Late Neolithic tethering or trapping stones from Bargat el-Shab (Western Desert of Egypt). Function and meaning

Abstract: Pastoral communities left numerous and varied traces of activity in the Sahara. Among them are so-called tethering/trapping stones, attested mainly in an area stretching from Algeria through Egypt to Sudan. Discovered in a variety of contexts, these originally utilitarian items with multiple functions occasionally gained importance in rituals performed by Middle Holocene pastoral communities. This paper focuses on stones found in the southern zone of the Western Desert of Egypt and discusses their function and significance in the broader context of North Africa.

Keywords: Tethering stones, Late Neolithic, Bargat el-Shab, Western Desert (Egypt)

INTRODUCTION

Pastoral communities of the Sahara have left behind numerous and varied traces of their activity, such as vast, multi-phase settlements, short-term camps, rock shelters, hearths, cemeteries, concentrations of rock art, and centers of worship. Many of these places functioned for centuries regardless of the changing environmental and socio-cultural conditions. As such, they became a particular type of "places of remembrance" in

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Acknowledgments
The authors wish to dedicate this paper to the memory of the late Professor Romuald Schild, a great scholar and prominent researcher of the prehistory of Africa and Europe and an invaluable contributor to the world of science. For us, he was also an outstanding director, teacher and mentor who introduced us to the fascinating adventure of research in the Sahara. He was an attentive observer of our scientific activities and an honest reviewer of many of our works.

the local landscape (Gabriel 2002; Schild and Wendorf 2004; Schild 2015; 2019; Bobrowski 2015). Some unique remains include burial tumuli, either isolated or clustered in groups, as well as large stone structures. While many of the features examined so far were found empty, some contained a variety of artifacts preserved both below the overburden and within the stone structures. Among the finds were so-called tethering/trapping stones discussed in this paper. These objects are known mainly from the Sahara, where they have been discovered both as stray finds and in meaningful contexts. These originally utilitarian, multifunctional items, traditionally interpreted as hunting traps or tethering devices for domestic animals (Pachur 1991), occasionally gained importance in rituals performed by Middle Holocene pastoral communities.

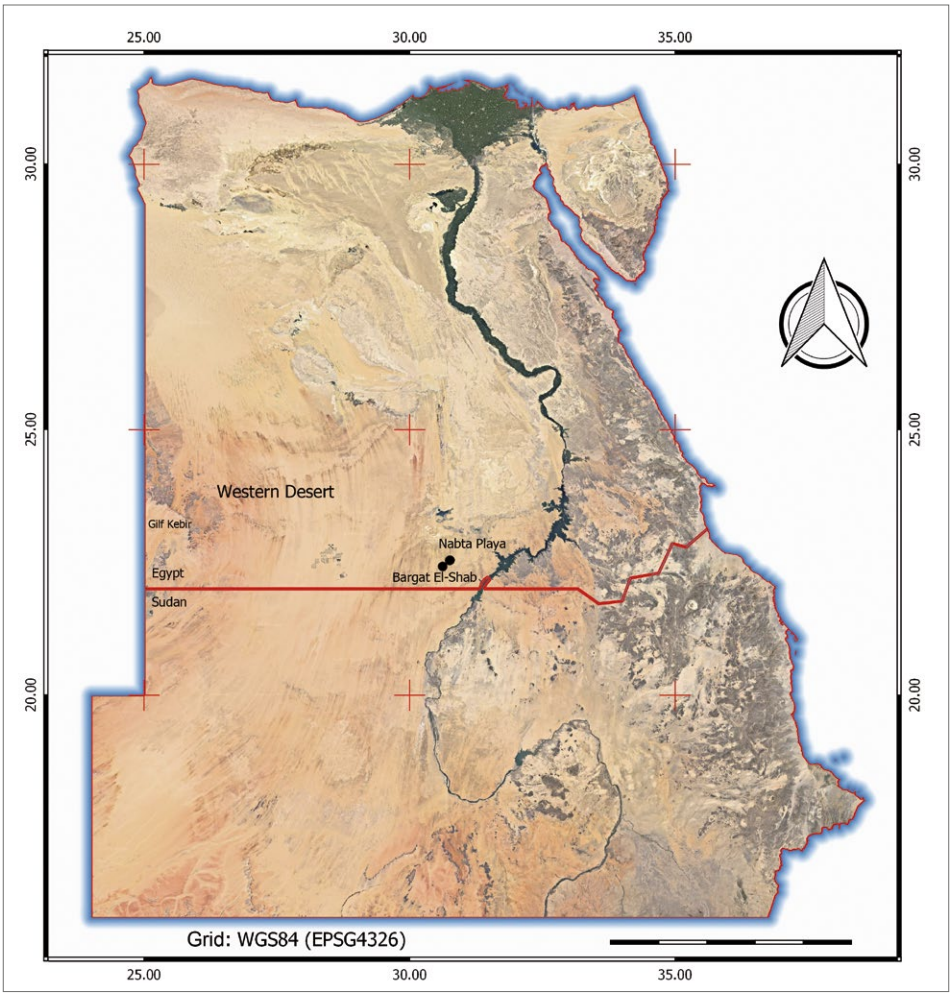

Fig. 1. Overview map of the Western Desert (Processing P. Wiktorowicz)

