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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 Playa¹ 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.

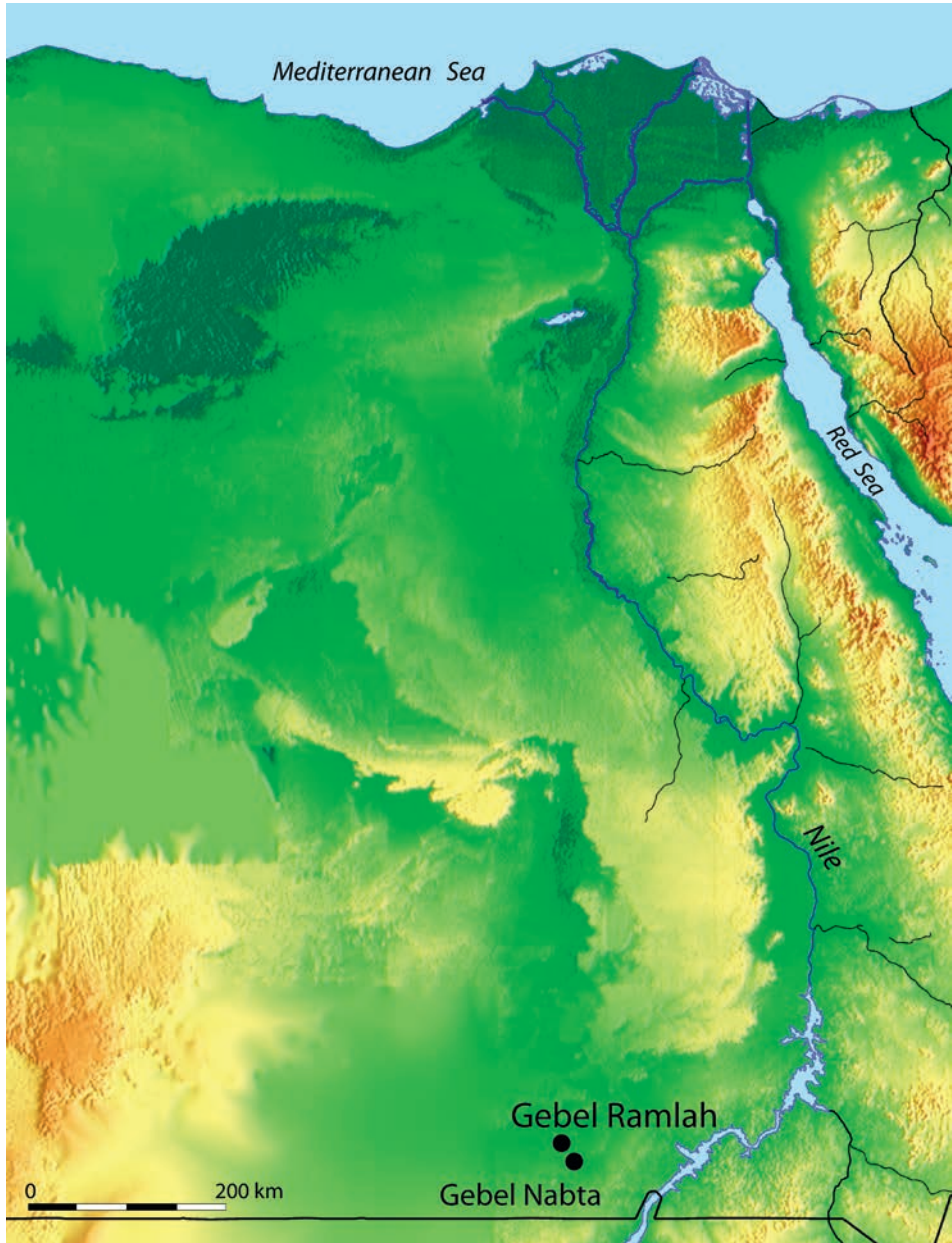


Fig. 1. Location of Gebel Ramlah and Nabta Playa

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).

