Modes de contacts et de déplacements au Paléolithique eurasiatique

Modes of contact and mobility during the Eurasian Palaeolithic

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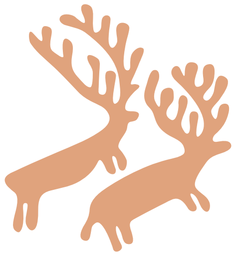

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Marcel OTTE & Foni LE BRUN-RICALENS

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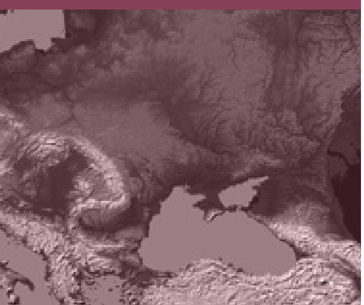

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ERAUL

Diffusion rapide des nouveaux savoirs

La diffusion rapide de l'information scientifique s'avère primordiale pour alimenter les réflexions afin d'actualiser les savoirs et faire progresser les connaissances. À l'issue du colloque international organisé sous la direction du Professeur Marcel Otte, président de la commission 8 (Paléolithique supérieur) de l'UISPP, il a été vivement souhaité par tous les chercheurs et participants de rapidement en éditer les actes. Dans cette perspective, eu égard notamment à leur proximité géographique, les éditions **ERAUL** et **Archéo**Logiques ont proposé de s'associer pour mettre en commun leur savoir-faire et compétence. Ce défi a été relevé grâce à la complicité et aux talents de Mary Etienne et Eléonore Simonin, qui ont assuré le secrétariat d'édition, ainsi que de François Lacrampe-Cuyaubère qui s'est chargé avec brio de la mise en page de la trentaine de contributions scientifiques avec le souci d'ajouter la forme au fond. Nous avions promis à notre ami Marcel de faire notre possible pour que les actes soient disponibles avant le prochain Congrès UISPP de Burgos prévu en septembre 2014, promesse tenue grâce à l'efficacité de l'équipe éditoriale et à la célérité des auteurs à remettre leurs articles.

« Les paroles s'envolent, les écrits restent… » dit l'adage. À l'occasion de la naissance de ce nouveau volume, il nous est particulièrement agréable de remercier chaleureusement les orateurs, les organisateurs, les participants, toutes les personnes et les instances qui ont permis de mener à bien ce projet d'édition à l'échelle eurasiatique. À son tour, le présent ouvrage et les idées qui y sont présentées doivent circuler pour stimuler de nouvelles interprétations et voies de recherche qui susciteront d'autres rencontres.

Nous vous souhaitons de très bonnes lectures à la découverte des diverses modalités et hypothèses de déplacements et contacts proposés pour les groupes paléolithiques.

Luxembourg, juin 2014

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Chargé de direction du Centre National
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Préface

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Préface

Si l'on considère l'ensemble de l'histoire humaine, estimée à trois millions d'années, l'immense majorité des populations humaines n'a cessé de suivre des cycles migratoires, aujourd'hui encore très importants (Le Monde 2008–2009). La fixité des habitats humains n'est qu'une affaire très « récente », d'environ dix mille ans, encore que limitée à certaines aires favorables au renouvellement spontané des ressources : la Chine orientale, l'Afrique subsaharienne, les pourtours méditerranéens, les régions andines et la Méso-Amérique (Guilaine 2011). Tout le reste de l'humanité, en espace et en temps, ne fit et ne fait encore que se déplacer, c'est « le propre de l'homme » parmi les primates. Le développement du tourisme de masse n'est qu'un avatar récent d'une aspiration beaucoup plus profonde, celle d'aller « voir ailleurs ». De proche en proche, l'humanité a ainsi conquis la Terre entière, soit par cycles migratoires « fermés », soit par l'extension sans retour, comme vers les Amériques ou l'Australie. L'intégration d'une tradition culturelle dans le paysage fait partie en quelque sorte de son identité : chaque lieu peut faire l'objet d'exploitation distincte, dictée par le mode de vie, les systèmes de valeurs et les motifs de contact (**figure 1**). En quelque sorte, les aires culturelles et leur mode d'exploitation font partie d'un choix ethnique, largement attesté en Sibérie actuelle (Ferret 2009), mais plus encore dans les cartes reconstituées des aires d'extensions préhistoriques (Otte *et al.* 2009). Ces réseaux forment comme une trame invisible dans le paysage, mais curieusement bien réelle, comme la possession des puits des déserts ou l'appartenance du gibier en régions steppiques (**figure 2**).

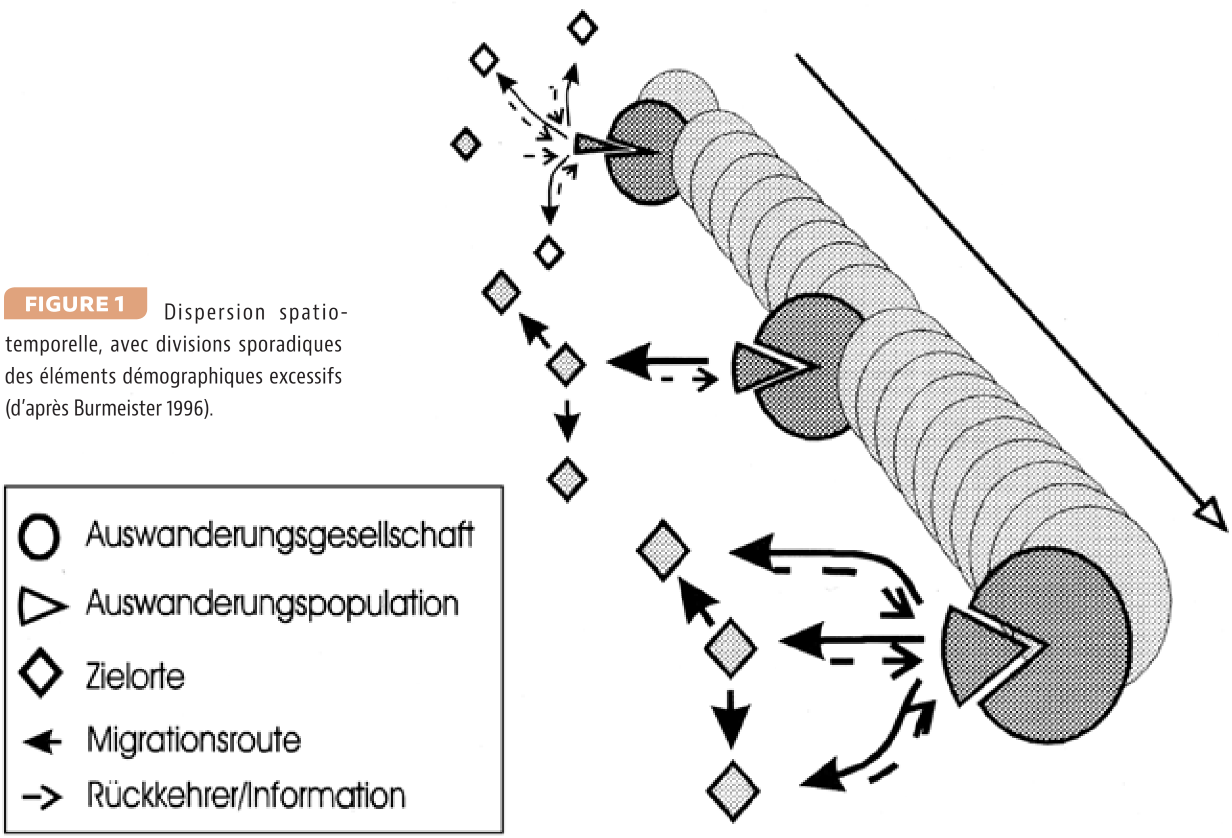


FIGURE 1 Dispersion spatio-temporelle, avec divisions sporadiques des éléments démographiques excessifs (d'après Burmeister 1996).

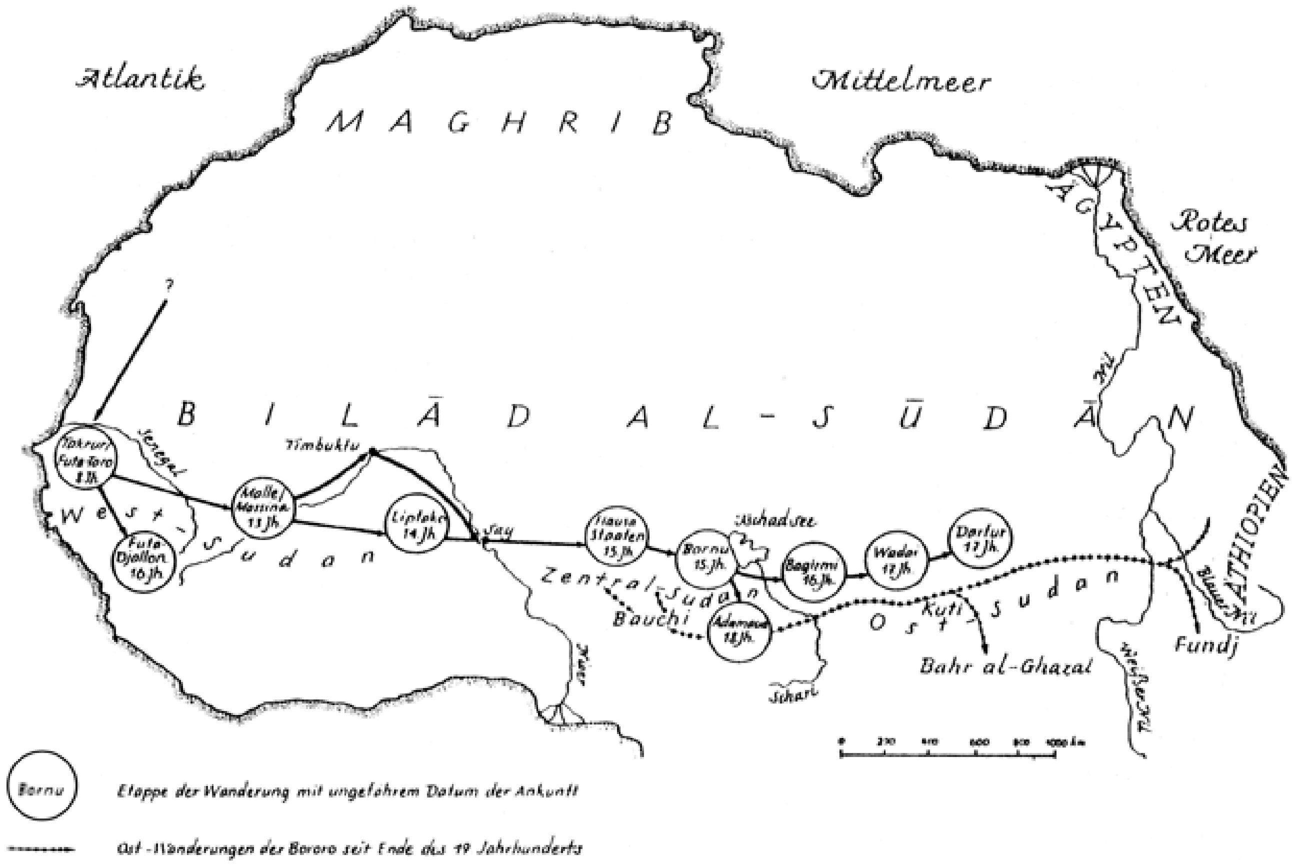
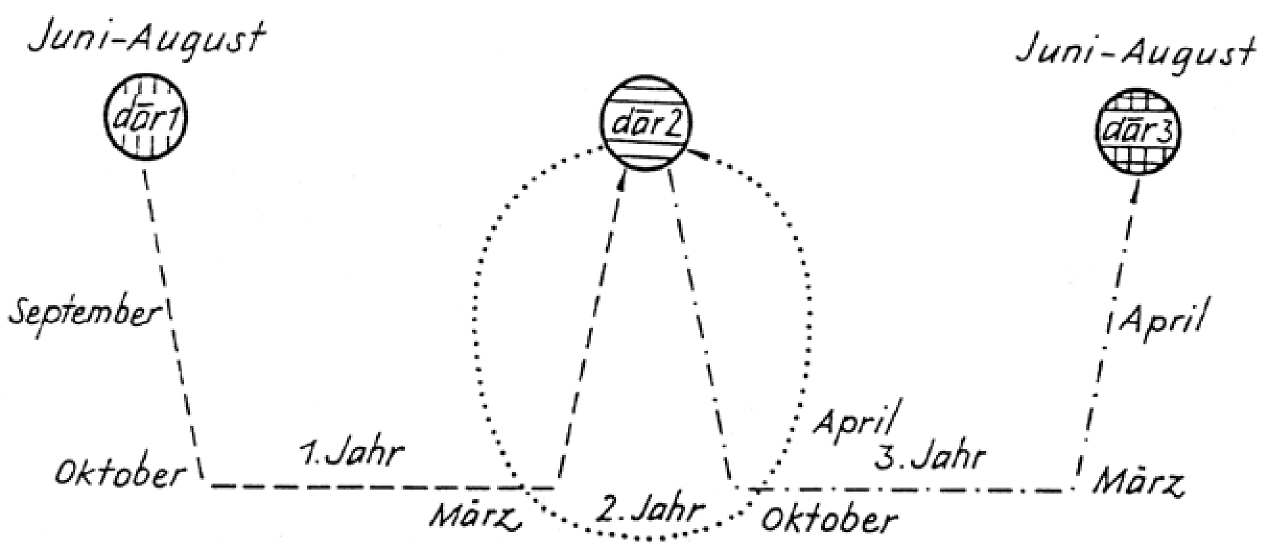


FIGURE 2 Migrations étalées au fil de l'espace africain, avec colonisations et installations sans retour (d'après Braukämper 1996).

FIGURE 3 Déplacements partiels, sporadiques et annuels des indiens Bororas (d'après Braukämper 1996).



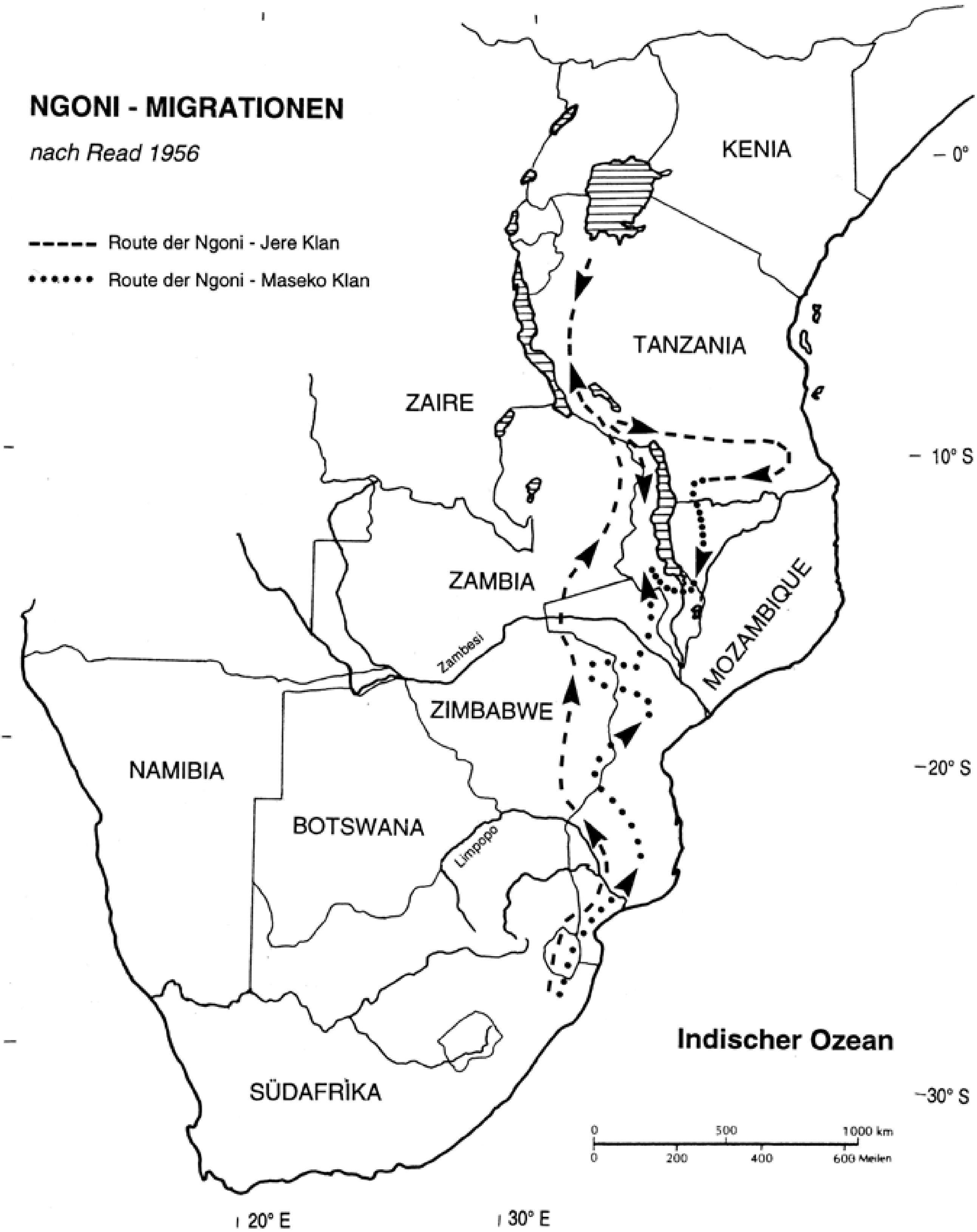


FIGURE 4 Déplacements à longues distances et avec retours étalés sur diverses années des Ngoni (d'après Braukämper 1996).

Les travaux sollicités lors de la rencontre de Liège, en 2012, embrassent, selon les auteurs, toute cette problématique, complexe main non chaotique, selon les voies propres aux auteurs et à leur champ d'études. On peut y lire les méthodes (matériaux exogènes) autant les traditions (dispersion d'œuvres d'art), que d'audacieuses synthèses culturelles, ou encore les modifications à la relation écologique ou économique (**figure 3**). L'essentiel de ces réseaux migratoires semble pourtant se délimiter à un choix, devenu coutume, aussi aléatoire dans son option que pourrait l'avoir été l'usage d'une arme plutôt que d'une autre ou un mode de croyances approprié à l'idée qu'une société se fait d'elle-même (**figure 4**). Les méthodes sont, on le verra, d'une grande variété selon la sensibilité des auteurs et les résultats autorisent les espoirs les plus encourageants (**figure 5**).

FIGURE 5 Traces des migrations laissées par la forme culturelle des fibules, diffusées de Scandinavie vers l'Europe centrale, aux sources des royaumes germaniques (d'après Böhme 1996).

Il me tient à cœur de souligner que la présente publication des actes du colloque international de la commission 8 de l'UISPP qui s'est déroulé à Liège en mai 2012 – soit deux ans à peine après ces stimulantes journées –, n'aurait pu voir le jour sans l'engagement, la complémentarité et la complicité amicale de Foni Le Brun-Ricalens pour éditer ce volume sous la double bannière **ERAUL** – **Archéo**Logiques.

Pour mener à bien ce projet éditorial, Foni et moi-même sommes redevables envers Eléonore Simonin, Mary Etienne et François Lacrampe-Cuyaubère qui ont assuré avec patience et persévérance le secrétariat d'édition et la mise en page.

Enfin la qualité de cet ouvrage est le fruit de tous les auteurs que nous remercions chaleureusement ici et que nous espérons rencontrer prochainement à Burgos à l'occasion du prochain Congrès de l'UISPP.

Liège, juin 2014

Marcel OTTE
Professeur à l'Université de Liège
Président de la commission 8 de l'UISPP

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BIBLIOGRAPHIE

La Vie & Le Monde, Hors-série (2008–2009) – *Atlas des Migrations, Les Routes de l'Humanité*.

BURMEISTER S. (1996) – Migration und ihre archäologische Nachweisbarkeit, *Archäologische Information 19*, issue 1–2: 13–21

BRAUKÄMPER U. (1996) – Zum Verhältnis vo Raum und Zeit bei Migrationen in Africa, *Archäologische Information 19*; issue 1–2: 51: 65

BÖHME H. W. (1996) – Kontinuität und Traditionen bei Wanderungsbewegungen im frühmittelalterlichen Europa vom 1.–6. Jahrhundert, *Archäologische Information 19*; issue 1–2: 89: 103

GUILAINE J. (2011) – *Cäin, Abel, Ötzi, L'héritage néolitique*. Paris: Gallimard

FERRET C. (2009) – *Une civilisation du cheval. Les usages de l'équidé, de la steppe à la taïga*. Paris: Belin

OTTE M., NOIRET P. & REMACLE L. (2009) – *Les hommes de Lascaux, civilisations paléolithiques en Europe*. Paris: Éditions Armand Colin

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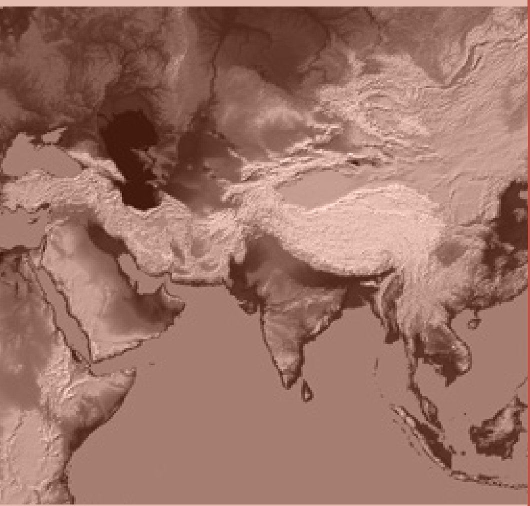
Thème I
ASIE



On the rebound – a Levantine view of Upper Palaeolithic dynamics

Anna BELFER-COHEN
A. Nigel GORING-MORRIS

Abstract: In our overview we endeavour to present the current state of research as regards the Levantine Upper Palaeolithic sequence from the Initial Upper Palaeolithic onwards, with particular emphasis upon the relationship between the Ahmarian and Aurignacian techno-complexes. It seems to us that the Euro-centric bias in the interpretations of the local data, initially apparent in the writings of the pioneer researchers of Levantine prehistory can still be traced, at least to a degree, in present-day studies.

Key-Words: Upper Palaeolithic, Euro-centrism, Initial Upper Palaeolithic (IUP), Aurignacian, Ahmarian, Levant.

1 INTRODUCTION

Some notions die hard... Pioneering prehistoric research in the Levant was conducted by scholars trained and experienced in Europe, which was both a blessing and a curse (Garrod 1934, 1938, 1953; Neuville 1934, 1951); accordingly there was a tendency to search for and highlight the similar rather than emphasize the differences with what was then known in Europe. In this vein it is of interest to follow the tortuous path taken by Dorothy Garrod when she initiated study of the local Upper Palaeolithic - first encountering it in el-Wad cave she immediately labeled the assemblages as 'Aurignacian' (Garrod & Bate 1937). Subsequently, after acquiring experience studying other local Upper Palaeolithic assemblages, she repudiated her initial definition, considering the particularities of the indigenous lithic assemblages as being more significant than the general similarities to European UP assemblages (Garrod 1953, 1957a). Accordingly she relabeled the successive el-Wad 'Aurignacian' assemblages as the 'Antelian' and then 'Atlitian' industries, while recognizing differences and discontinuities between them (Garrod 1957a).

Given the initial Euro-centric bias to prehistoric research in the Near East, today it is ironic to note that researchers in Europe are questioning the long-entrenched chrono-cultural frameworks within Europe and sometimes even adopt Near Eastern cultural terminology for European phenomena, i.e. the use of the term 'Ahmarian' (Teyssandier *et al.* 2010 and references therein). Indeed, there is an on-going debate as to the very nature of the 'European' frame of reference, as it has emerged that 'Aurignacian' should not be considered as a synonym for all early Upper Palaeolithic occurrences in Europe (*ibid.*). Scholars have long taken liberties in their assignment of archaeological phenomena to the 'Aurignacian', mostly because the term was accepted as a generic synonym for 'Early Upper Palaeolithic'. Over time, this practice has made comprehension of early Upper Palaeolithic developments more complex, since the various entities assigned to the 'Aurignacian' *sensu lato*, especially in Western Europe, differ in their specific techno-typological characteristics, resulting in incongruities (*ibid.*; Bon 2002). Currently 'Aurignacian' research within Europe is in a state of flux, with regards its' material culture characteristics, local developments and its range of variability (e.g. Tsanova *et al.* 2012).

This has major implications for UP research and terminology in the Near East. Until the mid 1970's debates on the Levantine UP largely revolved around the six-part unilinear framework suggested by Garrod (1957a) and Neuville (1951). Still, research in the late 1960's had already led to the adoption of a new status for the microlithic industries of the later part of the sequence, namely the Epi-Palaeolithic (Garrod 1957b; Perrot 1968; Bar-Yosef 1970).

It was only in light of field research in the marginal regions of the southern Levant during the 1970's that this unilinear developmental model was replaced by a radically new hypothesis encompassing the entire Levant. This new approach posited the presence of at least two (partially) parallel UP phyla by Gilead (1981) and Marks (1981; and see descriptions in Goring-Morris & Belfer-Cohen 2003). Altogether the Levantine UP currently spans some 25,000 years, beginning at ca. 50 k calBP, and concluding with the shift to the Epi-Palaeolithic at ca. 23 k calBP, more or less coinciding with the onset of the Late Glacial Maximum.

In the following pages we discuss the earlier Upper Palaeolithic from a Levantine viewpoint focusing on the Ahmarian/Aurignacian dichotomy.

2 THE EMERGENCE OF THE UPPER PALAEOLITHIC IN THE LEVANT

Currently the date of the Middle to Upper Palaeolithic (MP-UP) transition in the Levant is ca. 42 k BP uncalibrated (Rebollo *et al.* 2011). The main changes observed are a significant rise in the frequencies and types of end-scrapers and burins and the introduction of new tool types mostly blade forms (a variety of points on blade/bladelets). These reflect a technological shift away from surficial to volumetric concepts of cores for the production of the aforementioned blade/bladelets (Belfer-Cohen & Goring-Morris 2009).

While the Initial UP material culture demonstrates changes in its techno-typological characteristics, it provides few, if any clues as to who were its makers. The dominant scenario currently correlates those changes with the arrival of modern humans from Africa, replacing or mingling with local populations throughout Eurasia (Bar-Yosef 2000, 2007; Mellars 2005).

3 THE INITIAL UPPER PALAEOLITHIC

The first IUP industry in the Levant was defined by D. Garrod as the "Emiran" – initially recognized in the assemblages from Emireh Cave and el-Wad Cave E (Garrod 1955). By far the best documented example of the Emiran derives from the southern open-air site of Boker Tachtit dated to ca. 40 k BP uncalibrated (Marks 1983). Here, Levallois-type points (produced by an Upper Palaeolithic technique) were found together with a distinct tool type or fossile directeur – the basally thinned Emireh point (Marks 1983; Marks & Kaufman 1983; Volkman 1983). Systematically refitted cores demonstrate that the Levallois points were produced by a bidirectional blade technology, stemming from the North African MP 'Nubian' concept, which differs from the local, convergent late Mousterian Levallois points (Meignen & Bar-Yosef 1991; Kerry & Henry 2003; and see Belfer-Cohen & Goring-Morris 2007, 2009). Blade production, another distinctive characteristic of the Levantine IUP industries, has been observed within the Nile Valley Mousterian site of Taramsa (Van Peer 2004; Vermeersch 2001).

Another variant of an IUP industry in the Levant, with chamfered pieces, was described from layers overlying Mousterian occupations at the Ksar 'Akil rock shelter (Azoury 1986; Copeland 1975; Ohnuma 1988). Assemblages overlying these "chanfrein" layers comprise single platform, pyramidal cores that produced serial convergent blades and elongated, Levallois-type points (Ohnuma & Bergman 1990), resembling the Emiran assemblages from Boker Tachtit. Similar techno-typological traits were observed also at the open-air site Tor Sadaf in southern Transjordan (Fox 2003). Though the Emireh points are absent from this IUP variant, the reduction sequence is similar and comprises a uni-directional technology producing blades and elongated triangular blanks with facetted platforms.

An additional IUP occurrence is reported from the el-Kowm Basin of northeast Syria at the open-air site of Umm el-Tlel (layers II Base and III 2A); the assemblage comprises a "para-Levallois" reduction sequence, which results in narrow and elongated Levallois – "Umm el-Tlel" – points that feature unidirectional scar patterns. The cores grade into blade core types, somewhat akin to those at Tor Sadaf (Boëda & Muhesen 1993; Bourguignon 1998). At the same time the assemblages at Umm el-Tlel also comprise numerous burins and end-scrapers. The dates for these levels, ~34–36 k yrs (Bourguignon 1998) are rather late compared with IUP dates elsewhere.

Farther north in the Levant, the coastal sites of Üçagizli and Kanal caves have yielded IUP assemblages that are blade-based, with facetted striking platforms, similar to the Umm el-Tlel points. There are also a few chamfered pieces, end-scrapers, burins and retouched blades, although Emireh points are absent (Kuhn *et al.* 2009).

Industries similar to the two Levantine IUP variants have been reported from Eastern Europe. Thus the Moravian "Bohunician" entity displays remarkable similarity to the Boker Tachtit levels 1–2 assemblages (Skrdla 2003; Svoboda & Bar-Yosef 2003 and papers therein; Tostevin 2003). Chamfered elements were observed also in the IUP "Dabban" culture at Haua Fteah Cave, Cyrenaica (McBurney 1967). These IUP variants may reflect diffusions by long-range, 'leap-frogging' movements of highly mobile groups.

4 THE AHMARIAN

The 'Ahmarian' was actually first observed much earlier at Qafzeh and Erq el-Ahmar (Neuville 1951; Ronen 1976) than when it was formally defined (Gilead 1981; Marks 1981); yet, preconceptions had barred an awareness of this distinctive UP tradition.

The Ahmarian is subdivided into an Early, ~45–30 k calBP, and a Late phase, ~30–24 k calBP. It appears both in the Mediterranean zone and most especially in the steppic zone, where most sites are quite ephemeral. In the southern and eastern desertic margins of the Levant there appears to have been a greater degree of continuity between the Ahmarian phases than within the Mediterranean coastal areas; there local developments appear to have been interrupted by the brief incursion of the Levantine Aurignacian phenomenon (and see below). In the Mediterranean zone Ahmarian sites are found in caves and rock-shelters, e.g. Uçagizli, Kebara, Qafzeh and Erq el-Ahmar (Bar-Yosef & Belfer-Cohen 2005; Bar-Yosef *et al.* 1992; Gilead 1981; Kuhn *et al.* 2009). The site with by far the longest Ahmarian sequence is Ksar 'Akil, where the 7 m thickness of Levels 20–8 provides an extended techno-typological profile (Ohnuma 1988; and see Williams & Bergman 2010).

The techno-typological profile of the Ahmarian comprises narrow-fronted single-platform cores that yielded series of flat or incurvate, thin, narrow, convergent blade/let blanks. It should be noted though that sometimes there is a clear bimodal distribution according to the produced blanks, i.e. blades vs. bladelets (e.g. Bar-Yosef & Belfer 1977). Many of the retouched bladelets comfortably fit within current (European) definitions of *lamelles Dufour* (Chiotti 2005, and references therein). Larger tools were made on secondary blanks from the initial setting up or rejuvenation of the core (e.g. Davidzon & Goring-Morris 2003; Goring-Morris & Davidzon 2006). Ochre is present in many sites, while bone tools are only found in small numbers, perhaps due to taphonomic processes, while *Dentalium* also occurs sporadically (e.g Bar-Yosef & Belfer 1977; Coinman 2000).

In light of recent studies it seems likely that there was diffusion by groups related to the Early Ahmarian to Europe by way of the Danube corridor, as illustrated by Level VII at the site of Kozarnika, Bulgaria, dated to ~43–41 k calBP (Tsanova 2006; Tsanova 2012).

5 THE LEVANTINE AURIGNACIAN

The Levantine Aurignacian entity (most similar to Aurignacian I of Western Europe; and see below) appears rather sparsely, distributed only in the Mediterranean zone and, though still poorly dated, ~37–32(?) k yrs calBP, it seems to represent a relatively short incursion by groups from outside the Levant. At Ksar 'Akil the Levantine Aurignacian of Levels 7–8 is sandwiched between early and later Ahmarian occupations (and see Williams & Bergman 2010). The few cave and rock-shelter occupations are all small and ephemeral in nature. In addition to Ksar 'Akil and Antelias III on the Lebanese coast, they include mostly sites in the Galilee, e.g. Manot and Hayonim D, and the Carmel, e.g. el-Wad D-E, Kebara I-II, Raqefet III and Sefunim 8–10, as well as further east at Yabrud II/3–4 (Barzilai *et al.* 2012; Belfer-Cohen & Bar-Yosef 1981; Garrod & Bate 1937; Lengyel 2007; Ronen 1984). The technology of the Levantine Aurignacian lithic industry is characterized by single platform flake cores, though among the tools there is a marked and preferential use of blade/lets for tool blanks (Belfer-Cohen & Bar-Yosef 1981; Ronen 1976, 1984). Notable amongst the tools are frontally carinated and shouldered scrapers, items with Aurignacian retouch, burins and low frequencies of rather nondescript points. One should mention the relatively rich bone and antler assemblages, often including distinctive bi-points, although it is the two split-based points from Kebara and Hayonim caves that most closely associate the entity with its European counterparts. Of interest is the presence of decorative items on bone and equid teeth (Bar-Yosef & Belfer-Cohen 1996; Belfer-Cohen & Bar-Yosef 1999). So too, we note the faint engraving of a quadruped on an ochre-smeared plaque at Hayonim Cave (Belfer-Cohen & Bar-Yosef 1981). Marine molluscs comprising *Dentalium* and *Nassa gibbosula* were recovered at Yabrud II/4 (Rust 1950).

6 SUMMARY REMARKS

Basic questions arise when examining the developmental sequence of cultural dynamics during the earlier Upper Palaeolithic at the level of terminology. Prominent among these is what exactly we are talking about using the term 'Aurignacian'. Here it can be stated that the preconceptions of the Euro-centric background to the pioneering prehistoric research in the Near East has been a mixed blessing for comprehending cultural developments. Following her initial assignment of Upper Palaeolithic assemblages to the 'Aurignacian', Garrod later opted for local terms ('Antelian' and 'Atlitian') to describe those same assemblages. Later still, the 1969 Wenner-Gren London roundtable symposium convened to discuss the Upper Palaeolithic lithic assemblages at Ksar Akil was seminal, since it assembled a range of scholars working in the Near East as well as others in Europe to consider cultural developments in the Levant[1]. Although no official publication derived from this 'think tank', the discussions were recorded and unofficial transcripts circulated thereafter. These deliberations comprised the basis for synthetic papers on Levantine Upper Palaeolithic developments, most especially from a Lebanese perspective (e.g. Besançon *et al.* 1975–1976–1977; Copeland 1975; Hours 1974). Accordingly the terms 'Antelian' I and II and 'Atlitian' previously proposed by Garrod were replaced by 'Levantine Aurignacian' A, B and C (Ksar 'Akil levels 13–11 = A; 10–9 = B; and 8–6 = C).

1. Participants included: I. Azoury, O. Bar-Yosef, F. Bordes, M.N. Brezillon, L. Copeland, F. Hours, M. Newcomer, J. Perrot, A. Ronen, B. Schroeder, A. Sieveking, R. Solecki, D. de Sonneville-Bordes, and J. Waechter.

However, following detailed studies of the Ksar 'Akil Upper Palaeolithic assemblages from these layers, Bergman (1987) was uneasy with the terminological framework. Another gathering was convened in London in 1987 to consider the situation, and the results were summarized in Bergman and Goring-Morris (1987). There, it was suggested that only levels VIII-VII correspond to the term 'Levantine Aurignacian' (*sensu stricto*), i.e. most similar to 'Aurignacien I' of western Europe - an observation later corroborated by participants at the Lisbon 'Aurignacian' workshop in 2002 (and see Goring-Morris & Belfer-Cohen 2006). As an aside, as we are not going into detailed discussion of the 'Aurignacian' globally, it is of interest to note that currently, the expansive, all-encompassing use of the term 'Aurignacian' is raising a lively debate in Europe (e.g. Zilhão 2011, and references therein).

Both in the past and even today researchers who use the term 'Aurignacian' are motivated by different connotations; at one end of the scale the 'Aurignacian' has been a synonym for the early Upper Palaeolithic; on the other it is used in a minimalistic and particularistic fashion to relate only to very specific chrono-cultural attributes. In the present discourse we side with the more restricted definition since we believe that it is more appropriate for comprehending the dynamic cultural developments within the Levant, the Near East, and even further afield in Europe.

Summing up our position we begin by noting that, to date, no IUP has been reported from the Zagros-Taurus arc, in contrast to the Levant, where numbers of sites have been described, e.g. Boqer Tachtit, Ksar 'Akil, Uçagizli, Emireh, Tor Sadaf, amongst others (Fox & Coinman 2004; Garrod & Bate 1937; Kuhn *et al.* 2009; Marks 1983). The IUP in the Levant demonstrates clear techno-typological affinities with the Middle Palaeolithic (Belfer-Cohen & Goring-Morris 2007, 2009; Goring-Morris & Belfer-Cohen 2003). By contrast, in the Zagros region there appears to be a significant hiatus throughout the region that extends northwards to the Caucasus (e.g. Adler *et al.* 2006; Belfer-Cohen & Goring-Morris 2014).

Furthermore, it can be stated that the initial development of the Early Upper Palaeolithic in the Near East, and especially in the Levant, is geared towards blade/let based industries with affinities to the Ahmarian (Bar-Yosef & Belfer-Cohen 2010 and see references above).

The Levantine 'Aurignacian' appears later in the Near East than in Europe (Conard 2011; Otte *et al.* 2011, and references therein) and it differs significantly in terms of technology and typology (as well as in other realms of material culture) from both the Ahmarian phases that precede and postdate it.

Nevertheless, it is the preconceptions and misconceptions in the terminology used over the years that have 'muddied the waters'. Indeed, here one can bring as an example the interpretation of level X at the key site of Ksar 'Akil by François Bordes, who stated flatly "Layer 10 at Ksar 'Akil is definitely Aurignacian" (Bordes 1968:200). Even after the renewed excavations at the site by Tixier in the early 1970's the industry of level X (old series of excavation), level 12 (Phase VII - new excavations) was still considered as Levantine Aurignacian, though it was noted that it is very poor in "Aurignacian" artefacts (Tixier & Inizian 1981:360). It was only much later, from the mid 1980's onward that, by means of detailed techno-typological studies (Bergman 1987; Williams & Bergman 2010), it was finally possible to distinguish between the long Ahmarian succession (including level X) and the brief incursion of the 'Aurignacian' (*sensu Aurignacien I*) relatively late in the sequence.

It is amazing that Minzoni-Roche, as late as 1992 called the industry in the site of Uçagizli 'Aurignacian' simply because it was, without doubt, stratigraphically Early Upper Palaeolithic, an assumption that became obsolete through the subsequent prolonged excavations there during the 2000's led by Kuhn (Kuhn *et al.* 2009) that revealed a long IUP duration, followed by an Ahmarian sequence (but no 'Aurignacian' whatsoever).

It is instructive to follow Garrod's growing unease already in the 1950s with the situation of using European 'yardsticks': *"... the small, sharp Font-Yves point, which is the special feature of Upper Palaeolithic III* [i.e., the Levantine Aurignacian of today]*, is hardly known in the West"* (Garrod 1953:25). And, additionally, *"... the Upper Palaeolithic III* (i.e. what Garrod later called 'Aurignacian') *represents the stage at which an incoming Aurignacian group made contact with the natives, adopting and developing the Font-Yves point, which was missing from their original tool-kit, and which in any case rather soon went out of fashion again"* (*ibid.*: 33).

It seems that the Upper Palaeolithic in the Levant was much more dynamic than assumed previously. Studying it from a local perspective, traditions spread through and out of the Levant beginning very early in the UP sequence, e.g. the 'Ahmarian'-like industry at Kosarnika (see above); while other traditions intruded upon the Levant, e.g., the Levantine Aurignacian phenomenon. We believe that such a scenario is applicable to the Levant *sensu stricto* as well as for the whole Near East, e.g. Yafteh (Otte *et al.* 2012). The dynamics of earlier Upper Palaeolithic developments involved not just dispersions from points of origin, but also multi-dimensional interactions, influxes and movements back and forth (and see Zilhao 2011). We accept that new excavations and discoveries may provide fresh insights about issues concerning the Levantine Upper Palaeolithic and we are ready to adapt our views accordingly; data do talk and is much more reliable than theoretical discourse or wishful thinking based on previous presumptions and preconceptions. Still, we believe that the data available today more comfortably supports our current view point better than other theories as regards the sequences and spread of the Near Eastern Upper Palaeolithic.

REFERENCES

ADLER D.S., BELFER-COHEN A. & BAR-YOSEF O. (2006) – Between a rock and a hard place: Neanderthal-Modern Human interactions in the Southern Caucasus. In: N.J. Conard, *Neanderthals and Modern Humans Meet*, Tübingen, Publications in Prehistory, Kerns Verlag, p. 165–187.

AZOURY I. (1986) – *Ksar Akil, Lebanon. A Technological and Typological Analysis of the Transitional and Early Upper Palaeolithic Levels of Ksar Akil and Abu Halka*. Oxford, BAR International Series 289.

BARZILAI O., HERSHKOVITZ I., MARDER O., AYALON A., BAR-MATTHEWS M., BAR-OZ G., BOARETTO E., BERNA F., FRUMKIN A., KHALAILY H., WEINER S. & YESHURUN R. (2012) – Manot cave. Preliminary report. *Hadashot Arkeologiot* 124.

BAR-YOSEF O. (1970) – *The Epi-Palaeolithic Cultures of Palestine.* Unpublished Ph.D. Thesis, Hebrew University of Jerusalem.

BAR-YOSEF O. (2000) – The Middle and Early Upper Palaeolithic in Southwest Asia and Neighbouring Regions. In: O. Bar-Yosef & D. Pilbeam, *The Geography of Neandertals and Modern Humans in Europe and the Greater Mediterranean*. Harvard University, Cambridge, MA, Peabody Museum Bulletin 8:107–156.

BAR-YOSEF O. (2007) – The Archaeological Framework of the Upper Palaeolithic Revolution. *Diogenes* 54(2):3–18.

BAR-YOSEF O. & BELFER A. (1977) – The Lagaman Industry. In: O. Bar-Yosef & J.L. Phillips, *Prehistoric Investigations in Gebel Maghara, Northern Sinai*. Jerusalem, Monographs of the Institute of Archaeology, Qedem 7:42–84.

BAR-YOSEF O. & BELFER-COHEN A. (1996) – Another look at the Levantine Aurignacian. In: A. di Cesnola & A. Montet-White, *XIIIth International Union of Prehistoric and Protohistoric Sciences: Coloquium XI - The Late Aurignacian*, Forli, Italy, ABACO Edizioni, p. 139–150.

BAR-YOSEF O. & BELFER-COHEN A. (2005) – The Qafzeh Upper Paleolithic assemblages: 70 years later. *Eurasian Prehistory* 2(1):145–180.

BAR-YOSEF O. & BELFER- COHEN A. (2010) – The Levantine Upper Palaeolithic and Epipalaeolithic. In: E.A.A. Garcea, *South-eastern Mediterranean Peoples between 130 000 and 10 000 years ago*, Oxford, Oxbow Books, p. 144–167.

BAR-YOSEF O., VANDERMEERSCH B., ARENSBURG B., BELFER-COHEN A., GOLDBERG P., LAVILLE H., MEIGNEN L., RAK Y., SPETH J.D., TCHERNOV E., TILLIER A.-M. & WEINER S. (1992) – The excavations in Kebara Cave, Mt. Carmel. *Current Anthropology* 33:497–550.

BELFER-COHEN A. & BAR-YOSEF O. (1981) – The Aurignacian in Hayonim Cave. *Paléorient* 7(2):19–42.

BELFER-COHEN A. & BAR-YOSEF O. (1999) – The Levantine Aurignacian: 60 years of research. In: W. Davies & R. Charles, *Dorothy Garrod and the Progress of the Palaeolithic*, Oxford, Oxbow, p. 118–134.