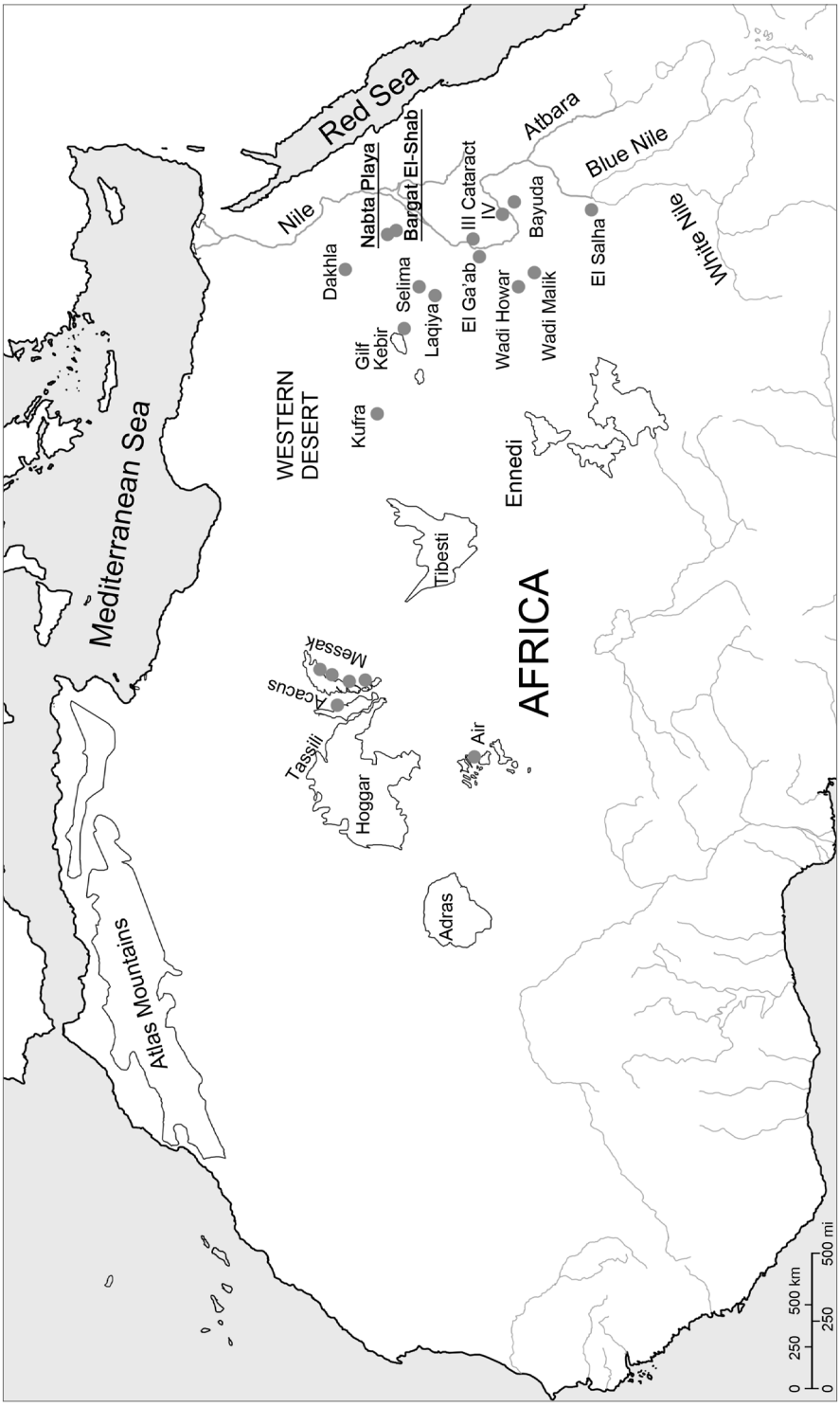

Fig. 2. Map of TS occurrences in Africa (Drawing M. Jórdeczka)

The site of Bargat el-Shab in the southern zone of the Western Desert of Egypt [*Fig. 1*] has attracted our attention for years. Bounded from the east by the Nile Valley, the area is adjacent at the northern end to the so-called Eocene Cliff and to the southern tip of the Great Sand Sea. To the west, it adjoins the Gilf Kebir and Jebel Ouenat. The southern (artificial) boundary of this zone follows the administrative border of Egypt. The wealth of archaeological traces scattered throughout the region includes a heterogeneous set of remains spanning in date from the Early Pleistocene to historic times (e.g. Bobrowski, Jórdeczka, and Kobusiewicz 2021; Masojć 2021). The findings presented below are associated with the so-called Pastoral Neolithic, corresponding to the so-called Late Neolithic Humid Interphase Ru'at el-Baquar (5450–4650 calBC) and Final Neolithic Humid Interphase Bunat el-Asnam (4550–3550 calBC) in the classical, detailed periodization of settlement activity in the southern zone of the Western Desert (Wendorf and Schild 2001a: 648–651; Schild and Wendorf 2013).

Trapping/tethering stones (TS) are found in the Sahara [*Fig. 2*], typically in the area stretching from Algeria through Egypt to Sudan (Cremaschi et al. 2006; Lohwasser 2013; Abdeen, Hamdeen, and Salih 2019; Bashir 2021; Huda 2021; Hamdeen, Abdeen, and Salih 2023), and, less often, in the Arabian Peninsula (Cremaschi and Negrino 2002). A characteristic feature of these highly intriguing stones is the presence of at least one incision on the long axis, or a groove/gouge on the circumference, used for fastening a rope and keeping it firmly in place (Gallinaro and di Lernia 2018: 1). While these objects often varied significantly in terms of size, weight, and function, they were usually made from boulders available in the immediate vicinity.

