3:1-2, 8-17).

The number of the discovered Kerma sites in the Kerma Basin is not large but they show a potential of this area. Among the sites it is necessary to mention:

ROM 29. Bugbugakutti, District Kadakol. In this small roundish mound, material which was preliminary dated to Early Nubian (Grzymski 1987: 25) was found. Among the pottery fragments with the comb and mat impressions and fragments of tulip beakers, fragments made of pink or orange paste of Egyptian tradition what was frequent in Kerma (Gratien 1994: 68-69, Fig. 1) (Fig. 3:1-7) were also found. This is the same site described by L. Krzyżaniak and M. Kobusiewicz as Kadakol 1.

ROM 54. Kadakol-Teraza. District Kadakol. K. Grzymski during his first survey thought that it is the same site as Kadakol 1 published by Kobusiewicz and Krzyżaniak (Grzymski 1987: 25-26). It later became apparent that Kadakol 1 is to be identified with ROM 29, because the site of Kadakol (Teraza) has quite different appearance from the Kadakol described by the Polish archaeologists. Moreover, most of the pottery was dated to the Christian period and only a few could be identified as Kerma Classic. Fragment of the rim of fine ware with black paste and orange exterior as well as rims with simple geometric decoration were also found (Gratien 1978: 69, Fig. 5) (Fig. 3: 8-9).

ROM 55, Arab Hag El Madrasa. District Arab Hag. Unidentified bricks and stone slabs, possibly pre-Christian were discovered there. The exact dating of the site was not certain, but hand made mat-impressed pottery, possibly be Neolithic or early Nubian (Grzymski 1987: 26) were found.

ROM 60, Sections, basin 3. The site is located between the sand dunes on the west side of Khor Letti and east of Kadakol. A scatter of pottery fragments and chert flakes. There he found clearly Kerma potsherds (Grzymski 1987: 23).

ROM 61, Section 2, basin 5. The site is located on two low mounds on the edge of cultivation on the west side of Khor Letti across the desert from Kadakol. The diagnostic potsherds included Kerma (Grzymski 1987: 22-23).

ROM 79. Barakol. Section 1, Basin 3. The site was located to the east of Amentego. A scatter of lithics and hand made potsherds spread over the rather flat area right on the edge of cultivation was found (Grzymski 1987: 23, Pl. 3b). Grzymski proposed identified this site as early Nubian and Kerma. Pottery analysis by Brigitte Gratien confirmed that the pottery could be dated from the Ancient to Classic Kerma. Between the pots, pottery fragments with incised criss-cross

Fig.5. Stone structures on the site ROM 202

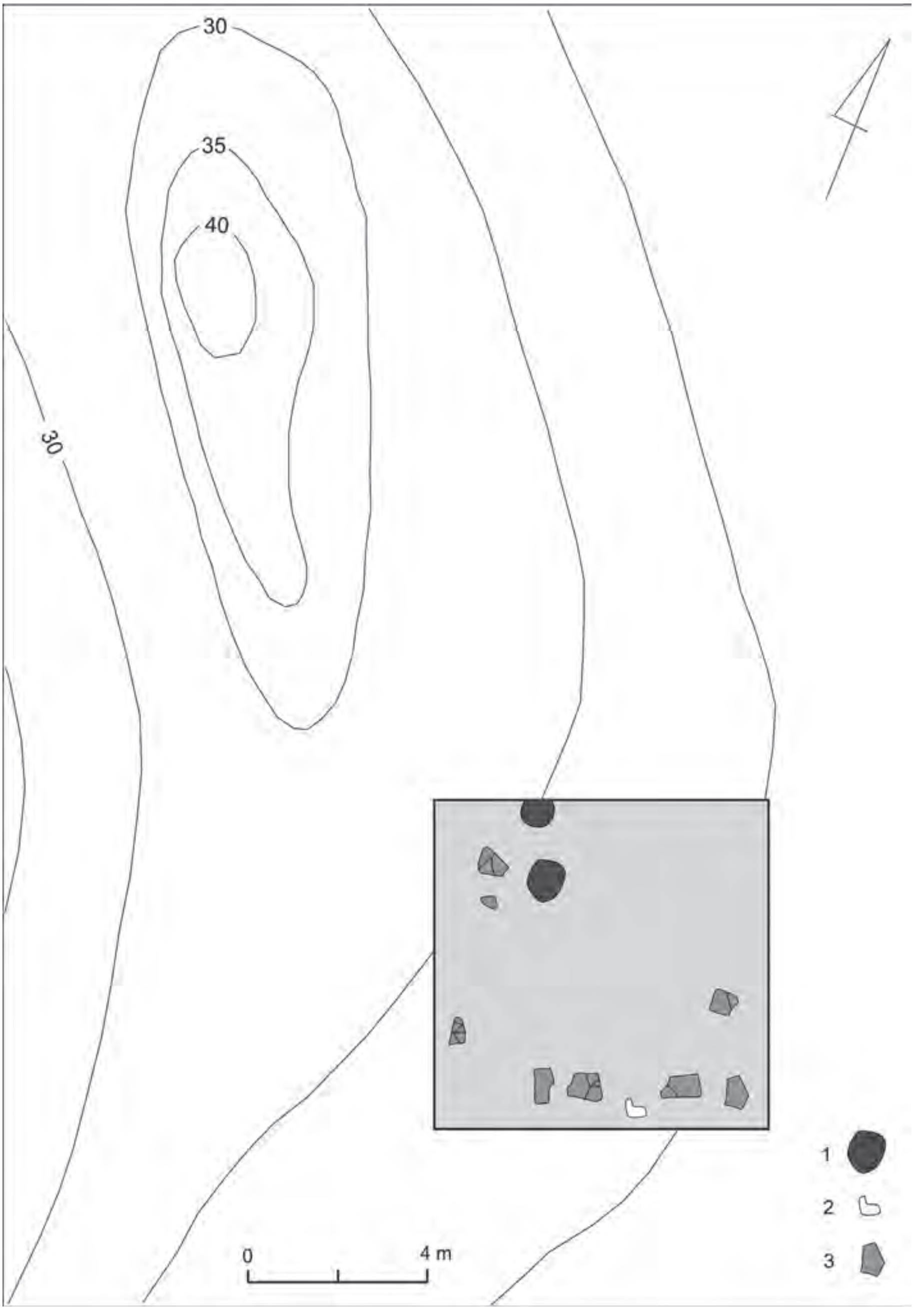

Fig. 6. Plan of the stone structures on the site ROM 202. 1 – fireplaces, 2 – remains of a plaster, 3 – stone blocks

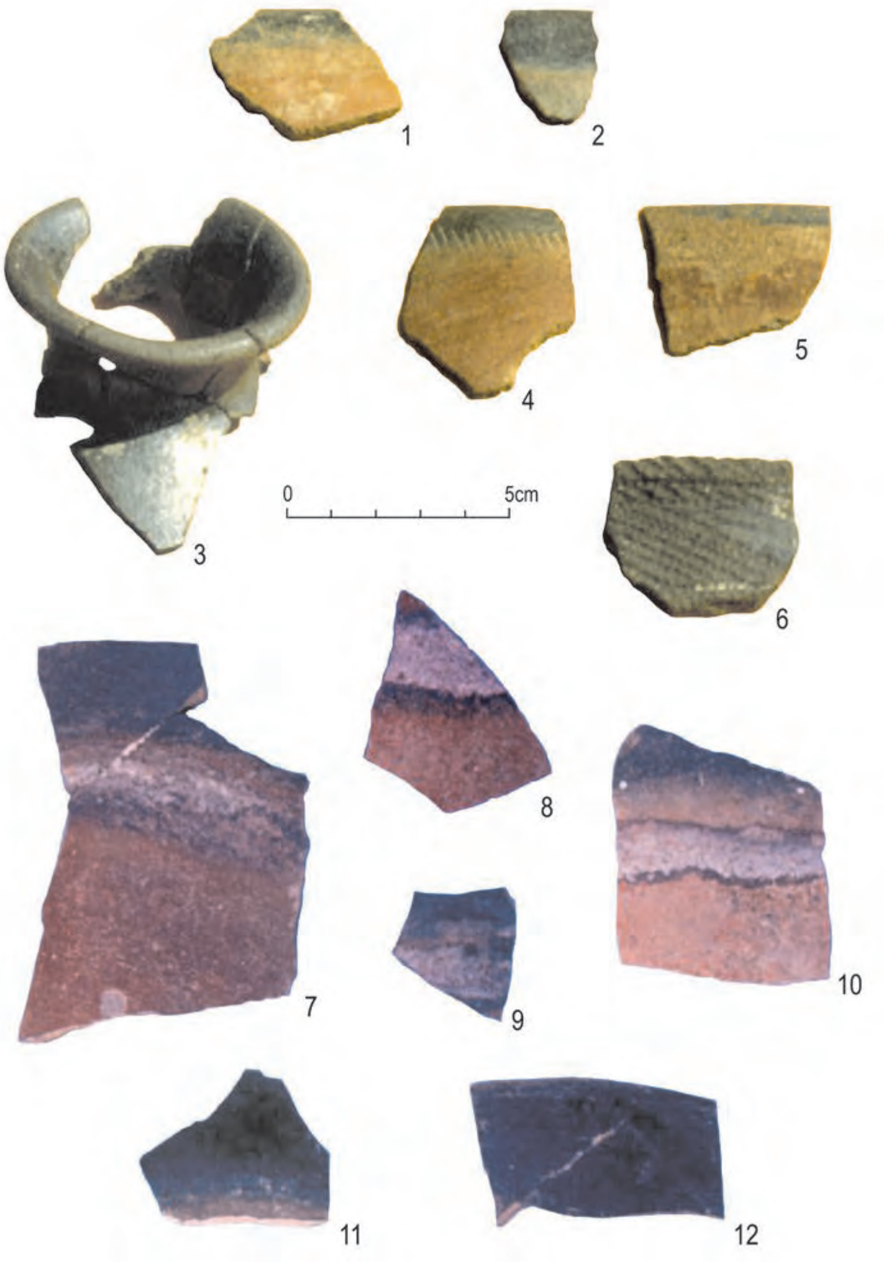

Fig. 7. Pottery from the site ROM 202 (photo: M. Chłodnicki)

lines, rim decorated with oblique incisions as well as with geometric decoration and mat impressions were found. Fragments of fine polished beakers were also collected (Gratien 1994: 69, fig. 2-4) (Fig. 3: 10-17). Some more potsherds were collected during the survey in 1998 (Fig. 3: 18-22).

ROM 80. Gerf el-Melik North, located north of Letti Basin, 2 km east of the Nile in the rocky desert near the lorry tracks. The site comprises up to 80 grave mounds of two types: 1 – conical pebble-covered mounds 3-4 m in diameter and 2 – mounds with the stone ring on top and usually a depression in the center, 6-8 m in diameter. Perhaps it dates to the Kerma period (Grzymski 1987: 29).

When in 1995 the Royal Ontario Museum team, comprising also archaeologists from Poznan, started again a survey in the Letti Basin, the work was concentrated in its the southern part. Especially interesting was the area located between the newly constructed suq and a new school in Ghaddar. In this area we found remains of a Neolithic settlement (Chłodnicki and Kabaciński 2003: 57-62) as well as a group of cemeteries consisting of almost flat tumuli of different sizes and construction. Some of the tombs were excavated but, unfortunately, all of them were robbed. Some of them, because of the construction method and position of the body, were clearly of a later date, but several seem to belong to the Kerma culture, especially those found at site ROM 201 (Fig. 4).

During the research we paid attention to a group of stones lying on the truck route. Around them flints and pottery sherds were scattered and fragments of Kerma classic black-topped beakers were found among the potsherds. This site was marked as ROM 202.

Small trench, 7x7m covering all stone blocks visible on the surface was opened. All stones are flat and carry signs of cutting to achieve a flat top surface (Fig. 5-6). The thickness of the blocks did not exceed 20 cm. The blocks were placed in the silt and the cultural debris not exceeded 10 to 12 cm. We discovered traces of the fireplaces and charcoal between the blocks, but not necessarily connected with the building. Remains of, most probably, a plaster could be of the Kerma chronology. Inside the construction a Post-Meroitic grave was dug.

From the trench almost 650 fragments of pottery were collected. 95 % of them were connected with the Kerma culture. Others are of the Neolithic, Post-Meroitic and Christian periods.

Almost a third of the material comes from the black-topped beakers. Similar quantity constitutes of red polished pottery decorated with comb impressions or brown pottery covered with incised lines. The smallest group, is pottery decorated with the mat or basket impressions (Fig. 7-8).

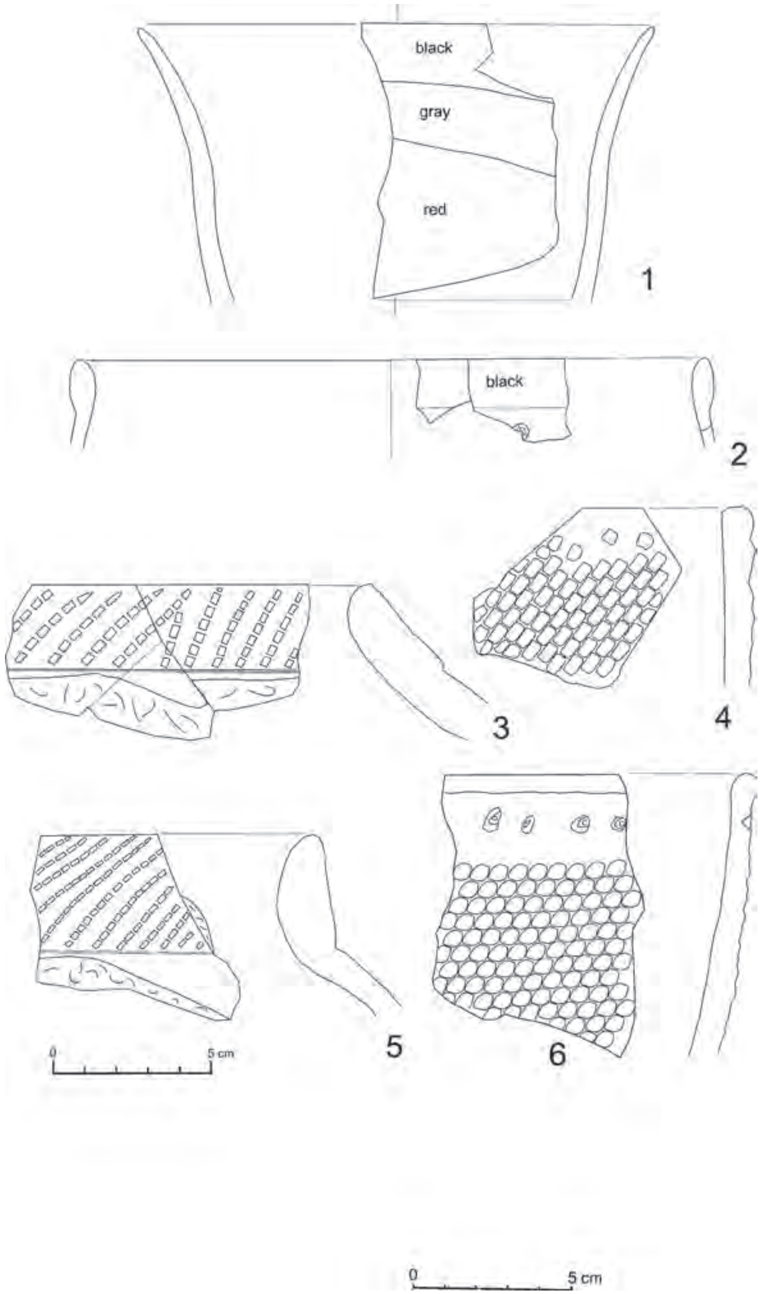

Fig. 8. Pottery from the site ROM 202 (drawings: M. Chłodnicki)

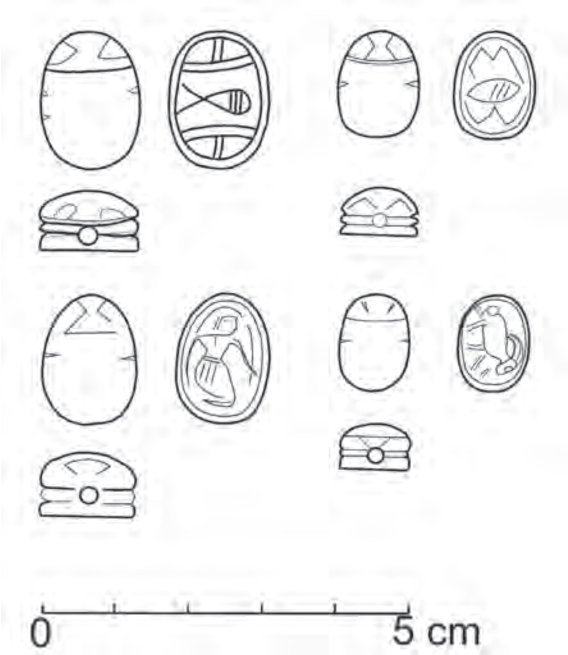

Fig. 9. Scarabs from the site ROM 202 (drawings: M. Chłodnicki)

Not only pottery was discovered. Among the stones we found a lip plug and beads made of ostrich egg shell, faience and rock crystal. Four faience scarabs are worth special attention (Fig. 9). Two are bigger and two smaller but all of them with the similar stylistic traits. Animals (gazelle, fish), humans, and signs resembling some hieroglyphs are depicted on them. All of them belong to the group of so called Hyxos scarabs dated do the 15th and 16th dynasty in Egypt, dated to about 1650-1540 BC, which corresponds well with the Classic phase of the Kerma culture (Śliwa 2003: 34-46). From and around the trench many flints were also collected[1]. Generally, from the typological point of view, the material is similar to that from Kadakol. The only difference is that the dominant raw material was chert.

We can now say that the Letti Basin was inhabited by the people of Kerma from the beginning of that culture. We can observe there the continuation from

[1] The stone material will be analized by Jacek Kabaciński

the pre-Kerma phase to its Classic phase. Most of the sites have been eroded (as were the Neolithic sites), or covered by the huge mounds with Christian period remains. There is still a chance, however, that better preserved sites will be found in the area, but it requires further long term works in the Letti Basin. It seems that it is only a matter of time when more sites will be discovered in the Letti Basin.

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Desert and the Nile.
Prehistory of the Nile Basin and the Sahara.
Papers in honour of Fred Wendorf
Studies in African Archaeology 15
Poznań Archaeological Museum 2018

Maira Torcia

Towards Upper Egypt: Items and Cultural Elements on Trade Routes

Since the prehistory, the exchanges of goods were the first, if not the only way to transfer culture. The presence of obsidian and lapis lazuli far from the sources is the evidence of the movements of goods since archaic periods. Ideas travelled together with raw materials and cultural elements were transferred through the handicrafts, testifying to the contacts between distant areas.

1. Handicrafts

Among the well-known objects and themes coming from Near East, we highlight the seals, symbol of power and accounting tool for leaders and officials: we can get information both from the materials they are made of and from their decorative patterns. They arrived in Egypt from Mesopotamia (Watrin 2004: 67-70; 2007: 20; Honoré 2007: 33-35) since Naqada IIb period, even if in sporadic way. They were probably used at the beginning, as ornaments or amulets[1]. At the end of Naqada II period, the *cretulae* made their appearance (Hartung 1998: 188-217), testifying, together with seals, that at last in Late Prehistoric period,

[1] An evidence of this could be the stamp seal from Mesopotamia, found in a tomb Naqada IIb at Naga ed-Der, inserted in a bracelet (Podzorski 1988: 262-263, fig. 3; Watrin 2004: 68-70).

control systems were carried out also in Egypt (Hartung 1996: 33). However, we shall bear in mind that the control systems were in use in Mesopotamia long time before: there, hundreds of seal impressions were found in the North, at Tell Sabi Abyiad, dating back to the 6th millennium (Akkermans and Duistermaat 1996: 17-44).

As for the *cretulae*, I had the chance to study, among other groups from Near Eastern sites[2], those from two settlements in Lower and Upper Egypt: Giza[3] and Hierakonpolis[4]. The imagery of the archaic seal impressions from both sites, suggests connections with the Near East because of some iconographic motifs, moreover arranged in rows (Amiet 1961: 27, Pl. 9, 171,

Pl. I

a

b

c

Fig. 1. a – the symbol of the goddess *Neith* combined with the toothed mouth (Z 46107); b – the *Neith* symbol and the bull with crescent horns (Z 45972); c – *Nekhbet* as a vulture (Z 45936).
Z – the materials from Hierakonpolis

[2] I have studied and partially published the *cretulae* from Uruk (Torcia Rigillo 1991a; Torcia 2009a), Tepe Gawra (Torcia Rigillo 1991b), Tell Brak and Susa.

[3] The *cretulae* from Giza (239 pieces) were excavated in '70ies by Austrian Archaeological Mission directed by K. Kromer (Kromer 1978: 93-99). This group comes from a site dated between the middle of Naqada II period and the Chefren kingdom (Kromer 1978: 70-73; 113-115). It includes seal impressions of the Pharaohs Cheops and Chefren (Kaplony 1981: 24-29; 67-95, Pl. 10-12, 23-31; Torcia Rigillo 2003: 36-73; 2007:1817-1826, Pl. 1-4; Torcia 2009b: 239-248, Pl. I-III; 2013: 219--243, Pl. I-V) and a group of 104 pieces with figurative imagery, that dates back to the archaic periods. Only drawings of 56 pieces were published (Kaplony 1981: Taf. 173-181).

[4] These sealings are conserved at Cambridge, Museum of Anthropology and Archaeology. I wish to thank here Ann Taylor, then Director of MAA, who allowed me to study them. I published part of them in 2013 (see note above).

173-176) or in superimposed registers (Amiet 1961: 16-17, 27, Pl. 10, 181-185, Pl.13, 224, 230, Pl. 41, 618-619; Tobler 1950: Pl. CLXVIII-CLXIX), all patterns frequently present in Mesopotamian glyptic. The impressions show a very interesting, figurative imagery, with animalistic and vegetal motifs, often combined with some isolated signs of writing or "proto-hieroglyphs" which seem to have only decorative purposes. Quibell made this same remark (Quibell and Green 1902: 55) looking at these signs impressed on the archaic materials that he discovered at Hierakonpolis.

The *cretulae* from Hierakonpolis, excavated at the end of XIX century, are nearly 300 pieces, part of which dating back to Pre – and Early Dynastic periods. Only 46 of them have been published (Quibell and Green 1902: 16-17, Pl. LXX--LXXI, 1-46). Even if the site of Hierakonpolis presented stratigraphic problems, it results from Quibell reports that part of the *cretulae* dates back to archaic periods, coming from areas with Pre – and Proto-dynastic materials, that is the Main Deposit (Quibell and Green 1902: 13-14, 33-34), a stratum close to the Temple entrance (Quibell and Green 1902: 2), the Northern Town Houses (Quibell and Green 1902: 18-19).

Among such interesting and peculiar patterns, we found elements and symbols referring to the religious sphere. We have entities as *3khw* (Helck and Otto 1975: 49-52), *b3w* (Helck 1954: 22; Helck and Otto 1975: 588-590); *k3* (Helck and Otto 1977: 275-282) and names of deities.

The symbol of the goddess *Neit*, the crossed arrows, is frequently found: it is combined with the reed or with the toothed mouth (Z 46107, Fig. 1a); in one case, with the bull with crescent horns, the *nṯr* and a standard (Z 45972, Fig. 1b): likely, here is represented a cult place[5]. This impression could be dated to the 1st Dynasty (Quibell and Green 1902: 55).

Nekhbet, the goddess of Upper Egypt, is represented as a vulture on a perch (Z 45936, Fig. 1c) and *M3't* through the goddess symbol (the ostrich feather).

But, above all, we need to mention here the presence of the symbol of the Sumerian goddess Inanna, impressed on a *cretula* from the Temple entrance (Fig. 2a).

The symbol of the mother-goddess Inanna in its origins is a pictogram reproducing the gateposts of the ancient reed huts in use in Sumer (Frankfort 1939: 15). We may compare the scene on our impression with the cult picture reproduced on a lapis lazuli seal from Uruk III-IVa (Fig. 2b) (Heinrich 1936: 9-10, 28-29, Taf. 17a;

[5] A *Neit* sacred place is reproduced on an ebony tablet from Abydos, with *Aha* (Aha) name (Petrie 1901: 21, Pl. IIIA, n. 5; Emery 1963: 51-52, fig.12) and a bull with crescent horns.

Amiet 1961: 30, Pl. 46, 655): the so-called "*hampes bouclées*", generally in couple (Amiet 1961: 78-79, Pl. 43, 636, 638), are represented, according to the Sumerian iconography, on a boat combined with goats, both being Sumerian motifs: the former indicates the way to transport the offerings to the goddess, the latter symbolizes the sacred herd[6]. But, on the left top of our impression, there is also a part of the Egyptian seal xtm; therefore this impression has been done with a seal made in Egypt, employing symbols borrowed from Sumer. We underline the great importance of the presence of Inanna symbol in the deep South of Egypt, a strong sign of contacts between these areas.

Another witness of these straight relations between Upper Egypt and Mesopotamia, but in opposite direction, is an even more astonishing terracotta cylinder (Fig. 2c), found at Uruk in '70ies (Nissen 1974: 40, Pl. 28h), bringing the name of the queen *Mr Neit* (mid 1st dynasty). On it, the hieroglyph *Mr* (the hoe) and the symbol of the goddess *Neit* were engraved after baking, together with other symbols as the rosette, symbol of power. The extraordinary fact is that the cylinder comes from Uruk, the centre of Mesopotamia where, until now, no Egyptian artefacts had ever been found. At the time of the discovery, Nissen wrote, about this piece coming from the debris dated to Sumerian Proto-Dynastic I period: "*Die Zeichen ergeben keinen Sinn*" (Nissen 1974: 40); the function of the object was not specified. Instead, we must suppose that it could be either a real cylinder seal with the name of the queen *Mr Neit*, entrusted to an official in charge of doing an exchange agreement or, more likely, a "message sealing" (Ratnagar 1981: 188 ff.) sent by the queen herself for accompanying goods and gifts, claiming some rare items – as we shall see later. Certainly the cylinder arrived from Upper Egypt to Uruk through trade routes. We may date the piece thanks to the name of *Mr-Neit*, the 5th queen of the 1st Dynasty (Khal 1994: 71). It is a good evidence that the mid 1st Dynasty in Egypt is nearly contemporary to the 1st Sumerian Proto-Dynastic period, as well as of the relations between the two areas.

Two other objects from Hierakonpolis may have been arrived from Mesopotamia: these are the *bullae*, peculiar of the Susian (Amiet 1972: 70, Pl. 66-68, 510, 540, 541, 649) and Sumerian areas (Lenzen 1965: 31-32, pl.17-19), highly significant in the course towards the cuneiform writing (Schmandt-Besserat 1980: 357-385). One of them is decorated with wavy lines (Z 46133,3, Fig. 2e), the other with two or three figures similar to fishes. The zoomorphic imagery at Hiera-

[6] On our impression, the goat has a long beard, just like that reproduced on a white stone seal, from Uruk III (Amiet 1961: 30, Pl. 43 , 636).

konpolis presents often fishes, also pinnate, a pattern common in Near East: the most ancient seals from Upper Egypt, coming from Near East, show fishes combined with "ovals" or nets as decorative elements (Wilkinson 2002: 241-242, figs. 5-6).

Lizard too is present both at Hierakonpolis (Fig. 3b) (Quibell-Green 1902: Pl. LXX, 40) and Giza (Fig. 3a) (Kaplony 1981: Taf. 181, 193).

At Giza – apart from proto-hieroglyphs – we have a vast imagery showing iconographic patterns, both naturalistic and stylized. There are a great number of zoomorphic motifs, arranged in different ways: animals in human attitude, as the two monkeys, compared to the same animal on a seal impression from the 1st Dynasty tomb of Hemaka, at Saqqara (Emery 1938: 64, fig. 26; Torcia 2013: tav. II a-b) – or as the varanus, combined with the head of *B3t* close to a baboon, similar to the figure on the Uruk IVa impression (Amiet 1961: 31, Pl. 13, 225; Torcia 2013: tav. I c-d)[7].

Comparisons with the archaic seal impressions from Abydos have also to be done since there are affinities with materials from Giza. At Abydos the most ancient findings come from four tombs dated to Naqada IId (U-127, 133, 134, 210) (Hartung 1998: 188-217): they pro-

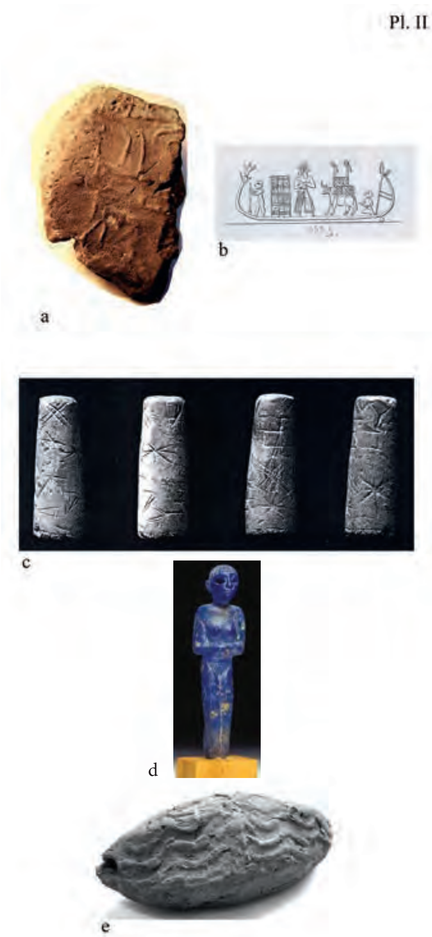

Fig. 2. a-b – the pictogram of the Sumerian goddess Inanna (Z 45981) and the lapislazuli seal impression from Uruk (after Amiet 1961); c – the terracotta cylinder with the name of the queen *Mr – Neith*, from Uruk (photo Nissen 1974); d – the lapis lazuli statuette from Hierakonpolis (Main Deposit); e – "*Bulle oblongue*" showing a wavy lines pattern (Z 46133,3).
Z – the materials from Hierakonpolis

[7] This piece comes from the White Temple, situated on the Anu Ziqqurat (Heinrich 1937: 29-53; Lenzen 1967: 10-12, Pl. 26).

Fig. 3. a-b – lizards coming from Giza (G 1421 J) and Hierakonpolis (Z 46104); c-d – superimposed caprids rows on G 1182, compared to the caprids from Abydos, tomb U-134; e-f – antelope head from Giza (G 1317 A) and a similar head on a seal impression from Abydos, tomb U-127. The letter G indicates the materials from Giza, the letter Z the materials from Hierakonpolis; d, f after Hartung 1998

vide a rich imagery on seal impressions, almost all from cylinders, with various, zoomorphic patterns, similar – in some cases – to those remarked on Giza *cretulae* (Hartung 1998: Abb. 5, 11; Abb. 3, 4) (Fig. 3c-d, e-f). This is the result of the trade relations between Lower and Upper Egypt that existed among the three towns of Giza, Hierakonpolis and Abydos, linked through the Nile. We know about these contacts, since, at the end of the second phase, Naqada culture moves from the Southern sites to the Delta, as pottery and other cultural elements testify (Watrin 2007: 27).

Among other patterns, we mention some of the so-called "proto-hieroglyphs": mouth (Fig. 4a), loaf (Fig. 4b), flowering reed (Fig. 4d), intertwined cord[8] and some others (Torcia 2013: 223, 230-232, tav. V d-l), often combined in specific way as mouth and loaves or birds and loaves; bird and mouth (Fig. 4c), gazelle and loaves (Fig. 4e). The geometric imagery includes the indented frame and lines arranged in group of four, maybe numerals (Torcia 2013, 230, Fig. 5a).

We underline the value of the presence of these elements in regard to the birth of writing in Egypt and to the eventual debt to Mesopotamia.

[8] The intertwined cord pictogram (H) is completely similar to the intertwined tails of the lionesses on seal impressions from Uruk and Susa (Torcia 2013: 232, tav. V d-e).

2. Trade

We specifically focus our interest on the movements of lapis lazuli and metals as copper and gold, even if there is a good deal of other interesting materials carried on trade routes.

Lapis lazuli, in Upper Egypt and in many other sites along the Nile, dates back at least to the Gerzean period (Bavay 1997: 81-82; Payne 1968). The source of this precious stone is very remote: Badakhshan, in Central Asia (Herrmann 1968: 22-28); nevertheless, the lapis travelled on trade routes since the prehistory. We find it in the North of Iraq, since the Ubayd period: at Tepe Gawra, the XIII level testifies to its presence (Bavay 1997: 94; Tobler 1950: 176, 192). Likely, lapis lazuli comes through the northern routes, touching sites in the Elburz region as Tepe Hissar and Tepe Giyan, where a good deal of this stone was found (Bavay 1997: 94-95).

At the end of the 4th millennium, the long distance trade was prevalently handled by Uruk, in the South, phase IVa. This phase corresponds in Egypt to Naqada IIc (Boehmer and Dreyer 1993: 63-68), when lapis lazuli findings are more numerous along the Nile (Payne 1968).

At Uruk, magnificent temples and palaces, richly decorated (Jordan 1931: 31-40), were built with precious, imported materials[9]: the intense movements of merchandises were made possible because of the presence of a centralized power and a good social and administrative organization. Documents show a very rich and articulate management of the different fields of activity of the ancient Sumerian society (Nissen *et al.* 1997: 292)[10].

Uruk, lacking in raw materials, began to manage exchanges very early, in Middle Uruk period (Watrin 2004: 56-63), so becoming the main source of demand. Manufactured items and raw materials were exchanged; Uruk sent handicrafts while raw or perishable materials arrived either from neighbouring or from far countries, Egypt among them. The lack of Egyptian items in Sumer could be explained just by the qualities of shipped merchandises (for instance textiles).

We believe that the two mentioned pieces (the *cretula* with Inanna symbol and the cylinder with *Mr-Neit* name) refer to direct exchanges between Sumer and Up-

9 The Steinstifttempel facades were decorated with cones made of imported stone as red sandstone, limestone and alabaster (Lenzen 1959: 13-16, 47, Taf. 20 a-b, Pl. 36-37); the "Riemchengebäude" (Lenzen 1958: 21-35, Taf. 9, 12) is rich in copper, gold and precious materials, decorating wooden furnitures (Lenzen 1959: 8-11). Huge blocks of fine limestone were used to build Eanna Temples and "Palast" (Lenzen 1968: 13-18, Taf.6 ff.; 1974: 14-18).

10 Nissen talks about 5000 documents dealing with administrative procedures coming from Uruk IVa/III.

Pl. IV

Fig. 4. A – the toothed mouths (Z 46108); b – loaves in opposite position (Z 45951); c – bird combined with mouth, a knotty arrow and four bars (G 940); d – flowering reed on G 1062; e – the crouched gazelle combined with loaves (G 1410 B). The letter G indicates the materials from Giza, the letter Z the materials from Hierakonpolis

per Egypt. Lapis lazuli could arrive directly in the South of Egypt, in the sphere of the long distance organized trade. This eventuality can be supported by the Mesopotamian cylinder seal, decorated with fish and net, found at Naga ed-Der, in a tomb Naqada IId (Podzorski 1988: 261), together with lapis beads and inlays (Kantor 1952: 245-246, Pl XXV B): these objects send us back to the Sumerian area. All the same, the lapis statuette of a praying woman (Fig. 2d) unearthed at Hierakonpolis (Main Deposit). It is 8.9 cm tall (the head was found later in the same context: Porada 1980: 175-176) and is described by Quibell as "similar to those of the Greek islands figures" (Quibell and Green 1902, 38, Pl. XVIII, 3). Actually, it is not in Egyptian style (Porada 1980: 178-179, Pl. I-II). In my opinion, on stylistic ground this object seems, in fact, manufactured in Near East or better in Mesopotamia, following the orants fixed standards: the devotion attitude with joined hands, the nudity, the great orbital cavities, likely to be filled, the dotted pubic zone, some of these going back even to the Ubayd period. Likely, this fine fashioned statuette is the product of the high specialized Mesopotamian handicraft, just as the well-known woman's head from Uruk IVa is (Frankfort 1970: 17, tav. 14).

Hierakonpolis is rich in imported materials. Beside lapis, which likely was acquired both raw and manufactured, also obsidian objects were found. For what concerns Upper Egypt, the source of obsidian seems to be the Ethiopian and Eritrean area, Yemen and Saudi Arabia (Bavay 2000: 15). Other stones as carnelian, serpentine, steatite, malachite were acquired from local mines, present in the Eastern Desert, while the turquoise was exploited in the Sinai, all likely arriving through a local, trickle trade (Beale 1973: 141).

Copper and gold are present at Hierakonpolis. The origin of copper ore, in Predynastic period, seems to be the Jordan mines (Watrin 2007: 9), but Sinai too could have been a source of supply. Copper largely spreads all over the Egypt since it is fit for making tools and weapons. Also Giza excavations provided copper objects and fragments (Kromer 1978: 79-82, Taf. 32). On the contrary, the bulk of gold came from the South, from Lower Nubia. Situated nearby the Nubian border and the wide goldfields of Eastern Desert, Hierakonpolis could easily reach this precious metal. We believe then that there is a chance for gold being one of the luxury goods sent to Mesopotamia.

Together with gold, other exotic goods as ivory, leather and incense came from the South, requested by the inhabitants of ancient Egypt. We know about the presence of Naqadian groups, spreading towards Lower Nubia since the beginning of Naqada period (Ic-IId) and later on, settling there in order to establish trade relations with the locals (Gatto 1998: 32). But we must also take into account that there were expeditions aimed at the control of the territory by 1st Dynasty kings (Emery 1963: 51, 59), at least to make sure of supplies of the precious Nubian products.

Evidence of Naqada culture are present as far as the II cataract, but Egyptian materials, including pottery (Emery 1963: 60; Gatto 1998: 29), are more numerous in the area south of the I cataract where also lapis has been found (Reisner 1910: 25, 128, 159; Payne 1968: 58-59).

Iconographic patterns provide evidence of cultural influences from Egypt towards Lower Nubia. The impression on the three Siali *cretulae* (Bongrani 1998: 36-37, fig. 1; Williams 1986: 169-171, fig. 58) are highly significant like the theme represented on the Qustul burners, inspired by the Egyptian royal ceremony of enthronization (Williams 1986: 138 ff., Pl. 34; Hill 2004: 61-62, fig. 31). The *cretulae* from Siali moreover are very interesting for our trading speech: the scene on the impressions could represent a tribute from Nubian inhabitants to Egyptian king: in fact, it would be really appropriate to read the round objects – ending in a comma – on the top of the impressions, as bags full of gold dust (Hill 2004: 60-61, fig. 27a), intended either as gift or as exchange goods.

Gold is testified in Lower Egypt too: at Tell el Farkha in the Delta area, there is a good deal of gold as well as ivory, both evidence of contacts with the South. Due to its strategic position, Tell el Farkha – rich in imported materials (lapis among them) – handles exchanges with the Near East, as well as South Egypt, from the second half of the 4th millennium (Ciałowicz 2011: 55-64). Probably, the raw materials as gold and ivory from Nubia could arrive to this Northern site, passing through the brokerage of Hierakonpolis.

3. Hypotheses

We propose here three coexisting hypotheses, on the basis of the two completely new elements, to which we add the lapis statuette:

1. The existence of straight contacts between Sumer (Uruk) and Upper Egypt (Hierakonpolis).
2. The role of Hierakonpolis as a hub.
3. The long distance organized trade managed by the Sumerians.

Straight contacts. Hierakonpolis, in the deep South of Egypt, presents crucial elements from Sumer and Susa: high likely, the site was directly and independently linked to the Near East (Hill 2004: 15-16). The *cretula* with Inanna symbol, the cylinder with *Mr-Neit* name, the lapis statuette and the *bullae*, all refer to direct exchanges between Sumer and Upper Egypt.

The relations began in Naqada II period (the stamp seal from Naga ed-Der is dated to IIb) and lasted until the half of the 1st Dynasty. The exchanges concern above all the Naqada II c-d phases, corresponding in Mesopotamia to Late Uruk-Jemdet Nasr periods, when the town of Uruk reaches the maximum extension and power, trades increase and writing appears and develops. Later on, at the beginning of Proto-Dynastic period, there is a deep crisis in the Near East. It's a blank period also in trades; lapis lazuli and other materials almost disappear (Payne 1968: 59; Bavay 1997: 96). This is the moment in which the queen *Mr Neit* sends her "message sealing" to the Lord of Uruk. We want suppose that the disruption in the lapis trade is a possible reason for that expedition.

It is necessary now to point out these other two factors, regarding these contacts:

1) Inanna is the mother-goddess, patron-deity of Uruk where the large templar area of Eanna is devoted to her.
2) The cylinder with the name of the Egyptian queen was found at Uruk, certainly a mark of movements between Egypt and Mesopotamia.

The presence of elements with ideological roots, not merely common decorative patterns, indicates that the relations between the two areas touched a deeper, ideological sphere and that there was a true cultural correspondence.

Hierakonpolis as a hub. We easily believe that Hierakonpolis, with its great religious value, became a collecting centre to which the goods arrived from different sources. It is not a case that numerous *cretulae* bring impressions with sacred names of deities. Apart the offerings to the sacred places (Friedman 2011, 33-44), we may suppose that the bulk of merchandises (among them gold) were allocated to exchanges and sent to countries on different trade routes. Movements of luxury goods and commodities, in Egyptian area, were certainly managed by the two most important settlements in Upper Egypt: Hierakonpolis which, as collecting centre, should have had an important role on the Egyptian trade network, and Abydos, seat of the kings and likely the true administrative centre.

Trade in Sumerian hands. Which routes could have the trade followed, being handled by Sumerians? Probably Southern routes: going down the Euphrates, the boats reached the Persian Gulf and sailed along the Arabian coasts: the findings of numerous Ubaydian sites on the Eastern side of the peninsula (Fig. 5) (Masry

Fig. 5. Pre – and Proto-historic sites in Near East. Location of Ubayd sites on Eastern Arabian coast

Pl. VI

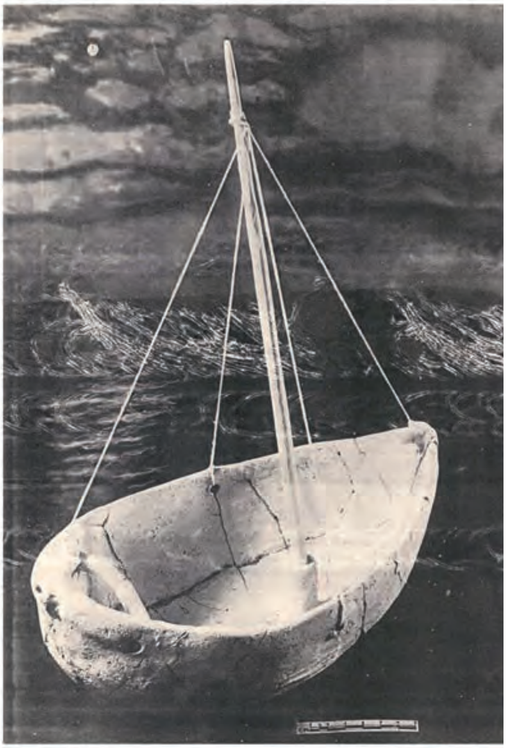

Fig. 6. Model of sailing boat from Eridu (Ubayd period)

1997: 10, 65-96) give evidence of it. Then, the boats went on and docked on the West coast. Even if it is a very long and hard course, it is not impossible to hypothesize the crossing of the Red Sea or the circumnavigation of Arabia (Bavay 1997: 96) by Sumerian traders and other sailor peoples of the coasts, since we know about archaic models of sailing boat, one of these found at Eridu (Fig. 6) (Lloyd-Safar 1981: 227, 230, fig. 111), dated back to the end of 5th millennium[11]. The same way, the Egyptians could cross the Red Sea, going toward the traders on Arabian coasts. Alternatively, the trade could have followed land routes. Caravans of onagers went along tracks, loaded with precious merchandises.

We may presume in fact that the long distance trade was carried on in composite ways: Arabia could be crossed and not circumnavigated. At that time, Arabia was not only a desert land; furthermore, it is rich in precious materials as obsidian and scented resins, to be picked up along the way.

The unloaded merchandises, from Egyptian coasts, were sent towards Southern centres as Hierakonpolis and Abydos, crossing the wadis of Eastern Desert, among them Wadi Hammamat and Wadi Abu Had (Bavay 2000: 17-18); then, the materials were sent to the North. We may also hypothesize the presence of small shelters, established by Sumerians for their boats on the western shore of Arabia,

[11] The small boat come from the Ubayd cemetery area where infants' burials were found (Lloyd-Safar 1981: 121) the boat could belong to a child.

used as starting point to cross the Red Sea. However, the items could travel also through other ways and intermediaries, covering the Northern routes, across Syria, Palestine and the Nile Delta. This explains, for instance, the presence of a good deal of Palestinian pottery at Abydos (Hartung 1993: 49-56; 1996: 39-41).

4. Conclusions

On the ground of these arguments, we point out two main ways for transferring the merchandises to and through Egypt:

- North-South and vice versa, sailing the Nile and using small caravans to reach inland sites;
- East-West and vice versa, along the Southern routes, entering Egypt through Eastern Desert.

Finally, we resume in this way:

1. The lapis lazuli, starting from Badakhshan, arrived to Upper Egypt through intermediaries as Uruk and the nearby Susa, an important trading centre strictly tied to the town of Uruk.
2. The gold from Nubia was easily acquired by Hierakonpolis, where it was collected and then sent towards North (Tell el-Farkha) or, perhaps, Near East.
3. Hierakonpolis, rich in imported materials from local mines, managed a local trade, beside to participate to the long distance trade network.

There are no doubts that in order to assure supplies of the various merchandises, trade was fully organized in Late Prehistory.

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Desert and the Nile.
Prehistory of the Nile Basin and the Sahara.
Papers in honour of Fred Wendorf
Studies in African Archaeology 15
Poznań Archaeological Museum 2018

Bashier Negood Hassan

The Nile as the Main Traffic Artery in the Ancient Sudan

The Nile has always played a very important role in the economic life of Sudan. Especially in the ancient time, it was very important for all the people, who lived near it. The Nile was the main traffic artery as well as a source of water for agriculture (especially, on the floods' periods) and a source of various types of fish (Bonnet 2000: 170; Adams 2010: 158).

The Nile flows from south to north at an average speed of about four knots during inundation season.

According to Pliny's Natural History "a canal was dug from the river Nilus (Nile) to the spot where the obelisk lay; and two broad vessels, laden with blocks of similar stone a foot square, the cargo of each amounting to double the size, and consequently double the weight, of the obelisk, were brought beneath it; the extremities of the obelisk remaining supported by the opposite sides of the canal. The blocks of stone were then removed, and the vessels, being thus gradually lightened, received their burden. It was erected upon a basis of six square blocks, quarried from the same mountain, and the artist was rewarded with the sum of fifty talents" (Pliny, Historia naturalis, XXXVI. 14). Herodotus wrote of the Nile: "the river rises of itself, waters the field, and then sinks back again; thereupon each man sows his field and waits for the harvest" (Herodotus, II. 93,6).

For traffic on the Nile, the Meroites made vessels (ships and boats) out of the stems of plants, reed and papyrus, so they were quick, but they could not carry more than three people.

The wooden boats with steering oars, a mast and sail, which appeared in the later period, could run therefore against the wind. For ritual purposes, those boats and ships were decorated with the gods' images on both sides. (Liverani 2004: 138-139; Bonnet 2004: 73). They carried portable Altar of God aboard. The graphics, indicating of that ceremony, are found on ceramics and pottery.

In the Graeco-Roman period in Egypt, the Romans used high side boats designed for two people (Engelmayer 1965) and large-sized boats, made out of several layers of papyrus. The large boats could place some passengers and even one big animal aboard. The boats made out of tightly roped papyrus' stems and woven reed mat were used by fishermen and hunters at shallow water.

The bow of the boat was on the water level and the stern rose high above the river, so the boat could smoothly sail forward and it could be easily pushed away from the sandbank (Trigger 1976: 39; David 2008: 362).

Due to the geographical location of the Kingdom of Meroe, the Nile river played an important role in the development of the trade between the Kingdom of Meroe and Ancient Egypt (Trigger1976: 18-19), which had a great demand for raw materials, gold, silver, iron, manpower, African and exotic products (incense, animal skins, precious wood, etc.) (Gradel 2010: 99-101).

For this reason, the Egyptian administration system was imposed by the Egyptian government on the Nile. To protect trade on the Nile, the Egyptian government based the garrison on the island of Philae. Later two main trade points were found on the Nile route (used, probably, as traffic terminal as well): in Hiera Sykaminos and in Syene. (Carl 1998, Plate XVI). The customs receipts were found in Syene, testifying to the Roman-Egyptian Customs in the region in the 1st and 2nd century AD. And the large market, where the Egyptian and Meroe commodities were supplied, took place in Hiera Sykaminos. (Berzin 1992: 66).

Meroe also controlled trade on the Nile Road, and put some military checkpoints along the Nile to regulate trade and protect caravans. The luxury life and well-being had become a habit for the Greek and Roman emperors and their nobles. The demand for ivory increased the number of elephant tusks' traders. (Tallet 2012: 84).

The Meroites used the Nile for goods' transportation all the year around. However, the Red Sea way was far from the trade centers' suppliers and the caravan routes connecting the Nile Valley and the coast run through the waterless and hot Eastern Desert. Moreover, the sea trade route on the African coast was seasonal and depended on monsoon. The route was more dangerous from equipping level point of view, especially the first period when the Red Sea coast was developed and studied.

The commodities' supply from Nubia to Greek Egypt, with their further reexport to the Mediterranean countries, increased after the expedition of Ptolemy II.

The Meroe nobles maintained from their side the demand for luxury goods, jewelry, statues, lamps, ships and weapons, bottles of wine and honey, clothing, aromatic oils and cosmetics supplied from Egypt. (Hintze 1978: 93; Adams1988: 24; Gradel 2010: 101).

In the Ptolemaic period, the interest for elephants increased not only for commerce but also for war purposes. The Greeks started to look for facilitation of the export of elephants and work on development of trade routes between Meroe and Egypt. Some Greek trade points were established on the Red Sea coast from there African elephants and other exotic products were deported to Egypt.

The shift of the trade route from the Nile to the Red Sea was one of the most crucial reasons that led to the end of the Kingdom of Meroe.

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Ikram Madani, Petr Pokorný, Yahia F. Tahir,
Hamad M. Hamdeen and Adéla Pokorná

Vegetation Mounds in El-Ga'ab Depression (Sudan): Their Significance in Archaeology and Archeaobotany

Introduction

Vegetation mounds (or vegetation hillocks) are hilly formations of sand and organic litter that has been trapped and thus successively accumulated within growths of long-living phreatophytic shrubs (mostly *Tamrix sp. div.*, namely *Tamarix aphylla*). This phenomenon was described and first thoroughly studied in Baharyia oasis in the Western Desert of Egypt (Pokorný and Pokorná 2013). In Sudan, Kababeesh settlers have encountered them when they first arrived at El-Ga'ab area and they gave them a local name – *tarbools*. In the same area, many tarbools are recorded near the old settlement remains, such as graves, churches and other buildings assigned to the Christian and Early Islamic periods. Madani *et al.* (2015) in their description of the vegetation cover of El-Ga'ab area considered tarbools as the most interesting features of local vegetation that are mostly the relics related to irrigated agricultural schemes of rather distant past. Tarbools occur in aggregations mainly in the bottoms of the depressions (Fig. 1). They extend along the whole length of El-Ga'ab in two chains. The eastern chain lies 25-40 km west of the Nile starting from north of Al Hasha through El-Ga'ab, Al Mweilih in

Um Hilal , Al Thawani, and Al Hamra. The western chain lies 60-70 km west of the Nile starting from Al Yanboo' Al Mirebeet through Al Yanboo' southwards until 90 km west of Dongola in Al Kwaib area (Fig. 2). Aggregations of tarbools increase in Um Hilal and some still support living plants on their tops. Um Hilal area, which is the lowest part of El-Ga'ab Depression (214-218 m a.s.l.), used to be flooded by the Nile during Early and Middle Holocene (Williams *et al*. 2010), but now all the cultivated farms are irrigated from wells. Nevertheless, underground water level of the local aquifer is close to the desert surface – not more than few meters.

A field survey was conducted in El-Ga'ab area in May 2013, September 2014, and November 2015. Its main task was to record the presence, location and morphometrics of the tarbools. The plants that formed them were identified as *Tamarix aphylla* (Fig. 3). The structures of these mounds or hillocks were also analyzed. More than 80 individual hillocks were encountered and documented in El-Ga'ab area. The height of some mounds may reach 10 m with a maximum basal circum-

Fig. 1. Vegetation mound (tarbool) landscape of El-Ga'ab Depression (Um Hilal area). Most tarbools are dead and partly eroded ones (photo: P. Pokorný)

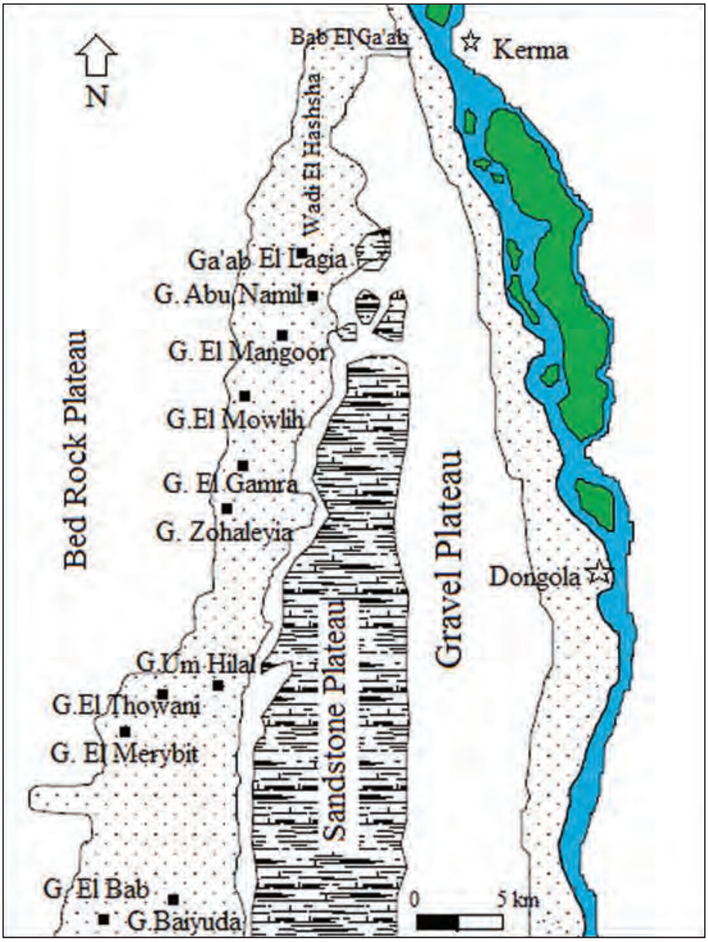

Fig. 2. Map of El-Ga'ab Depression

ference of 120 m. Most of them are exposed to wind erosion following the death of the *Tamarix aphylla* shrubs on their tops, resulting in a gradual decrease of height and volume of the remaining mound bodies. Some mounds are almost completely eroded (Fig. 4). In an attempt to uncover their stratigraphy and internal contents, six eroded tarbools were selected for excavation, five of which were in Um Hilal area and one in Al Hamra, near a Christian archaeological complex.

Fig. 3. Large tarbool with *Tamarix aphylla* shrub still growing on the top, supporting gradual accumulation of wind-transported sand and litter (photo: P. Pokorný)

Fig. 4. Almost completely eroded tarbool displaying its internal structure full of organic remains (photo: P. Pokorný)

Results

Site 1: Um Hilal

This site is located in a distance of about 36 km from the Nile. The coordinates, circumference and heights of the vegetation mounds were recorded. Five eroded mounds were selected for excavation. A vertical trench was made in the middle of one (heavily eroded) mound that is about 37 meters in diameter and three meters in high. Different remains were collected from different strata, such as animal droppings (presumably of camel), bones, pieces of pottery, and charcoal accumulations of herds (fire places). Some archaeologically important remains were encountered within the tarbool stratigraphies in Um Hilal area, such as pottery belonging to the Early Islamic period (Fig. 5). Numerous Christian and Early Islamic pottery was found and identified in the same area close to vegetation mounds. Fireplaces designed for accidental cooking which were noticeably located opposite to the wind direction (southern sides of the mounds, thus protected from northern winds). Samples for radiocarbon dating were collected from the interior of the mounds, where fireplaces with charcoal were encountered.

Fig. 5. Find of Early Islamic pottery (complete vessel) preserved in the interior of the tarbool (photo: P. Pokorný)

Site 2: El Hamra

This site is located in a distance of about 33 km from the Nile in El Hamra area near archaeological site reported as a Christian complex formed of 7 visible buildings and unknown number of invisible buried ones. The nearest to them, completely eroded tarbool was selected and the exposed plant remains (dry stems of *Tamarix*), as well as some carbonized seeds which were recovered during the Christian building excavation were taken for dating.

Conclusions

The discovery of *Tamarix* hillocks in El-Ga'ab Depression and what they hide underneath and in their internal stratigraphy qualifies them to be considered important archaeological and palaeoecological phenomenon. Inside the hillocks there are remains from old periods (Christian and Early Islamic in this particular case), indicating presence of irrigated lands in the past that supported germination of seeds and growth of plants. After the settlement and irrigation ceased, the phreatophytic shrubs were able to survive for a long time, even during and after desert encroachment, while other plants died off. As the dry climate is not suitable for the growth and establishment of seeds of such plants, it is believed that seedlings of these plants established in wet environment of irrigated agricultural land. They gradually accumulated wind-transported sand during the period of dry conditions, gradually forming the conical structure of vegetation mound (tarbool). Studying the internal structure of these mounds should recover archaeological materials and remains of plants and animals that reveal the ancient settlement, vegetation and fauna of the area, hence enabling to investigate environmental changes over centuries and even millennia.

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III

Oases and the Desert

Desert and the Nile.
Prehistory of the Nile Basin and the Sahara.
Papers in honour of Fred Wendorf
Studies in African Archaeology 15
Poznań Archaeological Museum 2018

Michał Kobusiewicz, Przemysław Bobrowski, Maciej Jórdeczka and Marek Chłodnicki

Gebel Karaiweb and Bir Nurayet (Sudan). The Oldest Settlement in the Red Sea Mountains

In the years 2010-12, owing to the grant received from the Ministry of Science and Higher Education No. NN109 244 239 and sponsored by Advertisement Agency "Just", a group of researchers from the Institute of Archaeology and Ethnology, Polish Academy of Sciences, investigated the widely termed prehistory of the region known as Bir Nurayet located in the Red Sea Mountains (Fig. 1). Outstanding is a Lower Palaeolithic site known as Gebel Karaiweb codenamed BN-11-3/2. It is located approximately 7 km north of the village Bir Nurayet, in the north-eastern tip of Gebel Karaiweb, the eponymous rock massif forming the western edge of Wadi Diib. The massif is built mostly of sandstones with vertical and diagonal walls and its eastern edge is fragmented with small erosional cuts. Loose rock blocks and small boulders eroded from the massif lie scattered at its foot on the east side. The north-eastern edge of the massif is more gentle. It was on this hillside and on adjacent longitudinal elevations that abundant Lower Palaeolithic materials were deposited. The whole site is approximately one hectare in area (Fig. 2). Some 7 kilometres south of Gebel Karaiweb, in the vicinity of gebel Magardi by the village Bir Nurayet also several Middle Palaeolithic sites were discovered. The most rich of them, codenamed BN-10-1/5 was partially investigated.

Fig. 1. Location of Gebel Karaiweb

Fig. 2. Gebel Karaiweb. Location of Acheulian site BN-11-3/2

1. Lower Palaeolithic

All Lower Palaeolithic artefacts recovered from the site BN-11-3/2 at Gebel Karaiweb were made of dark brown, almost black, heavily diagenesed quarzitic sandstone[1]. This raw material was procured from an outcrop forming a small hill, located on the edge of the site (Fig. 3). The collected objects are ever so slightly eolized.

[1] Kind information of dr Małgorzata Mrozek-Wysocka, Institute of Geology, Adam Mickiewicz University, Poznań.

Fig. 3. Gebel Karaiweb. Acheulian site BN-11-3/2. The outcrop of diagenesed quartzitic sandstone

Collected in the course of surveys, the assemblage comprises four types of retouched tools fashioned using core technology:

Proto-handaxes (Fig. 4:1; Fig. 6)

– The specimen in size of 220 x 110 x 70 mm made of large flake. Almost a half of the dorsal side is covered by three large negatives of flakes. Ventral side is retouched along all of the right edge by the continuous fine retouch. The rest of its surface is rough. One end is pointed, the second one is oval, blunt .

– The specimen very similar to described above, 136 x 70 x 64 mm in size. Made of large chunk. Both edges are sharpened by wide negatives of flakes. Almost sixty per cent of one side is rough as well as a half of the second side. The tool tapers toward both ends where their edges are sharpened by bifacial retouch.

– The very stocky proto-handaxe 170 x 80 x 70 mm in size, made of thick chunk. Both surfaces covered by deep negatives of medium and large size. One end is pointed; the second one is oval, steeply retouched (Fig. 6).

