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10 - UNIT H: LITHIC ARTIFACTS

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General representation of artifact categories

Unit H yielded 682 lithic artifacts which have been divided into 12 categories (tabl. 1). The most abundant category, as is common, is chips – somewhat more than one third of the assemblage (36.1%). Excluding chips, chunks, uncharacteristic debitage and heavily burnt pieces, flakes are dominant in the assemblage (32.7%), followed by tools (18.2%), bladelets (17.7%) blades (12.9%), microblades (7.1%), waste from tool production and rejuvenation (5.3%) and core maintenance products (5%). Core-like pieces are rare (1.1%). The relatively high percentage of tools is the main characteristic feature of the Unit H assemblage structure.

Typological structure of artifacts

Core-like pieces

These include only 4 cores and no pre-cores were found. The following categories of cores are represented: a blade/bladelet core, a bladelet "carinated" core, a bladelet multiplatform core and a core fragment. Both bladelet cores are on colored flint nodules/chunks, while the blade/bladelet core and the core fragment are on gray flint nodules/chunks.

The *blade/bladelet core* (fig. 1:1) has a double-platform with two bidirectional-adjacent flaking surfaces. Removal of blades and bladelets *sensu lato* from two opposed platforms in bidirectional order from two adjacent flaking surfaces gives the core a volumetric character with sub-cylindrical shape. Platform types and angles: 1st - roughly faceted acute and 2nd - plain acute. Platform abrasion: present. Platform morphology in plane and removal scars on flaking surfaces: 1st - straight with no twist scars and 2nd - semicircular with twist scars. Condition of flaking surfaces: 1st - hinged and 2nd - regular. Metrics: length - 5.2 cm, width - 3.9 cm, thickness - 2.9 cm. First platform width and thickness: 3.1 and 2.9 cm. Second platform width and thickness: 2.9 and 2.8 cm. The size of the second plain platform indicates removal of a core tablet with flake proportions for possible rejuvenation. Platform negatives, maximum length: the

	TOTAL #	**%**	**esse %**
CORE-LIKE PIECES	4	0.6	1.1
CORE MAINTENANCE PRODUCTS	19	2.8	5.0
DEBITAGE :	267	39.1	70.4
Flakes	124	18.2	32.7
Blades	49	7.2	12.9
Bladelets	67	9.8	17.7
Microblades	27	3.9	7.1
TOOLS	69	10.1	18.2
WASTE FROM PRODUCTION & REJUVENATION OF TOOLS	20	2.9	5.3
DEBRIS :	303	44.5	
Chips	246	36.1	
Uncharacteristic Debitage Piece	23	3.4	
Chunks	19	2.8	
Heavily Burnt Pieces	15	2.2	
TOTAL	**682**	**100.00**	**100.00**

Table 1 - Siuren-I. Unit H. General Artifacts Categories Representation.

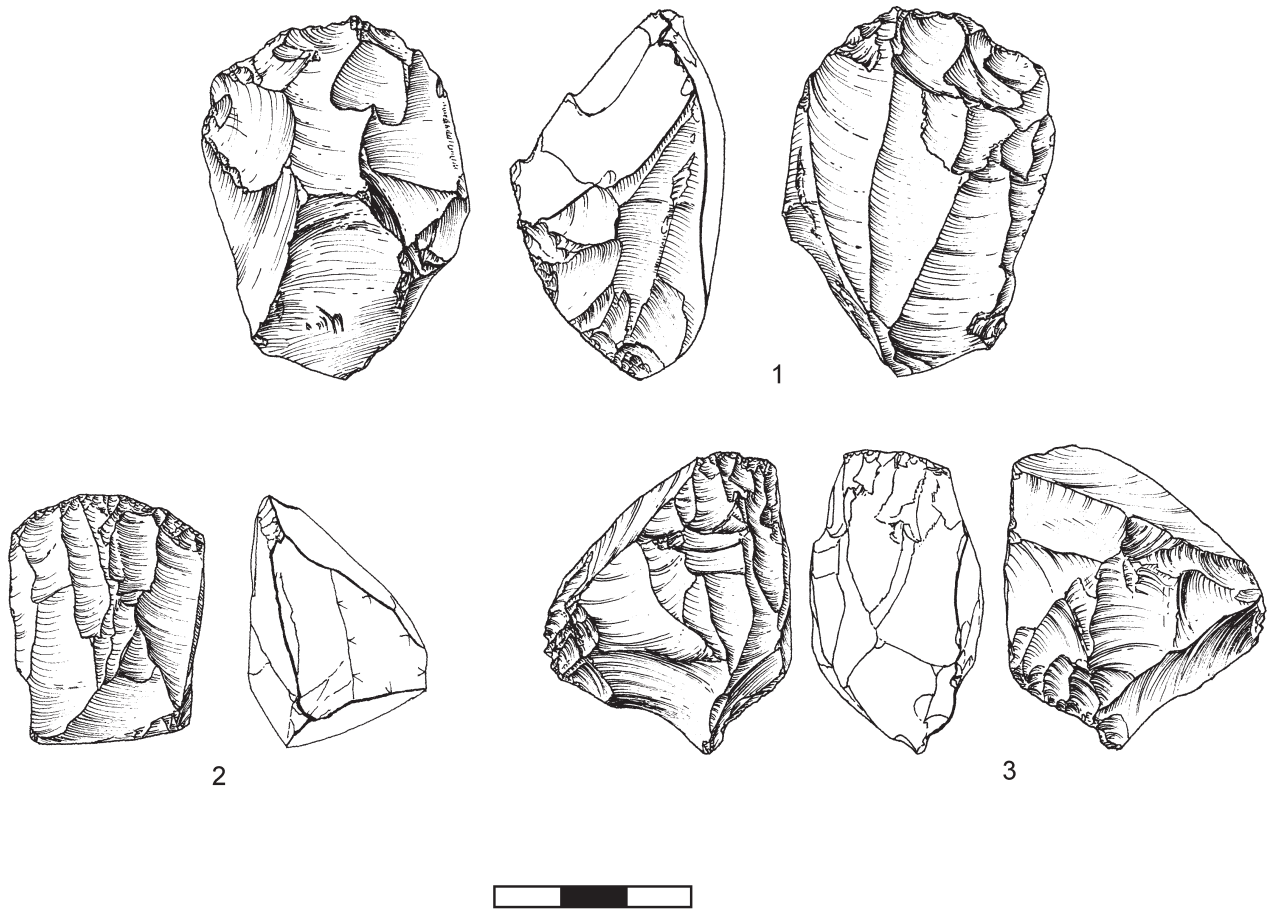

Figure 1 - Siuren I. Unit H. Flint Artifacts – Cores. 1, double-platform bidirectional-adjacent sub-cylindrical blade/bladelet core; 2, "carinated" single-platform sub-cylindrical bladelet core; 3, multiplatform exhausted bladelet core.

same as the core length - 5.2 cm. Reason for core abandonment: for 1st platform and flaking surface - hinged scars and for 2nd platform and flaking surface - no obvious reason.

Bladelet "carinated" core (fig. 1:2) has a single-platform and is of volumetric character with sub-cylindrical shape. Platform type and angle: dihedral acute. Platform abrasion: present. Platform morphology in plane and removal scars on flaking surface: semicircular with no twist scars. Condition of flaking surface: regular. Metrics: length - 3.7 cm, width - 2.9 cm, thickness - 2.6 cm. Platform width and thickness: 2.9 and 2.5 cm. Platform size indicates removal of a core tablet with flake proportions for possible rejuvenation. Platform negatives, maximum length: the same as the core's length - 3.7 cm. Reason for core abandonment: no obvious reason.

Bladelet multiplatform exhausted core (fig. 1:3) has three separate striking platforms and three flaking surfaces. Platform types and angles: 2 plain acute and 1 crudely-faceted acute. Platform abrasion: present. Platform morphology in plane and removal scars on flaking surfaces: 1 semicircular and 2 straight platforms with no twist scars. Condition of flaking surfaces: 2 regular and 1 hinged, the latter one associated with plain acute platform with straight morphology in plane. Metrics: length - 4.5 cm, width - 4.0 cm, thickness - 2.4 cm. Other metric data are not mentioned, as they would be too subjective, but some morphological features deserve a discussion. The disposition of the core's striking platforms and removal order on the flaking surfaces allow us to make some technological conclusions. First, this bladelet multiplatform core was a bladelet double-platform one with two bidirectional-alternate flaking surfaces. Then, after exhaustion of these two platforms and flaking surfaces, a third platform was formed on one of the core's narrow edges (plain acute with straight morphology in plane) from which new bladelet production began. This new exploitation stage was not long or successful since from the start most of the removals were heavily hinged straight in the upper part of this narrow flaking surface near the platform, obviously leading to core abandonment. Thus, we clearly see three stages of bladelet production on this core – two sequential ones from a single-platform to double-platform core on two different flaking surfaces and then, a third one with preparation and use of a third platform. Moreover, some removal scars with only the distal parts preserved are not associated with these three striking platforms, indicating the existence of at least one more stage in primary core reduction prior to these three stages. So, this bladelet core had a long and multiple "reduction history" that certainly led it to its final multiplatform exhausted form.

Core-like pieces of Unit H are represented by only three definable cores which suggest intensive bladelet production with the simultaneous presence of bladelet "carinated" and multiplatform types, and a blade/bladelet core with the notable ab-

sence among these cores of true bidirectional primary reduction from two opposed platforms on one flaking surface.

Core maintenance products (CMP)

This category is represented by 19 artifacts which are subdivided into crested pieces (15 items) and core tablets (4 items); no core trimming elements are present (see also tabl. 2).

Crested pieces

Based on metric proportions, crested pieces are additionally subdivided into crested flakes (n=2 /13.3%), crested blades (n=11 /73.4%) and crested bladelets (n=2 /13.3%). All but one crested blade are primary with a crested ridge present.

Crested flakes. 1 primary flake and 1 re-crested flake are pre-

	flakes-tools	flakes-CMP	flakes-debitage	Flakes Total
cortical			11	11 / 8.8%
dorsal-plain			3	3 / 2.4%
lateral			3	3 / 2.4%
crested	1	2		3 / 2.4%
unidirectional	2		66	68 / 54.4%
unidirectional-crossed			21	21 / 16.8%
bidirectional			10	10 / 8.0%
3-directional	1		4	5 / 4.0%
centripetal			1	1 / 0.8%
core tablet		3		3
unidentifiable	1		5	6
N	**5**	**5**	**124**	**134**
	blades-tools	**blades-CMP**	**blades-debitage**	**Blades Total**
cortical			1	1 / 1.4%
plain				
lateral				
crested		11		11 / 15.1%
unidirectional	12		43	55 / 75.3%
unidirectional-crossed			2	2 / 2.7%
bidirectional	1		3	4 / 5.5%
3-directional				
centripetal				
core tablet		1		1
unidentifiable	1			1
N	**14**	**12**	**49**	**75**
	bladelets-tools	**bladelets-CMP**	**bladelets-debitage**	**Bladelets Total**
cortical				
plain				
lateral				
crested		2		2 / 2.3%
unidirectional	17		59	76 / 87.4%
unidirectional-crossed			5	5 / 5.7%
bidirectional	1		3	4 / 4.6%
3-directional				
centripetal				
core tablet				
unidentifiable				
N	**18**	**2**	**67**	**87**
	microblades-tools	**microblades-CMP**	**microblades-debitage**	**Microblades Total**
cortical				
plain				
lateral				
crested				
unidirectional	24		26	50 / 96.2%
unidirectional-crossed	1			1 / 1.9%
bidirectional			1	1 / 1.9%
bidirectional-crossed				
centripetal				
core tablet				
unidentifiable				
N	**25**		**27**	**52**

UNIT H. DEBITAGE TOTAL (INCLUDING TOOLS & CMP):

	N	%
Flakes	134	38.5
Blades	75	21.6
Bladelets	87	25.0
Microblades	52	14.9
TOTAL	**348**	**100**

Table 2 - Siuren-I. Unit H. Flake, Blade, Bladelet and Microblade Dorsal Scar Patterns.

sent. Both have the same crested ridge characteristics: unilateral wholly crested treatment with lateral steep profile. Other features differ. The primary crested flake has a dorsal-plain scar pattern that shows only initial preparation of a core's flaking surface. The flake is whole with irregular shape, "on-axis" removal direction, convex profile, feathering distal end, slight lateral cortex, crushed butt. This piece is on a gray flint with the following metrics: length - 3.7 cm, width - 2.1 cm, thickness - 0.7 cm. Because it has a heavily convex profile, this crested piece did not reach blade size and became a flake. The re-crested flake has a regular unidirectional scar pattern with bladelet scars that are evidence of re-cresting repreparation of a core's flaking surface during continued reduction. This flake is a non-cortical proximal fragment with only an identifiable punctiform butt – semi-lipped, semi-acute angle, with abrasion. This piece is on a gray flint, 1.7 cm long, 1.5 cm wide, 0.4 cm thick.

Crested blades. These include 5 primary, 3 re-crested, 1 secondary and 1 unidentifiable blades with preserved crested ridge, and one truly secondary piece with no preserved crested ridge.

Five primary crested blades have the following characteristics of crested ridges: 4 unilateral and 1 bilateral wholly crested treatments with 4 triangular and 1 lateral steep profiles. Other morphological features are as follows: 3 complete, 1 proximal and 1 distal fragments; 1 cortical, 2 dorsal-plain, 1 crested and 1 unidentifiable scar patterns; 3 converging, 1 parallel and 1 irregular shapes; 1 "on-axis" and 4 "off-axis" removal directions; 3 twisted, 1 incurvate medial and 1 incurvate distal general profiles; 3 feathering, 1 blunt and 1 unidentifiable distal ends; 3 non-cortical, 1 cortical and 1 partially cortical with non-significant amount of lateral cortex; 3 plain, 1 dihedral and 1 missing butts (3 semi-lipped and 2 unidentifiable; 3 semi-acute and 2 unidentifiable; 1 with abrasion, 3 with no abrasion and 1 unidentifiable). There are 3 pieces on gray flints and 2 on colored flints. Their metric parameters are in the following ranges: length - 3.3-4.5 cm (including broken pieces), width - 1.3-1.9 cm, thickness - 0.7-1.4 cm.

