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HUNTING CAMPS IN PREHISTORY

François BON
Sandrine COSTAMAGNO
Nicolas VALDEYRON

Current Archaeological Approaches



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Karim GERNIGON

Céline THIÉBAUT

Translation

Karim GERNIGON

Hazel KING

Magen O'FARRELL

Layout, graphics

Fabien TESSIER

The contributions should be addressed to:

REVUE P@LETHNOLOGIE

Vanessa LEA, Research associates

TRACES - UMR 5608 of the CNRS

Maison de la recherche

5 allées Antonio Machado

31058 Toulouse cedex 9, FRANCE

Phone: +33 (0)5 61 50 36 98

Fax: +33 (0)5 61 50 49 59

Email: vanessa.lea@univ-tlse2.fr

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A MOUSTERIAN DROMEDARY HUNTING CAMP:

Level VI1aO at Umm el Tlel (El Kowm, Central Syria)

**Christophe GRIGGO, Éric BOËDA, Stéphanie BONILAURI
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A MOUSTERIAN DROMEDARY HUNTING CAMP:

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Abstract

The site of Umm el Tlel, located in the El Kowm basin in Central Syria, contains a long stratigraphic sequence extending from the Roman period to the Acheulean. The artifacts exceptional well preserved, particularly for the Mousterian. The existence of such a sequence on the steppe margins can be explained by the permanent presence of water.

The abundant artifacts collected throughout the Mousterian sequence have permitted us to show that there was a significant variability in regional technical behaviors and to identify the functions of this site.

Through a multidisciplinary approach, we thus propose to explain why we believe that the Mousterian level VIIa0 corresponds precisely to what most archaeologists consider as a “hunting camp”.

This level, excavated over a surface of 20 m², yielded nearly 250 archaeological artifacts. Faunal remains are by far the most abundant and all are attributed to a single species: dromedary, or Arabian camel. The lithic artifacts consist of less than twenty objects, including 15 retouched flint flakes over 2 cm long and two limestone blocks. The whole assemblage was fossilized in silts of a palustrine origin, which were deposited very shortly after the Mousterian occupation. There was no subsequent post-depositional disturbance. We thus have an exceptional recording of a short duration occupation during which a small group of Mousterians came to hunt dromedaries at the edge of a lake.

Keywords

Umm el Tlel, Syria, Middle Paleolithic, hunting camp, dromedary, lithic industry, limestone, skeletal representation, retoucher, spatial distribution.

In recent years, much multidisciplinary research has been devoted to Paleolithic sites. The objectives are, among others, to reconstruct the socio-economic activities performed at these sites and their function and/or season of occupation. The broader goal is to understand the capacity of prehistoric groups to master their environment through the planning and anticipation of activities within a territory.

The site of Umm el Tlel has been the subject of numerous multidisciplinary studies. Some of these studies (Boëda *et al.*, 1998, 2001; Griggo, 2000, 2004) have shown that throughout the Mousterian sequence, the site function changed several times, taking the following forms:

- habitat site with diverse activities, for level V2ßa;
- intermediary site with specialized activities in association with meat processing, in the eight levels of complex V13;
- hunting site with preliminary butchery activities in the two levels of complex VI1.

The activities performed on the site are thus variable from one level to another, except when there are several successive levels within the same sedimentary unit, in which case the activity stays the same. These different site functions do not appear to be associated with particular climatic conditions and do not correlate with the evolution of paleoclimates.

In this paper, we present the results obtained for level VI1a0, which corresponds to an exceptionally well preserved dromedary hunting camp on the edge of a paleo-lake occupied during the Middle Paleolithic. We use the term “hunting camp” in its strictest sense to define the location where a human group remained just as long as was necessary to kill a few animals and perhaps to prepare the carcasses to facilitate their transport. We will see how, based on the analysis of osseous and lithic artifacts and their spatial distribution, it is possible to reconstruct the successive events in level VI1a0 at Umm el Tlel.

1 - The site of Umm el Tlel

Umm el Tlel is an open-air site located in the El Kowm basin in central Syria, between Palmyra and the Euphrates (figure 1). It has been excavated since 1991 by a Syrian and French team, directed by É. Boëda, S. Muhesen and then H. Al-Sakhel. Its stratigraphic sequence is 25 m thick, extending from the Acheulean to the Roman and Byzantine historic periods (figure 2). Currently, 18 m of the stratigraphy have been excavated, containing over 100 archaeological levels, 75 of which are attributed to the Middle Paleolithic (figure 3). In addition to this stratigraphic sequence, one of the longest known in the Near East, the site is also characterized by the excellent state of preservation of its occupation levels, particularly those attributed to the Mousterian. The existence of such a sequence within the steppe margins is due to the permanent presence of water.

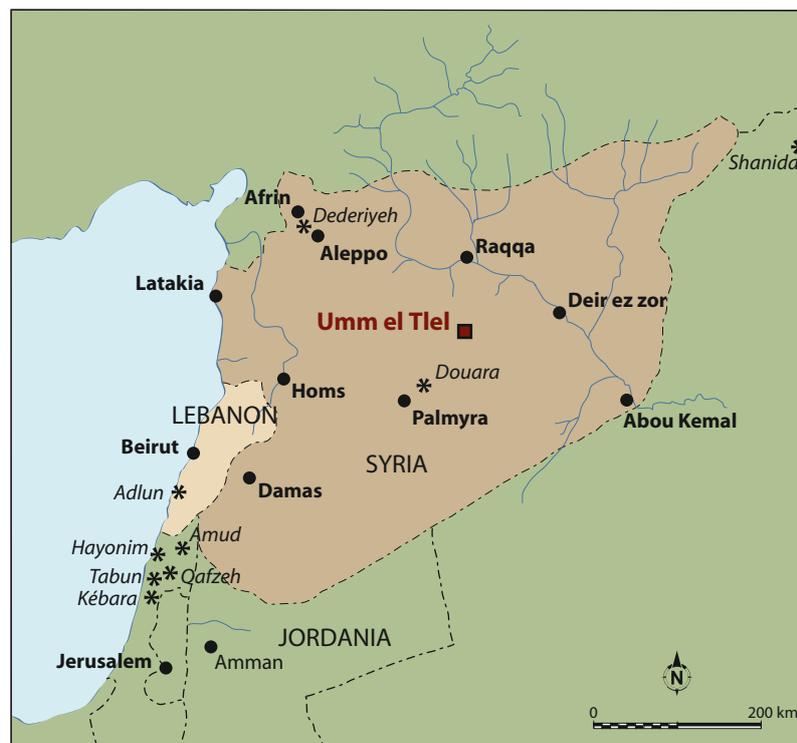


Figure 1 - Location of the site of Umm el Tlel.

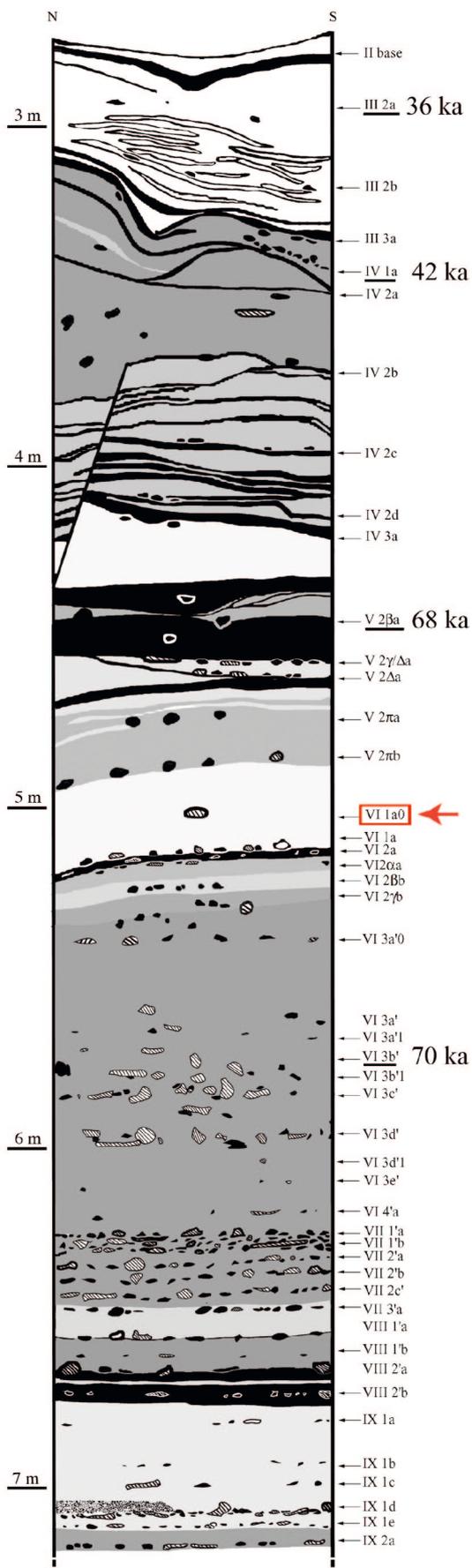
In addition to its importance for human groups occupying the region, this water contributed to the rapid burial of the remains and the preservation of a large number of artifacts such as bone, flint, limestone, bitumen, wood, leaves, gramineae stems, seeds, etc.