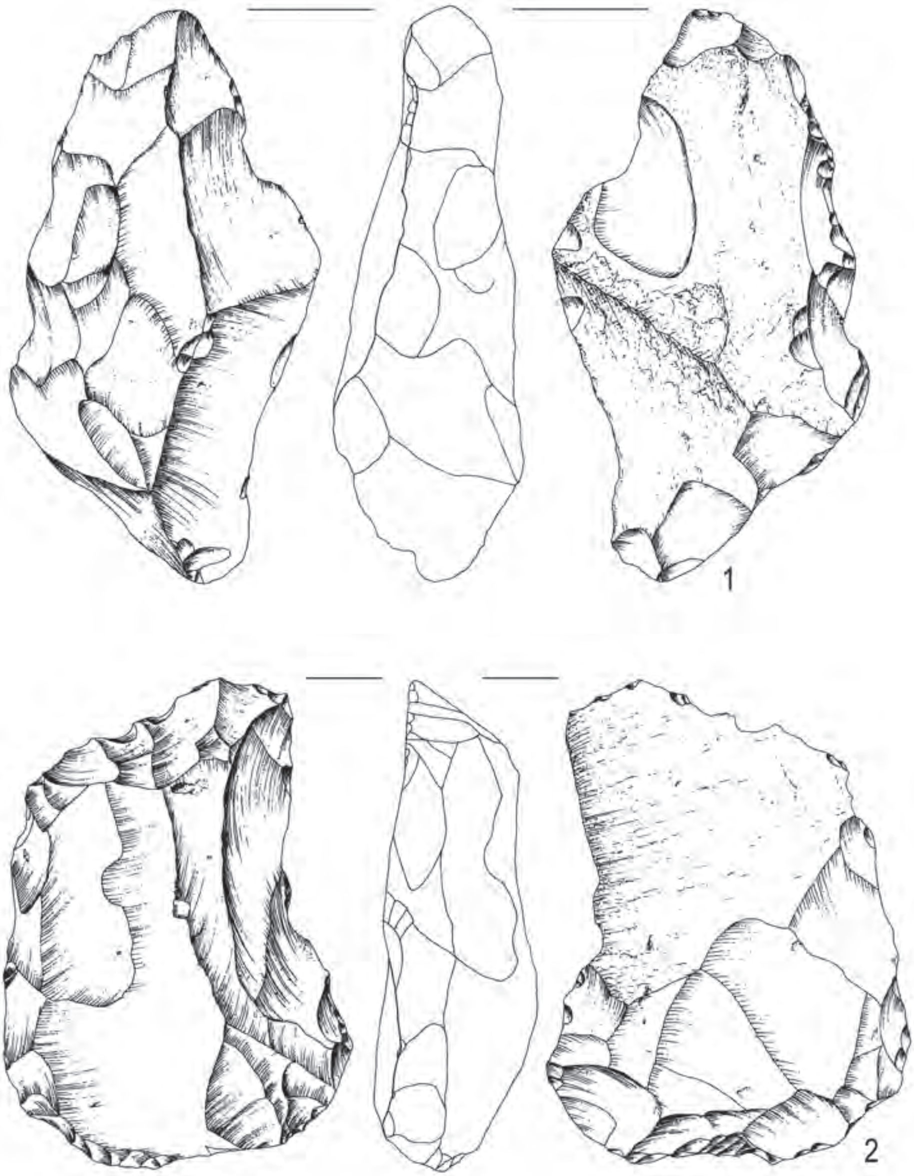

Fig. 4. Gebel Karaiweb. Acheulian site BN-11-3/2. 1 – proto-handaxe; 2 – cleaver

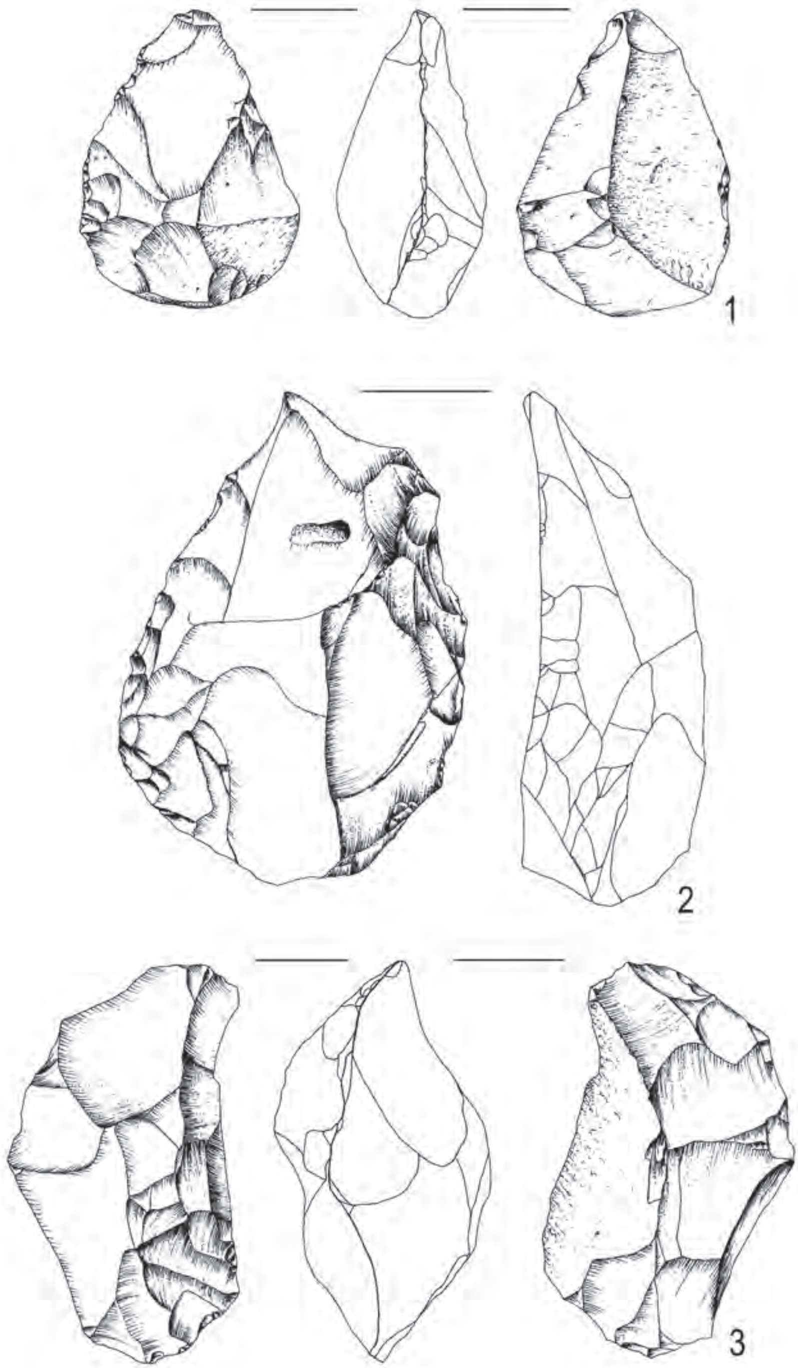

Fig. 5. Gebel Karaiweb. Acheulian site BN-11-3/2. 1 – handaxe; 2-3 –cleavers

Fig. 6. Gebel Karaiweb. Acheulian site BN-11-3/2. Proto-handaxe

– The specimen made of large flake 230 x 80 x 70 mm in size. Both surfaces are mostly rough. One end is pointed, partially shaped by fine irregular retouch. Second end is arched, also shaped by retouch.

– The specimen done of chunk measuring 125 x 80 40 cm. Both surfaces mostly rough. The arched edges partially retouched by fine obverse retouch, taper toward the end.

Handaxes (Fig. 5: 1; Figs. 7-8)

– The small handaxe 100 x 70 x 60 mm in size, made of thick chunk. One surface is covered by concentrically situated deep negatives of flakes. One half of the second surface is rough. On one edge it bears fine retouch.

Fig. 7. Gebel Karaiweb. Acheulian site BN-11-3/2. Hadaxe

Fig. 8. Gebel Karaiweb. Acheulian site BN-11-3/2. Handaxe

– A crude specimen made of chunk 170 x 120 x 60 mm in size. One surface is covered by concentrically located negatives of large flakes. The edges are retouched by negatives of small sharpening flakes. The second surface is rough.

Cleavers (Fig. 4:2; Fig. 5:2-3, Fig. 9-11)

– The cleaver made of large chunk 190 x 130 50 in size. The arched edge spans three-quarters of the circumference. It is retouched by striking small and medium sized flakes. One surface is entirely covered by negatives of large, elongated flakes. Similar negatives cover a half of the second surface. One edge in the lower part of the tool is covered by fine, continuous retouch.

– The specimen made of large chunk. Its measurements amount to 195 x 160 x 60 mm. One longitudinal straight edge and the second edge running downward at an angle of 80° are retouched by irregular obverse retouch composed of the negatives of fine flakes. One surface is entirely covered by deep negatives of large flakes. The second surface is rough.

Fig. 9. Gebel Karaiweb. Acheulian site BN-11-3/2. Cleaver

Fig. 10. Gebel Karaiweb. Acheulian site BN-11-3/2. Cleaver

Fig. 11. Gebel Karaiweb. Acheulian site BN-11-3/2. Cleaver

– The cleaver done of large chunk 195 x 160 x 65 mm in size. Both surfaces are rough. One edge is retouched by striking off several large flakes. The second, straight edge is retouched by delicate irregular retouch.

– The cleaver of approximately triangular shape, 185 x 125 x 60 mm in size. One side is partially covered by negatives of large flakes. The second side is rough. Two converging edges are retouched by fine bifacial, irregular retouch.

– The specimen 180 x 132 x 60 mm in size, done of large flake. One surface is rough. Its edge is bifacially retouched by striking off several largish flakes. The second surface is also rough except some retouch on edge.

Retouched flakes (Fig. 12)

– The large, stocky, elongated flake 214 x 102 x 8 mm in size. Both surfaces are almost entirely rough. Sections of both edges situated toward the narrowing, pointed end are retouched by fine irregular retouch.

Fig. 12. Gebel Karaiweb. Acheulian site BN-11-3/2. Retouched flake

– The flake of more or less trapezoidal shape, 121 x 125 x 4 mm in size. Both surfaces are rough. Only one straight edge of trapeze is retouched by slight re-touch.

Core (Fig. 13)

– The fair sized cubical multiplatform core for flakes 220 x 187 x 165 mm in size. Any traces of core preparation.

Fig. 13. Gebel Karaiweb. Acheulian site BN-11-3/2. Multiplatform core in the middle of debitage concentration

The distinction between the types described above poses considerable difficulties in some cases. This applies particularly to cleavers and retouched flakes. It is hardly possible to determine whether a specimen with edge retouch is still a retouched flake or an intentionally produced cleaver. In general, the inventory is very homogenous in terms of technology and even typology. The range of technological and thus typological capabilities available to knappers working at the discussed site was extremely narrow. The raw material was procured exclusively from a single source, i.e., the outcrop of heavily diagenesed quarzitic sandstone. In general, it seems reasonable to conjecture that the site of Karaiweb was not a camp but rather a workshop or a complex of workshops.

Virtually all these tools were made from large chunks scattered on the surface of the outcrop. They do not exhibit any ripples, bulbs or butts typical of flakes, much less common here. Flakes were probably produced using a technique called *bloc en bloc*. The chunks and a few flakes were most likely retouched with a hard hammer, as evidenced by the presence of deep flaking scars. Proto-handaxes, cleavers and retouched chunks and flakes are roughly similar in size – the artefacts range between 10 and 23cm in length, 9 and 16cm in width and 5 and 7cm in thickness. Surveys yielded very few handaxes – they are of slightly smaller dimensions. Although these figures were calculated for a small amount of specimens, they nevertheless give some idea as to the size of implements and exploited lumps of rock from which blanks were removed. Selected chunks show large and medium-sized deep scars left by retouch, which covered slightly arcuate or straight edges or their parts. With a few exceptions, the surface of the tools remained otherwise unretouched.

Whether artefacts we find here today were considered as failed and as such discarded or lost, and finely worked products were carried away is uncertain. The accessibility to the source of raw materials entailed a profligate use of raw material, markedly recorded in the inventory. A huge number of artefacts scattered over a wide area indicates that the outcrop of splintery quartzitic sandstone was repeatedly exploited throughout a very long period of time.

Visible *in situ* at the surface of the site are small, circle-like concentrations of flakes that are much smaller, yet too large to classify them as trimming flakes (Fig. 14). One such concentration yielded a cubic multiplatform core for flakes; the core was exploited from various directions, the sides or the striking platform were unprepared (Fig. 13). Perhaps the concentrations were left behind by a single individual who worked raw materials at this spot. In terms of typology, they seem to be of later chronology than earlier discussed proto-handaxes, handaxes and cleavers. No traces of Middle Palaeolithic techniques were registered.

Whether the products were considered to be failed or they were perhaps lost, and only the desirable were taken away – we do not know. The availability to the raw material prompted the prodigality clearly visible in the material. Given the huge amounts of artefacts scattered all over a large area, the quarry was often visited, probably for a very long period of time.

The chronology of the site remains, as in the case of the vast majority of Acheulian sites in Africa, the issue most problematic to address. Very preliminary attempts at dating the Karaiweb inventory have not provided any satisfactory answers as of yet. With no direct analogies identified, the chronology of the site can for the time being be based solely on typology. In general, the site of Karaiweb appears to be one of the most ancient sites in North-East Africa. Very primitive tools such as proto-handaxes, scarce, very primitive handaxes and clumsily made cleavers or retouched flakes suggest a very early dating of the site – the earliest Acheulian attributable to the turn of the Late Early and Middle Pleistocene. It follows that the investigated assemblage must have been produced by *Homo erectus.*

A timespan throughout which the place was frequented has not been determined – even a few hundred thousand years seems a likely number. Most similar and geographically closest to the Gebel Karaiweb assemblage are Acheulian sites in the vicinity of Khashm El Girba, located 600 kilometres away, notably site 111, but also 102 and 122 (Chmielewski 1987). They differ, however, in the presence of choppers, which are absent in the Karaiweb inventory. The site of Abbasiya, located at a distance of 1100 kilometres (today in Cairo), shows some typological and possibly chronological resemblance (Huzayyin 1941). Of similar age, an Acheulian site of Nag'a Ahmed El Khalifa in Middle Egypt yielded merely primitive handaxes and proto-handaxes (Vermeersch *et al.* 2000), similar to those known from Karaiweb, yet produced no cleavers. Further south, assemblages attributable to the early Acheulian were found at different sites of East Africa, to wit: in Ethiopia, Kenya and Tanzania, where the oldest Acheulian materials are estimated to be 1.5 – 1.4 million years old. Even more distant are the early Acheulian sites from the western Maghreb, such as Sidi Abderrahman, levels II and III of Morocco or Ternifine and Lac Karar from Algeria. Early Acheulian sites have also been identified in north-western Sahara. Early Acheulian materials have recently been discovered in the Bayuda Desert in northern Sudan (Masojć and Paner 2014).

None of the sites listed above exhibits a marked similarity to the Karaiweb inventory, and some are in fact fairly different. The overall chronology of all these sites spans a vast period from about 1.5 to 0.5 million years ago. Multiple stays of *homo erectus* at Karaiweb can be therefore hypothetically supposed to have occurred sometime throughout this period. Notably more numerous are Middle Acheulian sites, typologically different from Karaiweb, e.g., Arkin 8,and Guishard's site 516 from Lower Nubia south of the Second Cataract, the Middle Acheulian site of Khor Abu Anga from Omdurman upon the Middle Nile (Arkell 1949), or Abu Hugar, lying south of Singa, upon the Blue Nile, already close to the border with Ethiopia (Chmielewski 1987).

Fig. 14. Gebel Karaiweb. Acheulian site BN-11-3/2. Surface concentration of debitage

Fig. 15. Bir Nurayet. Rocky cirque. Location of Middle Palaeolithic site BN-10-1/5

The Late Acheulian sites from the northern areas of Lake Chad basin, south of Tibesti, are of particular interest to us – they yielded stone tool workshops (Tillet 1983), possibly analogous to the Gebel Karaiweb workshop.

The workshop character of the Gebel Karaiweb inventory and, above all, the type of raw material used for making tools can perhaps explain the remarkability of the Karaiweb typology. People exploiting the local outcrop could have chosen between large, sharp-edged chunks or flakes, while their distant neighbours from the areas upon the Nile or Atbara worked on cobbles – this, among other things, can partly account for the noticeable differences, at least in this case.

The current state of research on the Lower Palaeolithic of North-East Africa, particularly its older phase, is far from satisfying. Extremely scarce sites from this period are widely dispersed over a vast area – Gamal El Deen Idris (1994) notices merely four Older Acheulian sites in Sudan. Karaiweb is the only site to have been identified in the Red Sea Mountains thus far. Highly promising, the site of Gebel Karaiweb should definitely be further explored – it is bound to provide new data on the oldest period of human prehistory.

2. Middle Palaeolithic

Six Middle Palaeolithic sites have been registered in the vicinity of the village Bir Nurayet, approximately seven kilometres to the south of Gebel Karaiweb while walking along the western edge of Wadi Diib. Among them, the site codenamed BN-10-1/5 stands out as particularly wealthy. Having furnished most abundant information, the site currently provides the basis for our present knowledge on this period in the region of Bir Nurayet.

The site is located almost in the centre of the so-called rock cirque marked with number 1 This oval, nearly circular in shape erosion valley is surrounded on all sides with almost vertical walls (Fig. 15). From the east, looking from Wadi Diib, there are two low hills, between which an entrance to the valley was located in a depression (a kind of saddle). The bottom of this valley is located a few meters above the bottom of Wadi Diib and the maximum level of the ceiling of its alluvial sediments. Therefore, in contrast to the neighbouring erosion valleys 2 and 4 in the eastern edge of the rock mass, Valley 1 was not flooded by water flowing through the main *wadi* and it is not filled with silts.

In 2010 and 2011 research seasons, lithic materials were collected from the surface of the site. An elongated, ellipse-shaped concentration of Middle Palaeolithic artefacts, approximately 30-40 meters in length and about 20-30 meters in

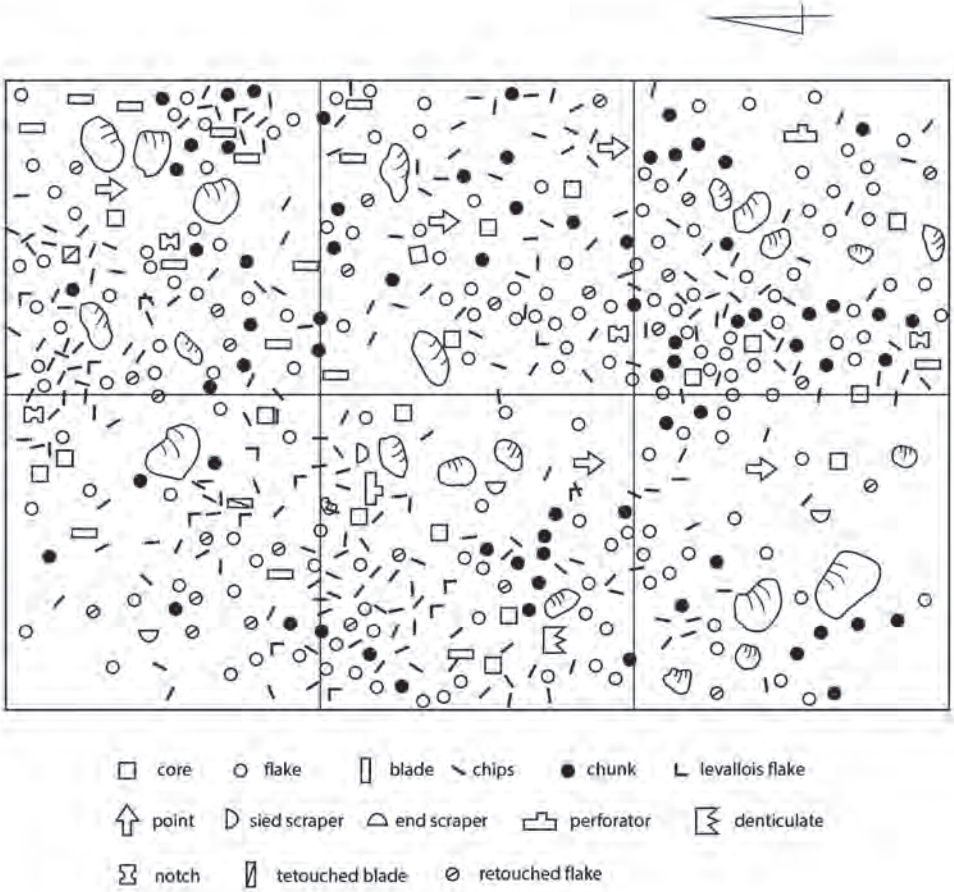

Fig. 16. Bir Nurayet. Middle Palaeolithic site BN-10-1/5. Scatter pattern of flint artefacts from six square meters of surface and from the layer ten centimeters below

width, extends along a high, steep rock wall. In the absence of clear-cut boundaries, it is not possible to determine its exact range. No stratigraphy or clusters of individual artefacts were registered. Artefacts were scattered on the surface of water and wind-deposited sands and just underneath the surface, up to a depth of 10 cm.

A unit sized 2 x 3m was excavated at a spot where the maximum concentration of lithic artefacts was noticed on the surface. All material of archaeological interest scattered on the surface of the trench and deposited within a ten-centimetre-deep layer beneath the surface was collected for analyses, in order to obtain, next to retouched tools and cores, a complete sample of debitage necessary to examine the technology applied by Palaeolithic tool makers (Fig. 16).

Importantly, the assemblage acquired thus far is too scanty to enable the calculation of indexes typically used for the description of Middle Palaeolithic materials, such as the Levallois index or index showing the frequency of particular types of tools, or group of tools. It is for this reason that this paper aims to explore only the typology and technology used by people working with lithic materials at the site.

Since there is no reason to assume that there were different episodes in the development and history of the site, assemblages of cores and implements collected from the surface and those from the excavated six square meters were analysed jointly.

Site BN-10-1/5 delivered a relatively small collection of artefacts numbering 432 pieces which amount to 2.31 percent for cores, 8.33 per cent for retouched tools and 89.19 percent for debitage. All artefacts from this site come from the heavily diagenesed quarzitic sandstone of different taint and different degree of patination, easy to procure in the vicinity. The structure is demonstrated in Tables 1-5.

Table 1. Bir Nurayet. Site BN-10-1/5. Absolute and percentage frequencies of cores and retouched tools

Core types	**No**	**%**
Levallois cores	10	66,67
Other cores	5	33,33
Cores total	15	100.00
Tool types	Ilość	%
Bifacial points	6	22,22
Mousterian points	4	14,82
Side-scrapers	6	22,22
End- scrapers	2	7,41
Noches	3	11,11
Denticulates	3	11,11
Retouched flakes	2	7,41
Retouched blades	1	3,70
Tools total	27	100.00

Table 2. Bir Nurayet. Site BN-10-1/5. Absolute and percentage frequencies of debitage types

Debitage type	No	%
Cortex flakes	3	0.78
Flakes from single platform core	30	7.88
Flakes from double platform core	1	0.26
Flakes from multiple platform core	46	12,07
Levallois flakes	13	3.41
Blades from single platform core	5	1.31
Unidentified flakes	45	11.81
Chips (less than 25 mm of diameter)	85	22.31
Chunks	153	40.17
Total	381	100

Table 3. Bir Nurayet. Site BN-10-1/5. Levallos flakes. Metrical parameters

Levallois flakes							
Category	**l.**		**Σx**	**Σx²**	**S**	**Mode**	**No. in mode**
Length	12	40,58	487	20675	9,1	35-39	3
Width	12	39,08	469	19301	9,39	40-44	3
Thickness	12	9,75	117	1241	3,02	9-10	4

Table 4. Bir Nurayet. Site BN-10-1/5. Flakes from single platform core. Metrical parameters

Flakes from single platform core							
Category	**l.**		**Σx**	**Σx²**	**S**	**Mode**	**No in mode**
Length	25	37,36	934	37850	11,1	25-29; 40-44	6
Width	25	32,64	816	28046	7,67	30-34	6
Thick-nees	25	9,08	227	2249	2,8	7-8	9

Table 5. Bir Nurayet. Site BN-10-1/5. Flakes from multiplatform core. Metrical parameters

Flakes from multiplatform core							
Category	**l.**		**Σx**	**Σx²**	**S**	**Mode**	**No in mode**
Length	42	36,09	1516	58616	9,75	31-35	12
Width	42	32,71	1374	47474	7,85	26-30	11
Thickness	42	9,74	409	4363	3,04	9-10	11

Cores (Fig. 17-18) Tabele 1

– 15 pieces. Ten of them are Levallois cores. All for flakes. The dimension of the smallest one are 47 x 37 x 13 mm, the largest one 70 x 50 x 30 mm (Fig. 17). Also five cores other than Levallois are distinguished. The smallest is 30 x 30 x 25 mm the largest one is 60 x 50 x 39 mm in size. The small core is single platform specimen for blades, totally exhausted. Two other specimens are double platform cores for flakes (Fig. 18:1-2), one is a double platform core for flakes with opposite striking platforms, and one multiplatform unpatterned core for flakes (Fig. 18:3).

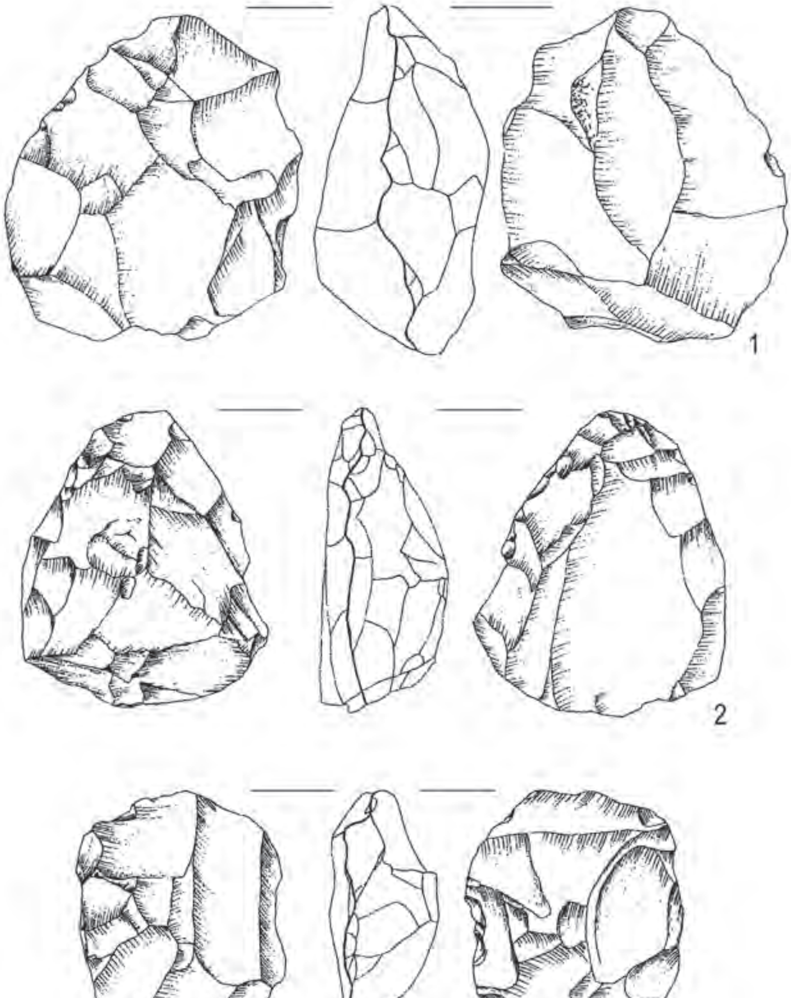

Fig. 17. Bir Nurayet. Middle Palaeolithic site BN-10-1/5. 1-3-Levallois cores

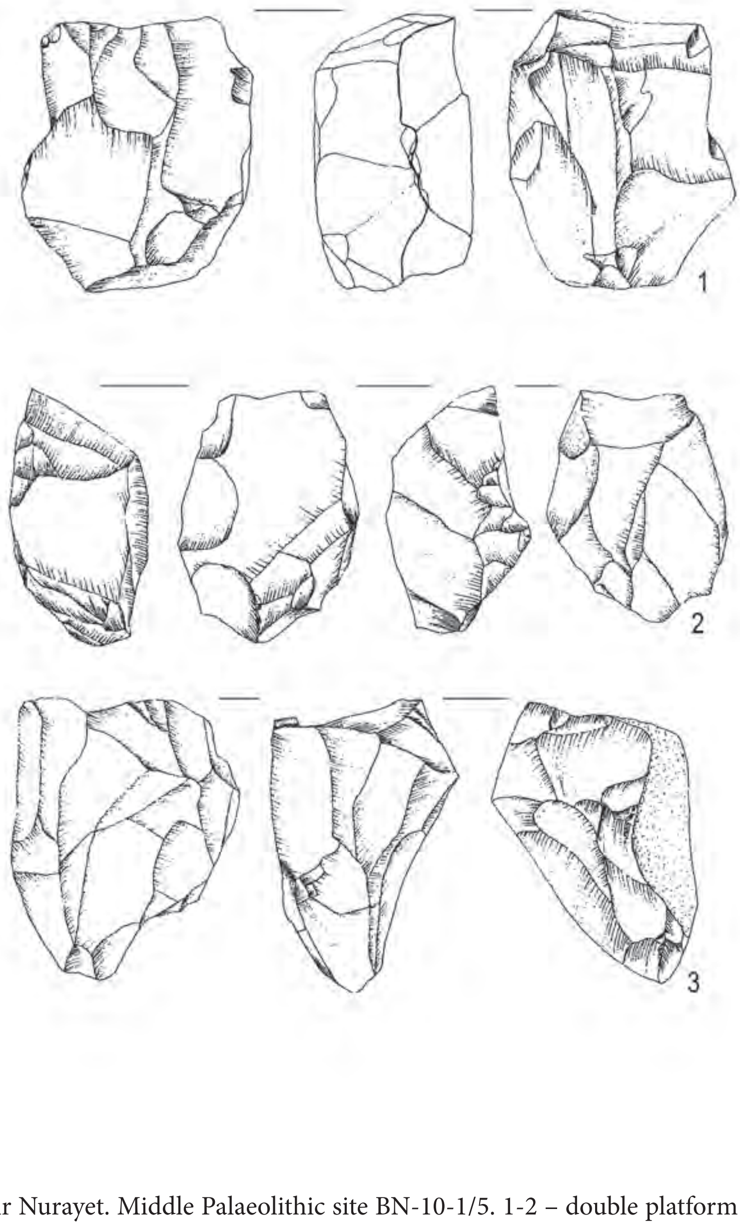

Fig. 18. Bir Nurayet. Middle Palaeolithic site BN-10-1/5. 1-2 – double platform cores for flakes; 3 – multiplatform core for flakes

Retouched tools

Bifacial points (Fig. 19) Tabele 1

– The most common are bifacial points – six specimens. The largest is broken. The dimensions of its preserved part are 60 x 50 x 12 mm. The dimensions of four remaining cores are: length oscillate between 40-50 mm, width 28-35 mm and thickness 9-14 mm. Both sides are entirely covered by retouch composed of medium and small negatives of flakes.

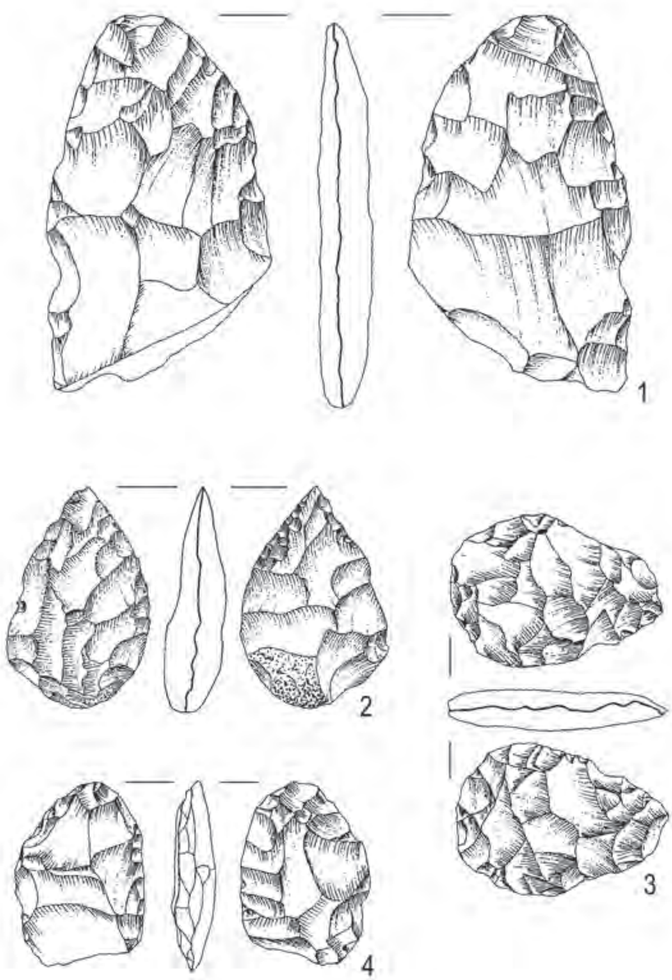

Fig. 19. Bir Nurayet. Middle Palaeolithic site BN-10-1/5. 1-4 – bifacial points

Mousterian points (Fig. 20) Table 1

– Four specimens. 5 x 27 x 9 mm up to 52 x 37 x 14 mm in size. On three pieces the dorsal side is entirely covered by retouch composed of negatives of flat flakes and the second side is smooth except, in two cases, the fragments of one edge have lateral fragmentary retouch and in one case both edges are retouched.

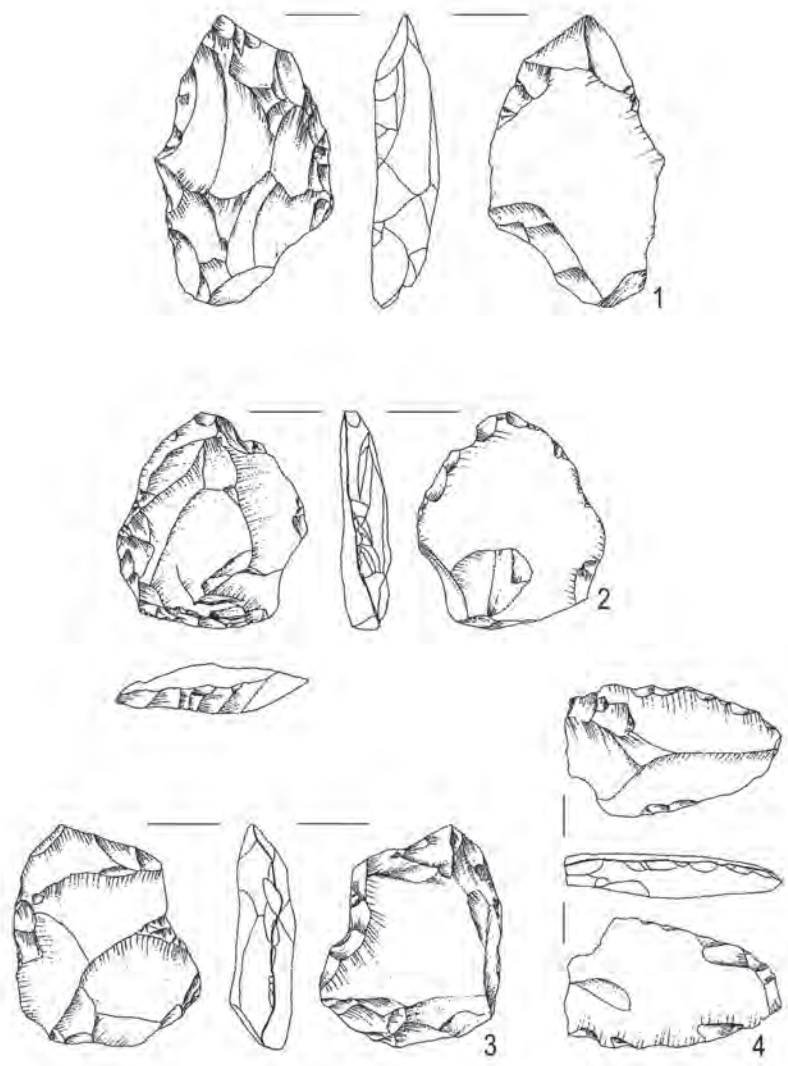

Fig. 20. Bir Nurayet. Middle Palaeolithic site BN-10-1/5. 1-4 – Mousterian points

Side scrapers (Fig. 21) Table 1

– Five specimens. 37 x 23 x 7 mm up to 63 x 37 x 13 mm. Two pieces are retouched on one, straight edge and one is retouched on the second, arched edge. One piece is retouched along the two straight, parallel edges. Two side scrapers are retouched along both convergent, slightly arched edges.

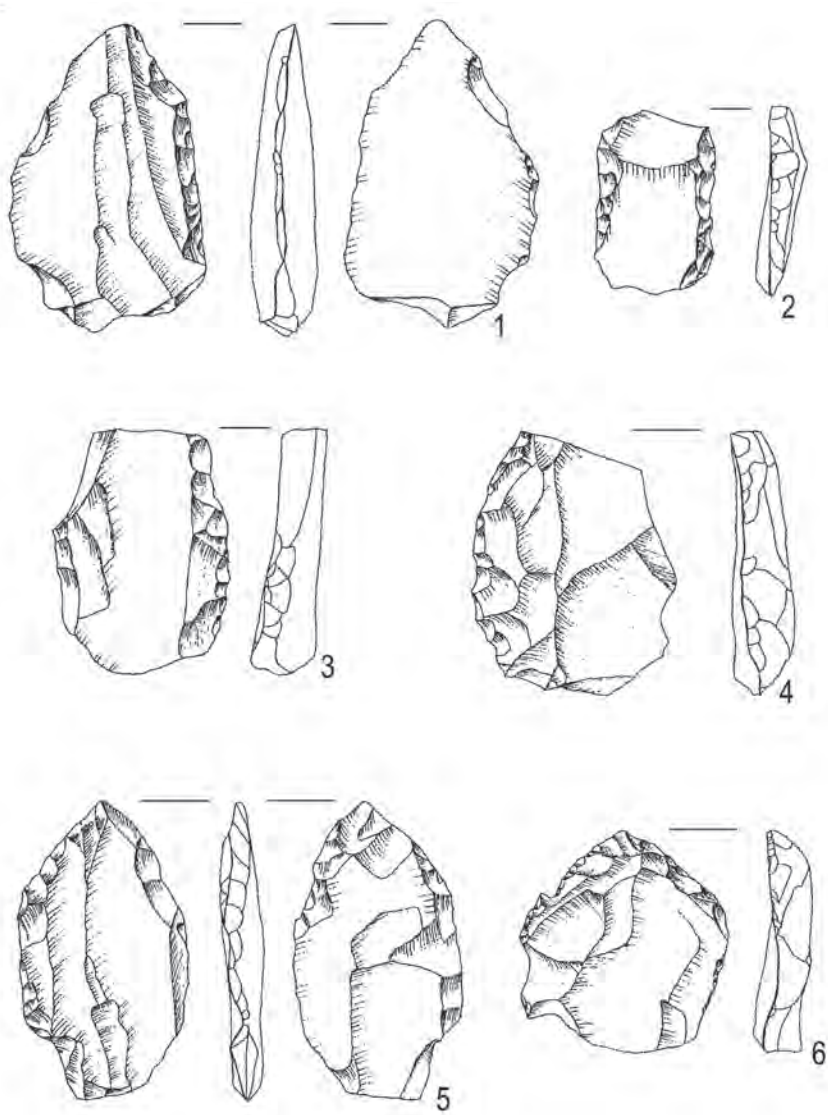

Fig. 21. Bir Nurayet. Middle Palaeolithic site BN-10-1/5. 1-5 – side-scrapers

End scrapers (Fig. 22: 1-2) Table 1

– Two specimens. One is made of massive flake 53 x 37 19 mm in size. The scraping edge is arched, symmetrically, abruptly retouched (Fig. 22:2). The second one, 97 x 41 x 16 mm in size is made of the large, massive blade (Fig. 22:1). The scraping edge, located at the distal end is similar to the nosed scrapers. One edge is retouched on the dorsal side by discontinuous retouch.

Fig. 22. Bir Nurayet. Middle Palaeolithic site BN-10-1/5. 1-2 – end scrapers; 3-5 – noches; 6-7 – denticulate tools

Noches (Fig. 22:3-5) Table 1

- Three specimens, 35 27 x 7 mm up to 48 x 17 x 10 mm. All done on blades. In two cases the noches are abruptly retouched on the dorsal side (Fig. 22:3-4). The third one is retouched on ventral side (Fig. 22:5)

Denticulated tools (Fig. 22:6-7) Table 1

Three specimens. 50 x 31 x 16 mm up to 62 x 37 x 22 mm in size. Two of them are retouched on the dorsal (Fig. 22:6-7) and one on the ventral side.

Retouched flakes (Fig. 23:1, 4) Table 1

- Two specimens. One of them is big, 150 x 80 x 22 mm in size. Made of flat triangular chunk with both surfaces rough. The base of the triangle is on one side retouched by alternating, regular and symmetrical retouch on one side and irregular, slightly denticulate, flat retouch on the other side. The second piece, 65 x 50 x 11 mm in size has the irregular, low angle retouch on one edge.

Retouched blades (Fig. 23:2) Table 1

- The single, flat piece 55 x 25 x 8 mm in size, retouched along both edges by irregular fragmentary retouch.

Absolute and percentage frequencies of retouched tools are given on Table 1

Debitage (Table 2-5)

381 pieces of debitage are distinguished. Most of them are unidentified (small chips, thermal chunks and unidentified flakes). The detailed structure of debitage presents Table 2.

- Only three cortex flakes were identified. Their size is 40 x 32 x 12 mm, 44 x 34 x 13 mm and 47 x 30 x 12 mm. Two have cortex platforms and one *lisse* platform.
- Between the identified flakes thirteen pieces are of Levallois type. The smallest is 29 x 26 x 4 mm and the largest 53 x 51 x 14 mm in size. The average main length is 40.58 mm, width 39.08 and thickness 9.75 mm. Seven Levallois flakes have platforms type *chapeau de gendarme*, two platforms are *lisse*, one dihedral and three unidentified. The detailed metrical data for flakes presents Tables 3-5.

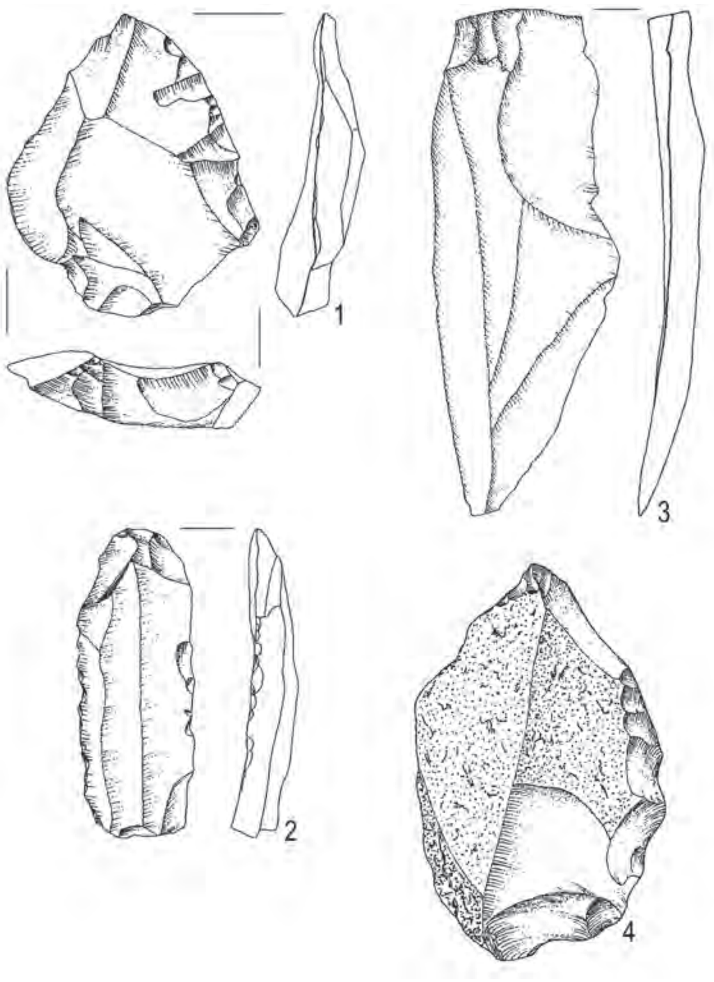

Figure 23. Bir Nurayet. Middle Palaeolithic site BN-10-1/5. 1, 4 retouched flakes; 2 – retouched blade; 3 – blade from single platform core (Table 2)

By far the most common are flakes from single platform (30 pieces) or from multiplatform cores one and a half more frequent. Between 25 of whole flakes from single platform core the smallest is 19 x 27 x 15 mm and the largest 68 x 34 x 15 mm in size. The mean length of flakes is 37,36 mm, width 32,64 mm and thickness 9.08 mm in size. The metrical data are demonstrated on Table 4. By this type of flakes the most popular platforms are *lisse* (11 pieces) then 5 faceted, 4 dihedral, one pointed and 6 unidentified platforms.

- Forty six flakes from multiplatform cores are distinguished. Between the whole pieces the smallest is 21 x 25 x 5 mm and the largest 63 x 38 x 9 mm in size. The main length of these flakes is 36.09 mm, width 32.71 and thickness 9.74 mm. Between identified flake platforms 19 are *lisse*, 4 are dihedral, 3 are faceted and one is pointed. 17 platform are unidentified.
- Only one flake was distinguished which may have come from the double platform core. Its size is 49 x 25 x 9 mm. The platform is unidentified.
- Between five blades struck from single platform core three pieces are whole (Fig. 23:3). Their size is 110 x 40 x 7 mm, 42 x 19 x12 mm and 43 x 21 x 8 mm. Four blades have *lisse* platforms and one has Levallois platform type *chapeau de gendarme.*

Except the flint inventory from the site BM-10-1/5 described above also the Middle Palaeolithic artefacts from several other sites were collected. And they are as follows:

- Site BN-10-1/1 Cordiform handaxe 77 x 55 x 20 mm in size (Fig. 24:1).
- Site BN-10-1/4 Single platform core for flakes made on flake 70 x 35 x 20 mm in size, and side scraper 88 x 52 x 25 mm in size retouched along the right, slightly arched edge by hefty retouch.
- Site BN-10-4/3 Big, stocky single platform core, cubical in shape, 90 x 91 x 70 mm in size (Fig. 24:2).
- On sites BN-10-6/1 and BN-10-12-8 several pieces of debitage were collected including Levallois flakes.

In terms of typology, there are several points of similarity between the inventory from BN-10-1/5 (and indeed other sites in the Bir Nurayet region) and the Middle Palaeolithic sites of Gademotta and Kulkuletti in Central Ethiopia (Wendorf and Schild 1974). Assemblages from both regions are typified by the occurrence of numerous bifacial and Mousterian points in different varieties, almost identical to analogous implements from Ethiopia, and the presence of similar sidescrapers and endscrapers. The frequent use of Levallois technology is another common feature. Similarly to Gademotta and Kulkuletti, site BN-10-1/5 is attributable to the Stillbay culture, spanning the vast areas of southern and eastern Africa. Site BN-10-1/5 is the northernmost site of this culture. Its close resemblance to the Ethiopian sites mentioned above can be explained by the way of adaptation to the similar environment of mountainous areas of Ethiopia and the Red Sea Mountains in north-eastern Sudan. Other Middle Palaeolithic sites registered in North-East Africa are notably different in terms of typology.

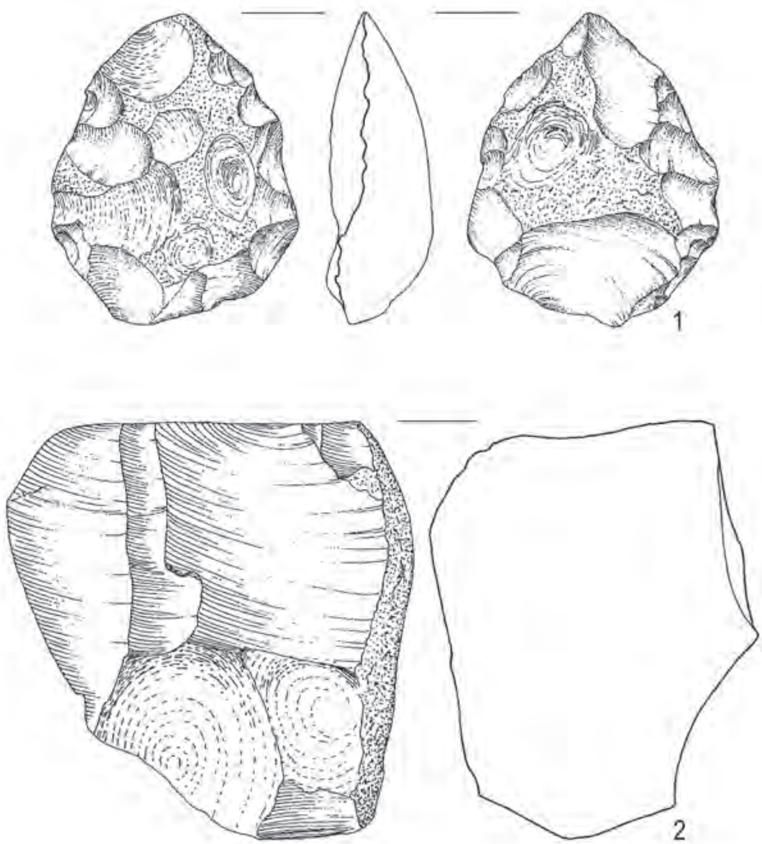

Figure 24. Bir Nurayet. Middle Palaeolithic site BN-10-1/1: 1 – handaxe; site BN-10-4/3: 2 – Core for flakes

Sites of the Stillbay culture in Africa date back to the period between 200,000 to 70,000 years BP, the timespan identical to that of site BM-1-1/5 and other Middle Palaeolithic sites in the area. The Stillbay cultural tradition lasted for a long time and there are no premises whatsoever to allow a more precise dating of our finds within such determined time frame. It is anticipated that further comprehensive research will provide a more exact chronology.

Given the wealth of artefacts, site BN-10-1/5 represents the remains of recurrent occupation of people using the technology and typology of the Stillbay culture. This multiplicity of stays can be explained by the favourable location inside the rock cirque, above the water levels rising in the adjacent Wadi Diib, sheltered from the wind blowing from the north and west. The discovery of other traces of the same Late Palaeolithic culture in various places in the region of Bir Nurayet testifies to the fact that the Stillbay communities penetrated the vast areas of the Red Sea Mountains.

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Desert and the Nile.
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Studies in African Archaeology 15
Poznań Archaeological Museum 2018

Agnieszka Czekaj-Zastawny, Joel D. Irish, Jacek Kabaciński and Jakub Mugaj

The Neolithic Settlements by a Paleo-lake of Gebel Ramlah, Western Desert of Egypt

Introduction

From the early 70's of XX century the Egyptian Western Desert was a main research area of the Combined Prehistoric Expedition (CPE). For the first three decades research activity of CPE was focused around the palaeo-lake of Gebel Nabta (Fig. 1). Over 20 years of intensive research allowed to reconstruct a sequence of settlement episodes spanning from the Early to Final Neolithic and correlated with main climatic phases recognized on the territory of the Western Desert (Wendorf and Schild 1980; 1995-96; 2001; Schild and Wendorf 2001; Schild *at al.* 2005). Except of numerous occupations a number of constructions interpreted as astronomic, sacral and social phenomenon, like famous Nabta Playa[1] calendar, rows of anthropomorphic stelae and tumuli were studied (Wendorf and Schild 2001; Nelson 2002; Kobusiewicz *et al.* 2004; 2010; Bobrowski *at al.* 2014).

Only at the beginning of XXI century a part of CPE research interest moved ca. 20 km to the north where another palaeo-lake adjacent from the south to Gebel Ramlah, a rocky massif pronounced in the landscape, witnessed a Holocene

[1] *Playa* is a Spanish-origin term for temporary lake.

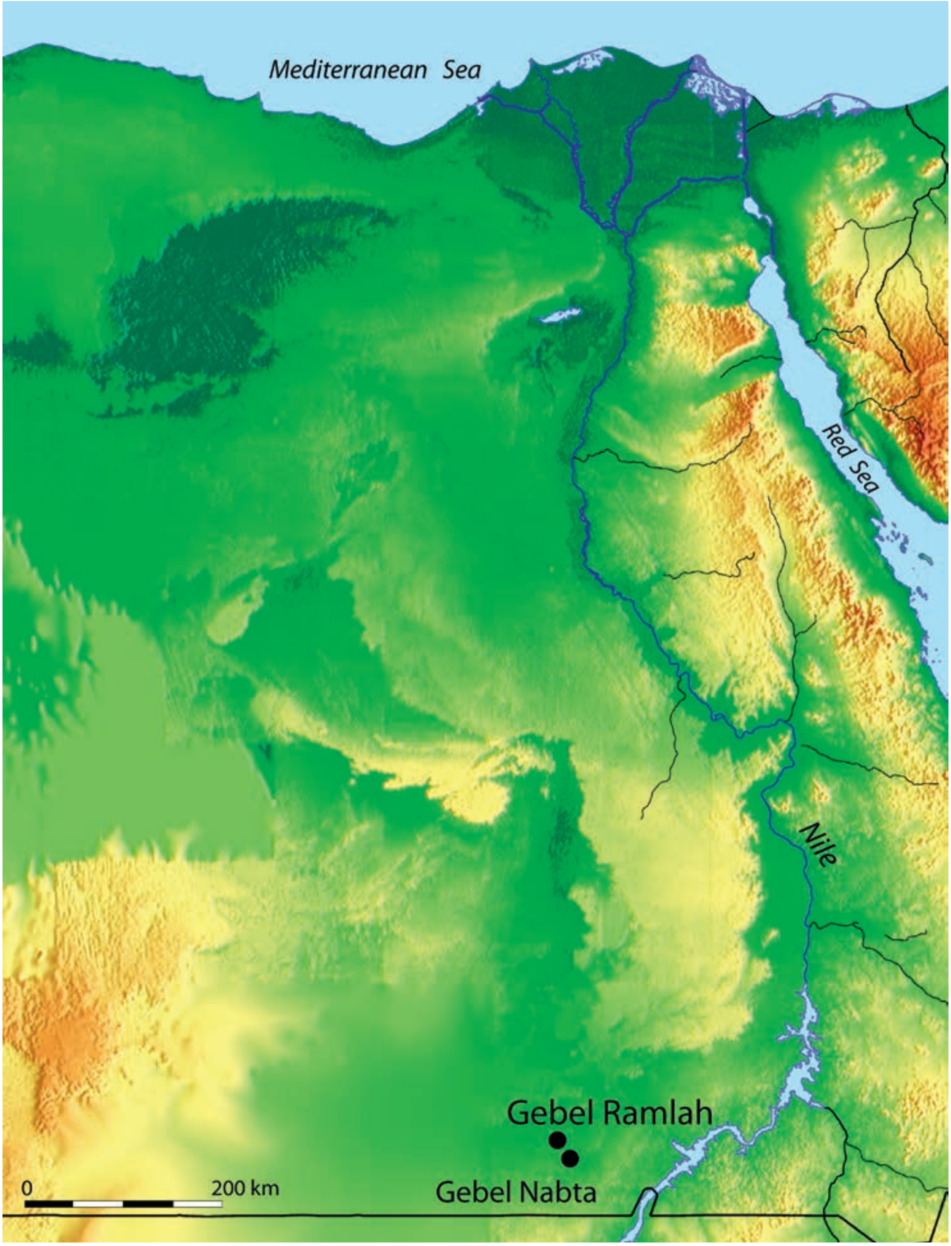

Fig. 1. Location of Gebel Ramlah and Nabta Playa

human occupation. Gebel Ramlah is located ca. 130 kilometers west of Abu Simbel (Fig. 1). Here, in 2001 and 2003 M. Kobusiewicz, J. Kabaciński and J. Irish excavated a complex of three Final Neolithic cemeteries, the first such occurrences known at that time from the Egyptian Western Desert (Schild *et al.* 2002; Kobusiewicz *et al.* 2004; 2010).

In 2009 A. Czekaj-Zastawny and J. Kabaciński have found another Neolithic cemeteries (Czekaj-Zastawny and Kabaciński 2015; Kabaciński *et al.* 2018) and the first children inhumations what resulted in a new CPE project concentrated specifically on burial practices of Gebel Ramlah. Crucial for that research was site E-09-02 – a complex of cemeteries and settlements located on a hillock close to the southern edge of Gebel Ramlah paleo-lake. During seven years of systematic exploration a unique cemetery for neonates, cemetery of adults, small aggregations of graves and single graves were discovered, dated to the Middle, Late and Final Neolithic (Kabaciński *et al.* 2018).

Equally important was a recognition of a settlement context of these cemeteries what was systematically performed in the following years. It resulted in discovery of a dense settlement network spreading all-over along the shores of Gebel Ramlah paleo-lake (Fig. 2).

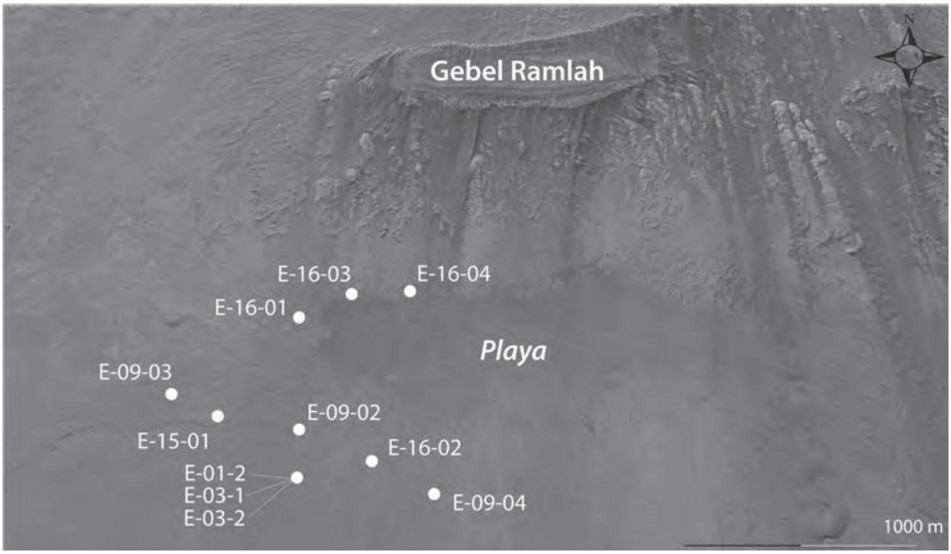

Fig. 2. Gebel Ramlah. Approximate area of detailed surface prospection and main sites indicated in the text

1. Outline of the Neolithic settlement on the Western Desert of Egypt

Over forty years of CPE research allowed to recognize a basic chrono-stratigraphic units of the Neolithic occupation of the Western Desert correlated with climatic fluctuations (Schild and Wendorf 2013). The sequence covers 4 basic periods: the Early, Middle, Late and Final Neolithic, each separated by a remarkable arid period recorded in the form of intensive aeolian sedimentation and erosion. The Early Neolithic (ca. 9300-6150 cal BC[2]) includes 4 cultural units, with the oldest El Adam, than El Ghorab and El Nabta/El Jerar. Dry period between ca. 6150 and 6050 cal BC separates the Early and Middle Neolithic. Climatic improvement allowed again human occupation at around 6050 cal. BC. The Middle Neolithic *sheep and goat herders* (Ru'at El Ghanam) inhabited in the Nabta-Kiseiba area till ca. 5550 cal BC. Short arid phase (ca. 5550-5500 cal BC) preceded the Late Neolithic occupation called Ru'at El Baqar (*cow herders*) and dated between ca. 5500 and 4650 cal BC. After another dry phase (ca. 4650-4600 cal BC) the last phase of the Neolithic – the Final Neolithic began. In Nabta Playa area that Final Neolithic societies are called Bunat El Ansam – *builders of megaliths* and lived there up to ca. 3600 cal BC. The settlement sequence of the Western Desert is bordered by a C-Group occupation that appeared there during climatic improvement around 2400 cal BC after over 1000 years of hyper-arid climatic conditions.

For Gebel Ramlah area we apply a periodization formed for Nabta-Kiseiba region as it valid for all the Western Desert. It doesn't exclude local differences in chronology of some units what is for instance suggested for Early/Middle Neolithic transition (see below).

2. History of the Neolithic occupation in Gebel Ramlah

Several years of archaeological research in the Gebel Ramlah area (between 2001 and 2016) allow to reconstruct general features of the Neolithic settlement around the paleo-lake. The Gebel Ramlah Playa measures approximately 1 x 3 km with the longer axis extending from east to west. It is adjacent to the Gebel from the south and certainly its range was changing during the Neolithic and what is readable today in the landscape is most probable a maximal extension of the lake during the Holocene climatic optimum.

[2] All 14C dates are calibrated with the help of CalPal software, version March 2007 (Weninger and Jöris 2007; Weninger *et al.* 2007).

Morphology of the shore zone of the Playa, modified by erosion and deflation, is diversified. Northern shores, located next to steep southern slopes of Gebel Ramlah, are morphologically uniform with clearly visible lake terraces, cut by short stream channels (*wadi*) running waters from the Gebel to the lake. Settlement traces spread especially on the lover terrace close to the lake shore, on small peninsulas in-between the *wadi*. Southern and western shores of the lake are of different character. The landscape here is characterized by a presence of large and wide river channels with numerous smaller tributaries that were driven waters of vast catchment area to the lake. Hillocks, large peninsulas and gentle slopes covered by settlements are typical morphological forms. They are much more extensive in size comparing to northern shores. Eastern edges of the lake are in majority covered by sand dunes. In places where observations are possible shores seem to be very gentle there and traces of human settlement are less intensive.

During prospections along the shores of the Playa we have recorded a divers evidence of human occupation, including large, long-lasting settlements, small settlements, short-lived camps and single traces of penetrations accompanied by cemeteries, clusters of graves or single burials. Sometimes within larger settlements specific utility zones are observable, comprising flint processing workshops, pits for red-ochre processing, places for plant processing and food preparation or graves.

The oldest possible trace of human occupation comes from site E-16-03. That is a single sherd technologically and stylistically closed to El Adam pottery (type S1 acc. to Gatto 2002: fig. 5.3; Nelson 2002). A vessel was decorated with single rows of stamps made with the help of a denticulated clay disc (Fig. 3).

Fig. 3. Gebel Ramlah, site E-16-03. Early Neolithic, El Adam phase – pottery fragment

Fig. 4. Gebel Ramlah, site E-16-03. Early Neolithic, El Ghorab phase – opposed platform core

Fig. 5. Gebel Ramlah, site E-16-03. Early Neolithic, El Ghorab phase – workshop for triangles' production

Fig. 6. Gebel Ramlah, site E-16-03. Early Neolithic, El Ghorab phase – multiple dihedral burin

On the same site (E-16-03) much more convincing evidence for slightly younger Early Neolithic occupation was recorded. These are several small workshops where blades were extracted from opposed platform chert cores (Fig. 4) as well as a workshop for production of an elongated scalene triangles with short base (Fig. 5). A microburin technique was used for microliths' manufacturing. Single dihedral burin made of a short blade from opposed platform core was spotted next to numerous triangles (Fig. 6). This kind of lithic production is typical for El Ghorab phase (Kobusiewicz 1984:151; Wendorf and Schild 2001: 654).

