

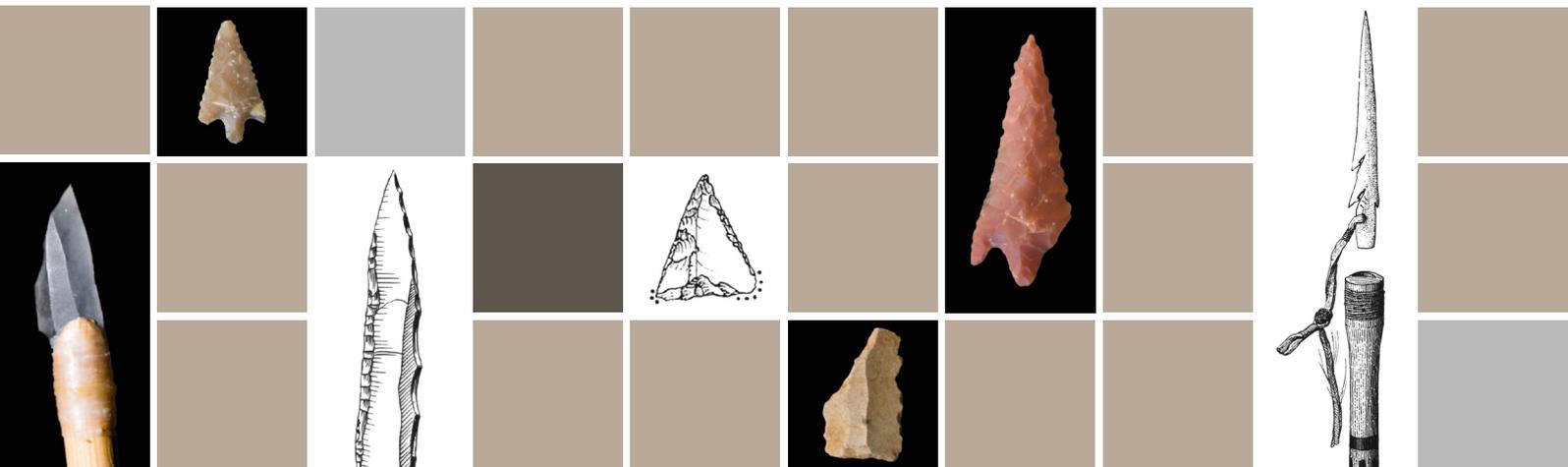
<http://www.palethnologie.org>
ISSN 2108-6532

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PROJECTILE WEAPON ELEMENTS

FROM THE UPPER PALAEOLITHIC TO THE NEOLITHIC

Proceedings of session C83



Review published by the P@lethnologie association, created and supported by the TRACES laboratory, the Ethnologie Préhistorique laboratory, the University of Liège and the Ministry of Culture and Communication.

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This event and its proceedings received support from



THE EVOLUTION OF STONE WEAPON ELEMENTS AND CULTURAL DYNAMICS DURING THE MESOLITHIC IN SOUTHWESTERN FRANCE : THE CASE OF THE HAUT QUERCY (LOT, FRANCE)

Nicolas VALDEYRON, Bruno BOSC-ZANARDO & Thomas BRIAND

Abstract

Following a recent quantitative and qualitative renewal of archaeological research in the Quercy, this region has become particularly favourable for analyses of the cultural dynamics of Mesolithic societies in southwestern France. These dynamics, principally associated with the evolution of projectile points, are most clearly manifest in the appearance of broad weapon elements (trapeze microliths and other evolved points) at the beginning of the seventh millennium cal BC. Through still poorly understood scenarios, these pieces replace narrow weapon elements (geometric or not). We have developed a research program concerning several thousands of objects recovered at five recently or currently excavated sites in order to obtain a better understanding of these evolutionary processes and to attempt to determine their modalities, rhythms and signification. In this paper, we present the current state of this work and the results obtained for the earliest phases of the Mesolithic.

Key-words : Mesolithic, southwestern France, Quercy, cultural dynamics, weapon armatures.

Introduction

In southwestern France, as elsewhere in western Europe, the beginning of the Mesolithic is characterised by the generalization of geometric microlithic weapon elements (most often triangles and less often segments), accompanied by other points that were also made on narrow blanks detached by direct percussion. During the first half of the seventh millennium cal BC, these elements were replaced by broad weapon elements (trapezes and other evolved points), which are often correlated with the development of new debitage techniques (indirect percussion, perhaps pressure flaking). This phenomenon, identified long ago, has been interpreted as both a rupture—the trapezes would have been the work of artisans coming from elsewhere and belonging to a different cultural tradition—and as a sign of continuity. In this latter case, the indigenous substratum would have evolved and new weapon armatures and associated blank producing methods would have been adopted through contacts, exchanges or imitation. In southwestern France, this alternative rapidly became the basis for the development of contradictory scenarios and as soon as the succession from triangles to trapezes was recognised, two antagonistic positions were successively developed. First, based on the eponymous sites of Sauveterre, Coulounges concluded that there was no relationship between the Sauveterrian that he had identified and the industries with Trapezes attributed to the Tardenoisian (Coulounges, 1935). On the contrary, though he followed the general scheme proposed by Coulounges, Lacam emphasised the continuity of the assemblages that he excavated at Cuzoul de Gramat (Lacam et al., 1944). Cl. Barrière (1956) first favoured the hypothesis of the arrival of exogenous populations, conforming to the then general vision of the Tardenoisian, which had always been perceived as a homogeneous and expansive phenomenon. However, the excavation of the site in the entrance of Rouffignac Cave later led him to imagine a possible internal evolution of the Sauveterrian from a local base (Barrière, 1972, 1973), though he never clearly expressed this hypothesis. J.G. Rozoy finally did though, after studying the remains excavated by Cl.

Barrière at Rouffignac: the Sauveterrian with trapezes was thus introduced, this terminology clearly indicating a supposed relationship between assemblages with triangles and those with trapezes. At around the same time and following a new study of the artefacts excavated by Coulounges at Roc Allan and Martinet, J. Rousset-Larroque developed her theory of the Roucadourian cycle (Rousset-Larroque, 1977, 1985, 1988), which totally contradicted the vision of J.G. Rozoy by claiming the existence of a clear and categorical rupture between the two major phases of the Mesolithic.

Two radically divergent scenarios, sometimes based on the same assemblages, were therefore successively or simultaneously constructed to explain the same phenomenon, namely the passage in the southwest from the First to the Second Mesolithic period. The program that we present here takes this observation as its starting point. While recognizing the strong cultural signification of weapon elements, our goal is to search for reliable answers based on a thorough knowledge of both the sedimentary and stratigraphic contexts and the technical and typological characteristics of these armatures throughout the period. Our primary objective is thus to identify the contents of the quivers (fig. 1) in order to apprehend their techno-typological variability through time and space and understand the rhythms and cultural meanings of these evolutions while attempting to integrate them within a global and dynamic perception of the history of these societies.

In its current stage of development, this program is largely based on data obtained in a geographic zone limited to the karst plateau of the high Quercy and its bordering valleys. Due to the quality of the available record, this zone offers a particularly favourable context for the study of the dynamics and evolutionary processes of projectile points from the end of the 10th to the beginning of the 5th millennia BC. We will subsequently extend this initial research zone, perhaps to include all of southwestern France. Meanwhile, even within this favourable context, the data available for the most recent phases are still partial and thus cannot be integrated into a long term explanatory scenario that