Since publication by Hans-Joachim Pachur (1991) of his report on TS, mentions of their presence have appeared in a number of other papers (e.g. Garcea 1997; Cremaschi and Negrino 2002; Gauthier and Gauthier 2004; di Lernia 2006; di Lernia, Mori, and Zerboni 2008; di Lernia 2013; Riemer 2009; Gallinaro and di Lernia 2018; Bashir 2021; Bobrowski, Jórdeczka, and Kobusiewicz 2021; Huda 2021). In recent years, the topic has been thoroughly analyzed by Marina Gallinaro and Savino di Lernia (2018) in the context of the Messak region, Libya. In their study, Gallinaro and di Lernia described 837 stones, the largest TS dataset recorded in a single region to date, analyzing not only their morphometric features, but also their context of discovery from the perspective of both the landscape (geographic and geomorphological contexts) and the archaeological setting. Made of local sandstone, the artifacts from Messak demonstrated very high morphometric variability, their weights ranging from 3.3 kg to nearly 300 kg (three size classes were distinguished: light — under 25 kg, medium — 26–85 kg, and heavy — over 85 kg). The shapes were so variable that Gallinaro and di Lernia decided to concentrate primarily on the methods applied to shape the rope attachment area. As a result, they distinguished several groups, of which the most numerous consisted of items with one or more meticulously incised notches. Other groups comprised specimens notched with simple blows, without additional treatment of the other surfaces, and so-called "heavy grooved" stones with deep grooves often around the entire circumference.

TETHERING STONES FROM BARGAT EL-SHAB

In recent years, research in the area of the paleolakes in Bargat el-Shab has provided some interesting discoveries. In addition to attestations of intensive Early Holocene settlement activity on the eastern shore of the paleolake, several large concentrations of megalithic features have been discovered. These included tumuli, stone circles, and smaller stone structures, always accompanied by numerous hearths or entire hearth complexes (Bobrowski, Jórdeczka, and Kobusiewicz 2021).

A particularly interesting concentration of large stone structures was discovered at the western end of the paleolake, at site E-12-04 [*Fig. 3:A*], referred to as the "Island". Several tumuli, stone chests and smaller stone structures, as well as remains of numerous hearths have been recorded in this location (Bobrowski, Jórdeczka, and Kobusiewicz 2021: 125–143). One of the most interesting finds is well-preserved Tumulus 1 [*Fig. 4*], which holds a burial of a child aged 4–6 years (Srienc, Bobrowski, and Jórdeczka 2020: 7–9). The tumulus is oval, about 4.5 m in diameter and roughly 1 m high, although originally it may have been considerably higher. It has a stone enclosure consisting of over 40 large sandstone slabs weighing from a few to over 100 kg.

Items from the weir (outer ring) of Tumulus 1 included a TS measuring 85 cm × 50 cm × 10–20 cm and weighing more than 50 kg, with characteristic traces of treatment [*Table 1*]. A recess about 25 cm long and 12 cm deep was made on one edge, opposite a natural depression [*Fig. 6:B*]. Another, larger TS (130 cm × 60 cm × 18 cm, weight around 100 kg) found in the lower layers on the opposite (western) side of the ring [*Fig. 6:C*], had one relatively large recess, over 50 cm long and about 10–12 cm deep, made with a series of blows. Both TSs were worked using lumps of raw material with appropriate morphometric features necessitating little additional processing (Bobrowski, Jórdeczka, and Kobusiewicz 2021: 128, 129, Fig. 3.1. 4; 131, Figs 3.1.7, 3.1.8). Based on their morphological and technological features, they fall into the second class in the typology of Gallinaro and di Lernia (2018), referred to as "opportunistic".

Another remarkable feature of Tumulus 1 is a stele placed vertically above the burial, in a NE–SW orientation, directly above the head of the deceased child [see *Figs 4, 6:A*]. It was made from a flat, slender stone (50 cm × 23 cm × 7.5 cm, weight 9.9 kg), originally a light TS with a longer (12 cm × 3 cm) recess on one edge and a smaller one (5 cm × 2 cm) on the opposite side. Its placement in the central part of the tumulus suggests that the stone may have held an important meaning to the pastoral communities, especially as similar finds are known from other features at Bargat el-Shab. Modest burial goods in the grave make its chronology difficult to determine with precision. Nonetheless, based primarily on a single radiocarbon date, the grave has been dated to the period from 4791 to 4546 calBC (95.4% probability).[1] The date

1 Radiocarbon date 5820±50 BP (Poz-92443) was calibrated with OxCal v.4.4.4 (Bronk Ramsey 2021) using the IntCal20 calibration curve (Reimer et al. 2020).

