Building monuments, creating identity: Cattle cult as a social response to rapid environmental changes in the Holocene Sahara

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Available online 9 March 2006

Abstract

Abrupt climatic changes in marginal areas, such as the central Sahara in the Early and Middle Holocene were among the major environmental constraints on prehistoric human groups. Social responses to these events were different, with different paths and outcomes. The spread of a ‘cattle cult’—animals buried in ‘megalithic’ stone structures—in the Sahara at the end of the 7th millennium BP (ca. 6400–6000 yr BP) is seen here as a collective ritual that emerged, within Saharan pastoral societies, to face uncertain climate and socially relate to ‘superhuman’ entities. The type of rite—slaughtering of precious domestic livestock—reveals a shared identity in coping with catastrophic episodes—i.e., abrupt droughts. The spread of this ‘cult’ over large parts of present day Sahara is interpreted as the result of rapid movements of nomadic groups in search of pasture and water. Dramatic climatic deterioration at 5000 yr BP is one of the causes of a further major social shift in the rituals archaeologically detected by stone structures: these monuments become human burials, underlining a shift from social to individual identity, as mirrored in the funerary traditions of later pastoral groups.

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1. Theoretical background

Although this paper deals with a specific case study—the emergence of a ‘cattle-cult’ within Holocene pastoral societies in the northern regions of Africa—it is worth outlining some theoretical and methodological aspects, which might contribute to the understanding of the environment/human interaction in ‘catastrophic’ events, that in this specific case is represented by increasing aridity. The nature of this interaction appears to be related to two principal issues: duration and magnitude. Often, the intermingling of two issues might produce a series of phenomena, which must be isolated, defined and explained.

With this in mind, it is therefore essential to consciously assess some of the terminological aspects. The term ‘catastrophe’ (katastrophe, from kata, down, and strepho, turn) originated in classical Greek tragedy to refer to the final outcome of the plot, usually a ruinous one, is commonly used today to define a destructive or dangerous event—implicitly assuming a very rapid timing. However, the term does not convey either the duration or the rapidity of the event itself. For example, the modern concentration of resources in western economies is likely to have catastrophic effects on large parts of the world, over a medium-long period but probably without heavily perceptible effects in the short term (for a discussion, and relations with political aspects and New Ecology see Van Buren, 2001). At the same time, the recent 26 December 2004 tsunami in South-western Asia has had dramatically catastrophic outcomes to differing degrees, according to exact timing, location, geomorphology, etc. This heart-breaking episode affected different places in strongly diverse ways: and this diversity should be evaluated in its socially related meaning.

Viewed from this perspective, catastrophes should be considered a process, and not an event as often implicitly assumed, whose evaluation represents above all an etic (and not emic) judgement of the final outcome: is it dangerous/negative, or not? Even if the tragic outcome of many natural catastrophes on social systems is indisputable, it is necessary, when approaching historical contexts, to carefully track the process itself, and to place at the centre of our analysis the social system. This is the only way to understand the difference between external and internal danger, and related types of perception (Dessai et al., 2004).
This appears to be true particularly in the study of the Holocene prehistory of the Sahara, a theoretically ideal ‘training ground’ for the analysis of social responses to major environmental alterations. The climatic events leading to arid conditions—severe arbiters of human cultural trajectories—short, rapid, abrupt or however we wish to define them, lasted for centuries and with different magnitude, and should therefore be evaluated according to a different time-scale, related to human life on a generational level (i.e., personal and collective memory).

From this point of view, the historical record of the last 10,000 yr—the Holocene archive—might then represent a formidable tool to analyse vulnerability of the system; it might be used for the creation of adequate development policies in marginal areas (e.g., di Lernia and Palombini, 2002), and to innovatively approach the analysis of local knowledge(s).

2. Necessity or opportunity, or why do humans have to move

In concrete terms, what do we need to confront this problem with? Firstly, common agreement on theoretical issues regarding human responses in the past to environmental/climatic events/processes, which is lacking. Secondly, accuracy is required in reconstructing both climate cycles and human cultural development, especially in terms of chronological settings (which are often not available).

As far as the first point is concerned, a marked and profound disagreement has recently arisen within the scientific community in Africa. We owe to Fred Wendorf and Romuald Schild the merit of having clearly set the agenda on the very nature of this climate/human interaction. Reviewing the book ‘Droughts, Food and Culture’ edited by Hassan (2002a), outcome of a ESF workshop held in London 8 yrs ago (1998), Wendorf and Schild (2003, p. 132) wrote: “We also have a philosophical difference that is very difficult to reconcile because of the abrupt and brief character of most of the arid episodes, and the current lack of true precision in dating those events. While the idea of innovation being pushed by the hardships of aridity is appealing, we suggest that in many instances the evidence to support this concept is either lacking or controversial. In some respects the problem resembles that old question: which came first, the chicken or the egg? We believe that many of the technical and economic innovations that developed in the Sahara during the Holocene did not occur in intervals of aridity, but during periods of increased moisture, and our radiocarbon chronology (which differs significantly in many details from that of Hassan) supports that contention. We believe, for example, that the initial spread of cattle into the Egyptian Sahara (ca. 9.2 kyr BP [calibrated]), and their subsequent movement, with sheep/goat, into the Central Sahara (ca. 7.0–6.6 kyr BP) took place during relatively wet periods when water and grazing would be available”.

