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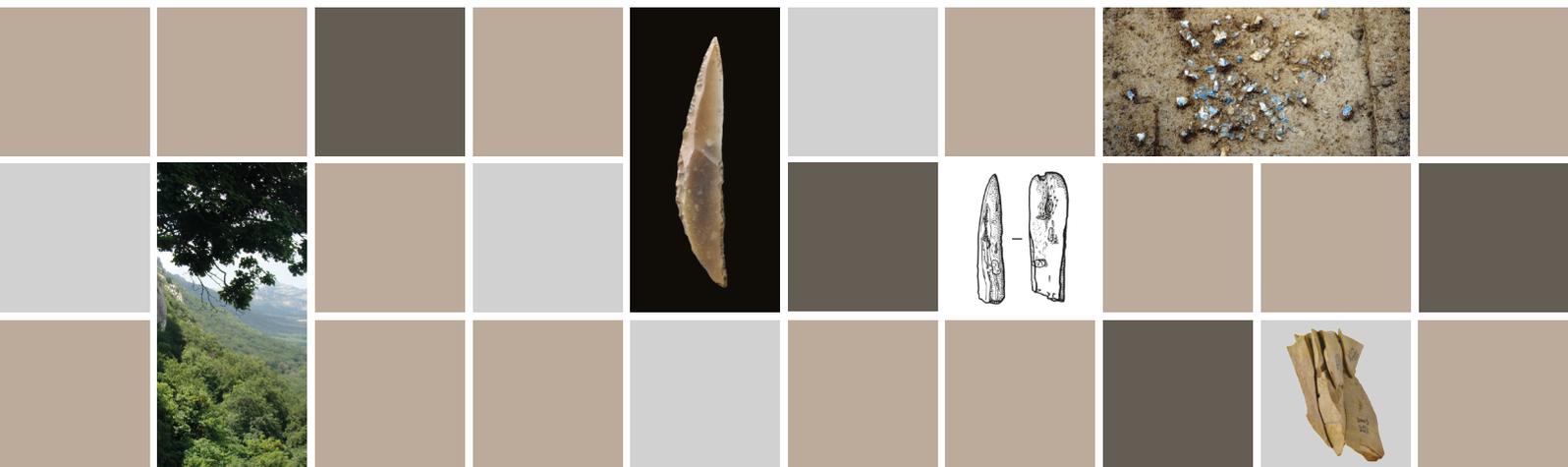
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VARIABILITY IN THE MANUFACTURING OF TRIANGULAR GEOMETRIC MICROLITHS DURING THE EARLY MESOLITHIC:

Toward a Simplification of Barb Manufacturing?
A Comparative Techno-functional Analysis
of Microlithic Assemblages from Saint-Lizier
at Creysse (24) and La Grande Rivoire at Sassenage (38)

Lorène CHESNAUX

1 - The study	55
2 - The triangles at Saint-Lizier, Creysse	56
3 - The triangles at La Grande Rivoire, Sassenage	58
4 - Toward a simplification of barb manufacturing	60
5 - First functional explanations	62
References cited	62

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Abstract

The aim of this short article is to present the heuristic potential of a detailed analysis of microliths. The analysis of the manufacturing methods and of the use-wear traces of microliths from two Early Mesolithic assemblages show a certain variability which can be interpreted as a simplification of operating procedures.

Keywords

Early Mesolithic, microliths, techno-functional analysis.

1 - The study

Geometric and non-geometric microliths are very numerous in the Early Mesolithic (Costa, Marchand, 2006). Most studies of them consist of descriptions of their morphological features and dimensions, rather than technological reconstructions. In the context of my doctoral research (Chesnaux, 2014), I developed a new classification of microliths through a detailed analysis of the morpho-technical features associated with weapon elements. It is based on the identification of the active or hafted parts, such as the point, edge, back, or base, which reflect the functional intentions of their makers and users. In conjunction with this analysis, I conducted several experiments (trampling, manufacturing and projection), which enabled me to interpret the damage observed on the microliths (Chesnaux, 2013, 2014).