BELFER-COHEN A. & GORING-MORRIS A.N. (2007) – From the beginning: Levantine Upper Palaeolithic cultural change and continuity. In: P. Mellars, K. Boyle, O. Bar-Yosef & C. Stringer, *Rethinking the Human Revolution*, Cambridge, McDonald Institute for Archaeological Research, p. 199–206

BELFER-COHEN A. & GORING-MORRIS A.N. (2009) – The shift from the Middle Palaeolithic to the Upper Palaeolithic: Levantine perspectives. In: M. Camps & C. Szmidt, *The Mediterranean from 50 000 to 25 000 BP: Turning Points and New Directions*, Oxford, Oxbow, p. 87–97.

BELFER-COHEN A. & GORING-MORRIS A.N. (2014) – The Upper Palaeolithic and Earlier Epi-palaeolithic of Western Asia (ca. 50–14.5 k calBP). In: A.C. Renfrew & B.G. Bahn, *The Cambridge World Prehistory*, vol. 3, Cambridge, Cambridge University Press, p.1381-1407.

BERGMAN C.A. (1987) – *Ksar Akil, Lebanon. A Technological and Typological Analysis of the Later Palaeolithic Levels of Ksar Akil. Vol. II: Levels XIII-VI*. Oxford, BAR International Series 329.

BERGMAN C.A. & GORING-MORRIS A.N. (1987) – Conference: the Levantine Aurignacian with special reference to Ksar Akil, Lebanon, March 27–28th, 1987. *Paléorient* 13:140–145.

BESANCON J., COPELAND L. & HOURS H. (1975–77) – Tableaux de Préhistoire Libanaise. *Paléorient* 3:5–45.

BOËDA E. & MUHESEN S. (1993) – Umm el Tlel (el Kowm, Syrie) : Étude préliminaire des industries lithiques du Paléolithiques Moyen et Supérieur 1991–1992. *Cahiers de l'Euphrate* 7:47–91.

BON F. (2002) – *L'Aurignacien entre mer et océan : réflexion sur l'unité des phases anciennes de l'Aurignacien dans le sud de la France*. Société Préhistorique Française, Paris.

BORDES F. (1968) – *The Old Stone Age*. London, Weidenfeld and Nicolson.

BOURGUIGNON L. (1998) – Les industries du Paléolithique Intermediaire d'Umm el Tlel. Nouveaux éléments pour le passage entre Paléolithique moyen et supérieur dans le Bassin d'El Khowm. *Préhistoire d'Anatolie. Genèse de Deux Mondes*, ERAUL 85:709–730.

CHIOTTI L. (2005) – *Les industries lithiques aurignaciennes de l'abri Pataud, Dordogne, France: Les fouilles de Hallam L. Movius Jr.*, Oxford, Archaeopress, BAR International Series 1392.

COINMAN N.R. (2000) – The Upper Paleolithic in the Wadi al-Hasa. In: N.R. Coinman, *The Archaeology of the Wadi al-Hasa, West-Central Jordan, Vol. 2: Excavations at Middle, Upper and Epipaleolithic Sites*, Arizona State University Anthropological Research Papers 52:143–159.

CONARD N.J. (2011) – The demise of the Neanderthal cultural niche and the beginning of the Upper Paleolithic in Southwestern Germany. In: N.J. Conard & J. Richter, *Neanderthal Lifeways, Subsistence and Technology: One Hundred Fifty Years of Neanderthal Study*, Tubingen, Springer Verlag, p. 223–240.

COPELAND L. (1975) – The Middle and Upper Paleolithic of Lebanon and Syria in the light of recent research. In: F. Wendorf & A. E. Marks, *Problems in Prehistory: North Africa and the Levant*, Dallas, Southern Methodist University Press, p. 317–350.

DAVIDZON A. & GORING-MORRIS A.N. (2003) – Sealed in stone: The Palaeolithic Early Ahmarian knapping method in the light of refitting studies at Nahal Nizzana XIII, Western Negev, Israel. *Journal of the Israel Prehistoric Society - Mitekufat Haeven* 33:75–206.

FOX J.R. (2003) – The Tor Sadaf Lithic Assemblage: A technological study of the earliest Levantine Upper Palaeolithic in the Wadi al-Hasa. In: A.N. Goring-Morris & A. Belfer-Cohen, *More Than Meets the Eye: Studies on Upper Palaeolithic Diversity in the Near East*, Oxford, Oxbow, p. 80–94.

FOX J.R. & COINMAN N.R. (2004) – Emergence of the Levantine Upper Paleolithic: Evidence from the Wadi Hasa. In: P.J. Brantingham, S.L. Kuhn & K.W. Kerry, *The Early Upper Paleolithic Beyond Western Europe*, Berkeley and Los Angeles, University of California Press, p. 97–112

GARROD D.A.E. (1934) – The Stone Age of Palestine. *Antiquity* 30:133–150.

GARROD D.A.E. (1938) – The Upper Paleolithic in the light of recent discovery. *Proceedings of the Prehistoric Society* 4:1–26.

GARROD D.A.E. (1953) – The relations between southwest Asia and Europe in the Later Palaeolithic Age. *Journal of World History* 1:13–38.

GARROD D.A.E. (1957a) – Notes sur le Paléolithique Supérieur du Moyen Orient. *Bulletin de la Société Préhistorique Française* 55:239–445.

GARROD D.A.E. (1957b) – The Natufian Culture: The life and economy of a Mesolithic people in the Near East. *Proceedings of the British Academy* 43:211–227.

GARROD D.A.E. & BATE D.M.A. (1937) – *The Stone Age of Mount Carmel. Excavations at the Wadi-Mughara I*. Oxford, Clarendon Press.

GILEAD I. (1981) – Upper Palaeolithic tool assemblages from the Negev and Sinai. In: J. Cauvin & P. Sanlaville, *Préhistoire du Levant*, Paris, CNRS, p. 331–342.

GORING-MORRIS A.N. & BELFER-COHEN A. (EDS) (2003) – *More Than Meets the Eye: Studies on Upper Palaeolithic Diversity in the Near East*. Oxford, Oxbow.

GORING-MORRIS A.N. & BELFER-COHEN A. (2006) – A hard look at the 'Levantine Aurignacian': How real is the taxon? In: O. Bar-Yosef & J. Zilhão, *Towards a Definition of the Aurignacian*, Lisboa, Trabalhos de Arqueologia 45, American School of Prehistoric Research/Instituto Português de Arqueologia, p. 294–313.

GORING-MORRIS A.N. & DAVIDZON A. (2006) – Straight to the point: Upper Palaeolithic Ahmarian lithic technology in the Levant. *Anthropologie* 44(1):93–111.

HOURS F. (1974) – Remarques sur l'utilisation de listes-types pour l'étude de Paléolithique Supérieur et de l'Epipaléolithique du Levant. *Paléorient* 2:3–18.

KERRY K.W. & HENRY D.O. (2003) – Tor Fawaz (J403): An Upper Palaeolithic occupation in the Jebel Qalkha area, Southwest Jordan. In: A.N. Goring-Morris & A. Belfer-Cohen, *More Than Meets the Eye: Studies on Upper Palaeolithic Diversity in the Near East*, Oxford, Oxbow, p.171–184.

KUHN S.L., STINER M.C., GÜLEÇ E., ÖZER I., YILMAZ H., BAYKARA I., AÇIKKOL A., GOLDBERG P., MARTIÍNEZ MOLINA K., ÜNAY E. & SUATA-ALPASLAN F. (2009) – The early Upper Paleolithic occupations at Uçagızlı Cave (Hatay, Turkey). *Journal of Human Evolution* 56:87–113.

LENGYEL G. (2007) – *Upper Palaeolithic and Epipalaeolithic Lithic Technologies at Raqefet Cave, Mount Carmel East, Israel*. Oxford, BAR International Series 1681.

MARKS A.E. (1981) – The Upper Paleolithic of the Levant. In: J. Cauvin & P. Sanlaville, *Préhistoire du Levant*, Paris, CNRS, p. 369–374.

MARKS A.E. (ED.) (1983) – *Prehistory and Paleoenvironments in the Central Negev, Israel. Volume III, the Avdat/Aqev Area, Part 3*. Dallas, SMU Press.

MARKS A.E. & KAUFMAN D. (1983) – Boqer Tachtit: The artifacts. In: A.E. Marks, *Prehistory and Paleoenvironments in the Central Negev, Israel. Volume III, the Avdat/Aqev Area, Part 3*, Dallas, SMU Press, p. 69–125.

MCBURNEY C.B.M. (1967) – *The Haua Fteah (Cyrenaica) and the Stone Age of the Southeast Mediterranean*. Cambridge, Cambridge University Press.

MEIGNEN L., & O. BAR-YOSEF, O. (1991) – Les outillages lithiques mousteriens de Kebara (Fouilles 1982-1985). In: O. Bar-Yosef & B. Vandermeersch, *Le Squelette Mousterien de Kebara*. Paris: CNRS, p. 49-76.

MELLARS P. (2005) – The impossible coincidence. A single-species model for the origins of modern human behavior in Europe. *Evolutionary Anthropology* 14(1):12–27.

MINZONI-DEROCHE A. (1992) – Uçagizli Magara, un site Aurignacien dans le Hatay (Anatolie), premiers résultats. *Paléorient* 18(1):89–96.

NEUVILLE R. (1934) – Le Préhistorique de Palestine. *Revue Biblique* 43:237–259.

NEUVILLE R. (1951) – *Le Paléolithique et le Mésolithique du Désert de Judée*. Paris, Archives de l'institut de Paléontologie Humaine, Mémoire 24.

OHNUMA K. (1988) – *Ksar 'Akil, Lebanon. A Technological Study of the Earlier Upper Palaeolithic Levels of Ksar 'Akil, vol. III. Levels XXV-XIV*. Oxford, BAR International Series 426.

OHNUMA K. & BERGMAN C.A. (1990) – Technological analysis of the Upper Palaeolithic Levels (XXV-VI) of Ksar Akil, Lebanon. In: P. Mellars & C. Stringer, *The Emergence of Modern Humans: An Archaeological Perspective*, Edinburgh, Edinburgh University Press, p. 91–138.

OTTE M., SHIDRANG S., ZWYNS N. & FLAS D. (2011) – New radiocarbon dates for the Zagros Aurignacian from Yafteh cave, Iran. *Journal of Human Evolution* 61(3):340–346.

OTTE M., SHIDRANG S. & FLAS D. (EDS) (2012) – *The Aurignacian from Yafteh Cave and its Context (2005–2008 excavations)*. Liège, ERAUL 132.

PERROT J. (1968) – La Préhistoire Palestinienne. *Supplément au Dictionnaire de la Bible* 8:286–446.

REBOLLO N.R., WEINER S., BROCK F., MEIGNEN L., GOLDBERG P., BELFER-COHEN A., BAR-YOSEF O. & BOARETTO E. (2011) – New radiocarbon dating of the transition from the Middle to the Upper Paleolithic in Kebara Cave, Israel. *Journal of Archaeological Science* 38(9):2424–2433.

RONEN A. (1976) – The Upper Palaeolithic in Northern Israel, Mt. Carmel and Galilee. Dans : F. Wendorf, *Deuxième Colloque sur la Terminologie de la Préhistoire du Proche-Orient*, Nice, IX Congrès UISPP, p. 153–186.

RONEN A. (ED.) (1984) – *The Sefunim Prehistoric Sites Mount Carmel, Israel*. Oxford, BAR International Series 230.

RUST A. (1950) – *Die Höhlenfunde von Jabrud (Syrien)*. Neumunster, Karl Wachholtz.

SKRDLA P. (2003) – Comparison of Boker Tachtit and Stranska skala MP/UP Transitional industries. *Mitekufat Haeven - Journal of the Israel Prehistoric Society* 33:37–74.

SVOBODA J. & BAR-YOSEF O. (EDS) (2003) – *Stranska skala. Origins of the Upper Paleolithic in the Brno Basin, Czech Republic*. Cambridge, MA, Peabody Museum of Archaeology and Ethnology, Harvard University.

TEYSSANDIER N., BON F. & BORDES J.-G. (2010) – Within projectile range. Some thoughts on the appearance of the Aurignacian in Europe. *Journal of Anthropological Research* 66:209–229.

TIXIER J. & INIZAN M.-L. (1981) – Ksar Aqil: stratigraphie et ensembles lithiques dans le Paléolithique Supérieur: Fouilles 1971–1975. In: J. Cauvin & P. Sanlaville, *Préhistoire du Levant*, Paris, Éditions CNRS 598, p. 353–367.

TOSTEVIN G. (2003) – A Quest for Antecedents: A Comparison of the Terminal Middle Paleolithic and Early Upper Palaeolithic of the Levant. In: A.N. Goring-Morris & A. Belfer-Cohen, *More Than Meets the Eye: Studies on Upper Palaeolithic Diversity in the Near East*, Oxford, Oxbow, p. 54–67.

TSANOVA T. (2006) – *Les Débuts du Paléolithiques supérieur dans l'Est des Balkans. Refléxion à partir de l'étude taphonomique et techno-économique des ensembles des sites de Bacho Kiro (couche 11), Temnata (couches VI et 4) et Kazarnika (niveau VII)*. Unpublished PhD thesis, Université Bordeaux 1.

TSANOVA T., ZWYNS N., EIZENBERG L., TEYSSANDIER N., LE BRUN-RICALENS F. & OTTE M. (2012) – Le plus petit dénominateur commun : réflexion sur la variabilité des ensembles lamellaires du Paléolithique supérieur ancien d'Eurasie. Un bilan autour des exemples de Kozarnika (Est des Balkans) et Yafteh (Zagros central). *L'anthropologie* 116:469–509.

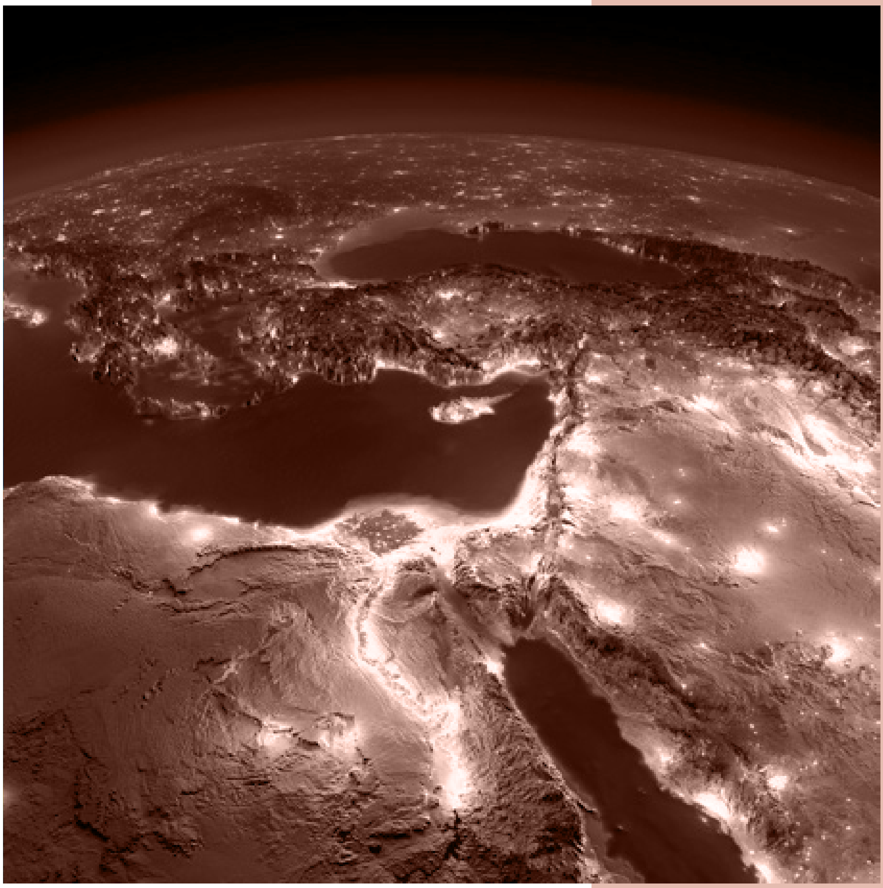
VAN PEER P. (2004) – Did Middle Stone age Moderns of sub-Saharan African descent trigger an Upper Palaeolithic Revolution in the Nile Valley? *Anthropologie (Brno)* 42:215–226.

VERMEERSCH P.M. (2001) – 'Out of Africa' from an Egyptian point of view. *Quaternary International* 75:103–112.

VOLKMAN P. (1983) – Boker Tachtit. Core reconstructions. In: A.E. Marks, *Prehistory and Paleoenvironments in the Central Negev, Israel, vol. III. The Avdat/Aqev Area, Part 3*, Dallas, SMU Press, p. 127–188.

WILLIAMS J.K. & BERGMAN C.A. (2010) – Upper Paleolithic Levels XIII-XVI (A and B) from the 1937–1938 and 1947–1948 Boston College Excavations and the Levantine Aurignacian at Ksar Akil. *Paléorient* 36(2):117–161.

ZILHÃO J. (2011) – Aliens from outer time? Why the "Human Revolution" is wrong, and where do we go from here? *In*: S. Condemi & G.-C. Weniger, *Continuity and Discontinuity in the Peopling of Europe: One Hundred Fifty Years of Neanderthal Study*, Springer Science+Business Media B.V., p. 331–366.



The Upper Paleolithic settlement of the Armenian Highlands

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Abstract: Excavations in 2009 and 2010 at Aghitu–3 Cave in the Syunik Province of southern Armenia yield new insights into the Upper Paleolithic settlement of the Armenian Highlands. The site is situated at an elevation of 1601 m in a side valley of the Vorotan River. The river cuts down through Pleistocene basalt flows and provides a corridor for the movement of people and game through the region. Sediments that accumulated in this basaltic cave are composed mainly of silt, clay minerals and volcanic ash. The archaeological layers preserve evidence of periodic human occupations dating to ca. 35–27 000 cal BP. Caves from the Upper Paleolithic were not previously known in Armenia, although contemporaneous sites exist in neighboring Georgia and Iran.

The lithic industry at Aghitu–3 is laminar with a strong focus on the production of bladelets made of obsidian and chert. While completely backed pieces are rare, the majority of tools are represented by finely retouched bladelets. The choice of raw material did not affect the desired end products. Our preliminary interpretation is that this distinctly Upper Paleolithic toolkit was oriented towards the production of hunting equipment and was technologically stable over an extended timeframe.

The lower assemblage dates to ca. 35–31 000 cal BP and suggests sparse occupation of the cave. Lithic artifacts are few and cluster near small combustion features. The poorly preserved faunal remains of the lower layers do not appear to be associated with the lithic remains. The bones often appear to be gastrically etched, suggesting accumulation by large carnivores such as wolves. On the other hand, the upper assemblage dates to ca. 29–27 000 cal BP and indicates more frequent occupation by humans. In these finely stratified layers, lithic artifacts are numerous, and combustion features are common. The well preserved, but highly fragmented faunal remains from the upper layers exhibit more indications of carcass processing, such as green breaks and impact fractures. Wild sheep and wild goat dominate the faunal assemblage, with horse and hare also present.

Combining the faunal identifications with ecological data gained from microfauna, pollen and charcoal, a mosaic landscape comes into focus: grassland on the level basaltic plateau, interrupted by a steep rocky valley sloping down to the Vorotan, where a riparian environment prevails. The data also suggest an environment that was cooler and moister than today, a picture echoed by preliminary micromorphological results showing cycles of freezing and thawing. Thus we interpret these data as evidence for increasing occupation of Aghitu–3 Cave, which served as a temporary hunting camp. While it is clear that the older occupations of the cave were ephemeral, during the time leading up to the last glacial maximum, occupation became more frequent.

1 INTRODUCTION

The Tübingen-Armenian Paleolithic Project (TAPP) began in 2008 as a joint endeavor of the Institute of Archaeology of the National Academy of Sciences of the Republic of Armenia and the Heidelberg Academy of Sciences and Humanities (co-directed by B. Gasparyan and A. Kandel). TAPP's main focus is to examine the Paleolithic settlement of the Vorotan River Basin in the Armenian Highlands. The Vorotan flows southeast to join the Arax River along the border with Iran (**figure 1**). The valley of the Vorotan represents a significant axis for movement through the region because high mountain ranges rising above 3800 m surround the basin on both sides, channeling the movement of game and early humans through the steeply incised Vorotan valley. The Vorotan basin enjoys a cool temperate climate and contains a mosaic landscape suitable to early human settlement.

During TAPP's initial season in June 2008, the team conducted survey around the town of Sisian in the Syunik region of southern Armenia (**figure 1**). In Aghitu, a village about 5 km east of Sisian, the team observed seven caves around the base of a basalt massif rising 25–30 m above the surrounding landscape. The flat-topped massif is situated near the terminal end of several basalt flows that emanated from Mt. Bugdatapa at 126–111 ka (Ollivier *et al.* 2010). Archaeological remains atop the massif date to the Middle Bronze Age, Hellenistic and Medieval periods (Kroll 2006; Cherry *et al.* 2007). In 2003 a French mission surveyed and tested the seven caves around the base of the massif, but found no Paleolithic finds in a 2 by 2 m test pit excavated to a depth of 1.5 m at Aghitu–3 Cave (N39°30'50.5", E46°4'54.5"). Named according to local convention, the cave is 11 m deep, 18 m wide, 6 m high and situated at an elevation of 1601 m above sea level, about 115 m above the Vorotan River. During our field survey in 2008, we observed obsidian artifacts and mineralized bones on the surface, suggesting that this cave had potential for excavation. In June 2009 and again in July 2010, the TAPP team conducted further excavation at Aghitu–3 Cave.

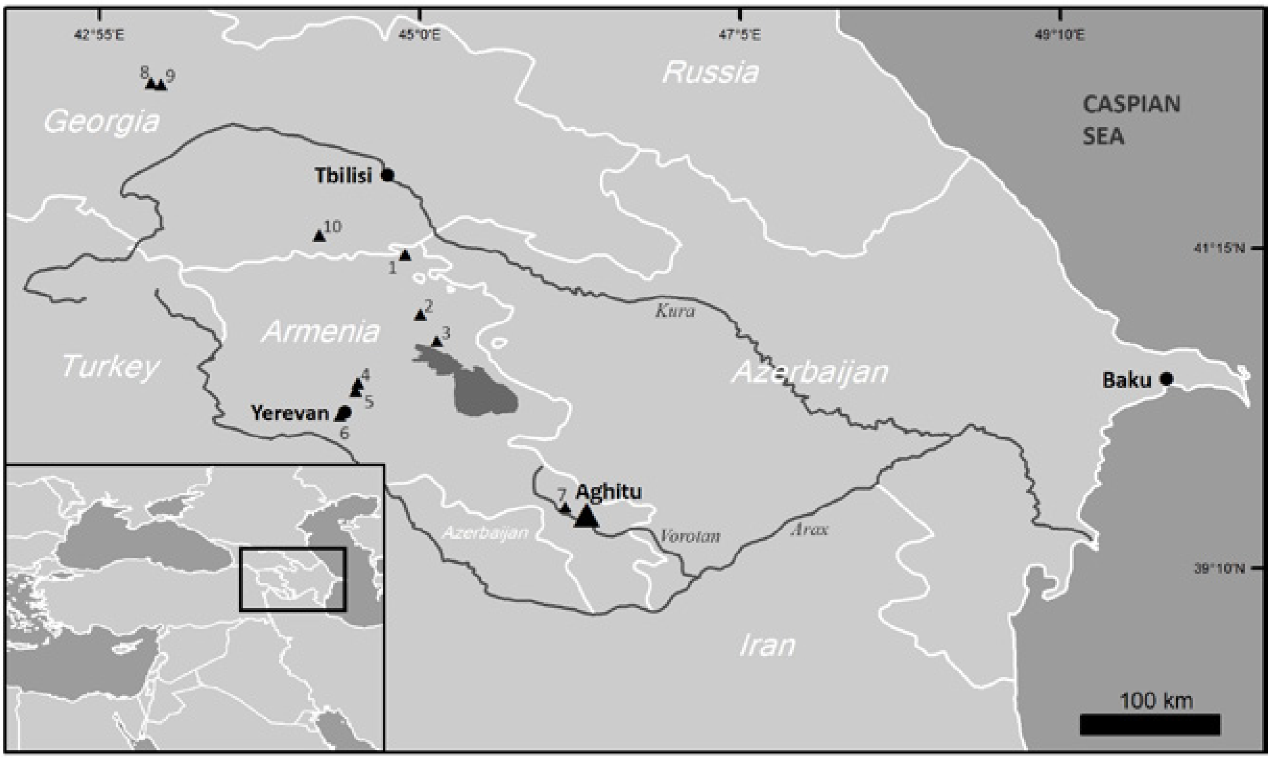

FIGURE 1 (Aghitu-3 Cave) – Reference map of the Caucasus region showing Aghitu in the Vorotan River valley and other sites mentioned in the text. Legend: 1. Debed river sites; 2. Hovk; 3. Kalavan; 4. Lusakert; 5. Nor Geghi; 6. Yerevan; 7. Angeghakot; 8. Ortvale Klde; 9. Dzudzuana; 10. Dmanisi (Map: Geraldine Quénéhérve).

2 BACKGROUND

While our knowledge about the Paleolithic settlement of the Caucasus has grown in the past decades, the archive of excavated and dated sites remains relatively small. The Georgian Early Pleistocene site of Dmanisi established the region as a focal point for research into the earliest human migrations out of Africa at about 1.8 Ma (Gabunia *et al.* 2000; Lordkipanidze *et al.* 2005; Ferring *et al.* 2011). Continued research programs at several Georgian sites, such as Ortvale Klde and Dzudzuana Cave, has vastly improved our understanding of the Middle to Upper Paleolithic transition of this region (e.g. Nioradze & Otte 2000; Bar-Oz & Adler 2005; Bar-Yosef *et al.* 2006, 2011; Adler *et al.* 2008; Moncel *et al.* 2012).

However, compared to Georgia, the picture in Armenia is just emerging. Lower Paleolithic settlement is documented mainly by open-air sites with Oldowan-like and Acheulean industries (Klein 1966; Golovanova 2000; Doronichev 2008; Kolpakov 2009; Gasparian 2010). In northern Armenia, researchers are investigating the Middle Pleistocene of the Debed river valley (Egeland *et al.* 2010, 2011), while others are examining the Dzoraget river valley in the region of Lori (Dolukhanov *et al.* 2004; Presnyakov *et al.* 2012). In central Armenia, Middle Paleolithic localities with late Mousterian occupations are known through excavations at Yerevan (Yeritsian 1970) and Lusakert (Yeritsian 1975) caves, but the dating of these sites remains unresolved. Recent work at Angeghakot–1 (Liagre *et al.* 2006), Hovk–1 Cave (Pinhasi *et al.* 2008, 2011; Bar-Oz *et al.* 2012) and Kalavan–2 (Ghukasyan *et al.* 2011) yielded three new Middle Paleolithic localities. Meanwhile, ongoing excavation projects led by Adler, Yeritsyan & Gasparyan in the Hrazdan River Gorge, including Nor Geghi and renewed work at Lusakert, is shedding light on the nature of the Armenian Lower and Middle Paleolithic (Adler *et al.* 2009, 2012).

Despite this improved effort to study the Paleolithic, stratified Upper Paleolithic sequences are extremely rare in Armenia, represented by a single Late Upper Paleolithic open-air site, Kalavan–1, dated to 17–16,000 cal BP (Chataigner *et al.* 2012). Thus, the discovery of the Upper Paleolithic site of Aghitu–3 has significance not only for the settlement of the Armenian Highlands, but also the Caucasus region.

3 FIELD METHODS

In 2009 the field crew began its systemic excavations, orienting the measuring grid to the 2 by 2 m test pit excavated by a French team in 2003. The team designated the coordinate system using letters for the x-axis and numbers for the y-axis (**figure 2**). A datum point hammered into the rear wall of the cave along the 9 m north line served as the zero point for measuring depth. In 2009, we deepened the French team's test pit to a depth of about 4 m and excavated a 1.5 by 5 m trench directly south of it, resulting in an L-shaped excavation. In 2010, we excavated the 2 by 4 m area immediately west of the French team's test pit and enlarged the L-shaped excavation by incorporating the 2 by 3 m area to the east. Additionally, we excavated a 2 by 2 m area just outside of the rock wall that runs more or less parallel to the dripline of the cave. At the end of both field seasons, the team drew the main profile walls of the excavation (**figure 3**).

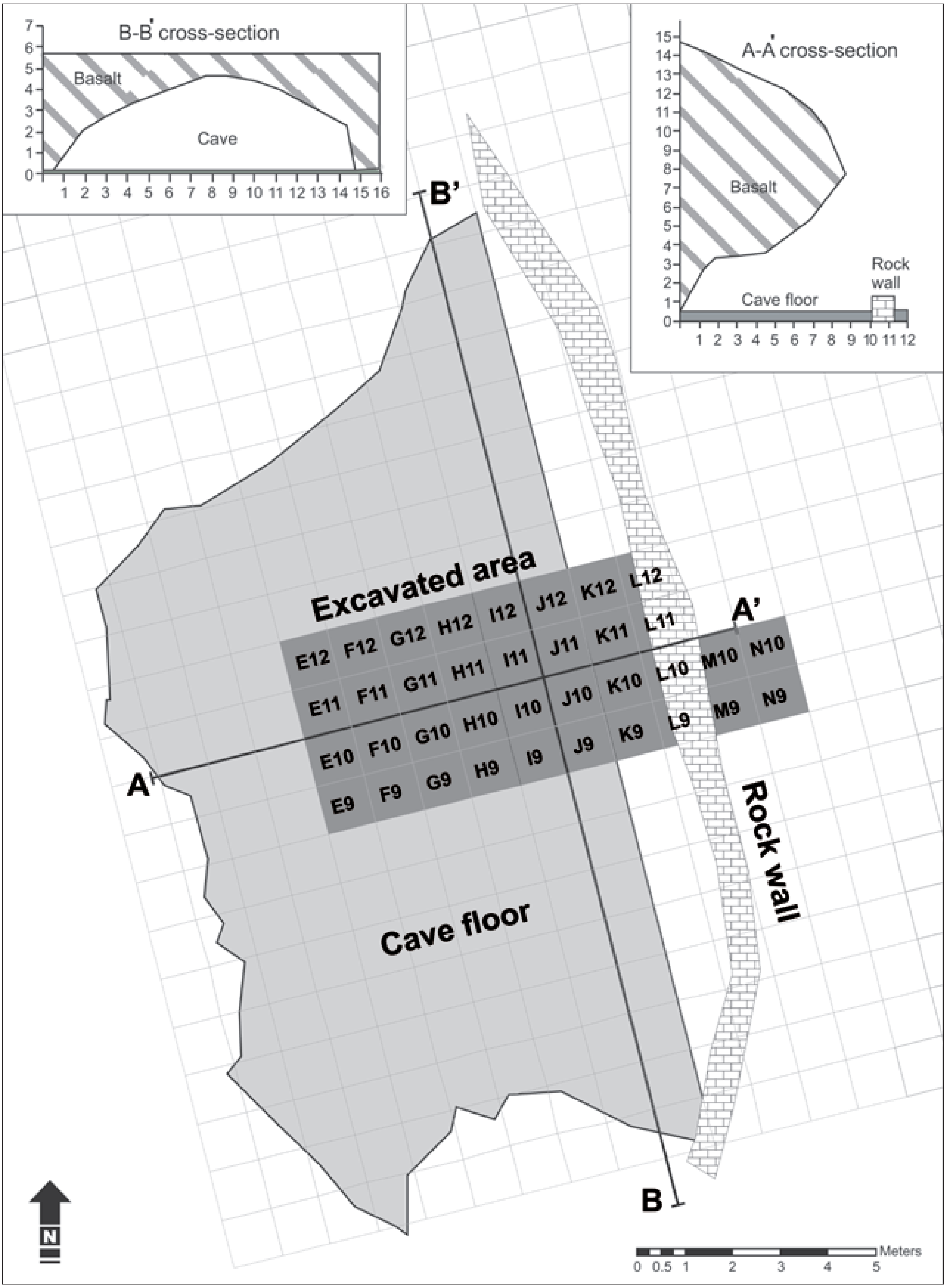

FIGURE 2 (Aghitu-3 Cave) – Site plan showing square designations of area excavated. Rock wall runs more or less along the dripline of the cave (Plan: Dmitri Arakelyan).

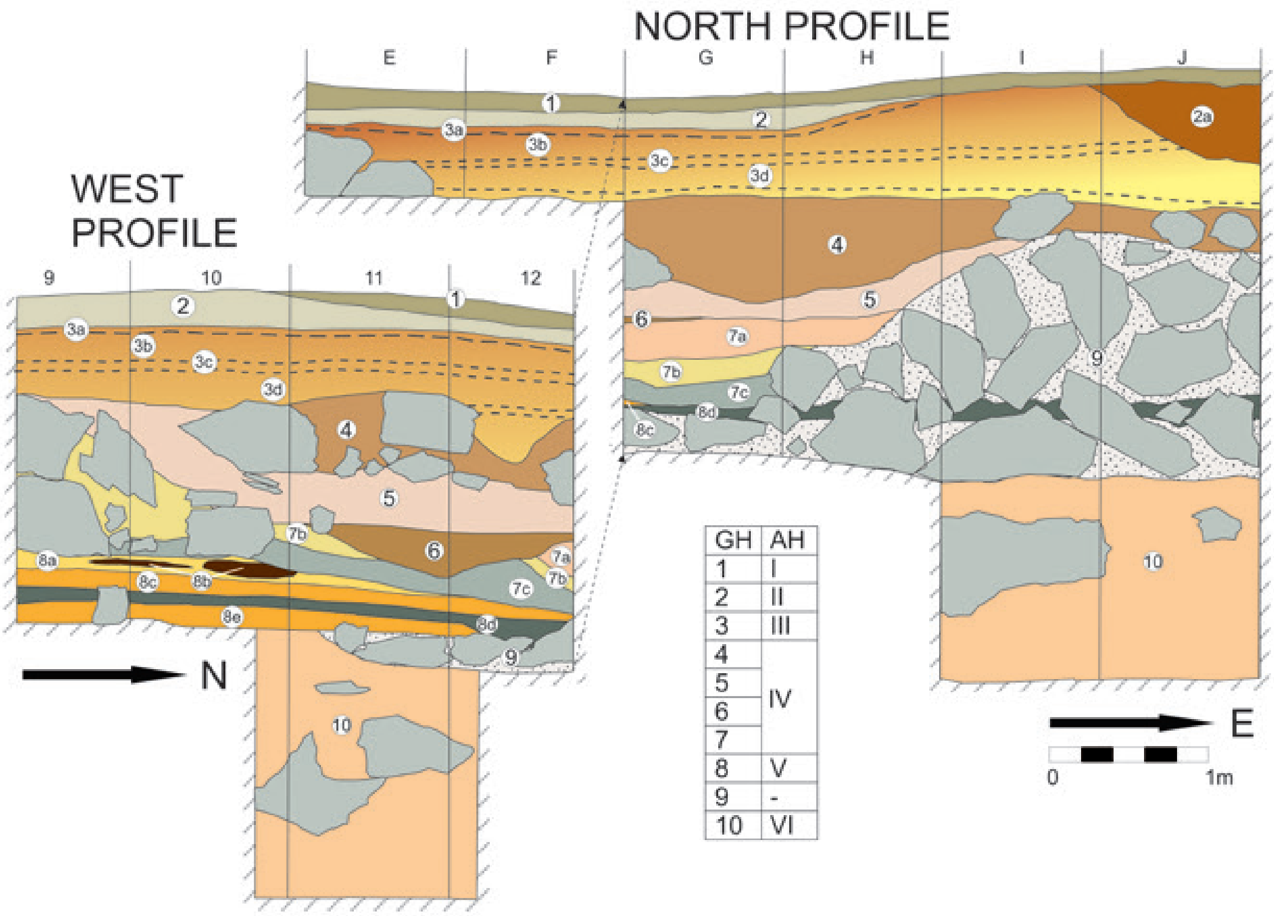

FIGURE 3 (Aghitu-3 Cave) – Digitized drawings of the west and north excavation profiles depicting geological layers (GH) and their corresponding archaeological horizons (AH).

As we explored the geological stratigraphy during the first field season, excavation proceeded in spits of 10–15 cm in units of one square meter. All finds were collected in one bag. The excavated sediment was searched by hand for smaller finds, with an effective recovery of about 5 mm. During the second season we modified this strategy because we encountered higher find densities. Starting in 2010 we excavated in spits of 2–3 cm thickness in units of one quarter meter. We piece-plotted single finds larger than 2 cm using meter sticks within the squares and a line level to measure depth. The team used screens of 5 and 2 mm to sieve the sediment and collected finds in a single bag. This increased the recovery of smaller lithic artifacts, faunal remains, small bird bones, microfauna and charcoal.

During excavation we encountered many large basalt blocks with maximum dimensions up to 1.5 m. Removal of these large blocks necessitated coarser methods. First the team broke the blocks using a sledge hammer, breaker bar, chisel and pick. Then the basalt debris was removed, so that controlled excavation could continue.

4 GEOLOGICAL RESULTS

At the end of the 2010 season we refined our geological understanding of the site. After studying the profiles, the team expanded the six geological horizons (GH) identified in 2009. The resulting ten lithostratigraphic units are described below and correlate with six archeological horizons (AH) (**figure 3**). Using the Tübingen tradition, we assign Arabic numbers for GH and Roman numerals for AH.

4.1 Stratigraphy

4.1.1 GH 1/AH I

The surface layer consists of a 10–15 cm of very loose, dry, dusty, light gray, organic-rich, clayey silt with occasional angular fragments and rounded basalt cobbles up to 10 cm. GH 1 has a completely anthropogenic character, rich in modern refuse, animal dung and charcoal. The base of GH 1 consists of very compact dung layers with white mineral laminations that will be the subject of future sedimentological analyses. The surface layer yielded a few obsidian artifacts, some mineralized bone fragments and occasional ceramic sherds.

4.1.2 GH 2/AH II

The next layer consists of a 10–20 cm thick, uniform, compact, dry, grayish-brown silt with frequent angular basalt fragments up to 15 cm. AH II yielded surprisingly little modern refuse, and is anthropogenic in origin. Below this level, modern debris and ceramic finds are infrequent. AH II contained a few obsidian artifacts, rare mineralized bone fragments and some ceramic sherds.

4.1.3 GH 3/AH III

The transition to the underlying 60–80 cm thick layer is very distinct, and the sediment changes from dry to moist. GH 3 is a geogenic yellowish-brown, finely laminated, clayey silt containing abundant fragments of weathered platy basalt up to 30 cm. Large boulders in parts of GH 3 appear to represent a phase that we refer to as the "upper rockfall". Finds from AH III included plentiful obsidian artifacts, ample charcoal and well preserved, dark, mineralized bone fragments coming from four occupation horizons designated from AH IIIa at the top to AH IIId at the bottom. Several intact combustion features consisted of a reddish-brown compact layer, underlying a black layer containing charcoal, and topped by a white ashy layer. Block samples taken from these features were collected for laboratory studies of the micromorphology of the sediment.

4.1.4 GH 4–7/AH IV

We subdivided the former GH 4 into four new geological layers which we renamed GH 4–7. AH IV can be regarded as archaeologically sterile despite the presence of a few finds. This layer yielded good samples of micromammals.

4.1.5 GH 4

The transition to this 15–30 cm thick layer was clear and marked by a brown, finely laminated, clayey silt with some sand. GH 4 contained some weathered basalt fragments 5–15 cm in size, but fewer large boulders than GH 3. This layer yielded a few lithics and some well-preserved faunal remains.

4.1.6 GH 5

The transition to this 10–20 cm thick layer was clear and marked by a light brown, finely laminated, clayey silt with some sand. GH 5 contained some basalt fragments, but no large boulders. This layer yielded no lithics or faunal remains.

GH 6 **4.1.7** The transition to this 5–10 cm thick layer was clear and marked by a brown, finely laminated, clayey silt with some sand. GH 6 contained some basalt fragments, but no large boulders. This layer yielded no lithics or faunal remains.

GH 7 **4.1.8** The transition to this 20–25 cm thick layer was clear. Based on changes in the amount of basalt debris, we subdivided GH 7 into three parts (**figure 3**). This layer yielded no lithics or faunal remains. The three finer subdivisions were GH 7a–7c:

- GH 7a–light olive brown silt with little angular basalt debris, 10 cm thick
- GH 7b–light olive brown silt with frequent angular basalt debris, 5–10 cm thick
- GH 7c–light olive brown silt with little angular basalt debris, 5–10 cm thick.

GH 8/AH V **4.1.9** The transition to this 20–30 cm thick, fine grained deposit is very distinct. Based on changes in color and grain size, as well as increased moisture content, we subdivided GH 8 into five easily recognized parts (**figure 3**). GH 8 yielded a few obsidian artifacts, yellowish-brown moderately preserved faunal remains, and abundant charcoal. The five finer subdivisions were named GH 8a–8e:

- GH 8a–light gray sand layer, 2–4 cm thick
- GH 8b–reddish brown clayey silt with abundant charcoal, 3–5 cm thick
- GH 8c–yellowish brown clayey sandy silt, 10 cm thick
- GH 8d–reddish brown clayey silt with less charcoal than GH 8b, 3–5 cm thick
- GH 8e–variably thick, distinct dark gray sand layer, 3–10 cm thick.

GH 9 **4.1.10** Large, angular basalt boulders up to 1.5 m represent a phase that we refer to as the “lower rockfall”. The spaces between these boulders are filled with a sandy silt matrix. This layer appears to thicken towards the dripline of the cave, reaching a maximum thickness of about one meter. This layer is sterile, yielding no lithics or faunal remains.

GH 10/AH VI **4.1.11** The transition to GH 10 is distinct (**figure 3**). This 180 cm thick layer was marked by the predominance of fine sediment, mainly silt, with varying amounts of clay and sand. The organic content of the sediment appears to increase, as does moisture. AH VI yielded many obsidian artifacts, much charcoal and numerous yellowish-brown, moderately preserved faunal remains. GH 10 reached its maximum depth at 414 cm below datum, or about 350 cm below the ground surface. A few intact combustion features consisted of a reddish-brown compact layer, underlying a black layer containing charcoal, and topped by a white ashy layer. Block samples taken from these features were collected for micromorphological studies.

4.2 Radiocarbon dating

From the 2010 season, five samples from AH III were sent to Kiel for radiocarbon dating using accelerated mass spectrometry. The new results from two bone and three charcoal specimens show uncalibrated dates ranging from ca. 24–22 000 BP for the upper find horizon AH III (**figure 4**). Four samples analyzed in 2009 resulted in uncalibrated dates of ca. 30–27 000 BP for the lower find horizons of AH V and VI (Kandel *et al.* 2012). Using OxCal version 4.1.7 (Bronk Ramsey 2009), the radiocarbon dates calibrate between ca. 35–27,000 cal BP (Riemer *et al.* 2009), placing the dates firmly in the early part of the Upper Paleolithic.

AH	Z	CATEGORY	IDENTIFICATION	LAB ID	^{14}C UNCAL BP	^{14}C CAL BP (1 σ)	^{14}C CAL BP (2 σ)
IIIA	–1,09	CHARCOAL	*Populus* or *Salix*	KIA-43242	22900 ± 180	28036 – 27060	28163 – 26895
IIIB	–1,19	CHARCOAL	*Populus* or *Salix*	KIA-43241	22630 ± 300	27779 – 26905	28066 – 26300
IIIC	–1,31	BONE	Sheep/goat metatarsal	KIA-43238	23140 ± 130	28174 – 27786	28470 – 27647
IIID	–1,37	CHARCOAL	Indeterminate	KIA-43243	23880 ± 150	28955 – 28421	29280 – 28253
IIID	–1,48	BONE	Equid radius R	KIA-43240	23960 ± 120	29024 – 28530	29265 – 28391
VB	–2,38	CHARCOAL	*Populus* or *Salix*	KIA-39640	27110 + 170/ –160	31235 – 31455	31138 – 31588
VI	–2,77	BONE	Wolf radius L	KIA-39642	27120 ± 170	31240 – 31459	31140 – 31595
VI	–3,50	BONE	Wild sheep or goat femur	KIA-39643	28680 ± 200	32814 – 33442	32249 – 34087
VI	–4,04	CHARCOAL	Indeterminate	KIA-39641	30210 + 180/ –170	34665 – 34934	34570 – 35094

FIGURE 4 Aghitu-3 Cave. Summary of AMS radiocarbon dating results from the Leibniz Laboratory in Kiel, Germany showing provenience, materials dated, lab numbers, as well as uncalibrated (uncal) dates and calibrated (cal) age ranges before present (BP).