Figure 2 - View from the south showing the excavation sectors at Umm el Tiel (photograph: É. Boëda).

2 - Archeological level VI1a0

The Mousterian level VI1a0 is one of the exceptionally well preserved levels at Umm El Tiel. It was excavated over a surface of 20 m² in the south sector. Along with level VI1a, it is contained within an alluvial-lacustrine formation around 35 cm thick. It corresponds to a heterogeneous sandy facies characterized by a mixture of detritic components with diverse origins, in the form of interstratified lenses contained within a fine browned clay-carbonated mass. In this facies we identify coarse quartz sands derived from alluvial deposits, carbonated sands derived from lacustrine deposits and limestone sands derived from pedogenic gypseous formations. Both levels, VI1a0 and VI1a, separated by 15 cm of sediments, were easily identifiable during excavation due to the presence of a small stratigraphic joint at the base of each one, corresponding to an emersion episode. The the variations in the level of a paleo-lake are thus responsible for the rapid burial, and thus excellent preservation, of the artifacts left on its banks by Mousterian groups during two occupation phases.



The presence of limestone concretions, which fossilized fragments of Monocotyledon stems of the *Phragmites* genus, indicate the presence of a reed bed on the banks of this paleo-lake. The pollens collected in this level are represented by a high proportion (over 80%) of Poaceae. No tree pollen was identified, indicating a severe drought. Near the paleo-lake there was a cold steppe with gramineae.

Due to the absence of charcoal or other organic artifacts, as well as heated flint, it is not possible to directly date level VI1a0. Nonetheless, TL dates obtained in the underlying and overlying levels of the stratigraphic sequence define a range between $68\,050 \pm 6150$ BP for level V2βa, and $71\,400 \pm 7100$ BP for level VI3b'1 (Boëda *et al.*, 2008a-b).

Though levels VI1a0 and VI1a appear to be identical, the study presented here concerns only level VI1a0, which yielded the greatest number of artifacts: 243 versus only 41 for level VI1a (table 1). It is interesting to note, meanwhile, that level VI1a0, with an average of 12 artifacts per meter square, is one of the poorest in the Mousterian sequence of Umm el Tlel (figure 4). In some levels of the VI3 or VII1 complexes, for example, there are often more than 500 recorded objects per meter square.

Figure 3 - Synthetic stratigraphy of the Mousterian sequence of Umm el Tlel (drawing: É. Boëda).



Figure 4 - Objects in level VI1a0 at Umm el Tlel (photograph: Chr. Griggo).

3 - The lithic artifacts in VI1a0

The lithic assemblage is composed of 17 artifacts (table 1; figures 5-6), including 2 in limestone. Most of these artifacts were made from tertiary flint and 13 of them can be attributed to four categories:

- the first category is composed of 5 pieces (figure 5, nos. 1-5) realized on elongated blanks with a flat triangular section. In terms of the production method, these flakes are recurrent. Four of them correspond to a Levallois recurrent unipolar parallel scheme with apparently different initializations: peripheral (figure 5, piece no. 4) and unipolar (figure 5, piece no. 5).

Table 1 - Distribution of lithic and bone remains in the two archaeological levels of geological complex VI1.

			VI1 a0	VI1 a
Lithic artifacts	Flint	unworked flakes	4	2
		retouched flakes	11	3
	Limestone		2	0
Total lithic			17	5
Bone artifacts	Dromedary		148	28
	Gazelle		1	0
	Ostrich		3	0
	undetermined		74	8
Total bone			226	36
Total per level			244	41
% lithic			7,0	12,2

In terms of function, we observe that:

- the distal parts are heterogeneous, with only two clearly convergent pieces;
- four pieces (figure 5, nos. 1-2, 4-5) have continuous retouch on only one edge. The edge modification does not seem to have modified their initial outline. The removals were carefully realized, creating a flat/concave edge outline adapted to cutting actions. The preservation of the initial contour and the maintenance, or even reduction, of the cutting angle probably corresponds to resharpening phases to maintain all of the initial technical criteria of each piece. Piece no. 3 has chips on its left edge and a “notch” on the proximal part of the right edge. These could be use traces;
- the proximal part of these five pieces is absent. For pieces nos. 1, 2 and 3, the butts were probably fractured at the moment of impact (though this is not certain). For piece no. 4, a bending fracture modified the initial profile of the object into a sagittal rectilinear profile (to be hafted?). The last piece (figure 5, no. 5) also has a bending fracture, but which is posterior to the retouching. This could be a bending fracture that occurred during use or, on the contrary, an intentional fracture in order to obtain a new tool attributable to category 3¹. The use traces indicate a longitudinal cutting action that could not have caused a bending fracture, especially on a piece more than 6 mm thick;

1. For convenience and by functional analogy with a modern tool, we call this third tool type a “Stanley knife”.

- the second category is composed of two elongated pieces with a trapezoidal section and convergent edges in the distal third of the object (figure 5, nos. 6-7). They were also produced with the Levallois recurrent unipolar method, with a highly specific removal sequence in order to obtain a trapezoidal section and edge convergence. The convergence was ensured by a peripheral initialization in the distal part of the core. In contrast to the preceding group, in which the feature of convergence is completely random, the guiding ridge in this case permitted the creation of the convergence. In this case, the technical features – parallel edges with a trapezoidal section, followed by convergent edges and a triangular section – are expected. The outline of the convergent edges is identical: straight / convex. This feature could be accidental, but since we observe a clear selection of the blank and tool, it should be emphasized. This is even more true since one of us (S. Bonilauri), in analysis of other levels of Umm el Tlel, has shown that this association of convergent straight / convex edges is clearly intentional;

- the third category is composed of four pieces (figure 5, nos. 8-11), which are generally quadrangular. Except for one piece (figure 5, no. 10), this morphology was obtained by a truncation on the proximal or distal end, forming a back adjacent to a sharp edge. In the case of piece no. 11, we observe a specific fracturing procedure. It appears that the bending fracture was facilitated by the realization of a notch made by micro-retouching. The production methods of these pieces are very diverse. Two of them (figure 5, nos. 8-9) are predetermining flakes with a cortical back, one is a type 2 recurrent Levallois flake (figure 5, no.10) (Boëda, 1994), and the fourth (figure 5, no. 11) predetermining / predetermined Levallois flake. As we have already mentioned, we could associate pieces nos. 5 and 15 with this category, which we will see below. The analysis of the edges opposite the “back” (nos. 8 and 11: intentional break; no. 9: hinge) clearly shows micro-removals that created a break in the outline of the piece, and especially, an increase in the cutting angle, like a sort of chipping. Their location corresponds to a Stanley knife manner of functioning, which consists of pushing on the “back” to drive the force in the direction of the gesture in order to make a transformative contact along a few millimeters of the edge opposite this back;

- the fourth category includes two quadrangular Levallois flakes (figure 6, nos. 12-13). One is a patinated Nahr Ibrahim piece whose only active edge was reworked by inverse retouch (not patinated). The proximal part of the second Levallois flake, of the same dimensions, was partially reworked. It fits within the variability of Nahr Ibrahim pieces.

Two unique pieces (figure 6, nos. 14-15) are associated with these objects.