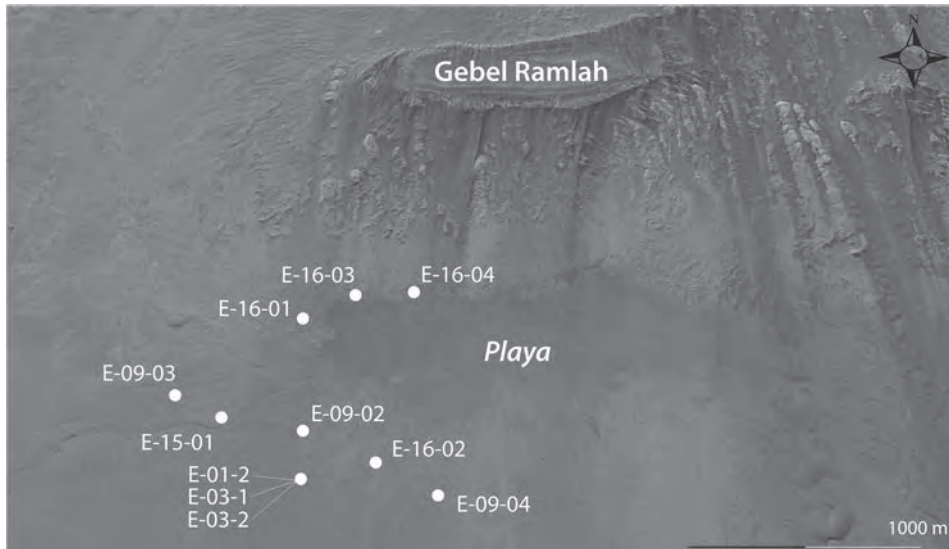


Fig. 2. Gebel Ramlah. Approximate area of detailed surface prospection and main sites indicated in the text

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 BC²) 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 lower 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 diverse 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 dihedric 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 dihedric 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 ^{14}C 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