This analysis method revealed a significant difference in the manufacturing of triangles – identified as barbs – in two homogeneous assemblages attributed to the Sauveterrian Early Mesolithic: Saint-Lizier à Creysse and La Grande Rivoire à Sassenage. After briefly describing these assemblages, triangle manufacturing in each one is compared and discussed in relation to other similar assemblages from this period.

2 - The triangles at Saint-Lizier, Creysse

The site of Saint-Lizier à Creysse (Tallet, 2013), located 200 m from the current banks of the Dordogne River, contained three concentrations. Concentrations 1 and 3, first attributed to the Mesolithic and then dated, were retained for study. Micro-charcoals (*Acer* or *Prunus*, identification realized by I. Théry-Parisot) found in the surrounding sediments were dated by AMS. The calculated ages are $10\,040 \pm 40$ BP and $9\,900 \pm 40$ BP, and respectively 9810-9380 cal BC and 9440-9280 cal BC after laboratory calibration (Beta analytic). These dates are particularly high and compare with the date of the earliest level at Fontfaurès-en-Quercy (9350/8600 cal BC; Barbaza, Valdeyron, 1991; Valdeyron *et al.*, 2008).

The geoarchaeological analysis realized by M. Rué (in Tallet, 2013) showed that concentrations 1 and 3 correspond to the second filling phase of a paleo-channel of the Dordogne, which was then stabilized. The taphonomic analysis (spatial distribution, object orientations, refitted and matched pieces, artifact surface features, and granulometry) showed that the two concentrations were displaced along the same south-east axis, but that this movement resulted in only a slight redistribution of the artifacts. The analysis by P. Fernandes (in Tallet, 2013) revealed that nearly the entire assemblage is composed of flint initially collected in the form of pebbles from the terrace itself. The techno-functional analysis of the assemblage (Chesnaux in Tallet, 2013) also argues in favor of its homogeneity, with around 50 refittings realized in each concentration.

Meticulous sorting of the water-sieved materials from concentrations 1 and 3 was realized using a binocular magnifier. Numerous significant pieces were thus found, including 10 microliths and hyper-microliths, 4 microliths broken during manufacturing, 9 Krukowski pseudo-microburins, and 29 microburins.

22 microliths were found in concentrations 1 and 3. Among the types identified, most (14 are isosceles triangles (figure 1). There are also two oblique truncated points with retouched bases. The remaining microliths are too damaged to be attributed to a type. It is likely that they are pieces in the beginning stages of manufacturing (these fragments have no damage diagnostic of impact and display fractures of the Krukowski pseudo-microburin type, Chesnaux in Tallet, 2013).

The 14 isosceles triangles were all manufactured in the same manner. They were made on the mesial part of a blade or bladelet – as is shown by the longitudinal ridge(s) on the upper face – with a double truncation that is straight or sometimes slightly concave. This enabled the formation of two pointed symmetric extremities on each end of the transverse axis of the piece. In my morpho-technical classification of active parts (Chesnaux, 2013, 2014), these are designated as double-points. A few trihedral points, not completely obliterated by retouch, are still visible on one of the extremities of some triangles (figure 2). It should be noted that the number of microburins (59) is nearly three times that of microliths (22).

Two isosceles triangles (figure 2) have discrete burinating fractures starting from a point and following the length of a truncation or edge. The experimental reference base indicates that these triangular weapon elements were broken upon impact and according to my interpretive model (Chesnaux, 2013, 2014), they were probably hafted laterally along the shaft of the arrow, thus as barbs. The other damaged microliths (12) display clear transverse fractures that are not diagnostic of impact. These fractures could result from trampling, manufacturing or impact.