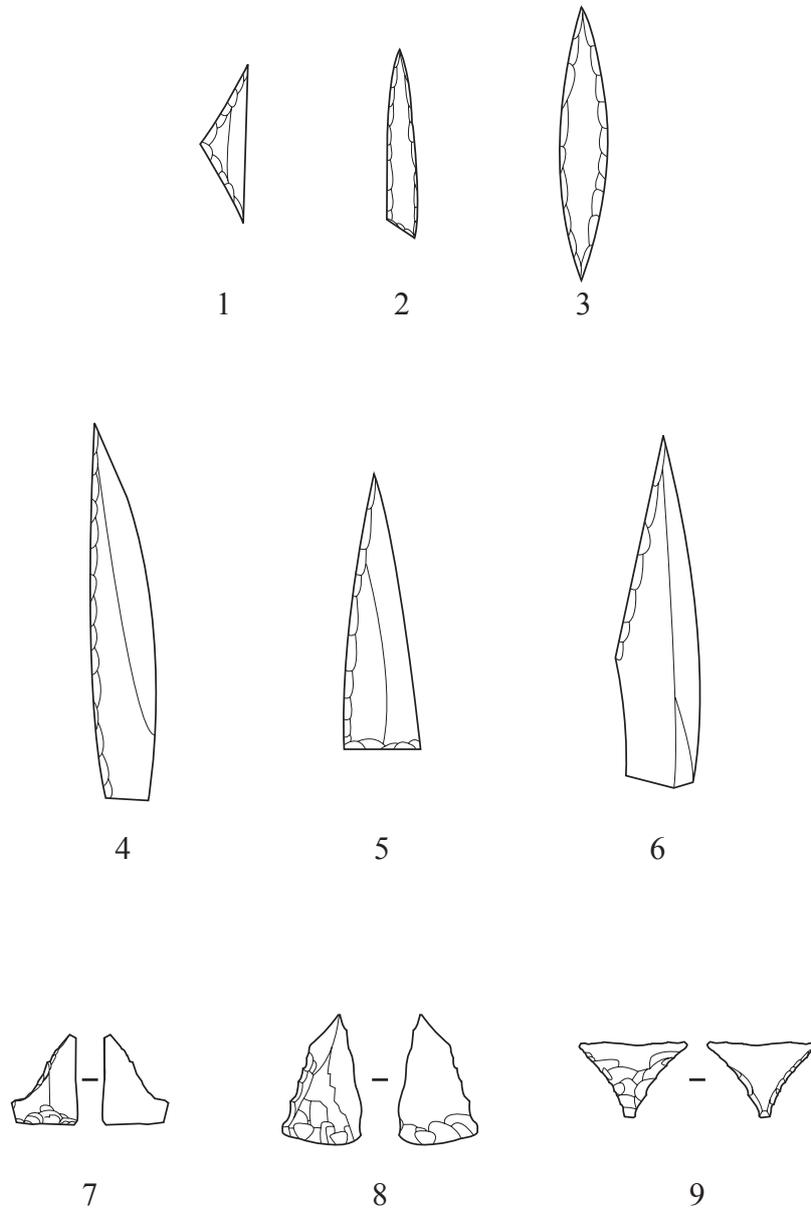


fig. 1 : Principal weapon element types in the Mesolithic of the Quercy region. 1: isosceles triangle; 2: Montclus triangle or similar object; 3: Sauveterrian bipoint; 4: linear backed point; 5: backed point (rectilinear or slightly curved profile) with a retouched base; 6: obliquely truncated point; 7: Martinet trapeze; 8: “bâtarde” point; 9: Montclus arrowhead.



would serve as a model. Therefore, we present here data concerning only the earliest phases.

A workshop zone with many advantages : the high Quercy

The zone studied in our program is centred on the limestone plateau of the Causse de Gramat and extends to the north of the Midi-Pyrénées region, between the Dordogne and the Lot. It covers a surface of approximately 1000 km² and is characterised by a succession of Jurassic limestone plateaus cut through by deep valleys. The altitude of these tabular surfaces, which are slightly undulated and dotted with evolved karstic formations, decreases regularly from east to west. It thus passes from nearly 500 m on average in the peripheral depressions of Ségala and Limargue, where contact is made with the Massif Central, to 350 m in the westernmost part of Bouriane, on the edge of the Périgord. The known Mesolithic sites in the sector (fig. 2) are thus located at the junction of three very distinct biotopes—dry limestone plateau, humid crystalline plateau opening onto the Massif Central, hospitable, but often confined valleys—which offered a contrasted ecological potential with numerous, often complementary, resources distributed over short distances. This landscape thus constitutes a significant advantage of the study zone since it may have led to a functional diversification of sites, which in turn influenced the composition of the lithic assemblages.

Another interesting element justifying the selection of this zone is the quantity and quality of research devoted to the characterisation of siliceous raw materials and the identification of their sources. This work has resulted in the creation of an excellent and already efficient dataset applicable on a local as well as allochthonous scale (Morala & Turq, 1990; Séronie-Vivien, 1990; Turq, 1990; Briois, 1991; Chalard *et al.*, 1994 and 1996; Demars, 1994; Morala & Ortega, 2002; Briand, 2005; Chalard *et al.*, in press). The local lithological potential is represented by Mesozoic (*Sécondaire*) flints (mostly Bajocians and Senonians) and Cenozoic (*Tertiaire*) collected from primary sources or alluvial contexts, as

well as jasperoid flints from the lower Lias (*Infralias*). Research in this domain permits us to address questions concerning acquisition territories and mobility (though the specific question of the variable accessibility of flint sources during the Mesolithic due to the evolution of the forest cover has not been clearly resolved), as well as questions directly related to the economy of raw materials and the choices that could have been determined, or at least favoured, by their different qualities. In this paper, the term “local raw material” is used in its broad sense, designating all materials present in the zone considered: the scale chosen is not that of an archaeological site but that of a workshop-zone, meaning all of the Haut Quercy.

A last, but not least point, since it was determinant in the selection of this workshop-zone, is the quality of the available documentation. In this case, it consists of more than a dozen recently excavated or studied (a large number of them by us) open-air or rock shelter sites within a small area, and thus provides, in theory at least, reliable data (particularly stone assemblages) within a revised radio-chronological framework.

Five of these sites constitute the core of this ensemble and have yielded most of the weapon elements studied in the context of this research program. They are:

- a) Fonfaurès (Lentillac-Lauzès, Lot), excavated by M. Barbaza from 1985 to 1987. Located in the high part of the Sagne Valley, this small site occupies an intermediary position (hence its interest) between the Célé Valley, of which the Sagne is a tributary, and the southwestern edge of the Causse de Gramat. It yielded a compact sequence that led to the proposition, in the early 1990's, of a new model for the organization of the southern Mesolithic. This model reaffirmed the unity of the Sauveterrian by demonstrating that the Montclusian is only the middle phase (Barbaza *et al.*, 1991; Valdeyron, 1994). This sequence is organised as follows:
- b) L. 6: Early Sauveterrian (Ly 4449: 9650 ± 130 BP, or 9350/8600 cal. BC to deux σ);



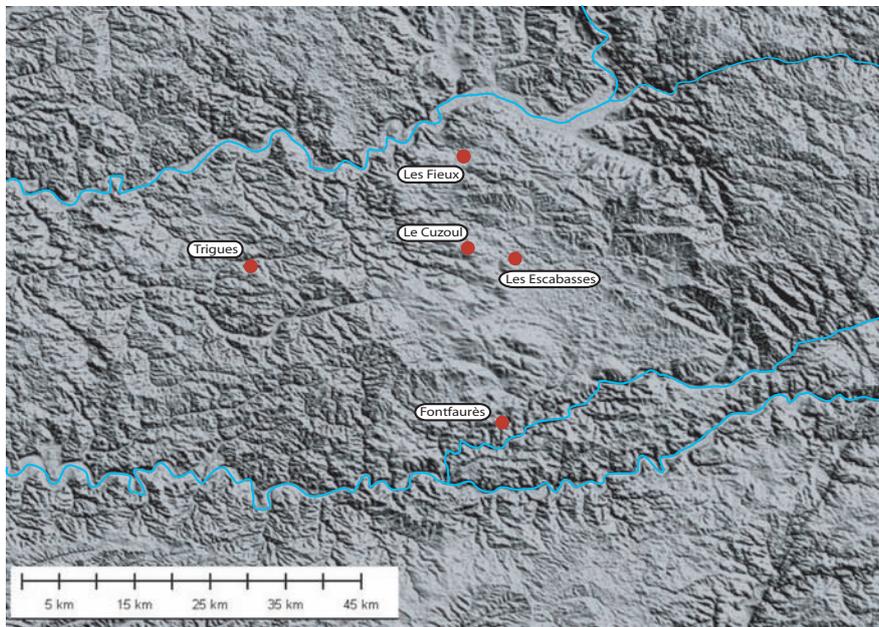
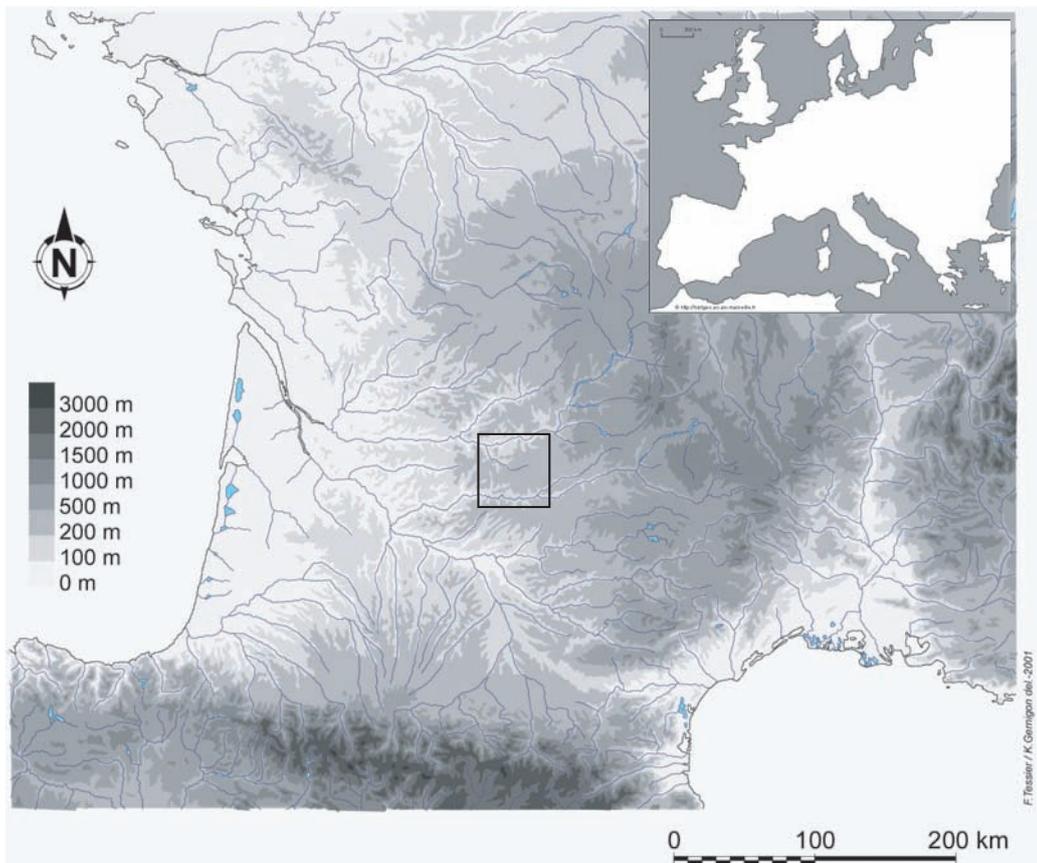


