

Prehistoric archaeology. The site of Karre I

Karre I

Arlette Berthelet¹, Jean Chavaillon¹

Some of the Melka Kunture sites, such as Gombore, Garba and to a certain extent Simbiro, have been sampled and excavated several times. Others, mostly from the left bank such as Kella, Karre, Waraba and Wofi, have been located and sampled but more rarely excavated. These sites, like those on the right bank, are linked mostly to deep erosion gullies which become small tributaries of the Awash River, cutting through volcanic and sedimentary deposits.

Karre is situated on the left bank, facing Gombore I. The formation of the small Karre ravine, only some hundreds metres long, begins at the base of the ignimbrite cliff and ends at the river. It was discovered in 1969. Three localities have been identified here: Karre I, the oldest, is situated two hundred metres from the Awash. Karre II, further from the river bed, is slightly higher in altitude. Finally, the Karre III, locality is at the base of the ignimbrite cliff. Levels that can be attributed to the Acheulian were located at this last site. However, the basal Levels J, K, L, M at Karre I and II, can be attributed to the Oldowan. The mapping of the sites in the gully was done by J.-L. Boisaubert.

A test excavation was undertaken in December 1980 and January 1981. Terracing was important and the excavation had to be restricted to a strip 2 metres wide and 6 metres long. It yielded a collection of artefacts and bones, all undisturbed, except for some artefacts in the Unit K-vertisol, that were reworked but found in situ at the base of the Black Cotton Soil. In all, 365 artefacts and faunal remains were recovered from Level K, 94 from Level L and 259 from Level M, the oldest.

The excavation was directed and undertaken by J. Chavaillon, with the assistance of C. Chavaillon-Béraud and a team of Oromo workers including Abarra Averso, Batchia Avas, Rorissa Delassa, Taffa Meurtu, Weurku Djiru, Zaoude Mamo. As the artefacts could not be exported, a study (typological cards) was made by J. Chavaillon and N. Chavaillon during the same field season in Melka Kunture. A. Berthelet, C. Chavaillon and J. Chavaillon whose drawings were done in Melka Kunture and Addis Ababa, reproduced the artefacts presented here. Finally, the complete study of the archaeological documentation (industry, faunal remains) from Levels K, L and M (Fig. 1) as well as the realizations of this part of the monograph, was done by the co-authors, A. Berthelet and J. Chavaillon.

In 1997, a particularly high flood of the Awash River completely buried and covered the Karre I and II gully with alluvial clays. Only the Karre III site remains visible (Fig. 2).



Fig. 1. Karre I. Oldowan. *Top*: the three levels; K top to the right, L to the left with the worker and M, to the right, near the sieve. *Bottom*: detail of the excavation of Level K; unifacial and bifacial choppers and bone fragments.

A. Berthelet, J. Chavaillon



Fig. 2. Karre. *Top*: the site of Karre III, The Acheulian levels are visible above a small gully. *Middle*: fluvialite and volcanic levels (Tuff) of the site of Karre I. *Bottom*: Karre I, detail of the tuffaceous levels.

LEVEL K

Three levels can be recognised. They have been respectively named K-V, K1 and K2. Unit K-Vertisol is an archaeological deposit overlying Layer K. Together, Units K1 and K2 constitute successive parts of the same archaeological unit (Figs. 3, 4).

The K-V Unit is a recent stratum of Holocene age at the base of the Vertisol or Black Cotton Soil, a black clayey sediment agglomerated in poorly developed pedes. At the base of the Black Cotton Soil (on the contact with K1), some Lower Paleolithic artefacts were found, and not Late Stone Age artefacts, as could be expected. These include not only choppers and polyhedrons, but also handaxes, cleavers and cores, flakes and flake fragments. This unit is undoubtedly reworked. Briefly, it could be an Acheulian level or a mixture of pieces from Unit K1 with those from an eroded Acheulian deposit, situated up-stream and at a higher altitude.

The Unit K1 is the upper part of Layer K. It was subjected to erosion prior to deposition of the Vertisol when material was washed out of the matrix and mixed with Vertisol K-V artefacts. In squares 27-28 South/4-5 East, artefacts from Unit K1 had been frequently displaced.

The Unit K2, which has not been disturbed, consists of one or two pebble beds. Lithic artefacts, faunal remains and pebbles are more common towards the top than at the base. The inventories of Units K1 and K2 will be presented separately for ease of comparison.

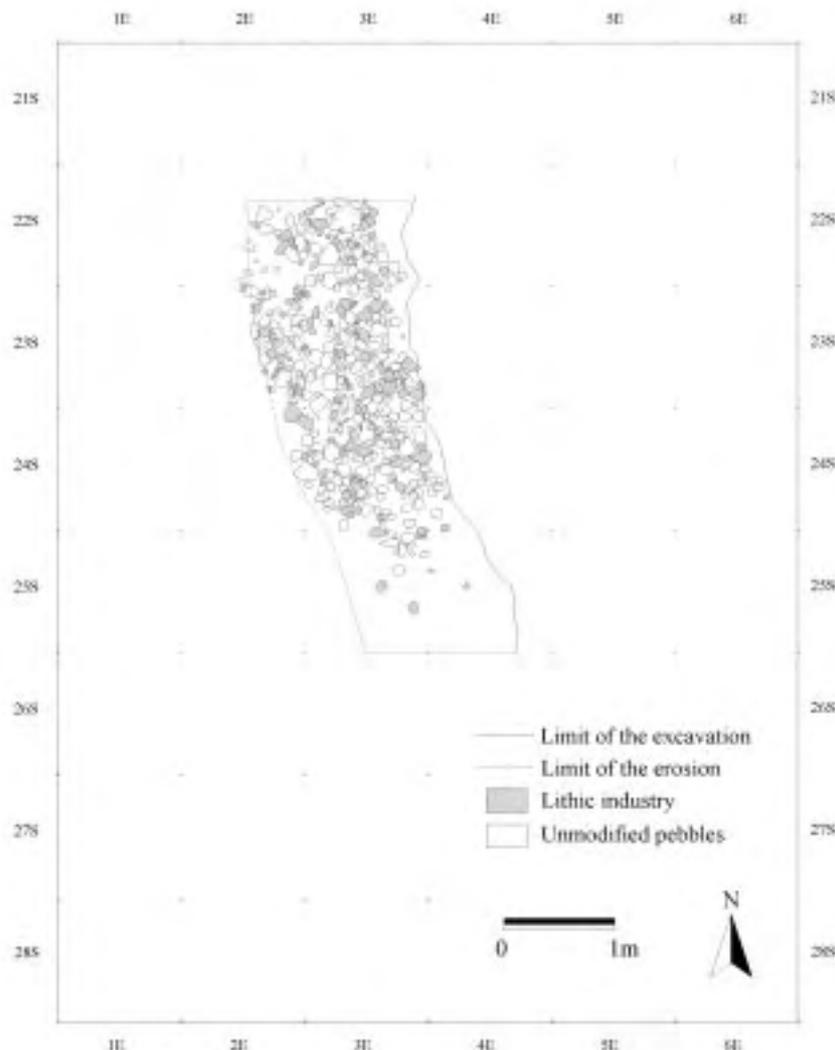


Fig. 3. Karre. Plan of Level K. (Original plan by J. Chavaillon, digital map by R. Gallotti)



Fig. 4. Karre I. Oldowan. *Top*: excavation of Level K. *Bottom left*: excavation of the Oldowan level; *Bottom right*: excavation of Level K. Level M is in proximity of the feet of the worker.

The entire collection from Level K is distributed as follows:

Unit K-Vertisol:	lithic artefacts	89	
	faunal remains (bone fragments)	9	not studied because reworked
Unit K1-2:	lithic artefacts	178	
	faunal remains	85	
	weathered bone, not collected	4	

In total, 365 pieces were collected during the excavation.

Unit K-V

Artefacts from Unit K-Vertisol are not *in situ* and at this point they derive entirely from the base of the Black Cotton Soil formation. The following inventory is necessarily limited, but the few pieces found there are nevertheless quite suggestive of a cultural tradition. A basic description of the different artefact categories completes this inventory.

Typology	N	Total of each category
Hammerstone, broken	1	
Broken pebbles, one fracture	5	
Broken pebbles, two fractures	2	11
Broken pebbles, three fractures	1	
Broken pebbles, several fractures	2	
Lateral choppers	2	
Lateral choppers + Heavy end-scrapers	1	
Distal choppers	1	
Choppers with peripheral working edge	1	
Polyhedrons with several working edges	1	13
Prismatic polyhedrons	2	
Shapeless polyhedrons	1	
Denticulates on pebbles	1	
Casually trimmed pebbles	1	
Broken pieces on pebbles	2	
Handaxes	6	
Cleavers	2	8
Unipolar cores	2	
Bipolar cores	1	
Discoid cores	3	8
Discoid cores + Atypical scrapers	1	
Shapeless cores	1	
Unmodified flakes	9	
Broken unmodified flakes	6	28
Utilized flakes	13	
Simple convex side-scrapers	1	
Transverse convex side-scrapers	1	
Side-scrapers on ventral face	1	
End-scrapers	1	
Atypical end-scrapers	4	21
Backed knives	2	
Naturally backed knives	2	
Notches	1	
Denticulates	4	
Casually retouched flakes	4	
Total	89	

Inventory of Unit K-V.

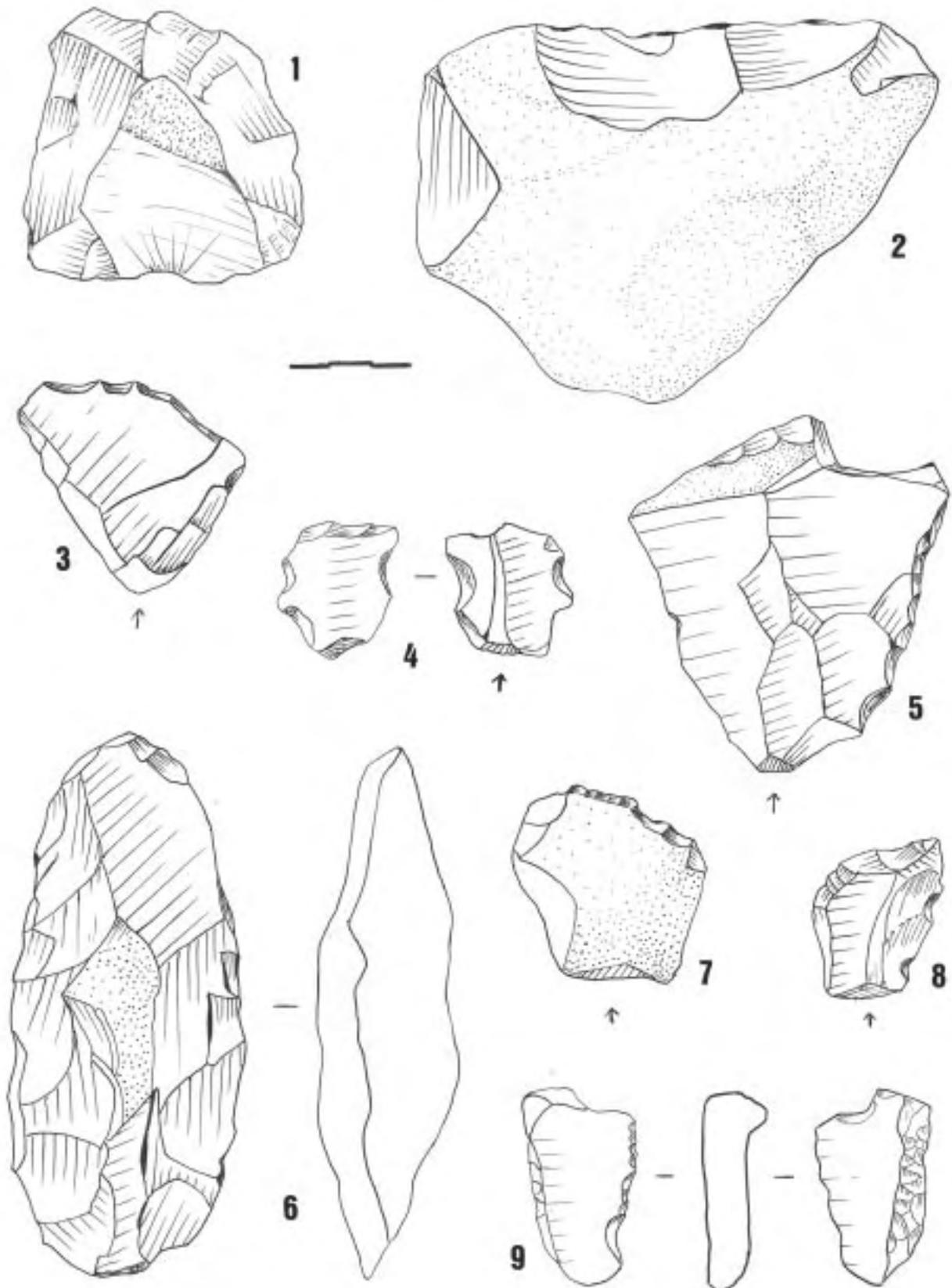


Fig. 5. Karre I. Lithic industry from Unit K-V. 2: bifacial lateral chopper; 3: utilized flake; 4: notched flake; 6: handaxe of Sangoan type; 9: backed knife. Lithic industry from Unit KI. 1: unipolar core; 5-7: utilized flakes; 8: borer. 1-2: trachyte; 5-7: basalt; 3, 4, 8, 9: obsidian. *Drawings by A. Berthelet*

Comments on typology

The hammerstone is a broken pebble of 370 g used repeatedly on one end, but also on the broken edge.

