

## Research on the Epigravettian site of Riparo Dalmeri on the Sette Comuni plateau (Trento)<sup>1</sup>

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**ABSTRACT** - Dalmeri Rockshelter is situated at 1240m a.s.l., on the Sette Comuni Plateau on the northern border of Piana di Marcesina. The settlements are attributed to the final phase of the Recent Epigravettian period. The numerous C14 radiometric analyses determine the date of the site to around 11200 years ago (non-calibrated). Two important flat dwelling surfaces have recently been identified (the level surface of a hut and some hearths). Hunted fauna is exceptionally well preserved, with a prevalence of ibex. The lithic industry is abundant. The site is unique for its cult representations (perforated shells, painted stones, graffiti on cortex); 4 sets of human milk teeth were found on the Epigravettian levels.

*Key words:* Final Epigravettian, Rockshelter, Dwelling structures, Sette Comuni Plateau

*Parole chiave:* Epigravettiano recente, Riparo, Strutture d'abitato, Altopiano dei Sette Comuni

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### 1. THE ROCKSHELTER

The rockshelter is situated on the Sette Comuni Plateau on the northern side of the Piana di Marcesina (Comune of Grigno) in Eastern Trentino.

The subrock faces North-East at 1240m a.s.l., at the foot of the rock-face formed by a Jurassic oolite limestone. This site is settled in the top part of the little valley of the Ombra Torrent, which becomes narrower at the northern part and forms a deep gorge which leads directly into Valsugana.

The central part of the projecting side of the rock shelter is over 7m deep, thus forming a natural shelter, the front part is about 30m long. Research was started in 1991, on an annual basis, by the Sezione di Paleontologia Umana of the Museo Tridentino di Scienze Naturali and is still being carried out in a multi-disciplinary system. The deposited strata fill-up (Fig.1), mainly consisting of breccia, is made up of calcareous thermoclastics deriving from the degradation of the vaulted shelter and is 5m thick. Excavations brought to light a sequence of anthropic occupational levels at about 2m below the modern pounding area, below the detritus. The maximum thickness of this sequence was

40cm and refers to different phases of human occupation of the site in the recent Epigravettian period, Alleröd interstage. This dating is based on the radiometric analysis and agrees with the faunal dates and with the typology of the lithic industries<sup>2</sup> (DALMERI & LANZINGER, 1989; BASSETTI & DALMERI, 1993).

### 2. THE PRESENT STATE OF THE EXCAVATIONS

The archaeological deposit belonging to the Epigravettian period was almost completely excavated for a stretch of 12m along the central part of the rockshelter, for an overall area of about 45m<sup>2</sup> (Sector 1), where the subrock is deeper and the vaulted rock is higher; this corresponds to about 1/3 of the potential anthropization area.

A deep opening was made in sq.48-50/G-O, where a very interesting stratigraphic sequence belonging to the end of the Pleistocene and to the initial Holocene period came to light (ANGELUCCI & PERESANI, 1996).

Very strict stratigraphical criteria were followed

in carrying out the excavation. After having traced 1m<sup>2</sup> grids on the whole of the shelter area, the sediment was dug out in single deposit units. These layers were divided into small 33 cm<sup>2</sup> squares that were given progressive numbers. For each single stratigraphic unit a chart was made out stating the topographic and stratigraphic location, the strata's geometry, the sedimentological characteristics, the finds that were found in the excavation etc. Nearly all of the material was sifted in water with 1mm meshes and thoroughly examined, separating it in to different specimen classes.

The current situation of the excavation (Fig.2): In sq.39-50/M-O, 45-50/I-L, 47-48/G-H, 39 L and 44 L, up to the end of the anthropic layers.

In sq.40-44/L e 40-41/I, up to the roof of the dwelling area 26c.

Excavation and emptying of the eastern area, Sector 2, sq.53-56/C-E; not preserved archaeological deposit and eroded stratigraphy.

### 3. THE STRATIGRAPHY

The stratigraphic situation in Sector 1 corresponding to sq.48-50/I-O and 48H includes the layers 1 to 14 (excavations 1991-1993), whereas in the area 39-47/I-N, it includes the layers 21 to 41 (excavation 1993-1996) (Fig.3). The units underneath these layers are not anthropic and are numbered from 15 to 20 and from 50 to 54 in relation to the investigated trench. In this article, preliminary examination was undertaken only on the stratigraphic unit (US) 14/26 and its sub-units relative to the anthropic sequence of the shelter (ANGELUCCI & PERESANI, in this volume).

The US14/26 shows marked traces of anthropization, referring to the recent Epigravettian period. This deposit is made up of blackish breccia with an organic matrix and presents strong anthropization with constant characteristics on the whole of the 45m<sup>2</sup> surface that has been examined till now. The thickness of the stratum increases from the internal layer (10cm) towards the projection limit where it reaches 40cm, at about 3m from the rock face (sq.44-45/I). In correspondence to sq.44-50/H-I it forms a gradual downward slope. It lays directly on the sterile calcareous breccia with a clear marked limit that shows where the matrix disappears.

US14/26, which was undisturbed, is horizontally situated in sq.45-47/I-N, in the central area. Topographically, it tends to rise considerably on the lateral borders of the subrock in sq.48-50/I-N and sq.39-44/I-N. However, on the whole, the majority of the archaeological deposit in the central part of the shelter is placed horizontally or sub-horizontally.

In sq.49-50/L, 48-49/M and partially in sq.45-47/I, US14/26 is completely disrupted by erosive phenomena. In these areas there are evident signs of holes and small ditches due to water dripping in the vaulted shelter.

In layer 14/26, in the undisturbed areas, there is incoherent sediment, constantly present on the superior section of this layer, of a highly organic, grey colour, silty-sandy texture. The thickness of the sediment varies from a few centimetres to about 50cm with a discontinued stratigraphic and topographic course, as shown in the US21-14a. The entire thickness of the grey sediment is characterised by frequent cryoturbations and erosive phenomena relative to water action. The scarce archaeological contents of the Epigravettian period (fauna and industry in inferior quantity) have been re-elaborated, especially the lithic manufactures which show numerous pseudo-retouchings. The greyish outline demonstrates the washing away of the upper surface of the strongly anthropical layer 14/26 due to the constant dripping coming from the vault of the shelter.

The upper part of the archaeological deposit is sealed by a non-anthropical detritus concretion that is variedly stratified and has a maximum thickness of 2m (US1-13).

The 14/26 layer with its sub-units 14b/26b and 26c show two extremely well preserved important pounding levels, with evident dwelling structures (Fig.5). Up till now, over 40m<sup>2</sup> 14b/26b has been excavated, and US26c 23m<sup>2</sup> of. The average thickness of the two strong anthropization levels is more than 20cm. The sub-units 26d-e are limited to sq.45-47/I-L.

The biological components of the sediments are made up of a large quantity of mammal remains, which are largely fragmented and are mainly represented by the ibex (*Capra ibex*) (CASSOLI *et al.*, in press and in this volume), ichthyofauna, avifauna, microfauna and shells; the artefacts consist of abundant lithic industry, some used pebbles, a sandstone "quern" and two small feakes of crystal rock. There are many decorated objects (various geometrical graffiti engraved on cortexes and on bone, a stone painted with red ochre) (DALMERI, in this volume). The ornamental objects are also abundantly represented by 23 perforated shells of *Columbellae* and *Cyclope* (DALMERI & FIOCCHI, in this volume), a perforated microbead, a perforated bone fragment, two deer incisors with grooves intentionally made on the base. Red ochre is particularly diffused.