4.3 Botanical remains

Ten samples of loose sediment from GH 8 and GH 10 were analyzed for palynological remains (Kandel *et al.* 2012). Wood charcoal was observed in seven of the samples. While the four samples from GH 8 contained no pollen, five of six samples from GH 10 yielded small quantities of pollen from the genera *Pinus* (pine), *Betula* (birch), *Quercus* (oak), and *Centaurea* (knapweeds), as well as the chicory subfamily (Cichorioideae). The presence of *Botryococcus*, a water dwelling species of green algae, was confirmed in three samples from GH 10, suggesting the presence of standing water nearby.

Charcoal remains are abundant in many of the excavated layers and 118 discrete samples were collected during excavation, with many additional samples collected during sediment screening. While a detailed study of the charcoal is under way, identified samples include only those sent for radiocarbon dating. The identified samples suggest that people brought poplar or willow (*Populus/Salix*) to the cave as fuel for burning (**figure 5**). These riparian species likely grew nearby in the Vorotan valley.

5 ARCHAEOLOGICAL RESULTS

In the following section we limit our discussion to finds collected in 2009 and 2010 coming from the Paleolithic layers AH III, IV, V and VI. We excluded finds from AH I and AH II because these layers include modern debris and appear mixed. We also exclude collected finds resulting from profile cleaning or collapse if these finds spanned more than a single AH. Here we present the results of 2216 finds, including 1970 chipped stone artifacts and 128 large mammalian remains (**figure 5**).

FIND CATEGORY	III	IV	V	VI	N	%
LITHICS						
Blank	891	2	4	95	992	50,4 %
Retouched tool	196	2	4	34	236	12,0 %
Core	18	--	--	2	20	1,0 %
Angular debris (chunks)	80	--	--	9	89	4,5 %
Small debitage (chips)	594	--	--	39	633	32,1 %
LITHIC subtotal	1779	4	8	179	1970	100 %
Tool index (excluding chips)	16,5 %			24,3 %		
FAUNA						
Small mammal (SC1)	3	5	--	5	13	10,2 %
Small-medium mammal (SC2)	14	7	2	58	81	63,3 %
Large-medium mammal (SC3)	12	2	4	8	26	20,3 %
Large mammal (SC4)	2	--	1	2	5	3,9 %
Canis lupus	--	--	1	2	3	2,3 %
FAUNA subtotal	31	14	8	75	128	100 %
CHARCOAL	93	4	12	9	118	
TOTAL FINDS	1903	22	28	263	2216	

FIGURE 5 Aghitu-3 Cave. List of main find categories with breakdown of lithics, fauna and charcoal by archeological horizon.

5.1 Stone artifacts

The entire lithic assemblage from AH III-VI consists of 1970 chipped artifacts, but for the purpose of this analysis, we do not consider the 633 chips, or 32 % of the lithic artifacts smaller than 10 mm. Furthermore, this analysis highlights and compares data from the two main find horizons, AH III and VI. For completeness, we present data from AH IV and V, but these assemblages are too small to provide meaningful interpretations about behavior.

5.1.1 Raw material

The two main raw materials present in the assemblages are obsidian (85.2 %) and chert (14.4 %). The remaining raw materials (0.4 %) include dacite and an unknown stone (**figure 6**). The sources of these raw materials are presently under study. It is interesting to note that obsidian is much more common in AH III (88 %) than in AH VI (57 %). Accordingly, AH VI contains a greater proportion of chert artifacts.

The obsidian used by the inhabitants of Aghitu–3 is of extremely high quality. It is variable in color, ranging from glassy translucent to smoky gray, and some variants are matte gray or opaque red. Banding, streaking and speckling are common features of all obsidian varieties. The diversity in color and texture suggests several sources for the obsidian. The closest known primary source of obsidian is represented by the volcanoes of the Vorotan Group about 30–40 km northwest of Aghitu (Fouloubey *et al.* 2003; Liagre *et al.* 2006; Cherry *et al.* 2010). Secondary sources of rounded obsidian pebbles likely stem from deposits in the Vorotan valley and are documented by the presence of brown cortex on 13 % of the obsidian finds.

The chert also has excellent knapping characteristics, with a uniform microcrystalline structure and glossy texture. The chert exhibits a high variability in color, ranging from dark brown, red and orange through yellow, beige, gray, white and green.

LITHIC RAW MATERIAL	III	IV	V	VI	N	%
OBSIDIAN						
No cortex	907	4	8	78	997	87,5 %
Cortex (< 50 %)	140	--	--	2	142	12,5 %
Cortex (> 50 %)	--	--	--	--	0	0 %
OBSIDIAN subtotal	1047	4	8	80	1139	100 %
FLINT						
No cortex	101	--	--	58	159	82,8 %
Cortex (< 50 %)	26	--	--	2	28	14,6 %
Cortex (> 50 %)	5	--	--	--	5	2,6 %
FLINT subtotal	132	0	0	60	192	100 %
Dacite	2	--	--	--	2	
Unknown	4	--	--	--	4	
TOTAL	1185	4	8	140	1337	
Obsidian index	88,4 %			57,1 %	85,2 %	
Flint index	11,1 %			42,9 %	14,4 %	
Cortical index	14,4 %			2,9 %	13,1 %	

FIGURE 6 Aghitu-3 Cave. Frequency of lithic raw materials showing distribution of cortical pieces and cortical index by archeological horizon.

The sources of the chert are presently unknown, but unpublished geological studies indicate outcrops 8 km west of Aghitu near Brnakot, and also near Goris, about 25 km to the east. Secondary sources of chert likely stem from pebbles deposited in the Vorotan valley and can be identified by the presence of cortex on 17 % of the chert finds.

5.1.2 Blank production and technology

The chipped lithic assemblage is strongly oriented towards the production of laminar products on volumetric cores. Blanks come mainly in the form of bladelets with widths less than 10 mm, and to a much lesser degree, blades with widths greater than 10 mm (**figure 7**). Of the blanks 62 % in AH III are laminar, while the tendency in AH VI is even more pronounced with 78 % laminar blanks. An even higher proportion of formal tools are made on laminar products, with 84 % in AH III and 97 % in AH VI. These data clearly document a lithic reduction strategy focused on making laminar blanks that are overwhelmingly bladelets.

The presence of angular debris comprising about 7 % of the entire assemblage, and especially the 633 chips smaller than 10 mm indicate that stone knapping took place at Aghitu–3. The argument for on-site reduction is further strengthened by the presence of cortical surfaces on 13 % of obsidian and 17 % of chert artifacts. However, of those artifacts with cortex, the vast majority are covered by less than 50 % of cortex. This illustrates that later stages of decortification, as represented by the artifacts with less than 50 % cortex coverage, occurred on-site. Thus, the early stages of reduction must have occurred elsewhere. A notable difference in the presence of cortex on artifacts can be seen when comparing the assemblages of AH III and AH VI. In AH III cortical pieces comprise 14 % of the assemblage, but only 3 % in AH VI. This difference seems to indicate a change in reduction strategy between these phases of occupation, or possibly differing lengths of occupation.

Lithic technology	III	IV	V	VI	n	%
Core	18	--	--	2	20	1,5 %
Flake	367	--	2	26	395	29,5 %
Blade	149	1	1	6	157	11,7 %
Bladelet	496	2	3	93	594	44,4 %
Core tablet	1	--	--	--	1	0,1 %
Preparation flake	44	1	--	3	48	3,6 %
Crested blade primary	7	--	1	--	8	0,6 %
Crested blade secondary	3	--	--	--	3	0,2 %
Burin spall	20	--	1	1	22	1,6 %
Angular debris	80	--	--	9	89	6,7 %
TOTAL	1185	4	8	140	1337	100 %

Lithic blanks	III	IV	V	VI	n	%
Laminar blanks	675	3	6	100	784	63,8 %
Non-laminar blanks	412	1	2	29	444	36,2 %
TOTAL	1087	4	8	129	1228	100 %
Laminar blank index	62,1 %			77,5 %		

Lithic tool blanks	III	IV	V	VI	n	%
Flake	25	--	--	1	26	11,0 %
Blade	19	--	--	1	20	8,5 %
Bladelet	146	2	4	32	184	78,0 %
Angular debris	3	--	--	--	3	1,3 %
Heat spall	1	--	--	--	1	0,4 %
Core	2	--	--	--	2	0,8 %
TOTAL	196	2	4	34	236	100 %
Laminar tool index	84,2 %			97,1 %		

FIGURE 7 Aghitu-3 Cave. Overview of lithic technology focusing on blank selection in tool production by archeological horizon.

So far 18 cores from AH III (**figure 8**) and two cores from AH VI (**figure 9**) have been recovered, most of which are small, highly reduced, single platform bladelet cores (**figure 10**). While the remaining cores have double or multiple platforms, they are also aimed at producing bladelets. The predominance of platform cores mirrors the prevalence of laminar blanks in the assemblage, although the length of the blanks appears to be much longer than the cores themselves. The presence of crested blades, core tablets and other preparation debris in both layers confirms that core preparation and maintenance occurred, although the smaller assemblage of AH VI contains fewer examples. As excavation continues we expect that the sample size will increase.

Of the 709 blanks with proximal preservation (complete flakes and proximal fragments), plain striking platforms are most common, followed in frequency by indeterminate, shattered, punctiform and faceted butts (**figure 11**). In AH III pronounced bulbs of percussion are visible on 7 % of blanks, while the incidence of shattered bulbs is 7 % and bulbar scars are present on 28 %.

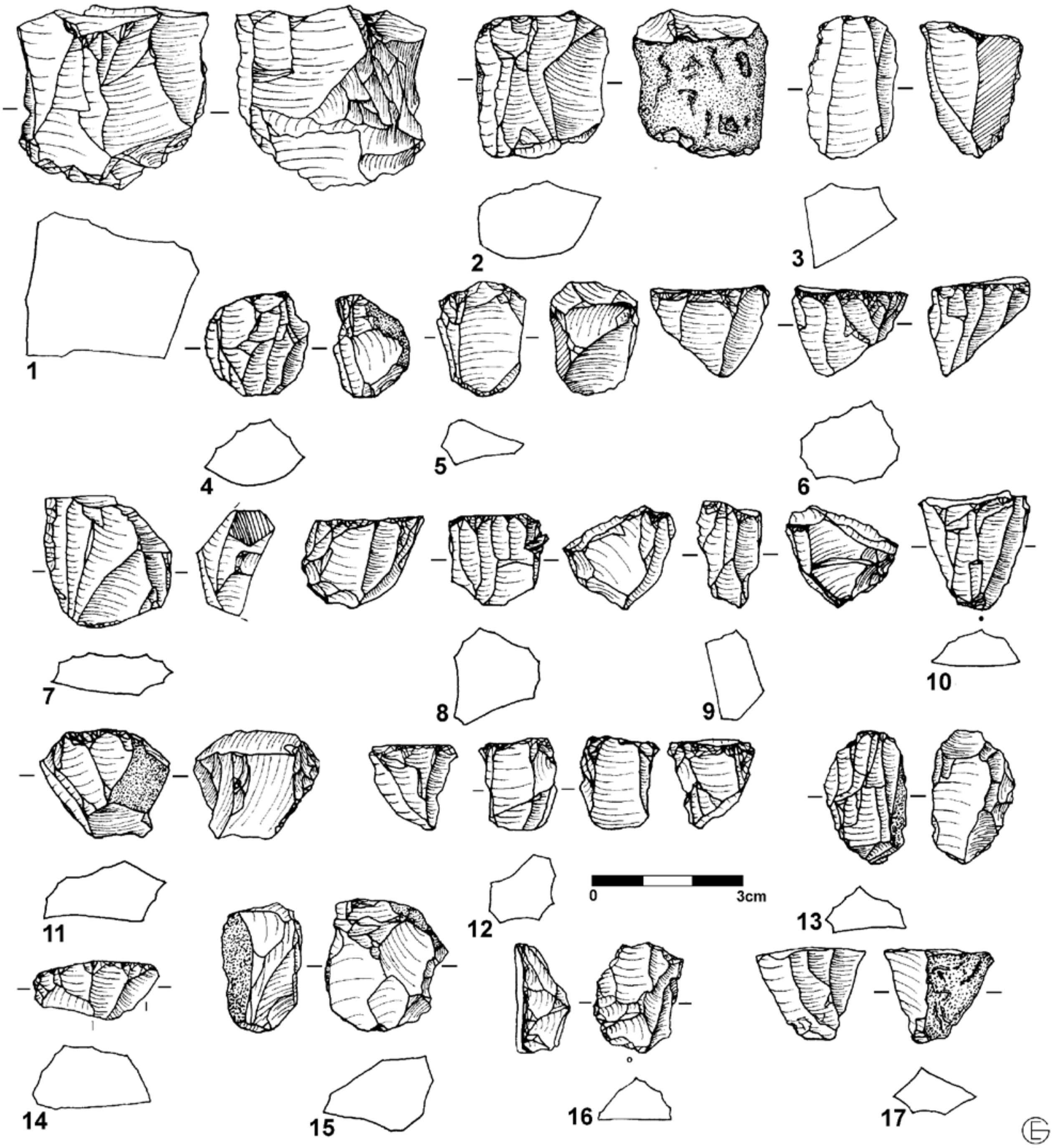

FIGURE 8 (Aghitu-3 Cave, AH III) – Platform cores (1–6, 8–13, 15–17), core fragment (7) and scraper on broken core (14). Raw material: chert (1, 10, 14–15); obsidian (2–9, 11–13, 16–17) (Illustration: Elham Ghasidian).

In AH VI, pronounced bulbs of percussion were observed on 5 % of blanks, while shattered bulbs were seen on 3 % and bulbar scars on 12 %. Together, these characteristics suggest a lower striking intensity for AH VI compared to AH III. These data are consistent with the presence of overhanging lips, which were observed in 15 % of blanks in AH III, contrasted to 33 % in AH VI. The trend shown by overhanging lips confirms that AH VI not only shows a lower striking intensity, but also the possible use of diffuse force. Another difference can be seen in the degree of dorsal reduction, which was observed in 33 % of artifacts in AH III, but only 14 % in AH VI. This suggests that knapping in AH VI produced blanks that required less preparation than in AH III.

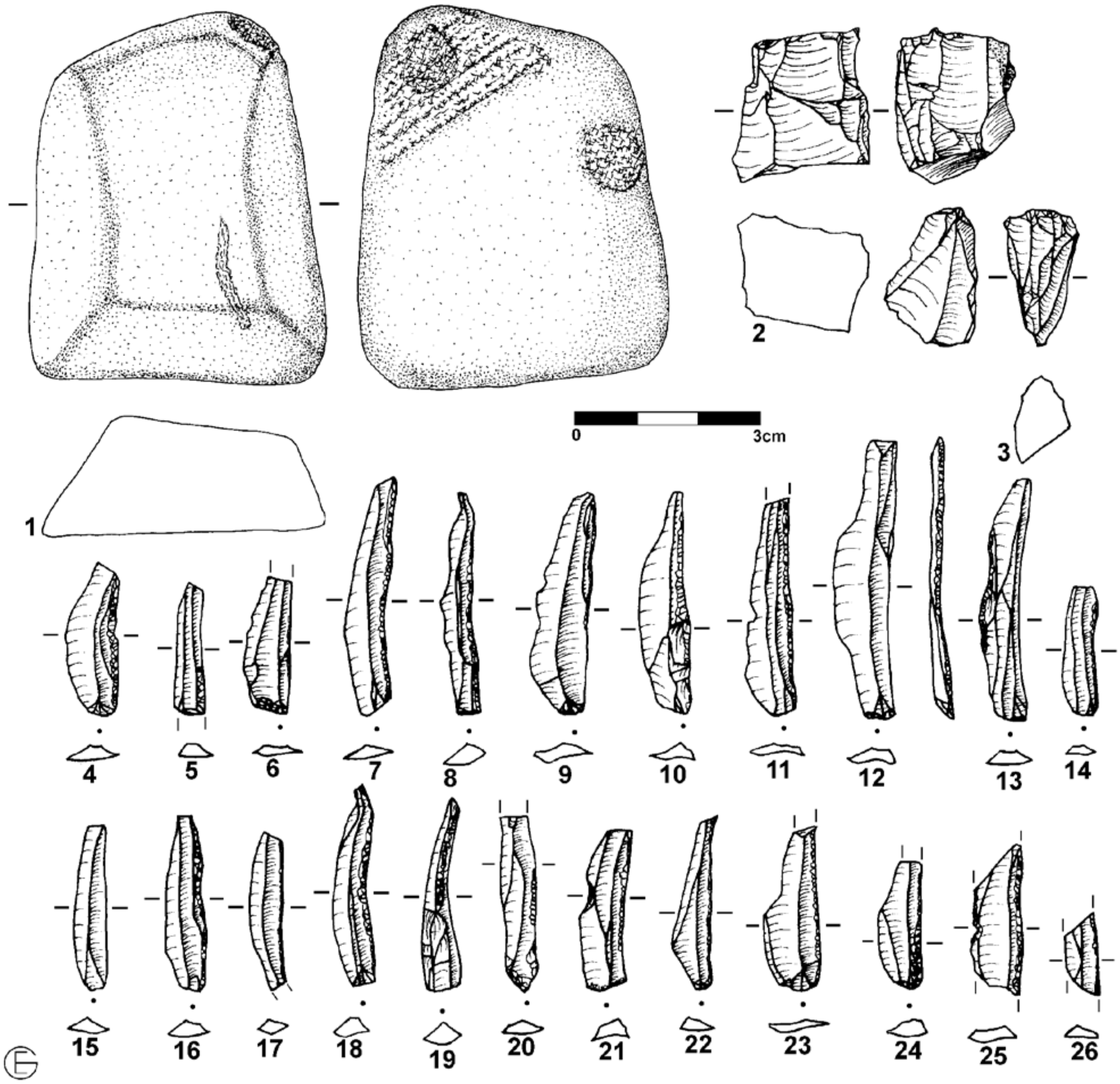

FIGURE 9 (Aghitu-3 Cave, AH VI) – Polishing stone (1), platform cores (2–3), laterally retouched bladelets (4–14, 16–18, 20–26) and unretouched bladelets (15, 19). Raw material: metamorphic (1); chert (2, 4, 6–8, 10–11, 13, 15–16, 18–19, 21–23); obsidian (3, 5, 9, 12, 14, 17, 20, 24–26) (Illustration: Elham Ghasidian).

FIGURE 10 (Aghitu-3 Cave. Distribution of core types by archeological horizon.

Lithic core type	III	IV	V	VI	n	%
Single platform	14	--	--	1	15	75 %
Double platform	3	--	--	1	4	20 %
Multiple platform	1	--	--	--	1	5 %
TOTAL	18	0	0	2	20	100 %

Lithic blank preservation	III	IV	V	VI	n	%
Complete	378	1	1	62	442	36,0 %
Proximal	236	2	2	27	267	21,7 %
Medial	246	--	--	28	274	22,3 %
Distal	227	1	5	12	245	20,0 %
TOTAL	1087	4	8	129	1228	100 %
Proximal index	56 %			69 %		

Lithic butt	III	IV	V	VI	n	%
Plain	255	2	--	52	309	43,6 %
Previous negative	18	--	--	2	20	2,8 %
Fracture plane	3	--	--	--	3	0,4 %
Punctiform	46	--	--	4	50	7,1 %
Faceted	48	--	--	2	50	7,1 %
Cortical	7	--	--	1	8	1,1 %
Shattered	64	1	1	7	73	10,3 %
Indeterminate	173	--	2	21	196	27,6 %
TOTAL	614	3	3	89	709	100 %

Lithic striking attribute	III	IV	V	VI	n
Bulb of percussion	7,2 %	--	--	4,5 %	48
Shattered bulb	6,5 %	--	--	3,4 %	43
Bulbur scar	28,0 %	--	--	12,4 %	185
Lip	14,8 %	--	--	32,6 %	120
Dorsal reduction	32,9 %	--	--	13,5 %	215

FIGURE 11 Aghitu-3 Cave. Review of blank preservation, as well as butt and striking characteristics by archeological horizon.

In summary, the data suggest that the striking intensity in AH VI was lower than in AH III, but neither assemblage appears to be produced solely by hard hammer. Based on the striking attributes, both assemblages appear to result from the application of diffuse force, such as soft hammer or indirect percussion. Nonetheless, the knapping characteristics of AH III suggest the use of a more forceful technique compared to AH VI.

5.1.3 Retouched tool typology

Retouched tools constitute a sizable proportion of the assemblage from AH III (17 %) and even more so in AH VI (24 %) (**figure 5**), keeping in mind that the percentage of tools excludes the 633 chips smaller than 10 mm. As mentioned before, the vast majority of retouched pieces were made on laminar blanks, 84 % in AH III and 97 % in AH VI (**figure 7**). The manufacture of laminar blanks, or more precisely bladelets, was the single most important aspect of lithic reduction, and based on their high degree of retouch, these bladelets were clearly geared towards the production of tools (**figure 12**).

In both AH III and AH VI the most common tool forms are bladelets that are finely retouched on one, or sometimes both, lateral edges (**figures 9** and **13**). The bladelets are often twisted to the right, but this attribute was not observed systematically during analysis, so that the nature of twisting must remain a hypothesis for now. The intensity of retouch is very fine and shows a consistent pattern. The degree of retouch is high, ranging from 50–100 % of a given lateral edge and can therefore be described as continuous.

Lithic tool type	III	IV	V	VI	n	%
Laterally retouched tool, fine	119	1	4	27	151	64,0 %
Laterally retouched tool, semi-abrupt	33	1	--	4	38	16,1 %
Laterally retouched tool, backed	9	--	--	1	10	4,2 %
End retouch	4	--	--	--	4	1,7 %
Scraper	15	--	--	--	15	6,4 %
Tanged point	1	--	--	--	1	0,4 %
Burin	5	--	--	--	5	2,1 %
Notch	6	--	--	1	7	3,0 %
Denticulate	1	--	--	--	1	0,4 %
Splintered piece	3	--	--	1	4	1,7 %
TOTAL	196	2	4	34	236	100 %
Fine lateral retouch index	60,7 %			79,4 %		

FIGURE 12 Aghitu-3 Cave. Frequency of tool types by archeological horizon.

This similarity in the character of the retouch suggests that the tools were created on laminar blanks in a standardized fashion for a similar purpose. However, use wear studies have not yet been conducted, so that we cannot discern the intentions of their makers.

A very low proportion of the bladelets show more invasive forms of modification such as semi-abrupt retouch and rare examples of backed pieces (**figure 12**). Nonetheless, these forms are much less common. These more invasive methods of retouch may indicate an alternate form of use or hafting, or may simply represent a part of the full spectrum ranging from fine retouch through semi-abrupt to fully backed pieces. Finally, other tool forms are rare, but include various scrapers, notches and burins, among other types (**figures 8** and **9**).

5.2 Large mammalian fauna

The finds excavated from Aghitu–3 include 128 large mammalian remains (**figure 5**). For now, the specimens have not been identified to genus or species level. Rather we used a preliminary classification system based on the live weight of an animal (e.g. Brain 1974; Klein *et al.* 1991) to establish four animal size classes: (SC1) 5–20 kg, small fauna, hare to fox size; (SC2) 20–100 kg, small-medium fauna, wild sheep and wild goat size; (SC3) 100–300 kg, large-medium fauna, equid size; and (SC4) 300–1000 kg, large fauna, aurochs size. We used these size classes to establish a picture of the distribution of the assemblage as a whole.

The results show that SC2 predominates with 63 % the assemblage, and most specimens come from AH VI. The next most frequent size class is SC3 with 20 %, and most examples are found in AH III. Remains of SC1 (10 %) and SC4 (4 %) correspond to much smaller proportions of the assemblage. The presence of wolf (*Canis lupus*) (2 %) in AH V and VI indicates that carnivores were active at the site.

Most of the fauna are moderately well preserved with good surface preservation. Preliminary taphonomic observations from AH III show three bones broken in a fresh state (green break), and two bones appear to be burned. Much of the fauna from AH III consists of well mineralized and well preserved shaft fragments of long bones that could not readily be identified. The size classes in AH III are also more evenly distributed, and together these characteristics suggest a fauna that was accumulated by humans. In AH VI, on the other hand, four bones show evidence of biting or chewing by carnivores, and 30 appeared etched, possibly by the gastric juices of a carnivore.

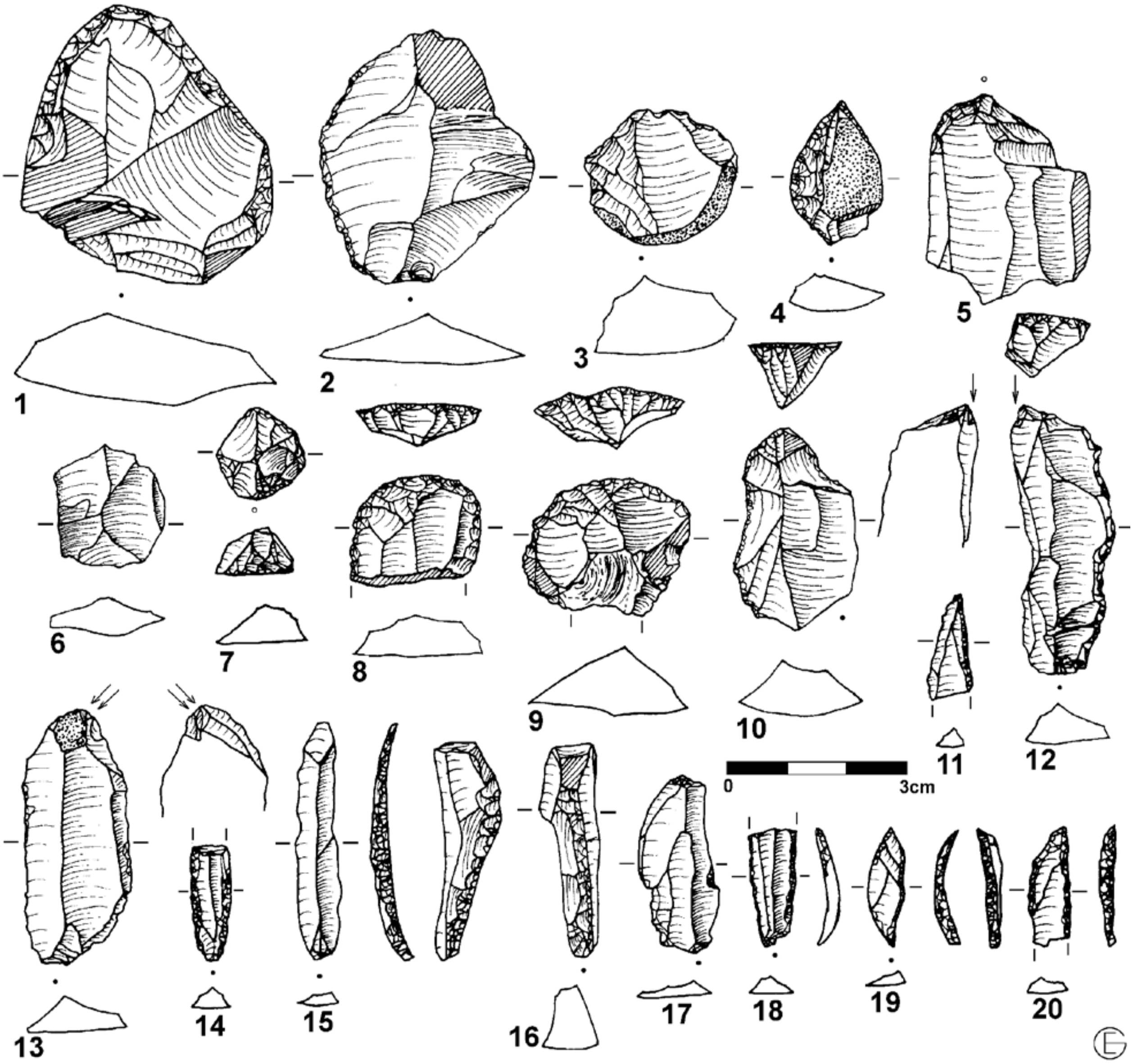

FIGURE 13 (Aghitu–3 Cave, AH III) – Retouched tools including scrapers (1–2, 4–5, 7–10), splintered piece (6), burins (12, 13, 17) and laterally retouched bladelets (11, 14–15, 18–20), platform core (3) and core trimming element (16). Raw material: obsidian (1–4, 6–7, 10–11, 13–16, 18–20); dacite (5); chert (8–9, 12, 17) (Illustration: Elham Ghasidian).

The fauna from AH VI includes many etched but otherwise complete small bones, such as phalanges, patellae and vertebrae. Furthermore, the fauna from AH VI appear skewed towards smaller (SC2) mammals. This preservation combined with the size class distribution suggests a fauna accumulated by carnivores.

Thus, our first impression of the fauna from Aghitu–3 is that humans and carnivores played different roles in accumulating the assemblages. While the fauna from AH III appears to be accumulated by humans, carnivores were more involved in the collection of fauna in AH VI. As the excavation continues, we plan to conduct thorough zooarchaeological analyses, including detailed taphonomic studies, to identify the species present and further assess the degree of anthropogenic and biogenic modifications.

FIGURE 14 Aghitu-3 Cave. Summary of identified microfaunal remains divided into two main stratigraphic groups based on archeological horizon (MNI = minimum number of individuals).

COMMON NAME	MNI (AH I-III)	MNI (AH IV-VI)
Pika	3	14
Vole	1	18
Migratory hamster	1	1
Water vole	--	5
Golden hamster	4	14
Mole vole	1	5
Jerboa	3	5
TOTAL	13	62

5.3 Micromammals, birds, fish and amphibians

The finds excavated from Aghitu–3 include a well preserved sample of 441 microfaunal specimens belonging to small mammals, birds, fish and amphibians. The microfaunal samples collected from Aghitu–3 were identified at the Zinman Institute for Archaeology at the University of Haifa and compared to collections at the Natural History Museum in Vienna. The seven genera of identified micromammals included pika, voles, hamsters and jerboa (**figure 14**). To gain a more detailed chronological view, we separated the assemblage into two groups from AH I-III and AH IV-VI. The composition of micromammalian species suggests that the climatic conditions of the Upper Paleolithic were generally cooler than at present. This is based on the high abundance of voles in the lower part of the sequence in comparison to their rarity in the upper part (**figure 14**).

More than 30 specimens of bird are present including bone and eggshell, but these have not yet been analyzed. On first glance, the avian fauna appear to be composed of small species that may have nested on the roof of the cave, just as swallows do today. In addition, one fish mandible (*Salmo trutta*) and four specimens of amphibians have been identified.

5.4 Post-Paleolithic

Here we provide a brief overview of the post-Paleolithic layers to complete the picture (Kandel *et al.* 2012). Up until now, our discussion of AH I and II has referred to inside the cave, where these layers average 20–30 cm in thickness. But outside of the cave, these layers extend to a depth of over 2 m and contain more pottery. While the pottery assemblage as a whole consists mostly of non-diagnostic body fragments, some diagnostic pieces are present, including rim, neck-rim, wall-rim, shoulder, base and body-base fragments. The analysis of these sherds represents the best means to examine the post-Paleolithic history of the site.

The typological distribution of the vessels includes goblets, jars, bowls and pots, with one example of household ceramic (oven/tile). The majority of pottery fragments can be attributed to Medieval times (IV-XIII centuries AD) when, according to the 13th century Armenian historian Stepanos Orbelyan, Aghitu was a flourishing town. Two sherds are typical of the Achaemenid to Hellenistic period (VIII century BC-III century AD), and the oldest sherd is represented by a single fragment dating to the Early Bronze Age (first half of the III millennium BC) belonging to the Kura-Araxes culture. We attribute these remains to the settlements situated on the massif above the cave (Cherry *et al.* 2007), which likely made use of the caves underlying the massif.

6 DISCUSSION AND CONCLUSION

The dating of layers AH VI to ca. 35–31 000 cal BP, AH V to ca. 31 000 cal BP and AH III to ca. 29–27 000 cal BP places occupation of Aghitu–3 firmly within the early part of the Upper Paleolithic. Although Upper Paleolithic artifacts have been documented at other sites in Armenia (e.g. Fourloubey 2003), the age of these sites remains unknown. Therefore, the well stratified and dated assemblages of Aghitu–3 are unique in Armenia.

Since raw material resources are not located at the site, we expect a conservative approach to knapping at Aghitu–3. With primary raw material sources located 30–40 km away, the presence of cortex on some pieces indicates that secondary sources such as Vorotan river gravels were also exploited. However, the low frequency of cortical pieces in the assemblage and the low degree of cortex covering those pieces indicate that primary reduction began elsewhere, perhaps at the raw material sources or other occupation sites within the settlement system. Despite this generally conservative approach, diachronic trends show a flexibility in behavior. For example, the proportion of obsidian and chert is more evenly distributed in AH VI, but obsidian dominates the younger AH III. This variability may reflect changes in preference or indicate connections to different parts of the landscape.

The conservative approach to knapping is also reflected in the continuity observed in the lithic assemblages over time. From the bottom of AH VI to the top of AH III the lithics appear standardized in terms of their typology and technology. People consistently manufactured bladelets that were finely retouched on one, or sometimes both, lateral edges. This production chain appears to be independent of raw material selection, which is not surprising given the high quality of raw materials available. Such laminar tools may represent insets that were hafted as arrowheads, although use wear studies will be necessary to confirm this hypothesis. This straightforward approach enabled the people who lived at Aghitu–3 to produce a standardized toolkit. The paucity of cores further supports the hypothesis that both obsidian and chert were used judiciously, as does the small and highly reduced nature of the cores. In fact, many of the laminar blanks are longer than the cores, underlining the efficient approach to knapping.

A surprising aspect of many Paleolithic sites in Armenia is their high elevation, and Aghitu–3 (1601 m) is no exception. Many Armenian sites are situated above 1000 m, such as Lusakert–1 and 2 (1417 m), Kalavan–2 (1630 m), Angeghakot–1 (1800 m) and Hovk–1 (2040 m). Thus high elevation sites do not preclude settlement. Situated around 40°N latitude, southern Armenia has a temperate climate today. Water resources are plentiful, and the volcanic nature of the soils makes them productive for plant life. Preliminary data from Aghitu–3 suggest that this environmental backdrop also extended into the past. Judging from the diversity of species identified so far, the setting was ideal for humans and fauna alike.

Paleoenvironmental studies of the fauna from Aghitu–3 are still underway, but preliminary data indicate that a small but varied sample of fauna accumulated on site. Taphonomic analysis suggests that both humans and carnivores acted as accumulators. The relatively low quantity of fauna suggests that humans lived at the site for short periods, perhaps seasonally. The presence of carnivore remains, small nesting birds and ample microfauna also supports the hypothesis that human activities in the cave were not too intense and did not last too long.

The micromammal assemblage can be considered characteristic of the steppic Armenian Highland region as described by Vereschagin (1959). All of the taxa present in the assemblage can be considered typical of steppe environments (Nowak 1999). They can also be associated with the Southwest Asian mammalian complex that is dominant in the Lesser Caucasus today. Similar assemblages in terms of the taxonomic composition have also been described recently by Hashemi *et al.* (2006) from a number of Upper Paleolithic cave sites in northwestern Iran and support a close environmental and faunal affinity of the two regions during the Upper Paleolithic. Furthermore, the distribution of micromammals indicates that the climate of ca. 35–31,000 cal BP was cooler than today.

Aghitu–3 appears to have parallels with other Caucasian sites, most notably 350 km to the northwest in Georgia. The well-studied sequence of Dzudzuana Cave is typologically and chronologically the closest companion to Aghitu–3 (Bar-Yosef *et al.* 2006, 2011), and layers D (ca. 34–32 000 cal BP) and C (ca. 27–24 000 cal BP) are its best analogs. The Upper Paleolithic sequence of Ortvale Klde provides another favorable comparison with layers 4c (ca. 38–34 000 cal BP), 4b (ca. 32–28 000 cal BP) and 3 (ca. 26–25 000 cal BP) (Adler *et al.* 2008). Further afield in Russia, layer 1a (ca. 34–32,000 cal BP) of Mezmaiskaya shows a diverse array of bone tools and personal ornaments (Golovanova *et al.* 1999, 2010). In Iran the upper sequence (ca. 30 000 cal BP) of Yafteh (Otte *et al.* 2011) can also be invoked. These sites show similar trends in chronology, technology and typology which will be further examined to test the hypothesis of regional links among these assemblages.

This glimpse of Aghitu–3 adds to our archaeological knowledge of the Caucasus region and supports our hypothesis that small and highly mobile groups returned to the site repeatedly over a period of at least 8 000 years. Such short, low intensity occupations hint that Aghitu–3 served as a temporary seasonal camp used by hunter-gatherers. The results from the field seasons of 2009 and 2010 give us reason to believe that continued research at Aghitu–3 will provide answers to questions about the first modern inhabitants of Armenia and add to the growing spectrum of knowledge about the origins of the Early Upper Paleolithic.

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REFERENCES

ADLER D.S., BAR-YOSEF O., BELFER-COHEN A., TUSHABRAMISHVILI N., BOARETTO E., MERCIER N., VALLADAS H. & RINK W.J. (2008) – Dating the demise: Neanderthal extinction and the establishment of modern humans in the southern Caucasus. *Journal of Human Evolution* 55:817–833.

ADLER D.S., PINHASI R., GASPARIAN B., TUSHABRAMISHVILI N. & YERITSYAN B. (2009) – Neanderthal life-ways in Southern Caucasus. In: N. Catto (ed.), *The Neanderthal Home: Spatial and Social Behaviors, Abric Romani (1909–2009)*. International workshop, Tarragona-Capellades (Spain), 6–9 October 2009, Institut Catala de Paleoecologia Humana i Evolucio Social, p. 125–126.

ADLER D.S., YERITSYAN B., WILKINSON K., PINHASI R., BAR-OZ G., NAHAPETYAN S., BAILEY R., SCHMIDT B.A., GLAUBERMAN P., WALES N. & GASPARIAN B. (2012) – The Hrazdan Gorge Palaeolithic Project, 2008–2009. In: P. Avetisyan & A. Bobokhyan (eds.), *Archaeology of Armenia in Regional Context. Proceedings of the International Conference dedicated to the 50th Anniversary of the Institute of Archaeology and Ethnography*, September 15–17, 2009, Yerevan, Armenia. NASRA Gitutyn Publishing House, Yerevan, p. 21–37.

BAR-OZ G. & ADLER D.S. (2005) – Taphonomic history of the Middle and Upper Paleolithic faunal assemblage from Ortvale Klde, Georgian Republic. *Journal of Taphonomy* 3(4):185–212.

BAR-OZ G., WEISSBROD L., GASPARIAN B., NAHAPETYAN S., WILKINSON K. & PINHASI R. (2012) – Taphonomy and zooarchaeology of a high-altitude Upper Pleistocene faunal sequence from Hovk–1 Cave, Armenia. *Journal of Archaeological Science* 39:2452–2463.

BAR-YOSEF O., BELFER-COHEN A. & ADLER D.S. (2006) – The implications of the Middle-Upper Paleolithic chronological boundary in the Caucasus to Eurasian prehistory. *Anthropologie* 44(1):49–60.

BAR-YOSEF O., BELFER-COHEN A., MESHEVILIANI T., JAKELI N., BAR-OZ G., BOARETTO E., GOLDBERG P., KVAVADZE E. & MATSKEVICH Z. (2011) – Dzudzuana: An upper Palaeolithic cave site in the Caucasus foothills (Georgia). *Antiquity* 85:331–349.

BINFORD L.R. (1984) – *Faunal Remains from Klasies River Mouth*. Academic Press, Orlando.

BRAIN C.K. (1974) – Some suggested procedures in the analysis of bone accumulations from southern African Quaternary sites. *Annals of the Transvaal Museum* 29:1–8.

BRONK RAMSEY C. (2009) – Bayesian analysis of radiocarbon dates. *Radiocarbon* 51:337–360.

CHATAIGNER C., GASPARYAN B., MONTOYA C., ARIMURA M., MELIKYAN V., LIAGRE J., PETROSYAN A., GHUKASYAN R., COLONGE D., FOURLOUBEY C., ARAKELYAN D., ASTRUC L., NAHAPETYAN S., HOVSEPYAN R., BALASESCU A., TOMÉ C. & RADU V. (2012) – From the Late Upper Palaeolithic to the Neolithic in north-western Armenia: Preliminary results. In: P. Avetisyan & A. Bobokhyan (eds.), *Archaeology of Armenia in Regional Context*. Proceedings of the International Conference dedicated to the 50th Anniversary of the Institute of Archaeology and Ethnography, September 15–17, 2009, Yerevan, Armenia. NAS RA Gitutyn Publishing House, Yerevan, p. 52–63.

CHERRY J.F., FARO E.Z. & MINC L. (2010) – Field Survey and Geochemical Characterization of the Southern Armenian Obsidian Sources. *Journal of Field Archaeology* 35(2):147–163.

CHERRY J.F., MANNING S.W., ALCOCK S.E., TONIKYAN A.V. & ZARDARYAN M.H. (2007) – Radiocarbon dates for the second and first millennia B.C. from southern Armenia: Preliminary results from the Vorotan Project 2005–2006. *ARAMAZD, Armenian Journal of Near Eastern Studies* 2:52–71.

DOLUKHANOV P., ASLANIAN S., KOLPAKOV E. & BELYAEVA E. (2004) – Prehistoric sites in Northern Armenia. *Antiquity* 78 (www.antiquity.ac.uk/projgall/dolukhanov301).

DORONICHEV V.B. (2008) – The Lower Paleolithic in Eastern Europe and the Caucasus: A reappraisal of the data and new approaches. *PaleoAnthropology* 2008:107–157.

EGELAND C.P., GASPARIAN B., ARAKELYAN D., BYERLY R.M., NICHOLSON C.M. & ZARDARYAN D. (2011) – Multiperiod archaeological reconnaissance in the Debed river valley, northeastern Armenia. *Antiquity* 85 (www.antiquity.ac.uk/projgall/egeland329).

EGELAND C.P., NICHOLSON C.M. & GASPARIAN B. (2010) – Using GIS and ecological variables to identify high potential areas for paleoanthropological survey: an example from northern Armenia. *Journal of Ecological Anthropology* 14:89–98.

FERRING R., OMS O., AGUSTÍ J., BERNA F., NIORADZE M., SHELIA T., TAPPEN M., VEKUA A., ZHVANIA D. & LORDKIPANIDZE D. (2011) – Earliest human occupations at Dmanisi (Georgian Caucasus) dated to 1.85–1.78 Ma. *Proceedings of the National Academy of Sciences* 108:10432–10436.

FOURLOUBEY C., BEAUVAL C., COLONGE D., LIAGRE J., OLLIVIER V. & CHATAIGNER C. (2003) – Le Paléolithique en Arménie: état des connaissances acquises et données récentes. *Paléorient* 29(1):5–18.

GABUNIA L., VEKUA A., LORDKIPANIDZE D., SWISHER C.C., FERRING R., JUSTUS A,. NIORADZE M., TVALCHRELIDZE M., ANTON S.C., BOSINSKI G., JÖRIS O., DE LUMLEY M.A., MAJSURADZE G. & MOUSKHELISHVILI A. (2000) – Earliest Pleistocene hominid cranial remains from Dmanisi, Republic of Georgia: Taxonomy, geological setting, and age. *Science* 288:1019–1025.

GASPARIAN B. (2010) – Landscape organization and resource management in the Lower Palaeolithic of Armenia. *Turkish Academy of Sciences Journal of Archaeology (TU-BAAR)* 13:159–183.

