The Late Acheulian Site of Dashtadem-3 in Armenia

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ABSTRACT

Dashtadem-3, discovered in 2004, is the only open-air Acheulian site *in situ* in the Caucasus. The site is located 25km northwest from the town of Stepanavan (1902 m asl). In 2004–2006 an area of 5x6m was excavated to a depth of 1m. The sediments are represented by loam soil which rests on a bedrock of porforitic andesite. The bedrock is situated from 0m to 1m beneath modern ground surface. The artifacts were not redeposited but rather partly displaced during the process of soil formation and erosion of the andesite bedrock. Organic remains were not found. The excavated area yielded 2,464 Late Acheulian artifacts from hyalo-dacite. These consist of 81 cores and 262 tools, including 49 handaxes, 8 Levallois points, 21 scrapers, 13 end-scrapers, 52 backed knives, 66 beak-like pieces, and 17 notched pieces. The typological assemblage of Dashtadem-3 can be identified as Late Acheulian.

INTRODUCTION

In 2003, on the initiative and with the support of the International Public Organization "Centre for Strategic and Political Studies," a joint Armenian-Russian archaeological expedition was established under the direction of Stepan A. Aslanian. The investigations of the Expedition were focused on the Lori intermountain region situated in the southern Armeno-Javakhet volcanic plateau in north-western Armenia. The work of the expedition teams was concerned with sites dating from the Lower Paleolithic to the Early Iron Age (Aslanian et al. 2006; 2007a; 2007b; Dolukhanov et al. 2004). However, the main efforts were concentrated at Stone Age sites, particularly the Lower Paleolithic ones. During five field seasons, 26 sites with distinctive Acheulian surface finds (about 350 handaxes alone), two stratified Acheulian sites, and the Grotto Pechka with re-deposited Mousterian and Mesolithic assemblages were found. The Acheulian sites are situated mainly on the eastern slopes of the Javakhet (Djavakhet, Dzhavakhet) Range. At one of the Late Acheulian sites—Dashtadem-3—an area of 30m^2 was excavated. In addition to the Late Acheulian sites, excavations were started at two stratified sites (Blagodarnoye-1 Muradovo and Kurtan-1), in the layers of which evidence for early Acheulian and pre-Acheulian (as dated by V.P. Lyubin and E.V. Belyaeva) was found.

> "The research of the Armeno-Russian Expedition of 2003–2006 in the poorly investigated Lori region of Armenia thus has resulted in the detection and studies of an entire group of archaeological sites of diverse periods. Of special value are the discoveries of Lower Palaeolithic sites. To the previously known Central-Armenian zone of Acheulian obsidian industries (Gegam highlands, vale of the Razdan River, and Aragats mountains) are now added the North-Armenian or Lori region where Acheulian industries based on the local dacite raw materials were concentrated" (Aslanian et al. 2007b: 153).

Satani-dar, where both obsidian and dacite tool-making materials were used, is situated at the junction of these two zones (Sardarian 1954: 44–52).

The objectives of this publication are the presentation of the results of excavations at the site of Dashtadem-3, discovered by the Armeno-Russian Expedition in 2004. This is a single non-redeposited open air Acheulian camp site in the Caucasus (all the other non-redeposited sites of the Caucasus are caves). The materials from Dashtadem-3 constitute at present perhaps the richest Acheulian assemblage of the Caucasus, after Kudaro-1 and Azykh. In 2005–2007 the excavation was conducted within an area of 5x6m, including an exploratory trench and an area cleared in 2004 (Aslanian et al. 2006; 2007a; 2007b). The excavations were completed upon reaching bedrock. In the process, several cracked blocks which were covering parts of the cultural layer had to be removed.

GEOGRAPHY OF THE SITE

The site is located in the south-eastern part of the Javakhet Range in north-western Armenia, 25km north-west of the city of Stepanavan (Figure 1). The Javakhet Range (Kechut Ridge, Mokrye Mountains) stretches for 70km. Its southern section is situated in Armenia and the northern one in Georgia.

The Javakhet Range is "a typical example of linear volcanic ridges which arose on the modern meridional abyssal fracture of the central vault of the Transcaucasian Transversal Uplift" (Harazian et al. 1983: 326). It is a:

> "complex meridionally-stretched volcanic structure formed in fact of a chain of numerous Quaternary central volcanoes closely adjoining each other and composed of andesite-basalts, andesites and dacites. The length of the volcano chain exceeds 50 km… The absolute height of the watershed is 2900-3000 m, particular peaks rising up to 3200 m. The relative elevation above the surface of the surrounding lava plateaus is from 1100 m (above the Gukasyan plateau on the west) to 1400 m (above the Lori plateau on the east)" (Harazian et al. 1983: 238).

> "The products of these volcanoes in the form of thick lava and lava-pyroclastic sheets and coulees have formed the modern Kechut Ridge and inundated the adjacent ar-

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eas of the Gukasyan and Lori plateaus… In the Kechut volcanic suite the following rock species are recognized bottom-up:

a) hyalodacites, hyalo-andesite-dacites;
b) lava-pyroclastic bed of augite andesite-basalts;
c) lava bed of bipyroxene andesite-basalts and andesites;
d) quartzitic andesites;
e) lava bed of amphibolic andesites, andesite-dacites, dacites" (Harazian et al. 1983: 138).

It is hyalodacite that was the main raw material for manufacture of early Paleolithic tools in the region under study. Hyalodacites and hyalo-andesites are "dark-grey or black, very dense and resonant glassy obsidian-like rocks. They are found as large boulders or debris with sharp cutting edges and semiconchoidal fracture" (Harazian et al. 1983: 139). In the south-eastern part of the Javakhetian Ridge, the hyalodacites are accessible from rich outcrops and large blocks, as well as in the form of pebbles and boulders.

The situation differs on the Lori Plateau adjacent to the Javakhet Range on the south-east. The fluvioglacial-proluvial products of the large ancient glacier valleys of Ovdzor and Chomcha (in the south-eastern part of the Javakhet Range) have armoured by a huge offset cone the entire western section of the Lori Plateau within the total area of up to 80 sq. km. According to the evidence of geological drillings, the thickness of these deposits around the village of Dashtadem exceeds 150 m (Harazian et al. 1983: 239).

TOPOGRAPHY OF THE SITE

Dashtadem-3 (N 41º08.13′ E 44º05.61′) (Figure 2) is situated 6.3km west of the village of Dashtadem (Ilmazlu). The absolute elevation of the camp site is 1902m and it lies in the southern heights of a broad rocky promontory formed by the Gyulunbulak Creek (right tributary of the Tashir River) and the latter's short left tributary at a height of 20m above the thalweg of the creek. On the western "floor" side of the promontory, it is cut off from the gently sloping mountain by a gully about 1m deep.

As demonstrated by the difference between the sediments found at the site (loams) and those in the area adjacent to the promontory (boulders and pebbles), the gully protects the site from the deposits sliding down from the surrounding mountains onto the promontory. In addition, the site occupies the highest area of the promontory. Thus, the topographic conditions of the site itself suggest that its materials have not been redeposited. They cannot have been moved from the adjoining areas or washed down from the mountain slopes.

The branches of the Gyulunbulak Creek stretch throughout the mountain valley with an area of 8–10km^2 (Figure 3), which is connected with the Lori Plateau by a fairly narrow gorge cut by the creek. The camp site is located exactly near the entrance to that gorge from the Gyulunbulak valley, 0.8km from the place where the creek goes out to the plain (Figure 4). The surface around the site is relatively horizontal with large rocks on it being irregularities of the bedrock or the results of bedrock deterioation.

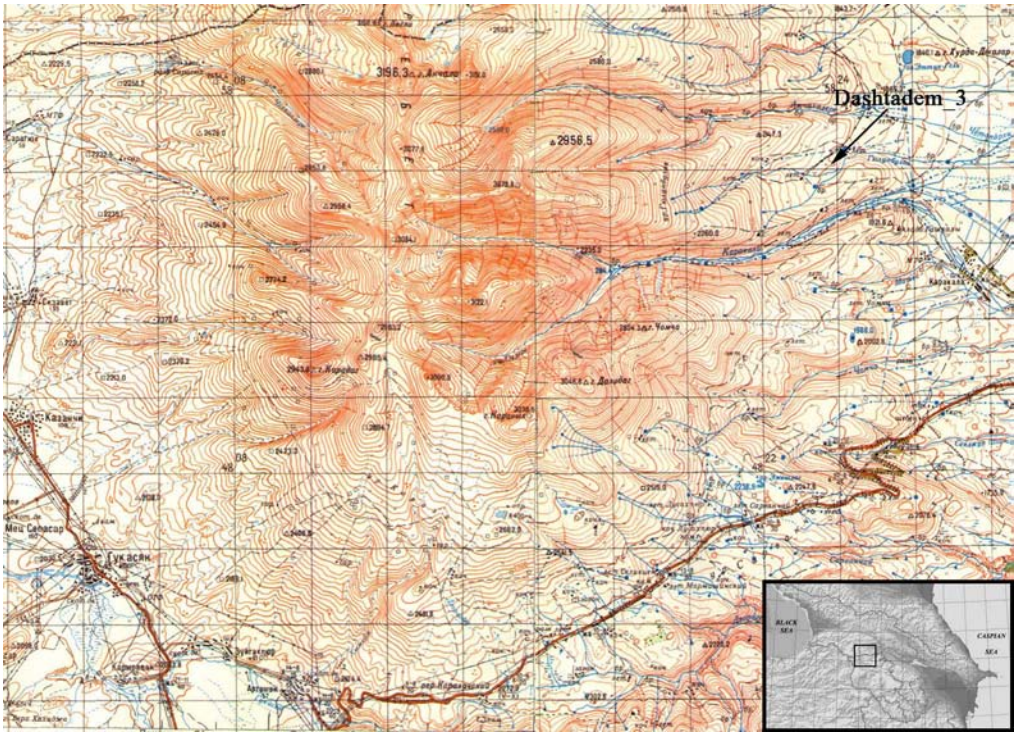


Figure 1. Map of southern part of the Javakhet Range and the site of Dashtadem-3.