Piece no. 14 is a triangular object whose edges and proximal part of the upper face are entirely retouched. The morphology is not simply due to a reworking of the edge since this piece was entirely prepared. The retouch consists of a single row of semi-parallel removals. It is different from that observed on the other pieces as it corresponds to knapping procedure that could be pressure retouch. The negative bulbs are clearly defined, which is not the case when a percussion retoucher is used as the non punctiform contact tears away part of the edge, creating a tiny flat surface with no negative bulb. On the distal part, there is chipping in the form of diverse micro-removals, very different from the series of scars that shaped the convergence. On the lower face, the proximal part displays removal scars that correspond to a preparation for hafting and chipping resulting from the hafting during the use of the piece.

Piece no. 15 is anachronous with regard to the other pieces. It is a core edge flake almost certainly made by the Levallois method. It has micro-removals on the convex part of the edge. These stigmata are similar to those observed on pieces nos. 8, 9 and 11. Is it the same tool type?

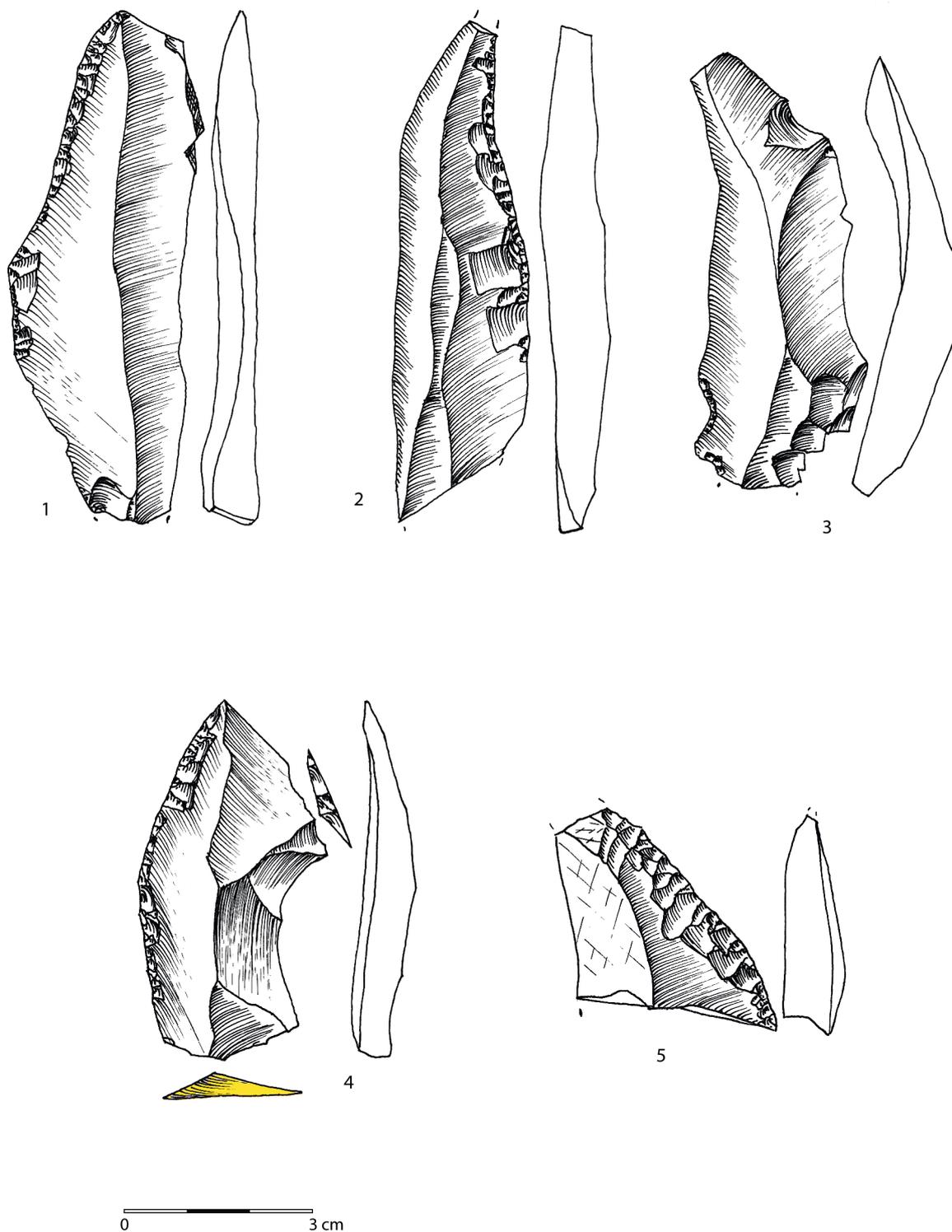


Figure 5a - Lithic artifacts in level VI1a0- Category 1: nos. 1 to 5; Object no. 4 display a fracture with a nearly certain anthropogenic origin (yellow) (drawings: Ě. Boěda).

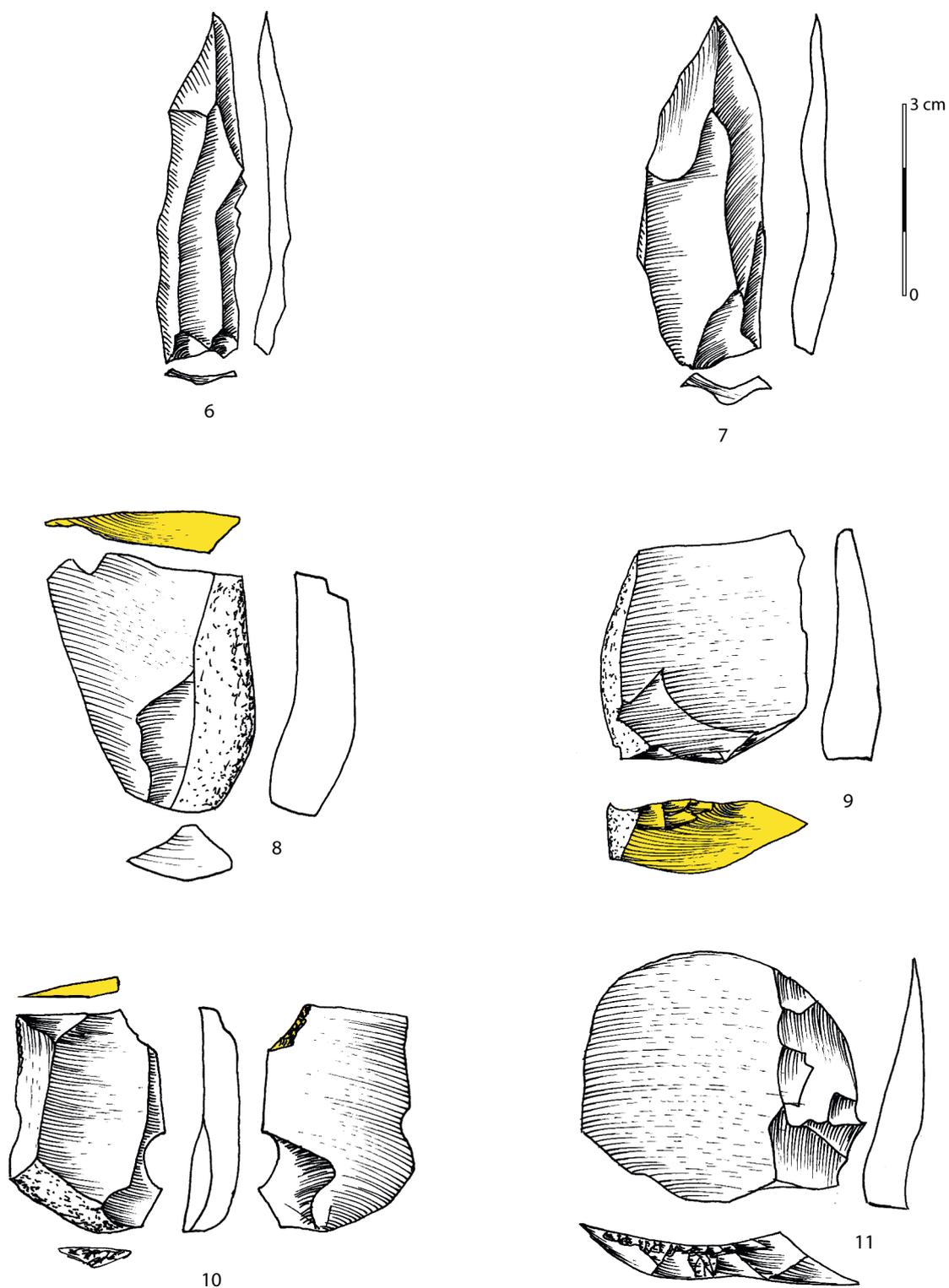


Figure 5b - Lithic artifacts in level VI1a0 - Category 2: nos. 6-7; category 3: nos. 8-11. Object nos. 9 and 10 display a fracture with a nearly certain anthropogenic origin (yellow) (drawings: É. Boëda).