fig. 2 : Location of the Haut Quercy zone and the sites described in the text.



c) L. 5d to L. 5b: Evolved Early Sauveterrian (Ly 4448: 9140 ± 160 BP, or $8800/7800$ cal. BC);

d) L. 5a, L. 4b, L. 4a, L. 3 (the two latter levels were more or less disturbed by later occupations): Middle Sauveterrian (= Montclusian) in an early phase.

The site yielded 735 tools including 518 weapon elements, thus comprising 70% of the total tool assemblage.

e) The western porch of Les Fieux Cave (Miers, Lot), explored by F. Champagne from 1967 to 1972, and under which one of us (NV) realised a small excavation in 1999 to prepare for the publication of these still largely unpublished data (Champagne & Espitalié, 1972; Champagne & Jaubert, 1981; Champagne *et al.*, 1990; Marcus, 2000; Briand, 2004; Valdeyron *et al.*, 1999). This site is located on the north-east edge of the Causse de Gramat. The Mesolithic sequence (maximum depth 1.5 m) is organised as follows:

- directly below the edge of the overhang, a single layer (layer D), composed of successive levels of charcoal, ashes and more or less rubified earth, is attributed to an evolved Early Sauveterrian;
- in the back of the shelter, three sedimentary ensembles: D1 (equivalent to D), D2 and D3, attributed to the same chronocultural phase as D.

Two dates were realised under the incentive of F. Champagne: one for layer D3 (Gif 1807: 9450 ± 190 BP, pr $9247/8310$ cal BC) and the other inside the cavity on charcoal trapped in a level sealing, stratigraphically at least, the Mesolithic occupation (Gif 4281: 9060 ± 190 BP, or $8725-7659$ cal BC). In 2000, new dates were realised on wood charcoal samples collected throughout the entire depth of Layer D. The following results are presented in the stratigraphic order of their collection: Ly 1767 (Poz-531): 9260 ± 70 BP or $8696/8299$ cal BC; Ly 1765 (Poz-529): 9220 ± 70 BP or $8611/8294$ cal BC; Ly 1763 (Poz-525): 9080 ± 70 BP or $8541/7999$ cal BC; Ly 1766 (Poz-530): 8900 ± 70 BP or $8258/7794$ cal BC; Ly 10805: 8075 ± 90 BP or $7311/6699$ cal BC (the pertinence of this latter date, obtained at the top of level D but much younger than the others, is questionable).

This site yielded 757 tools including 643 weapon elements (85% of the total tool assemblage).

f) Escabasses Cave (Thémines, Lot). Revealed by the research of M. Lorblanchet (Lorblanchet, 1974), the site of Escabasses, located in the centre of the Causse de Gramat associates both a cave and a rock shelter occupation. From 1994 to 2002, it was subject to a series of interventions conducted in the context of a program directed by one of us (NV). Several studies of the artefacts and recent excavation data are still in progress in preparation for a synthetic publication.

The Mesolithic sequence explored during these latter works is located outside the cavity in the zone of the edge of the porch of the rock shelter. The entrance gallery of the cavity was the subject of only limited work (Valdeyron, 1994, 1995 and 2000a). This sequence is organised in two ensembles located at the base of the archaeological deposit of this porch zone:

- L. 6: Middle Sauveterrian, in an evolved phase (L.6base Ly-12240: 8310 ± 55 BP or $7521/7145$ cal BC; L.6 middle Ly-12238: 8275 ± 60 , or $7518/7082$ cal BC; L.6 top Ly-10937: 8055 ± 60 BP, or from -7275 to -6822 BC).
- L. 5: Final Mesolithic (Ly-10938: 7135 ± 60 BP, or $6157/5844$ cal BC).

All levels combined, this site yielded nearly 800 weapon elements out of a little more than 1,000 tools.

g) Le Cuzoul (Gramat, Lot). This site is located in a limestone sinkhole in the heart of the Causse de Gramat. Its main component is located in a natural rock shelter, composed of the entrance gallery of a cavity and its exterior extensions, which form the two lateral rock shelters extending on either side of the porch. Concordant indications suggest that during different periods of the Mesolithic, at least part of the sinkhole was also used as an open-air habitat. The site was explored between 1923 and 1933 by R. Lacam, who dug test pits first inside the cavity and then in one of the two rock shelters. In addition to a burial, for which the site is internationally known, he revealed a well preserved Mesolithic sequence, covering in particular



the end of the period (Lacam *et al.*, 1944). Starting in 2005, new research has led to a better knowledge of the archaeological sequence through the study of numerous objects found in the back dirt of the earlier excavations and the first results of our own excavations. This sequence clearly appears to be more complete than that published in 1944 since we were able to characterise, in addition to final Mesolithic occupations that had already been well identified (but for which a large quantity of artefacts was collected), occupations during the Azilian, Montclousian and probably the Sauveterrian and Early Neolithic (Valdeyron *et al.*, 2005, 2006 and 2007). Le Cuzoul could thus cover all of the period concerned by our research program, and is thus a particularly strategic site.

The artefacts included in our study collection can be divided into three categories:

- the weapon elements of the Lacam collection (which represents only a small part of the material previously collected), conserved at the Cabrerets Museum and consisting of a few dozen pieces, which correspond to those presented in the publication;
- the weapon elements found during back dirt sieving: these currently represent nearly 400 objects, at least half of which belong to the later phases (their value is of course limited, but they nonetheless offer a good vision of the techno-typological variability, in particular for the broad weapon elements that are still poorly known.
- the weapon elements found in place during our excavations: though only a few dozen have currently been found, they will play an essential role in the future.

h) The site of Trigues (Le Vigan, Lot). Discovered by P. Roussel, this open-air site is located in the Bouriane, west of the Causse de Gramat, around ten km south of Gourdon. It occupies the head of a small valley at around 350 m altitude and covers surface of approximately 3000 m² (of little significance in fact, since the artefacts were dispersed over this surface by agricultural machines). Following the collection of

several thousands of lithic artefacts during walking surveys, an excavation was undertaken in 2003 to evaluate the residual archaeological potential of the site. A dozen manual test pits showed that the archaeological level had been destroyed by agricultural activities and research was thus discontinued (Valdeyron *et al.*, 2005).