This point is of absolute importance. Other scholars, including myself, believe the opposite. Aridity, like several other ‘push’ factors, forced humans to move. In my opinion, the archaeological (and geological) evidence clearly supports this position; but what is more important is the need to look for different sources of information, in order to correctly contextualise this issue. In this direction, ethnography and ethnoarchaeology of African pastoral societies support the idea of movement as an obliged condition, and not as a free and deliberate choice (e.g., Hogg, 1990; Iro, 2000; but also O’Connor and Kiker, 2004). It is worth remembering Hassan (2002b, p. 3) when he describes how environmental change is perceived and then implemented within a social system, and how many possible social responses there are, before moving (Table 1). Thus, ethnography, or even ethnoclimatology, might represent a challenge for archaeologists and geologists working on this topic in the future, in the attempt to increase our capacity to decode human behaviours. At the same time, analysis of local knowledge and expertise within modern groups, usually based on long lasting traditions, might help in decoding cultural systems used to predict coming rains, as recently done for the Andean potato farmers (Orlove et al., 2002).

A second point is accuracy in reconstructing the timing of climatic and historical processes and events: radiometric determinations appear to be a critical topic. Notwithstanding many efforts to strengthen this field of research, we still have some serious problems. ‘One date, no date’—someone

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Main social actions for coping dramatic change in rainfall, on the basis of ethnographical enquiries in India and Tanzania (after Riebssame, 1989, quoted in Hassan, 2002a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>India (rainfall decrease from 327 to 159 mm per year)</td>
<td>Tanzania (after the 1970s droughts)</td>
</tr>
<tr>
<td>(1) Collecting weeds as fodder;</td>
<td>(1) Selling cattle to buy food;</td>
</tr>
<tr>
<td>(2) harvesting field borders for fodder;</td>
<td>(2) storing more than one season food when crop is good;</td>
</tr>
<tr>
<td>(3) harvesting premature crops;</td>
<td>(3) moving;</td>
</tr>
<tr>
<td>(4) harvesting crops’ by-products;</td>
<td>(4) asking for help from friends and relatives;</td>
</tr>
<tr>
<td>(5) more weeding; and</td>
<td>(5) weeding plots;</td>
</tr>
<tr>
<td>(6) lopping trees for fodder.</td>
<td>(6) not planting when rain is not enough;</td>
</tr>
<tr>
<td></td>
<td>(7) planting drought resistant crops;</td>
</tr>
<tr>
<td></td>
<td>(8) paying for rainmaker;</td>
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<td></td>
<td>(9) praying; and</td>
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<td></td>
<td>(10) irrigation.</td>
</tr>
</tbody>
</table>

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said years ago. Yet we still rely on single radiocarbon measurements to place a phenomenon, and after several C-14 congresses, we still use conventional determinations (which are cheaper!), rather than processing our samples using AMS facilities. As a result our measurements still show hundreds of years of error, and it is all too easy to use the central date as if it were absolutely accurate: this is quite simply not the case. Therefore, taking into consideration this (desolate) picture, I deduce that we, as a scientific community, still do not agree even on the basic principles which intimately affected human responses (did people move to escape aridity or to follow moisture?), and that we still carry out our research using antiquated tools (a few radiocarbon dates, mostly conventional, with sigma as large as ±300 yr).

Research still has far to go, and more systematic information must be collected, to better redefine these crucial aspects. I wish to stress two points as this paper moves on from these brief considerations: first, ‘catastrophes’, especially rapid and dramatic climatic changes, should be considered as a process; second, humans, in the absence of significant demographic growth, appear to avoid movement, or, at the very least, to dislike moving. According to De Bruijn and van Dijk (2003, p. 285) “Mobility has always been the prime strategy of the Sahelian population for dealing with the vagaries of climate and poverty. People move to look for natural resources to use and exploit alternative economic possibilities, and search for better shelter, more prosperity and greater security”, thus mobility might essentially be seen as a strategy to cope with uncertainty, danger and risk. At the same time, mobility might be considered as a resource, per se (Tafuri et al., in press).

