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Truncations and pseudo-truncations in the Recent Epigravettian industries of North-Eastern Italy.

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ABSTRACT - PERESANI M., ZIGGIOTTI S. & DALMERI G., *Truncations and pseudo-truncations in the Recent Epigravettian industries of North-Eastern Italy.* – Starting from the recurrently-mentioned variability in the frequency of truncated tools reported by several scholars, sometimes interpreted as an indicator of adaptation, the authors felt the need to carry out a study on these implements. As feasible procedure was above all necessary that of experimental blademaking and the accidental production of transverse retouch during flaking, in order to obtain some reference for the subsequent analysis to be conducted on the archaeological artifacts. Once this accidental incidence had been highlighted, the study pointed out a clear variability in the morpho-technical and metrical features for this type of tool emerged that induced the authors to check certain affinities between the sheltered sites (independently from their geographic position) and the open-air camps. Results claim a functional study as a profitable perspective of investigation aimed at recognizing or otherwise functional classes, and to isolate those bearing similar features showing a standard procedure of selection.

Key Words: Epigravettian, Eastern Italian Alps, lithic technology, truncation, experimentation.
Parole Chiave: Epigravettiano, Alpi Orientali Italiane, tecnologia litica, troncatura, sperimentazione.

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1. INTRODUCTION

The interest in truncations which led to this article arose from the need to interpret a group of particular aspects encountered on both a diachronic and synchronic scale in the Recent Epigravettian of North-Eastern Italy. As some authors have already noted (BROGLIO 1997; BROGLIO & IMPROTA 1994-1995; BROGLIO *et al.*, 1992), a certain variability can be gleaned by observing at systematically differing frequencies whereby these implements occur in all the lithic assemblages recovered from valley-bottom and upland coeval sites: the former are characterised by end-scrapers prevailing over other tool types, the latter by the higher content in truncations, burins and backed knives.

In order to verify these presumed differences, analyse the manufacturing techniques and provide a basis for future functional studies, we considered it opportune first of all to move on to more technological questions concerning the production of accidental artifacts during flaking and formal toolmaking. The two latter aspects, together with the results of an experimentation, constitute the first part of this paper.

The results of the morpho-technological study conducted on the truncated tools sensu strictu (pieces on which truncation plays a subordinate role - like truncation burins, composite tools, truncated backed bladelets - are excluded) selected from three culturally coeval sites settled in different contextes constitute the second part of this work which, before treating the data, inspects the evidence reported in literature for the region concerned.

In a wider perspective, this investigation could also provide new elements for a future assessment of lithic production during this cultural phase, and of its implication in the reconstruction of settlement dynamics. Certainly, truncation displays versatility and

offers wide opportunities for application. Some reports taken into consideration from the literature (Ziggiotti & Peresani, 2001) highlight a relationship between shape and function, making it possible to group tools bearing evident morpho-metrical and typological affinities. Hence, a more specific characterisation may be opportune in order to distinguish different forms and take into account blank features, size, truncation shape and retouch.

2. CHRONOLOGICAL, ENVIRONMENTAL AND CULTURAL CONTEXT: A BRIEF INTRODUCTION

The history of human colonization during the Recent Epigravettian period in the Eastern Italian Alps is documented by numerous sites (some of which have been systematically excavated), and by various paleo-environmental archives that contribute to understanding the ecological modifications that occurred from the LGM to the onset of the Holocene.

In prealpine lacustrine basins, the late-glacial beginning is marked by open larch stands occurrence (Casadoro *et al.*, 1976), from which the conifer forests expanded during the interstadial and the tree line raised well over the altitude of 1,050 m at the end Bølling (Avigliano *et al.*, 2000; Schneider, 1985; Kofler, 1994). Forest expansion promoted human peopling the Pre-Alps and the Southern Dolomites, and implementation of settlement site systems extended from the main S-N disposed valleys across the Pre-alpine fringe to the karst plateaux (Lessini, Tonezza-Fiorentini, Asiago, Cansiglio, Piancavallo) at altitudes ranging from 1,000 to 1,500 m (Broglio, 1992; Broglio & Lanzinger, 1996).

According to A. Broglio & M. Lanzinger (1990), the settlement system was structured through:

A) residential sites in valleys at the foot of Pre-Alps. Mainly sheltered, these sites provide evidence of repeated human occupation (palaeo-living floor organization and subsistence economy) and show that many activities took place into the inhabited area, such as flint flaking, bone tool-making, butchering, hearth construction and maintenance, preparation of particular zones, cleaning the sheltered area and outside refuse evacuation;

B) middle-mountain seasonal camps, commonly found in the open ground near rock cliffs, peat-bogs, sheets of water or under rockshelters and sometimes very close to flint sources. Especially significant are shelters, where evidence of varied (ibex, red deer, chamois, roe-buck) or specialized (ibex at Dalmeri shelter) game hunting and fishing has been uncovered;

C) seasonal hunting camps at middle-to-high altitude. Lithic sets recovered at these sites are scarce and dominated by various implements intended to be hafted on weapons: backed points, backed bladelets, truncated backed bladelets and some types of geometric microliths.

The main cultural outline of this period has traditionally been depicted on the basis of the typological features concerned with the lithic assemblages recovered both at open and sheltered sites (Broglio, 1980, Bisi *et al.*, 1983). Other aspects regarding subsistence, site organization, art and non-flint tool-making and tool-utilization are less-known due to the strong heterogeneity and general dearth suffered by the archaeological records. Concerning lithic industries, it has been noted that the succession of the Tagliente Shelter is considered as the traditional and unique source useful in defining the first of three phases in which the Recent Epigravettian has been divided (Bisi *et al.*, 1983). In its turn, the second phase is well represented at Tagliente as well as at many other sites (Broglio, 1992): very short end-scrapers in prevalence, with thumbnail, sub-circular, semicircular outline and fan-shaped configurations; backed-knives are present only during the Allerød; backed points form a large typological variety including micrograveltes and other types of implements; backed and backed truncated bladelets are frequent; rare lunates, triangles and trapezoids occur. Except for trapezoids which disappear, these microlithic geometric implements abruptly increase during the third, final Epigravettian phase, in concomitance with the massive adoption of the microburin method and the appearance of forms that seem to prelude the Sauveterrian period (Broglio, 1992; Cusinato *et al.*, in press).

Chronologically, these phases fall or approximately cover the late-glacial subdivisions, in accordance with the ^{14}C dates obtained from many different sites (Broglio & Improta, 1994-1995): the first phase bracketing the Oldest Dryas[1], the second one covering the Bølling/Allerød interval and the main part of YD, while the third one is of uncertain position, and might be placed approximately around the YD – Preboreal transition. Site attribution to one or another of these phases, nevertheless differs among scholars (Broglio, 1992; Guerreschi, 1996) in function of the employed approach and the importance gave to the typological evolution.

3. THE SITES

The selected sites differ from one another on the basis of their location, environmental situation and complexity or simplicity of archaeological records.

According to their geographical position and altitude from the foot-hill to the middle altitude plateaux, a brief description of stratigraphy, environmental data, archaeological remains, archaeozoological and techno-typological data extracted is presented. All these sites display radiocarbon dates and in particular case of shelters, preserve stratigraphic successions which provide a good basis for truncated implements to be submitted to analysis.

3.1 *Soman Shelter*

The shelter lies at 100 m altitude in the Adige Valley and was excavated by A. Broglio & M. Lanzinger from 1984 to 1988 (Battaglia *et al.*, 1992). Laid upon a gravelly bar and overbank deposits of the Adige River, the upper part of the succession is formed by a thermoclastic breccia with anthropogenic Epigravettian levels and by mainly colluvial and anthropogenic fine deposits with Mesolithic and Neolithic remains. Stratigraphy, faunal remains and ^{14}C dates reveal the existence of two main Epigravettian occupation phases correlated with some environmental modifications: the lower one dates back to the Allerød, the upper one to the YD. In their archaeozoological study, A. Tagliacozzo & P.F. Cassoli (1992) pointed out how hunting concerned adult and young-adult ungulates in the ecologically varied site-surroundings, and noted that summer-early autumn seasonal slaughters occurred.

The lithic assemblage includes cores and flaking products derived from manufacturing of blades and bladelets. Apart from the backed knives, recovered only in lower units, the retouched implements from the two phases are similar. Tools number about 30% of the total: short thumbnail, semicircular, circular, subcircular and fan-shaped end-scrapers are more frequent than truncations and burins. Among the backed pieces, various types of truncated backed bladelets largely prevail over points, over very few backed bladelets as well as over rare triangles, lunates and trapezoids. Points, in their turn, count mainly micrograveltes and other small types.

3.2 *Dalmeri Shelter*

The Dalmeri shelter is situated at 1,240 m altitude on the northern slope of the Asiago Plateau, and is under extensive excavation managed by the Trento Natural Science Museum (Bassetti *et al.*, 1998). The site represents a case-study of notable interest for both its geographic setting and the presence of dwelling structures with faunal remains, flint and bone artifacts, ornamental objects and painted stones.

The earlier Epigravettian occupation occurred during a temperate climatic phase dated to the Allerød. Humans settled on a soil surface which was already stabilized and affected by pedogenesis (Angelucci & Peresani, 1998). Studies on macromammal remains (Curci & Tagliacozzo, 2000; Fiore *et al.*, 1998) suggest that the shelter was inhabited during the summer or early autumn in order to perform specialized hunting of ibex.

Up to now, with detailed lithic technological, typological and functional analyses currently in progress (Dalmeri, Cusinato, Montoya, pers. comm.), a sample of the lithic assemblage has been studied from a typological standpoint and a first assessment has been proposed about the organization of the lithic production (Cusinato, 1999; Bassetti *et al.*, 1995). Local flint as well as various exogenous types were exploited in order to obtain blades, bladelets and some flakes which were shaped into various tools: end-scrapers, the most frequent implement, mainly of short frontal type; burins (largely truncation burins); retouched blades and truncations; blades with marginal or invasive retouch, backed knives, points and piercers that instead record low frequencies. Truncated backed bladelets and backed points mostly prevail over backed bladelets and rare triangles, lunates and trapezoids. Truncated backed bladelets provide a wide variety derived from the number and arrangement of truncations. Backed points count mainly micrograveltes and other different types.

3.3 *Val Lastari*

This open-air site lies at 1,060 m of altitude on the Asiago Plateau, in the Lastari Valley, near a shallow limestone wall. Excavations managed from 1990 up to 1996 by A.Broglio and M.Peresani surveyed a 70 m^2 surface divided in two main sectors. Current research focuses on the organization of the lithic production. Leaving the wide chronological interval out of consideration, the set of radiocarbon dates suggests that site occupation mainly occurred during the Allerød (more details are given in Broglio *et al.*, 1992).

Field data, routine and micromorphological analyses (Angelucci & Peresani, 1995; in press) provided information about two late-glacial pedogenetic phases, one of which has been related to a palaeo-living floor (levels 3D-3F), and showed how various post-depositional processes were responsible for reducing the variety of archaeological remains and distributing the lithic artifacts both vertically and horizontally.