Broken pebbles, with one or several fractures, are on basalt, trachybasalt or obsidian. Their maximum length ranges from 40 to 110 mm.

There are five large choppers with lengths close to 130 mm. One of them was also used as a thick scraper. The angle of the working edge ranges from 75° to 88°.

Most of the polyhedrons have more than 11 removals. Two weigh more than 1 kg.

Notable is a denticulate on a small pebble with denticulations that show traces of utilization.

One of the broken pieces, 80 mm long, was probably a lateral chopper.

Half of the six handaxes are of ignimbritic tuff. A single handaxe, 47 mm long, is of obsidian and of light weight (26 g). Four handaxes are 100 to 150 mm long. One of them has a spatula-shaped end with a terminal bevel. The distal end of one of the handaxes is broken. Finally, five handaxes out of six can be classified in the F. Bordes 'thick handaxes' category.

Both cleavers are over 120 mm long; they are on trachyte.

There are eight cores and with one exception they are generally small at 40 to 50 mm. All are of obsidian. In most cases, the ventral surface shows negative scars of several preparation removals. Half of this small group is composed of discoid cores.

Among the flaking products (Fig. 5), the whole unmodified flakes are of small and average length (30 to 90 mm). They range from wide to very wide.

Broken unmodified flakes show more or less similar dimensions. The fractures are simple or double, transverse or oblique.

Butts of all flake groups are flat with the exception of one cortical example. Angles (butt/ventral face) range from 100° to 125°.

Six flakes out of fifteen are of obsidian, and the rest are of basalt.

Utilized flakes range in length from 27 to 87 mm. Most are wide flakes. Two-thirds are of obsidian. Butts are flat with the exception of a dihedral one. The angles range between 90° and 130°. Utilization is indicated by scaled or small nibbled flaking.

Side-scrapers are small, but the continuous stepped retouch is of good quality.

End-scrapers are generally retouched on the distal extremity (scraper on tip) and sometimes on one of the lateral edges. They are atypical except for one piece.

Backed knives are all of obsidian, of small and fairly small dimensions. Two are backed with natural cortex or a fracture. Two others show a very carefully retouched back. One has multiple alternating notches. It is a small wide flake of obsidian.

The four denticulated tools, of small and average dimensions, are of obsidian or basalt. Denticulates occupy the distal extremity, but sometimes the lateral edges.

Casually retouched flakes are small, of obsidian, and show more or less continuous retouch.

Summary remarks

This lithic material suggests an assemblage of Acheulian type. Notable is the relative abundance of handaxes and cleavers in contrast to the limited number of choppers and polyhedrons.

Cores are relatively frequent. Unmodified and retouched flakes are small in size and nearly half of them are on obsidian. Artefacts on flakes, especially scrapers and backed knives, show careful retouch.

This small assemblage, if it is indeed homogenous, could be attributed to the Lower or Middle Acheulian.

Units K 1-2

Only 16 artefacts were kept from the K1 Unit while the K2 deposit yielded 162 artefacts.

Inventory of Units K 1-2

The inventory presents the sub-units separately, but the typological analysis considers them together. Unit K has 178 actual artefacts, although the typological attributes list 188.

Typology	K1	K2	Total	Total of each category
Active hammerstones		4	4	
Passive hammerstones		2	2	
Battered pebbles		5	5	
Battered/broken pebbles - 1 fracture		4	4	
Battered/broken pebbles - 2 fractures		3	3	68
Broken pebbles - 1 fracture		22	22	
Broken pebbles - 2 fractures		16	16	
Broken pebbles - 3 fractures		3	3	
Broken pebbles - several fractures		9	9	
Lateral choppers	1	7	8	
Lateral choppers + Rabot	1	1	2	
Distal choppers		3	3	
Chisel-choppers		2	2	
Choppers with truncation		3	3	
Polyhedrons with primary working edge	1	3	4	
Polyhedrons with several working edges		1	1	
Prismatic polyhedrons	1		1	48
Heavy end-scrapers		2	2	
Rabots	1	3	4	
Rabots + Unipolar cores		1	1	
Notches on pebble		2	2	
Denticulates on pebble		1	1	
Truncated pebbles		1	1	
Casually trimmed pebbles	1	12	13	
Archaic handaxes		2	2	2
Waste	1	7	8	8
Unipolar cores	1	1	2	3
Bipolar cores		1	1	
Unmodified flakes	3	17	20	
Broken unmodified flakes		8	8	37
Utilized flakes	3	6	9	
Simple convex side-scrapers		1	1	
Atypical end-scrapers		2	2	
Awls		1	1	
Notches		2	2	12
Denticulates		2	2	
Pieces with abrupt retouch	1		1	
Casually retouched flakes	1	2	3	
Total	16	162	178	

Percussion material

This group comprises 68 actual objects, all coming from Unit K2 (Figs. 6-8). There are 6 true hammerstones and 12 battered pebbles, of which seven are broken. The analysis will therefore focus on 75 indices because 7 pieces (the seven battered and broken pebbles) have been studied twice (as battered pebbles and as broken pebbles with one or two fractures).

Typological inventory

Active hammerstones	4
Passive hammerstones	2
Battered pebbles	12
Broken pebbles with one fracture	26
Broken pebbles with two fractures	19
Broken pebbles with three fractures	3
Broken pebbles with several fractures	9

Raw material

Nearly 70% of these artefacts are of trachyte or basalt.

Dimensions

The great majority (85%) comprises artefacts with a maximum length of between 40 and 100 mm; pieces over these lengths are rare.

Active hammerstones (4)

Manual hammerstones are for the most part of basalt and their maximum length, with one exception, is between 85 and 95 mm. They are short or fairly long, thick or fairly thick pieces. Their shape is generally oval. Three pieces range between 500 and 600 g. The weight of the fourth hammerstone exceeds 1 kg.

The hammerstones are characterised by punctiform and diffuse percussion marks on the extremities, on one or both faces, and, on half of them, on the edges as well. There are small removals (micro-scalings) and crushings. One piece shows the initial trace of a pit. These objects have been frequently used and evidence for percussion is distributed at several points.

Passive hammerstones (2)

The two passive hammerstones, one of basalt, the other of trachyte, have a maximum length of 108 and 135 mm. They are both short and very thick. The shape of one is rectangular and the other is pentagonal and they weigh 1350 and 1860 g respectively.

Utilization marks are evident in small removals and crushing localised in several zones, indicating punctiform and linear percussion. These marks affect ridges, faces and, for one of these hammerstones, extremities.

Battered pebbles (12)

Out of 12 battered pebbles, 7 are broken in the same way (1 or 2 fractures). Most are of hard rocks: basalt, trachyte, bulbous lava, welded ignimbrite. Three-quarters of them range in maximum length between 60 and 100 mm. These pieces are fairly short or fairly long. Some are very thick and others fairly flat. A third have a polygonal outline. Weights range from 50 to 700 g with a peak between 180 and 250 g (42%).

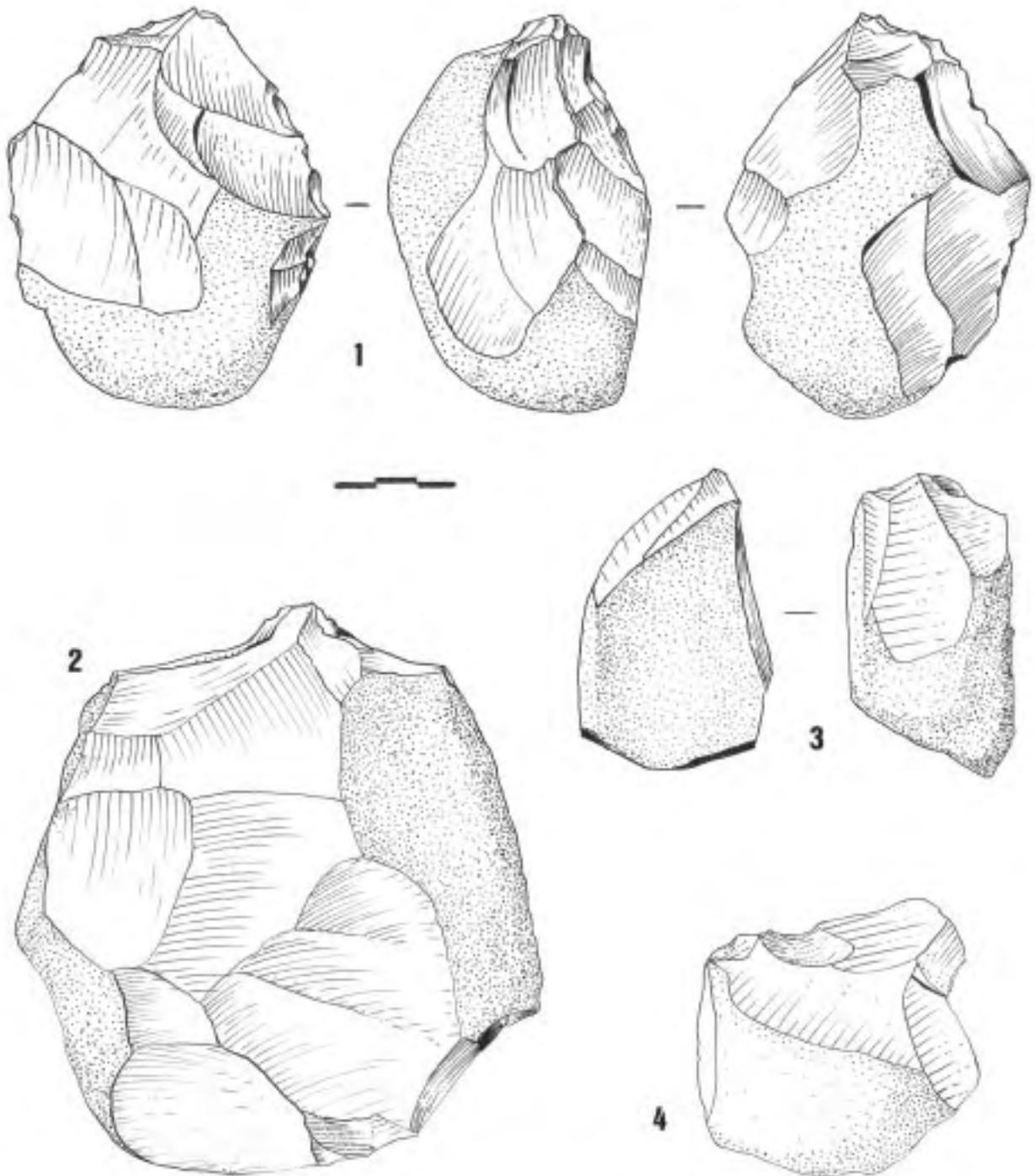


Fig. 6. Karre I. Lithic industry from Level K2. 1: archaic handaxe; 2: partial polyhedron; 3: chisel chopper; 4: utilized flake. 1-3: basalt, 4: trachyte. Drawings by J. Chavaillon (1-3) and A. Berthelet (4)

All these pieces show punctiform percussion marks and for 5 the percussion is also diffuse. They bear the negative scars of small removals (scalings) but a third show traces of crushing. For three-quarters of these pieces, the marks are visible on ridges, but half of the group has them on extremities. Six pebbles are only battered on a single point and six others are battered at two or several points.