3. Problem: Middle Holocene ‘cattle burials’ in the Sahara?

The recent evidence from Nabta Playa (e.g., Wendorf et al., 2001) has opened a new era in the archaeological research of the Sahara. After decades of studies almost exclusively devoted to the analysis of human adaptations to environmental changes, the existence of ceremonial sites featuring stone alignments, astronomical structures, stone-covered tumuli dating back to Neolithic times, really demands a different approach in our explanatory perspective. The material gathered at Nabta has been interpreted as evidence of a process of increasing social complexity, having as a final outcome the emergence of ranked society within Late Neolithic pastoral communities. Within this context, according to Wendorf and associates, cattle played a crucial role because they “symbolise status and power”. The presence of these animals buried in stone structures supports this idea. Furthermore, cattle surely hold a special role in African pastoral societies, and I wonder if we should speak, as many colleagues do, of an ‘African cattle cult’, quoting and reusing the concept put forth by Herskovits (1926).

I think it is a convincing and fascinating hypothesis, which may be strengthened by other data sets, even far from the Eastern Sahara. Comparisons could derive from old and new case studies from the central Sahara, viz. in Niger and Libya. The basic assumption is that of a strict, causal relationship between short, or even abrupt arid spells and ritual/social adjustments within Saharan pastoral societies to cope with vulnerable conditions (for a definition of vulnerability to climatic change and related adaptation, see Kelly and Adger, 2000). At the same time, the presence of identical monuments devoted to the burial of inhumations raises the question of the relationship between the former (cattle burials) and the latter (human burials).

If cattle symbolise social power, the change from ‘cattle burials’ to monuments with identical stone architecture but containing human inhumations traduces a profound social transformation in the rituals. As a matter of fact, it is evident how the two are strictly connected as far as monumental features are concerned, hinting to an African legacy, ‘buried’ in these stone structures. Thus, the explanatory line I will use in this paper will first highlight specific causal relations between the abrupt dry crisis at the end of the 7th millennium BP and the emergence of the first cattle burials in many—and distant—areas of the Sahara. Throughout the text, radiocarbon dates are expressed in years BP, i.e. uncalibrated years before present, using Libby’s half-life. Secondly, times and trajectories of diffusion of this particular ritual will be tracked. Eventually, I will draw attention to the evolution of the stone architecture connected with the practice of animal offering. This will be achieved having as a case study the central range of the Sahara, where stone tumuli changed their function (i.e., from animal to human burials) throughout time (i.e., from Middle to Late Neolithic Pastoral), and how this shift in function may be used as an effective tool to detect important social and ritual change within Middle-Holocene pastoral societies, mostly related to rapid changes in the environmental conditions.

4. Background: sites with cattle remains in stone monuments

The archaeological evidence gathered at Nabta is really spectacular. The cattle burials found and excavated there represent the greatest concentration in prehistoric North Africa. This phenomenon, seen as part of a complex ritual scenario related to the existence of a ceremonial centre in the Late Neolithic, should be considered, according to Wendorf and his colleagues, as prehistoric evidence of the so-called ‘African Cattle Complex’. Of interest to us are four excavated tumuli containing cattle remains, which are of two types (Applegate et al., 2001).

On the western edge of the largest wadi to the North of Nabta we have the first of two differing types of stone-covered tumuli marking the burial sites of cattle. Seven out of the nine tumuli examined have been excavated. At E-94-1n, at the northern end of the Late Neolithic ceremonial
complex, the stones covered the remains of an articulated young cow in a clay-lined chamber. Radiocarbon determination on a piece of wood gave a date of 6480 ± 270 yr BP. The badly preserved cow had the spine oriented North–South, its head looking South (Fig. 1).

The second type of tumulus consists of disarticulated Bos bones scattered between unshaped rocks. Sites E-94-1s, E-96-4, E-97-4, E-97-6 and E-97-16 are associated with the remains of three, four (two sub-adult, two young adults), two (one juvenile, one sub-adult), one and one (sub-adult) cattle, respectively. No particular body part was deliberately selected for deposition.

Even if quite spectacular, the Nabta evidence is not an isolated feature. We have important evidence, reported from the late 1970s to the early 1990s (Fig. 2) from Niger.

4.1. Air Mts., Niger

Lhote (1976), quoted in Paris (2000) reported a possible ‘cattle burial’, represented by remains of articulated cattle in the Talak–Timenroï area (western Air, Niger). These skeletons were located at the edges of settlements, sometimes apparently associated (at least in spatial terms) with human burials. However, according to Lhote, the deposi-

tional features of these animals should have to be referred to as epizootic deaths. The animals would have been immediately buried by heavy desert storms (thus preventing any possible scavenging and/or erosion), explaining why they have been found still in anatomical connection. Worthy of note, Paris (2000) simply observes that all these animals had their head oriented towards the East—a systematic position difficult to explain as due to random factors—therefore implicating some ritual activities. Nevertheless, Paris (2000, p. 114) reminds us that the presence itself of Bos burial cannot be interpreted as direct expression of ritual linked to animal (the ‘cattle cult’): in his own words—‘The Bos inhumations are the ones most likely to be linked to a ritual but it is not possible to affirm whether this ritual concerns the Bos itself, like the Egyptian bull tombs, or whether they were an offering to a separate individual or entity’, thus separating the offering (cattle) from the ‘divinity’.