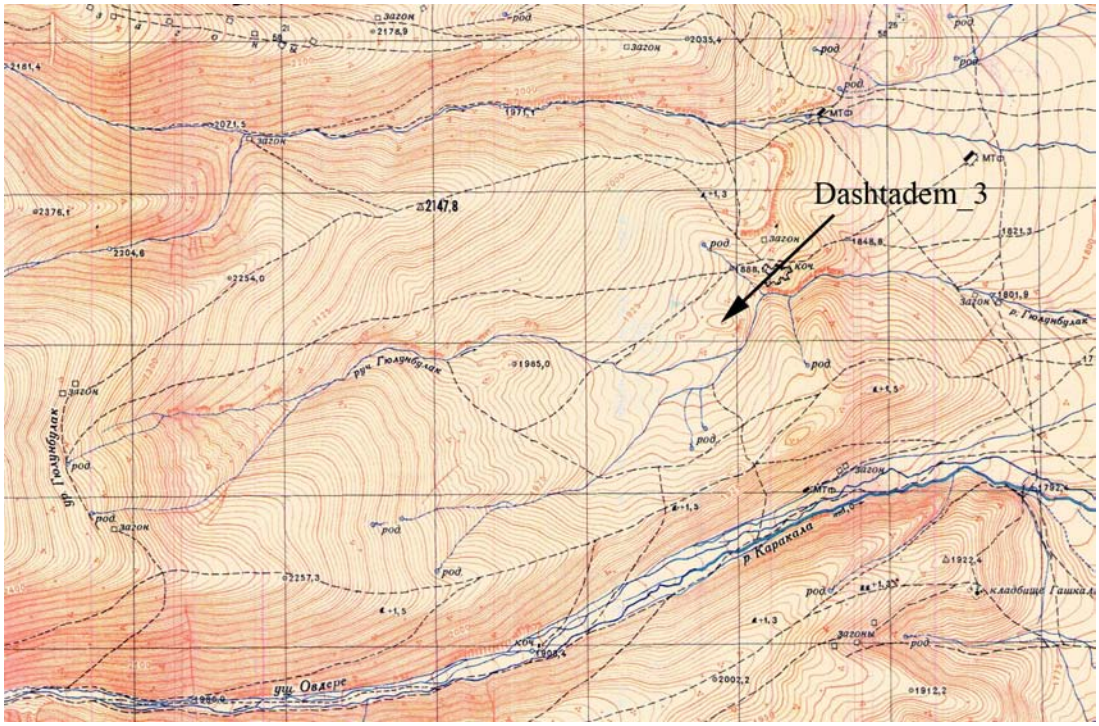


Figure 2. Locality of the site of Dashtadem-3.

PLAN OF THE EXCAVATED AREA

The surface of the bedrock within the limits of the excavated area has a complicated relief (Figure 5). In the southernmost third of the excavation, the bedrock lies at a depth of 0-0.3m from modern ground surface. On the bedrock there are single andesite blocks protruding to the surface. Northwards, the bedrock drops sharply down to 0.8m (to 1m in fissures) and along the northern wall of the excavation it rises sharply again to a level of 0.2-0.3m above modern ground surface. Along the east wall of the excavation there are massive andesite blocks, the tops of which reach the turf. Thus, about two-thirds of the northern section of the excavated area is occupied by a nearly rectangular bedrock hollow which is up to 0.5m deeper than the surface of the rock surrounding it. On the west, this hollow extends under the wall of the excavation. In the south-eastern section of the excavation there is a long north–south "passage" between the andesite blocks. This passage runs from the rocky hollow to the southern edge of the promontory.

Destruction, downward slippage, and decomposition of the bedrock were taking place during the period of occupation of the site. This fact is confidently indicated by the arrangement of the andesite blocks, smaller stones, and artifacts throughout the excavation pit. For many of the blocks, it is possible to reconstruct their original positions by the negatives of their fracturing. In general, slipping and collapsing of the rocks proceeded from south to north, probably due to the fact that the strata slope in this direction. The upper section of the rock in the southern area of the excavated pit was cleft into a number of large blocks which were moved from south to north partially covering the lower cultural levels. However, the northern and eastern walls of the rock hollow collapsed inwards, that is, from north to south and from east to west. Moreover, a block in the north-eastern corner of the hollow and the surrounding stones were broken and collapsed along a line from northeast to southwest.

Some large stones lay directly on the bedrock with no artifacts below them. This implies that they were already in place prior to the formation of the cultural layer. Some others lay above the artifacts without any artifacts above them, suggesting that these blocks were deposited after the formation of the cultural layer. The positions of the stones relative to the artifacts allows us to draw certain conclusions about the process of the layer's formation, as presented below following discussion of the typology, stratigraphy, and plan view of the finds.

STRATIGRAPHY OF THE SITE

The deposits from the excavation are represented mostly by homogeneous humusized brown loamy soil containing products of decay of the underlying porphyritic andesite (Figures 6–8). The most complete stratigraphic section was obtained in the test-pit of 2004 (in the northwest corner of the excavation) where the bedrock lies at the greatest depth. This general stratigraphic scheme, however, shows considerable variations in different areas of the excavation:

1. The density of the brown loam varies only in the central area of the hollow;
2. The concentration of the andesite debris directly above the rock surface is fairly inhomogeneous. The amounts of debris are generally small where the bedrock or separate blocks lie close to the modern surface (mostly in the southern third

Figure 3. Valley of the Gyulunbulak Creek and the site of Dashtadem-3. View to the southeast.

Figure 4. Site of Dashtadem-3. View to the northeast.

and eastern section of the excavated area). A clear exception is the southern part of the excavation with the "passage" filled with numerous pieces of andesite;

3. In the areas just mentioned (which occupy at least half of the excavation), Layers 2 and 3 are absent, the artifacts lie in the turf and immediately below it on the bedrock; and,
4. The top layer of the bedrock is cracked in many places, partially deteriorated into fine fragments or decayed completely. Therefore, in most cases it was impossible to distinguish the andesite pieces formed below from those which slipped down from above.

The artifacts are distributed throughout the entire thickness of the deposits. Up to a depth of 0.5m, along with Acheulian artifacts from hyalo-dacite, fragments of late Medieval pottery were occasionally found. A few small obsidian flakes, chips, and debris of unpatinated obsidian (56 pieces) were found to a depth of 0.9m, i.e., almost to the bedrock. No organic remains were found. No traces of water streams were revealed within the excavated area.

Figure 5. Excavation at Dashtadem-3. View to the southeast.

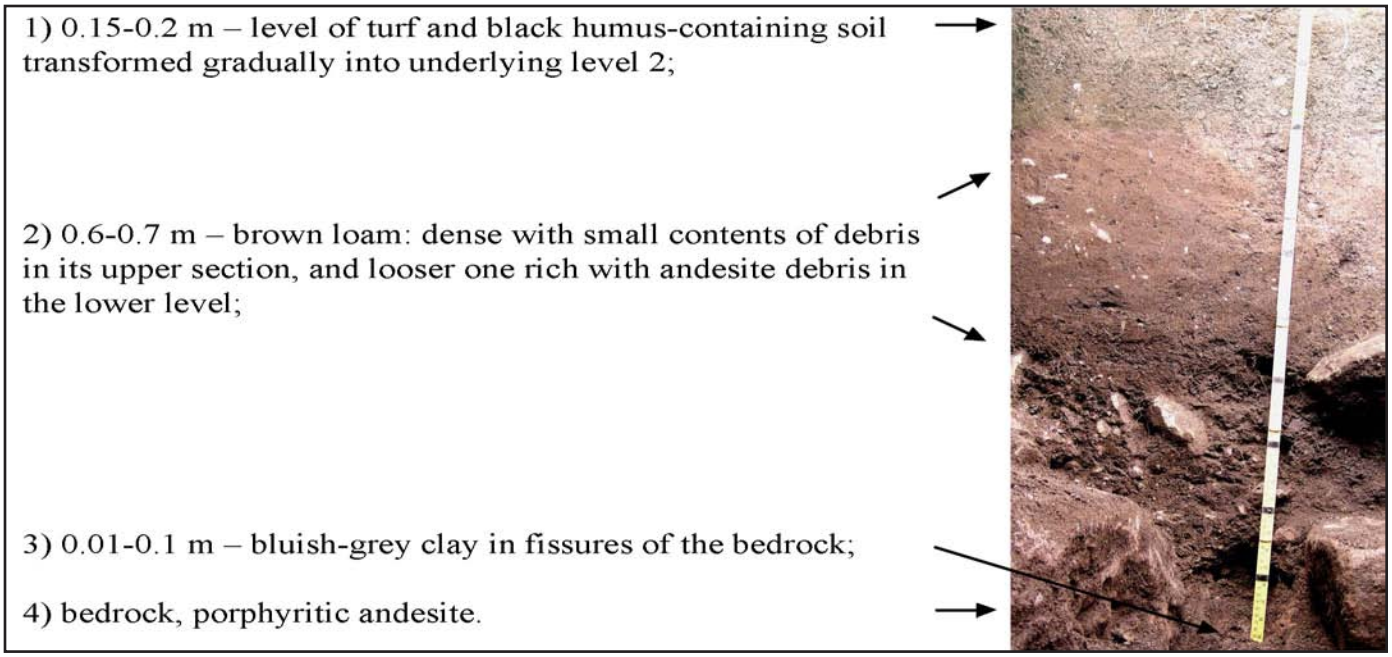


Figure 6. Dashtadem-3. Part of west profile.

Figure 7. Dashtadem-3. West profile.

Figure 8. Dashtadem-3. North profile.

Sampling pollen analysis showed that at the near-bottom level of the deposits, pollen or spores are completely absent (probably washed out by rain and water from melted snow), while in the top and middle levels, there are extremely rare specimens. It was possible to identify elm, sphagnum, southern adderstongue (*Ophioglossum vulgatum*), pine, willow, birch, polygonaceae, and selaginella (personal communication, Tatyana Sapelko, Institute for Lake Research, RAS). All these plants are found among the modern vegetation of the region as well.

It is important that the upper deposits within the area surrounding the promontory with the site are composed of boulders and pebbles of alluvial and diluvial genesis as shown by rock exposures in modern pits up to 1m deep (Figure 9).

Thus, the facts described above suggest that the entire layer of the deposits in the excavation down to the rocky foundation is involved in the process of modern soil formation. Hence, the archaeological materials from the site, although not redeposited, must nevertheless have been subjected to certain vertical and horizontal disturbances in the course of soil formation and erosion of the bedrock. Correspondingly, the vertical positions of finds in the layers cannot be used directly as relative chronological indicators.

Figure 9. Example of sediments in the valley of the Gyulunbulak Creek.

(Destruction of the bedrock and movements of the artifacts resulted also from earthquakes and freezing/thawing processes).

STONE ARTIFACTS

The excavation yielded 2,529 stone artifacts from hyalo-dacite (2,464), obsidian (57), and jasper (6), as well as 4 pieces of ochre (one of them of spheroid form [Supplement Figure 319]) and a polisher of pumice.