Broken pebbles with one fracture (26)

Nearly 15% bear impact marks, principally on the fracture ridges.

They are of trachyte, lava, welded ignimbrite, but mostly basalt (42%). Maximum length ranges from 40 to 100 mm with a peak between 60 to 80 mm (46%). Broken pebbles with one fracture are short or fairly long but also thick or fairly thick. Their shape ranges from semi-elliptic (27%), quadrilateral and pentagonal to irregular. Weight is distributed between 18 and 550 g with a mild peak between 160 and 250 g.

Each piece was studied from three aspects (see Methodology in this volume):

1. L/w plan
2. L/t plan
3. State of the fracture surface.

The most frequent fractures are longitudinal (70%), parallel (42%) and irregular (54%). Eight pieces (31%) show these three characteristics, that is to say a fracture which is at the same time longitudinal, parallel and irregular.

Broken pebbles with two fractures (19)

Three pieces have impact marks on fractures.

The most common raw material is basalt followed by trachyte. The maximum lengths are shorter than those of broken pebbles with one fracture, even if they are in the same dimensional category; most (42%) range between 40 and 60 mm. They tend to be short or fairly long and thick or fairly thick. Oval, quadrilateral and hexagonal plan forms each account for 20% of the total. Weights range from 20 to 550 g.

The most frequent fractures are longitudinal (63%) and steep (55%); the state of the surface is concave, irregular or flat. Finally, the most frequent formula is a longitudinal, steep and concave fracture (16%). In most cases the fractures are adjacent, forming an obtuse (62%) or right angle.

Type	Fractures		
	One	Two	Three
Longitudinal	18	24	4
Transversal	4	8	
Oblique	4	6	5
Parallel	11	13	3
Perpendicular	6	4	2
Inclined	9	21	4
Flat	4	11	4
Convex	2	2	
Concave	5	12	
Irregular	14	12	4
V-shaped	1	1	1
Total pieces	26	19	3
Total fractures	26	38	9

Summary of fracture characteristics of broken pebbles.

Broken pebbles with three fractures (3)

The maximum length is sometimes low, sometimes high (140 mm). They are fairly short but also fairly thick pieces. One is flat.

Broken pebbles with several fractures (9)

Two thirds of these pieces are of trachyte. Their maximum length ranges from 32 to 92 mm. They are fairly short or fairly long pieces and flat (55%). They are shaped either in a pentagon, or in a hexagon. They are light in weight.

These pieces show from 4 to 6 joined fractures forming various angles; the obtuse angles category dominates.

Tools on pebble

Choppers

Choppers are in the majority. There is a relative abundance of end-scrapers on pebbles and a certain scarcity of polyhedrons.

Choppers represent 36% of trimmed pebbles. Lateral choppers are the most numerous.

Types	N	Total of each category
Lateral choppers	10	
Distal choppers	3	
Chisel-choppers	2	18
Choppers with truncation	3	
Polyhedrons with privileged working edge	4	
Polyhedrons with several working edges	1	6
Prismatic polyhedrons	1	
Heavy end-scrapers	2	9
Rabots	7	
Notches on pebble	2	
Denticulates on pebble	2	5
Truncated pebbles	1	
Casually trimmed pebbles	12	12
Total	50	

Lateral choppers (10)

Two choppers are associated with a rabot. Another piece is a unipolar core reworked as a chopper.

The raw material is principally basalt and obsidian. There are two size groups: one in which maximum length ranges between 40 and 90 mm (the obsidian tools) and another in which length is between 100 and 160 mm. These objects range between short and long but are mostly fairly thick. The weight of the obsidian pieces ranges from 55 and 275 g, while that of the other pieces is between 330 and 920 g. The base of the choppers is generally thick, slightly rounded or angular with 80% cortex. The cortex extends over one edge or sometimes both edges.

30% are unifacial choppers and 70% are bifacial.

Unifacial choppers (3)

The working edge is formed by 2 or 3 adjacent removals, generally A1-A2.

Bifacial choppers (7)

They can be divided into two groups. The first group with 4 pieces shows a single removal on one face, but several removals on the other face, using a formula such as: A1-A2-B3 or A1-B2-B3-B4. The second group has pieces with two or several removals on each face, using the formula A1-B2-A3-A4-B5 or A1-A2-B3-B4-A5. Up to 10 bifacial removals associated with a rabot can be counted on another piece.

Other characteristics of the working edge

For 7 choppers (of which 3 are unifacial) the angle of the working edge is between 65° and 90°. The length of the working edge in relation to the maximum length of the piece ranges from 27 to 90%. Despite the small numbers, it is noted that working edges that occupy from 70 to 90% of the length of the pebble are on bifacial choppers. The length of the working edge occupies from 10 to 40% of the total perimeter.

Seen in profile, the working edge of 3 pieces is slightly curved, while the value of the index of sinuosity situates the other pieces amongst the choppers with a sinuous working edge, with the exception of one with a mildly sinuous edge. The outline of the working edge in the L/l plan is convex for half of the group. However some working edges are angular and others straight (those in the K1 Unit).

Traces of utilization (scalings and crushings) are, for the most part, clearly visible.

Distal choppers (3)

These three choppers are of trachyte. Two have a maximum length of 70 mm and the third reaches nearly 150 mm. They are fairly short or fairly long choppers. Two are thick and the third is fairly flat, and they are of average weight. The third weighs more than 1 kg.

One of the choppers is unifacial (4 removals) and both the others are bifacial. Two have a thick cortical base.

The working edge: the angle measures about 80°. The working edge, seen in profile, is mostly sinuous, but in the L/w plan shows small serrations.

Chisel choppers (2)

These two choppers, with a maximum length close to 75 mm, are thick. One is short and the other fairly long.

The trimming of the working edge is unifacial (1 removal) or bifacial (5 removals). The angle is 70° to 80°. The working edge, seen in profile, is straight or sinuous. In the L/t plan, it is necessarily thin: one is convex and the other concave. The unifacial chisel-chopper shows crushing or cut marks in the slight concavity of the working edge.

Choppers with truncation (3)

These trachyte choppers have a maximum length of 65 mm (2) and 150 mm for the third. One is short and fairly thick, while both the others are long and flat.

One piece is unifacial with a single removal. Both the others are bifacial (5 removals, one of which is on the A face, and four are on the B face). The same technique was used for lateral choppers in the same unit.

Seen in profile, two pieces show a sinuous working edge and the third a straight working edge. Seen face on, two working edges are concave and the third is angular. The angle ranges widely from 70° to 100°.

The truncation of one of the chopper edges was prepared by one or several removals.

Percussion marks are clear on the working edge. In addition, one of the choppers shows percussion marks on the base, a characteristic that was also observed on some pieces from the Gombore I Oldowan site.

Polyhedrons

Three types of polyhedron are present. The original blank is trachyte or basalt. Their maximum length is distributed into two groups, one from 60 to 90 mm and the other from 135 to 145 mm.

Polyhedrons with primary working edge (4)

This is the best-represented category. These polyhedrons, of average size, are “fairly short” or “fairly long”. There are thick and very thick pieces.

For three of them the number of removals ranges from 15 to 20. The shaping is sometimes partial (50%), sometimes nearly total.

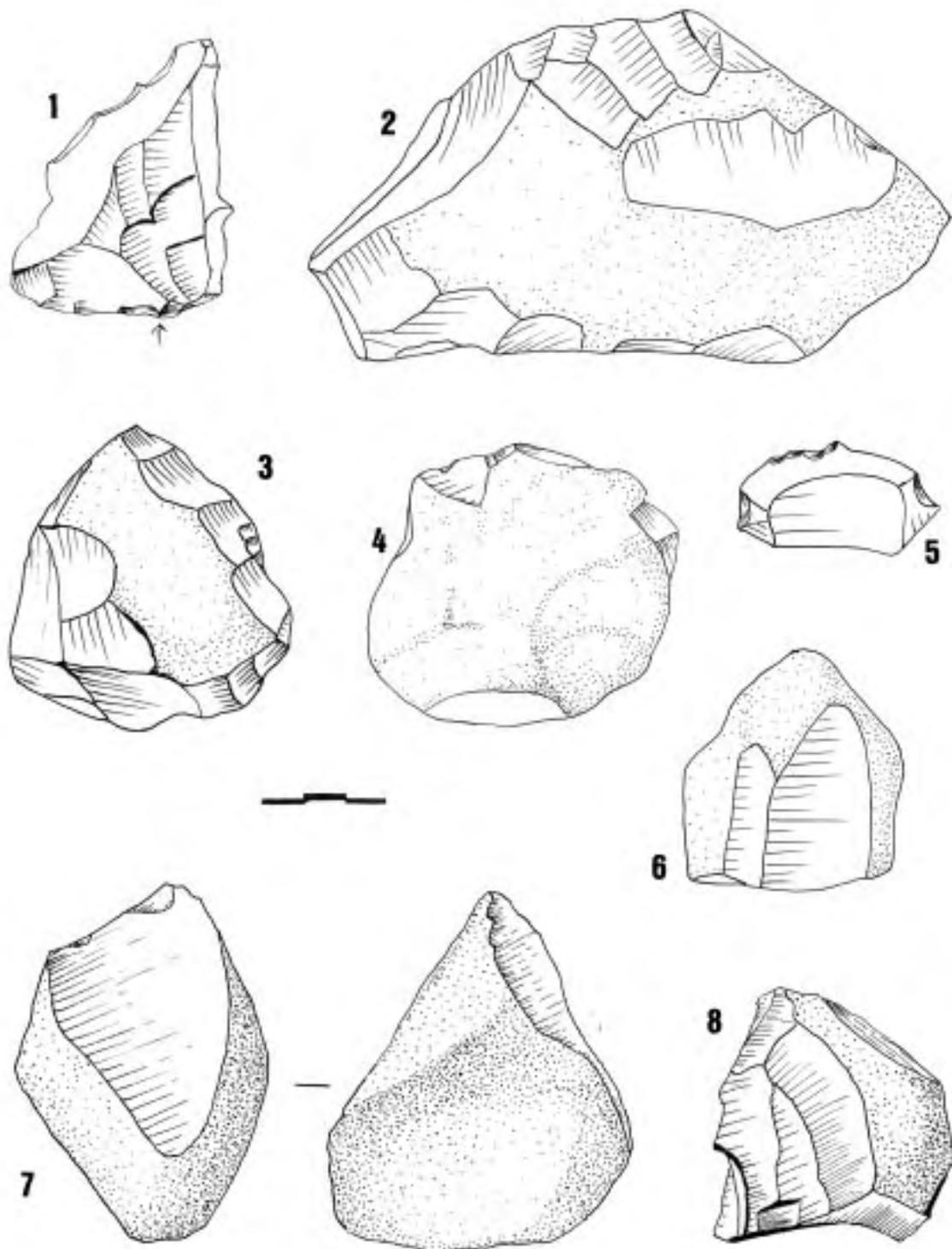


Fig. 7. Karre I. Lithic industry from Unit K2. 1: utilized flake; 2, 3: lateral bifacial choppers (N. 3 has been retouched and utilized as a rabot); 4: cortical flake; 5: retouched flake; 6: unipolar core; 7: chisel chopper; 8: rabot. 1, 4, 7, 8: basalt; 2: trachyte; 3, 5, 6: obsidian. Drawings by A. Berthelet (1-6) and J. Chavillon (7-8)

The primary edge is partially worked, although the retouch is continuous. In profile, the working edge is very sinuous and the angle is high: 90° to 100°. As at Gombore I, these polyhedrons could have been used as a cutting tool (chopper) or to crush, since many impact traces are visible on the working edge.