The existence of flint workshops has been suggested by the recovery of rough or tested blocks, va-

rious flaking products and a few hammerstones, in association with some waste pits and a cache filled with rough or tested flint cobbles provisioned in the vicinity of the site (PERESANI, 1992; in press).

The aims and modalities of toolmaking have been identified by means of technological analyses (MONTOYA & PERESANI, in press) that revealed the occurrence of three independent sequences largely performed on local flint: blade-making concerned straight blanks to be shaped into backed knives or to be used as brute; bladelet-making was addressed towards two morphometric categories ideal for shaping backed pieces; lastly, a few blanks (sometimes slightly retouched), were obtained from a subordinate production of laminar flakes. As regards retouched tools (BROGLIO *et al.*, 1992), the most numerous are the endscrapers (frontal, very short, with thumbnail and semicircular outlines), burins (dihedral, truncation, on fracture), backed knives and retouched blades, while the other types of implements on flake and blade are subordinate. Among the microliths, backed points and backed truncated bladelets appear to be highly differentiated.

4. A SIGNIFICATIVE STRUCTURAL IMBALANCE?

Following the cultural evolution of the Recent Epigravettian, it is possible to assess in Tab. I how the frequency of truncated blades and bladelets varies among the different phases and coeval sites. The first phase shows that, at the Tagliente Shelter, values are generally low and range from 3,6% to 7,9%, while the second phase reveals low indices at the Tagliente and Soman shelters, and higher ones in some sites such as Fiorentini, Battaglia Shelter, Val Lastari and Bus de la Lum. On the other hand, values remain low at Dalmeri Shelter and Viotte di Bondone. Except in the case of Pian dei Laghetti, the third phase records low values.

Thus, the frequency of truncations considered in a diachronic perspective is notlinear. In this respect, certain observations have been made (BISI *et al.*, 1983) on the variations encountered along the different arbitrary levels of Tagliente, in which a decreasing trend can be observed at the Oldest Dryas – Bølling transition. In spite of this evidence, the authors refrain from any commitment of chronological significance. In fact, not only are values rather irregular, but some of the Oldest Dryas levels record very low frequencies (levels 14 and 13).

By comparing the frequencies recorded at Battaglia Shelter and Viotte di Bondone, B.BAGOLINI & A.GUERRESCHI (1978) assigned a cultural significance

Phase	Site	Altitude	Frequency (%)
III	Pian dei Laghetti	1490	17,6
	Piancavallo	1280	5,3
	Palughetto	1030	7,5
	Andalo	1000	2,7
II	Viotte	1600	4,5
	Fiorentini	1480	14,8
	Dalmeri (26c)	1250	3,9
	Val Lastari	1060	11,8
	Battaglia	1050	13,7
	Bus de la Lum	995	20,2
	Tagliente (t.4)	250	3,2
	Tagliente (t.5)	"	5,2
	Tagliente (t.6)	"	4,3
	Tagliente (t.7)	"	2,1
	Tagliente (t.8)	"	3,2
	Tagliente (t.9)	"	3,5
	Tagliente (t.10)	"	5,3
	Biarzo (5b+5c)	160	3,2
	Biarzo (5c)	"	1,7
	Soman UTB	100	6,7
	Soman LTB	"	5,2
I	Tagliente (t.11)	250	7,9
	Tagliente (t.12)	"	5,3
	Tagliente (t.13)	"	3,6
	Tagliente (t.14)	"	3,8
	Tagliente (t.15)	"	5,8
	Tagliente (t.16)	"	6,7

Table I: Truncation frequencies from the Recent Epigravettian sites calculated on the total of retouched pieces as reported in literature. Data from Campoluzzo di Mezzo (ANGELUCCI, 1996), Passo delle Fittanze (CHELIDONIO, SOLINAS, 1979) and Villabruna shelters (AIMAR *et al.*, 1992) have not been taken into consideration owing to the scarcity of tools. Data from Dalmeri Shelter are referred to the stratigraphic unit 26c and to the overall tools recovered during the 1994-95 fieldworks (CUSINATO, 1987-88). References: Tagliente Shelter, BISI *et al.*, 1983; Soman Shelter, BATTAGLIA *et al.*, 1994; Biarzo Shelter, GUERRESCHI, 1996; Bus de la Lum, PERESANI *et al.*, 1999; Battaglia Shelter, BROGLIO, 1964; Val Lastari, BROGLIO *et al.*, 1994; Alpe dei Fiorentini, BARTOLOMEI, BROGLIO, 1967; Viotte di Bondone, BAGOLINI, GUERRESCHI, 1978; Palughetto, MASIN, 1997-98; Andalo, GUERRESCHI, 1984; Piancavallo, GUERRESCHI, 1975; Pian dei Laghetti, BAGOLINI *et al.*, 1986.

to the different values. Such a discrepancy, together with others observed, justified a subdivision of the Recent Epigravettian complex in two phases, of which the Battaglia (characterized by high frequency of truncations, lack of geometrics, absence of tools with bilateral back) could represent the earlier phase and the Viotte di Bondone the later one. Viewed in a synchronic perspective, the content of truncated tools – higher at Battaglia than at Tagliente - was interpreted as an indicator of adaptation.

The evolutive sequence described more recently by A.Broglio (Broglio, 1992; Broglio & Improta, 1994-1995) does not take into account the variation of truncated tools as an useful evidence for discriminating the different cultural phases. Moreover, even if one considers the increasing quantity of data and number of sites, this variability is of not great value from a diachronic standpoint. More interestingly, a slight difference emerges from a synchronic standpoint, according to which the sites share the same overall features in their lithic industries (Broglio & Improta, 1994-1995; Broglio, 1997). In the specific case of the second Epigravettian phase, sites differing in their altitude position (valley bottom, middle mountain) and location (i.e. open-air or under rockshelter), such as Soman, Val Lastari, Fiorentini and Battaglia, reveal throughout an apparent homogeneity in flaking procedures and typological features, as well as a clear variability in the lithic set compositions. In fact, mountain sites abound in burins, truncations and backed knives, as much as in backed points among the microliths; at the low-altitude sites, higher values are recorded for end-scrapers, while microliths are prevalently backed truncated bladelets. Among the domestic tools, the scarcity in truncated blades was considered a significant element for differentiating the valley-bottom sites from the other camps.

It was thus necessary to investigate whether the structural imbalance of truncations is flanked by respective techno-typological or metrical variations, or whether it is due to diverse economies adopted in the use of chipping products that are to be linked to site functionality. For a correct assessment of this problem, it should not be forgotten that a certain bias derives from the degree of subjectivity expressed during classification and also from the different criteria adopted in the course of selection from the lithic assemblage. With the purpose of reducing this uncertainty and investigating the intent behind pieces that exhibit marginal/discontinuous retouch (and that are inconsistent in the typological computations), an experimental protocol was required. Following a review of the relevant literature, the observations discussed below were especially addressed towards on the occurrence of accidental transverse retouch during blade and bladelet-making, while some tests were carried out in obtaining formal tools.

5. TRUNCATION: A VARIEGATED TECHNOLOGICAL REALITY

Although the literature contains various typological definitions relative to truncations (Ziggiotti, 1999-2000), and despite their lack of uniformity, it seems more difficult to collect information on these tools from a technological point of view. Generally speaking, even in the study of lithic industries, observations on the type of blank chosen for the manufacture of truncations (whether they are broken or not) tend to be ignored. An exception is the work of B. Schmider (1992) on the lithic industry from Marsangy, in which the truncations were grouped together not only on the basis of the form of truncation, but also on their location and the kind of blank used, which was distinguished on the basis of width and thickness. In addition, particular importance was given to the retouch itself, isolating those artifacts on which the retouch was applied to a break. The problem of blank breakage seems to be taken for granted even by those authors who have established a typological definition of "truncations". Among those examined, only G. Laplace (1964) specifies that they can be used to rectify a break obtained in various ways (but always intentionally), and not limited by the presence of the truncation or the break, since he was referring to independent retouch. On the other hand, Fortea Perez refers to truncations as "retouched breaks", implying that, for this author, the retouch was always applied to the surface of a break.

As far as the techniques adopted for making truncations are concerned, J.D. Clark (1974, p. 99) believed that the retouch was applied using pressure. A different scenario was proposed by J.L. Piel-Desruisseaux (1986, p. 10), who illustrates the manufacture of a truncated blade by means of direct percussion, using either soft or hard hammer, and anvil. Finally, M. Brézillon (1973, p. 128) suggests that hard hammer direct percussion was used, without anvil.

Apart from the methods used for their manufacture, another more basic problem to be resolved is the distinction between intentional and accidental retouch. Accidental retouch means the formation of involuntary retouch, which is easily confused with intentional retouch. Pseudoretouch may occur when blades or flakes are trampled, subjected to thermal stress, or else during use, such as when cutting or scraping hard matter (Newcomer, 1976). In addition, there is a strictly technological phenomenon observed by Newcomer during the experimental blademaking (*ibidem*), which causes the formation of "spontaneous" retouch (very similar to intentional retouch). This is particularly relevant to truncations, since the spontaneous modification of the blank tends to occur on the

distal end. This phenomenon occurs when a blade (at the moment of its removal from the core) cannot fall freely as it is blocked by the knapper's hand or thigh which functions as a pivot around which the blade rotates. The blade, in turn, is pushed by the force of percussion and is subjected to pressure on the distal part against the core, which is strong enough to remove a small series of flakes of the same morphology as those produced by intentional retouch (NEWCOMER, 1976, p. 62, fig. 1). The phenomenon observed by Newcomer is analogous to that noted by J. TIXIER (1963, p. 42; 1995, p. 86) on microburins: accidental retouch, often confused with use-wear, which forms at the moment of breakage of the lamellar blank. Spontaneous retouch is not related to any particular flaking technique; it can be observed with both direct percussion using a hard or soft hammer, and indirect percussion, or else with a retoucher, though it seems to occur more commonly with direct percussion where the flaking products are held with the fingers. The retouch is mainly direct and generally affects the distal part of the blank, although lateral retouch or notches may form (usually close to the distal end) when the flake rotates laterally; the retouch is abrupt, and in many cases marginal. Various types of artifacts can result from the formation of spontaneous retouch, including truncations, perforators, end-scrapers and denticulates. The experimental artifacts include two truncations: one total, and the other partial on break (NEWCOMER, 1976).

Newcomer's experiments were confirmed by those of Mansur-Franchomme, who analysed the technological changes related to direct percussion and observed on experimental artifacts: the formation of scales on the distal part of the flake or blade at the moment of detachment from the core. According to this author, they are however generally of small dimensions (similar to the flaking that occurs as a result of use), and only in rare cases are they large enough to constitute "pseudoartifacts", without being able to distinguish them from intentional retouch. The "pseudoartifacts" which may form in this way include small endscrapers, denticulates and truncations (MANSUR-FRANCHOMME, 1986, pp. 135-136).