At In Tuduf, 10 km N–W of Chin Tafidet (again in Niger), Columeau (quoted in Paris, 2000) surveyed a site with remains of probably Bos indicus, dated to 3500 yr BP. Also in this case, cattle were killed, butchered and then buried with a complex ritual. Animals lay on their right, East–West-oriented and with the forequarter almost always East-oriented, similar to the humans buried there. The ratios between number of animal and human inhumations, however, were of 5/38 at In Tuduf 1, 1/30 at In Tuduf 3 and 18/70 at Chin Tafidet: in all of these sites cattle inhumations are spatially separated from the human burials (Fig. 3).

4.2. Adrar Bous

French archaeologists excavated three small tumuli (Site 1) in the Adrar Bous. North of Adrar n Kifi, at the edges of the Tenerean site S1, Paris and associates excavated in 1981 a small tumulus (1.4 × 0.4 m²) containing the right forequarter of a cow (i.e., half right mandible, skull with horn cores, cervical and dorsal vertebrae with the first ribs and the right foreleg). The same team, 8 yr later (1989) in the same site, dug another tumulus (2 m large and 0.5 in height), discovering burnt bones of cattle, probably a whole disarticulated skeleton. Bone collagen gave 6200 ± 250 yr BP (Pa 753). A similar structure excavated by Roset (1987, p. 207) on 1985 yielded a date of 6325 ± 300 yr BP (Pa 330). According to Paris (2000, p. 121), “it is not possible to say that they are ritual structures but they are intentional as the bones are placed in a pit closed by stones”.

The most striking evidence rising from this rapid review is that initial forms of stone tumuli known in the Sahara contain livestock remains, be they articulated or scattered. All of them are more or less simultaneously dated around 6400–6100 yr BP. It has to be underlined, however, that the tradition of offering animals or other animal-related rituals is a long-lasting cultural phenomenon: in Niger, this rite is present in monuments dated to the 3rd millennium BP.
at Iwelen, in northeastern Air, a fragment of cattle mandible was found near a human skeleton in a stone tumulus radiocarbon dated on leather shroud to 2550 ± 350 yr BP (Paris, 2000).

5. New data from the Libyan Sahara

5.1. Messak Settafet

Recent research in this region added important pieces to the problem of ‘cattle burial.’ Some unplundered stone tumuli were excavated, during a rescue operation in areas connected with oil exploitation (Cremaschi and di Lernia, 2000; Anag et al., 2002). In particular, three structures yielded livestock remains, and may be interpreted as ‘cattle’ burials or ‘stone monuments built for ceremonial purposes’. Another important attestation is a site excavated at In Habeter during the 1993 field season: at that time, this kind of evidence was rather isolated, and not adequately seen in its proper context. These will be described in detail, after a rapid description of geomorphologic background and of the state of research in the area.

From the geological point of view, the Messak Settafet, in South-western Fezzan, Libya (Fig. 4), is a plateau cut into the Lower Cretaceous Nubian sandstone, gently tilted eastward and delimited to the North–West by an abrupt scarp. The plateau is interpreted as a relict of a Tertiary peneplain with inselberg-type relief. The large slope affecting the North-western part is due to processes originated in a humid environment. Present investigation discovered common remnants of lateritic paleosols on the top of the hammada and, at its eastern fringe, a continuous belt of similar soils, merging below the dunes of the Edeyen of Murzuq (Cremaschi, 1994; Cremaschi and di Lernia, 2000). A dense net of cataclinal wadis dissects the plateau, showing a dendroid pattern and highly sinuous channels. Hydrographical density, shape of the channel and sinuous pattern indicate that the fluvial net is fossil and originated under a rich water supply, possibly in a wet Tertiary equatorial climate. However, the wadis experienced a period of hydrographic activity also during the Pleistocene (e.g., Cremaschi, 1994). The desert pavement of the Messak Settafet is nowadays a palimpsest of lithic scatters ranging from Middle and Late Acheulean up to historical times. Unfortunately, these stone assemblages are usually deprived of their stratigraphic context, but still preserve some residual
spatial configurations. Holocene human presence is testified by hundreds, probably thousands of stone structures—conical tumuli, megalithic structure and other enigmatic lithic features (e.g., Gauthier and Gauthier, 2004, herein references). Unfortunately, this archaeological evidence is barely known, but some recent surveys help to settle the matter. Rare deposits in rock-shelters, pastoral campsites, rich concentrations of trapping/tethering stones and fireplaces roughly complete the picture of the human population of the last millennia (e.g., Cremašchi, 1994; Cremašchi and Di Lernia, 1998a, b, 2000; Anag et al., 2002). Needless to say, rock engravings deserve special attention. Without a first-hand approach, it is hard to comprehend the astonishing quantity and the superb quality of this immense open-air museum, nowadays better known thanks to the impressive research by several ‘amateurs’ (e.g., Lutz and Lutz, 1995; Le Quellec, 1998; Van Albada and Van Albada, 2000).