Possibly with the earliest Neolithic settlement of Gebel Ramlah relates single 14C measurement that comes from one of the fire-places sampled at site E-01-2 CAMP. Charcoal from the fire-place gave the date 8550±210 BP (Rome-1579) what after calibration shows the age around 7653±285 cal BC. Schild and Wendorf (2010: 171) suggest fossil wood use for this and another slightly younger fireplace. However, considering the presence of the Early Neolithic settlements around the paleo-lake, a hypothesis relating this date to some occupation episode seems reliable. This measurement, together with another younger one: 6680±162 cal BC (7775±120 BP – Rome-1578) that most probably

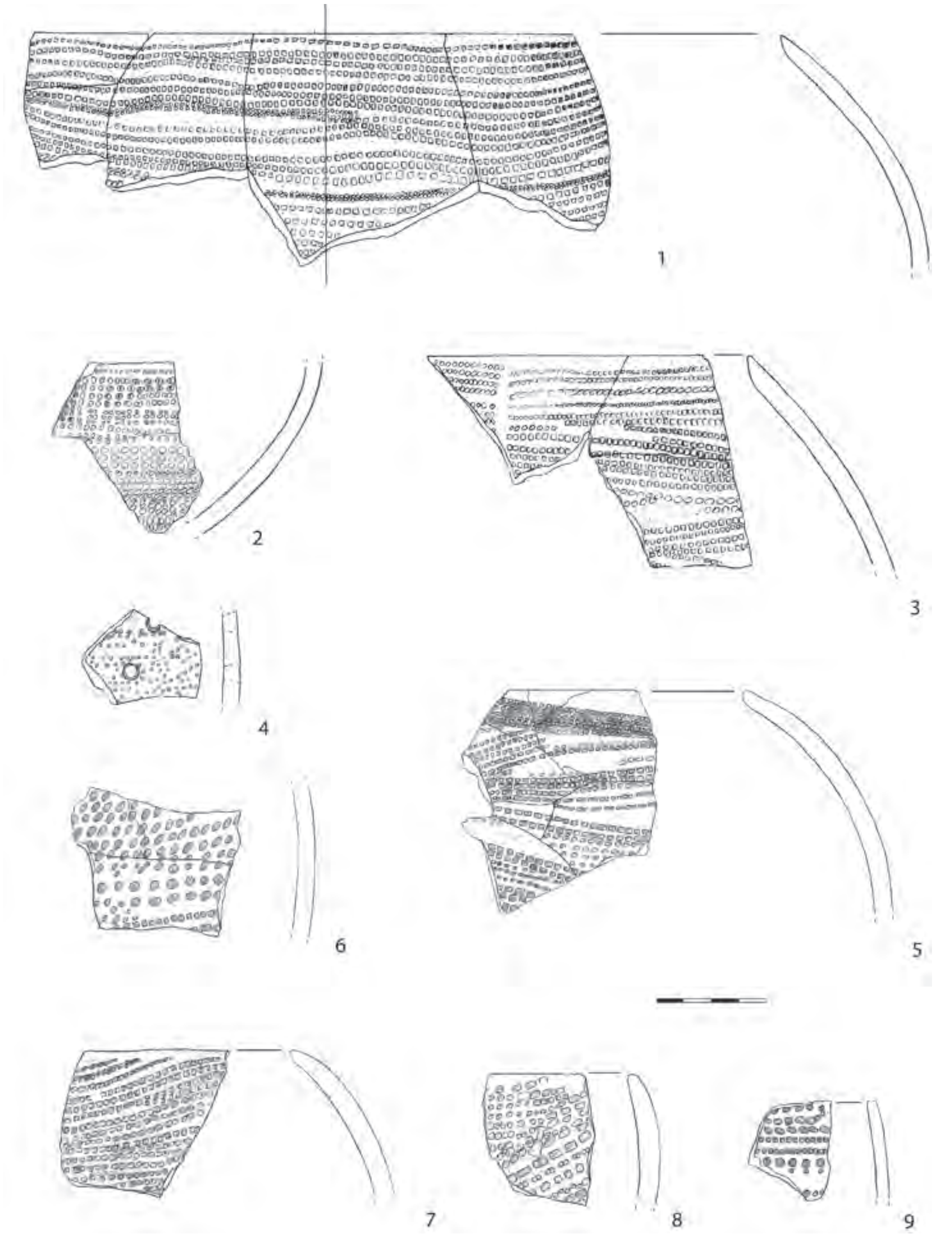

Fig. 7. Gebel Ramlah. Site E-09-02. Early Neolithic, El Jerar phase – pottery from settlement: 1, 3 – feature no. 15; 2 – feature no. 2; 4 – feature no. 22; 5 – feature no. 9; 6 – feature no. 4; 7-9 – feature no. 17

Fig. 8. Gebel Ramlah. Site E-09-02. Early Neolithic, El Jerar phase – pottery from settlement: 1 – feature no. 20, V-shaped beaker on small foot; 2 – feature no. 15, spherical bowl with a herring bone motif; 3 – feature no. 18, large open bowl

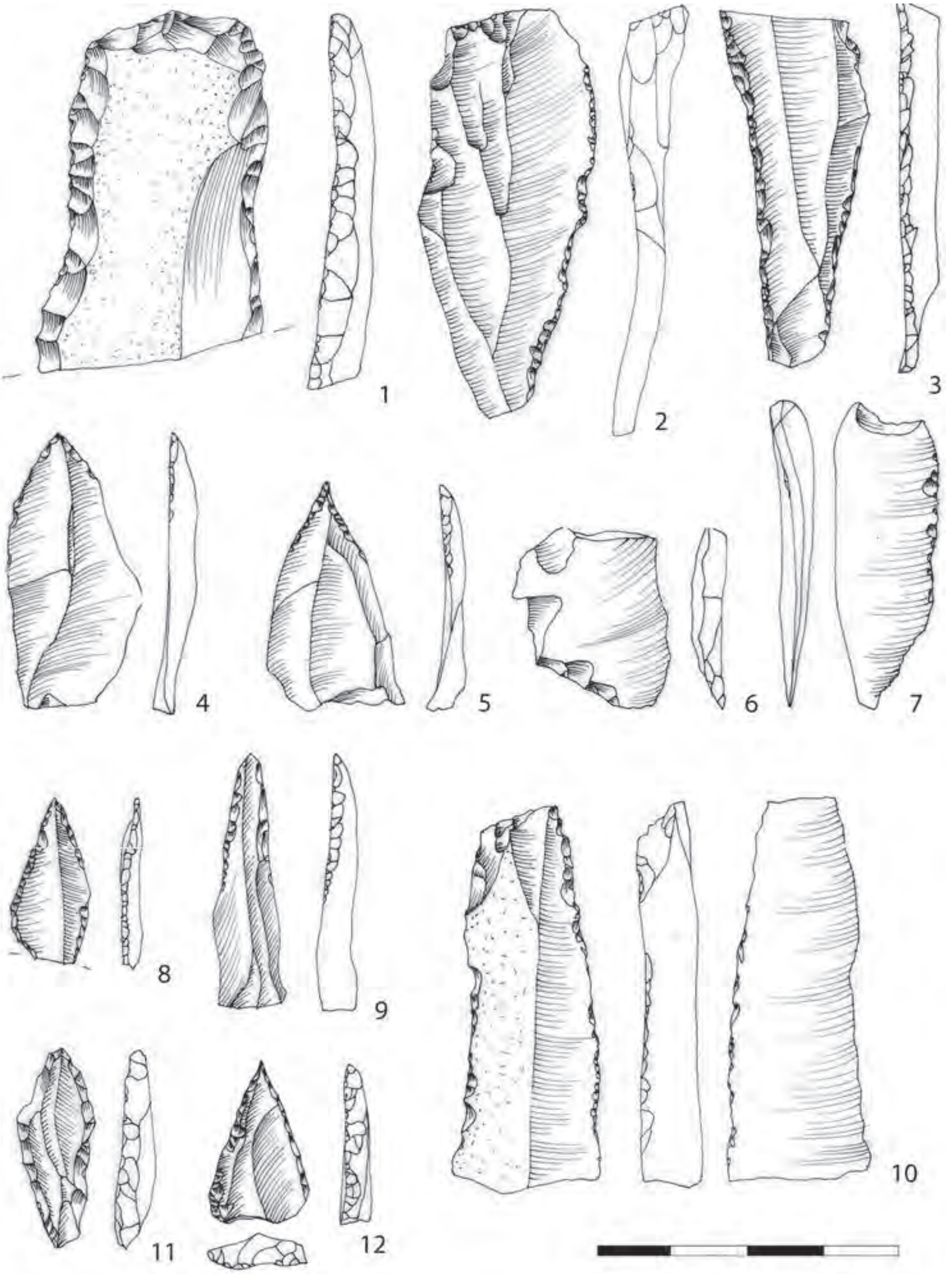

Fig. 9. Gebel Ramlah, site E-09-02. Early Neolithic, El Jerar phase – lithics from settlement: 1, 3-7, 10 – feature no. 15; 2 – feature no. 13; 8-9, 11 – feature no. 20; 12 – feature no. 2

Fig. 10. Gebel Ramlah, site E-09-02. Early Neolithic, El Jerar phase – harpoon made of animal bone

point to the beginning of El Jerar phase, are till now the oldest 14C dates for the Early Neolithic of Gebel Ramlah area.

The most intensive occupation around the paleo-lake is related to El Jerar phase that developed during the climatic optimum of the Holocene. At ca. 6500 cal BC is dated the oldest burial discovered so far in Gebel Ramlah, at the site E-15-01.

Several settlements of that unit were recorded. The most characteristic feature of El Jerar is pottery – very uniform from technological, morphological and stylistic point of view. It is made of a locally extracted clay (silt) with admixture of fine crushed stones, sand and sometimes mica. Its reddish color and hardness show high temperature of firing and advanced firing technique as well. Vessels' walls are medium-thick, mostly 6-7 mm sometimes up to 10 mm in the case of larger forms. Majority of forms are spherical or open bowls (Fig. 7; 8:3). Rarely V-shaped beakers on small foot are present (Fig. 8:1). The most distinguished feature is decoration: a carpet-like covering whole the exterior surface of every vessel. These are bands of imprints made with the help of denticulated clay discs mounted several in row on a stick rolled over the surface of the pot (Jórdeczka *et al.* 2011: fig. 12). This type of ornamentation is the same like that distinguished and called *R4* by Gatto (Gatto 2002: fig. 5.3). On some forms a herring bone motif placed horizontally below the rim is visible, made with a flint edge (Fig. 8:2). Lithic inventories accompanied pottery assemblages are dominated by retouched flakes and blades, often denticulated and notched (Fig. 9). Typical Ounan points were not present in settlement features but recorded on the sites' surface. In feature No. 2 (site E-09-02) with numerous El Jerar pottery a triangular point with retouched base was recorded (Fig. 9:12), so far linked with the Middle Neolithic period. Relatively numerous perforators (Fig. 9: 4-5, 8-9, 11) point to a specific activities undertaken on the site. Unusual find – a fragment of bone harpoon comes from site

E-09-02, feature No. 17 (Fig. 10). That last settlement is radiocarbon dated to ca. 6300 cal BC.

The Middle Neolithic period is poorly recognized. No settlements were found from that time yet. However there are two finds that confirm the Middle Neolithic human occupation of the Gebel Ramlah area. The first is a single burial of a 5.5 years old child (Burial 7/2014), without any equipment, dated to ca. 5680±26 cal BC (6775±30 BP – Poz-63828; Fig. 11). About 200 years older is a colie consisting of a triangular pendant made of animal long bone and a string of ca. 200 ostrich egg shell beads (Fig. 12). A bead from this jewelry gave a date 5967±45 cal BC (7090±50 BP – Poz-54443) what places this find at the very beginning of the Middle Neolithic period.

Fig. 11. Gebel Ramlah, site E-09-02. Middle Neolithic – Burial 7/2014

Fig. 12. Gebel Ramlah, site E-09-02. Middle Neolithic – colie consisting of a triangular pendant made of animal long bone and string of ca. 200 ostrich egg shell beads

Much more intensive evidence of human settlement is confirmed for the Late Neolithic period. The most representative is the site E-16-02 from where comes a large collection of typical Late Neolithic pottery (Gatto 1998; 1999 cited in Nelson 2001; 2002; Gatto 2010). It is made of a lake clay with a scarce admixture of sand and fine crushed stones. Pottery is completely undecorated with smoothed surface and relatively thin walls (5-7 mmm in average). The only forms recorded are spherical and open bowls (Fig. 13). The Late Neolithic lithic production

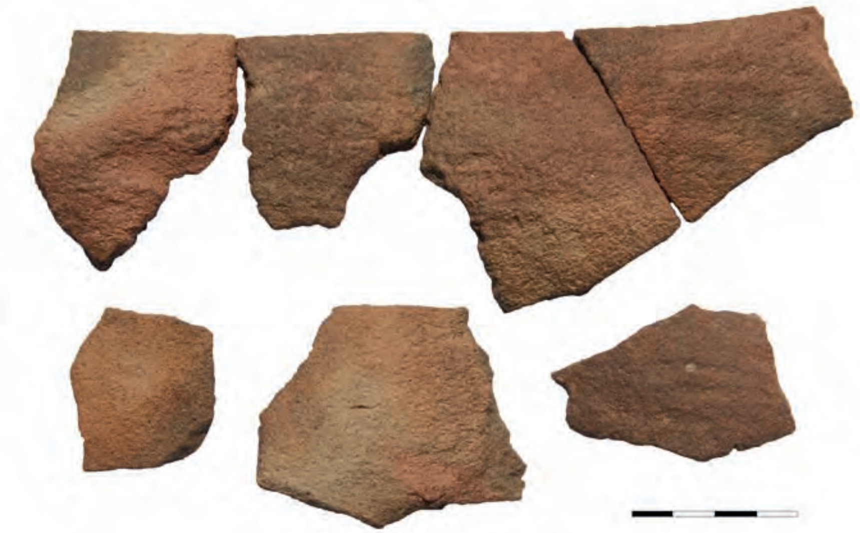

Fig. 13. Gebel Ramlah, site E-16-02. Late Neolithic – pottery

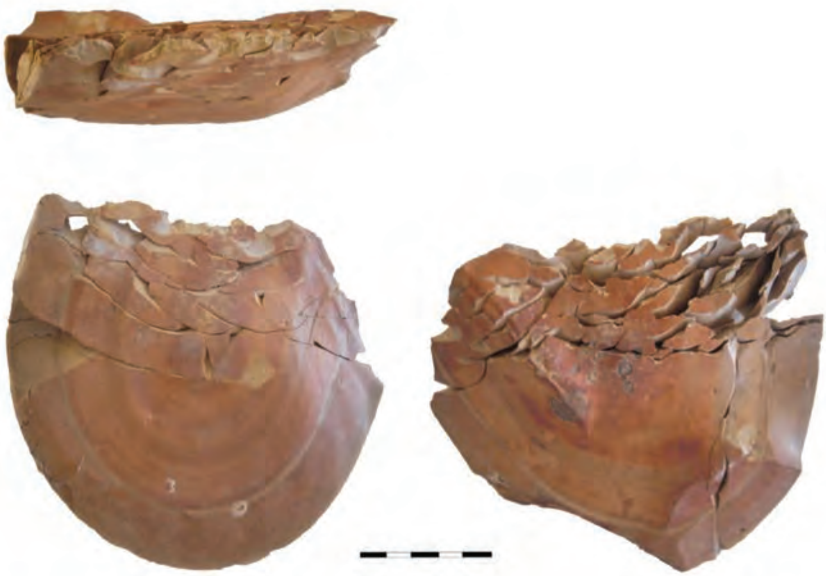

Fig. 14. Gebel Ramlah, site E-09-02. Late Neolithic – core refitting

Fig. 15. Gebel Ramlah, site E-16-03. Late Neolithic – retouched side-blow flake

based on simple flake technology (Fig. 14). Flakes removed from cores have edges covered by invasive abrupt and sometimes denticulated retouch. Bifacial surface retouch is applied for production of barbed points, unless bifacial technology seems to be present already in the Middle Neolithic (Mugaj 2016). Side-blow flakes are typical for this period (Fig. 15). For the first time in the Gebel Ramlah area a rectangular stone palettes appear on settlements, numerous later in the Final Neolithic burials.

At least two burials are connected with the Late Neolithic occupation. The first (Burial 3/2014) comes from site E-09-02. Most probably that is a skeleton of an adult women directly dated to 4943±63 cal BC (6045±45 BP – Poz-63827). The second is an inhumation of ca. 30 years old male found at site E-16-01 (Burial 1). A bifacial barbed flint point was placed by a sacrum bone (Fig. 16). Another confirmation of the Late Neolithic occupation are series of 14C measurements from fire-places from sites E-01-01 and E-01-02 CAMP (Bobrowski *et al.* 2006; Schild and Wendorf 2010).

The last period of intense human presence around the Gebel Ramlah lake is the Final Neolithic. It is known mainly form numerous cemeteries: E-01-02, E-03-1 and E-03-2 (Kobusiewicz *et al.* 2010), two cemeteries from site E-09-02 (Kabaciński *et al.* 2018) and E-09-04 (Czekaj-Zastawny and Kabaciński 2015). Evidence for settlements is ambiguous as till now only pottery fragments from surface or sub-surface are known with settlement features lacking.

Fig. 16. Gebel Ramlah, site E-16-01. Late Neolithic – Burial 1

For the first time a rich collection of vessels comes from graves (cemeteries E-01-02, E-03-1, E-03-2). It is strongly diversified containing both locally made pottery as well as numerous imports (for instance black-topped vessels or decorated tulip beakers – Gatto 2010). Locally produced pottery is made of a lake clay with possible marl and Qusier Clastic Member admixture (Nelson 2002). Pottery from settlement context we have recorded so far (site E-09-02) is either undecorated or with corrugated rims only (Fig. 17). Vessels from cemeteries, if decorated, have outside walls covered by ripples or zig-zag's. Morphology of pots is less uniform than in earlier periods but always these are spherical forms including spherical and open bowls (often deep), or conical forms, and ostrich egg containers (Fig. 18).

The only lithic artefacts that can be indisputably linked with the Final Neolithic lithic production were recorded in burials from cemeteries E-01-02, E-03-1 and E-03-2 (Kobusiewicz *et al.* 2010). These are mainly segments, rarely triangles, made of agate or chalcedony accompanied in single cases by large Helwan points made of chalcedony or Egyptian flint, single massive blades with invasive retouch or unretouched flakes or blades. Undoubtedly these are purposely selected pieces and as such cannot be a basis for a comprehensive analysis. Most probably to Final Neolithic horizon belong segments and triangles found on the surface of E-09-02 site together with pottery of that time (Fig. 17).

Long series of 14C measurements from graves places cemeteries of Gebel Ramlah between 4500-4300 cal BC, for the beginning of the Final Neolithic (Kabaciński *et al.* 2018).

Fig. 17. Gebel Ramlah, site E-09-02. Final Neolithic – pottery and lithics

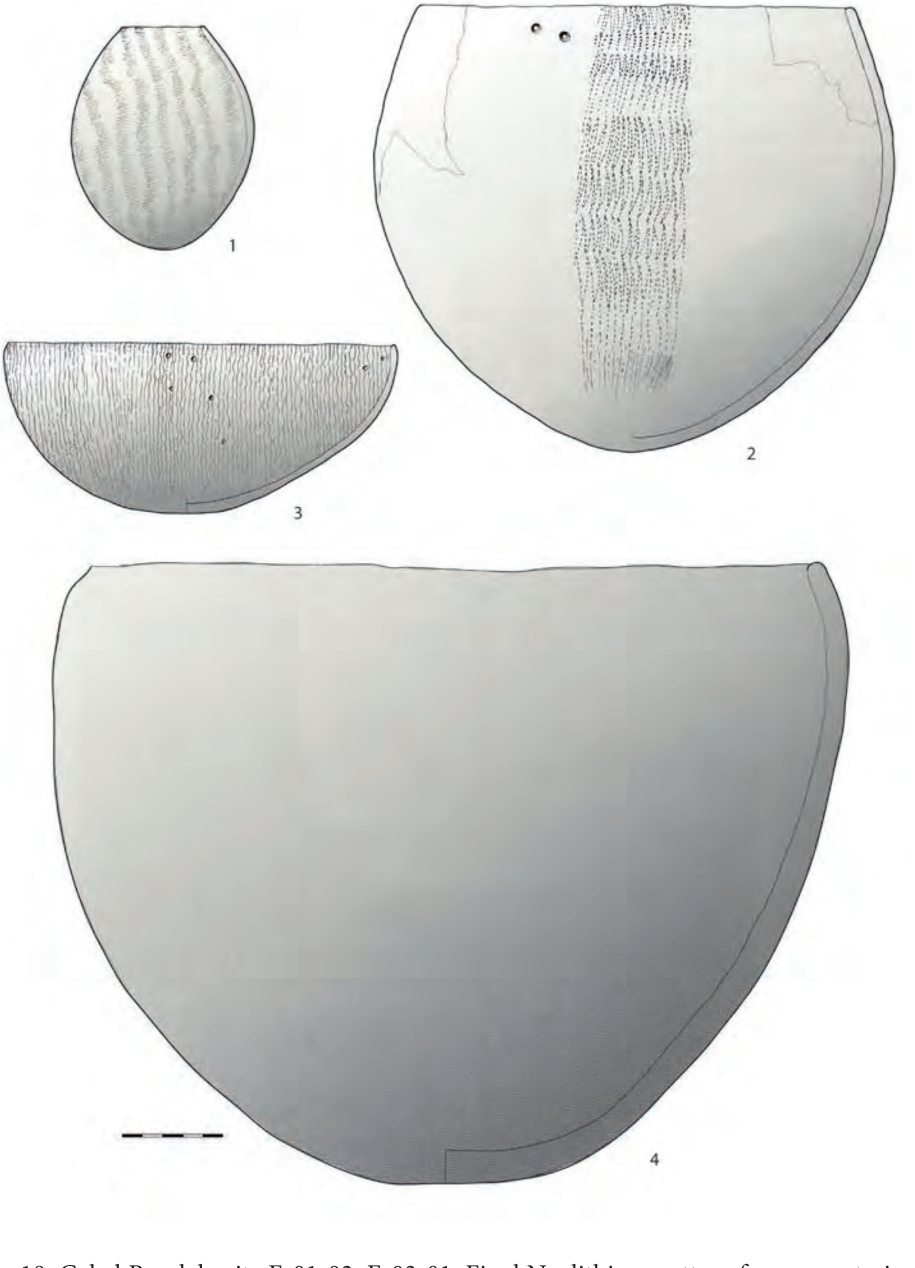

Fig. 18. Gebel Ramlah, site E-01-02, E-03-01. Final Neolithic – pottery from cemeteries: 1 – cemetery E-03-2, burial 9; 2 – cemetery E-01-2, burial 3; 3 – cemetery E-03-1, burial 4; 4 – cemetery E-03-2, surface (after Kobusiewicz *et al.* 2010)

3. Functional differentiation of settlements and its sepulchral context

The region of Gebel Ramlah witness the presence of human settlement for the most of the Neolithic period. The record is diversified: large settlements are surrounded by numerous traces of penetrations and sometimes, in younger periods, accompanied by cemeteries.

In the moment from the very beginning of the Early Neolithic only single sherds of El Adam pots are known suggesting occasional penetrations of the Gebel Ramlah area (site E-16-03). Much clear evidence proves El Ghorab settlement, unless it is very one-sided as only flint workshops were identified without a single case of a settlement. El Ghorab workshops for blades' and triangles' production were located very close to the water, on the low northern terrace of the lake. The intensity of flint production and abundance of production rests suggest that sources of raw material were somewhere nearby the lake, perhaps within the massif of Rebel Ramlah.

The explosion of human occupation is related to climatic optimum of the Holocene and El Jerar phase. At that time the lake was most probably a permanent one. Settlements of that time, permanent as well, were large and structured, exposing functionally different activity areas (sites E-09-02, E-16-01, E-16-03 and E-16-04): flint and chert workshops, places for grain processing (large block grinding stones and slab milling stones – Fig. 19), fireplaces for cooking containing burnt animal

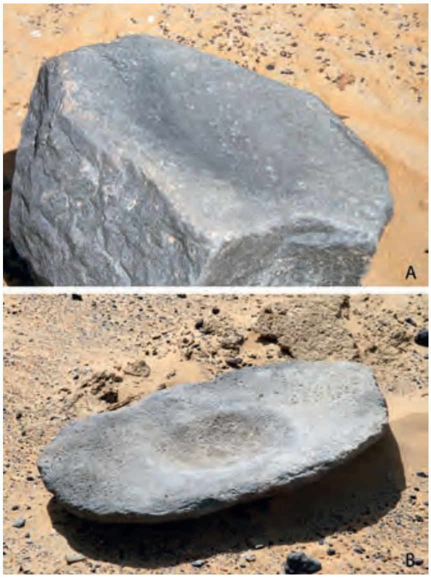

Fig. 19. Gebel Ramlah, site E-16-03. El Jerar phase: A – block grinding stone; B – slab milling stone

Fig. 20. Gebel Ramlah, site E-09-02. Feature 17 for red ochre processing

Fig. 21. Gebel Ramlah, site E-16-01. Teathering stone

bones and surrounded by smashed pots, pits for red ochre processing (Fig. 20) and tethering stones for tiding animals (Fig. 21). At the borders of settlements single burials were recorded, with contracted body on left or right side.

The only evident proof for the Middle Neolithic occupation are two graves dated to that period. Directly dated pendant may be placed either to dry period between the Early and Middle Neolithic or just after it. In the light of evidence from the Gebel Ramlah area the Middle Neolithic period seems to be very problematic. The occurrence of a very characteristic Middle Neolithic triangular points in features with numerous El Jerar pottery at site E-09-02 would suggest that these points should be dated for earlier period. What strikes, is almost complete absence of the Middle Neolithic settlements. Also on neighboring territories (Nabta, Kiseiba) materials from that period are poorly recognized.

The Late Neolithic settlement is clearly less intensive when compared to El Jerar. Sites are less numerous and cover much smaller areas. Good example is site E-16-02. It has ca. 50 meters in diameter. Few fire-places containing burnt animal bones (including cattle and sheep/goat bones) were surrounded by several broken vessels and flint/chert artefacts. Seldom fragments of milling stones and grinders are recorded as well (Fig. 22). From that period single graves located outside settlements are known. At the beginning of the Final Neolithic separated cemeteries appeared.

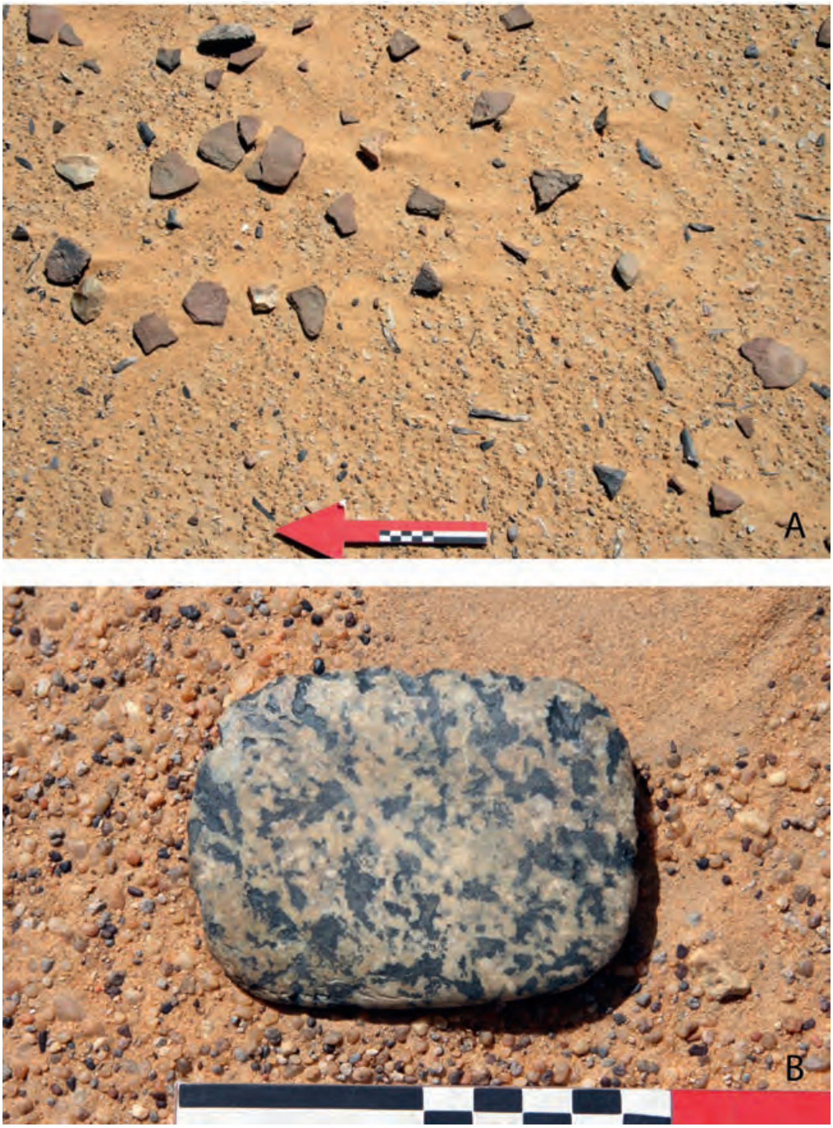

Fig. 22. Gebel Ramlah, site E-16-02. A – concentration of pottery fragments, lithics and animal bones; B – rectangular stone palette

Basing on available data in the Final Neolithic a significant change in the settlement system took place. There are no traces of stabile permanent settlements like it was before. In fact, there is no clear settlement sites at all. We recorded dispersed fragments of pottery nearby cemeteries only. It could be caused by a change in economy forced by desertification. On the other side human presence in the Gebel Ramlah area had to be at least semi-permanent. That is proven by numerous primary burials and the occurrence of a separate cemeteries. Up to now we have excavated six cemeteries dated to Final Neolithic: E-01-02; E-03-1 and E-03-2 (Kobusiewicz *et al.* 2010), E-09-04 (Czekaj-Zastawny and Kabaciński 2015), E-09-02 – cemetery for infants (Fig. 23) and E-09-02 – cemetery for adults (Kabaciński *et al.* 2018), and at least another one was recorded. Up to this moment no traces of younger occupation was found in Gebel Ramah.

Fig. 23. Gebel Ramlah, site E-09-02. Cemetery for neonates: burial 6 (female with a neonate on her chest)

3. Final Remarks

Almost 10 years of archaeological research in the Gebel Ramlah area document a long sequence of human occupation from the beginning of 9th to mid of 5th millennium cal BC. During that time the intensity of occupation varied. Its maximal development is related with El Jerar period, being connected with the climatic optimum of the Holocene, dated in the Nabta Playa area between ca.

7050 and 6150 cal BC (Schild and Wendorf 2013). During that time the lake was a permanent one with developed fauna and flora, as it was recognized in the case of Nabta and Kiseiba (Gautier 1984; 2001; Wasylikowa *et al.* 2001). Nabta was at that time surrounded by savanna with *Acacia* trees growing not only at the water basins but quite far from the lake (Wendorf and Schild 2001: 651-652). By the Gebel Ramlah lake numerous large settlements existed, and traces of short-lived stays and penetrations of the region are very distant from the lake shores indicating favorable environmental conditions.

Presence of numerous workshops for chert processing, located around the lake, but especially on north-western and northern terraces, suggest that sources of chert were nearby, most probably within the massif of Gebel Ramlah. It could also be a place where other stone materials, like limestone or sandstone were extracted.

Beside the time of climatic optimum, Gebel Ramlah lake was a temporary basin supplied with water during the rainy seasons. Artifacts (grinders, fragments of milling stones, flint blades etc.) found on the surface of the lake in its central part suggest that during later periods (Middle, Late or Final Neolithic) its surface was temporarily accessible for different activities and penetrated by people. From the Middle Neolithic one may observe a subsequent change in settlement pattern, most probably highly influenced by deterioration of climatic conditions and gradual desertification of the area. In the same time people became much more mobile having contacts with the Nile valley, Red Sea coast and sub-Saharan areas (Kobusiewicz *et al.* 2004; 2010). Final desertification of the area forced them to withdraw from the Gebel Ramlah territory around mid-5th millennium cal BC.

Acknowledgements

The research was sponsored by the Polish National Science Centre (grant No. NCN 2012/05/B/HS3/03928) and by the Combined Prehistoric Expedition Foundation. The authors would like to thank both institutions for that support.

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Desert and the Nile.
Prehistory of the Nile Basin and the Sahara.
Papers in honour of Fred Wendorf
Studies in African Archaeology 15
Poznań Archaeological Museum 2018

Hebatallah A. A. Ibrahim

Neolithic Aspects of the Western Desert and its Possible Role During the Following Time Periods in Egypt

Unlike most of the Western Desert basins in Egypt, Nabta Playa basin contains several significant sites. It was one of the biggest Neolithic localities, about 140 km southwest of present-day Abu Simbel city and 30 km north of the Egyptian-Sudanese border (Fig. 1). It is one of the most unique prehistoric areas in the Western Desert that contains several hundreds Holocene age sites, which represent the entire time span of human settlement, from the Early to the Late Holocene about 10.000 – 4500 BP, when increasing aridity forced the general abandonment of the desert (Schild and Wendorf 2004a: 1-2).

During the Neolithic period, the Western Desert was not a very dry and lifeless place as it is now. It was receiving a fair amount of rainwater that made it a good environment for several Neolithic societies to establish seasonal camps on lakeshores, herd their own cattle, manufacture fine decorated pottery, make their distinctive lithic tools that suite their needs and have their own beliefs and ceremonies around 9500 years ago. The Neolithic occupants settled in several localities in the Western Desert before the first known Neolithic settlements along the Nile Valley (Wendorf and Schild 2004: 14-15).

Nabta Playa megalithic ceremonial centre is one of the oldest in the world, and unique in Africa. At which, large stone constructions were erected during the last two phases of the Neolithic period, Late and Final Neolithic (Cattle Herders and the Megalith Builders) between 6500 and 4100 PB (Schild and Wendorf

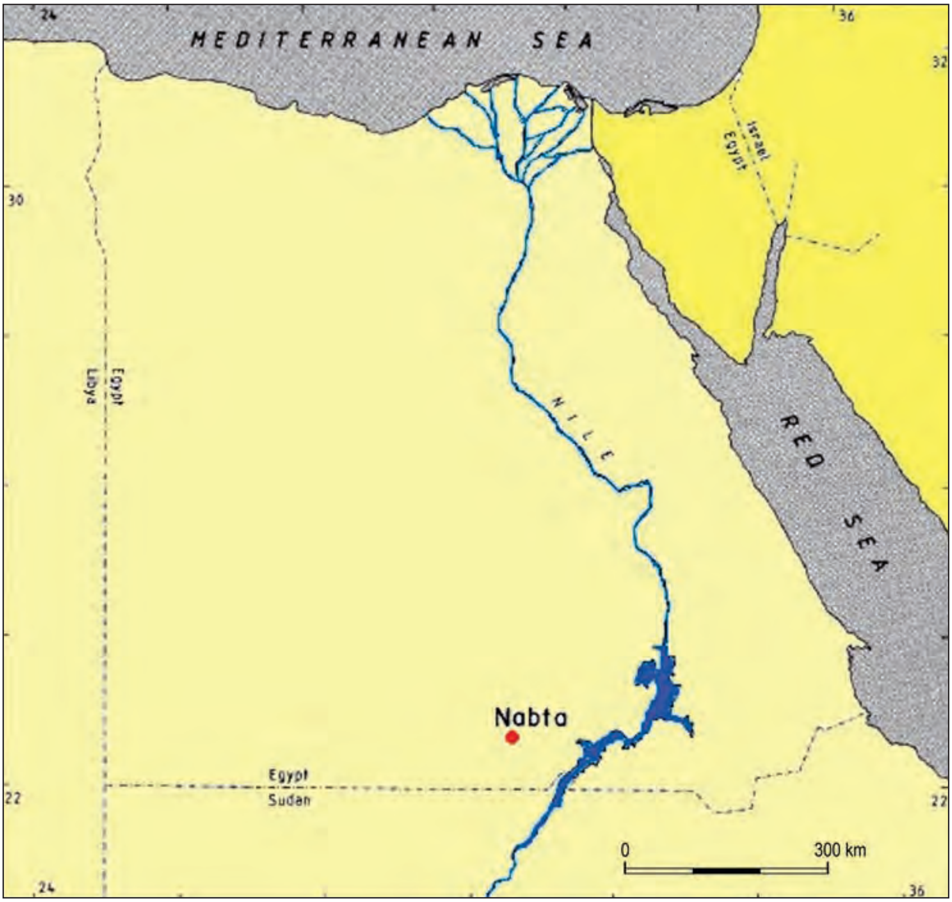

Fig. 1. Map of Egypt showing the location of Nabta Playa

2004b: 14-15). The megalithic centre of Nabta Playa contains several megalithic structures included: the Valley of Sacrifices, the calendar circle, the 4 megalithic large groups of stelae and the megalithic alignments (Fig. 2). The Late and Final Neolithic occupations were mainly depended economically on cattle, and were famous for the creation of these features, which required a high level of complexity and social organization, and the clustering them led the archaeologists to refer to Nabta Playa as a 'regional ceremonial centre' (Cattle Herders ca. 5500– 4500 BC; Megalithic Builders ca. 4500-3500 B.C) (For more details see: Schild and Wendorf 2004; Ibrahim 2013; Ibrahim 2014).

The idea of megalithic structures that started at Nabta large basin in the Western Desert appears to be extended to other areas in the Nile valley and some sites of the Eastern Desert during the Neolithic and into the following periods of Predynastic and Early Dynastic Egypt. The megalithic site at Nabta Playa might have some kind of influence on the Nile Valley and the Eastern Desert that the megalithic tradition appears to be continued in the later periods of Predynastic and Early Dynastic, although in different representations and amounts, and the limited number of examples were found.

Nabta Playa became a dry desert around 3350 BC, when the herders had to move to some place not far, like the Nile Valley, and it may be there that the prehistories of Upper Egypt and the South Western Desert have met. The Late and Final Neolithic megalithic structure of the Nabta Playa may be regarded as the earliest representations of features that continue into the Predynastic and Dynastic periods (Schild and Wendorf 2004b: 15).

At the Eastern Desert, several archaeological sites with a crude megalithic stone architecture were recorded. In Wadi Elei east of the Wadi Allaqi, Wadi Er Arib in wadi

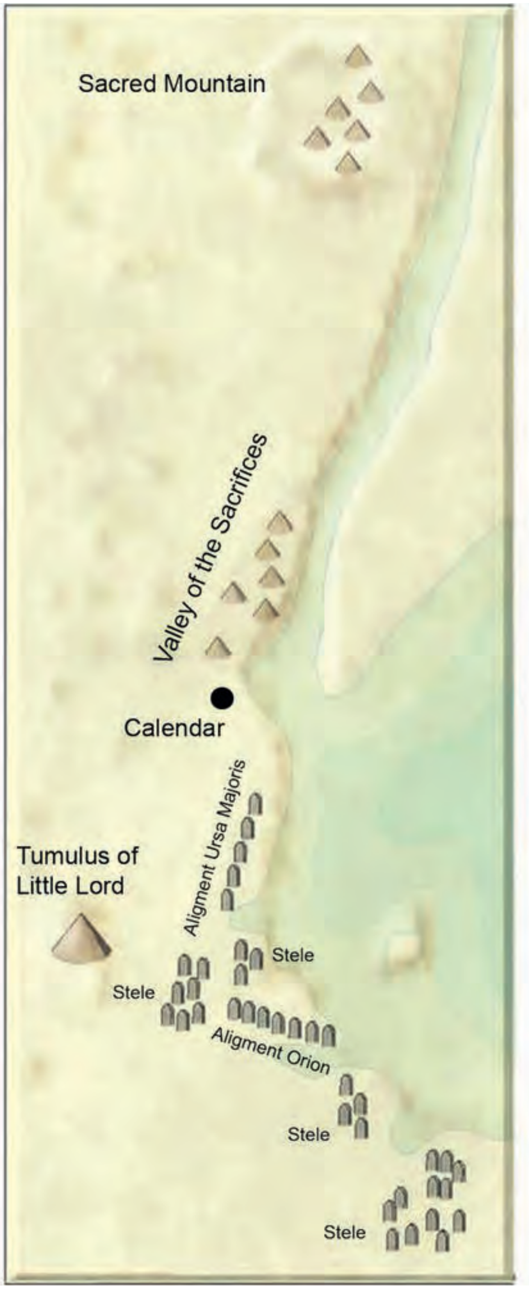

Fig. 2. The Megalithic structures at Nabta Playa (courtesy of R. Schild)

Shurafa el-Sharki, at the southeastern corner of the Eastern Desert of Egypt, and Wadi Atulla that located in the central part of the Eastern Desert of Egypt, north of Wadi Hammamat.

1. Wadi Elei Region

In the middle of the Nubian Desert, along the Wadi Elei (Fig. 3), east of the Wadi Allaqi, there are several archaeological sites related to the Predynastic period. In this area a dispersed village with rough stone architecture, and burial

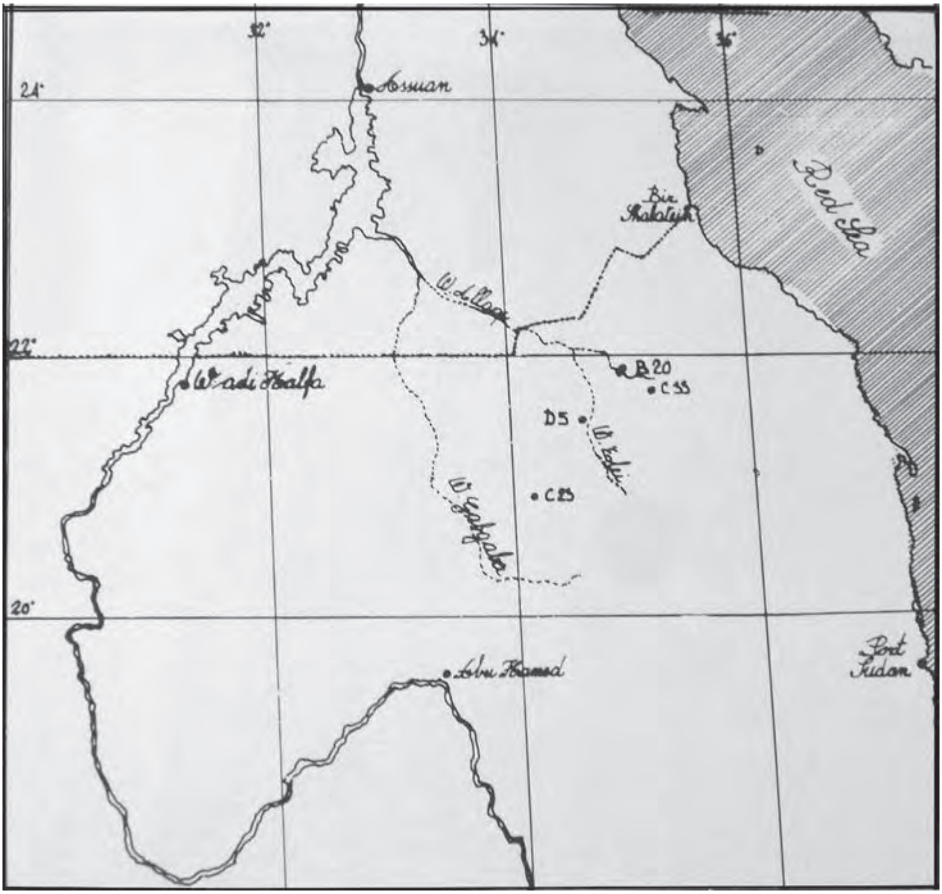

Fig. 3. Map showing the location of Wadi Elei, east of Wadi Allaqi, southeast of the Eastern Desert, Egypt (after Sadr *et al.* 1994: 68)

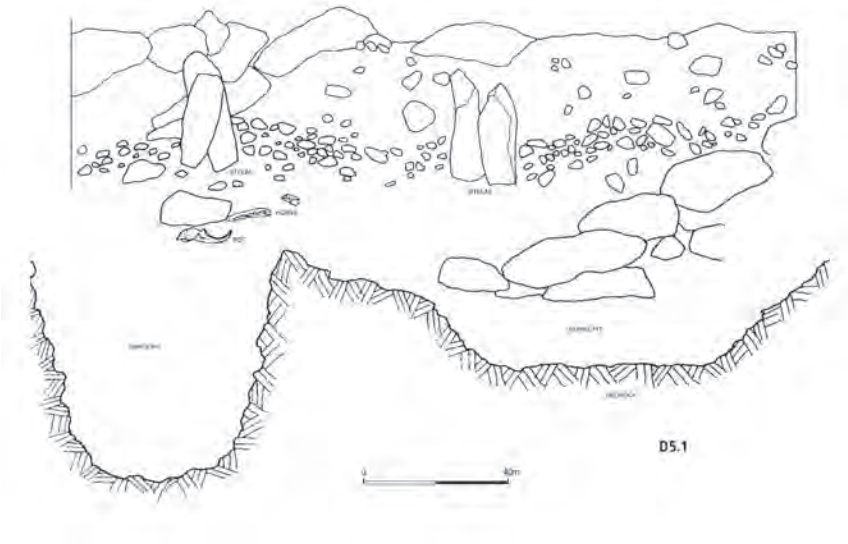

Fig. 4. Profile of a burial type of Wadi Elei, southeast of Egypt (after Sadr 1997: 71)

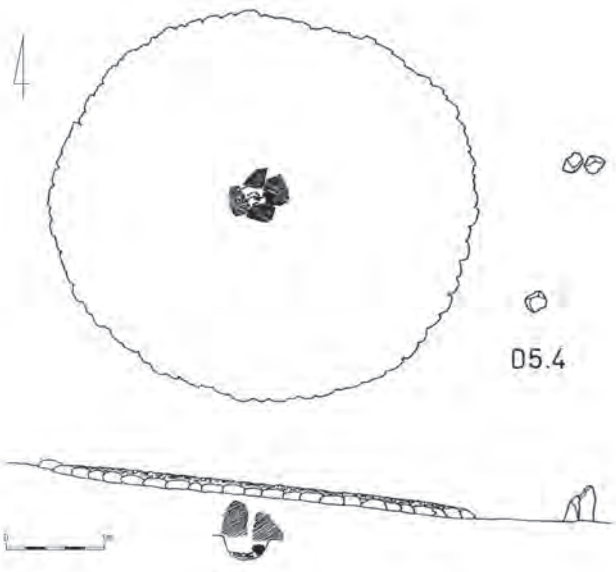

Fig. 5. Plan of a grave type at Wadi Elei, south of the Eastern Desert (after Sadr 1997: 72)

grounds were located. The dates from this site suggested to the 5th – 4th millennia B.C. and the late 2nd millennium B.C (Sadr 1997: 67).

At Wadi Elei, several tumuli burials were recorded, relatively undisturbed graves that have a superstructure composed of rings of boulders filled with sand. Within the circles were upright stelae, or slabs of stones marking the offering area (Friedman and Hobbs 2002: 182). The stone features extend along the Wadi in scattered clumps for at least 5 km. Among them there were many potsherds and stone tools of entirely local row material. The ceramics were associated with the Predynastic period (for more details see: Sadr 1997; Sadr *et al.* 1994; 1995). Several radiocarbon dates, provided from the excavated graves, are comparable with the date of the village as assessed by ceramics (Sadr 1997: 67-68).

Three types of graves were documented; most contained offerings such as a polished stone pendants, beads, ceramic and in some one case gold objects. At the first type of graves, the burial shaft was located to the east of the offerings pit, they were constructed of boulders filled with sand and approximately 7 m. in diameter, revealed an offering area in the centre of the tumulus. These graves were marked by megalithic stelae (Fig. 4, 5). The overall Predynastic character of these finds was confirmed by radiocarbon dates of ca. 4475 BC. Another grave gave date of ca. 3962 BC. One of the graves types had low superstructures of circles of stones capped with small pebbles. To the east, it had two megalithic stelae placed like a gate (fig. 6). This grave gave a radiocarbon date to ca. 1295 BC. Another type of grave was like a cairn of stones rather than a ring of boulders. No data is available to know if it was associated with any grave goods, because it was destroyed by looters (Sadr *et al.* 1995: 207-11; Sadr 1997: 68-73). Faunal remains from the site suggest a pastoral population, while the ceramics suggest a population in contact with both Upper Egypt and Eastern Sudan (for further readings see: Sadr 1991)

2. Wadi Er Arib Cemetery

The site was noted by Murray, 1926, and recent archaeological research has been conducted in the area. According to Murray, the site was recorded as a remarkable cemetery, which is located at the foot of the mountain of Er Arib, in wadi Shurafa el-Sharki, at the southeastern corner of the Eastern Desert of Egypt, north of Gebel Gerf. It was marked by a low rubble wall, about 25 cm high, with an entrance at the east marked by a high monolith, now fallen, around 6 m in length. In the centre of the cemetery is a platform, about 50 cm high, formed of rubble walls filled in with earth. Three other megalithic stelae or standing stones,

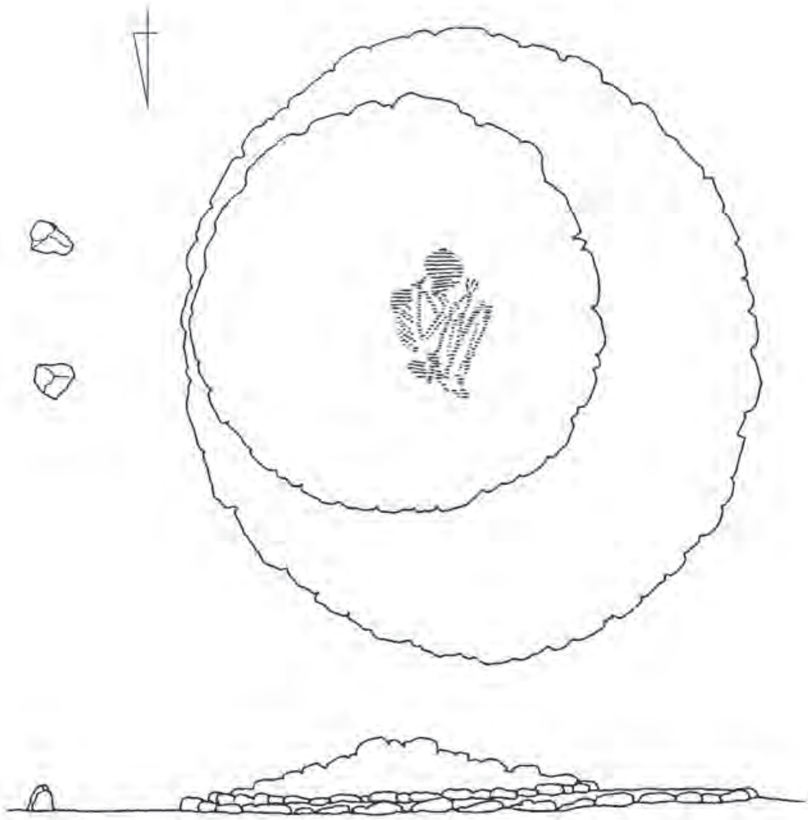

Fig. 6. Plan of a burial type at Wadi Elei (after Sadr 1997: 75)

now fallen, can be seen in the eastern part of the platform. The cemetery contains around 300 low stone tumuli. To the east, outside the walls, there is a subsidiary cemetery, which contained 41 graves. Three graves of the main cemetery were excavated, and one in the subsidiary cemetery (Fig. 7). All contained bones of oxen at a depth of 50-60 cm. The bones were found in a confused state suggesting that the animals had been cut up before they were buried. No ceramics were associated with the site, except for one potsherd, which was found in the fill of one of the graves, representing C-Group type pottery. The burials could be dated to the

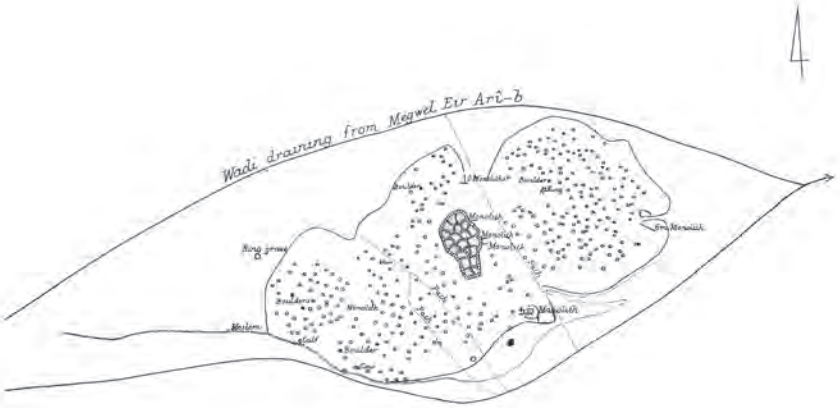

Fig. 7. Sketch map showing Wadi Er Arib cemetery (after Murray 1929: 250)

C-Group or later, who inhabited Lower Nubia during the Middle Kingdom. These people undoubtedly possessed cows, because cow heads and horns are common in their cemeteries. They also setup megalithic standing stones. These stones were found in Faras and Dakkah, where the rough outlines of a cow were scratched on two of the stelae. A similar cemetery was recorded at Wadi Abu Had, the Sudanese tributary of Wadi Allaqi (Murray 1926: 248-249).

3. Wadi Atulla Tomb

In Wadi Atulla, located in the central part of the Eastern Desert of Egypt, north of Wadi Hammamat (Fig. 8), a burial site was found, which indicated multiple occupants. The closest finds of this site are parallel with the Tasian. Conventional radiocarbon dating of the remains provided dates of between ca. 4970 and 4455 BC. Ceramics analysis suggests that they were locally made. The recent discovery of similar material deep in the western desert indicates that the makers of these ceramics were apparently far-ranging desert dwellers. The presence of related pottery at various locations in the Egyptian Nile Valley may be the most distinctive

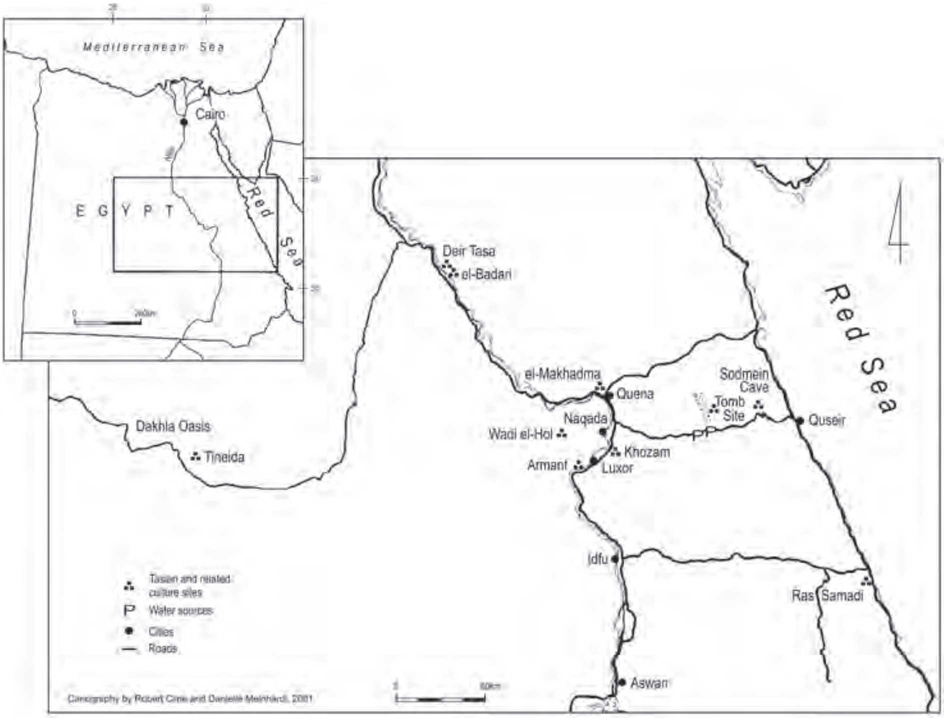

Fig. 8. Map showing the location of Wadi Atulla tomb (after Friedman and Hobbs 2002: 179)

evidence for the early interaction of the desert people with those in the Nile Valley (Friedman and Hobbs 2002: 178).

Excavation at the site yielded human bones, pottery, beads, palettes, lithic tools and sea shells. The tomb is located on the eastern edge of a sloping ridge overlooking a confluence of two wadis. As a result of multiple disturbances in the site, probably in ancient and recent times, it was difficult to determine the original above-ground appearance of the superstructure, or to determine what induced its users to select such a seemingly unlikely place for the tomb. According to Bedouin reports about the site, the area contained several burials. A single upright stone at the edge of the ridge was found. Additionally, a prominent cluster of around 20 boulders, darker than other stones in the area, were located lower on the ridge, protruding from the ground. Probably these stone slabs were brought in from the Wadi bed below (Friedman and Hobbs 2002: 178-182).The megalithic structures at the Eastern desert could be used by different groups of people who did not have any connection with the people of Nabta, but putting in mind that there is an evidence for an active trade network between the Western Desert and the Nile Valley by the beginning of the Final Neolithic and the existence of some goods and shells from the Red Sea might show that there was some direct or indirect connections between Nabta Playa and Eastern Desert.During the following period, the Early Dynastic period, there were numerous examples for using stone megaliths as tomb stelae beside the graves, at several localities in Upper and Lower Egypt as the cemeteries of Um el-Qa'ab cemetery at Abydos, Abu Rawash north of Giza, Helwan, southeast of Giza and Dahshour south of Giza. At the Royal and Private tombs, some stelae were rough, others were decorated and some were well shaped and finely decorated. The most interesting part concerning these tomb stelae, at Um el-Qa'ab cemetery, the private rough stelae were oriented to the northwest, the same direction of Nabta Playa megaliths.

The amount of evidences from the Eastern Desert and the Nile Valley might be enough proof for extending the use of megalithic stelae from the Neolithic through the Predynastic to the Dynastic period and explain the development and the changes of their shapes and uses. Finally, The Tasian-related material in the Eastern Desert and at the burials at Gebel Ramlah area near Nabta Playa in the Western Desert suggests that this Neolithic culture may be the most distinctive missing link in the picture of interaction between the desert dwellers and the Nile Valley cultures, which led ultimately to the development of Egyptian civilization (for further reading see: Friedman and Hobbs 2002: 178; Kobusiewicz *et al.* 2010).

The megalithic structures, perhaps the most striking of the ceremonial features at Nabta, do not have close analogs in the Neolithic or in the Predynastic record along the Nile; although the shaping and use of large stones occurs in some of the tombs in Badarian graveyards. It is possible, however, that similar features to those at Nabta are present in the Nile Valley, but are unrecognized. The Combined Prehistoric Expedition worked at Nabta Playa for several years, even mapping some of these features as bedrock, before they recognized that they were of human origin (Wendorf and Schild 2004: 25). Perhaps, other expeditions did not pay enough attention, in the past century, to recognize the presence megalithic structures in the Nile Valley. On the other hand, they could have been destroyed or they were never there at all.

The small amount of evidences from the eastern desert may not create a strong argument for extending the use of megalithic stelae from the Neolithic through the Predynastic to the Dynastic period. Similarly, it may not explain the development and the changes of their shapes and uses. However, their representation shows the existence of the use of megalithic structures during the Predynastic period, and offers proof that there were megaliths in Egypt during these periods.

Acknowledgments

My immense gratitude goes to Fred Wendorf and Romuald Schild who made the data about Nabta Playa available today. I emphasize my gratefulness to both of them, without their support and help I wouldn't be able to do any of my researches. My deep gratitude is also owed to Jacek Kabaciński and Gebel Ramlah Teamwork for the support and all scientific data that they have kindly offered to me, in particular, Agnieszka Czekaj-Zastawny. I'm deeply indebted to my professors and Dear friends who never gave up on me, Renee Friedman, Richard Parkinson, Vivian Davies and Liam McNamara.

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Desert and the Nile.
Prehistory of the Nile Basin and the Sahara.
Papers in honour of Fred Wendorf
Studies in African Archaeology 15
Poznań Archaeological Museum 2018

Maria Lityńska-Zając and Krystyna Wasylikowa

The Role of *Ziziphus* in the Economy of Neolithic Nomadic Societies of the Sahara (S Egypt)

The strategies adopted by ancient people in order to cover their basic food demands belong to essential questions in the study of prehistoric societies. Much information about procuring foodstuffs can be obtained from plant remains recovered from archaeological sites and the achievements of the Combined Prehistoric Expedition are good example how much can be deduced from properly handled archaeobotanical material. The investigations carried out in Egypt by the Combined Prehistoric Expedition, first under the supervision of Professor Fred Wendorf and Professor Romuald Schild and later by Professor Michał Kobusiewicz, Professor IAE PAS, Dr. hab. Jacek Kabaciński, and Dr. Przemysław Bobrowski, brought about the discovery of numerous settlements and camp sites left by the nomadic Epipaleolithic and Neolithic people. The fillings of these features contained rich plant material which provided numerous information about subsistence of pre-agricultural populations of the Eastern Sahara. From among many plants documented by macrofossils the jujube tree was selected as an example of a wide variety of possible uses confirmed by ethnographic evidence. In 2001-2003 for the first time three cemeteries were discovered in Gebel Ramlah (e.g. Wendorf and Schild 1998; Wendorf *et al.* 2001; Kobusiewicz *et al.* 2004, 2010). With this short article the authors want to pay tribute to the memory of Professor Fred Wendorf and express their appreciation for his deep interest in archaeobotanical investigations.

Fruits and seeds of jujube tree (*Ziziphus* sp.) were found on the Early Neolithic site E-75-6 at Nabta Playa (Wasylikowa *et al.* 1995) and the Early and Middle Neolithic site E-05-1/2 at Berget el Sheb (Bobrowski *et al.* 2010, 2011). In the latter site wood charcoal was also present. The sites are located in the Egyptian Western Desert, about 140 km west from Abu Simbel, at a distance of ca. 25 km from each other (Fig. 1). Nowadays, it is an extremely dry part of the Sahara, with scanty rains occurring irregularly once in many years making possible the growth of only single and scattered plant specimens. More favourable conditions for the development of trees and shrubs exist in the oases (Zahran and Willis 1992, 52-53) and

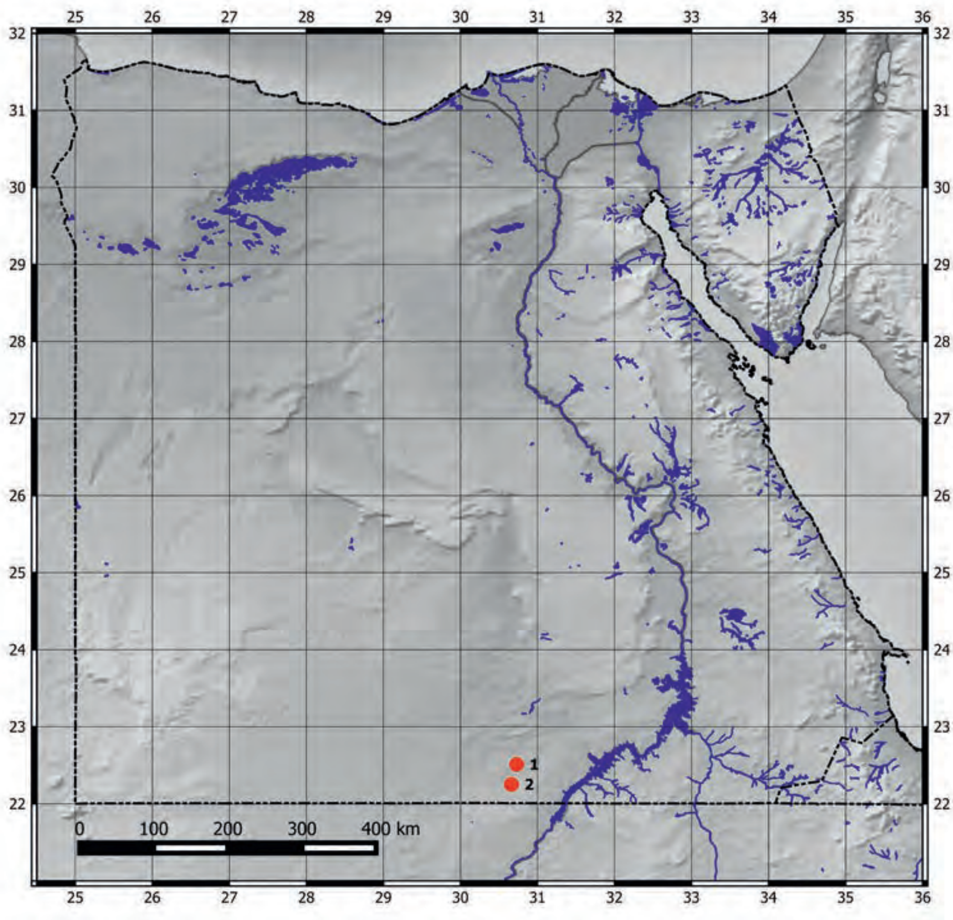

Fig 1. Locations of sites E-75-6 at Nabta Playa and E- 05-1/2 at Berget el Sheb in Western Desert, South Egypt (1 – Nabta Playa; 2 – Berget el Sheb)

humid depressions are periodically covered with luxuriant grass communities with sedges and rushes. Archaeobotanical, anthracological, and geological investigations indicate that in the Neolithic much better moisture conditions prevailed in this area and the development of fairly abundant herbaceous vegetation with some trees and shrubs was possible. Such favourable environment encouraged nomadic populations to locate their seasonal settlements near the then existing water reservoirs (e.g. Kubiak-Martens and Wasylikowa 1994; Barakat 1995, 2001; Wasylikowa 1997, 2001;Wendorf and Schild 1998; Wendorf *et al.* 2001; Wasylikowa *et al.* 2001, 2001a; Kobusiewicz *et al.* 2004).

Huts and pits from Nabta Playa provided the richest assemblage of plant remains hitherto known from the Western Desert, which contained at least 128 species of wild plants. Many of them had useful properties and were collected and stored for food or for other uses, for instance grass grains (including the oldest finding of wild sorghum *Sorghum bicolor* var. *arundinaceum*), fruits and seeds of several other herbaceous plants and of few trees or shrubs (e.g. Kubiak-Martens and Wasylikowa 1994; Wasylikowa *et al.* 1995; Wasylikowa 1997, 2001; Wasylikowa *et al.* 1997, 2001, 2001a). Plant material from Berget el Sheb was poorer (Lityńska-Zając 2016, in preparation). Both sites provided relatively high number of *Ziziphus* remnants (Fig. 2) which suggests that useful properties of this plant were recognized by their inhabitants.