Polyhedrons with several working edges (1)

This large piece shows 15 negative flake scars.

The two working edges are partial and independent. They occupy less than 30% of the periphery. The angles are close to 100°. The two very sinuous working edges have been strongly battered and crushed.

Prismatic polyhedrons (1)

The category is poorly represented in this site whereas it is dominant at Gombore I.

This small polyhedron is very short and very thick. The polygonal shape was determined by 15 flake removals.

Percussion marks are mainly linked to flakes or fragment removals rather than to intensive utilization.

Heavy end-scrapers on pebbles

End-scrapers are well represented. Three of them are associated with choppers and with a core.

The majority are on basalt, some are on trachyte, and obsidian is used more rarely. The maximum length defines two groups: one of average dimensions (70 to 80 mm), the other one between 100 and 110 mm; the exception is one basalt end-scrapers 48 mm long.

Heavy end-scrapers (2)

These two pieces are short and thick. After removal of a fracture, large flakes are often reworked with end-scrapers retouch. The angle of the working edge ranges from 72° to 80°. Utilization marks are visible on the working edge of the upper face (front of the scraper).

Rabots (7)

Rabots are heavier than thick end-scrapers. They are short and always thick. One of them is a double robot with crossed planes, which brings the number of working edges to 8.

Starting from a basal platform, 2 to 7 major removals can be observed, retouched by 1 to 8 smaller flakes forming an abrupt or vertical front. The basal platform is generally a slightly concave main flake surface. A robot with flat cortical base is notable. On another specimen, the negative scar of the main flake of a unipolar core was used as the basal platform for a robot.

The outline of the working edge of the robot is:

Very convex	2
Convex	4
Angular	2

The angle ranges between 85° and 105°.

Utilization marks are seen on the front edge of all pieces with scalings on the basal platform.

Various tools on pebble

These pieces are represented by two notched pebbles, a denticulate on a pebble and a truncated pebble, as well as thirteen casually retouched pieces.

Notched pebbles (2)

These two basalt pieces have a maximum length close to 100 mm. They have been trimmed from very short and fairly thick to flat pebbles.

One shows a notch on the tip 33 mm long with a shallow concavity. The other one shows a clearly concave lateral notch 48 mm long. They have been formed by the removal of a large flake and reworked by several small flakes. The angles are respectively 87° and 90°. Utilization marks are abundant.

Denticulates on pebble (1)

A broken, flat pebble shows 3 regular and joined denticles that are shallow and 8 mm long, forming an angle of about 100°. Utilization traces are visible.

Truncated pebbles (1)

A basalt pebble is truncated transversally. The truncation was retouched by four convergent and flat removals; the point of impact from the removal of the flake is quite visible.

Casually trimmed pebbles (13)

These are pieces that cannot be classified in any typological category.

According to the petrographic analysis, basalts dominate (54%), followed by trachyte and obsidian.

They range from very short to fairly long. Most are thick or very thick.

With one exception, the number of secondary flakes ranges from 2 to 5 and they are conjoined.

Two pieces out of 13 have utilization marks on ridges.

These casually trimmed pebbles are probably artefacts in progress. Half of the tools can be compared to:

Distal choppers	1 piece
Partial polyhedrons	4 pieces
Heavy end-scrapers	1 piece
Notched pebbles	1 piece

The rarity of utilization marks seems to definitely indicate that they are unfinished pieces and for the most part were not used.

Archaic handaxes***Archaic handaxes (2)***

These two pieces are made on obsidian and basalt.

They are similar in shape and dimension (98 and 115 mm maximal length) and probably in function. Despite their broken distal extremity, they are still quite long but also fairly thick. They weigh over 500 g. The base is thick and cortical and the cortex is invasive on both faces.

The mesio-distal part was trimmed by 5 or 6 bifacial removals, forming a point of more or less trihedral section which could have been broken accidentally during manufacture or utilization. These archaic handaxe edges are sinuous and the angle is close to 80°.

It seems that, at a later time, these archaic handaxes were used as choppers, for one of their edges bears clear utilization marks in the mesio-distal area.

Débitage

Cores

Typological inventory

Unipolar cores	3
Bipolar cores	1

One of the unipolar cores was reworked as a rabet. The material used is obsidian and basalt. The maximum dimensions range between 60 and 105 mm. Cores range from short to fairly short and from thick to fairly flat. Three of them weigh from 150 to 200 g.

Unipolar cores (3)

Two cores have quite a flat cortical lower surface. For the third, the lower convex surface was trimmed by several removals. Two pieces without upper surface preparation yielded no less than 2 adjacent cortical parallel flakes. By contrast, the third core shows some facets prior to the removal of a single wide and fairly small flake.

Bipolar cores (1)

This hexagonal core has a flat faceted lower surface. The upper face shows the negative of two small and very wide flakes. Working platforms are flat and opposed.

Débitage products

These include all unmodified, utilized or retouched flakes (49):

Unmodified flakes	20
Broken unmodified flakes	8
Utilized flakes	7
Broken utilized flakes	2
Retouched whole flakes	11
Retouched broken flakes	1

In the following table, we note that obsidian predominates with 47%, followed by basalt with 30%:

Raw material	Unmodified flakes	Broken flakes	Utilized flakes	Retouched flakes	Total
Trachyte	1	1	1	1	4
Basalt	9	1	2	3	15
Volcanic tuff	1	3	1	2	7
Obsidian	9	3	5	6	23
Total	20	8	9	12	49

Dimensional classes of the flakes

Using the débitage classes of A. Leroi-Gourhan on 38 whole flakes we have:

Flakes	Very wide	Wide	Very long	Long	Total N	Total %
Fairly large		2	1		3	7.9
Medium	2	2	4	2	10	26.3
Fairly small	3	3	3	2	11	29.0
Small	6	3	1	3	13	34.2
Very small	1				1	2.6
Total	12 (31.6%)	10 (26.3%)	9 (23.7%)	7 (18.4%)	38	

With one exception, these flakes are very wide to wide, and fairly long or long; while others are fairly small but also very small or of average size. Very wide and small flakes are also well represented. This characteristic is even more accentuated in the tool on flake category.

Flattening index

Of 38 whole flakes a clear majority is fairly flat (60%). The rest are distributed between flat and fairly thick flakes.

Their weight does not exceed 225 g and 42% weigh under 25 g.

Facets

Of the 47 flakes studied, those with 3 facets are most numerous, but 51% of the flakes have 3 or 4 facets. Eleven flakes retain cortex:

Upper face	Unmodified flakes	Utilized flakes	Tools on flake	Total
Cortical	2	1		3
1 removal	6			6
2 removals	2	1	2	5
3 removals	7	3	4	14
4 removals	6		4	10
5 to 7 removals	3	4	2	9
Total	26	9	12	47

Butts are visible on 36 whole or broken flakes, while 61% of the butts are flat. Dihedral butts are rare (nearly 10%) and are mainly on used or retouched flakes:

Butt	Unmodified flakes	Utilized flakes	Retouched flakes	Total
Cortical	2	1	2	5
Flat	15	3	4	22
Dihedral	1	2	1	4
Linear/punctiform	1	1	3	5
Total	19	7	10	36

The butt/ventral face angle ranged between 90° and 125°, with 58% between 110° and 120°.

Unmodified flakes (38)

The unmodified whole flakes are of basalt and obsidian. They can be of medium or small size or very wide and long.

Practically half of this group has cortex on the dorsal face. Butts are most frequently plain.

Broken flakes (10)

Eighteen unmodified flakes are broken. The maximum length of 8 of them ranges from 36 to 73 mm. Some have simple fractures (there are 3 longitudinal or lateral fractures) while others are double and cut obliquely (2), or multiple (3 fragments).

Utilized flakes (11)

The length of these nine flakes ranges from 33 to 87 mm. Seven are whole and two are broken. Utilization traces can be seen on the left (2) and right (3) edges.

These marks only partially affect the used edge, but always the mesial part. However, 4 flakes have only small scalings at the distal extremity.

Two utilized flakes have double and oblique fractures, joined and separated.

Tools on flakes

There are seven types of retouched pieces. This typological category of tools on flakes is poorly represented in comparison with that of tools on pebble.

Simple convex end-scrapers (1)

This is a long flake, with several facets and a dihedral butt. The stepped retouch occurs all along the right edge.

Atypical end-scrapers (2)

These are two wide flakes, both with a flat cortical butt. Abrupt adjacent retouch scars occur on the distal extremity (denticulated end-scrapers) of one and along the mesio-distal part of the left edge on the other.

Awls (1)

An awl, trimmed by 2 shallow retouched notches, occurs on a small obsidian flake fragment with several facets on the upper face. This awl is one of the more elaborate pieces from the Unit K.

Notched flakes (2)

There are two flakes with large notches with a fairly distinct concavity, trimmed by the removal of several flakes. One is on a flake tip, the other one is on a lateral edge.

Denticulates (2)

Two small obsidian flakes show well-marked denticulated retouch along one edge.

Pieces with abrupt retouch (1)

This very wide small flake, shows regular, continuous and abrupt retouch on the transverse edge and on one of its lateral edges.

Casually retouched flakes (3)

On very wide flakes, discontinuous, irregular retouch affects transverse and lateral edges. One has traces of crushing as a result of utilization.

Fragments or debris

These are scrap pieces, on fragments of pebbles, flakes or cores, that are shapeless and unclassifiable.

All these 8 artefacts are of obsidian. Seven range in length from 30 to 55 mm with 4 to 11 facets. Three of these artefacts show areas of cortex. They are long and fairly long, but also fairly thick. Several of them are modified and one has impact marks.

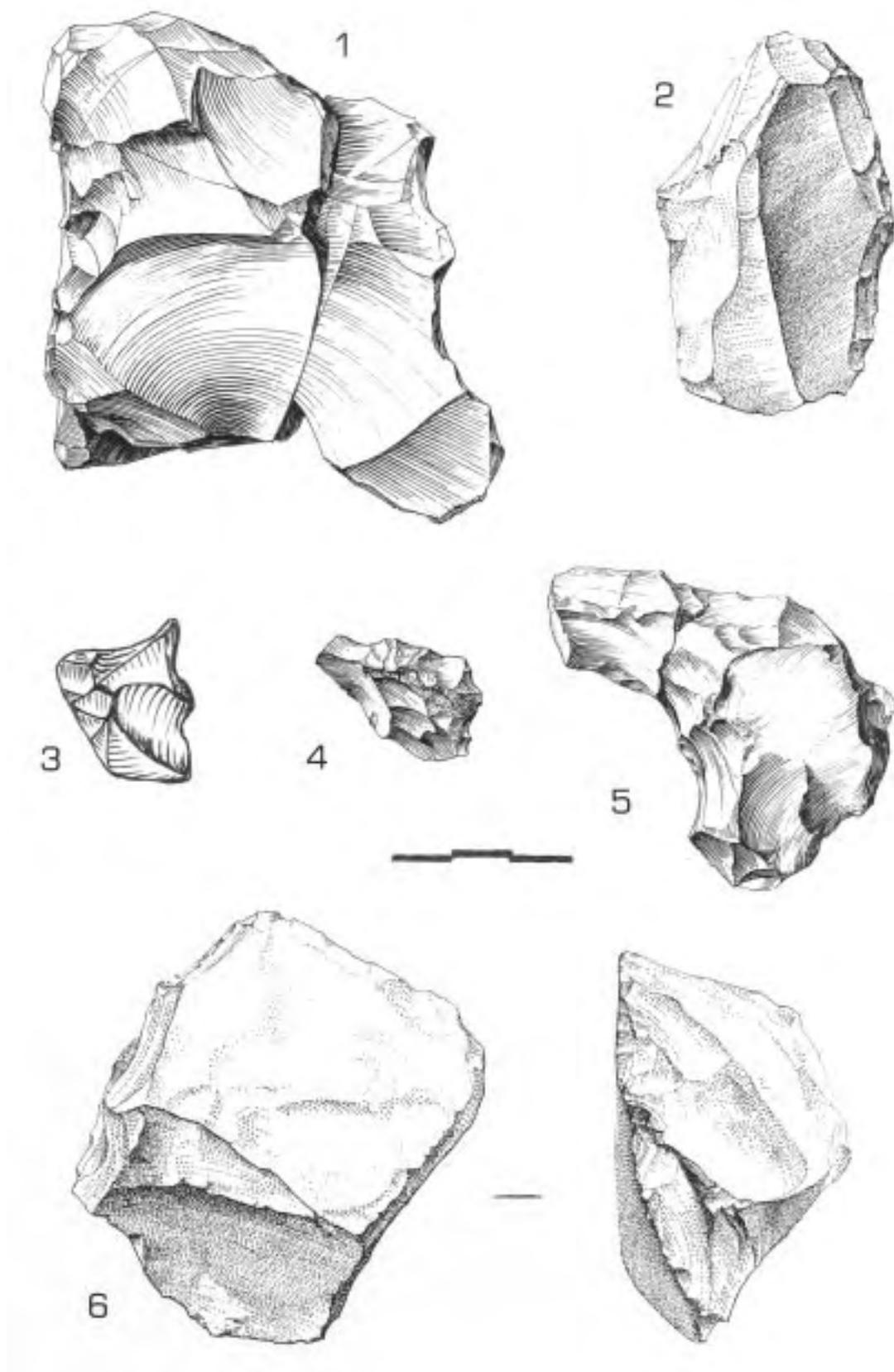


Fig. 8. Karre I. Lithic industry from Unit K2. 1: unipolar core; 2: simple convex side-scraper; 3: borer; 4, 5: notched flakes; 6: large end-scraper on flake. 1, 3-5: obsidian, 2: basalt; 6: tuff. Drawings by C. Chavaillon (1, 2, 4-6) and A. Berthelet (3)

Faunal remains

Faunal remains in the Units K1-2 occur in relatively low numbers (85), comprising only a third of the collection.