Three re-crested blades have crested ridges as follows: bilateral (2)/unilateral (1) and wholly (1)/partially (2) crested treatment with 1 triangular and 2 lateral steep profiles. Other morphological features: 1 complete, 1 proximal and 1 distal fragments; 3 unidirectional scar patterns; 1 converging and 2 unidentifiable shapes; 1 "on-axis" and 2 unidentifiable removal directions; 1 flat and 2 unidentifiable general profiles; 1 hinged, 1 blunt and 1 unidentifiable distal ends; 1 non-cortical and 2 partially cortical with non-significant distal and lateral amount of cortex; 1 plain butt (semi-lipped, semi-acute angle, with abrasion), 1 crushed and 1 missing butts. There are 2 pieces on gray flints and one more piece on colored flint. Metric parameters are in the following ranges: length - 3.0-4.6 cm (including broken pieces), width - 2.1-2.4 cm, thickness - 0.8-0.9 cm.

The secondary complete blade has a unilateral partially treated crested ridge with lateral steep profile. It is also has the following morphological features: unidirectional scar pattern, irregular shape, "off-axis" removal direction, flat general profile, hinged distal end, non-cortical dorsal surface, crushed butt. It is 5.4 cm long, 2.5 cm wide, 1.0 cm thick, made on gray flint.

An unidentifiable blade is a medial fragment with a unilateral wholly treated and lateral steep crested ridge. The only other identifiable characteristics are that it is non-cortical broken with an unidentifiable scar pattern on gray flint with measurements of 2.9 cm length, 1.3 cm width and 0.8 cm thickness.

There is a single truly secondary blade with no preserved crested ridge. This is a medial partially cortical fragment with an insignificant amount of lateral cortex on gray flint - 2.4 cm long, 1.5 cm wide, 0.7 cm thick.

Crested bladelets. Both are primary crested items which have unilateral wholly treated crested ridges with lateral steep profiles. One is complete and the second is a medial fragment. The latter is on gray flint, partially cortical with an insignificant amount of lateral cortex, cortical dorsal surface, and is 2.4 cm long, 1.1 cm wide and 0.7 cm thick. The complete bladelet has a dorsal-plain scar pattern, converging shape, "on-axis" removal direction, incurvate medial general profile, feathering distal end, non-cortical dorsal surface, crushed butt. It is on colored flint with measurements of 4.1 cm length, 0.7 cm width, 0.8 cm thickness.

Core tablets

There are 3 primary and 1 secondary core tablets. All are complete and non-cortical items made on gray flints. As expected, none of the core tablets have butt abrasion.

One primary piece has blady metric proportions (length - 6.5 cm, width - 3.1 cm, thickness - 1.0 cm), while the other 2 primary pieces are flakes (length - 2.7 and 3.0 cm, width - 2.4 and 3.9 cm, thickness - 0.4 and 1.1 cm). One piece on a flake has core striking platform remnants both on its butt area and one lateral edge, while the other 2 pieces have such top parts of cores only on their butt areas.

A single secondary core tablet is on a flake (2.1 cm long, 1.2 cm wide, 0.4 cm thick). As a primary core tablet on flake, this piece also has core striking platform remnants both on its butt area and along a lateral edge.

The structure and characteristics of the core maintenance products allow us to make some technological observations for them. First, the prevalence of blades among crested pieces evidences core flaking processes starting from relatively large nodules and/or pre-cores with the aim of subsequent general blade reduction. It is also obvious that of the 11 crested blades, 10 are primary. The presence of two crested primary bladelets also serves to indicate independent bladelet core reduction at the site. Along with this, the presence of a crested primary flake and a re-crested flake is evidence of a subordinate role for crested pieces with flake proportions at the beginning of primary flaking processes at Siuren I, probably pointing out their accidental origin. The basic core tablet features are regular ones with the dominance of such pieces on flakes and another on a blade that again shows bladelet core reduction. All in all, the presence of 19 core maintenance products with 4 cores (ratio 4.75:1) showing multiple bladelet reduction is strong evidence for intensive primary flaking processes taking place at the rock-shelter by the Aurignacian inhabitants of archaeological level H.

Debitage

This category of artifacts is composed of 267 pieces which are divided into flakes (n=124/46.4%-, blades (n=49 18.4%), bladelets (n=67/25.1%) and microblades (n=27/10.1%) (see also tabl. 2-11).

Flakes

All 124 flakes have been subdivided into complete (n=79/63.8%) and broken (n=45/36.2%), with further distribution of the latter into proximal (n=11/8.9%), medial (n=4/3.2%), distal (n=23/18.5%) and longitudinally fragmented (n=7/5.6%).

Dorsal scar pattern. All eight scar pattern types on 119 flakes with definable scar pattern have been identified. The most common type is unidirectional (55.6%), followed by the much less common unidirectional-crossed type (17.6%). Bidirectional (8.4%) and cortical (9.2%) types are similar in percentage, and again much less representative than the previous type. The remaining four scar pattern types are represented by only a few pieces each and none reach 5%, although even the minimal presence of three-directional (3.4%), centripetal (0.8%), dorsal-plain (2.5%) and lateral (2.5%) types is notable.

Comparisons of scar pattern types with presence/absence of cortex on respective flakes are as follows. Cortical pieces have the following proportions for the different scar pattern types: unidirectional - 36.4%, unidirectional-crossed - 33.3%, bidirectional - 20%, lateral - 33.3% and centripetal - 100% (only one piece is cortical).

Surface cortex area and location. All 124 flakes were used for surface cortex area identification. Non-cortical flakes are dominant (63.7%). Partially cortical flakes are about twice as predominant as wholly cortical flakes – 25% vs. 11.3%. For whole flakes only, proportions are as follows: non-cortical (63.3%), partially cortical (24.1%) and wholly cortical (12.6%). This smaller sample shows an internal subdivision of partially cortical flakes into pieces with a significant amount of cortex (36.8%) and pieces with an insignificant amount (63.2%).

Only 19 complete partially cortical flakes were used for surface cortex location. More than half of these flakes have distal cortex (52.7%), while three other identified types (flakes with proximal, lateral, distal + lateral cortex) are much less common – 10.5%, 21%, 15.8%, respectively.

Shape and axis. 99 flakes with definable shapes and 112 flakes with definable axis of removal direction were used for this analysis.

The most common shape type is expanding, present for nearly half of the flakes (44.4%). This is followed by irregular (30.3%)

	flakes-tools	**flakes-CMP**	**flakes-debitage**	**Flakes Total**
parallel			11	11 / 10.6%
converging	1		8	9 / 8.6%
expanding	2		44	46 / 44.2%
ovoid			6	6 / 5.8%
irregular	1	1	30	32 / 30.8%
unidentifiable	1	4	25	30
N	**5**	**5**	**124**	**134**
	blades-tools	**blades-CMP**	**blades-debitage**	**Blades Total**
parallel	3	1	6	10 / 21.7%
converging	4	4	7	15 / 32.6%
expanding	1		7	8 / 17.4%
ovoid				
irregular		2	11	13 / 28.3%
unidentifiable	6	5	18	29
N	**14**	**12**	**49**	**75**
	bladelets-tools	**bladelets-CMP**	**bladelets**	**bladelets total**
parallel	3		10	13 / 35.1%
converging	2	1	16	19 / 51.4%
expanding			1	1 / 2.7%
ovoid				
irregular			4	4 / 10.8%
unidentifiable	13	1	36	50
N	**18**	**2**	**67**	**87**
	microblades-tools	**microblades-CMP**	**microblades-debitage**	**Microblades Total**
parallel	11		2	13 / 59.1%
converging	2		6	8 / 36.4%
expanding				
ovoid				
irregular			1	1 / 4.5%
unidentifiable	12		18	30
N	**25**		**27**	**52**

Table 3 - Siuren-I. Unit H. Flake, Blade, Bladelet and Microblade Shapes as Percentages of Each Type

	flakes-tools	flakes-CMP	flakes-debitage	Flakes Total
on-axis	2	1	53	56 / 47.9%
off-axis	2		59	61 / 52.1%
unidentifiable	1	4	12	17
N	**5**	**5**	**124**	**134**
	blades-tools	**blades-CMP**	**blades-debitage**	**Blades Total**
on-axis	3	2	7	12 / 26.1%
off-axis	2	7	25	34 / 73.9%
unidentifiable	9	3	17	29
N	**14**	**12**	**49**	**75**
	bladelets-tools	**bladelets-CMP**	**bladelets-debitage**	**Bladelets Total**
on-axis	18	1	54	73 / 92.4%
off-axis			6	6 / 7.6%
unidentifiable		1	7	8
N	**18**	**2**	**67**	**87**
	microblades-tools	**microblades-CMP**	**microblades-debitage**	**Microblades Total**
on-axis	25		1	26 / 76.5%
off-axis			8	8 / 23.5%
unidentifiable			18	18
N	**25**		**27**	**52**

Table 4 - Siuren-I. Unit H. Flake, Blade, Bladelet and Microblade Axis as Percentages of Each Type.

	flakes-tools	flakes-CMP	flakes-debitage	Flakes Total
flat			30	30 / 23.6%
incurvate medial	2		43	45 / 35.4%
incurvate distal			21	21 / 16.6%
convex		1	13	14 / 11.0%
twisted	2		15	17 / 13.4%
unidentifiable	1	4	2	7
N	**5**	**5**	**124**	**134**
	blades-tools	**blades-CMP**	**blades-debitage**	**Blades Total**
flat	3	2	8	13 / 21.7%
incurvate medial	5	1	14	20 / 33.3%
incurvate distal	1	1	6	8 / 13.3%
convex				
twisted	1	3	15	19 / 31.7%
unidentifiable	4	5	6	15
N	**14**	**12**	**49**	**75**
	bladelets-tools	**bladelets-CMP**	**bladelets-debitage**	**Bladelets Total**
flat	2		10	12 / 15.2%
incurvate medial	3	1	22	26 / 32.9%
incurvate distal	1		4	5 / 6.3%
convex			1	1 / 1.3%
twisted	9		26	35 / 44.3%
unidentifiable	3	1	4	8
N	**18**	**2**	**67**	**87**
	microblades-tools	**microblades-CMP**	**microblades-debitage**	**Microblades Total**
flat	4		8	12 / 24%
incurvate medial	8		11	19 / 38%
incurvate distal	3			3 / 6%
convex				
twisted	10		6	16 / 32%
unidentifiable			2	2
N	**25**		**27**	**52**

Table 5 - Siuren-I. Unit H. Flake, Blade, Bladelet and Microblade General Profiles as Percentages of Each Type.

and parallel (11.1%) types. Two other types (converging and ovoid) occur in small numbers less than 10% each – 8.1% and 6.1%, respectively. Such distribution of shape types is similar to the subdivision of dorsal scar pattern types in terms of their proportional representation.

Flakes with "off-axis" removal direction (52.7%) are slightly more common than flakes with "on-axis" removal direction (47.3%). This corresponds well to the predominance of expanding and irregular shapes (together 74.7%), for which the "off-axis" removal direction is very characteristic.

General profiles of flakes, profiles at distal end and midpoint

Data for such analyses were obtained from 122 definable flakes and separately from 79 complete flakes for general profiles, from 103 definable flakes for profiles at the distal end and from 117 definable flakes for profiles at midpoint.

The unique feature of the general profiles of flakes is that none of the five types is represented at less than 10%. Although incurvate medial (35.2%) are dominant followed by flat type (24.6%), incurvate distal (17.2%), twisted (12.3%) and convex (10.7%) are also in relatively good numbers for the larger sample of 122 flakes. These data are also in good agreement with the general profiles of 79 complete flakes – incurvate medial (38%), flat (21.5%), incurvate distal (15.2%), convex (13.9%) and twisted (11.4%).

Half of the definable flakes have a feathering distal end (50.5%). The second most common type is hinged (28.2%). The blunt type occurs in a moderate percentage (15.5%). Overpassed distal ends are quite rare (5.8%). It is worth noting here that a significant number of hinged distal ends which, additionally in conjunction with overpassed distal ends, make up one third (34%) of all flakes.

The striking feature of profiles at midpoint is that none of the 7 types is particularly dominant. Moreover, 3 types (triangular, irregular and trapezoidal) are practically identical in percentage – 24.8%, 22.2% and 21.4%, respectively. Two more types (lateral steep and multifaceted) are less common – 13.7% and 9.4%, respectively, but are still not rare. The only rare types are crescent and flat profiles – 5.1% and 3.4%, respectively.

The data below on four morphological attributes of flake butts (types, lipping, angle, abrasion) are based on the same sample of 90 pieces which is composed of the 79 complete flakes and 11 proximal fragments.

Butt types. The most common group of types among the 90 identifiable butts is "plain-punctiform-linear" – 46.7%, with corresponding internal representation - 24.5% - 10% - 12.2%. The next common type is crushed – 22.2%, followed by faceted – 14.4%, with a slight prevalence of finely-faceted (8.9%) over crudely-faceted butts (5.5%). The dihedral type follows with 10%. Cortical butts are the least common – 6.7%, but their presence is nevertheless notable.

	flakes-tools	**flakes-CMP**	**flakes-debitage**	**Flakes Total**
feathering	2	1	52	55 / 51.4%
hinged			29	29 / 27.1%
overpassed			6	6 / 5.6%
blunt	1		16	17 / 15.9%
unidentifiable	2	4	21	27
N	**5**	**5**	**124**	**134**
	blades-tools	**blades-CMP**	**blades-debitage**	**Blades Total**
feathering	4	3	17	24 / 57.1%
hinged	2	2	5	9 / 21.4%
overpassed			3	3 / 7.2%
blunt		2	4	6 / 14.3%
unidentifiable	8	5	20	33
N	**14**	**12**	**49**	**75**
	bladelets-tools	**bladelets-CMP**	**bladelets-debitage**	**Bladelets Total**
feathering	5	1	26	32 / 82.1%
hinged			2	2 / 5.1%
overpassed			2	2 / 5.1%
blunt			3	3 / 7.7%
unidentifiable	13	1	34	48
N	**18**	**2**	**67**	**48**
	microblades-tools	**microblades-CMP**	**microblades-debitage**	**Microblades Total**
feathering	10		9	19 / 90.4%
hinged	1			1 / 4.8%
overpassed	1			1 / 4.8%
blunt				
unidentifiable	13		18	31
N	**25**		**27**	**52**

Table 6 - Siuren-I, Unit H, Flake, Blade, Bladelet and Microblade Profiles at Distal End as Percentages of Each Type.

	flakes-tools	flakes-CMP	flakes-debitage	Flakes Total
flat			4	4 / 3.2%
triangular	1		29	30 / 24.4%
trapezoidal	2		25	27 / 22.0%
multifaceted			11	11 / 8.9%
lateral steep		2	16	18 / 14.6%
crescent			6	6 / 4.9%
irregular	1		26	27 / 22.0%
unidentifiable	1	3	7	11
N	**5**	**5**	**124**	**134**
	blades-tools	**blades-CMP**	**blades-debitage**	**Blades Total**
flat				
triangular	3	5	12	20 / 27.8%
trapezoidal	7		19	26 / 36.1%
multifaceted	1		13	14 / 19.4%
lateral steep	1	5	3	9 / 12.5%
crescent				
irregular	1		2	3 / 4.2%
unidentifiable	1	2		3
N	**14**	**12**	**49**	**75**
	bladelets-tools	**bladelets-CMP**	**bladelets-debitage**	**Bladelets Total**
flat				
triangular	4		26	30 / 34.9%
trapezoidal	13		34	47 / 54.6%
multifaceted	1		5	6 / 7.0%
lateral steep		1	2	3 / 3.5%
crescent				
irregular				
unidentifiable		1		1
N	**18**	**2**	**67**	**87**
	microblades-tools	**microblades-CMP**	**microblades-debitage**	**Microblades Total**
flat				
triangular	11		20	31 / 59.6%
trapezoidal	13		5	18 / 34.6%
multifaceted	1		2	3 / 5.8%
lateral steep				
crescent				
irregular				
unidentifiable				
N	**25**		**27**	**52**

Table 7 - Siuren-I. Unit H. Flake, Blade, Bladelet and Microblade Profiles at Midpoint as Percentages of Each Type.