The very typical lithic artefacts indicate two occupation phases: one during the Early Sauveterrian, and the other during the Late/Final Mesolithic. Though the lack of spatial and stratigraphic data prevents the site from contributing to certain questions, the lithic artefacts can nonetheless participate in a typo-technological analysis. The interest of this site, however, does not lie in its weapon armatures, which are in fact not very numerous (a dozen or so for the Early Sauveterrian and 6 for the Late/Final Mesolithic), but rather in the relative abundance of blades and bladelets produced by a Montbani type reduction sequence and the associated cores, the latter being poorly represented in other Quercy assemblages.

These five sites thus cover all, or at least a large part, of the period concerned by our program (fig. 3) and have yielded a total of nearly 2,500 weapon elements. Of course, all of these data do not have the same documentary capacity. Some, for example, cannot be clearly positioned within the chronological framework. They nonetheless constitute a nearly unique corpus whose quantity and heuristic value should progressively increase, particularly with the advancement of work at Cuzoul. We will thus be able to gradually refine the scenarios based on the chronology, while improving the data (notably paleo-environmental) necessary to replace these artefacts within their original context.

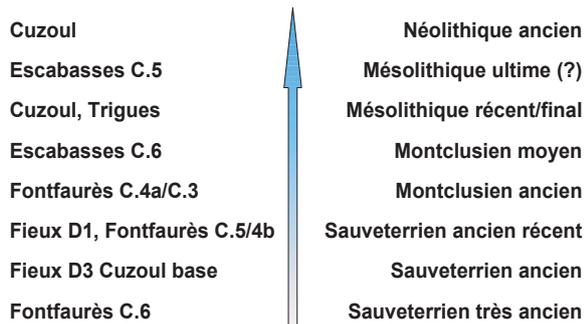
The First Mesolithic: Early and Middle Sauveterrian (Montclousian)

Let us briefly address the question of functional analyses, which though crucial, are somewhat beyond our personal competencies. The projectile point or lateral element function of these microlithic tools, *a priori* qualified as weapon armatures, has been demonstrated several times



over the last thirty years through use-wear analyses in Early and Middle Mesolithic contexts in western Europe (e.g. Odell, 1978; Dumont, 1988; Khedhaier, 2003). This same result was obtained for the two sites in Quercy that have been subject to this type of analysis, Fontfaurès (Philibert, 1991 and 2000) and Les Fieux (Khedhaier, in press). In both cases, the use of microliths as projectile weapon elements is demonstrated by the presence of micro and macro impact traces on geometric microliths (triangles and segments) and other non geometric types. The simultaneous presence of these tools in the assemblages thus raises the question, which will remain unanswered until their efficacy can be measured, of the criteria used in the choice between different tools and hafting methods. A barb function, with insertion of the large or small truncation, is also attested, at Les Fieux only for triangles and segments (Khedhaier, *ibid*).

Une séquence presque complète...



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fig. 3 : Relative position of the different levels of the five reference sites in the Mesolithic chronological sequence of Quercy.

The data obtained at Les Fieux (Marcus, 2000; Briand, 2004), which confirm and complete those reported at Fontfaurès (Briais, 1991), allow a satisfying characterisation of the first part of the production sequence of these armatures. They reveal a number of probably general traits (the analyses in progress at Escabasses give the same indications), along with other elements that appear to be more specifically related to the status of each site (fig. 4).

All of the available local raw materials were used for the fabrication of weapon elements of all types, with

proportions comparable (as far as this can be determined given the small size of these pieces) to those recorded for the other tools in this industry.

Knapping during the full debitage (primary blank production) phase was generally realised on unipolar cores, most often with a soft stone hammer, or sometimes with a small, hard stone cobble. These actions were oriented toward the production of thin, relatively narrow and elongated blanks (short bladelets or small elongated flakes), destined principally for the fabrication of weapon elements. A certain degree of anticipation is perceptible in the rather frequent choice of small raw material volumes (rarely more than 10 cm in length) with natural convexities that allowed the creation of multiple surfaces and reduced the preparation phase. This intention is particularly manifest in the frequent use of stones collected in alluvial contexts: the form and dimensions of these cobbles was perfectly adapted to the production objective (the weapon elements are rarely longer than 20 mm), while allowing a simplification of the initial preparation phases. This simplification of the beginning of the core reduction sequence contrasts with the greater care devoted to the full debitage phase. This is shown by frequent repairs to the striking platform, often careful abrasion of overhangs on the striking platform (though this characteristic is perhaps related to the percussion technique), as well as the frequent correction of convexities. At Les Fieux, as at Fontfaurès, the reduction sequences were spatially separated: the relative rarity of cortical products indicating that most of the cores were prepared elsewhere before being introduced into these sites.

The weapon elements were fabricated after a systematic and rigorous selection of the best blanks. These were the most regular pieces, in particular those with straight dorsal ridges, and a rectilinear or slightly curved profile. Those with a thickness of less than 2-2.55 mm were also preferred. The quality of this Sauveterrian knapping, usually appreciated only after observation of the unretouched products, is often underestimated. The lower quality blanks were sometimes used as second choices, but we often find them in high proportions among the unretouched debitage products, which can



give a false impression of their relative economic value. In the Middle phase, during which triangular geometric armatures of the “Montclus Triangle” type (often hyper-microlithic, always narrow and retouched on three sides) became common, small flake-bladelets were also frequently used as blanks.

The fracturation of these lamellar blanks by the microburin technique is attested, particularly during the early phase, on pieces shaped by truncations (triangles or points). The frequency of this technique is more difficult to estimate as the associated trihedral points are rarely preserved. In addition, since the weapon elements could have been fabricated away from the site, the quantity of microburins present is only indicative. Regardless, the use of this technique does not seem to have been systematic. Moreover, it clearly regresses during the middle phase (observation first made at Fontfaurès and then confirmed at Escabasses). This phenomenon is probably linked to the development of narrow armatures of the “Montclus Triangle” type, whose truncations were usually created by the abrupt edge retouch technique. The truncations, like the backed edges, were realised by abrupt direct retouch, often becoming semi-abrupt retouch on the apical part of the blank. A few of the thicker pieces have abrupt alternating retouch, but they are rare. On all of the weapon element types, the retouch is generally very regular; the delineation of retouched edges only exceptionally takes the form of slight denticulations. On the triangular geometric elements, the third side sometimes has a slight distal retouch, closer to a scraping than to true shaping retouch. A few triangular or ogival points have inverse retouch on the base. This retouch, which is generally semi-abrupt, is in this way distinct from the very flat inverse retouch present in the more recent phases.

Globally, and independently of the type of weapon element considered, these productions are thus associated with the use of relatively simple production strategies, starting from blank production until the shaping of the tool, resulting in relatively standardised products, despite a certain typological diversity (fig. 4 and 5).

This typological diversity opened another research perspective concerning these products, whose typology

was revised in stages and more or less completely (Valdeyron, 1991, 1994).

For several reasons, it is the geometric triangular armatures that captured our attention most: in the majority of sites, this is the best represented weapon element; this type is present (in contrast to the others) throughout the two phases of the First Mesolithic, and; their variations through time seem to have a particular significance, which merited testing. We conducted a Principal Components Analysis on a collection of 421 whole pieces constituted from the assemblages of Fontfaurès and Le Fieux (to which we added a few pieces from the sites of Chez Jugie in Corrèze and Salzets in Aveyron). This test allowed us to propose a morphometric typology in which symmetric forms gradually pass into forms more distant from the symmetry of the two truncations. Isosceles Triangles and Montclus Triangles occupy the two extremities of this range of variation. The novelty of this typology lies not so much in the identification of these extreme types and the associated intermediary types (the G.E.E.M. typology, 1969 and 1972, had already more or less identified these), but in the recognition of a chronological gradient represented in the percentages of the principal types. This gradient marks the passage from the early to the middle phase (Montclusian) of the Sauveterrian, thus also confirming the phyletic nature of the relationship between these two ensembles (fig. 6).