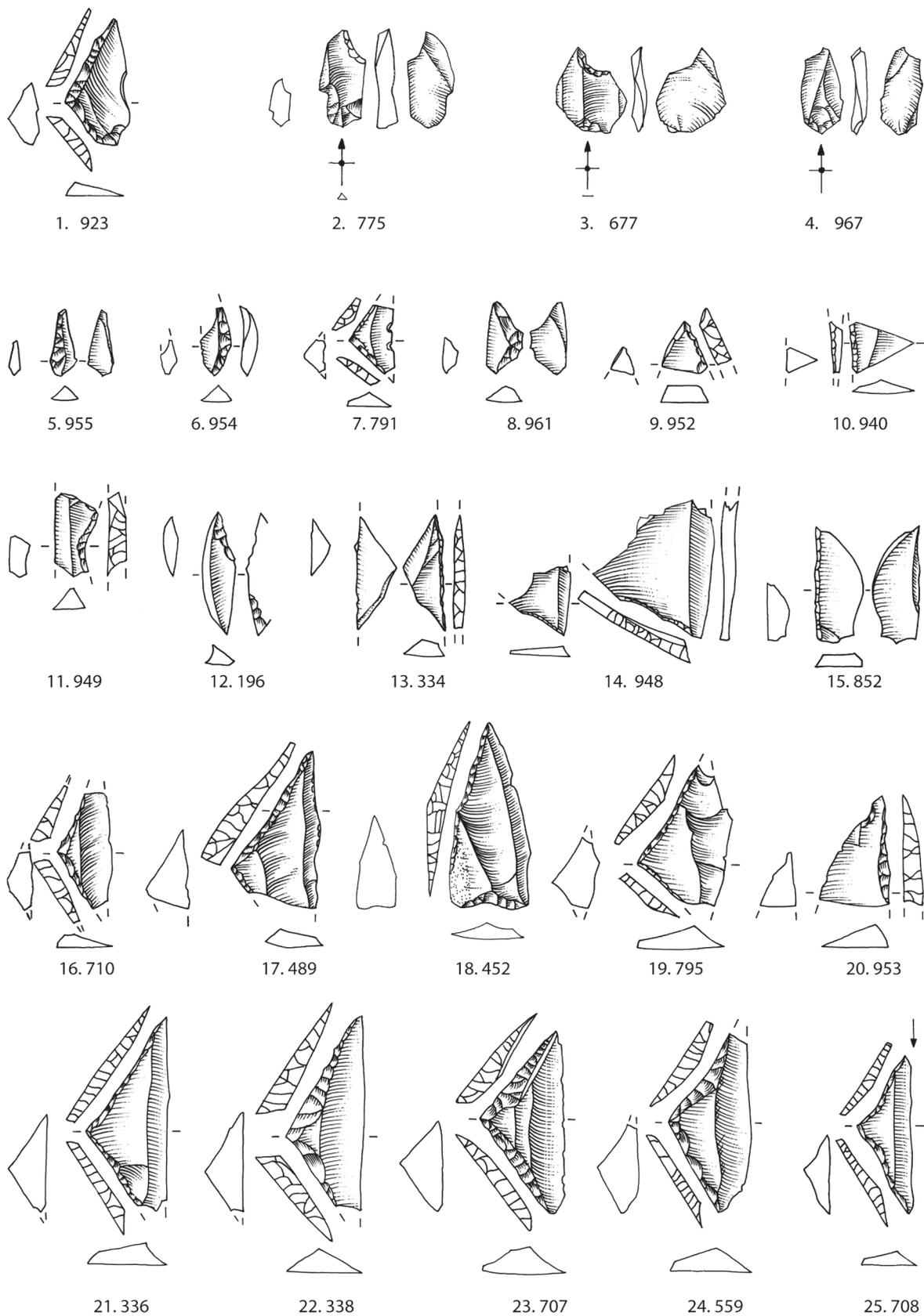


Figure 1 - Saint-Lizier. Microlithic assemblage from C1 and C3. Isosceles triangles: 1, 7, 16, 17, 19, 21-25; point with oblique truncation and retouched base: 18; undetermined microlith fragments: 6, 8-10, 14, 20; microburins: 2-4; Failed microburin: 11; Krukowskis: 5, 8, 12, 13, 15 (drawings: R. Picavet, after Tallet, 2013).