Inventory

Unidentified species

Bone and teeth fragments of which 4 are large bones	62	
Long bone fragments with epiphysis	1	
Long bone fragments	1	
Articular extremity fragments	4	
Flat bone fragments	1	76
Scapula fragments	1	
Skull bone fragments	3	
Indeterminate bone	2	
Tooth fragments	1	

Bovids

Lower maxilla with teeth	1	1
--------------------------	---	---

Hippopotamus

Bone fragments: tibia	1	
Pelvis fragments	1	
Rib fragments	1	7
Teeth: canine	3	
Teeth: molar	1	

Equids

Lower maxilla with teeth	1	1
--------------------------	---	---

Bone and teeth fragments are dominant. Pieces anatomically or specifically identifiable (limbs, pelvis and ribs, scapulae) account for only 15%. There are also some skull fragments, as well as two maxillae still bearing some teeth. In this domain, the best represented are hippopotamus canines, but also the lower mandibles of an antelope and an equid.

Morphometric analysis

Of the faunal remains, 60% have a maximum length between 25 and 100 mm, but 38% are between 100 and 260 mm.

Length (mm)	Bones	Teeth	Jaws	Total
< 24	1			1
25-39	7	1		8
40-62	20			20
63-99	23	1		24
100-159	21	1	1	23
160-250	6	2	1	9
Total	78	5	2	85

The fragments of both equid and bovid maxillae are more than 100 mm long. Hippopotamus remains are among the largest and are probably also the most frequent.

Weight

The weight ranges from 1 g (small skull fragment) to 960 g (a fragment of hippopotamus tibia), for a total of 10270 g.

Weight (g)	%
1-24	29.4
25-99	37.6
100-1000	33.0

The table shows a nearly equal division between splinters (up to 25 g) and fragments, which are more variable in weight. However we note that the teeth and bone fragments that weigh between 100 and 1000 g represent a third of the faunal remains numerically.

Comments on Level K

The percussion material represents almost the same proportion (38%) as it does at the Oldowan site of Gombore I. In this group, the six true hammerstones are notable because, although they are few in number, they are relatively important considering the small number of excavated squares.

Tools on pebble are four times more common than tools on flake. If we leave casually trimmed pebbles aside, we see that choppers represent nearly half of the tools on pebble. As for end-scrapers on pebbles, they are proportionally numerous (24%).

Both archaic handaxes have a broken distal extremity. The presence of these archaic handaxes is reminiscent of some levels at Olduvai Gorge, as well as the main level at Gombore I.

Half of the less abundant débitage material is of obsidian. Cores are rare (3) and flakes are in relatively low proportions. There are twelve artefacts on flakes but they are uncharacteristic, except for a side-scraper and one awl.

Faunal remains are quite numerous. When hippopotamus is well represented, antelopes and Equids are also present (Fig. 9). From the anatomical point of view, long bone fragments and two mandible fragments are worth noting. Level K seems more easily linked to the classic Oldowan than to the Lower Acheulian. However, it was only a test-excavation and the number of objects was therefore very small. Even if some arguments allow preference for the Oldowan label, one must nevertheless have certain reservations.

LEVEL L

Archaeological Level L consists of two gravel strata within a whitish argilo-arenaceous cement. Unit L1 forms the upper part of the fluviatile layer and Unit L2, the most important and best preserved in this location, is at the base of this sandy layer. L2 is a thin stratum of sand and gravel from 5 to 10 mm thick at the top of the brown clay layer (35 to 40 cm) which separates the archaeological Level L from the underlying Level M (Fig. 10).

General inventory

- Unit L1: 2 pieces: 1 - unmodified flake
 1 - bone fragment
- Unit L2: 91 pieces: 26 - lithic artefacts
 65 - bones and teeth (fragments)



Fig. 9. Karre I. Oldowan Level K. Detail of the excavation with bone fragments, hippopotamus teeth, choppers and flakes.

If both groups are put together, the typological inventory is as follows:

- 1 - broken pebble with two fractures
- 1 - discoid core
- 1 - shapeless core
- 12 - whole unmodified flakes
- 7 - broken unmodified flakes
- 5 - utilized flakes

The maximum lengths of lithic objects and bone fragments or teeth are between 19 and 104 mm. The weight of these remains ranges from 1 to 214 g. The heaviest lithic piece is a whole unmodified flake of 157 g.

Percussion material

Broken pebbles with two fractures (1)

The percussion material is represented by a small fragment of a trachyte pebble 37 mm long, fairly thick, of low weight (10 g) and trihedral section. Both fractures are joined and show the same characteristics: longitudinal fractures, steep length/width plan and irregular surface.

Débitage

Cores

There are 2 cores, represented by a discoid core and a shapeless core. Both are small and of obsidian.

Discoid cores (1)

It is a small core 43 mm long, short and fairly flat. Its weight is low (30 g). The lower face is flat and poorly preserved. The upper face bears 4 concentric removals with convergent impacts. Flakes detached from this core were wide, small and of more or less triangular shape.

Shapeless cores (1)

This small core is 34 mm long, and is very short and thick.

Débitage products

Raw material

Most of the whole and broken flakes are of obsidian (83%) and both cores are of obsidian.

Typology	Trachyte	Basalt	Other volcanic rocks	Obsidian	Total
Whole unmodified flakes	1	2		9	12
Broken unmodified flakes			1	6	7
Utilized unmodified flakes				5	5
Total	1	2	1	20	24

Raw material of whole or broken unmodified flakes and utilized flakes.

Flake dimensions

Three quarters of the unmodified flakes are small. They are distributed between very wide and long flakes. A third of them are at the same time wide and small. They are fairly flat and mainly flat (58%).

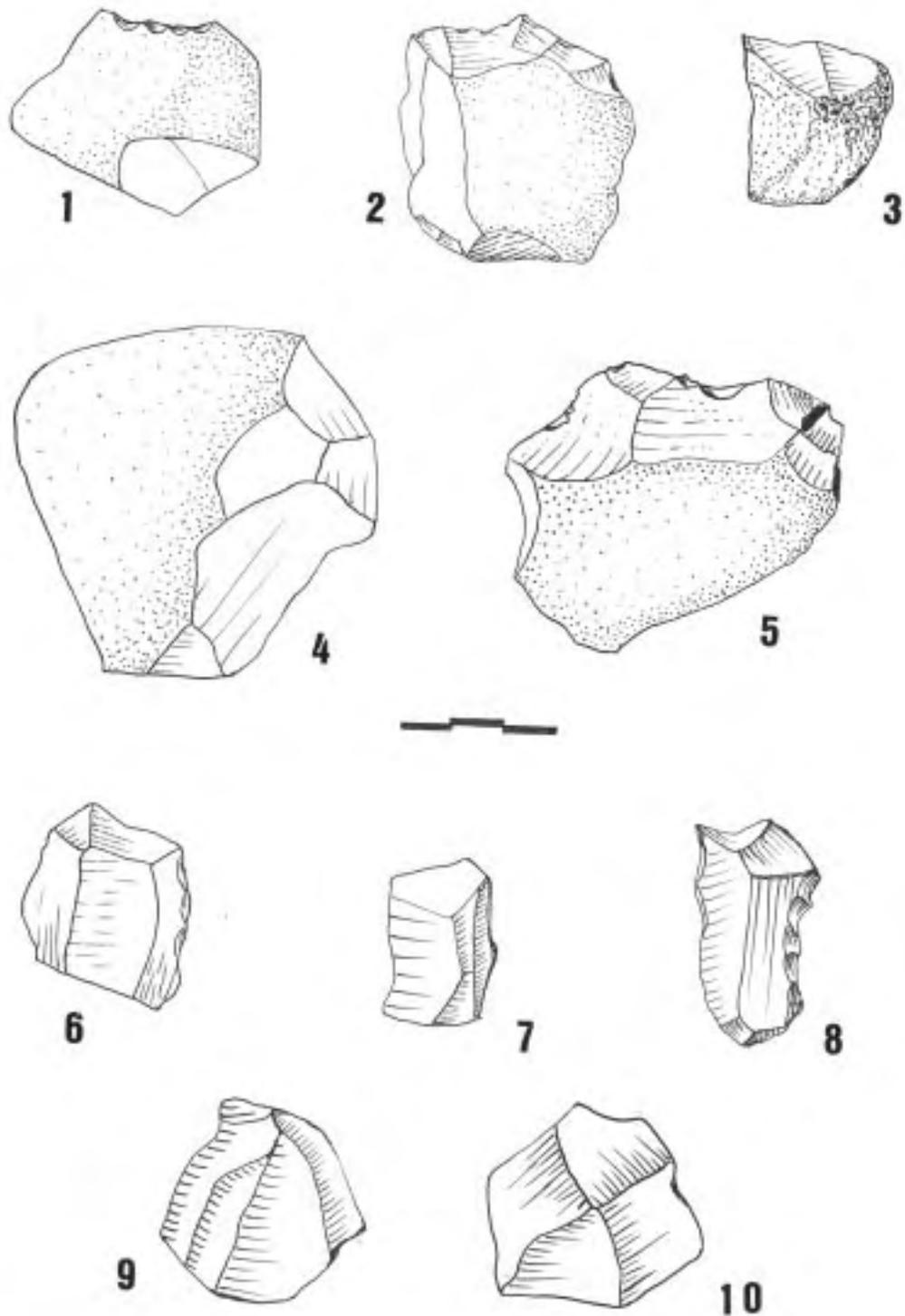


Fig. 10. Karre I. Lithic industry from Level K2. 1, 3: utilized flakes; 2: atypical end-scraper; 5: flake; 8: denticulate-borer. Lithic industry from Level L: 4, 7, 9: flakes; 6: utilized flake; 10: centripetal core. 1, 3, 5, 6, 8-10: obsidian, 2: trachyte; 4, 7: basalt. Drawings by A. Berthelet

Flake	Very wide	Wide	Very long	Long	Total
Middle	1				1
Fairly small				1	1
Small	1	4	2	2	9
Very small	1				1
Total	3	4	2	3	12

Dimensions of the 12 whole unmodified flakes.

Weight

Nearly two thirds of whole flakes weigh between 5 and 10 g, except for one unmodified flake weighing 137 g. Broken, unmodified or utilized flakes weigh under 10 g, except for one broken of 22 g.

Overall, the lithic material is a bit lighter than the faunal remains.

Number of facets

The following table concerns 12 whole flakes, 5 partially broken flakes out of 7 and 4 out of 5 utilized flakes.