GHUKASYAN R., COLONGE D., NAHAPETYAN S., OLLIVIER V., GASPARYAN B., MONCHOT H. & CHATAIGNER C. (2011) – Kalavan–2 (north of Lake Sevan, Armenia): A new late Middle Paleolithic site in the Lesser Caucasus. *Archaeology, Ethnology & Anthropology of Eurasia* 38(4):39–51.

GOLOVANOVA L.V. (2000) – Late Acheulian of the northern Caucasus and the problem of transition to the Middle Paleolithic. In: D. Lordkipanidze, O. Bar-Yosef & M. Otte (eds.), *Early humans at the gates of Europe.* Proceedings of the first international symposium, Dmanisi, Tbilisi (Georgia, September 1998). ERAUL 92:49–65.

GOLOVANOVA L.V., HOFFECKER J.F., KHARITONOV V.M. & ROMANOVA G.P. (1999) – Mezmaiskaya Cave: A Neanderthal occupation in the northern Caucasus. *Current Anthropology* 40:77–86.

GOLOVANOVA L.V, DORONICHEV V.B. & CLEGHORN N.E. (2010) – The emergence of bone-working and ornamental art in the Caucasian Upper Paleolithic. *Antiquity* 84:299–320.

HASHEMI N., DARVISH J., MASHKUR M. & BIGLARI F. (2006) – Rodent and lagomorph remains from late Pleistocene and early Holocene caves and rock shelter sites in the Zagros region, Iran. *Iranian Journal of Animal Biosystematics* 2:25–33.

KANDEL A.W., GASPARYAN B., BRUCH A.A., WEISSBROD L. & ZARDARYAN D. (2012) – Introducing Aghitu–3, the First Upper Paleolithic Cave Site in Armenia. *ARAMAZD, Armenian Journal of Near Eastern Studies* 6(2):7–23.

KLEIN R.G. (1966) – Chellean and Acheulean on the territory of the Soviet Union: A critical review of the evidence as presented in the literature. *American Anthropologist* 68(2–2):1–45.

KLEIN R.G., CRUZ-URIBE K. & BEAUMONT P. (1991) – Environmental, ecological, and paleoanthropological implications of the Late Pleistocene mammalian fauna from Equus Cave, Northern Cape Province, South Africa. *Quaternary Research* 36:94–119.

KOLPAKOV E.M. (2009) – The Late Acheulian site of Dashtadem–3 in Armenia. *PaleoAnthropology* 2009:3–31.

KROLL S. (2006) – Southern Armenia Survey (Syunik), 2000–2003 (Achaemenid-Hellenistic Period, Aghitu Fortress, Sisian, 1640 m, N39 30'49.7" E46 4'51.2"). *ARAMAZD, Armenian Journal of Near Eastern Studies* 1:19–49.

LIAGRE J., GASPARYAN B., OLLIVIER V. & NAHAPETYAN S. (2006) – Angeghakot 1 (Armenia) and the identification of the Mousterian cultural facies of "Yerevan points" type in the southern Caucasus. *Paléorient* 32(1):5–18.

LORDKIPANIDZE D., VEKUA A., FERRING R., RIGHTMIRE G.P., AGUSTI J., KILADZE G., MOUSKHELISHVILI A., NIORADZE M., PONCE DE LEÓN M.S., TAPPEN M. & ZOLLIKOFER C.P.E. (2005) – The earliest toothless hominin skull. *Nature* 434:717–718.

MONCEL M.-H., PLEURDEAU D., TUSHUBRAMISHVILI N., YESHURUN R., AGAPISHVILI T., PINHASI R. & HIGHAM T.F.G. (2012) – Preliminary results from the new excavations of the Middle and Upper Palaeolithic levels at Ortvale Kldenorth chamber (South Caucasus Georgia). *Quaternary International* (doi.org/10.1016/j.quaint.2012.09.012).

NIORADZE M.G. & OTTE M. (2000) – Paléolithique supérieur de Géorgie. *L'Anthropologie* 104:265–300.

NOWAK R.M. (1999) – *Walker's mammals of the world* (6th edition). The Johns Hopkins University Press, Baltimore.

OLLIVIER V., NAHAPETYAN S., ROIRON P., GABRIELYAN I., GASPARYAN B., CHATAIGNER C., JOANNIN S., CORNÉE J.-J., GUILLOU H., SCAILLET S., MUNCH P. & KRIJGSMAN W. (2010) – Quaternary volcano-lacustrine patterns and palaeobotanical data in southern Armenia. *Quaternary Research* 223–224:312–326.

OTTE M., SHIDRANG S., ZWYNS N. & FLAS D. (2011) – New radiocarbon dates for the Zagros Aurignacian from Yafteh cave, Iran. *Journal of Human Evolution* 61:340–346.

PINHASI R., GASPARIAN B., NAHAPETYAN S., BAR-OZ G., WEISSBROD L., BRUCH A.A., HOVSEPYAN R. & WILKINSON K. (2011) – Middle Palaeolithic human occupation of the high altitude region of Hovk–1, Armenia. *Quaternary Science Reviews* 30:3846–3857.

PINHASI R., GASPARIAN B., WILKINSON K., BAILEY R., BAR-OZ G., BRUCH A., CHATAIGNER C., HOFFMANN D., HOVSEPYAN R., NAHAPETYAN S., PIKE A.W.G., SCHREVE D. & STEPHENS M. (2008) – Hovk 1 and the middle and Upper Paleolithic of Armenia: A preliminary framework. *Journal of Human Evolution* 55:803–816.

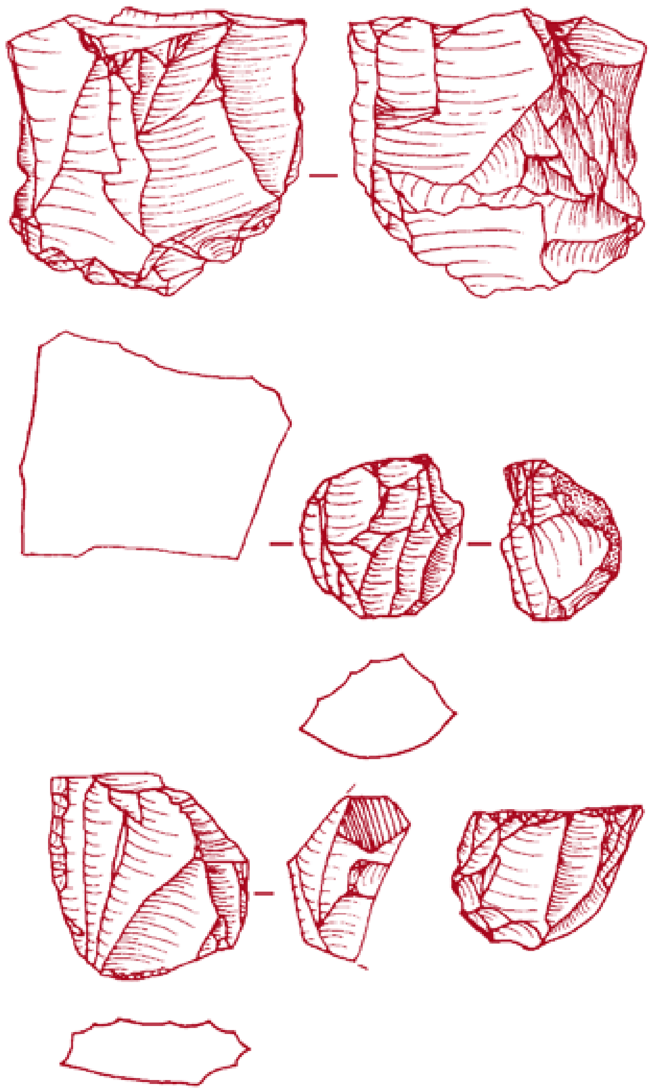
PRESNYAKOV S.L., BELYAEVA E.V., LYUBIN V.P., RODIONOV N.V., ANTONOV A.V., SALTYKOVA A.K., BEREZHNAYA N.G. & SERGEEV S.A. (2012) – Age of the earliest Paleolithic sites in the northern part of the Armenian Highland by SHRIMP-II U-Pb geochronology of zircons from volcanic ashes. *Gondwana Research* 21:928–938.

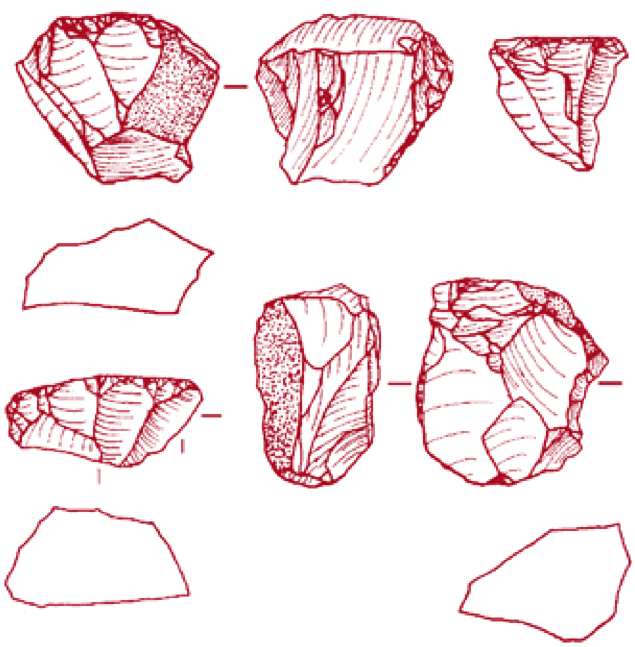
REIMER P.J., BAILLIE M.G.L., BARD E., BAYLISS A., BECK J.W., BLACKWELL P.G., BRONK RAMSEY C., BUCK C.E., BURR G.S., EDWARDS R.L., FRIEDRICH M., GROOTES P.M., GUILDERSON T.P., HAJDAS I., HEATON T.J., HOGG A.G., HUGHEN K.A., KAISER K.F., KROMER B., MCCORMAC F.G., MANNING S.W., REIMER R.W., RICHARDS D.A., SOUTHON J.R., TALAMO S., TURNEY C.S.M., VAN DER PLICHT J. & WEYHENMEYER C.E. (2009) – IntCal09 and Marine09 radiocarbon age calibration curves, 0–50,000 years cal BP. *Radiocarbon* 51:1111–1150.

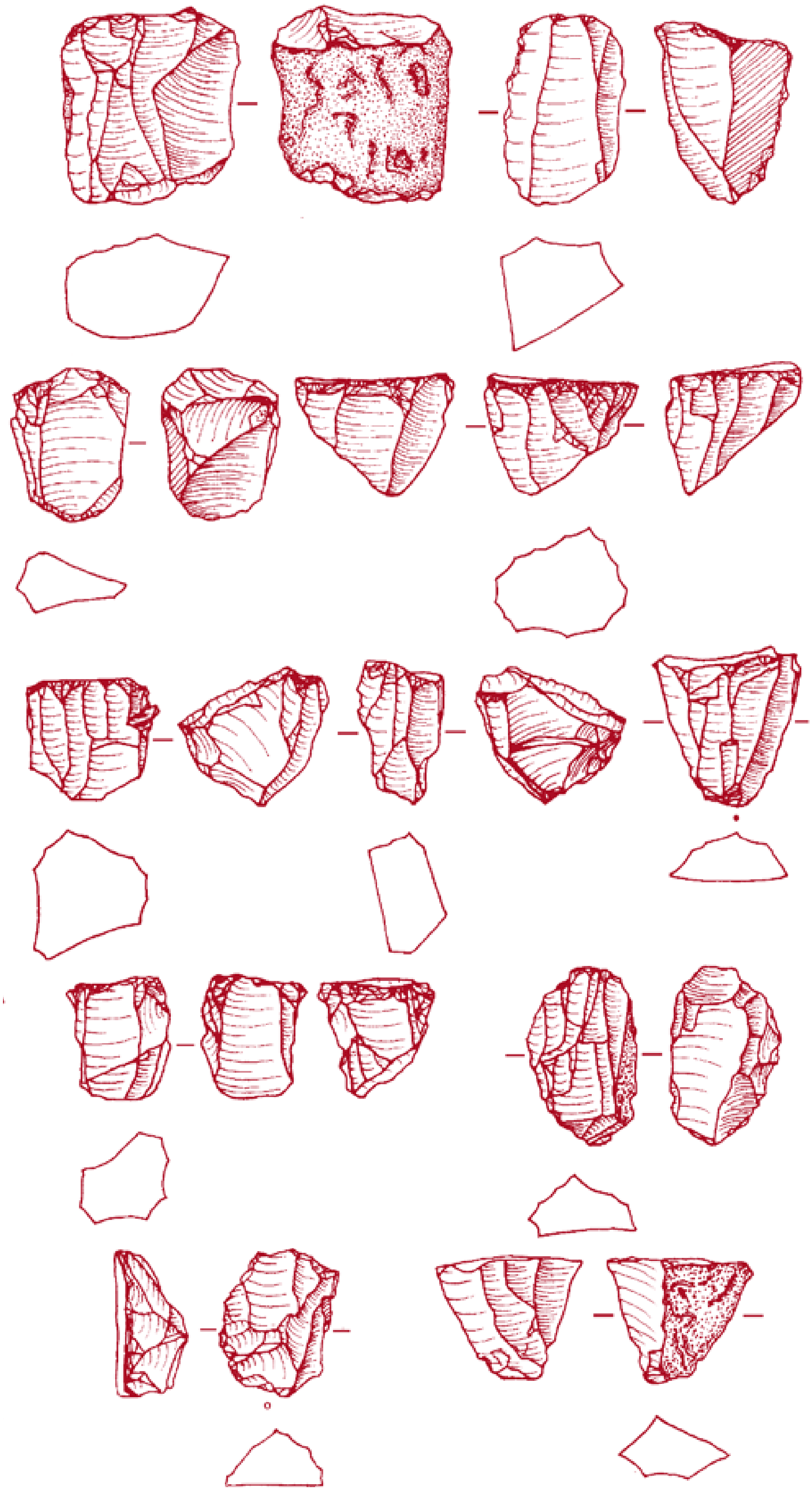
VERESCHAGIN N.K. (1959) – *The Mammals of the Caucasus: The History of the Fauna*. Academy of Science, Moscow.

YERITSIAN B.G. (1970) – *Paleolithic cave site of Yerevan and its place among the earliest sites of Caucasus*. Ph.D. Thesis, University of Moscow (in russian).

YERITSIAN B.G. (1975) – The new Lower Paleolithic cave site Lusakert 1 (Armenia). *Kratkiye Soobshcheniya o Dokladakh i Polevykh Issledovaniyakh* 141:54–67 (in russian).







Through a prism of paradigms: a century of research into the origins of the Upper Palaeolithic in the Levant

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"I have yet to see any problem, however complicated, which, when looked at in the right way did not become still more complicated"
Poul Anderson

Abstract: *In the Levant, the origins of the Upper Palaeolithic is closely linked to the question of modern human emergence. This paper reviews a century of research on the subject. The history of discoveries in Mount Carmel (1900-1945) is argued to have particular importance in shaping the debate, yielding both archaeological and physical anthropological remain that were initially considered to be "transitional" between modern humans and their Neanderthal predecessors. This perspective changed dramatically in the 1980s, with the introduction of the Replacement hypothesis, necessitating a new view of the IUP as a foreign, intrusive industry into the Levant. In recent years, distinctions between species in the Levant have been called into question, while ancient DNA evidence suggests there was genetic admixture between early humans and Neanderthal populations somewhere in the greater Near East. There is no archaeological evidence for a movement of peoples out of Africa, nor is there evidence for complete cultural continuity. New data from the Arabian Peninsula show that the most likely precursor of Levantine IUP technology was the Arabian Nubian technocomplex. Therefore, we argue that the Levantine IUP developed at the interface of the southern Levant and northern Arabian Peninsula.*

1 INTRODUCTION

For nearly one hundred years, prehistorians have sought to explain the origin, development, and inter-regional significance of the Levantine Upper Palaeolithic (UP). Along the way, great strides have been made in the descriptive details of lithic technologies, typological variability, geographic distribution, and absolute chronology; yet, we are only a little closer, at best, to truly understanding the early UP than we were when the likes of Neuville (1934) and Garrod (1938) first began to ask these questions. There has never been decisive support for any explanation of UP origins and development. Rather, competing models have risen to prominence at different times, influenced by the prevailing paradigm of modern human origins.

For better or for worse, the question of Levantine UP origins is historically entangled in the problem human emergence. To this day, the earliest UP assemblages are known from the Levant, suggesting that the initial MP-UP "transition," and its behavioral implications, might be rooted here. Serving as the land bridge out of Africa, the Levant was a demographic hub throughout human prehistory. Both modern humans and Neanderthals have been documented in the region prior to the Initial Upper Palaeolithic (IUP); however, the biological and cultural relationship between these species (if, indeed, they are distinct taxa), the timing of their occupations, and associated lithic technologies are debated. Consequently, the archaeological record tends to be implicitly and, at times, explicitly, linked with the current perception of modern human evolution. The Levant has long served as a prism of paradigms concerning the biological and behavioral emergence of our species, guiding and framing scholar's views of the archaeological data.

Generally speaking, there are three broad paradigms of modern human evolution that have historically influenced interpretations of the Levantine UP: **1)** a linear and local development from archaic to modern, **2)** total replacement, and **3)** replacement with occasional admixture. In the early years of research from the 1900s through 1970s, the evolution of Neanderthals to anatomically modern humans (AMHs) was thought to have taken place concurrently in different regions, nowhere expressed more clearly than in the Near Eastern skeletal record. A second, radically different paradigm was championed starting in the 1980s, at which time most scholarly thinking coalesced around the scenario of a uniquely African emergence of AMHs, who then went on to replace all other archaic species across the globe. While the multiregional paradigm of modern human origins retained some support, most interpretations of Near Eastern archaeological data shifted in line with total replacement.

We have now entered a new era, in which admixture is a real possibility. Although this option was previously considered in the literature (e.g. Ahrensburg & Belfer-Cohen 1998; Hawks & Wolpoff 2001), it has only recently been supported by empirical evidence. In a landmark study of the Neanderthal genome published in 2010, researchers first reported low levels of admixture between Neanderthals and modern humans (Green *et al.* 2010). On the heels of this breakthrough, more evidence has been produced indicating that modern humans may have interbred, to a minor degree, with archaic species in Africa, Europe, and Asia (Durand *et al.* 2011; Hammer *et al.* 2011; Reich *et al.* 2011; Skoglund and Jakobsson 2011; Alves *et al.* 2012; Meyer *et al.* 2012; Neves & Serva 2012). Moreover, based on a widespread distribution of the shared Neanderthal markers found among North African, European, Middle Eastern, and Asian populations, some geneticists have proposed that the locus of AMH-Neanderthal admixture was in the Near East (e.g. Yotova *et al.* 2011; Sanchez-Quinto *et al.* 2012).

This possibility has obvious and significant implications for interpreting the archaeological record of the region, making total replacement of both people and cultures much less likely.

While archaeogenetics necessitate a reappraisal of modern human emergence in the Levant, at the same time, we are now able to contextualize this process within a vastly expanded archaeological database from the Greater Arabian Peninsula. The recently invigorated Arabian research program has been driven, in large part, by the discovery of genetic signals pointing to the significance of the "Southern Dispersal Route" out of Africa (e.g. Quintana-Murci *et al.* 1999; Kivisild *et al.* 2004; Metspalu *et al.* 2004; Forster & Matsumura 2005; Macaulay *et al.* 2005; Oppenheimer 2009; Ghirotto & Barbujani 2011). Consequently, for the last decade, archaeological research projects have been combing the deserts of Arabia in search of physical evidence supporting these genetically-predicted population dispersals. Far from answering the question, several recent unexpected discoveries have only added further complexity to understanding of AMH movements and, perhaps, even development outside of Africa.

In reviewing these new data, we revisit the question of Levantine UP origins and development, offering a fresh perspective on an old problem. Considering the origins of the Levantine UP in light of recent genetic research and archaeological discoveries in the Arabian Peninsula, we suggest that the evolutionary trajectories of these two regions may have been inexorably intertwined.

2 THE FIRST YEARS: 1900 – 1945

From the beginning, the first excavated Levantine UP sites were seen as extensions of European industries and placed within a European taxonomic scheme (Zumoffen 1908; Buzy 1927, 1929). The first serious considerations of a distinct regional Upper Palaeolithic came from excavations at stratified cave sites in the coastal Mount Carmel range and inland in the Judean Desert. In the Judean Desert rockshelters, Neuville (1934, 1951) uncovered a stratigraphic sequence of assemblages characterized by distinct blade production, which at the time was considered to be a clear diagnostic marker of the Upper Palaeolithic. Meanwhile, Garrod's excavations in Mount Carmel during the late 1920s and early 1930s also unearthed stratified assemblages with a matching laminar reduction strategy (Garrod 1937, 1938; Garrod & Bate 1937).

The Mount Carmel excavations not only produced Upper Palaeolithic archaeological deposits, they also uncovered hominid remains associated with the underlying Middle Palaeolithic (MP) assemblages (Keith & McCown 1939). While these had no direct relationship with the Upper Palaeolithic cultural layers, they were to have a major influence on interpretations of local Upper Palaeolithic origins. The hominid skeletons at the time, from Tabun and Skhul, were all considered Neanderthals, yet they differed from European Neanderthals to the extent that Keith and McCown (1937:52) interpreted the Tabun specimens to be "closer to the form of humanity which was the parent of both the Paleoanthropic and Neanthropic branches of mankind than is the case with their western cousins" and the remains from Skhul to be "intermediate between Neanthropic and Neanderthal man… indicative of an evolution towards the modern types of man" (ibid). In short, they saw an evolutionary development from classic Neanderthal to a form heading toward modern man, referred to as "progressive Neanderthals" (McCown & Keith 1939).

Neuville's and Garrod's work in Mount Carmel and the Judean Hills culminated with the proposal of a six stage relative chronology for the entire Levant (Neuville 1934). The details of the sites excavated, the assemblages described, and the tools recognized as significant have all been published in detail, both in the original descriptive publications (Garrod & Bate 1937; Neuville 1951) and in more recent reviews of the history of the Levantine UP studies (e.g. Bar-Yosef 1980; Marks 1983a; Gilead 1991; Belfer-Cohen & Bar-Yosef 1999). These will not be repeated here; rather, we consider how these various researchers have perceived the UP and all it entails. While Neuville and Garrod each found very similar assemblages, they arrived at very different conclusions about them. Neuville had no doubt from where his Stage I UP came:

« L'introduction des cultures du Paléolithique supérieur correspond á l'arrivée d'un homme nouveau, éloigné de son prédécesseur néandertaloïde, mas qui conserve encore des caractères assez primitifs » (Neuville 1934:249).

He never indicated, however, from where the earlier, somewhat primitive moderns may have derived, and did not accept the Skhul specimens as the "missing link" between Neanderthals and moderns (Neuville 1934:245). Neuville's early UP Stages I and II had many diagnostic MP elements alongside UP features. This "mixture" of MP and UP traits adhered to his view that early moderns arrived in the Levant during the late MP, and that they co-existed with the local Neanderthals for some time (Neuville 1934).

For Garrod, it was a time of rapidly expanding data from her ongoing excavations; as such, her understanding of Levantine UP origins and significance changed as new information became available. Unlike Neuville, she took a broader view, considering a wide range of possible relationships, migrations, and diffusion scenarios. While recognizing the meager body of evidence, she saw the emerging Near Eastern UP as a source or, at least, an influence, for much of the European UP:

"The only stages of the Upper Palaeolithic of the West in which the Near East plays no part are the Solutrean, which apparently originates in Central Europe, and the Magdalenian, which arises as a specialized form of the Gravettian in Southern France" (Garrod 1937:39).

Initially, Garrod saw the local Levantine UP as "immediately succeeding" the MP Levalloiso-Mousterian, and as being "predominantly of the type known in Western Europe as Middle Aurignacian" (Garrod 1937: 36). Recognizing that no similar industry was known in Africa, she postulated that its origin might lie close by, perhaps, "in Iran, or even further east" and that it moved into Europe via the Crimea, where there was an "Upper Palaeolithic sequence closely resembling that of Palestine" (ibid). While Garrod found no early Aurignacian in Iran during her limited survey of the region, she presciently predicted that it would be found when more work had been done there. Although she posited a geographic origin for the Levantine UP to the East, she did not suggest from which earlier industry it evolved.

The problem that Garrod and others were soon to face was the epistemological issue of what actually constitutes an "origin" or "transition." Origins of industries are inherently difficult to recognize and define because, by their very nature, they involve either *in situ* transformation from one state to another or the relatively sudden appearance of something so different from what came before that no case could be made for autochthonous developmental change.

In the latter case, the question of origin becomes one of finding comparable materials in some adjacent region; however, this merely transfers the question to somewhere else. In essence, finding the root of a lithic industry first involves differentiating between continuity and discontinuity. In these incipient years of research, the data did not yet permit such resolution. It would still be several decades before serious consideration of Levantine UP origins could be undertaken.

3 POST-WWII EXPANSION: 1945 – 1979

The Second World War led to a brief hiatus in fieldwork, at which time few new sites were published (Haller 1942/43, Ewing 1947). Meanwhile, Garrod used the opportunity to reexamine some of her previously excavated Levantine samples, particularly those from the MP-UP interface at El Wad, which she had initially reported as mechanically mixed. On reconsideration, and comparing her samples with those from Turville-Petre's excavations at Emirah (Turville-Petre 1925), Garrod (1955) proposed an initial UP stage, which she called "Emiran." Because of the presence of both MP and UP tools in the Emiran, she interpreted this industry as being developmentally "transitional" between the local MP and UP (Garrod 1951:129). This proposed developmental continuity consciously paralleled that seen by McCown and Keith (1939) in the skeletal record, leading Garrod (1951:129) to speculate that the people who made the Emiran might have been biologically transitional between Skhul and more recent AMH specimens. From then on, the coupling of lithic technology and biological evolution has loomed large in our interpretations of the Levantine archaeological record. Garrod (1953, 1954) also shifted her interpretations of the early Levantine UP sequence – no longer the source for the European Aurignacian, now seen as a limited regional phenomenon that was deserving of a local, rather than European, nomenclature. She incorporated the Levantine taxonomic scheme into Neuville's six stage organization of the UP. While considering each of these stages as a separate industry, she saw them as a continuous evolutionary development that took place exclusively in the Levant.

Views of modern human evolution did not change in this time; rather, they became more explicitly articulated and integrated into the Levantine geological stratigraphic context (Howell 1959). Perhaps the most significant new perspective was Gonzalez-Echegaray's (1964, 1966) re-interpretation of the Levantine record. While he accepted Garrod's hypothesis that the Emiran was autochthonous, he believed that the later Aurignacian elements were the product of a migration from the north, resulting in a hybrid Aurignacian culture differing from Europe. This new view did not gain much support, but added to the myriad of speculations surrounding the Levantine Aurignacian.

In 1969, a historic conference held at the University of London shifted the focus of Levantine UP studies from the traditional Israeli sites northward into Lebanon. Ksar Akil, with its 18 m of deposits, was presented with considerable fanfare, sold as the first complete UP cultural sequence (Copeland 1975, 1976). In classifying the sequence, the authors retained Neuville's six stage chronology; yet, it was clear that Stage I at Ksar Akil was not the same as Stage I to the south. This marked the first indication of sub-regional differences within the Levant. Ronen (1976) further articulated these subdivisions in his local developmental sequence for northern Israel. Unlike the Ksar Akil sequence, the Stage I Emiran in the south was succeeded by an industry lacking "Aurignacian" elements. Still, the sequences were viewed as developmentally unilinear.

The original concept of the transitional Emiran was an industry that contained both MP tools made on MP blanks (Levallois flakes) and UP tools made on Upper Palaeolithic blanks (blades from volumetric cores) (Garrod 1951, 1955). After examining a number of Lebanese "transitional" assemblages, including Ksar Akil, Copeland redefined the essence of what made the transitional assemblages actually "transitional":

"We are not dealing here with a mixture of Middle Palaeolithic tools made by Middle Palaeolithic technology, and Upper Palaeolithic tools made by Upper Palaeolithic technology, but the characteristically Upper Palaeolithic tool types are found on blanks made by a Middle Palaeolithic tradition of flint knapping (direct percussion), on prepared cores, to produce Levallois blades or points." (Copeland 1975:337–339).

This was a major step forward, since it proposed a combination of technological continuity with typological change. The previous explanations failed to account for the presence of true Upper Palaeolithic blanks, and were less than convincing for some (e.g. Bar Yosef & Vandermeersch 1972). Copeland's developmental sequence did not simply view the Levantine UP in a vacuum, but took into account technological patterns seen in preceding Levantine MP industries. In the south, the Early Levantine Mousterian (or Tabun D type) at Rosh Ein Mor had significant numbers of UP tools. In particular, burins and endscrapers were found manufactured on elongated Levallois blanks, in conjunction with some MP tools that were well in the minority (Marks & Crew 1972; Marks 1975). This same pattern was reported at Tabun in Mount Carmel, where Bed 39 was not only characterized by a high laminar index, but also had 39 % "Upper Palaeolithic" tools (Jelinek 1975:307–310). The real change in the Emiran, then, was the absence of typical MP tools, as well as the presence of the Emirah point and, in the north, chamfered pieces (Newcomer 1970, 1971; Copeland 1975, 2001; Volkman & Kaufman 1983).

The pattern of developmental change seen in the Emiran, as well as technologically and typologically comparable elements found in Tabun D type Mousterian assemblages – only distinguished by the presence of MP tools – would have made a solid case for an autochthonous MP-UP transition. The problem was that Tabun D type Mousterian assemblages and the Emiran were separated in time by some 150 thousand years. Two other Mousterian assemblage types, Tabun C and B, seemed to fill the temporal gap, insofar as the Mount Carmel cave sequences was concerned (Garrod & Bate 1937; Stekelis 1954). Tabun C and B type assemblages have neither significant numbers of Upper Palaeolithic tools, nor do they produce many elongated blanks (see Bar Yosef 1998 for a concise description of technology and typology of these Mousterian types). The intellectual climate implicitly viewed Tabun's MP dated stratigraphic sequence as pan-Levantine, later made explicit by Bar-Yosef (1994:40), despite the fact that the archaeologically explored area of the Levant with dated occupations was restricted to the Israeli/Lebanese Mediterranean zone. To further confound matters, the latest Mousterian industry, Tabun B, was associated with Neanderthals (Suzuki & Takai 1970; Arensburg *et al.* 1985), rather than "progressive Neanderthals," as was expected had the cultural developmental sequence gone hand in hand with hominid evolution. Essentially, there was no base from which the transitional Emiran could have arisen within this pan-Levantine MP scenario. A similar situation existed for the development from Emiran into the "true" UP, in the sense of volumetric blade technology. Stage II, defined only on the basis of a few tools (Neuville 1951), could not be technologically linked to the Emiran. So, by the end of the 1970s, the Emiran was an accepted developmentally "transitional" industry, which had no obvious local progenitor and no clear descendent.

The publication of Boker Tachtit by the Central Negev project in the early 1980's would imminently fill at least part of this lacuna (Marks 1983b, 1983c), accompanied by the emergence of a new paradigm that effectively replaced the preceding evolutionary models and fundamentally shifted the perception of the MP-UP in the Levant.

4 TOTAL REPLACEMENT: 1980 – 2010

The period between 1980 and 2010 saw enormous changes in Near Eastern UP studies; the most visible was a new paradigm in human evolution that posited a recent African origin model for all modern humans. This, in turn, caused some changes in the perception of Levantine Upper Palaeolithic technological development within the "transitional" Emiran.

This chapter of Levantine UP studies began with Stringer's (1985) proposition that modern humans evolved exclusively in Africa, while Neanderthals diverged from their evolutionary line hundreds of thousands of years earlier, thereby relegated to a side branch of human evolution. Shortly after the publication of Stringer's "Replacement" (or "Out of Africa") model, a team of geneticists from the University of Berkeley pioneered the application of mitochondrial DNA (mtDNA) analysis to explore human phylogenetic history (Wilson *et al.* 1985; Cann *et al.* 1987). Their results led to the conclusion that all modern humans are descended from a single ancestral population that evolved in Africa some 200,000 years ago. "Out of Africa," bolstered by support from the burgeoning field of archaeogenetic studies, seemed to demolish the possibility of a hominid evolutionary continuum in the Levant. This new model certainly represented a radical change as to where the origin of anatomically modern people and, presumably, modern culture was to be found; yet, several questions remained unanswered. The model provided no more than a generalized time frame for AMH speciation, dispersal, and replacement from 200 ka to 40 ka (Klein 1994:7). There was no clear indication as to where, within the entirety of the African continent, this evolutionary process took place. Since the oldest known AMH remains had been discovered in East Africa, this became the presumptive region of human emergence. Moreover, scholars still had no clue as to which route(s) these anatomically moderns took when leaving Africa, or exactly when within the predicted 160 thousand year window of time, the exodus of behaviorally modern people took place, not to mention disagreement as to the very definition of anatomical and cultural modernity.

It is noteworthy that, as late as the mid–1990s, Stringer considered the Levant, in addition to Africa, as a potential point of origin (Stringer 1994:164). Yet, this was ignored by some archaeologists, whose focus had shifted from exploring specific avenues of a local Levantine Middle-Upper Palaeolithic transition, to a default position that Africa must be the source of the Upper Palaeolithic (e. g. Bar Yosef 2000; Tostevin 2003; Shea & Sisk 2010; Sisk & Shea 2011). Still, this paradigmatic shift only affected the perception of the Levantine Middle-Upper Palaeolithic transition; it in no way changed the expanding database related to it.

The discovery of anatomically modern remains at Qafzeh, Israel, and their morphological similarity to the Skhul specimens, (Vandermeerch 1981, 1992), provided the first tangible evidence for an early AMH population in the Levant. These were no longer viewed as "progressive Neanderthals" or "proto-Cro-Magnon"; rather, they were now classified as fully modern humans, albeit with some vestigial archaic features. Their presence in the Levant at around 100 ka (Vandermmersch 1992) provided both a specific route and timing for the Out of Africa dispersal.

Early human expansion from Lower Egypt into Sinai and the Levant was certainly reasonable and expected, particularly given the multitude of such movements through time: from Homo erectus to the armies of Ramesses II. Yet, although the Skhul/Qafzeh specimens were considered anatomically modern, they lacked those associated cultural traits that were thought to suggest "modern behavior" (e.g. Bar-Yosef 1995; Mellars 1996). In fact, their material culture was classified as Levantine Mousterian of Tabun C type, showing only slight differences in emphasis within the Levallois method from that which preceded it and that which followed (Meignen 1998; Hovers 2009). Thus, the assumed relationship between anatomical and cultural modernity, as traditionally argued for the Aurignacian in Europe (e.g. Mellars 1973), was decoupled in the Levant. The mere presence of anatomically modern people outside Africa did not necessarily signal the appearance of modern culture in an Upper Paleolithic form. Advances in ESR and TL dating confirmed that the Skhul/Qafzeh AMH remains predated the Levantine Neanderthals, leading some to speculate that this expansion was, in fact, a migratory "dead end" followed by a later wave of behaviorally modern groups out of Africa (e.g. Shea 2007).

Klein (1998:509) addressed the apparent disjunction between physical and cultural modernity by proposing that, prior to 50 ka, anatomically modern humans in Africa "were not behaviorally modern." He suggested that behavioral modernity came about due to a "neurological advance" after 50–40 ka, archaeologically seen in the shift from the Middle Stone Age (MSA) to Late Stone Age (LSA) in Africa (ibid: 510). The anomalously early date of 50–40 ka for the African MSA-LSA transition mainly rested on the thin reed of extrapolated obsidian hydration dates from Enkapune Ya Muto rockshelter in Kenya (Ambrose 1998), despite the fact that the beginning of the LSA observed in South Africa could not be documented before 24 ka (Klein 1998:511), anywhere in East Africa before 30 ka (Brandt 1986), and was not widespread there until ca. 20 ka (Barut 1994). Klein's hypothesis of a neurological development around 50 ka predicted a rapid shift to modern behavior, expressed in cultural traits such as hunting adaptation, social organization, and symbolic expression. His proposition was examined in detail and unequivocally rejected by demonstrating that all of these behaviorally modern characteristics had antecedents in the MSA (McBrearty & Brooks 2000).

Yet, the idea of a ~50 ka date for the exodus of anatomically/behaviorally modern humans out of Africa persisted, fueled in large part by the field of archaeogenetics, which had been growing increasingly influential in modern human research. The expanding database enabled a more complete understanding of mtDNA phylogenetic history, showing a common ancestral "trunk" in Africa from which all non-African stem: haplogroup L3. From L3, descendant lineages haplogroup M and N diverge. Based on the mtDNA mutation estimates available to them at the time, geneticists calculated a coalescence of these lineages between 70 and 50 ka (e.g. Endicott *et al.* 2009; Soares *et al.* 2009). The Near East remained the canary in the coalmine, however, since the earliest MP-UP transitional assemblages were to be found in the arid margins of the Levant, not in Africa, as geneticists and palaeoanthropologists expected.

Expanding into the arid margins

Until the 1980s, part of the problem scholars had encountered in trying to understand the origin and development of the Upper Palaeolithic was that so little of the region had undergone serious investigation, most of which was primarily restricted to the Mediterranean zone. This changed considerably in the 1980s, when researchers began to expand into the more marginal areas of the Levant.

One of the most significant contributions to UP studies at this time was the Central Negev Project's discovery of Boker Tachtit (Marks 1983c), where the basal Emiran occupation floor was dated to ca. 47 ka[1], and the uppermost IUP floor was dated to ca. 35 ka. The state of preservation allowed for large-scale core reconstructions and detailed descriptions of technological changes that took place during the MP-UP transition (Volkman 1983). As importantly, the Emiran itself was more clearly defined, beyond the two more or less type fossils (the Emireh point and the chamfered piece) and the oversimplified perception that its basic technology was Levallois and, thus, Middle Palaeolithic derived. These data have been published in great detail (Volkman 1983, 1989), summarized numerous times (e.g. Marks 1983a; Marks & Volkman 1983, 1985), so will only be briefly described here.

1. All ^{14}C dates presented without calibration.

The developmental technological changes at Boker Tachtit are seen in a temporal shift from a highly standardized, hard hammer bidirectional Levallois point and blade production, utilizing cresting in initial core shaping in Level 1, through Level 2, which exhibits a co-association between Levallois point production and hard hammer volumetric blade core reduction, mainly bidirectional but also at times unidirectional, to a marked shift away from bidirectional Levallois point cores and to an increase in unidirectional cores in Level 3, finishing with a wholly hard hammer volumetric blade strategy, predominantly single platform but with some bidirectional cores as well, in Level 4 (Volkman 1983). Thus, it begins with a Levallois point and blade reduction strategy and ends with an entirely non-Levallois blade strategy over four different occupations. While this technological shift was taking place, however, very little change occurred in the blanks produced, mainly blades and points, and for the tool assemblages, primarily retouched points, end scrapers, and burins (Marks and Kaufman 1983).

Across the Jordan Valley, several long term research projects were also initiated in heretofore unexplored areas: the Wadi Hasa Survey (MacDonald 1988) followed by Clark's Wadi Hasa Project on the eastern slopes of the Jordan Valley (e.g. Clark *et al.* 1987, 1988, 1992, 1994; Coinman *et al.* 1986, 1988, 1989; Olszewski 1997; Olszewski & Coinman 1998; Olszewski *et al.* 1990, 1994), as well as Henry's investigations throughout the southern Jordanian Plateau (e.g. 1979, 1982, 1985, 1988, 1994, 1995). For the first time since Buzy's (1927) work in the Sinai Peninsula, prehistoric exploration was carried out in southern (Philips 1987a, 1988) and northern Sinai (Bar-Yosef & Philips 1977; Gilead 1983, 1985; Gilead & Grigson 1984; Gilead & Bar-Yosef 1993).

At the northern end of the Levant, excavations were conducted at Karain Cave by joint Turkish/European teams (Albrecht 1988, Otte *et al.* 1995) and at Üçağizli Cave in Hatai Province (Kuhn *et al.* 1999). In the late 1990s, a fieldwork project was initiated north of Damascus in Syria by a team from Tübingen University (Conard *et al.* 2004). Excavations of deep Pleistocene stratigraphic deposits at El Koum in eastern Syria commenced in 1982 and are still ongoing, making the Palaeolithic of this region one of the best known areas in the Near East (e.g. Le Tensorer 2004; Boëda *et al.* 2001; Bourguignon 1998).

The Levantine Mousterian and Emiran

Extending the archaeological database into these new areas made it possible to better judge just how widespread was the Middle and Upper Palaeolithic of the Israeli/Lebanese littoral. Heading into the 1980s, three big questions remained unresolved: a) from what specific Levantine Middle Palaeolithic base did the Emiran arise, if any; b) how did the Emiran evolve technologically into a true Upper Palaeolithic; and c) could the Emiran be developmentally linked to the local Upper Palaeolithic, or was there a hiatus between them? In short, was the Emiran truly transitional between local Middle and Upper Palaeolithic industries?

Under the new replacement paradigm, it was assumed that the roots of the Emiran must lie outside the Levant. To bolster that case, technological differences between Tabun B type Mousterian and the Emiran were described that did not support developmental continuity (Tostevin 2000). Since it was widely accepted then that the Tabun sequence was linear, pan-Levantine, and Tabun B was linked to Neanderthals, logic dictated that researchers search elsewhere to locate the source of the Emiran. A few dissenting voices still claimed developmental continuity between the Emiran and a Tabun D lineage (Demidenko & Usik 1993, Marks 2003); yet, this perspective was mostly discounted.

In one sense, additional work outside the Mediterranean zone confirmed the prevailing Levantine Mousterian chronology, as no stratified sites were found that challenged the Tabun sequence. On the other hand, the three Tabun industries were clearly not pan-Levantine, and even within these types, assemblage turned out to be more diverse than previously thought (Hauck 2011). In the central and northern Negev, only Tabun D type was discovered (Munday 1976, 1979; Crew 1976), while there was no Middle Palaeolithic at all found by survey work in the southern Negev. In southern Transjordan, all but two Middle Palaeolithic sites were Tabun D type. These two sites, Tor Faraj and Tor Sabiha, found at high elevations of the Jordanian Plateau, were classified as Tabun B due to the characteristic predominance of unidirectional-convergent broad-based Levallois points. Yet, the assemblages also show a curious attribute that differentiate them from other Levantine Mousterian Tabun B type assemblages - the increased use of bidirectional preparation on smaller Levallois point cores (Henry 1997, 1998). At lower elevations of the Jordanian Plateau, the site of 'Ain Difla yielded a Tabun D type assemblage, while types C and B were not present at all (Lindley and Clark 1987, 2000). Surveys in Sinai located only one Middle Palaeolithic surface scatter that is "possibly" Tabun C type (Gilead 1985). In southern Sinai, two otherwise undescribed workshop-sites near Mt. Sinai were recorded (Philips 1987b), as well as "Nubian" Levallois cores mentioned near Jebel Urayf An Naquah (Schild 1998).

In the northern Levant, excavations at Katain Cave in Turkey uncovered deep Middle Palaeolithic deposits that were found to be technologically closer to the Iraqi and Balkan Mousterian than to any Levantine type (Yalçinkaya *et al.* 1992). This was true for most of Anatolia, where surface sites contain mainly small centripetal preferential Levallois cores (Yalçinkaya 1995). In eastern Syria, the Hummalian Industry is coeval with early Tabun D type assemblages (Richter *et al.* 2011), and is consistently found stratigraphically underlying Tabun C and B assemblages (Boëda *et al.* 2001). While the production of elongated blanks is characteristic of both Tabun D and Hummalian Industries, the latter is distinguished by a distinct toolkit and methods of retouch not seen elsewhere in the Levant (Hours 1982).

In sum, the emerging Middle Palaeolithic map now showed a Levantine Mousterian circumscribed to the north by the high Anatolian Plateau and to the south by the hyperarid deserts of Sinai and the southern Negev, to the west by the Mediterranean and to the east by the Black Desert of Jordan, sprawling eastward into Mesopotamia.

Mousterian of Tabun D type was found to be widespread across the Levant, extending from the Central Negev to northern Syria. Mousterian of Tabun C type appears more limited along the Israeli/Lebanese littoral, with the exception of its presence at El Koum in eastern Syria. Tabun B Mousterian has been documented in the Carmel Mountains, in eastern Syria, and at high elevations on the southern Jordanian Plateau, while it is absent across the arid territories of the Levant. So, with the exception of El Koum, Tabun B is restricted to the Mediterranean zone.