The non geometric weapon elements were not subject to a factor analysis; we applied more classic approaches to these objects, with analyses consisting mostly of adapting to these southern contexts the classifications conceived (those of G.E.E.M.) in order to have a much more general scope. The Fontfaurès sequence allowed us to clarify the rhythm of their appearance and to recognize that some of them have a chronological significance: while the narrow, backed bladelets, linear backed points and points with a retouched base (either ogival or triangular) do not show significant variation in their percentage of representation from level to level at this site, Sauveterrian Points (absent or very rare in the assemblages attributed to the early phase) and obliquely truncated points (which are, on the contrary, absent



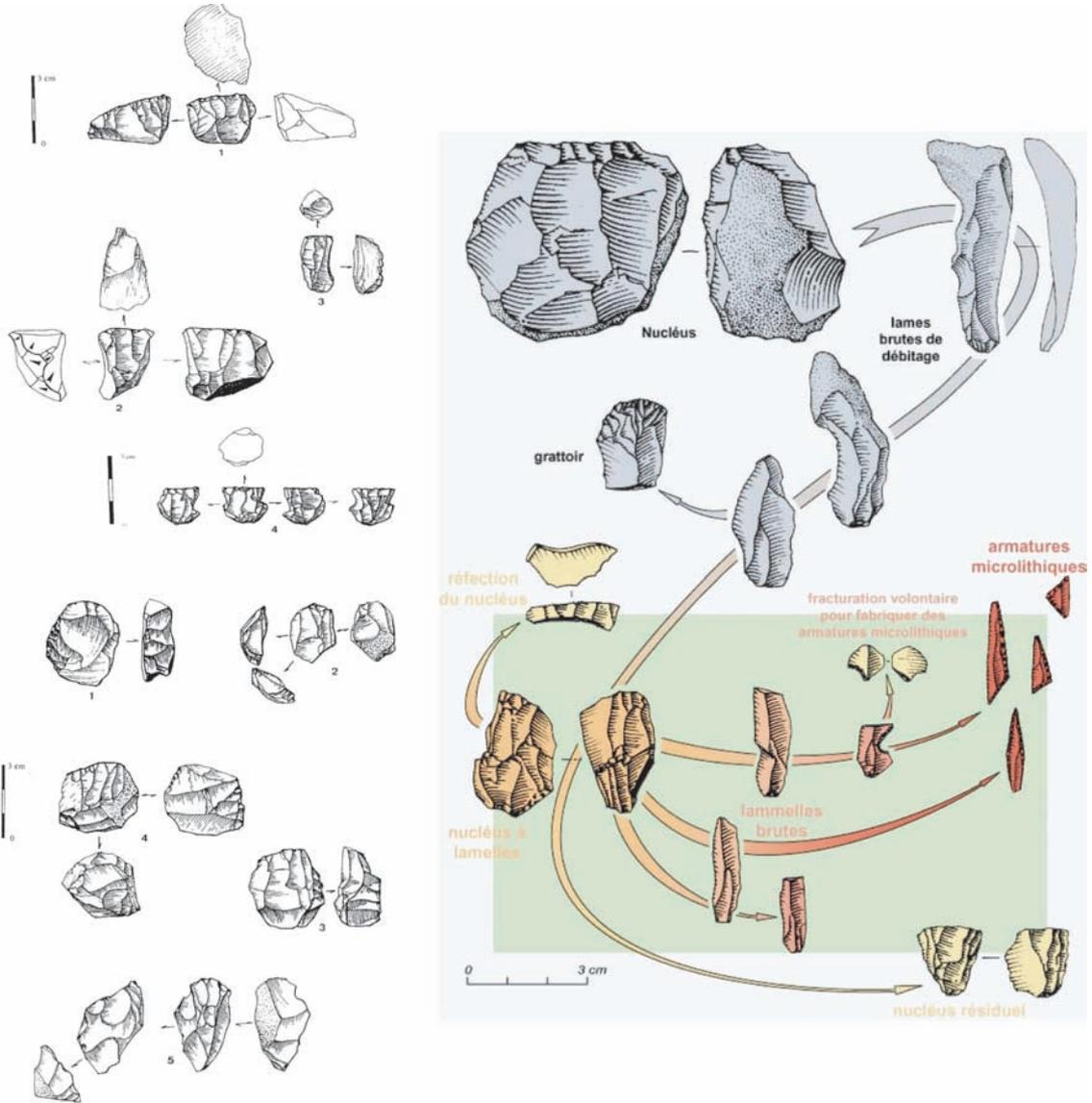


fig. 4 : left, blade core from level D of Les Fieux at Miers (excavation F. Champagen, drawings O. Marcus); right, Sauveterrian core reduction sequence at Fontfaurès at Lentillac-Lauzès (excavation M. Barbaza, after Barbaza 1999).



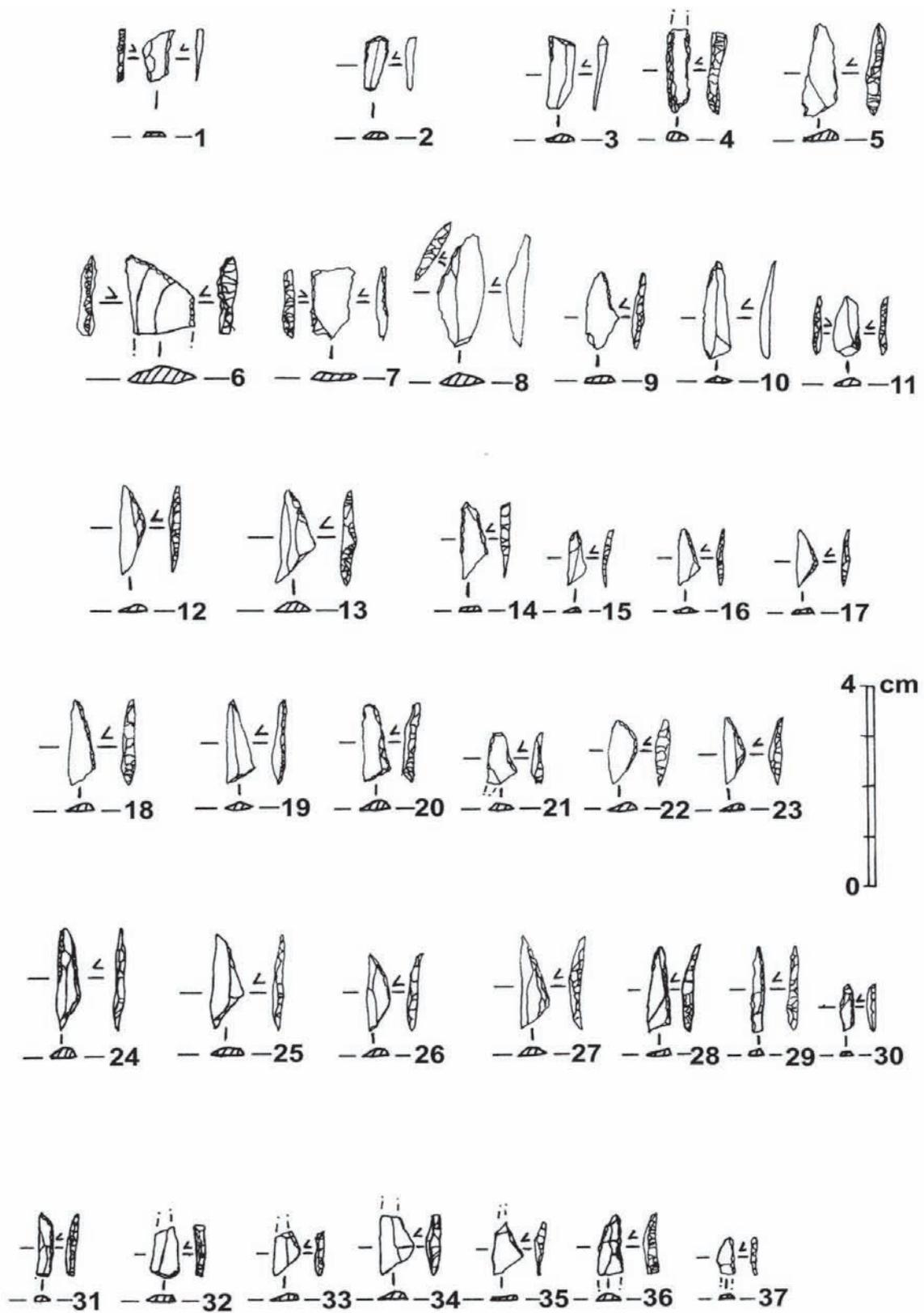


fig. 5 : Diverse weapon elements of the evolved Early Sauveterrian of level D of Les Fieux at Miers (excavation F. Champagne, drawings T. Briand).