The genus *Ziziphus* Mill. from the family Rhamnaceae includes about 86 species (or over 40 according to other sources, Shahat *et al.* 2001) which grow in the subtropical, tropical, and warm zones (Boulos 2000: 84). Three species *Ziziphus spina-christi* (L.) Desf., *Z. lotus* (L.) Lam. and *Z. nummularia* (Burm. f.) Wight &Walk. occur in the modern flora of Egypt. The first one is an evergreen tree up to 4-8 m high, the two others are deciduous shrubs. The Christ's thorn jujube, *Ziziphus spina-christi*, is a plant of subtropical zone, nowadays growing on the Mediterranean and Black Sea coasts, in the Nile delta and in the oases. It can be found also in desert *wadi* in the Western and Eastern Deserts. It belongs to the native flora of Sudan (Jafri 1977). Due to human activity it was introduced to the Sahara already in the Neolithic (Marinova 2008), because its fruits and seeds could have been transported by people and animals (Bakarat 2001). At present, it is cultivated in the Nile valley and in the oases (Boulos 2000: 84) but its remnants found in the Roman port Berenike at the Red Sea coast suggest that it was cultivated as early as the 1^{st} – 5^{th} c. A.D. (Cappers 1999). *Z. lotus* is a 1-3 m high shrub growing on stony and sandy substrate in north Africa. *Z. nummularia* is a relatively small shrub reaching the maximum height of ca. 1-2.5 m. In Egypt it

Fig. 2. Remains of *Ziziphus* from Nabta Playa and Berget el Sheb (1 – Nabta Playa – complete fruitstone; 2 – Nabta Playa – fruitstone fragment with two cells which contain seeds; 3 – Berget el Sheb – fruitstone fragments (1-2 photo: A. Pachoński; after Wasylikowa 1997 with permission from the W. Szafer Institute of Botany PAS, Cracow; 3 photo: K. Cywa). Scale bars equal 1 mm

is recorded only from Ka-el-Nabg, about 15 km north-west of Taba (Boulos 2000: 85-86). According to some authors (Barakat 1995) it is a pioneer tree.

Mature fleshy *Ziziphus* fruits are edible and can be consumed either fresh with no preparation or dried. Coarse-grained flour made from dried fruits can be used for baking or making porridge (Wasylikowa 1997: 133 ; Wasylikowa and Mitka 1998; Wasylikowa *et al.* 2001: 559 and the lit. cited). *Ziziphus* fruits can also be used as components of different food products (Tenberg 2003), for instance thick paste used for spreading on bread. Ethnographic data indicate that fresh and dried fruits of *Ziziphus spina-christi* are valued by Egyptian Arabs and Bedouins. Bedouins gather fruits, dry them and store for future use during winter time. Similar use of *Z. lotus* fruits is reported from Cyprus and Saudi Arabia (Dafni *et al.* 2005). *Ziziphus* species belong to melliferous plants and are important source of honey in Eritrea and Jemen (Dafni *et al.* 2005). This honey, known under the name *sidr* after the local name of the tree, is considered highly valuable and belongs to the most precious ones. The pap made of the bark from young branches is also consumed (El Hadidi 1985). In ancient Egypt *Ziziphus spina-christi* was probably considered sacred tree, it was found in the Dynastic tombs and was used for making funerary loaves (Fahmy 2003: 104, and the lit. cited).

Fruits, leaves and ashes from burnt wood were used in folk medicine (Wasylikowa 1997: 133). Few examples cited below illustrate fairly broad use of jujube in phytotherapy thanks to its antiseptic properties. The ash obtained by burning wood and mixed with vinegar was applied locally to cure wounds caused by serpent bites. Cataplasms made of leaves were used against abscesses and furuncles and for skin softening. Fresh green leaves were put on swollen eyes. *Ziziphus* was used as antiphlogistic, purifying and analgesic medium as well as shrinking medium for gargling. In Saudi Arabian folk medicine leaves were applied to speed up the healing of wounds and to cure some skin diseases. The brew made from bark and fresh fruits was used for compresses applied in healing wounds and for body washing. People suffering from bronchitis, cough, and tuberculosis were also treated with brew from fruits (Shahat *et al.* 2001, and the lit. cited.).

Heavy and durable *Ziziphus spina-christi* wood is used in the production of artistic woodworks while branches and wastes from trunk woodworking are used for fuel and for making the high quality charcoal (Dafni *et al.* 2005). According to the records dated to various historical periods of ancient Egypt jujube wood was used for making boats, dowels, coffins, mummy labels, stelae, bows and several other objects (Gale and Cutler 2000, 286-288; Cartwright and Taylor 2008).

Collecting fruits was a seasonal activity dependent on the rhythm of nature. Following summer floods, during the period of abundant vegetation development mainly fruits and seeds of herbaceous plants were available. In winter months, as the other environmental resources were exhausted, human activity was focused on gathering mature fruits of trees and shrubs (El Hadidi 1985). It is worth emphasizing that collecting wild plants was not given up in the times of the intensive cultivation of cereals, as evidenced by the numerous findings coming from the pre-dynastic localities (Fahmy 2005).

Macroscopic remains of the genus *Ziziphus* recovered from archaeological sites include fruits, seeds and charcoals, among which the lignified fruit-stone (endocarp) fragments are usually the most frequent. They are recorded in archaeological sources of different age, prehistoric and historic ones, situated in the Western and Eastern Deserts in Egypt (e.g. El Hadidi 1985; Neumann 1987; Wasylikowa 1997; Marinova *et al.* 2008; Neef *et al.* 2011: 554-560; Fadl 2013). The material from Nabta Playa, site E-75-6 included 7 complete fruit-stones, over 670 their fragments of various sizes and 27 seeds. They were found in eight huts and four pits. Radiocarbon dating of fruit-stones from three features gave the following results: 1. 8050±130 BP OxA-3218 (hut F 1/90); 2. 9025±120 BP OxA-3220 (pit P 1/90); 3. 7980±95 BP OxA-3485 (pit P 75/5) (Wasylikowa 1997). In the neighbouring site Nabta Playa, E-92-7, dated also to the Early Neolithic, 71 charcoal fragments were found and identified as *Ziziphus spina-christi* (Barakat 2001). Fairly large number of remains was found also in Berget el Sheb, site E-05-1/2. They were represented by 72 fruit-stone fragments and 2 seeds, which occurred mainly in pits 4 and 6, but also in pits 3 and 5. Pits 4 and 6 contained also charcoals, four and two specimens respectively (Lityńska-Zając 2016, in preparation). Wood charcoals represented the remnants of fuel.

The occurrence of jujube tree remnants (most probably *Ziziphus spina-christi*) at Nabta Playa and Berget el Sheb indicates that they were intentionally collected and stored for different purposes. Some fresh fruits were certainly consumed on the spot but a portion of the gathered yield must have been dried (over a fire?) for future use because the nomadic tribes only seasonally visited this area. The presence of many endocarp fragments may be an evidence of purposeful crushing of fruit-stones in order to extract seeds but some spontaneous fragmentation of stones thrown to the hearth was also possible (Wasylikowa 1997: 133). The presence of charcoals indicates that jujube wood was used for fuel.

Acknowledgements

The authors wish to thank Ms Katarzyna Cywa, M. SC., W. Szafer Institute of Botany, PAS, for taking *Ziziphus* fruit-stone picture and the arrangement of Figure 2.

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Poznań Archaeological Museum 2018

Friederike Jesse, Nader El-Hassanin, Hubert Berke
and Nadja Pöllath

First Insights into the Prehistory of Selima Oasis, Northern Sudan – Excavations at Site SOP 1024

Introduction

Compared to the Egyptian oases, the oases of northern Sudan, among them Selima and Laqiya, attracted much less archaeologists. Probably because they have not been permanently occupied and are more difficult to reach. However, being located on the Darb el Arba'in, a main ancient traffic route linking the middle Nile Valley with the Darfur region (Riemer and Förster 2013: 52-53), they have been important places within the trans-Saharan network.

Selima Oasis (Fig. 1) was known early on, descriptions of ancient travellers go back to the 17th century. Especially the ancient building present there attracted the attention and led to speculation about its function with propositions ranging from a church to a fort to a tavern (Leach 1926: 43-44; see Hinkel 1979 as well as Pichler and Negro 2005 for overviews of the visits to Selima). From an archaeological point of view, the oasis and the whole region remained, however, relatively unknown. In 1926, Thomas Leach, then Governor of Halfa, published a detailed description of Selima oasis and a relatively precise ground plan of the ancient building (Leach 1926). In the 1920s and 1930s different expeditions led among others by Donald Newbold and William B. Kennedy Shaw travelled in the southern Libyan Desert (see e.g. Newbold 1928; Newbold and Shaw 1928; Shaw 1936a) and reported archaeological finds, for example in Grassy Valley (Shaw 1936b),

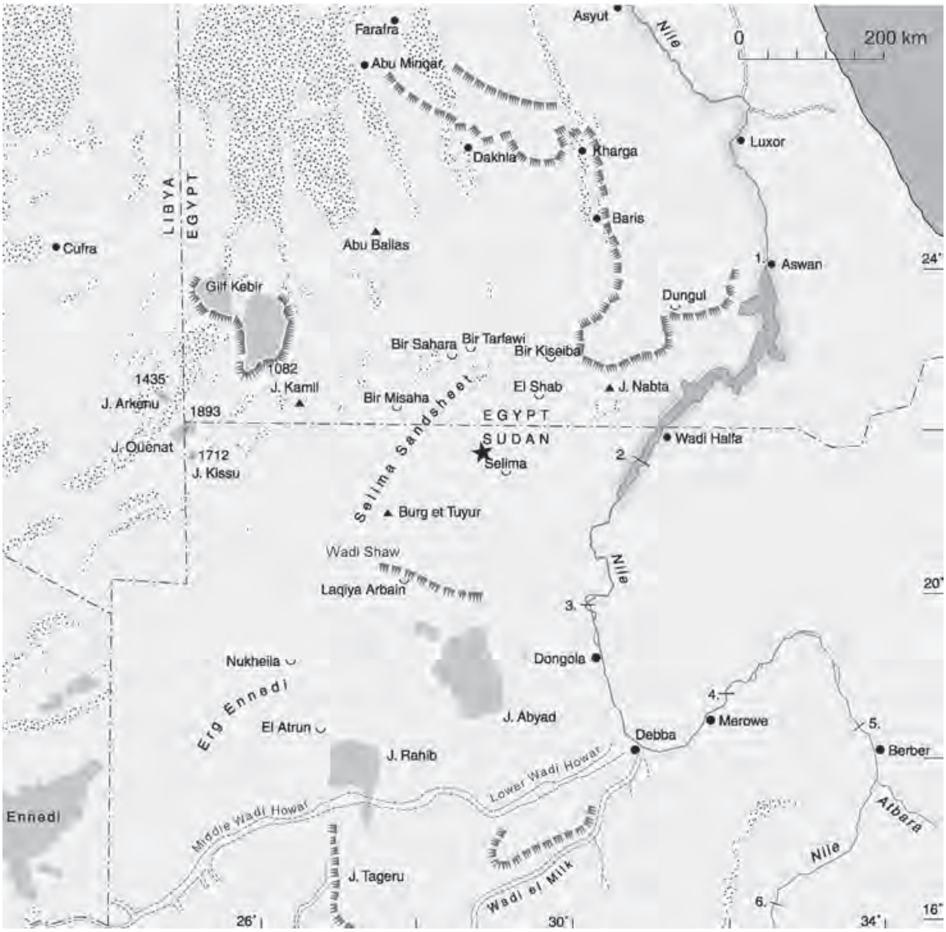

Fig. 1. The location of site SOP 1024 (black star) close to Selima oasis and other archaeological sites and regions mentioned in the text (base map: Heinrich-Barth-Institut)

Burg et Tuyur (Newbold 1928: 282) and the Laqiya region (around Camp 49; Shaw 1936a: 206). Research was intensified in the 1970s and 1980s: Palaeolithic and Neolithic sites were discovered by American team led by C. Vance Haynes e.g. in Selima and the Laqiya region (see Haynes 1985: 271). Many more sites were then recorded – especially in the Laqiya region – by the University of Cologne's B.O.S. project directed by Rudolph Kuper during the field seasons between 1980 and 1985 (for an overview see Kuper 1995). At Selima Oasis, however, only a few sherds were collected on the site 80/90 during a short stay in 1980[1]. Even taking into account all this work, archaeological research in this part of the South Libyan Desert is still punctual and scarce, despite the great importance of this region for contacts between the Nile Valley and the areas to the west, south and north. To fill this gap, the Selima Oasis Project (SOP) was initiated by the French archaeologist Coralie Gradel in 2011. The aim of the project is to study the development of the oases at Selima and Laqiya and their surroundings since prehistoric times but also their role as trade stations on the Darb el Arba'in. Since the beginning the Selima Oasis Project works as a German-French Cooperation and in strong collaboration with the Sudanese counterpart, the National Corporation for Antiquities and Museums (NCAM). Three short field seasons took place so far, in 2011, 2013 and 2014 (Jesse *et al.* 2015). During the survey altogether more than 150 sites were recorded, covering all periods from the Palaeolithic to modern times. In 2011, a study of the vegetation and water resources was conducted in Selima Oasis and the ancient building and especially the petroglyphs there were documented. During the second field season in November 2013 excavations took place in the oasis, in and around the ancient building ("Beit es-Selima", SOP 2001), at the nearby site SOP 57, and at a prehistoric site (SOP 1024) situated about 6 km northwest of the oasis. The latter will be described in more detail in this paper. In 2014 the French part of SOP continued excavations at Beit es Selima (SOP 2001).

1. The area of interest

The British desert explorer William Boyd Kennedy Shaw called Selima "...the loveliest of all the Libyan oases..." (Shaw 1935). Selima is located at the base of an escarpment formed by Jurassic to middle Cretaceous rocks. Geoscientific research – done by an American team directed by Vance Haynes, and the Berlin Collaborative Research Centre 69 – documented old lake sediments (Haynes *et al.* 1989; Pachur and Altmann 2006): shore terraces of different age are marked by calcified rhizomes. Palaeolithic artefacts have been found. The Holocene lake development started at around 9200 bp (8300 BC) and may be explained with increased local rainfall. At that time savannah-type vegetation can be supposed. The main extension of the lake occurred at around 8000 bp (6900 BC). The molluscs found point to a water depth of more than 3 m over large areas of the lake and in some places

[1] See the African Archaeology Archive Cologne (AAArC): arachne.dainst.org/project/afrarchcologne For site 80/90: arachne.uni-koeln.de/item/topographie/8008653

even of more than 10 m. Around 5500 bp a transition to a saltwater / sebkha phase is attested at Selima. A radiocarbon date of about 4100 bp (2700 BC) (H-7877-7929) indicates the drying out of the lake (Pachur and Altmann 2006: 363-371).

Today, water of good quality is available at a depth of about 70 to 80 cm. The actual vegetation is not very rich in species. In 2011 and 2013 different kinds of grasses, among them Halfa grass, were mapped, as well as reed (*Phragmites australis*, *Saccharum)*, camelthorn (*Alhagi maurorum*) and tamarisk *(Tamarix)*. There are date (*Phoenix dactylifera*) and doum palms (*Hyphaene thebaica*) (Jesse *et al.* 2015: 163). Up to recent times, salt was exploited in Selima, mainly by groups coming from the Nile Valley especially for that purpose (see Leach 1926: 42-43; Jesse *et al.* 2015: 163).

2. Site SOP 1024

About 6 km northwest of the oasis the prehistoric site SOP 1024 was discovered in 2011. The large surface site is situated in a flat depression which is surrounded by small outcrops (Fig. 2). The archaeological material consists of stone artefacts, a few potsherds of Early Khartoum type as well as some fragments of bone and ostrich eggshell, and spreads over an area of about 1000 x 300 m. Different denser concentrations of artefacts are visible as are numerous small mounds of gravel and / or stone which probably represent tumuli. In 2013, the contours of the site were mapped and some features and artefacts were recorded and partly collected on the surface using GPS. Furthermore, an area with a concentration of lithic artefacts and some bone fragments visible on the surface was chosen for excavation.

The excavation trench SOP 1024-1 covers 7 x 4 m[2]. Underneath the small layer of windblown sand (about 2 to 3 cm) playa sediments of reddish-brown colour became visible (Fig. 2). In some parts of the excavation trench artefacts such as lithics and bones were still visible in the playa sediments (Fig. 3). In these squares two sub-surface strata, each about 5 cm thick, were excavated to recover the archaeological material. In three squares (501/807, 501/808 and partly also 501/809) concentrations of bones and lithic material were present. On top of the second level (sub-surface 1) a small knapping area was documented (squares 501/809c and 501/808a; Fig. 4). One part of the trench (squares 500/806b and 501/806a)

[2] The trench was excavated by the late Amged Bashir, accompanying inspector of the National Corporation for Antiquities and Museums (NCAM), Jan Kuper and Friederike Jesse (both University of Cologne, Institute for Prehistoric Archaeology, African Archaeology).

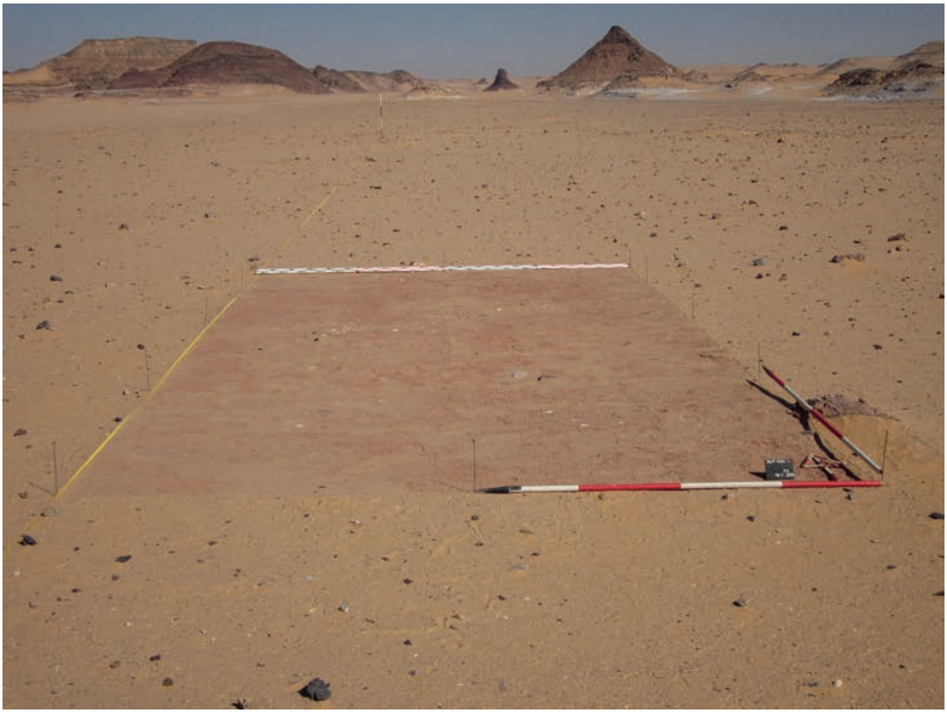

Fig. 2. Overview of site SOP 1024 with the area of excavation (photo: F. Jesse)

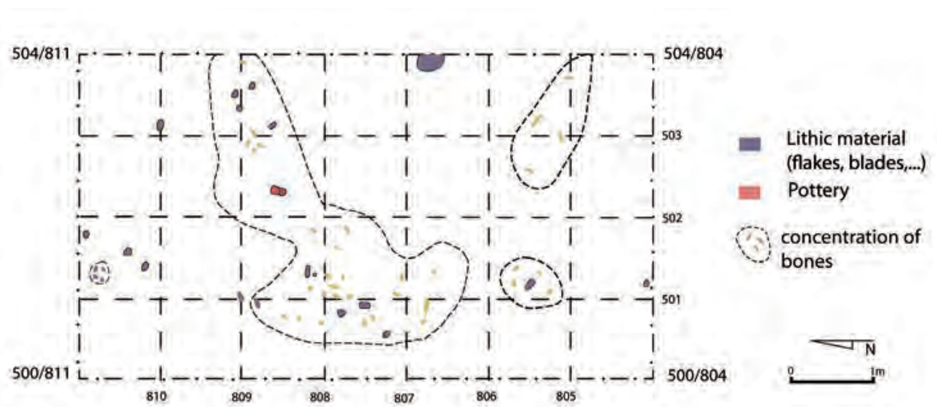

Fig. 3. The excavation area after the removal of the first layer of windblown sand (graphic implementation: Nader El-Hassanin)

Fig. 4. The concentration of stone artefacts - the knapping area – in squares 501/809c and 510/808a (photo: J. Kuper)

was finally dug to a depth of about 50 cm to record the geological profile. Only playa sediments of slightly different colours are present. Four different layers could be documented; sediment samples taken indicate an expanse of water in ancient times. The trench was finally refilled with the excavated sediment.

2.1. Archaeological material

The archaeological material of SOP 1024 consists of stone artefacts, some pottery sherds and faunal remains. In its following description special emphasis is given to the lithic artefacts as they represent the largest category of finds on the site.

More than 5000 bone fragments with a total weight of about 2 kg were found during excavation. Only wild animals are present, especially gazelles and antelopes (*Gazella dorcas, Nanger dama, Addax nasomaculatus, Alecelaphus buselaphus, Oryx dammah* could be identified), seldom hare (*Lepus capensis*), few eggshell fragments (ostrich and other birds), the mandible of an unidentified hedgehog and the land snail *Zootecus insularis*. Gazelles and antelopes certainly have been hunted. Some of the bones show traces of burning. With the exception of the hartebeest, *Alcelaphus buselaphus*, which was probably vagrant from the Nile valley in years with very good rainfalls, the faunal remains indicate a (semi-) arid landscape that means contracted desert vegetation or semi-desert.

Pottery is scarce on the site. In 2011, the presence of some sherds was recorded on the surface. In 2013, 6 wall sherds were collected on the surface and two rim sherds were found in the excavation (Table 1). The pottery is handmade and heavily tempered with mineral material, mostly quartz and mica. The colour of the surface is brown to reddish-brown. Decoration is made by impression using the rocker technique. The decorative motifs are either horizontal rows of impressed dots or closely serrated dotted zigzags (Fig. 5). Among the sherds observed during the survey in 2011 were also some with a dotted wavy line pattern (Fig. 5B).

Lithic artefacts[3]

The lithic artefacts represent the most frequent artefact class on the site: altogether 2776 pieces of stone artefacts with a total weight of about 15 kg have been collected. Most of them were found in the excavation trench SOP 1024-1 (2752 pieces with a total weight of 14.5 kg), 24 stone artefacts were collected on the surface, 15 without any precise location and 9 pieces in places where GPS coordinates were taken. Grinding tools are present: 22 pieces made mostly of sandstone (seldom quartzite) were found in the excavation, among them one complete lower grinder. Concentrations of stone artefacts have been observed during excavation (see Fig. 3).

The flaked lithic material of site SOP 1024 (n = 2754) was sorted by the major artefact groups that constitute a site`s lithic assemblage: debitage, debris, cores and tools.

For more than two thirds (about 68 %) of the stone artefacts quartzite with its different varieties (0201 – 0204) was used as raw material (Fig. 6). Most numerous is the light variety (0201: white to yellow quartzite), followed by the dark variety (0202: dark grey to black quartzite). Quartz (04) and chalcedony (07) are second and third respectively in the percentage composition, which clearly shows that all these raw materials (quartzite, quartz and chalcedony) can be regarded as local or sub-local in origin. All other raw materials are marginal in numbers; they comprise fossil wood, clay shale and sandstone which likely originate in the

[3] This paragraph is based on the Master thesis „SOP 1024 Site in Selima Oasis. Techno-Typological Study of Lithic Materials" presented by Nader El-Hassanin at Cairo University in 2016.

Table 1. The pottery of site SOP 1024

VU	location	RS	WS	outer surface	inner surface	wall thickness	weight	tempering agents	decoration	form
1	Surface collection (F21)	–	1	well smoothed; reddish-brown	not preserved	> 8mm	5.1 g	quartz, mica; ferruginous material grain size: < 0.5 to > 2 mm	–	–
2	Surface collection (F17)	–	2	smoothed; brown (to greyish-brown)	smoothed; brown	(6–)7 mm	9.3 g	quartz, mica grain size: ≤ 0.5 mm	impression, probably rocker technique; horizontal rows of dots	–
3	Surface collection (499,6/821,6)	–	3	smoothed; reddish-brown	well smoothed; reddish-brown	6 mm	26.9 g	quartz, mica grain size: < 0.5 to 1 mm	impression, rocker technique, comb; closely serrated dotted zigzag	–
4	Excavation (Square 502/808c–7)	2	–	well smoothed; reddish-brown, partly grey	well smoothed; reddish-brown	8 mm (7–9 mm)	116.9 g	quartz, mica grain size: < 0.5 to 1 mm	Rim lip: undecorated Rim and wall zone: impression, rocker technique, comb with at least 7 teeth; closely serrated dotted zigzag	Closed vessel; rim diameter: 32 cm; rounded rim lip

VU – vessel unit
RS – rim sherd
WS – wall sherd

Fig. 5. Examples of pottery found at site SOP 1024: A – The two rim sherds found in the excavation trench SOP 1024-1; B – Pottery sherds observed during the survey in 2011, among them sherds with dotted wavy line pattern (photos: F. Jesse)

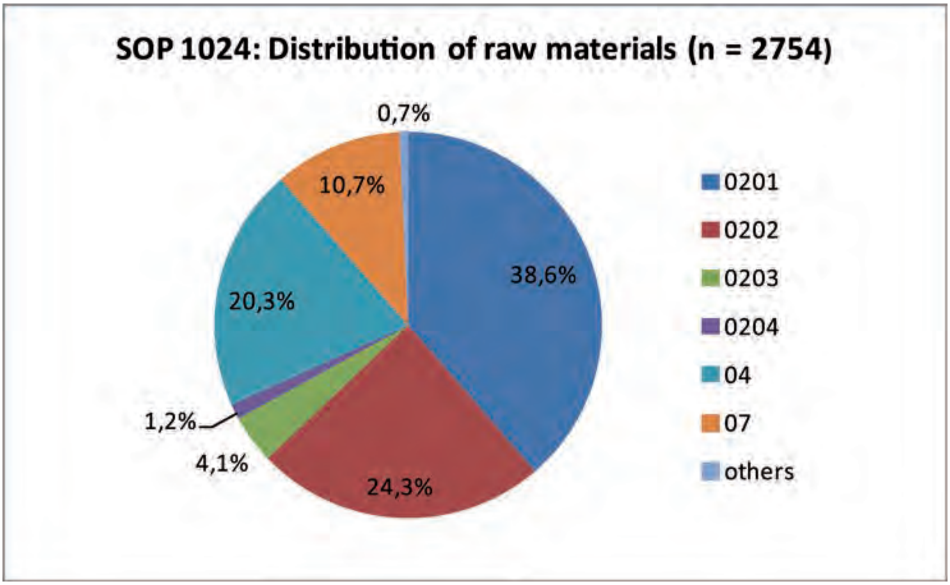

Fig. 6. Chart showing the distribution of the main raw material types in the flaked lithics of site SOP 1024.
Raw material codes: 0201 to 0204 – different varieties of quartzite; 04 – quartz; 07 – chalcedony; others – Egyptian Flint, silicified wood, clay shale and sandstone

local formations, but also Egyptian flint whose nearest sources are about 300 km to north-northeast in the Egyptian limestone plateau (see Kindermann 2010: 20, Fig. 2).

Beside raw material classification the lithic analysis concentrated on the study of debitage (blanks), cores and tools. For the analysis of the debitage only complete blanks larger than 15 mm, made of quartzite (0201 and 0202) and chalcedony (07) – altogether 759 blanks – were taken into consideration. A metrical analysis of the 759 blanks clearly shows, that the blank production on site SOP

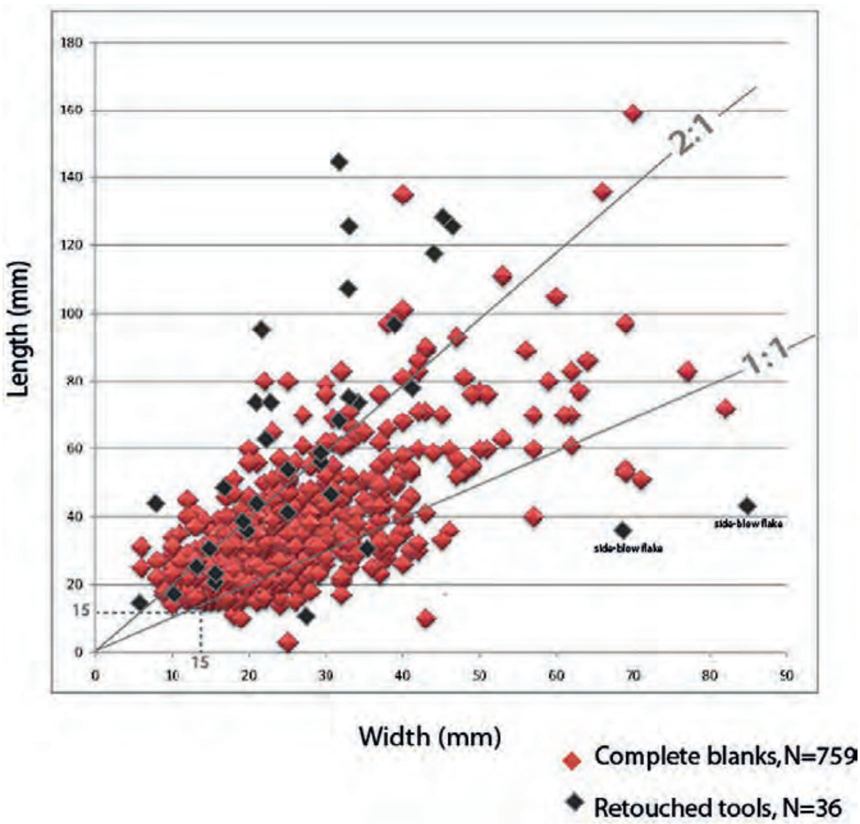

Fig. 7. Scattergram of length/width ration of complete blanks compared to retouched tools

1024 is flake based. Around 85 % of the stone artefacts are flakes, while 15 % are blades (Fig. 7). A qualitative inspection of the blanks' type indicates that they tend to show a rather irregular shape. This mainly represents direct hard-hammer technique which is also supported by a QS-index of 2.5 for the blades and 2.8 for the flakes (for the QS-index see Schön 1996: 64-71).

A total of 18 cores were identified from the different levels of the excavation at the site: 13 cores were collected from the surface of trench SOP 1024-1, while 5 pieces came from the sub-surface levels. Cores were analyzed following the classification of Angela Close (1977). Most of them were made of quartzite (n = 10) and chalcedony (n = 7). This is fully in line with the dominating raw materials in the blank production, indicating that these materials were flaked on site. Most numerous are single-platform cores (n = 7), ninety-degree cores (n = 4) and patterned multiple-platform cores (n = 3); all other core types (unpatterned multiple platform, opposed platform, bipolar core and discoidal core) were represented only with a single piece for each type (Fig. 8).

Modified pieces are rare on site SOP 1024. A total of 36 retouched tools were excavated (18 pieces) and collected (18 pieces) from areas of the surface scatter SOP 1024 outside of the excavated part. The analysis of tools by raw material shows that the prevailing materials used for blanks and cores – quartzite and chalcedony – were also most frequently used for tools (Table 2). This also indicates that most tools were produced on site and perhaps in the nearer surrounding of the site where quartzite and chalcedony occur. Nevertheless, there are a number of outliers represented by exotic materials that are absent among cores and blanks. This is best represented by four tools made of Egyptian flint, for which no indication is given that they were flaked on site. Considering blank types, tools are preferably made on blades, especially larger tools, while flake tools do not exceed 60 mm in length (see Fig. 7). The exception are two side-blow flakes made of Egyptian flint which are considerably larger.

The tool spectrum recognized at site SOP 1024 is rather limited. Tools were classified according to Jacques Tixier's description of flaked stone tools (Tixier 1963, 1974) (see Table 2). Most numerous are pieces with continuous edge retouch (Fig. 9.1-2) followed by notched pieces (Fig. 9.3), perforators and burins (Fig. 9.4-5). Geometric microliths (Fig. 9.7-8) and truncations are rare. Remarkable are side-blow flakes (Fig. 9.6), a tanged bifacial point and a bifacial foliate (Fig. 10).

With the examination of the flaked lithics and their technical aspects, it was possible to develop a model for the *chaîne opératoire* (production sequence) on the site where two different strategies could be determined (Fig. 11):

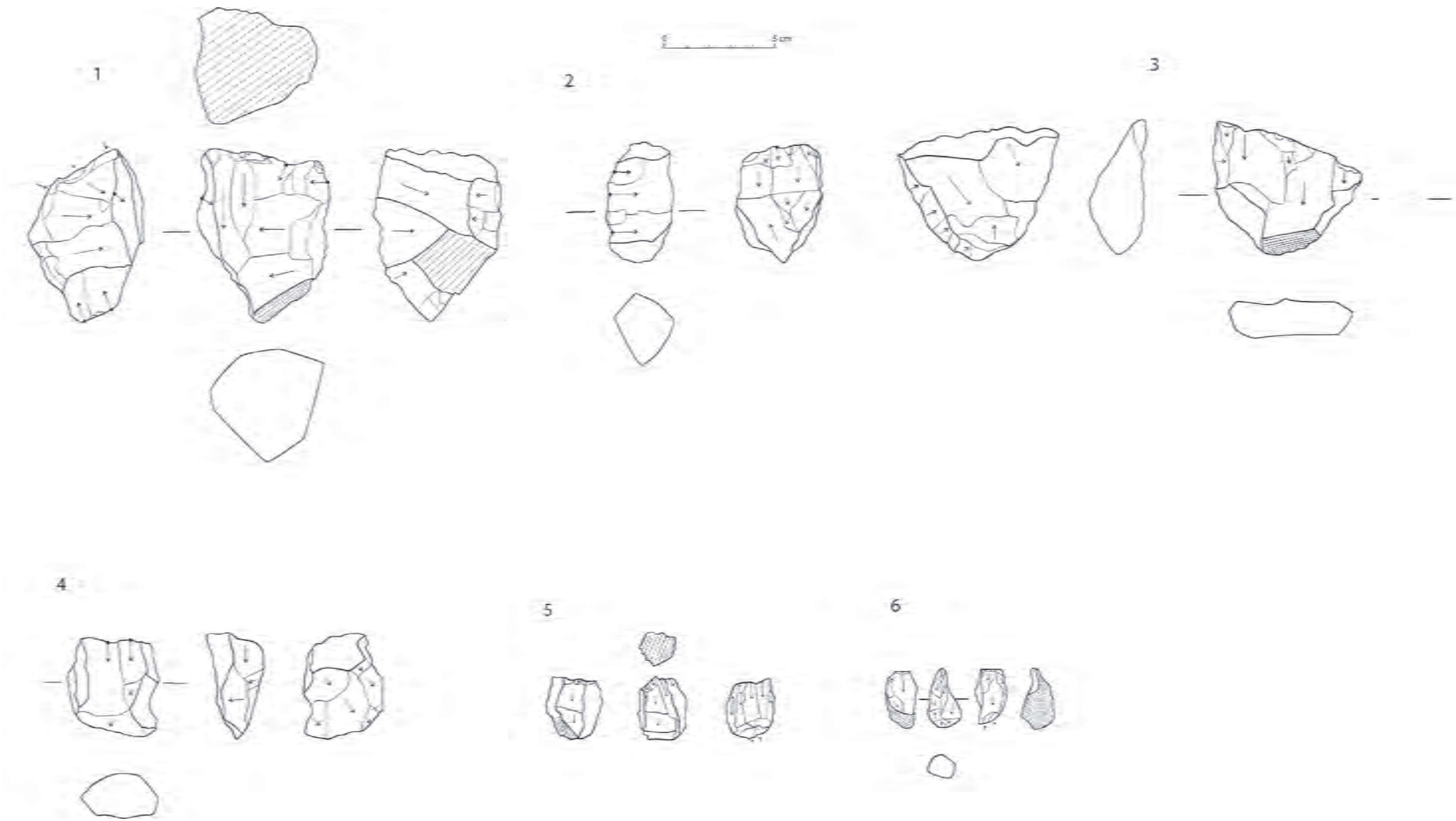

Fig. 8. SOP 1024. Examples of the different core types: 1, 3 – multiple platform core; 2 – ninety degree core; 4-5 – single platform core; 6 – bipolar core. Raw material: 1-4 – quartzite; 5-6 – chalcedony. Scale 2 :3 (drawings: Nader El-Hassanin)

(1) The first strategy is represented by just a few exotic materials (Egyptian flints) on the site which do not originate from the Nubian sandstone formation. The types of flint tools, namely bifacials and side-blow flakes, are likewise an exotic element in the local tool tradition with the absence of flint cores and blanks. This indicates that the tools were produced elsewhere and brought to the site as finished products.

(2) The second strategy is represented by local or sub-local raw materials which are restricted to the Nubian sandstone formation of Selima oasis and its vicinities. It is visible in cores, blanks and tools showing that they have been knapped on the spot. Among these local materials further sub-strategies can be identified. These are connected to individual raw material types (quartzite, chalcedony and quartz; see Fig. 11, Strategies 2A to 2D]. The analysis of tools by raw material shows that the prevailing materials in blanks and cores are also most frequent in tools. Quartzite and chalcedony are therefore most frequent and represented in all flaked classes; most tools were produced on site and perhaps in the nearer surrounding of the site where quartzite and chalcedony occur.

Regarding tool production there are a number of detailed observations to be reported. Firstly, tools are preferably made on blades, except some distinct flake tools, such as the side-blow flakes (see Fig. 7). Secondly, all microlithic tools, like segment and triangles are made of chalcedony; and there is also a preference of chalcedony for notched pieces (see Table 2). Nevertheless, artefacts made of chalcedony do not include any microburin or other waste products of secondary modification. This means, that the microlithic tools, such as the triangle, were produced directly from convenient flakes, chunks, or split elements, instead of blades using the microburin technique. This refers to the fact that chalcedony occurs only in small pebbles or other irregular shapes which apparently do not allow for a regular blade or bladelet production.

The yellow quartzite (0201) (see Fig. 11, sub-strategy 2A) has almost exclusively been used for blade tools, in particular edge retouched (Tixier type 105), often pointed tools on regular large blades. However, no such core and rather few blades were found in the excavation trench SOP 1024-1 matching the length of these edge-retouched blades. Therefore it can be suggested that they have been produced elsewhere on the site.

Another issue is black quartzite (0202) (Fig. 11, sub-strategy 2B) which shows no preference in tool production. Moreover, there are only two retouched pieces from this material, though there is a clear emphasis on blades in the blank production of this material.

Table 2. SOP 1024. Frequencies of tool types according to Tixier's type list. Blank type and raw materials are indicated: 01 – Egyptian flint; 0201 – light quartzite; 0202 – dark quartzite; 07 – chalcedony; 16 – sandstone

Tixier type		**Blank type**		**Raw material**					**SUM**
		Flake	**Blade**	**01**	**0201**	**0202**	**07**	**16**	
Perforators	**12**	1		–	–	–	–	1	**1**
	13	–	1	–	–	–	1	–	**1**
	16	–	3	–	1	1	1	–	**3**
Burins	**17**	2	–	–	1	–	–	1	**2**
Backed pieces	**42**	–	1	–	–	–	1	–	**1**
	64	–	1	–	–	–	1	–	**1**
Notches	**74**	1	–	–	–	–	–	1	**1**
	76	–	2	–	–	–	2	–	**2**
	77	–	5	–	2	1	2	–	**5**
Truncations	**80**	1	–	–	–	–	1	–	**1**
Geometric Microlithic	**82**		2	–	–	–	2	–	**2**
	89	1	–	–	–	–	1	–	**1**
Continuous edge retouch	**105**	–	11	–	11	–	–	–	**11**
	Side–blow flake	2	–	2	–	–	–	–	**2**
	Tanged bifacial point	–	(1)*	1	–	–	–	–	**1**
	Bifacial foliate	–	(1)*	1	–	–	–	–	**1**
		8	**28**	**4**	**15**	**2**	**12**	**3**	**36**

* The bifacial pieces may have been made on blade according to their production. However, there is no clear indication of the blank type due to the bifacial modification of the entire surface.

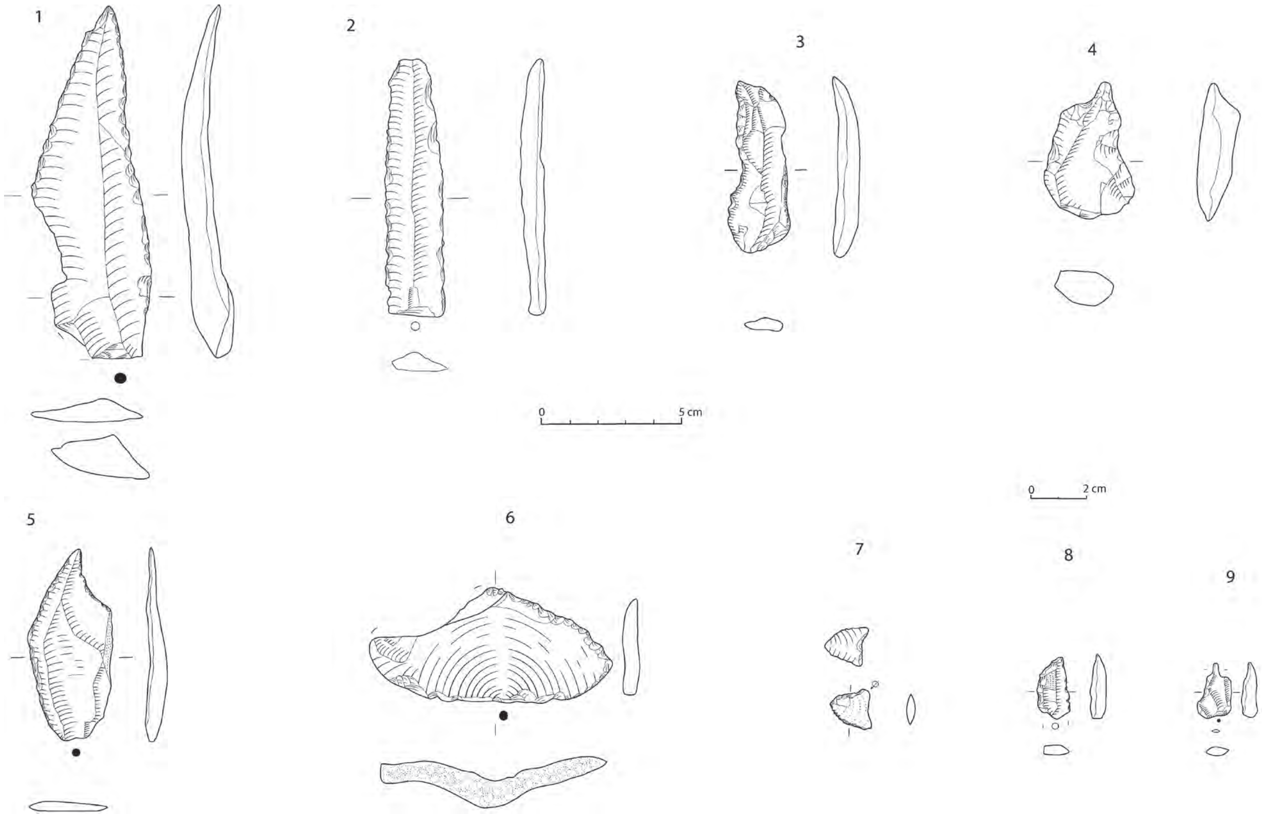

Fig. 9. SOP 1024: Examples of tools: 1-2 – edge retouched blades (Tixier 105); 3 – notched blade (Tixier 76); 4-5 – single piercer (Tixier 12); 6 – side-blow flake; 7 – equilateral triangle (Tixier 89); 8 – semi-circular segment (Tixier 82); 9 – shouldered bladelet (Tixier 64). Raw material: 1-2 – quartzite; 3-5, 7-9 – chalcedony; 6 – Egyptian flint. Scale 2:3 (drawings:: Nader El-Hassanin)

Fig. 10. The tanged arrow head (A) and the bifacial foliate (B) found at site SOP 1024 (photos: F. Jesse)

There should be a word left on the quartz flaking (see Fig. 11, sub-strategy 2D), because this is the second largest group in raw material and artefact frequency (see Fig. 6). Yet, there is only one distinct core and no tool made of quartz. Qualitative observations may point to the dominance of small pebbles of quartz. The splitting and knapping of the latter by bipolar technique is indicated, which usually produces large amounts of shatter, but few regular or identifiable flakes. Likewise does the high number of quartz pieces refer to its omnipresence on and around the site.

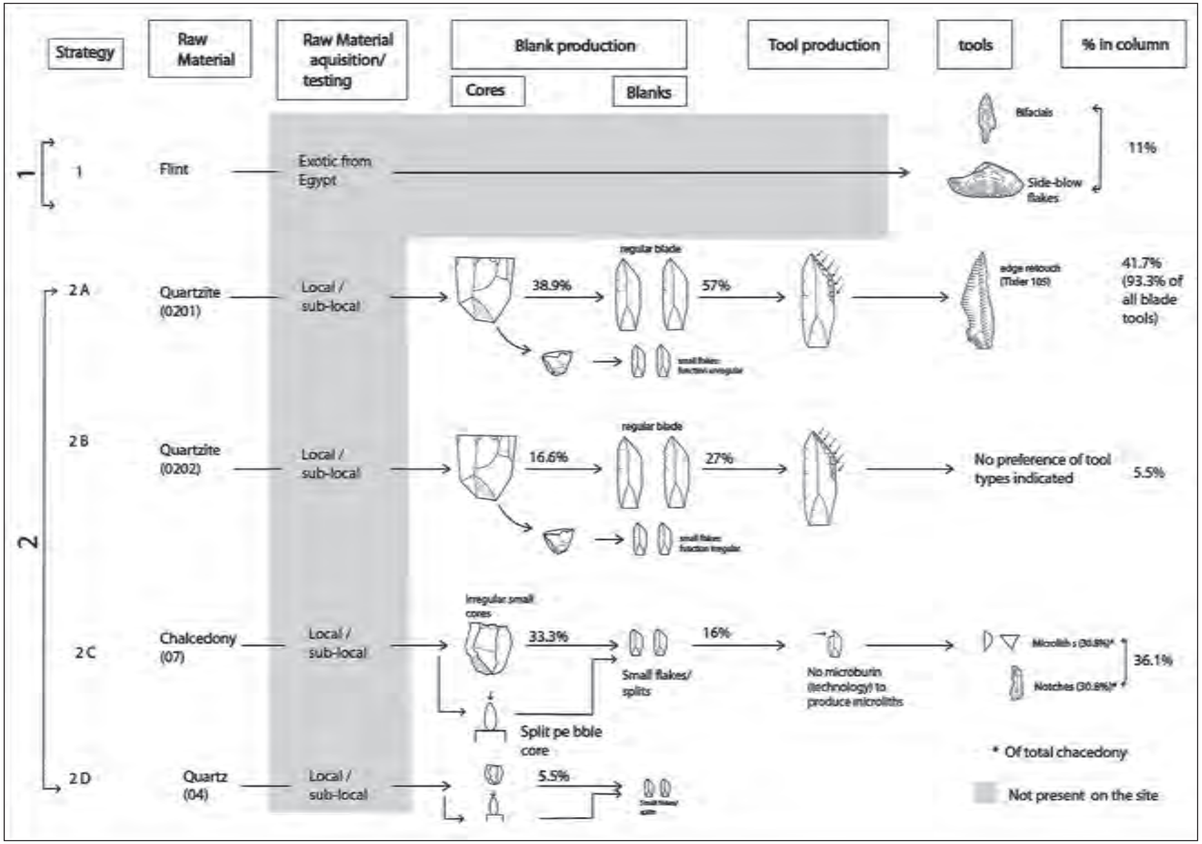

Fig. 11. Model of the "Chaîne opératoire" in the lithic production of site SOP 1024 showing the probable production strategy, with percentages of lithic types resulting from the quantitative analysis of blanks, cores and tools. Uncompleted blanks are not listed. (graphics: Nader El-Hassanin)

2.2. Chronology

Two radiocarbon dates were made out of bone samples for site SOP 1024:

Sample 1: Poz-63698: 7125 ± 35 bp (6010 ± 30 calBC) [6070 – 5950 calBC, 95 %];

Sample 2: Poz-64363: 7280±40 bp (6150 ± 50 calBC) [6250-6050 calBC, 95 %].[4]

The dates indicate an occupation during the Middle Holocene: ca. 6200 to 6000 cal BC (Jesse *et al.* 2015: 168). This is confirmed by the archaeological material of site SOP 1024 which fits well to the Middle Holocene.

3. Comparison and conclusion

When looking for comparisons for the Mid-Holocene site SOP 1024 the archaeological material give good hints. The pottery shows affinities with the broad Early Khartoum Horizon. During the SOP survey in 2011, similar ceramics (sherds with Dotted Wavy Line pattern and closely serrated dotted zigzag patterns) and lithic material were recorded on sites SOP 1009 and SOP 1022, both located close to SOP 1024. Comparable material can also be found in the Middle Holocene material from other regions such as the Abu Ballas Scarp-Land (Gehlen *et al.* 2002) and the Nabta – Kiseiba area (e.g. Wendorf and Schild 2001) in Egypt. In northern Sudan, Burg et Tuyur and Wadi Shaw in the Laqiya region are to name, especially for the pottery (see Schuck 1989, 1993; Kuper 1995).[5] The pottery also finds parallels in the Khartoum Variant of the Nile Valley (e.g. site 1045; see Wendorf 1968: 723).

Especially the lithic industry of the El Jerar phase (ca. 6600 – 6200 BC [7700 – 7200 bp]; Wendorf and Schild 2001: 52-53, Tab. 3.1) shows striking parallels (personal communication Romuald Schild, Poznań 2015). El Jerar is documented at different sites in the region of Nabta – Kiseiba (e.g. E-75-6 and E-91-1; see Wendorf and Schild 2001), at the northern edge of El Gebal El Beid Playa, about 70 km north of Nabta and also "elsewhere in the Southwestern Desert the Jerar variant is perhaps the most common occupation." (Wendorf and Schild 2001: 658). In the El Jerar lithic industry at site E-91-1, flakes and blades are the dominant

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4 Sample 1: SOP 1024-1, Square 501/808c-7; part of the horn core of *Gazella dorcas*, found in a loose concentration of bones and lithic material in the playa sediment in about 5 cm depth. Sample 2: SOP 1024-1, Square 500/806b-18; burnt bone of a large antelope (size of Oryx or Addax), found in the playa sediments in a depth of about 5 to 10 cm. Both dates were calibrated using CalPal 2007 (Weninger *et al.* 2007).

5 The archaeological material of the early occupation phase in the Laqiya Region still awaits detailed publication.

types of debitage, "quartz was used for presumed expedient tools, while flint or other fine-grained stones are used for retouched tools" and among the retouched tools in order of numerical importance continuously retouched pieces, perforators, notches, denticulates and backed bladelets are present (Wendorf and Schild 2001: 325-328). Very similar lithic material was found at site Jebel Kamil 80/63, where quartzite was mainly used as raw material. A stone place there (80/63-2) was radiocarbon dated to about 6000 BC (KN-3175: 7140±160 bp).[6]

Of special interest for comparison are the side-blow flakes and bifacially retouched tools found at site SOP 1024. Side-blow flakes are known in Mid-Holocene assemblages of different regions in Egypt and Libya, such as the Nile Valley, the oases but also the coastal Mediterranean region. Parallels can be found for example in Djara B assemblages dating to the 6th millennium BC (Kindermann 2010: 75-77), in Eastpans, the Nabta – Kiseiba region or in the Nubian Nile Valley (e.g. at Dibeira West 50; see Wendorf 1968: 754, Fig. 55.4). The bifacially retouched foliate point also finds parallels in Mid-Holocene assemblages such as Djara 90/1 (see Kindermann 2010: 238, Fig. 99). The bifacial complex is present since the late 7th millennium BC and then characteristic for the 6th and early 5th millennium in the northern part of Egypt, in the area of the Abu Muhariq Plateau and the oases (Kindermann 2010: 109-110).

Basing on results of analysis of lithic artefacts, two occupation phases can be identified at site SOP 1024: the first one represented by the material from the excavated area and dated to the end of the 7th millennium BC and the second one, represented by single finds found at the surface of the site, such as the side-blow flakes and the bifacial retouched tools, dated at the 6th millennium BC. The small knapping area and the bones of wild game excavated in trench SOP 1024-1 might indicate meat processing and preparation.

To conclude: Site SOP 1024 with its archaeological material of the Middle Holocene gives first insights in the hitherto more or less unknown prehistory of the Selima area and indicates wide contacts to other parts of the Libyan Desert which open broad perspectives for further research.

6 African Archaeology Archive Cologne (AAArC): arachne.uni-koeln.de/item/topographie/8008630

Acknowledgments

The work in Selima oasis would not have been possible without the support of the National Corporation for Antiquities and Museums (Khartoum) to whom we are deeply indebted for close and fruitful co-operation. For good co-operation in the field we would like to thank the French colleagues of the Selima Oasis Project, especially Coralie Gradel and Franck Derrien. For help with the sediment analysis Olaf Bubenzer (Cologne) is greatly appreciated. Heiko Riemer, Karin Kindermann and Jan Kuper (Cologne) gave useful feedback for the analysis of lithic material. We especially would like to thank Abou Al-Hassan Bakry (Cairo), the main supervisor of the Master thesis of Nader El-Hassanin on the lithic material of site SOP 1024, for his useful comments and constant support.

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Desert and the Nile.
Prehistory of the Nile Basin and the Sahara.
Papers in honour of Fred Wendorf
Studies in African Archaeology 15
Poznań Archaeological Museum 2018

Simon Holdaway, Rebecca Phillipps, Joshua Emmitt and Willeke Wendrich

E29G1 Revisited: the Current State of the Surface Archaeology of Western Regions of the Fayum North Shore, Egypt

Introduction

In their book on the Fayum North shore, Fred Wendorf and Romuald Schild reported on a site they designated E29G1, recording the presence of stone artefacts and fishbone and relating two radiocarbon determinations to the local lacustrine sediment stratigraphy. In 2009, we revisited the site and recorded the numbers and spatial distribution of material in two areas together with a survey to locate hearths and grinding stones. It was our intention to work in this area after the preliminary work was completed but political conditions have prevented our return. Since our visit, highway construction has modified areas of the desert surface in the vicinity of E29G1. While the Google Earth image accessed in November 2015 showed the site had escaped direct damage, a new highway is located only 1.5 km to the south west of E29G1 and a new track exists adjacent to the site that leads to an area of what appears to be industrial excavation to the northwest. The site is therefore potentially threatened and it is important that our observations, limited though they are, should be published. This report also provides a means to acknowledge the importance of the work Fred Wendorf and Romuald Schild undertook in the Fayum. The significance of the Fayum north shore to our understanding of the prehistory of the eastern Sahara is due to the diligence of a small group of scholars, including Wendorf and Schild, who have built upon each other's work. The results reported in this study continue this tradition.

1. Background

Gertrude Caton-Thompson and Elinor Gardner worked in the Fayum in the 1920s concentrating on two stratified sites, Kom K and Kom W (Fig. 1), but noting the presence of extensive surface artefact deposits in surrounding areas. They produced an extensive body of published work (Caton-Thompson 1926a; 1926b; 1927; Caton-Thompson and Gardner 1929; 1934; Caton-Thompson *et al.* 1936; 1937), and their findings were incorporated into early studies accounting for the origins of the Neolithic (e.g. Braidwood 1960). These early publications were subsequently built upon through a series of later 20th century projects, notably by Fred Wendorf and Romuald Schild (1976) whose report we discuss in more detail below. Other notable studies include those by Bolesław Ginter, Janusz Kozłowski and colleagues (Ginter *et al.* 1980; Kozłowski and Ginter 1989; 1993), Robert Wenke (1984; Wenke, *et al.* 1983; Wenke and Casini 1989; Wenke, *et al.* 1988), Fekri Hassan (1986; Hassan, *et al.* 2006; 2012), and Douglas Brewer (1987; 1989a; 1989b). More recently Noriyuki Shirai (2010) has published a study focusing on the stone tools from the Fayum north shore.

In their 1976 book, Wendorf and Schild suggest that the site they labelled E29G1 is the equivalent of Caton-Thompson and Gardner's Site Z1 (Fig. 1). Site Z1 is mentioned briefly by Caton-Thompson and Gardner (1934: 59) and described as a location with large quantities of microliths. When Wendorf and Schild visited the area decades later, they reported on six artefact concentrations together with what they described as a scattered veneer of artefacts found along the eastern slopes of two deflated basins covering an area measuring approximately 700 x 120 m (Fig. 2). Within lacustrine sediments, which they describe as organogenic swamp sediments associated with *Pila ovata* snail shells, they describe a complex stratigraphy. Based on the observations they made from the trenches excavated this stratigraphy is used to propose links to a series of suggested lake advances and retreats. As we have discussed elsewhere (Phillipps *et al.* 2016), there is reason to be cautious about the suggested lake change sequence, since there are issues with the way that chronostratigraphic correlations were made in a series of studies that followed on from Wendorf and Schild's work. Rather than repeat the discussion of the issues surrounding chronostratigraphic correlations (see also Holdaway and Wendrich 2017), here we consider the artefact concentrations that Wendorf and Schild observed.

In one area of reworked lacustrine sediments at E29G1, Wendorf and Schild report the presence of a small number of stone artefacts together with a fragment of a human skull and a number of fish bones. In Areas A through E, more substantial archaeological deposits are reported. In Area A, fish bones and stone artefacts occur together with charcoal and a radiocarbon date that was obtained from this charcoal is re-reported here in Table 1 using the latest calibration curve. Bands of what are described as swamp sediments occur at higher elevations above Area A and the uppermost of these deposits also contains stone artefacts. Calibration was unavailable to Wendorf and Schild at the time they published. The radiocarbon determinations they obtained came from Teledyne Isotopes. Radiocarbon determinations published by this laboratory in the journal *Radiocarbon* indicate that determinations were calculated using the conventional Libby half-life (publications refer back to the method given in Walton *et al.* 1961). We have therefore calibrated the dates reported by Wendorf and Schild using the northern hemisphere terrestrial curve (*Pila ovata* is a freshwater shell).

Area E is described as a small concentration of artefacts eroding from the top of lacustrine sediments. An L shaped trench excavated in this area revealed three layers with cultural material including fishbone cemented in a breccia, relatively rare stone artefacts and burned *Pila ovata* shells. One of these shells was dated (Table 1).

Table 1. Radiocarbon determinations published by Wendorf and Schild (1976) calibrated against the IntCal13 (Reimer *et al.* 2013) curve using Oxcal 4.2 (Bronk Ramsey 2009)

	Lab No. (material)	CRA BCE	Calibrated age BCE IntCal13
Area A	I-4128 (charcoal)	6150 +/- 130	7064+/-202
Area E	I-4129(*Pila ovata* shell)	5190+/- 120	6019+/-127

Wendorf and Schild do not describe the stone artefacts they observed in detail nor did they publish descriptions of the faunal remains. Fish remains from E29G1 remain unpublished however Linseele *et al.* (2016) reviews the non-fish faunal material from E29G1 as well as from other Fayum sites that are described as Epipalaeolithic (E29H1, Site 2 and FS2). The E29G1 assemblage is dominated by Dorcas gazelle (*Gazella dorcas*) and Hartebeest (*Alcelaphus buselaphus*) although around half the elements were not identified. The two radiocarbon determinations obtained, once calibrated, indicate ages around 9000 BP and 8000 BP respectively however while both samples were obtained from deposits that included cultural materials, neither of the dates were obtained from secure cultural deposits like hearths. Thus, while they provide general age indications they may not date the archaeological materials precisely. As discussed in detail elsewhere (Holdaway and Wendrich 2017; Phillipps *et al.* 2016), using isolated charcoal deposits to date both the lake advances and retreats, and concentrations of artefacts can be problematic. Based on the observations Wendorf and Schild made, the area that we have designated as Z1 referring to the site name employed by Caton-Thompson and Gardner indicates the presence of an archaeological record comparable to that found further to the east in the vicinity of Kom W and Kom K.

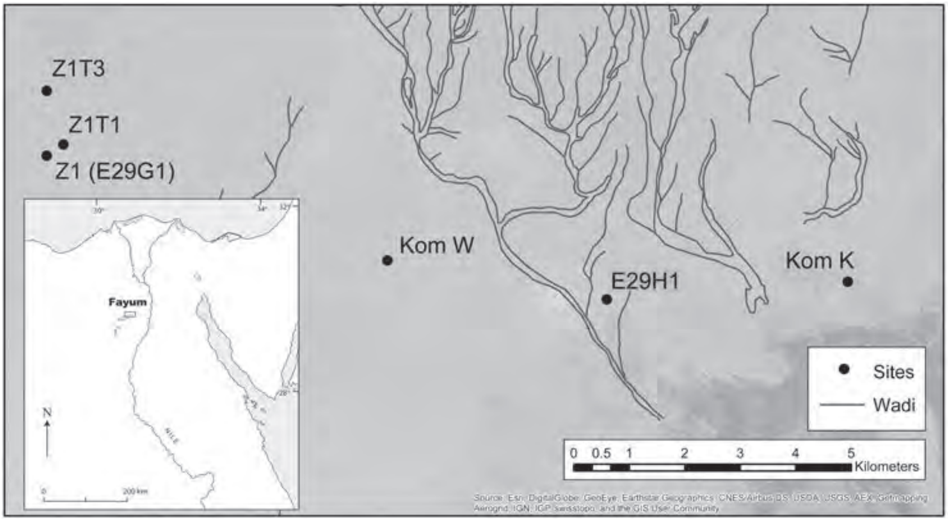

Fig. 1. The Fayum north shore showing the sites mentioned in the text

2. The 2009 Survey

As part of a wider survey of the prehistoric archaeology of the Fayum north shore (Holdaway *et al.* 2015; Holdaway and Wendrich 2017), the area around E29G1, designated Z1, was visited in 2009 and a series of observations made. Figure 2 shows the area covered in the 2009 survey measuring 2138 m^2 together with a georegistration of the map published in Wendorf and Schild (1976: Fig 97) that shows the features they recorded and the location of their excavation trenches. Also shown on the figure is the location of two transects, Z1T1 and Z1T3, which were used to record the locations and numbers of surface archaeological materials. These transects, laid out as a cross 100 m in a north south and east west direction with arms 10 m wide, were used as sampling units in our Fayum north shore study (Holdaway and Wendrich 2017). As in our wider study, the two transects

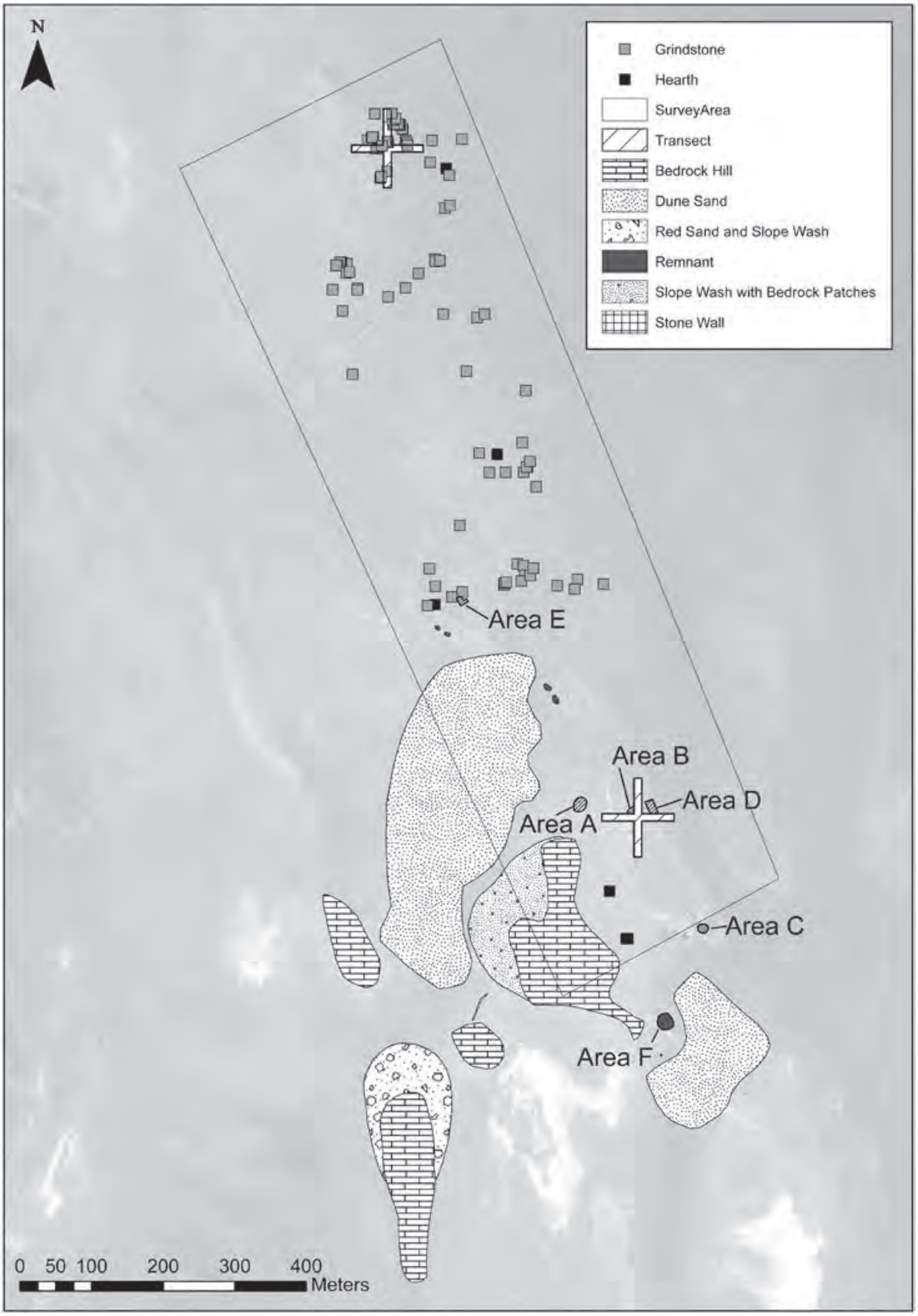

Fig. 2. Z1 (E29G1) with the georegistered map published by Wendorf and Schild (1976: fig. 97). The georegistration is approximate and is based on the topographic features that Wendorf and Schild identified

reported here were first surveyed to record different surface sediment types then surveyed to record the location of individual archaeological items with a maximum dimension > 20 mm (Fig. 3-4). We report the results of the survey of the two transects below making comparisons with the results of similar transects recorded further to the east along the Fayum north shore.