FINDS

The raw material used for Acheulian lithic tools from the site was exclusively hyalodacite (Table 1), the outcrops of which are a peculiarity of the Javakhet Range. Occurring as nodules or pebbles, hyalodacite is widely distributed in the immediate vicinity of the camp site. In the excavation, 10 dacite nodules were found, including three with traces of chipping. The quality of particular examples of dacite varies considerably and influences the degree of patination and weathering of the artifacts. Thus, based on our observations, the surface of artifacts from schistose dacite is patinated and weathered to a greater depth. Therefore, in terms of the preservation state of their surface, these lithics look very archaic. In general, examination of differences in patination and weathering of artifacts found in different levels of the excavation leads us to the conclusion that, in our case, these features cannot be used for relative dating of the finds except for clearly fresh unpatinated scars.

Artifacts from obsidian and jasper are fairly small (≤2cm). They include no identifiable tools (Table 2), and exhibit no signs of weathering or patination. There is no doubt that the obsidian and jasper artifacts, as well as the polisher of pumice which is Bronze Age and pottery were introduced into the cultural layer much later (probably in the Holocene) than those artifacts made of dacite. There is only one exception—the beaked obsidian tool produced by alternate retouch which typologically is similar to tools made of dacite. The former is strongly patinated and its edges slightly smoothed, so that there are firm grounds to attribute this obsidian tool to the Acheulian tradition.

SECONDARY USE

Some of the dacite artifacts (3.9%) have separate plain or retouched areas clearly less patinated than the adjoining facets. Although it seems that the majority of such cases are relatively recent damage, at least in one example we are dealing undoubtedly with subsequent re-use of the initial tool—a core on a handaxe (Figure 10, Supplement Figure 100). The "secondary" facets under consideration show a practically identical degree of patination.

The secondary facets were not taken into account during classification of the tool types at Dashtadem-3. It must be noted, however, that their consideration would have led to no revision of our typology, only increasing the number of such types as beaked tools, backed knives, and retouched flakes among the assemblage from the site. The presence of the negatives of secondary facets with similar patina on them suggests that there was a period in the history of the site when part of its materials were re-exposed on the surface.

MACROTRACES OF USE-WEAR

Although no microtraces of the use of stone tools are preserved due to the weathering and patination, quite a number of the lithics show macrotraces in the form of use indentions on the working edges. Analysis of the finds suggests

TABLE 1. DACITE FINDS.

	N	%
Tools	262	10.6
Cores	81	3.3
Retouched blades and flakes	49	2.0
Blades and flakes with use retouch	49	2.0
Blades	88	3.6
Flakes	1,753	71.1
Chips and debris	137	5.6
Large fragments	35	1.4
Nodules	10	0.4
Total	**2,464**	100.0

TABLE 2. OBSIDIAN FINDS.

	N
Notched tool (?)	1
Beaked tool produced by alternate retouch	1
Microblade	1
Nucleiform fragment	1
Tool fragment	2
Retouched flake	1
Flakes, debris, chips	50
Total	**57**

that these macrotraces were not a result of post-depositional damage because, in the overwhelming majority of cases, they were found on the sharp edges of tools whereas on the chipping debris they are absent.

STONE TOOLS OF DASHTADEM-3

The description is presented according to the following scheme. First, a definition is given for a category among the assemblage from the site, then the definitions of the types within that category follow, and finally the features of particular artifacts of each type are prersented. It must be noted that both the categories and the types are defined only within the lithic assemblage from the site of Dashtadem-3. Naturally, these definitions follow the generally accepted typologies and characteristics of Paleolithic tools, primarily those applied by V.P. Lyubin to the Lower Paleolithic of the Caucasus (Lyubin 1998; Lyubin, Belyaeva 2004). Accordingly, the types distinguished for Dashtadem-3 correspond fairly well with those known from other sites (Table 3). (Here we will not dwell on typological arguments since the objective of the present work is to publish the finds as exhaustively as possible).

Handaxes (49 pieces)

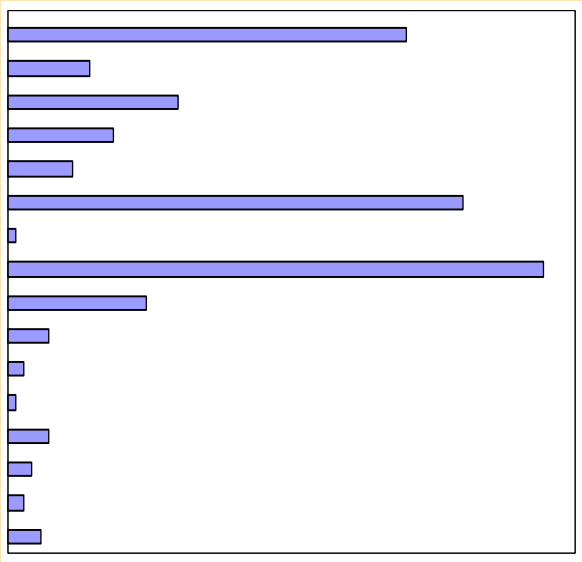
Handaxes are stone artifacts, biconvex in section, worked by flaking along both sides, with two long lateral cutting edges or with a single cutting edge and a back. Usually they are convergent on the distal end forming a point or a short cutting edge. In the study of handaxes, the following numerical attributes were used—L: length; B: the maximum width; T: the maximum thickness; Lb: distance from the base (butt) to the maximum width; and, Bmid: width at the middle of the handaxe. None of these attributes or their ratios proved to be efficient for classification. Figure 11 shows that they do not form any significant clusters. The index "width/thickness" does not work either. Diminutive handaxes are not statistically differentiated by their sizes. Neither ovate, cordiform nor triangular handaxes differ statistically from each other in their proportions. For that reason, these numerical attributes can only supplement the qualitative ones (Table 4).

Triangular (10 pieces; Figure 12, Supplement Figures 73–82). Slightly convex or straight edges that converge at the tip. The maximum width is in the lower third of the tool (Lb/L = 0.16–0.28). The objects are more or less sym-

Figure 10. Core on a reused handaxe.

TABLE 3. STONE TOOLS.

	N	%
Handaxe	49	18.6
Handaxe, half-finished	10	3.8
Scraper	21	8.0
End-scraper	13	4.9
Point Levallois	8	3.0
Knife	56	21.3
Knife-like retouched blade	1	0.4
Beak-like piece	66	25.1
Notched piece	17	6.5
Notched-denticulate piece	5	1.9
Nucleiform tool	2	0.8
Chisel	1	0.4
Adze	5	1.9
Burin	3	1.1
Hammerstone	2	0.8
Tool fragment	4	1.5
Total	**263**	100.0



metrical across the long axis. As a rule they are carefully worked. The distal ends of the two examples with the index Lb/L>0.28 are broken.

Cordiform (7 pieces: Figure 13, Supplement Figures 83–89). Slightly convex or straight edges that converge at the tip. The maximum width is below the middle but above the lower third of the objects (Lb/L=0.34–0.45). They are more or less symmetrical across the longitudinal axis. One edge is slightly concave on one of the examples, apparently as a result of resharpening.

Ovate (16 pieces: Figure 14, Supplement Figures 90–105). The edges converge convexly to both the distal and proximal ends, forming no distinct tip. The maximum width is in the middle of the object (Lb/L=0.47–0.54). They are more or less symmetrical both across the longitudinal and transverse axes.

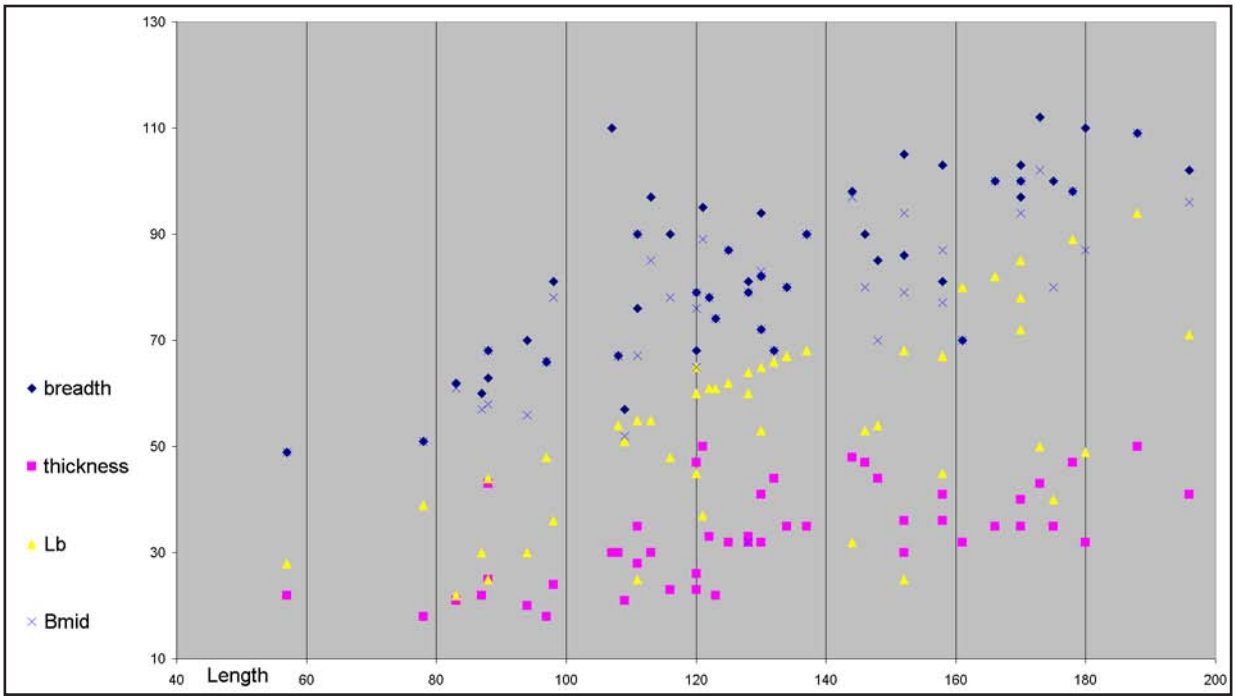


Figure 11. Dimensions (in mm) and some handaxe indices.

TABLE 4. DIMENSIONS (in mm) AND SOME HANDAXE INDICES.