The bone industry is present with many specimens of points and awls, small spatulas and needles.

Four deciduous human teeth, one of which had a longitudinal perforation, were also found on the site.

The results of the radiometric dating on the Epigravettian levels of the Dalmeri rockshelter are as follows: Rome-657, 11250 ± 100 BP, US26e (Sector 1, sq.46I/e - carbons), n.c.;

Rome-426, RD-2, 11000± 115 BP, US26b (carbons), n.c.;

Rome-425, RD-1, 10800 ± 110 BP, US14b (carbons), n.c.;

KI No. 2-3634, 11260 ± 100 BP, US14 (Sector 1, sq.47L/b - carbon), n.c.;

UtC-Nr. 5289 RD-3, 7767 BP, US23 (cal. BC 6602-6473) (Sector 1, sq.39N organic matter); it is a carbonate deposit with whitish silty-sandy matrix, and is mainly distributed along the internal wall sealing the Epigravettian sequence to the roof 14b/26b and 26c;

UtC-Nr. 5040 RD-5, 11550 BP, US51 (cal. BC 11642-11417) (Sector 1, sq.47I-carbon); US51 is a small non anthropic organic level, discontinuous in the sequence that is beneath the archaeological deposit and relative to the stratigraphic profile of the depth survey, open in sq.48-50/G-O (ANGELUCCI & PERESANI, in this volume).

#### 4. LEVELS 14B/26B AND 26C: AN OUTLINE OF THE DWELLING STRUCTURES

These are two homogeneous levels averaging from 5 to 10cm thick that are very rich in archaeological material. These levels can be recognized in nearly all the excavated area and continue on the lateral side of the area which has not yet been explored and represent a stratigraphic outline that is a guide for most of the integral Epigravettian deposits. The absence of these levels is due to erosions of the eastern area.

They define two interesting pounding surfaces, mainly horizontal (roof 14b/26b and roof 26c) with evident dwelling structures. The dwelling areas may have been re-adapted by levelling the respective surfaces. The anthropical finds are generally regularly arranged. They are represented by a large quantity of remains of meals (bones), flint flakes and cores.

All the lithic and faunal material relevant to the two paleosurfaces was topographically registered during the excavation phases. A detailed research is being elaborated on the area of dispersion of the flaking products with sub-cores/cores, some categories of tools (scrapers-burins-retouched blades) and also of backed tools. The spatial analyses carried out regarding debitage products is integrated by the following: fire action, whole/fragmented flints, small flints, cortex, the weight, refitting; the length/width index and core reduction patterns are also taken into consideration. The whole of the operation is carried out using an informatic programme<sup>3</sup>. At this point of the research there are data available on about 62000 lithic objects of US14b/26b (Fig.4).

It was possible to outline and reconstruct the settlement modalities through a preliminary planime-

tric survey on the two single levels 14b/26b and 26c, supported by the topographic data obtained *in situ*. The use of the most internal part of the site is well documented because it was protected by the rock vault (sq.39-50/I-N).

The levels, hereby taken into consideration, are defined as two very well-preserved dwelling structures, situated in the western area (sq.39-44/I-N): a sub-circular topographic depression ("A") with an approx. 3m diameter, with evident traces of a peripheral alignment of calcareous stones, near a large morphological recess in the rock and an extraordinary circular heap of well defined broken bones (S46), with a 1,5m diameter, present in 40-41/I-L, at the edge of this large sub-circular structure (roof 26b-c) (Fig.4-5).

In the inner part of the depression, which has not yet been completely explored, there are numerous combustion remains and alignments of large charcoal but there are no traces of flints and bones. Red ochre is abundantly scattered everywhere. A heap of rocks and stones mixed with refuse has been intentionally placed in a semi-circle on the border to mark the boundary. The base of structure "A" is placed directly on the sterile breccia.

Even though the exploration is at an initial stage, on the basis of the elements acquired till now, it would seem certain that this area of the site was the intact base of a dwelling place, marked with areas used for particular activities. It is, therefore, possible to think that this part of the shelter was enclosed by a structure supported on poles.

Near the above-mentioned structures there seems to be a sub-rectangular "small mound" (S38) made of calcareous stones, situated at sq.39M (diameter: 0.80x0.60cm) and two hearths partly delimited by stones, situated under the protruding part of the shelter, in accessible areas of sq.46/I (S29) and 48/I (S30).

#### 5. INDUSTRY

The available data on the Epigravettian lithic industry of the Dalmeri rockshelter refer to the batch of manufactures collected during excavations carried out in 1991-1993, relative to all the anthropical sequence found in sq.47-50/I-O. At least two important anthropic occupational phases with recent Epigravettian industry are recognizable in the cryoclastic breccia which corresponds to 14b/26b and 26c.

Industry, almost exclusively on local flint of a whitish or light greenish-grey colour, was frequent and we hereby quote only a few general typological considerations. In this first note, the two intensely anthropical units, 14b/26b and 26c, shown in the

typological table are provisionally considered as being one.

Altogether there are 1583 tools including fragments, 1628 backed tools, 140 microburins and other discards, 204 cores/pre-cores and a large quantity of debitage products.

Cores include prismatic blade-bladelet forms, with one or two detached surfaces, oblique prepared platforms and sub-pyramidal, globular and sub-discoid forms.

Only tools and backed tools<sup>4</sup> are examined: 1) Burins. There is a large quantity of these; the mostly represented burins are the dihedral ones followed by the truncation and break ones; there are also many double ones. 2) End-scrapers: these are numerous, and were mainly made on flakes; they are short or very short, nail-shaped or semicircular; the circular-shaped ones are rare; the laterally convergent retouched end-scrapers are sporadically present (c.d. point-scrapers). 3) Truncated blades: an elevated number are present. 4) Backed-knives: these prevail on other types of tools and are highly diffused. 5) Retouched blades: highly diffused and prevail on other types of tools.

With regard to end-scrapers, burins and points, some of the forms have a "cap" cortex, obtained directly from the first chipping of the pebble.

The backed tools are characterised by a considerable number of segmented backed bladelets, and fewer backed-points.

There are a great variety of types of segmented backed bladelets. The most represented are the types with one oblique truncation-obtuse angle and with one normal truncation.

Among the backed points, there are "microgravettes" with ventral backing on bi-directional backing and points with partial backing. There are many fragments attributed to various types of backed points.

The microburin technique in the production of the backed tools is documented by a small number of microburins and other discards, found here in a small quantity of geometric tools.

Among the segmented backed bladelets with two oblique symmetric truncations, there are also some very narrow forms (3mm - "slim" type) and long/very long forms (more than 19mm).

The results of the first typological analyses at the Dalmeri rockshelter suggest a balanced situation of tools (49,3%) and backed tools (50,7%) (Fig.6). In the tool category there is a high percentage of retouched blades (23,3%), followed by scrapers (20,2%), burins (17,9%) and truncated blades (14,5%); among the backed tools, the segmented backed bladelets (including the fragments) prevail with 44%, while the backed points (including the fragments) are fewer (10,4%). There is a notable incidence of undetermined backed fragments.

This industry represents the final phase of the Epigravettian sequence. It has precise parallels in the Epigravettian industry in the sites of Val Lastari on the Asiago Plateau (Veneto Prealps) (BROGLIO *et al.*, 1992) and in Soman rockshelter in the southern part of the Adige Valley (CASSOLI *et al.*, 1992; BROGLIO *et al.*, 1992).