Considering the geographic distribution of these Levantine Mousterian industries within a temporal context, the absence of Tabun B sites in the southern steppic zone is particularly important. In the northern Levant, Tabun D assemblages are roughly bracketed between 270 and 150 ka. These dates vary widely, depending upon which dating method is used. In the case of TL, the range is 270 – 170 ka, while ESR produces results between 200 and 150 ka (Bar-Yosef 1998). In the same caves, TL and ESR measurements from Tabun C assemblages range from 170 ka to 85 ka (ibid). Given the dates on Tabun C materials at Qafzeh (TL average 92 ± 5 ka and ESR average 96 ± 13 ka), the real date of Tabun C is likely to be closer to 100 ka, than to 170ka. Tabun B assemblages either date between 60 and 50 ka by TL, or between 70 and 50 ka by ESR (ibid).

Dates from the southern Levant are considerably less consistent. The Tabun D type assemblage at Nahal Aqev was determined to be younger than ~80 ka, based on two Th/U dates (85.2 ± 10 and 74 ± 5 ka) from a travertine directly underlying the artifacts in the adjacent fossil spring. At 'Ain Difla, the upper Tabun D assemblages have been TL dated to 105 ± 15 and dated by ESR to 102.9 ± 12.9 ka (Bar Yosef 1998: table 1). Three TL dates for the Tabun B at Tor Faraj average 48 ± 2.7 ka (Henry 1998), making it contemporary with the youngest of the Tabun B levels at Kebara, Unit VI, dating to 48 ± 3.5 ka (ibid).

So, the chronological sequence from the southern Levant indicates that Tabun D type Mousterian lasted somewhat longer in the arid margins than it did in the Mediterranean zone, where there was a demographic replacement, presumably, by Tabun C toolmakers. These data also raise the possibility (granted, more dates would be useful) that Tabun D in the south persisted after 75 ka, thus, may again be considered a potential candidate for the technological base of the Emiran. As the Mousterian assemblage from Tor Faraj is contemporary with the Emiran at Boker Tachtit, there is a reasonable possibility that the Emiran may be temporally and geographically close enough to be related to either the southern Tabun D group, and/or the Tabun B type Mousterian at Tor Faraj, with its rather curious use of bidirectional point preparation.

Prior to the excavations at Boker Tachtit in the Central Negev (Marks 1977; Marks & Kaufman 1983), the Emiran itself seemed to have no temporal variability, although northern and southern facies were recognized (Copeland 1975). In both regions, it merely existed as an assemblage type chronologically sandwiched between the Middle and the Upper Palaeolithic. Rather than representing a process of dynamic developmental change, the Emiran was viewed as another static industry, so much so that a separate type list was proposed for it (Hours 1974).

Following the work of the Central Negev Project, it was surmised that the technological origin of the Emiran in the south should closely match that of Level 1 at Boker Tachtit (Marks 1981). The dominant production of points and elongated blanks, as well as the abundance of Upper Palaeolithic type tools, suggested that the Emiran might have come out of a modified Tabun D type technology, unlike any known at that time.

Subsequent excavations at ʻAin Difla produced materials in its upper levels (1–5) that closely match aspects of the Level 1 Boker Tachtit technology, both metrically and categorically, including the presence at both sites of retouched points with ventral blunting retouch on the proximal end (Demidenko & Usik 1993; Mustafa & Clark 2007).

The similarities are such that a good case could have been made for Levels 1–5 at ʻAin Difla being the progenitor to Boker Tachtit, Level 1, save for the problem of a 50,000 year interval between them. Even with this time gap, however, the technological similarities, including very esoteric ones for the Middle Palaeolithic (e.g., cresting of cores during preparation), makes it highly likely that both lie along the same developmental trajectory. Still, this does not answer the questions of how, when and where these particular "transitional" traits arose, such as the cresting of cores during early preparation, the bidirectional Levallois point core preparation, and the oddly consistent right side basal blunting of Levallois points.

The technological patterns documented within Emiran assemblages at Boker Tachtit and ʻAin Difla in the southern Levant differ somewhat from those observed in in the northern Levant. The clearest technological sequence was excavated at Üçağizli Cave, Turkey, spanning units F though I (Kuhn *et al.* 2009). Rather than opposed platform Levallois point production (only a single Levallois point core is noted out of 76 Levallois cores), the dominant reduction strategy involved unidirectional, elongated Levallois point cores (58 out of the 76). Without refittings, it is not possible to be sure whether a cresting technique was used for these Levallois cores, although some evidence from the site may point to this. In stratigraphic units F and Fb-c, there are 1.9 and 3.35 crested blades to each core, respectively, while in unit H1–3 there is 93 crested piece to each core (Kuhn *et al.* 2009, tables 3 and 6). Therefore, it is highly likely that Levallois blade core formation involved cresting as at Boker Tachtit, and even earlier at ʻAin Difla. Although blunting retouch on the basal ridge of Levallois points is not mentioned in the typological descriptions, at least two illustrated examples (Kuhn *et al.* 2009, fig. 10, 8 and 10) show basal blunting, one on the right side and one on the left.

How then should the lowest levels of Üçağizli Cave be thought of relative to Boker Tachtit? If the developmental sequence at Boker Tachtit is a representative example for the rest of the Levant, then it began with bidirectional Levallois point production and developed into hard hammer single platform volumetric blade production. In this scheme, the lower units of Üçağizli Cave would fit comfortably between Boker Tachtit Levels 3 and 4. Yet, the dates from Üçağizli Cave (Kuhn *et al.* 2009, fig. 6) indicate a somewhat later date compared with those levels at Boker Tachtit. The use of a cresting technique in Levallois core preparation, as well as the basal blunting of the Levallois points at both sites, indicates broad technological connections, while the presence of chamfered pieces but absence of Emireh points in the northern Levant suggest the development of a separate facies from that in the south. Together, the chronology and technology at these sites indicates that the Emiran spread from south to north. Yet, it did not seem to have expanded beyond the Levant; there are no Emiran sites found to the north in the mountains of Turkey or to the east in the desert interior. There was, however, a seemingly related assemblage found in northeastern Syria at El Koum (Bourguignon 1998), indicating that some coeval group occupied the desert oases of this region.

At present, there is insufficient information to know whether the Emiran or any related industry is present south of the Negev. Middle Palaeolithic level 1 (MP1) at Sodmein Cave, situated in the Egyptian Red Sea hills, included a toolkit comprised of burins and two Emireh points (Mercier *et al.* 1999).

If the MP1 toolkit is indicative of an Emiran occupation, Sodmein Cave may well represent an example of back migration into Africa; hence, parsimonious with the genetic proposition of a population movement from the Levant into Africa between roughly 50 and 30 ka (Olivieri *et al.* 2006). Moreover, although the core reduction systems from Sodmein Cave have not yet been described in detail, the presence of Nubian Levallois reduction throughout the lower Middle Palaeolithic levels is noteworthy, given its focus on opposed platform Levallois point production, not unlike Emiran core reduction. Although the evidence from Sodmein Cave is insufficient to draw any conclusions, the relationship between Nubian Levallois and Emiran technology in the northern Red Sea hinterlands of both Africa and Arabia may be a fruitful area of research.

For now, it certainly appears that the Emiran arose in the southern Levant, with its earliest known manifestation at 'Ain Difla starting in level 5, the base of which is TL dated to ca. 105 ka (Henry 1998, table 1; Clark *et al.* 1997). Since TL dates from Jordan are consistently older than their equivalent ESR dates (Henry 1998), and since the vast majority of the Emiran-related materials at 'Ain Difla lie above level 5, it is highly likely that the 105 ka date is too old and that the five uppermost levels at 'Ain Difla, in reality, are younger than 100 ka.

In situations of clear developmental continuity, as at Boker Tachtit, articulating the end of one major archaeological phase and beginning of another is an arbitrary exercise. The criterion used at Boker Tachtit was the distinction between those levels (1 through 3) that utilized the Levallois method for at least some of its reduction strategies, thus considered Middle Palaeolithic, and Level 4, in which the Levallois method was replaced by hard hammer blade production; hence, it was classified as Initial Upper Palaeolithic (Marks & Ferring 1988). Some authors, however, would place the Emiran under the general umbrella of the IUP, so as not to imply a connection to the Levantine Mousterian, implicitly contradictory to the out of Africa model (Bar-Yosef 2000; Meignen and Bar-Yosef 2003; Kuhn *et al.* 2009). The argument against considering the Emiran as locally transitional is partly because "Levallois" in and of itself is too "plesiomorphic" to be diagnostic (Kuhn *et al.* 2009). Yet, it is not the mere presence of Levallois, *per se*, that makes the Emiran transitional; it is the technological transition from a specific Levallois reduction strategy (i.e., bidirectional point preparation utilizing crested preparation) to a fully volumetric hard hammer reduction strategy that is significant. This specific bidirectional system was only found elsewhere at 'Ain Difla, and, perhaps, a tendency toward bidirectional re-preparation at Tor Faraj. In addition, crest preparation of unidirectional Levallois blade cores has not been described outside of Boker Tachtit, although it was likely present at Üçağizli Cave, as noted above, and at Tor Sadaf in Wadi Hasa, Jordan (Fox 2003, fig. 8.8).

These technological elements are clearly non-plesiomorphic, pointing to a local development, with its earliest known manifestation in the southern Levant. It is reasonable, then, that the change from "transitional" to IUP should be recognized somewhere along the continuum from a fully Levallois strategy to a fully volumetric one. From this perspective, calling the Emiran "Initial Upper Palaeolithic," with its predominant Levallois reduction strategy, is illogical. We maintain that the Emiran is essentially a local Levantine transitional MP-UP industry but whose full antecedents are not yet known; given the current state of research, it would be premature to exclude non-Levantine influences for some specific technological aspects of the Emiran.

The Ahmarian

In addition to changing views on the origins of the transitional Emiran, the 1980s also brought a major shift in the perception of the Levantine Upper Palaeolithic, when the unilineal sequence was replaced by a "two tradition" model (Gilead 1981; Marks 1981). This new view recognized a technological and typological dichotomy between those assemblages, mainly in the south, that were characterized by skilled blade production (Monigal 2003) and simple retouched blades, El Wad points, and simple end scrapers and burins, versus those, mainly in the north, that showed strong "Aurignacian" traits. The blade assemblages were grouped together under the term Ahmarian, while those with considerably less blade production and Aurignacian traits – carinated scrapers, polyhedric burins, lamelle Dufour, *etc.* – were grouped together as "Levantine Aurignacian." Temporally, the earliest was clearly the Ahmarian, with dates in the southern Levant beginning around 37 ka at Boker A (Marks 1983c) and in the northern Levant at Üçağizli at about 36/34 ka (Kuhn *et al.* 2009).

While the earliest known IUP assemblage was found at Boker Tachtit, Level 4 (Marks and Ferring 1988), there was a technological discontinuity between the hard hammer blade production in Level 4 and the fine soft hammer blade/bladelet production of the earliest Ahmarian at Boker A. This technological gap has been filled both in the north, at Üçağizli Cave (Kuhn *et al.* 2009), and in the south at Tor Sadaf in Jordan (Fox 2003). Even before this, however, the Ahmarian was seen as developing out of the Emiran (Bar-Yosef 2000; Marks 1993; Gilead 1991).

Most Ahmarian sites indicate rather ephemeral occupations and, since most are open-air sites in the desert, organic materials are rare. On the other hand, cave sites, such as Ksar Akil (Hooijer 1961) and Üçağizli Cave (Kuhn *et al.* 2009) in the north have well-preserved faunal remains, evidence of bone tool manufacture (Bergman 1987; Newcomer 1974), and perforated shells (Kuhn *et al.* 2009), both of which are considered criteria for "modern" behavior (e.g. Klein 1999; Mellars 2000; McBrearty & Brooks 2000; Bouzouggar *et al.* 2007; de'Errico & Henshilwood 2007). Whether these non-lithic artifacts are typical of the Ahmarian everywhere, or are geographically limited to the northern littoral cannot be ascertained, given the variable taphonomic processes in the northern and southern Levant. Albeit infrequent, they do occur in the south, including bone tools in the Wadi Hasa (Coinman 1996), as well as a bone point found at Abu Noshra II in Sinai (Phillips 1988). At the same time, the Emiran and Ahmarian levels at Tor Sadaf, while containing fauna, failed to produce either bone tools or perforated shells (Fox 2003), indicating that perhaps these features were rare in the southern Levant until the Late Ahmarian, as at Ein Aqev East (Ferring 1977).

By 32 ka, the Ahmarian was widely distributed across the Levant, from southern Sinai to northeastern Syria (Belfer-Cohen & Goring-Morris 2003a, fig. 1.2). Like the Emiran, it was neither found in the mountainous regions of Turkey, nor any farther east than El Koum in Syria. While Ahmarian sites are present in southern Sinai, there is yet no hint of either Emiran or Early Ahmarian in the Arabian Peninsula. Recent claims of Ahmarian farther afield, such as in the Caucasus and on the Don River in Russia (Hoffecker 2012) stem from an overly broad definition of the Ahmarian Industry, which is just one of a series of different early Upper Paleolithic industries based on blade/bladelet production (Tsanova *et al.* 2012).

The Levantine Aurignacian

The sites initially called Levantine Aurignacian (Gilead 1981; Marks 1981) were distinguished by a technology that produced mainly flakes, and a toolkit that included carinated, thick, nosed and, in the case of burins, either carinated or polyhedric forms, as well as lamelle Dufour. Considerable variability has been recorded within the Levantine Aurignacian; there are assemblages that truly look not only typologically like the French Aurignacian, such as Ksar Akil Levels VIII and VII (Bergman 1987) and level D at Hayonim Cave in Mount Carmel (Belfer-Cohen & Bar Yosef 1981), but also have bone tools, pendants made on teeth, and at Kebara, even two engravings of animals. Alongside the classic Aurignacian assemblages, there were also those where many "Aurignacian" tools were present, but which fit uncomfortably into traditional Aurignacian definitions (Williams 2003). It is not surprising that these latter findspots lacked bone tools and pendants, given that they are all from surface sites in the southern Levant with no organic preservation.

Based on the preponderance of radiocarbon dates (Phillips 1994), the earliest occurrence of the Levantine Aurignacian is at Kebara Cave in the Mediterranean zone, where it is dated to around 34 ka (Marks 2003:256), possibly as early as 36 ka (Bar-Yosef 2000:136). General consensus places the end of the Levantine Aurignacian at about 20ka (Belfer-Cohen & Bar-Yosef 1981), although at least one typical Aurignacian site in the central Negev, Ain Aqev, persists until approximately 17 ka (Marks 1976:230). Thus, it appears well after the Ahmarian and seems to disappear with no discernible progeny (Goring-Morris and Belfer-Cohen 2006). Along a parallel trajectory, the Ahmarian develops into the Epipalaeolithic, *sensu* latu, at about 23/20 ka or somewhat later (Henry 1983, Olszewski 2003).

The term Aurignacian was first applied in a Levantine context to the assemblage from Antelias Cave (Zumoffen 1908) positing a connection to the European sequence. This position came and went over the years, with Garrod at first theorizing it was the root of the European Middle Aurignacian, and later considering it as something quite distinct from its European counterpart (Garrod 1957). Many researchers over the years have grappled with the origin of the Levantine Aurignacian (see Williams and Bergman 2010:151–156 for a detailed history of the problem), from Garrod's initial view that it came from farther east, to the view that the Ksar Akil sequence documented a local development (Tixier and Inzan 1981, Mellars and Tixier 1989). In spite of the varying perspectives on its geographic source, most prehistorians tended to view the Levantine Aurignacian as intrusive into the Levant (e.g. González-Echegaray 1978; Marks & Ferring 1988; Kozlowski 1992; Bar-Yosef 2000; Marks 2003; Otte *et al.* 2007), while Williams and Bergman (2010) have conclusively and exhaustively documented that there was no developmental sequence between the Ahmarian and Levantine Aurignacian at Ksar Akil.

The geographic distribution of the two different variants of the Levantine Aurignacian (Belfer-Cohen & Goring-Morris 2003a, fig. 1.3 and 1.4) indicate a very limited distribution in the core Mediterranean zone for the "typical" Levantine Aurignacian, and a more southern but still limited, highland steppic distribution for the atypical Levantine Aurignacian, with the exception of it at El Koum. The distribution of the more classic Levantine Aurignacian suggests that it was adapted to the wetter Mediterranean environment, rather than to the drier settings of the southern and eastern Levant. This might indicate that the Aurignacian did not enter the Levant from steppic or arid areas, which certainly seems to be the case to the south, as there are yet no known Aurignacian-like assemblages in the Sinai, Arabian Peninsula, or, for that matter, northeast Africa.

5 UNVEILING ARABIAN LATE PLEISTOCENE PREHISTORY

Since the earliest days of research in the Greater Near East, the Arabian Peninsula was thought to have played a significant role in modern human origins, even dubbed the "cradle of *Homo sapiens*" (Field 1932), but posed logistically and politically insurmountable obstacles for carrying out research. Hence, the region languished in obscurity relative to the rest of the Near East for most of the 20th century. That is not to say that scholars were unaware of its potential. On his historic crossing of the Rub' Al Khali sand sea, Philby (1933) documented evidence of an ancient lake in the eastern desert, complete with lithic artifacts strewn about the beach. To some degree, knowledge of the profoundly different Pleistocene landscapes of Arabia has driven Palaeolithic research throughout the Peninsula and provided the theoretical framework for understanding prehistoric occupation of the region (for comprehensive summaries of palaeoenvironmental oscillations and their speculative demographic implications see Parker & Rose 2008; Preusser 2009; Rose 2010; Rosenberg *et al.* 2011).

Over the winter of 1937/8, Caton-Thompson (1939) conducted the first serious Palaeolithic investigation in the Arabian Peninsula. Raising the possibility of early human exchange across the Red Sea, Caton-Thompson's expedition to the Hadramawt Valley in central Yemen searched for similarities between Arabian and African Palaeolithic industries. She documented lithic assemblages of various types on different terraces of the Wadi Hadramawt, but did not discover any significant features reminiscent of known African sites at the time. In the end, she concluded there were no Pleistocene connections across the Red Sea (Caton-Thompson 1957).

Around the same time, petroleum geologists searching for oil in the Rub' Al Khali and Nefud deserts of central Arabia reported numerous lithic scatters across the expansive dune fields (Field 1955, 1958). By the late 1970s, archaeological survey in central Arabia began in earnest. The Comprehensive Archaeological Survey Program was initiated in Saudi Arabia - a decade-long investigation that documented scores of new prehistoric sites, including several identified as "Mousterian" based on the presence of Levallois technology (both centripetal and convergent), and "Upper Palaeolithic" based on the presence of blade-dominated assemblages similar to the Levantine UP (Adams 1977; Parr 1978; Zarins *et al.* 1979, 1980, 1981, 1982).

In southern Arabia, under the direction of Amirkhanov (1994, 2006), the Soviet expedition to Yemen also began to document laminar-based "Upper Palaeolithic" assemblages in the central and eastern regions of the country. A French survey near Shabwa in central Yemen reported a few intriguing Levallois cores with affinities to the African Nubian Complex (Inizan and Ortlieb 1987). In southern Oman, just across the Yemeni border, a Harvard expedition to the Dhofar region recorded dense concentrations of surface assemblages characterized by the frequent manufacture of blade-proportionate blanks (Pullar 1974, 1985; Pullar & Jäckli 1978). The same again was reported from an expansive surface scatter near Saiwan in central Oman (Biagi 1994). Despite all of these tantalizing findings, the lack of stratified sites anywhere in the Peninsula, and directly comparable industries elsewhere, prevented cultural or chronological classification of these surface sites. Yet, it established the potential presence of Middle and Upper Palaeolithic populations in the very heart of Arabia, and suggested some degree of cultural and/or demographic exchange at various times with both the Levant and north-eastern Africa.

A landmark genetic study published in 1999 further served to shift the focus of modern human origins research to Arabia, ushering in a new era of archaeological fieldwork throughout the Peninsula. Quintana-Murci (*et al.*'s 1999) discovery of mtDNA haplogroup M1 bearing populations in Ethiopia was thought to represent the first branch from an initial founding population. The discovery of a basal M clade in East Africa – an otherwise predominantly Asian lineage – lent credence to the posited "Southern Dispersal Route" out of Africa (e.g. Tchernov 1992; Lahr & Foley 1994). The study was followed by more extensive genetic research tracking relict early human populations across South Asia (e.g. Kivisild *et al.* 2004; Metspalu *et al.* 2004; Forster and Matsumura 2005; Macaulay *et al.* 2005), ultimately crystallizing in the coastal expansion model of modern human emergence (Stringer 2000; Mellars 2006; Oppenheimer 2009). At this point, the only thing missing was direct archaeological evidence from Arabia itself indicative of a population expansion out of East Africa around 60 ka BP.

This elusive connection to Africa became the focal point and MacGuffin of archaeological fieldwork in Arabia. The period between 2000 and 2012 witnessed a flurry of activity in Arabian Palaeolithic research (for a history of research see Rose and Petraglia 2009; Groucutt and Petraglia 2012). Of particular note are four recently discovered Late Pleistocene archaeological sites, which shed unexpected light on early human prehistory in Arabia. These include the Wadi Surdud site complex on the western flank of the Yemeni highlands (Delagnes *et al.* 2012), Jebel Faya in Sharjah, UAE (Marks 2009; Armitage *et al.* 2011), the Nubian and Mudayyan industries in southern Oman (Rose *et al.* 2011; Usik *et al.* 2012), and a series of stratified Mousterian Middle Palaeolithic occupations from the Jubbah palaeolake basin, northern Saudi Arabia (Petraglia *et al.* 2011, 2012). Contrary to most genetic and palaeoanthropological expectations, not one site was found along the coast, and no indications of a Pleistocene population expansion from Africa after 75 ka have been found to date.

What is also surprising about these discoveries is that they show only a minor degree of technological overlap with one another, pointing to a complex demographic history comprising mosaic source populations. This is not surprising, given the Peninsula encompasses some 3.3 million square kilometers – ten times the size of the Levant. Additionally, taking into consideration lower sea levels during most of the Late Pleistocene, Arabia abutted the entirety of the Levant, Mesopotamian floodplain, and Zagros Mountains, with no significant geographic borders separating these regions. Should we consider Jubbah basin, for instance, as belonging to northern Arabia or the margin of the Levant? Strong wet phases, such as those experienced between 125 and 75 ka, appear to have facilitated a virtual land grab of multiple hunter-gatherer range expansions onto the Peninsula from all directions.

The earliest potential indication of modern human presence on the Arabian Peninsula comes from Jebel Faya Assemblage C, where excavators noted broad similarities to the East African MSA, positing an early wave of AMH expansion into Arabia during the Last Interglacial (~125 ka). Recently, Assemblage C has been specifically linked with an East African Eritrean site, Asfet (Beyin 2011:8), where comparable technological and typological patterns were observed. The overlying Assemblages B and A at Jebel Faya, loosely bracketed between 90 and 40 ka, do not resemble any other known Arabian, African, or Near Eastern assemblage types; thus, are interpreted as an autochthonous industrial development unique to the Gulf basin region of eastern Arabia (Marks 2009; Rose 2010; Armitage *et al.* 2011).

In contrast, Late Pleistocene archaeological sites found outside of the Gulf basin exhibit connections to both the Levant and Northeast Africa. Evidence for a distinct, widespread expansion of AMH toolmakers comes from several hundred Nubian Complex findspots reported across Hadramawt, Dhofar, the southern Rub' Al Khali, and central Saudi Arabia (Inizan & Ortlieb 1987; Crassard 2009; Crassard and Thiebaut 2011; Rose *et al.* 2011; Usik *et al.* 2012). A dated "Classic Dhofar Nubian" assemblage (*sensu* Usik *et al.* 2012) at Aybut Al Auwal places the expansion of Nilotic MSA populations into southern Arabia around 106 ka (Rose *et al.* 2011). Although the fate of these toolmakers in Arabia remains a mystery, at least in Dhofar, the descendant "Mudayyan" industry demonstrates Nubian-derived characteristics. Alongside the production of diminutive Nubian Levallois cores, Mudayyan reduction strategies include recurrent bidirectional point cores and simple unidirectional blades struck from the narrow elongated face of chert slabs (Usik *et al.* 2012).

Lithic material from the Jubbah basin, excavated from stratified deposits dated to around 75 ka, show different Levallois reduction strategies described as both centripetal and unidirectional-convergent Levallois, mirroring the range of Levantine Mousterian types (D, C, and B). The paucity of formal tools and small sample sizes, however, do not allow for any detailed technological or typological comparisons. At the Wadi Surdud site complex in Yemen, assemblages dated between 63 and 42 ka were found interstratified within a 6 m fluvial accretion (Delagnes *et al.* 2012; Sitzia *et al.* 2012). The industry was assigned to the Middle Palaeolithic and is characterized by a combination of occasional Levallois and, more frequently, non-Levallois convergent laminar reduction strategies. Excavators describe the unidirectional convergent reduction strategies as "the hallmark of the late Levantine Mousterian," while also noting that the tendency toward elongation and de-emphasis on platform faceting more resembles the preceding Tabun D type, rather than the contemporary Tabun B type (Delagnes *et al.* 2012:20). On the basis of significantly earlier dates for the Tabun D industry in the Levant and absence of Tabun D tool types at Wadi Surdud, the authors discount a direct connection between Wadi Surdud and the Levantine Mousterian, suggesting rather that they may both be derived from a common cultural base.

In sum, the emerging picture of the Arabian late MP is one of regional diversity, stemming from populations sharing a mix of African, Levantine, and Arabian ancestry. The Peninsula appears to have been a demographic sump during the wet phases that occurred between 125 ka and 75 ka, while fluctuating arid conditions between 75 and 15 ka led to a contraction of hunter-gatherer groups into local Arabian refugia. The presence of seemingly indigenous occupations at Wadi Surdud and Jebel Faya B, both during periods of aridity, attests to the ability of early human groups to survive in Arabia during climatic downturns.

6 DISCUSSION

After a century of research, the origins of the Levantine UP still remain an enigma. At this point, at least one thing is clear: the Emiran has no African progenitor. As such, there is a disconnect between the archaeological database and the Replacement paradigm, which necessitates that the earliest Levantine Upper Paleolithic must have come fully developed from northeast Africa. The Replacement model should have been a parsimonious prism through which to view the transition from the MP to the UP in the Levant. It was not. In fact, the data that have accumulated over the past thirty years have consistently negated the model, to the extent that even the molecular clock used to estimate the mtDNA L3 coalescence age (hence, AMH population expansion from Africa) may need to be radically recalibrated to 125 – 100 ka (Scally & Durbin 2012). For Replacement to serve as an effective paradigm, it should clearly explain the Mousterian-Emiran-Ahmarian sequence as being non-developmental. In addition, it should encourage debate as to which African lithic industry was brought to the Levant by African émigrés some 50 ka years ago.

For the most part, neither has happened. Emerging data have filled the technological and temporal gaps in the proposed Emiran-Ahmarian continuum, while detailed comparisons between 'Ain Difla and Boker Tachtit clearly show continuity. In spite of this, some still promoted the Replacement paradigm and ceased considering a local source within the Levant (e.g. Bar-Yosef 2000:142). To further make this case, Tostevin (2000) attempted to demonstrate that the technologies of Tabun B type Mousterian and that from Boker Tachtit, level 1 were different. Contentious methodology aside (Belfer-Cohen & Goring-Morris 2003b: 278; Marks 2003:261–264), the study was based on the premise of disproving a connection between the Emiran and Tabun B Mousterian, which no one had actually proposed.

Finding the cultural source of the 50 ka old African émigrés was also not as straightforward as the Replacement model predicted. Bar-Yosef (2000) made such an attempt, linking the lower Egyptian Taramasan with the Emiran, but later (Meignen & Bar-Yosef 2005:173) revised this position, stating that "the evidence from Africa is still insufficient for validating this hypothesis." There is unanimous agreement among researchers who have worked in the Nile Valley that there is no clear connection between Egyptian/Sudanese industries dated between 70 and 40 ka and those from the Levant (Marks 1990, 1992; Van Peer 1998; Vermeersch 2001).

Most recently, Meignen (2012), while recognizing and even emphasizing the intra-Levantine technological complexity of the Emiran (her IUP), corroborates the position of Demidenko and Usik (1993, 2003): "with our current state of knowledge, strong exterior influences do not appear necessary to explain the transformations observed in the lithic productions in the Levant, and in any case, we have so far no convincing archaeological evidence on hand to demonstrate such an influence" (Meignen 2012:19).

Rather, she sees a "stimulus for new combinations of pre-existing technologies" (ibid: 19). Such new combinations include the use of a cresting technique in core preparation, the shift from unidirectional to bidirectional point core preparation, and even blunting of the right side of Levallois points (as consistently seen in the Emiran). This last trait also occurs in the Egyptian Taramsan (Van Peer *et al.* 2010), but the other "new combinations" - the use of opposed platforms in point core production and the use of dorsal cresting in their formation - are not characteristic of the Taramsan, while both occur in the Mudayyan industry of Oman (Usik *et al.* 2012).

Consequently, this "stimulus" may, in fact, be in the form of demographic/ cultural input from the Arabian Peninsula, rather than directly from Africa. We tentatively suggest that some cultural manifestations influencing the development of the Emiran around 50 ka might have arisen in Arabia – the progeny of Nubian Complex toolmakers who had expanded onto the Peninsula during the Last Interglacial. That is not to say such influences resulted from a rapid migration or one event; rather, from gradual, episodic expansions northward of the Arabian Nubian Complex, suggested by Nubian Levallois findspots recorded in the Rub' Al Khali and central Saudi Arabia. At the same time, there is possible evidence of southward range expansions from the Levant, indicated by the seemingly classic Mousterian assemblages found at Jubbah basin dated to ca. 75 ka and Tabun D-like assemblages found at Wadi Surdud in Yemen dated to ca. 55 ka. Thus, the possibility of contact in the southern Levant or northern Arabia must be considered. This proposed "Arabian Crucible" scenario is in agreement with the estimation of Neanderthal-AMH admixture in the Greater Near East between roughly 40 and 80 ka (Sankararam *et al.* 2012), occurring over a prolonged period of infrequent interbreeding (Neves & Serva 2012). It is also parsimonious with reports of relict mtDNA N haplotypes found among modern populations in Arabia, with coalescence age estimates between 60 and 50 ka (Fernandes *et al.* 2012) – remnants of the basal node of the European/West Asian modern human branch.

For this to be true, we must accept the position that Late Pleistocene Near Eastern hominids were a single admixed species, not distinct Neanderthal and AMH populations, and that the developmental sequence established at Tabun is not pan-Levantine and not necessarily linear. The absence of Tabun D type assemblages in the Mediterranean region after 150 ka may only signify a retreat into the Saharo-Arabian phytogeographic zone, and not the disappearance of this population from the Near East altogether. Hence, we suggest a local sequence where the Emiran develops, primarily, out of a Tabun D technological system in combination with external stimulus from residents of Arabia. A strong wet phase across central and eastern portions of the Peninsula between 55 and 50 ka (McLaren *et al.* 2008; Parton *et al.* nd) might have facilitated range expansions and demographic exchange in both directions.

At this point, however, too little is known about the complexities of Arabian Late Pleistocene prehistory to point conclusively to any specific demographic/ cultural influences that might have contributed to the development of the Emiran, beyond general Nubian Levallois characteristics (i.e. opposed platform point production and the use of a dorsal crest in Nubian point core formation). The recent data from Arabia only begin to fill in huge gaps of information across a vast terra incognita. We have argued that the emerging picture necessitates a reconsideration of the Levantine MP-UP developmental sequence within the context of the Greater Arabian Peninsula, as a whole. For thirty years, researchers have failed to identify an African industry that was the source of, or influenced the development of, the Levantine UP. Rather than searching for an external stimulus on the Emiran in Africa, the answer may lie somewhere in Arabia.

REFERENCES

ADAMS R., PARR P., IBRAHIM M. & AL-MUGHANNUM A.S. (1977) – Preliminary report on the first phase of the Comprehensive Survey Program. *Atlal* 1:21–40.

ALBRECHT G. (1988) – An Upper Paleolithic sequence from Anatolia in southern Turkey. ERAUL 8:23–35.

ALVES I., HANULOVÁ S., FOLL M. & EXCOFFIER L. (2012) – Genomic data reveal a complex making of humans. *PLoS Genetics* (doi:10.1371/ journal.pgen.1002837).

AMBROSE S. (1998) – Chronology of the Later Stone Age and Food Production in East Africa. *Journal of Archaeological Science* 25:377–392.

AMIRKHANOV H. (1994) – Research on the Palaeolithic and Neolithic of Hadhramaut and Mahra. *Arabian Archaeology and Epigraphy* 5:217–228.

AMIRKHANOV H. (2006) – Stone Age of South Arabia. Moscow, Nauka (in russian).

ARENSBURG B., BAR-YOSEF O., CHECH M., GOLDBERG P., LAVILLE H., MEIGNEN L., RAK Y., TCHERNOV E., TILLIER A.-M. & VANDERMEERSCH B. (1985) – Une sépulture néandertalienne dans la grotte de Kébara (Israel). *Comptes-Rendus de L'Académie des Sciences de Paris* (Série D) 300:227–230.

ARENSBURG B. & BELFER-COHEN A. (1998) – Sapiens and Neanderthals: Rethinking the Levantine Middle Paleolithic Hominids. In: T. Akazawa, K. Aoki & O. Bar-Yosef, *Neanderthals and modern Humans in Western Asia*, p. 311–322.

ARMITAGE S.J., JASIM S.A., MARKS A.E., PARKER A.G., USIK V.I., UERPMANN H.P. (2011) – The southern route "Out of Africa": evidence for an early expansion of modern humans into Arabia. *Science* 331:453–456.

BARUT S. (1994) – Middle and Later Stone Age lithic technology and land use in East African savannas. *The African Archaeological Review* 12:43–72.

BAR-YOSEF O. (1980) – Prehistory of the Levant. *Annual Review of Anthropology* 9:101–133.

BAR-YOSEF O. (1994) – The Contributions of Southwest Asia to the study of the origin of modern humans. In: M.H. Nitecki & D.V. Nitecki, *Origins of Anatomically Modern Humans*, p. 23–66.

BAR-YOSEF O. (1998) – The Chronology of the Middle Paleolithic of the Levant. In: M.H. Nitecki & D.V. Nitecki, *Neandertals and Modern Humans in Western Asia*, p. 39–56.

BAR-YOSEF O. (2000) – The Middle and early Upper Paleolithic in southwest Asia and neighboring regions. In: Bar-Yosef & D. Philbeam, *The Geography of Neanderthals and Modern Humans in Europe and the greater Mediterranean*, Cambridge, Peabody Museum, Harvard University, p. 107–156.

BAR-YOSEF O. & PHILLIPS J. (EDS.) (1977) – *Prehistoric Investigations in the Gebel Maghara, Northern Sinai*. Jerusalem, Institute of Archaeology of the Hebrew University.

BAR-YOSEF O. & VANDERMEERSCH B. (1972) – The Stratigraphical and cultural problems of the passage from the Middle to the Upper Palaeolithic in Palestinian caves. In: F. Bordes, *The Origin of Homo Sapiens*, Proceedings of the Paris symposium, 2–5 September 1969, Paris, UNESCO. p. 221–226.

BELFER-COHEN A. & BAR-YOSEF O. (1981) – The Aurignacian at Hayonim Cave. *Paléorient* 7(2):19–42.

BELFER-COHEN A. & BAR-YOSEF O. (1999) – The Levantine Aurignacian: 60 Years of research, In: W. Davies & R. Charles (1956), *Dorothy Garrod and the Progress of the Paleolithic: Studies in the Coon*, The seven caves Prehistoric Archaeology of the Near East and Europe, Oxford, Oxbow Books, p. 118–134.

BELFER-COHEN A. & GORING-MORRIS N. (2003a) – Current Issues in Levantine Upper Paleolithic Research. In : A.N. Goring-Morris & A. Belfer-Cohen, *More Than Meets the Eye*, Exeter, The Short Run Press, p. 1–12.

BELFER-COHEN A. & GORING-MORRIS N. (2003b) – Final Remarks and Epiloque. In: A.N. Goring-Morris & A. Belfer-Cohen, *More Than Meets the Eye*, Exeter, The Short Run Press, p. 274–280.

BERGMAN C.A. (1987) – Ksar Akil, Lebanon: A Technological and Typological Analysis of the Later Palaeolithic Levels of Ksar Akil. *BAR International Series* 329(2).

BEYIN A. (2011) – Upper Pleistocene Human Dispersals out of Africa: A Review of the Current State of Debate. *International Journal of Evolutionary Biology* 2011:1–17 (ID 615094. doi:10.4061/208/625094).

BIAGI P. (1994) – An Early Paleolithic site near Saiwan (Sultanate of Oman). *Arabian Archaeology and Epigraphy* 5:81–88.

BOËDA E., GRIGGO C. & NOËL-SORIANO S. (2001) – Différents modes d'occupation du site d'Umm el Tlel au cours du Paléolithique moyen (El Kowm, Syrie centrale). *Paléorient* 27(2):13–28.

BOURGUIGNON L. (1998) – Les industries du Paléolithique intermédiaire d'Umme el Tlel : nouveaux éléments pour le passage entre Paléolithique moyen et supérieur dans le Bassin d'El Khowm. Dans : M. Otte, *Préhistoire d'Anatolie: Genèse de Deux Mondes*, ERAUL 85:709–730.

BOUZOUGGAR A., BARTON N., VANHAEREN M., D'ERRICO F., COLLCUTT S., HIGHAM T., HODGE E., PARFITT S., RHODES E., SCHWENNINGER J.-L., STRINGER C., TURNER E., WARD S., MOUTMIR A. & STAMBOULI A. (2007) – 82,000 year-old shell beads from North Africa and implications for the origins of modern human behavior. *Proceedings of the National Academy of Sciences USA* 104:9964–9969.

BRANDT S. (1986) – The Upper Pleistocene and early Holocene prehistory of the Horn of Africa. *The African Archaeological Review* 4:41–82.

BUZY D. (1927) – Les stations lithiques d'el Qeseimeh. *Revue Biblique* 36:90–92.

BUZY D. (1929) – Une station magdalénienne dans le Négeb ('Ain el-Qedeirat). *Revue Biblique* 38:364–381.

CANN R.L., STONEKING M. & WILSON A.C. (1987) – Mitochondrial DNA and human evolution. *Nature* 325:31.

CATON-THOMPSON G. (1939) – Climate, irrigation, and early man in the Hadramaut. *Geographic Journal* 9:18–35.

CATON-THOMPSON G. (1957) – The evidence of South Arabian paleoliths in the question of Pleistocene land connections with Africa. *Pan- African Congress on Prehistory* 3:380–384.

CLARK G. A., OLSZEWSKI D.I., SCHULDENREIN J., RIDA AND N. & EIGHMEY J. (1994) – Survey and Excavation in Wadi al-Hasa: A Prelirninary Report of the 1993 Field Season. *Annual of the Department of Antiquities of Jordan* 38:41–55.

CLARK G.A., LINDLY J.M., DONALDSON M., GARRARD A., COINMAN N., SCHULDENREIN J., FISH S. & OLSZEWSKI D. (1988) – Excavations at Middle, Upper and Epipalaeolithic sites in the Wadi-Hasa, West-Central Jordan. In: A.N.Garrard & H.G. Gebel (1986), *The Prehistory of Jordan: The State of Research*, BAR International Series 396(1):209–285.

CLARK G.A., LINDLY J.M., DONALDSON M., GARRARD A., COINMAN N., SCHULDENREIN J., FISH S. & OLSZEWSKI D. (1987) – Paleolithic Archaeology in the Southern Levant. A Preliminary Report of Excavations at Middle, Upper and Epipaleolithic Sites in Wadi el-Hasa, West-Central Jordan. *Annual of the Department of Antiquities of Jordan* 31:19–78, 547.

CLARK G.A., NEELEY M., MACDONALD B., SCHULDENREIN J. & AMR K. (1992) – Wadi Hasa paleolithic project–1992: a preliminary report. *Annual of the Department of Antiquities of Jordan* 36:13–23.

CLARK G.A., SCHULDENREIN J., DONALDSON M., SCHWARCZ P., RINK W.J. & FISH S.K. (1997) – Chronostratigraphic contexts of Middle Paleolithic horizons at the 'Ain Difla rockshelter (WHS 634), west-central Jordan. In: H.G.K. Gebel, Z. Kafafi, G.O. Rollefson (eds.), *The Prehistory of Jordan : II. Perspectives from 1997*. Ex Oriente, Berlin, p. 77–100.

COINMAN N.R., CLARK G.A. & LINDLY J.M. (1986) – Prehistoric Hunter-Gatherer Settlement in the Wadi Hasa, West-Central Jordan. In: L. Strauss, *The End of the Paleolithic in the Old World*, BAR International Series 284:129–169.

COINMAN N.R., CLARK G.A. & LINDLY J.M. (1988) – A Diachronic Study of Paleolithic and Early Neolithic Site Placement Patterns in the Southern Tributaries of the Wadi Hasa. In: B. MacDonald, *The Wadi Hasa Archaeological Survey [1979–1983] West-Central Jordan*, Waterloo, Wilfrid Laurier University Press. p. 48–86.

COINMAN N.R., CLARK G.A. & DONALDSON M. (1989) – Aspects of Structure in an Epipaleolithic Occupation Site in West-Central Jordan. In: D.O. Henry & G. Odell, *Alternative Approaches to Lithic Analysis*, Washington, Archaeological Papers Of The American Anthropological Association 1:213–236.

COINMAN N.R. (1996) – Worked bone in the Levantine Upper Paleolithic: Rare examples from the Wadi al Hasa, West-Central Jordan. *Paléorient* 22(2):113–121.

CONRAD N., KANDEL A., DODONOV A. & AL-MASI M. (2004) – Middle Paleolithic Settlement in the Ma'aloula Region of Damascus Province, Syria. In: N. Conard, *Settlement Dynamics of the Middle Paleolithic and Middle Stone Age II*, Tübingen, Kerns Verlag. p. 65–87.

COPELAND L. (1975) – The Middle and Upper Paleolithic of Lebanon and Syria in the light of recent research. In: F. Wendorf & A.E. Marks, *Problems in Prehistory: North Africa and the Levant*, Dallas, Southern Methodist University Press, p. 317–350.

COPELAND L. (1976) – Terminological correlations in the Early Upper Palaeolithic of Lebanon and Palestine. Dans : F. Wendorf (1976), *Deuxième Colloque sur la Terminologie de la préhistoire du Proche-Orient, Neuvième Congrès, Union Internationale des Sciences Préhistoriques et Protohistoriques*, p. 35–48.

COPELAND L. (2001) – Forty-six Emireh points from the Lebanon in the context of the Middle to Upper transition in the Levant. *Paléorient* 26(1):73–92.

CRASSARD R. (2009) – The Middle Paleolithic of Arabia: the view from the Hadramawt region, Yemen. In: M.D. Petraglia & J.I. Rose (eds.), *The Evolution of Human Populations in Arabia: Paleoenvironments, Prehistory and Genetics*. Springer Academic Publishers, Netherlands, p. 151–168.

CRASSARD R. & THIÉBAUT C. (2011) – Levallois points production from eastern Yemen and some comparisons with assemblages from East-Africa, Europe and the Levant. Études et Recherches Archéologiques de l'Université de Liège 999, 1–14.

CREW H.L. (1976) – The Mousterian site of Rosh Ein Mor. In: E. Marks, *Prehistory and Paleoenvironments in the Central Negev, Israel I, The Avdat/Aqev Area I*, Dallas, Southern Methodist University Press, p. 75–111.

DELAGNES A., TRIBOLO C., BERTRAN P., BRENET M. & CRASSARD R. (2012) – Inland human settlement in southern Arabia 55 000 years ago. New evidence from the Wadi Surdud Middle Paleolithic site complex, western Yemen. *Journal of Human Evolution* (doi:10.1016/j.jhevol.2012.03.008).