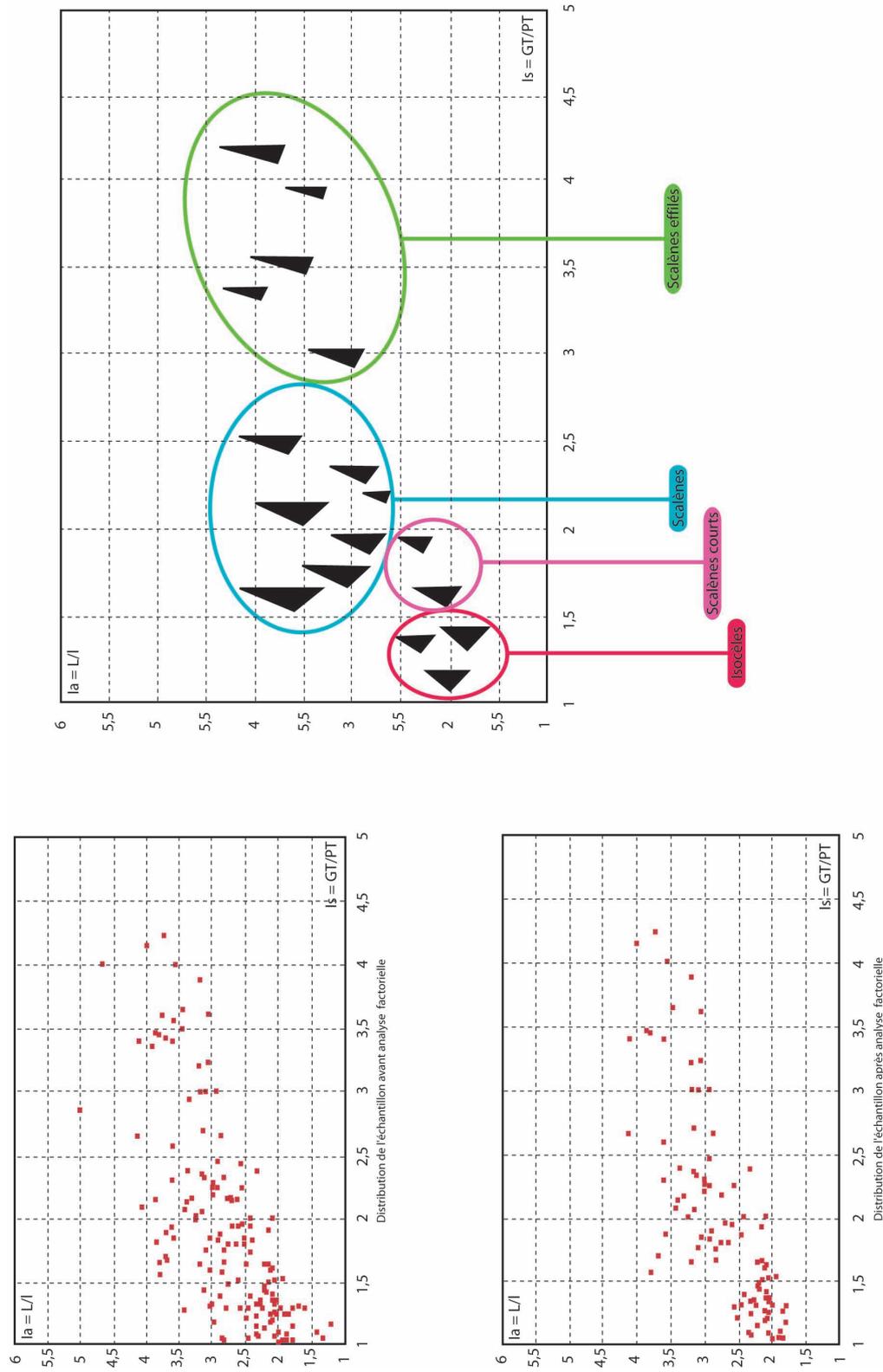


fig. 6 : Graphic treatment of the results of the Principal Components Analysis applied to a series of 421 geometric weapon elements. Left, distribution of individuals according to the symmetry index "Is" (length of the large truncation/length of the small truncation) and elongation index "la" (length/width) before and after the PCA. Right, interpretation of the results showing the existence of four morphometric tendencies whose variations in percentage evolve through time (after Valdeyron, 1994).

or extremely rare in the upper levels) do show such a variation. The first observations made at Les Fieux (Briand, 2004) and at Escabasses seem to confirm the status of chronological marker for these two weapon element types, whose percentage variations indicate changes in the conception of the wounding parts of arrows, even if they always associate a piercing extremity and lateral cutting edges.

The Second Mesolithic : first data

The current state of the documentation does not yet allow a satisfying characterisation of the production sequences of the broad weapon elements (triangles or trapezes) typical of this period. It also does not allow us to address the question of the relationships between the two major phases of the Mesolithic. Nonetheless, based on observations of the artefacts collected in the back dirt of Lacam at Cuzoul and of the artefacts collected at Trigues, we can make a few significant remarks that are of interest here.

Local raw materials are always largely dominant and our first observations do not seem to show particular choices related to the manufacture of weapon elements. It is possible, however, that some “discrete” features could have played a role in favour of a particular type within a large family of materials. It indeed appears that there was a preference for homogeneous, fine-grained materials, which was perhaps related to more restrictive and demanding production objectives (cf. *infra*).

These materials were exploited primarily to obtain high-quality blade-bladelet blanks (i.e. comparable to Montbani or Montclus types [Rozoy1978]). The pieces observed at Trigues (fig. 7) and Cuzoul are clearly characterised by intentionally laminar products with a slightly curved profile and with edges parallel to the straight dorsal ridges (there are many pieces with three planes). Certain elements, such as the presence of a few concave butts, suggest the use of indirect percussion.

Concerning the shaping of weapon armatures, we must first note the abundant reappearance of the microburin

technique. This technique was nearly abandoned during the middle phase, but is then apparently frequently used to sever blanks for the fabrication of trapezes and triangular points. We have recorded several dozen examples at Trigues and already nearly 150 in the disturbed assemblages of Cuzoul (the characteristic morphology of these blanks allows us to attribute them with certitude to the later phases of the Mesolithic. In contrast to earlier phases, trihedral points are very often preserved in this phase, spared at least in part by the abrupt retouch of the notch. This microburin technique is nonetheless not exclusive. Though we have not yet determined the reasons for choosing between these techniques, blanks were also severed by simple breaks. Some of the blanks sectioned by this latter technique also have the remains of a trihedral point: several pieces at Trigues are perfect examples and thus suggest an explanation related to typological criteria (the objects in question are rectangular trapezes in the process of fabrication, the fracture allowing the creation of a small base).

The shaping itself was realised by abrupt retouch, which was always direct and most often in the form of truncations, but also on the edges. This retouch was generally very regular. Many trapezes and points also have inverse retouch on their base. This retouch is sometimes semi-abrupt, but more often flat and was often carefully realized. In most cases, the inverse retouch is posterior to the base modifying truncation. Direct thinning retouch is also present on various types, particularly large, triangular points (the *bâtard*, or hybrid, points of Lacam), on which it often covers a significant part of the base. On the Montclus arrowheads, this retouch often becomes invasive and always starts from an inverse semi-abrupt retouch that serves as the pressure flaking platform. All of these particular pieces merit intensive study in order, for example, to record significant recurrences in the different retouch sequences and their organizational rhythms.

A temporary conclusion

As we have seen, the Quercy zone is particularly well adapted to a research program concerning the evolution of lithic weapon elements during the Mesolithic. For