Lipping, butt angle and butt abrasion

There are 69 butts suitable for lipping identification. There is a great predominance of semi-lipped butts – 72.5%. Therefore, the most important is the ratio between lipped (18.8%) and unlipped (8.7%) butts: 1 unlipped butt: 2.2 lipped butts.

68 butts are suitable for angle identification. The most common is semi-acute – 41.2%. Right angle (33.8%) is only slightly more common than acute (25%) and their ratio is 1 right angle: 0.7 acute angle.

There are 69 identifiable butts for identification of presence/absence of abrasion. Only 47.8% butts have traces of abrasion, while 52.2% lack abrasion. Thus, the ratio for present/absent abrasion is 1: 1.1.

Metrics (length, width, thickness) of flakes. Detailed metric data are mainly based on the analysis of 79 complete flakes, with some additional comparable information obtained from broken flakes.

Length. The common group of complete flakes in terms of length is in the range 1.6-2.5 cm – 59.4%. As a whole, flakes with length in the range 0.5-3.0 cm make up 86% of all complete flakes. The remaining 14% of flakes have a length of more than 3 cm with one unique feature – only 2 flakes (2.6%) pass the 4.5 cm threshold (6.3 and 9.0 cm). Thus, flakes are certainly not long. Moreover, average length is only 2.3 cm, falling into the most common metric range of 1.6-2.5 cm.

Analysis of all broken 45 flakes is consistent with the data on complete flakes. Most broken flakes (89%) are not longer than 3.0 cm and only 2 flakes (4.4%) of the remaining 11% are longer the 4.5 cm threshold (both 5.1 cm).

Width. Data on flake width are very similar to length. The most common are complete flakes with width in the 1.6-2.5 cm range

	flakes-tools	flakes-CMP	flakes-debitage	Flakes Total
cortical			6	6 / 6.2%
plain			22	22 / 22.9%
punctiform		1	9	10 / 10.4%
linear			11	11 / 11.5%
dihedral			9	9 / 9.4%
crudly-faceted			5	5 / 5.2%
finely-faceted	2		8	10 / 10.4%
crushed	2	1	20	23 / 24.0%
missing	1	3	34	38
N	**5**	**5**	**124**	**134**
	blades-tools	**blades-CMP**	**blades-debitage**	**Blades Total**
cortical				
plain	1	4	14	19 / 38.8%
punctiform			7	7 / 14.3%
linear			5	5 / 10.2%
dihedral	4	1	5	10 / 20.4%
crudly-faceted				
finely-faceted			1	1 / 2.0%
crushed		2	5	7 / 14.3%
missing	9	5	12	26
N	**14**	**12**	**49**	**75**
	bladelets-tools	**bladelets-CMP**	**bladelets-debitage**	**Bladelets Total**
cortical				
plain	1		2	3 / 6%
punctiform	1		9	10 / 20%
linear	4		19	23 / 46%
dihedral			4	4 / 8%
crudly-faceted				
finely-faceted				
crushed	2	1	7	10 / 20%
missing	10	1	26	37
N	**18**	**2**	**67**	**87**
	microblades-tools	**microblades-CMP**	**microblades-debitage**	**Microblades Total**
cortical				
plain			1	1 / 5%
punctiform	2		6	8 / 40%
linear	6		3	9 / 45%
dihedral			1	1 / 5%
crudly-faceted				
finely-faceted				
crushed			1	1 / 5%
missing	17		15	32
N	**25**		**27**	**52**

Table 8 - Siuren-I. Unit H. Flake, Blade, Bladelet and Microblade Butt Types as Percentages of Each Type.

– 53.2%. Flakes with width between 0.5-3.0 cm again exceed 80% – 83.5% to be precise. There are only 3 flakes (3.8%) with width larger the 4.5 cm threshold (4.6, 4.7 and 6.8 cm). The average width of flakes is again 2.3 cm.

Analysis of 38 broken flakes (without longitudinally fragmented pieces) shows the same situation. Most broken flakes (92.1%) have width in the 0.5-3.0 cm range and no other flake is wider than 4.1 cm.

Having such metrics on length and width of flakes, let us take a closer look at them right now. It appears that the average length and width are identical (2.3 cm), making "an ideal complete flake" with shortened, transversal proportions (L<=W). Moreover, accounts on actual (not ideal) complete flakes show that there are indeed in reality 51.9% flakes with shortened, transversal proportions (L<=W). Such very minor prevalence of shortened flakes (51.9%) over flakes which are longer than they are wide (48.1%) appears because of some slight numerical differences for length and width in several metric intervals, as well as the general rarity of elongated flakes with L >1.5W (n=12 /15.2%).

Thickness. The average thickness of all 79 complete and 45 broken flakes is 0.4 cm. In terms of metric intervals, the most com-

	flakes-tools	flakes-CMP	flakes-debitage	Flakes Total
lipped			13	13 / 18.1%
semi-lipped	2	1	50	53 / 73.6%
not lipped			6	6 / 8.3%
unidentifiable	3	4	55	62
N	**5**	**5**	**124**	**134**
	blades-tools	**blades-CMP**	**blades-debitage**	**Blades Total**
lipped			5	5 / 12.2%
semi-lipped	4	5	27	36 / 87.8%
not lipped				
unidentifiable	10	7	17	34
N	**14**	**12**	**49**	**75**
	bladelets-tools	**bladelets-CMP**	**bladelets-debitage**	**Bladelets Total**
lipped	7		6	13 / 25.5%
semi-lipped			28	28 / 54.9%
not lipped			10	10 / 19.6%
unidentifiable	11	2	23	36
N	**18**	**2**	**67**	**87**
	microblades-tools	**microblades-CMP**	**microblades-debitage**	**Microblades Total**
lipped	8		3	11 / 55%
semi-lipped			9	9 / 45%
not lipped				
unidentifiable	17		15	32
N	**25**		**27**	**52**

Table 9 - Siuren-I. Unit H. Flake, Blade, Bladelet and Microblade Butt Lipping as Percentages of Each Type.

mon are flakes with thickness in the 0.1-0.5 cm range – 77.2% for complete and 77.8% for broken flakes. Flakes with thickness in the 0.6-1.0 cm range are more than three times lower – 19% for complete and 17.8% for broken flakes. There are only a few rather thick flakes with thickness in the 1.1-1.5 cm range – 3.8% for complete and 2.2% for broken flakes. There are no flakes with thickness more than 1.5 cm, although even the rarity of flakes with thickness between 1.1 and 1.5 cm is notable. Thus, flakes are generally thin.

Butt size. Two more metric attributes (butt width and height) were recorded for all 79 complete flakes and 11 proximal frag-

	flakes-tools	flakes-CMP	flakes-debitage	Flakes Total
right	1		23	24 / 33.8%
semi-acute	1	1	28	30 / 42.3%
acute			17	17 / 23.9%
unidentifiable	3	4	56	63
N	**5**	**5**	**124**	**134**
	blades-tools	**blades-CMP**	**blades-debitage**	**Blades Total**
right			6	6 / 14.6%
semi-acute	4	4	21	29 / 70.8%
acute	1		5	6 / 14.6%
unidentifiable	9	8	17	34
N	**14**	**12**	**49**	**75**
	bladelets-tools	**bladelets-CMP**	**bladelets-debitage**	**Bladelets Total**
right	7		2	9 / 22.0%
semi-acute			24	24 / 58.5%
acute			8	8 / 19.5%
unidentifiable	11	2	33	46
N	**18**	**2**	**67**	**87**
	microblades-tools	**microblades-CMP**	**microblades-debitage**	**Microblades Total**
right				
semi-acute	8		11	19 / 100%
acute				
unidentifiable	17		16	33
N	**25**		**27**	**52**

Table 10 - Siuren-I. Unit H. Flake, Blade, Bladelet and Microblade Butt Angles as Percentages of Each Type.

ments. To calculate average indices, all 20 crushed butts (not measured as they are damaged) and all 9 punctiform (all have size 0.1 x 0.1 cm) were excluded from this sample of 90 butts. Thus, average butt width is 1.1 cm and average butt height 0.4 cm. Twenty two plain butts have an average width of 0.9 cm and average height of 0.3 cm, showing their even smaller size in comparison with all flake butts, which are themselves not very big.

Thus, the flakes of Unit H can be generally characterized by:
- a dominance of unidirectional scar pattern (55.6%), a moderate number of unidirectional-crossed scar pattern (17.6%) and rare representation of 6 other types (< 10% each);
- a prevalence of non-cortical pieces (63.7%), while wholly cortical and partially cortical specimens together make up a little more than one third of all flakes and distal cortex location is the most characteristic for partially cortical pieces, as well as almost 40% with a significant amount of cortex;
- a dominance of expanding and irregular shaped pieces (74.7% together) in association with mainly "off-axis" removal directions (52.7%);
- a wide range of general profiles of flakes with the most common incurvate medial type represented by no more than one third of all flakes, while twisted type accounts only 12.3%;
- a dominance of feathering distal ends (50.5%) with about one third representation of hinged and overpassed ("not regular") types together (34%);
- a wide range of profiles at midpoint types with about equal representation of triangular, trapezoidal and irregular types (together 68.39%), while trapezoidal and multifaceted types, so characteristic for intensive parallel reduction processes, together make up only 30.8%;
- a dominance of "plain-punctiform-linear" group of butt types, although together they do not exceed half of all butts (46.7%), and a notable presence of all other butt types, including crudely- and finely-faceted and cortical ones;
- a predominance of semi-lipped butts with semi-acute angle, with poor representation of lipped butts with acute angle and a moderate quantity of unlipped butts with generally right angle;
- a slight dominance of flakes with no butt abrasion (52.2%) over flakes with butt abrasion (47.8%);
- a dominance of pieces with shortened, transversal metric proportions (average flake length and width of 2.3 cm) and an average thickness of 0.4 cm.

Regarding raw material types, all 124 flakes are as follows: gray flints (n=103/83.1%), colored flints (n=19/15.3%,) limestone (n=2/1.6%).

Blades

All blades (n=49) have been subdivided into complete (n=26/53.1%) and broken (n=23/46.9%), with subsequent subdivision of the latter into proximal (n=11/22.4%), medial (n=7/14.3%) and distal (n=5/10.2%).

Dorsal scar pattern. Four scar patterns types have been identified for all 49 blades. Most blades have a unidirectional scar pattern – 87.8%, while unidirectional-crossed (4.1%) and bidirectional (6.1%) are each represented by a few pieces and a single cortical blade is also present (2%).

Comparison of scar pattern types with presence/absence of cortex on respective blades revealed an important regularity. Both unidirectional-crossed blades have some cortex on their dorsal surfaces, while only 1 of 3 bidirectional blades has cortex. There are 14 (32.5%) partially cortical pieces among 43 unidirectional blades.

Surface cortex area and location. All 49 blades were used for surface cortex area identification. Non-cortical blades are dominant – 63.3%. Partially cortical blades are represented by somewhat more than half as many – 34.7%, while there is only a single cortical blade (2%). Additional cortex area data on the smaller

	flakes-tools	flakes-CMP	flakes-debitage	Flakes Total
present	1	1	33	35 / 47.3%
absent		3	36	39 / 52.7%
unidentifiable	4	1	55	60
N	**5**	**5**	**124**	**134**
	blades-tools	**blades-CMP**	**blades-debitage**	**Blades Total**
present	5	2	28	35 / 89.7%
absent		3	1	4 / 10.3%
unidentifiable	9	7	20	36
N	**14**	**12**	**49**	**75**
	bladelets-tools	**bladelets-CMP**	**bladelets-debitage**	**Bladelets Total**
present	8		30	38 /82.6%
absent			8	8 / 17.4%
unidentifiable	10	2	29	41
N	**18**	**2**	**67**	**87**
	microblades-tools	**microblades-CMP**	**microblades-debitage**	**Microblades Total**
present	8		7	15 / 93.7%
absent			1	1 / 6.3%
unidentifiable	17		19	36
N	**25**		**27**	**52**

Table 11 - Siuren-I. Unit H. Flake, Blade, Bladelet and Microblade Butt Abrasion as Percentages of Each Type.

sample of 26 complete blades are slightly different and help to make some specifications for the data on all blades. So, there are 57.7% non-cortical blades and 42.3% partially cortical blades, none with a wholly cortical dorsal surface. This sample also allows us to make an internal subdivision of partially cortical blades into pieces with significant amount of cortex - 18.2% and pieces with an insignificant amount of cortex - 81.8%. Thus, we should assume on the basis of these additional data that there was not actually a single wholly cortical specimen among blades, as the only piece identified as such is a proximal fragment which may have been only partially cortical if complete; while partially cortical pieces compose an important portion among blades with, however, only a fifth of them having a significant amount of cortex.

Only 11 complete partially cortical blades were used to record surface cortex location. More than half of these blades have lateral cortex – 54.5%, while distal cortex is present on 36.4%. There is one blade with distal + lateral cortex – 9.1%. Lateral cortex location is the most characteristic for blades.