DEMIDENKO Y. & USIK V. (1993) – The problem of changes in Levallois technique during the technological transition from the Middle to the Upper Palaeolithic. *Paléorient* 19(2):5–15.

DEMIDENKO Y. & USIK V. (2003) – Into the mind of the maker: Refitting study and technological reconstruction. In: D. Henry, Neanderthals in the Levant, London, Continium, p. 107–155.

DURAND E.Y., PATTERSON N., REICH D. & SLATKIN M. (2011) – Testing for ancient admixture between closely related populations. *Molecular Biology and Evolution* 28:2239–2252.

ENDICOTT P., HO S., METSPALU M. & STRINGER C. (2009) – Evaluating the mitochondrial timescale of human evolution. *Trends in Ecology and Evolution* 24:515–521.

D'ERRICO F. & HENSHILWOOD C. (2007) – Additional evidence for bone technology in the southern African Middle Stone Age. *Journal of Human Evolution* 52:142–163.

EWING J.F. (1947) – Preliminary note on the excavations at the Paleolithic site of Ksar 'Akil, Republic of Lebanon. *Antiquity* 84:186–196.

FERNANDES V., ALSHAMALI F., ALVES M., COSTA M.D., PEREIRA J.B., SILVA N.M., CHERNI L., HARISH N. ČERNÝ V., SOARES P., RICHARDS M.B., PEREIRA L. (2012) – The Arabian Cradle: Mitochondrial relicts of the first steps along the southern route out of Africa. *American Journal of Human Genetics* 90 (doi:10.1016/j.ajhg.2011.12.010).

FERRING C.R. (1977) – The Late Upper Paleolithic site of Ein Aqev East. In: E. Marks, *Prehistory and Paleoenvironments in the Central Negev, Israel II: The Avdat/Aqev Area, Part 2 and the Har Harif*, Dallas, Department of Anthropology, Southern Methodist University, p. 199–226.

FIELD H. (1932) – The cradle of Homo sapiens. *American Journal of Archaeology* 36:426–430.

FIELD H. (1955) – New stone age sites in the Arabian Peninsula. *Man* 55:136–138.

FIELD H. (1958) – Stone implements from the Rub' al Khali, Southern Arabia. *Man* 58:93–94.

FORSTER P. & MATSUMURA S. (2005) – Evolution: Did early humans go north or south? Science 308:965–966.

FOX J. (2003) – The Tor Sadaf Lithic Assemblages: A Technological Study of the Early Upper Paleolithic in the Wadi al-Hasa. In: A.N. Goring-Morris & A. Belfer-Cohen, *More Than Meets the Eye*, Exeter, The Short Run Press, p. 80–94.

GARROD D.A.E. (1937) – The Near East as a gateway of prehistoric migration. In: G.G. MacCurdy, *Early Man*, Philadelphia, J.P. Lippincott and Co, p. 33–40.

GARROD D.A.E. (1938) – The Upper Paleolithic in the light of recent discovery. *Proceedings of the Prehistoric Society* 4:1–26.

GARROD D.A.E. (1951) – A transitional industry from the base of the Upper Palaeolithic in Palestine and Syria. *Journal of the Royal Anthropological Institute* 81:121–129.

GARROD D.A.E. (1953) – The relations between southwest Asia and Europe in the Later Palaeolithic age, with special reference to the origin of the Upper Palaeolithic blade cultures. *Journal of World History* 1(1):13–38.

GARROD D.A.E. (1954) – Excavations at the Mugharet Kebara, Mount Carmel, 1931: The Aurignacian industries. *Proceedings of the Prehistoric Society* 20 (2):155–192.

GARROD D.A.E. (1955) – The Mugharat el-Emireh in lower Galilee: type station of the Emiran industry. *Journal of the Royal Anthropological Institute* 85:141–62.

GARROD D.A.E. (1957) – Notes sur le Paléolithique supérieur du Moyen Orient. *Bulletin de la Société* Préhistorique Française 55:239–445.

GARROD D.A.E. & BATE D.M.A. (1937) – *The Stone Age of Mount Carmel I*. Oxford, Clarendon Press.

GHIROTTO S.L.P. & BARBUJANI G. (2011) – Genomic evidence for an African expansion of anatomically modern humans by a southern route. *Human Biology* 83:477–489.

GILEAD I. (1981) – Upper Paleolithic tool assemblages from the Negev and Sinai. Dans : J. Cauvin & P. Sanlaville, *Préhistoire du Levant : chronologie et organisation de l'espace depuis les origines jusqu'au VI millénaire*, Paris, Éditions du CNRS,(Colloques internationaux du CNRS 598:331–3.

GILEAD I. (1983) – Upper Paleolithic Occurrences in Sinai and the Transition to the Epi-paleolithic in the Southern Levant. *Paléorient* 9(1):39–52.

GILEAD I. (1985) – The settlement patterns at Gebel Maghara (northern Sinai) in the Upper Paleolithic. *Mitekufat Haeven* 18:67–69.

GILEAD I. (1991) – The Upper Paleolithic Period in the Levant. *Journal of World Prehistory* 5 (2):105–154.

GILEAD I. & BAR-YOSEF O. (1993) – Early Upper Paleolithic sites in the Qadesh Barnea area, NE Sinai. *Journal of Field Archaeology* 20 (3):265–280.

GILEAD I. & GRIGSON C. (1984) – Farah II: a Middle Paleolithic open-air site in the northern Negev, Israel. *Proceedings of the Prehistoric Society* 50:71–97.

GONZÁLEZ-ECHEGARAY J. (1964) – *Excavaciones en la terraza de "El Khiam" (Jordania) I. Estudio del yacimiento y los niveles paleoliticos*. Madrid, Bibliotheca Praehistórica Hispana.

GONZÁLEZ-ECHEGARAY J. (1966) – *Excavaciones en la terraza de "El Khiam" (Jordania) II. Los niveles meso-neoliticos, estudio de la fauna, flora y análisis de las tierras del yacimiento*. Madrid, Bibliotheca Praehistórica Hispana.

GONZÁLEZ-ECHERAGARY G. (1978) – Notes toward a systematization of the Upper Paleolithic in Palestine. In: L. Freeman, *Views of the Past: Essays in Old World Prehistory and Paleoanthropology*, The Hague, Mouton Publishers, p. 177–191.

GREEN R.E., KRAUSE J., BRIGGS A., MARICIC T. & STENZEL U. *et al.* (2010) – A draft sequence of the Neandertal genome. *Science* 328:710–722.

GROUCUTT H. & PETRAGLIA M. (2012) – The prehistory of the Arabian Peninsula: deserts, dispersals, and demography. *Evolutionary Anthropology* 21:113–125.

HALLER J. (1941–43) – *Notes de la préhistoire phénicienne: l'Abri d'Abou Halka (Tripoli)*. Bulletin du Musée de Beyrouth 5:31–33.

HAMMER M.F., WOERNER A.E., MENDEZ F.L., WATKINS J.C. & WALL J.D. (2011) – Genetic evidence for archaic admixture in Africa. *Proceedings of the National Academy of Sciences USA* 108:15123–15128.

HAUCK T. (2011) – Mousterian technology and settlement dynamics in the site of Hummal (Syria). *Journal of Human Evolution* 61:519–537.

HAWKS J. & WOLPOFF M. (2001) – The four faces of Eve: hypothesis compatibility and human origins. *Quaternary International* 75:41–50.

HENRY D. (1979) – Palaeolithic sites within the Ras en Naqb Basin, Southern Jordan. *Palestine Exploration Quarterly* 3:79–85.

HENRY D. (1982) – The Prehistory of Southern Jordan and relationships with the Levant. *Journal of Field Archaeology* 9(4):417–444.

HENRY D. (1983) – Adaptive Evolution within the Epipaleolithic of the Near East. In: F. Wendorf & A. Close, *Advances in World Archaeology* 2, New York, Academic Press. p. 99–160.

HENRY D. (1985) – Late Pleistocene environment and Paleolithic adaptions in the Southern Levant. In: A. Hadidi, *Studies in the History and Archaeology of Jordan* 2, London, Routledge and Kegan Paul. p. 67–78.

HENRY D. (1988) – Summary of prehistoric and paleoenvironmental research in the Northern Hisma. In: A. Garrod & H. Gebel, *The Prehistory of Jordan: The State of the Research in 1986*, Oxford, BAR International Series 396(1):7–37.

HENRY D. (1994) – Prehistoric cultural ecology in Southern Jordan. *Science* 265:336–341.

HENRY D. (1995) – *Prehistoric Cultural Ecology and Evolution: Insights from Southern Jordan*. Plenum Press, New York.

HENRY D.O. (1997) – Cultural and Geologic Successions of Middle and Upper Paleolithic Deposits in the Jebel Qalkha Area of southern Jordan. In: H. Gebel, Z. Kafafi & G. Rollefson, *The Prehistory of Jordan II: Perspectives from 1996. Studies in Early Near Eastern Production, Subsistence, and Environment 4*, Berlin, Ex Oriente, p. 69–76.

HENRY D. (1998) – The Middle Paleolithic of Jordan. In: D. Henry, *The Prehistoric Archaeology of Jordan*, BAR International Series 705:23–39.

HOFFECKER J. (2012) – *A new framework for the Upper Paleolithic of Eastern Europe (abstract). Proceedings of the European Society for the study of Human Evolution 1*. Leipzig, ESHE, p. 101.

HOOIJER D. (1961) – The fossil vertibrates of Ksar Akil, a Paleolithic Rockshelter in Lebanon. *Zoologische Verhandelingen* 49:1–67.

HOURS F. (1974) – Remarques sur l'utilisation de listes-types pour l'étude du Paléolithique supérieur et de l'epipaléolithique du Levant. *Paléorient* 2(1):3–18.

HOURS F. (1982) – Une nouvelle industrie en Syrie entre L'Acheuléen supérieur et le Levalloiso-Mousterien. In : R. Saideh, *Archaéologie au Levant*, Lyon, Maison de l'Orient, p. 34–36.

HOVERS E. (2009) – *Lithic Assemblages of Qafzeh Cave*. Oxford, Oxford University Press.

HOWELL F.C. (1959) – Upper Pleistocene stratigraphy and early man in the Levant. *Proceedings of the American Philosophical Society* 103(1):1–65.

INIZAN M.L. & ORTLIEB L. (1987) – Prehistoire dans la region de Shabwa au Yemen du sud. *Paléorient* 13:5–22.

JELINEK A.J. (1975) – A Preliminary report on some Lower and Middle Palaeolithic industries from the Tabun Cave. In: F. Wendorf & A.E. Marks, *Problems in Prehistory*, Dallas, Southern Methodist University Press, p. 297–31.

KEITH A. & MCCOWN T. (1937) – Mount Carmel Man. His Bearing on the Ancestry of Modern Races. In: G. MacCurdy (ed), *Early Man. Philadelphia*, J. B. Lippencott and Co., p. 41–52.

KEITH A. & MCCOWN T. (1939) – *The Stone Age of Mount Carmel* 2, Oxford, University Press.

KIVISILD T., MAERE R., METSPALU E., ROSA A., ANTONIO A., PENNARUN E., PARIK J., GEBERHIWOT T., USANGA E. & VILLEMS R. (2004) – Ethiopian mitochondrial DNA heritage: tracking gene flow across and around the Gate of Tears. *American Journal of Human Genetics* 75:752–770.

KLEIN R. (1994) – The Problem of Modern Human Origins. In: M. Nitecki & D. Nitecki, *Origins of Anatomically Modern humans*, New York, Plenum Press, p. 3–17.

KLEIN R. (1998) – Why anatomically modern people did not disperse from Africa 100 000 years ago. In: T. Akazawa, K. Aoki & O. Bar-Yosef, *Neanderthals and Modern Humans in Western Asia, New York*, Plenum Press, p. 509–522.

KLEIN R. (1999) – *The Human Career*. Chicago, University of Chicago Press.

KOZLOWSKI J.K. (1992) – The Balkans in the Middle and Upper Paleolithic: the gate to Europe or a cul-de-sac. *Proceedings of the Prehistoric Society* 58:1–20.

KUHN S.L., STINER M.C. & GULEC E. (1999) – Initial Upper Palaeolithic in south-central Turkey and its regional context: a preliminary report. *Antiquity* 73:505–517.

KUHN S., STEINER M., GÜLEÇ E., ÖZER I., Y1LMAZ H., BUYKARA I., AÇ1KKOL A., GOLDBERG P., MARTÍNEZ MOLINA K., ÜNAY E. & SAUTA-ALPASLAN F. (2009) – The Early Upper Paleolithic occupations at Üçağizli Cave (Hatay, Turkey). *Journal of Human Evolution* 56:87–113.

LAHR M.M. & FOLEY R.A. (1994) – Multiple dispersals and modern human origins. *Evolutionary Anthropology* 3:48–60.

LA TENSORE J. (2004) – Neuvelles fouilles à Hummal (El Kowm, Syrie Centrale). Premiers résultats (1997–2001), *BAR International Series* 1263:223–239.

LINDLY J.M. & CLARK G.A. (1987) – A Preliminary lithic analysis of the Mousterian site of Ain Difla (WHS site 634) in the Wadi Ali, West Central Jordan. *Proceedings of the Prehistoric Society* 53:279–292.

LINDLY J. & CLARK G.A. (2000) – The Ain Difla Rockshelter and Middle Paleolithic systematics in the Levant. In: N.R. Coinman, *The Archaeology of the Wadi Al-Hasa, West-Central Jordan 2: Excavations at Middle, Upper, and Epipalaeolithic Sites*, Arizona State University Anthropological Research Papers, Tempe, p. 111–117.

MACAULAY V., HILL C., ACHILLI A. *et al.* (2005) – Single, rapid coastal settlement of Asia revealed by analysis of complete mitochondrial genomes. *Science* 308:1034–1036.

MACBREARTY S. & BROOKS A. (2000) – The revolution that wasn't: a new interpretation of the origin of modern human behavior. *Journal of Human Evolution* 39:453–563.

MACDONALD B. ED. (1988) – *The Wadi el Hasa Archaeological Survey 1979–1983, West-Central, Jordan*. Waterloo, Wilfred Laurier University Press.

MARKS A.E. (1975) – An outline of prehistoric occurrences and chronology in the Central Negev, Israel. In: F. Wendorf & A.E. Marks, *Problems in Prehistory*, Dallas, Southern Methodist University Press, p. 351–362.

MARKS A.E. (1976) – Ein Aqev: a late Levantine site in the Nahal Aqev. In: A.E. Marks, *Prehistory and Paleoenvironments of the Central Negev, Israel I, The Avdat/Aqev Area, Part 1*, Dallas, Southern Methodist University Press, p. 227–292.

MARKS A.E. (1977) – The Upper Paleolithic sites of Boker Tachtit and Boker: a preliminary report. In: *Prehistory and paleoenvironments of the Central Negev, Israel, volume II: The Avdat/Aqev Area, Part 2 and the Har Harif*, Dallas, Department of Anthropology, Southern Methodist University, p. 61–79.

MARKS A.E. (1981) – The Middle Paleolithic of the Negev, Israel. Dans : J. Cauvin & P. Sanlaville, *Préhistoire du Levant*, Paris, Éditions du CNRS, p. 287–298.

MARKS A.E. (1983a) – The Middle to Upper Paleolithic transition in the Levant. In: F. Wendorf & A.E. Close, *Advances in World Archaeology* 2, New York, Academic Press, p. 51–98.

MARKS A.E. (1983b) – *Prehistory and Paleoenvironments in the Central Negev, Israel* 3. Southern Methodist University Press, Dallas.

MARKS A.E. (1983c) – The Sites of Boker and Boker Tachtit: A Brief Introduction. In: A.E. Marks, *Prehistory and Paleoenvironments in the Central Negev, Israel, volume III, the Avdat/Aqev Area, Part 3*, Dallas, Department of Anthropology, Southern Methodist University, p. 15–37.

MARKS A.E. (1990) – The Middle and Upper Paleolithic of the Near East and Nile Valley: the problems of cultural transformations. In: P. Mellars, *The Emergence of Modern Humans: An Archaeological Perspective*, Edinburgh, Edinburgh University Press, p. 57–80.

MARKS A.E. (1992) – Upper Pleistocene Archaeology and the Origins of Modern Man: A View from the Levant and Adjacent Areas. In: T. Akazawa, K. Aoki & T. Kimura, The Evolution and Disperal of Modern Humans in Asia, Tokiyo, Hokusen-sha, p. 229–252.

MARKS A. E. (1993) – The Early Upper Palaeolithic: the view from the Levant. In: H. Knecht, A. Pike-Tay & R. White, *Before Lascaux: The complex record of the Early Upper Palaeolithic*, Boca Raton FL, CRC Press, p. 5–22.

MARKS A.E. (2003) – Reflections on Levantine Upper Paleolithic Studies: Past and Present. In: A. Neigel Goring-Morris & A. Belfer-Cohen, *More then Meets the Eye*, Exeter, Oxbow books, p. 249–264.

MARKS A.E. (2009) – The Paleolithic of Arabia in an inter-regional context. In: M. Petraglia & J. Rose, *Evolution of human populations in Arabia: paleoenvironments, prehistory and genetics*, Dordrecht, Springer, p. 293–309.

MARKS A.E. & CREW H.L. (1972) – Rosh Ein Mor, Central Negev, Israel. *Current Anthropology* 13:591–593.

MARKS A.E. & FERRING C.R. (1988) – The early Upper Paleolithic of the Levant. In: J.F. Hoffecker & C.A. Wolf, *The Early Upper Paleolithic: evidence from Europe and the Near East*, Oxford, British Archaeological Reports, International Series 437:43–72.

MARKS A.E. & KAUFMAN D. (1983) – Boker Tachtit: The Artifacts. In: A.E. Marks, *Prehistory and Paleoenvironments in the Central Negev, Israel, volume III, the Avdat/Aqev Area, Part 3*, Dallas, Department of Anthropology, Southern Methodist University, p. 69–126.

MARKS A.E. & VOLKMAN P. (1983) – Changing core reduction strategies: a technological shift from the Middle to the Upper Paleolithic. In: The Mousterian Legacy, Human Biocultural Change in the Upper Pleistocene, edited by E. Trinkaus. Oxford: British Archaeological Reports International Series S164. p. 35–51.

MARKS A.E. & VOLKMAN P. (1985) – Technological variability and change seen through core reconstruction. Cambridge, Cambridge University Press, *Proceedings of the 4th International Flint Symposium* 1.

MCBREARTY S. & BROOKS A. (2000) – The revolution that wasn't: a new interpretation of the origin of modern human behavior. *Journal of Human Evolution* 39:453–563.

MCCOWN T. D. & KEITH A. (1939) – *The Stone Age of Mt. Carmel: the fossil human remains from the Levalloiso-Mousterian II*. Oxford, Clarendon Press.

MCLAREN S.J., AL-JUAIDI F., BATEMAN M.D. & MILLINGTON A.C. (2008) – First evidence for episodic flooding events in the arid interior of central Saudi Arabia over the last 60 ka. *Journal of Quaternary Science* 24:198–207.

MEIGNEN L. (1998) – Hayonim Cave Lithic Assemblages in the Context of the Near Eastern Middle Paleolithic: A Preliminary Report. In: T. Akazawa, K. Aoki & O. Bar-Yosef, *Neandertals and Modern Humans in Western Asia*, New York, Plenum Press, p. 163–180.

MEIGNEN L. (2012) – Levantine Perspectives on the Middle to Upper Paleolithic "Transition." *Archaeology, Ethnology and Anthropology of Eurasia* 40(3):12–21.

MEIGNEN L. & BAR-YOSEF O. (2003) – The Lithic Industries of the Middle and Upper Paleolithic of the Levant: Continuity of Break? In: A.P. Derevianko, *The Middle to Upper Paleolithic Transition in Eurasia: Hypotheses and Facts*, Novosibirsk, Institute of Archaeology and Ethnology Press, p. 166–175.

MEIGNEN L. & BAR-YOSEF O. (2005) – The Lithic Industries of the Middle and Upper Paleolithic of the Levant: Continuity or Break? In: A.P. Devevianko, *The Middle and upper Paleolithic Trnsition in Eurasia: Hypotheses and facts*, Novosibirsk, Institute of Archaeology and Ethnology Press, p. 166–175.

MELLARS P. (1973) – The Character of the Middle-Upper Palaeolithic transition in south-west France. In: C. Renfrew, *The Explanation of Culture Change: Models in Prehistory*, London, Duckworth, p. 255–276.

MELLARS P. (1996) – *The Neanderthal Legacy*. Princeton, Princeton University Press.

MELLARS P. (2000) – The Archaeological Records of the Neandertal-Modern Human Transition in France. In: O. Bar-Yosef & D. Pilbeam, *The Geography of Neandertals and Modern Humans in Europe and the Greater Mediterranean*, Cambridge, Peabody Museum Bulletin 8:35–48.

MELLARS P. (2006) – Why did modern human's populations disperse from Africa ca. 60,000 year ago? A new model. *Proceedings of the National Academy of Sciences of the USA* 103:9381–9386.

MELLARS P. & TIXIER J. (1989) – Radiocarbon-accelerator dating of Ksar 'Aqil (Lebanon) and the chronology of the Upper Paleolithic sequence in the Middle East. *Antiquity* 63(241):761–768.

MERCIER N., VALLADAS H., FROGET L., JORON J.-L., VERMEERSCH P.M., VAN PEER P. & MOEYERSONS D.J. (1999) – Thermoluminescence dating of a Middle Palaeolithic occupation at Sodmein Cave, Red Sea Mountains (Egypt). *Journal of Archaeological Science* 26:1339–1345.

METSPALU M., KIVISILD T., METSPALU E., PARIK J., HUDJASHOV G. *et al.* (2004) – Most of the extant mtDNA boundaries in south and southwest Asia were likely shaped during the initial settlement of Eurasia by anatomically modern humans. *BMC Genetics* 5:26.

MEYER M., KIRCHER M., GANSAUGE M.-T., LI H., RACIMO F. *et al.* (2012) – A High-Coverage Genome Sequence from an Archaic Denisovan Individual. *Science* (doi:10.1126/science.1224344).

MONIGAL K. (2003) – Technology, Economy and Mobility at the Beginning of the Levantine Upper Paleolithic. In: A.N. Goring-Morris & A. Belfer-Cohen, *Exeter, More than Meets the Eye*, Oxbow Books, p. 118–133.

MUNDAY F.C. (1976) – Intersite variability in the Mousterian occupation of the Avdat/Aqev area. In: A.E. Marks, *Prehistory and Paleoenvironments of the Central Negev, Israel I, The Avdat/Aqev Area, Part 1*, Dallas, Southern Methodist University Press, p. 57–68.

MUNDAY F.C. (1979) – Levantine Mousterian technological variability: a perspective from the Negev. *Paléorient* 5:87–104.

MUSTAFA M. & CLARK D.J. (2007) – Quantifying diachronic variability: the 'Ain Difla Rockshelter (Jordan) and the evolution of Levantine Mousterian technology. *Eurasian Prehistory* 5(1):47–84.

NEUVILLE R. (1934) – Le préhistorique de Palestine. *Revue Biblique* 43:237–259.

NEUVILLE R. (1951) – *Le Paléolithique et le Mésolithique du désert de Judée*. Mémoire 24, Archives de l'Institut de Paléontologie Humaine, Paris.

NEVES A. & SERVA M. (2012) – Extremely rare interbreeding events can explain Neanderthal DNA in living humans. *PLoS ONE* 7(10):e47076.

NEWCOMER M. (1970) – The Chamfered pieces from Ksar Akil (Lebanon). *Bulliten of the Institute of Arachaeology*, University of London 8–9:177–191.

NEWCOMER M. (1971) – Un nouveau type de burin à Ksar Akil (Liban). *Bulletin de la Société Préhistorique Française* 68:276–272.

NEWCOMER M. (1974) – Study and replication of bnes tools from Ksar Akil. *World Archaeology* 6:138–153.

OLIVIERI A., ACHILLI A., PALA M., BATTAGLIA V., FORNARINO S., AL- ZAHERY N., SCOZZARI R. *et al.* (2006) – The mtDNA legacy of the Levantine early Upper Paleolithic in Africa. *Science* 314:1767–1770.

OLSZEWSKI D.I. (1997) – From the Late Ahmarian to the Early Natufian: A Summary of Hunter-Gatherer Activities at Yutil al-Hasa, West-Central Jordan. In: H.-G. Gebel, Z. Kafafi & G. O. Rollefson, *The Prehistory of Jordan II. Perspectives from 1997. Studies in Early Near Eastern Production, Subsistence, and Environment* 4, Berlin, p. 171–182.

OLSZEWSKI D.I. (2003) – The Conundrum of the Levantine Late Upper Paleolithic and Early Epipaleolithic: Perspectives from the Wadi al-Hasa, Jordan. In: A.N. Goring-Morris & A. Belfer-Cohen, *More than Meets the Eye*, Exeter, Oxbow Books, p. 230–241.

OLSZEWSKI D.I. & COINMAN N.R. (1998) – Settlement Patterning during the Late Pleistocene in the Wadi al-Hasa, West-Central Jordan. In: N.R. Coinman, *The Archaeology of the Wadi al-Hasa, West-Central Jordan, Vol. 1: Surveys, Settlement Patterns, and Paleoenvironments*, Tempe, Arizona State University, Anthropological Research Papers 50:177–203.

OLSZEWSKI D.I., CLARK G.A. & FISH S. (1990) – WHS 784x (Yutil al-Hasa): A Late Ahmarian Site in the Wadi Hasa, West-Central Jordan. *Proceedings of the Prehistoric Society* 56:33–49.

OLSZEWSKI D.I., STEVENS M., GLASS M., BECK R.F., COOPER J. & CLARK G.A. (1994) – The 1993 Excavations at Yutil al-Hasa (WHS 784), An Upper/Epipaleolithic Site in West-Central Jordan. *Paléorient* 20(2):129–161.

OTTE M., YALÇINKAYA I., TASKIRAN H., KOZLOWSKI J., BAR-YOSEF O. & NOIRET P. (1995) – The Anatolian Middle Paleolithic: new research at Karain Cave. *Journal of Archaeological Research* 51(4):287–299.

OPPENHEIMER S. (2009) – The great arc of dispersal of modern humans: Africa to Australia. *Quaternary International* 202:2–13.

OTTE M., BIGLARI F., FLAS D., SHIDRANG S., ZWYNS N., MASHKOUR M., NADERI R., MOHASEB A., HASHEMI N., DARVISH J. & RADU V. (2007) – The Aurignacian in the Zagros region: new research at Yafteh Cave, Lorestan, Iran. *Antiquity* 81:82–96.

PARR P., ZARINS J., IBRAHIM M., WAECHTER J., GARRARD A., CLARKE C., BIDMEAD M. & AL-BADR H. (1978) – Preliminary report on the second phase of the Northern Province Survey 1397/1977. *Atlal* 2:29–50.

PARKER A.G. & ROSE J.I. (2008) – Climate change and human origins in southern Arabia. *Proceedings of the Seminar for Arabian Studies* 38:25–42.

PARTON A.P., FARRANT A.R., LENG M.L., SCHWENNINGER J.-L., ROSE J.I., UERPMANN H.P. & PARKER A.G. IN PRESS – An Early MIS3 Pluvial Phase Within Southeast Arabia: Climatic and Archaeological Implications. *Quaternary International*.

PETRAGLIA M.D., ALSHAREKH A., CRASSARD R., DRAKE N., GROUCUTT H., PARKER A. & ROBERTS R. (2011) – Middle Paleolithic occupation on a last interglacial lakeshore in the Nefud Desert, Saudi Arabia. *Quaternary Science Reviews* 30:1555–1559.

PETRAGLIA M.D., ALSHAREKH A., BREEZE P., CLARKSON C., CRASSARD R. *et al.* (2012) – Hominin Dispersal into the Nefud Desert and Middle Palaeolithic Settlement along the Jubbah Palaeolake, Northern Arabia. *PLoS ONE* e49840.

PHILBY H. (1933) – Rub al' Khali: an account of exploration in the great south desert of Arabia under the auspices and patronage of His Majesty 'Abdul 'Aziz ibn Saud, King of the Hejaz and Nejd and its dependencies. *Geographical Journal* 81:1–21.

PHILLIPS J.L. (1987a) – Upper Paleolithic hunter-gatherers in the Wadi Feiran, Southern Sinai. In: O. Soffer, *The Pleistocene Old World*, New York, Plenum Press, p. 169–182.

PHILLIPS J.L. (1987b) – Sinai during the Paleolithic: the early periods. In: A.E. Close (ed.), *Prehistory of Arid North Africa*, Dallas, Southern Methodist University Press, p. 105–122.

PHILLIPS J.L. (1988) – The Upper Paleolithic of the Wadi Feiran, Southern Sinai. *Paléorient* 14 (2):183–200.

PHILLIPS J.L. (1994) – The Upper Paleolithic chronology of the Levant and the Nile Valley. In: O. Bar-Yosef & R. Kra, *Late Quaternary Chronology and Paleoclimates of the Eastern Mediterranean*, Tucson, Radiocarbon Press, p. 169–176.

PREUSSER F. (2009) – Chronology of the impact of Quaternary climate change on continental environments in the Arabian Peninsula. *Comptes Rendus Geoscience* 341:621–632.

PULLAR J. (1974) – Harvard archaeological survey in Oman, 1973: flint sites in Oman. *Arabian Seminar* 4:33–48.

PULLAR J. (1985) – A selection of aceramic sites in the Sultanate of Oman. *Journal of Oman Studies* 7:49–88.

PULLAR J. & JÄCKLI B. (1978) – Some aceramic sites in Oman. *Journal of Oman Studies* 4:53–71.

QUINTANA-MURCI L., SEMINO O. & BANDELT H.J. *et al.* (1999) – Genetic evidence of an early exit of Homo sapiens sapiens from Africa through eastern Africa. *Nature Genetics* 23:437–41.

REICH D., PATTERSON N., KIRCHER M., DELFIN F., NANDINENI M. *et al.* (2011) – Denisova admixture and the first modern human dispersals into southeast Asia and Oceania. *American Journal of Human Genetics* 89:516–528.

RICHTER D., HAUCK T., WOJTCZAK D., LE TENSORER J.-M. & MUHESEN S. (2011) – Chronometric age estimates for the site of Hummal (El Kowm, Syria). In: J.-M. Le Tensorer, R. Jagher & M. Otte, *The Lower and Middle Paleolithic in the Middle East and Neighbouring regions*, ERAUL 126:249–262.

RONEN A. (1976) – The Upper Palaeolithic in Northern Israel: Mount Carmel and Galilee. In : F. Wendorf, *Deuxième colloque sur la terminologie de la préhistoire du Proche-Orient, 9th Congres U.I.S.P.P.*, Nice, Colloque III, p. 153–186.

ROSE J. (2010) – New light on human prehistory in the Arabo-Persian Gulf Oasis. *Current Anthropology* 51:849–883.

ROSE J. & PETRAGLIA M. (2009) – Tracking the origin and evolution of human populations in Arabia. In: M. Petraglia & J. Rose, *Evolution of human populations in Arabia: paleoenvironments, prehistory and genetics*, Dordrecht, Springer, p. 1–14.

ROSE J. & USIK V. (2009) – The "Upper Palaeolithic" of southern Arabia. In: Petraglia, M. & J. Rose (eds.), *The Evolution of Human Populations in Arabia: Palaeoenvironments, Prehistory, and Genetics*, Springer Academic Publishers, Netherlands, p. 169–185.

ROSE J., USIK V., MARKS A., HILBERT Y., GALLETTI C., PARTON A., GEILING J.M., CERNY V., MORLEY M. & ROBERTS R. (2011) – The Nubian Complex of Dhofar, Oman: an African Middle Stone Age industry in southern Arabia. *PLoS ONE* 6(11):28239.

ROSENBERG T., PREUSSER F., FLEITMANN D., SCHWALB A., PENKMAN K., SCHMID T.W., AL-SHANTI M.A., KADI K. & MATTER A. (2011) – Human periods in southern Arabia: Windows of opportunity for modern human dispersal. *Geology* 39:1115–1118.

SÁNCHEZ-QUINTO F., BOTIGUÉ L.R., CIVIT S., ARENAS C., ÁVILA-ARCOS M. *et al.* (2012) – North African Populations Carry the Signature of Admixture with Neandertals. *PLoS ONE* 7:47765.

SANKARARAMAN S., PATTERSON N., LI H., PÄÄBO S. & REICH D. (2012) – The date of interbreeding between Neandertals and modern humans. *PLoS ONE* 8:1002947.

SCALLY A. & DURBIN R. (2012) – Revising the human mutation rate: implications for understanding human evolution. *Nature Review Genetics* (doi:10.1038/nrg3295).

SCHILD R. (1998) – Comments on Van Peer: The Nile Corridor and the Out-of- Africa Model: An Examination of the Archaeological Record. *Current Anthropology* 39:S134–S135.

SKOGLUND P. & JAKOBSSON M. (2011) – Archaic human ancestry in East Asia. *Proceedings of the National Academy of Sciences USA* (doi:10.1073/pnas.1108181108).

SHEA J. (2007) – Behavioral differences between Middle and Upper Paleolithic Homo sapiens in the East Mediterranean Levant. *Journal of Anthropological Research* 63(4):449–488.

SHEA J. & SISK M. (2010) – Complex Projectile Technology and *Homo sapiens* Dispersal into Western Asia. *PaleoAnthropology* (doi 10.4207/PA.2010.ART36).

SISK M. & SHEA J. (2011) – The African Origin of Complex Projectile Technology: An Analysis Using Tip Cross-Sectional Area and Perimeter. *International Journal of Evolutionary Biology* 2011:1–8 (doi 10.4061/2011/968012).

SITZIA L., BERTRAN P., BOULOGNE S., BRENET M., CRASSARD R. *et al.* (2012) – The paleoenvironment and lithic taphonomy of Shi'Bat Dihya 1, a Middle Paleolithic site in Wadi Surdud, Yemen. *Geoarchaeology* 27:471–491.

SOARES P., ERMINI L., THOMSON N., MORMINA M., RITO T., SALAS A., OPPENHEIMER S., MACAULAY V. & RICHARDS M. (2009) – Correcting for Purifying Selection: An Improved Human Mitochondrial Molecular Clock. *American Journal of Human Genetics* 84:740–759.

STEKELIS M. (1954) – Nouvelles fouilles dans la grotte de Kébara. *Proceedings of the 4th Congress of the U.I.S.P.P. Madrid*, p. 385–389.

STRINGER C. (1985) – Middle Pleistocene hominin variability and the origin of Late Pleistocene humans. In: E. Delson (ed.), *Ancestors, the Hard Evidence*, Alan R. Liss, New York, p. 289–295.

STRINGER C. (1994) – Out of Africa – A personal history. In: M. H. Nitecki & D.V. Nitecki, *Origins of Anatomically Modern Humans*, New York:Plenum, p. 150–174.

STRINGER C. (2000) – Coasting out of Africa. *Nature* 405:24–26.

SUZUKI H. & TAKAI F. (ED.) (1970) – *The Amud man and his cave site*. Tokyo, Academic Press.

TCHERNOV E. (1992) – Biochronology, paleoecology and dispersal events of hominids in the southern Levant. In: T. Akazawa, K. Aoki & T. Kimura, *The evolution and dispersal of modern humans in Asia*, Tokyo, Hokusen-Sha, p. 149–188.

TIXIER J. & INIZAN M.-L. (1981) – Ksar Akil, stratigraphie et ensembles lithiques dans le Paléolithique supérieur: fouilles 1971–1975. Dans : J. Cauvin & P. Sanlaville, *Préhistoire du Levant*, Paris, Éditions du CNRS, p. 353–367.

TOSTEVIN G. (2000) – The Middle Upper Paleolithic Transition from the Levant to Central Europe: in situ development or diffusion. In: J. Orschiedt & G. Weniger, *Neanderthals and Modern Humans – Discussing the Transition*, Mettmann, Neanderthal Museum, p. 92–111.

TOSTEVIN G. (2003) – A quest for Anticedents: A Comparison of the Terminal middle Paleolithic and Early Upper Paleolithic of the Levant. In: A. Neigel Goring-Morris & A. Belfer-Cohen, *More then Meets the Eye*, Exeter, Oxbow Books, p. 54–67.

TSANOVA T., ZWYNS N., EIZEBERG L., TEYSSANDIER N., LE BRUN-RICALENS F. & OTTE M. (2012) – Le plus petit dénominateur commun réfluxion sur la variabilité des ensambles lamellaires du Paléolithique supérieur ancient d'Eurasie. Un bilan autour des examples de Kozarnika (Est des Balkans) et Yafteh (Zagros central). *L'anthopologie* 116:469–509.

TURVILLE-PETRE F. (1925) – Excavation of two Palaeolithic caves in Galilee. British *School of Archaeology in Jerusalem Bulletin* 7:99–101 (and plates III-V).

USIK V., ROSE J., HILBERT Y., VAN PEER P. & MARKS A. (2012) – Nubian Complex reduction strategies in Dhofar, southern Oman. *Quaternary International* (http://dx.doi.org/10.1016/j.quaint.2012.08.2111).

VAN PEER P. (1998) – The Nile corridor and the out-of-Africa model. *Current Anthropology* 39:S115-S140.

VAN PEER P., VERMEERSCH P.M. & PAULISSEN E. (2010) – *Chert Quarrying, Lithic Technology and a Modern Human Burial at the Palaeolithic Site of Taramsa 1, Upper Egypt*. Leuven University Press, Leuven.

VANDERMEERSCH B. (1981) – *Les homes fossils de Qaftzeh (Israel)*. Paris, CNRS.

VANDERMEERSCH B. (1992) – The Near Eastern Hominids and the Origins of Modern Humans in Eurasia. In: T. Akazawa, K. Aoki & T. Kimura, *The Evolution and Disperal of Modern Humans in Asia*, Tokiyo, Hokusen-sha, p. 29–38.

VERMEERSCH P.M. (2001) – 'Out of Africa' from an Egyptian point of view. *Quaternary International* 75:103–112.

VOLKMAN P. (1983) – Boker Tachtit: core reconstructions. In: A.E. Marks, *Prehistory and Paleoenvironments in the Central Negev, Israel, volume III, the Avdat/Aqev Area, Part 3*, Dallas, Department of Anthropology, Southern Methodist University, p. 127–190.

VOLKMAN P. (1989) – *Boker Tachtit: the technological shift from the Middle to the Upper Paleolithic in the Central Negev, Israel. Ph.D. dissertation.* Southern Methodist University, AAD89- 21973.

VOLKMAN P. & KAUFMAN D. (1983) – A reassessment of the Emireh point as a possible type fossil for the technological shift from the Middle to the Upper Palaeolithic in the Levant. In: Trinkaus E. (ed.), *The Mousterian Legacy*, Oxford, BAR International Series 167:631–644.

WILLIAMS J. (2003) – An Examination of Upper Paleolithic Flake Technologies in the Marginal Zone of the Levant. In: B. Goring-Morris & A. Belfer Cohen, *More Than Meets the Eye*, Exeter, The Short Run Press, p. 196–208.

WILLIAMS J. & BERGMAN C. (2010) – Upper Paleolithic Levels XIII-VI (A and B) from the 1937–1938 and 1947–1948 Boston College Excavations and the Levantine Aurignacian at Ksar Akil, Lebanon. *Paléorient* 36(2):117–161.

WILSON A.C., CANN R.L., CARR S.M., GEORGE M., GYLLENSTEN U.B., HELM-BYCHOWSKI K., HIGUCHI R.G., PALUMBI S.R., PRAGER E.M., SAGE R.D. & STONEKING M. (1985) – Mitochondrial DNA in relation to evolutionary genetics. *Biological Journal of the Linnaean Society* 26:375–400.

YALÇINKAYA I., OTTE M., LEOTARD J.-M., TASKIRAN H., BAR-YOSEF O. & KOZLOWSKI J. (1992) – Karain 1991. Recherches paléolithiques en Turquie du sud. Report provisoire. *Paléorient* 18(2):109–123.

YALÇINKAYA I. (1995) – Thoughts on Levallois Technique in Anatolia. In The Definition and Interpretation of Levallois Technology, edited by H. L. Dibble and O. Bar-Yosef. Madison, Prehistory Press, *Monographs in World Archaeology* 23:399–412.

YOTOVA V., LEFEBVRE J.-F., MOREAU C., GBEHA E., HOVHANNESYAN K. *et al.* (2011) – An X-linked haplotype of Neandertal origin is present among all non-African populations. *Molecular Biology and Evolution* 28:1957–1962.

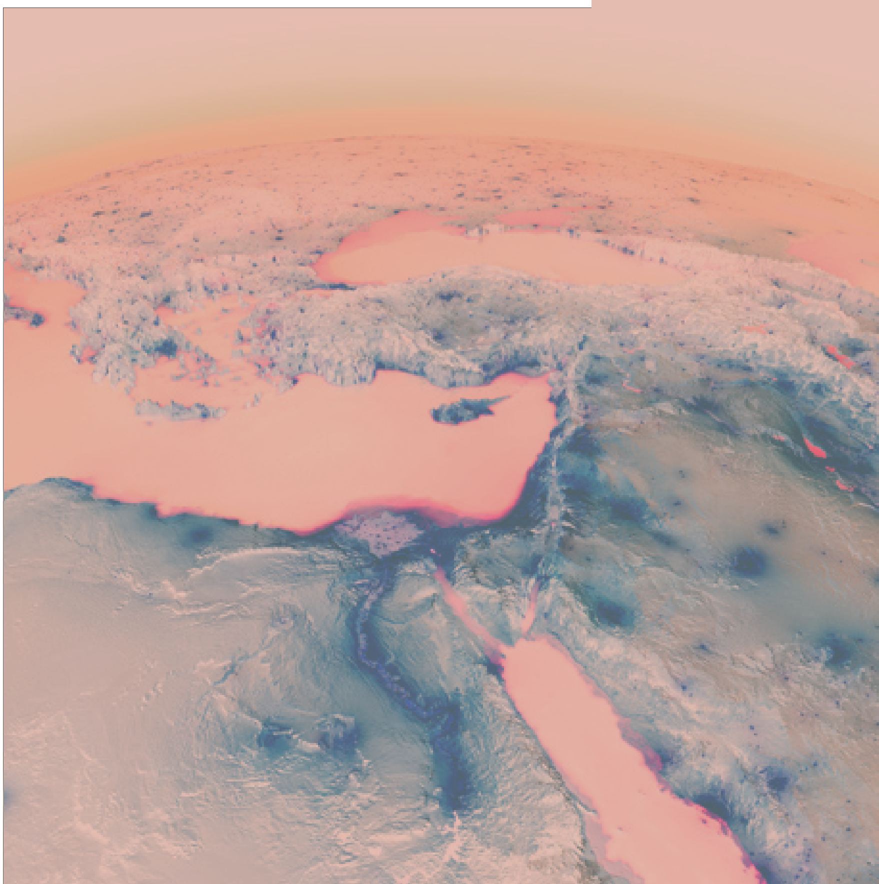
ZARINS J., MUHAMMED I., POTTS D. & EDENS C. (1979) – Preliminary report on the third phase of the archaeological survey program – the Central Province. *Atlal* 3:9–42.

ZARINS J., MURAD A. & AL-YISH K. (1981) – Comprehensive archaeological survey program: the second preliminary report on the Southwestern Province. *Atlal* 5:9–42.

ZARINS J., RAHBINI A. & KAMAL M. (1982) – Preliminary report on the archaeological survey of the Riyadh area. *Atlal* 6:25–38.

ZARINS J., WHALEN N., IBRAHIM M., MURSI A. & KHAN M. (1980) – Comprehensive archaeological survey program: preliminary report on the Central and Southwestern Province Survey: 1979. *Atlal* 4:9–36.

ZUMOFFEN G. (1908) – L'âge de la pierre en Phénicie. *Anthropos* 3:431–455 and plates I-XVII.