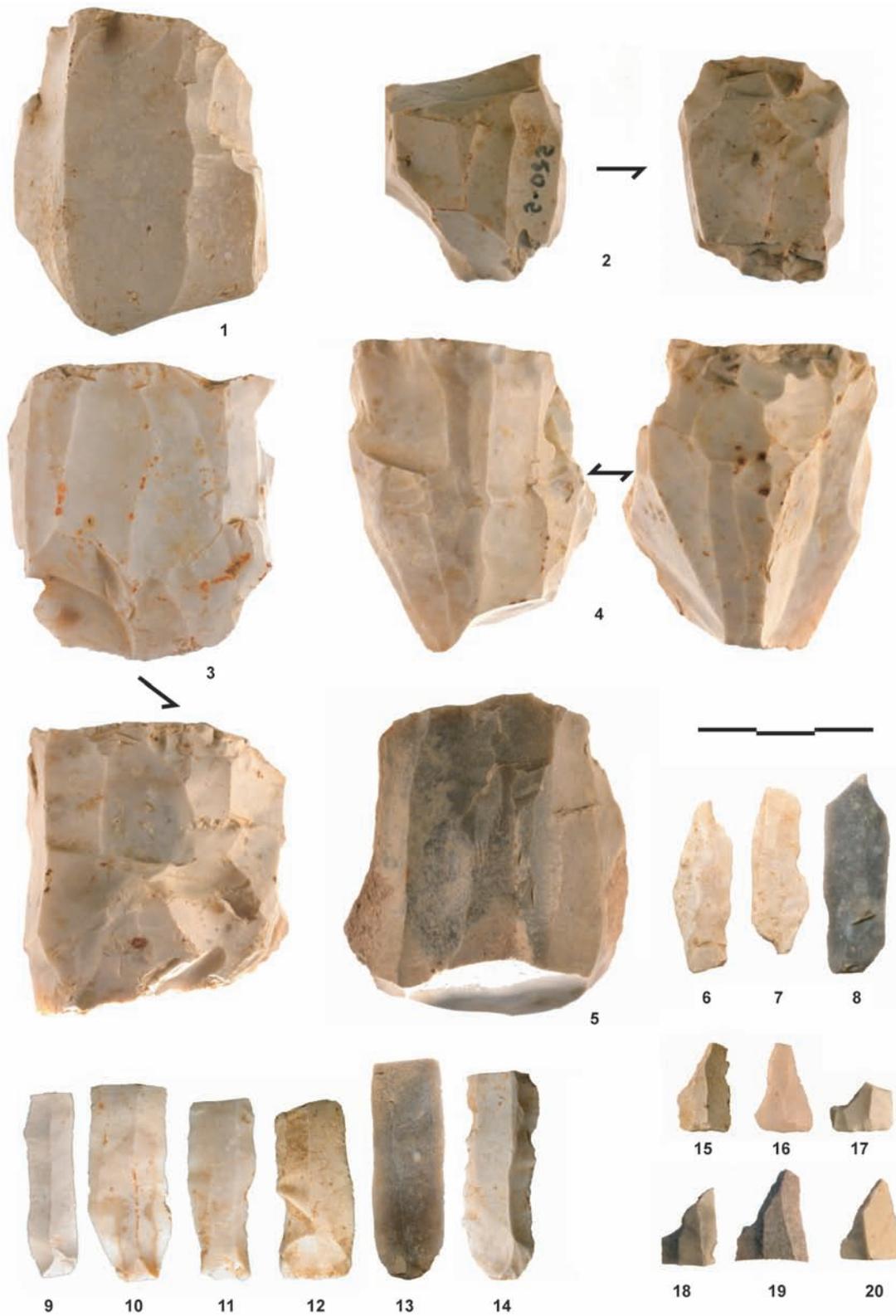


fig. 7 : lithic artefacts from Trigues at Vigan (prospections P. Roussel); 1-4: unipolar blade/bladelet cores probably knapped by indirect percussion; 6-8: microburins; 9-14: examples of regular blanks with two or three dorsal planes; 15-17: asymmetric trapezes (17 is a Martinet trapeze, the two others approach the definition of this type, particularly by the presence of semi-abrupt inverse retouch of the small base posterior to the truncation); 18-20: trapeze performs (the small base is created from a break).

the latest phases, several studies in progress will soon provide us with datasets that can be compared to those already available for the early and middle phases. These include a functional analysis of the Monclus arrowheads from Escabasses by S. Philibert, as well as a detailed techno-typological study of weapon elements collected in the back dirt of Lacam at Cuzoul by B. Bosc-Zanardo. Following this latter study, which should be rapidly available, the objective of future work at this major site will be to establish a reliable chronological framework that will allow us to reason in terms of coherent associations. For the already well documented phases with triangles, research at Escabasse will soon allow us to establish a relationship with the Montclusian of Fontfaurès, which is clearly older according to recently obtained dates. In this way, we will soon have a complete sequence covering all of the Sauveterrian, which will permit us to follow the evolution of these weapon element groups, if not continuously, at least without significant gaps. It will then be necessary to relate this ensemble to the data from Cuzoul in order to construct a reference base covering all of the Mesolithic and the beginning of the Neolithic, and finally address our original research problem. The time will then be ripe to move beyond the stage of techno-typological and chronological characterisations into other levels of reasoning. For example, we must begin to construct models that draw upon and integrate data concerning habitats, the environment and raw material circulation. It will then be profitable to extend our research zone into other areas: the Brive Basin, where numerous open-air sites have already been recorded (Demars 2000) could be a next step.

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References

- BARBAZA, M., VALDEYRON, N., ANDRÉ J., BRIOIS, F., MARTIN, H., PHILIBERT, S., ALLIOS, D. ET LIGNON, E. (1991) - *Fontfaurès en Quercy. Contribution à l'étude du Sauveterrien*. Toulouse, Archives d'Ecologie Préhistorique, 11, 271 p.
- BOSC-ZANARDO, B. (2005) - *Les armatures larges du Mésolithique au Néolithique dans le Sud de la France. Etude préliminaire*. Mémoire de DEA, Université Toulouse-Le Mirail, 148 p., 15 fig.
- BRIAND, T. (2004) - Les industries lithiques du gisement sauveterrien du porche ouest de la grotte des Fieux à Miers (Lot). Etude typologique des outils. Mémoire de maîtrise, Université Toulouse-Le Mirail, 109 p., 38 fig.
- BRIAND, T. (2005) - *Archéopétrographie des industries du Mésolithique en Quercy, intégration d'un système de gestion d'une lithothèque*. Mémoire de DEA, Université Toulouse-Le Mirail, Toulouse, 55 p., 13 fig., 1cdrom.
- BRIOIS, F. (1991) - Économie des matières premières. Économie du débitage, in *Fontfaurès en Quercy, contribution à l'étude du Sauveterrien*, Archives d'Ecologie préhistorique, 11, p. 97-106.
- CHALARD, P., DUCASSE, S., BON, F., BRUXELLES, L., TEYSSANDIER, N., RENARD, C., GARDÈRE, P., GUILLERMIN, P., LACOMBE, S., LANGLAIS, M., MENSAN, R., NORMAND, C., SIMONNET, R. ET TARRINO, A. (à paraître) - Chalosse type flint : exploitation and distribution of a lithologic marker during the Upper Palaeolithic of Southern France. In : Burke, A. et LaPorta, P.C. (eds.). *Prehistoric mines and quarries, a Trans-Atlantic perspective*. Oxbow Books.
- CHALARD, P., SIMONNET, R., BRIOIS, F., LACOMBE S. ET SERVELLE, C. (1994) - *Lithothèque des matières premières siliceuses : Région Midi-Pyrénées*. Projet collectif de recherche, rapport d'activité, SRA de Midi-Pyrénées, Toulouse, 54 p.