Shape and axis. 31 blades with definable shapes and 32 blades with definable axis of removal direction were used to record shape and axis traits.

The striking feature is that the most common shape is irregular (35.5%). Parallel, converging and expanding shape are all of similar moderate percentages – 19.3%, 22.6%, 22.6%, respectively. Ovoid shape is absent.

"Off-axis" blades (78.1%) are more than three times more common than "on-axis" blades (21.9%). This is consistent with the predominance of irregular and expanding shapes (together 58.1%), for which an "off-axis" removal direction is very characteristic.

General profiles of blades, profiles at distal end and midpoint. Data for such analyses are based on 43 definable blades and separately on 26 complete blades for general profiles, 29 definable blades for profiles at distal end and all 49 blades for profiles at midpoint.

In terms of general profiles for the bigger sample of 43 blades, there is nearly equal predominant representation of twisted (34.9%) and incurvate medial (32.6%) types, followed by the much less common flat (18.6%) and incurvate distal (13.9%) types. For only 26 complete blades, on the other hand, there is a slightly higher dominance of twisted type (42.2%), similar representation of incurvate medial (34.7%) and incurvate distal (15.4%) types compared to the larger sample and a rarity of flat type (7.7%). There are thus some differences in representation of twisted and flat types. We are inclined to trust the more restricted data only the 26 complete blades for the following reasons. The flat type for 43 blades is represented by 2 complete and 6 broken pieces where the latter, if they are complete, could be of any type – not necessarily flat. On the other hand, the twisted type for 43 blades is represented by 11 complete and only 4 broken pieces, as for showing possible twisting a blade needs some length which is often absent for broken specimens. In this case, it would be better to accept that blades quite often have twisted profile, although this type does not prevail over "regular" (flat, incurvate medial and incurvate distal) types, and the flat type is rather rare. Blades with incurvate medial and incurvate distal profiles occur in significant and moderate percentages. Convex type is absent.

More than half of all definable blades have a feathering distal end – 58.7%. The other three types are less common and similar in percentage: hinged - 17.2%, blunt - 13.8%, overpassed - 10.3%. So, hinged and overpassed distal ends together compose about one quarter of identifiable pieces (27.5%).

There is a dominance of trapezoidal type (38.8%) for profiles at midpoint identification. The next two types are well represented by about the same percentage: multifaceted - 26.5% and triangular - 24.5%. Altogether these three types comprise almost 90% of all blade profiles at midpoint. The other two types are uncommon: irregular - 4.1% and lateral steep - 6.1%, while flat and crescent types are absent.

All data below on four morphological attributes on blade butt characteristics (types, lipping, angle, abrasion) are based on the sample of 37 pieces which is composed of all 26 complete blades and 11 proximal fragments.

Butt types. The most common group of types is "plain-punctiform-linear"– 70.3%, with corresponding internal representation - 37.9% - 18.9% - 13.5%. Two other types present are crushed and dihedral – 13.5% each. Faceted butts are represented by a single finely-faceted butt (2.7%), while cortical butts are completely absent.

Lipping, butt angle and butt abrasion

There are 32 butts suitable for lipping identification. There is a great dominance of semi-lipped type (84.4%) and a much smaller percentage of lipped type (15.6%), while no unlipped butt was identified. There are 32 butts suitable for angle identification. The most common is semi-acute (65.6%). Right angle (18.8%) and acute angle (15.6%) are represented by similar quantities and their exact ratio is as follows: 1 right angle: 0.8 acute angle. There are 29 identifiable butts for presence/absence of abrasion identification. 28 butts have abrasion (96.6%) with only one butt with no traces of abrasion (3.4%).

Metrics (length, width, thickness) of blades. Detailed metric data are based only on the analysis of 26 complete blades with some comparable information from 23 broken blades.

Length. There are 2 clusters of 26 complete blades in terms of their length intervals: one at 2.6-5.5 cm (n=24/92.4%) and the second at 7.1-8.0 cm (n=2 (7.2 and 7.6 cm)/7.6%) with "a metric gap" at 5.6-7.0 cm with no blades. The most typical blade length is in the 3.6-5.0 cm range (65.5% of all complete blades). This conclusion is also supported by an average length of complete blades of 4.4 cm.

Data on all 23 broken blades cannot serve as a serious source of information for blade length analysis. Nevertheless, these data are provided: 2.1-3.0 cm – 60.9%, 3.1-4.0 cm – 30.4%, 4.1-5.0 cm – 8.7% with the longest example at 4.3 cm.

Width. The following width distribution of 26 complete blades is observed: 1.2-1.5 cm – 46.1%, 1.6-2.0 cm – 38.5% and 2.1-2.5 cm – 15.4%. This is supplemented with data on 23 broken blades: 1.2-1.5 cm – 65.2% and 1.6-2.0 cm – 34.8%. As a whole, these data show that really wide blades are totally absent – there are no blades with width more than 2.5 cm and a dominance of blades with width close to abrupt "threshold" of 1.2 cm between blades and bladelets – 55.1% of all 49 blades are in width interval of 1.2-1.5 cm. The average width for all blades is 1.6 cm which could actually be even lower (1.5 cm) if we exclude rare blades with width 2.0-2.5 cm.

Thickness. The average thickness of both 26 complete and 23 broken blades is 0.4 cm. In terms of metric intervals, the most common are blades with thickness in the 0.1-0.5 cm range – 57.7% for complete and 87% for broken blades. All other blades have a thickness in the 0.6-1.0 cm range. Thus, blade thickness shows their overall thinness where no blade is thicker than 1.0 cm.

Butt size. Two more metric attributes (butt width and height) were recorded for all 26 complete blades and 11 proximal fragments. To calculate average indices, all 5 crushed butts and all 7 punctiform were excluded from this sample of 37 butts. Thus, average butt width is 0.5 cm and average butt height 0.2 cm for the sample of 25 blades. Plain butts (n=14) have an average butt width of 0.4 cm and average butt height of 0.2 cm, showing their general similarity in sizes to other blade butt types.

Thus, the blades of Unit H can be generally characterized by:
- a dominance of unidirectional scar pattern (87.8%) and rare representation of only three other scar pattern types;
- a prevalence of non-cortical pieces (63.3%) over partially cortical pieces with no real representation of wholly cortical items, as well as the dominance of lateral cortex location for partially cortical pieces with less than 20% having a significant amount of cortex;
- a dominance of irregular (35.5%) and a moderate representation of expanding, converging and parallel shaped pieces in association with mainly "off-axis" removal directions (78.1%);
- a near equal representation of twisted and "regular" (flat, incurvate medial and incurvate distal) general profiles types;
- a dominance of feathering distal ends (58.7%) with about one quarter representation of hinged and overpassed types together (27.5%);
- a wide range of profiles at midpoint with dominance of trapezoidal and multifaceted types (65.3% together) which with the addition of triangular type account for 89.8%;
- a dominance of "plain-punctiform-linear" group of butt types (together 70.3%) with absence of cortical butts and a single representation of a faceted butt;
- a great predominance of semi-lipped butts (84.4%) with mainly semi-acute (65.6%) and some right (18.8%) angles, a low number of lipped butts (15.6%) with acute angle (15.6%), and absence of unlipped butts;
- a characteristic presence of abrasion for blade butts (96.6%);
- an average length of 4.4 cm, average width of 1.6 cm and average thickness of 0.4 cm.

By raw material types, the 49 blades are made on gray flint (n=36/73.5%) and colored flint (n=13/26.5%).

Bladelets

All 67 bladelets have been subdivided into complete (n=19/28.4%) and broken (n=48/71.6%), with subsequent subdivision of the latter into proximal (n=22/32.8%), medial (n=14/20.9%) and distal (n=12/17.9%).

Dorsal scar pattern. Only three scar pattern types were identified for all 67 bladelets. The most common is unidirectional – 88%, while two other types occur in small numbers: unidirectional-crossed – 7.5% (n=5) and bidirectional – 4.5% (n=3).

Comparison of scar pattern types with presence/absence of cortex on respective bladelets has shown a unique feature. All unidirectional-crossed and bidirectional bladelets lack cortex, while 16.9% of unidirectional bladelets are partially cortical. These data may point to the possibility that non-unidirectional bladelets reflect multiple reduction of bladelet cores, whereas some unidirectional bladelets with cortex may be evidence of systematic bladelet core reduction from the start of their flaking.

Surface cortex area and location. All 67 bladelets were used to record surface cortex area. Non-cortical bladelets comprise more than 4/5 of all bladelets (85.1%). Other bladelets are partially cortical (14.9%) and none (even a fragmented piece) is wholly covered by cortex. The same proportions are observed in the sample of 19 complete bladelets: non-cortical – 89.4% and partially cortical – 10.6%. There are 6 bladelets (60%) with significant amount of cortex and 4 bladelets (40%) with an insignificant amount of cortex among all 67 bladelets.

Comparative analysis of cortex area location is not possible as there are only 2 partially cortical pieces among 19 complete bladelets. One has distal cortex and the other distal + lateral cortex.

Shape and axis. 31 bladelets with definable shapes and 60 bladelets with definable axis of removal directions were used for the present analysis.

The most numerous is a converging shape (51.6%). It is followed by parallel shape (32.3%), while irregular (12.9%) are much less numerous. The expanding shape is represented by only a single piece (3.2%) and ovoid type is not noted at all.

"On-axis" bladelets (90%) are much more dominant than "off-axis" bladelets (10%). Comparison of shape geometry and axis of removal direction shows an association between converging and parallel shapes (together 83.9%) with the predominance of the "on-axis" removal direction (90%).

General profiles of bladelets, profiles at distal end and midpoint. Data for these analyses were recorded for 63 definable bladelets and separately for 19 complete bladelets for general profiles, 33 definable bladelets for profiles at distal end and for all 67 bladelets for profiles at midpoint.

For general profiles for the bigger sample of 63 bladelets, there is a slight dominance of twisted type (41.3%) which is followed

by the incurvate medial type (34.9%). The flat type is moderately represented (15.9%), while incurvate distal (6.3%) and convex (1.6%) types are rare. The dominance of twisted and incurvate medial types and the possibly accidental presence of other general profile types become even more evident when we examine the 19 complete bladelets: twisted - 47.4%, incurvate medial - 42%, flat and incurvate distal - 5.3% each. The latter two types are represented by only a single piece each, while the convex type is absent.

The most dominant type for profiles at distal end is feathering – 78.7%. Other types (hinged and overpassed - 6.1% each, blunt - 9.1%) are represented by only a few pieces each, while a combination of hinged and overpassed types is only 12.2%.

There are two common types for profiles at midpoint: trapezoidal (50.7%) and triangular (40.3%). Two more types (multifaceted - 6% and lateral steep - 3%) are present but rare, although trapezoidal and multifaceted types together could be considered the dominant group (56.7%). Flat and crescent types are absent.

Data on four morphological attributes on bladelet butt characteristic (types, lipping, angle, abrasion) were recorded on a sample of 41 pieces – 19 complete bladelets and 22 proximal fragments.

Butt types. The most common group of types is "plain-punctiform-linear" – 73.1%. Internal representation of this butt type group shows for the first time a subordinate position of plain butts (4.9%), a moderate number of punctiform (21.9%) and dominance of linear (46.3%). The two other types present are crushed (17.1%) and dihedral (9.8%) ones. Cortical and faceted butts are absent.

Lipping, butt angle and butt abrasion

There are 34 butts suitable for lipping identification. These show the great dominance of semi-lipped type (82.4%) and a much lower presence of lipped butts (17.6%). All bladelets have some form of lipping.

For angle identification of the same sample, the most common is semi-acute (70.6%). Right angle (5.9%) is much less common in comparison to acute angle (23.5%): 1 right angle per 4 acute angles.

There are 38 butts for presence/absence of abrasion identification. Of these, 79% have butt abrasion and 21% do not.

Metrics (length, width, thickness) of bladelets. These analyses are mainly based on the sample of 19 complete bladelets with some additional data from 48 broken bladelets.

Length. Complete bladelets (n=19) were subdivided into two groups according to length: up to 3 cm (n=13/68.5%) and greater than 3 cm (n=6/31.5%). So, "short" bladelets are twice as common as "long" bladelets, a ratio of 2.2: 1. The shortest bladelet is 1.6 cm long and the longest 4.5 cm long. The average length of all complete bladelets is 2.7 cm. There are only 2 pieces (4.2%) with length more than 3 cm among all broken 48 bladelets, although the presence of 16 fragmented bladelets (33.3%) in the length interval of 2.1-3.0 cm is notable. Thus, data on broken specimens seem to be in accordance with the data on complete bladelets, although possible fragmentation of initially relatively long bladelets should be kept in mind.

Width. The following width subdivision of complete 19 bladelets is obtained: 0.7-0.9 cm (n=10/52.6%) and 1.0-1.1 cm (n=9/47.4%). Data on 48 broken bladelets show a similar pattern: 0.7-0.9 cm (n=28/58.3%) and 1.0-1.1 cm (n=20/41.7%). These width data show approximately equal representation of "narrower" and "wider" bladelets. Some quantitative differences are easily explained by differences in measurement: an interval of 3 mm for the first group (0.7-0.9 cm) and 2 mm for the second group (1.0-1.1 cm). The approximate balance of these two groups of bladelets is confirmed by an average width for all 67 bladelets of 0.9 cm, an intermediate index that is exactly the same for both complete and broken pieces.

Thickness. All 67 bladelets have thickness no more than 0.4 cm. Average thickness is 0.2 cm for all bladelet categories: complete, broken and all items together. So, bladelets are quite thin.

Butt sizes. Butt width and height data were obtained on the sample of 19 complete bladelets and 22 proximal fragments with the exclusion of 7 crushed and 9 punctiform butts. Average butt width is 0.3 cm and average butt height 0.1 cm for the sample of 25 bladelets. All but one (0.6 cm) butt width fall within the interval of 0.1-0.5 cm, and all but one (0.9 cm) butt height are within the interval of 0.1-0.2 cm. Plain butts are represented by only two pieces with butt widths of 0.4 and 0.5 cm, and butt heights of 0.2 cm. These data show the small sizes of bladelet butts.