5.1.1. In Habeter IIIa

During the 1993 field season of the Italian–Libyan Mission in the Acacus and Messak, the area of In Habeter, well known for its magnificent rock art, was intensively mapped and selected excavations were undertaken (di Lernia and Cremašchi, 1997; Cremašchi and Di Lernia, 1998a, b; Ponti, 2003). In particular, a large conical tumulus (12°09′55″N 24°43′20″E) revealed to be the burial of a badly preserved adult male: the radiocarbon
determination, on charcoal associated with the inhumation, gave 5071 ± 91 yr BP (GX 20348-AMS). A few metres from the tumulus, a rough standing stone, around 70 in height and 40 cm in width appears to have been raised after an elaborate ritual (Fig. 5). Before setting the stele, two ceramic containers were probably ritually broken and placed in the pit. In the latter, a number of animal bones, in a poor state of preservation, was also found. According to Corridi (1998), 38 fragments of *Bos primigenius f. taurus* were identified, all belonging to a single, adult male. Radiocarbon determinations run on burnt bones gave 5213 ± 80 yr BP (GX 19108-AMS). As evident, In Habeter IIIa is of utmost importance, since human and animal burials are both present. Furthermore, radiocarbon chronology points to a substantially contemporaneous ritual:

200 yr might not be significant as their standard deviation nearly overlaps. In any case, strong similarities are evident in the pottery, found in the two structures: one vessel with decorated rim placed as grave goods in the human burial; two vessels with quite similar decoration in the foundation pit of the standing stone.

### 5.1.2. Site 301

The monument is a stone tumulus (26°03′48.2″N 12°04′56.6″E, 815 m asl), located on the right bank of the wadi Tin Einessnis (Fig. 6) and built within a very complex scenario: among many other stone tumuli, more than a hundred trapping stones punctuate the landscape. This stone, slightly deflated conical tumulus was particularly well preserved, and showed some covering boulders.
bearingschematic/enigmatic rock engravings. In the surroundings, other stone structures were probably related to the ritual function of the monument. The tumulus is about 4.5 m in diameter and presents two small semicircular annexes. The monument yielded lithic artefacts, one potsherd, and many faunal remains. Four hearths were present at its base, very rich in charcoal and faunal remains (Fig. 7). Two big stone axes were also found (Fig. 8), likely related to a ritual deposition. According to wear traces study (made by C. Lemorini), the artefacts show a strong unbalance in use between the handle (heavily used) and the cutting edge (very scarcely used), indicating rejuvenation immediately before its abandonment in the stone monument. The single potsherd found shows a plain edge rocker decoration, echo of a Middle Pastoral tradition: its location on the very end of the structure, again, appears to be ‘ritual’. Radiocarbon date on charcoal is consistent, giving 6080 ± 80 yr BP (spot C; GX-28453).

The faunal assemblage, still under study by Francesca Alhaique (nd), consists of more than 5000 fragments (88% turned out to be unidentifiable). As a whole (Table 2), we have the remains of at least two cows (one practically whole) and four domestic ovicaprids. All the individuals are rather young. The hearths show a differentiated accumulation of animal remains. In particular, Spot B yielded only ovicaprine bones, whereas Spot C (dated by radiocarbon) cattle remains. Spots A and D show a mixed composition. Modifications on bones are difficult to recognise: most of the remains are burned and poorly preserved; however, chop, and other scraping marks may be interpreted as meat removal. According to the archaeozoologist, and to myself, animal bones were put in the hearths in the same moment, underlying the important quantity of animals slaughtered, and therefore the relevance of the ritual performed there. As recently reminded by Achilles Gautier (Applegate et al., 2001, p. 487), we should imagine that many (dozens, probably hundreds) persons took part in the ceremony, given the large quantity of available meat.