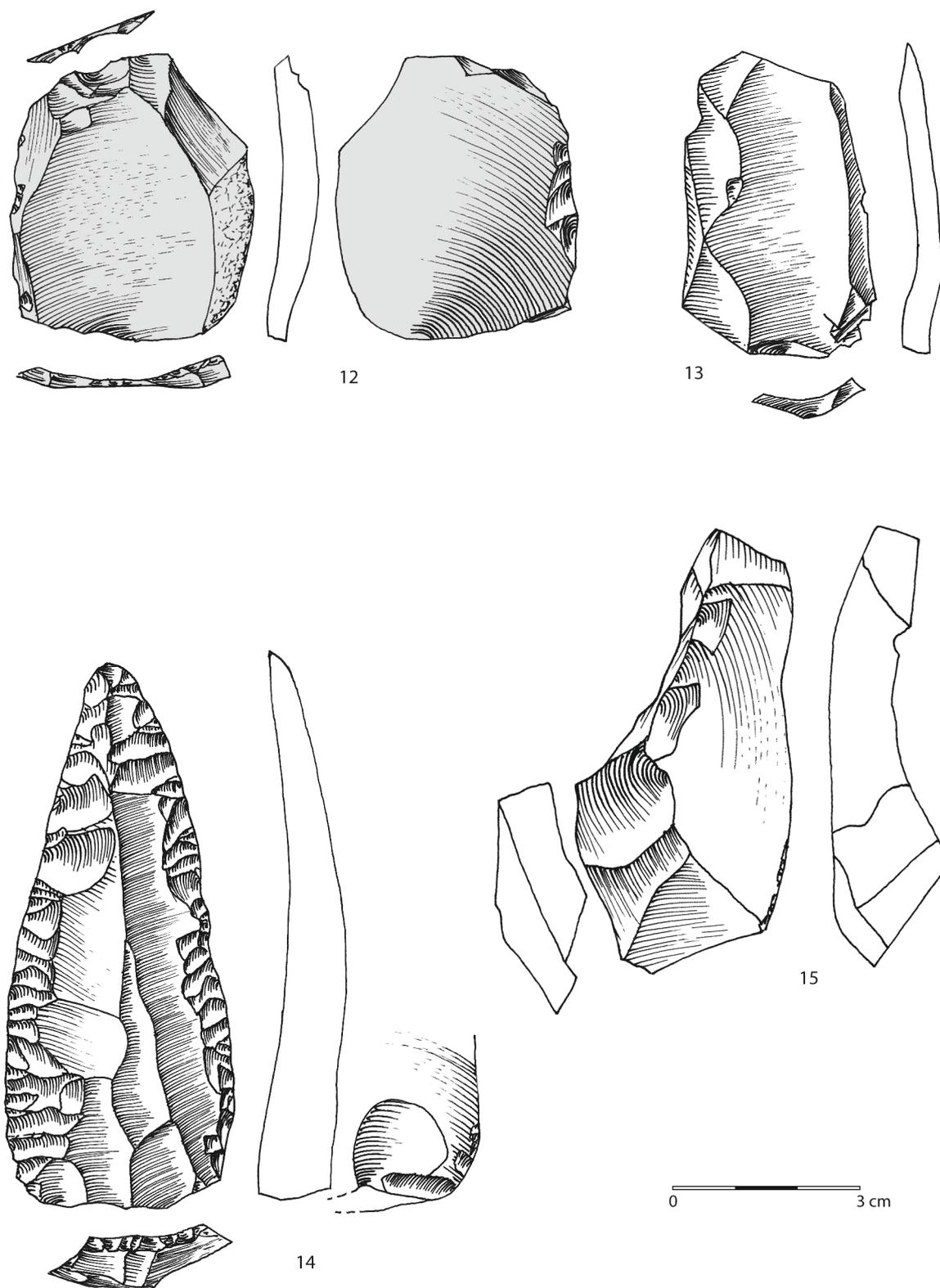


Figure 6 - Lithic artifacts in level VI1a0 - Category 4: nos. 12-13.
The gray areas indicate patinated surfaces
(drawings: Ě. Boěda).

Usewear analyses² were made on eight pieces (figure 5, nos. 1-2, 4-5, 7-9; figure 6, no. 14, figure 7). All show use traces resulting from contact with animal materials of varying hardness (Kazaryan, 1993; Geneste, Plisson, 1996; Claud, 2008): fresh hide, viscera, muscle, tendon, synovial capsule, articular cartilage and bone. It is nonetheless difficult to precisely distinguish these materials since a cutting tool rarely comes into contact with only one of them. The observation of modern butchery activities confirms that while specific actions require a specific tool, when it is used for this action, the tool will come into contact with several different animal materials.

Use traces resulting from contact with one or several animal materials were observed on 7 pieces²³:

- on 3 pieces (figure 5, nos. 4, 8-9), the traces are on one retouched or non retouched edge. On these pieces, the opposed edge is not sharp. The location of the traces on pieces nos. 8 and 9 correspond to the chipped zones described above. These zones, one centimeter long at most, are adjacent to a “back”, consisting of an intentional break (figure 5, no. 8; figure 8) or hinge termination (figure 5, no. 9). The chips seem to correspond to a contact with a hard animal material;
- on 4 pieces (figure 5, nos. 1, 2, 7; figure 6, no. 14), the traces are located on two edges (figure 9). On each of its edges, piece no. 2 displays two distinct transformative zones, while the non retouched transformative zones of pieces nos. 1, 7, and 14 are convergent (figure 5, nos. 1, 7) or retouched (figure 6, no. 14; figure 10). Since the convergence was not created by the retouch, blanks nos. 1 and 7 appear to have been selected in part for this technical feature, in contrast to piece no. 14, which is characterized by retouch that creates a convergence. In addition, this artifact is the only one with axial hafting traces (Bonilauri, 2010; Rots, 2010). Their location and limits indicate an axial prehension covering more than two thirds of the surface of the piece and ending with a triangular form in the distal part (figure 11).

The movements realized by all of these tools correspond to longitudinal cutting kinematics. For the convergent pieces, this movement is associated with the penetration of their extremities.

Among the lithic artifacts, there are also two limestone blocks (figure 12). They have a roughly spherical form and were found less than 30 cm from each other in square BL156 (figure 13). They originate from the chalky limestones of the Tertiary, whose closest current outcrop is located 5 km north of the site. The largest block is 11.3 cm long and 9.5 cm wide. It is broken in two in the middle of the object, but the two fragments were found joined together when excavated. The second block is 10.4 cm long and 10 cm wide. It has several removal scars that permitted the creation of more or less angular ridges. Several crushing points are concentrated on one of these ridges (figure 12). These stigmata could result from the use of this piece as a hammerstone, while the other one, located nearby, probably served as an anvil. These limestone blocks could thus have been used to break bones to extract the marrow, as appears to be indicated by the high concentration of bone fragments found nearby (figure 13).

2. The pieces studied correspond to all of the materials found during the first excavation sessions. Though an extension of the excavation zone increased the size of the lithic sample, it was not possible to conduct a new usewear analysis.
3. We do not include piece no. 5 in the analysis as it shows only traces of vegetal materials.