In sum, the bladelets from Unit H can be generally characterized by:
- a dominance of unidirectional scar pattern (88%) and a rare representation of only two other scar pattern types; a low number (14.9%) of partially cortical pieces and absence of wholly cortical items;
- a dominance of converging and parallel shaped pieces (83.9% together) in association with "on-axis" removal direction (90%);
- a near equal representation of twisted and "regular" (flat, incurvate medial and incurvate distal) types of profiles;
- prevalence of feathering distal ends (78.7%) with less than 1/8 representation of hinged and overpassed types together (12.2%);
- a dominance of trapezoidal and multifaceted types of profiles at midpoint (56.7% together) which including the triangular type make up 97%;
- a dominance of the "plain-punctiform-linear" group of butt types (73.1% together) with the most significant among them being linear (46.3%), as well as a notable absence of cortical and faceted butts;
- a great predominance of semi-lipped butts (82.4%) with mainly semi-acute (70.6%), right (5.9%) and some acute angles, a low number of lipped butts (17.6%) with acute angle (23.5%) and absence of unlipped butts;

- a dominance of butts with abrasion, although about 20% lack traces of abrasion;
- an average length of 2.7 cm, an average width of 0.9 cm and an average thickness of 0.2 cm.

Identification of raw material types for all 67 microblades reveals 58 pieces on gray flints (86.6%), 7 pieces on colored flints (10.4%) and 2 pieces on black flints (3%).

Microblades

All 27 microblades have been subdivided into complete (n=3 /11.1%) and broken (n=24/88.9%), with subsequent subdivision of the latter into proximal (n=9/33.3%), medial (n=9 /33.3%) and distal (n=6/22.3%).

Dorsal scar pattern. Aside from a bidirectional complete microblade (3.7%), the other 26 microblades (96.3%) have a unidirectional scar pattern. None have dorsal cortex.

Shape and axis. There are only 9 microblades for such analysis.

The predominant shape is converging (n=6/66.6%). Parallel (n=2/22.2%) and irregular (n=1/11.1%) are quite rare. Expanding and ovoid shapes are absent.

"Off-axis" microblades (n=8/88.8%) are predominant over a single "on-axis" microblade (11.1%).

General profiles of microblades, profiles at distal end and midpoint. Data for these analyses are based on 25 definable microblades and separately on 3 complete microblades for general profiles, 9 definable microblades for profiles at distal end and on all 27 microblades for profiles at midpoint.

Only three general profile types (incurvate medial - 44%, flat - 32% and twisted - 24%) were identified for the 25 microblades. Such a distribution, however, may be unreliable since only three complete pieces are present: two twisted and one incurvate medial profile. Therefore, it is probably reasonable to consider at least some flat profiles of broken microblades may have been unidentifiable, and to regard incurvate medial and twisted profiles as the two main types. A similar situation has already been observed for the general profiles of bladelets.

All 9 definable microblades have feathering distal ends.

The most common type among profiles at midpoint is triangular (74.1%). The rest are trapezoidal (18.5%) and multifaceted (7.4%). No other profile at midpoint type was identified.

Data on four morphological attributes for microblade butt characteristics (types, lipping, angle, abrasion) were recorded for a sample of 12 pieces – 3 complete artifacts and 9 proximal fragments.

Butt types. The most common group of types is "plain-punctiform-linear" – 83.3%, with corresponding internal representation: n=1/8.3%; n=6/50%; n=3/25%. As seen, the punctiform type is dominant. Other types (dihedral and crushed) are represented by a single piece each – 8.3%. No cortical or faceted butts are present.

Lipping, butt angle and butt abrasion

There are 9 semi-lipped (75%) and 3 lipped (25%) butts.

Semi-acute angle is the characteristic for 11 microblade butts.

There are 7 butts with abrasion (87.5%) and only 1 butt with no abrasion (12.5%) in the sample of 8 identifiable microblade butts.

Metrics (length, width, thickness) of microblades

Length. All 3 complete microblades have length in metric interval 1.5 - 2.0 cm (1.7 cm in average). No one from 24 broken microblades is longer 3 cm, while broken microblades with length more than 1.5 cm compose 20.8% (5 pieces) where a longest piece is 2.6 cm.

Width. All 27 microblades have the following distribution in terms of their width: 0.6 cm (n=18/66.7%), 0.5 cm (n=5/18.5%) and 0.4 cm (n=4/14.8%). There is one item with a width of 0.4 cm and two 0.6 cm wide among the three microblades. Thus, the majority of microblades are similar to bladelets in their width: 85.2% of them are in the interval of 0.5-0.6 cm, while the remaining 14.8% are have a width of 0.4 cm; none has a width less than 0.4 cm. Average width of all microblades is 0.6 cm.

Thickness. There is only a single microblade with a thickness of 0.3 cm (3.7%), while all of the other 26 microblades (including three complete ones) are in the interval of 0.1-0.2 cm. Average thickness is 0.1 cm. So, microblades are "featheringly" thin.

Butt sizes. Butt width and height average indices were calculated for only 5 microblades as 1 crushed and 6 punctiform butts were excluded. Microblades have an average butt width of 0.4 cm and butt height of 0.1 cm. A single plain butt has a width of 0.3 cm and a height of 0.2 cm, very close to the minimal size of plain butts (0.2 x 0.2 cm).

In sum, the microblades of Unit H can be generally characterized by:
- a near exclusive representation of the unidirectional scar pattern (96.3%);
- a dominance of converging and parallel shaped pieces (88.8% together) in association of "off-axis" removal direction (88.8%);
- a near equal dominance of twisted and incurvate medial general profile types and a moderate number of flat type with no other types represented;
- an exclusive presence of feathering distal ends;
- a dominance of triangular type of profiles at midpoint and presence of only trapezoidal and multifaceted types which together comprise only about 25%;
- a great dominance of "plain-punctiform-linear" group of butt types (83.3% together) with punctiform types most common (50%);

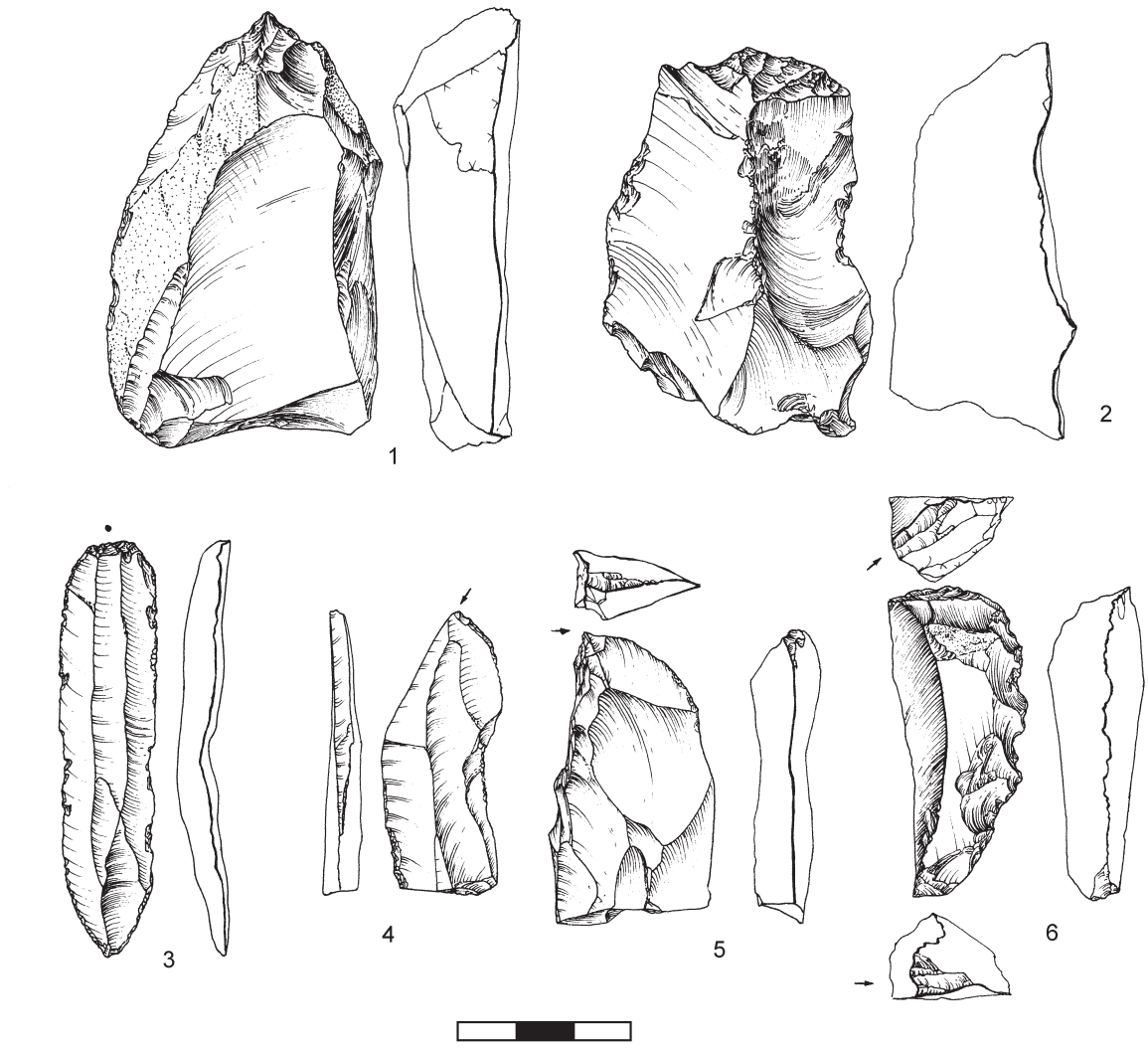

Figure 2 - Siuren I. Unit H. Flint Artifacts – Indicative Upper Paleolithic tool types. 1, thick nosed end-scraper; 2, thick shouldered end-scraper; 3, flat simple end-scraper; 4, burin on an oblique straight truncation; 5, transverse burin on a straight lateral preparation; 6, double transverse burin on natural surfaces.

- a presence of dominant semi-lipped and some lipped butts with only semi-acute angle;
- a characteristic presence of abrasion for microblade butts (87.5%);
- an average length of 1.7 cm, an average width of 0.6 cm and an average thickness of 0.1 cm.

Of the 27 microblades, 26 are on gray flints (96.3%) and a single piece on colored flint (3.7%).

Some summarizing data on the debitage

The attribute data for the Unit H debitage artifacts can be briefly summarized as follows (see also tabl. 2-11). The proportional representation of flakes (46.4%), blades (18.4%), bladelets (25.1%) and microblades (10.1%) is the first, but not last, indication of the general blade orientation of core reduction processes. The seeming large quantitative representation of flakes does not provide evidence that this category was the intention of primary flaking processes. This is seen, not only by their overall small size and cortex data, but also by the diversity of all of their attributes. However, diversity in size and morphology sharply decreases for blady artifacts from blades to microblades. The internal structure of blady pieces in the recalculated view is as follows: blades – 34.3%, bladelets – 46.8% and microblades – 18.9%. Also taking into consideration the strong similarities between bladelets and microblades and their likely production from the same objects, bladelets *sensu lato* were intentional products of significant core reduction, as blanks for retouched non-geometric microliths, which also correspond well with the core data, while blades had a rather subordinate role in blank production, serving as blanks for different Upper Paleolithic type tools. These conclusions are also supported by tool composition data.

Tools

There are 69 tools which have been subdivided into seven groups: 1) Indicative Upper Paleolithic types (n=9/13.05%); 2) Non-Geometric Microliths (n=43/62.31%); 3) "Neutral" types (n=3/4.35%); 4) Retouched Pieces (n=5/7.25%); 5) Unidentifiable Tool Fragments (n=4/5.8%); 6) Non-Flint Tools (n=2/2.9%); and 7) Middle Paleolithic types (n=3/4.35%) (tabl. 12).

Indicative Upper Paleolithic tool types

These include 3 end-scrapers, 3 burins, 1 truncation and 2 retouched blades.

End-scrapers

1 flat simple, 1 thick nosed and 1 thick shouldered.

The flat simple end-scraper (fig. 2:3) is on a complete blade with bilateral dorsal marginal discontinuous retouch. The end-scraper's front is straight, formed on the blade's dorsal surface proximal end by non-convergent scalar steep non-lamellar retouch. The blade is non-cortical with a bidirectional scar pattern, converging shape, "on-axis" removal direction, incurvate medial general profile, feathering distal end, trapezoidal profile at midpoint, the butt replaced by the end-scraper's front. It is on gray flint, 7.1 cm long, 1.7 cm wide, 0.5 cm thick.

The thick nosed end-scraper (fig. 2:1) is on a complete flake with lateral dorsal irregular partial retouch. The end-scraper's front is very narrow, formed on the flake's dorsal surface distal end by convergent sub-parallel lamellar (microblade scars) retouch. The flake is partially cortical and truly secondary crested (with no preserved crested ridge) with an insignificant amount of cortex on both laterals edges, with a bidirectional scar pattern, converging shape, "on-axis" removal direction, twisted general profile, blunt distal end, trapezoidal profile at midpoint, crushed butt. It is on colored flint, 7.2 cm long, 4.6 cm wide, and 1.6 cm thick.

The thick shouldered end-scraper (fig. 2:2) is on a large thick chunk. The end-scraper's front is convex with a one-sided notch, of a general shouldered shape to offset a core's platform morphology in plane, formed by convergent sub-parallel lamellar (microblade scars) retouch. The chunk is non-cortical on gray flint, 6.1 cm long, 4.6 cm wide, 2.7 cm thick.

Groups & Types	N	%
INDICATIVE UPPER PALEOLITHIC TOOL TYPES	**9**	**13,05**
END-SCRAPERS	*3*	*4,35%*
Simple flat on blade	1	1,45
Thick nosed	1	1,45
Thick shouldered	1	1,45
BURINS	*3*	*4,35*
On oblique straight truncation	1	1,45
Transverse on lateral preparation	1	1,45
Double Transverse on natural surfaces	1	1,45
TRUNCATIONS	*1*	*1,45*
RETOUCHED BLADES	*2*	*2,9*
NON-GEOMETRIC MICROLITHS	**43**	**62,31**
Dufour, *bladelets with alternate retouch*	15	21,73
Dufour, *microblades with alternate retouch*	16	23,18
Dufour, *microblades with ventral retouch*	3	4,35
Pseudo-Dufour, *microblades with dorsal retouch*	2	2,9
Pseudo-Dufour, *bladelets with bilateral dorsal retouch*	1	1,45
Pseudo-Dufour, *microblades with bilateral dorsal retouch*	2	2,9
Krems point, *bladelets with bilateral dorsal retouch*	1	1,45
Krems point, *microblades with bilateral dorsal retouch*	1	1,45
Krems point, *microblades with alternate retouch*	1	1,45
Bladelet *with dorsal retouch at proximal end*	1	1,45
"NEUTRAL" TOOL TYPES	**3**	**4,35**
NOTCHED PIECES	*3*	*4,35*
RETOUCHED PIECES (with marginal and/or irregular retouch)	**5**	**7,25**
BLADES WITH MARGINAL RETOUCH	*4*	*5,8*
FLAKES WITH IRREGULAR RETOUCH	*1*	*1,45*
UNIDENTIFIABLE TOOL FRAGMENTS	**4**	**5,8**
NON-FLINT TOOLS	**2**	**2,9**
CHOPPERS	*1*	*1,45*
RETOUCHERS	*1*	*1,45*
MIDDLE PALEOLITHIC TOOL TYPES	**3**	**4,35**
SCRAPERS	*3*	*4,35*
Simple wavy dorsal	1	1,45
Elongated semi-trapezoidal dorsal	1	1,45
Transversal wavy dorsal *with ventral basal thinning + bipolar dorsal thinnings of both lateral edges*	1	1,45
TOTAL	**69**	**100,01**

Table 12 - Siuren-I. Unit H. Tools Classification.