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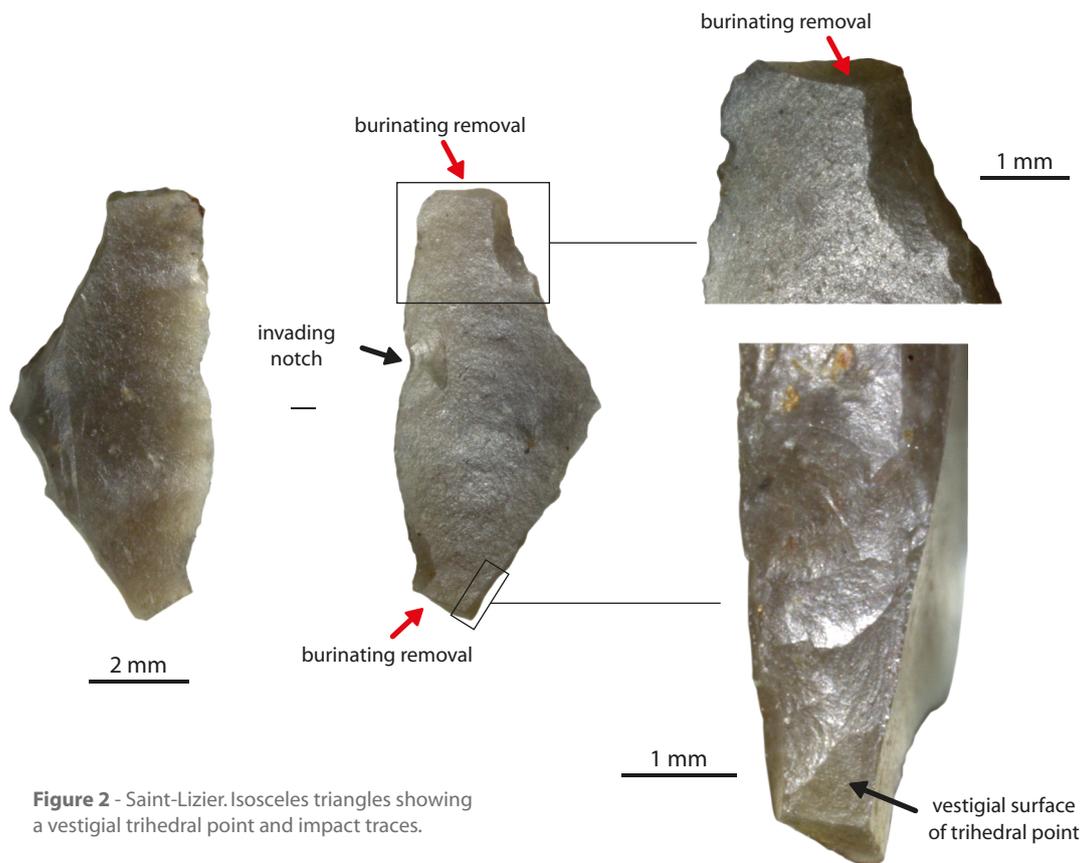


Figure 2 - Saint-Lizier. Isosceles triangles showing a vestigial trihedral point and impact traces.

3 - The triangles at La Grande Rivoire, Sassenage

The site of La Grande Rivoire (Sassenage, Isère) is a rock shelter (Senonian limestone with flint) located at 580 m altitude in the northern foothills of the Vercors mountains, and 70m above the current bed of the Furon River.