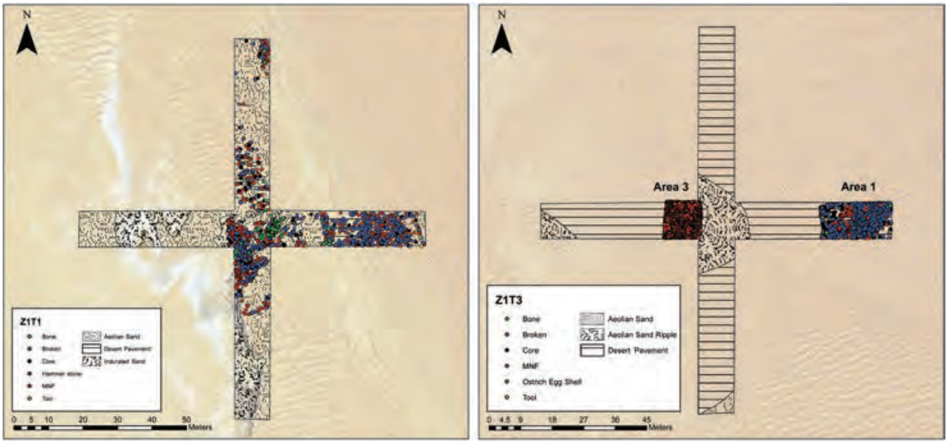

Fig. 3. Transects Z1T1 and Z1T3 recorded in 2009. Owing to the high density of artefacts encountered, only limited areas in each of the transects were recorded

Fig. 4. Survey of Z1T1

The area between transects was surveyed to locate hearths and grinding stones following the same protocol adopted in other areas. Individuals, spaced 10 m apart, walked in a line marking hearths and grinding stones as they were encountered. Those at either end of the line used handheld GPS units to ensure that all areas were covered. A team followed behind to record the location and form of the marked items. Hearth and grinding stone descriptions followed those reported for the wider study (Holdaway and Wendrich 2017). For grinding stones the shape and lithology was recorded while for hearths the presence of heat retainers was noted, the degree to which these were clustered and the presence of charcoal was recorded.

3. Results

Both transects recorded, Z1T1 and Z1T3, were covered with dense concentrations of stone artefacts and smaller quantities of bone and other materials. Owing to the concentration of items, not all of the area covered by the transect arms were surveyed (Fig. 3). Table 2 provides counts of the number of artefacts and bones recorded with densities calculated relative to the actual area surveyed. Artefact density in Z1T3 was very high, meaning that only two relatively small areas were recorded. Stone artefacts were divided into broad technological classes: complete and proximal flakes, broken flakes, cores, and tools where flake blanks included retouch. The short duration of the time we spent within the area surrounding E29G1 meant that we did not complete a full technological analysis of the stone artefacts identified as we have reported for other areas (Phillipps and Holdaway 2016; Holdaway and Wendrich 2017). Nor were the bones observed identified to species as we have for deposits further to the east (Linseele *et al.* 2014; Linseele *et al.* 2016). We noted the presence of bifacial axes, comparable to those found by Caton-Thompson and Gardner (1934, plate IX and XXIII) at Kom W and Kom K, in the Z1T3 transect although none of these fell within the areas we intensively surveyed (Fig. 5). The analyses presented here are therefore necessarily preliminary but important since as noted above, sites in this region are under threat.

On the Z1T1 transect, areas of desert pavement (defined following the discussion in Holdaway and Wendrich 2017) tend to have better visibility than areas with aeolian and indurated sand. However, a comparison of the relative frequencies of artefacts found on the different surface types indicates that these are more frequent on surfaces with some aeolian sand cover. As proposed for areas studied further to the east in the Fayum, it is possible that sand cover serves to protect

Table 2. Object frequency and density (number/m²) together with surface type for the areas recorded in transects Z1T1 and Z1T3. For transect Z1T3 the only surface type was desert pavement. Surface type and artefact class definitions follow those used in Holdaway and Wendrich (2017)

	Z1T1				Z1T3			
	Aeolian sand		Desert pavement		Area 1		Area 2	
	Frequency	Density	Frequency	Density	Frequency	Density	Frequency	Density
Bone	123	0.94	12	0.07	3	0.01	1164	10.86
Broken	423	3.23	171	1.02	903	4.49	1148	10.71
Core	105	0.80	25	0.15	824	4.10		0.00
Hammer stone	1	0.01				0.00		0.00
Flake platforms	929	7.08	203	1.21	3236	16.09	3510	32.76
Ostrich eggshell					1	0.00		0.00
Tool	38	0.29	12	0.07	46	0.23	44	0.41
Total lithic	1404	10.71	411	2.45	5009	24.90	5866	54.75

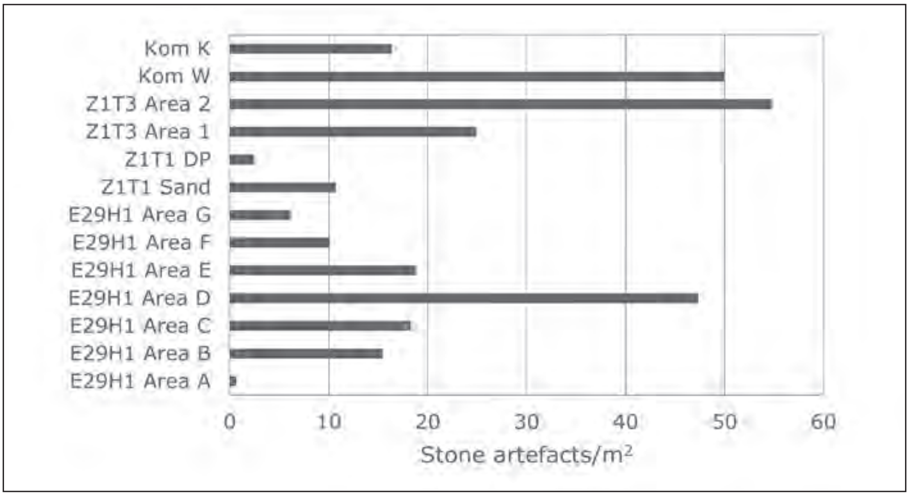

Fig. 5. Stone artefact density for the Z1 transects together with densities obtained for areas further east in the Fayum north shore. Densities are calculated as number of objects of all forms per square meter and are based on fieldwork reported in Holdaway and Wendrich (2017)

surface artefact deposits. In addition to the results from the Z1 transects, Figure 6 provides stone artefact densities for survey areas within the region of E29H1 recorded in a separate period of fieldwork in 2008. This site, also reported Wendorf and Schild (1976), was thought by them to be similar in composition to E29G1. There are now a number of radiocarbon determinations from hearths at E29H1 (Holdaway and Wendrich 2017) that show a temporal range that encompasses the two calibrated determinations Wendorf and Schild obtained from E29G1. Acknowledging the issues with using older radiocarbon dates from sedimentary charcoal deposits, the calibrated ages support Wendorf and Schild's (1976:194) suggestion that the two sites date to similar periods.

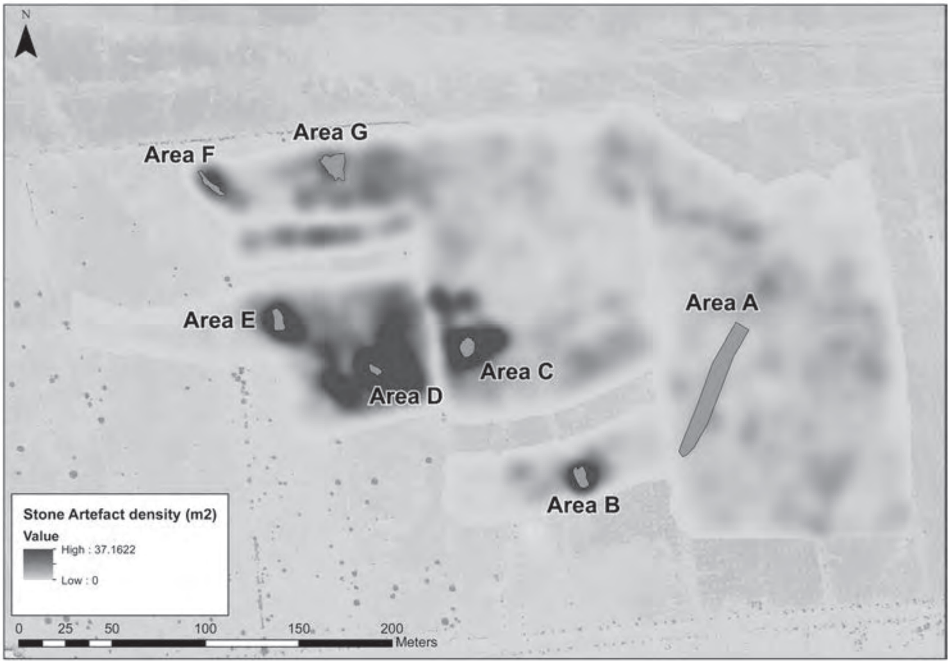

Fig. 6. E29H1 and the areas of analysed artefacts

For comparative purposes, Figure 5 also provides surface stone artefact densities for areas recorded at Kom K and Kom W. With a density of up to 54 artefacts per square meter (in Area 2 of Z1T3), parts of the Z1T3 transect have densities as high as those found on the surface of parts of Kom W and one of the areas (Area D) recorded at E29H1 (Fig. 6). Both of the areas recorded at Z1T3 have densities in excess of those recorded for the surface at Kom K (Holdaway and Wendrich 2017).

In contrast, the density of artefacts at Z1T1 is lower, varying from a high of around 10 artefacts per square meter on the area with aeolian sand to a low of 2.4 artefacts per square meter on the area with desert pavement. These densities are comparable with those found at E29H1 (except Area D) which also ranges considerably in values from lows less than one artefact per square meter to high values close to those found on Kom W. Based on density measures, the two Z1 transects differ in composition, a difference that is also expressed in the relative proportions of stone artefact types.

Figure 7 provides stone artefact proportions based on frequency counts for the basic artefact types noted above. Flakes with platforms (i.e. complete and proximal flakes) are the most frequent form in both transects and therefore account for the largest proportion of artefacts but the proportion of cores is higher in Z1T3 than it is in Z1T1. Figure 7 includes artefact proportions from E29H1 from the areas analysed using the same artefact categories recorded in the Z1 transects. E29H1 frequency measures per area are variable however a number have higher proportions of retouched tools than observed at the Z1 transects. Core proportions vary with some showing proportions as high as those recorded for Z1T3. Overall, the Z1 transects have higher proportions of broken flakes than found in the E29H1 analysed areas.

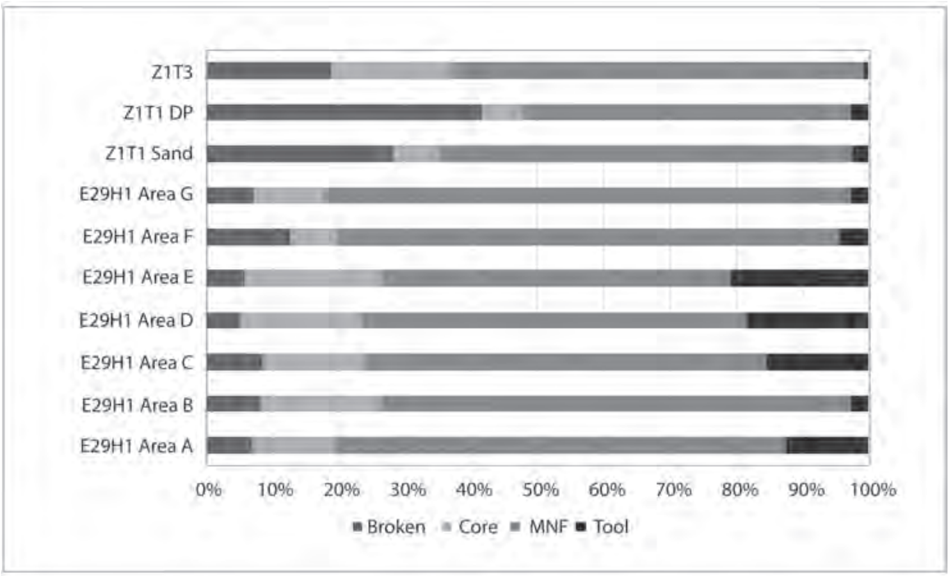

Fig. 7. Stone artefact proportions for the Z1 transects and Areas A through G at E29H1

Figure 8 shows the flake to core ratios for the two Z1 transects and those from E29H1. The ratio for the two surface types at Z1T1 are high, comparable to the ratio from Areas F and G at E29H1. In contrast, the ratio value for Z1T3 is lower, comparable in value to Areas A through E from E29H1.

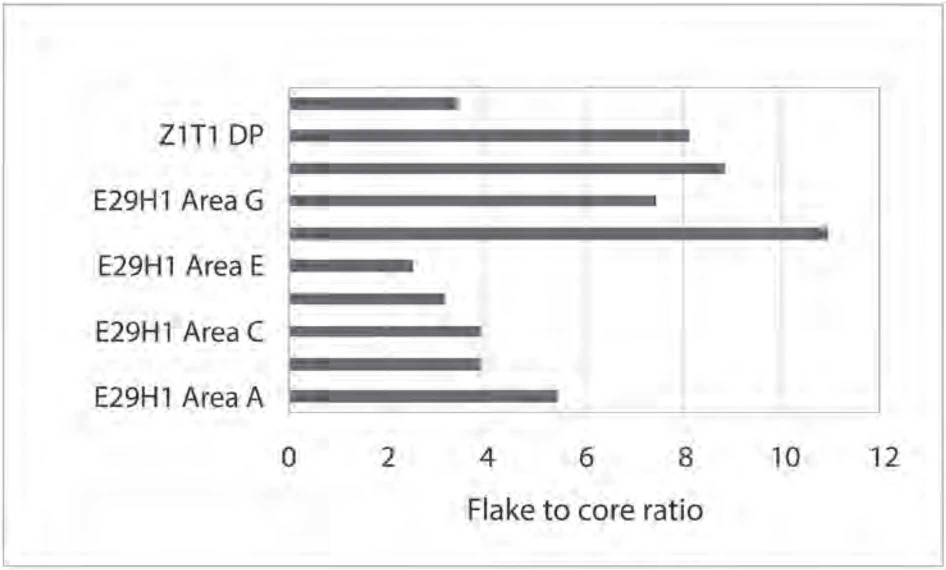

Fig. 8. Flake to core ratio for the areas recorded at the Z1 transects together with Areas A-G at E29H1. The ratio is calculated by dividing the number of complete and proximal flakes by the number of cores. The two areas recorded at Z1T3 are combined

The area between the two Z1 transects was surveyed for hearths and grinding stones as discussed above. As a result of this survey, 68 grinding stones were identified together with five hearths. The area covered was more than 2000 m^2, giving a grinding stone density of 0.032 per square meter and a hearth density of 0.0023 per square meter. These are higher values compared to the densities of grinding stone and hearths recorded further to the east in the vicinity of E29H1 where grinding stones have a density of 0.000173 per square meter and hearths a density of 0.00066 per square meter.

Table 3 provides frequencies of the upper and lower grinding stones identified in the Z1 survey area together with their shape and lithology. Sandstone is the most common material whereas further to the east, in the vicinity of E29H1, limestone grinding stones are more common. The five hearths identified have scattered heat retainers and showed no evidence for the presence of charcoal.

Table 3. Grinding stones recorded in the Z1 survey area

Hand stone			Lower grinding stone		
Lithology	**Shape**	**Frequency**	**Lithology**	**Shape**	**Frequency**
Conglomerate	Concave	2	Basalt	Flat	1
	Triangular	1	Conglomerate	Block	2
	Flat	1		Concave	8
Limestone	Flat	3		Flat	1
Quartzite	Flat	1	Limestone	Concave	5
Sandstone	Concave	10	Sandstone	Block	3
	Flat	6		Concave	19
	Triangular	1		Flat	4

4. Discussion

The description that Wendorf and Schild (1976) supplied for E29G1 indicated the potential the site provided for understanding occupation of the Fayum north shore in areas west of E29H1. Our more recent survey confirms their observations and provides more data on the abundance of archaeological material in surface deposits. Frustratingly, our time in the area was limited, reflected in the extent of the observations we have reported here. Our understanding of the Z1 area is therefore largely based upon limited observations used to make comparisons with areas further east along the Fayum north shore where we have conducted more extensive research.

Our research focussed on two sections of the Z1 area with the southern transect providing a sample of material from the area Wendorf and Schild identified as E29G1. We can be confident of this based on matching the topographic features that Wendorf and Schild included in their location map (1976: Figure 97) which we used to georegister their map in relation to ours (Fig. 2). We also retrieved a trowel from the trench illustrated in Wendorf and Schild (1976: 103) which was likely left after their work was completed (as a material record of archaeological work in the Fayum we left the trowel in place; Fig. 9).

At the time of our visit, the region around E29G1 was covered with stone artefacts and bones (largely fish) found on the surface but with remnants in stratified

Fig. 9. Image of the trowel found at E29G1 during survey in 2009. The trowel is in the lower left hand side of the image

deposits. Our work concentrated on the surface deposits in one transect, Z1T1, in which we recorded a large number of stone artefacts.

Stone artefact density at Z1T1 is comparable to some of the areas recorded further to the east at E29H1 but the density in the area of E29G1 we recorded is relatively low. The artefacts are more fragmented compared to the areas further to the east and have relatively low proportions of retouched tools. The flake to core ratio values for both desert pavement and sand surfaces recorded at Z1T1 are high, toward the upper end of the values recorded at E29H1. More detailed recording at E29H1 indicated that flakes were likely transported away from this site for use elsewhere (Phillipps and Holdaway 2016). One of the consequences of this is relatively reduced values for the flake to core ratio. Although we did not measure the required variables to detect flake movement at Z1T1 directly, and so cannot demonstrate the movement or otherwise of the products of lithic reduction, the flake to core ratio at Z1T1 is at the upper end of the range of values found at E29H1. This might indicate a different form of lithic economy operated in the western edge of the Fayum north shore compared to areas further to the east. This might also be connected to the relatively low density of stone artefacts found at Z1T1 compared to E29H1 together with the small number of tools. However, these results need to be read as interesting observations rather than firm conclusions at this stage until the area can be investigated more fully by further fieldwork.

The high density of stone artefacts at Z1T3 contrasts with the lower densities at Z1T1. The former are in fact some of the highest densities we have recorded in the Fayum north shore, and as noted above, are only approached by the deflated surface deposits in some parts of Kom W. The composition of the Z1T3 lithic assemblage is different to that found at Z1T1 further to the south. It has a very large number of cores reflected in the low value of the flake to core ratio, which is lower than the majority of the areas studied at E29H1. The assemblage is dominated by flakes and cores with the retouched tool proportion barely registering in the relative artefact proportions shown in Figure 7. This is similar to the low proportions of tools found in the Kom K and Kom W assemblages, and there are some typological similarities between these locations (Phillipps 2012).

In some ways the potential of this assemblage is even more interesting than that observed at Z1T1. As described elsewhere (Phillipps and Holdaway 2016), further to the east there are a number of assemblages (e.g. Kom W) for which analysis indicates the loss of cores. That is, in contrast to the E29H1 assemblages, there is evidence to suggest that cores rather than flakes were removed leaving behind flake dominated assemblages. It is tempting to suggest that some of the cores that were initially worked in the eastern parts of the Fayum north shore were transported west and deposited in areas sampled in the Z1T3 transect. Of course moving cores into an area would decrease the flake to core ratio by augmenting the number of cores relative to the number of flakes. Unfortunately we need more data than were recorded in 2009 to be sure of this conclusion so like the results from the comparisons between E29G1 and E29H1, this observation should only be taken as the impetus for more work.

A final set of observations relate to the grinding stones found when we systematically surveyed an area between the Z1T1 and Z1T3 transects. In this area, grinding stones are common and they occur at densities higher than those found further to the east. Grinding stones are of course susceptible to movement by people well after their use and abandonment and it might be that this difference simply reflects removal of grinding stones from areas further to the east. However, any activity of this type was not very systematic since grinding stones are found across the Fayum north shore. Thus, they do not seem to have been uniformly attractive to later visitors to the area. In addition, as detailed in Holdaway and Wendrich (2017), despite a long prehistory of activity around the Fayum north shore, the surface archaeological record has remained surprisingly intact right up that is until recent times. Thus, the relatively large number of grinding stones can be added to the list of interesting observations that make the Z1 area an important location for future research.

One of the conclusions of our more in-depth study conducted in areas to the east of Z1 was the need to understand the Fayum record at a landscape scale (Holdaway and Wendrich 2017). No one location, not even the famous stratified sites of Kom K and Kom W, can provide sufficient information to allow for inferences about the settlement system and socio-economy of the prehistoric occupants of the Fayum. Instead, multiple records of different types spread across the Fayum north shore need to be assessed in combination. The results obtained from the Z1 area provide indications that may bolster this argument further. There are hints that the Z1T3 assemblage may include cores that were moved from areas further east. It is even possible that the high flake to core ratio at Z1T1 reflects flakes that were added to the assemblage transported from the places further to the east that show a net flake loss. Unfortunately, without further data recording, these observations must remain speculative.

This brings us to a final point. The need to publish these preliminary findings is driven not by the completeness of the scientific analysis we can present but by the imminent potential destruction of the archaeological record the study of which is needed to allow us to make the observations that are conclusive rather than speculative. Development is of course necessary, however before such land altering development goes ahead observation of the archaeological record needs to be made. The difficulty for archaeological records like those in the Fayum is that the types of observations that are needed require what appear to be largely redundant, repeated measurements of less than spectacular archaeological remains. Of course these measures are not in realty redundant nor is the spectacular nature of the record a criterion for assessing its archaeological significance. To understand how people used the landscape in the early to mid-Holocene in Egypt we need to make repeated observations over very large areas of things like flaked stone artefacts, fragmented pottery and animal bones. We need to study these items even if their information content appears to be low. It is things like the flakes and cores that tell us about movement and therefore landscape use. These items with low aesthetic appeal are nevertheless the basic material that when analysed fully will provide insight into a foundational period in Egypt's prehistory. To put it bluntly, if we are to understand the foundation of Egypt's Pharaonic civilisation we need access to intact desert surfaces before they are destroyed by development. And we need the time to study these surfaces and the archaeological record they hold. The 'once over lightly' approach as reported here is likely to raise more questions than it solves therefore we need to pressure authorities to allow meaningful heritage mitigation to be undertaken before development occurs.

Conclusion

Archaeological research in the Z1 area that includes E29G1 shows that surface scatters of archaeological materials, particularly stone artefacts, differ in density and composition from areas further to the east. Although observations are preliminary and more work needs to be undertaken, there is the possibility that flakes and cores that were removed from sites in the eastern regions of the Fayum North Shore were moved to locations further to the west. If so, this has implications for the extent and nature of the settlement system that occurred during time periods that cover the early to mid-Holocene. It might suggest that movement during times when people were occupying areas surrounding Lake Qarun was largely concentrated within the vicinity of the lake. Different aspects of lithic economy are suggested by the two transects studied at Z1. In Z1T1, high flake to core ratios suggest an excess of flakes. If this site is of an equivalent age to E29H1 then it might be that some of the flakes removed from this location were deposited further west. In contrast, at Z1T3 the flake to core ratio is low suggesting a large number of cores. In the eastern areas of the Fayum north shore sites dated to the mid-Holocene indicate the removal of cores. If these were deposited at locations further west, this might explain the high number of cores (and therefore low flake to core ratio) at Z1T3. Unfortunately, these assessments remain speculative at present since we lack sufficient data to draw conclusive inferences. More work is needed before the critical surface deposits are destroyed through development.

Acknowledgements

Work reported here was supported by the Royal Society of New Zealand through a Marsden grant, by the National Geographic Society and by the University of Auckland. Permission to work on the Fayum material was provided by the Egyptian Supreme Council of Antiquities and the Ministry of State for Antiquities (MSA) to the UCLA, Groningen University, University of Auckland Fayum Project (URU). Figures were prepared by Briar Sefton and Tim Mackrell.

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Desert and the Nile.
Prehistory of the Nile Basin and the Sahara.
Papers in honour of Fred Wendorf
Studies in African Archaeology 15
Poznań Archaeological Museum 2018

Noriyuki Shirai

New Light on *The Desert Fayum*: Restudying Gertrude Caton-Thompson's Fayum Lithic Collections in London

Introduction

The British archaeologist Gertrude Caton-Thompson has carried out the first academic fieldwork in the Fayum in the 1920s. Her monograph entitled *The Desert Fayum* and published in 1934 is still regarded as the most authentic source of information about the prehistory of the Fayum, even though she did not publish every single find in this monograph. Regardless of whether published or unpublished, her finds which are presently stored in museums and other institutions around the world are worth restudying for information which one cannot obtain through new fieldwork anymore, as archaeological sites in the Fayum have been disturbed by antiquarians' collecting activities and archaeologists' fieldwork since her time and are being rapidly destroyed by modern land use activities like clay mining and agriculture. I had an opportunity to be based in London and to study her Fayum lithic collections at three institutions there. This article briefly overviews her fieldwork and the distribution of her finds, and presents what were found through this study.

1. Caton-Thompson's fieldwork in the Fayum

Caton-Thompson had three seasons of fieldwork in the Fayum (Caton-Thompson 1983: 101-109; Caton-Thompson and Gardner 1934: 3-11). The first season in

1924-5 was for gaining the first impression about the geology and archaeology of the concession area. She surveyed the large area around the north shore of Lake Qarun from Dimai in the west to Kom Aushim in the east (Fig. 1), and spotted promising sites for excavation. She also recognised the necessity of the participation of a geologist in the next season's fieldwork.

Fig. 1. Caton-Thompson's archaeological sites on the north shore of Lake Qarun

The second season in 1925-6 was most productive. A large number of elaborate stone tools, complete pottery vessels and miscellaneous artefacts were obtained through excavations at prominent sites like Kom W, Kom K and Upper K Pits, and the Neolithic status of artefact assemblages found *in situ* at these sites was confirmed. Similar artefacts from many other surface sites were also considered to be dated to the Neolithic. Moreover, Caton-Thompson was joined by the geologist Elinor Gardner, who concentrated on surveying and mapping the large concession area. The first two seasons of fieldwork were sponsored by the British School of Archaeology in Egypt, and the two ladies could be engaged in their work without being bothered by financial and administrative problems.

The third season in 1927-8 had a lot of trouble before its start. Due to the loss of the sponsorship of the British School of Archaeology in Egypt and the overlap of the research area with other researchers' one, the research concession was not granted as originally scheduled. Fortunately, the Royal Anthropological Institute in London became the main sponsor, and the last season's fieldwork was carried out in the end. However, it was not a productive season, because the research area was restricted and the fieldwork period was shortened. The planned participation of Dorothy Garrod for studying Middle Palaeolithic artefacts was cancelled. In this situation, Caton-Thompson and Gardner have worked not only within the restricted concession area but also outside of it. Much time was spent working at post-Neolithic sites, and the knowledge about the human life and material culture of the Predynastic, Old Kingdom, Ptolemaic and Roman periods was augmented.

2. Division and distribution of Caton-Thompson's Fayum finds

At the end of the second and third seasons, her finds were transported to Cairo for the official division at the Department of Antiquities of Egypt, and only small portions of her finds were left in the Egyptian Museum in Cairo. The rest of her finds were given to her and shipped to the United Kingdom. Upon arrival in London, her finds were divided further into small portions and distributed to many institutions in the United Kingdom and abroad as the reward for their financial support. When *The Desert Fayum* was out in 1934, the distribution had already been completed, and Caton-Thompson published a list of the finds distribution (Caton-Thompson and Gardner 1934: xiv). According to this list, her Fayum finds were finally distributed to 31 institutions in nine countries including Australia, Canada, Egypt, France, Ireland, Japan, the Netherlands, the United Kingdom and the United States, but no information about exactly how many and which finds were distributed to which institutions was provided. Unless the institutions which received her Fayum finds publish the accession list or any other data, there is no means to know which finds are there (Shirai 2011a).

I studied the portions of her finds which are presently stored in the Petrie Museum of Egyptian Archaeology, the British Museum, and the UCL Institute of Archaeology. These institutions have online catalogues of their collections, and these catalogues are the first clue to knowing which finds are stored there. However, these catalogues are incomplete and not informative, and it was not until I studied their collections that the whole picture of Caton-Thompson's Fayum finds became clearer.

3. Caton-Thompson's Fayum lithic collections in London

The Petrie Museum has the largest portion of Caton-Thompson's Fayum finds, and there are 1580 accessioned objects including approximately 1400 lithic artefacts but debitage products are few. More than half of all accessioned objects are from the 1925-6 season. At present, 63 Neolithic stone tools from Kom W, Kom K, Upper K Pits and some surface sites, and three Predynastic stone tools are on display in a showcase in the main gallery of the museum. All other artefacts except Neolithic pottery vessels and sherds displayed in the pottery gallery can be seen not only in the showcase of the main gallery but also in the glass-covered drawers under the showcase (Fig. 2). As far as I checked, the photographs and/or illustrations of 331 stone tools including 50 Epipalaeolithic ones, 266 Neolithic ones, 10 Predynastic ones and five Old Kingdom ones in the Petrie Museum were published in *The Desert Fayum*.

Caton-Thompson's Fayum finds in the British Museum are not many, and the total number of artefacts is 80. All of the artefacts are from the 1925-6 season only and were accessioned in 1927. There are 58 stone tools including two Epipalaeolithic ones, 55 Neolithic ones and one Old Kingdom one. There are also pottery vessels, a basket, a complete wooden sickle with flint blades, wooden sticks for uncertain use, bone points, and a fragment of woven linen. As far as I checked, the illustrations and/or photographs of 37 artefacts (including 22 stone tools) out of the 80 artefacts were published in *The Desert Fayum*, and some of them have

Fig. 2. Drawer containing lithic artefacts from Kom W in the Petrie Museum. Photograph taken by the author by courtesy of the Petrie Museum of Egyptian Archaeology, UCL

Fig. 3. Caton-Thompson's Fayum finds on display in the British Museum. Photograph taken by the author by courtesy of the British Museum

were mentioned with the accession numbers given by the museum in the monograph. About one third of all artefacts representing the Fayum Neolithic culture have been on display in the Early Egypt gallery of the museum and well known to the general public as well as academics. In 2014, this gallery was completely refurbished, and the number of Caton-Thompson's Fayum finds on display was reduced to 21 including 15 stone tools, a complete wooden sickle with flint blades, a basket, and five pottery vessels, all of which are Neolithic (Fig. 3).

Caton-Thompson's Fayum finds in the UCL Institute of Archaeology have not been known even to academics because of their accession history and state of storage in the Institute. It is a portion which was originally given to the Wellcome Historical Medical Museum in London, as simply indicated as 'Wellcome Historical' in Caton-Thompson's distribution list. Its founder Henry Wellcome was a pharmaceutical entrepreneur and a keen collector of medical artefacts as well as archaeological and ethnological artefacts. After his death in 1936, his collection in this museum was divided and distributed, and part of his archaeological collection including Caton-Thompson's Fayum finds came to the Institute (Russell 1986). For unknown reasons, only half of all artefacts were accessioned when they arrived at the Institute in 1955, but the rest of artefacts have been left unaccessioned until I started to study them in 2014. The total number of accessioned artefacts is 250, and 247 are lithic artefacts including many formal tools as well as some cores. However, 52 lithic artefacts which are all described as arrowheads in the accession list made in 1955 could not be found in the storage of the Institute during my stay in London. At present, there are 192 tools including 73 Epipalaeolithic ones, 96 Neolithic ones, 22 Old Kingdom ones, and one Middle Kingdom one. None of them is on display in the Institute. More than half of all accessioned artefacts are from the 1927-8 season. As far as I checked, the photographs of nine Neolithic stone tools and four Old Kingdom stone tools in the Institute were published in *The Desert Fayum*.

As mentioned above, Predynastic and Old Kingdom stone tools are not many in the three institutions in London. Caton-Thompson has sometimes found Predynastic and Old Kingdom stone tools at Neolithic surface sites and wrongly published some of those tools as of the Neolithic. Apart from the wrong ones, she recognised what Predynastic and Old Kingdom stone tools looked like, and published the Predynastic and Old Kingdom stone tool assemblages from particular sites like Qasr Qarun and Kom IV in Plates LIII, LIV, LV, LVI, LVII, LXVII, LXVIII, LXIX, LXXIX, LXXX, LXXXI and LXXXII of *The Desert Fayum*. However, none of the Predynastic stone tools and few Old Kingdom stone tools in these plates were found stored in the three institutions in London.

4. The Dark Side of *The Desert Fayum*

The Desert Fayum was published in 5-6 years after the end of fieldwork. This quick publication is truly admirable, given that Caton-Thompson was extremely busy with other fieldwork in Zimbabwe and Egypt in this period (Caton-Thompson 1983: 114-163). In addition, the prehistoric archaeology and geology of the Fayum were described on an unprecedented regional scale. Caton-Thompson dismissed the involvement of the British School of Archaeology in Egypt in the publication work, in order to protect her own interpretations on archaeological and geological issues from the objections of Flinders Petrie (Caton-Thompson and Gardner 1934: 11-12). Moreover, the beautiful and accurate illustrations of lithic artefacts published in this monograph were made by the hands of Olga Tufnell and Mary Leakey (nee Nicol), who were very early in their archaeological career at that time but later became renowned archaeologists.

Despite these positive things, there are many flaws in this monograph. Firstly, even though Caton-Thompson published a considerable number of lithic artefacts, hundreds or thousands of artefacts are actually left unpublished. Secondly, many lithic artefact photographs published in this monograph are printed in mirror image. Thirdly, some important lithic artefacts were published with wrong information about their provenances. Fourthly, small details of lithic artefacts were neither noted nor illustrated. Lastly, damaged lithic artefacts and the lithic artefacts of uncertain date were not published.

5. A considerable number of unpublished lithic artefacts

When I studied Caton-Thompson's Fayum finds collections in London, I usually checked which artefacts in the collections were published in *The Desert Fayum*. I realised that Caton-Thompson often marked the lithic artefacts which she intended to publish with a black ink dot. Such a black dot on the surface of lithic artefacts is clearly seen in many photographs published in *The Desert Fayum* and also in several photographs in this article (Figs. 4, 6-8 and 10). However, I found that not all artefacts published in *The Desert Fayum* were marked with a black dot, and that more than 20 lithic artefacts which were marked with a black dot were left unpublished in the Petrie Museum.

The photographs and/or illustrations of 541 lithic artefacts were published by her as of the A group (presently known as the Neolithic), the B group (presently known as the Epipalaeolithic) and uncertain dates (presently known as the Neolithic), and I found that 330 out of the 541 lithic artefacts are presently stored in the Petrie Museum. This means that her publication relied heavily on the Petrie Museum collection and that she published only one quarter of her Fayum finds stored there. A considerable number of lithic artefacts are left unpublished even in the Petrie Museum alone. There is little doubt that countless numbers of valuable lithic artefacts remain untouched and unrecognised in other museums and institutions around the world.

6. Lithic artefact photographs printed in mirror image

It is obvious to the readers of *The Desert Fayum* that many lithic artefact photographs like Plate XXXV-2, 3, 7, 21 and 22, Plate XXXVI-8 and 14, Plate XXXVIII-8, Plate XL-4 and 9, Plate XLI-6, 11, 17 and 19, and Plate XLV-1 are printed in mirror image, because ink inscriptions on the artefact surface are mirror images (Fig. 4). However, as I compared real artefacts in my hand with their photographs in the

Fig. 4. Gouges from Site T (bottom left: UC3699) and Site N (bottom right: UC3620) with Plate XXXV-2 and 3 (top: © 1934 The Royal Anthropological Institute). Photograph taken by the author by courtesy of the Petrie Museum of Egyptian Archaeology, UCL

plates of *The Desert Fayum*, I realised that far more lithic artefact photographs are indeed printed in mirror image. While there is no problem in Plates VIII, X, XXII, XXXIII, XLIX and L, all photographs of the lithic artefacts which I handled in Plates XXXV, XXXVI, XXXVII, XXXVIII, XL, XLI, XLIII and XLV are printed in mirror image. It is hard to know why such errors occurred, as Caton-Thompson did not mention anything about who took, printed and laid out lithic artefact photographs in her note on publication (Caton-Thompson and Gardner 1934: 11-12).

7. Wrong provenances of lithic artefacts

It was also found that there are several discrepancies between the ink inscription about the provenance of an artefact on the artefact surface and the description about the artefact provenance attached to the artefact illustration in *The Desert Fayum*. For instance, one side-blow flake scraper (Plate XLIV-11) is described as from Site X. I found this artefact in the British Museum, and the ink inscription on its surface reads that it is not from Site X but from the Area between Camp II and Kom W (Fig. 5). One polyhedral drill (Plate XLVIII-24) is described as from Site Z. This artefact was found in the Petrie Museum, and the ink inscription on its surface reads that it is not from

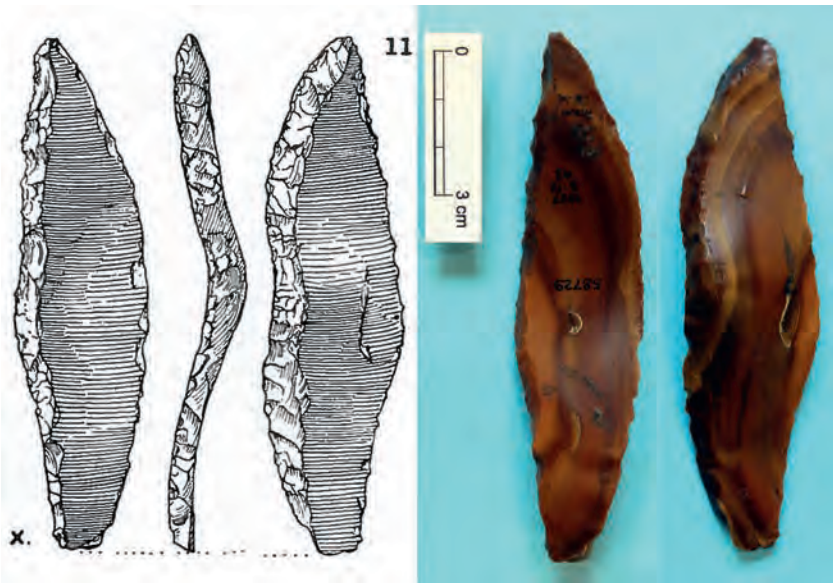

Fig. 5. Side-blow flake scraper from the Area between Camp II and Kom W (right: EA58729) with Plate XLIV-11 (left: © 1934 The Royal Anthropological Institute). Photograph taken by the author by courtesy of the British Museum

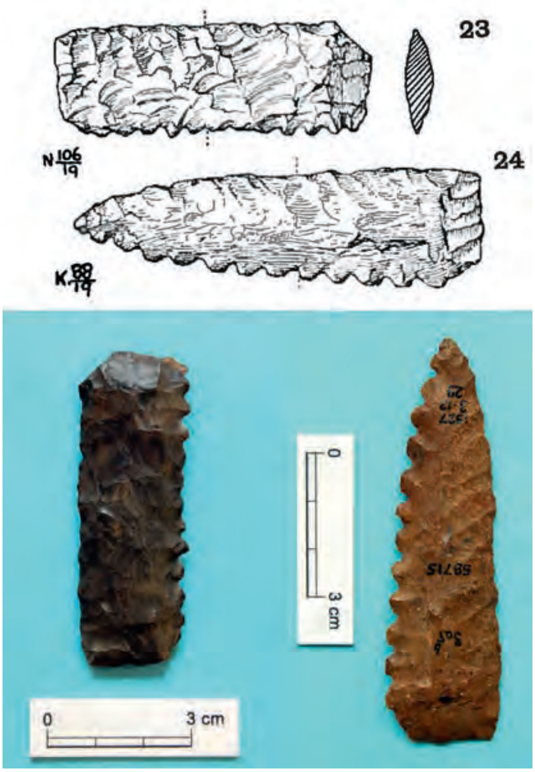

Fig. 6. Sickle blades from Site N (bottom left: EA58714) and Site V (bottom right: EA58715) with Plate XI-23 and 24 (top: © 1934 The Royal Anthropological Institute). Photograph taken by the author by courtesy of the British Museum

Site Z but from the L Basin Bench Mark. One blade (Plate LXXXII-1) is described as from Site N. This artefact was found in the Petrie Museum, and the ink inscription on its surface reads that it is actually from Camp II Basin. These discrepancies may be careless mistakes.

Moreover, such discrepancies were found among lithic artefacts from Kom W. Plate XI in *The Desert Fayum* shows representative stone tools from this most important site of the Fayum Neolithic. Two sickle blades at the lower left corner of the plate (Plate XI-23 and 24) have unique numbers (N106/19 and K88/19) as indicated near the illustrations. I found these sickle blades illustrated in this plate in the British Museum, and the ink inscriptions on their surface read that they are not from Kom W but from Site N and Site V respectively (Fig. 6). The real artefacts with these unique numbers stored in the Petrie Museum (Fig. 7 and Fig. 8) are apparently different from the illustrations with these numbers in the plate. Another discrepancy was found with one concave-based arrowhead at the upper right corner of the plate (Plate XI-7). I found this concave-based arrowhead in the British Museum, and the ink inscription on its surface reads that it is not from Kom W but from Site Z (Fig. 9). These discrepancies cannot be tolerated as careless mistakes.

It is probable that Caton-Thompson sometimes did not have necessary illustrations of the right artefacts to fill empty spaces in a plate and hence substituted with the illustrations of similar artefacts from different sites. As far as I checked her Fayum finds collections in London, no more instances of such discrepancies exist. However, more instances may be found as her Fayum finds stored elsewhere are studied carefully.

Fig. 7. Sickle blade from Kom W (UC2595, N106/19). Photograph taken by the author by courtesy of the Petrie Museum of Egyptian Archaeology, UCL

Fig. 8. Sickle blade from Kom W (UC2724, K88/19). Photograph taken by the author by courtesy of the Petrie Museum of Egyptian Archaeology, UCL

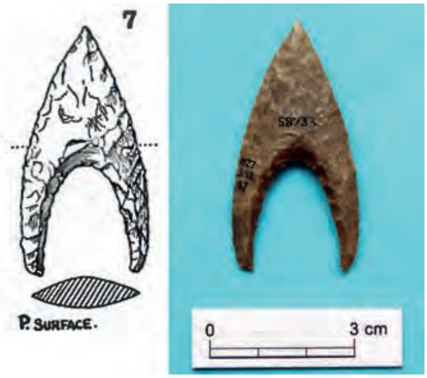

Fig. 9. Concave-based arrowhead from Site Z (right: EA58733) with Plate XI-7 (left: © 1934 The Royal Anthropological Institute). Photograph taken by the author by courtesy of the British Museum

8. Small details of lithic artefacts missed by Caton-Thompson

It is important to study small details of lithic artefacts, which Caton-Thompson did not mention in her monograph. For instance, she described that various Neolithic flint tools in the Fayum such as axes, knife blades and spearheads were made by thorough bifacial flaking, but she did not describe the raw materials of those tools very well. It was noted through my study on hundreds of examples that one or both faces of those bifacially flaked tools often retain patinated patches which are cut by flake scars (Fig. 8). This means that toolmakers did not always use fresh flakes which were just knapped from flint cobbles but picked up naturally split and already aged flakes of suitable size and thickness in source areas. This is a smart way of saving time and labour for toolmaking. As evidenced by a number of flint cobbles found at residential and task sites on former lakeshores (Caton-Thompson and Gardner 1934; Shirai 2010), Fayum Neolithic people transported flint cobbles which did not naturally occur in their habitat from distant source areas. However, it must be reconsidered that they also transported a number of flakes which were ready for toolmaking.

While lithic artefacts collected on the desert surface are normally abraded by sandblasting, the preservation of stone tools excavated at Kom W and stored in the Petrie Museum is generally very good. Such well-preserved stone tools give interesting information about how they have been used. For instance, as Caton-Thompson has pointed out (Caton-Thompson and Gardner 1934: 29), serrated working edges of many sickle blades are glossed, and it is evident that they have been used for

Fig. 10. Sickle blades from Site X (from left to right: UC3189, UC3186, UC3188 and UC3187). Photograph taken by the author by courtesy of the Petrie Museum of Egyptian Archaeology, UCL

cutting siliceous cereal culms. When looking at the working edges more carefully, I noted on several pointed sickle blades that the teeth on the tapered part of the blades are still sharp and not glossed while the teeth on the straight part of the blades are heavily worn and glossed (Fig. 8). This means that the tapered part of the blades has not frequently contacted cereal culms being cut and was not functional. In the case of rectangular sickle blades, the serrated working edges of the entire stretch of straight blades are equally worn and glossed. Caton-Thompson has pointed out that the majority of sickle blades in the Fayum Neolithic were in the pointed form, but has not commented on the functional difference between the two forms (Caton-Thompson and Gardner 1934: 21). A question is why the majority of sickle blades were made pointed in spite of no functional merit in that form.

In relation to this question, another variation in sickle blades needs to be considered. As Caton-Thompson has mentioned in her description of this tool class, great variation is seen in the fineness/coarseness of working edge serration (Fig. 10). Another question is whether such variation reflects different functions or different ages. As it has not been made clear whether coarsely serrated sickle blades and finely serrated sickle blades had co-existed at the same time at any sites in the Fayum, a seriation study is important for understanding the development of sickle blades and discussing functional and non-functional aspects of the variation in body form and working edge serration.

Fig. 11. Damaged axes from Kom W (from left to right: UC2820, UC2667 and UC2634). Photograph taken by the author by courtesy of the Petrie Museum of Egyptian Archaeology, UCL

9. Negligence of the lithic artefacts of little aesthetic value and uncertain date

Caton-Thompson collected 75 axes at Kom W (Caton-Thompson and Gardner 1934: 25) and published 29 axes out of them with photographs and illustrations in Plates VIII and IX of *The Desert Fayum*. Most of the published axes are intact and good-looking examples. However, I realised through the study of all axes from Kom W which are stored in the Petrie Museum that half of all axes are badly damaged and that several examples have traces of repair and recycling (Fig. 11). From an aesthetic point of view, it is understandable that Caton-Thompson did not publish the damaged axes, but it is significant to focus on the unpublished axes in order to gain information about how these tools have been used. Many damaged axes suggest that there was a great need of tree cutting around Kom W.

Caton-Thompson collected 230 small arrowheads at a surface site named Camp II and more at nearby surface sites like Site V and Site Z (Caton-Thompson and Gardner 1934: 75-79), but she was not sure about their date, and published only 10% of them as of uncertain date in Plate LI of *The Desert Fayum*. Among the unpublished arrowheads, the most notable ones are Ounan points. It seems that she did not know the importance of these arrowheads, as more than 10 examples of these arrowheads are left untouched in the Petrie Museum (Fig. 12). Ounan point is a typical arrowhead in North Africa in the Early Holocene, but its existence in the Fayum has long been unknown and has recently been confirmed by my fieldwork (Shirai 2012). Caton-Thompson's unpublished finds reconfirmed the existence of Ounan points in the Fayum Epipalaeolithic.

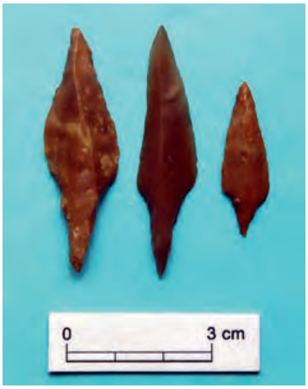

Fig. 12. Ounan points from Camp II (from left to right: UC3436, UC3435 and UC3438). Photograph taken by the author by courtesy of the Petrie Museum of Egyptian Archaeology, UCL

As for other undated small arrowheads made by unifacial or bifacial flaking, I have argued elsewhere that they are similar to the arrowheads of the Pottery Neolithic culture in the southern Levant, which are called Haparsa point (winged and tanged arrowhead), Nizzanim point (shouldered and tanged arrowhead) and Herzliya point (lens-shaped arrowhead)

(Shirai 2010; 2011a; 2011b; 2015) (Fig. 13). This similarity suggests that these arrowheads may be dated from the middle 7th millennium to middle 6th millennium BC. In particular, Haparsa point has not been found in other part of the Egyptian Western Desert, and it is highly possible that this type of arrowhead in the Fayum derived from the southern Levant.

Fig. 13. Herzliya points from Camp II (from left to right: UC3449, UC3456, UC3451, UC3450 and UC3455). Photograph taken by the author by courtesy of the Petrie Museum of Egyptian Archaeology, UCL

This possibility may be expanded to consider the origin of concave-based arrowheads. Caton-Thompson did not publish any large examples of winged and tanged arrowheads, but they are certainly included in her Fayum finds stored in the Petrie Museum (Fig. 14). Such unique large arrowheads are unlikely to appear suddenly out of nowhere but could have developed from small ones which had existed in the Fayum. It is probable that toolmakers removed the tang of the winged arrowhead for some technical reasons like reducing the weight of the arrowhead or attaching the arrowhead to the foreshaft in a different way. Concave-based arrowheads have been common at other contemporary sites in Egypt, but those in the Fayum have the greatest variation in form and size among all other concave-based arrowheads found in Egypt. It is most likely that the Fayum was a centre where many experimental arrowheads have been made and selected, and that only selected ones have spread to other regions and have been inherited over generations. Again, this is where a more detailed seriation study is needed.

Fig. 14. Haparsa points from Camp II (from left to right: UC3444, UC3445, UC3440 and UC3418). Photograph taken by the author by courtesy of the Petrie Museum of Egyptian Archaeology, UCL

Conclusion

There is no doubt that *The Desert Fayum* is still the primary reference for understanding the prehistory of the Fayum from the Epipalaeolithic to the Neolithic. However, it must be kept in mind that there are problems in its contents, and that many of Caton-Thompson's finds remain unpublished. As stated in the introduction, it is significant to restudy her finds in museums and other institutions, not only because it is not possible to make such excellent collections in the field anymore, but also because one can obtain information which she did not publish. In particular, new ideas about how Neolithic stone tools were made and used, and how certain types of Neolithic stone tools have developed can be gained through carefully noting small details of the tools and sorting their various forms. A further study on old collections will provide fresh insights into the prehistory of the Fayum.

Acknowledgements

I would like to thank all of the staff of the Department of Ancient Egypt and Sudan in the British Museum, the Petrie Museum of Egyptian Archaeology, and the UCL Institute of Archaeology for accommodating my research on Gertrude Caton-Thompson's Fayum lithic collection. I am grateful to the Royal Anthropological Institute for granting me permission to reproduce part of several plates in *The Desert Fayum* for this article. My research based at the UCL Institute of Archaeology was made possible by the Marie Curie postdoctoral fellowship of the Gerda Henkel Foundation's M4HUMAN Programme (file number: AZ45/EU/12). I sincerely appreciate their support.

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Desert and the Nile.
Prehistory of the Nile Basin and the Sahara.
Papers in honour of Fred Wendorf
Studies in African Archaeology 15
Poznań Archaeological Museum 2018

Friederike Jesse and Mirosław Masojć

Early to Mid–Holocene Pottery from Two Sites in the Bayuda Desert, Sudan

Introduction

The Bayuda desert is the subject of an interdisciplinary research project of Gdańsk Archaeological Museum (MAG) intended to recognize the history of settlement in this desert area from the earliest periods of prehistory to modern times, including its geological structure in the context of palaeogeography. The research work in the Bayuda was initiated in 2009. The concession covers an area of ca. 140,000 km excluding all sites situated in the Nile Valley and at its edges (Paner and Pudło 2010).

So far nearly a thousand archaeological sites have been discovered and documented, including several dozen early to middle Holocene sites (for a general commentary on the excavated sites see Masojć and Paner 2014). This article discusses the pottery material from two early to middle Holocene sites from the western part of the Bayuda desert (Fig. 1): BP133 and BP424. The sites are situated at a distance of ca. 60 km from each other in very different geological contexts. The site situated closer to the Nile – BP133, is located in the area of volcanic culminations (Basement Complex), while site BP424 is located within sedimentary deposits (Cretaceous Nubian Sandstone Formation). In both sites a small area was excavated.

1. Site BP133

The site is situated in the western part of the Bayuda desert (N18° 21.818' E31° 59.520'), ca. 20 km to the east of the locality of Karima, within the extensive massif of Jebel Naser (Fig. 1) which is of volcanic origins (Palaeozoic and Mesozoic igneous complexes and dyke swarms areas). Occupying an area exceeding 100 square kilometres, the massif is situated between two big wadis running along a SE–NW axis: Wadi Abu Dom in the north and Wadi Korai in the south. The site is located in the massif's western part, within a small basin surrounded by culminations largely shielding the site. In the west the basin adjoins a small, nameless wadi originating in the volcanic massif, running towards the south and joining Wadi Korai further away at a distance of 8 km from the site.

The remains of three residential objects were excavated in the basin's central part. These are areas of oval outlines devoid of rock material (obviously cleared of the volcanic rocks occurring in large amounts at the site), with an occasional

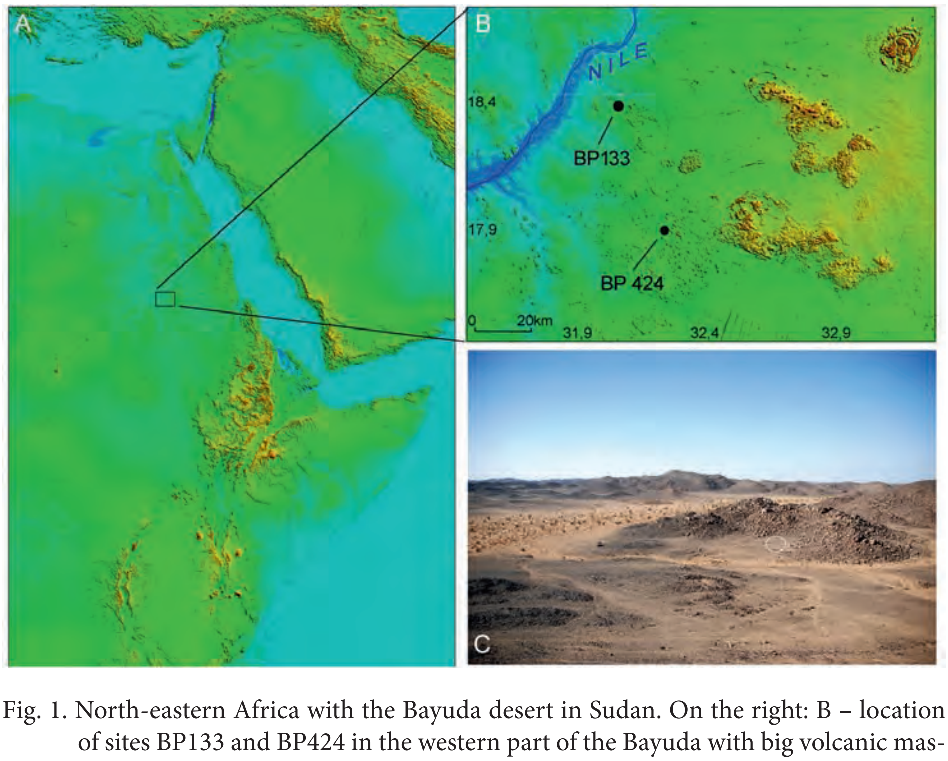


Fig. 1. North-eastern Africa with the Bayuda desert in Sudan. On the right: B – location of sites BP133 and BP424 in the western part of the Bayuda with big volcanic massifs east of the sites and hundreds of small volcanic structures south of the sites; C – view of the site BP133 from the south (white ellipse) (photo: M. Masojć)

Fig. 2. Site BP133 during the excavation (photo: M. Masojć)

stone casing and a considerable accumulation of artefacts in their interiors. The excavation comprised one of such a residential object with a surface area of 15 m^2 (Fig. 2).

Within the excavated area – the interior of such a residential object – a great number of artefacts were recorded. Apart from animal bones (Tab. 1)[1] and pottery, over 2000 knapped stone products were found (including nearly 300 cores and 78 tools).[2] The predominant raw materials are volcanic rocks, quartzite and flint. The stone material indicates a constant presence of microlithic tools and the presence of segments and backed bladelets among the microliths (Fig. 3: 1–5). Microlithic cores for bladelets are also present. These are mainly single platform cores with a prepared flaking platform in form of one or two side blows (Fig. 3: 6–8). The stone artefacts were relatively evenly distributed within the excavated area, without forming any bigger concentrations (Fig. 4).

[1] The archaeozoological analysis was carried out by Dr Marta Osypińska, Polish Academy of Sciences, Poznań Branch.

[2] A detailed analysis of the lithic material of sites BP 133 and BP 424 is still ongoing.

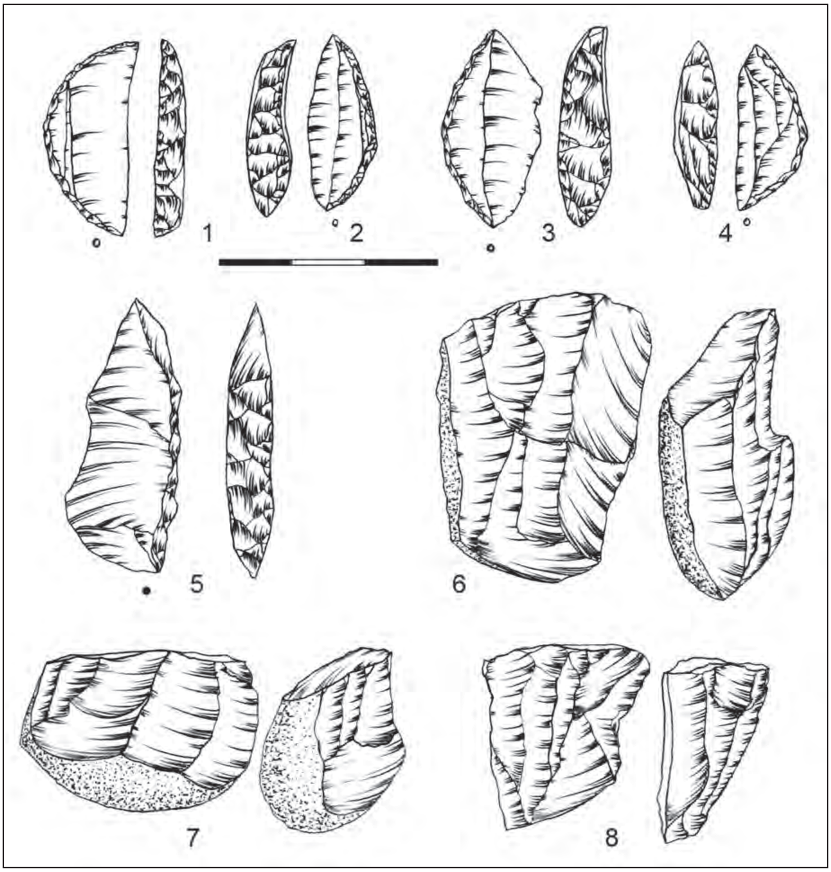
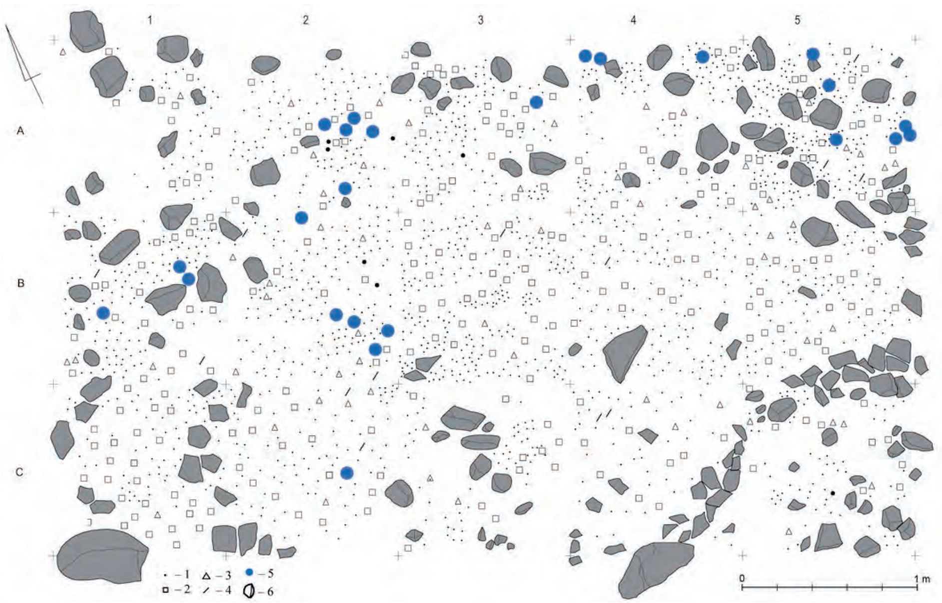


Fig. 3. Site BP133. Chosen stone artefacts: 1-5 – microliths; 6-8 – cores (drawing: by M. Masojć)

Table 1. Composition of the bone remains at site BP133: LSM / LSR– large size mammal / large size ruminant; MSM / MSR – middle size mammals / middle size ruminants. (data after Marta Osypińska)

TAXA	**n**
LSM	17
MSM/MSR	5
Ostrich eggshell	1
Unidentified mammals	7
TOTAL	**30**



ig. 4. Site BP133. Spatial arrangement of the feature: 1 – debitage; 2 – cores; 3 – tools; 4 – bones; 5 – pottery sherds; 6 – rocks (drawing: M. Ehlert, N. Lenkow, M. Masojć)

The pottery from BP133 is very fragmented and abraded. Altogether 61 pieces (only wall sherds) with a total weight of 150.9 g are present. For analysis only the pieces bigger than 1 cm² were taken into consideration, 35 pieces of pottery were therefore not considered. Among the remaining 26 sherds, 23 are decorated and 3 sherds have an eroded exterior surface. These 26 sherds can be grouped to 20 vessel units (VU): 18 with decoration and 2 with eroded exterior surface. No rim or base sherds are preserved.