TYPE	L	B	T	Lb	Bmid	Lb/L	B/T
1 Discoid	88	68	25	44	68	0.50	2.72
2 Discoid	57	49	22	28	49	0.49	2.23
3 Beak-like	107	110	30	0	0	0.00	3.67
4 Ovate	132	68	44	66	68	0.50	1.55
5 Ovate	113	97	30	55	85	0.49	3.23
6 Ovate	178	98	47	89	98	0.50	2.09
7 Ovate	109	57	21	51	52	0.47	2.71
8 Ovate	120	68	26	65	65	0.54	2.62
9 Ovate	170	97	40	72	94	0.42	2.43
10 Ovate	158	81	41	67	77	0.42	1.98
11 Ovate on flake	78	51	18	39	51	0.50	2.83
12 Ovate on flake	188	109	50	94	109	0.50	2.18
13 Ovate on flake	134	80	35	67	80	0.50	2.29
14 Ovate on flake	166	100	35	82	100	0.49	2.86
15 Ovate on flake	123	74	22	61	74	0.50	3.36
16 Ovate backed on flake	120	79	23	60	79	0.50	3.43
17 Ovate backed on flake	122	78	33	61	78	0.50	2.36
18 Ovate backed on flake	130	82	41	65	82	0.50	2.00
19 Ovate backed on flake	108	67	30	54	67	0.50	2.23
20 Ovate backed on flake	125	87	32	62	87	0.50	2.72
21 Ovate backed on flake	128	81	32	60	32	0.47	2.53
22 Ovate elongated on flake	161	70	32	80	70	0.50	2.19
23 Ovate partial	128	79	33	64	79	0.50	2.39
24 Ovate partial on flake	130	72	32	65	72	0.50	2.25
25 Ovate partial on flake	170	100	35	85	100	0.50	2.86
26 Subrectangular on flake	111	90	28	55	90	0.50	3.21
27 With a beak	121	95	50	37	89	0.31	1.90
28 With a beak on flake	146	90	47	53	80	0.36	1.91
29 Shouldered	97	66	18	48	66	0.49	3.67
30 Shouldered on flake	137	90	35	68	90	0.50	2.57
31 Transversal	196	102	41	71	96	0.36	2.49
32 Transversal	170	103	40	78	94	0.46	2.58
33 Cordiform	98	81	24	36	78	0.37	3.38
34 Cordiform	148	85	44	54	70	0.36	1.93
35 Cordiform	130	94	41	53	83	0.41	2.29
36 Cordiform on flake	116	90	23	48	78	0.41	3.91
37 Cordiform on flake	87	60	22	30	57	0.34	2.73
38 Cordiform on flake	152	105	36	68	94	0.45	2.92
39 Cordiform partial	120	79	47	45	76	0.38	1.68
40 Triangular on flake	94	70	20	30	56	0.32	3.50
41 Triangular on flake	83	62	21	22	61	0.27	2.95
42 Triangular on flake	111	76	35	25	67	0.23	2.17
43 Triangular elongated	152	86	30	25	79	0.16	2.87
44 Triangular elongated	173	112	43	50	102	0.29	2.60
45 Triangular elongated	175	100	35	40	80	0.23	2.86
46 Triangular elongated on flake	180	110	32	49	87	0.27	3.44
47 Triangular elongated on flake	144	98	48	32	97	0.22	2.04
48 Triangular partial	88	63	43	25	58	0.28	1.47
49 Triangular partial	158	103	36	45	87	0.28	2.86

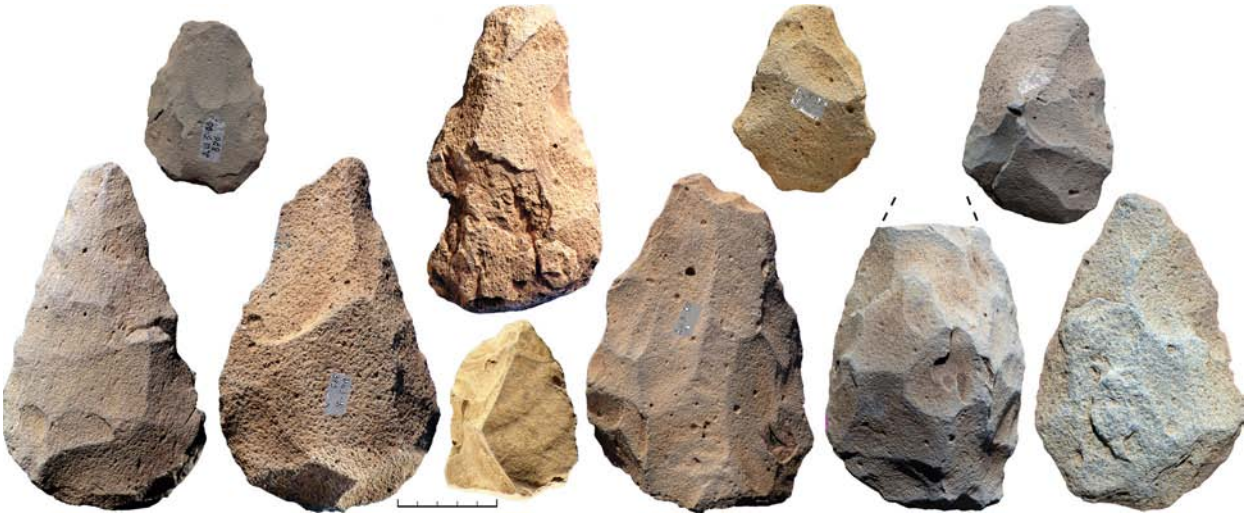


Figure 12. Triangular handaxes.

Ovate backed (6 pieces: Figure 15, Supplement Figures 106–111). The maximum width is located at the middle of the tool (Lb/L=0.5). They are asymmetrical across the longitudinal axis. One of the longitudinal edges is straight or slightly convex, its edge angle being considerably less than that of the opposite convex edge.

Discoid (2 pieces: Figure 16, Supplement Figures 112–113). These are oval in plan without any distinct butt or tip; the cutting edge runs around the entire perimeter. One example is 8.8cm long, the other has a length of 5.7cm. The latter is formally a diminutive handaxe but, as it differs in no way from its larger counterpart except for its size and is represented only by a single specimen, there are no firm grounds to distinguish it as a specific type.

Subrectangular (1 piece: Figure 17, Supplement Figure 114). This is nearly rectangular in plan.

Shouldered (2 pieces: Figure 18, Supplement Figures 115–116). The distal end is emphasized by two notches on the lateral edges.

Beak-like (1 piece: Figure 19, Supplemental Figure 117). In plan view, the object is shaped like a regular pentahedron with the length and width nearly equal. The tip ("beak") is formed by two concave sharp edges at the apex of the pentahedron.

With a beak (2 pieces: Figure 20, Supplement Figures 118–119). At the junction of the lateral edge and transversal distal end (without any tip), there is a distal extremity ("beak") deviating from the longitudinal axis of the tool.

Transversal (2 pieces: Figure 21, Supplement Figures 120–121). The distal end is not an edge, and the wide transversal edge is located at some angle to a long axis of the tool. This edge was not made by special removal or removals; more likely, it represents the facet formed without refinement at "initial" splitting.

Handaxes half-finished (10 pieces)

Various bifaces which can be considered as half-finished handaxes (Figure 22, Supplement Figures 122–131).

Levallois points (8 pieces: 5 complete and 3 fragments)

Unretouched points that are nearly triangular in plan; their shape is predetermined by that of the nucleus (Figure 23, Supplement Figures 132–139). Each has a "*chapeau de gendarme*" striking platform. In addition, there is one broken blade-flake with a similar striking platform (Supplemental Figure 140). Since its attribution as a Levallois point is arguable, it has not been included in the count above.

Scrapers (21 pieces)

These are tools on flakes or blades with one edge produced by fine abrupt or semi-abrupt retouch (Figure 24, Supplement Figures 141–160). One of the examples is retouched

Figure 13. Cordiform handaxes.

Figure 14. Ovate handaxes.

Figure 15. Backed handaxes.

Figure 16. Discoid handaxes.

Figure 17. Subrectangular handaxe.

Figure 18. Shouldered handaxes.

Figure 19. Beak-like handaxe.

Figure 20. Handaxes with a beak.

Figure 21. Transversal handaxes.

Figure 22. Half-finished handaxes.

Figure 23. Levallois points.

around the entire perimeter and resembles a limace. Another one, triangular in plan, is flattened on the ventral side by removals covering over half of the ventral surface.

End-scrapers (13 pieces)

Tools on flakes or blades with one edge produced by fine abrupt or semi-abrupt retouch (Figure 25, Supplement Figures 161–173).

Knives (56 pieces)

Backed knives (53 pieces: Figure 26, Supplement Figures 174–225). Tools on flakes or blades with one long sharp edge produced by flat retouch or retouched in the process of use on the dorsal and/or ventral sides, and an opposite edge that is backed (blunted either by abrupt or partial retouch, broken or just unworked). In cross-section, these objects are wedge-shaped. Often the distal end is additionally refined by several removals, making it thinner, and the lateral sharp edge curves to it. The proximal end also is frequently truncated and thinned by various techniques. Two of the specimens were produced from crested blades. One example is noteworthy for its distal end, straight in plan, and trimmed on both sides by flat removals, some of which possibly are the scars produced by use.

Double knives (3 pieces: Figure 27, Supplement Figures 226–228). Knives on blades or blade-flakes with two long sharp edges that are formed by flat retouch or use-retouch on the dorsal and/or ventral sides. The distal end of two of the specimens is truncated, whereas the end of the third preserves its natural surface.

Burins (3 pieces)

Flakes with burin spalls (Figure 28, Supplement Figures 229–230).

Beak-like (66 pieces)

Flattened tools, the working element of which is a narrow

Figure 24. Scrapers.

Figure 25. End-scrapers.

projection formed by two notches produced by various techniques.

Simple (37 pieces: Figure 29, Supplement Figures 231–260). On flakes or blades, the narrow pointed "beak" is formed by two notches on the dorsal side.

Alternate (17 pieces: Figure 30, Supplement Figures 261–277). On flakes or blades, the narrow pointed "beak" is formed by two alternate notches. (*Bec burinant alterne* in French literature).

Wide (10 pieces: Figure 31, Supplement Figures 278–287). On flakes or blades, the "beak" is wide and blunt compared with other beak-like tools.

On core (2 pieces: Figure 32, Supplement Figures 288–289). Tools on exhausted cores.

Notched (17 pieces)

A notch is formed by retouch on one edge of the flake (Figure 33, Supplement Figures 290–304).

Denticulate-notched (5 pieces)

Adjacent notches are formed by retouch on the edge of the flake (Figure 34, Supplement Figures 305–308).