Accidental retouch has also been observed by L. OWEN (1988, p. 68), whose experiments confirmed that various kinds of retouch were obtained on the distal part of blanks: rectilinear, oblique, concave and convex; similar modifications on blades and flakes can also be the result of trampling and other accidental damage.

Similar morphologies to those of incidental retouch can also be produced by means of the voluntary breakage of a blank, when the breakage surface comes into contact with a stone hammer or anvil which abrades it (BERGMAN *et al.*, 1983; OWEN, 1982). This question is further complicated by the fact that spontaneous retouch can also be combined with unintentional breakage (ROCHE & TIXIER, 1982, p. 74), which can occur as a result of either percussion or pressure, giving rise to *franches* and tongued morphologies. After a series of experiments of both intentional and accidental breakage, Owen concluded that it is very difficult to distinguish between these, and that they are not restricted to particular morphologies, except for the traces of impact due to the percussion of an artifact resting on an anvil. In the study of the voluntary breakage at the site of Hengistbury Head, the experimental reproduction of artifacts showed the typical morphologies which accompany the percussion producing the break: impact cones, percussion cones, abrasion of the dorsal ridges, and phenomena which are generally called "contact traces" (BERGMAN *et al.*, 1983, pp. 330-331) are never observed as flaking accidents, while a second series of evidence - constituted by cracks, undulations and lip morphologies - is associated with breaks produced by flexion.

The difficulties inherent in the lack of an unequivocal definition of truncated artifacts are compounded by those deriving from the uncertainties concerning not only the techniques used to produce the tools, but also the deliberate nature of their making. Despite this, it should be pointed out that the production of real pseudoartifacts due to spontaneous retouch does not occur very often (MANSUR-FRANCHOMME, 1986, pp. 135-136), and that, even in the most frequent case in which this retouch is marginal, experimentation offers a valid aid whereby to understand the frequency with which spontaneous retouch occurs, its morphology and its characteristics (NEWCOMER, 1976, p. 64), as well as the context to which the artifact belongs, since a single piece with distal, abrupt, marginal retouch will be more suspect if it is found amongst waste flakes, compared with a similar artifact found within a group of clearly intentional tools.

6. THE EXPERIMENTATION

In order to answer the questions above and to interpret the incidence of some artifacts with summary retouch in the Epigravettian lithic assemblages, a series of experiments was carried out which focused on the accidental occurrence of truncations (from here on "pseudo-truncations") during blade/bladelet-making, as much as the intentional tool manufacture.

The raw material used was supplied from the residual deposits which make up the valley bottom of the Lastari valley (Asiago Plateau), close to the eponymous site (BROGLIO *et al.*, 1992; PERESANI, 1992). It

consists of ten centimetre blocks and tablets of compact and cryptocrystalline chert from the Biancone formation (Lower Cretaceous). Knapping was carried out by three experimenters with direct percussion, employing both soft stone and organic hammers (red deer antler or box wood). During manufacture, the formation of spontaneous retouch was observed on the transversal part of 18 blanks, almost all of which occurred during the main phase of core reduction (Tab. II).

6.1 *The pseudo-truncations*

In the light of the experiments it is possible to focus on two distinct phenomena: spontaneous retouch occurring on the distal part of the blanks, i.e. on the sharp edge, and technological breaking with an associated spontaneous retouch.

Spontaneous retouch on the distal part was observed on various blank types: cortical flakes, crested blades (Fig. 1, n. 1; Fig. 2, n. 1, 2), blades and bladelets (Fig. 1, n. 5; Fig. 2, n. 3). Retouch is direct, abrupt and very marginal; total retouch occurs rarely, partial frequently, or usually located on a corner; one was discontinuous on a single bladelet.

Quite frequently during the experiments, spontaneous retouch was seen to form on the surface of the break, a situation which Newcomer's article does not cover in particular; however, the same article shows the drawing of an artifact with a clear accidental truncation next to the break (Newcomer, 1976): the retouch lies on one corner of the transversal part, and is very similar to a series of examples obtained during experiments and which are quite systematic.

Truncations on breaks have been observed on different types of laminar blanks: in the early stages of knapping, there are first blades, crested blades (Fig. 2, n. 5) which are sometimes thick and long, and cortical blades (Fig. 1, n. 3); in addition, accidental truncations also appear during blade-making (Fig. 1, n. 2,

blank	h.	edge	ampl.	distr.	table/photo	notes
cortical flake	shs	entire	m	2/4		thick butt; thick blank
first blade	shs	fracture	p	4/4		simple asimmetric fract., prominent part; lateral triangle
cortical blade	sh	entire	p	total	Fig. 2/3	
cortical blade	shs	fracture	m	1/4		simple asimmetric fract. with radial fissures, prominent part
cortical blade	shs	fracture	tm	3-4/4		lower simple fract.
crested blade	shs	entire	p	4/4	Fig. 2/2	
crested blade	shs	fracture	m	1/4	Fig. 2/5	simple fract.; lateral triangle
crested blade	sh	entire - fract	p-m	4/4-4/4	Fig. 1/1-Fig. 2/1	simple proximal fract. with radial fissures, promi-nent part; lateral triangle
blade	sh	entire	m	3-4/4		
blade	shs	fracture	vm	disc		simple mesial fract., prominent part
blade	sh	fracture	p	1/4	Fig. 1/2	simple fract.; lateral triangle
cortical bladelet	shs	fracture	m	1-2/4	Fig. 1/3	simple fract., prominent part; lateral triangle
bladelet	shs	entire	m	1-2/4		
bladelet	shs	fracture	m	4/4	Fig. 2/4	simple fract., prominent part; lateral triangle
bladelet	sh	entire	m	disc	Fig. 1/5	
bladelet	sh	fracture	p	1/4;4/4	Fig. 1/4	lower fract. tongue, prominent part; lateral triangles
hinged bladelet	shs	fracture	vm	1/4		upper fract. tongue, prominent part;
secondary bladelet	shs	fract/fract	p-vm	tot/tot	Fig. 1/6	by-product; simple prox. fract., prominent part

Table II. List of the experimental pseudo-truncations. There are indicated: blank morpho-technical features, employed hammer (h) (soft hammerstone - limestone, soft hammer-boxwood), edge type on which pseudo-truncation occurs, retouch amplitude (vm-very marginal, m-marginal, p-profound) and distribution (indicated through a quarters non-cumulative subdivision of the edge; disc=discontinuous) and some observations concerning the blank, the fracture on which pseudo-truncation occurs and the detachment of the characteristic triangular portion associated. In the case of multiple truncations, the first truncation described corresponds to the distal one.

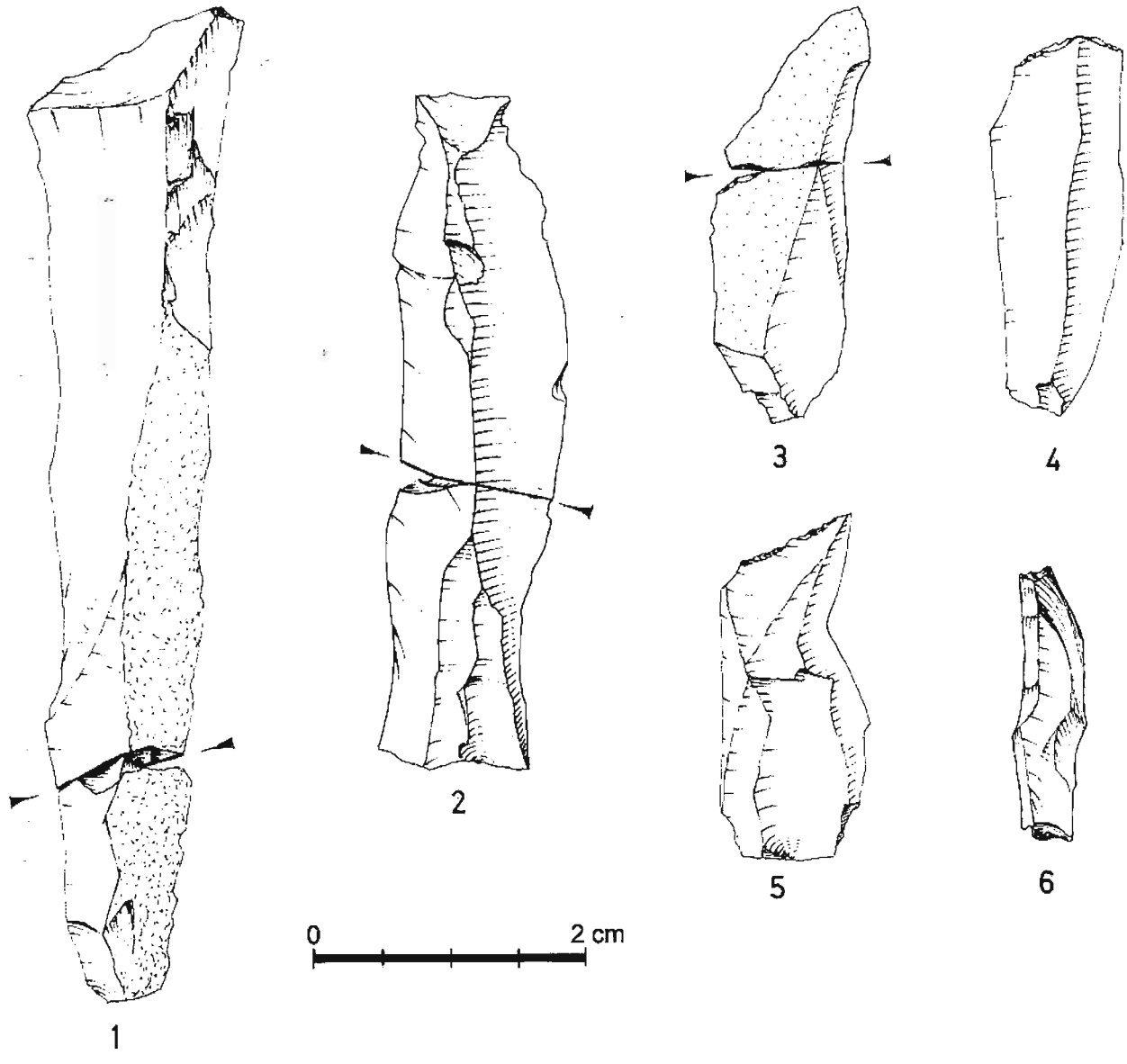


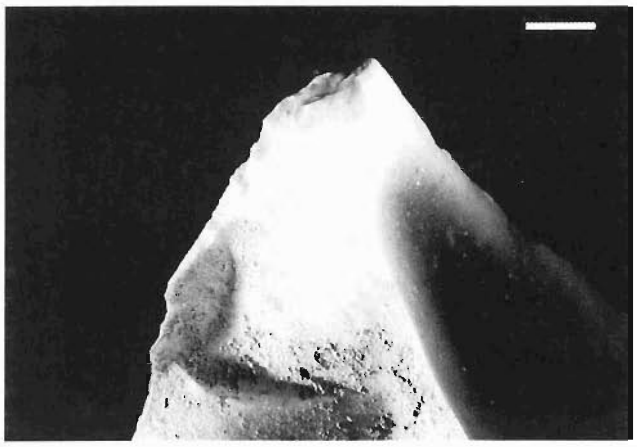
Fig. 1 - Experimental pseudo-truncations (drawings by G.Almerigogna).