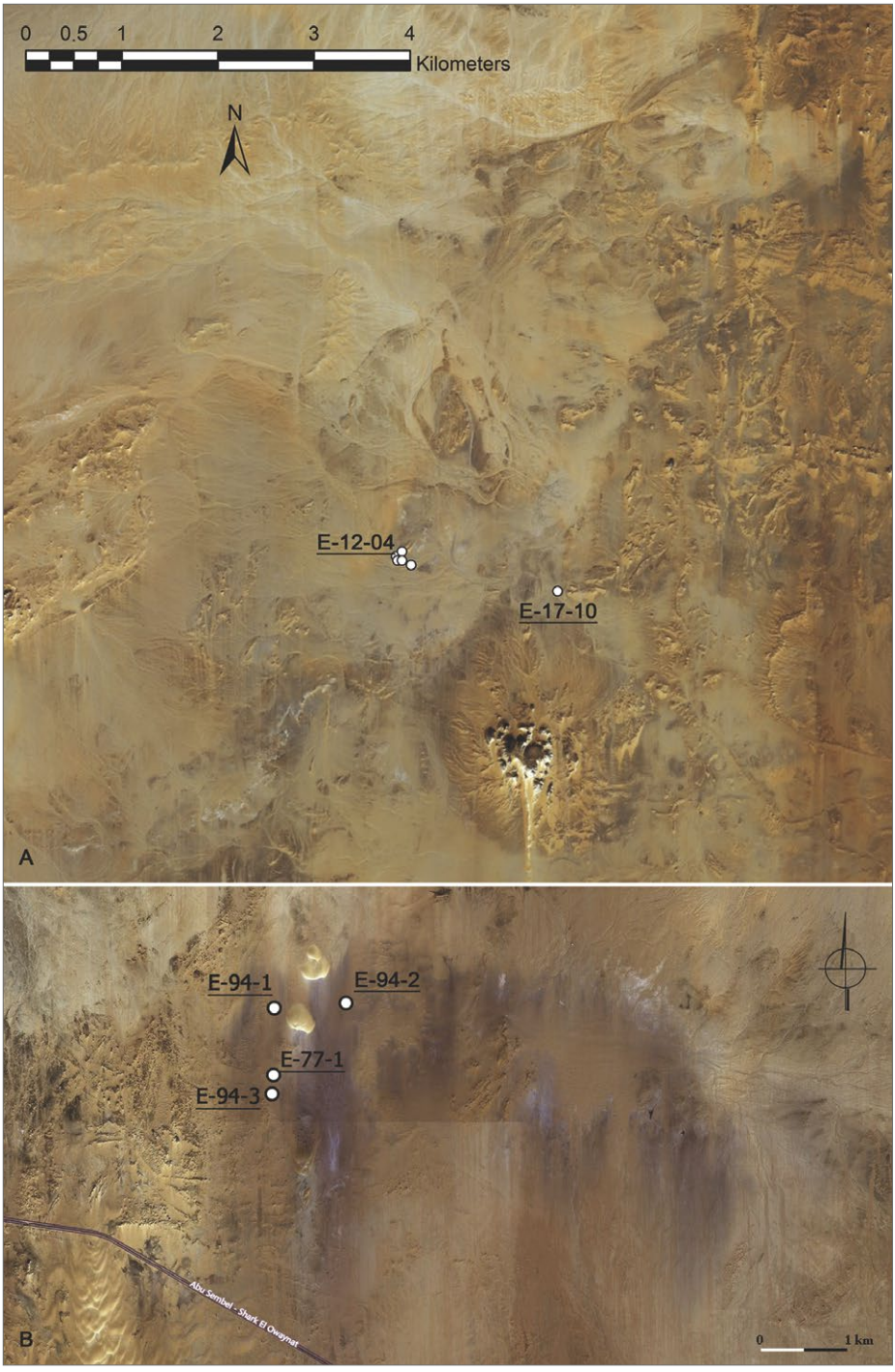

Fig. 3. Map of Bargat el-Shab and Nabta Playa with TS locations (Processing M. Jórdeczka and P. Wiktorowicz)

was obtained from a *Tamarix sp* charcoal found in the fill of the burial pit, near the child's skull (Bobrowski, Jórdeczka, and Kobusiewicz 2021: 133, 190–191, 195). Similar dates were obtained from hearths in the immediate vicinity of the tumulus. Hence, it is reasonable to assume that the site's chronology corresponds to the end of the Ru'at el-Baqar interphase in this region of the Western Desert, a relatively humid period that continued for about 700 years (Schild and Wendorf 2013: 128).

The external structure of Tumulus 3 at site E-12-04 resembled that of Tumulus 1. Its original size was somewhat difficult to interpret, as many of the stones were displaced by deflation and rain erosion. The outer ring had a span of about 3.0–3.5 m. Another oval structure (about 1 m in diameter) was set up inside the tumulus; it may have been a kind of ring made of smaller sandstone blocks, surrounding a poorly distinguishable small pit with a sandy fill. A flat oblong stone (stele) was placed vertically in the pit in a similar position as the stele/TS from Tumulus 1. Its current dimensions are 38 cm × 12 cm × 3–5 cm, but originally it was probably longer (a part of it seems to have broken off), and is rather strongly eroded [*Fig. 6:E*]. It may have been a TS, although no traces of treatment were identified on its surface. Additionally, no traces of a burial, charcoal or any artifacts were recorded in the pit (Bobrowski, Jórdeczka, and Kobusiewicz 2021: 135).

Another TS from site E-12-04 was found in the context of a different stone structure consisting of a dozen or so quartzite sandstone slabs of various sizes (from several centimeters to nearly a meter long and weighing up to 20 kg). Most