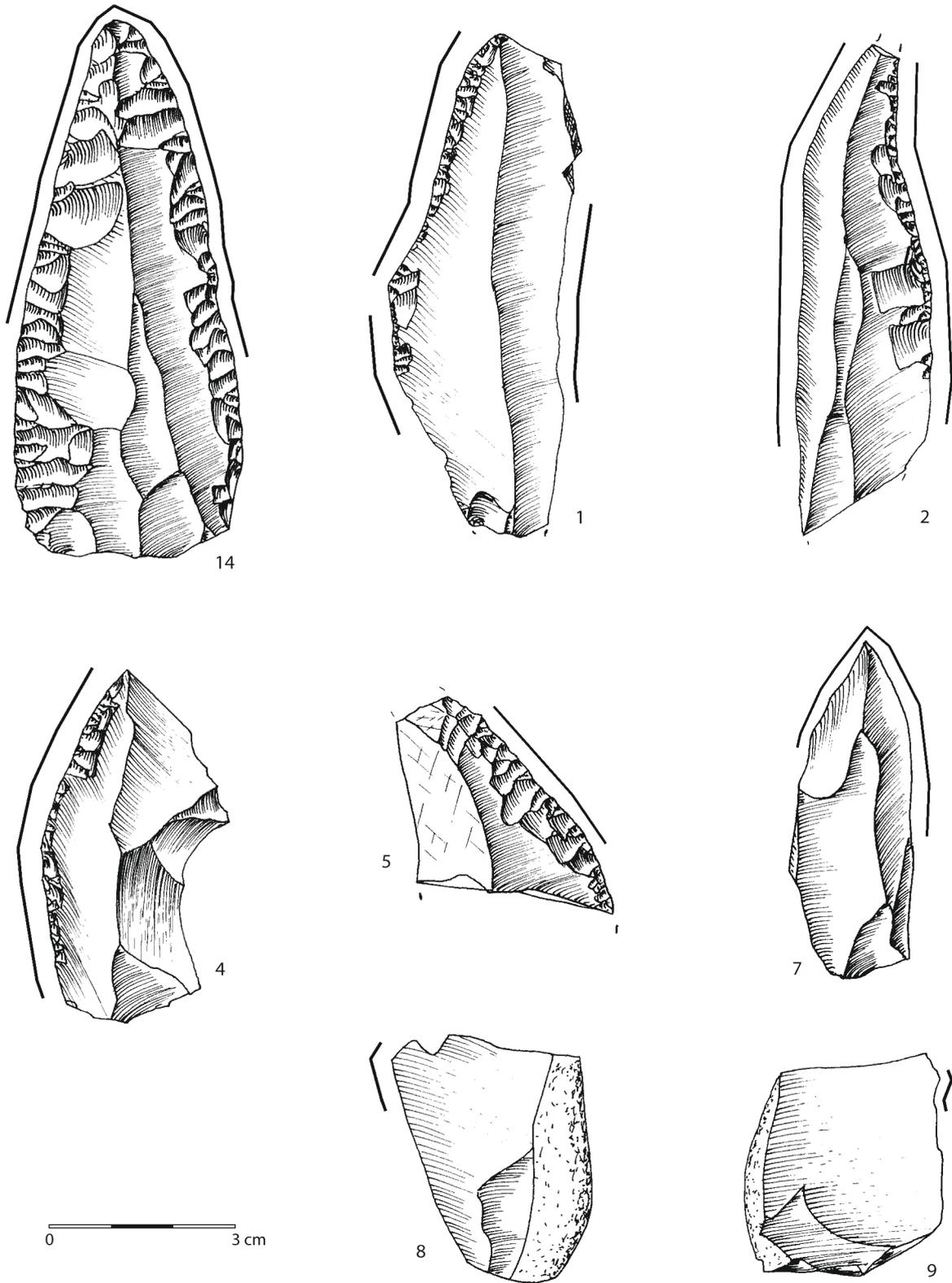


Figure 7 - Lithic artifacts in level VI1a0 subject to a usewear analysis and locations of the observed traces.

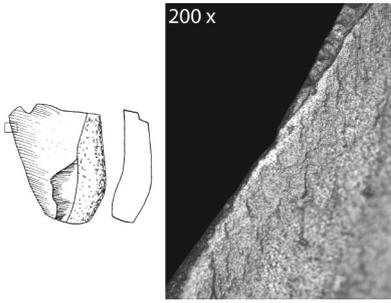


Figure 8 - Pièce no. 8 (BK155-9).
Micro-photography - magnification $\times 200$.
Micro-polish made by a hard animal material located on the sharp edge
(photograph: S. Bonilaurie).

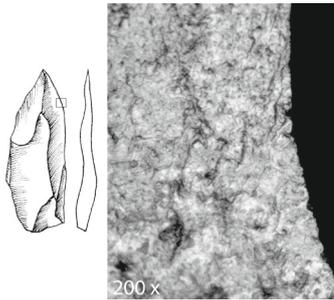


Figure 9 - Pièce no. 7 (BL155-4).
Micro-photography - magnification $\times 200$.
Micro-polish made by a soft animal material (soft meat) located on the sharp edge
and on the edge adjacent to the sharp edge
(photograph: S. Bonilaurie).

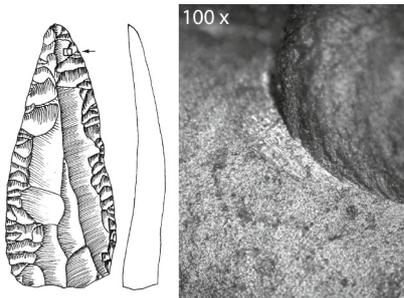


Figure 10 - Pièce no. 14 (BL153-9). Micro-polish made by a hard animal material
(contact with bone) associated with fine striations parallel to the sharp edge. Micro-
polish present on the retouched area (on a high ridge) (photograph: S. Bonilaurie).
Direction of the use traces: parallel to the active edge.

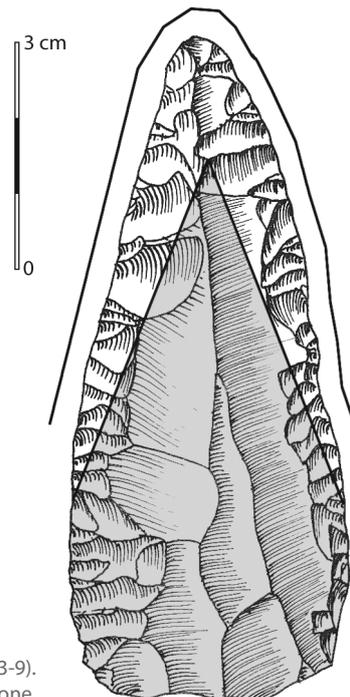
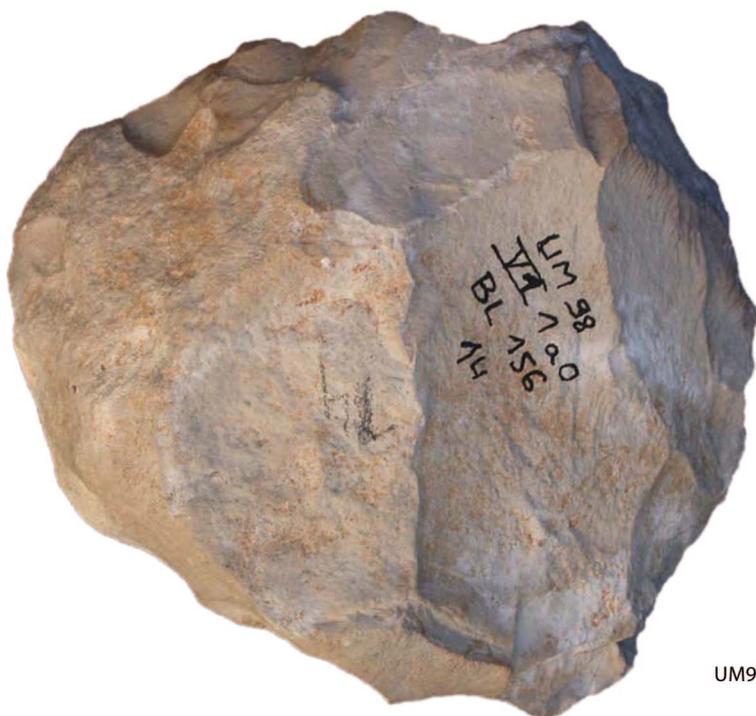


Figure 11 - Pièce no. 14 (BL153-9).
The shaded area shows the limit of the prehension zone.