4; Fig. 2 n. 4). In one case, percussion produced two truncations, one on the sharp edge, and the other on a proximal break. The breaks are simple, sometimes asymmetrical or with radial fissures, and generally have spontaneous retouch on the prominent part.

We also observed the formation of pseudo-truncations on the sharp edges and breaks (simple or tongued) of bladelets, independently of the morphological characteristics of the blank. One microbladelet (Fig. 1, n. 6), which was formed as a by-product during the removal of a crested blade, has two breaks with total marginal and invasive, abrupt retouch.

Two characteristics systematically appear:

- distribution of the retouch, which is nearly always partial, is often situated on the corners of the distal end and can be of different amplitudes (very marginal and marginal retouch are slightly more frequent, but invasive retouch also occurs). However, we have never observed the formation of pseudo-truncations with invasive and total retouch, such as those published by Newcomer, and for this reason - in agreement with Mansur-Franchomme - we can confirm that the occurrence of pseudoartifacts is quite rare (Mansur-Franchomme, 1986);
- refitting showed that the surfaces of the breaks do not coincide at the level of the spontaneous retouch, which is always located at the proximal end of the blank. Some of the products have angles smoothed by abrupt and marginal retouch, which leaves an empty space in the triangular contour of the refitted blank, independently of its thickness or type: first blades, crested blades, ordinary blades, cortical or



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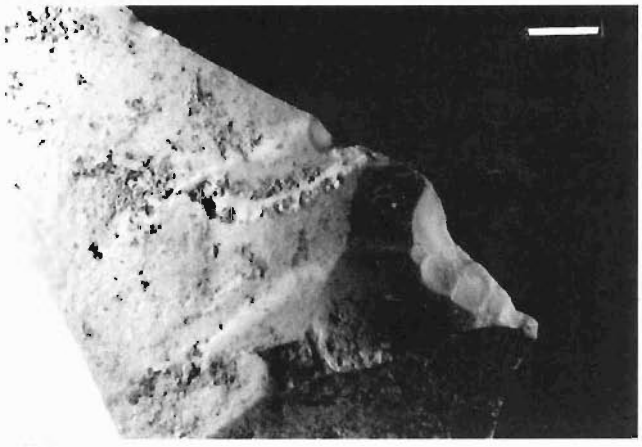

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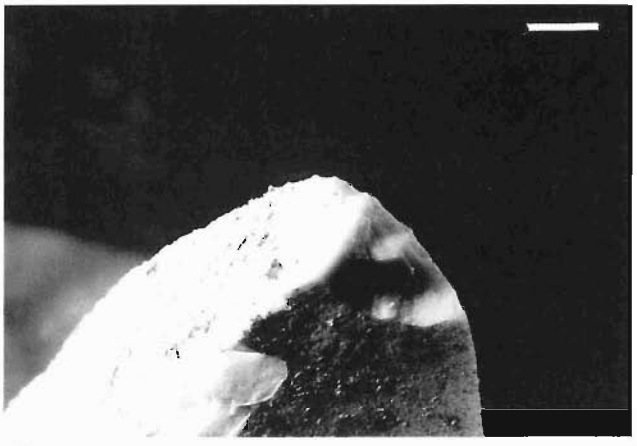

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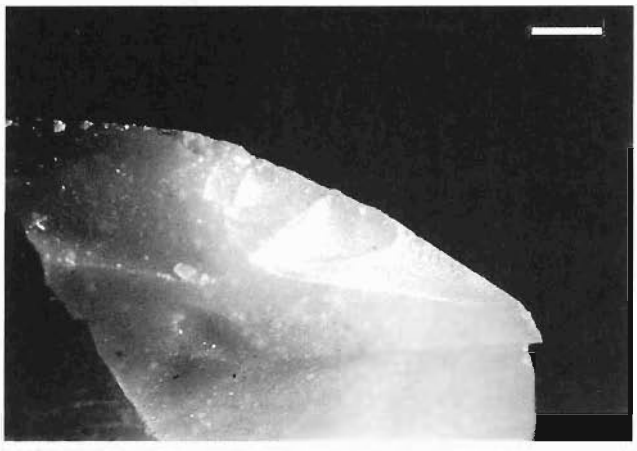

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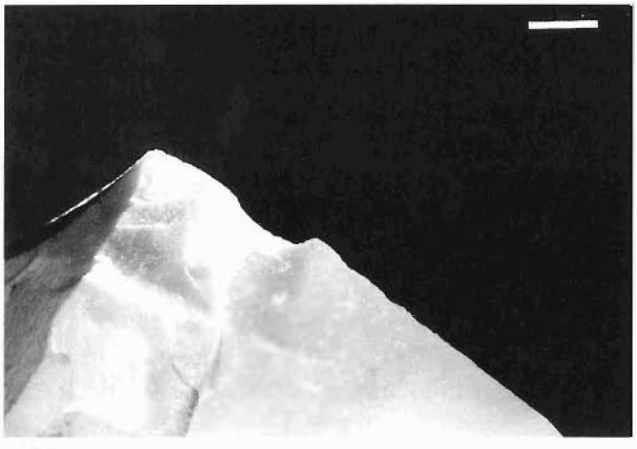

5

Fig. 2 - Details of experimental pseudo-truncations (magnification: 6,1X (n. 1), 5,5X (n. 2), 7,6X (n. 3), 14,7X (n. 4), 7,2X (n. 5).

ordinary bladelets. It is necessary to specify that the pieces with angles smoothed by retouch are considered by some authors to be intentional tools, identified as particular types of truncations and defined as truncations *en coin* (BORDES, 1970; SCHMIDER, 1992).

Spontaneous retouch, on breaks or on natural surfaces, was found on all types of blank, regardless of the type of hammer used. In addition, this phenomenon - observed quite frequently – does not appear related to any particular technological class, as was also confirmed by the work of Newcomer (NEWCOMER, 1976).

6.2 *The formal truncations*

The second phase of the experiments was aimed at reproducing intentional truncations, in order to verify some methods of retouching blanks of different dimensions and types, from cortical blades to bladelets.

Retouching blades on the sharp edge required the employment stone hammer and anvil (stone or wood), in the way it was proposed by Desruisseaux (Piel-Desruisseaux, 1986). Sometimes, retouching thick blanks involved a series of abrupt removals which totally masked the original morphology of the edge. Other truncations were made holding the blank between the fingers (according to the technique proposed by M. Brézillon): one of these, a plunged blade, had marginal abrupt retouch.

Using the hammer and anvil, other blanks broke as a result of flexion. In the case of very thin bladelets, the use of a stone hammer to remove part of the blank can produce a break with abrupt, invasive and partial retouch around the point of percussion. As regards the different kinds of breaks obtained using an anvil, inclined direct percussion produces a break that is inclined with respect to the ventral surface, while perpendicular direct percussion results in an orthogonal break. Direct percussion on an anvil also results in the formation of retouched notches. The formation of breaks and notches is accompanied by the formation of micro-hinged pins, due to the obstruction of the percussion waves by the anvil. Anvil percussion also tends to result in a break or a notch on blanks of a certain thickness, while on thin blanks breaks occur not at the point of percussion, but close to the thumb which is holding the blank; these accidental breaks were only observed when using a stone hammer.

6.3 *Considerations and implications on the occurrence of pseudo-truncations*

Formally conceived as a tool type or as an element participating in a more complex process of manufacture, truncations, in reality, occupy a more uncertain position in the ambit of lithic technology organization, in spite of the typological conception, which is substantially shared by various authors. The experimental tests have in fact confirmed the accidental nature of few types of these artifacts, with various percussion techniques in blade flaking showing, above all, the occurrence of this phenomenon at different stages throughout the reduction sequence. If, in certain cases, it seems possible to interpret some of the modifications of the transversal end of the blank as unintentional, strong uncertainties remain for a large number of pseudo-truncations as a result of the close similarities observed between these and the formal artifacts; consequently, they cannot be differentiated merely by simple typological comparison.

A further implication concerns the role played by intentional artifacts and accidentally transformed blanks in the economy of flaking products. On the basis of morphotechnical similarities and the potential use offered by their edges (sharp or retouched), not surprisingly, some of the pseudo-truncations may have been used in the wide range of activities so far identified for formal tools (Ziggiotti & Peresani, 2000-2001).

7. ANALYTICAL PROCEDURES

The present study concerns the determination of the lithological, morpho-technical and metrical features of truncations, as well as the retouch analysis conducted following the protocol drawn up by Inizan *et al.* (1995). To describe the blank, a broad distinction was made between large blade, blade, bladelet and microbladelet, laminar flake, flake and waste as a function of the length/breadth value rate; among the laminar blanks, a further distinction was based on the breadth value, empirically fixing the discriminative boundaries in relation to the features of each specific lithic assemblage. Besides recording tool integrity or partiality, and the blank's sagittal outline (curved, straight, twisted, curved at the distal extremity), and the features of its lateral edges (when retouched), an effort was made to determine the role that it played throughout the reduction sequence. Some categories that testify the diverse reduction phases were thus adopted: cortical products (flakes and blades), crested and neocrested blades, regular and ordinary blanks, coretablets, various by-products derived from the rejuvenation and the repairing of the core face, blades detached for shaping the lateral core face convexities, and flaking accidents (hinged or plunged detachments). All the specimens, entire or incomplete, were measured thus: length, along the morphological axis; breadth and thickness (both on the central part of the blank).

Analysing the retouched edge required the piece to be disposed arbitrarily showing the truncation uppermost, independently of its distal or proximal position on the blank. The retouched edge was thus analysed: position, zenithal outline (straight, convex, concave, notch, broken, trapezoidal, sinuous, denticulate, irregular; for partial truncations the adjacency between retouch and sharp edge was also taken into consideration), orientation and inclination on the blank morphological axis (0° being coincident with the left vertex and 180° with the right one; truncations disposed to the right have values ranging from >0° to £45°, those to the left from ³135° to <180°). Further observations were conducted on retouch distribution (total, discontinuous or partial, adopting for the latter two cases an arbitrary subdivision in 4/4,

from left to right), orientation, inclination, invasiveness, nature of the truncated edge (sharp, hinged or fracture, notch, butt). Invasiveness was related to the surface thickness and to the type of edge on which the truncation falls and was estimated as follows: 1/3 = very marginal; 2/3 = marginal; 3/3 = profound.