- CHALARD, P., SIMONNET, R., BRIOIS, F., LACOMBE S. ET SERVELLE, C. (1996) - *Lithothèque des matières premières siliceuses : Région Midi-Pyrénées*. Projet collectif de recherche, rapport de synthèse, SRA de Midi-Pyrénées, Toulouse, 149 p.
- CHAMPAGNE F., JAUBERT, J. (1981) - La grotte des Fieux, à Miers (Lot). Bilan de 13 années de recherches. *Congrès Préhistorique de France*. XXI session. Montauban-Cahors 1979, p. 85-104, 13 fig.
- CHAMPAGNE, F., CHAMPAGNE, CH., JAUZON, P. ET NOVEL, PH. (1990) - La grotte des Fieux à Miers (Lot). Etat actuel des recherches. *Gallia Préhistoire*, t. 32, p. 1-28, 23 fig.
- CHAMPAGNE, F., ESPITALIÉ, R. (1972) - Note sur une datation du Sauveterrien de la grotte des Fieux à Miers (Lot). *Bulletin de la Société Préhistorique Française*, t. 69, p. 55-58.
- DEMARS, P.-Y. (1994) - *L'économie du silex au Paléolithique supérieur dans le Nord de l'Aquitaine. Analyse, synthèse et interprétations*. Thèse de doctorat d'état, université de Bordeaux 1, 2 vol., 549 et 270 p.
- DEMARS, P.-Y. (2000) - La circulation du silex au Sauveterrien entre le Limousin et le Périgord : déplacement des personnes et territoires. In *Les derniers chasseurs d'Europe occidentale*. Actes du colloque international, Besançon, 1998, Presses Universitaires Franc-Comtoises, p. 277-286.
- DUMONT, J.V. (1988) - *A microwear analysis of selected artefacts types from the Mesolithic sites of Star Carr and Mount Sandel*, Oxford, B.A.R., 187, 2 vol., 531p.
- G.E.E.M. (1969) - Epipaléolithique-Mésolithique : les microlithes géométriques. *Bulletin de la Société Préhistorique Française*, t. 66, p. 355-366, 9 fig.
- G.E.E.M. (1972) - Epipaléolithique-Mésolithique : les armatures non géométriques. *Bulletin de la Société Préhistorique Française*, t. 69, p. 364-375, 8 fig.
- KHEDHAIER, R., (à paraître) - Etude tracéologique de l'outillage lithique de la grotte des Fieux (Lot). In Valdeyron, N. (dir.) *Le gisement mésolithique du porche ouest de la grotte des Fieux (Miers, Lot) : une halte de chasse sur la cause de Gramat*. 4 fig.
- KHEDHAIER R. (2003) - *Contribution à l'étude fonctionnelle des industries lithiques sauveterriennes : Comparaison de deux sites du Sud-Est de la France (Le Sansonnet et le Pey de Durance) et de la Suisse Occidentale (La Baume d'Ogens et le Château d'Oex)*, Centre d'Aix, Université Aix-Marseille I, Thèse de Doctorat, 2vol., 408p.
- LACAM, R., NIEDERLENDER, A. ET VALOIS, H. (1944). - *Le gisement mésolithique du Cuzoul de Gramat*. Archives de l'IPH, mémoire 21, 92 p., 44 fig., VIII planches.
- LORBLANCHET, M. (1974) - *L'Art préhistorique en Quercy : la grotte des Escabasses (Thémines, Lot)*. P.G.P., Morlaas, 104 p., 43 fig.
- MARCUS, O. (2000) - *Etude technologique du matériel lithique sauveterrien du gisement du porche ouest de la grotte des Fieux (Lot)*. Mémoire de maîtrise, Université Toulouse-Le Mirail, 100 p., 42 fig.
- MORALA, A. ET ORTEGA, I. (2002) - Les silicifications du bassin aquitain, in *Comportements techniques et économiques des sociétés du Paléolithique supérieur dans le contexte pyrénéen*. Projet collectif de recherche, rapport d'activité, SRA de Midi-Pyrénées, Toulouse, p. 67-74.
- MORALA, A. ET TURQ, A. (1990) - Les stratégies d'exploitation du milieu minéral, du Riss à l'Holocène en Haut-Agenais, in *Le silex de sa genèse à l'outil*, actes du Vème colloque international sur le silex, Bordeaux, 17 sept-2 oct. 1987, Cahiers du Quaternaire n° 17, éditions du CNRS, Paris, tome II, p. 405-414.
- ODELL, G.H. (1978) - Préliminaire d'une analyse fonctionnelle des pointes microlithiques de Bergumermeer (Pays-Bas), *Bulletin de la Société Préhistorique Française*, t. 75, p. 38-49.



- PHILIBERT, S. (1991) - Fontfaurès : Analyse tracéologique de l'industrie lithique et approche fonctionnelle du site, in : *Fontfaurès en Quercy : Contribution à l'étude du Sauveterrien*, Archives d'Écologie préhistorique, 11, p. 151-168.
- PHILIBERT, S. (2000) - *Les derniers chasseurs-cueilleurs du Sud de la France : approche des systèmes techno-économiques par analyse fonctionnelle d'industries de pierre taillée épipaléolithique et mésolithique*. Toulouse, Ecole des Hautes Etude en Sciences sociales, Thèse de Doctorat, 2 vol., 367p.
- RIVIÈRE, J. (2006) - *Approche archéozoologique des occupations du Mésolithique moyen et final des Escabasses (Lot). Campagnes 1993-2002*. Mémoire de master II, Muséum National d'Histoire Naturelle de Paris, 126 p., 49 fig. et 6 tabl.
- Séronie-Vivien, M.-R. (1990) - Les silex du Mésozoïque Nord-Aquitain, in *Le silex de sa genèse à l'outil*, actes du Vème colloque international sur le silex, Bordeaux, 17 sept-2 oct. 1987, Cahiers du Quaternaire n° 17, éditions du CNRS, Paris, tome II, p. 104-117.
- TURQ, A. (1990) - Exploitation des matières premières lithiques dans le Moustérien entre Dordogne et Lot, in *Le silex de sa genèse à l'outil*, actes du Vème colloque international sur le silex, Bordeaux, 17 sept-2 oct. 1987, Cahiers du Quaternaire n° 17, éditions du CNRS, Paris, tome II, p. 415-427.
- VALDEYRON, N. (1995) - Le Sauveterrien de la grotte des Escabasses à Thémines (Lot), *Préhistoire Quercinoise*, t. 2, p. 65-71, 3 fig.
- VALDEYRON, N. (2000a) - Le gisement de la grotte des Escabasses à Thémines (Lot) et la séquence mésolithique en Aquitaine. In *Les derniers chasseurs-cueilleurs d'Europe occidentale*, actes du colloque international de Besançon (Doubs, France), 1998, pp.151-159, 2 fig.
- VALDEYRON, N. (2000b) - Géographie culturelle du Mésolithique récent/final dans le Sud-Ouest de la France. In Leduc, M., Valdeyron, N. et Vaquer J. (dir.) *Sociétés et Espaces*, actes des IIIèmes Rencontres Méridionales de Préhistoire Récente, Toulouse, 1998, p. 23-34, 1 fig.
- VALDEYRON, N. (1994) - *Le Sauveterrien. Culture et sociétés mésolithiques dans la France du Sud durant les X et IX millénaires*. B.P. Toulouse, Thèse de doctorat nouveau régime, Université Toulouse-Le Mirail, 2 tomes, 584 p., 140 figures.
- VALDEYRON, N., BOSC-ZANARDO, B., BRIAND, T. ET MARQUEBIELLE, B. (2005) - *Le gisement du Cuzoul de Gramat (Lot)*. Rapport de fouille programmée annuelle, SRA de Midi-Pyrénées, 52 p., 7 fig., 14 pht., 3 pl.
- VALDEYRON, N., BOSC-ZANARDO, B., BRIAND, T., BRUXELLES, L., MARQUEBIELLE, B., HENRY, A. ET PEDOUSSAUT, L. (2006) - *Le gisement du Cuzoul de Gramat (Lot)*. Rapport de fouille programmée annuelle, SRA de Midi-Pyrénées, 79 p., 21 fig., 6 pht.
- VALDEYRON, N., BOSC-ZANARDO, B., BRIAND, T., HENRY, A., MARQUEBIELLE, B. ET PEDOUSSAUT, L. (2006) - *Le gisement du Cuzoul de Gramat (Lot)*. Rapport de fouille programmée triannuelle, 1er rapport intermédiaire, SRA de Midi-Pyrénées, 49 p., 12 fig., 8 pht.
- VALDEYRON, N., BOSC-ZANARDO, N., BRIAND, T. ET ROUSSEL, P. (2005) - *Le gisement mésolithique de plein air de Trigues (Le Vigan, Lot)*. Rapport de sondage, SRA de Midi-Pyrénées, 16 p., 1 fig., 10 pht.
- VALDEYRON, N., BROCHIER, J.E., CHAMPAGNE, F., BOUBY, L., GALOP, D. (1999) - *Le gisement du porche ouest de la grotte des Fieux à Miers (Lot)*. Rapport de fouille programmée, SRA de Midi-Pyrénées, 28 p., 6 fig., 8 pht.
- VALDEYRON, N., BRIAND, T., BOSC-ZANARDO, B., BOUBY, L., BROCHIER, J.E., GAILLARD, A., HENRY, A., MARQUEBIELLE, B., MARTIN, H., THIBEAU, A., MARCUS, O. (à paraître) - *Le gisement mésolithique du porche ouest de la grotte des Fieux (Miers, Lot) : une halte de chasse sur le causse de Gramat*.

To quote this article

VALDEYRON N., BOSC-ZANARDO B., BRIAND T. (2008) - The evolution of stone weapon elements and cultural



dynamics during the Mesolithic in Southwestern France : the case of the Haut Quercy (Lot, France). In : J.-M. Pétilion, M.-H. Dias-Meirinho, P. Cattelain, M. Honegger, C. Normand, N. Valdeyron (coord.), Projectile weapon elements from the Upper Palaeolithic to the Neolithic (Proceedings of session C83, XVth World Congress UISPP, Lisbon, September 4-9, 2006), *Palethnologie*, 1, p. 269 - 286.

Article translated by Magen O'Farrell





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Bilingual review of prehistory