The most evident differences are structural; there are typological analogies both within the category of both the tools and the backed tools (Fig.14):

1. There is a balanced situation in the tool/backed tool ratio as in Val Lastari; at Soman rockshelter the backed tools are more abundant.
2. Within the tool category at Dalmeri rockshelter, the presence of retouched blades is very high, followed by end-scrapers and burins. These have the same frequency ratio as Val Lastari; at Soman the end-scrapers clearly prevail while the retouched blades are less represented than at Dalmeri; the truncate ends are as frequent as at Soman and more abundant at Val Lastari; the backed knives are scarce at Dalmeri, better represented at Soman rockshelter inf. and very frequent at Val Lastari.
3. In comparison to the site of Val Lastari, within the category of backed tools there is a clear inversion of the ratio between backed points and segmented backed bladelets; backed points are also less frequent than at Soman, where the segmented backed bladelets are abundant.

The two classes of backed tools characterize the Epigravettian of the Alleröd interstage and the Early Dryas III phase.

The industry at Ripari Dalmeri can be compared to the Recent Epigravettian sequence of the region (BARTOLOMEI & BROGLIO, 1967; SALA MANSERVIGI, 1970; BISI *et al.*, 1983; BAGOLINI *et al.*, 1985; AIMAR *et al.*, 1993).

## 6. CONCLUSIONS

This important site provides a complex of settlement and paleocological information obtained from the exceptional state of preservation of the biological material. The numerous C14 radiometric analyses, carried out on carbon remains, confirm the dating as being around 11200 before our time (non-cal. chronology). The utilization of the site is well documented especially the inner part which is protected by the rocky vault.

The results of the first typological investigations

on the lithic industry attribute the settlements to the final phase of the recent Epigravettian period.

Archaeological evidence suggests that the site was used seasonally, and re-occupied at different times in the Recent Epigravettian period. Two pounding surfaces with evident dwellings structures are connected to differentiated areas used for particular activities. These activities allow us to determine the use of the site with regard to the semi-permanent occupation. The prevailing of wild animals such as the ibex and the marmot, is index of a surrounding environment characteristic of the Alpine prairie.

## NOTES

1 - G. Dalmeri is the author of paragraphs 1,2,5; M.Bassetti and G. Dalmeri are the authors of paragraphs 3,4; all the authors have written out paragraph 6 relative to considerations on the findings and on the prospects of the research.

2 - The people helping with the research are: P.F. Cassoli, I. Fiore, A. Tagliacozzo (faunal analyses); D. Angelucci and M. Peresani (pedostratigraphy and micromorphology); G. Bartolomei (paleoecology); A. Girod (mollusca fauna); C. Fiocchi (ornamental objects); L. Castelletti e A. Maspero (anthracology); L. Cattani (palinology) M. Bassetti, G. Dalmeri, K. Kompatscher, M. Kompatscher Hrozny (lithic industry and settlement structures).

3 - Macintosh, Rag Time 3, Version 3.1/7

4 - **Backed tools**: within this category, we include "microgravette" points and various types of backed points, segmented backed bladelets, and "geometric" tools. **Tools**: within this category, we include burins, end-scrapers, retouched blades, truncated blades, backed knives, scrapers, perforators, and denticulated tools.

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**SUMMARY** - Dalmeri Rockshelter is situated at 1240m a.s.l., on the Sette Comuni Plateau on the northern border of Piana di Marcesina. Research started in the year 1991. The fill-up deposit at the bottom of the rockshelter is composed of a sequence of strata mainly made of breccia. At 2 metres below the modern pounding area the levels suggest a strong anthropization with abundant lithic industry, bone and faunal remains, for a thickness of about 40cm. The settlements are attributed to the final phase of the recent Epigravettian period. The numerous C14 radiometric analyses determine the date to around 11200 years ago (non-calibrated). Two important flat dwelling surfaces have recently been identified (the level surface of a hut and hearths). Hunted fauna is exceptionally well preserved, with a prevalence of Ibex. The lithic industry is abundant. The site is unique for its cult representations (perforated shells, painted stones, graffiti on cortex); 4 sets of human milk teeth were found on the Epigravettian levels.

**RIASSUNTO** - Riparo Dalmeri è un ampio insediamento sottoroccia dell'Epigravettiano recente, ancora in corso di scavo e studio. Si apre a quota 1240m al margine settentrionale della Piana di Marcesina, nel Trentino sud-orientale. Il deposito di riempimento del riparo è costituito da una sequenza di strati prevalentemente brecciosi. A due metri di profondità dal piano campagna sono presenti dei livelli fortemente antropizzati (US14/26 e sottounità) con abbondante industria litica, su osso e resti faunistici ben conservati, per uno spessore complessivo di 40cm. Lo strato 14/26 definisce con le sottounità 14b/26b e 26c due importanti piani di calpestio eccezionalmente conservati, con strutture abitative evidenti. La grande quantità di resti di mammiferi peraltro molto frammentati, è rappresentata quasi esclusivamente dallo stambecco; rilevante è l'ittiofauna. Dal deposito proviene un cospicuo numero di cortici graffiti, una pietra dipinta d'ocra e reperti ornamentali. Le evidenze archeologiche suggeriscono che è un sito a carattere stanziale, rioccupato più volte nell'ambito dell'Epigravettiano.

no recente, interstadio di Alleröd, sulla base delle datazioni radiometriche (una prima data su carboni di focolari di US14 indica: 11260±100 BP), in accordo con i dati faunistici e con la tipologia delle industrie. I risultati delle prime analisi tipologiche sull'industria litica suggeriscono una situazione di equilibrio tra strumenti (49.3%) e armature (50.7%). All'interno della categoria degli strumenti assumono una forte incidenza percentuale le lame ritoccate (23.3%), seguono i grattatoi (20.2%), bulini (17.9%) e troncature (14.5%); tra le armature dominano col 44% le lamelle a dorso e troncature (compresi i frammenti), mentre le punte a dorso (compresi i frammenti) sono meno rappresentate (10.4%). Da notare la forte incidenza di frammenti di dorsi, dorsi troncati e di punte a dorso. Questa industria rappresenta il termine finale della sequenza epigravettiana. Essa trova riferimento preciso nelle industrie epigravettiane dei siti di Val Lastari sull'Altopiano di Asiago (Prealpi Venete) e di Riparo Soman in Val d'Adige meridionale.