The first operations were rescue excavations that began in 1986 under the direction of R. Picavet. Five sessions took place from 1986 to 1994, revealing a long stratigraphy extending from the Sauveterrian to the Gallo Roman period (Picavet, 1991, 1999). The Mesolithic Sauveterrian and Castelnovian deposits were explored through a deep sondage. Given the exceptional nature of this stratigraphy, more than five meters deep, the excavations were continued by P.-Y. Nicod in 2000 (e.g. Nicod *et al.*, 2006; Nicod, Picavet, 2009, 2011). Most of the flint originated from the wall of the site itself, from which some blocks were collected, and from the Val de Lans (Senonian) 15km away, and Vassieux (Barrémo-Bédoulian) around 20 km away (Bressy, 2002). It is nonetheless difficult to extrapolate these results to the microliths, whose surface is sometimes too small to identify the features of each raw material.

Horizons D and C of the sondage by R. Picavet during the 1980's, correlated in 2006 with the stratigraphic horizons of S36 and S39, were respectively dated to 8540-8280 BC. (Drucker *et al.*, 2008) and 7790-7570 BC (Picavet, 1999), which permits an attribution of the entire group to the Early Mesolithic Sauveterrian. I was able to analyze the microliths yielded by the planimetric excavation in 2010 in sectors SU12-15 (spits d18-22) and SU16-22 (spits d39-42 and d44), marking the end of the Sauveterrian sequence and broadly corresponding to level C in the sondage by R. Picavet.

I identified 162 microliths, including 103 scalene triangles, 25 Sauveterrian points and pointed backed bladelets, one backed bladelet, and 33 undetermined microliths. The main focus of this article is the triangular weapon elements. As with the Saint-Lizier assemblage, these are dominant in this assemblage. Though all of them have a scalene shape, they were not all made in the same manner, and I distinguished two manufacturing methods. 69 scalene triangles have only one modified point, the small point (GEEM, 1969). This point is skewed relative to the longitudinal axis of the piece and formed by a concave or straight-oblique truncation. These are designated as skewed monopoints (Chesnaux, 2013, 2014). The large point was therefore not modified. It corresponds either to the proximal end of the blank (presence of the butt) or the unmodified distal end of the blank (figure 3). Among the 69 scalene triangles / skewed monopoints, 38 were made on the proximal end of the blank and 31 on the distal end. Surprisingly, two probable matches were identified between two skewed monopoints (figure 4). These matches indicate rather regular blanks, with an ogival shape (possibly broken in two by bending, though we have no factual evidence of the bladelet fracturing method), permitting the creation of two microliths, each with a small, skewed point. This shows a particularly significant simplification in triangular microlith manufacturing techniques. We should note that while skewed monopoints modified on their distal end are often designated in typological classifications as scalene triangles whose large point is broken, skewed monopoints modified on their proximal end are often designated as scalene bladelets (Bintz, Pelletier, 1999). This is a type that is often found in assemblages attributed to the later phases of the Sauveterrian, as at the site of Blachettes, Sinaré (Pelletier *et al.*, 2004), for example.