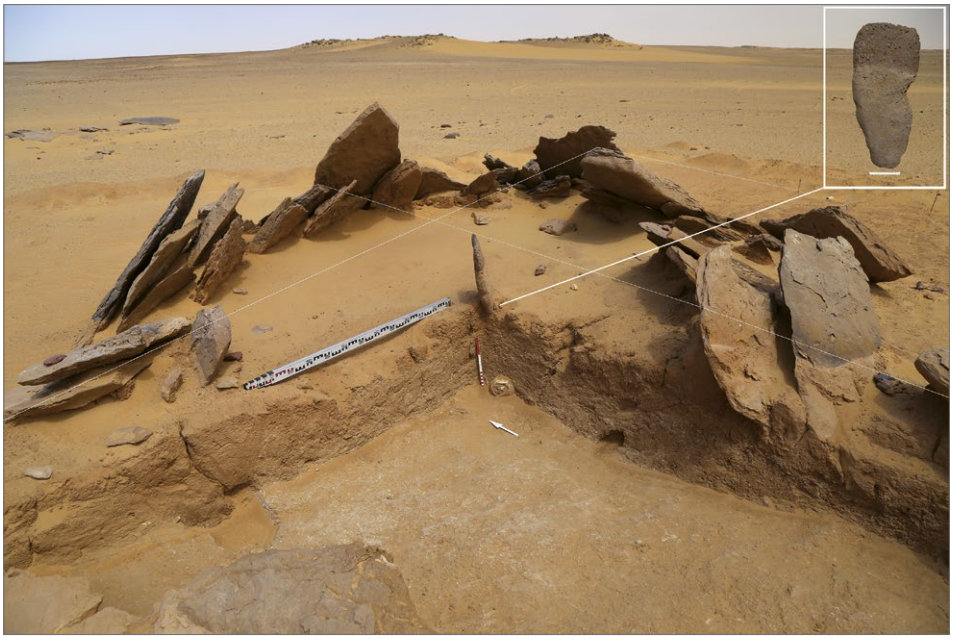

Fig. 4. Bargat el-Shab, site E-12-04, Tumulus 1 (Photos and processing M. Jórdeczka)

of these slabs were placed vertically or diagonally, creating a slightly rounded, elongated shape. The base of the structure was a flat stone [see below, *Fig. 6:D*] measuring about 65 cm × 45 cm × 10–12 cm, with traces of treatment on two edges (two recesses made with a series of blows, 3 to 5 cm deep and 14 and 20 cm long, respectively). The stone may have been previously used as a TS (Bobrowski, Jórdeczka, and Kobusiewicz 2021: 137). The only find accompanying the structural elements was a small fragment of an unidentified animal bone found in the fill, just above the slab. The structure may have had a symbolic meaning with the TS as the central element. Similar ritual contexts for stones of this type are known more widely from the Sahara (Gallinaro and di Lernia 2018). However, a slightly more utilitarian function is also possible; as suggested by Baldur Gabriel (2002),

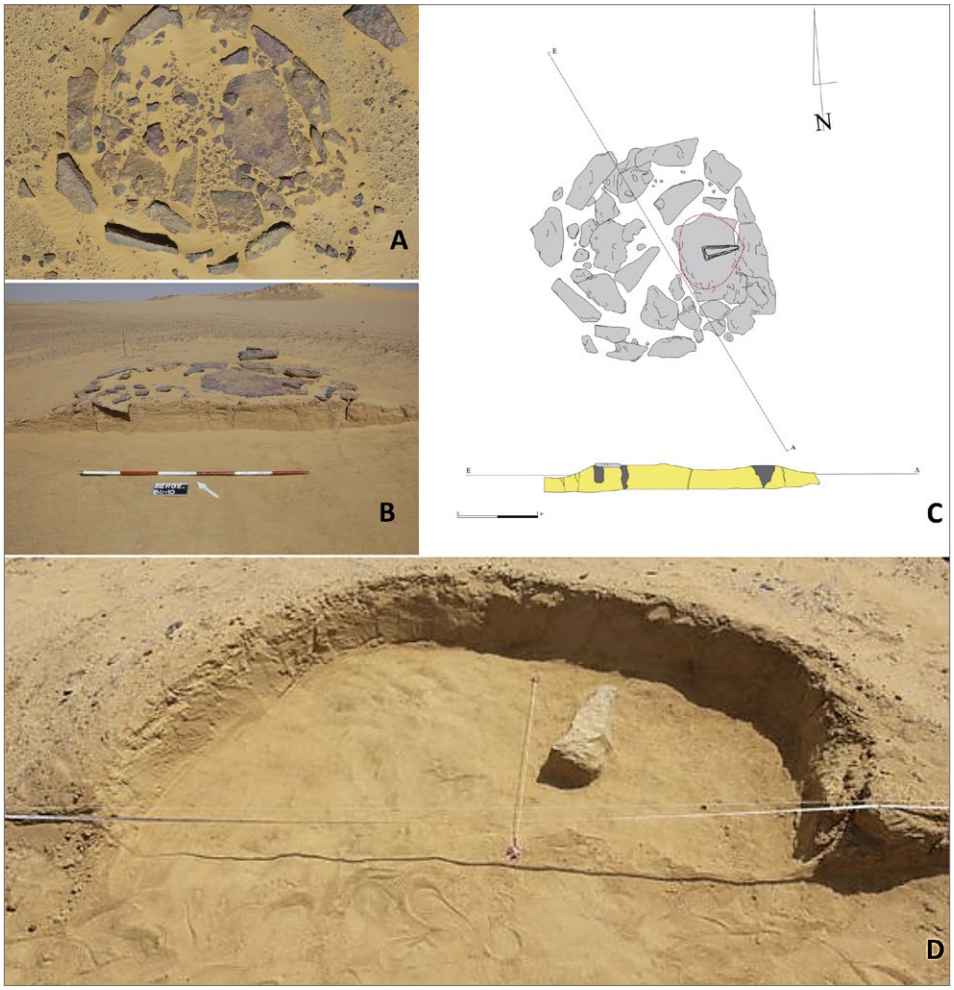

Fig. 5. Bargat el-Shab, site E-17-10 (Photos P. Bobrowski, drawing P. Rutkowska)

Fig. 6. Examples of TSs from Bargat el-Shab (A–E: photos M. Jórdeczka, F: drawing P. Rutkowska)

these small stone circles could have served as drinking troughs for domesticated animals when lined with leather and filled with water (Bobrowski, Jórdeczka, and Kobusiewicz 2021: 137).