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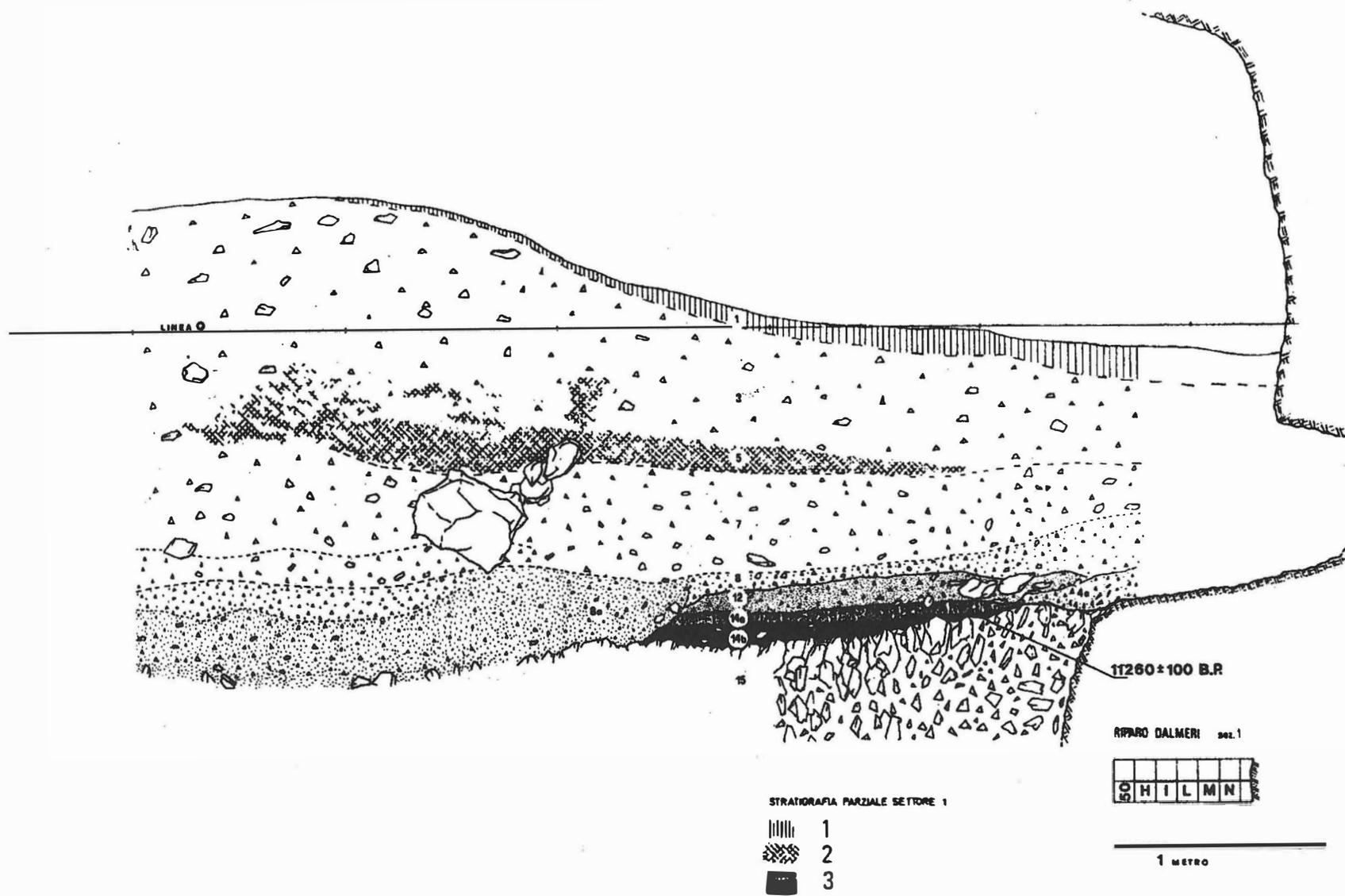


Fig. 1 - Dalmeri rockshelter. Partial stratigraphy: 1) humid stratum; 2) concretion; 3) strong anthropization deposit

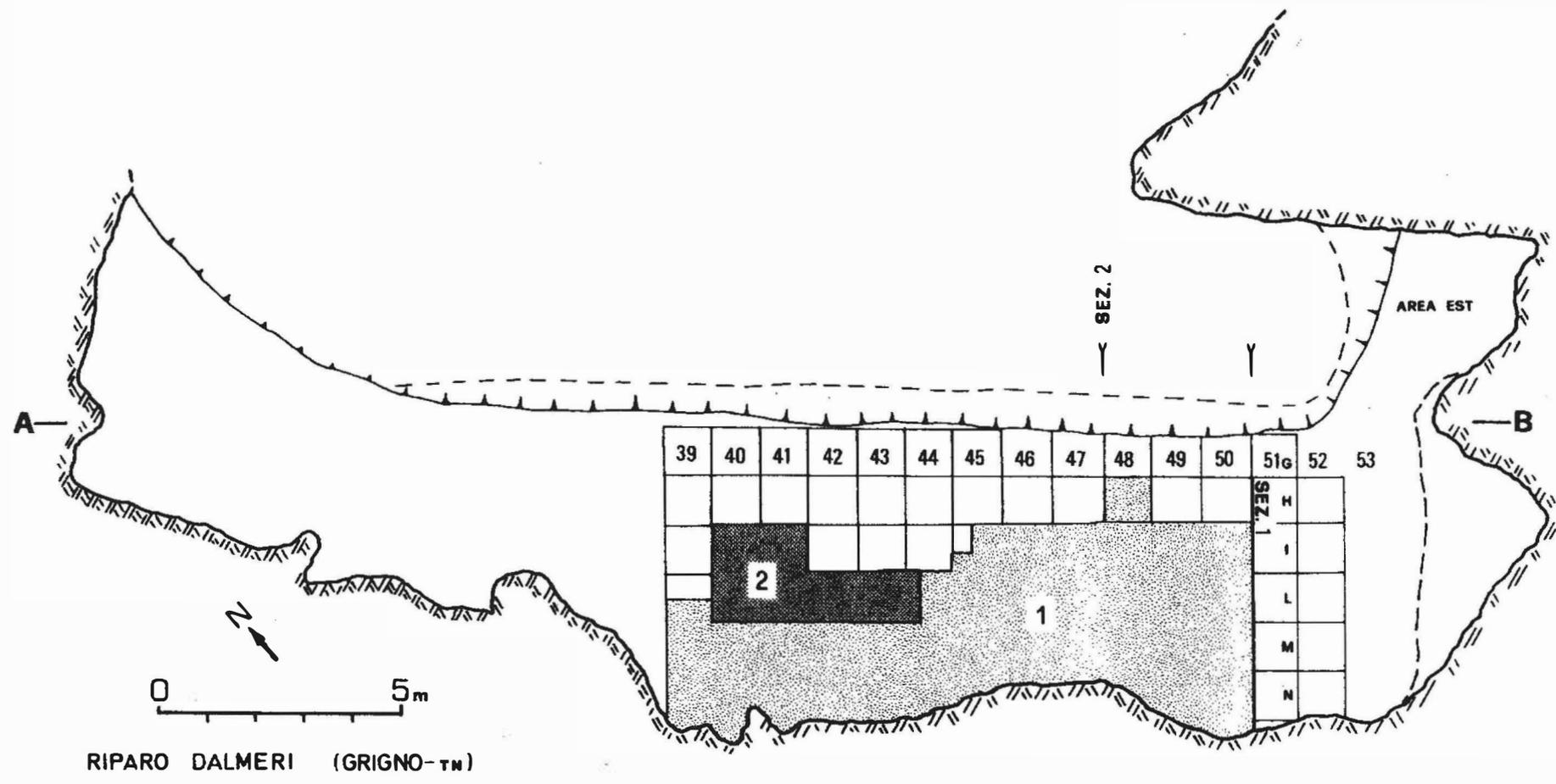


Fig. 2 - 1) area in which the excavation was extended to the base of the anthropic deposit; 2) area in which the excavation was extended to the roof of US26c