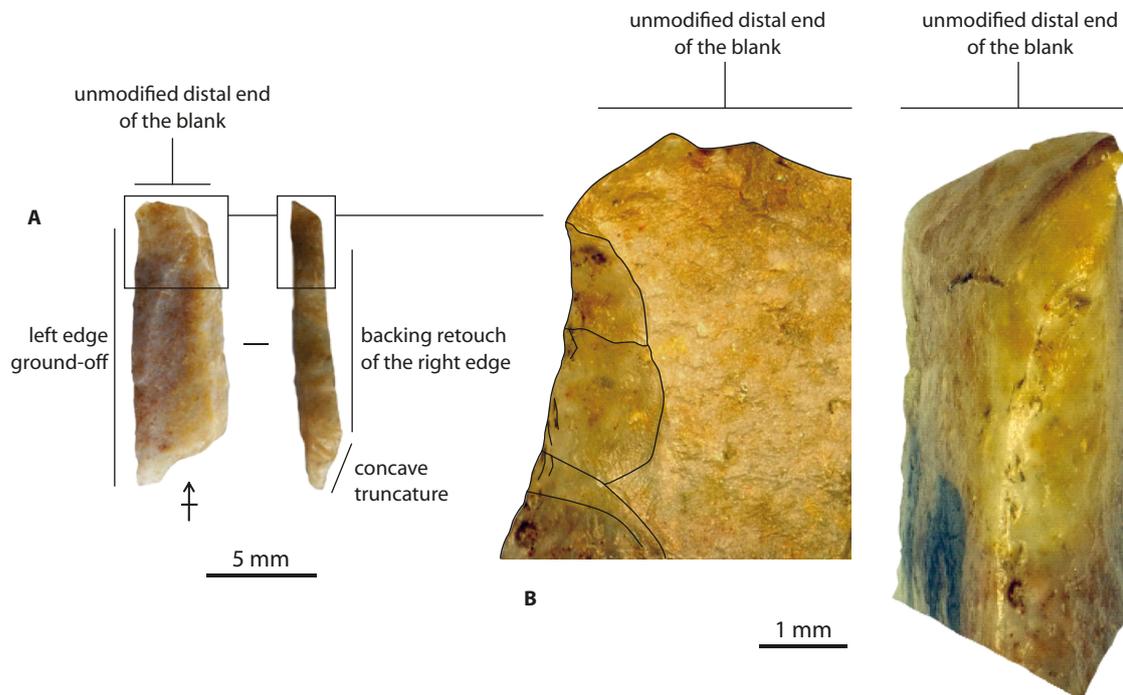
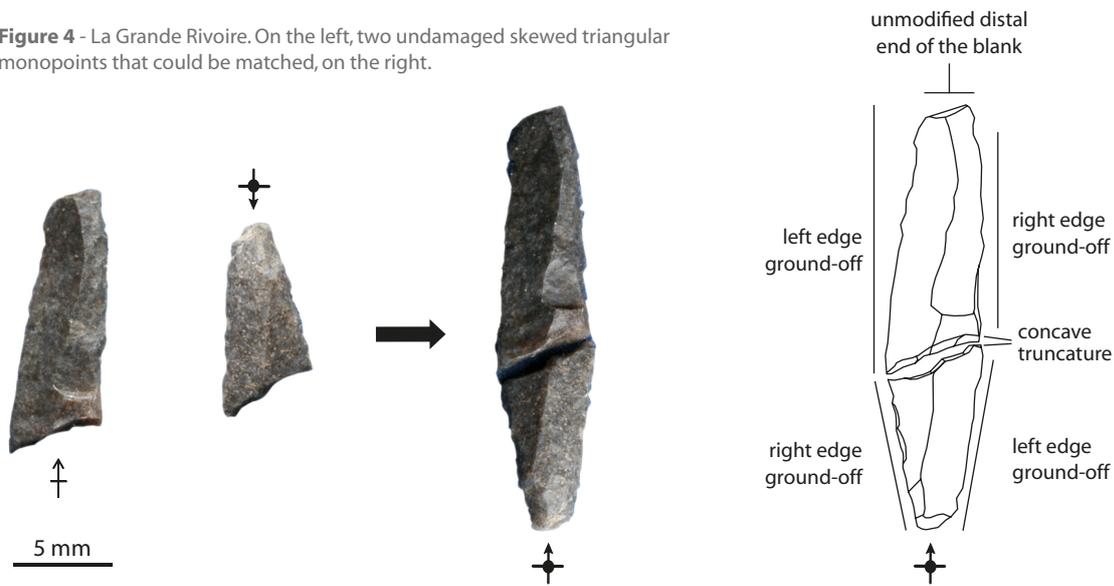


Figure 3 - La Grande Rivoire. Scalene triangle/skewed monopoint modified at the distal end of the blank. A: It may look as the large point is broken; B: However, stereomicroscopic observation of the distal end reveals that the backing retouch runs through the distal end of the blank. A single small point is intended. On the left: detail of the ground-off left edge and of the distal end (front view). On the right: detail of the ground-off left edge and of the unmodified distal end (lateral view).