Adze (5 pieces)

Flattened tools with one edge retouched unilaterally or bilaterally possibly in the course of use (Figure 35, Supplement Figures 309–312).

Chisel (1 piece)

A tool more massive as compared with adzes, the narrow distal end bilaterally retouched possibly in the course of use (Figure 36, Supplement Figure 313).

Knife-like retouched blade (1 piece)

A very large blade measuring 22x8 x3cm (Figure 37, Supplement Figure 314). On the proximal end, a second striking platform was formed, truncating the previous bulb of percussion. From that platform the dorsal surface was removed from the blade. The distal end was retouched by several removals on the ventral and dorsal surfaces. The tool is probably unfinished.

Nucleiform (2 pieces)

Flattened artifacts with one side preserving the cortex and the other worked by sub-parallel removals without distinct bulbs of percussion (Figure 38, Supplement Figures 315–316). Accordingly, these objects cannot be considered exhausted cores or unfinished tools.

Hammerstones (2 pieces)

One is an elongated pebble with indistinct traces of striking on one of its ends (Figure 39, Supplement Figures 317–318). The other item is an angular pebble from possibly some softer species of dacite, without distinct traces of use. Because the cultural layer contained no pebbles at all and the unworked stones were represented only by andesite, the above pebbles undoubtedly were brought intentionally to the site.

Figure 26. Backed knives.

Figure 27. Double knives.

Figure 28. Burins.

Figure 29. Beak-like simple tools.

Figure 30. Alternate, beak-like tools.

Figure 31. Beak-like wide tools.

Figure 32. Beak-like tools on a core.

Figure 33. Notched.

Figure 34. Denticulate-notched.

Figure 35. Adzes.

Figure 36. Chisel.

Figure 37. **Knife-like retouched blade.**

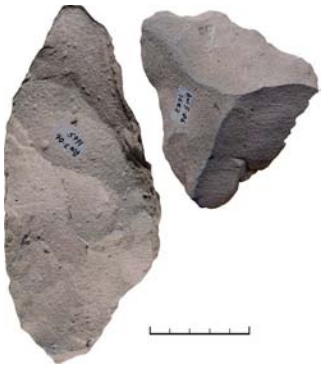


Figure 38. Nucleiforms.

Figure 39. Hammerstones.

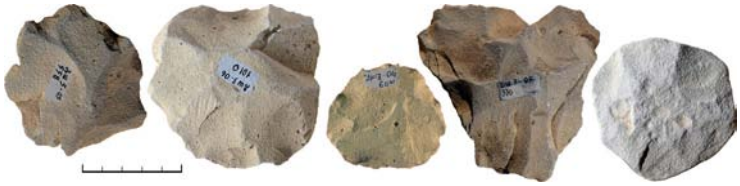


Figure 40. Radial cores.

CORES

Noteworthy is the thrifty use of the raw material in spite of its abundance and easy accessibility. The overwhelming majority of the nuclei were used to exhaustion, the remainder often serving as tools as suggested by use-retouch and other macrotraces (Table 5). Moreover, the last removals were sometimes detached from the cores nonsystematically—in any direction and from different striking platforms. This is the exact way, it seems, that the five **radial cores** from our collection were produced (Figure 40, Supplement Figures 320–324). The striking platforms were mostly preliminarily prepared. On three of them, the cortex was preserved. The platforms are very oblique. On half of the nuclei the cortex is completely or partially preserved on the back side.

Single-platform unilateral cores are the most abundant at the site. The planes of cleavage are both sub-rectangular (for the blades) (Figure 41, Supplement Figures 325–345) and sub-triangular (for Levallois points) (Figure 42, Supplement Figures 346–356). On one of the triangular nuclei, a beak-like tool was formed (Supplement Figure 346).

The **double-platform cores** may be considered as a specific type only conditionally (Figure 43, Supplement Figure 357–365). The best formed of these probably is an unfinished handaxe (Supplement Figure 357). All the others are reduced to exhaustion. The move of striking point onto the second platform was seemingly an attempt to obtain removals in any fashion possible. One of the nuclei was transformed into a beak-like tool. On two others, probably the second striking platform was formed with an attempt at refining the distal end.

The **multiplatform core** probably resulted from unsuccessful attempts at flaking it (Figure 44, Supplement Figure 366).

Four pieces are **cores on flakes** (Figure 45, Supplement Figures 367–370).

In one case, removals were detached from a biface fragment (Figure 46, Supplement Figure 371). No calculations so far have been made of the types of striking platforms on the flakes. It is evident, however, that the most numerous are the unprepared striking platforms, the prepared facetted ones being very few. Flaking was not lateral because reduced platforms are lacking. The "*chapeau de gendarme*" platforms were found only on Levallois points, on two flakes of triangular plan, and one beak-like tool probably produced from a broken Levallois point . Characteristic of the entire industry of the site is the tendency to obtain blade removals (Figure 47, Supplement Figures 372–376). It is of note that for the largest blades and flakes found here there are no cores of corresponding dimensions (Supplement Figures 377–378). The longest blade was 28cm (Supplement Figure 372).

TABLE 5. CORES.

	N	%
Nucleiform fragment	10	12.3
Core	10	12.3
Core on flake	4	4.9
Core double-platform	1	1.2
Core double-platform bilateral	2	2.5
Core double-platform unilateral	6	7.4
Core bilateral longitudinal-transverse	1	1.2
Core multiplatform	1	1.2
Core on fragment of biface	1	1.2
Core fragment	5	6.2
Core single-platform	24	29.6
Core radial	5	5.1
Core triangular	11	13.6
Total	**81**	**100**

TYPOLOGICAL CONCLUSIONS

1. The assemblage of lithic artifacts under study looks absolutely homogeneous throughout in terms of typology. There are no finds which could be considered a "typological admixture;"
2. All of the types are fairly standard and well known elsewhere;
3. At the same time, there is no other site resembling Dashtadem-3 in its set of types; and,
4. The peculiar features of Dashtadem-3 are certain items that it "lacks" rather than any "positive" attributes:
   - a) no types of handaxes with concave edges;
   - b) no cleavers (although there are two handaxes with a transverse cutting edge);
   - c) no choppers;
   - d) no retouched points;
   - e) the scrapers are few and rather indistinctive; and,
   - f) practically no denticulate tools.

As a whole, the assemblage of Dashtadem-3 may be defined typologically as Late Acheulian or rather the initial or middle stage of the Late Acheulian.

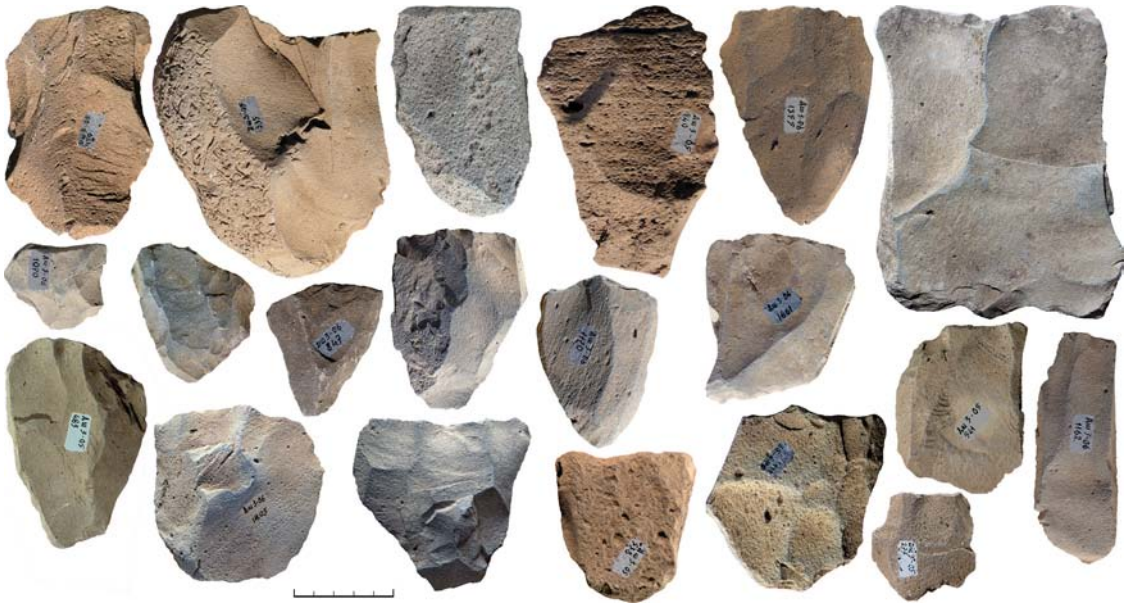


Figure 41. Sub-rectangular cores.

Figure 42. Triangular cores.

Figure 43. Double-platform cores.

PLAN VIEW AND STRATIGRAPHY OF THE FINDS

The bulk of the dacite artifacts are found within the rock hollow and in the "passage" (Figure 48). The plan view shows that the density of finds decreases in the central area of the hollow and north of this. A denser concentration of artifacts along the walls of the hollow could be explained by their collapse from higher up. However, this supposition is contradicted by the low density of finds near the central section of the northern wall. It also is contradicted by the extremely small number of artifacts found beyond the southern wall of the hollow in the southern section of the excavation, into which some artifacts should have moved, had they been present. At the same time, a similar distribution of materials often is found in dwellings where rubbish, production debris, tools, etc. accumulated below the walls. Of note is that the basic types of artifacts also are non-uniformly distributed in plan view (Figures 49–56, Table 6). It

Figure 45. Cores on flakes.

Figure 44. Multiple-platform core.

Figure 46. Core on a fragment of biface.

Figure 47. Blades.

seems unlikely that any natural factors would have distributed the artifacts according to typology.

In the vertical section the finds also are distributed non-uniformly (Figure 57). In the upper levels, up to 0.2m, only single artifacts were found, except for some of those areas where the bedrock rises up to modern ground surface. The larger objects lie mostly in the lower section of the deposits, as is easily demonstrated by the average depth of the concentration of different categories of finds throughout the excavation area. Table 7 shows the average depth of the concentrations of finds, indicating that the more massive artifacts generally are buried deeper. Only the beak-like tools deviate from that scheme—although the overwhelming majority of them are small examples, they nevertheless lie considerably deeper than the Levallois points and scrapers.