5.1.3. Site 556

A few kilometres South of site 301, we mapped another complex area in the southern part of the wadi Tin Einessnis. The area is some 400 × 300 m in size, and it includes the wadi bank, a small valley bordered by two minor tributaries, and two large quartzite outcrops. Many other structures punctuated this area. The Middle Pastoral occupation is most evident. The most interesting site is stone structure 556 (25° 59′ 37.7″ N 12° 11′ 07.0″ E, 756 masl), circular in plan, some 2.8 × 2.3 m, composed of a ring of huge slabs set into the ground in an oblique position, due to post-depositional gravity displacement (Fig. 10). It encircles a stone platform made with small- and medium-sized globular and prismatic stones, varnished on the upper part. Two standing stones were present, close to the centre of the structure, one of which was set over the bedrock with several wedging stones. A semicircular annex was present on the North-western side of the stone ring. Two engraved stele were recovered, one in the stone ring (with ‘ovoid’ representation), and another one some 1.6 m SE of the monument (with two cattle figures in naturalistic style: Fig. 11). Several potsherds, mainly undecorated, but also with a plain rocker zigzag pattern, were recovered outside and
inside the structure, along with a lot of faunal remains, many lithic artefacts including a cleaver, and pieces of charcoal.

Faunal remains have been unearthed from both the stone platform and foundation pit of the engraved stele. Both spots have been also radiocarbon dated: burned bone from the platform gave $5150 \pm 110$ yr BP (GX 28446); the bone from the pit yielded a consistent determination, of $5290 \pm 40$ yr BP (GX 28447-AMS). Ceramic potsherds from the structure confirm this delayed Middle Pastoral attribution.

About 200 fragments of animal bones came from the stele foundation pit (60 fragments selected for radiocarbon dating: Table 3). Almost all determinable bones belong to domestic cattle. Only a portion of the animal was placed in the monument, lacking parts of the cranium and of the axial skeleton: therefore, a single animal is represented, although its age, given the poor state of preservation of the remains, is uncertain.

Bones from the platform show similar preservation, and quantity. A few are surely related to domestic cattle; however, remains of a “large ungulate”, quite likely *Bos*, refer to other (lacking) parts. Considering the assemblage as a whole—given architectural relations and radiocarbon determinations—it is likely that a single cow has been slaughtered, but not entirely placed in the monument.

5.1.4. Site 557

This stone platform, named site 557, is placed only few metres southwest of site 556 (25°59’37.8”N 12°11’06.8”E, 760 m asl). The structure, some $3 \times 4$ m in size, is composed of prismatic stones, small to medium in size, varnished on the upper side only (Fig. 12). One of the major points in choosing this structure for archaeological investigation was due to the presence of potsherds among its covering stones and the proximity to site 556. Many potsherds were also recovered during the excavation, together with several pastoral lithic artefacts (among which a rough-out foliated axe) and a few faunal remains, some burnt. The animal bone fragments point again to a large ungulate (cattle?): radiocarbon determination on burned bone gave an age of $5750 \pm 40$ yr BP (GX-28448).

This structure should be strictly related to site 556 as far as its meaning is concerned. The differences between the two adjacent sites in their CI4 chronology point either to a real time gap (some 600 yr) or to specific problems in quality of radiocarbon determination. However, the entire area could be interpreted as a ritual site connected with the killing (sacrifice?) of cattle, probably reflecting long-lasting tradition in the area, as also testified by rock art in the immediate vicinity.

Rock art provides spectacular evidence for the existence of a ‘cattle cult’ in the Sahara. In the Messak mountain

<table>
<thead>
<tr>
<th>Provenance/species</th>
<th><em>Bos taurus</em></th>
<th>Small mammal</th>
<th>Small ungulate</th>
<th>Large ungulate</th>
<th>Ungulate Unident.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Platform</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>36</td>
<td>—</td>
</tr>
<tr>
<td>Foundation pit</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>12</td>
<td>5</td>
</tr>
</tbody>
</table>

Fig. 11. Site 556, Tin Einessnis, Messak Settafet, Libya: particular of the naturalistic engravings on the stele associated to the ‘corbeille’ monument: a ‘ritual’ offering of burnt cattle bones was deposed at its base.
ranges, we have scenes—mostly engraved—of cattle sacrifices, vivid descriptions of this ritual within pastoral societies (Fig. 13). Unfortunately, their dating is still a controversial matter. Nevertheless, the same existence of an extraordinary rock art—both painted and engraved—focussed on cattle and on pastoral ideology may be considered evidence of the ‘African Cattle Cult’ (as indicated for example by Holl, 1998, and more recently by Smith, 2004).

6. Remarks, and some hypotheses

Thus, also in the central Sahara, the presence of sites with cattle bones, dedicated to complex rituals, cattle sacrifices depicted on the wadi walls, sacred fires and building of labour-demanding monuments appears to strongly resemble the evidence known at Nabta in Egypt. In the Messak, this phenomenon appears to be a cultural component of Middle Pastoral groups (ca. 6100–5000 yr BP), known as transhumant cattle herders, exploiting different ecotonal niches on a seasonal basis.