Fig. 5. Site BP133. Decorated pottery sherds: horizontal rows of dots; the pottery is tempered with plant material (Photo: F. Jesse)

The surfaces of the sherds were smoothed. The colour of the exterior surface is mainly brown, of the interior surface – brown to dark brown. Cores are mainly black to grey. Wall thickness ranges between 6 and 13 mm, most frequent is a wall

Fig. 6. Site BP133. Decorated pottery sherds: packed dotted zigzag; to the right: sherd with a probably intentionally rounded edge (photo: F. Jesse)

thickness of 9–10 mm. In two cases coiling technique is clearly recognizable as a mode of production.

The pottery is mainly tempered with rounded to angular quartz grains, only seldom exceeding 1 mm in size, sometimes mica was also added. Two vessel units show organic temper (Fig. 5), in one case only plant material was added as a tempering agent, in the second case a mixture of quartz and plant temper was used. All of the decoration was made by impression. Rocker stamping using a comb is the preferred technique and closely packed dotted zigzags (12 VU) or horizontal rows of dots (5 VU) are the most common decorative patterns (Fig. 6). The sherds might have been used as tools: in one case a later modification is probably present – a worked (rounded) edge (Fig. 6, right sherd).

The pottery from the site BP133 fits in the early to middle Holocene, the so–called Mesolithic/Neolithic period.

2. Site BP424

The site is situated in the western part of the Bayuda desert (N17° 52.943' E32° 08.014'), ca. 65 km to the south–east of the Nile valley, within the large Wadi Abu Rugheiwa running along a SE–NW axis and ca. 1 km to the north of a well (*bir*) of the same name (Fig. 1). In this part the Bayuda is formed of Palaeozoic and Mesozoic sedimentary rocks. The site is situated at the foot of a small sandstone culmination in the centre of the wadi and surrounded by Quaternary sediments (Fig. 7).

Seven square metres of the site were excavated (Fig. 8), where – apart from pottery and animal bones (Tab. 2) – over 6000 stone artefacts were found, including over 700 cores and 150 tools. Among the tools the dominant microlith's

Table 2. Composition of the bone remains at site BP424: BSM – big size mammal/ mega fauna; LSM / LSR– large size mammal / large size ruminant; MSM / MSR – middle size mammals / middle size ruminants; SSM / SSR – small size mammals / small size ruminants; R – hare. (data after Marta Osypińska)

TAXA	**n**
BSM	3
LSM	19
MSM/MSR	87
SSM/SSR	75
R	5
Unidentified mammals	160
TOTAL	**349**

Fig. 7. Location of the site BP424 at the foot of a small sandstone culmination in the centre of the Wadi Abu Rugheiwa (photo: M. Masojć)

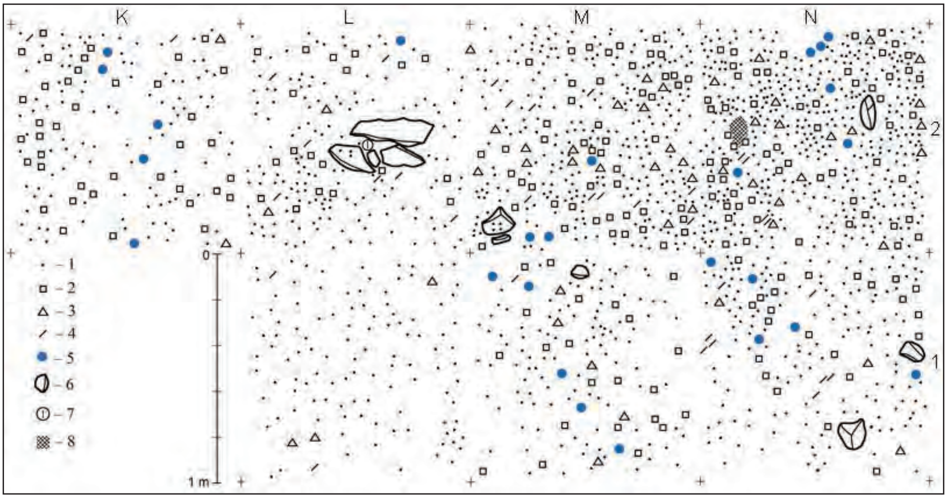


Fig. 8. Site BP424. Spatial arrangement of the excavated area (level 0-5 cm): 1 – debitage; 2 – cores; 3 – tools; 4 – bones; 5 – pottery sherds; 6 – rocks; 7 – grinding stone; 8 – charcoal concentration (drawing: M. Ehlert, N. Lenkow, M. Masojć)

category are lunates (Fig. 9: 1–6). Besides segments, truncations are present and a few triangles (Fig. 9: 8). Among the other tools end–scrapers are frequent (Fig. 9: 7,9–12) and irregularly retouched flakes (Fig. 9: 13,14). Microlithic cores for bladelets are the most common ones. These are mainly single platform cores with a prepared flaking platform (Fig. 9: 15–16). The predominant raw material is quartzite, but also volcanic rocks and flint are present. The most characteristic tool in the assemblage is the lunate. The stone artefacts were relatively evenly distributed within the excavated area, without forming any bigger concentrations.

Altogether 186 sherds with a total weight of 1,265.3 g are present, among them 47 smaller than 1 cm². The remaining 138 sherds include 10 rim sherds (9 are decorated and 1 has an eroded exterior surface) and 128 wall sherds (113 sherds are decorated, 3 undecorated and 12 have an eroded surface). The sherds can be grouped into 68 vessel units (VU): 62 VU with decoration, 4 VU with an eroded exterior surface and 2 VU with plain surface (no decoration). A fragment of a pottery disk bead is also present. The edges of the sherds are heavily abraded.

The surfaces of the sherds were smoothed to carefully smoothed. The surface colour of the sherds is mainly brown, followed by reddish–brown. Cores are mainly black, dark brown or grey. Wall thickness ranges between 5 and 13 mm, most frequent is a wall thickness of 7–8 mm (41 VU).

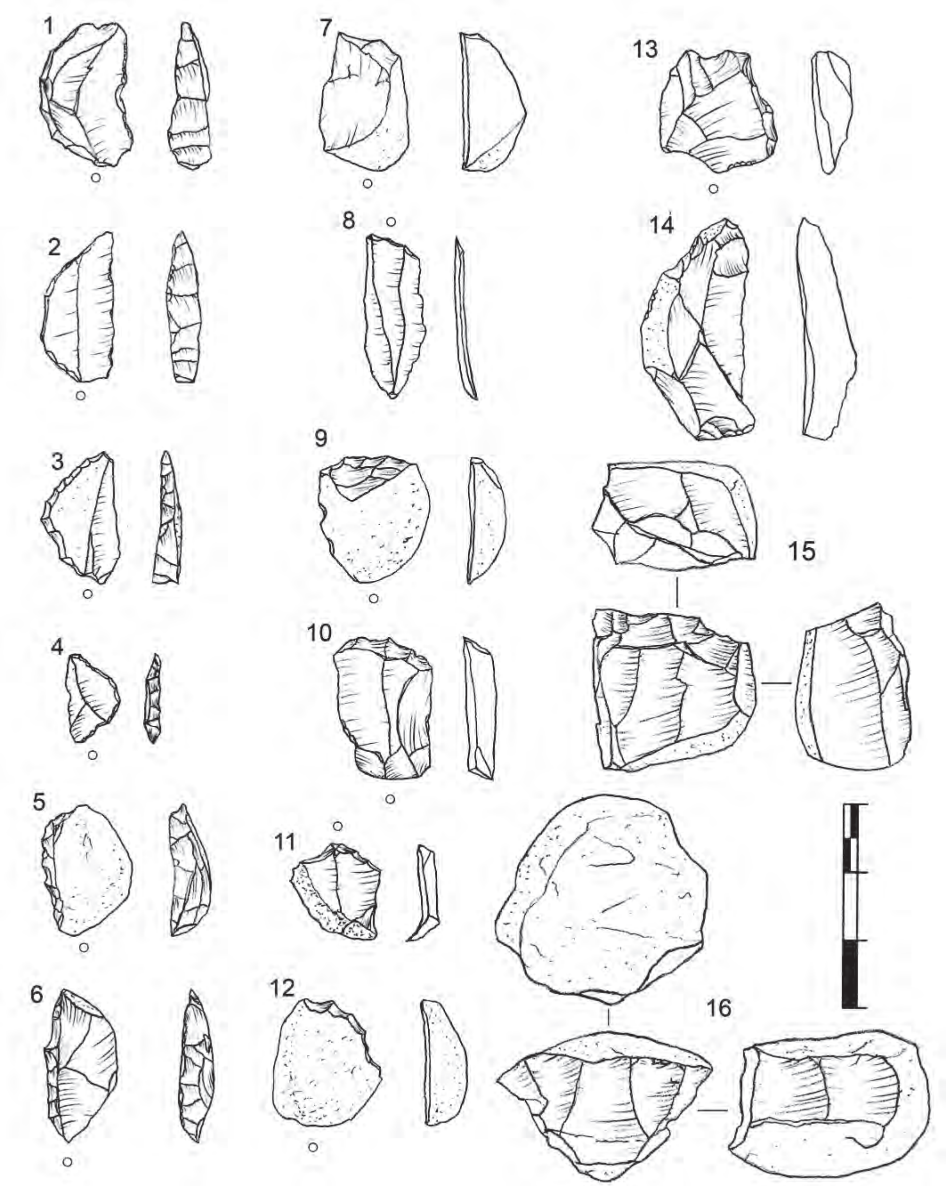


Fig. 9. Site BP424. Chosen chipped stone artefacts: 1-6 – segments; 8 – truncation; 7, 9-12 – end-scrapers; 13-14 – retouched flakes; 15-16 – cores (drawings: M. Ehlert)

Fig. 10. Site BP424. Decorated pottery sherd: the rim is decorated with a band of simple impressions (probably fingernail), the wall is decorated with horizontal rows of dots (photo: F. Jesse)

The pottery is tempered with rounded and angular quartz grains seldom exceeding 1 mm in size, or quartz and mica. The addition of mica sometimes gave the sherds a lustrous appearance. Five VU show organic temper: four times a mixture of plant material and quartz was used as a tempering agent, in one case only plant material was added.

Coiling technique is recognizable as a mode of production. The rim forms are simply rounded, but due to the predominantly rather small size of the rim sherds the reconstruction of the rim diameter was only possible in one case. Here a rim diameter of 24 cm could be identified. The recognizable vessel forms are all closed ones.

All of the decoration was made by impression. Only in one case a decoration of the rim lip was observed: shallow notches made by simple impression. A discrete decoration of the rim zone was recorded on 5 VU. The decorative patterns are either a band of fingernail impressions (Fig. 10) or oval or oblique impressions. The decoration of the wall zone was mostly made using a comb and the rocker technique. Closely packed dotted zigzags (17 VU) or horizontal rows of impressions (22 VU) are the most common decorative patterns (Fig. 11: 1–5). Alternately pivoting stamp with a two–toothed implement was recognized on 5 VU. Remarkable is the decoration of VU 68 (Fig. 11:6): the rim lip is partly decorated with shallow notches (see above). A small implement producing dashes (probably a cord wrapped stick) was then used to create a complex pattern of horizontal rows of packed dotted zigzags and Dotted Wavy Line covering the vessel from the rim zone downwards.

The sherds were also used as tools: intentionally rounded edges are present. Further modifications were also observed: in one case a hole was drilled through the sherd from the interior surface (probably a repair hole), a further sherd shows traces of drilling on the interior surface, probably the start of a perforation and in one case the edge of a sherd was modified by notches to give it a dentate appearance.

An interesting object is the fragment of a ceramic disk bead with a dentate edge (Fig. 12). This bead was very probably made of a decorated sherd. The diam-

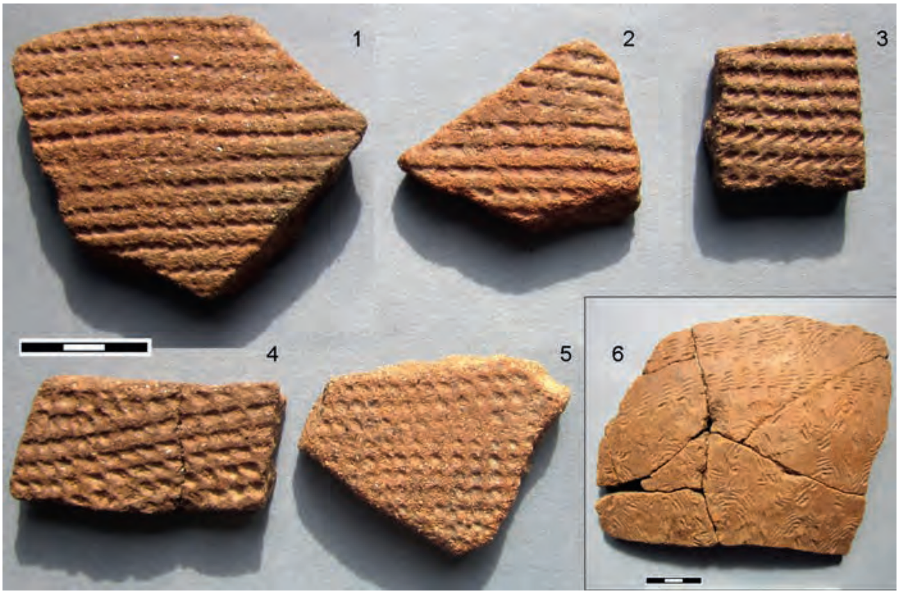


Fig. 11. Site BP424. Decorated pottery sherds: 1-5 – horizontal rows of dots; 6 – complex pattern of Dotted Wavy Line and packed dotted zigzags (photos: F. Jesse)

eter of the bead is 26 mm, the perforation hole has a diameter of 9 mm.

With the exception of some surface finds, the pottery sample from site BP 424 is rather homogenous in terms of paste, temper and decoration. No significant changes are observable in the different excavated layers. Refitting was seldom possible due to the abraded edges of the pottery. However, the large vessel unit (VU 68; see Fig. 11: 6) was distributed over several squares and layers.

Fig. 12. Site BP424. Fragment of a ceramic disk bead (photos: F. Jesse)

On the basis of the pottery the time of the site's functioning may be determined as the early to middle Holocene.

3. Discussion

Sites BP133 and BP424 are so far the only early to mid–Holocene sites excavated within the concession of the Gdańsk Archaeological Museum in the Bayuda desert. Parallels for the heavily plant tempered pottery found at site BP133 can be found in the Nile Valley, for example among the pottery of the Karmakol Industry sites (see Hays 1971a: 127–131; Gatto 2006). The range of the Karmakol Industry includes the area between the Debba bend and the 4th Nile Cataract region. At site MTG 3 at El Multaga, pottery attributed to the Karmakol Industry could be dated by radiocarbon to the 8th millennium bp (Gatto 2006: 77).

Comparisons for the pottery from BP424 can be found at other sites in the Bayuda and the surrounding Nile Valley: for example, site ELG 13/15 south of the 5th Nile Cataract (rim decoration and packed dotted zigzag; see Jesse et al. 2013: 63, Fig. 5), on Mograt Island (packed dotted zigzag: MOG086 [Dittrich and Gessner 2014: Fig. 20. 13, 15, 16]; alternately pivoting stamp: MOG027 [Dittrich and Gessner 2014: Fig. 20. 5,7,8]; small implement producing dashes: MOG027 [Dittrich and Gessner 2014: Fig. 20. 6]), on Boni Island, sites S 05/140 and S 05/142 (rim decoration: Petrick 2012: Plate 20.1–2; alternately pivoting stamp: Petrick 2012: Plate 20.15–16), El Multaga – site MTG3 (rim decoration and packed dotted zigzag; see Gatto 2006: 84, Pl. IId) and Aneibis (rim decoration and packed dotted zigzag; Haaland and Magid (eds.) 1995: 91, Fig. 7.d). All these sites belong to the early to middle Holocene, the so–called Mesolithic and Neolithic period.

Early to mid–Holocene settlement in the Bayuda desert has not been extensively researched. Apart from the work carried out at the two sites discussed here, excavations were conducted only within Wadi Muqaddam in the 1990s, resulting from the construction of a road from Khartoum to the Nile valley in the area of Ganetti (Fuller and Smith 2004). "Artefactual evidence from sites 115.1 and 61.3 assessed to date, comprising ceramics and ground stone implements, provided a general dating for the associated paleoenvironmental evidence within the period of the 'Khartoum Mesolithic' (...). Apparent stylistic similarities, most striking in the ceramics, further indicate links between the sites in or near the Wadi Muqaddam and areas to the north and south within the Nile Valley itself and, potentially, much further west into Saharan regions like the Wadi Howar." (Fuller and Smith 2004: 275). Also the pottery of sites BP133 and BP424 find parallels in the near and also broader regional context. Of great interest regarding supra–regional contacts is the large vessel unit (VU 68) found at site BP424 (see Fig. 11:6): The complex pattern of Dotted Wavy Line and packed dotted zigzags reminds from a stylistic point of view the arrangement of (Dotted) Wavy Line in the Khartoum Variant (see Gatto 2002: 77, Fig. 5.10), in the Nabta–Kiseiba Area (see Gatto 2002: 69–74) and in the Atbara region (see Gatto 2002: 75, Fig. 5.8). The idea of a "Khartoum–Horizon Style" to account for broad similarities over a large area while still taking into account regional stylistic variations has already been proposed in the 1970s (Hays 1971b). To further elucidate the role of the Bayuda desert within such a larger "Khartoum–Horizon–Style" network and especially its role as a possible intermediary between central Sudan and northern Nubia (see also Gatto 2006: 77) further excavations and surveys will certainly contribute.

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Alain Anselin

Archaeology of the *Images* and the *Words* of the Ancient Egyptian World: from Pools of Gone Saharan Cultures to Current Sociological Parallels

Short introduction to the archaeology of Northeastern African cultures in the context of climatic and demographic co-evolution

The Eastern Sahara (the Western Desert of Egypt and the Nubian Western Desert notably) was populated during the Holocene Humid Phase, between 9000 and 5000 BC (Riemer *et al.* 2013: 159).

After 7000 BC, the bumpy decrease of the Humid Phase provided the time-span context for the emergence of cattle African lifeway from hunting-gathering worlds. In the midst of the sixth millennium BC, "*retreating monsoonal rains caused the onset of desiccation of the Egyptian Sahara*" (Kuper and Kröpelin 2006: 806, fig. 3, c-d), "*impacted a dramatic depopulation of most territories in the Egyptian Western Desert*" and a lesser dropout in the now Nubian Western Desert because of the lower recoil of the summer rain belts to the south (Riemer *et al.* 2013). First half of the fourth millennia BC, in henceforth "*full desert conditions all over Egypt*", the populations left the Western Egyptian Desert for the Nile Valley – a move coinciding "*with the initial stages of pharaonic civilization*" on its banks (Fig. 1). And later still, for a Sudanese today fossil hydrographic network, a hub to a wide hinterland stretching towards the past Mega-Chad zone and the present Omo river region (Kuper and Kröpelin 2006).

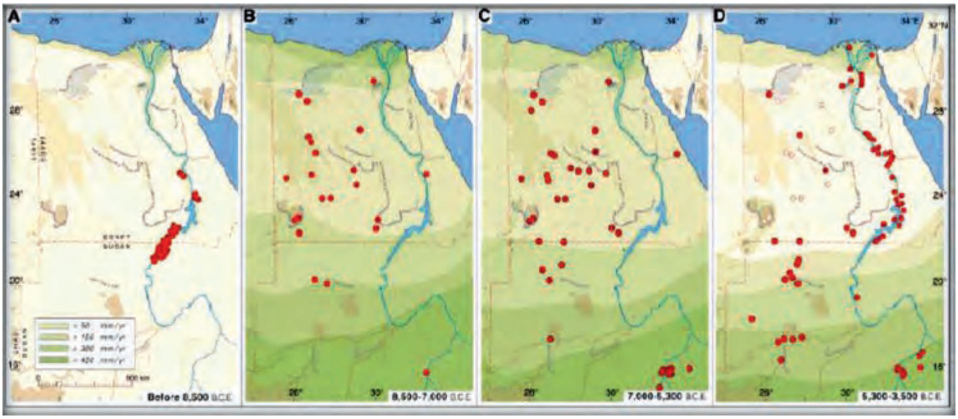

Fig. 1. Map of the archaeological sites from arid periods to humid phases (Kuper and Kröpelin 2006)

The cultures of this wide Northeastern African space-time of past have left a mass of archaeological data provided by the contents (*bestiary, tools, weapons, clothing, adornment, hair style*) of the communication systems (*rock art, iconographies, writings, languages*), methodically considered in their elements, associations and syntax. They may be from a one major sociological fruitfulness by their comparison with African modern cultures and their linguistic data.

In this view, we take into consideration four points:

– the iconographies are today the visible part of vanished institutions and their cultural programs, and their archaeological sites were the cultic places of *ritual oralitures* (as ***mdw nṯr*** were literally);
– the words of the languages are so many lexical and semantic artifacts;
– the lack of epigraphic data excepted for Ancient Egypt, between the past languages without writing of the dumb iconographies and the modern ones of the comparandum;
– the sociological parallels of (yet) contemporary cultures according to lexical and semantic cognates of the past and modern attested languages, the former iconography and the ancient epigraphy of the whole area.

1. The rock art and the bestiary zoonyms of two African animals

In this global context where the climate provides the scene and the human societies write the plays, the earlier Holocene Saharan rock art is characterized by a significant over-representation of a bestiary of, notably, giraffes and ostriches. The rock art of the earliest sites of the Karkur Talh in the Gebel Uweynat, wild fauna documents ostriches, giraffes, wild bovids (*bos primigenius*), antelopes, oryx, dogs, archers (Zboray 2005) (Fig. 2), the Gebel Arkenu, hunter and tethered ostrich (Menardi-Noguera and Zboray 2012) and farther – Akukas. This over-representation fits well the sociological parallels provided by the founding myths of the cultures of the Hadza and the San, who were *hunters-gatherers* and *never herders*. The *Hadza* down from the *sky* along the neck of the *giraffe* (Marlowe 2010). The God of the San, ***Piisi!koagu,*** robs the *fire* under the wings of the *ostrich*, ***!gero!koagu*** (Tanaka 1996:17).

Lack and existence of cognates. The Hadza and San zoonyms are not related to Egyptian names of the ostrich and the giraffe. There is a solution of continuity from the Khoe-San language phylum and the other African linguistic families that provides cognates to the two Egyptian zoonyms.

The Egyptian names of the giraffe provide a situation equally complex : the usual , MK***mmy***, *giraffe* with the determinative of the (Wb II 58:14) may know lexical cognates in Nilotic languages, shaped on its characteristics, haired or spotted animal: nuer: ***mi***, *giraffe, hair*, maasai: ***ol meut***, midob: ***ti-mmit***. Cf. also maasai: ***e-mara***, *the spotted one*, giraffe, dinka: ***miir***.

A second zoonym is attested from the New Kingdom : , ***zr***, ***sr***, and corresponds with the Nilo-Saharan, Nilotic: Nuer, Turkana, ***k-r**, Lotuko: *na**ko**-**ri***, Bari: ***kurit*** ; Cushitic: Somali, Rendille: ***geri*** according to K. Peust who noted a prior single correspondence of Cushitic Somali and Rendille : ***geri***, *giraffe*, with an Eastern Nilotic root: ****kr***, *e.g.* Turkana*:* ***e-kori***, *bari*, ***kurit,*** base ***zr**: *Ge'ez:* ***zärat***, and observed, after Reinisch in 1896, a connection between the Somali and ge'ez

Fig. 2. Saharan rock art: the bestiary of the Gebel Uweynat. South Uweynat SU 17 – Karkur Talh KT 42/B (Zboray 2005)

forms, and the Arabic ***zarafa*(*h*)** *(with a suffix* ***-f*** *of unknown origin)*– which replaces the original local form in Saho: ***zerraaf*** (Vergari and Vergari 2007).“*The Semitic words appear to have been borrowed from a form such as ****geri*** *or ****keri*** *after it had been palatalized into something like ****žeri*** *or ** ***šeri*** *in the hypothetical African donor language*.” (Peust 2008: 257-261). Phonetically suitable, if the source language is Cushitic: the Eastern Cushitic root ***gir**, *to live, exist,* is realized ***žira*** in Rendille (Takacs 2001: 267)[1].

The Egyptian word for **ostrich**, , ***niw*** has lexical cognates in Berber languages: ***nil**, tamacheq, ***anil, a-nohil, a-nhêl***, literally ***a-nɔhɔl***, *the stout* and in Omotic, Dizi: ***noy*** (Beachy 2005). The Berber, Libyan Nefusi: ***asil***, Sus and Mzab: ***asid, asil***, share another root, ***sid**-, lacking in Egyptian, with the Nilotic language of Maasai: ***e-sidáí***, *ostrich*, where ***sidáí*** means *good* (Payne and Ole-Kotikash 2008), that provides a perfect pair of semantic cognates with the Egyptian metaphoric concept of *goodness* carried by *feather* (*see below*).

From a god to another. Completed by the feminine marker ***-t***, the hieroglyph H6 of the ostrich feather, names the feather itself, ***šwt*** (Gardiner 1988: 474) This ostrich feather, ***šw.t***, is the attribute of , ***šw***, the *Air-god*, and of the Goddess of the Truth, , ***Mꜣᶜt***. The mao (Omotic) : ***šaw.i, šiw.i,*** *wind*, *air*, provides the best cognate. The Berber languages give ***i-žuwu***, for *wind* in Zenaga, ***ta-žawa.t***, in Mzab, and ***ta-žežžwi.t***, that names the *fan* in Ghat (Takacs 1999: 205).

The Arabic name, ***naᶜam***, differs, and later, enters the Berber vocabularies (Zenaga, Sus, Mzab: ***alnem, anneam***), and the Sudanic (Ibiri). In Arabia, some toponyms of Hadramawt, ***wadi naᶜam*** (*Ostrich River*) and the Yemeni rock art attesting that the ostrich was in demand for its feathers, seem to be an extension of the Saharan African cultures. In addition, the food taboo which still affected the bird in a Surah of Quran may indicate a previous divine status (Potts 2001: 182-190).

The place in the social practices and in the culture. The bird and the mammal had a place in the Egyptian culture that differs from the last hunters-gatherers of Africa. But the *Egyptian hunters,* the ***nw.w,*** are often depicted in the same desert environment as the archers of Saharan rock art. The *New* shapes of their culture carry the *Ancient* ones, if it rules : since the Predynastic palettes, the ***nw.w*** are led by a royal leader, and from the Old Kingdom on, they are subordinated to the

[1] The other Maasai word for giraffe, ***al-ɔsira***, is a tantalizing cognate, but its meaning declines a property : ***al-ɔsira*** *the doted*, similar to ***e-mara***, giraffe, *the spotted one* (Payne and Ole-Kotikash 2008).

pharaonic State by high officials, ***jmy-r nw.w n ḥm.f***, *director of the hunters of his Majesty*, ***ẖrp nw.w***, *controller of the hunters*. In a Middle Kingdom painting, the leader of the ***nw.w*** presents ostrich feathers to the ***jmy-r nw.w ẖ3s.wt*** (*director of the hunters of the deserts*) and his team brings *ostrich eggs and feathers*, *roped up ostrich*, *hare, oryx* (Gandonnière 2014). The key concepts of giraffe and ostrich were thereby re-arranged into new cultural uses in the cultivation and granary society of the Nile valley (see below).

2. From hunting to herding: artifacts, questions and sociological parallels

This earlier rock art iconography presents some elements of the materiality of ***first human-animal linkage***, like weapons of hunting (clubs, spears, bows, arrows – and *archers' wrist-guards* (Le Quellec 2011: 201-220), and binding artifacts (ropes, lasso, traps) linked to aurochs, antelopes, ostriches and giraffes (Zboray 2005: KT44; Houlihan 1986: 1-5; Osborn and Osbornova 1988: 148-150). It infers a particular ritualized relationship to the animals, perhaps documented by a Karkur Talh rock art site (Zboray 2005: KT61) engraving horny hunters likely identified to the game (bovines), and may result in a categorization of wild fauna into linguistic classes like among the Hadza (Blench 2013). The sociality of the rock art underlies the choice of the elements of the fauna elaborated into a bestiary as well as the development of hunting practices into conservative attempts – possibly a man lassoing hartebeest on a rock drawing near Gebel Silsila documents it (Osborn and Osbornova 1988: 171, 13-130). Such a panorama suggests that the development of herding did not mean the abandon of the hunting and gathering and their culture and values, but their mutualization. In this view, we can deduce from the presence or the lack of domesticated elements, and the associations, a period of dating – the archaeological horizons of the rock art associating giraffes, ostriches, and humpless longhorn bovines in Karkur Talh sites (Zboray 2005: KTN23) appear to be more recent than engraved scenes involving only giraffes and ostriches. In comparison with rituals still performed in contemporary caves, for eg., the masculine cult in a boomorphic fiber costume performed in the rock shelter of the painted mask of Ngombe by the Chewa, a farming sedentary society of Zambia (Smith 2014: 1448-1452), we can infer that the northeastern rock art sites were similar cultic places characterized by mutualized features of *hunters-gatherers, herders*, or/and *farmers* – and that the iconographies were programs to be read, sung and/or danced, with a syntax, as an act of communication ritually subordinating the society to collective representation, values and relation patterns it engages -hunting, eating, *subjecting, binding* (Tambiah 1981:140-141).

Sociological parallels: the trap and the lasso, metaphor of the binding of fauna species

The Nilotic pastoralist cultures provide modern sociological parallels of the use of such artifacts in this pooling of life ways. In the mid twentieth century, Sudanese herders, the Dinka, continue to use a ***dang***, a bow-trap similar to those of the hunters of the Gebel Arkenu and Gebel Uweynat rock art. In Ancient Egypt, a type of snare made hieroglyph, the T27, , a *bird trap*, ***sẖt*** (Gardiner 1988: 515), used by the ***sẖty***, *fowler* (Wb IV 262,3-263,5).

Attested from forty thousand millennia, used in manufacturing a lot of artifacts, the rope is one of the oldest ones in the history of mankind. It is present in Saharan rock art of long-lasting tethering practices (Menardi-Noguera and Zboray 2012) and Naqadan iconography – as far as the Naqada IIA-B at Nekhen (Veldmeyer 2008: 35) (Fig. 3). The rope is no lack of words. Those of earlier ancient Egyptian were contemporaneous of those of the last authors of the rock art.

Fig. 3. Saharan rock art: tethered ostrich (Gebel Arkenu AR/55D); tethered giraffe (Karkur Talh KT 26) (Zboray 2005); Sudan: a Dinka deploying a dang (hunting bow trap) (Menardi-Noguera and Zboray 2012)

Three hieroglyphs share a drawing of the lassos and slipknots of the former Saharan rock art:

The first is the hieroglyph V4, ,***wꜣ***, *lasso*, ***wꜣ.t***, ***wꜣwꜣt***, *cord* (Gardiner 1998: 523). Southern Cushitic: ****wēl***, *rope,* Iraqw, Alagwa: ***wēli***, Burungi: ***wela***; Western Chadic: Galambu, Gera*:* ***wula***, *rope* (Takacs 1999: 100). In addition, Ngamo: ***wàla***, *hemp rope* (Janga-Dole *et al.* 2009). A less common word, , ***wn.t***, *Art Schnur* (Wb I 314 :18) has Nilotic cognates: Mabaan: ***wyen-***, *rope*, ***wiɛndo***, *tie with rope* (Blench 2006b: 185) and Dinka: ***wiɛn***, *rope*, ***wïn***, *rope made of leather straps* *used to tie down cattle;* ***wiɛl***, *fiber*, *wire*, *giraffe tail* (Blench 2006a: 184-185). In Ancient Egyptian, /***l*** / is written ***ꜣ*** or **n** : may ***wn.t*** be related with ***wꜣ.t*** ?

The second sign for the cord, V12, , *flax rope* (Wb I 211,18-23), with phonetic value, ***ʿrḳ***, carries the oath metaphor.

A third rope hieroglyph is related to the cattle binding, V16, , is $^{\mathrm{OK}}$**zꜣ**, **sꜣ**, *looping cord serving as hobble for cattle* (Gardiner 1988: 523). The word multiplies the cognates: Western Chadic: ***zVr**, Hausa: ***zááráárà̀***, *long cord attached to the neck of animals, **záári**, rope passed into the nose of groups of oxen*, Bole-Tangale: ***zōri**, *rope*, Karekare, Ngamo: ***zòori***, Gera: ***zùra*** (Takacs 1999: 178-179). In addition: Ron-Fyer: Karfa: ***zir***, Richa: ***zàr***, and South Bauchi: ***sVr**, *rope*, Polchi: ***siyir***, Buli: ***sir***. Cushitic: Saho: ***soro***, *rope* (*to tie goods on animals*). Gidole: ***sur***, *rope*. The last not the least, the names of the *back rope of the saddle*, ***i-ž***(***w***)***iwr-en***, in ayr (Berber), and the *girdle*, ***mizrana***, in Syriac, derived from the same basic root.

In the same way many sites of the Gebel Uweynat gather engravings and paintings of giraffes, ostriches, cattle, the rope words tie both game and cattle in hieroglyphic writing.

The semantic fields of the vocabularies of the rope point as well the earlier times of the giraffe hunting as those of the cattle binding, which suppose another *intentions* and *food strategies*. The rope of the rock art is less the representation of the instrumental bond used in the domestication than a pictorial metaphor that declines both two cognitive schemas, the subjugation one or *force schema* and the conjunction one or *link schema*, which will contribute to feed the discourse of power.

Then cattle came, by original ways

African cattle were domesticated in the eastern Sahara during the Early Holocene, and its African sheep and goats entered Africa slightly later and before crops were cultivated (Marshall and Hildebrand 2002; Wendorf and Schild 1998; 2002; 2004)[2]. So, a "*distinctive African pathway toward food production*" emerged, "*where animals were domesticated before plants, herding populations became more mobile than their forager ancestors*" (Marshall and Weissbrood, quoted by McDonald 2015: 274).

The interpretation of the current data may be nuanced by recent works updating the field. At the earlier Holocene, the wadis deposits sedimented into gezirahs in the Egyptian Nile valley. In increasing aridification context of the eastern Sahara (Kuper and Kröpelin 2006), the wadis opening out to the valley were gradually covered by Nilotic alluvia over the late Holocene. In the midst of the sixth millennium, the small eminences of gezirahs formed at the mouth of the tributary wadis, protected from annual flooding of the river the installation of the first inhabitants coming from the eastern Sahara (Ghilardi *et al.* 2012: 7-22). Wadis and Nile flood gave the landscape of their country to the first Egyptians, and the flood modeled their life way. So, Ancient Egypt was both gift of Desert and Nile.

Farther south, Middle Holocene northern and central Sudan people exploited both savannah millets they gathered, and a *flooding Nile cultivation* of Near East domestic cereals ca. 5000 BC. These new data of the Sudanese sites near Sedeinga, and most southern, near Kadada, predate those of Merimde and Fayum, ca. 4500 BC, and Kadruka, ca. 4500-4000 BC (Madella *et al.* 2014). It supposes an earlier spread north-south not yet documented of the cereal growing in the valley, and the adoption of the "new" plants in the context of the foods strategies of the Holocene Sudanese peoples under the constraint of the climate variations. The Merimde people (not correlated to anthropological data) practiced a *raining cultivation* linked to the Mediterranean climate of the time at this place. With the climatic change, the increasing aridity reduced the rains and the fecundity of the northern model, whereas the rising flooding fed by southern monsoon drew to the valley the human populations pushed by the dryness. In this context, the Sudanese Nile model of flooding cultivation (both practicing gathering of millets, tubers and cultivation of the new domesticated Eastern plants, wheat and barley), appears also as an earlier antecedent of the reverse south-north spread ridden later by the Naqadan Upper-Egyptian new elites along the valley of the flooding Nile river after original acculturation of new plants and animals (see Fuller *et al.* 2011 on this dynamics). The same way, shepherds of Nubia (ca. 6000-3500 BC) and Central Sudan (ca. 5000-3500 BC) carry many material and social features of Saharan herding-centered cultures (Usai 2005:103-115) in their pastoral economy arrived and arose on the attractive wet banks of the Nile, or its affluents, as the Wadi Howar. The two events reinforced the original cultural complex of African use of ox and corn from which first African polities emerged.

All the data suggest the concept of diffusion as irrelevant if not considering the worldwide processes of acculturation of new *elements* as well the endogenous elaboration of new *forms*, and the food strategies motivating of both practicing the innovation and the acculturation. As well as the pastoralism, "*cultivation was not a rare discovery but a strategic and systematic shift in economies. The question* *then becomes* ***why*** *it was developed in the particular regions and periods where it appeared*" (Marom and Bar-Oz 2009: 3) – not who or which core[2].

Be it the domestication of animals or that of plants, any diffusion goes by the ways of interculturality and through the door of acculturation, and is necessarily a cultural re-invention in original contexts, sometimes galloping, sometimes abandoned.

So, as Dorian Fuller insists, the *multi-focal agricultural origins is a worldwide pattern* as well as the variable single-centered cereal which integrate a whole system, rooted in gathering practices, grinding tubers and seeds, use of pottery, that predate most of the cultivations.

What is true for the domestication of plants is for that of animals. "*Traditionally, it is accepted that cattle domestication occurred independently in at least two regions: the Levant and the Indian subcontinent from where, respectively, the modern so-called taurine (humpless) and zebu (humped) cattle types are derived*" (Van Neer 2010: 8). But an independent domestication may also occurred in northeastern Africa – in a hunting context rather, in a competition with earliest forms of farming like in the Orient. In the Western Desert of Egypt, excavations at Nabta Playa and Bir Kiseiba yielded remains of large cattle dating from around 8000 BC, without any possibility to identify if they were domesticated or wild. It was

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[2] Archaeology suggests *for the sole Middle East environment* dispersed groups of parallel processes and variable patterns characterized by competition between the sedentary farming and wild *bovids* that could cause depression leading to very early conservatory domestication of game in terms of food strategy (Fuller *et al*. 2011:628-652; Marom and Bar-Oz 2009). Always in the context of co-evolutions of the human, animal and vegetal species, wider scenarios of multiple centers of "domestication" rather than core areas, and parallel asynchronous cultural processes, with change of animal or vegetal source, are well known and identified. Further north, the *horse* of the "Magdalenian" rock art, ca.15000 BC, victim of climate events and systematic hunting, was reduced to relict populations in France and Spain, and more larger flocks in Central Asia. Y. Lignereux inventoried possible focal areas between Volga and Ural, where Neolithic sites testify the domestic character of the horse and its cultural originality (inhumation of a stallion within two dogs under a row of stones ca 3500 BC). Whatever the species, the lands and the cultures, what a striking sociological parallel ! Between 4300 and 3800 BC, sheep and cattle of the region badly resisted the colder climatic episode called *Piora oscillation*, that seems motivate the new precautionary domestication of the horse – a food reserve better adapted to severe climatic conditions, and of more advantageous conveyance (Lignereux 2001). It is also the case of the African wild rice unrelated to the domesticated rice of Asia studied by Fuller (Fuller 2011: 78-92). Its seasonal selective harvesting of wild rice spikelets beforehand bound by the women in the plains of the Chad lake area -still practiced (Dupuy 2014: 4) – predates some millennia its current cultivation as far the paddies of the Casamance (Hiss 1992: 203).

"*postulated that these animals were under human control, as they would have been unable to survive in the harsh desert environment without human care. DNA from ancient and modern African cattle is currently being investigated in order to shed further light on the domestication history of the species*". And later in Egypt, the *bos primigenius* impacts always Naqadan iconographies (Hendrickx 2002: 309; Navajas 2012: 171-180).

The expansion of cattle in the Nile Valley distinguishes the *"unequivocal evidence of domestic cattle is known from at least the fifth millennium BC on sites such as Merimde and Maadi"* – that consists in food refuse (*bones heavily fragmented).* As it can be opposed, *the elite cemetery HK6* of Nekhen in Upper Egypt, yielded burials of 18 domestic cattle at the beginning of the fourth millennium BC, 3800-3650 BC, compared to prior Nabta Playa and later Saqqara ones (Van Neer 2010). It is uneasy to decide between a parallel invention, a re-invention, and an original acculturation.

In our current state of knowledge and considering the lack of genetic studies from the available bone materials (Merimde food refuse, Nekhen skeletons) that may shed further light on links and processes, we can just already observe there were two different models of domestication: Merimde was an expansion of the Eastern cultural pattern in a context of borderline Mediterranean climate, a then *raining land*; Nabta Playa, Gebel Ramlah and Nekhen generalized an original African model that starts from the Western Desert and the Upper Egypt then ends into political and (inter-) cultural thrust sheet ruled by the kings of the *flooding country* to the Delta sites (Friedman 2002; Midant-Reynes 2014) and was determined by the increasing aridity and the monsoon rainfall that alimented the Nile flood underlying a new model of cultivation.

…and spread along the centuries, the waters and the meadows – or the seasonal mobility as key concept of generative chaînes opératoires

Domestication, from where ? So, under the sixth-fifth millennia BC, cattle-herding and ultimately original forms of pastoralism emerged across the North-eastern Africa. Artifacts as well as hunted and domesticated animals and gathered plants involve *chaînes opératoires* that shape or modifies the social structure. In the more and more arid climatic context, the same ways, more and more narrow, followed by hunters-gatherers, of seasonal mobility closely linked to the existence of water supply points, *generate* the *operating chain* of the African domestication of the ox. In a parallel concept, under many different versions, Fulbe, Shilluk, Anuak, Nupe, Nyangatom myths link the first cattle to a lake or a river – as echo of an original history: "*The myth of an aquatic origin of cattle is exclusively known in Africa*" (Le Quellec 2002).

Considering the herders were driving their cattle in Saharan heights, or in today Western Desert, the pastoral way of life was shared between alternating seasonal occupations of sandy savannas during the wet season -when the inter-dune depressions are covered with lakes and pastures, and mountainous areas, near the sources, in the dry season, like D. Chorin and A. Holl (2013) point out – or near the oasis or the banks of the Nile, as developed by H. Riemer and K. Kinderman (2008). Placed in perspective, the archaeological data suggest that the pastoralist seasonal occupations continue the seasonal cycles of hunting-gathering where "*people had continuously to adapt to low or high rainfall years, and to the changing localities where rainfall took place. These are the major constraints which definitely caused highly mobile and flexible strategies in order to cope with the unpredictable environment*" (Riemer and Kindermann 2008: 607-631).

Most marked seasons of the end of Holocene Humid Phase may have provided context to possible over-hunting of the game as well as support of rapid development of herding and could result in linkage mode with fauna reduced to few new animal species (oxen, then goats and sheep). Everywhere, between plateaus or hills and lakes, oasis, rivers, there was a sort of parallel seasonal movements from the cultural context of the former hunting-gathering ways to the herding way of life, that does not emerge from vacuum, but results from change of food strategies – perhaps under the constraint of a progressive game depression linked to climatic changes (Zeder 2015). Everywhere in the Saharan spaces, there was a minimal continuity of the occupation of the areas where "*the herders socialize their space, invest it of a living culture whose engravings and paintings of rock shelters are now silent remains*" (Chorin and Holl 2013).

The places and the seasonal mobility are common to the two life ways and suggest an internal herding-centered change within spread next to next by the door of the acculturation. In this view, any acculturation is necessarily an endogenous process, consistent with the ritual practices of prior forms of culture that used a sophisticated collecting of plants, required high knowledge of the paths of wildlife and the characteristics of mobility and values of linkage to the fauna species of the culture whose it renews the framework – where for eg., the hunted animals became *dead souls*, like among the Hadza – who never became pastoralists (Blench 2009). The herdsmen did not replace the societies of hunter-gatherers from which they emerged such as pastoralists, the two ways of life might shape each other in a same temporality. Some rock art engravings show the presence of both animals of the earliest wild bestiary and domesticated cattle in the new way of life (Zboray 2005). Until the twentieth century, the sociological parallel points the mutualization of the life ways and cultural expressions: the Nilotic herders refer to the former bestiary, ostriches, when, like Dinka, they name ***wuut***, the pawns of their *manqala* game, or to the new cattle when they identify "*the game table to the enclosure of livestock, or its original river*" (Le Quellec 2002) – and, like the Nyangatom, call with a single name, ***ngiladoy***, sg. ***lado***, the animal tails (*giraffe* for men, *cows* for women), adorning the arms of the dancers (Tornay 2001: 350).

The *seasonal mobility* in the same life world appears to be the key of the *generative operating chain* along which the herding arises – without eliminating artifacts and know-how of prior ways of life (ropes, baskets, ceramics, weapons). Once herding centered, the societies institute it into tradition, as a corpus of *defined operating chains* within its tools and skills henceforth more *expressive* of a transmittable culture. That may explain that they printed their stamp on the same broader net of paths of a wider seasonal mobility, as suggested by a diachronic study of the rock art sites of the Wadi Takarkori in the Libyan Tadrart Akukas (di Lernia *et al.* 2015: 1-25) – and by similar data provided by the site of El Kab, where, ca. 8000-7000 BC, people fished on reed boats on the Nile, and gathered in the dunes at the time of the flood From the ninth to the fifth millennium BC, as S. di Lernia *et al.* (2015) show, the hunter-gatherers used the grindstones not only in milling the gathered seeds, but also to manufacture pigments with rock scrapers -from hematite, animal glue, egg -and at last, casein when herding came. They laid it on the rock faces of cultic shelters as well as bodies and their adornments in a sophisticated artwork prior to the renewing of the art of iconography by the pastoralists cultures from the cradle of the hunter-gatherers societies. Furthermore, both the hunting-gathering and herding *life* ways shaping a millenary context of step by step long-distance contacts favorable to pooling cultural paradigms and features, and the increasing aridity of the next millennia, may have foster the expansion of a regional model of seasonal mobile cattle-centered societies.

Domestication, how ? The Sahara of the end of the Humid period provides many rock art areas outlining the African meeting between the Ox and the Man. Paintings of iconographic social and cultural programs distinguishing the gender and associating oxen, cows, men and women in their dwelling, characterized the emergence of a new conceptual framework inferring a *second* type of *human-animal linkage*, that of a narrow control of fauna, in *an ox-centered relation not ruled* *by a close property concept*, but a metaphoric solidarity or commensality where the animal may be the double of the man.

Life ways are unpredictable: they appear the same way they disappear: the herding can be deserted in the event of epizooties or prolonged droughts. In the survival strategy of the pastoralist societies, the fishing, hunting and gathering groups in whose midst they live acted as refuge for destitute herdsmen. For the twentieth century, N. Sobiana gives a sociological parallel of such processes bringing together the people of the oxen and that of the lakes and rivers in the same shortage on the shores of the Lake Turkana: Elmolo fishermen, cattle-herders Nilotic speaking peoples: Samburu and Turkana, Cushitic speaking ones: Dasenech, and camel-herders Rendille. The Elmolo were in fact former pastoralists who became fishermen after a long famine, and by extension, hunters (hippo, crocodile, turtle). The Dasenech do not fight them: "*We are brothers. They live by the lake, we have animals*."(Sobania 1988:41-56)

This type of redistribution of lifestyles may have occurred on the Nile, and reactivate paradigms of power based on hunting wild fauna, this time around the swamps and a flooding river. However, the parallel finds its limits in the different co-evolution of animal and human populations in wider terrestrial and aquatic spaces (a huge lake), and a lesser demographic pressure not leading to identical strategies. And the two cultures are operative into very different socio-economic contexts: the harpooners of hippos of the Lake Turkana operate in and from a context more oriented to the herding, the royal harpooners of the Nile Valley where men and hippos were competing from the very beginning (Droux 2011: 372) in a situation of farming right from the Badarian and soon equipped with granaries and brasseries in Upper Egypt, since the Naqada IC-IIB period 3762-3537 cal BC (Takamiya 2011: 20-21).

The spread of a model ? So, as well the Elmolo history as the Upper-Egyptian one show that the spread of herding was anything but linear and linked to local contexts of co-evolution of all the species. It ran anyway from the key areas of Nabta Playa (before the sixth millennium) and the Gilf Kebir (middle of fifth millennium BC), and the Nile-Wadi Howar confluence (4200-2200 BC) following the reduction of the regional rainfalls of African Humid Phase. One of the characteristics of the site of Nabta Playa, ca. 4500-4200 BC is the presence of covered tumuli of bull burials in the ceremonial centre (Wendorf and Schild 2004). Owing to asynchronous dryer conditions, the herders gave up wide more wet regions – first for northern oasis and the linear one of the Nile valley, where they buried also their bulls (Van Neer 2010: 8). Then they stopped long time in the today fossil Wadi Howar area, where the pastoralism predominates in rock art, the site Djabarona 84/13, give cattle carcasses (from 4000 to 3000 BC), and later, the site

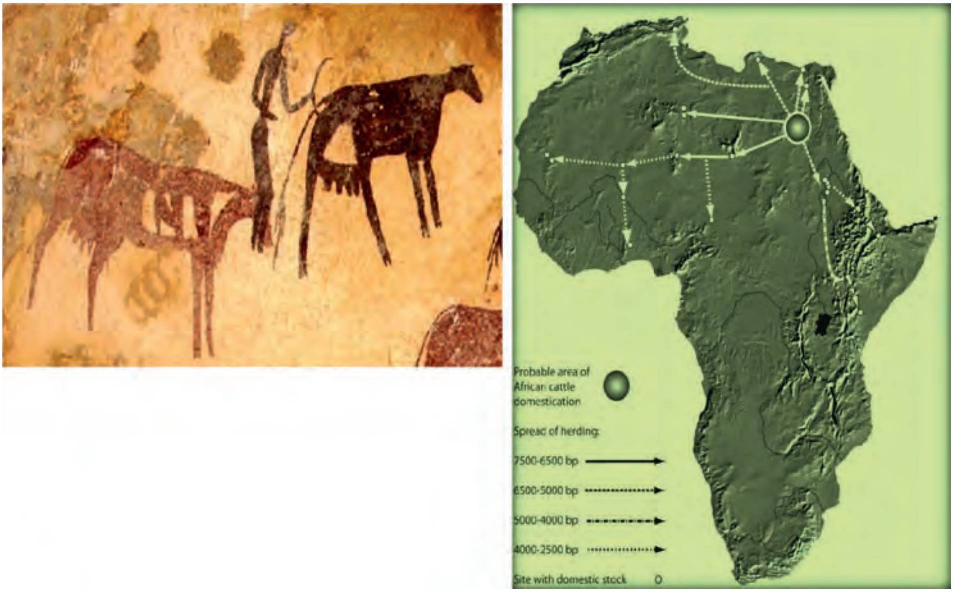

Fig. 4. A Saharan painting (Zboray 2005) and the map of the spread of the herding and the cattle-centered way of life in Africa (Hildebrand and Grillo 2012)

Abu Tabari 02/28, cattle burials (ca. 3000 BC). Later and beyond the Wadi Howar, in the Ennedi, the site of Chéïré I painted shelter pictures feathered warriors and cattle. (Menardi-Noguera and Bonomo 2016). Then, the model spread with the cattle and the herders to the far western seasonal or more permanent stretches of water, and from the Sudanese Nile to the Omo river and the Turkana Lake along a grassland corridor (de Menocal and Tierney 2012) (Fig. 4).

At the southeastern terminus, the Pillar sites on the west of Lake Turkana, ca. 3000-2000 BC occurred under different circumstances: among non-sedentary people who were either adopting domestic stock or moving herds into unfamiliar terrain. *Were cultural activities a continuation of original ones ? or reflect a co-opting of pillar sites for new social purposes?* (Hildebrand and Grillo 2012).

An original culture of the domestication of the ox

So there are never predictable or definitive answers to the questions, only their history roughed out the emergence of an original form of pastoralist culture: the African one.

Funerals. The Saharan Holocene was the crucible of a peculiar form of cattle domestication (di Lernia 2006; 2013). Archaeological materials and sociological parallels sketch original cultural frameworks -*from* the domesticated cow ritually buried in the Tumulus E-94-1N of the Late Neolithic Nabta Playa Ceremonial Complex in the mid of the sixth millennium BC *to* the funeral of the Sacred Bull of the Nigerian Fulbe which Hampate Ba witnessed in 1929 – *passing by* the domestic Longhorn Bull of the tomb 43 and the Cow of the tomb 36 of the Elite cemetery HK6 at Nekhen (Naqada IC-IIA, in the first half of the fourth millennium, 3800-3650 BC), and, later, the burials of Apis at Saqqara (Van Neer 2010: 8). In contrast with earlier Merimde where domesticated bovines, attested only by *food refuse*, had no tomb.

Gods and myths. From its first Naqadan times, the Egyptian culture multiplied the zoomorphic deities, notably boomorphic ones, like ***Bꜣt***, prior to Hathor with her ears of cow, whose earlier name may have cognates in Afar and Oromo: ***bor-a***, *white faced animal* (Takacs 2001b:14-15).

Divine figures like Apis, ***ḥꜥpy***, the Bull of the Nile, or the Primordial Cow, ***ꜣḫt***, *die Hathorkuh* (Wb I 17:3-4), later known as ***Mḥt Wrt***, litt. *the Great Flood*, may appear to be echoes of the mythical times of "*an aquatic origin of cattle – exclusively known in Africa*" like Fulbe or Nyangatom document it (Le Quellec 2002). (Fig. 5).

Artifacts. Ancient Egypt and the last today pastoralists cultures share many artifacts expressing a cognate sociality. The Nyangatom *headrest*, ***ekicolong***, is the *material double of his owner* – the *favourite ox* is his *living double* (Tornay 2001:348). The artifact has counterparts in Ancient Egypt as well in contemporary African cultures (Beja, Oromo, Turkana, Luba, Zande, Dogon) (Fig. 6).

A cattle "hornstyle" -the *dissymetric horns*-, is common to rock art of Gebel Uweynat as of the Fifth Cataract (Abu Sideir, Sudan), Kerma (cemetery of Faras, Nubia), and Ancient Egypt (Old Kingdom bas-reliefs), and today *Nilotic* pastoralists who call it ***komar*** in Turkana (Otha 1989), ***kamar*** in Pokot (Crazzolara 1978). Cultures are dynamic. *Omotic*-speaker pastoralists who share the same cultural framework of shaping horns, the Hamar recently adopt the up-down one from their Nilotic neighbors (Honegger *et al.* 2009: 8). In the same way, the Mursi practice a circular shaping of the horns of their oxen (Insoll *et al.* 2015: 99).

Evans-Pritchard gave a relevant explanation of the dissymmetric feature as expression of a dualistic view of the world: the Nuer people always turned the left horn down, and the right up, representing what is *good, right* and *up* (Drzewiecki and Stępnik 2014: 115; Evans-Pritchard 1940 : 294-295). Like the ostrich feather among Maasai, Oromo, Pokot and other pastoralists (Fig. 7).

Fig. 5. Burial of the Cow at Nabta Playa mid VI mill. BC (Wendorf and Schild 2004). Statue of the Bull Apis at Saqqara (Louvre), and ***B3t*** became Hathor : palette of Gerzeh, Ostracon of Nekhen Hk 29 (Hendrickx and Friedman 2003). Bas-relief of Cairo Museum (photo: of the author 2014)

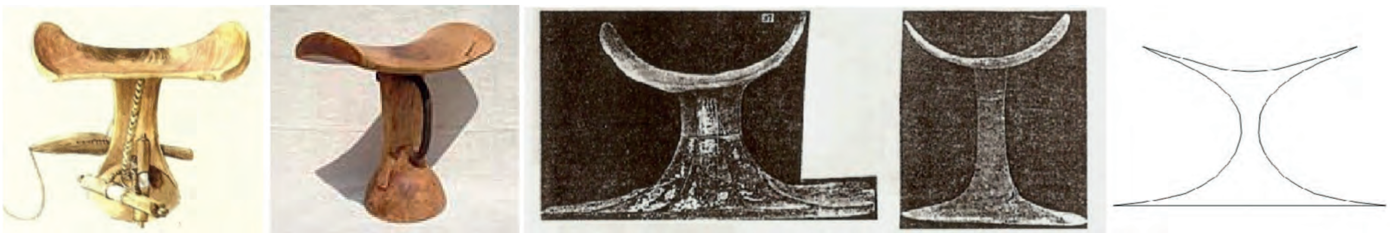

Fig. 6. Headrests: Nyangatom (Tornay 2001), Hamar (S.O.R.C), Egyptian (Lam 2003), and the hieroglyph Q3

Right to the *Egyptian script* mirrors the strong stamp of pastoralist cognitive way and embodies *dead zoomorphic metaphors* of ancient cultural models, by the graph of the name of human body-parts with the glyphs of cattle ones, the image of the tongue of *ox*, F20, , writing the *tongue*, ***ns***, and that of the ear of ox or *cow*, F21, , the *hear* and the *hearing*, ***sḏm*** (see Gardiner 1988).

Fig. 7. Dissymetric horns: Sudanese rock art, Abu Sideir, V cataract of the Nile (Drzewiecki and Stępnik 2014). ***Komar*** Turkana (Evans-Pritchard 1940). Kerma, bucrane (Chaix 2006). Egyptian ***iwꜣ*** ox (Montet 1954)

3. The Words of the Herding and the Milking: some lexical cognates

In terms of domestication practices, the oldest attestation of *milking* dated from 5200 BC (Dunne *et al.* 2012), predates seven centuries the settled down cultivation of the Sudanese Nile valley. The well-attested dispersion of the further abandoned practice of the milking insufflations draws the wide map of the first times milking practice, inconsistent with *"the hypothesis of milk consumption as "secondary revolution" in Africa"* (Le Quellec 2010: 204-246).

The **artifacts of the words** shared by past and present languages of human cultures are the asynchronous disperse ***echoes*** of the ***images*** from a Saharan macro-epicenter area.

The words the pastoralists are slamming in their games and those of the herd and the milk used in the Egyptian Nile Valley, sketch the map of the Saharo-Nubian pastoral complexes crystallized during the Mid Holocene, then distributed by a later expansion, from the Wadi Howar – a fossilized affluent of the Nile, to the south west of today Chadic languages people, the south east of Cushitic and Nilotic ones and the south-eastern Sudanese area.

Without pretending to exhaust the way, we just consider four words marking this long expansion.

First two names of milk : Pyr ***iꜣ.t*** *milk goddess* (Wb I 26:16-17-27:1-4), OK ***jꜣ.t.t***, *milk or cream* (Wb I 27:1), Pyr ***jr.tj***, *milky* (Wb I 116:6), XXIII ***jrj.t***, *milk-cow* (Wb I 114:18), OK ***jr-č.t***, *milk* (Wb I 117), ***irt***, *milk* (WbI 117:1-6). Cushitic: ***ore**, *cream*; Nilo-Saharan: Teda : ***yọar***, *to milk*, Daza: ***yɔɔr***; *milk*, Didinga: ***iro***, Nyima: ***elo***; Teso: *ak.**ile***, Maasai: *k.**ule*** (Takacs 1995: 123-131).

The determinative of the Egyptian word, ***mr***, of the *milk jug* (Gardiner 1988: 529), and the skin and vegetal containers (gourds, calabashes) of the iconography of the rock art of the Saharan dwellers stand comparison with the artifacts of last modern pastoralists (Fig. 8).

The hieroglyph W19, is used to write the preposition: , ***mj*** (Wb II 36,9), whose graphical variants of the Old Kingdom document the phonetic commutability of the hoe U6, and the jug W19, : pyr , , ***mr*** (Wb I 36:9). The etymological study by G. Takacs sheds light on the comparandum: Egyptian: ***mr***, *milk jug*, Chadic: Masa: ***miira***, *to milk*, Gizey: ***mir***, *milk* (Takacs 2008: 403). In addition: Cushitic: Proto-Sam: ***māl**, *to milk*, Somali: ***māl-ayya***, *to milk*, ***māl***, *milk* (Heine 1978). Nilotic: Dinka: ***miel***, *milk off* (Blench 2006a: 115), Maasai: ***e-mála***, *milk container* (Payne and Ole-Kotikash 2008).

Then, two of the many Egyptian words for the oxen, and their cognates in the basins of languages of their African hinterland. First, MK ***mr***, *bull* (Wb II 106:8-109), ***mr wr***, *the great bull* (Wb II 106:4), would seem very familiar to the speakers of Eastern Cushitic languages: ***mor-a**, *ox*, to these of Northern Omotic ones: ***mārā***, *young bull*, Janjero: ***omora*** and Central Chadic ones: Matakam, Mafa: ***maray***, *bull sacrificed during the Taureau festival*, Mofu-gudur: ***maray***, *fattened bull in the stable* (*see also* Müller-Kosack 1999); and to another dead language like Egyptian is: the Akkadian: ***mīru***, *young bull* (Takacs 2008: 392-394) as well the speakers of the Nilotic languages: Dinka: ***miɔr***, *bullock* (Blench 2006a: 116).

Fig. 8. The Saharan rock art (Gebel Uweynat) (Zboray 2005). Milk jug of the Daseneč (Elfmann 2005), the Hamar (South Omo Research Center) and the Egyptian hieroglyph

The word travelled with the herds and the shepherds as far as the (Niger-Congo> Mande>) sooninke speaking country: ***mere***, *humpless bullock* – continually used in this language after the later arrival of the Sanga during the mid second millennium BC in Africa.

At last, MK ***mnmn.t***, *herd, cattle* (Wb II 81:18), a word linked with social status and economic wealth as its semantic expansions shows, has lexical cognates in the same phyla: Northern Omotic: ***mēn**, *buffalo*, Male: ***meni***, Zayso: ***meno***, Gangule: ***mēno***, Southern Omotic: Gimurra: ***men***, Dizi, Seko: ***mīn***; Eastern Nilotic: Ongamo, Maa: ***o-monyi*** ; Eastern Chadic: Mokilko: ***mâal**, herd*, Dangaleat: ***mallē**, cattle*; Cushitic: Agaw, Bilin: ***mal**, cattle*, Afar: ***māl**, wealth*; and on the southern shore of the Arabian peninsula, Mehri: ***mōl**, livestock* (Takacs 2008: 293-294).

4. How did the Egyptians see and name their neighbors?

Toponyms, ethnonyms, anthroponyms of the Old Kingdom ca 2500-2200 BC

The durable civilization of the grain and the granaries crystallized in the long linear oasis of the Nile, at the east of the last narrowing wet basins, bears a strong stamp of the original pastoralists cultures which came on the banks of the Nile from its Saharan hinterland and provided men, words, arts to Ancient Egypt. The country went in reverse the way of a history merged with that of the vast Northeastern Africa. With new cultural tools, including writing, ancient Egypt soon left the narratives of its contacts with its lifelong neighbors on the support of stone, bone, clay, leather and papyrus.

The Old Kingdom is contemporary with polities located in the Lower Nubia and the Wadi Howar-Nile confluence area. For instance, the biography of Weni gives the origins of the Egyptian army waging war against the Asiatics: Egyptians, Tehenou, Nubians (Sethe 1933: 101) and maps a past constellation of the peoples and their countries neighboring the Ancient Egypt (Fig. 9).

Their toponyms , ***wꜣwꜣt***, , ***mḏꜣ***, , ***kꜣꜣw***, , ***irṯt***, , ***imꜣ***, are determined by the mountains hieroglyph and their OKEgyptian **ethnonymic** class, , ***nḥs.w***, a feathered human plural, which characterize here both Cushitic and Nilotic-speaking peoples. The writing of the country of Berber-speaking people is characterized by the combination of the land sign N16, ***tꜣ***, and its abbreviated **ethnonym**, , ***ṯḥnw***, glyphed with their typical throw stick T14 and the V13 of tethering rope.