A stone circle (E-17-10) located on the opposite shore of the paleolake is an extremely interesting feature [see *Figs 3:A, 5*]. Its maximum height, measured from the contemporary ground level, does not exceed 25 cm. The structure was created by building an outer ring of a dozen or so large (50–100 cm long) quartzite sandstone blocks, some of which bear traces of intentional shaping. The surface inside the ring was covered with several large flat sandstone slabs (approximately 50 cm long) and numerous smaller fragments. In the southeast part of the feature, a large slab measuring approximately 100 cm × 70 cm was placed; under the slab, at a depth of approximately 20 cm from the contemporary surface, a shallow, oval pit (approximately 80 cm × 90 cm) with a trough-shaped cross-section was discovered. At the bottom of the pit, a fragment of a quartzite sandstone plate bearing clearly visible traces of intentional treatment was found [*Fig. 6:F*]. The plate had the form of a small stele shaped like an elongated trapezoid, about 50 cm high, from 20 cm to 7 cm wide, and 8 cm thick. Traces of shallow recesses formed by chipping are visible on both sides, along the longer base. Two more recesses were chipped on the right side. The shape indicates that the stele was originally a light TS. It was placed in the pit along the west–east axis, with the shorter base oriented eastward. No artifacts or traces of other features were recorded in the immediate vicinity of this structure, except a stone circle constituting a distinctive landmark in the vicinity of other large stone structures and numerous hearths. The unique location of the stone circle also seems meaningful: it is an exposed spot visible from various directions, at the mouth of the main wadi that drains rainwater from the southeast into the lake at Bargat el-Shab (Bobrowski, Jórdeczka, and Kobusiewicz 2021: 146).

Table 1. List of TSs from Bargat el-Shab and Nabta Playa

Region	Site No.	Site type	Chronology	TS amount	Context
Bargat el-Shab	E-12-4	Ritual	Late Neolithic	5	Tumulus 1 construction, stele Tumuli 1 and 3, stone structure
	E-17-10	Ritual	Late Neolithic?	1	Stone structure
Nabta Playa	E-77-1	Settlement	Late Neolithic?	7	Surface collection
	E-94-3	Settlement	Late Neolithic	1	Surface collection
	Vicinity of sites E-77-1/ E-94-3		Late Neolithic	18	Surface collection
	E-94-2	Settlement	Late Neolithic	22	Surface collection, in the context of hearths complex
	E-94-1s	Ritual	Late Neolithic	several	Surface collection, near tumuli
	E-97-4	Ritual	Late Neolithic	4	Tumuli construction
	E-97-5	Ritual	Late Neolithic	1	Surface collection, near tumuli with grave

PARALLEL FINDS

Apart from Bargat el-Shab, TSs were recorded at other sites in the southern zone of the Western Desert, primarily in the Nabta Playa area [see *Table 1*].

Five large and heavy notched stones were found on the surface of site E-77-1 at Nabta [*Figs 3:B, 7:B, C*], on its southern periphery. They were made of quartzitic sandstone (3), basalt (1), and limestone (1) and measured 30–42 cm in length, 20–25 cm in width, and 7–12 cm in thickness. Rectangular to long oval, the TSs were roughly shaped by heavy percussion bifacial flaking around the entire edge of the slab. Centrally, along each of the long sides, there were two opposing pronounced notches also formed by bifacial flaking. In addition, the finds included a large milling stone made of sandstone with two pecked recesses in the middle of the longer sides [*Fig. 7:A*] and a small granite stone (13 cm × 6 cm × 3 cm) with four opposed notches pecked into the center of each longer edge was found [*Fig. 7:D*]. Although two settlement phases were distinguished at this site, these finds are more likely to be associated with the younger, Late Neolithic settlement (Wendorf and Schild 2001b: 448–450). In its turn, the Late Neolithic site E-94-3 yielded a notched stone made of a fragment of a milling stone (approximately 15 cm × 6 cm × 3 cm) with a triangular in-out line and two opposed notches pecked into each side [*Fig. 7:E*]. Fred Wendorf and Romuald Schild (2001b: 460) suggested that it could have been used as a tethering stone for small animals. Another 18 large notched stones were found on the surface of deflated silts near sites E-77-1 and E-94-3 (Wendorf and Schild 2001b: 449).

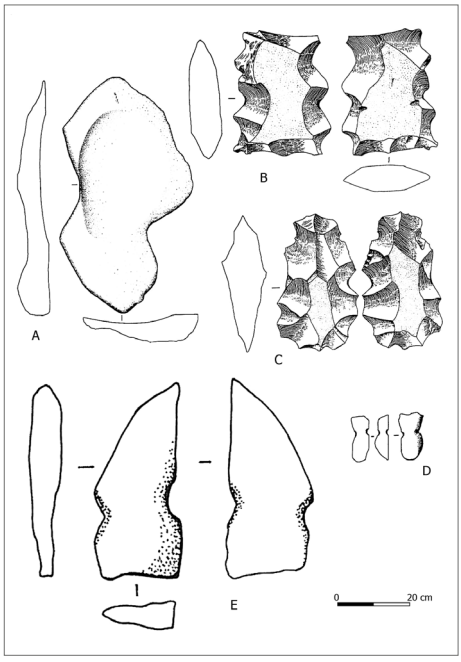

Fig. 7. Examples of TSs from Nabta Playa (After Mohamed 2001 and Wendorf and Schild 2001b)

Twenty-two large notched stones found at the Late Neolithic site E-94-2 at Nabta may have, in the present authors' opinion, been used as tethering stones. They were recorded on the surface of the site, in the context of a hearth complex. The majority of the pieces had at least two notches retouched on two opposite sides. Their dimensions, taken from a sample of five specimens, were 24–50 cm in length, 19–40 cm in width and 4–11 cm in thickness (Mohamed 2001: 423).