8. RESULTS

As a consequence of what came to light during the experimentation, i.e. the occurrence of spontaneous transverse retouch, re-examination of the overall sample has been considered a feasible procedure (ZIGGIOTTI, 1999-2000) in order to exclude accidental artifacts. Thus, partially retouched pieces and microbladelets with transverse, usually marginal, sometimes total, pseudo-retouch have not been taken into account. For this we selected: 148 pieces (92 ordinary products – 73 blades and 19 laminar flakes[2] - and 56 by-products) from Val Lastari (VL); 24 (17 ordinary products and 7 by-products) from Soman Shelter (SS); 209 (137 ordinary products and 72 by-products) from Dalmeri Shelter (DS).

The frequency of ordinary blanks (Tab. III) is higher at VL and DS (computations are comparable) than at SS; likewise, again at SS these products are better represented than by-products. However, it should be noted that by-products are frequent, and that - at least in the two mountain sites - their selection for shaping truncations played an undeniable role.

Site	tools	ord. pr.	by-products
Val Lastari	148	93 (62,8%)	55 (37,2%)
Soman* Shelter	24	17	7
Dalmeri Shelter	209	137 (65,6%)	72 (34,0%)

* Lower thermoclastic breccia.

Table III: Sample composition, pseudo-truncations excluded. The number of ordinary flaking products and by-products is also reported.

8.1 *Truncation manufactured on flaking end-products*

8.1.1 *On bladelet*

These are well represented at VL and SS; on the contrary, pieces on blade prevail from DS (Fig. 3). Truncations shaped on sharp edges usually exhibit direct marginal retouch (sometimes inverse), occasionally profound or very marginal. Zenithal outline is straight, sometimes convex, irregular or concave. A few pieces from DS manufactured by means of simple retouch are also present. Truncations on fracture are normally distal (except for some proximal ones found at DS); retouching is inverse, usually abrupt, marginal, and draws straight, occasionally concave or convex outlines. On both types profound retouch appears more frequent at DS than at VL and SS. Concerning truncations with indeterminable original edge, proximal types are generally more numerous (particularly at VL) than usual. Outlines are frequently straight; concave, convex, angular or sinuous are present too. The rate between oblique and normal truncations is higher for the former type at VL, vice versa at DS. Retouching is almost exclusively direct, abrupt and profound, marginal at DS. A couple of pieces (1 DS, 1 SS) on notch with abrupt marginal retouch complete the set.

8.1.2 *On blade*

At both VL and DS sites, truncations on sharp edge prevail, but are absent at SS (Fig. 4). They are distal, mainly straight, although broken, convex, denticulate, sinuous outlines were also counted. Retouch is direct, commonly abrupt (occasionally simple), profound or marginal. Among the truncations on fracture, proximal types are commonly found; straight zenithal outlines are more frequent than concave or convex shapes. They all present direct, abrupt, profound or marginal (very marginal is rare) retouch. Some indeterminable truncations are proximal at VL and DS. Their outlines are variously straight (more usual at DS) convex, broken or concave; retouch is systematically abrupt profound, marginal on some pieces only. Particular types are also present: a few tools with transverse notch (1 at DS, 2 at VL) manufactured by marginal/profound retouch; two pieces from VL show truncation on the hinged terminal edge.

8.1.3 *On laminar flake*

Particularly at VL, many truncations were shaped on laminar flakes (Fig. 4). Retouch usually occurs on sharp edges, rarely on fracture (two pieces); indeterminacy was recorded for a single piece. Zenithal outlines are mostly straight; convex, concave, broken and denticulate are also present. Retouch is almost exclusively abrupt direct, alternate on one tool; a balanced rate was noted between very marginal, marginal and profound.

8.2 *Truncations on flaking by-products*

8.2.1 *Bladelet morphology*

Among the truncations manufactured on sharp edges, at VL straight forms prevail over convex and

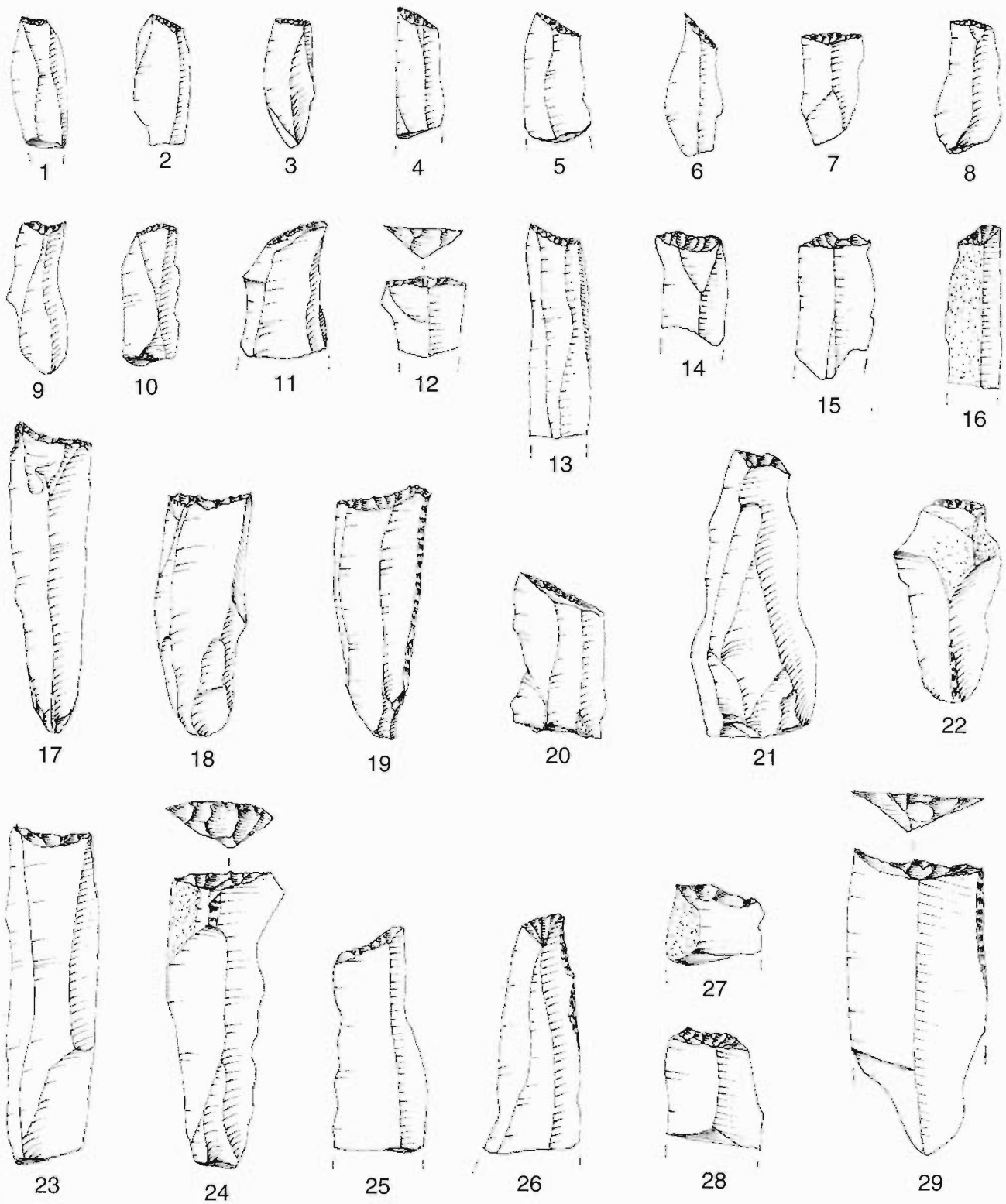

Fig. 3 - Truncated bladelets (1-16) and blades (17-29) from Val lastari (1-6, 17-21), Soman Rockshelter (7-8, 22-24) and Dalmeri Rockshelter (9-16, 25-29) (real size, dis. S. Ziggiotti e G. Almerigogna).

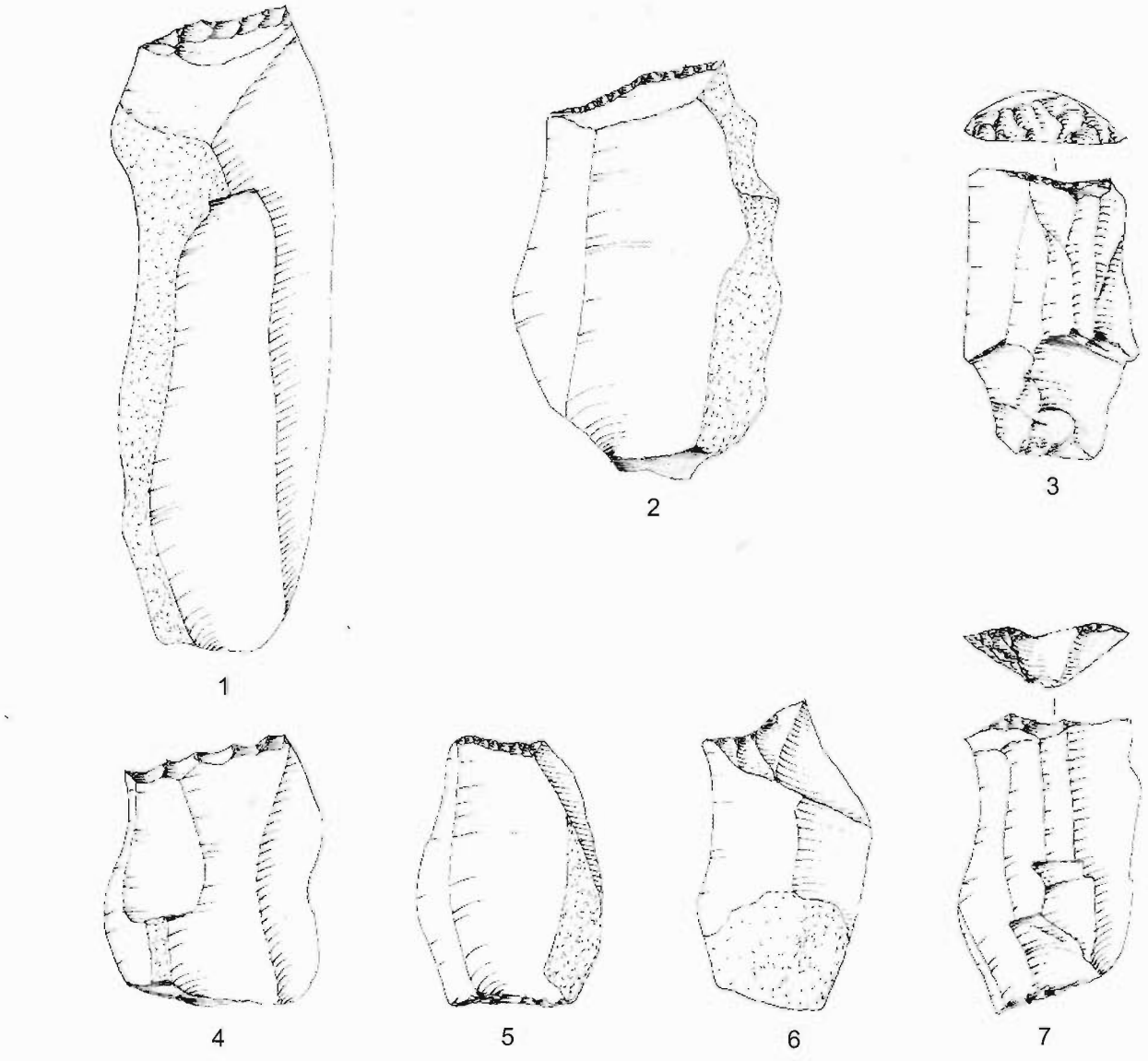

Fig. 4 - Truncated long blade (1), blades (3, 7) and flakes (2, 4-6) from Val Lastari (1-4) and Dalmeri Rockshelter (5-7) (real size, drawings by S. Ziggiotti and G. Almerigogna).

sinuous; retouch is abrupt, marginal, occasionally profound (Fig. 3). Shapes of truncation on fracture vary too; retouch is commonly abrupt direct marginal, profound on some cases. Concerning the indeterminable pieces, truncation falls equally on the proximal or distal part of the blank. Edges are variable and retouch is abrupt, profound or marginal, or simple profound. At DS a single tool with proximal notch, oblique, showing abrupt direct very marginal retouch was counted.