Typology	2	3	4	5 and >	Total
Whole unmodified flakes	2	1	2	7	12
Broken unmodified flakes	1		1	3	5
Utilized unmodified flakes	1		1	2	4
Total	4	1	4	12	21

Number of facets of unmodified flakes.

More than half of the flakes have at least 5 facets. None are cortical flakes. Only one unmodified flake has several facets and a significant area of cortex.

The differing characteristics of the flakes perhaps have an explanation in the presence of small cores. The flakes detached from these cores or waste products from the flaking of other blocks are generally small flat flakes, of generally light weight. If the number of facets on the upper face is high, the butt is generally flat. There is a single dihedral butt. The angle formed by the striking platform and the butt ranges from 110° to 135°. This flaking shows both archaic characteristics (butt) and evolved characteristics (facets).

Butt	Cortical	Flat	Dihedral	Punctiform	Total
Whole unmodified flakes	1	3	1	1	6 of 12
Broken unmodified flakes					0 of 7
Utilized unmodified flakes		2		1	3 of 5
Total	1	5	1	2	9 of 24

Butts of unmodified flakes.

Whole unmodified flakes (12)

Unmodified flakes are mostly of obsidian. However, some specimens are of basalt. They are generally small. A third are wide flakes. Their weight ranges from 5 to 10 g. Butts are principally flat with an angle ranging from 110° to 125°. Three quarters of these flakes have 4 facets or more on the upper face. They have pentagonal, hexagonal but also polygonal shapes. Half of them came from square 26-S/4-E.

Broken flakes (12)

They are divided between 7 unmodified flakes and 5 utilized flakes. The length does not exceed 42 mm and their weight ranges from 1 to 22 g. Even when broken, there are numerous facets on the upper

face. Six flakes out of seven came from the square 26-S/4-E. In 90% of cases, the distal end of the flake has been retained. Fractures are mainly transverse, most of the time perpendicular, except for one piece in which the fracture is slightly oblique. Three flakes out of ten have longitudinal fractures. These flakes have only one fracture except for one fragment which shows three.

Utilized flakes (5)

These are all broken obsidian flakes. The length ranges from 19 to 41 mm. The butts have an angle of 115° and 135°. There are 4 or more facets on the upper face and they have a pentagonal and hexagonal shape. A single specimen is triangular.

Utilization traces, both continuous and discontinuous, are located at the distal extremity or on edges. It seems that the generally acute angle formed by the meeting of two edges at the distal end is the result of utilization. These marks are very small scalings. Four flakes out of five were in square 26-S/4-E.

Fauna and artefacts

As a general indication, indices of length and flatness were related to the maximum length of faunal remains.

Indexes	V. thick	Thick	R. thick	R. flat	Flat	V. flat	Bones	Teeth	Horns	Total	%
V. short	1						1			1	1.51
Short		1	1	1		2	4		1	5	7.58
R. short		2	2	1		1	6			6	9.09
R. long		1	1	2	2			6			
R. long		1	1	4	3		9			15	22.73
Long				1				1			
Long			1	6	5	2	14			15	22.73
V. long				6	9	4	19			19	28.79
Ext. long					3	2	5			5	7.57
Bone	1	3	5	18	20	11	58				
Teeth		1	1	3	2			7			
Horn		1							1	66	
%	1.51	7.58	9.09	31.82	33.33	16.67					

Relationship between length and flatness index for faunal remains from Level L.

What stands out is that all remains have a maximum length under 105 mm. The piece length for three-quarters of the sample is between 25 and 62 mm. Finally, 80% of the faunal remains are in the long and flat categories, in equal proportions. These are fragments, even splinters, that are often very long and sometimes extremely long. They are flat or fairly flat and 17% are very flat. It is not surprising that very long and flat (14%) are the most frequently combined characteristics encountered on the same bone fragment.

Length (mm)	Bones	Horns	Teeth	Total
< 24	5	1	1	7
25-39	21		5	26
40-62	23		1	24
63-99	8			8
100-160	1			1
Total	58	1	7	66

Maximum lengths of faunal remains: bones, horns, teeth.

Weight

The faunal weight values and, for comparison, those of lithic pieces show that the majority of lithic pieces (93%) and faunal remains (82%) weigh under 25 g. This does not exclude rare pieces that weigh less than 220 g. The total weight of the faunal remains is 1240 g.

Weight (g)	Bones	Teeth	Horns	Total	%	Lithic	%
1-3	8			8	12.12	3	11.11
4-5	6	1		7	10.61	9	33.33
6-9	17	3		20	30.3	8	29.64
10-15	7	3	1	11	16.67	2	7.41
16-24	8			8	12.12	3	11.11
25-39	7			7	10.61	1	3.7
40-62	3			3	4.54		
63-99							
100-159						1	3.7
160-250	2			2	3.03		
Total	58	7	1	66		27	

Weight of faunal and lithic remains.

Spatial distribution

Level L contains obsidian flakes and bone fragments and, more rarely, tooth or horn fragments. The lithic material consists almost entirely of broken obsidian flakes and two small cores. Flakes lay flat, mixed with bone fragments. The horn fragment could belong to an antelope. One of the tooth fragments is of a hippopotamus. Finally, one bone is an articular end.

Square 27-S/5-E yielded most of the pieces of average size. In the 1.5 x 3 m strip which was excavated, square 26-S/4-E undoubtedly yielded the highest density with 17 artefacts: 1 discoid core, 12 unmodified flakes, of which 5 were broken, and 4 utilized flakes. It is the same for faunal remains: 19 fragments (bone, tooth, horn) 29%. If this square metre has the highest density of lithic pieces, nearby squares are proportionally well represented by fauna. For example square 26-S/5-E yielded 3.7% of the lithic material but 18% of fauna. Square 27-S/4-E only has fauna, 14%.

Comments on Level L

This level, poor in lithic implements and rich in small bone fragments, is not without interest. The small area of the test-excavation does not allow any firm conclusions, apart from the fact that there are essentially cores and flakes. However, two hypotheses concerning the spatial distribution can be put forward:

Hypothesis 1: the excavated sector of Level L could belong to a living floor. It could be an area of obsidian flaking, but probably also an area for butchering small animals. The average size of the animal bone fragments, and the presence of numerous unmodified or utilized flakes, used as knives, support this hypothesis.

Hypothesis 2: This archaeological deposit could be completely or partially biased, that is to say, it could be the result of the transport competency of the river because of the small dimensions of the flakes and bones and their very low weight. However, there are also average sized pieces and weighing over 200 g. The entire deposit is in a sandy-clayey sedimentary context with gravel with a maximum size of 10 mm (weight about 3 g). Although not convincing, the presence of these objects could lead one to think about a temporary living site that has been more or less reworked.

LEVEL M

The archaeological Level M is restricted to a bed of pebbles several centimetres thick. As the excavation was restricted to three square metres, information is limited. This level is 0.55 m below Unit K2 and only 0.4 m from Level L (Figs. 11, 12).

Level M lies on a thin layer of whitish hardened tuff covering tuffaceous sand and gravel. The archaeological level is covered by yellowish clay, mixed with tuffaceous sand.

Level M is poor in river pebbles. It contains numerous bones, as well as pebbles tools and flakes (Fig. 13).

General inventory

The percussion material represents 28% of the total. The tools on pebble are rather poorly represented (17%). The tools on flake (3%) are rare and have no typological significance. In fact, half of the assemblage is débitage, consisting of cores and numerous flakes.

Percussion material

Battered pebbles, broken pebbles	18	28.2%
<i>Tools on pebble</i>		
Choppers, scrapers on pebbles	8	12.5%
Casually trimmed pebbles, Various	3	4.7%
<i>Débitage</i>		
Cores	4	6.2%
Unmodified or utilized flakes	26	40.6%
<i>Pieces on flake</i>		
Casually retouched flakes	2	3.1%
<i>Waste</i>	2	3.1%
<i>Worked bones</i>	1	1.6%
Total	64	

The analysis was done according to typological attributes.

Real count	N	Typological count	N
Battered pebbles	3	Battered pebbles	5
Battered and broken pebbles (1 fracture)	1		
Battered and broken pebbles (3 fractures)	1		
Broken pebbles (1 fracture)	4	Broken pebbles (1 fracture)	5
Broken pebbles (2 fractures)	4	Broken pebbles (2 fractures)	4
Broken pebbles (3 fractures)	1	Broken pebbles (3 fractures)	2
Broken pebbles (4 fractures)	4	Broken pebbles (4 fractures)	4
Total	18		20

Inventory of real and typological count.

Raw material

More than half of the artefacts are of basalt, which is logical for this type of object as it is preferred for its hardness. Three pieces are of obsidian.

Typology	Trachyte	Basalt	Lava	Obsidian	Total
Battered pebbles		4		1	5
Broken pebbles (1 fracture)	1	2	1	1	5
Broken pebbles (2 fractures)	1	2	1		4
Broken pebbles (3 fractures)		2		1	2
Broken pebbles (4 fractures)	2	1			4
Total	4	11	2	3	20

Dimensions

Length almost never exceeds 100 mm, but the group is heterogeneous: three dominant groups (40-50 mm, 60-70 mm and 90-100 mm) represent three-quarters of the pieces. Overall, there is a progressive decrease in length when the number of fractured pieces increases. This fact was also observed at Gombore I on a much larger number of artefacts.

Widths are between 18 and 80 mm. A third of the pieces are more than 24 mm thick.

Battered pebbles (5)

Out of five battered pebbles, two are broken: one shows a fracture and the other one has three fractures.

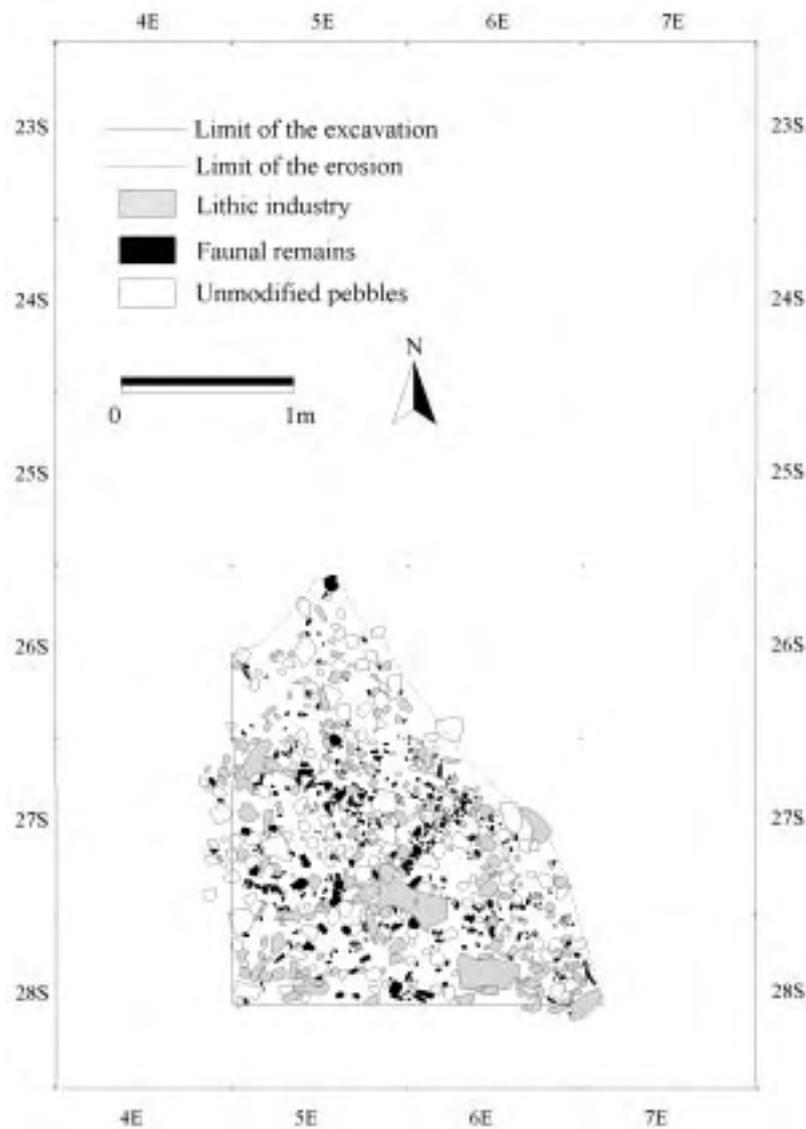


Fig. 11. Karre. Plan of Level M. (Original plan by J. Chavaillon, digital map by R. Gallotti)