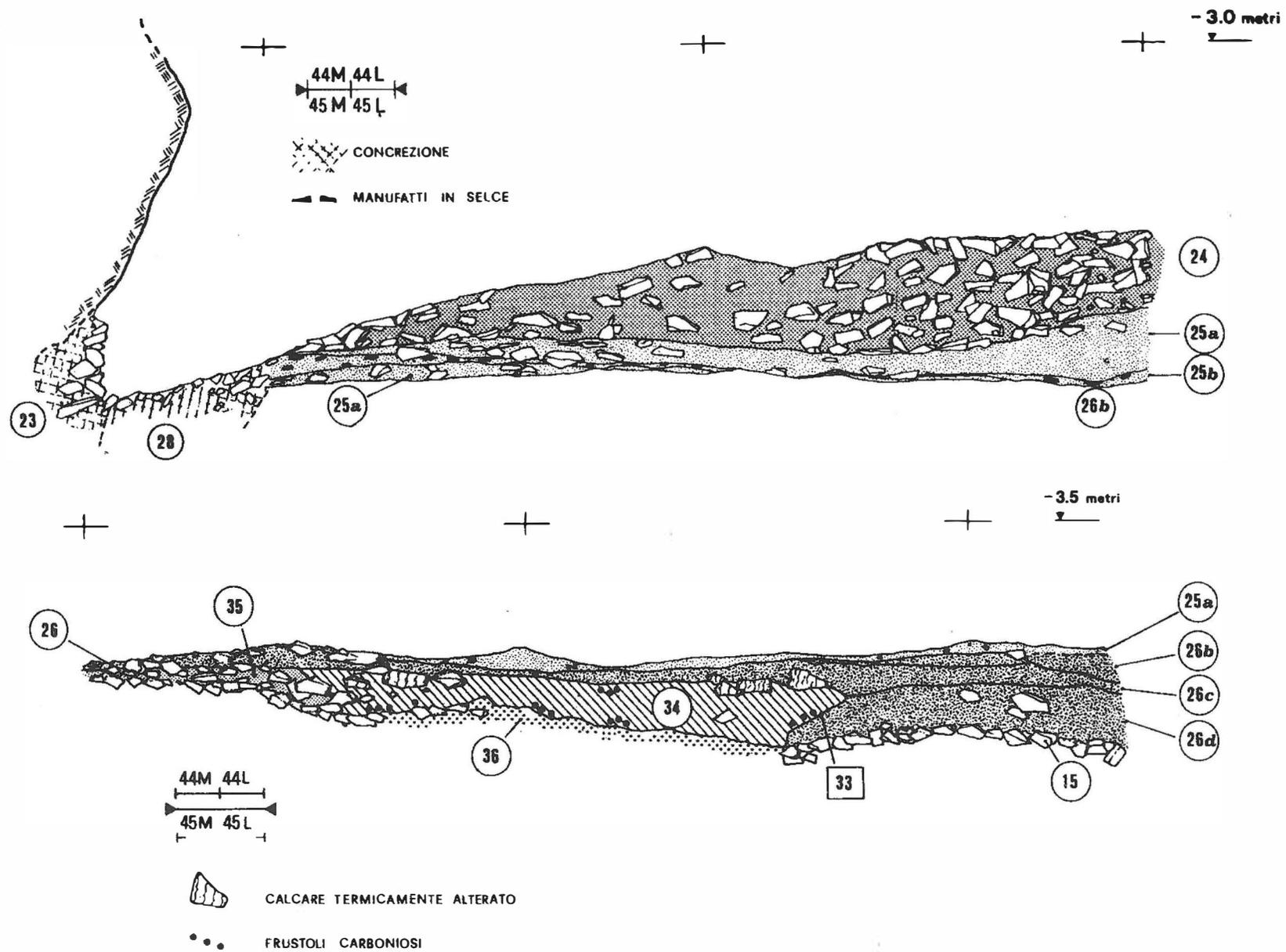


Fig. 3 - Stratigraphic transversal sections of the wall in Sector 1 regarding the anthropical units