The importance of raw material factor for Final Paleolithic investigations in Trans-Baikal region (Russia)

Pavel V. MOROZ Georgy A. YURGENSON

Резюме: В работе представлены результаты петроархеологических исследований, проведённых авторами на базе материалов памятников Усть-Менза I и II в Западном Забайкалье. Проведён полный анализ коллекций указанных памятников, который выявил, что артефакты из яшмы, кремня и халцедона доминируют в горизонтах стоянки Усть-Менза I, составляя 69% от общего числа. Для Усть-Мензы II кремень, яшма и халцедон также преобладают, совокупно составляя 59% артефактов, что близко к значениям Усть-Мензы I. Для выяснения источников этого сырья высокого качества были использованы данные о распространении этих горных пород в регионе. В результате было выяснено, что источники сырья были удалены от памятников Усть-Мензы на расстояния не менее 150 км. по прямой. Таким образом, мы полагаем, что отсутствие жизненно необходимых минералов и горных пород в значительной части территории Западного Забайкалья, вынуждало человеческие коллективы постоянно перемещаться, с целью пополнения запасов этого сырья

Ключевые слова: Ключевые слова: верхний палеолит, Забайкалье, петроархеология, перемещения в палеолите.

Abstract: *The results of petroarheological research conducted by the authors based on materials sites of Ust-Menza I and II in the Western Transbaikalia are presented in the given work. A full analysis of these sites' collections was made and proved that artifacts on jasper, chalcedony and flint (in total, 69%) dominate in the levels of Ust-Menza I site. Similar to the Ust-Menza I raw material data of flint, jasper and chalcedony also prevail (all together 59%) among the Ust-Menza II artifacts. To find out the source of these high quality raw materials the data on the distribution of these rocks in the region were used. As a result, it was found out that the sources of raw materials were removed from the Ust-Menza sites at a minimum distance of 150 km. in a straight line. Thus, we believe that the absence of vitally necessary minerals and rocks in the significant part of the territory of Western Trans-Baikal region forced Paleolithic humans to move permanently in order to replenish stocks of these raw materials.*

Key-Words: *Upper Paleolithic, Trans-Baikal region (Russia), petroarcheology, movement in the Paleolithic.*

1 INTRODUCTION

For more than a century, the study of Stone Age archaeological sites in Trans-Baikal region resulted in finding of a number of stratified sites geochronologically related to the time of Final Pleistocene - Early Holocene. As usual for Stone Age sites, tools were produced using different minerals and rocks. Namely, varieties of minerals and rocks do constitute a subject of the present study.

A series of books have been already published after the region's site excavations during last thirty years (e.g, Okladnikov &. Kirillov 1980; Konstantinov 1994; Lbova 2000; Tashak 2005). Almost all basic stratified Trans-Baikal Stone Age sites were described in the books. The main sites among some other ones are Studenovsky, Ust-Menzinsky and Ust-Kyakhtensky archaeological complexes, as well as Tolbaga, Podzvonkaya, Varvarina Gora, Hotyk, and Kamenka settlements that did serve for creation of some Trans-Baikal Stone Age industrial-chronological periodizations.

Although geological (Bazarov *et al.* 1982; Karasev 2001), spatial pattern (Razgildeeva 2003) and habitation structure (Konstantinov 2001) studies were realized for the region's sites, the priority was still devoted to stone artifact analyses. Namely, Paleolithic stone artifacts are used basic archeological method studies, such as typological, technological and functional approaches that can be named as "culture determined" methods allowing to differentiate stone artifact assemblages through techno-typological and functional features (Girya 1997). Along with these basic artifact studies, a little or almost no attention was paid to raw material varieties applied to stone artifact production for the Trans-Baikal Stone age sites. Also, any Paleolithic human migration possibilities have not been actually investigated for the territorially huge area.

It is well known that raw material data started to be studied with many special observations during ca. last 30 years with an emphasis on interrelations between Paleolithic human communities and surrounding paleoenvironments. For example, thanks to various mineralogical and petrographic analyses, a great attention is paid now to recognition of different flint outcrops used by Paleolithic humans and ways on bringing of raw material blocks and artifacts to archeological sites (e.g. Demars 1982; Dibble 1991; Miller 2001).

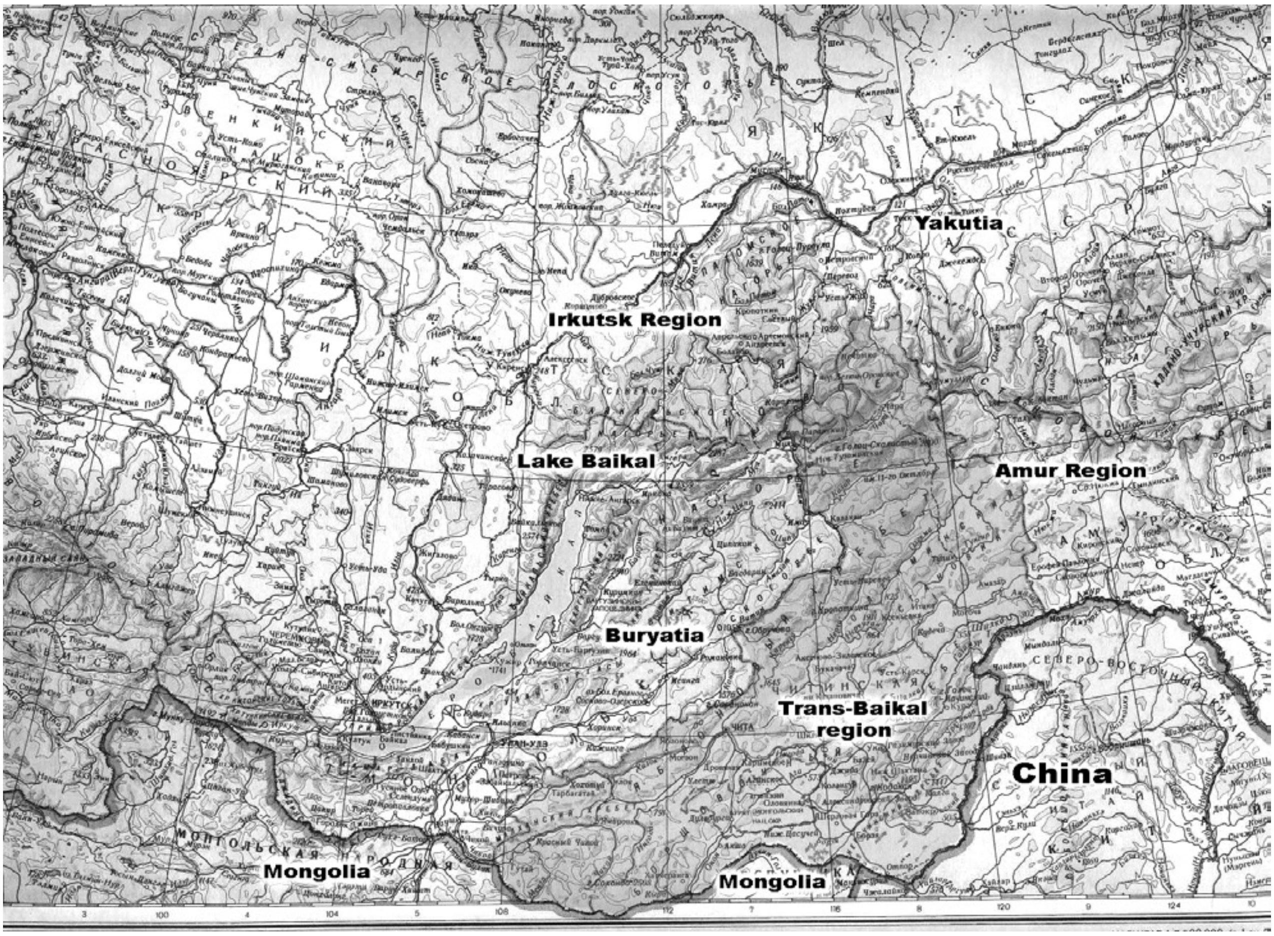
In the ex-Soviet Union, such mineralogical and petrographic studies have been organized much less extensively. However, it should be mentioned the name of V.F. Petrun, who even developed a concept of "archeological petrography" at the intersection of geology and archeology in Ukraine (Petrun 1990; 2000). At present time, some successful Paleolithic raw material studies have been already performed for some European Russian Paleolithic materials (see Otte *et al.* 2006; Matioukhin 2010; 2012) and Paleolithic materials in Altai region (e.g. Postnov *et al.* 2000). Some very special raw material studies have been also realized on Ural mountain region flint and jasper materials (Mosin & Nikolsky 2008) and on Far East obsidian data (Kuzmin & Glascock 2010).

2 A SHORT OVERVIEW OF TRANS-BAIKAL UPPER AND FINAL PALEOLITHIC

At the present stage of the Trans-Baikal Stone Age studies (**figure 1**), most researchers use the scheme developed by Mikhail V. Konstantinov. It was created by him after thirty years of field work and combines the Stone Age sites in the region on the basis of cultural, chronological and stratigraphic data. The scheme is a tripartite one with three stages for each important Stone Age epoch in the region, Upper Paleolithic, Mesoilithic and Neolithic (Konstantinov 1994).

By basic features of stone artifacts, Trans-Baikal Early Upper Paleolithic is characterized by two various primary flaking strategies corresponding to two different archaeological cultural traditions. On one hand, Kunaleiskaya culture demonstrates an archaic primary reduction directed to mainly flake production. On the other hand, Tolbaginskaya culture clearly features a blade primary flaking reduction. At the same time, both cultures do contain mainly Upper Paleolithic tool classes and types, although Kunaleiskaya cultural tradition is usually considered to have a less developed stone treatment characteristics. From the point of view of their tools and tool-blanks, both cultures are known through presence of a rather massive tools produced on large-sized flakes and/or blades. The cultures' chronology is placed into interval in between ca. 35 000 and 25 000 BP uncalibrated. Almost no attention was paid to raw material data used in stone treatment processes for the two culture sites.

FIGURE 1 Trans-Baikal region geographical position.



Middle stage of Trans-Baikal Upper Paleolithic is less studied in comparison to the Early UP one. The most known Mid UP sites are Masterov Klyuch and Melnichnaya 2. The sites' stone artifact assemblages are of specific characteristic being different from the Early UP ones in the region (Moroz 2002; Mescherin & Moroz 2003). The stage's main techno-typological characteristics are as follows: a clear both morphological and technological irregularity of blades; absence of any bladelet reduction; a dominance of tools on flakes; size of tools and debitage decreases in comparison to the respective data for the Early UP sites. Chronologically, the Mid UP stage is referred to the time span in between ca. 23 000 and 16 000 BP uncalibrated. Only some limited raw material data studies have been done for some site assemblages.

Late stage of Upper Paleolithic is very different from the two previous stages by both technology of core reductions and raw material data. A number of multilevel stratified sites (Ust-Menza 1–3, Studyonoe 1–2) demonstrate the appearance of bladelet technology, and namely, microblade technology. Microblades (1 – 3,5 cm long, no more than 0,5 cm wide, 0,1 – 0,2 cm thick) become the main debitage class. Various narrow flaked and wedge-shaped cores have been used for their reduction. The core and tool overall sizes reach their minimal indications during the Late UP stage (ca. 18 000 – 13–12 000 BP uncalibrated) that is well seen on materials from lower levels at Ust-Menza II site (Moroz 2007). An intensive raw material data study was realized for materials from Ust-Menza archeological complex.

In sum, there is a sort of the region's UP development during ca. 30 000 years represented by dozens of sites having in total several hundred archeological levels. Of course, each site and/or its level contain artifacts produced from different rocks and minerals. Traditionally, our archeologists have been only studied the following artifact data: technology of primary flaking processes, morphology and typology of tools. Much less attention was even paid to the size of cores, debitage and tools as there was a generally accepted opinion that the average size of artifacts was gradually decreasing from Early Upper Paleolithic until Neolithic. The "size decreasing trend" has been explained by cultural factors and a development of projectile hunting weaponry "insert technology" leading to so-called microlitization of stone assemblages through time. Along with this, artifact size studies were certainly at a "side road" of the Trans-Baikal UP assemblage investigations. The same can be said to the raw material data studies. As a rule, our colleagues were just noting basic raw material types occurred in such and such assemblage and indeed have never studied any possible interrelations for raw material types – technologies of primary flaking – tool formation processes.

3 RAW MATERIAL TYPES KNOWN FOR THE LATE PERIODS OF UP IN TRANS-BAIKAL REGION

First time for the Trans-Baikal Late and Final Paleolithic the present authors work on petrographic studies of artifact assemblages using materials from Ust-Menza archeological complex. Moreover, we do not study only some artifact samples but involve into the studies all artifacts from all sites and their archeological levels (Moroz 2008; Yurgenson & Moroz 2009). The situation with Ust-Menza raw material data (**figure 1**) can be summarized as follows.

Flint, chalcedony, prase, microslate, microquartzite, two-mica schist, rock crystal, quartz sandstones, quartz, volcanic glass, hornfels and jasper have been recognized for artifacts from 17 levels of Ust-Menza I site.

But artifacts on jasper, chalcedony and flint (in total, 69 %) do clearly dominate there and this tendency is traced for each level of site showing one and the same raw material pattern. Additionally, some more raw material data for particular tool classes are also very indicative for Ust-Menza I materials. End-scrapers on jasper (34 %) do prevail, while flint (23 %) and chalcedony (20 %) are equally less represented. At the same time, end-scrapers on microquartzite (13 %), micro-slate (7 %) and prase (3 %) are of minor importance. In most cases, scaled tools were made on flint (66 %). All Ust-Menza side-scrapers (*sic!*) have been manufactured exclusively on microslate. Burins were made on chalcedony (50 %), prase (25 %) and flint (25 %). Borers were equally produced on flint and microquartzite equally. Blades have been made on chalcedony and flint.

Ust-Menza II site's tool-kits do show a greater variability of used raw material types. Petrographic analyses have shown the following rocky types: flint, jasper, chalcedony, microquatzite, microslate, felsite, obsidian, albitophyre, sandstone, opal, chalcedony, granite, quartzite, metamorphosed diatomite, prase, lamprophyre, hornfels, quartz, rock crystal, porphyry and microcline. Similar to the Ust-Menza I raw material data, flint, jasper and chalcedony also do prevail (all together 59 %) among the Ust-Menza II artifacts. The total rate of microquartzite, microslate and hornfels is 18 % showing a rather important role of these rocks too. However, a share of each other raw material type is much lower and do not exceed even 3 %. At the same time, shares of different rocks for tool-kits within of Ust-Menza II levels are enough similar to the respective data for Ust-Menza I site. Chalcedony, flint and jasper collectively make up 70 % of tools of each level at Ust-Menza II. Such raw material data are not considered as accidental and are influenced, in our opinion, by primary flaking technological peculiarities.

There is a clear tendency to use certain types of rocks for tool production in all levels of the two sites. The priority of using of high quality rocks and minerals is unambiguously confirmed. Flint, jasper and chalcedony were of the highest value. These three raw material types dominate for about all tool classes. Most likely, high petrophysical properties of these rocks do explain it. First, hardness of jasper is more than 5.5, flint - 6, and chalcedony and praze - 6.5–7 units on the Mooca scale. Second, these minerals and rocks have small and microgranular structures (**figure 2**), also being in some cases with an aphanic structure. All of these characteristics are the most important when choosing a material for stone treatment processes. Grain size of any material is extremely important for treatment processes as nature of the rock structure affects the formation of Hertzian cone in an isotropic body, as well as then a behavior of fracture. The having microgranular and aphanic structures the used raw materials are almost perfect to obtain conchoidal fracture.

An interconnection between size of raw material types and produced tools is even more evident. Based on geology data, high quality Transbaikalia chalcedony and prase are formed in a view of tonsils (Yurgenson 2001). The tonsil length does not exceed 5–6 cm and the formed tonsils are not always a sort of volumetric nodule. As a rule, a chalcedony tonsil is a flattened piece with cellular surface structure, often containing voids, cavities and extrinsic inclusions that complicate to some extent its primary flaking, but still certain high petrophysical properties have been making it attractive for Paleolithic human primary and secondary treatments. Namely, small sizes of chalcedony and flint original pieces / nodules have actually led to the miniaturization of cores and debitage produced on these rocky materials by Late UP humans at Ust-Menza sites. Debitage more than 6 cm long from these raw material types are completely absent in the sites' assemblages and it was caused by not any cultural but raw material causes.

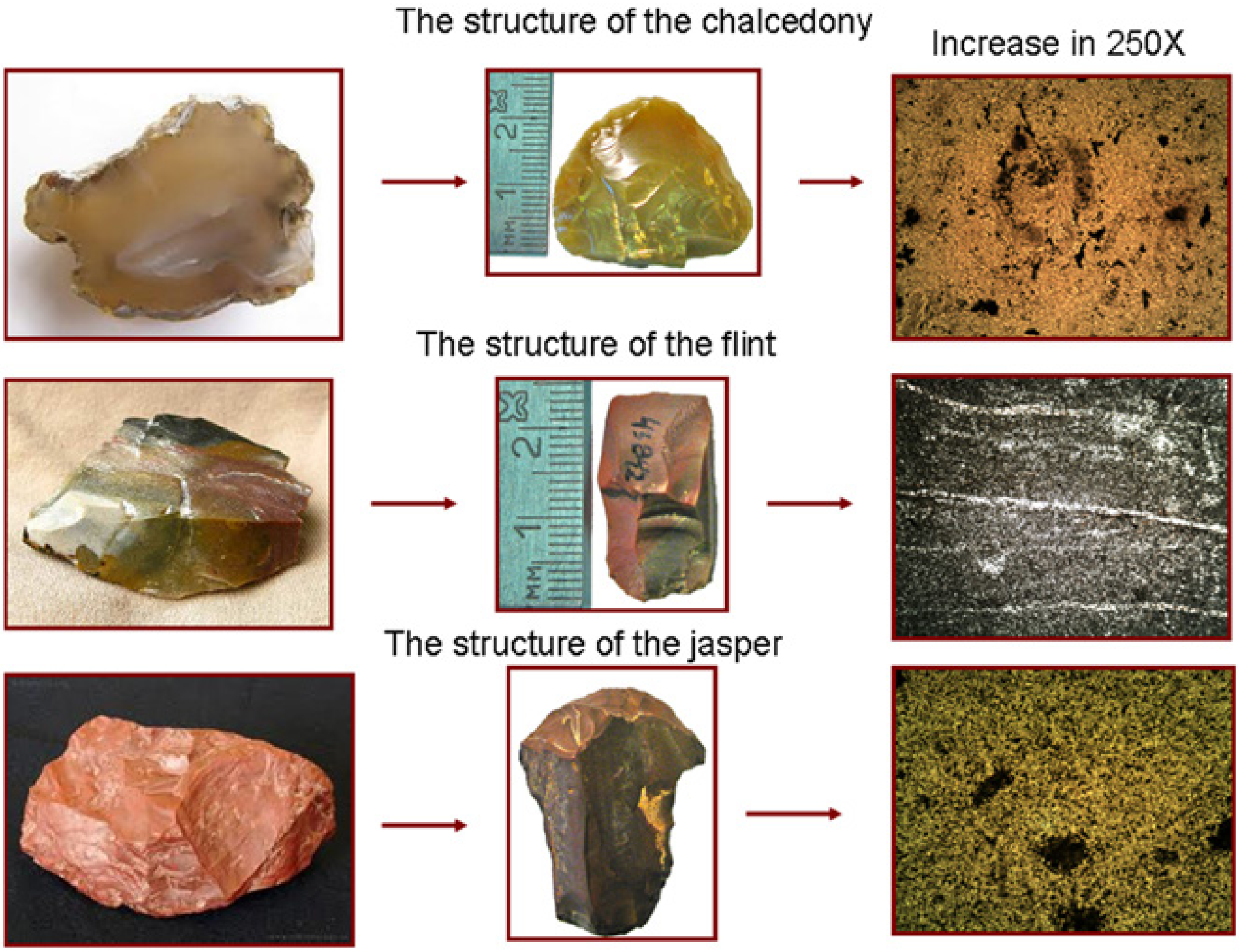


FIGURE 2 Trans-Baikal region's main raw materials and their structures.

Also, initial raw material pieces / nodules more than 6 cm long are extremely rare in the assemblages and, of course, even not each of them was good enough for a core formation and reduction. In such situation, microblade reduction seems to be an objective and easy technological solution, especially remembering that projectile inserts were solving problems of both raw material economy and easy renovation of the tool-kits.

The sites' assemblage artifact metrical parameters show clearly small sizes of tool made on chalcedony, flint and jasper from all archeological levels there. End-scrapers, scaled tools and debitage produced on these raw material types are equally miniature in all levels of the sites. Moreover, all tools made on high quality rocks have clear signs of multiple re-shaping of their working edges and also cores are extremely exhausted. We inclined to think that the basic cause of such "repetitive diminutiveness" is the size of initial raw material pieces / nodules that were not changing through time. It has also limited a set of technologies that could be applied to treatment of these raw materials. As a result, microblade reduction was the most suitable for the existing in the region's raw material types that brought its usage for a long time then, even including Trans-Baikal Iron Age time period. It was also a main reason why techno-typologically Trans-Baikal both Late Upper Paleolithic and Final Paleolithic are so similar one to another.

4 RAW MATERIAL AVAILABILITY FOR THE TRANS-BAIKAL FINAL PALEOLITHIC

But where were sources of the high quality raw materials? There was no answer for the question before our studies, however. That's why the present authors have conducted a special research on natural distribution of various minerals and rocks within Ust-Menza archeological complex. The complex has the most significant concentration of Final Paleolithic sites in Trans-Baikal region. Our research was based on the following factors:

- A number of cortical and semi-cortical debitage pieces in levels of Ust-Menza sites significantly prevails over quantity of debitage with parallel scar pattern;

- Dimensions of raw material pieces / nodules, used for production of particular tool or debitage class, directly dependent on type of a rock or mineral. The smallest in size residual cores are on rock crystal. Tools and debitage pieces on flint and chalcedony are no more 4 cm long. Jasper debitage pieces are usually in average 4 – 5 cm long, only rarely approaching 6 cm. Large-sized tools with the maximum size in 15 cm, side-scrapers and choppers, were generally made on microslate, microquartzite and lamprophyre;

- Raw material types used in stone treatment processes by human inhabitants of Ust_Menza sites are mainly represented by small- and medium-sized alluvial gravels and only rarely by some boulders up to 15 cm long.

Keeping in mind the enumerated factors, we have chosen an object for the study – gravels of 1st and 2nd terraces of Menza river. According to some geochronological data (Konstantinov 1994), fluvial gravels of the 1st terrace are dated to ca. 13 000 BP uncalibrated and fluvial gravels of the 2nd terrace are related to the time span in ca. 30 000 – 25 000 BP uncalibrated. Namely, this chronological interval in ca. 25 000 – 13 000 BP uncalibrated envelopes human occupations at Ust-Menza sites found in the alluvial deposits there. Accordingly, the sites' humans were able to collect easily various raw material types from the river's alluvial sediments. Therefore, there was analyzed a petrographic composition of modern pebble beaches of Menza river, as well as bars of creeks that flow into the river and bring coarsely fragmented bedrock materials in it, to trace a dynamic development of fluvial gravels during Final Pleistocene – Early Holocene. Sampling of different raw material pieces / nodules was done taking into account metrics of Ust-Menza sites' debitage and tool pieces.

Analyses of clastic rocks were repeatedly held in Trans-Baikal (Borsuk 1973), but they were of only geological *sensu stricto* character. That's why the analyses data have been adapted for our particular petroarcheological study. There were also established minimal and maximal metrics (3 – 15 cm) for the tested raw material samples. As a statistically reliable sample is considered to be a one with no less than 70–80 pebbles (Borsuk 1973:21), minimum number of studied samples was 100 items and larger samples were multiple to 100. In sum, there were studied 6 raw material type samples with the total 2 000 pieces / nodules collected within 20 km length of the river bank.

The most representative collected pebble sample was received on modern beaches of an island, located opposite the Ust-Menza sites. The sample includes 1 000 items. Taking into consideration the accessibility of large area to exploration, the island's beaches were subdivided into squares of 10 sq. m each and 100 pieces of pebbles and small boulders were collected at each of the square. This method with some modifications was also applied to other samples. Fluvial gravels of the 1st terrace were selected straight at excavation block of Peschanaya Tropa site (Ust-Menza - 8). Around 80 – 100 pieces were collected for each square meter there. Pebbles from the base of the 2nd terrace gravels were selected at the place ca. 5 km upper along the Menza river, where the river undercuts the terrace opening alluvium there. 40–50 pieces were gathered for each square meter there. Identification of clastic rocks, brought down by streams, was realized in the mouth and the bar of the creek, as boulders and pebbles found up the stream exceeded the selected metric standard. Most of the sampled pieces / nodules were determined macroscopically, whereas determination of the dominant rocks was done on 25 transparent sections served then as references for the rest of sampled items.

Modern gravels of Menza river provide the widest range of rocks: slate, microslate, granodiorite, granite, pegmatite, gneiss, microgneys, quartz, quartzite, microquartzite, metamorphosed sandstone, metamorphosed sandstone with separate secretions of quartz, and jasper.

The most numerous rocks in the sample are metamorphosed sandstones (32 %). The metamorphosed sandstones include two similar rocky types: metamorphosed sandstone (10 %) and metamorphosed sandstone with separate secretions of quartz (22 %). Both rocks were heavily metamorphosed why their petrophysical properties have changed to some extent. They have got a considerable hardness and viscosity in comparison to unmetamorphosed sandstones. Along with this, still having the fine-grained structure, the rock is not isotropic at all being not suitable for any treatment processes. As a result, this raw material type is only known through presence of a few tested pebbles and flakes, while tools are completely unknown on it.

The group of granites and gneisses occupies the second place, representing in total 22 % of the sample. It includes different types of granite (12 %), pegmatite (1 %), gneiss (1 %) and microgneiss (8 %). It should be noted that obtaining of conchoidal fracture by flaking of these rocks is practically impossible. That's why only hammer-stones do occur on granites and pegmatites. A chose of granite and pegmatite for a hammer-stone use is explained by the fact that the roundness coefficient of granite pebbles and pegmatite is the highest among all local rocks and is ca. 3 - 4 by the scale of Khabakov. These pebbles also have about perfect ellipse shape, enough weight and density to be hammer-stones. Unlike granite and pegmatite, gneiss and microgneiss were not used by Ust-Menza Final Paleolithic humans at all.

Granodiorite composes 6 % of the sample. It indicates a modest presence of it in the modern gravels but it is completely absent in the discussing archaeological collections. From the petrophysical point of view, this rock doesn't have the potential to be used as raw material by Paleolithic humans because it cannot produce debitage pieces with a good conchoidal fracture being in an intermediate position between the group of granites and quartzites.

Quartzite and microquartzite do compose in total 5 % of the sample. Both rocks are present in the discussing archaeological assemblages. Moreover, microquartzite was used for medium-sized blade production at Ust-Menza sites.

The rocks in the assemblages are characteristic by several varieties of color, ranging from dark gray to light green. Microquartzite, which occurs in modern gravels, has the best flaking properties in area. It has a microgranular structure without any heterogeneous inclusions. According to the Mooca's scale, the rock's hardness is no less than 5 units. The collected microquartzite pebbles of mikrokvartsit are in average no more 8 cm long, have a good roundness and a rich gray or light green color, as well as fresh surface when it is flaked. It was possible to easily get blades, bladelets and even microblades using a quartz hammer-stone with almost no special core preparation in a course of our experiments. As petrographic analysis testifies, the microquartzite was widely used by humans of Ust-Menza sites. Moreover, this rock was predominantly recognized for blade / bladelet *sensu lato* debitage and tools made on it and the tiniest chips, where the latter items clearly indicate intensive on-site tool re-sharpening processes and its significant importance for the sites' Final Paleolithic humans.

Quartzite composes 2 % of the sample. This rock is of much less flaking properties in comparison to the microquartzite, but it was, however, often used for short end-scraper production at Ust-Menza sites. Also, blade / bladelet *sensu lato* reduction is almost impossible on quartzite.

Lode quartz composes 4 % of the sample. It occurs in a view of large-sized pebbles and also small- and medium-sized boulders in Ust-Menza area. Despite the fact that the lode quartz is a hard material for flaking, a few end-scrapers on the material are present among assemblages of Ust-Menza II site. Also, lode quartz debitage is known in almost every assemblage of Ust-Menza sites. According to the petrographic analysis, lode quartz from the archaeological assemblages is identical to the one collected by us in the modern gravels why it surely has the local origin.

Lamprophyre pebbles are very similar visually to local microslate but it is much more solid and viscous that makes it more difficult to flake. However, lamprophyre was used for some flake and short blade / bladelet production. Also, tools on lamprophyre do compose 3 % at Ust-Menza II site. The same share in 3 % of lamprophyre is known within the modern gravels too.

Slate and microslate make up 13 % within the modern gravels. Slates at pebble beaches of Menza river are mainly composed of quartz-feldspathic material mixed with amphiboles. Such properties have given a considerable strength and viscosity for the slates that, however, make it very difficult for flaking. That's why debitage pieces received from these slates are very fragile due to the shale their inner structures. They were almost not used for knapping like metamorphosed sandstones.

Microslate and microquartzite are the best local rocks suited for knapping. Due to its microgranular shale structure, these rocks can produce very plain debitage pieces along the rocks' microlayers. Therefore, it can be used for producing blade / bladelet *sensu lato* debitage, as it did happen for the Ust-Menza site assemblages. Shares of tools on microslate are enough representative – 14 % for Ust-Menza I and 7 % for Ust-Menza II. At the same time, share of microslate in the modern gravel is 10 %. It occurs in the form of elongated wand black pebbles up to 10 cm in size and small boulders of also elongated form up to 14 cm long. Local microslate has a high content of biotite, which gives the cortex and fresh flaked surface a characteristic dark color. It also has an elongated or teardrop shape of pebbles, distinguishing it visually from other raw material types.

Jasper also looks different from the other rocks, having a distinct red color. It composes 3 % of the studied sample. By petrophysical characteristics, jasper has the best flaking properties among all local rocks. It has a microgranular structure and uniform composition, and gives a conchoidal fracture during knapping. But despite all the positive properties, jasper was rarely used for tool production at Ust-Menza sites. It is explained by two reasons. First, the size of jasper pebbles in the collected sample does not exceed 5 cm, and the majority of them are 3 - 4 cm long. Second, jasper also has a strong internal fracturing. The latter fact was noted during the material knapping that virtually eliminates it from any blady reduction that is also confirmed by the Ust-Menza assemblage data. No one Ust-Menza microblade core, blade, bladelet or microblade occurs on this sort of jasper. It is interesting to note that bladey debitage was produced on wax and dark gray jasper, which is, however, absent in all samples of pebble materials.

Thus, of 14 types of rocks that form the modern pebble beaches, 8 varieties, such as microslate, too-mica slate, granite, quartz, quartzite, lamprophyre, micro-quartzite and jasper were used by Ust-Menza Final Paleolithic humans. Granite pebbles were used as hard hammer-stones. Too-mica slate was probably used, as abrasive and grinding stones because of its structure. The other rocks in rare cases were used for production of flakes, but none of them was used for the microblade reduction.

It is established that the number of rock varieties encountered in modern gravel deposits and Pleistocene terraces, as well as the balance between their raw material types is about the same (Yurgenson & Moroz 2009, 2011). The composition of rocks in stream offsets entirely repeats the identified spectrum of terrace gravels by their structures and parts. Now it can be argued that the nature of the raw material resource base in Ust-Menza area has not undergone any visible changes for at least 25 000 years, and their basis were local indigenous rocks forming the sides of Menza river valley. And only a small portion of these rocks was used for tool production due to a high level of so-called paleotechnological adaptation (Moroz 2009). The most important point of our study is also that the rocks and minerals making up the raw material foundation of industries such as wax and gray colored jasper, flint, chalcedony, prase and rock crystal at the Ust-Menza sites were not found even in a single copy in any of the studied samples of local raw materials. It clearly indicates their absence in river gravels of the area.

Thus, these rocks and minerals were non-local raw materials for humans of Ust-Menza sites. The gravel study of Menza river area does not provide an answer to the question about the origin of chalcedony, flint and jasper, representing more than 60 % of artifacts at the sites' assemblages. For solving the problem it is possible to use geological data on occurrences of significant silica rocks and minerals at the present level of their erosion.

Chalcedony, being almost pure silica, is geologically the result of crystallization of melts with a high content of silica in volcanic rocks, and it occurs in andesites and basalts in a view of small phenocrysts - tonsils. During the destruction of volcanic rocks by various agents in the course of million years, chalcedony, as the hardest mineral, enters into detrital material and under the influence of the gravitational drift flows into streams and rivers. Therefore, chalcedony is objectively absent in the areas where there are no igneous rocks, so-called "parent rocks".

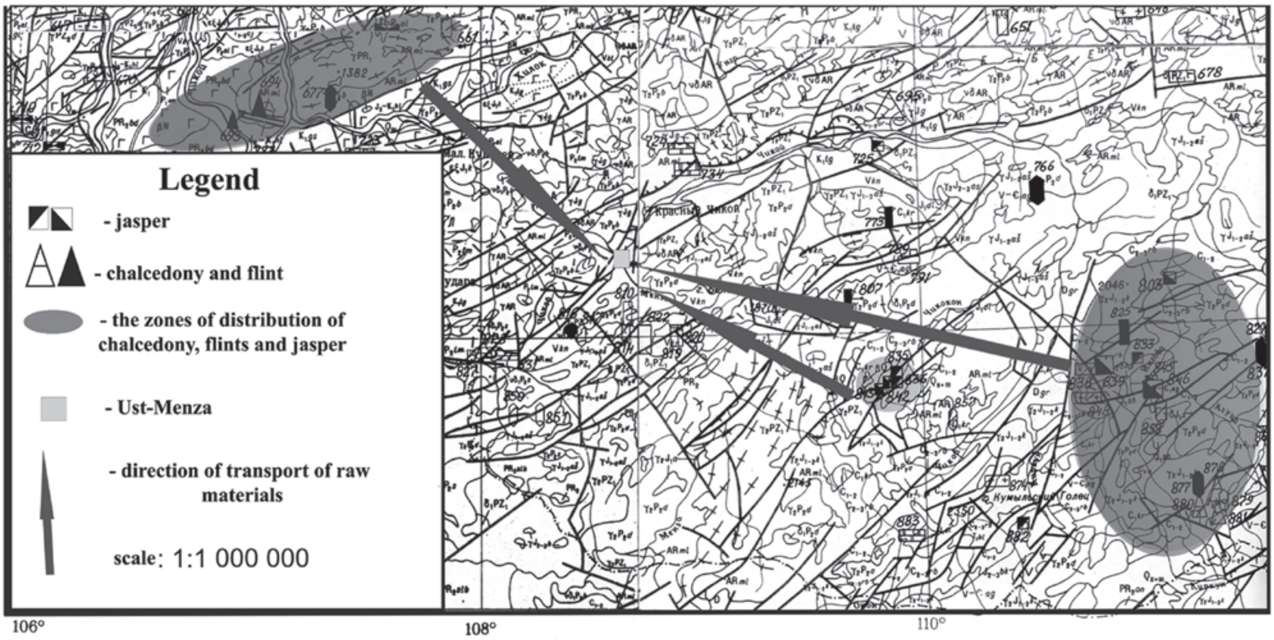


FIGURE 3 Basic distribution areas of stone raw materials in Trans-Baikal region.

According to some Trans-Baikal data (Yurgenson 2001), it should be young volcanic rocks, effused during Jurassic or Cretaceous periods, as ancient volcanic rocks went through metamorphism leading to a change in flints and chalcedonies contained therein. That's why it is possible to predict presence of this raw material with a fairly high degree of accuracy.

Such work was carried out by our region geologists. There was prepared a map of semiprecious raw in Trans-Baikal, including Western Trans-Baikal region), administratively belongings to the Republic of Buryatia. The rocky materials around Ust-Menza sites with radius no less than 60 km are ancient metamorphosed sedimentary rocks and intrusive igneous rocks that excludes presence of chalcedony and high-quality flint in the area. The closest area with volcanic rock distribution is known to the west along the right bank of Khilok river that is no less than 150 km from Ust-Menza sites. Second zone of volcanic rock distribution is located to the east, ca. 170 km from Ust-Menza sites (**figure 3**). Due to the mountain ranges, the water transportation of raw material from the "western zone" is excluded. The contact with the "eastern zone" is also excluded as the rivers that do originate in that area belong to the Amur river basin, and there is Zachikoyskaya mountainous country between Ust-Menza and "eastern zone" (**figure 3**).

High-quality jasper is absent in Ust-Menza region either. Brick-red colored jasper was known to humans of the discussing sites, but it was indeed used occassionally. The preference was given to high-quality wax and gray jaspers, which are a part of Ryabinovskay series of Ingodinsky geological formation (Yurgenson 2001, 2011). Moreover, the known locations of these jaspers almost coincide with the boundaries of the "eastern zone", although the closest source of the jaspers is located in the upper stream of Chikokon river (the inflow of Chikoi river) at a distance of ca. 70 km away from our sites.

5 BRIEF CONCLUSIONS

The conducted research allows us to make the following observations.

Stone artifact assemblages of Ust-Menza sites that are type sites for the region's Final Paleolithic are based on chalcedony, flint and jasper. Their total share in many assemblages at Ust-Menza I and II sites approaches 70 %.

Due to the lack of sources of these high quality raw materials near the Ust-Menza sites, Final Paleolithic humans were bringing debitage pieces, already made tools and cores on these raw materials to the sites. It is indirectly confirmed by almost complete absence of pre-cores and initially flaked cores at the sites.

Because of small initial sizes of raw material, the stone assemblages have "microlithic" characteristics, with length of debitage pieces and tools no more than 6 cm, being in average ca. 3 - 5 cm long.

Large-sized tools were made on local materials, mainly on microquartzite and microslate with also some produced on lamprophyre, quartz, quartzite, granite, and metamorphosed sandstone.

The deficiency of high quality raw materials have certainly forced Final Paleolithic humans to extremely careful handling of the tools made on such rocks and minerals. It is reflected in permanent reshaping of the tools' working edges, until their heavy wearing.

Thus, we believe that the absence of vitally necessary minerals and rocks for a significant part of the territory of Western Trans-Baikal region forced Paleolithic humans to move permanently in order to replenish stocks of stone raw materials. It definitely affected the nature and structure of the analyzed artifact assemblages. Raw material factor seems to be one of the major reasons of human displacements in the Western Trans-Baikal region, as there was no other way to get the needed for treatment processes raw materials. Short-term residence characteristics for archeological levels at all multi-layered Final Paleolithic sites in Western Trans-Baikal region do also indirectly confirm our assumption.

ACKNOWLEDGEMENTS

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REFERENCES

BAZAROV D.B., KONSTANTINOV M.V., IMETHENOV A.B., BAZAROVA L.D. & SAVINOVA V.V. (1982) - *Geology and culture of the ancient settlements of the West Transbaikalia*. Novosibirsk, p. 162 (in russian).

BORSUK O.V. (1973) - *Analysis of debris and gravel deposits in geomorphological studies (for example, the Trans-Baikal region)*. Moscow, p. 110 (in russian).

DEMARS P.Y. (1982) - L`utilisation du silex au Paléolithique supérieur : choix, approvisionnement, circulation. *Cahiers du Quaternaire* 5(253):18–153.

DIBBLE H.L. (1991) - *Local raw material exploitation and its effects on Lower and Middle Palaeolithic assemblage variability. Raw Material Economies Among Prehistoric Hunter-Gatherers.* Lawrence, University of Kansas Publications in Anthropology, 19:33–46.

GYRIA E.Y. (1997) - *The technological analysis of stone industries (Methods of micro-macro analysis of ancient tools)*. St. Petersburg, p. 198 (in russian).

KARASEV V.V. (2001) - *The Cenozoic of Transbaikalia*. Chita, Chitageolsemka, p. 128 (in russian).

KONSTANTINOV M.V. (1994) - *The Stone Age of the eastern region of Baikal Asia*. Ulan-Ude – Chita, p. 180 (in russian).

KONSTANTINOV A.V. (2001) - *The ancient dwellings of Transbaikalia (Paleolithic and Mesolithic)*. Novosibirsk, p. 224 (in russian).

KUZMIN Y.V. & GLOSCOCK M.D. (2010) - *Crossing the straits: prehistoric obsidian source exploitation in the North Pacific Rim.* Oxford, p. 227.

LBOVA L.V. (2000) - *The Paleolithic of the northern zone of the Western Transbaikalia*. Ulan-Ude, p. 240 (in russian).

MATIOUKHINE A.E. (2010) - About the character of communication the raw materials, typology and technology premousterian and Mousterian sites of the russian Plain. *Stratum plus* 1:201–225 (in russian).

MATIOUKHINE A.E. (2012) - The influence of raw materials on the morphology and technology of products in the Upper Paleolithic (example of some sites of south and south-west of the russian Plain). *Stratum plus* 1:153–178 (in russian).

MESCHERIN M.N. & MOROZ P.V. (2003) - *Average time of the Upper Paleolithic on the Hilok and Chikoi. The ancient cultures of Asia and America*. Chita, Ulan-Ude, p. 14–16 (in russian).

MILLER R. (2001) - Lithic resource management daring the Belgian Early Upper Paleolithic: effects of variable raw material context on lithic economy. Liège, *ERAUL* 91:43–161.

MOROZ P.V. (2002) - Features of stone industries of the middle period of the Upper Paleolithic in western Transbaikalia (for example, sites Melnichnaya 2 and Masterov Klych). RAESK XLII. Omsk. p. 170–172 (in russian).

MOROZ P.V. (2007) - *The role of raw materials in the industries of Final Pleistocene and Early Holocene in Western Transbaikalia*. Chita, p. 126–133 (in russian).

MOROZ P.V. (2008) - *The stone industries of boundary between Pleistocene and Holocene of Western Transbaikalia (based on the Ust-Menza area)*. St. Petersburg, p. 22 (in russian).

MOSIN V.S. & N IKOLSKY V.Y. (2008) - *Flint and jasper in the Stone Age material culture of the South Urals*. Yekaterinburg, p. 196 (in russian).

OKLADNIKOV A.P. & KIRILLOV I.I. (1980) - *Southeastern Transbaikalia in the Stone Age and the early Bronze Age*. Novosibirsk, Nauka, p. 176 (in russian).

OTTE M., MATIOUKHINE A.E. & FLAS D. (2006) - La chronologie de Biryuchya balka (région de Rostov, Russie). The Early Upper Paleolithic in Eurasia: general and local. TKBAE 2. St. Petersburg, Nestor History, p. 183–192.

PETRUN V.F. (1979) - To the petrophysical characteristics of the material of Paleolithic stone tools. Moscow-Leningrad, MIA. *Paleolithic and Neolithic* 6, p. 282–297 (in russian).

PETRUN V.F. (1990) - *Petroarheologiya or archaeological petrology? "The Modern Science and restructuring of Soviet science"*. Kyiv, p. 77–78 (in russian).

PETRUN V.F. (2000) - *Lower Dniester as a standard archaeological and petrographic polygon. Materials of the Field Seminar "Chobruchsky archaeological complex and ancient culture of Dniester"*. Tiraspol, p. 178–182 (in russian).

POSTNOV A.V., ANOYKIN A.A. & KULIK N.A. (2000) - Criteria for the selection of raw materials for the Paleolithic industries the sites of Basin Anouilh River (Mountain Altai). *Archaeology, Ethnology and Anthropology of Eurasia* 3:18–30 (in russian).

RAZGILDEEVA I.I. (2003) - *Planigraphy of Paleolithic dwellings in Studenovskaya archaeological complex (Western Transbaikalia)*. Vladivostok, p. 28 (in russian).

TASHAK V.I. (2005) - *Paleolithic and Mesolithic sites of Ust-Kyakhta*. Ulan-Ude, p. 130 (in russian).

YURGENSON G.A. (2001) - *Gemstones and ornamental stones of Transbaikalia*. Novosibirsk, p. 390 (in russian).

YURGENSON G.A. (2011) - Justification of gemological minerageny. *ChSU Journal* 3:125–131 (in russian).

YURGENSON G.A. & MOROZ P.V. (2006) - *About technological arheominerageny. Theory, history, philosophy and practice of mineralogy*. Syktyvkar, p. 89–90 (in russian).

YURGENSON G.A. & MOROZ P.V. (2009) - *Technological arheomineragenіy as direction at the junction of minerageny and archeology Mineralogy and technogenesis*. Miass, p. 179–187 (in russian).