Fig. 9. Feathered warriors and rulers: Tehenou ~Libyans, Nilotic pastoralists on Egyptian painting of New Kingdom and in the Upper Nile, XX century (Robbins 2010). Predynastic Egyptians and Nehesou~Nubians (Sethe 1933), Nyangatom (Tornay 2001, from Musée de l'Homme)

Toponyms and anthroponyms shape sets of languages as pointed by three few examples:

XII° ***wbȝspt*** may be a [***mḏȝ***] toponym: Beja: ***bur***, *land*, ***safit***, *northern* (El-Sayed 2011) Saho: ***buure***, *soil* (Vergari and Vergari 2007).

VI° ***kȝȝw***, with a **channel** determinative, may be a [***mḏȝ***] Cushitic place name: Agaw: ***kurā*** (El-Sayed 2011) and a *[nḥsw]* Nilo-Saharan one: Teda: ***karkur***, *wadi* (Lecoeur 1955), Dinka: ***kuer***, *river* (Blench 2006a; Anselin 2015b: 47-52; 2015a: 9-11).

V° ***wsȝ***, ***w– šr***, son of the ***ḥȝtj-ꜥ m ṯḥnw***, a Libyan (Berber) anthroponym: ***wsr***, ***wosor*** (El-Sayed 2011: 182).

After 2000 BC, the feathered warriors of Saharo-Nubian pastoralist populations began to move down more and more to the southern areas. In terms of lexical comparanda, it may be interesting to notice that the closely points of lexical reference for Nilo-Saharan and Cushitic languages are provided by the nearest neighbors the Teda and the Beja were and are always. The Beja are goat and camel herders, who name their country Atbai, a *good land* of wadi-centric topography, populated by perennial trees with wide umbrage and deep roots, notably the *acacia tortilis*. Their pastoralism is subject to the traditional ***silif*** law (pruning, ***ewak***, the branches for the goats[3]) -a practice known in Egypt and elsewhere, as a painting of a NKTheban tomb shows (Hendrickx *et al.* 2010:189-244), and the marginal cultivation of durra (sorghum) by the Islamic rule (Krzywinski and Pierce 2001: 28, 40, 52, 55, 57-58).

5. The feather as *fossile directeur* in pastoralist cultures

The Ancient Egyptians identified their neighbors, Nubians and Libyans, as feathered peoples whose rulers wore two feathers. The same, they crowned with a pair of ostrich feathers few royal and divine figures, such as Hathor (Goebs 2008)**.** They also share with other pastoral cultures the feather as a conceptual metaphor of rightness, justice, truth.

But, comparanda with nowadays Saharan societies of ancient pastoralists are uneasy because of cultural changes occurred during the two late millennia. Touareg and Tubu are no longer feathered. Most of the actors replaced *the feather of justice and truth* by *the justice and the peace of holly books* from later next Asian cultures – even if their cultures continue to convey past shapes and contents.

The , ***ṯḥnw*** wore ostrich feathers at a time when they had gods named ***ʿš*** or ***igɜy***, long before Zenaga and Mzab call the bird *alnem*, *anneam*, from the Arabic – while the Touareg still use the older root, ***nil** (Heath 2006).

More easy is the parallel with the last pastoralist dynamic cultures who came down to the Omo river and Turkana Lake by the *corridor of grasslands* – now joined by all other more recent forms of human cultures in a clash way (see below *the Pokot Tale*) (Fig. 4).

[3] Suggesting the motivation of the phytonym ***leggal mbaali***, *sheep tree* in Fulfulde (Seydou 1998).

In the Nilotic and Cushitic pastoralist cultures, the ostrich feather is closely linked to conceptual metaphors of the conjunctive socialization of cattle (headrest double, favourite ox, twisted horns), and its parallels artifacts of the words. So we'll take the ostrich feather as the *type fossil* of a sociological comparandum (Fig. 9).

6. Contemporary sociological comparanda *seen from* the Egyptian culture

How did the Egyptians see the ostrich feathers and the giraffe, in their own culture? What do the texts say?

Present within the iconography of the palettes, ivories, combs, potteries from Naqada I to III, the ostrich and the giraffe soon disappear from the hieroglyphic repertoire (Regulski 2010), and appear again under Old Kingdom with the value of , Pyr***niw***, *ostrich* (Wb III 202:13) and Middle Kingdom with the value of MK***mmy***, *giraffe* (Wb II 56:14).

Some texts and data show the feature of the ***ostrich*** *dancing with the* ***sun*** shared by Nubians, Libyans and Egyptians : ***niw ḥr ibꜣ m in.wt***, *the ostrich dances in the valleys,* ***mi tm m iꜣb.t pt***, *like Atoum to the east of the sky* (Dautheville 1922: 225-229; Kuentz 1924: 86).

The site HK64 of Nekhen delivered a Nubian deposit of ostrich feathers dedicated to Hathor during the Second Intermediate Period. Comparable to a stance of pap.Ritual of *Mwt* : «*Let us take for her feathers off the back of ostriches which the Libyans slay for you and let the Libyans dance for you*». In both cases, Friedman adds "*the inhabitants of the desert back when the sun is hottest and flooding occurs*: *the Nubians become symbols of the return of Hathor and play a role in its celebration*" (Friedman 1996: 4-5).

Some passages of the *Pyramid Texts, Coffin Texts* and *Book of the Dead* highlight the perception of the historical depth of the Egyptian bestiary that the ritualists were still able to have: "*Hail to thee, says Horus 21st Portal of the Weary-hearted One. The God who guards thee his name is Giraffe. He came into being before pines grew, before acacias were born, before copper ore was formed in the desert* (Allen 1974: 132, Spell 145).

During the New Kingdom, the *giraffe* reappears in the Egyptian culture like a vehicle of thought of the future which the zoonym was a paronym of word used for *prediction*: , , ***sr***, has lexical cognates in Chadic, bideyat : ***čaar*** (Takacs 2009:120), and Nilotic, Dinka: ***caar***, *prophecy,* ***car***, *to divine,* ***cäär***, *to see with a magical sight* (Blench 2005: 33).

The Nilotic language of the Nuer provides a semantic cognate: the name of the prophecy is based on those of giraffe, ***gwɛɛc,*** and god, ***kwoth*** : ***gwɛɛc kwoth***, *prophecy*

(Huffman 1929:18, 27). Like in earlier Saharan rock art, ca. 1550 BC, the *giraffe* and the (new) *sanga* cattle were co-textual in the valley royal paintings of Kerma (Emberling 2014:129) (Fig. 10).

Fig. 10. Mortuary Chapel KXI, Kerma, ca. 1550 BC (Emberling 2014)

7. Complex sociological parallels: commutables metaphors

When the ostrich and the ox were commutables. Like the herders of the Saharan rock art, the pastoralists of Eastern Africa associate the ostrich and the cattle in their ritual games. Most of them play a *manqala game in which the pawns, pebbles or seeds, placed in four lines of little hole,* figure the oxen, and the party a cattle razzia, as in Erythrea (Le Quellec 2002).

The Dinka (Nilotic) name the game ***aweet***, *the cranes*, or ***wuut*** (sg ***wut***), *the ostriches,* a paronym of ***wut***, pl.***wuot***, *cattle camp, familial section* (Blench 2006a).

The second version of the same game is founded on the myth of the first bovine, not on the birds, ostrich or crane. It is called fingers, ***ayit****, a game with two rows of nine holes, where groups of four pions are called* ***wong*** *«cow», while those of five are named* ***thon*** *«bull»*. The Nuer – who call the ostrich ***wud***– practice the same game «*call(ing) the pions* ***yung*** *«cow», and* ***tut*** *«taureau»*. It is the same for Nyangatom, and their neighbors, the Mursi, for whom «*play a game is said "lead a cow", and win "I have driven a bull». Thus, parts of this game are regularly considered representative of cattle*», the gaming table is the enclosure, even the river where the man won the first bovine from the aquatic genie (Le Quellec 2002).

When the ostrich was the ox of the herders and the headrest their double. The Pokot story-tellers (Southern Nilotic) use the metaphor of the *ox* as a prototype of the *favourite animals* class of Teso and Pokot pastoralists: *Oh, the* ***ostrich*** *is the '****ox****' of a Teso named Arimo* (*see below* A Modern Pokot Tale). May it be that current practices and ancient rock art associations underlied by a relational pattern where ostrich and ***ox*** are switchable as animal double of man**?**

8. Complex sociological parallels: *Age classes, War feathers, Goodness and Justice Feathers*

The feather headdresses of the Predynastic slates, Saharan rock art and Egyptian iconography of ***mḏ3w*** and ***ṯḥnw*** find modern sociological parallels and lexical mirrors throughout the Northeastern Africa. In Cushitic, Bayso: ***baal***, Oromo: ***baala***, means *feather*. The Omotic languages abound in cognates: Ometo, Wolayta: ***ball-iya***, Gofa: ***balla***, Gamo, Dorze : ***balle***, feather (Blazek 2008:73). In the Cushitic speaking cultures of the Afar and the Oromo, the word is inseparable from a precise social context. In Afar, ***baàla*** names *the feather worn by one who killed a man*, in Borana, the *ostrich feather*, in Ormo and Waata, the *ostrich* itself. The feather of the bird that does not fly is the prototypical feather of the conceptual metaphor of key institutions like the Oromo ***baali***, which provides *elected leaders*, ***abba****(s)*, *fathers*, to the ***gadaa***, a socio-political structure of age classes (Stroomer 1976: 268, 308). At the term of his mandate, the ***abba*** celebrates the exchange of the scepter ***bokkuu,*** also called transfer of ostrich feathers (Birbiso 2013: 1-18). The highest leadership is exerted eight years by the holder of the ***bokkuu*** scepter. To the term of his mandate, the ***abba bokkuu*** celebrates the ***bokkuu walira fuud'a***, characterized by the "*the event of power* "take over ceremony", *i.e. the symbolic act of* "the incoming class" and *"the event of power* "handover ceremony", *i.e. the symbolic act of* "the outgoing class". This ceremonial is also called ***baalli walira fud'a***, *transfer of the ostrich feathers* (Legesse 1973: 81; 2006: 125) – *two symmetrical acts/concepts (..) enfolded "as a single act [or word] of "exchange" performed by <u>exchanging the **Bokkuu** scepter</u> during **Baalli** ceremony* (Birbirso 2013). Ostrich feather, ostrich and leadership based on the war and the age classes are there one and the same thing in the discourse of power. The ostrich feather is clearly a metaphorical emblem of power. Documented by the semantic of ***baalli*** in borana going from '*ostrich feather*' to '*power*, *authority*, *responsibility*' (Stegman 2011: 5, 68), an ultimate logical shift may find a conceptual parallel in the feathered ***Mȝʿt*** of Egyptian thought.

The words of the feather and of the fighting belong to a same sociological universe in the past Egyptian society and in the pastoral ones of the Northeastern Africa. The Egyptian , ***ʿḥȝ***, is attested from Predynastic times, as name, *the Fighter*, of a king, and as semantic value in the iconography of feathered hunters in ritual hunting palettes. The word, , ***ʿḥȝ***, *to fight* (Wb I 215-216) <* ***ʿḥl***, has an army of cognates in the languages who offer semantic ones to the pharaonic metaphor of the ostrich feather: Eastern Cushitic: * **ʿol**, *war* (Sasse 1979:21), Northeastern Omotic: ***ol**, *to fight* : Gofa, Gamo, Dorze: ***ʔola*** (Takacs 2005:88). Such retention of similar social facts and words by the ancient Egyptian from the first times and by modern languages is that they will continue to make sense in their societies.

The regulation of complementary antagonisms is the keystone of the fighting ethics of the culture: in addition to its scepters and ostrich feathers, the ***Abba***

Gadaa, political leader, and the the ***Qaallu*** high priest of the Borana, wear for attributes the ***qallačča***, a frontal ornament in meteoric iron, emblem of social and religious mediation «*which is able to bundle positive and negative "cosmic" energies» for want of a better world* (Birbiso 2013). Comparable with the rule stick of the Hamar, an Omotic-speaking people, the ***woko*** "*also extended to the realm of ritual where the fork of the staff is used to ward off what is unwanted (disease, drought, war) and the hook is used to draw close what is wanted (health, abundance, peace)* (Thubauville 2009: 1-2). From this perspective, the ancient Egyptian Goddess of what is true, right, just, ***mꜣᶜ.t***, wearing an ostrich feather appears a window on a pastoralists cradle where it has drawn materials and paradigms available for new developments in its culture of strongly hierarchical rural society: the pastoral violence (razzias), whose purpose was the prosperity of the group and the marital circulation (beneficial actions to society and its reproduction), a way of life "wisely" ritualized. It may seem paradoxical that the feather of blood which flows is also the emblem of wisdom, and what motivates violence is searching for its opposite, a code of the Good (Saho cognates of ***mꜣᶜ.t*** : ***meᶜe***, *good*, ***maᶜani***, *goodness, righteouness* (Vergari and Vergari 2007: 56, 60).

It should be remembered that no society is never a copy of another one, on the pretext that they are playing same cultural sheet music. In this case, the pharaonic power is not elective, and cumulates all the emblems of power. In the new context of the pharaonic state, shifting the conflicts and their modes of resolution along the stratification of a tributary rural society, the ***Mꜣᶜt*** became synonym of *Order, peace, justice, goodness*, an armed Harmony fighting and repelling the ***izf.t***, the *Chaos*.

9. Cultures of Pastoralists, War feathers, Goodness and Justice Feathers

Semantic cognates of sociological parallels

The Nilotic languages provides the same schemes than the Cushitic, not the lexical cognates, but the semantic ones. So, the Maasai : ***e-sídáí***, names the *ostrich*, and ***sidáí*** means *good, well*. So, ***kɛ átà ɔlmʉrraní inkiaasîn sidaîn*** means: *A warrior has* (by nature) *good deeds* (Payne and Ole-Kotikash 2008). After hunts and battles, a ceremony installs the young warriors as elders, and opens to them ways of marriage and cattle, after a *milk* ritual, ***aók kʉlɛ.***

Both practices of hunting, herding and fighting shaped a complex cradle to pastoralists cultures. The shepherds sport ornaments from hunting pristine times, like the *ostrich feather* headdress, into the rituals of social reproduction giving access to cows and women – to the marriage.

Everything happens under the control of the higher ritualist of the Maasai, the ***ol-oibónì***, who counseled and blessed when they went to fight. One of the elected leaders, the ***ol-aigúɛ nànì***, embodies speech, *arbitrations,* chairs meetings and ceremonies.

Thus, the Karomojong and the Dongori, whose the last point of departure was Dongiro in the southern Sudan. The founding fathers of the Nyangatom are a fraction of the Dongori, ca. 1700 AC. Then, the Lycaons, ***ngi piey***, succeeded them ca. 1730. Two centuries later, the generation of the Elephants, ***ngitome***, is that of the Fathers of the Country (1930-1980) and the ***ngikaleeso***, the Ostriches, the Sons of the Country and future Fathers. The Nyangatom generations cycle through like the rows of animals in narratives of Predynastic Egyptian slates and ivories.

Among the Nyangatom, the *oryx horn,* ***a-tom****,* carried accross the shoulder, like holster of the ostrich feathers, became by metaphor, the name of the gun they use today (Tornay 2001: 24-25, 35, 290-291). And the Ostriches, later called ***Nyam e-tom***, *Elephant Eaters*, turned their name in ***nyang a-tom*** [***yellows*** *(fauves)* – *(horns of oryx)* ***guns***], the Yellow Guns**.** Their pastoralist culture was according with hunt and war patterns who traditionally associates two elements of the Desert bestiary, the oryx (horns) and the ostrich (feathers).

At last for examples of sociological parallels, a ***Pokot Song*** registered in the twentieth century stands comparison with the Egyptian texts seen *above*:

> Sun, good*, pretty thing*
> *My father holds a certain bird*
> *Ostrich, very good, pretty thing*
> *My mother holds another plume*
> *Ostrich , very good, very pretty thing*
> *Ostrich (*akalis*) of my ancestral father*
> *Ostrich, white feathers, mm*
> *Its mother lays eggs in the sun* (Robbins 2010: 191).

10. The Ban of Ostriches and the End of a Culture: how the Ostrich flied out the Pokot culture.

But the cultures fit or disappear: the same way the Nyangatom replaced *in a classical process of acculturation* their ostrich feathers holster by the gun in their culture, the same way the Pokot abandoned the law of the ostrich feather under the constraint of new forms of power imposed by new rulers. Traditionally, the Pokot decline their temporality in oral *annals* characterized by events: *The Year the Lizard Cried* (1890), *The Year the Sun Died* (solar eclipse of 1896), *The Year of the Great Rains* (1930), *The Year of the War Recruitment* -a kind of tribute to the benefit of the new ruler *(1939-1940),* and so on.

The year of Kenyatta trial (1953), a Pokot, Chepusepa, tells:

> "The son of Arimo, a Teso, headman of the local *road crew*, found an ostrich's nest, and took back the baby ostriches. Arimo took care of them, they grew quite large, and Arimo harvested its feathers twice.
> A colonial official saw the ostrich and asked the people, "*Where did this come from*?"
> "*Oh, the **ostrich** is the '**ox**' of a man named Arimo*," they told him.
> The official demanded: "*Do you have a license to keep an ostrich*?"
> "*Of course not!*" Arimo replied: "*This ostrich doesn't belong to anyone else -it's mine.*
> *So why would I need a license*?"
> The official decreed: "*From this day on, you must not keep this ostrich without a license.*
> *If you do, you will go to jail for stealing from the government*!"
> That was only the beginning !
> The officials have been seizing our *pet ostriches* ever since!
> When other people heard about the event, they killed their ostriches".
> Now there are no ostriches left in the Pokot country.
> The Pokot can get feathers only by trading.
> However, they still sing frequently about these splendid birds.
> During one song, learned from the *Karamojong*, they join hands, raising and lowering their arms,
> like an ostrich flapping its wings in the rain (after Robbins 2010: 190).

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Desert and the Nile.
Prehistory of the Nile Basin and the Sahara.
Papers in honour of Fred Wendorf
Studies in African Archaeology 15
Poznań Archaeological Museum 2018

Miroslav Bárta

The Birth of Supernatural. On the Genesis of Some Later Ancient Egyptian Concepts

The following text represents a new way to understand rock-art preserved in the caves of Wadi Sura I and Wadi Sura II in Gilf Kebir, located on the southwest border of modern Egypt[1]. The sites are dated to the late seventh and the sixth millennia BC. The principal aim of this paper is to show that there are several elements featuring in their decoration which indicate that creators of this art formulated some very basic ideas which were later on elaborated in the Nile valley and that we traditionally connect with the specific character of Ancient Egyptian civilization. These include the following motifs: running chieftain (renewing his magical powers and physical forces), chieftain smiting his enemies, the ethiological myth of Earth and Sky, swimmers as the souls of the deceased individuals, creatures protecting the Netherworld and eventually what seems to be the earliest depiction of the hereditary principle. Surprising as it may be, the suggested link between the Gilf Kebir local populations of hunter-gatherers and cattle keepers, or the Western Desert popula-

[1] The publication was compiled within the framework of the Charles University Progress project Q11 – Complexity and resilience. Ancient Egyptian civilisation in multidisciplinary and multicultural perspective.

tions in general, and the much later populations inhabiting the Nile valley finds additional support in the recent discoveries at Gebel Ramlah cemeteries located in between Gilf Kebir and Aswan and slightly later in time (Kobusiewicz *et al.* 2010.). This cultural transfer and a major movement of the local populations in an west-east direction may be explained by the increasing environmental stress and deteriorating climate which started in the sixth millennium BC.

Fig. 1. Cave of the Swimmers (photo: M. Bárta)

Introduction

What makes prehistory of the Sahara in general and Egyptian Western Desert in particular such a fascinating subject to modern scholarship is in my opinion above all the fact that it provides rich evidence for how past communities of hunters, gatherers and pastoral nomads coped with their changing environment and how they were able to readjust to major climate changes, during the Holocene in particular. Obviously, much less is known about the intellectual dimension of these past communities. Indeed, except of some indications provided indirectly by the artefactual evidence, very little has been on offer.

Except, perhaps, of some surviving remains of rock-art left behind by these populations. Few in numbers, rock-art sites pose itself as a very challenging scientific endeavor. Generally difficult to date and even more complicated to interpret, decorated surfaces present themselves as frequently used, reused, expanded, complemented and/or reduced sets of motifs likely imbued with different layers of meaning. From this observation results yet another stressful characteristics of the rock-art, namely that more often than not it doesn't seem to follow a single master plan. Decorated surfaces incorporate different motifs juxtaposed next to each other, with frequent superimpositions, other without any significant relationship to one another. This is at least what we seem to anticipate based on our current knowledge of the issue.

The research on the Western Desert Holocene prehistory has been revolutionized by two dominant figures and their expeditions – American prehistorian Fred Wendorf to whom this volume is dedicated and a German scholar Rudolf Kuper. It is thanks to their decades long focus on archaeology of the vast expanses of what is nowadays barren and life-threatening desert, in particular between the Gilf Kebir and the Nile valley, that we can seriously appreciate specific forms of subsistence strategies and visual expressions of many local populations (compare the current state of research with the one reflected in Kuper *et al.* (1978).

Yet even today we tend to think in categories born out by our modern perception of the world based on sedentary principle of our everyday life and clear-cut boundaries lending support to our use of mutually exclusive categories of experience – be it art, language, culture or history. Deep prehistory, however, may offer, completely different experience. During the middle Holocene, the whole Sahara was far from a vast emptiness. It was a region with rich forms of life occupied by populations of hunters, gatherers and pastoralist nomads. Only from the late seventh millennium BC the climate started to deteriorate and as a consequence Sahara became largely dry region within the following two millennia (Kuper and Kröpelin 2006). This had serious impact on the local populations which were forced to withdraw towards the east and started to experiment with sedentary forms of life in the Nile valley.

Until recently, the prevailing if not the only opinion among the scholars specialized in the prehistory of Sahara and specifically of what we call today Egyptian Western Desert was that the prehistoric populations living there had barely anything in common with the later Egyptians from the Nile valley. To explore this view we have to turn to two most important sites with rock-art in Egyptian Western Desert dating to the so-called Gilf B phase, the so-called Cave of the Swimmers – Wadi Sura I and Cave of the Beasts – Wadi Sura II.

The painted scenes there were most frequently made with red ochre in combination with white pigment. The compositions are distributed rather irregularly within the whole complex of other scenes, yet they seem to represent self-contained independent units. Most importantly, many of the scenes are difficult to comprehend based on contemporary rock-art or within their own context. Therefore, in order to explore their significance, one has to turn to later formal parallels, which make a sense in historical, environmental, chronological and regional context.

1. Hans Rhotert and Wadi Sura I

Wadi Sura I cave (Fig. 1) was discovered by the renowned Hungarian desert explorer Láslo Almásy in 1933 who gave it its original name based on preserved human figures formally resembling swimmers – hence the name Cave of the Swimmers (Almásy 1998). Following Almásy, it was then German explorer and archaeologist Hans Rhotert who concluded that a very small human male figure (Fig. 2), which today stands isolated in the left part of the cave, shows similar traits as much later parallels known from Ancient Egypt. The Wadi Sura I figure features about 12 cm high figure oriented to the left. It has a body painted red with stretched-out arms. The man holds in his right hand an elusive artefact similar in shape to an adze. On his right knee is fastened a double band and his left knee is decorated with two hanging strips of cloth. The figure wears on the head a prolonged, cone-like object closely resembling the shape of the much later Upper Egyptian white crown (the earliest attestation of the white crown dates from the Naqada I period; Ciałowicz 1997). The overall appearance of the figure suggests that it portrays a person in a frozen moment of an intensive run. Moreover, due to the elements indicating decoration, it may be suggested that this was a ceremonial or festive performance. Within the context of the known rock-art of the Western Desert there is no parallel motif known to me and the closest parallel is known only from much later period from the Nile valley. As will be shown, this is notably the case with many of the scenes attested from Wadi Sura I and II and discussed in this text (Le Quellec *et al.* 2005). H. Rhotert therefore considered the scene to be very close to what Egyptologists recognize and interpret as a prototypic *sed*-feast scene, as performed by much later ancient Egyptian kings (Rhotert 1952: 55, pl. XXIX, 5).

Fig. 2. Cave of the Swimmers, running man (photo: M. Frouz)

In Ancient Egypt, the earliest evidence for the *sed* feast representations dates to the late Predynastic period (around 3300 BC). It is fragment of a mace head traditionally connected with King Scorpion (Hornung and Staehelin 1974: 16; Hornung and Staehelin 2006: 13; Serrano 2002: 51 and fig. 18). Later on, similar motif is known from around 2900 BC. from the reign of the first king of unified Egypt, Narmer (Hornung and Staehelin 2006: 13). Finally, the third early attestation is provided by the seal of Den dating to the First Dynasty (Decker 1987: 40, fig. 10). The *sed* feast represented an ancient ceremony which comprised many important symbolical activities related to the renewal of the physical and mythical powers of the king implying his exclusive possession of the rule over his community bestowed on him by the gods. At the same time, this ceremony became very important part of the king's afterlife existence (Hornung and Staehelin 2006: 91–95; Kaiser 1971: 87–105; Martin 1984: 785–786; Serrano 2002: 44–46). Significant part of it was a ritual run. This was a specific way how to manifest that he was the true ruler of the world (Hornung and Staehelin 1974: 43).

Another dominant though much damaged feature in the cave represent the figures of the so-called swimmers (Fig. 3). This element occurs also in the Cave of Beasts. It shows small human figures portrayed on the belly prostrate formally resembling attitude of the swimmers. For Almásy they represented swimmers whom he thought were referring to the times when people used to swim in the local pools. Later, Hans Rhotert considered them to be images of dead persons (Rhotert 1952: 105). In this context, a reference to the Coffin Texts spells where the 'swimmers' are representing the souls of the dead floating in the waters of Nun (Le Quellec 2008: 31–33). The Ancient Egyptians ascribed to the swimmers quite specific status because they played an important role in resurrection ritual as attested by some Egyptian texts:

> *O drowned ones, who are in the water, swimmers, who are in the stream, see Re, who enters his boat, great of mystery…Well, then, get up, tired ones. See Re. He takes care of you. Re says to them: Exit for your heads [= your head above the water], O sinking ones. Movement of the arms for your arms, O overturned ones.*
> *Circulation for your legs, O swimmers.*
> (Zandee 1960: 236)

The figures of the so-called swimmers occur in different caves in Gilf Kebir area including the Cave of the Swimmers and the cave of the Beasts. Recently, Rudolf Kuper and his team discovered that in the Cave of Beasts they form a kind of a "arc" overarching the most part of the cave (Kuper *et al.* 2013: 58, fig. 7). This allows to assume that their arrangement followed a preconceived plan and that the individual compositions in the cave were imbued with specific meanings. In fact, looking at the preserved similar arc in the Cave of the Swimmers indicates that the same solution was taken there as well. Thus we encounter a motif that was not local but had a generous meaning and was used in different locations as we know that the "swimmers" were preserved in more caves in the area.

It is above all the observation that these figures were intentionally arranged in an arc which renders the original notion of them being real swimmers rather obsolete.

Fig. 3. Cave of the Swimmers, detail of the "swimming" figures (photo: M. Bárta)

2. Wadi Sura II – Cave of the Beasts

Unlike Cave of the Swimmers, this cave was discovered almost a century later, by an expedition led by col. Ahmed Mestekawy and Italian explorers Massimo and Jacopo Foggini in 2002 (Fig. 4). In this case, the decoration of the cave was incredibly well preserved and consisted of several thousands of painted elements/units. It features figures of the swimmers as well as several other motifs for which we can find parallels in the valley of the Nile only much later. As is the case with the swimmers, also all the below-mentioned motifs and scenes are unique within the context of the Saharan rock-art and parallels to them can be found only considerably later in the Nile valley.

To start with, the left-hand side of the cave contains a small scene with a male, perhaps a chieftain, holding in his hand a mace (Fig. 5). To the left of the chieftain we can see a fallen male upside down, perhaps a defeated enemy? Two rows of human figures are to the right of the assumed chieftain. The individual human figures are either standing or shown upside down. These two asymmetrical groupings are separated by a horizontal natural rock fissure that divides the upper and

Fig. 4. Cave of the Beasts (photo: M. Bárta)

lower row rendered in different attitudes. The upper row contains robust figures with their arms lifted above their heads. The lower row shows figures almost half the size of those in the upper row. Their bodies are slender (could they be females?) with their heads down. Their arms are arranged in a different way: while one arm is always hanging along the body, the other is raised above the figure´s head.

Very close parallels to the composition consisting of a victorious chieftain and a killed enemy occur much later in ancient Egyptian sources where the standard elements of the so-called smiting scene show the king (in earliest scenes a chieftain) with a raised mace above his enemies, about to smash their heads. This ideological feature of a victorious king successfully protecting his territory and people from evil forces and enemies permeated the whole ancient Egyptian civilisation. Typically, Ancient Egyptian fashion of rendering defeated enemy was to show him upside down. The king was, from the very early stages of the civilisation in the Nile valley, considered to be a superior force whose task was, among many others, to maintain order, drive off the forces of Chaos and protect his subjects from malevolent forces including enemies from different territories. One of the earliest examples of this iconographic element is attested from the late Predynastic tomb L 100 at Hierakonpolis belonging to one of the rulers of a local chiefdom (Quibell and Green 1902, pl. LXXVI).

One of the most important scenes in the Cave of Beasts features a large figure of a composite creature with body painted white (Fig. 6). It consists of a combination of beast´s legs and a female torso with a clearly visible breast. The figure is leaning against the ground with her outstretched arms and legs, making an arc. There is a red figure – probably of a male, which seems to support the body of the white creature, reclining on his right elbow and with his left arm touching/supporting her body. His legs are unnaturally long and nine men are depicted walking on them upwards on the right side. In their hands they carry large elongated items in a similar fashion as the later offering bearers attested in Egyptian tombs from the Old Kingdom (27th cent. BC) onwards. Based on the scheme of the scene, it may be said that the largest and thinnest figures in the composition which are painted red represent one species of creatures in human shape but with exceedingly long arms and legs, most likely beings of different, perhaps supernatural substance.

Fig. 5. Cave of the Beasts, chieftain smiting his enemy (photo: M. Bárta)

Fig. 6. Cave of the Beasts, the composition with the white figure (photo: M. Bárta)

It is in this context hard to resist equation of the White being with much later depictions of the sky goddess Nut in ancient Egypt, being supported by an Earth-god, called in Ancient Egypt, Geb (Bonnet 1952: 536-9; Wells 1992). Geb, for instance, is in one passage of the Pyramid Texts (Spell 510) described as a god whose one arm touches the sky while other rests on earth:

> *…while Geb, with his (one) arm to the sky and his (other) arm to the earth, is extending Meryre to the sun…*
> (Allen 2005: 153)

Quite specific is also a group of scenes dominated by headless beasts which are rendered in a way that prevent their reliable identification (Fig. 7). They are always surrounded by smaller human figures. Some humans are rendered in a way implying that they may be swallowed by these creatures. They have been considered by most of the scientists as headless beasts. The problem with this proposal is simple – to our knowledge the Saharan rock-art does not incorporate mythological creatures. Thus this solution assumes a completely new approach to the rock-art in Gilf Kebir.

If we were to find out a more mundane solution, we encounter difficulties and no reliable explanation seems to be at hand. However, I am inclined to identify these "headless" beasts hypothetically being baboons. This suggestion is based on observation of their contours, body attitude and profile view of their "double" heads. The "double" head visual impression is what you can actually see when looking at baboons from the profile. Be it as it may, the concept based on a scheme where an animal is devouring a human is quite unusual within the context of the rock-art of the day and, again, may be much better understood with the help of Egyptian sources preserved in the literary composition of the Book of Dead. Following the text, we can understand these creatures as protecting the cave, the place of resurrection and the enbrance to the Nethewor from being entered by those who were not worthy of it. This is to me the only feasible way how to explain the animals devouring the humans (Bárta 2011: 61). In connection with these headless beast some authors posit another interesting observation claiming that the vertical cuttings across some of these figures envisage yet another Ancient Egyptian mythological practice – namely "neutralising" potentially dangerous animals by means of cutting them into several separate parts and thus keeping their negative and harmful forces at bay (D'Huy 2009).

Fig. 7. Cave of the Beasts, the "headless beast" (photo: M. Bárta)

Another piece of unique evidence provided by the Cave of the Beasts seems to relate directly to the social organisation of the community which devised the decoration of the cave and used the place. It shows an adult pair and a child (Fig. 8). The adult pair shows a male with a mace held horizontally or alternatively, with a symbol of his masculinity. The woman is standing beside him and holding a basket (?) on her head. The child is attached to the mother by means of umbilical cord. If this interpretation is correct, we may consider this scene to be the earliest heredity rendered in iconography.

Fig. 8. Cave of the Beasts, the pair with a child (photo: M. Bárta)

To finish this brief overview of the selected scenes in the decoration of the caves, let us conclude with yet another element in the decoration, in fact a dominating one. It is human hands, mostly occurring in pairs which take up significant part of the decorated surface of the cave. While a human hand is a common element used independently by many populations throughout prehistory on several continents, in this case, in this place and in this particular context, it is difficult to refrain again from a direct comparison with Ancient Egyptian culture. Shall we hypothetically agree that some processes portrayed in the caves have something in common with etiological concept and concepts of death and rebirth, the pairs of hands only add to the religious relevance of the scenes. In such a context, they would symbolise souls of the deceased which made it to the Afterlife.

Conclusions

Despite the general acknowledgement that prehistoric populations of the Western Desert played an important role with regard to the Egyptian civilisation, primary attention has always been paid rather to the Egyptian – Near East connection (Wengrow 2006: 21–29). A direct connection that would link the populations of the Western Desert living in the area of Gilf Kebir and the early inhabitants of the Nile valley has been, however, missing. Only recently the Combined Prehistoric Expedition led by F. Wendorf and R. Schild has indicated that there might had be a connection between the Sahara Neolithic and the Neolithic in Upper Egypt (Wendorf *et al.* 2001).

Above all, it was the discovery of the Nabta Playa late Neolithic megalithic culture dated to the second half of the fifth millennium BC that allows to propose a connection between the Egyptian Western Desert populations and the rise of the Predynastic cultures in Upper Egypt (Wendorf *et al.* 1993: 7–16). The Nabta Playa settlement area also featured unique tumuli with cattle burials (Applegate *et al.* 2001: 468–88). The burials prove clearly that these prehistoric cattle keepers practised a cult of sacred cows which later became one of the dominant features of ancient Egyptian religion (Hassan 1998: 98–112).

The Gebel Ramlah cemeteries dating to the middle of the fifth mill. BC may be used along similar line of argument (Kobusiewicz *et al.* 2009). They display the very same characteristics: the placement of the dead, the grave construction and the grave goods. The graves assume the form of oval pits with burials in flexed positions, head west, face south. Typical representative of the pottery are beakers of caliciform shapes and black-topped pottery. Quite frequent are also polished axe heads, palettes, shell and ivory bracelets, needles etc. Prominent was the effort of the grave builders to keep older bodies together despite the fact that they had to move them aside during later interments. They took every measure to preserve the earlier skeletons intact and yet they were making mistakes such as reinserting wrong teeth into mandibullas or maxillas. A rather manifold collection of parallels to the Nile valley culture of Badari made the excavators seriously consider close links between the community of Gebel Ramlah and the Tasa/Badari culture.

It may be suggested for further considerations that there are quite a few indications supporting the notion of the cultural transfer of several intellectual concepts originally developed by the local populations of the Western Desert and Gilf Kebir areas (for details see Bárta 2011 with bibliography; for opposing and prevailing opinion comp. Förster and Kuper 2013; Zboray 2013). The scenes in the caves prove that there was significant social complexity existent in the society that conceived the commented concepts. At the same time, these local communities possessed significant intellectual capability to embed their surrounding environment within the framework of complex etiological compositions that later on became a characteristic part of ancient Egyptian culture, mythology and world-view.

The Gilf Kebir decorated caves pose in general a very interesting and multilayered phenomenon. In comparison with the rock-art known from other locations such as Gebel Uweyinat or some minor places in the Western Desert but also including other sites from the north-east Africa in general, it is easy to recognise their unique status. The wide spectrum of individual motifs goes far beyond the traditional and expected genre of hunter-gatherers and early pastoralists.

The topicalization of the chieftain and scenes with suggested transcendental meaning indicates that these sites were of a special nature. This is also indicated by the fact that most ancient routes mapped by the Cologne team in the area of the Cave of the Beasts make the cave their focal point. It would be out of place to consider the creators and users of these caves exceptional within their environment and context of other populations in the region (but this cannot be excluded either). It is more likely to suppose that the preserved decoration communicates the world as it was perceived by that time. We can even speculate that it could be the approaching climate deterioration which mobilised the intellect of the local communities and made them express their thoughts in particular sites developed as special places for communicating with the gods. Similar examples are easy to be named. Take, for instance, the appearance of the Gobekli Tepe monumental complexes in eastern Turkey close to modern Sanliurfa, most likely as a consequence as a Younger Dryas rash cooling on the Northern Hemisphere which led to a radically more difficult life for humans within one's lifetime. Or the genesis of the first Egyptian state in the wake of another serious climate worsening. The human history is rich in examples when serious progress has been made due to internal or external stress. But these thoughts are currently beyond the limits of the presently known evidence.

While it is impossible to state that it was exclusively the populations of the Western Desert that created Ancient Egyptian civilization flourishing in the Nile valley, I fully subscribe to the conclusion that there is and most likely will be increasing evidence showing important relationships between populations which once lived in the vast expanses of what we nowadays call the Western Desert and those settled in the Nile valley. Simultaneously, in my opinion, the populations originating to the west of the Nile valley contributed intellectually to the genesis of some of the most outstanding pillars which constituted the essence of Egyptian civilization.

Accordingly, it is tempting to assume that we are confronted here with an incipient concept of ethic norms according to which only people following them in their life could enter the afterlife existence following their physical death. Here the earlier commented compositions of the swimmers and the headless beasts merge together in a joined effect to express rather complicated concept of ethical principles on which the community of the day perhaps operated.

Summing up the importance of the evidence provided by the Cave of the Swimmers and the Cave of the Beasts, we may conclude that these caves:

- provided legitimity to the current social order by fostering the topicality of victory of the chieftain on behalf of his population (smiting and running male figures, likely being chieftains);
- portray a sophisticated etiology how to imagine the physical world, earth and sky, that surrounded those communities;
- introduce ethics appeal – indicating means of resurrection after meeting the 'qualifying' criteria in order to attain the afterlife (headless beasts);
- they cemented the current status of the community by perpetuating the hereditary principle;
- they provided each member of the community with individual experience of the transcendental realm (pair-hands).

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Desert and the Nile.
Prehistory of the Nile Basin and the Sahara.
Papers in honour of Fred Wendorf
Studies in African Archaeology 15
Poznań Archaeological Museum 2018

Paweł Lech Polkowski

A Giraffe's Tale. On Enigmatic Composition from Site 04/08 in the Central Dakhleh Oasis, Egypt

1. The rock art in the central part of the Dakhleh Oasis

Until 2002 the research conducted by the Petroglyph Unit (which is part of the Dakhleh Oasis Project – DOP) was almost entirely focused on the eastern fringes of the Dakhleh Oasis (for references and general outline of the research, see Polkowski *et al.* 2013). However, in 2002 a new area was opened for scientific investigations of rock art, namely the Central Oasis – the rocky area between the modern villages of Ismant and Balat (Krzyżaniak 2004). Subsequent field seasons have yielded a high concentration of rock art findings and to date almost 1400 rock art panels, distributed among more than 250 sites, have been recorded (for the distribution of sites and panels, see Polkowski 2016: 38-44, figs. 1.13-1.19). The petroglyphs which are the subject of this paper were found by Lech Krzyżaniak in 2002, and later recorded by the team led by Michał Kobusiewicz in 2008 (Kuciewicz and Kobusiewicz 2011: 238-9). The site has been registered as site 04/08.

The site is located in the southern part of the research area, approx. 6 km south of the tarmac road (Fig. 1-2). In this part of the sandstone ridge the *wadis* are broader than in the northern area; site 04/08 is located in the so-called Painted Wadi – the long and wide sandy valley running from north to south. The hill in question is situated within the *wadi* and resembles an isolated island. The surroundings of the site are surprisingly devoid of rock art, with only two registered sites within the 0.5 km radius (one of these contains solely dynastic petroglyphs,

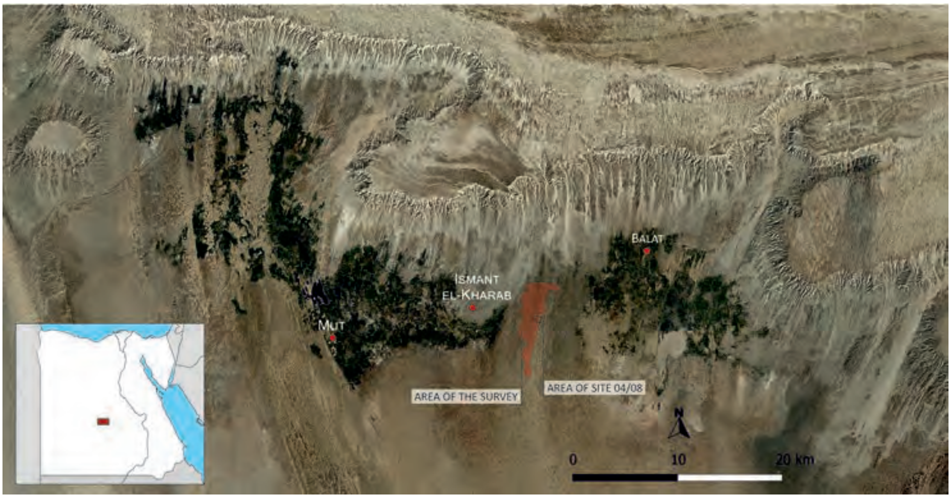

Fig. 1. Dakhleh Oasis. Research area in the central parts of the Oasis, as well as the area of the site under study (04/08), are indicated. The rock art complexes investigated by Hans Winkler (late 30's) and Lech Krzyżaniak (1985-2002) are situated southeast of the easternmost cultivation area

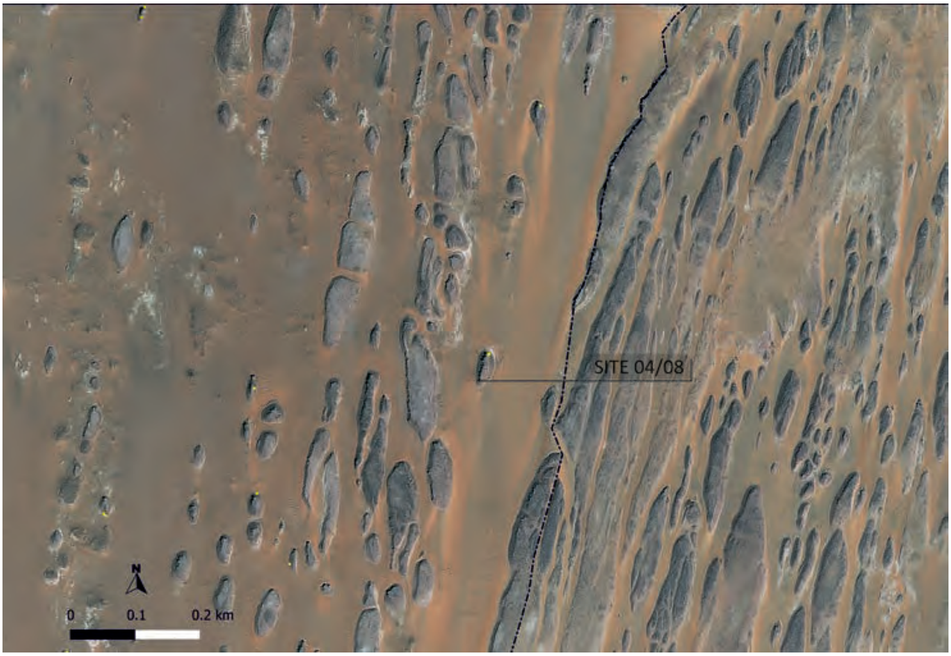

Fig. 2. The vicinity of site 04/08. The hill is located at the bottom of the sandy Painted Wadi. The valley is relatively wide and at this length rather devoid of rock art. The site under study provides an example of just one of a few locations with petroglyphs within the radius of approximately 0.5 km. Yellow points indicate rock art panels

and is, therefore, outside the scope of this paper). However, as the survey has only reached the eastern flank of the Painted Wadi, we still do not know whether more rock art sites exist to the east of the site under study.

Hill 04/08 is a flat-topped *yardang* with almost vertical walls rising above the low slopes (Fig. 3). The slopes are covered with loose stones and gravel. In contrast, the northern part of the hill has almost no loose boulders. Instead, a shallow shelter is situated there, of which two sides (southern and western) are formed by the solid nearly vertical walls. From the north it is protected by a huge rectangular boulder, which apparently, fell off the northern wall in antiquity. The shelter, when approached from the eastern direction, reveals to the observer many of its petroglyphs. However, most of the figures are only visible at close range, from the inside of the rock niche.

Fig. 3. Site 04/08. The hill viewed from the east. It is a relatively flat-topped *yardang* with highly eroded slopes. To the right is the *abri* where most of the rock art is situated

Fig. 4. Site 04/08. View from the north. The panels with petroglyphs are located in both the "shelter" itself or upon the huge boulder, which fell off the wall. Only two panels out of six are to be found outside the rock niche. Panel 6 is not indicated in this figure

Six panels have been registered on the site (Fig. 4). Five of them seem to contain petroglyphs dated broadly to the prehistoric period of history of Dakhleh. Panel 1 is located upon the horizontal surface of a huge boulder in front of the shelter. There, besides the sandal engraving from a later time, a human figure holding a bow is depicted. Just next to it a petroglyph is situated, which was interpreted by Krzyżaniak as representing the "female" anthropomorphic figure type (the so-called Winkler's "goddess"; see Krzyżaniak 2004: 186-7, fig. 7; *cf*. Polkowski *et al.* 2013: 106-11). The third petroglyph depicts a hand, although in this case one cannot be sure of its Neolithic origin. On panel 3 a unique motif was registered, namely an animal tail. It seems to be a bushy tail of a giraffe, which characterizes many representations in the Oasis (Kuciewicz and Kobusiewicz 2011: 238-40, fig. 3). Petroglyphs on the southern wall of the shelter are barely visible and some of them are damaged. One of such figures seems to depict a tree or a hand and a forearm(?). Panel 4, also located on the rear wall of the *abri*, contains at least three representations of giraffes (Fig. 5). They clearly differ in size and stylistic features. The most visible one is the biggest giraffe with an extremely long neck. Moreover, it seems that the petroglyph was not only outlined, but also smoothed and executed in a manner which resembles sunken relief. The two remaining animal depictions are smaller and more rectangular in shape (however, one of them has also a very long neck, although straight, not curved). Panel 5, the last one associated with the shelter was produced during the Dynastic era. The final panel (panel 6) depicting giraffes, is located in the south-eastern part of the hill, away from the shelter. It is badly damaged and only some of the animals can be recognized. They seem to be of the same size and executed by the same person.

Fig. 5. Panel 4, fragment. On this almost vertical wall several petroglyphs of giraffes are executed. Each differs stylistically from the others. The one in the picture is characterized by an elongated and very massive neck, the non-naturalistic shape of its back and wide and exaggerated legs

This is the context, in which one finds the most intriguing panel on the site – panel 2 (Fig. 6), situated on an even, vertical wall facing east. The uppermost petroglyph is a hand motif. It consists of 4 lines – three strokes inserted between the ends of a U-shaped line. A single giraffe depiction is engraved in the central part of the panel. It has no tail and no head, and it seems that these features were omitted intentionally. The overall impression is of a very crude drawing, consisting of shaky lines. What is, however, characteristic, is the orientation of this animal, for we deal here with the so-called "sitting" giraffe motif – an animal turned through 90^{o} (*cf*. Deregowski and Berger 1997; Van Hoek 2005).

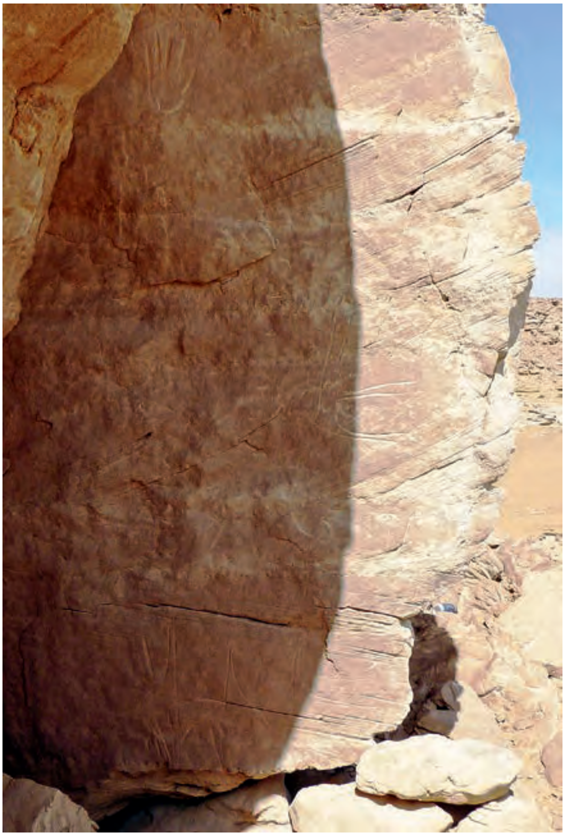

Fig. 6. Panel 2. The panel is situated upon the western wall of the "shelter". The surface is even and shaded for most of the day. A hand motif is engraved at the top while in the middle and to the right a "sitting" giraffe image has been engraved. The scene involving the three giraffes figures is located at the very bottom of the wall (compare fig. 7)

Fig. 7. Panel 2, detail. Three quadrupeds, no doubt giraffes, are placed in a row and directed to the right. They resemble each other stylistically, although some minor differences occur as well. The petroglyphs are in a good state of preservation, except for the central giraffe image, which has been covered with another animal figure of unclear shape, possibly an oryx antelope(?) (photo: E. Kuciewicz)

The figures which are the subject of my inquiry are positioned at the bottom of the wall (Fig. 7). We find there three giraffe images, oriented to the right. The first giraffe has a long straight neck ended with a barely visible head. However, the remnants of the ears and ossicones are still recognizable. It has long legs and a short tail. The forelegs and hind legs meet at their very ends. Additionally, a pointed stroke is juxtaposed with this figure, being directed towards the giraffe's dorsum. The giraffe at the centre is roughly similar in terms of stylistic traits. The difference lies in the arrangement of the animal's legs. They are significantly outstretched and the forelegs seem to be raised slightly higher than the hind limbs. The muzzle is clearly indicated, as well as the ears and ossicones (however, there is no differentiation in their size). The only interpretational difficulty concerns the hindquarters area of the animal. It seems that another animal drawing has been superimposed on this part of the petroglyph. According to the tracing published by Kuciewicz and Kobusiewicz (2011: 239, fig. 3), there is an unidentified quadruped imposed upon the legs of the two giraffes. This is quite probable; however, it is equally likely that we deal here with the depiction of an oryx whose short legs are drawn upon the hind limbs of the giraffe at the centre. Then, the deep slightly curved line connecting the left and central giraffes may be interpreted as the long horns of the oryx. Altogether, such a "style" of execution is fairly widespread in the whole Dakhleh Oasis and elsewhere (Fig. 8). There is also a possibility that the curved line, and the second one below it, had been executed before the oryx was added to the composition. Then, the horizontal lines touching the back of the giraffe at the centre could be treated as contemporary with it, and the antelope – as a later addition, where, subsequently, one of the existing lines was used to form the long horns. I will return to this ambiguity later in this paper. The last giraffe, (on the right) is again very similar to the other two, at least when it comes to the manner of execution. The top part of the animal is almost the same as that of the giraffe at the centre. The difference lies, however, in its overall orientation, as it is turned through 90°, in relation to the other giraffes. The legs are straight and perpendicular to its body, which also distinguishes the animal from the other two.

Fig. 8. Site CO52, panel 3. An image of an oryx antelope executed in a similar manner as the one superimposed on the central giraffe figure on site 04/08, panel 2. Both figures were pecked. The shape of their bodies is not naturalistic. The legs and the tails are schematically drawn and obviously too large in both cases

The prehistoric rock art in Dakhleh is relatively rich in scenes involving animals, giraffes in particular. There are, for instance, rare "hunting scenes" with humans and/or dogs preying these animals (*e.g.* Krzyżaniak 1990: 95, fig. 92) or less unique scenes showing together giraffes and anthropomorphic figures with exaggerated buttocks (*e.g.* Kuciewicz *et al.* 2010: 309, fig. 7). Equally common are the compositions which bring together several giraffes, as if representing the herds (*e.g.* Polkowski 2016: figs. 5.42, 5.76). Doubtless, they are scenes constituting pictorial narratives, which likely must have involved story-telling. It is beyond the scope of this paper to suggest whether these stories should be treated as "simple" narratives about the observed phenomena, depictions of events or perhaps as representation of mythological realm. What I intend to explore by analysing panel 2 is a more diachronic dimension of such a rock art scene. It stems from an observation that we tend to treat similar compositions as representing one event, in which every petroglyph represents a single entity. In other words, they all "co-exist" in a story simultaneously as separate entities (for instance, in a scene depicting a row of giraffes, which is usually interpreted as a herd consisting of separate walking animals). I would like to consider an optional interpretation – that particular petroglyphs in a scene may represent the same entity in different stages of one story. In this case, it would be a story of **one** giraffe (not three!), with the narrative most probably divided into three parts.

2. From static petroglyphs to figures in motion

There are two implications stemming from the above deliberations: the animal figures on panel 2 may represent just one giraffe, depicted in different stages of a "story", and secondly – it is a story of movement, so the giraffe would be represented in different stages of motion. The idea that prehistoric art in some instances could represent animals' movement due to accumulation of images is not new. It is especially the Palaeolithic imagery that seems to provide good examples of such visual treatment (*e.g.* Azéma 2005; Azéma and Rivère 2012; Luis and Batarda Fernandes 2009). Marc Azéma (2005) distinguishes between "breaking down movement" by superimposition of figures and juxtaposition of successive images. The first employs an image, which is covered by more depictions of similar shape in order to create a visual illusion of a moving animal. It is, however, the latter type of composition, which may be comparable with the panel 2 scene. Juxtaposed figures are not separated by any "artificial" features – they just represent the same characters in different actions and poses. Azéma brings examples of such “split-action movement” depictions from variety of contexts, including the Palaeolithic art of France. He notes, however, that this artistic mode was used to depict movement (therefore, a story) also in historical times, *i.a.* in the Egyptian paintings (*e.g.* the Middle Kingdom scenes of fight and wrestling in Beni Hasan tombs, see Newberry 1893: Pl. V). Does the scene on panel 2 provide an example of similar visual mode?

I believe one should not exclude such a possibility. Firstly, one deals here with three highly similar depictions of giraffes, and the degree of resemblance may point not only to the same artist, who would be responsible for drawing them, but also to his very intention to depict the same animal. The rendition of heads and body, and the overall size of the figures all add to such a possible conclusion. Secondly, the impression is strengthened by the arrangement of the petroglyphs in the form of a register. All drawings are based at the same level, and even though there is no baseline indicated, they all are placed just above the edge of a broken rock. One cannot know this for sure, but it is possible that the rock had already been broken when a prehistoric artist, or artists, decided to execute the petroglyphs on panel 2. Moreover, the figures are all turned in the same direction, *i.e.* to the right. The three possible poses of the animal seem to be depicted in a very “natural” order and the overall impression of the intended successive changes of its position looks very probable. Needles to say, these arguments are highly dependent on intuition and impression. As persuasive as they may be, one cannot forget that such a regularity and linear “reading” of a scene may also be affected by modern comprehension of visual arts.

Having commented on the general similarity of the figures and their supposed linear composition, I would like to focus now on particular features of these images. Firstly there is the congruence between the rendition of the animals’ poses (especially the legs) and the behavioural patterns. There are only two types of a giraffe’s gait. The first one is walking “with both legs on one side off the ground simultaneously” (Innis 1958: 254). The second is a gallop (giraffes do not trot), in which the forelegs and the hind legs work together in pairs. During gallop the hind feet land outside and a bit ahead of the forefeet (Innis 1958: 254; Innis Dagg 1971: 5; Jolly 2003: 12; Peterson and Ammann 2013: 101). It means that, when a giraffe is running fast, the legs become outstretched (Fig. 9-a) and subsequently the hind feet and forefeet meet at more or less one point (Fig. 9-d). I argue then, that both the giraffe to the left and the central one on panel 2 represent two stages of a galloping animal. The first image would show a moment, in which the legs of the giraffe are bunched together, and the second would be a depiction of an outstretched position. Two more features may strengthen my argument. First, while running, a giraffe curls up its tail (Estes 1991: 204). Only the giraffe image to the left seems to have its tail still visible. It is in the horizontal position. Although it is not a proper rendering of a curled up tail, neither is it shown as hanging down and inert. Instead, it seems to be somewhat 'stretched out'. The second feature concerns the position of the giraffe's neck. Neck movement constitutes an important element of the overall giraffe movement pattern. When the forelegs extend forward, the neck moves down to a more horizontal position. Should the forefeet and hind feet join together, the neck changes its position to a more vertical one (Holdrege 2005: 52-3). The giraffe at the centre on panel 2 has a slightly bowed neck, while the one to the left seems to be in a more erect position. Obviously, these differences do not provide conclusive evidence for the whole argument and the complete image as such may be 'in the eye of the beholder'. Nevertheless, I think these factors should at least be considered before the final scientific evaluation of the petroglyph scene.

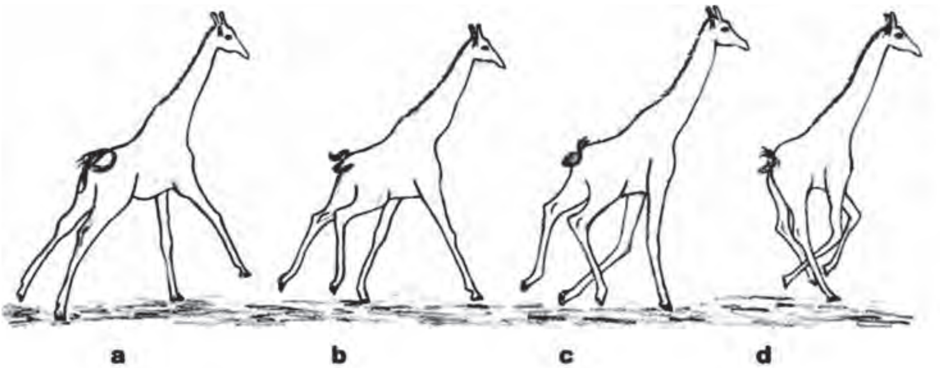

Fig. 9. A schematic drawing of a galloping giraffe. The following stages (a-d) show an animal in its most extended position (legs stretched out forwards and backwards) through intermediate stages, to the position, in which legs are bunched together. The position of the legs is coordinated by slight movements of the neck. After Holdrege 2005: 53, fig. 18

And what about the third image of a giraffe, located on the right side of the panel? We can see there an animal, which unlike the rest of the figures, seems to be depicted in a rather unrealistic position. Being turned through 90° it resembles a "sitting" giraffe more than a walking or a running one, however *sitting* should be taken in inverted commas. As I mentioned before, this kind of representation has been recognized throughout the whole of the Sahara, and an array of interpretational proposals has been put forward in that matter. Deregowski and Berger (1997: 88ff) proposed that this kind of imagery is a direct effect of certain perceptual issues, therefore it is a psychological and universal rule. The directional cues, or their lack in any given place, would be responsible for placing the animal figures in a "sitting position" . Marteen Van Hoek (2005) reasonably refuted this hypothesis and showed that the perceptual rules of Deregowski's and Berger's model cannot help in answering many questions as regards the "sitting" zoomorphs. Panel 2 engravings seem to provide a good example of why this model is doubtful. If one assumes that all three giraffe petroglyphs were executed by the same hand, then one deals here with pure intentionality in their placing. Two of the giraffes are placed horizontally (one may say – in a naturalistic way) and parallel to an imagined ground line created by the broken rock. However, the third giraffe, although close to other figures, was chosen to be turned perpendicularly. It would be difficult for me to believe, that this situation was the outcome of purely perceptual factors. I rather prefer to see it as evidence of intentional and meaningful action. Neither do I share the view that the depiction may be just the result of the position (*e.g.* seated or lying), in which a prehistoric artist found himself when drawing, as suggested by Salima Ikram (2009b: 270).

If one refutes the simple explanation that the rightmost image on panel 2 was a depiction of a resting animal (after, supposedly, gallop), especially as such a position is absolutely unnatural for a giraffe, one may ask, what other possible circumstances may be depicted here. Deregowski and Berger (1997: 92) mention the work of Ulrich Hallier (1995), who considers the "sitting" giraffes to be representations of dead animals. Hallier (1995: Abb. 34, 76) provides examples from the area between Tassili and Tibesti, therefore a considerable distance from the Dakhleh Oasis, but at least two scenes found there seem to give us some insight into the giraffes scene on panel 2. Both scenes recorded by Hallier (Fig. 10-11) involve two giraffes and in both cases one animal is depicted as "sitting". In the first scene the animal to the left seems to be represented in one of the stages of gallop. The giraffe to the right, similar in style to the first one, is turned through 90°. It resembles the panel 2 configuration of giraffes, but without the central animal image. In the second scene from the Central Sahara we come across a very similar situation involving two giraffes, however they are not as close to each other as in the first scene. Moreover, the giraffe on the left does not seem to be running, but rather standing. Still, the scene's idea reminds that of panel 2, which would be a representation of one animal, but in different stages of motion/story.