Burins

1 on truncation, 1 transverse and 1 double transverse.

The first burin (fig. 2:4) is on an oblique straight truncation with bilateral dorsal marginal continuous retouch, made on a broken blade. The burin's termination is on the distal end, with a single burin facet struck from the dorsal truncation formed by light scalar steep retouch. The blade is a non-cortical distal fragment with a unidirectional scar pattern, flat general profile, feathering distal end and trapezoidal profile at midpoint. It is on colored flint, 4.9 cm long, 1.8 cm wide, 0.5 cm thick.

The second burin (fig. 2:5) is transverse on a straight lateral preparation, formed on a broken blade. The burin's termination is on the distal end, has a single weakly developed burin facet struck from limited dorsal lateral preparation formed by scalar steep retouch. The blade is a non-cortical truly secondary crested (with no preserved crested ridge) distal fragment with a unidirectional scar pattern, incurvate distal general profile, hinged distal end, irregular profile at midpoint. It is on colored flint, 5.1 cm long, 2.8 cm wide, 1.1 cm thick.

The third burin (fig. 2:6) is double transverse on natural surfaces, made on a complete blade. Two opposing burin terminations are on the proximal and distal ends, have two burin facets each, struck from different unprepared loci on the same lateral edge. The blade is a partially cortical piece with an insignificant amount of central cortex. It appears to be either a large primary burin spall or a crested blade from a core with narrow-edged flaking surface, or, more likely, because of its general large size and well-developed lateral denticulate retouch, it is a burin-like spall blade from radical rejuvenation of a large denticulate tool. Most of the blank's morphological features are unidentifiable, aside from a twisted general profile. It is on gray flint, 5.1 cm long, 1.7 cm wide, 2.0 cm thick.

Truncation

There is a single truncation that is double alternate, made on a complete narrow blade. Two opposing truncations are on the proximal and distal ends. The distal truncation is straight and formed by marginal retouch on the dorsal surface. The proximal truncation, on the other hand, is concave and formed by scalar retouch on the ventral surface. The blade is non-cortical crested (with re-cresting characteristics) with a unidirectional scar pattern, parallel shape, "on-axis" removal direction, incurvate medial general profile, feathering distal end, lateral steep profile at midpoint, the butt removed by retouch. It is on colored flint, 3.0 cm long, 1.3 cm wide, 0.5 cm thick.

Retouched blades

There are two blades with lateral dorsal retouch, one complete and one broken.

The first has light scalar semi-steep partial retouch. The blade is complete and partially cortical with an insignificant amount of lateral cortex and has a unidirectional scar pattern, parallel shape, "on-axis" removal direction, incurvate medial general profile, unidentifiable distal end, trapezoidal profile at midpoint, small 0.3 x 0.1 cm linear butt (semi-lipped, semi-acute angle, with abrasion). It is on colored flint, 5.4 cm long, 2.1 cm wide, 0.5 cm thick.

The second has scalar flat continuous retouch. The blade is a non-cortical medial fragment with a unidirectional scar pattern, flat general profile, and trapezoidal profile at midpoint. It is on gray flint, 2.9 cm long, 2.2 cm wide, 0.5 cm thick.

Non-geometric microliths

These are subdivided into four types: Dufour bladelet– 34 items (79.0%), pseudo-Dufour bladelet– 5 items (11.7%), Krems point – 3 items (7.0%), bladelet with dorsal retouch at distal end – 1 item (2.3%).

The *Dufour bladelet type, on bladelets with alternate retouch* (fig. 3:1-4, 6) comprises 15 pieces (34.8% of all microliths). The retouch placement on these microliths is as follows. Two microliths have ventrally retouched left and dorsally retouched right edges. The other microliths of this type have dorsal retouch on the left edge and ventral retouch on the right edge. Continuous retouch was identified on 23 of 30 retouched edges. Also, 6 lateral edges were partially retouched. A single edge has discontinuous retouch. Semi-abrupt and flat retouched angles were measured on 19 and 11 edges, respectively. Micro-stepped (16 edges) and micro-scalar (12 edges) retouch was employed in near equal proportions. Two other edges were marginally retouched.

In sum, the most representative retouch combination is continuous semi-abrupt micro-stepped (10 edges), followed by: continuous flat micro-scalar (6 edges), continuous semi-abrupt micro-scalar (3 edges), continuous flat micro-stepped (3 edges), partial semi-abrupt micro-stepped (3 edges), partial semi-abrupt micro-scalar (2 edges), continuous flat marginal (1 edge), discontinuous flat micro-scalar (1 edge) and partial semi-abrupt marginal (1 edge).

The *Dufour bladelet type, on microblades with alternate retouch* (fig. 3:7-12) is represented by 16 pieces (37.2% of all microliths). The retouch placement on these microliths is as follows. All have dorsal retouch on the left edge, while the right edges have ventral retouch. Continuously retouched edges are the most representative – 23 of 32 edges. Discontinuously and partially retouched edges are fairly rare – 2 and 7, respectively. Semi-abruptly (21 items) retouched angles are more common than edges with flat (11 items) retouched angle. The micro-scalar type of retouch is represented on 18 edges. The edges treated by micro-stepped retouch (11 edges) are also relatively common. Marginally retouched edges are rare – 3 examples.

Thus, three combinations of retouch are more or less representative: continuous semi-abrupt micro-stepped – 10 edges, continuous semi-abrupt micro-scalar – 5 edges, continuous flat micro-scalar – 7 edges. The remaining variants of retouch combinations are represented by low frequencies: continuous flat marginal – 1 edge, discontinuous semi-abrupt micro-scalar – 2 edges, partial semi-abrupt micro-scalar – 3 edges, partial semi-abrupt micro-stepped – 1 edge, partial flat micro-scalar – 1 edge, partial flat marginal – 2 edges.

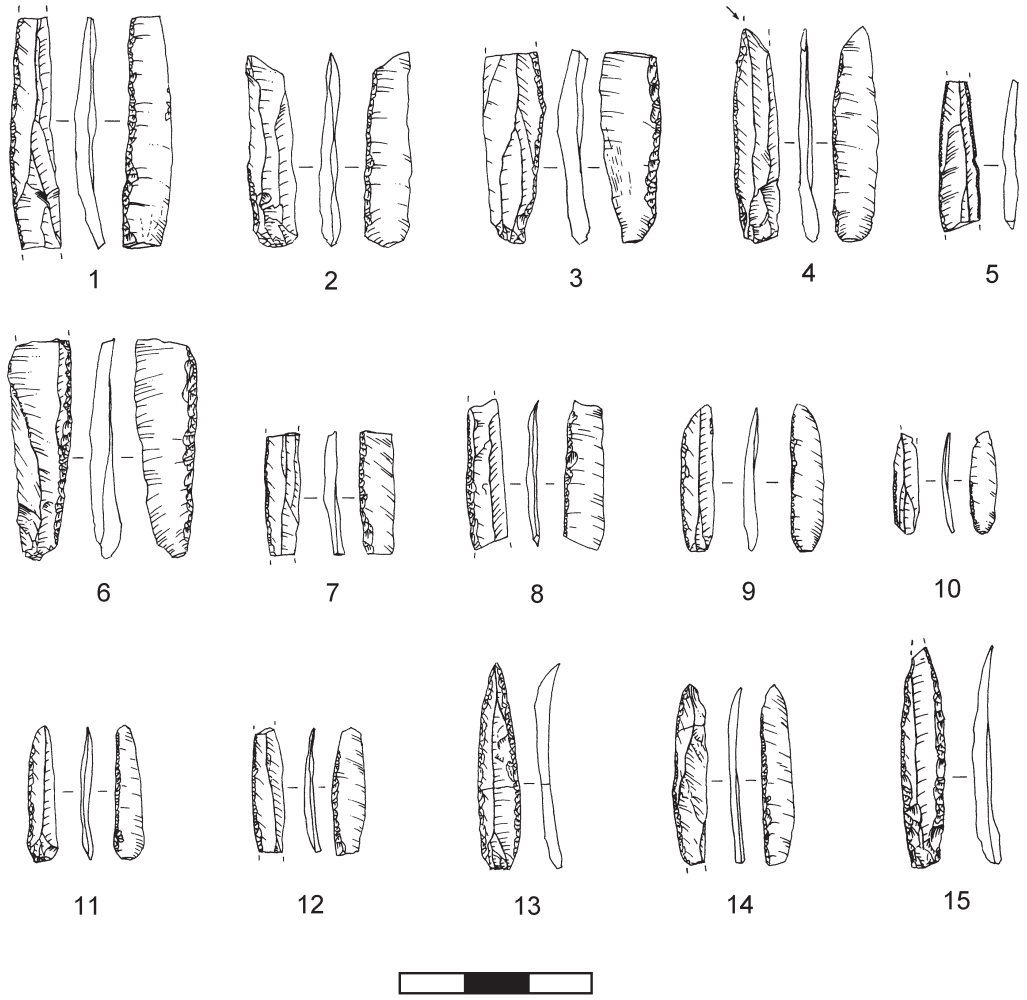

Figure 3 - Siuren I. Unit H. Flint Artifacts – "Non-Geometric Microliths". 1-4, 6, Dufour type bladelet, on bladelets with alternate retouch; 5, pseudo-Dufour type bladelet, on bladelet with bilateral dorsal retouch; 7-12, Dufour type bladelets, on microblades with alternate retouch; 13, Krems point, on microblade with bilateral dorsal retouch; 14, Krems point, on microblade with alternate retouch; 15, Krems point, on bladelet with bilateral dorsal retouch.

The *Dufour bladelet type, on microblades with ventral retouch* includes 3 items (7.0% of all microliths). All have ventral retouch on the right edge. Two variants of retouch combinations were employed for edge treatment: partial flat marginal (2 edges) and continuous semi-abrupt micro-stepped (1 edge).

The *pseudo-Dufour bladelet type, on microblades with dorsal retouch* is represented by 2 pieces (4.7% of all microliths). Microliths of this type have dorsal retouch on the left edges: continuous semi-abrupt micro-stepped and continuous semi-abrupt micro-scalar.

The *Pseudo-Dufour bladelet type, on bladelet with bilateral dorsal retouch* (fig. 3:5) is represented by a single piece (2.3% of all microliths). Its left and right edges have continuous flat marginal and continuous semi-abrupt marginal retouch, respectively.

The *Pseudo-Dufour bladelet type, on microblades with bilateral dorsal retouch* is represented by 2 pieces (4.7 % of all microliths). Both edges of the first microblade have partial semi-abrupt micro-scalar retouch. The left and right edges of the second microlith have discontinuous semi-abrupt micro-scalar and discontinuous flat marginal retouch.

The *Krems point type, on bladelet with bilateral dorsal retouch* (fig. 3:15) is represented by a single piece (2.3% of all microliths). Both edges have continuous semi-abrupt micro-stepped retouch.

The *Krems point type, on microblade with bilateral dorsal retouch* (fig. 3:13) is represented by one item (2.3% of all microliths). Both edges have continuous semi-abrupt micro-stepped retouch.

The *Krems point type, on microblade with alternate retouch* (fig. 3:14) is represented by one item (2.3% of all microliths). The left edge of the point is dorsally retouched with discontinuous semi-abrupt micro-stepped retouch, while its right edge is ventrally retouched by partial semi-abrupt micro-stepped retouch.

There is only a single *bladelet with dorsal retouch at proximal end* (2.3% of all microliths). The proximal end has continuous abrupt micro-stepped retouch.

18 bladelets and 25 microblades were selected for non-geometric microlith production. All were removed "on-axis". Blanks with twisted (19 pieces) and incurvate medial (11 pieces) general profiles are dominant. The other general profile types are

represented by relatively low numbers of blanks: flat – 6 pieces, incurvate distal – 4 pieces, unidentifiable – 3 pieces.

Eight microliths are complete: 3 *Dufour* bladelets on microblades with alternate retouch (length - 1.6, 2.1, 2.3 cm); 2 *Dufour* bladelets on bladelets with alternate retouch (length - 3.0 and 4.0 cm); a *Krems point* on bladelet with bilateral dorsal retouch (length – 3.5 cm); a *Krems point* on microblade with bilateral dorsal retouch (length – 3.2 cm); a *Krems point* on microblade with alternate retouch (length – 2.8 cm). Also, 5 other broken microliths are longer than 3.0 cm.

43 microliths are represented by 80 edges. Most of the edges have micro-stepped and micro-scalar retouch: 36 and 34 edges, respectively. Ten more edges are marginally retouched. A sole edge has an abruptly retouched angle, while 53 edges are semi-abruptly retouched. Also, 26 edges have flat retouch angle. Continuous retouch was employed for 66 microliths edges. Discontinuous and partial retouch were used on 6 and 18 edges, respectively (see tabl. 13-15).

In total, 16 different retouch combinations were identified. The continuous semi-abrupt micro-stepped retouch combination was employed for 26 edges. The other combinations are as follows: continuous semi-abrupt micro-scalar – 9 edges, continuous flat micro-scalar – 13, continuous flat marginal – 3, continuous flat micro-stepped – 3, continuous abrupt micro-stepped – 1, continuous semi-abrupt marginal – 1, discontinuous flat micro-scalar – 1, discontinuous semi-abrupt micro-stepped – 1, discontinuous semi-abrupt micro-scalar – 3, discontinuous flat marginal – 1, partial semi-abrupt micro-scalar – 7, partial semi-abrupt micro-stepped – 5, partial flat micro-scalar – 1, partial flat marginal – 4, partial semi-abrupt marginal –1.