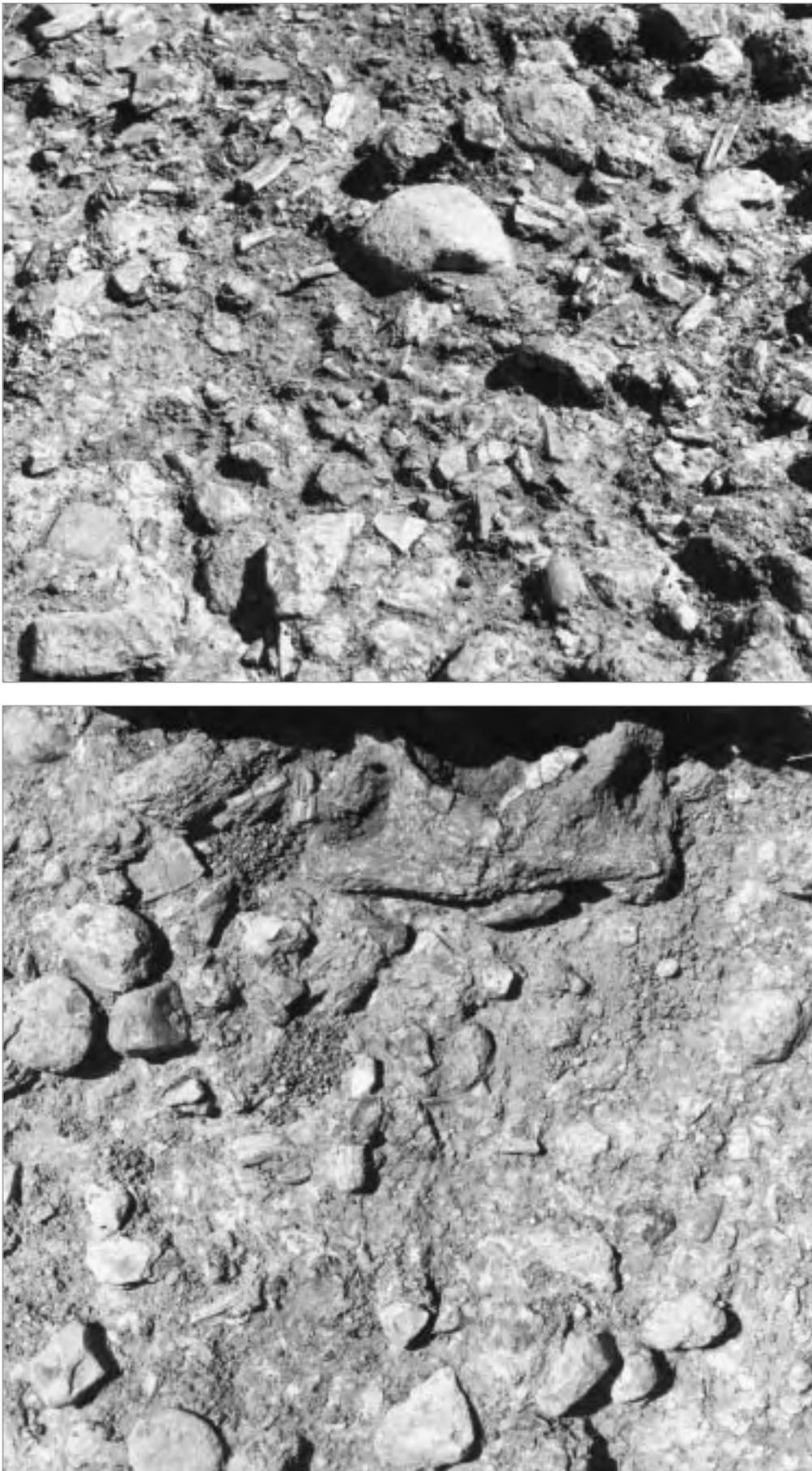


Fig. 12. Karre I. Oldowan. Excavation of Level M. Details: bones and tooth fragments of hippopotamus and Bovid, flakes and tools on pebble.

A. Berthelet, J. Chavaillon

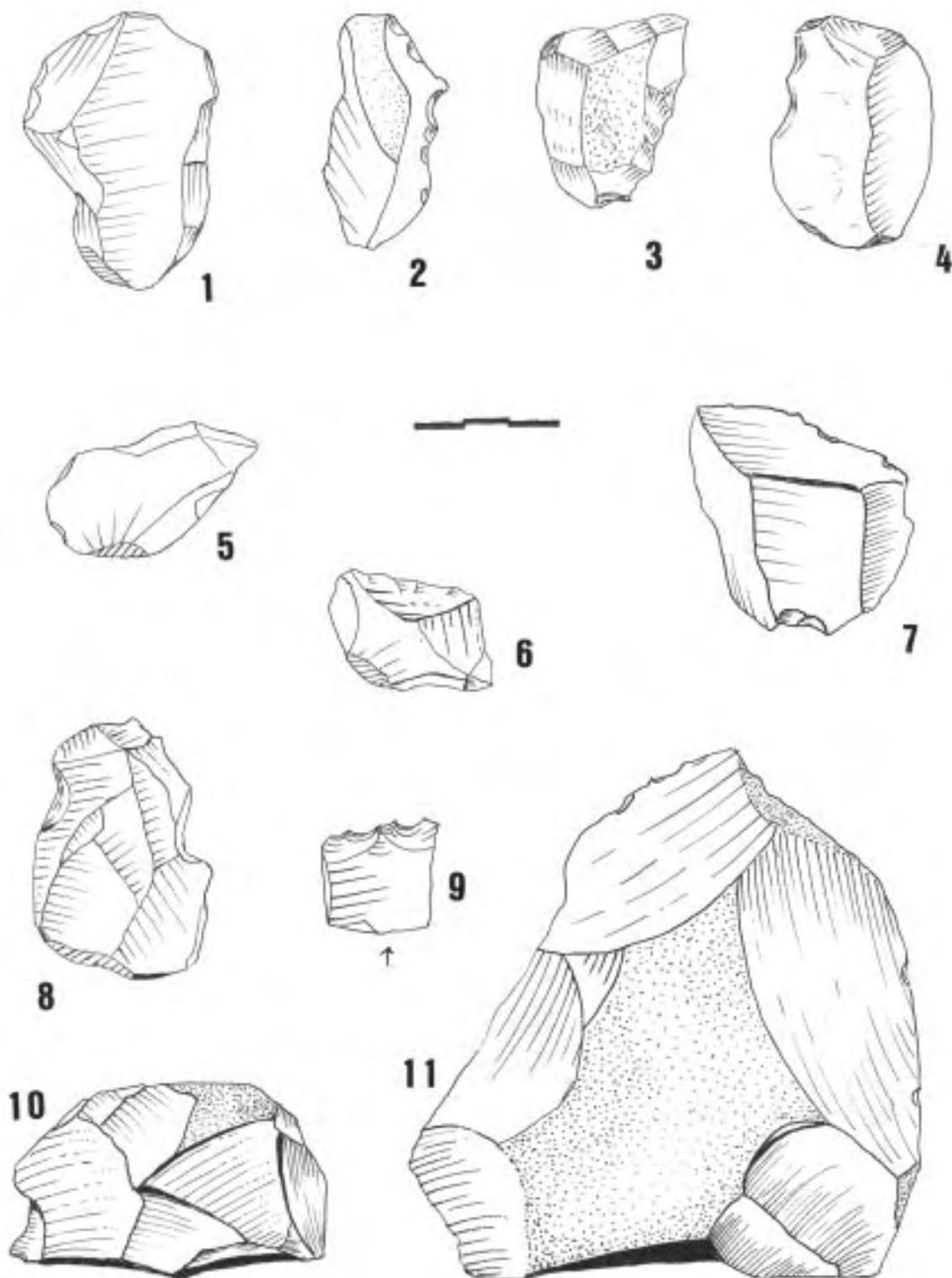


Fig. 13. Karre I. Lithic industry from Level M. 1, 5, 7, 8: flakes; 2, 4, 6: utilized flakes; 3, 9: retouched flakes; 10: rabot; 11: chopper with peripheral cutting edge. 1, 2, 5, 8: obsidian; 3: tuff; 4, 6, 7, 9: basalt; 10, 11: trachyte. Drawings by A. Berthelet (1-9) and J. Chavaillon (10-11)

Four of them are of basalt, the fifth is of obsidian.

Maximum lengths are variable and cluster mainly between 60-70 mm and 90-100 mm. There are short or fairly short pieces that are thick with very heterogeneous shapes and outlines. As for weight, there are two groups: one from 44 to 73 g and the other from 240 to 500 g.

Characteristics of percussion

1. The punctiform is the dominant percussion type (4 pieces out of 5). A single specimen has linear percussion marks restricted to the edge of a previously blunted fracture.

2. Aspect of percussion marks: 4 pieces out of 5 have signs of very small removals (scalings) and only 2 crush marks. No traces of pitting are visible.

3. Location of marks: 4 pieces have marks on one ridge, 2 pieces also have some on extremities. None show wear on surfaces.

Broken pebbles with one fracture (5)

A single piece has percussion marks. It is relatively heavy at 494 g. The most common raw material used is basalt.

Apart from one pebble 90 mm long, the rest of the pieces in this group lie between 33 and 50 mm. They range from short to fairly long and long and are in general fairly thick and exceptionally flat.

There is a variety of shapes, with ellipses proportionally well represented.

As for weight, except for one or two of them, this small group is in the under 35 g category.

Three pebbles out of five show a fracture of the same type: longitudinal, parallel and with a concave surface. Another piece shares the first two attributes, but the surface is irregular.

Broken pebbles with two fractures (4)

Two out of four are of basalt. Maximum lengths range between 40 and 72 mm. These pebbles are in general fairly long and long as well as fairly thick; one piece is however flat. With one exception, they weigh between 20 and 32 g.

Fractures: The three accepted attributes are different on each of the 8 fractures, even though two fractures are at the same time oblique, perpendicular and flat. Most fractures are transverse (3) and oblique (3). Steep fractures and flat fractures can be seen throughout the group. Three pieces out of four have adjacent fractures forming an obtuse angle (1) or an acute angle (2).

Broken pebbles with three fractures (2)

These two pebbles are of basalt; one bears impact marks. Their length is from 40 to 90 mm. They are fairly short and fairly thick. One has a triangular form. The weight is 33 and 287 g.

Fractures: Out of the 6 fractures 2 are similarly longitudinal, steep and flat. These fractures are joined.

Broken pebbles with several fractures (4)

Half are of trachyte. In contrast to Gombore I, pieces from Karre M have maximum lengths slightly over those of other broken pebbles categories. They range from 60 to 102 mm. These pieces are fairly long and thick. They frequently have an irregular outline and the weight is fairly high.

Fractures: Three pieces have 4 fractures and another has 5. All these fractures are joined and form various angles with a majority of right angles.

Tools on pebbles

Inventory

Pointed choppers	1
Choppers with peripheral working edge	1
Heavy end-scrapers	4
Rabots	2
Casually trimmed pebbles	2
Pieces with abrupt fractures	1

Despite the low number of pieces, the end-scrapers group is better represented than choppers. This characteristic is reminiscent of the typological distribution of pieces on pebbles at butchery sites or areas.

Choppers

The two choppers are not among the types most frequent in the Oldowan.

Pointed chopper (1)

This piece is 64 mm long and is short and very thick. Four small alternating removals keep most of the cortex and form an 87° used working edge, marked with crushing and scaling and a point with a 92° angle.

Chopper with peripheral working edge (1)

This chopper 120 mm long is of trachyte. It is fairly short and fairly thick. Its weight is 885 g. In fact it is a flaked broken pebble. The sinuous working edge was trimmed by 8 removals occupying 80% of the perimeter. Impact marks are visible.