It would appear that the non-uniform distribution of artifacts in plan view itself suggests that the artifacts were not subjected to any significant horizontal post-depositional disturbances. At the same time, the vertical distribution of the finds leads us to suppose that they have been, to some extent, sorted by mass—almost all larger artifacts are concentrated in the lower levels. Probably, in the course of soil formation, the artifacts were moved vertically, as confirmed in addition by the stratigraphic evidence in the excavation. At the same time, the relatively deep location of the beak-like tools, which commonly are of a very small size, is noteworthy.

Figure 48. Plan view of the excavations at Dashtadem-3, showing distribution of lithic artifacts.

Of extreme importance, furthermore, is that in the lower levels of the deposits, the artifacts, including chips and small flakes, are mixed up with andesite debris. This fact leads us to two suppositions. First, in the lower layers, the vertical disturbances of artifacts are at minimum. Second, the period of accumulation of cultural deposits must have been relatively long because it is unlikely that people would have been living at the camp site under the conditions of continuous rockfall.

In a number of places in the excavation, it has proved possible to distinguish reliably the vertical sequences of the types according to their positions and the incline of the slumping of the cultural deposits. Each case is shown from the lowest to highest depth for the artifacts:

Sq. 52/40: handaxe triangular elongated => handaxe ovate => handaxe ovate elongated => handaxe ovate backed => backed knife (Figure 58).

Sq. 52/40: handaxe triangular elongated => handaxe ovate backed (Figure 59).

Sq. 51/41: handaxe shouldered => handaxe ovate backed (Figure 60).

Sq. 51/38: handaxe ovate => handaxe ovate => handaxe cordiform => handaxe ovate (Figure 61).

Sq. 52/41: backed knife => handaxe ovate => handaxe cordiform => handaxe triangular => handaxe subrectangular (Figure 62).

Sq. 49/40: backed knife => end-scraper => wide beak-like tool (Figure 63).

Sq. 51/39: handaxe ovate => beak-like tool => end-scraper (Figure 64).

Sq. 52/37: notched tool => end-scraper => point Levallois (Figure 65).

TABLE 6. DISTRIBUTION OF TYPES OF ARTIFACTS.

TYPE	PLAN VIEW OF THE DISTRIBUTION
Handaxes	In the hollow except for its center, and in the North section of the "passage" (Figure 49).
Levallois points	Lying compactly in the center of the West section of the hollow. One in the "passage" and one on the eastern wall of the hollow (Figure 50).
Scrapers	In the East section of the hollow, in its northwest and southwest corners and in the North end of the "passage" (Figure 51).
End-scrapers	In the South section of the hollow and near the center of the North edge of the hollow, one in the "passage" (Figure 52).
Knives	Throughout the entire hollow and in the "passage" (Figure 53).
Beak-like tools	In the hollow except for its central area, and in the "passage" (Figure 54).
Notched and denticulate tools	Absent only in the northern half of the hollow (Figure 55).
Cores	Throughout the entire hollow and in the "passage" (Figure 56).

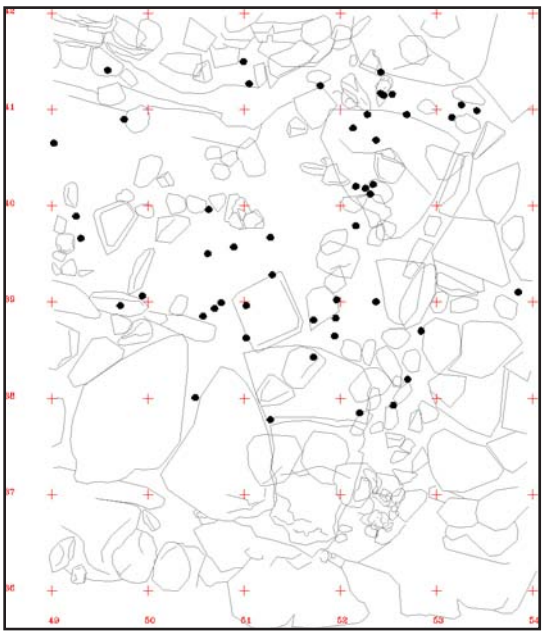


Figure 49. Distribution of handaxes.

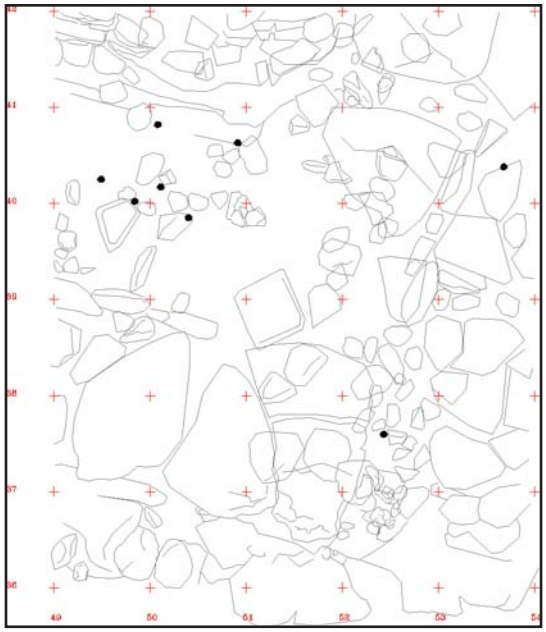


Figure 50. Distribution of Levallois points.

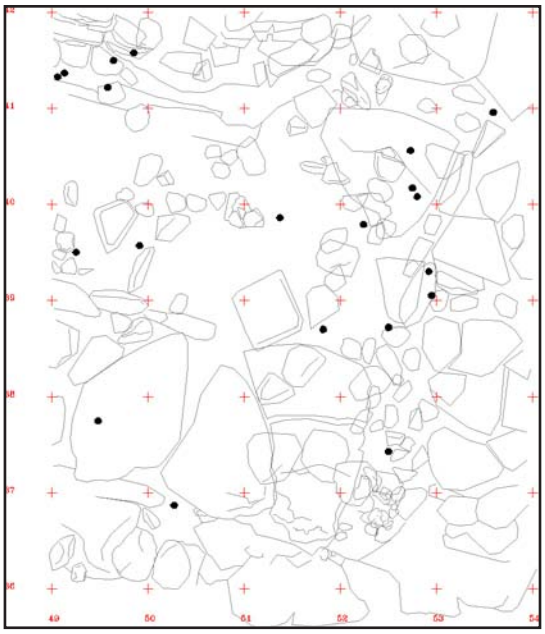


Figure 51. Distribution of scrapers.

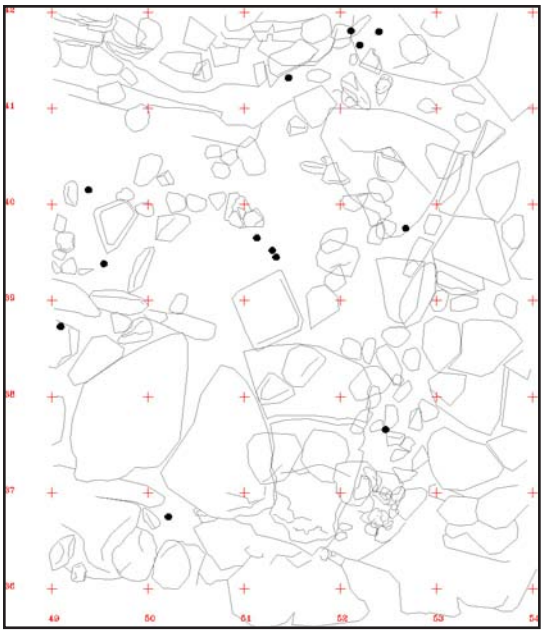


Figure 52. Distribution of end-scrapers.

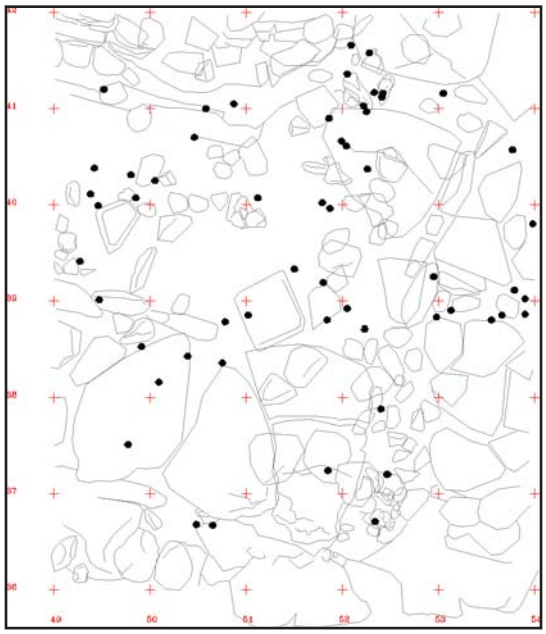


Figure 53. Distribution of knives.

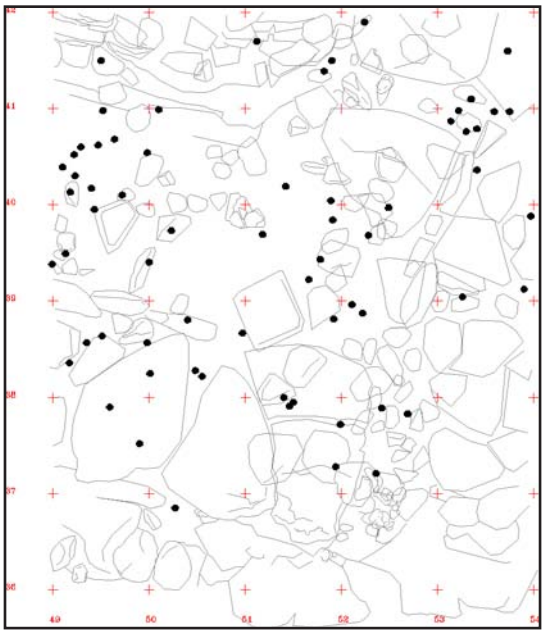


Figure 54. Distribution of beak-like tools.

Sq. 52/41: end-scraper => backed knife => beak-like tool => end-scraper => end-scraper (Figure 66).

Sq. 50/38: handaxe ovate backed => handaxe transversal => handaxe triangular => handaxe transversal (Figure 67).

These sequences are fairly diverse, giving no grounds to base any chronological differences on them.