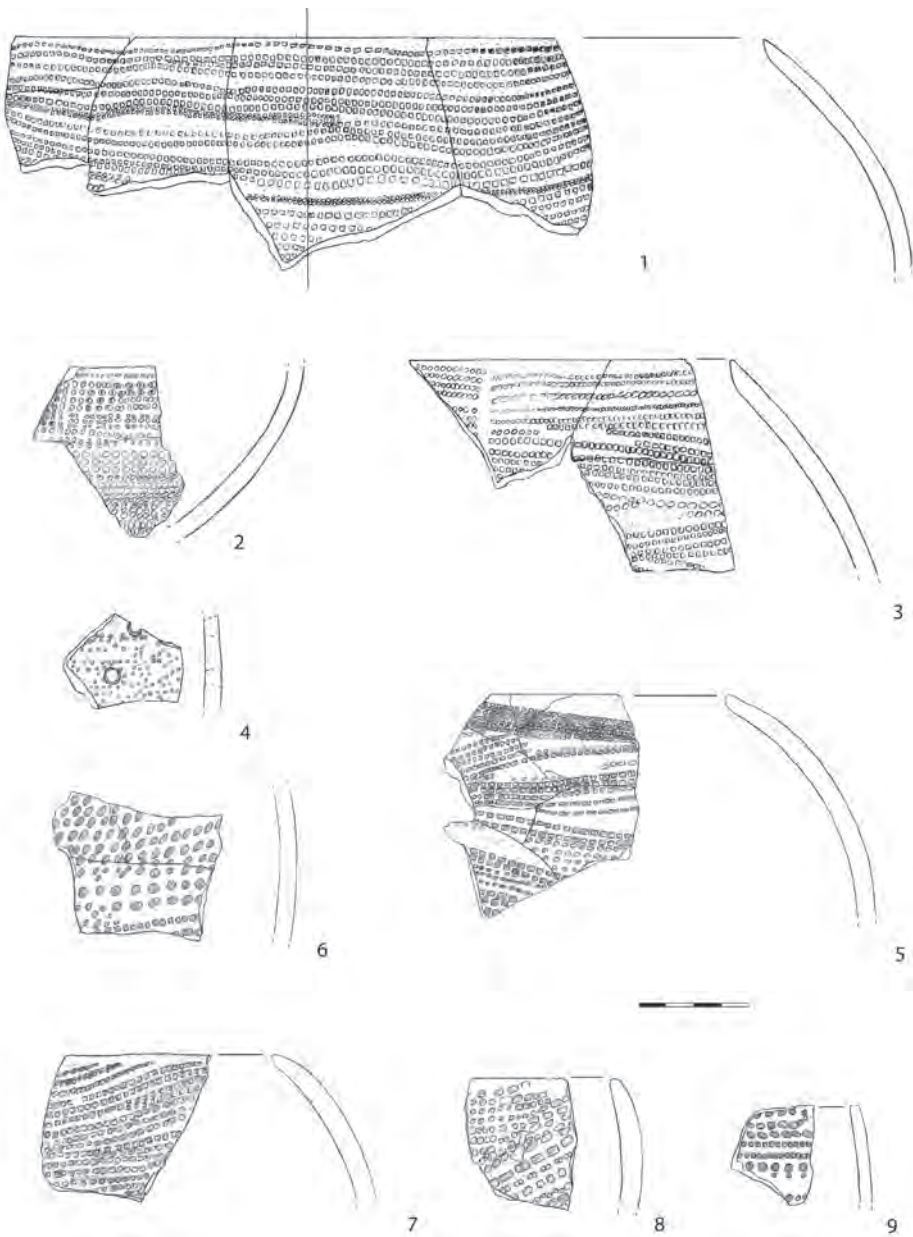


Fig. 7. Gebel Ramlah. Site E-09-02. Early Neolithic, El Jerar phase – pottery from settlement: 1, 3 – feature no. 15; 2 – feature no. 2; 4 – feature no. 22; 5 – feature no. 9; 6 – feature no. 4; 7-9 – feature no. 17