UM98-BL156-15



UM98-BL156-14

Figure 12 - Limestone blocks in V11a0
(photograph: Chr. Griggo).

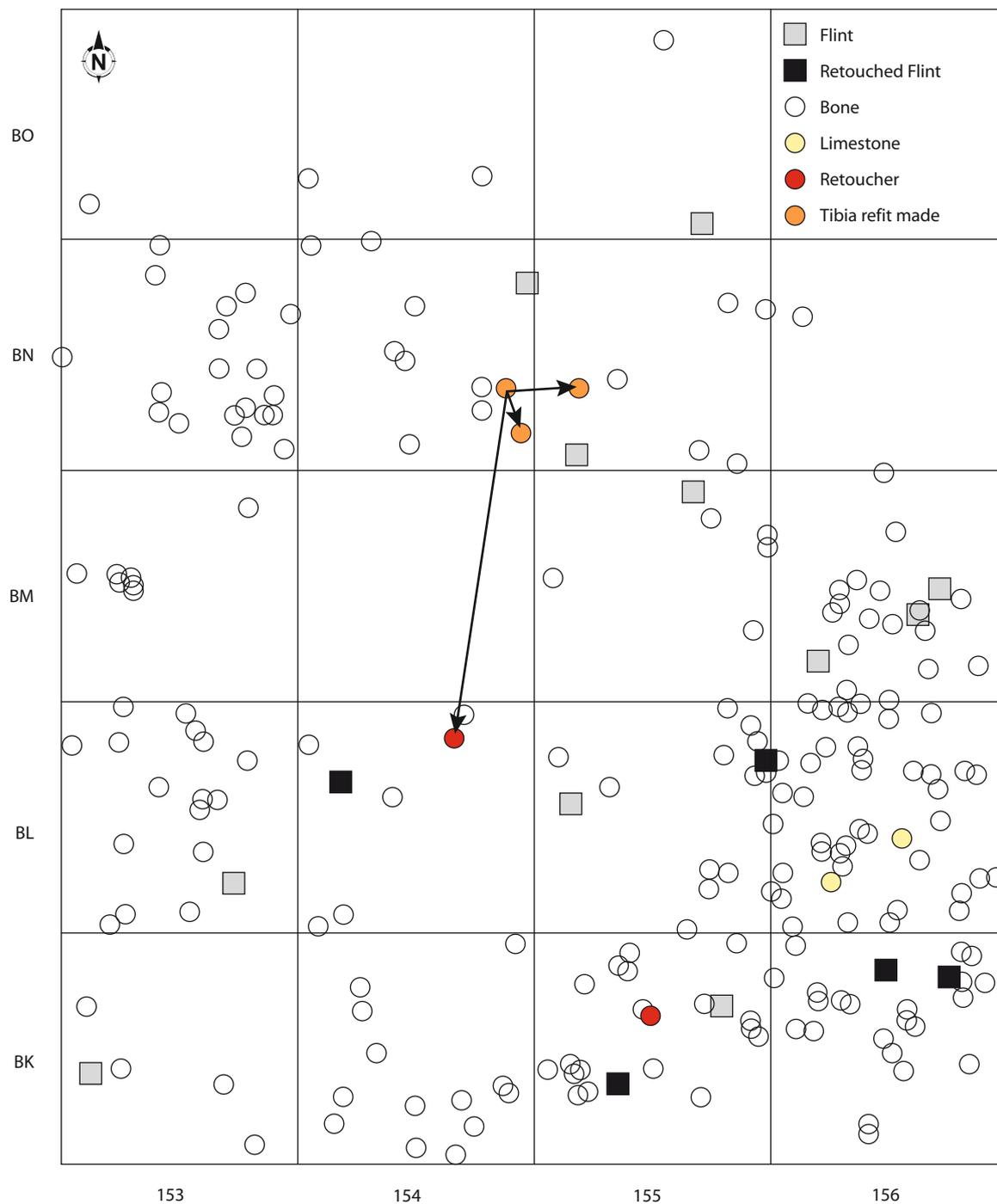


Figure 13 - Distribution of the archaeological remains in level V11a0.

4 - The bone artifacts in VI1a0

The main taxon identified in level VI1a0 is dromedary, *Camelus dromedarius*. It represents 97.4 % of the determined bone remains. The other species identified are Gazelle and Ostrich (table 1). In addition, the 74 undetermined remains correspond to a large animal that can only be a dromedary, but we were not able to identify the anatomical parts to which they correspond.

These extremely well preserved bone remains, whose surfaces are very fresh, show no superficial desquamation or fissuring resulting from a climatic alteration (Behrensmeyer, 1978; Griggo, 1999). On the other hand, we observed several anatomical connections mostly concerning axial skeletal elements: between 4 thoracic vertebrae, between 2 lumbar vertebrae (figure 14a) and between 1 thoracic vertebra and 1 rib (figure 14b), which is rarer. This indicates a rapid burial of these remains, which permitted the connections to remain in place. According to our observations of a dromedary carcass exposed for several years to climatic agents, the burial time of the bones of level VI1a0 can be estimated at less than six months (Griggo, 1999). Moreover, no bone shows traces of carnivore actions, providing another argument for a rapid burial.

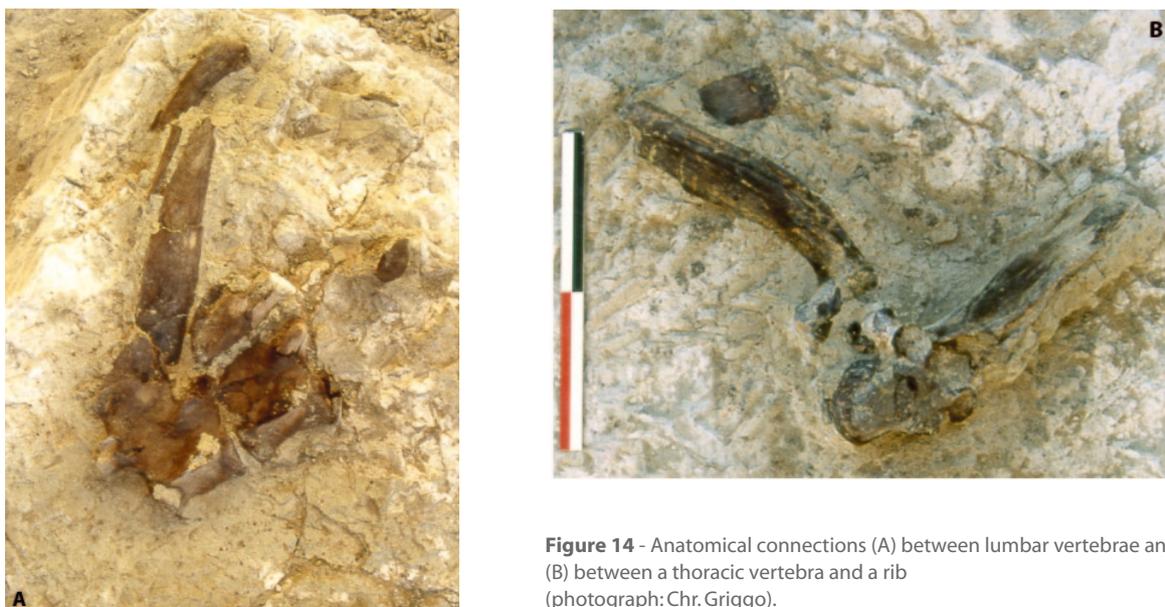


Figure 14 - Anatomical connections (A) between lumbar vertebrae and (B) between a thoracic vertebra and a rib (photograph: Chr. Griggo).

The minimum number of individuals can be estimated at 4 dromedaries: 1 adult whose vertebrae were completely ossified, 2 sub-adults whose vertebral disc were just about to connect to the vertebral bodies and 1 animal less than six month old according to its dentition (after Cornevin and Lesbre, 1894) (figure 15).