Heavy end-scrapers on pebbles

Heavy end-scrapers (4)

These tools manufactured on basalt pebbles are the most numerous. Their maximum length is under 90 mm and their weight does not exceed 350 g. They are fairly long and thick or fairly thick. The number of removals ranges from 4 to 9.

The working edge of the heavy end-scraper (used or usable) represents from 19 to 38% of the total perimeter, which is low. These pieces are wider than they are high, for the end-scraper front always has a lower value to that of the working edge length. Finally the basal platform is slightly concave or flat. As for the outline, the active part is convex, except for one angular piece. Sometimes the outline is slightly nosed. The angle formed by the platform and the retouched part (the front of the scraper) ranges from 67° to 80°. Scalings resulting from use of the working edge only affect the retouched part and not the basal platform.

Rabots (2)

These objects show marked shape similarities but also some differences. The maximum length is over 100 mm. They are fairly long and thick. The active edge only occupies 27% of the total perimeter and the angle is 90°. On one the basal platform is a fracture and on the other it is cortex. The front of the rabot is high and vertical. The outline of the active part is convex. It has many scalings as a result of use on the active edge, but only on the retouched part.

Various tools on pebble

Casually trimmed pebbles (2)

These two pebbles in volcanic rock have a length close to 100 mm. Their weight is around 400 g. Removals are small in number (from 3 to 4) and determine a lateral working edge. These objects could be assimilated, functionally, with lateral choppers.

Pieces with abrupt fractures (1)

This trachyte pebble 85 mm long, is fairly long and fairly flat. Both faces are cortical and half of the perimeter shows continuous and abrupt removal scars: six removals come from one face and 7 from the other; the angle of this sharp edge ranges from 80° to 105°.

Débitage

Cores

This group is dominated by unipolar cores, technically the simplest. They are of obsidian, as are most of the flakes. These cores are of variable dimensions and can be either short or long and either fairly thick or fairly flat. Their weight ranges between 10 and 80 g.

Unipolar cores (3)

These cores have a more or less cortical and convex base, although one of the bases has two facets. The preparation of the upper face is very simple (1 or 2 removals). As for the main and single flake scar, it occupies the greater part of the upper face: wide flakes for two cores and fairly long for the third.

Discoid cores (1)

This core is rectangular with a base trimmed by several removals. On the upper face are the negative scars of 3 small flakes, wide and very wide converging towards the centre of the core.

Débitage products

Despite their small number, flakes represent 45% of the group.

Whole unmodified flakes	16
Broken unmodified flakes	5
Whole utilized flakes	5
Casually retouched flakes	2

Raw material

In the following table, it is clear that obsidian is the rock most commonly used. This is particularly clear for whole or broken, not utilized or retouched, flakes.

Due to the presence of the four obsidian cores, it can be expected that flakes in this raw material are numerous. Some flakes could be waste from choppers or other tools.

Raw material	Unmodified flakes	Broken flakes	Utilized flakes	Retouched flakes	Total
Ignimbrite			1		1
Trachyte	1	1			2
Basalt	4		3	1	8
Volcanic tuff				1	1
Obsidian	11	4	1		16
Total	16	5	5	2	28

Dimensional modules

More than half of the flakes are small and more than a third are wide. There are seven pieces with these two characteristics. Three exceptions must be noted: a fairly large flake (utilized) and two very small unmodified flakes.

Flattening index

Unmodified flakes, utilized or retouched, are equally well represented in the fairly flat and flat categories.

Facets

This subdivision only concerns 23 whole flakes.

Upper face	Unmodified flakes	Utilized flakes	Retouched flakes	Total
1 removal	4	1	1	6
2 removals	5	1		6
3 removals	3	1		4
4 to 6 removals	4	2	1	7
Total	16	5	2	23

The number of facets ranges from one (flat upper face) to six, with a slight dominance of flakes with 1 or 2 facets (52%).

Butts

The butt could be observed on only 20 flakes. There are 7 punctiform or linear butts and 12 flat butts (60%). A single flake (utilized) with a dihedral butt is worth noting. This indicates a fairly archaic flaking, which is not out of place with the core types and preparation mode of tools on pebble.

The angle of the ventral face/butt ranges from 85° to 135°, with the majority between 100° and 110°.

Unmodified whole flakes (16)

Mainly of obsidian, these are small flakes, with a punctiform or flat butt.

Broken flakes (5)

These are small flakes (about 40 mm). For two flakes, the upper face is cortical on the distal part.

Fractures: Three flakes show a single fracture. It is transverse for two and oblique for the third. One flake shows two fractures (transverse and parallel). It is the mesial part that was kept. One flake is only a fragment with three joined fractures.

Utilized flakes (5)

Their maximum length ranges between 24 and 84 mm. The butt is flat or punctiform. A single flake has a dihedral butt. Two flakes show a presence of cortex.

Utilization marks are seen either on the right edge (2) or on the left edge (2). A single flake bears marks on the distal extremity. They are small scalings, most of the time joined but of irregular form and dimensions.

Casually retouched flakes (2)

These flakes, small and fairly small, are wide and very wide. One has a flat upper face and the other one shows several facets.

One of these objects shows denticulated retouch. On the second, the retouched part is mesial and distal. Both retouched edges converge and form a kind of point.

Waste (2)

These are two obsidian fragments of small dimensions (about 50 mm). They show 7 and 8 facets. One of them is a kind of shapeless polyhedron, the other could be a broken piece.

Worked (?) bone (1)

A bone fragment 77 mm long is very long and flat. It shows an oblique fracture at one extremity, which is worked by a small removal that forms a kind of bevel.

Comments on the industry of Level M

This group of 64 artefacts has few diagnostic tools. The tools on pebble are poor. Both choppers are second rate, but the six end-scrapers on pebbles (heavy end-scrapers and rabots) have a good technique and are relatively well represented. This characteristic is interesting for it is frequently found in butchering sites, but at Karre I the excavated surface is too limited for a definitive assessment.

The flaking material represents half of the assemblage, with 28% broken and battered pebbles. Obsidian cores are of the simple type. Small wide flakes show mainly a flat butt. The upper face of these flakes has from 1 to 2 facets.

A casually retouched bone fragment that has been probably used, is worth noting.

Faunal remains

The relatively large number of faunal remains, 195 fragments, allows an inventory to be established and some comments to be made.

Inventory

Unidentified species		
Bone fragments	134	
Long bone fragments	10	
Flat bone fragments	4	
Rib fragments	8	
Vertebra fragments	1	168
Articular end fragments	2	
Skulls fragments	1	
Unidentified bones	4	
Tooth fragments	4	

Hippopotamus		
Vertebrae	2	
Humerus	1	
Carpus	1	
Rib fragments	1	
Unspecified tooth fragments	7	18
Canine	1	
Canine fragments	2	
Incisor fragments	1	
Premolar fragments	1	
Molar fragments	1	
Bovids		
Vertebrae	2	
Pelvis fragments	1	6
Molar fragments	3	
Equids		
Cannon bones	1	3
Molars	2	

Bone and tooth fragments are numerous, but some pieces are intact, such as hippopotamus canine, humerus, carpal, vertebrae, Equid cannon bone and molars, or Bovid vertebrae. Unidentified bone fragments are the most numerous, with 4 large fragments of spongy bone, and long bone fragments of vertebrae, flat bones, ribs and teeth, for a total of 168 pieces.

By contrast, 27 pieces could be anatomically or specifically identified. The hippopotamus is the best represented (18 pieces) with 2 vertebrae (one 330 mm long), a humerus (430 x 245 x 153 mm), a carpal, a large rib fragment (220 mm) and many tooth fragments and a canine (255 x 130 x 43 mm).

Bovids remains are less abundant: there are vertebrae, pelvis fragments and 3 molar fragments.

Finally, Equids are represented by a cannon bone and 2 molar fragments.

Morphometric analysis

Some 90% of these faunal remains have a maximum length between 25 and 100 mm, with a clear dominance between 40 and 60 mm. However, 10% of the pieces are between 100 and 450 mm long. This is quite characteristic of Oldowan and Acheulian levels of Melka Kunture. As far as the hippopotamus faunal remains are concerned, a third are in the high length category. Bovids and Equids are only represented by remains of smaller dimensions at Karre Level M.

Weight

Weights are distributed in much the same way as maximum lengths

Weight (g)	%
4-24	53.3
25-99	32.3
100-999	13.3
1000 - > 5000	1.1

Weights are distributed from a few g to several kilograms. The total of the remains represents an overall weight of 13520 g. However, this does not include two hippopotamus bones that alone weigh over 7000 g.

The orientation of the faunal remains varied. Bones were laid flat, sometimes obliquely. They look rather like small bone heaps than a concentration made by rain-wash or river floods. In other words, it could possibly be an anthropogenic deposit.

Comments on Level M

It is interesting to observe that Level M, despite the probable proximity of the river, only has rare unmodified pebbles. As said before, another characteristic is the abundance of bone remains (75%) in comparison with artefacts (25%).

The fauna is mostly represented by hippopotamus pieces or fragments (75%), Bovids (17%) and Equids (8%). Some bone or tooth pieces are complete (often of large dimensions and weight).

The percussion material and débitage represent 70% of the lithic industry but tools are rare: a few choppers and end-scrapers, some cores and two retouched flakes.

This industry is technically archaic and can be attributed to the classic Oldowan. However, it is only a test-excavation covering four square metres.

As a hypothesis, we can suggest that this is an area where butchery activity dominated.

General conclusions

The three levels of the Karre I site studied here are quite distinct from one another. They are separated by fluvial strata containing reworked tuffs and from the base of Level K to the top of Level M, the thickness is about 0.7 m.

These three Levels, K, L, M, with an added fourth, Level J, located but not excavated, are stratigraphically quite close to one another, although each is quite discrete. Another common point is that all four contain both lithic tools and faunal remains.

From the lithics point of view, two of the three excavated Levels, K and M, are clearly dominated by implements on pebbles versus rare pieces on flakes. No true handaxes and cleavers are present, except for two second-rate archaic handaxes in Level K. Percussion material is present but is better defined in Level K (true hammerstones). By contrast, tools on pebble are four times more common in Level K than in Level M. In this last level, heavy end-scrapers on pebbles represent more than half of the tools on pebble while they account for only 15% in Level K. The utilization on heavy end-scrapers could be linked to butchering activities. In Level M, where broken bones are abundant, large body parts such as hippopotamus vertebrae and humeri are found in a few squares.

Flaking material in the form of cores and flakes constitutes the bulk of the Level L assemblage suggesting the possibility that this level represents stone flaking activity. For both other levels this material is quite well represented. In Level K, flakes are numerous (48% flaked pieces) and in Level M they dominate with 65%. There are a few cores in each level. However, tools on flakes are nearly non-existent in L and in M. In Level K, tools on flakes reach 12% of the lithic assemblage.

Identifiable faunal pieces are quite rare and belong to three main families: Hippopotamidae, Bovidae (principally antelopes) and Equidae. Anatomically, these remains are long bone fragments, from limb parts. But sometimes pelvis, scapulas, vertebrae and ribs fragments are found, as well as maxillae and tooth fragments. Skull fragments are rare and small.

In Level L there are only a few bone fragments, and it is hard to attribute them to a species or to definite anatomical body parts, except for a tooth fragment (hippopotamus) and a bovid horn fragment.

The three archaeological levels do not have the same proportion of fauna and lithics. Level K has the lowest faunal count with 32% of the total of fauna and lithic remains, while Levels L and M have yielded 71 and 75% of faunal remains respectively.

So, if Level L, with its numerous bone splinters and its lithic flaking products, could be a flaking area, it could also be a reworked soil. The rain-wash could have caused granulometric sorting (weight and size selection).

The few metres excavated from Levels K and M can only be a small part of a base camp, with more or less defined activity areas. More precisely, Level M, at the test-excavation location, could be a sector where butchery activities were important.

These three levels show none of the characteristics associated with the Acheulian sites of Melka Kunture, such as the presence of handaxes, and numerous flake artefacts. On the contrary, Level K is rather reminiscent of Unit B2 of Gombore I. Observations made on a naturally sharp but evidently restricted surface in Level J lead to a possible comparison with Gombore IB. Insofar as this comparison is real, the three Levels K, L, M, could belong to the Oldowan.