8.2.2 *Blade morphology*

At VL these pieces are poorly represented; on the other hand, the sample from DS reveals many blanks used to make truncations (Fig. 4). Tools on sharp edge prevail at all sites: distal, usually straight, concave too, and denticulate or convex. At DS a significant number of inclined truncations prevail. Just one piece bears retouch, on the lower face; the remaining pieces show abrupt direct, marginal or profound retouch, simple on one case. Tools on fracture are equally divided between proximal and distal; outlines are straight, concave, and convex; retouch is direct, simple profound, abrupt marginal or profound. Proximity and distality are equally represented on the indeterminable pieces too. All straight, these were shaped by means of abrupt profound direct retouch; only one piece is marginal. Among these blanks we also included large blades: 3 at VL, 11 at DS, shaped from sharp edges, from fracture or from

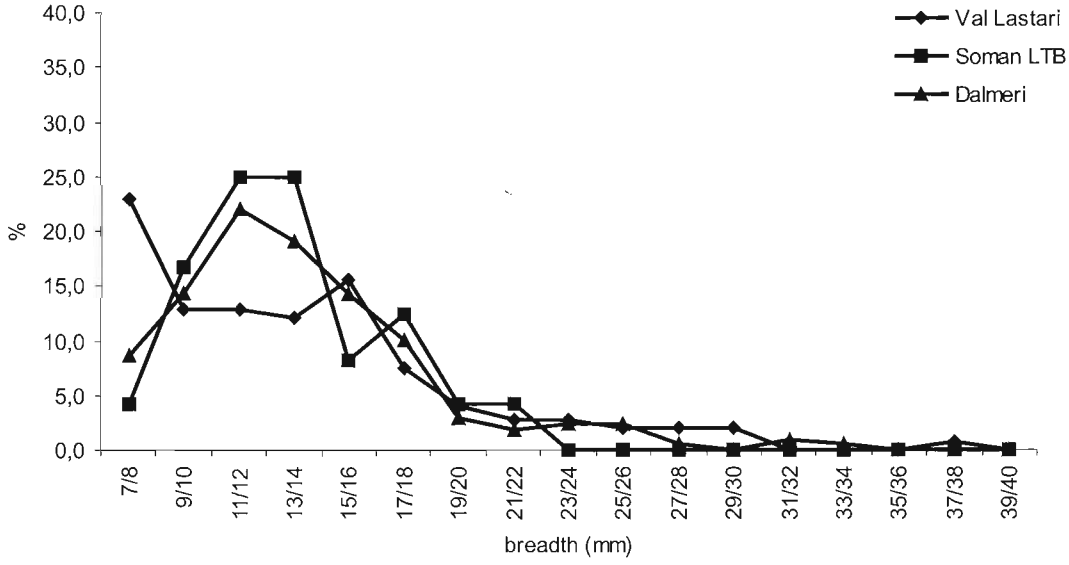

Fig. 5 - Histogram showing the frequencies of breadth classes (2 mm interval) for truncations from Val Lastari, Soman Rockshelter (lower thermoclastic breccia), Dalmeri Rockshelter.

unrecognizable parts. Variously outlined, the transverse edges were manufactured by abrupt, direct, sometimes simple, marginal or profound retouch.

8.2.3 *Flake*

At VL, truncation usually falls on the sharp edge of these blanks: straight or convex, with direct abrupt retouch (inverse in a single case), marginal or profound. The same features were noted on the samples from SS and DS, in which one truncation on notch is also present (Fig. 4). Besides, some truncations on fracture were counted: distal, straight or concave, shaped by abrupt marginal, very marginal, profound retouch. Indeterminable pieces bear various outlines (notch, irregular, sinuous, concave); retouch is direct abrupt, marginal or profound.

It sometimes can be noted that truncations on both end-products and by-products bear simple or abrupt, variably invasive, commonly partial or discontinuous retouch on one lateral edge of the blank; one notch was also found. Usually, when these manufactured lateral edges are positioned adjacent to the truncation, retouch is invasive.

8.3 *Comments and morphometric features*

From a general overview, truncations are seen to exhibit variable zenithal outlines (Tab. IV), but straight outlines prevail at all sites. Tools were manufactured on different types of edges, the sharp ones occurring most commonly at VL and DS. The whole sample (pseudo-truncations included) was examined in order to support the experimentation: it emerged that this accidental retouch essentially occurs on fractures.

Furthermore, DS records the highest number of indetermined originary edges derived from extensive retouching (abrupt and total). The same discrepancy was noted right from the first examination, but still remains confirmed after excluding the pseudo-truncations; this could suggest a standard procedure, as well as a probable function for tools that are also more fragmented at this site than in others. A fairly limited variability was also observed at VL: total invasive retouch drawing straight or concave outline; sometimes, lateral accessory retouched edges occur. Still, as observed at VL and DS, truncations were sometimes made on the proximal portion of the blank.

Concerning morphometric features, the distribution of breadth values reveal the same range (7-40 mm) for all sites and an almost identical trend, the large majority of pieces (82-84%) falling in the 7-18 mm range (Fig. 5). A slight difference can be observed for VL, whose histogram shows a mode at 7/8 mm and an abatement in the following classes up to a modest peak, beyond which values gradually approach the lowest. This second part is known by the sheltered sites (wiggling of SS derives from the sample weakness) that, on the contrary, record an abrupt increasing of values from the first to the third class, where they reach the

			Val Lastari	Soman LTB	Dalmeri
retouch	inclination	abrupt	139 (93,9%)	24	198 (94,7%)
		simple	8 (5,4%)	-	11 (5,3%)
		other	1 (0,7%)	-	-
	extension	very marginal	13 (8,8%)	-	28 (13,4%)
		marginal	67 (45,3%)	14	67 (32,0%)
		invasive	61 (41,2%)	10	112 (53,6%)
		other	7 (4,7%)	-	2 (1,0%)
originary edge		fracture	40 (27,0%	11	55 (26,3%)
		sharp	72 (48,6%)	6	81 (38,8%)
		hinged	2 (1,4%)	-	-
		other	2 (1,4%)	1	8 (3,8%)
		indeterm.	32 (21,6%)	6	65 (31,1%)
zenital outline		straigth	85 (57,4%)	14	129 (61,7%)
		convex	18 (12,2%)	3	28 (13,4%)
		concave	19 (12,8%)	4	31 (14,8%)
		irregular	6 (4,1%)	2	4 (1,9%)
		denticulate	8 (5,4%)	-	2 (1,0%)
		sinuous	4 (2,7%)	1	4 (1,9%)
		broken	7 (4,7%)	-	2 (1,0%)
		other	-	-	4 (1,9%)
		undeterm.	1 (0,7%)	-	5 (2,4%)

Table IV: General data on retouch.

mode. Likewise, histograms of thickness (Fig. 6) show that the large majority (84-87%) of pieces fall within the 2-7 mm interval and that VL records mode at 2 mm, while SS and DS have their main peaks at 3-4 mm and 5 mm respectively; beyond these, frequencies decrease in a similar manner (wiggling of SS depends again on the sample weakness).

The blanks used at VL to obtain truncations seem to be narrower than at both the sheltered sites, but they share the same robustness (considering the breadth\thickness rate). As previously observed during examination of the overall sample, pseudo-truncation included, the high coefficient of variation for breadth (VL=42,5%; DS=34,2%) and thickness (VL=57,4%; DS=54,7%) does not suggest particular selection of blanks.

Maximum, minimum, average length values and variation coefficients of entire and fragmentary blades and bladelets are reported in Tab. V, while the frequencies are drawn in Figs. 7 -10. Generally speaking, truncations on entire and fragmentary bladelets and blades give averages higher at DS than at VL and SS. Likewise, tools on laminar flakes show the same discrepancy between DS and VL. This situation is also expressed by the different histograms calculated for the entire bladelets and blades (data from SS are also reported, but are of little value due to the sample weakness). Shaping the entire bladelets at VL produced tools largely variable (13-37 mm) in length and few longer pieces (Fig. 7), while at DS a clear peak is recorded in the 23-27 mm class, beyond which the frequencies remain comparable to VL. Looking at the fragmentary pieces, the two sites share the same frequencies in low-middle classes (Fig. 8), while higher classes count more specimens for DS than for VL: values gradually increase from <8 mm to 18-22 mm, the main peak behind which they decrease. Significantly, since a high number of pieces fall within the 13-22 mm interval, it may suggest a routine procedure in intentional breaking and tool-making. Variation coefficient are high for all sites too.

Truncations on complete blades at DS and VL are greatly variable in length (Fig. 9). Both sites share a peak at the 38/42 mm class and a similar decrease of frequencies towards the higher classes. Looking at fragmentary pieces, DS depicts a wider interval than VL, showing that the large majority of pieces fall within the 18-47 mm range, with the highest values at 18/22 and 23/27 mm (Fig. 10). VL defines a narrower field of values, with a peak at 18/22 mm too. Variation coefficients are also high.

			bladelets	blades	fl. & l. fl.
VAL LASTARI	entire	total	42	47	30
		min	14	19	20
		max	58	95	57
		aver.	27	44	32
		v.c. (%)	35,5	36,0	29,8
	fragm.	total	20	7	-
		min	4	18	-
		max	42	42	-
		aver.	19	27	-
		v.c. (%)	41,4	-	-
SOMAN LTB	entire	total	5	10	3
		min	21	22	18
		max	40	50	31
		aver.	27	34	-
		v.c. (%)	-	-	-
	fragm.	total	2	4	-
		min	18	34	-
		max	28	58	-
		aver.	-	-	-
		v.c. (%)	-	-	-
DALMERI	entire	total	43	94	10
		min	16	25	18
		max	65	98	66
		aver.	31	47	40
		v.c. (%)	31,1	28,0	34,4
	fragm.	total	22	37	-
		min	6	12	-
		max	45	52	-
		aver.	24	30	-
		v.c. (%)	44,5	35,6	-

Table V: Length values relative to entire and fragmentary truncations made on blade, bladelet, flake and laminar flake.