The elements of the axial skeleton, which are generally the most fragile, are relatively abundant (table 2). The cranial fragments, vertebra and ribs constitute slightly more than 70 % of the bone assemblage. The mandible, on the other hand, which has a high potential for preservation, is absent. These axial skeletal elements are only slightly fractured and some of them were found in anatomical connection (see above).

Table 2 - Distribution of the dromedary remains for level VI1a0, per number of determined remains (NR), minimum number of elements (MNE) and the survival percentage (survival %).

	<i>Camelus dromedarius</i> VI1 a0 (NMI=4)			
	NR	NME observed	NME theoretical	survival %
Skull (neuroskull)	19	1	4	25,0
Skull (face)	4	2	4	50,0
Upper teeth	5	3	8	37,5
Lower teeth	0	0	8	0,0
Mandible	0	0	8	0,0
Atlas	3	3	4	75,0
Axis	0	0	4	0,0
Cervical vertebrae	4	2	20	10,0
Thoracic vertebrae	16	10	52	19,2
Lumbar vertebrae	9	6	28	21,4
Sacrum S1	0	0	4	0,0
Caudal vertebrae	0	0	24	0,0
Ribs	46	20	104	19,2
Costal cartilage	1	1	-	-
Sternebrae	1	1	-	-
Scapula	7	5	8	62,5
Humerus	4	2	8	25,0
Radioulnar	5	2	8	25,0
Carpals	0	0	8	0,0
Metacarpal	3	1	8	12,5
Coxal	0	0	8	0,0
Femur	2	1	8	12,5
Patella	1	1	8	12,5
Tibia	12	3	8	37,5
Calcaneus	0	0	8	0,0
Talus	0	0	8	0,0
Other tarsals	0	0	8	0,0
Metatarsal	2	1	8	12,5
1 st phalanges	3	3	32	9,4
2 nd phalanges	1	1	32	3,1
3 rd phalanges	0	0	32	0,0
Total	148	69		



Figure 15 - Skull of a young dromedary, central view
(photograph: Chr. Griggo).

The bones of the appendicular skeleton represent only 30 % of the assemblage. The pelvis, carpal bones and tarsal bones are absent, and the phalanges are very rare. Scapulae, which are the most fragile, are the most abundant (table 2; figure 16). These latter are also rarely broken: one of them is complete and the three others correspond to portions that represent nearly three quarters of the total length. The long bones of the limbs are all broken. The morphology of the breaks (Villa and Mahieu, 1991) and the presence of percussion notches on three diaphysis fragments (7 % of the NR of the long bones) indicate fractures of an anthropogenic origin (table 3; figure 17). This could be associated with two intentions: to extract marrow and/or to obtain diaphysis fragments. The systematic fracturation of the long bones indicates that the principal motivation was to extract the marrow.

Table 3 - Distribution of traces observed on the bones in level VI1a0.

	Skull	Vertebrae	Ribs	Front limb	Back limb
Natural traces					
carnivore	-	-	-	-	-
weathering	-	-	-	-	-
Anthropogenic traces					
skinning striations	-	-	-	-	-
striations disarticulations	-	3	3	3	-
defleshing striations	-	10	6	3	7
percussion	-	-	-	2	2
retoucher	-	-	-	1	1
burned bone	-	-	-	-	-

Figure 16 - Percentage of the anatomical parts of dromedary found in level VI1a0, calculated based on the survival percentage (after <http://www.archeozoo.org>).

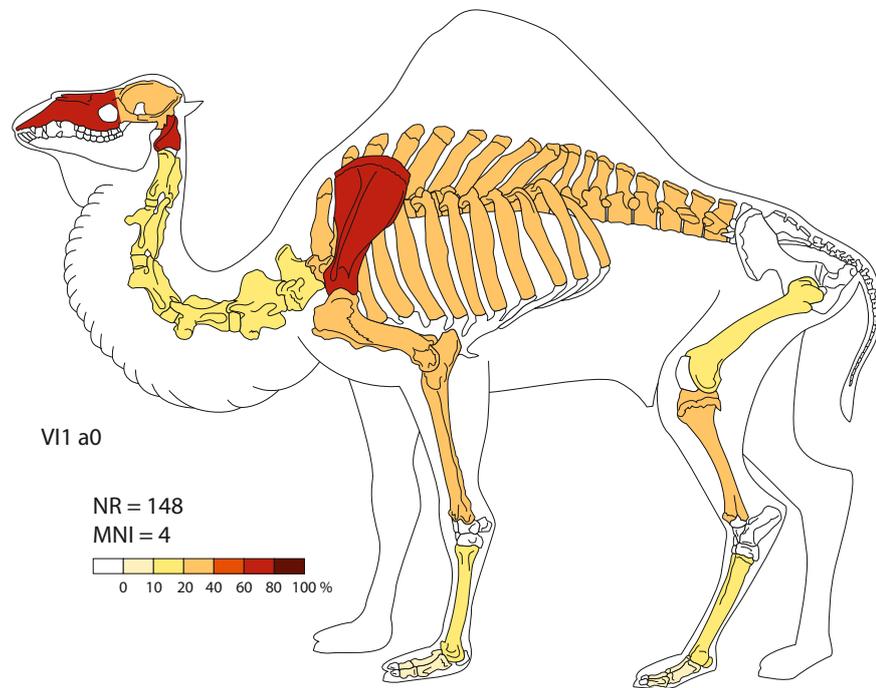


Figure 17 - Notch and percussion impacts on dromedary tibia diaphysis fragments (photograph: Chr. Griggo).

Butchery traces, in relation to the operations of disarticulation and especially defleshing, are abundant on all parts of the skeleton (table 3; figure 18). They are present on 15.5% of the bone assemblage and 24% of the determined remains. They are differentially distributed on the axial and appendicular skeletons, with the respective proportions of 19.6% and 32.5%. These relatively high values indicate that many butchery activities were realized at the site.

In addition, two retouchers on long bone diaphysis fragments were used to retouch flint tools (figure 19). The first corresponds to a diaphysis fragment of a metacarpal, 7.5 cm long. It displays one zone of small percussion marks. The second corresponds to a medial fragment of a tibia diaphysis. It has two zones with percussion marks on the same extremity. This retoucher, found in square BL154, refits with three other diaphysis fragments found in a sector overlapping squares BN154 and BN155, at approximately 1.5 m distance. The traces observed on this dromedary tibia suggest that it was first defleshed and then fractured to extract the marrow. The Mousterian butcher then collected the fragments to retouch his flint tools so that he could continue butchering carcasses, and then finally abandoned the tool further away.

5 - Spatial distribution (figure 13)

There is a higher concentration of bone artifacts in the south-east part of the excavated zone, in the sector in which the two limestone blocks used as a hammerstone and anvil were found. This location is also near the zone where we found the anatomical connections between the elements of the axial skeleton, as well as the 5 flint tools and 2 bone retouchers (see above). The refit made between one of the retouchers and three other portions of a tibia diaphysis shows that this piece was moved toward the limestone blocks, in proximity to which the retouched tools were found.

The distribution of these artifacts indicates that the phases in the processing of dromedary carcasses: skinning, disarticulation, defleshing, and marrow extraction, as well as tool resharpening, were organized around these two limestone blocks.

6 - Discussion and conclusion

During the deposition of level VI1a0, Umm el Tlel was located on the banks of a paleo-lake with a reed bed of *Phragmites* and *Typha*. The level of this lake varied seasonally. In the surrounding environment, in association with a very dry and cold climate, there was a gramineae steppe landscape. The site thus constituted a watering location for the animals in the region.

A group of Mousterian hunters likely took advantage of the reed bed to create blind from which they hunted at least four dromedaries. As these animals are relatively heavy (between 600 and 800 kg), they could not be transported as is. The hunters would thus have brought with them the tools necessary to realize preliminary butchery activities in place, in order to facilitate the transport of the carcasses. These tools consist of:

- Levallois flakes and laminar flakes to cut up the animals;
- limestone blocks to break the bones and extract the marrow.

These lithic objects represent a very small proportion of the artifacts recovered in level VI1a0 (table 1). The techno-functional analysis of the flint artifacts shows that no debitage activities took place at the site. It is also possible that the hunters collected a few flakes abandoned near the site by earlier groups. This is suggested by one piece that has a double patina in its retouched zone.