Fig. 10. Rock art panel with a potential "hunt scene", Tassili-Tibesti region. The giraffes are depicted rather schematically. The oversised oval ending of their tails is a characteristic feature. A group of anthropomorphic figures is situated to the left of the animals and only one figure stands to the right of them. Humans nearest to the giraffes hold bows, albeit in different positions. No scale as in the original tracing. After Hallier 1995: 150, fig. 76-U

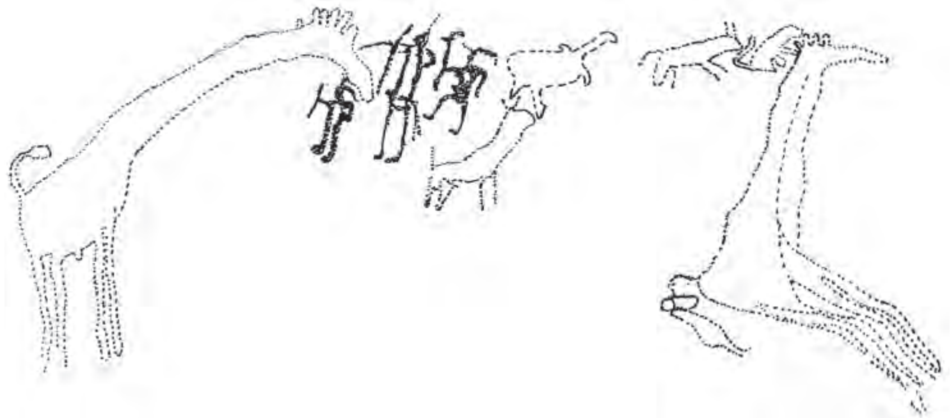

Fig. 11. The second "hunt scene" from the Tassili-Tibesti region. It is a slightly more developed scene involving similar elements as the one in fig. 10 and some additional figures, such as a dog chasing an ostrich. The giraffes are drawn in a manner similar to the ones from the first scene, but the position and the shape of their tails are much more accurate. Three anthropomorphs armed with bows are facing the animal on the left. The one to the right seems to be attacked by two dogs. No scale as in the original tracing. After Hallier 1995: 150, fig. 77-U

What is different in the scenes described by Hallier, is the presence of human figures. Thus, in the first scene the left side of the composition contains six anthropomorphs and a dog. One human figure holds a bow with an arrow pointing at a giraffe. To the right, next to the "sitting" giraffe there is another human figure with an attached tail(?) and a bow. It raises its hands and is called by Hallier

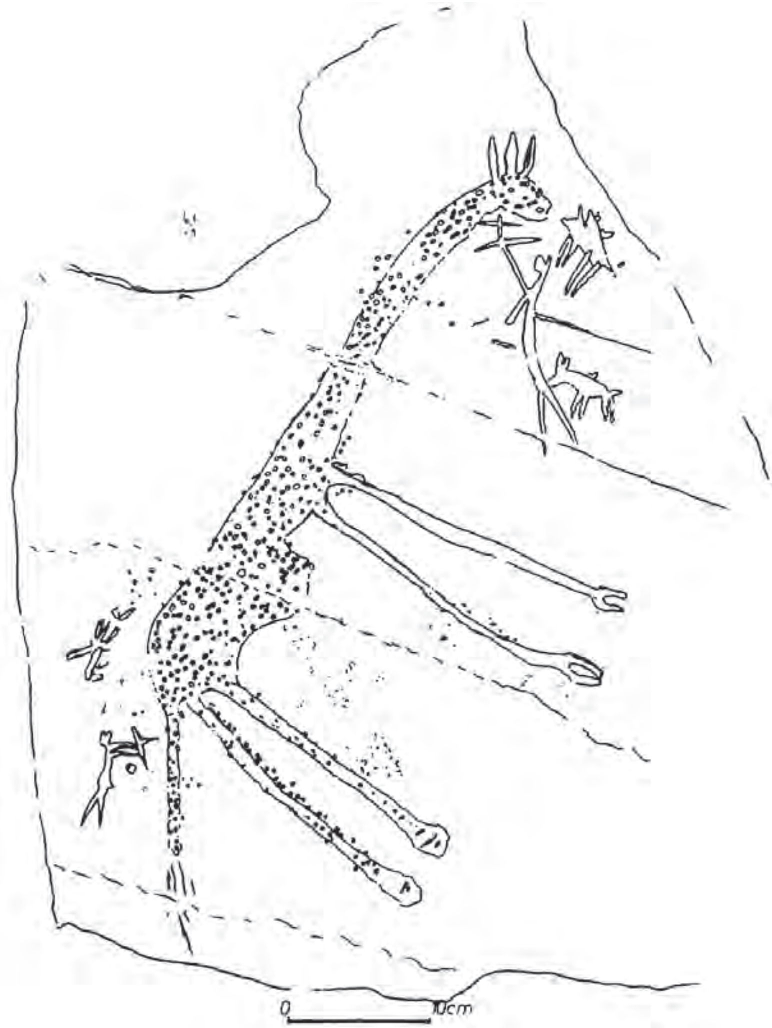

Fig. 12. Site 61-39/E3-3, eastern Dakhleh Oasis. The oversized giraffe (possibly pregnant?) is surrounded by the anthropomorphic figures holding bows. The latter are accompanied by two dogs. In the case of the forelegs the cloven-hooves are indicated. After Krzyżaniak 1987: 186, fig. 2

a "worshipper" (*Adorant*). In the second scene three humans are turned to the left, thus facing a giraffe. They are armed with bows(?). To the left of them a dog is chasing an ostrich, and even further to the left two dogs are depicted near a head of a "sitting giraffe". It seems then that both cases mean to represent a hunt, which is mainly indicated by the dogs and armed anthropomorphs. In fact, these may be two stories divided into two episodes: 1) a hunt in progress and 2) hunted game goes down, therefore suggesting a successful hunt. If this is the case, it would be quite convincing to treat the "sitting" zoomorphs as dead game.

In fact, a very similar scene comes from the Dakhleh Oasis itself and was published by Lech Krzyżaniak (1990: Fig. 2). It shares an array of features with Hallier's compositions, notably human figures with bows, attacking dogs and, of course, a giraffe (Fig. 12-13). The main difference seems to be that at Dakhleh only a single giraffe is depicted and that it is turned through approx. 45°. Nevertheless, if anthropomorphs delineate the imagined ground line, then obviously the position of the hunted quadruped is distorted. In view of what has been said above, one may carefully assume that we deal here with a representation of a dead animal (indicating a successful hunt). Hence, the scene from Dakhleh site 61-39/E3-3 provides an analogy for other hunting scenes in terms of potential subject-matter, but not in terms of narrative strategy as it depicts only one (final?) stage of a story. Nevertheless, all of the above mentioned compositions may support the theory that the "sitting" giraffes could connote dead game. Let me then turn once again to the panel 2 scene in order to read the possible narrative of its petroglyphic content.

Fig. 13. The photograph of the panel from fig. 12. Photo: Lech Krzyżaniak. Archives of the Poznań Archaeological Museum

3. Towards a fuller interpretation

Looking at the scene from left to right, one sees a giraffe, which most probably runs in a gallop gait and is shown, first having its legs bunched together, and subsequently spread possibly moving at full speed. The third image may depict the final episode – the fatal state. Assuming that giraffes run fast on rare occasions, in most cases while escaping (*cf.* Seeber *et al.* 2012: Table 1, "canter"), I think that panel 2 contains a narrative telling us a story of a fleeing giraffe, which eventually died. If this was the basic tenet of the story, then one or two other elements may support this theory.

The first of these features would be a short line parallel to a neck of the giraffe image to the left. This straight line makes a strong impression of being in motion and directed towards the animal's body. If we now compare this scene with the other mentioned before, we may hypothesize that the line is actually a metonymy for a human being and therefore for a hunt. If that were the case, the line may possibly be depicting an arrow or a spear, albeit extremely simple, almost symbolic in nature. Although the scene is very well preserved, the giraffe at the centre has been superimposed and thus damaged by other petroglyph(s), which I had already mentioned. One can only regret that happened, because it is extremely difficult to say now whether a line protruding from the back of the animal was once an independent feature or is exclusively part of the zoomorphic figure. If the first option is valid, then one may deal here with a depiction of an arrow/spear, which impacted into a back of the quadruped. Unfortunately, the current documentation of panel 2 does not allow to resolve this uncertainty once and for all. In any case, this would be the second feature pointing to a possible hunt story on the panel.

As simple as it may seem at first glance, the scene on site 04/08 may have been treated by prehistoric dwellers of the Dakhleh Oasis as a very rich and meaningful composition. Although, it is beyond the scope of this paper to explore further potential meanings of these petroglyphs, a few comments may be of importance. First of all, even if the scene was executed for the purpose of telling a story about one giraffe being chased and killed, other spectators could have easily treated the whole composition as containing the figures of three different animals. Secondly, even if recognized as a hunt scene, the composition might have referred to an array of contexts and events. Possibly perceived as a one-time event, a hunt, it could have also been associated with ritual practices, mythological events or hunting in a more generic sense. It could have even been associated simultaneously with all of these potential scenarios, as hunting and mythology are often inseparable (in the context of rock art studies, see *e.g.* Dowson 2009: 382). What must be underlined, is the fact that I do not intend to imply that the rock art composition was infested with meanings and that there was just one set of meanings to be decoded by others. There certainly must have been a meaningful intention behind creating the scene, possibly well understood by people from the same community, but the images themselves have always played their own roles in the never-ending interpretational game (*cf.* Ljunge 2013). The meanings emerging from an interaction between the people and rock art are always unique, though may be also similar across the time. Thirdly, it is the social aspect, which should be expanded upon for the purpose of a deeper understanding of such scenes. The societies inhabiting Dakhleh in the 6th and 5th millennia BC, a possible chronological frame for the petroglyphs on panel 2, (*cf.* Riemer 2011: 248) were economically dependent on hunting, despite the increased significance of pastoral elements (for the latest overview of the Dakhleh Oasis Neolithic phase, see McDonald 2016). One may assume that game hunting played an important role at many various levels of people's social life and its economic significance was just one of them. Animals, no doubt, formed a part of the same world as humans, and their mutual engagement in this world could have been embraced by what we call mythology. However, it seems that there was often no division between the real and mythical realm, just one realm seemed to exist, in which humans, animals and many other entities dwelled (*cf.* Ingold 2000). The great interest in giraffes all over the eastern and central Sahara, measured in thousands of petroglyphs and paintings, provides an invaluable clue, namely that we are dealing with elements (images), which once belonged to a wide and apparently coherent and intersubjective system of knowledge. It was not merely about drawing images of animals. It was about important features of the world – about the prehistoric "truths". Finally, there is a whole array of questions regarding the very context of rock art execution. Was panel 2 created during a one-time event? Was it produced as an element of a performance, *e.g.* a ritual or storytelling? Was the artist alone or surrounded by other members of a group, when drawing the images? Was the place of site 04/08 regularly visited because of the presence of the petroglyphs or was it abandoned after the figures were put on a rock face? There can be many questions asked regarding the *biography* of this rock art location (*cf.* Polkowski 2015).

All of these issues must temporarily remain unanswered as the main purpose of this brief contribution is to shift attention towards an alternative approach to understanding petroglyphs. In their studies, scholars tend to treat the human and/or animal figures as separate entities, but, in some instances, this approach may only be appropriate at the formal level. No doubt, in the case of panel 2 one deals with at least seven petroglyphs; this by no means indicates that there are seven different entities involved in the narratives of this panel. I argue that at least three petroglyphs represent the same entity, namely a giraffe, which was hunted. Such a diachronic vision of a rock art scene, if accepted, may in future, serve as inspiration when interpreting other Saharan compositions involving similar figures. Perhaps scenes depicting herds of game in fact represented movement of certain individual animals? We can only guess what was the narrative content accompanying the figures when they were approached and perceived by people. But I am willing to believe that these petroglyphs formed just a part of a bigger whole. As Luis and Batarda Fernandes (2009: 1315) write, "behind action lies a narrative, a speech that most certainly sustained those artistic manifestations".

In conclusion, I would like to comment on two isolated petroglyphs situated high up on the rock wall. They certainly do not make the interpretation of the panel easier. The first one, is a single depiction of another "sitting" giraffe, either unfinished or intentionally incomplete. As no other petroglyphs are juxtaposed with it, one tends to treat it as an isolated image, possibly "telling" the same story as the "three giraffes" composition, but in a very different artistic mode. This would not be a diachronic chain of events, but only a final stage of the narratives: a dead giraffe (a "snapshot", see Luis and Batarda Fernandes 2009: 1307). And then there is the second petroglyph, depicting a hand. Not only does its presence open another discussion on the possible significance of site 04/08, but also forces one to ask further questions relating to chronological relations and interdependencies between the different elements constituting the site. Another issue, which must be, regrettably, put aside for the time being.

Acknowledgements

I would like to express my gratitude to Anthony Mills, the head of the Dakhleh Oasis Project. I also thank Michał Kobusiewicz, Ewa Kuciewicz and Eliza Jaroni for shared effort during the fieldwork and the very memorable time in every season of work in the Oasis. All photographs were taken by the author, unless stated otherwise. The research was sponsored by the Polish National Science Centre (grant No. 2016/23/D/HS3/00805).

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Desert and the Nile.
Prehistory of the Nile Basin and the Sahara.
Papers in honour of Fred Wendorf
Studies in African Archaeology 15
Poznań Archaeological Museum 2018

András Zboray

The Petroglyphs of Jebel Uweinat. Many Questions and a Few Answers…

Introduction

Jebel Uweinat and its environs, lying in the centre of the aridest part of the Libyan Desert (Eastern Sahara) at the convergence of the borders of Egypt, Libya and Sudan (Fig. 1), contains one of the most prolific concentrations of prehistoric rock art in Northern Africa. According to the last published count (Zboray 2009) there are 720 sites scattered about the mountain and the surrounding smaller massifs. Of these, 414 sites contain paintings and 347 petroglyphs, with an overlap of 41 sites containing both.

Recent comprehensive publications (Le Quellec 2009; Zboray 2012) focused mainly on the paintings, on account of their artistic appeal and much finer execution, allowing for a more detailed study and conclusions. The evidence from the paintings demonstrate that the peak of occupation at Uweinat and the surrounding area was during the time of the cattle pastoralists, with 337 (81%) of the painting sites depicting cattle or humans in the Uweinat cattle pastoralist style. From a series of superimpositions it may be deduced that the paintings of the cattle herders were preceded by several styles of paintings that lack any domesticated fauna with few exceptions of dogs (Zboray 2013). Correlating the sequence of paintings with climatic and archaeological evidence, the cattle pastoralists may be confidently assigned to the 4400-3300 BCE time span, with the preceding cul-

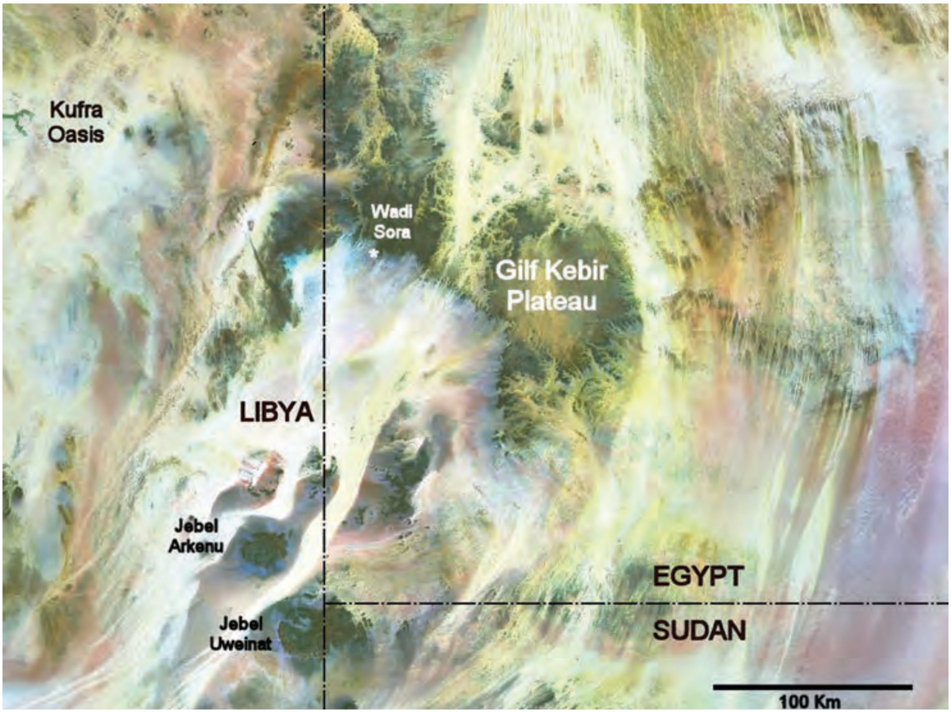

Fig. 1. Map of the central Libyan Desert

tures spread over a 2000 year period commencing around 6500 BCE (Riemer *et al.* 2017).

However, as nearly half of all rock art sites at Jebel Uweinat are petroglyphs, their study and inclusion in the chronological framework and cultural succession is essential to a full understanding of the early to mid Holocene occupational history of the region.

Unfortunately with the Uweinat petroglyphs the technique (mainly small scale pecked figures) resulted in a much cruder execution than the fine details observable in paintings. It is much harder to distinguish individual styles, especially for those executed on a small scale (like the majority at Uweinat and environs) with scratched or pecked outlines. Thus the study of the Uweinat petroglyphs must address key questions about their subject matter and the significance of their peculiar geographical distribution, rather than the stylistic aspects of depictions.

In the following, all references to individual sites use the numbering system developed and revised by the author (Zboray 2009) unless otherwise noted.

1. How do giraffe petroglyphs relate to those of the cattle pastoralists?

The most striking elements of Uweinat petroglyphs are the very fine naturalistic depictions of giraffe, sometimes shown in large numbers on the same panel. Ahmed Hassanein was the first to report petroglyphs of giraffe and other wild animals (Fig. 2) at Jebel Uweinat (Hassenein 1925). He observed that the scenes depict giraffe but no camels. With the camel having been introduced to North Africa after 670 BCE (the Assyrian invasion of Egypt), he concluded that the makers of the pictures knew the giraffe, which has long since disappeared from the region, but not the camel, therefore they must be very ancient.

Spurred by Hassanein's discoveries, Prince Kemal el Din visited Uweinat in 1925 and 1926, and documented several more rock art sites. El Din showed the photographs to Abbé Henri Breuil, the greatest prehistoric authority of the times, who identified two distinct periods based on the subject matter, hunters and pastoralists, and summarily concluded that the oldest, depicting giraffe, bear similarity to South African bushmen petroglyphs associated with a microlithic industry, hence they are "hunters from the upper paleolithic, with some of the others probably historic and recent" (El Dine and Breuil 1928)

Fig. 2. The "giraffe rock" in Karkur Talh, the first known rock art site at Jebel Uweinat (Hassanein1925)

While Hans Rhotert made the first scientific survey of the petroglyphs and paintings, accompanying the 1933 Almásy/Frobenius expedition, his work remained unpublished till 1952. It was Hans Winkler who published the first monograph on the rock art of the area (1939), after having visited the area with Bagnold in 1938. He too identified two principal styles: the "Uweinat Cattle Breeders" (both paintings and petroglyphs, which he equated with his "Autochtonous Mountain Dwellers" of the Eastern Desert) which post date the "early hunters" who made exclusively petroglyphs of wild animals, predominantly giraffe. He commented that "the many grades of patination in the engravings prove that the occupation of Uweinat lasted for a very long period … from predynastic until far into historic times."

Rhotert (1952) accepted Winkler's general division and chronological sequence, however observed that no evidence may be found of any contact with Egypt. He also noted that some scenes show both cattle and wild fauna, and considered these petroglyphs and paintings to be the result of 'intense intercourse' between an indigenous group of hunters and cattle herder immigrants arriving from the south-west (lower Nile basin).

This view was supported by William McHugh who reviewed and published the archaeological material collected by Oliver Myers during the 1938 Mond-Bagnold expedition (McHugh 1971, 1975). He considered the petroglyphs depicting wild fauna to be the oldest, followed by an intermittent stage where both wild fauna and cattle were depicted, to be replaced by petroglyphs showing only cattle, before the artists turned to paintings as their preferred medium. The same views were formulated by Paul Huard and Leone Allard-Huard, with a culture of ancient hunters represented by petroglyphs preceding two distinct groups (petroglyphs and paintings) of pastoralists (Huard and Allard-Huard 1977).

The monograph describing the results of the 1968 Belgian expedition to Jebel Uweinat (Van Noten 1978) substantially expanded the corpus of known paintings and petroglyphs, though unknown to Van Noten, many of the described petroglyphs were already recorded but not published by Winkler (as attested by the Winkler photographs in the Archives of the Egypt Exploration Society, London). Much influenced by McHugh (who reviewed the manuscript) Van Noten recognised five main periods of rock art at Jebel Uweinat. The early period displayed exclusively petroglyphs of wild fauna without any depiction of cattle. This was followed by a period of petroglyphs of several styles, depicting among others long-horned cattle (taken to be domesticated *Bos primigenius*). He estimated this period to date posterior to 4500 B.C. the date of the appearance of these animals in Egypt. The next proposed period was of the paintings, dominated by cattle of *Bos brachyceros* type. His conclusion was that these paintings must post-date the petroglyphs and should be posterior to 2500 B.C. (when short-horned cattle made their debut in Egypt). The fourth recognised period was contemporary with or later than the previous, with depictions of goats replacing cattle, attributed to the increasing aridity of the area. Finally there was a period of protohistoric date, with present-day arid climate fauna and dromedaries shown exclusively on petroglyphs.

All these categorisations and chronologies were based on the *a priori* assumption that any hunter-gatherers must precede pastoralists, and all petroglyphs lacking domestcated fauna must by definition be hunter-gatherers. This view was challenged by Muzzolini (1981, 1995), who considered the absence of large "Ethiopian fauna" (Elephant, rhinoceros) aside giraffe, and the presence of scimitar-horned oryx (a chronological marker for post pastoralist periods in the Central Sahara) proof that the petroglyphs depicting giraffe were of a later date than the paintings, from a period when the climate dried and could no longer support cattle. His argument in part was supported by the scarcity of giraffe (just two examples known at the time) among the paintings.

Le Quellec first visited western Uweinat in 1996, and recorded several new rock art sites, including some paintings depicting giraffe (1998). He argued that as both petroglyphs and paintings represent giraffe and cattle, there is no need to make any distinction, they could be contemporary. He further argued that since archaeozoological material from the broader Libyan Desert area confirms the presence of large Ethiopian fauna in the region at the beginning of the Holocene, but no such fauna (except giraffe) is depicted, both petroglyphs and paintings must be relatively recent, not older than 4000 BP, by which time the environment became so dry that only giraffe survived. Berger (2000) however presented that there is no conclusive evidence of large African fauna ever present at Jebel Uweinat itself, and suggested that 4000 BP is more likely a latest possible date for any giraffe depictions.

In light of new discoveries clearly indicating the presence of pre-pastoralist paintings Le Quellec revised his proposed chronology (Le Quellec *et al*. 2005) to permit an older date for the appearance of domesticated fauna and the preceding earlier painting styles, however did not address the position of petroglyphs.

In 2005 (revised in 2009) the author prepared an illustrated catalogue of all known rock art sites in the Gilf Kebir – Jebel Uweinat region, incorporating hundreds of new finds made over the preceding decade. An attempt was made to categorise petroglyphs based on depicted subjects along the lines developed by earlier authors, but incorporating some stylistic elements. This classification split petroglyphs into a group depicting 'ancient' wild fauna (primarily giraffe with some ostrich and oryx present), a group depicting cattle, and a group depicting present day arid climate wild fauna only (addax, oryx, ostrich, barbary sheep). However as both Rhotert, McHugh and LeQuellec observed, there are several panels of petroglyphs which depict ***both*** cattle and giraffe in a similar style, so this classification clearly needs to be revised.

Since 2002 numerous new rock art discoveries were made at Jebel Uweinat, among them several paintings that depict giraffe. Some of them show giraffe among cattle in the same style (eg. EH 21, Menardi Noguera *et al.* 2005, KTW 51, Zboray and Borda 2010), further giving support to LeQuellec's observation that the presence of giraffe on any engraving cannot form a basis of differentiating them from cattle pastoralist art.

However giraffe are not only present in cattle pastoralist paintings. They are an integral part of the Wadi Sora style paintings in the Gilf Kebir, and several giraffe hunt scenes are known from miniature style paintings. A unique scene in Wadi Wahesh (WW52) shows a captured giraffe captured by a tether. All these scenes are demonstrably older than the cattle pastoralist paintings (Zboray 2013).

The 1998 discovery of the inscription of Montuhotep (II) Nebhepetre at Jebel Uweinat (Clayton *et al.* 2009) provided a unique dating opportunity for at least some of the local rock art. The inscription itself contains a version of the Royal Nomen (with the Sa Re title inside the cartouche) that was only in use between the 14th and 39th years of the reign, approximately 2047-2022 BCE (Von Beckerath 1984). On a terrace above the inscription, there are numerous petroglyphs depicting humans and wild fauna, including giraffe, oryx and ostrich (but no cattle). Associated with these petroglyphs, executed in the same style and with similar patination, there are four crude copies of the offering bearers of the Mentuhotep inscription. This association provides strong evidence that giraffe were present in the area until at least 2000 BCE, more than a thousand years after cattle have disappeared (Zboray and Borda 2010).

The corpus of sites and figures provide clear evidence that giraffe existed throughout the rock art producing periods of Jebel Uweinat (except the historic to recent period characterized by crude engravings of camels), and its presence or absence cannot be used as a chronological marker. To answer the original question of how giraffe petroglyphs relate to cattle pastoralist art of the region, the context of giraffe and cattle must be examined in detail.

Of the 347 studied sites with petroglyphs in the Jebel Uweinat region (Zboray 2009), 248 contain giraffe or cattle among their depicted subjects, the balance showing other wild fauna, human figures or camels in any combination. Of these, 130 contain only cattle, 76 only giraffe, and 42 sites display both on the same panel.

Despite the large number of sites, there are only seven instances where giraffe and cattle petroglyphs overlap. In four of these, at sites KT 23/B (Fig. 3), KTN 11/C, KTS 12 and KTS 25, cattle are clearly superimposed over giraffe. However at three other sites, AR 11/B (Fig. 4), KT 39/A and KTE 12/A, giraffe overlie the cattle. In all cases there is very little if any difference in execution technique, style or patination, suggesting that only a short time elapsed between the creation of the lower layers and the superimposed figures.

In general there is little ground to make any stylistic distinctions between the majority of giraffe and cattle petroglyphs, there are several panels (e.g. AR 11/B, KT 12/A, KT 26, WW 23) where it is very clear from all details that the cattle and

Fig. 3. Engraved cattle superimposed over a giraffe, site KT 23/B (Karkur Talh, Jebel Uweinat)

Fig. 4. Engraved giraffe superimposed over cattle, site AR 11/B (Jebel Arkenu)

giraffe depicted together are a part of a single composition, created at the same time (Fig. 5).

While the engraved cattle and giraffe figures themselves display no readily distinguishable features, the associated human figures show marked differences, providing some opportunity to group the petroglyphs based on stylistic attributes.

31 sites display characteristic human figures holding what appears to be either a bow, curved stick or spear in one hand, and a solid oval or rectangular object (shield ?) in the other. These figures are almost universally associated with cattle (Fig. 6), though they do appear also on panels where both giraffe and cattle are present. Except for a few crude examples, the majority of these striking human figures occur in Karkur Talh, the principal valley draining the Eastern part of Jebel Uweinat. The author originally used the term "Uweinat warriors" to characterize these petroglyphs (Zboray 2005, 2009), distinguishing them from the cattle pastoralist petroglyphs, however on close scrutiny this distinction is clearly invalid and needs to be abandoned. All the human figures falling into this category

Fig. 5. Cattle and giraffe executed in identical style on the same panel, site KT 12/A (Karkur Talh, Jebel Uweinat)

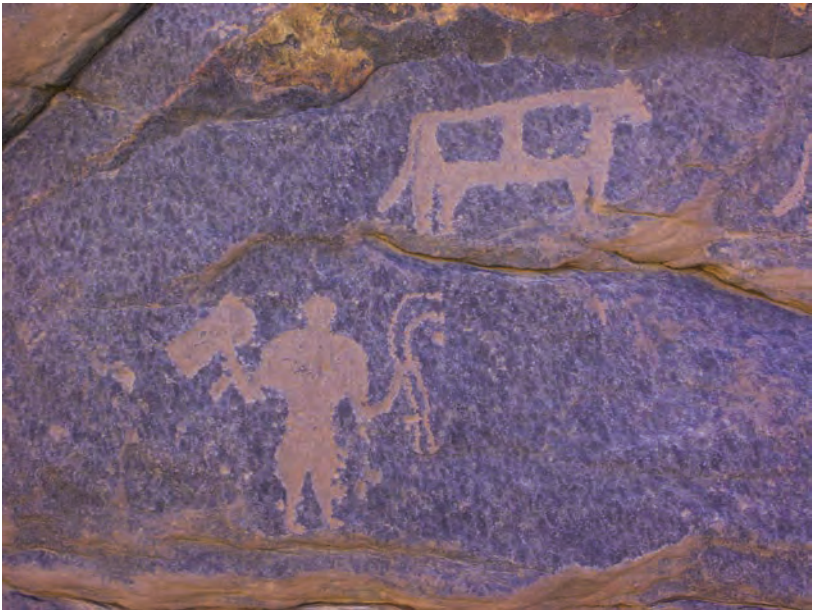

Fig. 6. Human figure associated with cattle holding a rectangular object (shield?) and a pair of curved sticks , site KT 23/A (Karkur Talh, Jebel Uweinat)

Fig. 7. Human figures associated with giraffe one holding a curved object (lasso?) the other holding a giraffe by a tether to its neck , site KT 86/A. Note oryx under second figure, executed in the same style as many of the cattle depictons (Karkur Talh, Jebel Uweinat)

are associated with cattle, and the cattle depicted cannot be distinguished from those where no human figures are present. These figures are an integral part of cattle pastoralist petroglyphs.

Another type of human figure, exclusively occurring at nine sites within the main valley of Karkur Talh, appears to be associated with giraffes. The common element is a curved object with a blob at the end held in one hand, with a bow or stick in the other hand. When shown in close association with giraffe, these figures are invariably positioned in front of the heads of the animal. Sometimes similar figures are shown holding a giraffe with a tether tied to the neck (Fig. 7) instead of holding the curved object, thus it is not unreasonable to assume that the object in question may be a stylized lasso (McHugh, 1971). Sometimes these figures are shown with two or three "antennae" on the head, possibly feathers or other hair decoration. In a few instances such figures are shown next to giraffe without any associated objects.

Fig. 8. "Horned" human figures associated with cattle holding a curved object (lasso?) KT 32/B (Karkur Talh, Jebel Uweinat)

Fig. 9. Human figures associated with giraffe holding oval or rectangular objects (shields?) and spears, otherwise indistinguishable from humans with curved objects (lassos?) on same panel shown on Fig. 7, site KT 88/A (Karkur Talh, Jebel Uweinat)

It would be convenient to associate these figures with giraffe and other wild fauna (one such figure is associated with an ostrich, at site KT 76/A), however there are three examples where they are in clear association with cattle, two of them on panels with no giraffe present (Fig. 8). At KT 88/A, one of the finest panel of giraffe petroglyphs, there are several figures with the curved objects (lassos ?) at the heads of giraffe, but there are several figures with spears and oval objects standing next to the giraffe, all appearing to be a part of the same composition and executed in the same style except for the objects held (Fig. 9).

As the depiction of cattle being rounded with lassos is known from cattle pastoralist paintings (Zboray and Borda 2013), giraffe have been depicted on numerous cattle pastoralist paintings, and the style and execution of both cattle and giraffe petroglyphs bear strong similarities, it appears that the majority of petroglyphs depicting cattle and giraffe are closely related. The large number of sites showing one or another does suggest a possible shift from an economy de-

Fig. 10. Male figures holding unidentified objects above their heads, site KDL 54 (Karkur Delein, Jebel Uweinat)

pendent primarily on the hunt of wild fauna (giraffe and ostrich) towards cattle pastoralism (as proposed by van Noten 1978, McHugh 1971 and earlier authors), or vice versa (Muzzolini 1981). As giraffe hunt scenes also exist in the miniature style paintings which pre-date the cattle pastoralist paintings, from the evidence presented so far, both explanations could be possible. The fact that cattle petroglyphs are more numerous than the ones depicting giraffe match the evidence from paintings, suggesting that a population maximum was reached during cattle pastoralist times during the most favorable climatic conditions, however in the case of petroglyphs this could also be interpreted as a progressive decline in population.

Fortunately there are some further pieces of evidence which suggest that the petroglyphs represent a gradual shift from pastoralism to hunting as the primary means of sustenance.

It was already mentioned that a giraffe hunt scene was found near the Mentuhotep inscription, which by association may be securely dated to around 2000 BCE. These giraffe petroglyphs are in association with a peculiar type of human figures that are very different from the ones described above. Their most striking feature is an object held above the head, with the male sex prominently displayed (Fig. 10). They only occur at three principal sites (plus a few isolated and somewhat doubtful examples) and were the subject of a recent detailed study (De Cola *et al.* 2014). They may also be linked with a unique representation of a donkey train (Cambieri and Peroschi 2010), possibly representing the Egyptian caravan or another trading expedition, where giraffe hunt scenes are also shown (Fig. 11). These representations indicate that giraffe were being hunted by the local inhabitants of Uweinat till at least 2000 BCE, well after the conditions have turned too dry to sustain a pastoralist economy.

Several authors (e.g. Winkler 1939; Rhotert 1952; Le Quellec *et al.* 2005) have observed, that white paintings of cattle represent the last phase of pastoralist art at Uweinat. These terminal pastoralist paintings are very different in style from the mainstream pastoralist paintings. The square bodies and the depiction of the dewlap as several strikes emanating from the neck are practically identical to cattle depictions on a number of petroglyphs, both with and without giraffe present (Fig. 12). This similarity was already noted by Van Noten, who however did not visit the site with clear superimpositions referred to by Winkler and Rhotert, and – incorrectly – considered these paintings to be the most ancient (Van Noten). Re-examining the relevant sites leaves no question that the white cattle are the last phase of cattle pastoralist paintings (Zboray 2018). This suggests

Fig. 11. Panel with row of pack donkeys (left) and giraffe hunt (right), site KTN 13/C (Northern Karkur Talh, Jebel Uweinat)

that the cattle (and associated giraffe) petroglyphs were made towards the end of the pastoral period, with the gradual abandonment of painting as an artistic medium.

A further supporting evidence for the emerging importance of giraffe as hunted game towards the end of the cattle pastoralist period comes from site KTW 26/B, containing one of the only three unambiguous giraffe hunt scenes known from pastoralist paintings (the others being at sites KT 83/C and EH 21, other giraffe representations on pastoralist paintings lack the clear hunting element), with a pair of archers attacking an adult and young giraffe. This scene may be dated to the penultimate phase of pastoralist paintings (Zboray 2018).

In conclusion, the weight of evidence strongly points towards the bulk of Jebel Uweinat petroglyphs having been executed towards the end of the cattle pastoralist times. Petroglyphs lacking cattle continued to be made by hunters using dogs, with giraffe disappearing from scenes sometime after 2000 BCE, but the depiction of hunting present day arid climate fauna continued well into historic times.

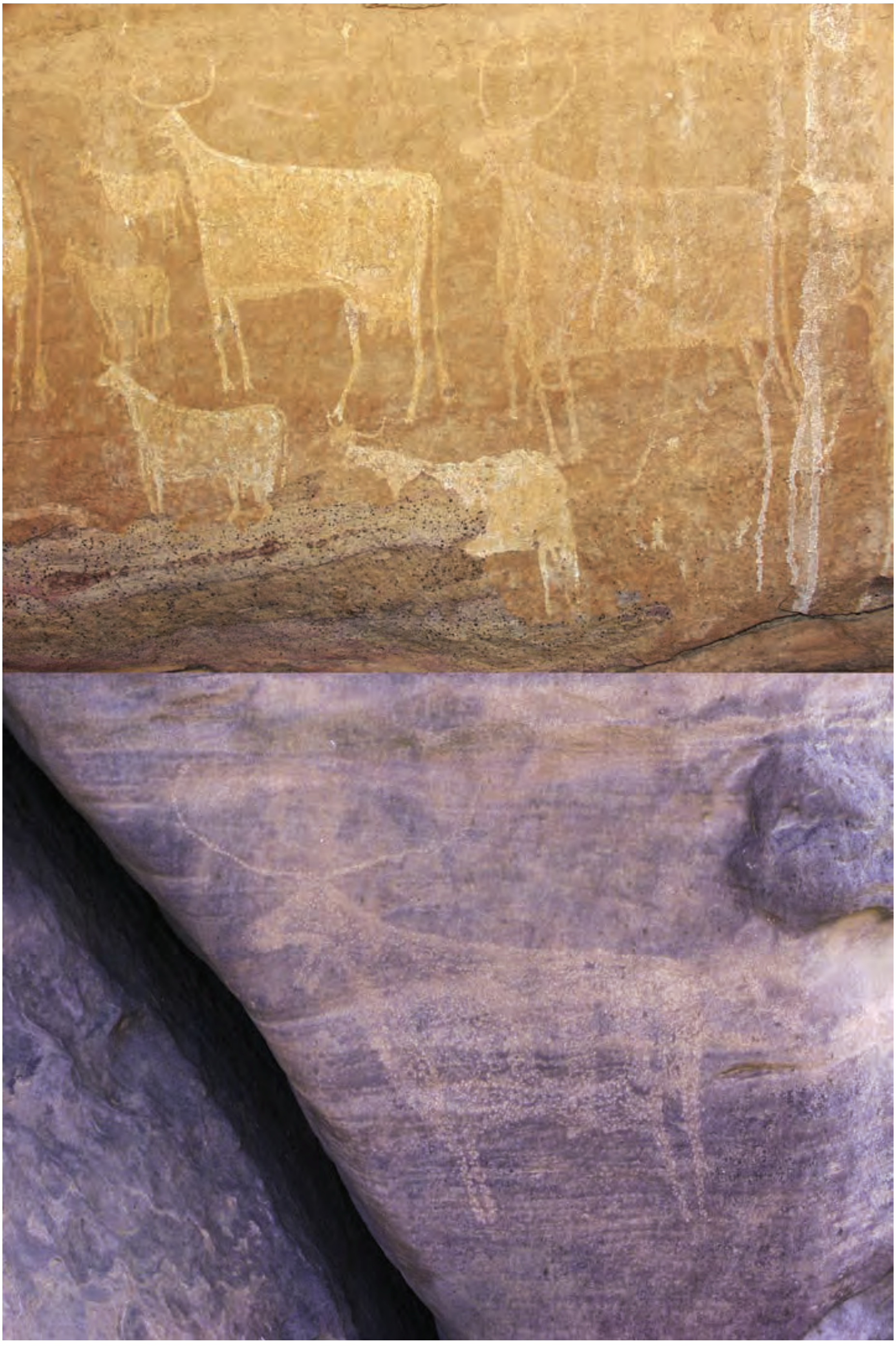

Fig. 12. Cattle representing the latest phase of cattle pastoralist paintings at site KT 64, and engraved cattle in an identical style at site KT 72/D (Karkur Talh, Jebel Uweinat)

2. Are there any petroglyphs at Uweinat pre-dating the cattle pastoralists ?

While the arguments presented in the previous section demonstrate that the majority of petroglyphs at Jebel Uweinat and environs are contemporary with, or post-date the cattle pastoralist paintings, the possibility remains that some older petroglyphs do exist, not conforming to the above described patterns.

Just 200 kilometres to the North of Jebel Uweinat, at site WG 21 ("Cave of the Beasts") near Wadi Sora along the Western Edge of the there are several petroglyphs of wild fauna which are overlain by the negative hand stencils which represent the oldest layer of paintings (Le Quellec *et al.* 2005). As the paintings may be dated to the 6500-4500 BCE period, these Wadi Sora petroglyphs are among the very earliest rock art known in the central Libyan Desert. They are not pecked in outline like those at Jebel Uweinat, but are executed in a shallow sunk relief, with the entire body sunk into the rock surface and smoothed (Fig. 13).

Fig. 13. Animal with curved horns, executed in sunk relief, painted over by later negative hand stencils, site WG 21 ("Cave of Beasts", Wadi Sora, Gilf Kebir plateau)

Such petroglyphs associated with pre-pastoral paintings are completely absent from Jebel Uweinat. There is only a single panel which may be considered as a candidate for being pre-pastoral, with the central figure being a life-sized soft shelled turtle (*Trionyx triunguis*), accompanied by two smaller giraffe grazing on a tree to the left, and an unidentified horned quadruped (aurochs or buffalo?) quite similar to the illustrated animal with curved horns at site WG 21. The execution technique is sunk relief, similar to the Wadi Sora engravings, and the patination is well developed (unlike most other Uweinat engravings), making the scene almost invisible except in contour lighting at sunset (Fig. 14).

The presence of *Trionyx* is exceptional, not only in the rock art of Jebel Uweinat, but also in a broader Saharan context (Honoré 2009). Even during the most favorable climatic period of the mid– Holocene, the environment of Jebel Uweinat remained too arid for this aquatic species to exist at the mountain or its immediate vicinity. The closest evidence for the presence of *Trionyx* is the West-Nubian Palaeolake of the Erg Ennedi some 300 kilometres to the south, where turtle bones were found on lake levels associated with "dotted wavy line" ceramics, representing the earliest human settlements in the area (Hoelzmann *et al.* 2001).

Fig. 14. Panel executed in sunk relief, with a pair of giraffe grazing a tree, a large soft-shelled turtle, and an unidentified quadruped, site KT 22 (Karkur Talh, Jebel Uweinat)

Similar dotted wavy line ceramics may be found at Uweinat associated with pre-pastoralist rock art sites (Riemer *et al.* 2017), and 300 kilometres is certainly not an unsurmountable distance for highly mobile small groups of hunter-gatherers. The combined circumstantial evidence does suggest that this unique panel could be the oldest engraving at Uweinat, though being a single example not much more may be deduced.

3. Is there any evidence of depiction of large African fauna (other than giraffe) at Jebel Uweinat ?

Muzzolini (1981) used the lack of any of the "classical" large African fauna (elephant, rhinoceros, hippopotamus) as evidence for the late date of all rock art in the Jebel Uweinat region. However recent discoveries have created a somewhat more ambiguous picture. Among the already referred to petroglyphs in site WG 21 ("Cave of Beasts") there is one very stylized depiction of an elephant, only recognizable on account of the trunk and tusks as the rest of the body proportions bear no resemblance to a real animal. Two other panels with elephant petroglyphs have been found in the Gilf Kebir (Morelli *et al.* 2006; Zboray 2008), and one at Jebel es Soda in Libya (Berger *et al.* 2003). The common trait of all these panels is the association of the elephants with giraffe and ostrich, which on superficial look may not be distinguished from the petroglyphs depicting the same subject (minus elephants) at Jebel Uweinat.

However all the panels depicting elephants exhibit the low relief technique seen on the Cave of Beasts petroglyphs, with a smoothed body and a marked sunk edge as opposed to the lack of perceptible depth and rough pecked outlines and interior of the Uweinat wild fauna petroglyphs. The elephants, while recognizable, do not show natural body proportions, especially the legs are shown as long and thin, contrasting sharply with the fine anatomical detail shown on associated giraffe and ostrich figures. A ready explanation could be that the elephants were drawn based on a verbal description or distant memories, with no living examples to be observed in the closer environment.

While all the discussed examples may be assigned to the pre-pastoral periods, Le Quellec professed to see a figure of an elephant (Le Quellec *et al.* 2005, fig. 177) on a panel of Uweinat cattle pastoralist paintings at site KM 12 in Karkur Murr, at Jebel Uweinat. However the scene is much weathered, and the identification is highly questionable. The author is of the opinion that the "elephant" is in fact made up of several overlapping and partially effaced cattle.

A supposed rhinoceros was also reported from the Wadi Hamra in the Gilf Kebir (Negro 2001). While its presence would not be surprising in the light of the recent elephant finds, the identification is very doubtful. Having observed the figure several times under different lighting conditions (site WH 2), the author is of the opinion that the crude pecked figure represents some other quadruped (possibly cattle), the "horn" being simply a flaw in the rock rather than part of the man-made figure.

As such one must agree with the conclusion of Berger (2000) that large African fauna were completely absent from the Jebel Uweinat region throughout the rock art producing periods.

4. Were the petroglyphs depicting cattle made by the same people who created the cattle paintings ?

Paintings of cattle, sometimes by the hundreds, often accompanied by the characteristic elongated human figures dominate the rock art landscape of Jebel Uweinat. The sheer numbers and proportions (337 sites out of a total of 414 paintings at Uweinat) suggest that the cattle pastoralist paintings represent the peak of human occupation at Jebel Uweinat. As the majority of petroglyphs also depict cattle, but in a seemingly very different style, the question arises whether the two were made by the same or different people.

It may be argued that the differences observable in the depictions of cattle (different body postures, different coat patterns, etc.) may be explained by the choice of different mediums, however also the depicted human figures and their accessories are very different.

While there is a considerable variation in the style of depicting human figures among the Uweinat cattle pastoralists (Zboray 2018), a number of common accessories unique to the Uweinat pastoralists confirm a clear cultural continuity (MenardiNoguera and Zboray 2011; Zboray 2013). The cattle pastoralists who made the paintings had well established conventions of representing the human body, clothing and accessories. Some recent and partially unpublished finds confirm that these conventions were applied in petroglyphs too. At Jebel Soda Berger and Le Quellec found two engraved figures (ER 2, Berger *et al.* 2003, ER 3/A; Le Quellec *et al.* 2005) carrying the characteristic "tailed quiver cum utility bag" which is a standard accessory of the Uweinat cattle pastoralists. At site SU 17 a scene shows a couple of elongated human figures in the characteristic body posture (both elbows bent) together with cattle, and a group of similar archers hunt-

Fig. 15. Giraffe hunt scene, the style and body posture of archers with elongated bodies are similar to depictions of archers on cattle pastoralist paintings, site SU 17 (South Uweinat)

ing a giraffe (Fig. 15, echoing the scene at KTW 26/B), while near Wadi Wahesh a recent find (Zboray and Borda 2013) again shows a typical cattle pastoralist couple in a posture seen on dozens of paintings. These rare but clearly recognizable examples indicate that the artists of the paintings could reproduce the same style in petroglyphs, just their preference was for paintings.

In contrast the characteristic figures holding spear and oval/rectangular objects (shield ?) and the curved objects (lassos ?) have no parallels in any of the cattle pastoralist paintings. The single apparent example at site KT 57 on close scrutiny is revealed to hold a bow in one hand and a bunch of arrows in the other, rather than the rectangular or oval solid object depicted on petroglyphs.

The marked differences in depicting humans on paintings and on the majority of petroglyphs suggest that the latter were made by a group of people with different artistic conventions and cultural traditions. As it had already been demonstrated that the cattle petroglyphs are related to a small subset of paintings representing the final stages of painting activity at Uweinat, one may tentatively conclude that sometime near the end of the cattle pastoralist period a new group arrived to Jebel Uweinat, possibly after a temporary abandonment by the earlier pastoralists who made the majority of the paintings.

This hypothesis is supported by observing the rock art of Uweinat in a broader regional context. While the Uweinat cattle pastoralist paintings have no direct stylistic parallels elsewhere, both Huard (Huard and Leclant 1972) and Le Quellec (2005) commented on the resembance of some Jebel Uweinat petroglyphs to those attributed to the Nubian C Group in the Nile Valley, and there are also some recently discovered cattle pastoralist petroglyphs at Bir Nurayet (Bobrowski *et al.* 2013) in North-eastern Sudan which show a marked similarity to the engraved cattle at Uweinat. Perhaps most intriguingly, a large panel of petroglyphs near the town of Bardai in the central Tibesti Mountains depicts a herd of cattle accompanied by a group of people appearing to hold the same curved objects (lassos ?) as some of the figures at Jebel Uweinat (Staewen and Striedter 1987).

While these similarities and the archaeological context have not yet been studied in any detail, it is entirely conceivable to envision a period of increased migration around 3500-2500 BCE when the gradual onset of present-day aridity forced pastoralist people to seek out new, more favorable grazing areas, while returning to the marginal desert regions during short wetter interludes (much as the Tibu people returned to Uweinat periodically after years of better rain in the first half of the last century).

5. What is the significance of the geographical distribution ?

While there are roughly the same number of paintings as petroglyphs at Jebel Uweinat and environs, this even distribution hides a very differing geographical spread: petroglyphs are only found along the sides and low terraces bordering the lower courses of the wadis (dry riverbeds) draining the eastern (sandstone) parts of Jebel Uweinat, in the lower sections of wadis and around the northern and eastern (sandstone) perimeter of Jebel Arkenu, and along the perimeter of smaller sandstone inselbergs on the surrounding plains. In contrast, paintings may be found in shelters practically everywhere on Jebel Uweinat and the surrounding other massifs, with concentrations in the upper sections of wadis, reaching up to the highest areas of the sandstone plateaus forming the elevated parts of both Uweinat (Fig. 16) and Arkenu mountains.

Petroglyphs are completely lacking in the western (granite) part of Uweinat, and also from the lesser granite massifs. This (at least in part) may be explained by the hardness of the rock medium, which could not be worked with the technology

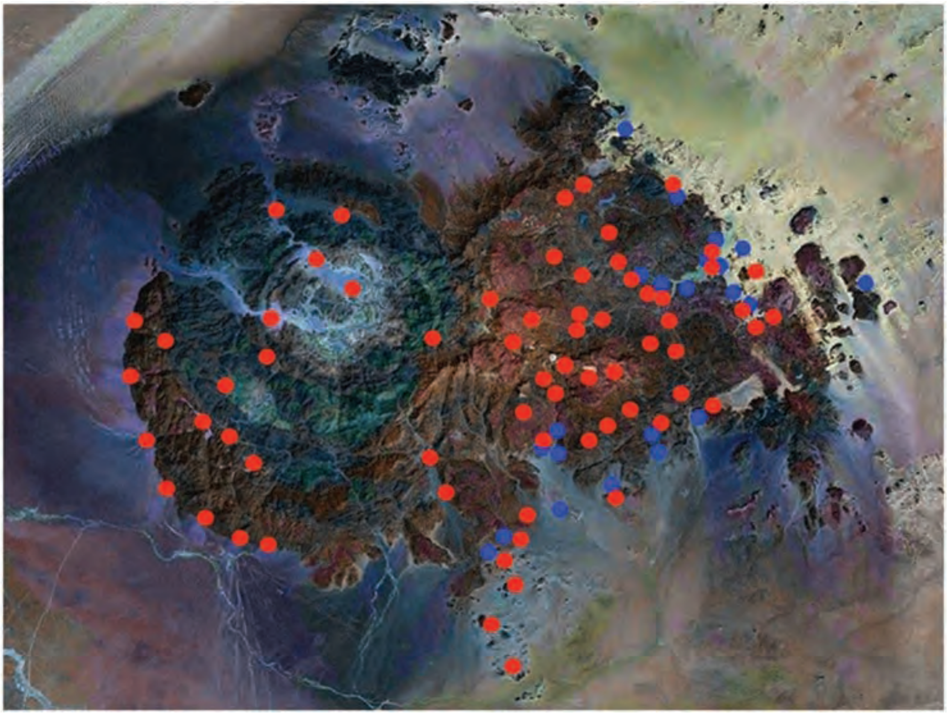

Fig. 16. Satellite map of Jebel Uweinat showing the distribution of principal painting (red dots) and petroglyph (blue dots) localities

available to the prehistoric inhabitants. The only exception may be found in the main valley of Jebel Arkenu, where phonolite outcrops among the more prevalent granites provided suitable softer surfaces (workable with granite flakes of greater hardness) for some panels of petroglyphs, all conforming to the pattern of being in the lower section of the wadi.

Significantly, if one examines the geographical distribution of the latest phase of the cattle pastoralist paintings, the style of which matches those of the cattle petroglyphs, one may observe a complete overlap with the distribution of petroglyphs, providing further support that these late paintings and the petroglyphs were made by the same people.

As both the classical cattle pastoralist paintings and the late paintings/petroglyphs appear to have been made at living sites (supported by considerable surface scatters of ceramics and artifacts at undisturbed localities), from the differences in geographical distribution one may infer that the people who made the petroglyphs simply did not inhabit the higher elevations. As it is extremely unlikely that two separate groups of pastoralists with different artistic traditions could have co-existed at Uweinat, the only alternative explanation is a temporal succession. It is an attractive hypothesis to see this distribution as evidence for an ongoing deterioration of environmental conditions, with all of the mountain exploited and inhabited during the climatic optimum (corresponding to the peak of occupation), followed by a period where only the main valleys and the alluvial plains offered suitable living areas.

Examining the distribution of camel petroglyphs provides some further support to this hypothesis. These latest additions to the Jebel Uweinat rock art repertoire may only be found in the most favored central part of the lower Karkur Talh (which is also the area richest in prehistoric petroglyphs, still supporting a vestige arid savanna vegetation with acacia groves, the largest such vegetation patch in a 500 kilometre radius), and along a path linking this valley with the single remaining permanent spring in Karkur Murr. They are always in close association with historic and modern Tibou settlements and artifacts. One may infer that by the time the camel petroglyphs were made, the rest of the mountain and the smaller valleys could no longer support human settlement.

Summary

From the demonstrated evidence it may be deduced that following a long period of successive artistic traditions expressing themselves through paintings, the abundant cattle / giraffe petroglyphs represent the final pastoralist phase at Jebel Uweinat (possibly following a break in settlement), when only the fringes of the mountain offered suitable habitat and resources, the rest of the massif was no longer inhabited.

As conditions deteriorated the cattle disappeared from the petroglyphs, however giraffe and other game remained to be exploited. This continued (without cattle) at least until ~2000 BCE. At some point giraffe too disappeared, however the hunting based subsistence (aided by dogs) continued along the fringes of the mountain.

The final phase of human settlement at Jebel Uweinat is characterized by crude petroglyphs depicting camels and associated humans. Some of these completely lack patination, and are undoubtedly historic, probably made by Tibu nomads periodically exploiting the area.

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Desert and the Nile.
Prehistory of the Nile Basin and the Sahara.
Papers in honour of Fred Wendorf
Studies in African Archaeology 15
Poznań Archaeological Museum 2018

List of volume contributors

AHMED HAMID NASSR, Al-Neelain University, Faculty of Arts, Archaeology Department, Kahrtoum, Sudan; e-mail: ahmedkabushia84@gmail.com

Elizabeth ALEXANDER, e-mail: ema8645@gmail.com

Alain ANSELIN, Cahiers Caribéens d'Egyptologie, Université des Antilles-Guyane 97233, Schoelcher, Martinique FWI; Gare Rosa no. 3, Belle Espérance, 97139 Abymes, Guadeloupe; e-mail: alain.anselin0497@orange.fr; alain.anselin@gmail.com

Kimball M. BANKS, Combined Prehistoric Expedition Foundation & Institute for the Study of Earth and Man, Southern Methodist University; e-mail: kimballbanks@hotmail.com; kimballbanks@gmail.com

Bashier Negood HASSAN, Krasnogvardeysky Boulevard, 1. Flat. 186, 123317 Moscow, Russia; e-mail: negoodh@yahoo.com

Anna Christine BEDNAR, 12242 Montego Plaza, Dallas, TX 75230, USA; e-mail: christy.bednar@gmail.com

Hubert BERKE, University of Cologne, Institute of Prehistoric Archaeology, African Archaeology, Jennerstr. 8, 50823 Cologne, Germany; e-mail: berke@archaeozoologie.de

Przemysław BOBROWSKI, Institute of Archaeology and Ethnology, Polish Academy of Sciences, Rubież 46, 61-612 Poznań, Poland; e-mail: boberpusz @gazeta.pl

Louis CHAIX, Département d'archéozoologie – Muséum d'histoire naturelle – 1 route de Malagnou – CH – 1211 Geneva 6; e-mail: louis.chaix@bluewin.ch

Marek CHŁODNICKI, Poznań Archaeological Museum, Wodna 27, 61-781 Poznań, Poland; e-mail: mchlod@man.poznan.pl

Agnieszka CZEKAJ-ZASTAWNY, Institute of Archaeology and Ethnology, Polish Academy of Sciences, ul. Sławkowska 17, 31-016 Kraków, Poland; e-mail: aczekajzastawny@gmail.com

Giulia D'ERCOLE, ERC Project Across Borders, Ludwig Maximilians University, Katharina-von-Bora-Str. 10, 80333 Munich, Germany; email: Giulia. Dercole@lmu.de

Grazia A. DI PIETRO, Institute of Archaeology, University College London, 31-34 Gordon Square London WC1H 0PY; email: g.pietro@ucl.ac.uk; graziadipietro@yahoo.it

Annett DITTRICH, Hausburgstraße 24, 10249 Berlin, Germany; e-mail: annettdi @gmx.de

Wojciech EJSMOND, Antiquity of Southeastern Europe Research Centre, University of Warsaw, 00-927 Warszawa, ul. Krakowskie Przedmieście 32, Poland; e-mail: Wojtek.ejsmond@wp.pl

Joshua EMMITT, Department of Anthropology, University of Auckland, Auckland, New Zealand; e-mail: josh.emmitt@gmail.com

Elena A. A. GARCEA, Department of Letters and Philosophy, University of Cassino and Southern Latium, Via Zamosch 43, 03043 Cassino (FR), Italy; email: e.garcea@unicas.it

Maria C. GATTO, The University of Leicester, School of Archaeology and Ancient History; e-mail: mcgatto@aliceposta.it

Krzysztof GRZYMSKI, Royal Ontario Museum, 100 Queen's Park, Toronto, ON M5S 2C6; e-mail: kgrzymski@hotmail.com

Ulrich HARTUNG, German Archaeological Institute Cairo; e-mail: ulrich.hartung@dainst.de

HAMAD M. HAMDEEN, Department of Archaeology, Faculty of Arts, Khartoum University, Sudan; e-mail: hmohamed366@gmail.com

Nader El-HASSANIN, Faculty of Archaeology, Cairo University, Giza 12613, Egypt; e-mail: nadergem@gmail.com

HASSAN MUSTAFA ALKHIDIR, Shendi University, Shendi town, Sudan; e-mail: Hassanmustafa8950@yahoo.com

HEBATALLAH A.A. IBRAHIM, Oriental Institute, Oxford University, UK; Ministry of Antiquities, Cairo, Egypt; e-mail: Heba22_eg@yahoo.com

Simon HOLDAWAY, Department of Anthropology, University of Auckland, Auckland, New Zealand; Archaeology School of Social Science, University of Queensland, St. Lucia, Brisbane, Australia and Department of Environmental Sciences, Macquarie University, NSW 2109, Australia; e-mail: sj.holdaway@auckland.ac.nz;

IKRAM MADANI, Department of Botany, Faculty of Science Khartoum University, Sudan; e-mail: ikramahmed3@yahoo.com

Joel IRISH, Anthropology and Archaeology Research Centre in Evolutionary Anthropology and Palaeoecology School of Natural Sciences and Psychology, Liverpool John Moores University, Byron Street, Liverpool L3 3AF, United Kingdom; e-mail: J.D. Irish@ljmu.ac.uk

Friederike JESSE, University of Cologne, Institute of Prehistoric Archaeology, African Archaeology, Jennerstr. 8, 50823 Cologne, Germany; e-mail: friederike.jesse@uni-koeln.de

Maciej JÓRDECZKA, Institute of Archaeology and Ethnology, Polish Academy of Sciences, Rubież 46, 61-612 Poznań, Poland; e-mail: maciej.jordeczka@iaepan.poznan.pl

Jacek KABACIŃSKI, Institute of Archaeology and Ethnology, Polish Academy of Sciences, Rubież 46, 61-612 Poznań, Poland; e-mail: jacek.kabacinski@interia.pl

Attila KIRÁLY, Institute of Archaeological Sciences, Eötvös Loránd University, Budapest, Hungary, H-1088 Budapest, Múzeum krt. 4/B; e-mail: attila@litikum.hu

Michał KOBUSIEWICZ, Institute of Archaeology and Ethnology, Polish Academy of Sciences, Rubież 46, 61-612 Poznań, Poland; e-mail: mkobus@man.poznan.pl

Robert KUHN, Ägyptisches Museum und Papyrussammlung Berlin, Geschwister-Scholl-Str. 6, 10117 Berlin; e-mail: r.kuhn@smb.spk-berlin.de

Taichi KURONUMA, Department of Philosophy, History and Cultural Studies, Tokyo Metropolitan University, 1-1 Minami-osawa, Hachiouji-City, Tokyo, Japan. Postal Code: 192-0397; e-mail: taichi.kuronuma@gmail.com

Lenka LISÁ, Institute of Geology, Academy of Sciences of the Czech Republic, Prague; e-mail: lisa@gli.cas.cz

Maria LITYŃSKA-ZAJĄC, Institute of Archaeology and Ethnology, Polish Academy of Sciences, Sławkowska 17, 31-016 Kraków; e-mail: marialitynska@gazeta.pl

Natalia MAŁECKA-DROZD, Jagiellonian University, Institute of Archaeology, ul. Gołębia 11, 31-007 Kraków, Poland; e-mail: nbmalecka@gmail.com

Agnieszka MĄCZYŃSKA, Poznań Archaeological Museum, Poznań, Poland; e-mail: agnieszka.maczynska@muzarp.poznan.pl

Mirosław MASOJĆ, Laboratory for Non-European Archaeology, Institute of Archaeology, University of Wrocław, Poland; e-mail: mirekmasojc@poczta.onet.pl

Jakub MUGAJ, Institute of Archaeology and Ethnology, Polish Academy of Sciences, Rubież 46, 61-612 Poznań, Poland; e-mail: j_mugaj@o2.pl

MOHAMMED ALFATIH HAYATI, Department of Archaeology, University of Khartoum, Khartoum-Sudan, mohhyati@yahoo.com

Jan PACINA, Department of Informatics and Geoinformatics, Faculty of Environment, J. E. Purkyně University in Ústí nad Labem, Czech Republic; e-mail: jan.pacina@ujep.cz

Rebecca PHILLIPPS, Department of Anthropology, University of Auckland, Auckland, New Zealand; e-mail: rphi025@aucklanduni.ac.nz

Adéla POKORNÁ, Laboratory of Archaeobotany and Palaeoecology, Faculty of Science University of South Bohemia, Česke Budějovice, Czech Republic; e-mail: adepo@seznam.cz

Petr POKORNÝ, Center for Theoretical Study, joint workplace of the Charles University in Prague and the Czech Academy of Sciences, Czech Republic; Laboratory of Archaeobotany and Palaeoecology, Faculty of Science, University of South Bohemia, České Budějovice, Czech Republic (2013–2015); e-mail: pokorny@cts.cas.cz

Paweł Lech POLKOWSKI, Poznań Archaeological Museum, ul. Wodna 27, 61-781 Poznań, Poland; e-mail: ppolkowski@o2.pl

Nadja PÖLLATH, Institut für Paläoanatomie und Geschichte der Tiermedizin, ArchaeoBioCenter Ludwig-Maximilians-University, Kaulbachstr. 37, 80539 Munich, Germany; e-mail: nadja.poellath@palaeo.vetmed.uni-muenchen.de

Jacques REINOLD, Le Bourg – F-71260 Saint-Maurice de Sattonay, France; e-mail: j.reinold@wanadoo.fr

Sandro SALVATORI, Centro Studi Sudanesi e Sub-Sahariani, Italy; e-mail: sandro_salvatori@fastwebnet.it

Romuald SCHILD, Institute of Archaeology and Ethnology, Polish Academy of Sciences, Al. Solidarności 105, 00-140 Warszawa, Poland; e-mail: romuald.schild@gmail.com

Linda SCOTT CUMMINGS, PaleoResearch Institute, Department of Geography & Anthropology, Louisiana State University, USA; e-mail: linda@nospam.com@paleoresearch.com

Noriyuki SHIRAI, Institute of Archaeology, University College London, 31-34 Gordon Square, London WC1H 0PY, United Kingdom; e-mail: noriyuki.shirai@ucl.ac.uk

J. Signe SNORTLAND, Combined Prehistoric Expedition Foundation; e-mail: jsnortland@usbr.gov

Maira TORCIA, Via Cesare de Fabritiis 133, 00136 Roma, Italy; e-mail: al.maira@libero.it

Donatella USAI, Centro Studi Sudanesi e Sub-Sahariani; Italy; e-mail: donatellausaisalvatori@gmail.com

Dorian VANHULLE, F.R.S.-FNRS / Université libre de Bruxelles, Centre de Recherches en Archéologie et Patrimoine 50, avenue F.D. Roosevelt – 1050 Bruxelles (CPI 133/01); e-mail: dorian.vanhulle@ulb.ac.be

Ladislav VARADZIN, Institute of Archaeology, Academy of Sciences of the Czech Republic, Prague; Laboratory of Archaeobotany and Palaeoecology, Faculty of Science, University of South Bohemia, České Budějovice, Czech Republic (2013–2015); e-mail: varadzin@arup.cas.cz

Lenka VARADZINOVÁ, Czech Institute of Egyptology, Faculty of Arts, Charles University, Prague, Czech Republic; Laboratory of Archaeobotany and Palaeoecology, Faculty of Science, University of South Bohemia, České Budějovice, Czech Republic (2013–2015); sukova.lenka@gmail.com

Krystyna WASYLIKOWA, W. Szafer Institute of Botany PAS, Lubicz 46, 31-520 Kraków; e-mail: k.wasylikowa@botany.pl

Scott WENDORF, e-mail: wendorf@hotmail.com

Gail WENDORF, e-mail: gail.wendorf3@gmail.com;

Willeke WENDRICH, Cotsen Institute of Archaeology, University of California Los Angeles, Los Angeles, USA; e-mail: wendrich@humnet.ucla.edu

YAHIA F. TAHIR, Department of Archaeology, Faculty of Arts Khartoum University, Sudan, e-mail: Yahiasd@gmail.com

András ZBORAY, Denevér u. 48/D, Budapest, H-1121 Hungary; e-mail: andras@fjexpeditions.com

Andrea ZERBONI, Dipartimento di Scienze della Terra "A. Desio", Università degli Studi di Milano, Milano, Italy; e-mail: Andrea.Zerboni@unimi.it

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PL ISSN 0866-9244
ISBN 978-83-60109-60-1