However, to better understand this phenomenon, we should ask ourselves: how and why did this particular cult spread so quickly and over such a large area? What is its meaning? And, mostly, what are the relationships with the ubiquitous megalithic architecture typical of later nomadic pastoral groups, known to have identical architectural features but containing human instead of animal burials?

6.1. How and why?

The earliest evidence of ‘cattle-burial’ cult appears to be evident over a large territory and in a rather narrow chronological interval (Fig. 14): from around 6400 yr BP, there are sites sharing strictly similar ritual, but at more than 3000 km from each other. Even when taking into account the bias due to archaeological research, the fact remains puzzling: the idea of a fast rate of dispersal appears not unsound.

It is improbable that a population increase was the reason for the spread of this ‘cattle cult’ from the Egyptian desert (where the oldest cattle burials are located) to the central Sahara. Analysing the (apparently) rapid rate of expansion of small livestock in northern Africa, which appears to have similar timing and directions, Hassan (2000a, p. 74) suggests that it is unlikely to be interpreted as “demic (population) expansion of an advancing ‘wave’ or a ‘frontier’, but rather a ‘leap-frog’ movement by small groups”. He hypothesises a possible movement of 10 km/yr: if true, some 300 yr would have been necessary to cover the distance separating the two areas (eastern and central Sahara). I think it is more likely that the movement was even much faster, given the deteriorating environmental conditions. In fact, with high interannual variability in
rainfall and increasing droughts, this idea better fits with archaeological data. This highly plausible intermittent movement of pastoral people might parallel, in some ways, non-linear responses between climatic change and Saharan vegetation cover, as indicated by Claussen et al. (2003). The same was for the domestic livestock, whose management was a severe challenge for pastoralists of arid lands, probably affected by ‘boom and bust’ population dynamics in relation to highly variable and unpredictable precipitation, especially in unfamiliar environments (Scoones, 1993; O’Connor and Kiker, 2004).

I strongly believe that conditions of aridity are to be regarded as an essential background to mobility, at the foundation of the ‘cattle-cult’ spread. As a consequence, it is tempting to suggest a rapid diffusion of this ‘cult’, in relation to other forms of group movement connected to climate change and management of resources. The related spread of megalithic architecture in the Sahara—i.e., the use of stone structures to bury cattle and other animals in elaborated rituals—has to be related to large-scale movements of nomadic pastoral groups that used these stone structures to mark their territories and as aggregation signs for different sections or lineages. We should also take into consideration ways of penetration in unfamiliar environments, as recently argued by Rockman and Steele (2003), and consequent need to mark their new landscape. These ‘ritual’ slaughtering of cattle, in areas characterized by drying environments could have been part of an articulated scenario, related to rainmaking ceremonies, a likely cultural milieu to counteract the abrupt changes in environmental conditions.

Literature on African paleoclimate is too large to be recalled here; however, most evidence supports a scenario of dramatic decrease in rainfall in the second half of the 7th millennium (e.g., Hassan, 1997; deMenocal et al., 2000; Cremaschi, 2001); furthermore, the main features of the ca. 6400–6100 yr BP arid spell are the patchy distribution and its length: where recorded, it seems to have lasted around 300 yr. Thus, it is noteworthy the apparent similarity in duration and chronological placing of this arid interval and the very initial spread of the ‘cattle-burial’.

Thus, the second half of the 7th millennium BP, characterised by increasing aridity, marks the emergence of a ‘cattle cult’ as a social response to cope with droughts and famine, using this precious resource as an offering to superhuman entities. As a matter of fact, as evidenced by Wendorf et al. (2001), cattle still seem to dominate the lives of modern herders living along the Upper Nile: they are their primary wealth today; they are used to pay bride-payments and blood fines, and they are the basis for prestige. Particularly relevant among these groups are the rain-maker religious figures, who “derive their power from ancestral spirits, and may be either the embodiment of their high god or, more frequently, serve as intermediary with that god to bring rain, so the grass will grow and their cattle will flourish” (Wendorf and Schild, 1998, p. 117). An ethnographic example for cattle sacrifice, with due caution and far from a ‘buckshot’ approach, is given by the Wodaabe in Niger, with attestations of ritual butchering. When clans gather a bull is sacrificed, cut up except for the head, tail and hocks, grilled, and eventually re-constructed in its anatomy, just before performing a ritual ceremony. At the end of the ritual all the meat is eaten, and the skin used for making prized objects (Paris, 2000). Interesting ethnographic evidence of the relations between livestock, rock art and use of space is given by Richard Gramly (1975) on meat-feasting sites. The analysis of two late 19th century Masai sites in eastern Africa revealed a complex pattern, indicating that ‘special areas well away from open-air settlements are reserved for slaughtering and consumption’ (Gramly, 1975, p. 109), in this case rockshelters. With obvious differences, compared to prehistoric processes, the main interest is the ritual use of cattle as a cultural tool for strengthening alliances in the occasion of clan (lineage) meetings.