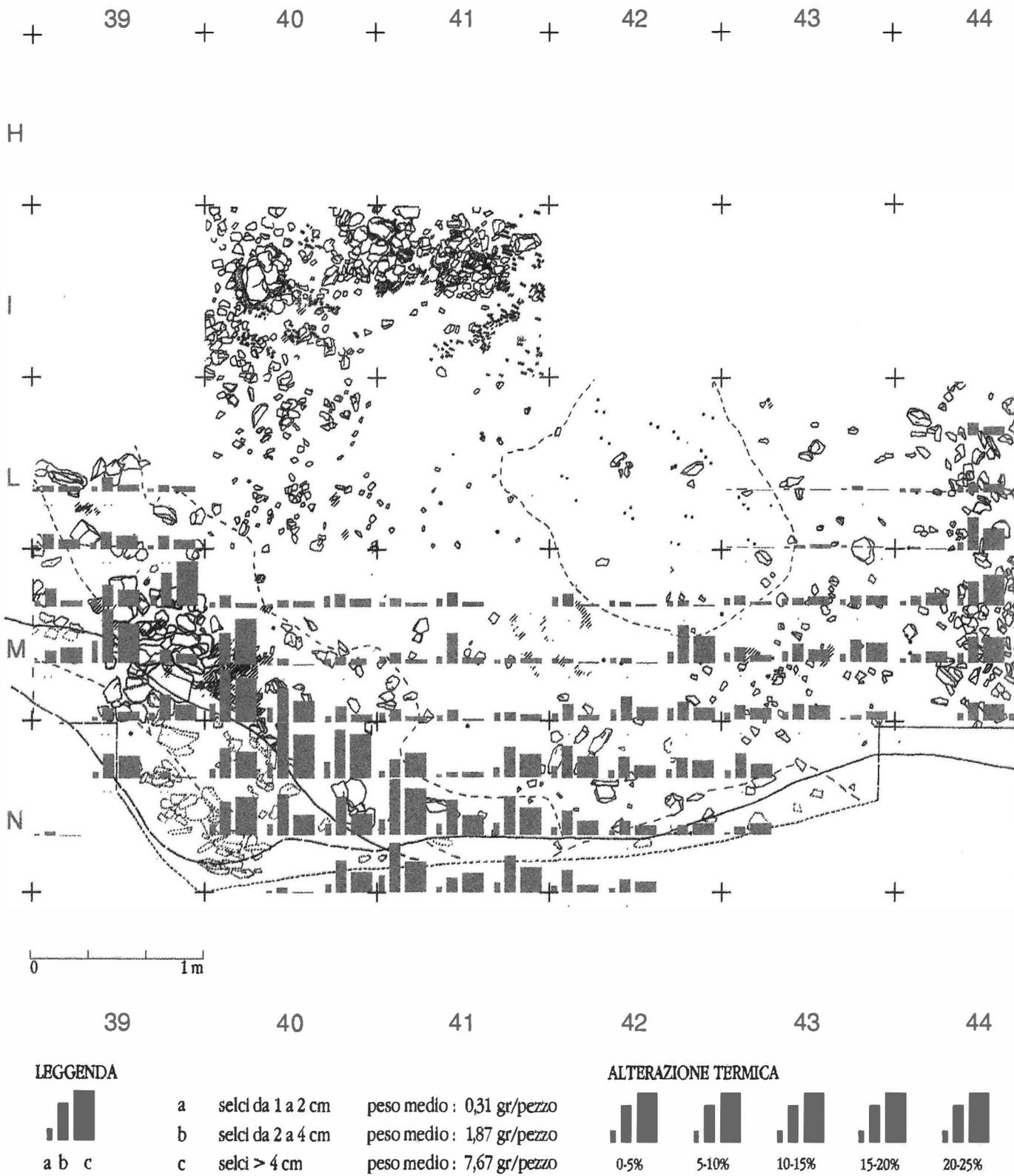
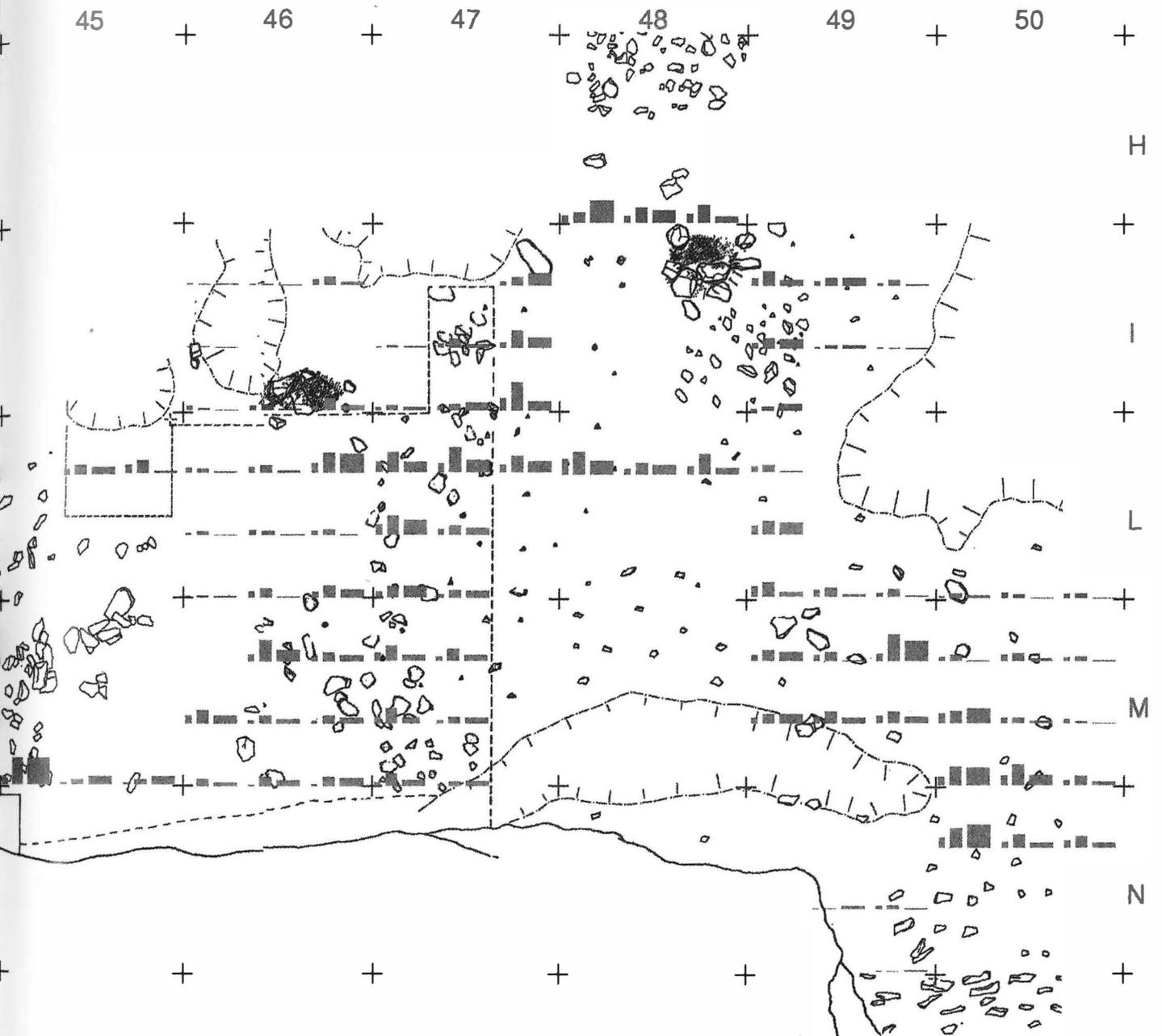
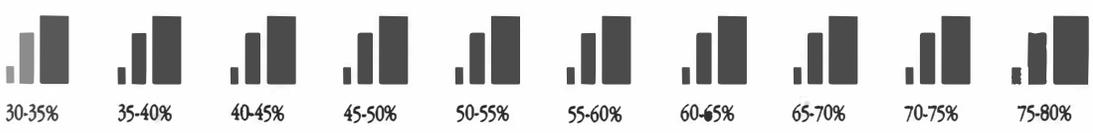


Fig. 4 - Area relative to US26b (and sub-unit). Debitage products: distributive dimensional and thermal alteration (elab. Kompatscher)



45                      46                      47                      48                      49                      50



1997

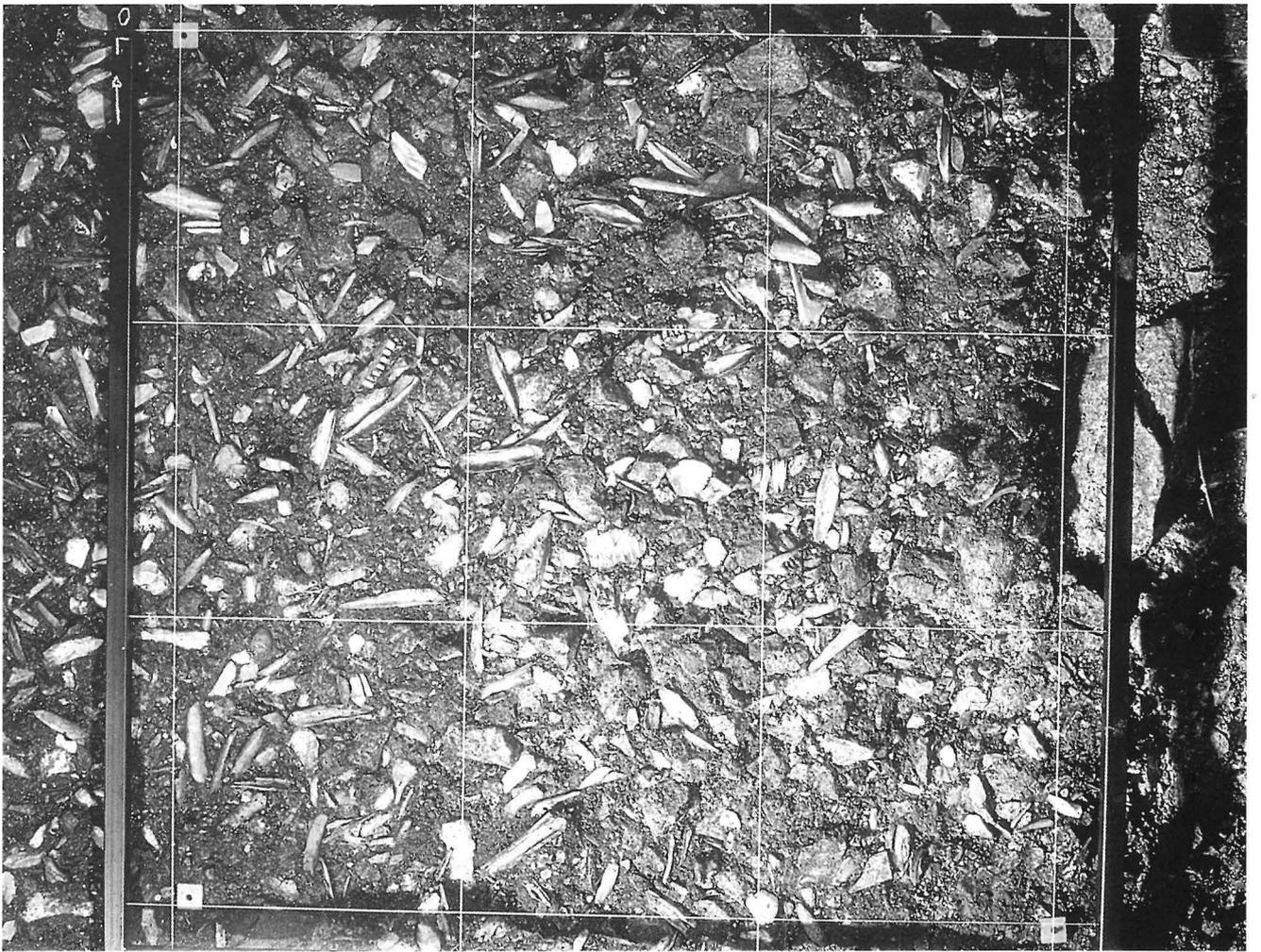


Fig. 5 - Dettaglio della paleo superficie epigravettiana (US 26c)