The 43 non-geometric microliths are made on gray flints (29 pieces) and colored flints (14 pieces).

"Neutral" tool types

These are composed of just three notched pieces.

Notched pieces

All three tools are lateral ones on broken blades, but with differences in number and location of retouched notches.

The first has two separated notches on one lateral edge and another notch on the other lateral edge. All three notches were formed by scalar semi-steep retouch on the blade's dorsal surface. The blade is a non-cortical proximal fragment with a unidirectional scar pattern and multifaceted profile at midpoint. It is on colored flint, 2.5 cm long, 1.9 cm wide, 0.5 cm thick.

The second has a single lateral dorsal notch formed by scalar steep retouch. The blade is a non-cortical proximal fragment with a unidirectional scar pattern, trapezoidal profile at midpoint, small 0.3 x 0.1 cm linear butt (semi-lipped, semi-acute angle, with abrasion). It is on colored flint, 2.0 cm long, 1.6 cm wide, 0.4 cm thick.

		Dufour	Pseudo-Dufour	Krems points	N	%
LEFT EDGE	MARGINAL	4	1	0	5	6,33
	SCALAR	19	3	0	22	27,85
	STEPPED	8	1	3	12	15,19
RIGHT EDGE	MARGINAL	3	2	0	5	6,33
	SCALAR	11	1	0	12	15,19
	STEPPED	20	0	3	23	29,11
TOTAL		**65**	**8**	**6**	**79**	**100**

Table 13 - Siuren-I. Unit H. Non-Geometric Microliths: Retouch Types.

The third specimen again has only one lateral, but ventral, notch formed by scalar semi-steep retouch. The blade is a partially cortical medial fragment with a significant amount of lateral cortex, a unidirectional scar pattern and triangular profile at midpoint. It is on gray flint, 2.4 cm long, 2.6 cm wide, 0.5 cm thick.

Retouched pieces

These include four blades with marginal retouch and one flake with irregular retouch.

Blades with marginal retouch are represented by 2 complete blades, 1 proximal fragment and 1 distal fragment. All but the proximal fragment have unilateral dorsal marginal retouch (continuous for 2 pieces and partial for 1 piece). The proximal fragment has bilateral dorsal marginal continuous retouch. All 4 blades are non-cortical. The blades have the following morphological features: 4 unidirectional scar patterns; 1 converging, 1 expanding and 2 unidentifiable shapes; 2 "off-axis" and 2 unidentifiable removal directions; 1 flat, 2 incurvate medial and 1 unidentifiable general profiles; 1 feathering, 1 hinged and 2 unidentifiable distal ends, 2 triangular and 2 trapezoidal profiles at midpoint; 1 small 0.3 x 0.2 cm plain butt (lipped, acute angle, with abrasion), 2 linear 0.6 x 0.1 cm and 0.5 x 0.1 cm butts (both semi-lipped, semi-acute angles, with abrasion) and 1 unidentifiable missing butt. Three are made on colored flints with one of them burnt (the proximal fragment) and only a single piece is made on gray flint. Two complete blades are 7.6 and 5.0 cm long, both 1.7 cm wide, 0.4 and 0.6 cm thick, respectively. Two broken blades have the following metrics: length - 2.7 and 2.3 cm, width - 1.4 and 2.3 cm, thickness - both 0.3 cm, respectively.

The retouched flake (fig. 4:1) has two dorsally retouched edges and is on a complete flake. One lateral edge has sub-parallel flat partial retouch and the transversal edge has irregular semi-steep discontinuous retouch. The retouched portions of these two edges are not connected. According to our typological definitions, this piece is a flake with irregular retouch. However, if two retouched edges were connected by "well-made" retouch, this piece would be certainly classified as a semi-trapezoidal dorsal scraper (a déjeté side-scraper in F. Bordes' terminology). Thus, from an interpretative point of view, it is also possible

		Dufour	Pseudo-Dufour	Krems points	N	%
LEFT EDGE	FLAT	15	1	0	16	20,51
	SEMI-ABRUPT	16	2	3	21	26,92
	ABRUPT	0	0	0	0	0
RIGHT EDGE	FLAT	9	2	0	11	14,1
	SEMI-ABRUPT	25	2	3	30	38,46
	ABRUPT	0	0	0	0	0

Table 14 - Siuren-I. Unit H. Non-Geometric Microliths: Retouch Angles.

		Dufour	Pseudo-Dufour	Krems points	N	%
LEFT EDGE	CONTINUOUS	23	3	2	28	35,44
	DISCONTINUOUS	2	1	1	4	5,06
	PARTIAL	6	1	0	7	8,86
RIGHT EDGE	CONTINUOUS	24	1	2	27	34,18
	DISCONTINUOUS	1	1	0	2	2,53
	PARTIAL	9	1	1	11	13,92
TOTAL		**65**	**8**	**6**	**79**	**100**

Table 15 - Siuren-I. Unit H. Non-Geometric Microliths: Retouch Features.

to consider this tool as an unfinished Middle Paleolithic type scraper. The flake is non-cortical with a 3-directional scar pattern, expanding (trapezoidal) shape, "off-axis" removal direction, incurvate medial general profile, feathering distal end, irregular profile at midpoint, crushed butt. It is on gray flint, 2.1 cm long, 3.7 cm wide (shortened, transversal proportions), 0.7 cm thick.

Unidentifiable tool fragments

These four pieces can only be described through the presence/absence of cortex on their dorsal surfaces and raw material types. All fragments lack cortex. Three are on gray flints, including one burnt, and the fourth is on colored flint, also burnt.

Non-flint tools

These include a retoucher on a tuff-like limestone pebble and a chopper on a limestone pebble.

The retoucher is found on a longitudinally splintered small pebble (length - 5.0 cm, width - 3.6 cm, thickness - 1.4 cm) that was partially refitted from three fragments. It was identified as a retoucher by the presence of a series of short shallow striations (small battering-like traces) on one of the rounded tips.

The chopper is on a large pebble (length - 11.9 cm, width - 8.4 cm, thickness - 6.1 cm) with unifacial circular rough treatment around its entire perimeter.

Middle Paleolithic tool types

There are three different Middle Paleolithic types of scrapers with unifacial secondary treatment.

The first scraper (fig. 4:3) is a simple wavy dorsal one on a complete flake. The scraper's wavy edge is formed by heavy scalar steep retouch on one lateral edge. The flake is partially cortical with a unidirectional scar pattern, irregular shape, "on-axis" removal direction, twisted general profile, trapezoidal profile at midpoint, non-significant amount of lateral cortex, finely-faceted 3.4 x 0.7 cm butt (semi-lipped, semi-acute angle, with no abrasion), made on gray flint, 5.8 cm long, 3.3 cm wide, 0.5 cm thick.

The second scraper (fig. 4:4) is an elongated semi-trapezoidal dorsal one on a complete flake. This scraper has two nearly connected retouched edges in a pointed flat tip at the distal end of the flake. Absence of retouch on the very tip of the piece, however, makes this tool typologically a scraper and not a point. The left lateral edge has sub-parallel flat retouch, while the transversal edge has stepped semi-steep retouch. The flake is non-cortical with a unidirectional scar pattern, expanding (elongated trapezoidal) shape, "off-axis" removal direction, incurvate medial general profile, feathering distal end, triangular profile at midpoint, small 0.7 x 0.4 cm finely-faceted butt (semi-lipped, right angle, with no abrasion). It is on gray flint, 5.8 cm long, 3.0 cm wide, 0.6 cm thick. In F. Bordes' terminology, this tool would be defined as a convergent asymmetric side-scraper.

The third scraper (fig. 4:5) is a transversal wavy dorsal one on a complete flake. The scraper's wavy edge is formed by stepped semi-steep retouch on the transversal edge. This scraper also has ventral basal thinning and rather unusual bipolar dorsal thinning of both lateral edges. Heavily treated by different thinning techniques, this flake can only be described as partially cortical with an insignificant amount of central cortex. It is on colored flint, 3.9 cm long, 4.5 cm wide (shortened, transversal proportions), 1.6 cm thick.

Some summarizing data on the tool-kit

The internal structure of the tools and their typological and morphological characteristics are in generally good correspondence with the core and debitage data. These data will be discussed in detail in another chapter in the present volume – "Inter-Unit and Inter-Level Comparisons of Assemblages from the 1990s Units H, G and F". Therefore here, as well as for other typological data from the different units, we note simply the main features of the tool-kit.

The first feature of note is the quite surprising representation of raw material types used for tool production in Unit H. Of the 69 tools, 26 are on colored flints (37.7%) that, without taking into account an equal representation of gray and colored flints for only four core-like pieces, is the highest rate of such flints for all other artifact categories of the assemblage and is more than twice as high in comparison with the average index

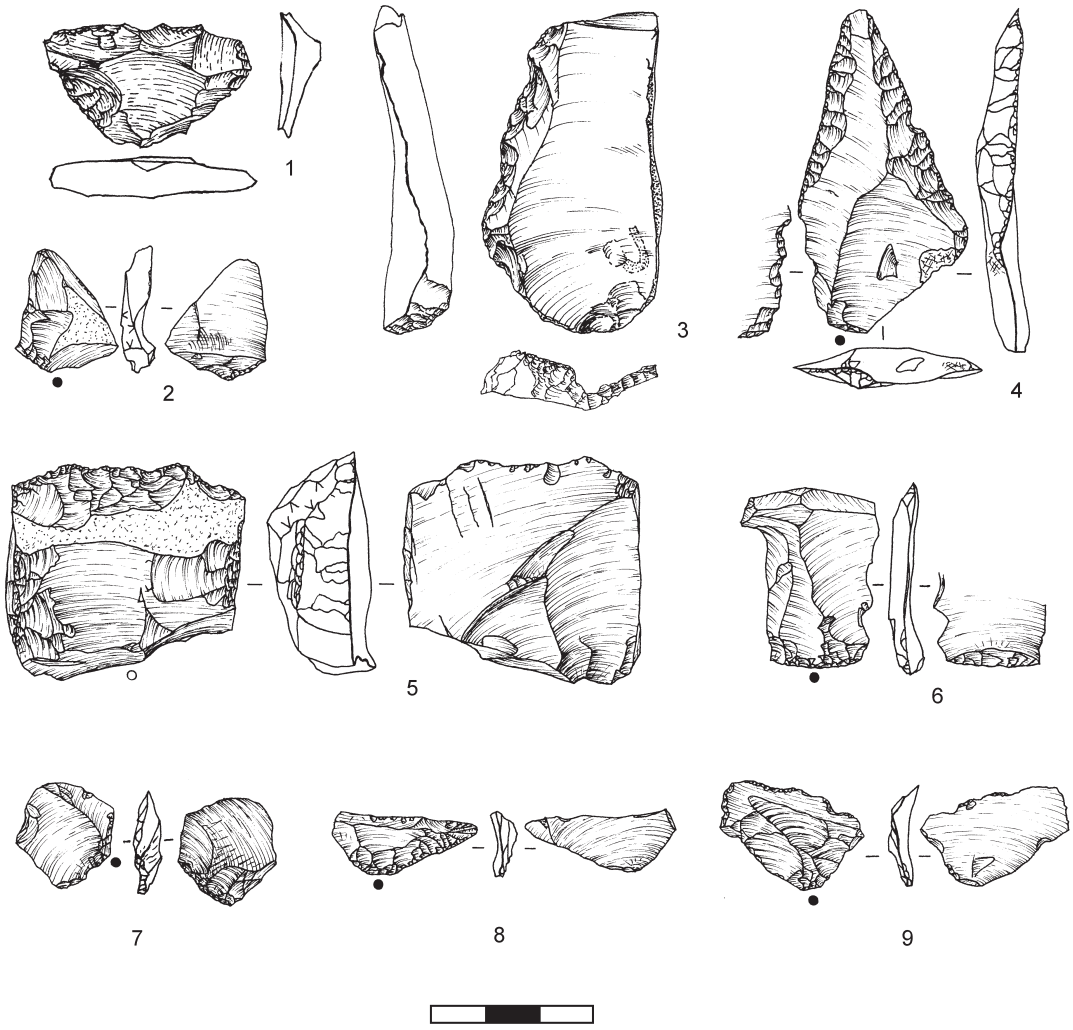

Figure 4 - Siuren I. Unit H. Flint Artifacts – Middle Paleolithic pieces. 1, retouched flake (an unfinished Middle Paleolithic scraper?); 2, bifacial shaping flake; 3, simple wavy dorsal scraper; 4, elongated semi-trapezoidal dorsal scraper; 5, transversal wavy dorsal scraper with ventral basal thinning and bipolar dorsal thinning of both lateral edges; 6, bifacial thinning flake; 7, resharpening flake from the tip of a bifacial convergent tool; 8, resharpening flake from the tipe of a unifacial convergent tool; 9, simple retouch flake.

of 14.7% for colored flints (see tabl. 16). The other tools are on gray flints (41 pieces/59.4%) and limestones (2 pieces/2.9%). We may thus reasonably infer human attention to the selection of colored flint blanks for tool production at the site.