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

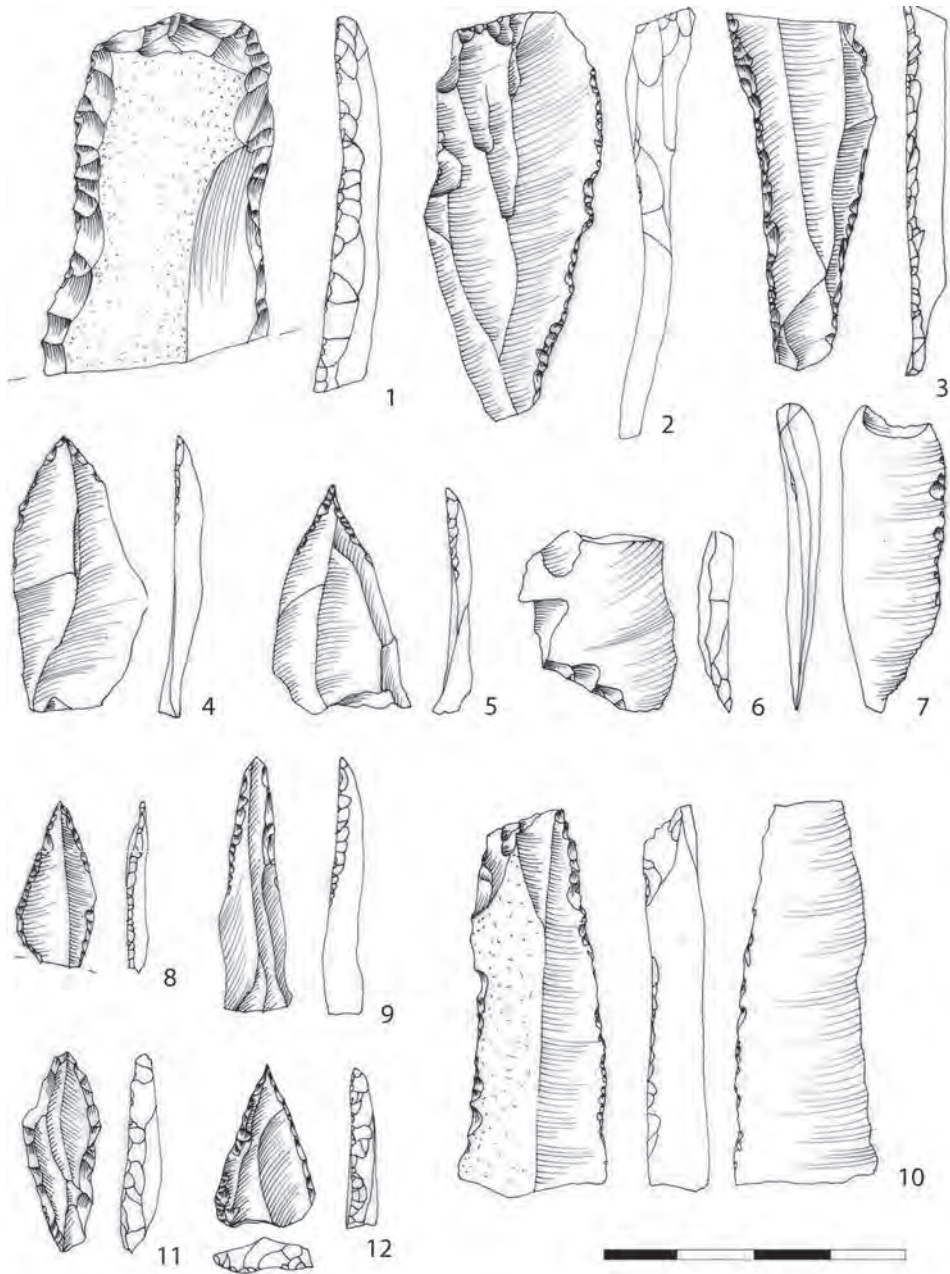


Fig. 9. Gebel Ramlah, site E-09-02. Early Neolithic, El Jerar phase – lithics from settlement: 1, 3-7, 10 – feature no. 15; 2 – feature no. 13; 8-9, 11 – feature no. 20; 12 – feature no. 2



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.

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 mm in average). The only forms recorded are spherical and open bowls (Fig. 13). The Late Neolithic lithic production



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



Fig. 13. Gebel Ramlah, site E-16-02. Late Neolithic – pottery

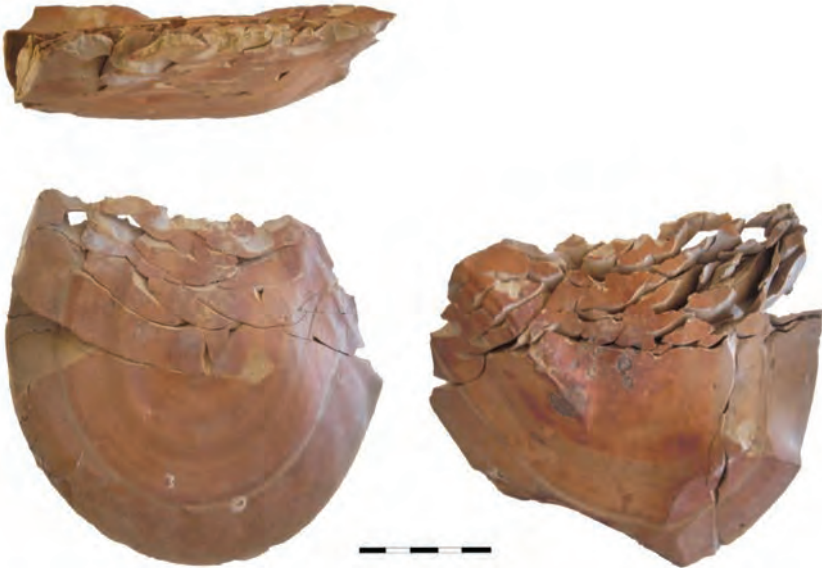


Fig. 14. Gebel Ramlah, site E-09-02. Late Neolithic – core refitting

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 from 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. 15. Gebel Ramlah, site E-16-03. Late Neolithic – retouched side-blow flake



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).