RIPARODALMERI		1991-'92-'93	
UNITA' STRATIGRAFICHE 14 26b-26c		TOTALE	
STRUMENTI		1583	
	n.	%	
BULINI	283	17.9	
semplici	124	7.8	
su frattura	50	3.2	
su ritocco	64	4.1	
multipli	45	2.8	
GRATTATOI	320	20.2	
frontali+framm.	252	15.9	
(frontali lunghi)	(47)	(3.0)	
(frontali corti)	(151)	(9.5)	
(subcircolari+circolari)	(5)	(0.3)	
non frontali	25	1.6	
carenati	30	1.9	
multipli	13	0.8	
TRONCATURE	230	14.5	
BECCHI	40	2.5	
COLTELLI A DORSO	5	0.3	
PUNTE	16	1.0	
RASCHIATOI	75	4.7	
LAME RITOCATE	369	23.3	
SCHEGGE A RITOCO ERTO	31	1.9	
DENTICOLATI	94	5.9	
FRAMMENTI A RITOCO SEMPLICE	43	2.7	
SCAGLIATI	12	0.8	
FRAMMENTI INDETERMINABILI E DIVERSI	42	2.7	
COMPOSITI	23	1.5	
RIPARO DALMERI		1991-'92-'93	
UNITA' STRATIGRAFICHE 14 26b-26c		TOTALE	
ARMATURE		1628	
	n.	%	
PUNTE A DORSO	48	2.9	
a dorso diretto	14	0.8	
a dorso bipolare	3	0.2	
a dorso parziale	17	1.0	
punta prossimale a base naturale	4	0.3	
a due dorsi sub-rettilinei	3	0.2	
a due dorsi convessi	2	0.1	
base a tendenza pedunculata	5	0.3	
LAMELLE A DORSO	16	1.0	
DORSI E TRONCATURE	329	20.2	
lamelle a dorso e troncatura normale	85	5.2	
lamelle a dorso e due troncature normali	17	1.0	
dorsi e troncatura obliqua ad angolo acuto	6	0.4	
dorsi e troncatura obliqua ad angolo ottuso	96	5.9	
dorsi e due troncature simmetriche	63	3.9	
dorsi e due troncature non simmetriche	35	2.1	
dorsi e <i>piquant-trièdre</i>	11	0.7	
punte a dorso e troncatura	16	1.0	
TRIANGOLI	3	0.2	
isosceli allungati	1	0.1	
scaleno lungo a base corta	1	0.0	
scaleno lungo a base lunga	1	0.1	
SEGMENTI	14	0.9	
segmenti corti	2	0.1	
segmenti lunghi	12	0.8	
BITRONCATURE	2	0.1	
trapezi	2	0.1	
FRAMMENTI DI DORSI INDETERMINATI	707	43.4	
a dorso diretto	607	37.3	
a dorso bipolare	100	6.1	
FRAMMENTI DI LAMELLE A DORSO E TRONC.	387	23.8	
FRAMMENTI DI PUNTE A DORSO	122	7.5	

Fig. 6 - Number and frequency index of tools and backed tools

RIPARO DALMERI		1991-'92-'93	
UNITA' STRATIGRAFICHE 14 26b-26c		TOTALE	
PEZZI RITOCATI		3211	
Strumenti		1583	49.3 %
Armature		1628	50.7

Fig. 7 - Retouched items

RIPARO DALMERI		1991-'92-'93	
UNITA' STRATIGRAFICHE 14 26b-26c		TOTALE	
PRENUCLEI-NUCLEI		227	
Prenuclei		23	10.1 %
Nuclei		204	89.9
MICROBULINI +ALTRI RESIDUI		140	
TOTALE		367	

Fig. 8 - Core, sub-cores, microburins and discards.

RIPARO DALMERI		1991-'92-'93	
UNITA' STRATIGRAFICHE 14 26b-26c		TOTALE	
OGGETTI IN OSSO		99	
Punteruoli		5	
Punte (zagaglie)		8	
Frammenti Punte		10	
Punte con solcature longitudinali (frammenti arpone?)		1	
Spatoline		2	
Aghi		7	
Frammenti osso con foro		1	
Frammenti indeterminati + altri		65	
DENTI DI CERVIDE CON SOLCATURA		2	

Fig. 9 - Bone and ornamental objects.

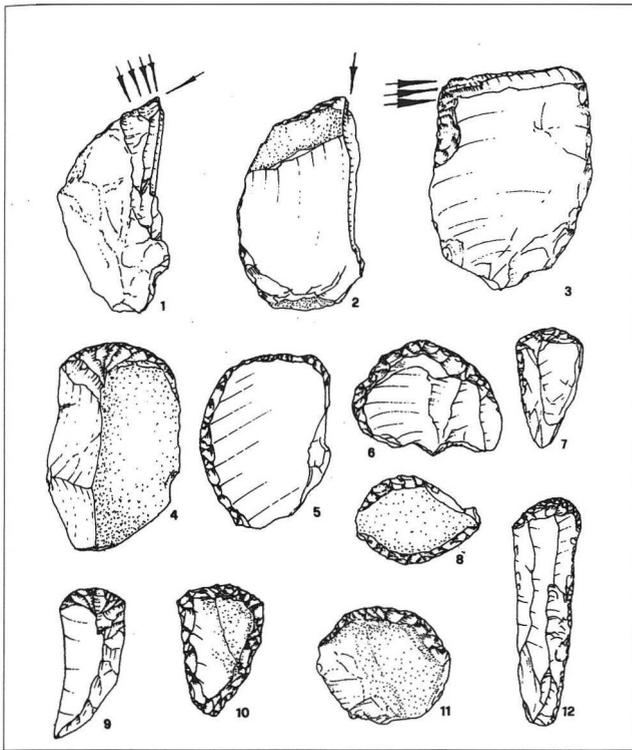


Fig. 10 - Dalmeri rockshelter. Burins and end-scrapers (drawings of lithic/bone industry by Dalmeri)