With this in mind, I think it is likely to look at the ‘cattle cult’ as an African legacy, rooted in the Holocene prehistory, and mediated through time and places with different social meanings, for millennia. The origin of the ‘African cattle complex’ might be found in this habitus, born more than 6000 yr ago, which places the cattle at the centre of social rituals performed to deal with diversities and superhuman entities.

6.2. Relations with later nomadic people

As stressed above, megalithic architecture—represented by cattle burials—spread over the Sahara in relation to mid-Holocene short, abrupt dry events. However, the ideological and cultural transformation evident in the use of these stone monuments (from animal to human burial) across time is yet to be stated. This ‘megalithic’ culture, with minor differences, lasted for centuries and covered an enormous territory. Progressively, this practice moved from animals towards humans, some 5000 yr ago: to my knowledge, only a couple of isolated radiocarbon dates for human burials are older than that date (5650 ± 70 yr BP for Egypt: Site D5.1: Castiglioni et al., 1995; 5360 ± 200 yr BP for Niger: Adrar Bous, Site 2: Paris, 1997). In our study area (Acacus and Messak Mountains, Libyan Sahara), the first evidence of stone-covered monument related to human inhumation is much later. As discussed before, it is known at In Habeter, in the Messak, at around 5000 years BP (Cremaschi, 1994; Cremaschi and di Lernia, 1998a, b).

Interestingly, we record a partial overlapping between the ‘last’ animal-burial monuments, and this first expression of a new funerary rite, related to humans. This ‘passage’ appears to have occurred just at the transition between Middle and Late Pastoral, when the abrupt arid oscillations probably forced people to move again, and to meet.

There is evidently a cognitive shift in the use of megalithic monuments throughout time: the following tentative explanation is, of course, a speculative process.
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. Deep social and economic changes will be later evident in the use of megalithic tombs for people, where a process of social differentiation develops in the use of these structures as a way of affirming (starting from the ‘cattle-cult’ legacy) personal identity. In fact, the first ‘human-related’ stone tumuli were generally single burials of adult males. Therefore, from ‘things fixed in the ground’ (sensu Ingold, 1986)—i.e., elements of social tenure and group’ territorial markers—stone tumuli related to cattle ritual ‘became’ human tombs, changing their symbolic function and bearing the vertical expression of incipient social stratification. These monuments no longer belong to the group—underlining common identity and group wealth, as was the case for the cattle burials—but probably to lower segments of semi-nomadic, pastoral societies: smaller clan members or extended families. This change in megalithic architecture represents the shift of symbolism from collective memoir to individual biography, both however evocative of a dense social tradition.

The shift in the ideological process is materialised in a change in the use of these megaliths. The original mediation with the divinities/ancestor—a cosmological value—remains, but it is shifted from the ‘collective’ to the individual. Therefore, these monuments begin to emphasise a direct relation between the individual(s) and the ancestors, and between the latter and the land where they are buried. In this way, the ancestors strengthen the cohesion of the community and its economy, claiming rights over resources. Following this approach, it is possible that a primary function for these first human-related stone structures was to emphasise the continuity within the group and its rights on the land, stressing kinship relations.

This really is a fundamental transformation, whose archaeological record is still nebulous and vague, but it represented a crucial change within Saharan pastoral societies. Looking at radiocarbon determinations, such (very long) millennium BP. Timing is imprecise, and data are still poor, but it is of interest to underline that such (very long) ‘transition’ begun in apparent concomitance with yet another dramatic worsening of environmental conditions, the dry spell at some 5000 yr BP (e.g., Gasse and Van Campo, 1994; Hassan, 1997, 2002c; Cremaschi, 2001). Again, rapid climatic changes of environmental conditions push people to respond and implement these mutations innovating their social, ritual and economic structure.

Acknowledgements

I wish to thank Suzanne Leroy for her invitation at the Dark Nature Conference in Mauritania, greatly appreciated and enjoyed. I benefited of comments and suggestions from many people there, particularly Martin Williams. I would also like to express my gratitude to Mauro Cremaschi, co-director of the Messak Settafet Rescue Operation, for information and discussion. Many thanks also to the Libyan colleagues, particularly Ehmeh Ali Khaddouri (President of the Department of Antiquities), to Drs. Giuma Anag and Ebrahim Azzabi. My warmest thanks to Mary Anne Tafuri, especially for discussion on mobility and identity. I also wish to thank Helene Jousse for her kind help in a previous draft of the manuscript. I would also like to thank very much Andrew Smith and the anonymous referee for comments and improvements to the text. Useless to say, errors and omissions are mine.

References

deMenocal, P.B., Ortiz, J., Guilderson, T., Adkins, J., Sarnthein, M., Baker, L., Yarusinski, M., 2000. Abrupt onset and termination of the