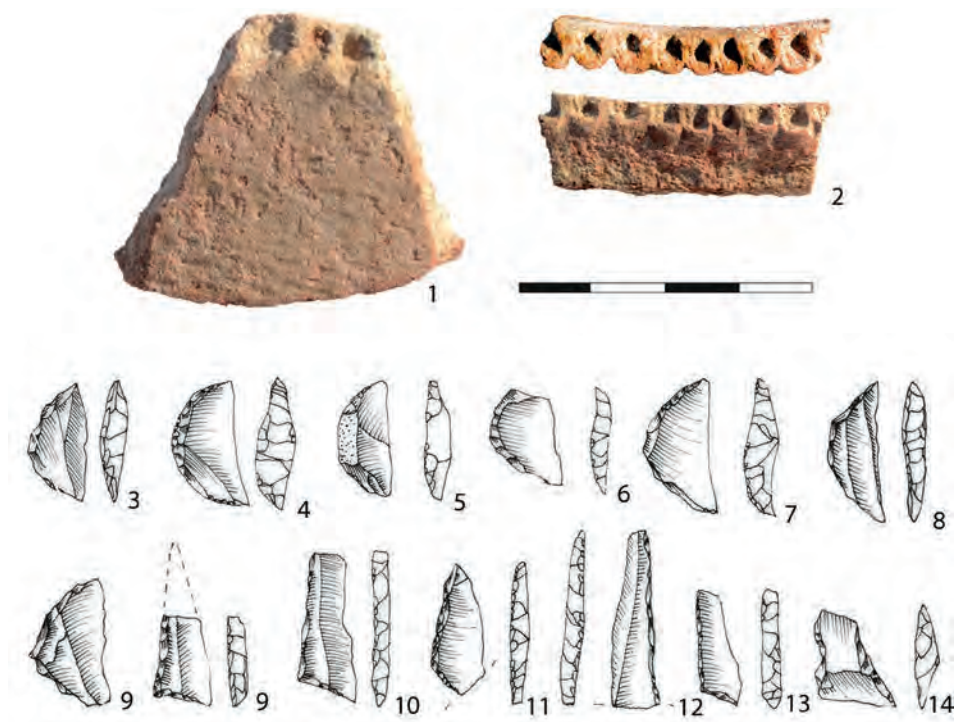


Fig. 17. Gebel Ramlah, site E-09-02. Final Neolithic – pottery and lithics

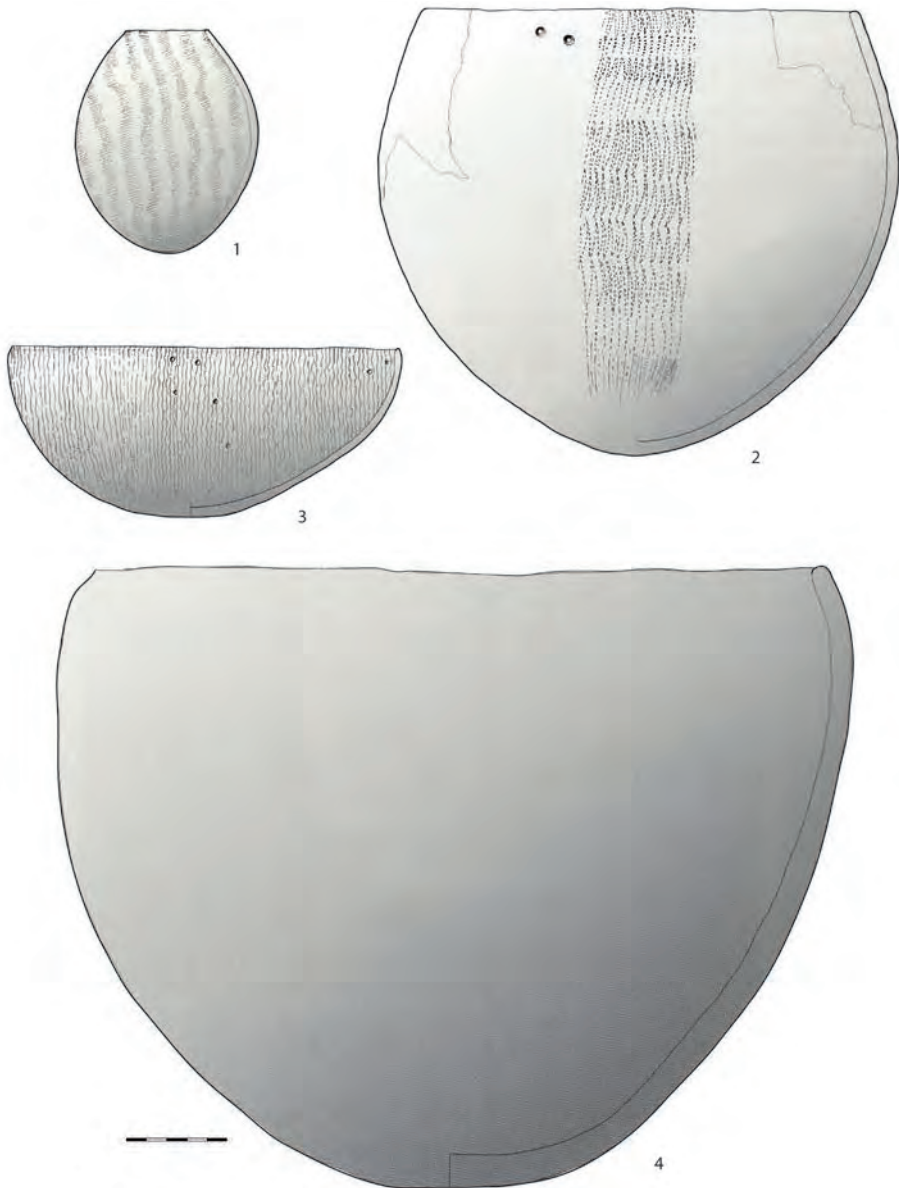


Fig. 18. Gebel Ramlah, site E-01-02, E-03-01. Final Neolithic – pottery from cemeteries: 1 – cemetery E-03-2, burial 9; 2 – cemetery E-01-2, burial 3; 3 – cemetery E-03-1, burial 4; 4 – cemetery E-03-2, surface (after Kobusiewicz *et al.* 2010)