Figure 4 - La Grande Rivoire. On the left, two undamaged skewed triangular monopoints that could be matched, on the right.



The second manufacturing technique is represented by 13 scalene triangles with two points made on the mesial part of the blank and opposite each other in the transverse axis of the piece. Backing and two truncations form one point oriented in the longitudinal axis of the piece and another that is skewed relative to this same axis. Like the triangles at Saint-Lizier, these are double-points (Chesnaux, 2013). However, in contrast to the triangles at Saint-Lizier, these are all scalene triangles which were probably not made using the microburin technique since only 3 microburins were found in these levels. Furthermore, there is a large number of Krukowski pseudo-microburins (flaking accidents) clearly showing that microburins were made at the site.

21 triangular microliths (13%), due to the transverse fragmentation that removed their distal or proximal end, can be attributed to either the first or second manufacturing technique. Even if double-points constituted the majority of this group of undetermined pieces, skewed monopoints would remain dominant in the complete assemblage.

Finally, since the six fractures diagnostic of impact observed on these triangles (double-points and skewed monopoints) are all burinating fractures (in contrast to the experimental axial points; Chesnaux, 2013), it appears that, like the triangles at Saint-Lizier, they were hafted as barbs on an arrow shaft.

4 - Toward a simplification of barb manufacturing

This study of Early Sauveterrian assemblages from Creysse and Late Sauveterrian assemblages from La Grande Rivoire revealed a remarkable difference in the manufacturing techniques of scalene triangles, all of which served as barbs. While in the Early Sauveterrian at Saint-Lizier, double-points were made through two truncations (obtained by one or two fractures made by the microburin technique), in the Late Sauveterrian at La Grande Rivoire, the creation of large points, useless in the functioning of barbs, was abandoned and two lateral weapon elements were made from a single blank (figure 5).