9. CONSIDERATIONS AND IMPLICATIONS

The data from this study provide new implications for certain aspects concerned with this particular kind of tool and, above all, with the mentioned variability observed throughout the Epigravettian in the Eastern Italian Alps. At the same time, it opens new perspectives for further investigation into a type of artifact that has usually been more neglected than others. Highly differentiated in their techno-typological and metrical features, also in relation to the correspondent sites, truncated tools may also support implications regarding the functional aspect, as previously noted (Dalmeri *et al.*, 2001), and may be considered like a profitable subject for work in the future.

Shaping concerned both end- and by-products flaking, avoiding the preference for any one type of blank; however, it also involved some differences in retouching the transverse edge. Not surprisingly, some implications may arise in debating the significance of the structural indexes or, at least, may lead to assume more prudence in adopting them as indicators of human behaviour.

This result could also be representative of the supposed functional variability, as the literature points out (Ziggiotti & Peresani, 2001), and could thus lead to reconsidering the high coefficient of variation (thickness in particular) calculated for our samples as indicative of the choice occurring between two possible alternatives: procedures of low selection among the bulk of blanks, or effective polyfunctionality of tools classified under a probably too generic typological label. Besides, as this aspect can still be observed within any single site, it may be considered somewhat indicative of the existence of polyfunctional tools.

This variability also concerns comparisons between the selected sites. The higher content in ordinary blanks than waste flaking products manufactured with transverse retouch, distinguishes Dalmeri Shelter from the others. On the other hand, the same shelter fits with Soman Shelter in both metrical features and retouched edges. In this sense, attention must be paid to site functionality, which – as in the case of Val Lastari (flint workshop addressed to the exportation of finished or curated products) - played an undoubtedly important role. Diversely, although of studies on Dalmeri are still in progress, an introduction of implements on-site can only be supposed by noting that the Scaglia Rossa red flint becomes more frequent among the retouched tools (Cusinato, 1997-98, p. 58). Some variable sizes, as much as other particularities have also to be placed in a large-scale comparative examinations of these assemblages from a techno-economical point of view.

On one hand, this study provides more complex evidence how it was concerned from the hypothesis that macroscopic structural unbalances suggest site functional differences, as in the case of truncations recovered from coeval valley-bottom and mountain sites. It seems that some affinities recognized at Dalmeri and Soman shelters correspond more with the location of both sites than with their difference in altitude: thus, independently of their geographic position, sheltered occupations may differ from open-air camps.

On the other hand, we deal with the potentiality and biases involved in the contribution of use-wear analysis to defining site functionality. From a certain

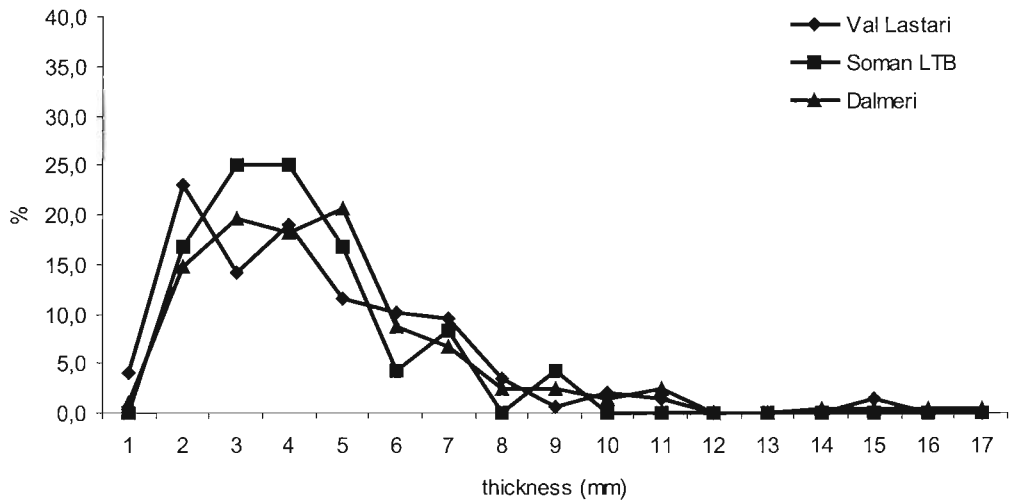

Fig. 6 - Histogram showing the frequencies of thickness classes (1 mm interval) for truncations from the three sites.

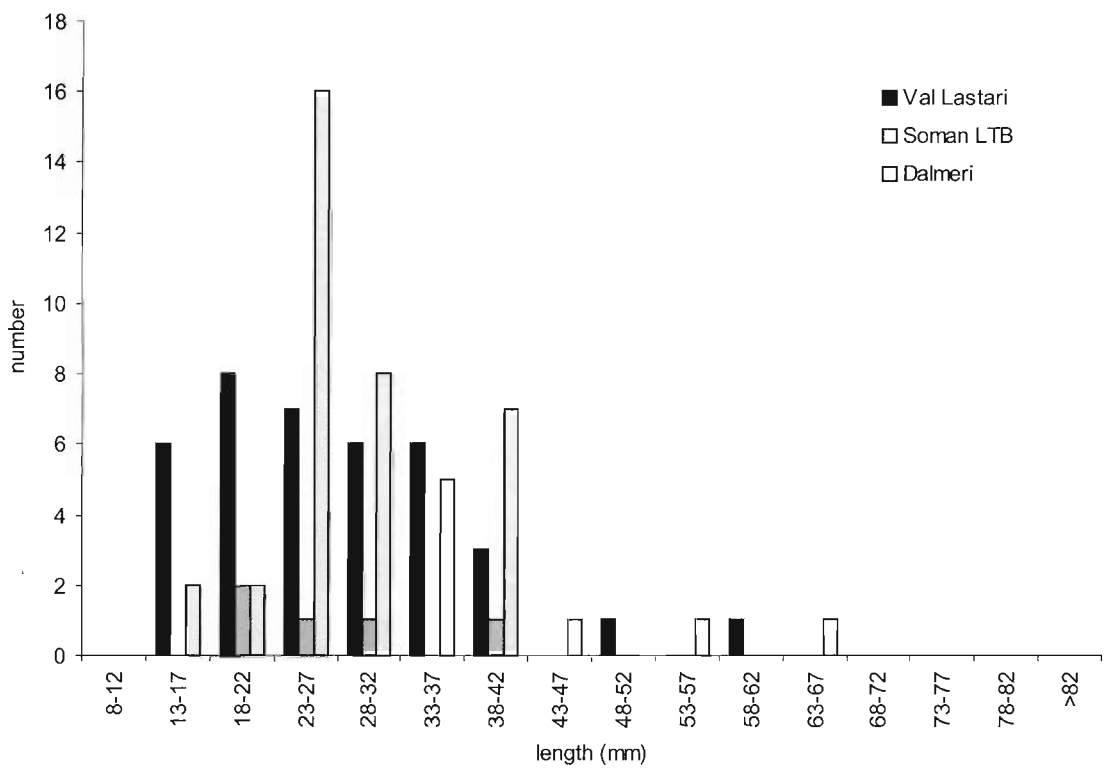

Fig. 7 - Histogram showing the frequencies of length classes (5 mm interval) for truncations on entire bladelets from the three sites.

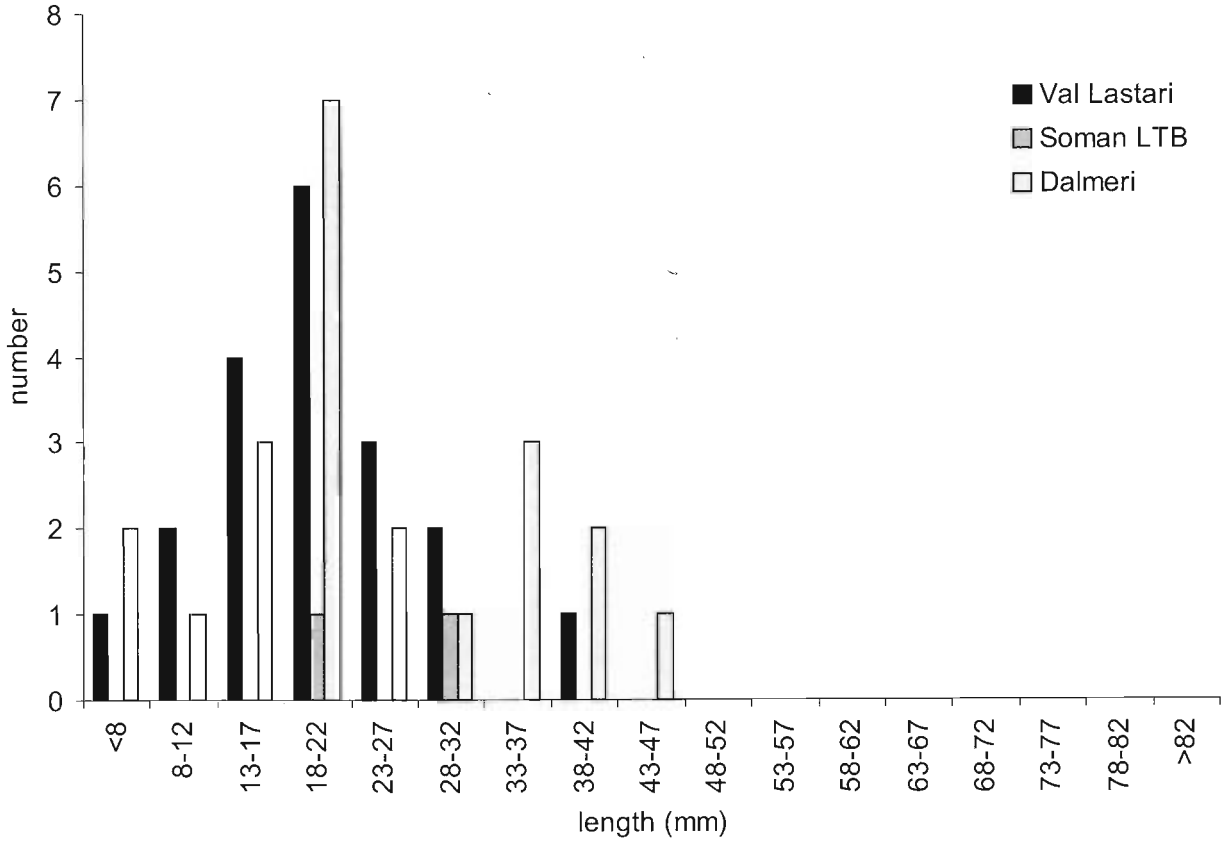

Fig. 8 - Histogram showing the frequencies of length classes (5 mm interval) for truncations on fragmentary bladelets from the three sites.