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

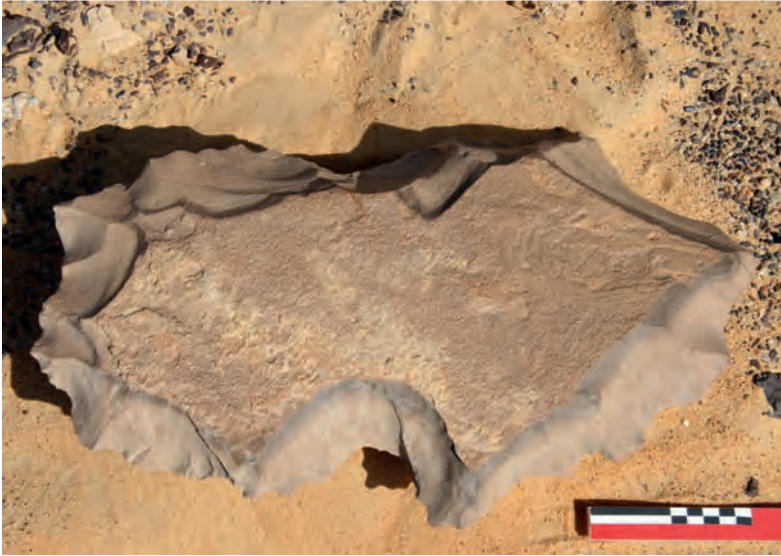


Fig. 21. Gebel Ramlah, site E-16-01. Tethering stone

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; Wasylkova *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.

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