The relative positions of quite a number of finds allow us to draw conclusions about the post-depositional disturbances of particular artifacts or their groups. For instance, a handaxe [51.72/38.43: n783] was found lying immediately on the bedrock, literally pinned down by a massive stone block measuring 0.5x0.35x0.4m (Figure 68). Another handaxe [49.02/40.65: n716], in the western wall of the excavation, was found standing on edge near the bottom andesite debris and was overlain by a block which seems to have slipped down from south to north (Figure 69). Yet another handaxe [51.02/38.63: n1301] was found in the center of the excavation standing upright, directly underneath a horizontally lying block 0.65x0.6x0.35m (Figure 70). Beneath the same block were found a nucleus [51.25/39.16: n1595], a handaxe with a beak [51.29/39.28: n1597], a backed knife [51.02/38.85: n 1590], and numerous flakes. A very massive

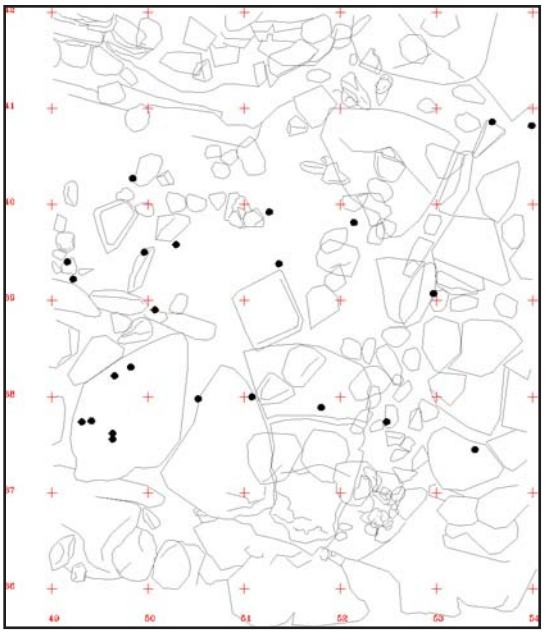


Figure 55. Distribution of notched/denticulates.

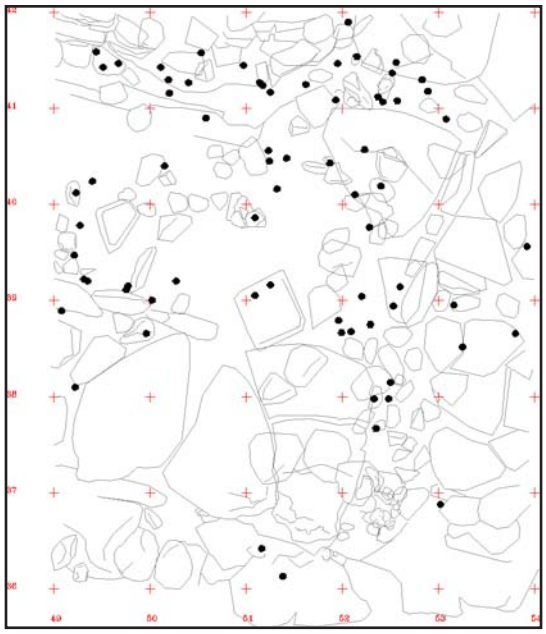


Figure 56. Distribution of cores.

flake [49/41.5: n534] measuring 21x12 x3.5cm was found standing almost upright on the rocky base covered over by a stone block (Figure 71). The accumulation of large tools and flakes lying almost immediately on the bedrock surface in Sq. 51/41 was covered by a group of blocks collapsed, judging by their arrangement, from northeast to southwest (Figure 72). It is obvious that the positions of all the artifacts enumerated are not related to their movements in the course of soil formation. Probably they came to their places in antiquity as a result of deterioration and sliding of the andesite blocks.

Along with the situations described, there is a dense concentration of artifacts near the southern end of the "passage." This group is deposited on/in a narrow (0.4m wide) talus of andesite debris, the top of which is found immediately under the turf and the bottom is sloping towards the bedrock in a north–south direction. There are firm grounds to suppose that initially the artifacts under consideration

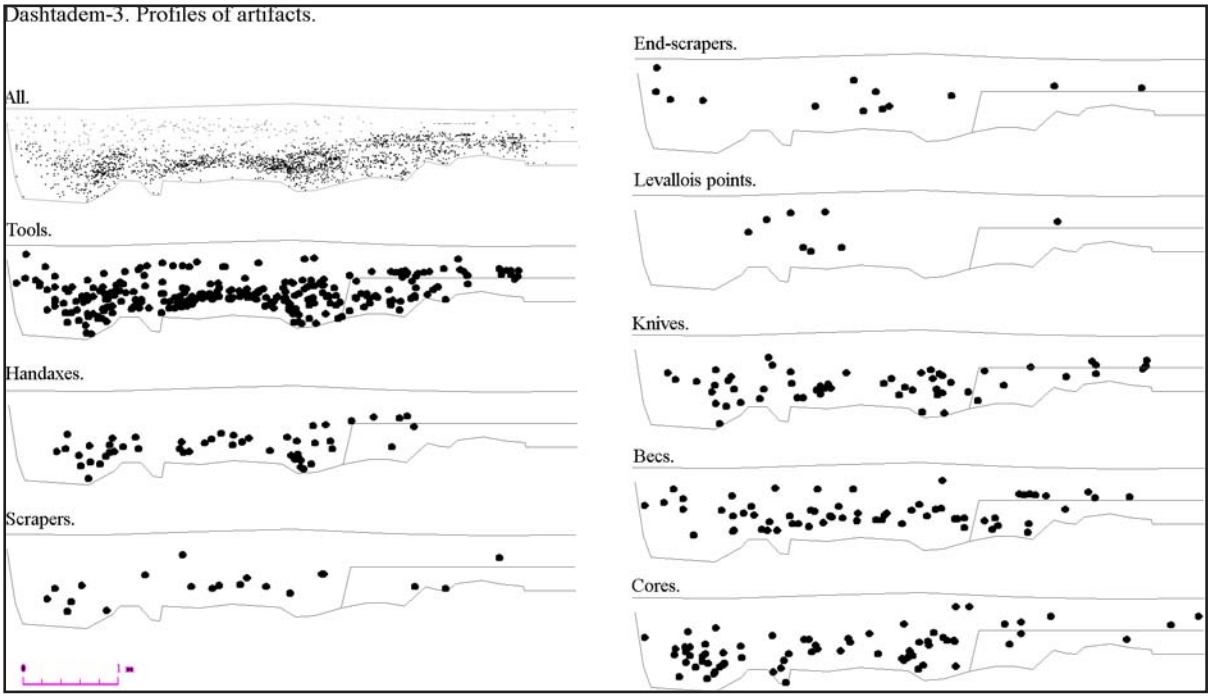


Figure 57. Profiles of artifacts. View to the east.

TABLE 7. AVERAGE DEPTH OF MATERIALS AND TYPES OF ARTIFACTS.

	Depth		Depth
Total	-0.96	Points Levallois	-0.82
Ceramics	-0.70	End-scrapers	-0.83
Obsidian	-0.89	Beak-like pieces	-0.91
Dacite	-0.96	Notches	-0.91
		Knives	-0.97
		Scrapers	-0.99
		Cores	-0.99
		Handaxes	-1.03

Figure 58. Sequence of artifacts in Sq. 52/40.

Figure 59. Sequence of artifacts in Sq. 52/40.

Figure 60. Sequence of artifacts in Sq. 51/41.

Figure 61. Sequence of artifacts in Sq.51/38.

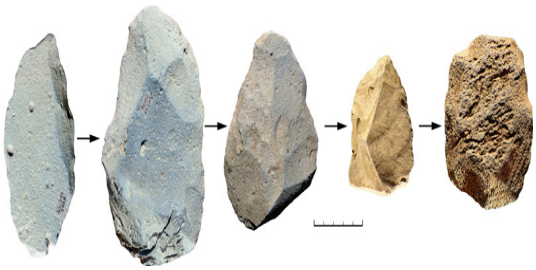


Figure 62. Sequence of artifacts in Sq. 52/41.

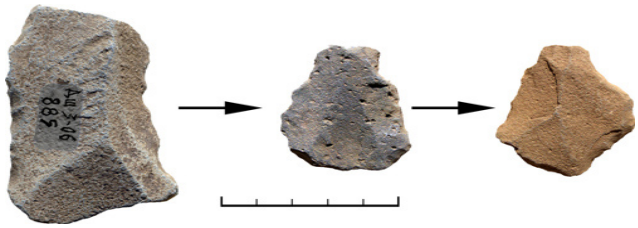


Figure 63. Sequence of artifacts in Sq. 49/40.

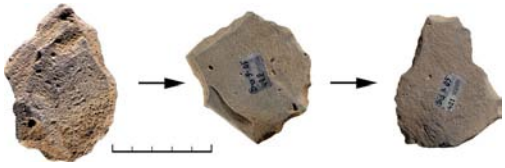


Figure 64. Sequence of artifacts in Sq. 51/39.

Figure 65. Sequence of artifacts in Sq. 52/37.

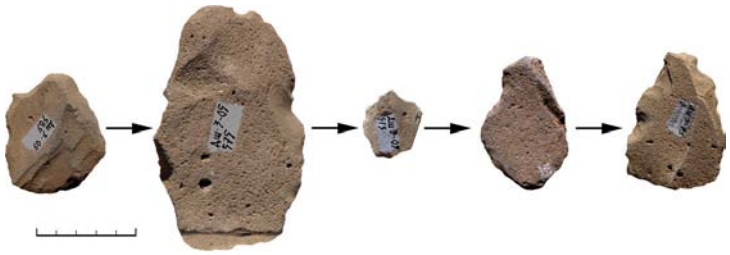


Figure 66. Sequence of artifacts in Sq. 52/41.

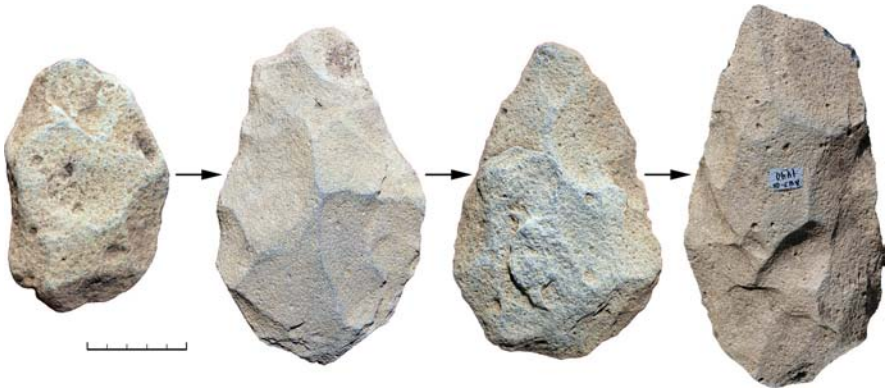


Figure 67. Sequence of artifacts in Sq. 50/38.

were located near the top of the talus, at least in the same level with the modern surface, but later came to the position recorded due to slipping of the underlying soil.