A cluster of ten tumuli grouped along the so-called Valley of Sacrifices was discovered at the ceremonial center at Nabta (Schild and Wendorf 2012: 422).

These mounds with diameters of 3–4 m had overlays formed of natural or partly shaped sandstone slabs. Underneath the largest tumulus located at the northern end of the valley, a nearly complete skeleton of a young cow was found resting on its left side, oriented north–south with the head facing north. The skeleton was placed in a previously prepared semicircular chamber covered with a tamarisk roof. Fragments of a small ruminant's rib and tibia were also found in the stone overlay under the lowest layer; the animal was probably a Dorcas gazelle or a young sheep/goat. The feature was radiocarbon dated to the very beginning of the Late Neolithic (Schild and Wendorf 2001).

Examination of seven more tumuli also revealed traces of cattle or sheep/goat burials. One of these tumuli (E-94-1s), featuring a stone overlay 4–5 m in diameter, contained the remains of probably three cattle specimens. Two flint flakes found in this structure may have been left behind by its builders. It was the only feature with stone artifacts clearly associated with burials. Several stones used to tie down cattle (TS) were found in the immediate vicinity of the tumulus (Applegate, Gautier, and Duncan 2001: 473). Four of them were used in an overlay above a burial of a young cow in another tumulus, E-97-4 (Applegate, Gautier, and Duncan 2001: 475). Lastly, a partly preserved human burial was found under the overlay of tumulus E-97-5, whose wider context also yielded a TS (Applegate, Gautier, and Duncan 2001: 475).

Based on radiocarbon datings obtained from the two above features, it is safe to assume that the tumuli from the Valley of Sacrifices were built between 5500 and 4500 calBC (Schild and Wendorf 2012: 422). The authors emphasized that their special location —at the northern end of the Nabta basin, along the main wadi— and the paucity of typical settlement remains, as opposed to the central part of the playa, may indicate a significant social meaning of these structures (Applegate, Gautier, and Duncan 2001).

Studies in the Kufra region (Libya) contributed interesting information on TS distribution. The TSs were discovered as stray finds, in isolation, far from any settlements, but also near them, as well as in ritual places, where they were sometimes found in large numbers (di Lernia, Mori, and Zerboni 2008: 23). In the previously mentioned Messak region in Libya, the vast majority of TSs (approximately 80%) were situated in the context of endorheic depressions, nearly 15% in desert pavements, and the rest on hill slopes. They usually appeared in isolation or in small groups, while their largest concentrations were found in ceremonial areas where rich rock art, *corbeille* structures, and burial tumuli with cattle remains were recorded.

FUNCTION AND MEANING

Previous studies have shown that accurately defining where the TS fits into the network of meanings and functions in the world of the communities living in the Western Desert during the Middle Holocene is both crucial and rather complex, since a variety of social phenomena need to be taken into account. The utilitarian

function of the TS has been confirmed by both archaeological research and ethnographic studies. In rock carvings, these stones are usually depicted as objects used in hunting (Gallinaro and di Lernia 2018: 17; Riemer 2009: 183), and originally this could have been their main function — in fact, modern Tuaregs also use them for a similar purpose, i.e. to catch wild animals (di Lernia, Mori, and Zerboni 2008: 22). An example of a typical foot snare, where one end of a rope is tied to a trap stone or wooden stick, and the other end forms a noose laid upon a spiked wheel was presented by Heiko Riemer (2009: 182–183, Fig. 7). In Saharan rock art there are also depictions of TS in a pastoral context (as devices for tethering cattle). In both cases, the practical application was similar: the animal's foot was tied to the stone with a rope to prevent it from running away (Gallinaro and di Lernia 2018: 17, Fig. 9, f).

Some observations can be made concerning the geographic location of the stones. It is worth noting that no TSs were found in wadis. In Messak, the specimens found in endorheic depressions were typically smaller and more meticulously made, often with deep grooves, while medium and heavy specimens made using simple techniques prevailed on desert pavements and hill slopes (Gallinaro and di Lernia 2018: 10). Near playas, the stones were associated with seasonal shepherds' camps, yet they mostly lay on the surface and were rarely reused as elements of stone structures.

The chronology of these finds is rather difficult to determine, although the presence of a dark varnish only on the exposed surfaces along with the analysis of archaeological contexts suggest the Pastoral Neolithic, with the end of their production at around 3000 BC (Gallinaro and di Lernia 2018: 12, 17). The research by Gallinaro and di Lernia (2018) showed the diversity of TS, which means that their wide application in the Pastoral Neolithic does not preclude their continued use for hunting purposes.

Remarkably, the biggest concentrations of TS occurred in ceremonial contexts. A case in point are sites 07/39 and 07/40 on the bank of Wadi Bedis (di Lernia 2013), where the TS not only occurred on the surface, but also constituted structural elements of ceremonial facilities (*corbeille*). Some stones were also placed inside the *corbeilles* for ritual or symbolic purposes, as confirmed by TSs decorated with engravings, like the specimen from *corbeille* C1 depicting cattle (Gallinaro and di Lernia 2018: 15).

The TSs found at the presented sites in the southern zone of the Western Desert varied in significance and function. At Nabta Playa, they were also found in two different types of contexts. At site E-94-2, all the specimens (probably belonging to the light category) appeared on the surface, in the context of hearths (Mohamed 2001: 423), while at sites E-94-1s (Applegate, Gautier, and Duncan 2001: 473) and E-97-5 these stones were found in the vicinity of tumuli, and at site E-97-4 they even constituted part of the tumulus structure (Applegate, Gautier, and Duncan 2001: 475).