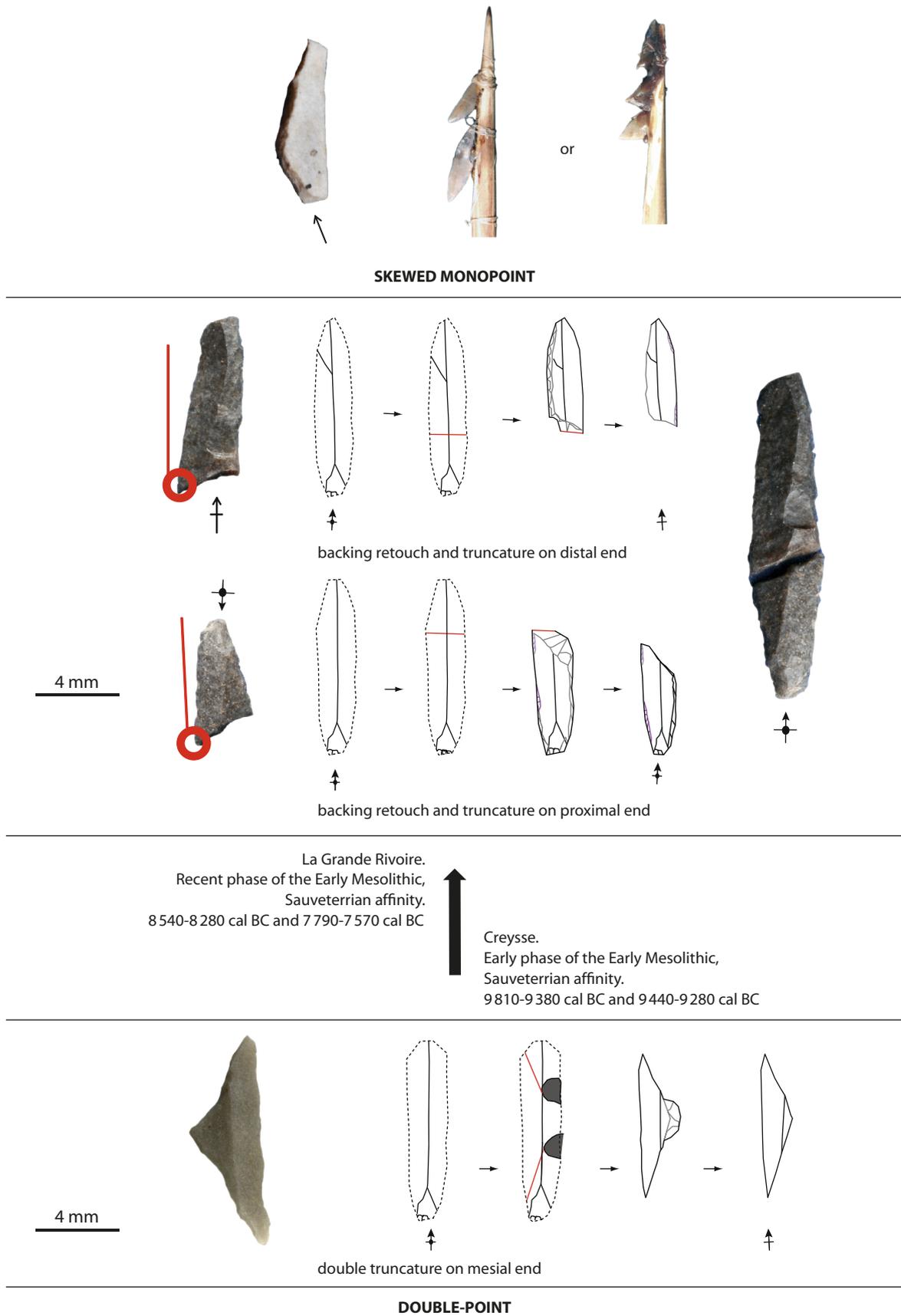


Figure 5 - Evolutionary scenario of barb manufacturing from the Early Sauveterrian (Saint-Lizier) to the Late Sauveterrian (Grande Rivoire).

This variability, even if between two geographically distant assemblages, could indicate an evolution in the manufacturing of barbs during the Early Mesolithic tending toward a simplification of techniques and an optimized use of blanks. It is of course necessary to analyze more triangular weapon element assemblages in well-dated southern contexts to confirm this variability.

We should first note that this scenario already mirrors the evolutionary model concerning Sauveterrian triangles from Fontfaurès-en-Quercy in south-western France, described by N. Valdeyron (Barbaza, Valdeyron, 1991; Valdeyron, 1994) who observed a trend toward elongation during this period. In this case, the Early Sauveterrian triangles realized with the microburin technique are made on the mesial part of the blank. The angle between the large base and the small base is thus very open. In contrast, the Late Sauveterrian triangles are no longer made on the mesial part of the blank. Here the entire length of the blank was used and the angle between the large base and small base thus becomes smaller. The elongation of triangles (and notably the change from isosceles to scalene triangles) during the Sauveterrian would thus correlate with changes in their manufacturing techniques.

Furthermore, in a study of three microlith assemblages in south-western France, R. Guilbert (2001, 2003) showed an evolution in the manufacturing of geometrics by fragmentation using the microburin technique at the beginning of the Early Sauveterrian, which completely disappears at the end of the Sauveterrian.

5 - First functional explanations

The manner in which composite arrows with lateral armatures, requiring a large number of barbs (the barbs are often detached when the arrow penetrates the animal), as was shown in our experiments (Chesnaux, 2013, 2014), could have itself incited Mesolithic hunters to simplify their microlith manufacturing techniques and to improve their production investment by abandoning the microburin technique (associated with many flaking accidents), and by sometimes even producing two microliths from one bladelet blank. It is of course necessary to verify the existence of this latter practice on other assemblages since, for the moment, it has been identified only at La Grande Rivoire.

Meanwhile, these results have opened new perspectives in our understanding and palethnological explanation of the evolution of microlith assemblages during the Early Mesolithic.

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