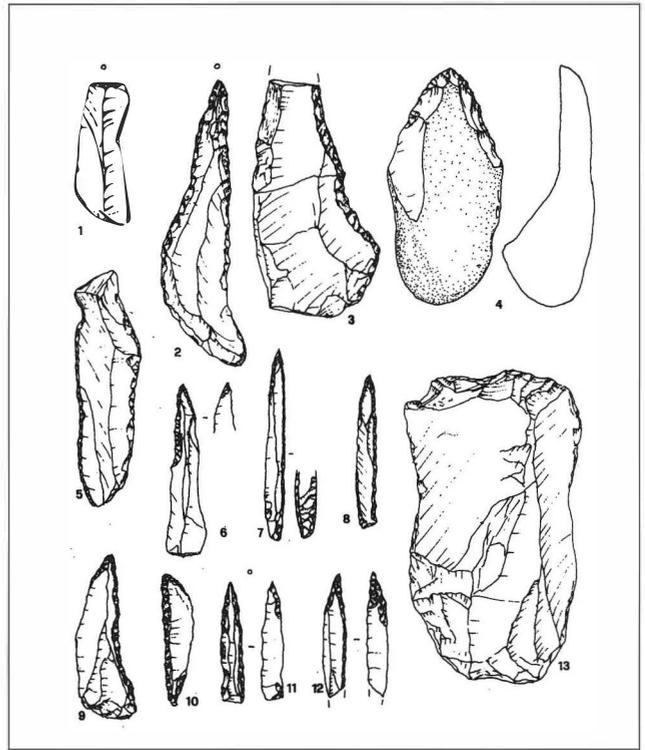


Fig. 11 - Truncated blades, perforator, backed knife, thick point, retouched blade, backed points, scraper

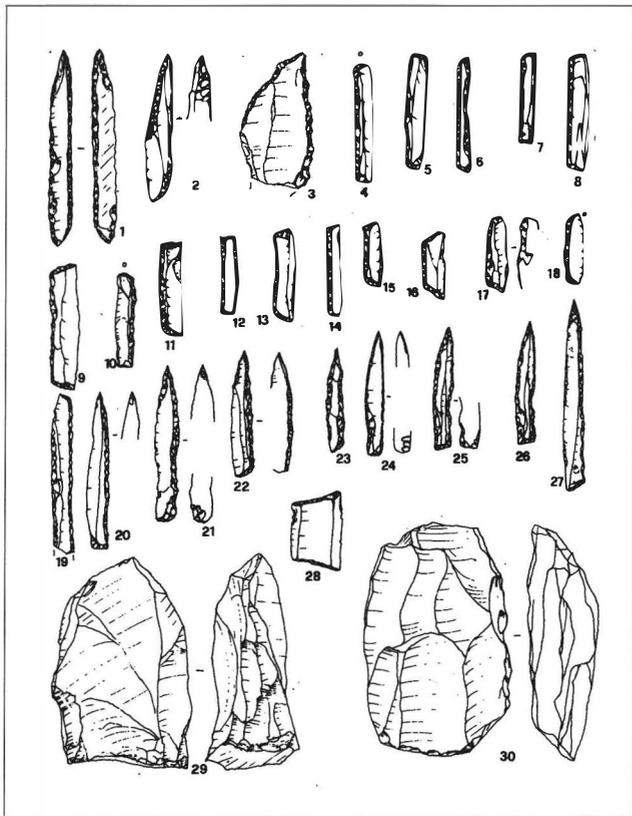


Fig. 12 - Backed tools: 1-3) backed points; 4-19) segmented backed bladelets; 20-27) backed points with truncation; 28) bitruncated piece. Cores

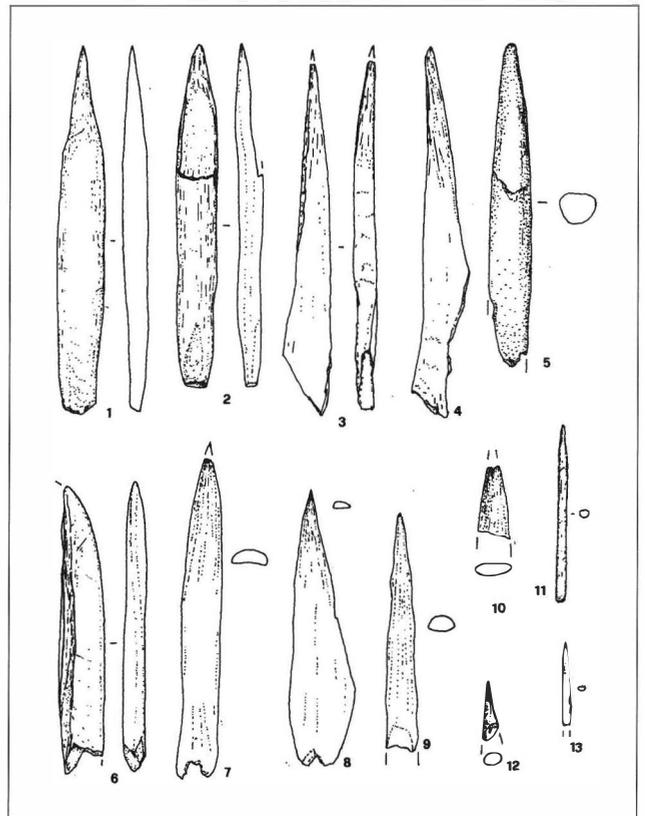


Fig. 13 - Bone tools: 1) awl; 2-5) points; 6) fragments of hooks?; 7-9) points; 10,12) point fragments; 11,13) needles

(n° pezzi ritoccati)	Soman inf. (612)	Soman sup. (268)	Lastari (651)	Dalmeri (3211)
<b>STRUMENTI</b>	22.7 %	27.2 %	45.5 %	49.3 %
<b>ARMATURE</b>	77.3	72.8	54.5	50.7
(n° strumenti)	<b>(139)</b>	<b>(73)</b>	<b>(296)</b>	<b>(1583)</b>
<b>BULINI</b>	4.3 %	8.2 %	18.6 %	17.9 %
<b>GRATTATOI</b>	52.2	50.7	21.6	20.2
<b>TRONCATURE</b>	11.5	12.3	26.0	14.5
<b>BECCHI</b>	4.3	1.3	4.7	2.5
<b>COLTELLI A DORSO</b>	5.8	-	13.5	0.3
<b>PUNTE</b>	-	-	1.0	1.0
<b>LAME RITOCcate</b>	11.5	16.4	5.0	23.3
<b>RASCHIATOI</b>	2.9	2.7	2.4	4.7
<b>ERTI</b>	0.7	2.7	1.0	1.9
<b>DENTICOLATI</b>	2.2	2.7	6.4	5.9
<b>PEZZI SCAGLIATI</b>	-	2.7	1.0	0.8
<b>DIVERSI</b>	-	-	1.0	5.4 <sup>1</sup>
<b>COMPOSITI</b>	4.3	-	1.0	1.5
(n° armature)	<b>(473)</b>	<b>(195)</b>	<b>(355)</b>	<b>(1628)</b>
<b>PUNTE A DORSO</b>	29.3 %	27.5 %	46.7 %	10.4 <sup>2</sup> %
<b>LAMELLE A DORSO</b>	3.9	6.3	10.4	1.0
<b>DORSI E TRONCATURE</b>	60.4	61.3	39.2	44.0 <sup>3</sup>
<b>TRIANGOLI</b>	1.9	2.5	0.9	0.2
<b>SEGMENTI</b>	2.9	-	1.9	0.9
<b>PEZZI BITRONCATI</b>	1.5	2.5	0.9	0.1
<b>FRAMMENTI INDETERMINATI DI DORSI</b>				43.4 <sup>4</sup>
(n° pezzi di tecn.)	16	2	32	
(n° microbulini)	18	11	8	140 <sup>5</sup>

Fig. 14 - Frequency indexes of tools and backed tools of Dalmeri rockshelter, Val Lastari and Soman rockshelter (from BROGLIO *et al.*, 1992, with added notes)

1. Indet. Fragments, simple retouched fragments, others
2. Including fragments
3. Including fragments
4. Undetermined backed fragments have been included elsewhere because they were abundant
5. Microburins and other discards