In Bargat el-Shab, TSs were discovered only in the direct context of ritual features. Viewed collectively, the sites seem to have formed a set with similar ritual and symbolic functions and a convergent chronol-

ogy (5000 calBC). The stones were either used as elements of the tumulus structure or placed centrally as a stele (Bobrowski, Jórdeczka, and Kobusiewicz 2021).

Their placement under the mantle of stone in Feature E-17-10 and in the base of the stone structure at site E-12-4 was also clearly intentional.

SUMMARY AND DISCUSSION

During the Holocene Climatic Optimum, the Western Desert was covered with savannah-type vegetation, and its shallow basins would fill up with water during rainy seasons. Such conditions were favorable for game, followed by hunters and gatherers from the oases and the Nile Valley. After a short-lived yet drastic deterioration of climatic conditions (8.2 dry event) and the disappearance of settlement activity, the first Neolithic shepherds passed through these areas in search of favorable environmental conditions. With some interruptions, the process continued from 6000 to 3550 BC. Initially, grazing sheep, goats or cattle constituted an addition to their economy based on hunting and gathering. The significance of pastoralism increased after 5300 calBC, as reflected in the rock art in places such as Jebel Ouenat and Gilf Kebir (Kuper 2006). Eventually, in the 5th millennium BC, with the gradual drying of the Western Desert, pastoralism became the main subsistence strategy (Riemer 2009: 182). This may indeed have been a difficult period, associated with a climate crisis and the gradual drying of these areas, forcing the residents to migrate. Concurrently, settlements increasingly began to emerge along the Nile and in the oases — in locations with continuous access to water.

The discovery of ceremonial sites featuring stone structures in Nabta Playa, where animal remains were buried (Applegate, Gautier, and Duncan 2001), much like in the Messak region (Gallinaro and di Lernia 2018) or in the Red Sea Mountains (Osypiński and Osypińska 2016; Osypińska 2018: 304), demonstrated the complexity of these societies wherein cattle played a key role, symbolizing "status and power", as suggested by Wendorf and Schild (2001a). The presence of cattle burials in stone structures in different regions of North Africa[2] may confirm the existence of a wide cultural circle within the context of the "African Cattle Complex".

Natural conditions forced the human population groups to switch to a more mobile lifestyle, which brought with it the expansion of cattle breeding, as well

2 Outside Egypt, "Cattle burials" are known from many places, including the Talak-Timenrs01 (Paris 2000) or Adrar Bous (Roset 1987; Paris 2000) regions in Niger or the Libyan Sahara (Cremaschi and di Lernia 2000; di Lernia 2006). Numerous TSs were also recorded in certain features. Particularly relevant in this respect are discoveries from Wadi Khashab in the Red Sea mountains, where oval stone structures, dated to the end of 5000 and 4000 calBC, held human burials as well as over ten cattle and sheep burials (Osypiński and Osypińska 2016; Osypińska 2018: 304). Sites with megalithic architecture in the area of Wadi Elei and Wadi Atula were dated to similar periods (Friedman and Hobbs 2002; Ibrahim 2018).

as the extended range of megalithic architecture in the Sahara. Di Lernia (2006) noted the close and causal link between short-term, sudden periods of drought and corresponding ritual/social changes in pastoral Saharan societies, facilitating their adaptation to difficult conditions. The temporal relationship between the climate crisis at the end of 6000 calBC and the emergence of cattle sacrifices and burials in the vast expanses of the Sahara is particularly evident.[3] According to Ignacy Danka and Andrzej Kowalski (2000: 232), cattle breeding was inspired not only by utilitarian needs and the desire to obtain new sources of food; it originated from the need to secure a constant and reliable supply of animals needed to perform sacrificial rituals whenever deemed necessary or at a specific time.

According to di Lernia (2006: 61), "at the beginning of the "cattle-cult", animals served as mediators between group, territory and divinities: actors of this mediation were probably the rain-makers". The use of similar stone structures first for animal burials and somewhat later human burials indicates major social and economic changes (Bobrowski, Jórdeczka, and Kobusiewicz 2021: 124), which led to the transformation of rituals and mortuary ceremonies.

Tumuli containing human burials testify to the emergence of social stratification. They no longer represented the common identity of a group or its collective memory, but rather belonged to members of smaller clans or extended families. Their function could have been to accentuate continuity within the group, the relationships of individuals/families with their ancestors, and their rights to land, with an emphasis on kinship relations (di Lernia 2006: 61).

These changes coincided with the steady deterioration of natural conditions (Wendorf, Karlén, and Schild 2007; Riemer, Lange, and Kindermann 2013), forcing people to adjust their economy and social organization, and consequently, to introduce changes in their ritual sphere. The TSs from Bargat el-Shab described above are part of that process. Originally, they were most probably used for hunting purposes, and since the introduction of pastoralism to the Sahara, they gained a new function as tethering stones. Their presence in the context of sacrificial features (Gallinaro and di Lernia 2018) and human burials (see Bobrowski, Jórdeczka, and Kobusiewicz 2021) may inspire further research on the symbolic meanings of these stones for the shepherds of the time. Placing a TS as a stele above the head of the deceased child was not accidental — rather, it is reasonable to assume that it was an important element of the ritual. In the case of the TS placed under the mantle of stones at site E-17-10, it is possible to draw a similar interpretation. A question for further investigation is whether this act could have been equivalent to sacrificing an animal.

3 The tradition of offerings or other rituals related to animals was a long-standing phenomenon; already in Qadan, at the Tushka 8905 site, skulls of aurochs were placed in graves to mark the head of the buried person (Wendorf 1968: 875; Wendorf and Schild 2001a: 657; Schild and Wendorf 2010: 120).

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