Now let us turn to data for tool blanks. Excluding unidentifiable tool fragments and non-flint tools, the following information has been recorded. One of the end-scrapers (a thick shouldered one) is made on a chunk and excluded since this is not a debitage piece. For all the other 62 tools, the following blanks were used: flakes – 5/8.1%; blades – 14/22.6%; bladelets – 18/29.0% and microblades – 25 /40.3%. This list is a kind of staircase with increasing indices. Moreover, 5 flake-blanks (all of them complete) have a separate place here. All three Middle Paleolithic types of scrapers are made on flakes and the single retouched flake is also "suspected" to be an unfinished Middle Paleolithic scraper. The last flake-blank is characteristic for a thick nosed end-scraper and no other Upper Paleolithic tool was made on a flake. Taking also into consideration the common practice of making Aurignacian carinated end-scrapers (in a broad sense) on thick blanks (flakes and chunks), we can suppose a very specific role of flakes for the properly Upper Paleolithic industrial component within the assemblage where, aside from the their clearly technological supplementary role in on core decortification and preparation of striking platforms and flaking surfaces, and some Aurignacian end-scraper production, flake blanks are limited to the Middle Paleolithic typological component. Therefore, the internal structure of blady pieces only for tool blanks is as follows: blades – 24.6%, bladelets – 31.6% and microblades – 43.8 with joint accounts for bladelets *sensu lato* to 75.4%. The latter index is higher than for just blady debitage – 65.7%. So, there is clearly high selection of bladelets *sensu lato* for retouching into many non-geometric microliths. At the same time, the role of blades in the tool-kit should not be underestimated, as apart from the two end-scrapers, all the other tools were made on blades – 1 end-scraper, all 3 burins, all 3 notches and, of course, all 4 retouched pieces on blades. Thus, we should conclude that the Upper Paleolithic part of the assemblage mainly consists of both primary reduction of blades and bladelets *sensu lato* and their selection for tool production, while the certainly minor Middle Paleolithic typological component of the tool-kit is exclusively restricted to

	gray flint%	color flint%	black flint%	limestones%	TOTAL #	%	esse %
Core-Like Pieces	50	50	0	0	4	0,6	1,1
Core Maintenance Products	78,9	21,1	0	0	19	2,8	5
Flakes	83,1	15,3	0	1,6	124	18,2	32,7
Blades	73,5	26,5	0	0	49	7,2	12,9
Bladelets	86,6	10,4	3	0	67	9,8	17,7
Microblades	96,3	3,7	0	0	27	3,9	7,1
Tools	59,4	37,7	0	2,9	69	10,1	18,2
Waste From Production & Rejuvenation of Tools	90	10	0	0	20	2,9	5,3
Chips	91,1	8,5	0,4	0	246	36,1	
Uncharacteristic Debitage Pieces	91,3	8,7	0	0	23	3,4	
Chunks	94,7	5,3	0	0	19	2,8	
Heavily Burnt Pieces					15	2,2	
TOTAL	**84,3**	**14,7**	**0,4**	**0,6**	**682**	**100**	**100**

Table 16 - Siuren-I. Unit H. Artifacts Totals by Raw Material Types as Percentages of Each Type.

flakes. Accordingly, having now the two separate Middle Paleolithic and Upper Paleolithic tool-kits in the assemblage, we can take more precise look at them. The Upper Paleolithic one is structured as follows: Indicative Upper Paleolithic tool types – 9/15.3%, Non-Geometric Microliths – 43/72.8%, Retouched Pieces (on blades) – 4/6.8% and "Neutral" types (notches on blades) – 3/5.1%. The co-occurrence of thick nosed/shouldered end-scrapers and mostly Dufour bladelets of Dufour sub-type with alternate retouch (31 pieces/72.1%) and Krems points (3 pieces/7.0%) within the 43 non-geometric microliths, and, at the same time, the absence of any flat nosed/shouldered end-scrapers, carinated and dihedral burins, altogether point out that this is definitely an Early/Ancient Aurignacian of Krems-Dufour type industry. This is new for Siuren I, as Unit H was identified only during the 1990s excavations. Three Middle Paleolithic types of scrapers from Unit H, from only a typological point of view, are most comparable to the Crimean Micoquian Tradition.

The tool-kit blanks aspect can also be studied with respect to blank selection from different debitage categories, including all tools and core maintenance products. All 62 identifiable tool blanks of debitage character and altogether flakes, blades, bladelets and microblades show the following selection practices: 5 flake-tools of all 134 flakes (3.7% selection); 14 blade-tools of all 75 blades (18.7% selection); 18 bladelet-tools of all 87 bladelets (20.7% selection) and 25 microblade-tools of all 52 microblades (48.1% selection). These data clearly show both the high importance of non-geometric microliths in the tool-kit and the clear pattern of many bladelets *sensu lato* selected for retouch – 43 of all 139 (30.9%), nearly a third of all bladelets. At the same time, the selection of blades for secondary treatment processes is similar to that for bladelets *sensu lato*, testifying once again the importance of blade production in the assemblage, whereas flake selection for tool production was very minor and limited to a few Middle Paleolithic tools. As a result, it can be seen that flakes were not the aim of core reduction processes for blank production for Upper Paleolithic tool types and are mostly technological waste by-products of blade and bladelet reduction. All these data, finally, point out the general non-flake and overall general blady character of the Siuren I Unit H Early/Ancient Aurignacian of Krems-Dufour type assemblage.

Some more data on blanks

The joint and most complete accounts for all debitage pieces (flakes, blades, bladelets and microblades), including tools-blanks and core maintenance products, were treated through our attribute analysis and the data can be compared with attributes of the debitage only sample (see tabl. 2-11). In general, these two sets of data correspond well to another, although some discrepancies are listed below with additional explanations. Dorsal scar pattern data vary to some extent because of the inclusion of the crested type in the most complete sample (tabl. 2). Also, because of crested pieces, converging shape became the most representative one for blades in the most complete sample, while it occupied the 2nd-3rd position with expanded blades in the debitage only sample (tabl. 3). Adding tools-blanks for microblade shape identification, parallel type was dominant in the most complete sample, whereas converging type was predominant for the debitage only sample (tabl. 3). For axis identification (tabl. 4), "on-axis" microblades are dominant in the most complete sample, but "off-axis" microblades are dominant in the debitage sample. For general profile data (tabl. 5), one of our very basic technological indicators, indices of both samples show a subordinate position of twisted type for all debitage types. Butt type shows some changes within the "plain-punctiform-linear" group for microblades: punctiform butts are most dominant in the debitage sample, although for the most complete sample they follow linear butts (tabl. 8). Accordingly, microblade butt lipping data also vary (tabl. 9): semi-lipped butts are very common in the debitage sample and lipped butts over semi-lipped butts in the most complete sample. This is due to the addition of microblade-tools to the microblade-debitage sample. Namely, it definitely shows that for retouching, "on-axis" microblades were preferred. Thus, the two represented data sets complement one another and provide additional information for technological considerations during Inter-Unit and Inter-Level comparisons for assemblages from Units H, G and F.

Waste from production and rejuvenation of tools

This artifact category consists of two groups: burin spalls – 7 items, and retouch chips and flakes – 13 items.

Burin spalls. There are 2 complete burin spalls (both on colored flints) and 5 broken burin spalls (all on gray flints). Both complete specimens are primary burin spalls. The first is a simple unretouched one with flat general profile and faceted butt that is evidence of its removal from a burin on truncation. It is 3.3 cm long, 0.5 cm wide, 0.6 cm thick. The second has unilateral retouch (fine very partial), twisted general profile and crushed butt that makes identification of its origin unclear. It is 2.7 cm long, 0.3 cm wide, 0.7 cm thick. Broken burin spalls are represented by 1 proximal and 4 distal fragments. These 5 burin spalls are also primary. The proximal specimen has bilateral retouch similar to cresting preparation, twisted general profile and linear 0.3 x 0.1 cm butt that prevents identification of the burin type from which it was struck. It is 1.7 cm long, 0.5 cm wide and thick. There is one simple distal specimen with no retouch. It also has a flat general profile and is 1.8 cm long, 0.3 cm wide and thick. Three other distal specimens have some unilateral retouch but two have only irregular partial retouch, while the third has regular sub-parallel retouch that suggests use of a retouched blade for burin manufacture. It has a convex general profile and is 3.1 cm long, 0.3 cm wide, 0.7 cm thick. Two other distal specimens have twisted general profiles and very similar metrics: 1.7 cm length, 0.5 cm width and thickness for the first and 1.8 cm length, 0.6 cm width and thickness for the second. All four distal fragments of burin spalls are unidentifiable in origin because of missing butts.

Because all 7 burin spalls are primary, we may infer that rejuvenation/resharpening of burin working edges at the site was not intensive. At the same time, it should be kept in mind that the proportion of 7 primary burin spalls to just 3 burins may indicate production and export of burins from the rock-shelter. The single identifiable burin spall from a burin on truncation corresponds well to the presence in the tool-kit of one burin on truncation and one transverse burin on a lateral preparation among the three burins.

Retouch flakes and chips. According to their morphological and metric characteristics, these pieces are subdivided into:

- bifacial shaping flake - 1 piece;
- bifacial thinning flake - 1 piece;
- resharpening flake of a bifacial convergent tool's tip - 1 piece;
- resharpening flake of a unifacial convergent tool's tip - 1 piece;
- simple retouch flakes - 3 pieces;
- retouch chips - 6 pieces.

All these retouch flakes and chips are on gray flints.

Bifacial shaping flake (fig. 4:2): a partially cortical complete piece with significant amount of distal cortex and unidirectional-crossed scar pattern, expanding shape, "off-axis" removal direction, incurvate medial general profile, blunt distal end, irregular profile at midpoint, crudely-faceted 1.8 x 0.6 cm butt (lipped, acute angle, with abrasion). It is 2.2 cm long, 1.9 cm wide, 0.4 cm thick. Because of the very characteristic crudely-faceted butt and some dorsal cortex, this piece is identified as a shaping flake of Middle Paleolithic bifacial tool type.

Bifacial thinning flake (fig. 4:6): a non-cortical complete piece with unidirectional scar pattern, expanding shape, "on-axis" removal direction, incurvate medial general profile, feathering distal end, trapezoidal profile at midpoint, finely-faceted 1.7 cm x 0.4 cm butt (lipped, acute angle, with abrasion). It is 3.3 cm long, 2.6 cm wide, 0.4 cm thick. Because of the very characteristic finely-faceted butt with pronounced abrasion and absence of any cortex on its dorsal surface, this piece is interpreted as a thinning flake of Middle Paleolithic bifacial tool type.

Resharpening flake of a bifacial convergent tool's tip (fig. 4:7): a non-cortical complete piece with only characteristics of a bifacial convergent tool's tip. The flake is 1.8 cm long and wide, 0.3 cm thick. It has the very tip (0.8 x 1.5 cm) of a Middle Paleolithic type bifacial convergent tool on its left lateral from ventral surface. Such disposition of a bifacial tool's tip and its triangular shape on the flake allow us, first, to suppose a side resharpening blow on a bifacial tool's tip and, second, to consider this bifacial tool as a convergent symmetric one. The presence of a large and concave scar on the flake's dorsal surface also points out multiple resharpening of this bifacial convergent tool's tip which ended by the final removal of this flake.

Resharpening flake of a unifacial convergent tool's tip (fig. 4:8): a non-cortical complete piece 1.0 cm long, 2.7 cm wide, 0.2 cm thick. This flake has the very tip (0.7 x 0.4 cm) of a Middle Paleolithic type unifacial convergent tool on its right lateral dorsal surface. The tip's ventral surface is plain, indicating unifacial treatment (dorsal) of a tool. The tip's very pointed features should also be considered as characteristic of a point rather than a convergent scraper. Moreover, such shortened, transversal metric proportions (length 1.0 cm vs. width 2.7 cm) of this resharpening flake with expanding shape and scalar retouch along the entire length of its right lateral edge are quite characteristic of secondary treatment of "déjeté/semi- and subtrapezoidal points with "off-axis" removal direction in Crimean Middle Paleolithic Micoquian Tradition industries.

Simple retouch flakes. All three are non-cortical complete pieces with nearly the same morphological features: unidirectional scar pattern, expanding shapes, "off-axis" removal directions, incurvate medial general profiles, feathering distal ends, multifaceted profiles at midpoint, 1 plain 1.6 x 0.6 cm butt (lipped, acute angle, with abrasion) and 2 linear 0.3 x 0.1 cm and 0.4 x 0.1 cm (fig. 4:9) butts (1st - lipped, acute angle, with abrasion; 2nd - semi-lipped, acute angle, with abrasion). They have the following metrics: length - 1.6 - 1.7 - 1.8 cm, width - 1.4 - 1.1 - 2.6 cm, thickness - 0.3 - 0.1 - 0.3 cm, respectively. These morphological features and especially plain and punctiform butts which are either with lipping, acute angles and abrasion, or, in one case, with semi-lipping but with acute angle and abrasion, distinguish these three pieces from all other debitage pieces and allow us to consider them rather as retouch flakes from Middle Paleolithic type unifacial tools (points and scrapers) than from Middle Paleolithic bifacial tools, although this cannot be completely excluded. The rather large general size of these flakes precludes their removal from Upper Paleolithic tool types such as end-scrapers and retouched blades.

Retouch chips. All six are non-cortical. Two are proximal fragments and four more are complete. None exceed 1.5 cm in

length and width and all have butts (2 plain, 2 punctiform, 2 linear) with lipping, acute angles and abrasion. Such metric and morphological characteristics allow us to consider these chips as retouch chips from secondary treatment of either Middle Paleolithic or Upper Paleolithic unifacial tool types; a more precise determination is impossible.

The data on retouch flakes and chips allow us to make the following comments. The appearance of six retouch chips is not surprising, given the presence in the tool-kit of several endscrapers and retouched blades of the Indicative Upper Paleolithic tool types group and scrapers of the Middle Paleolithic tool types group. On the other hand, the structure of retouch flakes, reflecting secondary treatment processes of Middle Paleolithic tool types, can surely help to reconstruct the tools' "life history". Of note is that there are no bifacial tools whatsoever in the tool-kit, whereas three definite bifacial retouch flakes are present. This is strong evidence of Middle Paleolithic bifacial tool use and rejuvenation at the rock-shelter, tools that were then taken away from the rock-shelter by their human users. Moreover, the presence of a resharpening flake of a unifacial convergent tool's tip also shows a probable similar process of use of a unifacial point at the site and its subsequent removal from the site. Thus, analysis of both Middle Paleolithic tool types and their retouch flakes seems to be very promising for "bringing back to life dead flints". Finally, the morphological features of the retouch flakes once again confirm the Crimean Micoquian Tradition industrial affiliation of the Unit H Middle Paleolithic component, first noted only for the tools.

Debris (see also tabl. 1 and 16)

Chips, uncharacteristic debitage pieces and chunks are only described by presence/absence of cortex and raw material types, while heavily burnt pieces (15 items) were counted.

Chips

There are 246 chips and 27 (11%) have some cortex. The following raw material types have been identified. There are 224 chips on gray flints – 91.1% and 24 items have some cortex – 10.7%. There are 21 chips on colored flints – 8.5% and two have some cortex – 9.5%. There is a single chip (0.4%) on black flint which also has some cortex.

Uncharacteristic debitage pieces

There are 23 such pieces and 4 (17.4%) have some cortex. There are 21 pieces (91.3%) on gray flints and 4 (19%) have some cortex. There are also 2 pieces (8.7%) on colored flints, none with cortex.

Chunks

There are 19 chunks and 8 (42.1%) have some cortex. Most chunks (18 pieces/94.7%) are on gray flints and 7 (38.9%) have some cortex. Colored flints are represented by just a single piece (5.3%) which also has some cortex.