The evidence related to the disturbed large blocks of the bedrock and particular large stones provides us with additional information on the pattern of deposition of the artifacts. The rocky base which, in the southern section of the excavation constitutes the southern wall of the hollow, is broken into large blocks. The largest two of the latter were transported northward covering the cultural level with their edges. The southwestern block tilted to the hollow with its northern end so that its southern end was raised about 0.2m above the base rock. In the resulting fissure between the block and bedrock were found 80 artifacts lying within a distance of up to 1m from the southern edge of the block. Beneath the neighboring block on the east, 20 artifacts were found— all under its southern edge. Regardless of the time when the blocks were broken off – prior to the occupation of the camp site or afterwards – this particular situation suggests that considerable post-depositional horizontal movements of the artifacts possibly have taken place.

It is significant that beneath a number of large and medium blocks lying on the bedrock in the western half of the central area of the hollow (squares 49/39, 49/40, 50/39, and 50/40) no finds were unearthed (except for those under the edges of the blocks). The context of the site suggests that during the formation of the cultural layer, these blocks were already lying in their present positions, constituting the microhabitat of Dashtadem-3. It is noteworthy that exactly within this area, 17 beak-like tools of the 66 total and 6 Levallois points of the 8 total were found.

The "pros" and "cons" of substantial post-depositional movements of our artifacts may be summarized as follows:

- The pottery-containing deposits on average are the uppermost;
- The positions of the materials correspond statistically to the rule: the more massive are the objects the deeper they are found;
- The vertical sequences of the tool types indicate the decrease of massiveness from bottom to top;
- Small dacite flakes and chips are fairly abundant on the surface of the bedrock and among the near-bottom debris;
- Unpatinated obsidian flakes, chips, and debris are found throughout the entire layer down to the bedrock;
- Quite often the artifacts are overlain by large blocks which preclude any movements of the artifacts;
- In the bottom deposits, the artifacts are mixed with the andesite debris; and,
- The artifact types are non-uniformly distributed (structured) in plan view.

Thus one set of evidence indicates that the artifacts were subjected to post-depositional movements, particularly vertical ones. In contrast, another series of facts suggests that the artifacts barely moved. We are, however, able to use the aggregated evidence to propose a quite natural scheme of formation of the cultural layer at the site as de-

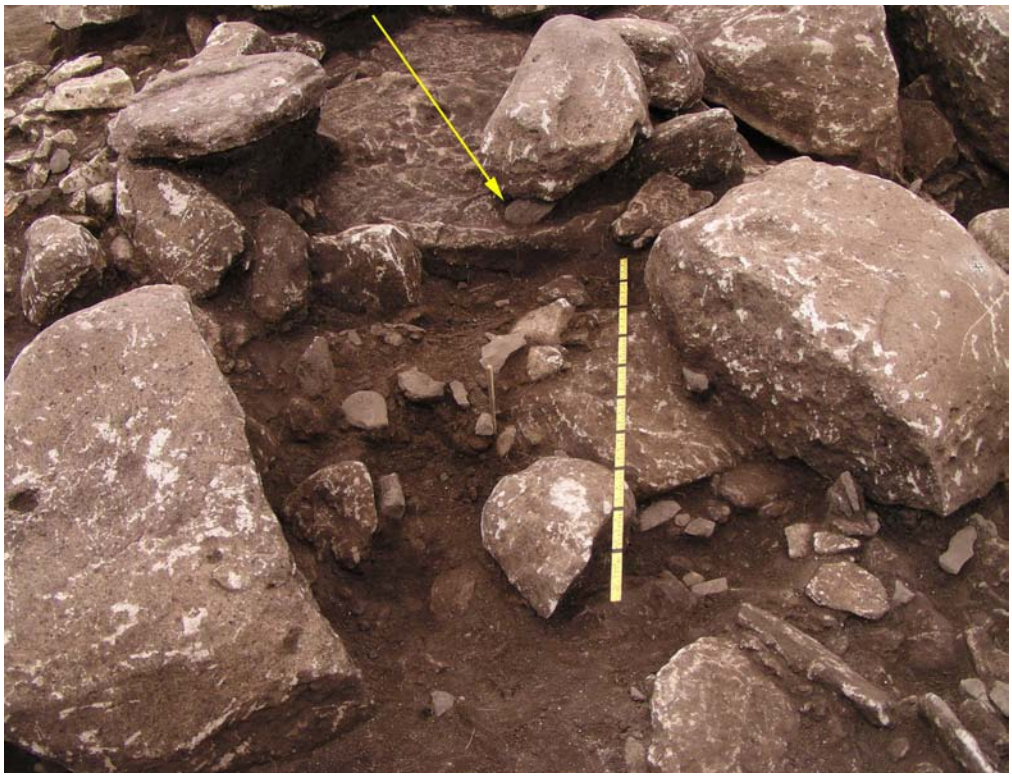


Figure 68. Handaxe on the bedrock and under a large stone.

Figure 69. Handaxe in the western profile.

Figure 70. Handaxe under a large andesite block.

scribed below. When occupation of the rocky hollow began here, the hollow still had not been filled up but was only partly covered with turf across the surface of the rock. The rock slowly deteriorated, its debris filling the hollow throughout a long period of time. The collapsing debris fell on the turf and "sank" gradually into the turf, carrying the artifacts with it and producing a denser mixed mass. The processes of soil-formation and movements of the debris were occurring during the period of occupation of the camp site. Prehistorically, some artifacts moved upwards and others sank down. Apparently fairly long periods occurred when the process of soil-formation was curtailed or even erosion of the contemporary surface took place (e.g., during cold spells). As a result, some of the artifacts must have been lying directly on the surface for a long time span as suggested by the traces of their secondary use.

At the same time, those artifacts which were overlain by collapsed or slipped rocky blocks did not move anywhere. The entire scheme of the formation of the site as depicted above must have corresponded to a long sequence of its occupation, that is, over centuries or rather millennia either with some interruptions or without.

The aggregated evidence yielded by our excavation seems to indicate that we are dealing here with a dwelling made in a natural rocky hollow. The latter probably was roofed in some way and had an entrance from the south. This hypothesis, however, remains to be definitively demonstrated. Nevertheless, it would explain the structured arrangement of finds in plan view because, e.g., at seasonal habitation sites, the pattern of their occupation, the household areas, etc., were often repeated.

DASHTADEM-3 IN COMPARISON TO THE ACHEULIAN OF THE CAUCASUS

It is undoubtedly important to assess the typological place of the artifacts from Dashtadem-3 among the other Acheulian assemblages of the Caucasus. Stratified deposits are represented in this region at six cave camp sites: Azykh, Kudaro-1, Kudaro-3, Tsona, Akhshtyr, and Treugolnaya.

The Acheulian materials from **Kudaro-3**, **Tsona** and **Akhshtyr** are fairly few in number. They show no clear similarity to the finds from Dashtadem-3, but owing to the scarceness of the specimens for comparison, it is difficult to come to any conclusion.

The most representative and best published is the assemblage of tools from **Kudaro-1**. The difference between Kudaro-1 and Dashtadem-3 can be shown at the level of categories. Well-represented at Kudaro-1 are choppers, leaf-shaped tools, and retouched points, all of which are totally absent at Dashtadem-3. In turn, there are no Levallois points at Kudaro-1. At Kudaro-1, the scrapers amount to 38% of all tools. Moreover, in contrast to Dashtadem-3, these scrapers are fairly distinctive and typologically diverse.

If we compare the types of bifaces, we see that even those which formally belong to a single type, e.g., the cordiform or almond-shaped ones, show their similarity only at the most general level – indeed that of all Acheulian bifaces.

The same is true if the beak-like tools from the two sites are considered. A number of particular examples show a close similarity. However, on the whole, the beak-liked tools from Kudaro-1 and Dashtadem-3 differ substantially.

Figure 71. Very large flake in the western profile.

Figure 72. Accumulation of large tools and flakes in the NE corner.

At Kudaro-1, "the beaks most commonly are produced by the deep and large Clactonian notches, occasionally running throughout the entire length of the object, rather than by retouch" (Luybin and Belyaeva 2004: 220). At Dashtadem-3, in contrast, the beaks are produced by bilateral retouch.

On the whole the assemblage from Dashtadem-3 seems more advanced typologically than that from Kudaro-1, even taking into consideration the poorer quality of the raw material at Kudaro-1.

Among the materials from Acheulian layers at **Azykh,** scrapers of diverse types can be remarked (Luybin 1998: 17–44). Beak-like tools are absent. The handaxes differ clearly from those from Dashtadem-3 and their types look considerably more archaic, as indeed do all the Acheulian artifacts from Azykh.

There is no similarity to the evidence from the "pre-Mousterian" layers of **Treugol'naya Cave** (Doronichev et al. 2007; Doronichev 2008: 114–119).

Among unstratified sites, the closest similarity to Dashtadem-3, it would seem, is shown by the finds from the **Dicle River basin** in eastern Anatolia (Taşkiran 2008: 145–149). The shapes of handaxes, Levallois points, and cores are fairly close to the corresponding types from Dashtadem-3.

CONCLUSIONS

The topographical position of Dashtadem-3, the characteristics of the layers with artifacts, and the types of artifacts suggest that the assemblage of dacite tools from this site is probably an unmixed complex deposited throughout a fairly long time span. It preserves the ancient distribution of the artifacts in plan view, thus reflecting some ancient cultural regularity.

Interpreting the distribution of the tool types revealed in the 30m^2 plan view as the habitual scheme of spatial division of different spheres of activity or the like is probably premature. Indeed, as shown by taphonomic analysis, some of the artifacts undoubtedly were moved and there is a high probability that a considerable number of the finds have been subjected to post-depositional disturbances. Rather, taphonomy is used here mainly as an argument in favor of the overall integrity of the assemblage; that is, it is not derived from elsewhere in the landscape.

The disadvantage of the site is the lack of organic remains, which makes it impossible to date it using methods such as TL or ESR. The main value is the integrity of the assemblage of artifacts which typologically are attributed to the Late Acheulian.

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NOTE

Figures 73–378 are available as a Supplement, Dashtem-3: Additional Figures, at:

www.paleoanthropology.org/journal/content

Drawings and photos of all lithic tools from the site of Dashtadem-3 also are accessible at the internet site of the Armenian-Russian Archaeological Expedition:

http://amru.rekvizit.ru

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