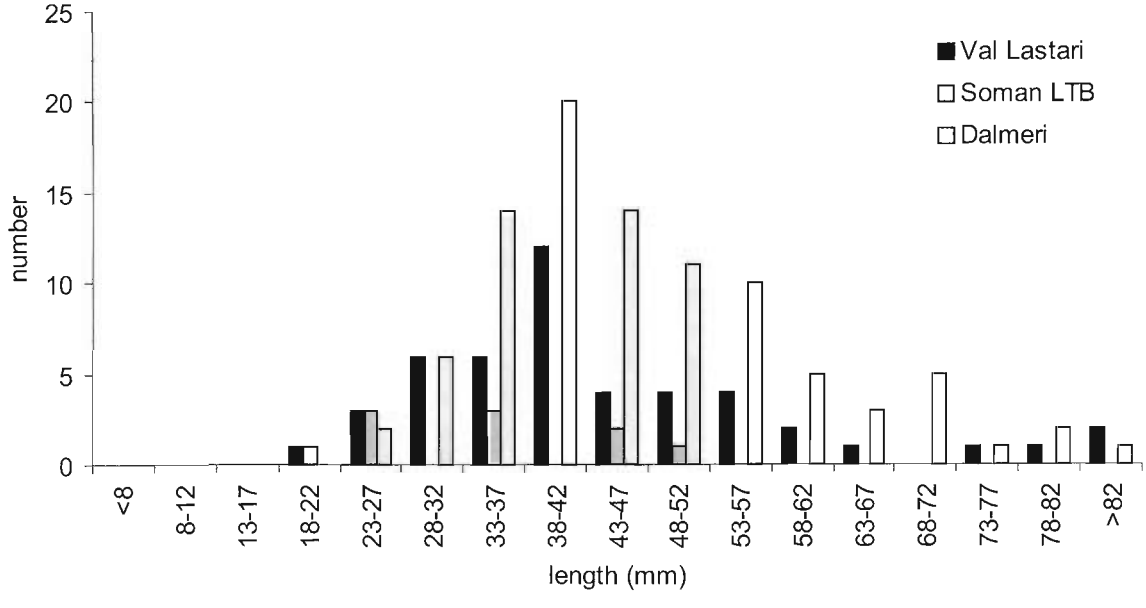

Fig. 9 - Histogram showing the frequencies of length classes (5 mm interval) for truncations on entire blades from the three sites.

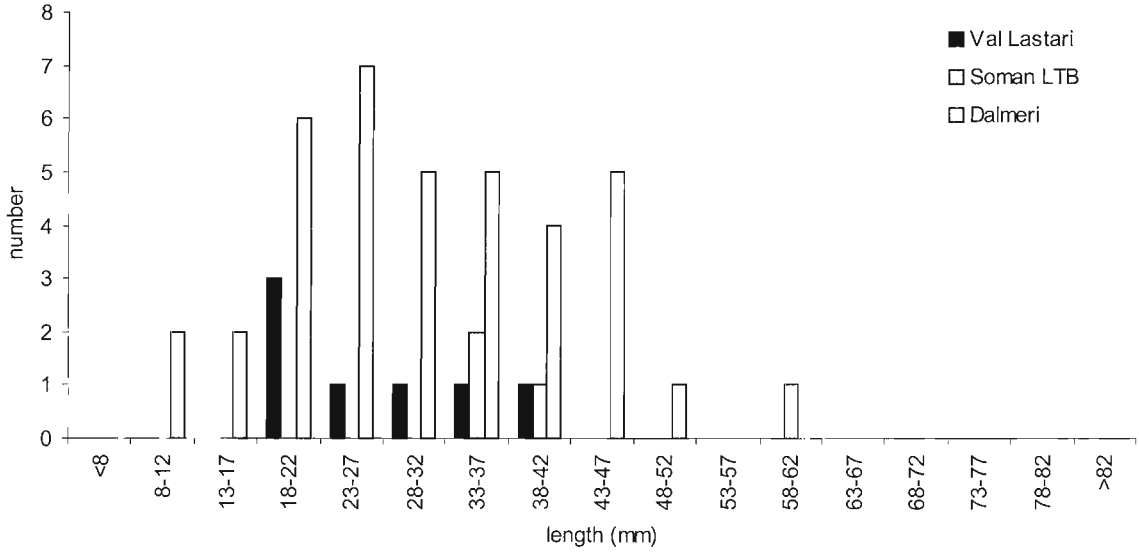

Fig. 10 - Histogram showing the frequencies of length classes (5 mm interval) for truncations on fragmentary blades from the three sites.

view-point, traceological investigations may highlight somewhat differing sites, assuming as possible presupposition the differences encountered in the morpho-technical field (prevalence of truncations on bladelets at Val Lastari, for instance). Nevertheless, such a perspective cannot take into account the possible limitations intrinsic in this type of tool: due to its polyfunctionality, it is the best suitable for recognizing possible functional specialization but, on the contrary, it yields evidence of similarities between sites. Such evidence is provided by the documentation of unspecialized activities concerned with ordinary subsistence that were usually performed at all sites, irrespective of their functional trend. This does not totally rule out the possibility that variability of truncated tools is significant, since it is proportional to the intensity of such activities performed at the camp.

NOTES

[1] The real chronological length of this phase as well as the criteria adopted in its recognition along the whole Tagliente succession have recently been debated (Montoya *et al.*, in press).

[2] This specification among the ordinary products derives from the technological analyses carried out (Montoya & Peresani, in press): for this reason, and unlike what was recorded at DS and SS (where laminar flakes are indeed weakly represented), such blanks are counted within the ordinary pieces.

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SUMMARY - The interest in truncations which led to this study arose from the need to interpret a group of particular aspects encountered on both a diachronic and synchronic scale in the Recent Epigravettian in North-Eastern Italy. As it was traditionally maintained, truncations seem to occur with systematically different frequencies in lithic assemblages from coeval valley bottom (lower values) and upland sites (higher values). In order to verify such presumed differences, to analyse the manufacturing techniques and to provide a basis for future functional studies on these implements, it was considered of interest to move on to more technological questions concerning the accidental occurrence of artifacts during flaking and

formal tool-making. Spontaneous retouch, on breaks or on natural surfaces, was found on all types of blank, and regardless of the type of hammer used. The experimental tests have in fact confirmed the accidental nature of few types of these artifacts, with various percussion techniques in blade flaking showing, above all, the occurrence of this phenomenon at various times throughout the reduction sequence. If, in certain cases, it seems possible to interpret some of the modifications of the transversal end of the blank as being not intentional, strong uncertainties remain for a large number of pseudo-truncations as a result of the close similarities observed between these and the formal artifacts; as a result, they cannot be differentiated by mere typological comparison. The second part of this study deals with the determination of the lithological, morpho-technical and metrical features of truncations collected from three coeval sites: Dalmeri Shelter and Soman Shelter - the former settled at 1,240 m altitude, the latter at valley-bottom - and Val Lastari, an upland site at 1,060 m. Analysis was conducted on retouched edges too. On account of their highly differentiated techno-typological and metrical features, even within the correspondent sites, the truncated tools may support certain implications also from a functional point of view, and thus be considered a fruitful subject for further work in the future. Shaping is seen to have concerned both end- and by-flaking products, avoiding the preference for any one type of blank, and also to have led to some differences in retouching the transverse edge. It seems that some affinities recognized on pieces from Dalmeri and Soman shelters reflect the typology of both sites, rather than the difference in altitude: thus, independently of their geographic position, sheltered occupations may differ from open-air camps. From this point of view, traceological investigations may highlight somewhat differing sites, assuming as possible presupposition the differences encountered in the morpho-technical field. Nevertheless, such a perspective must take into account the possible limitations intrinsic to this type of tool: due to its polyfunctionality, it emerges as the least suitable for recognizing possible functional specializations but, on the other hand, may yield evidence of similarities between sites.

RIASSUNTO - L'interesse verso le troncature da cui prende le mosse questo articolo nasce dall'esigenza di interpretare un insieme di aspetti particolari riscontrati a livello sia diacronico che sincronico nell'Epigravettiano Recente dell'Italia nordorientale. Sulla base di quanto tradizionalmente affermato, le troncature sembrano registrare delle differenze sistematiche tra le industrie dei siti di fondovalle (valori più bassi) e di quelli altitudinali (valori più elevati). Nell'intento di verificare suddette differenze, di analizzare le tecniche di fabbricazione e di fornire una base per futuri studi funzionali, è stata avviata un'indagine a larga scala che ha comportato un approfondimento sugli aspetti della produzione formale di tali manufatti, nonchè sull'incidenza di una produzione accidentale durante la scheggiatura. Il ritocco spontaneo su frattura o su margine bruto è stato riscontrato su tutti i tipi di supporto, indipendentemente dalla natura del percussore impiegato. La sperimentazione ha infatti confermato la formazione accidentale di questo tipo di strumenti mediante l'impiego di tecniche differenti e, soprattutto, nell'ambito dell'intera catena operativa. Se in certi casi sembra possibile interpretare come intenzionali alcune modificazioni del margine trasversale del supporto, il grado di incertezza nella distinzione tra pseudotroncature e strumenti formali resta elevato. Ne deriva che essi non possono essere differenziati solo mediante una tradizionale comparazione tipologica. Nella sua seconda parte, questo lavoro affronta la determinazione delle caratteristiche litologiche, morfo-tecniche e dimensionali delle troncature recuperate in tre siti coevi, Riparo Dalmeri e Riparo Soman, il primo posizionato a 1,240 metri di altitudine, il secondo localizzato in fondovalle, e Val Lastari, ubicato all'aperto a 1,060 m. Ovviamente, l'analisi è stata condotta anche sui margini ritoccati. In virtù della sua forte differenziazione interna, riscontrata anche nell'ambito dei corrispondenti siti, l'insieme dei pezzi troncati potrebbe supportare alcune implicazioni anche dal punto di vista funzionale che avvallerebbero un ulteriore approfondimento in futuro. L'analisi ha messo in evidenza come l'elaborazione mediante ritocco riguardasse indiscriminatamente sia i prodotti di prima scelta che vari supporti sortiti dagli interventi di gestione dei nuclei, e come questa comportasse delle differenze anche nel modificare il margine trasversale. Dai risultati ottenuti, sembra che alcune affinità riconosciute sui manufatti di Riparo Dalmeri e Riparo Soman appaiano in sintonia con la tipologia del sito, indipendentemente dalla loro differenza altitudinale: perciò, a prescindere dalla posizione geografica, le occupazioni antropiche in riparo si differenzierebbero da quelle all'aperto. Da questo punto di vista, l'indagine traceologica potrebbe esaltare tali differenze, assumendo come base di partenza le diversità riscontrate nel campo morfo-tecnico. Tuttavia tale prospettiva deve tenere conto, in termini di potenziale scientifico, anche dei limiti intrinseci in questo tipo di strumento: a causa della sua polifunzionalità, risulta il meno idoneo per riconoscere possibili specializzazioni funzionali ma, al contrario, può essere in grado di produrre evidenze di similarità tra i siti.

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