Figure 18 - Butchery striations. (A) and (C): on the spinous process of a thoracic vertebra (B) and (D): on the exterior face of a rib (photograph: Chr. Griggo).



Figure 19 - Bone retouchers in level VI1a0 (photograph: Chr. Griggo).

What are the behavioral indications of such a lithic assemblage? It appears that there was only one butchery activity, realized with tools that can be attributed to four techno-functional categories:

- laminar convergent, with distal and lateral use and axial prehension;
- laminar non convergent, with lateral use only and axial prehension;
- quadrangular: Nahr Ibrahim, with lateral use (based only and macroscopic analysis of micro-retouching) and lateral prehension;
- quadrangular with a proximal or distal “back”, with lateral use and opposed/adjacent prehension.

The absence of Levallois points, which are highly dominant in the 70 other Levallois-Mousterian levels of Umm el Tlel, is remarkable, especially since all the other categories of predetermined Levallois products are present. Did they never exist, or were they taken away by the hunters?

If we think more broadly in terms of presence and absence, we can interrogate several oppositions:

- presence of tools / absence of hunting weapons:
 - the absence of hunting weapons could be due to taphonomic factors if they were made from vegetal materials;
 - the absence of traces on the flint tools characteristic of use as a composite weapon element (Geneste, Plisson, 1990; Morel, 1993; Odell, Cowan, 1986) corroborates an exclusive use of vegetal materials for hunting weapons⁴;
 - the weapons are taken away by the hunters. All or only some of the tools remain in place. We are then faced with the problem of the status of objects that is impossible for us to explore;
- presence of selected blanks / absence of knapping by-products (except retouch flakes):
 - the actors arrive with their tools and leave all or part of them behind;
 - the actors arrive without tools and collect old tools left in place;
 - the actors have mixed behaviors;
- Presence of specialized tools / Absence of multipurpose tools: this indicates an anticipation of actions and a diversification of tools depending on the functional intentions;
- Presence of several examples of the same tool type: occupation unity / palimpsest. Several scenarios can be imagined, representing different site organizations and occupation durations:
 - the same group returns several times to hunt one or two animals, using the same range of tools. This would be the scenario of a long term hunting site (several months);
 - one group conducts a massive hunt and brings a stock of tools.

The presence of two retouchers, one of which has two use zones, shows an intention to maintain the sharp cutting edges of tools that were either introduced or found in place. This type of tool is generally rare at Paleolithic sites (Vincent, 1993). On this subject, we recall that the surface excavated in VI1a0 is 20 m² and only 228 bone remains were recovered. In the other Mousterian levels of Umm el Tlel, we found only 20 other retouchers out of a total of 20.623 determined bones, which is ten times less than for VI1a0.

4. This observation is applicable to all of the 70 Mousterian-Levallois levels, except for the piece found embedded in the cervical vertebra of an ass, which shows the use of a mixed weapon (vegetal / mineral) (Boëda *et al.* 1999). This paradox has not been explained.

The high concentration of bones in the south-east sector of the excavated zone and the presence, on the periphery, of all of the flint tools and the bone retouchers, show that the main dromedary carcass processing activities were organized in proximity to the two limestone blocks (figure 13); these latter having served as a hammerstone and anvil to break the bones.

The four dromedaries were cut up at the hunting site in order to facilitate their transport. The abundance of striations made by the flint knives corresponds to disarticulation and defleshing operations. On the axial skeleton, numerous traces observed on the dorsal processes of the thoracic and lumbar vertebrae indicate the removal of thick and relatively long muscles from the dorsal region: *trapezius* muscles, *latissimus dorsi* muscles (Barone, 2000), as well as those located on the ribs on the external face, are related to the cutting of the *dorsal serratus* muscles. On a dromedary, these different muscles represent a large quantity of meat. The Mousterian hunters of VI1a0 preferred to devote their time to these butchery activities realized at the kill site, in order to collect this meat and leave the axial skeleton bones in place, thus saving a lot of time, weight and volume.

The slight deficit of long bones of the appendicular skeleton, relative to those of the axial skeleton, could indicate that some portions of the limbs were exported before defleshing. This is not the case for those that were abandoned at the site. These bones display frequent disarticulation, and especially defleshing, traces. In addition, all of these bones are broken and, as is shown by the percussion traces on them, this fragmentation was intentional. Consequently, once the hunters of VI1a0 had removed the meat from the limb long bones, they fractured them in order to extract the marrow. Among the diaphysis portions thus obtained, they also selected two fragments to be used as retouchers. These pieces show no traces of modification (scraping of the periosteum, modification of the convexity), in contrast to observations made at other Paleolithic sites (Vincent, 1993; Armand, Delagnes, 1998). These pieces were not introduced with the other lithic artifacts by these Mousterian hunters⁵.

Level VI1a0 of Umm el Tlel is thus an exceptional example of Paleolithic hunting camps. It recorded the passages of Mousterian hunters who remained just long enough to kill a few dromedaries and realize preliminary butchery tasks in place, in order to export only the most dietary efficient parts of the animal. The tools necessary for this work, which were few, were introduced by the hunters and then abandoned at the site after use. The presence of a spring probably attracted the animals and thus constituted a strategic hunting location. The habitat site to which the meat was transported must be located further away from this source of water. The subsequent rise of the lake level and sedimentation in a relatively calm context led to the rapid burial and excellent preservation of the bone and stone artifacts left at the site during occupations of a very short duration.

For level VI1a0, we speak of multiple “hunting camps” since we cannot determine if the four dromedaries identified in this level were killed during a single hunting episode or several episodes over a few weeks or months at most. This is also justified by the geologic complex VI1, which contains two levels: VI1a0 and VI1a. This latter, though it yielded very few artifacts, appears to be comparable in all ways to VI1a0. Moreover, the VI1 geologic complex has also been identified in other sectors of Umm el Tlel: in a sondage, in the 3 north sector, and in a trench between sectors 3 and 4. Some small loci of archaeological occupation were identified in these locations and though we cannot determine whether they correspond to VI1a0 and VI1a, or perhaps other occupation episodes, they have the same characteristics as those described for VI1a0. In any case, it appears that the Mousterian hunters took advantage of times when the lake level was low to come to hunt dromedaries.

5. One of the retouchers refits with three other diaphysis fragments of a dromedary tibia, found some distance away.

The diachronic and spatial homogeneity demonstrates that complex VI1 at Umm el Tlel contains a succession of short duration occupations that correspond to dromedary hunting camps. The hunted animals were cut into quarters and transported to another location. No other activity was identified in this sedimentary formation. We are thus able to apprehend the manner in which the Mousterians of complex VI1 organized their territory. We have an image of the reoccupation of a hunting location over the long term (several months) and a geographic separation of activities: habitat, hunting camps, knapping workshop, etc...

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Christophe GRIGGO

CNRS - UMR 5204 - EDYTEM
Université Joseph Fourier, Grenoble I
Bâtiment «Pôle montagne», Campus scientifique
73376 Le Bourget-du-Lac cedex, FRANCE
cgriggo@ujf-grenoble.fr

Heba AL-SAKHEL

Musée de Damas
Direction générale
des Antiquités et des Musées
Damas, SYRIA
h.alsakhel@iforient.org

Éric BOËDA

CNRS - UMR 7041 - ArScAn - AnTET
Université de Paris X, Nanterre
Maison de l'Archéologie et de l'Ethnologie
21 allée de l'Université
92023 Nanterre cedex, FRANCE
Franceeric.boeda@wanadoo.fr

Aline EMERY-BARBIER

CNRS - UMR 7041 - ArScAn - AnTET
Maison de l'Archéologie et de l'Ethnologie
21 allée de l'Université
92023 Nanterre cedex, FRANCE
aline.emery-barbier@sfr.fr

Stéphanie BONILAURI

CNRS - UMR 7041 - ArScAn - AnTET
Université de Paris X, Nanterre
21 allée de l'Université
92023 Nanterre cedex, FRANCE
stephanie.bonilauri@wanadoo.fr

Marie-Agnès Courty

CNRS - UMR 5198
Centre d'Études et de Recherches Préhistoriques
Avenue Léon-Jean Grégory
66720 Tautavel, FRANCE
courty@tautavel.univ-perp.fr

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