YURGENSON G.A. & MOROZ P.V. (2011) - Technological arheomineragenіy as a methodological approach to the study of stone industries (for example, the Ust-Menza archaeological complex). *ChSU Journal* 72:109–115 (in russian).

Georgia on the Crossroad. Cultural Exchanges and Evidences for Different Distance Contacts in Middle and Upper Paleolithic

Nikoloz TUSHABRAMISHVILI · Tamuna MELADZE · Lasha SUKHISHVILI

Abstract: In our article we deal with three Upper Paleolithic cave sites, which are located in Upper Imereti region just in few km from each other (2–6 km). These are already well-known sites - Ortvala Klde, Dzudzuana Cave and newly discovered Bondi Cave. The landscapes, where these caves are situated, are the similar. All of them are located in parallel gorges. The distance between the gorges is 4–8 km. According to pollen analysis and obtained dating, the environment around these caves was the similar. The inhabitants of Dzudzuana and Bondi caves were hunting mostly on bisons and equses. At the same time the Neanderthals and the Modern humans of Ortvala Klde traditionally were extracting the Capra caucasuica (95 %). The industry of Bondi and Dzudzuana caves is more or less similar but there are differences as well-the microliths are dominated in the material of Dzudzuana. The blade and bladelet oriented technology are represented in both sites. The blade technology is represented in Ortvala Klde as well, but there are some Aurignacian features which are better represented in this cave than in other above-mentioned sites. Co-existence of Aurignacian and Gravettian features is one of the characters of Upper Paleolithic of Western Georgia. In Bondi and Dzudzuana caves there were discovered the most ancient flax and colored fibers dated from 35000–34000. Perhaps the differences between those contemporary sites can be explained by different economical activities of different groups, or by distribution of the habitat areas between them.

1 INTRODUCTION

The territories of Georgia belong to the space, which were important terrestrial bridges that connect the Middle East and Europe (Transcaucasia, Anatolia, Balkans) in Paleolithic age.

The frequency of Paleolithic sites on the territory of Georgia was determined by geographic and topographic position - the Main Caucasus Range protects Transcaucasus and in particular, Georgia, from the strong impact of glaciations (**figure 1**) and which prevented cold climate spread from the North. Due to specific topography, some endemic vegetal species and refuge zones have been preserved until present (**figure 2**).

The fact, that Northern cold climate did not have much affect South Caucasus, can be proved by existance of Upper Paleolithic sites on 1300 meters high in the Caucasus Southern front mountainous zone. Here we have to note, that in XX cc 800 meters above the sea level were considered to be the limit of Upper Paleolithic vertical spread, which could be explained by cold climate conditions [Тушабрамишвили 1991. 453].

The region was a geographic "deadlock" during the Paleolithic, where because of small area, different cultures were obliged to contact each other on the background and these cultures were each others' competitors in mastering and using living resources [Adler, Bar-Oz, Vekua, Tushabramishvili 2004. 52–55]. This should as well facilitate the study of such problem as relations between human being and natural environment. Local environment seem to have influenced the human behavior throughout the Paleolithic.

The main aim of our works is to research specific settlements of Neanderthals and Anatomically Modern Humans. We also try to identify, if there were any kinds of contacts between these culturally and biologically diverse populations in that critical age (37–34000 BP), when Neanderthals started to extinct and first contemporary people appeared.

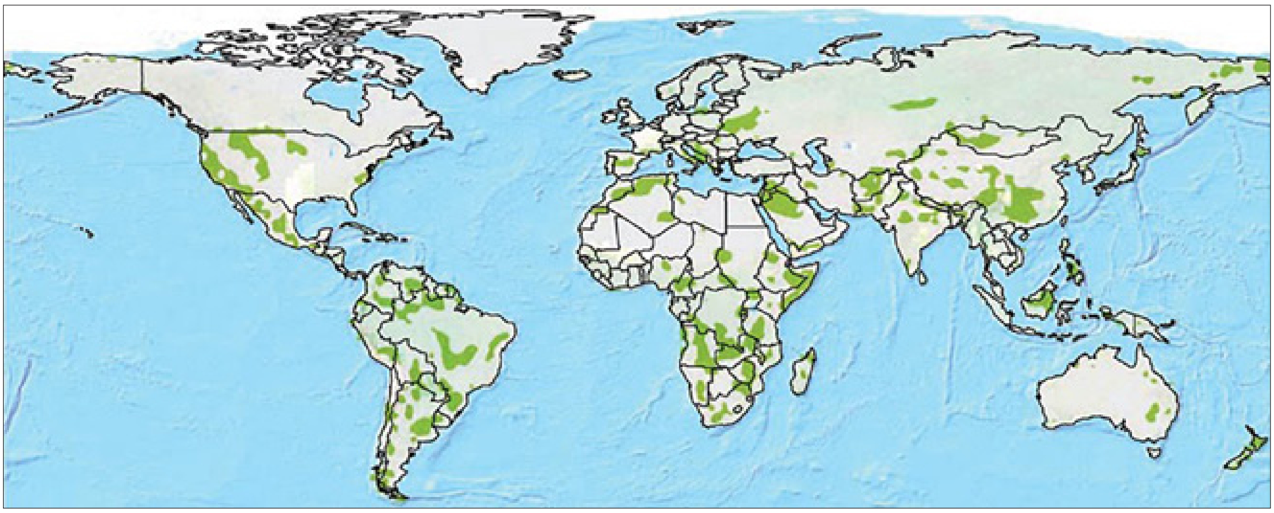
Western Georgia (particularly Upper Imereti region, **figure 3**), is one of the most significant regions, where it is possible to research relations of Neanderthals and AMH beings. (Adler, Tushabramishvili. 2004. 91–132).

In the current article we will consider LMP and Upper Paleolithic sites. Due to Geographic location three cave-sites – Ortvala Klde, Dzudzuana Cave and Bondi Cave, have been selected as those to be considered. They are separated from each other only by several kilometers (**figure 4**).

All three caves are located in the valley, canyon, which have a Plateau and more or less open spaces on top of them and which are bordered by a further canyonlike valley in about 2–4 kilometers (Distances between some MP, UP caves: Undo Klde-Ortvala Klde–2 km; Ortvala Klde-Bondi Cave–2 km; Bondi Cave Dzudzuana Cave–1,5 km; Dzudzuana-Djruchula Cave–6 km). These caves, of course have been worked out in one karst system. Curving of the plateau by rivers was also happening more or less simultaneously.

FIGURE 1 Caucasus region.

FIGURE 2 Map of refugia.



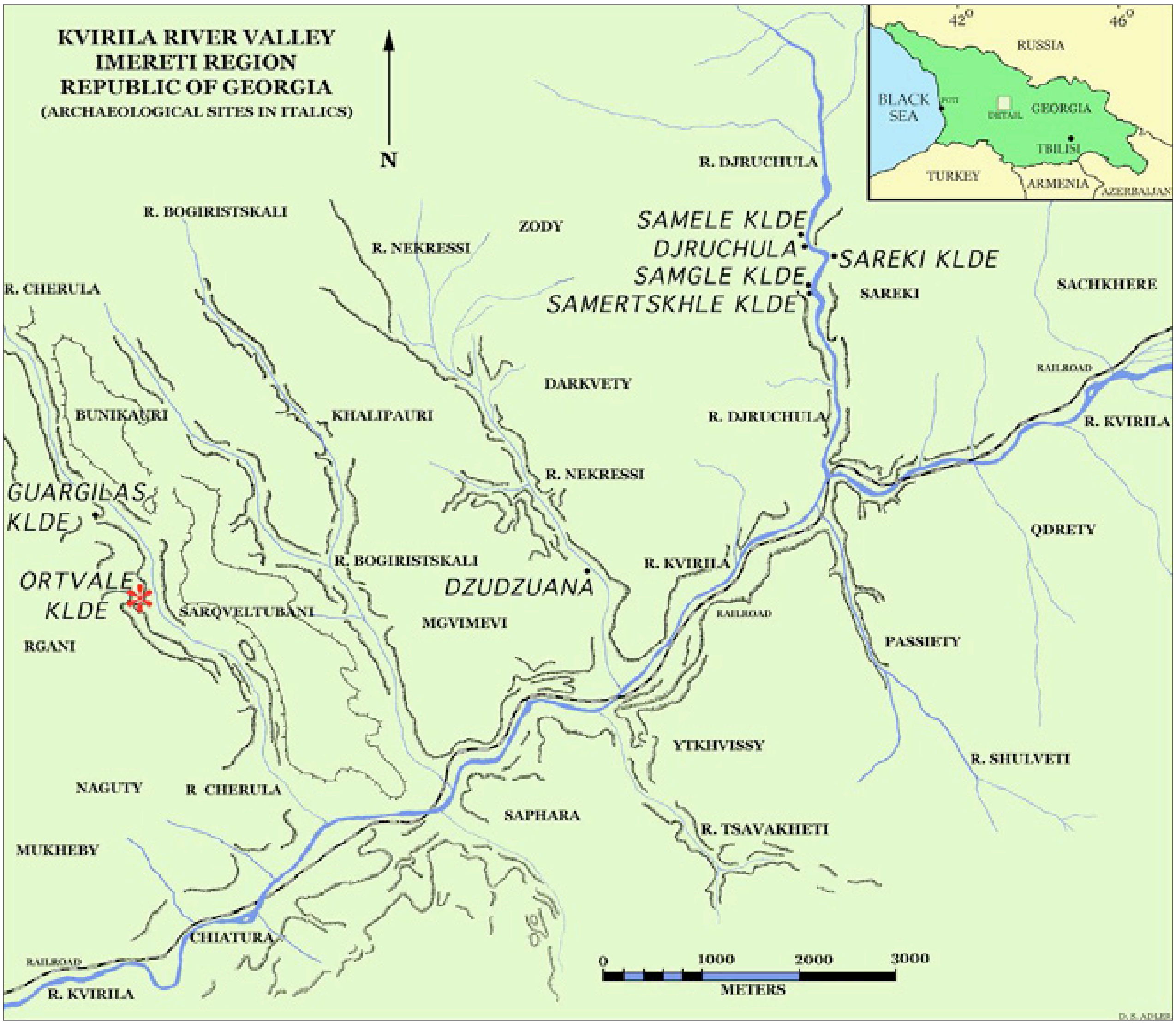


FIGURE 3 Spatial distribution of Paleolithic sites in Imereti.

2 ORTALVA KLDE

Ortalva Klde is situated near the Chiatura town, slightly to the North-West on the territory of Didi Rgani village, on the right bank of the Cherula or Rganis Tskali river (right inflow of the river Kvirila), 35 meters high from the river level, 530 meters high from the sea level.

Ortvala Klde is a rock-shelter, in which two chambers can be separated (**figure 5**). The name takes its origin from this fact. Joint width of both chambers is thirty-five meters, depth – 14,5 meters, height – in the center of the big chamber - 7 meters, at the entrance 2 meters. The cave has an eastern exposition. It is dry and full of light.

The cave was found in 1973 by the archaeological expedition (led by D. Tushabramishvili) of the Georgian National Museum, carried out in the Rioni-Kvirila basin (D. Tushabramishvili,1990).

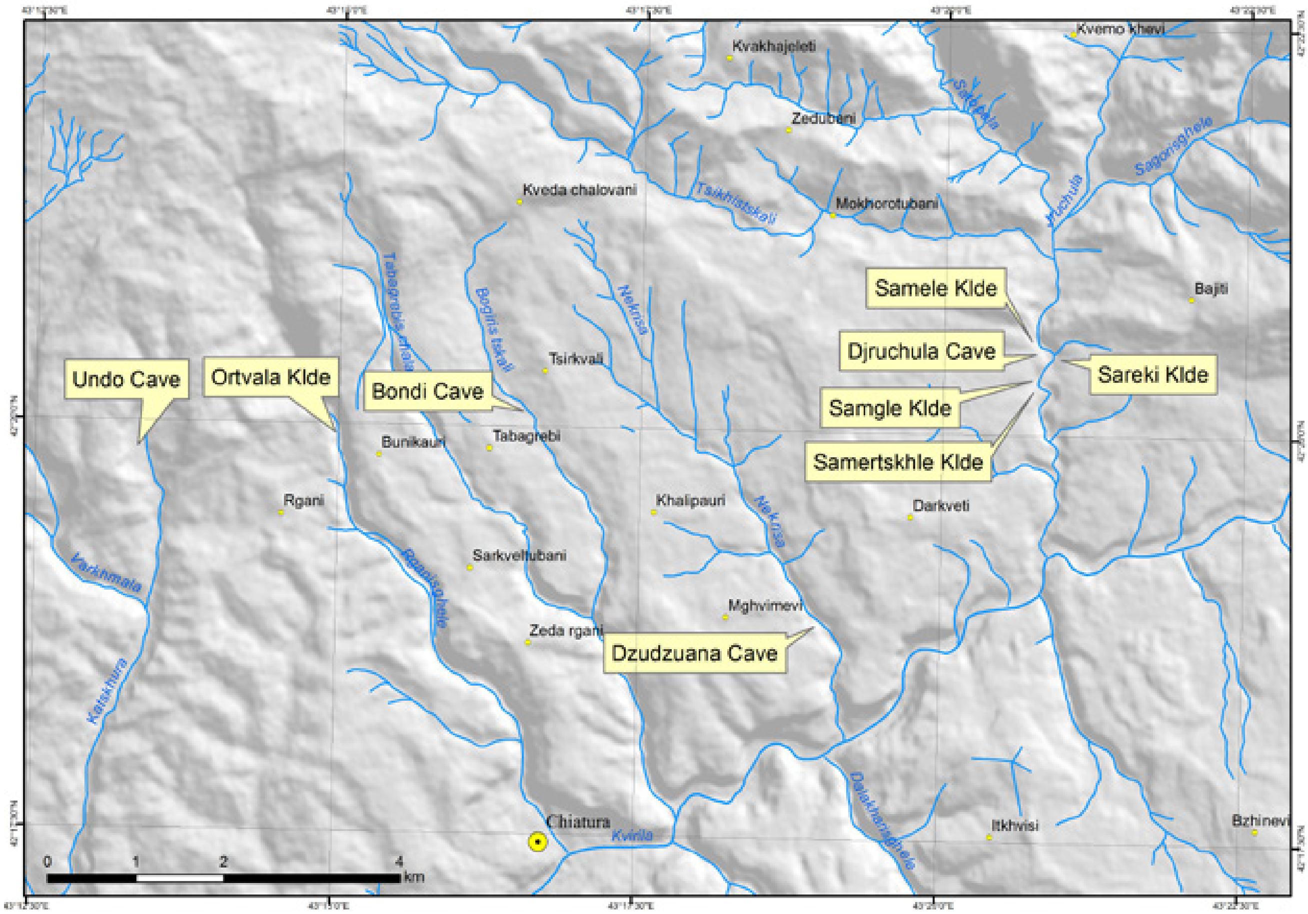


FIGURE 4 Location of the cave sites.

From 1993 the expedition has been working under the leadiship of N. Tushabramishvili. Further works (1997–2001) by the Georgian/American team (Adler, 2002, Adler and Tushabramishvili, 2004, Adler *et al.*, 2006), mainly focused on the MP/UP transition in the south chamber, have shown that the subsistence behaviors of Neanderthalians and modern humans were largely identical (Bar-Oz *et al.*, 2002, Bar-Oz and Adler, 2005; Adler *et al.*, 2006). Several dates, by ^{14}C, thermo-luminescence and electron spin resonance documented the stratigraphic depositional history. It appeared that the UP/MP transition occurs at 34 ± 1 ka (Adler *et al.*, 2008. 817–833). In 2006, four new test pits were open by our team in 2006–07 (Moncel *et al.*, 2007). Three of those, open in the same location as the earlier ones, on the slope outside the porch), reached again MP levels while the fourth one, below the porch, unearthed UP levels.

The animal species most represented are *Capra caucasica*, *Cervus elaphus* and *Bison priscus* and rodents indicate "mountainous" forested areas around the site. (Tushabramishvili, N., Lorkipanidze, D., Vekua, A., Tvalcherlidze, M., Muskhelishvili, A., Adler, D. S.,1999, 65–77;).

The palinological sequence has been correlated to OIS 4, and is similar to the one observed in levels 3a and 4 of Koudaro I (U/Th age of 44.15 ka and 60 ka, respectively, *cf.* Liubine, 1989; Lorkipanidze, 1992). The lithic industry was principally knapped from local flints of a very good quality. It includes mainly unilateral and bilateral unifacial points, close to Djruchula MP tradition (Meignen et Tushabramishvili, 2006, Pleurdeau *et al.*, 2007. In the UP levels, blade-bladelet cores and retouched tools are frequent (**figure 6**).

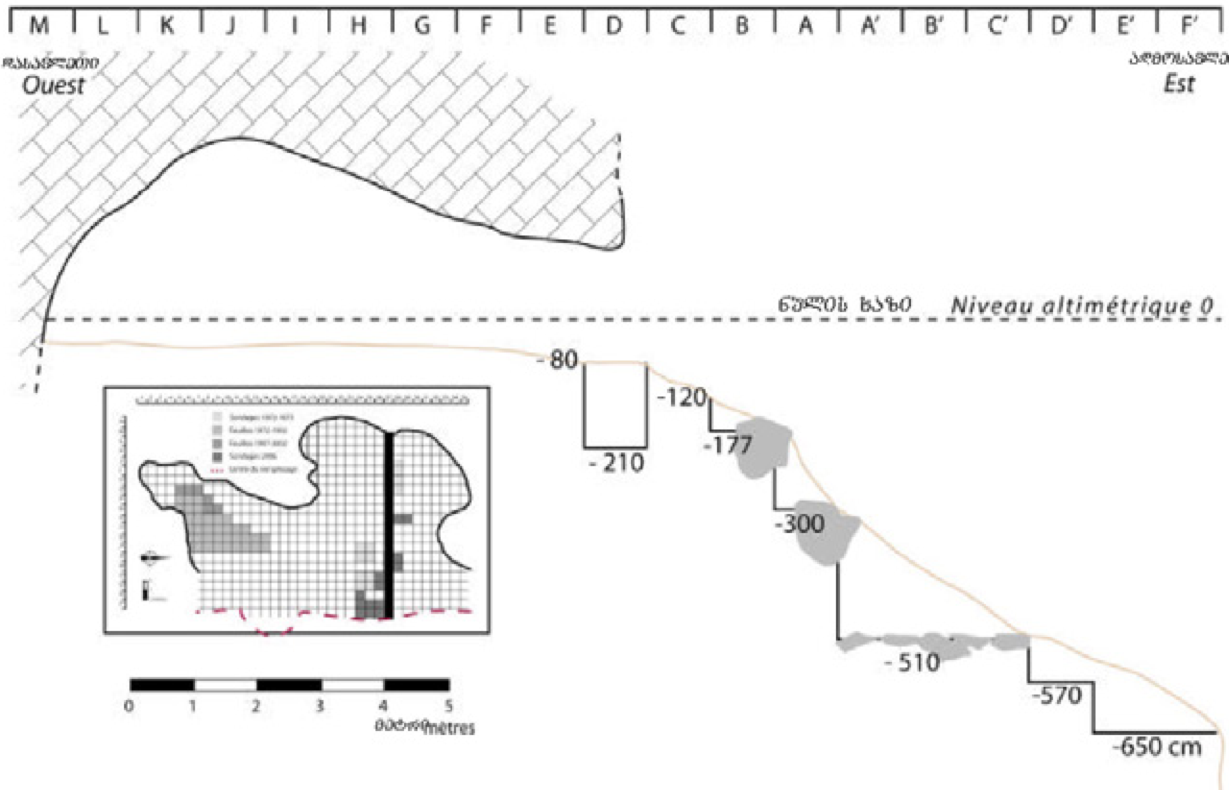


FIGURE 5 Small chamber section.

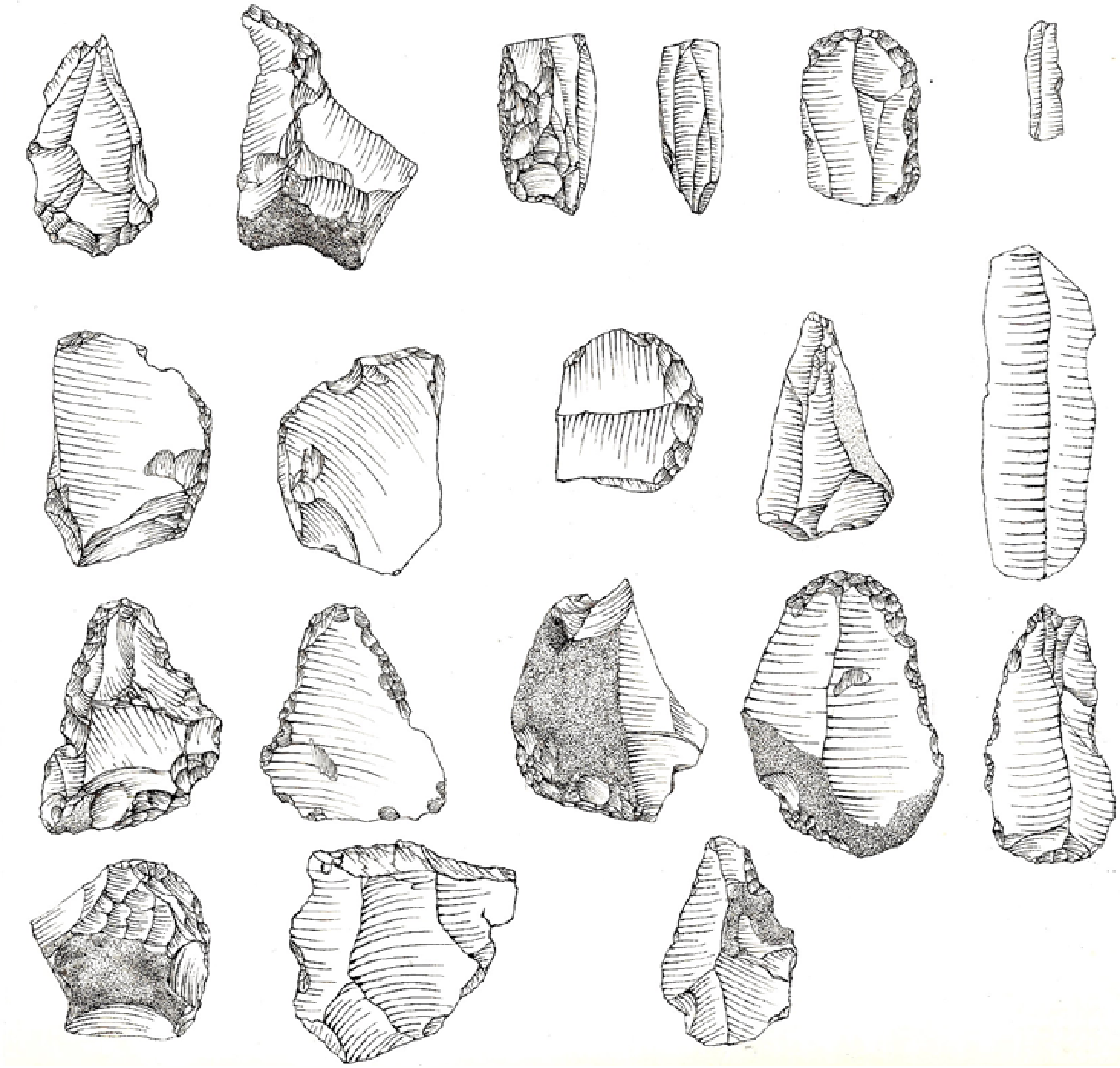


FIGURE 6 Stone artefacts from Ortvala Klde.

There are 11 lythological layers in the cave (**figure 7**). The second and the third layers belong to the Upper Paleolithic Age, the fourth layer was considered to be the transitional layer from Middle to Upper Paleolithic [Tushabramishvili 1994]. According to the research of 1997–2001s, the fourth layer was also considered as of Upper Paleolithic Age and its certain sections were considered as a mixed. In these sections Middle and Upper-paleolithic material is mixed [Adler, Bar-Oz, Belfer-Cohen, Bar-Yosef 2006.]. After investigation of the material again, revision samples of other Upper Paleolithic sites in the region, discovery of upper paleolithic sites, the questions of existance of the transitional (from Middle to Upper Paleolithic) step in the sites of South Caucasus become still actual.

The data from Ortvale Klde indicate that Layers 2 and 3 date to ~21 ka BP (**figure 8**) and can be correlated with OIS 2, during which much of Eurasia experienced severe climatic conditions. Layers 4a and 4b are dated to ~27 Ka B.P. and are probably associated with an increasingly colder period prior to the LGM. Layer 4c is dated to 34–30 Ka B.P., and may be separated from Layer 4b by Heinrich 3; this layer contains the densest local EUP occupation with a high frequency of burning. Layer 4d represents the first EUP occupation at Ortvale Klde and contains a stone-lined hearth dated to ~38/35 Ka B.P. (2008. O. Bar-Yosef et. JHE 55, 817–833)

The terminal LMP occupations represented in Layer 5 are dated to ~38/35 Ka B.P. Stratigraphically and archaeologically Layer 5 reflects an ephemeral Mousterian occupation. Layers 6 and 7, dated to 43–42 Ka B.P. by three independent radiometric techniques comprise high-density LMP occupations, thick accumulations of anthropogenic sediment, and a high frequency of burning. Layer 8 is a sterile deposit of undated roof-fall, and Layers 9 and 10 are dated to ~50 Ka B.P. (2004. D. Adler, G. Bar-Oz, A.Vekua, N.Tushabramishvili. Paleolithic Hunting Practices. Caucasus Environment, 2(7), 52–55)

So, Middle Paleolithic layers of Ortvala Klde are dated 50000–35000, as for Upper Paleolithic layers, they are dated 35–34000~20–19000. In fact the rock-shelter represents approximately maximum 2000 years interval (36000 – 34000) between these two ages. Although, it should be noted, that interpretation of dates by different methods can be done in a different way. If we take into consideration the fact, that certain dates properly fill the above mentioned time interval, it is possible to think of continuous life of the cave in this period. [Adler D. *et al.* 2008.8]

Both elongated blady forms (similar to the near east Ahmarian and Western Europe Gravetian) as well as Aurignacian signs: Carinated type, big size end-scrapper made of blades, Busque type burins, several aurignacian bone points, ornamented bones are existed in Ortvala Klde Upper Paleolithic (**figures 9** and **10**).

It is very important that in every cultural layer of the Ortvala Klde, including the oldest layer, after which the human being has left this site, remains of Capra Caucasica prevail in composition of faunistic material (**figure 11**).

In one of the publications we have mentioned that the cave had been mainly used on a seasonal basis – from late autumn till early spring [Adler, Bar-Oz, Belfer-Cohen, Bar-Yosef 2006]. This decision was made by the archaeo-zoologyst Guy Bar-Oz, who investigated faunistic material. He supposes that, mainly mid age animals were hunted, which he connected with the cycle of their breeding [Bar-Oz, Adler 2005].

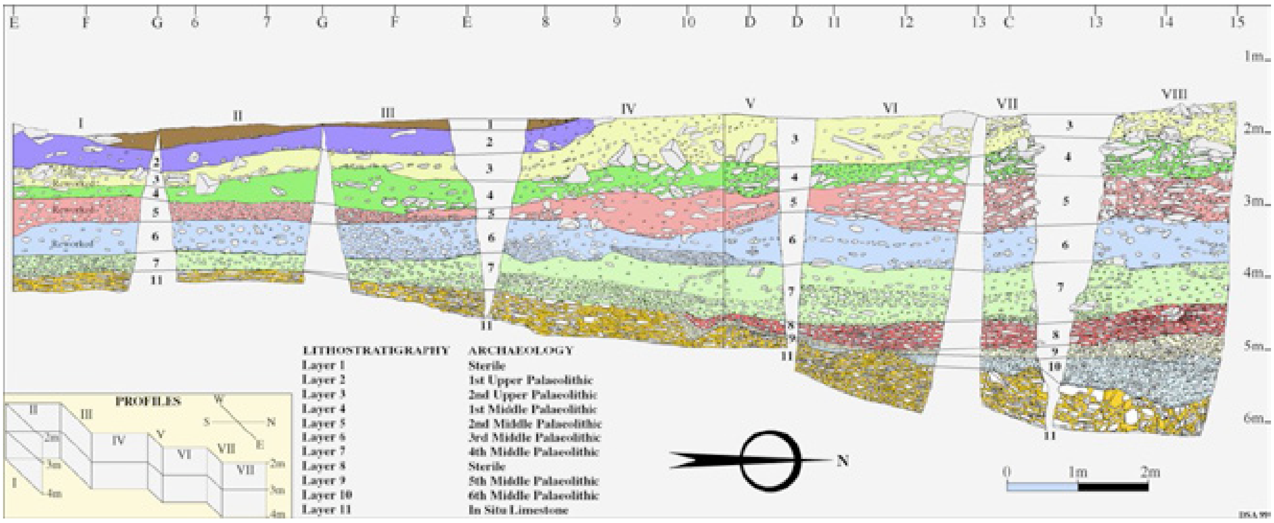


FIGURE 7 Section of Ortvala Klde.

FIGURE 8 The section of the small chamber.

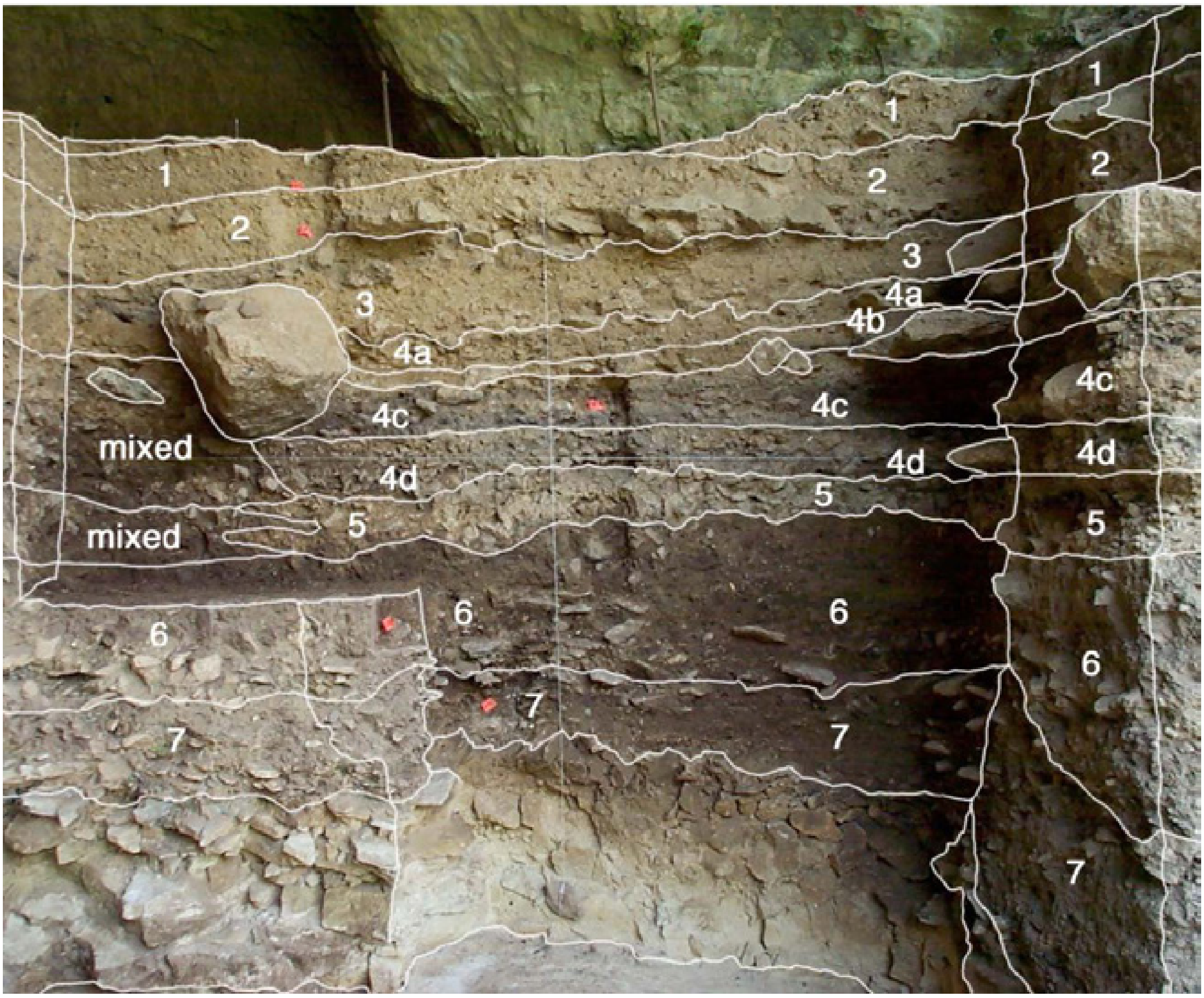


FIGURE 9 Ortvala Klde bone point (Upper Paleolithic Layer 2).

FIGURE 10 Ortvala Klde bone tools (Layer 4).

SPECIES	10	9	7	6	5	4	3	2
Capra caucasica	x	x	x	x	x	x	x	x
Capreolus capreolus				x	x	x	x	
Cervus elaphus	x	x	x	x	x	x	x	x
Bison priscus	x	x	x	x	x	x	x	x
Bos primigenius				x		x		
Sus scrofa	x			x	x			
Ursus spelaeus		x	x	x	x	x		
Ursus arctos							x	x
Canis lupus							x	
Vulpes vulpes					x		x	
Lepus sp.				x				x

FIGURE 11 Faunal representation by layer at Ortvale Klde.

The fact that the habitats of the Ortvala Klde, both Neanderthal and contemporary human being hunt Capra Caucasica the same way, had been and is explained by equal level knowledges about Capra Caucasica living area and behaviour and similar hunting methods of both species. We have noted in earlier works, that a human being, of course, is hunting the animal which is more accessible. Relevantly, this is facilitated by multitude of a certain kind of animals on the given territory, in this case, Capra Caucasica. This viewpoint, based on other scientists, as well as our observations, we explaned not only by seasonal, but also day and night migrations of Capras. Migrations on approx. hight of 2000 metres during one day and night is typical for this species (e.g. Khuro Range, Nakerala Range) [Maruashvili 1981]. This information has not been taken into consideration by our collegues Prof.Bar-Oz and Prof. D.Adler. They make conclusions basing on data of some of the scientists (Macharashvili) [Adler *et al.* Tushabramishvili 2004] and doesn't use other information except the one, that seasonal migrations are typical for Capras.

The fact, that during the Paleolithic Age, especially in its cold sections, vertical zones were lowered, in some cases even by 800–1000 metres, should be considered [Tushabramishvili, 1991]. This means that, Capra Caucasica always existed on those territories, where the Ortvala Klde is located and consequently, this creature had always been accessible for all kinds of human beings. Information obtained through investigation of different sites stipulates to bear in mind other versions as well and work in this direction in future.

It has to be mentioned, that existance of the Upper Paleolithic layers, also, the same age and period are proved in the caves, located only in several kilometers from the Ortvala Klde – Dzudzuana and Bondi Caves. These sites have certain similar characteristics, although the main hunting animal for the Upper Paleolithic human beings, habitats of these caves, are other animals. Despite this, it is possible that there were certain connections between the habitats of the above mentioned caves.

3 THE BONDI CAVE SEQUENCE

Bondi Cave is found in 2007 by Prof. N. Tushabramishvili. The cave is located in 6 kilometers on the North-West from town Chiatura, on the territory of Tsirkvali village, on the right bank of Tabagrebis River, 30 meters high from the river. The altitude of the cave is 477 meters. The site opens to the south onto the slope of a small valley (**figure 12**).

The whole area of the Bondi Cave is 101 sq. metres The known sequence consists of eight lithological very distinct layers with bone and lithic remains (**figures 13** and **14**), with phases of blocks representing major collapses of the porch of the cave. The first layer is mixed and belongs to later ages. In other layers numerous and diverse material of Upper Paleolithic and Middle Paleolithic has been discovered. It has to be mentioned, that the expedition has not reached the dead-rock yet. It is possible that in the lower layer more earlier, including Middle Paleolithic Age, material is also represented, the signs of which have been observed (N.Tushabramishvili *et al.* 2009. 8–21).

The archaeological material is especially abundant on the upper two-thirds of the sequence (the most intensive layers were the IV and the V layers), which corresponds to the UP layers (layers I to VI). All layers contain bone and lithic material but the layer VII has yielded a different lithic industry (MP) to the one identified from the overlying layers (layers VI to II).

FIGURE 12 Bondi Cave.

Evidence of fire has been recovered through all the stratigraphic layers (burned bones and flint, micro-charcoal fragments).

Bones and lithic artifacts are present in all archaeological layers. They are especially abundant in the UP layers (layers VI to I), deposited less than ca 30,000 cal BP (**figures 15** and **16**). Some ornaments-herringbone were found in layer III, one human tooth, assigned to *Homo* sp. in layer V and a small pierced disc of cockle-shell 3 mm wide and 1 mm thick. The lithic industry of layers VII and VIII, dated between ca 40,000–43,000 cal BP, presents MP affinities. The Bondi Cave fauna is typical of that found in most Georgian sites of the region, and in particular to those attributed to the Middle Paleolithic and/or the Early Upper Paleolithic (Ortvale Klde, Dzudzuana) (Adler *et al.*, 2006,; Bar-Oz *et al.*, 2002, 2004, 2008; Bar-Oz and Adler, 2005; Bar-Yosef *et al.*, 2006, Meshveliani *et al.*, 2004; Tushabramishvili *et al.*, 2007).

FIGURE 13 Bondi Cave section.

The main raw material is flint; only 63 items are made of obsidian, twenty-two - of andesite-basalt. The lithic implement was realized almost uniquely from various local flints. The later represents 98.8 % of the artifacts of the UP levels (layers I-VI), where it is mainly composed of blades and bladelets (**figure 17**), laminar cores testify (**figure 18**) of *in situ* debitage. Obsidians were found only in the three UP layers II, IV and V, where they represent ≈1 % of the lithic remains. Sixty-one obsidian artifacts were doscovered during the 2007–2008 campaigns. They are mainly composed of unretouched pieces, blades (n = 13), bladelets (12), and small flakes (21).

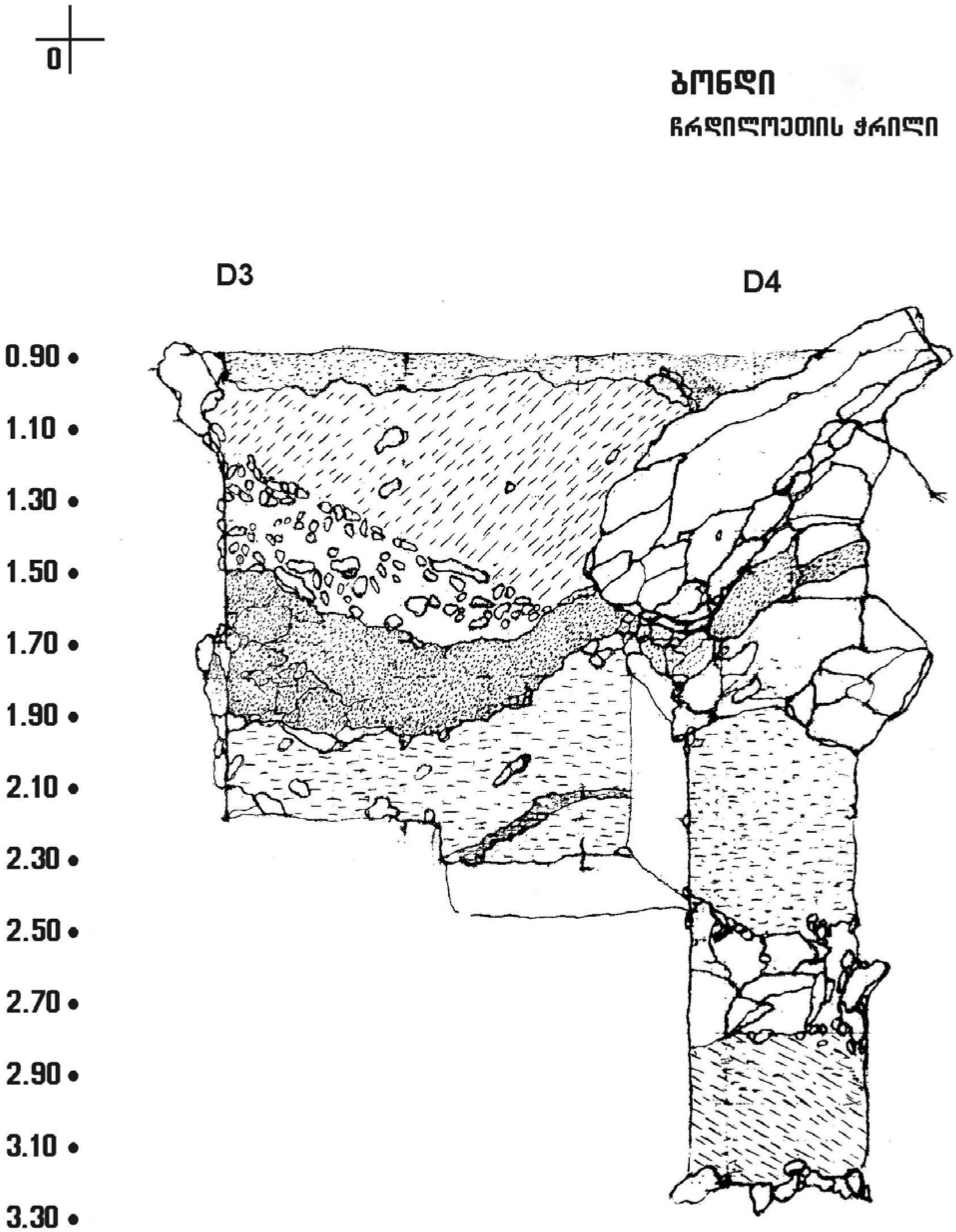


FIGURE 14 Bondi Cave section.

SAMPLE	SQUARE	ELEVATION (Z)	LAYER	X	Y	TYPE	LAB CODE	DATE	+/-	$\delta^{13}C$
BON02	C4a/D4c section	152	IV	50	100	bone	OxA–23902	27120	240	–18,494
BON06	C3b/D3d section	243	Vc	80	100	bone	OxA–23903	35300	650	–18,705
BON06	C3b/D3d section	243	Vc	80	100	bone	OxA–23904	34950	600	–18,55
BON07	B3b/C3d section	255–265	Vb		100	bone				
BON09	B4a	305–315	VI			bone	OxA–23905	47500	2900	–17,694
BON14	B4a	365–375	VII			bone	OxA–23906	> 47700		–19,131
BON20	B4c	390–395	VIII			bone	OxA–23908	> 48400		–19,369
BON21	B4c	365–375	VIII			bone	OxA–23909	> 48100		–17,263
BON25	B4a	375–380	VIII			bone	OxA–23907	> 48600		–18,904

FIGURE 15 Dating chart.

LAB#	SQUARE	PERIOD	LAYER	DEPTH (CM)	CONVENTIONAL RADIOCARBON AGE BP	AGE CAL BP – 1 σ
SacA–12064	C3	UP	III	130–150	14330 +/– 90	17504 +/– 257
SacA–12065	C3	UP	III	150–160	14050 +/– 90	17295 +/– 225
Beta 2392225	B4	UP	IV	110–140	19360 +/– 120	23124 +/– 286
SacA–12066	C3	UP	IV	170–190	20080 +/– 170	24005 +/– 349
Beta 270160	C3	UP	IV	178	26020 +/– 170	30978 +/– 348
Beta 239226	A4	UP	V	145–165	10920 +/– 40	12860 +/– 81
SacA–12067	C3	UP	V	200–210	18010 +/– 140	21726 +/– 395
Beta 270161	A4	UP	V	185–205	21550 +/– 120	25668 +/– 405
SacA–12068	C3	UP	V	203–230	24620 +/– 300	29462 +/– 580
SacA–12069	C3	UP	VI	240–250	31270 +/– 640	35438 +/– 683
Beta 2392227	B4	MP	VII	270–280	35070 +/– 340	40082 +/– 867
Beta 270162	A4	MP	VIII	315–325	38750 +/– 480	43123 +/– 632

FIGURE 16 ^{14}C dates at Bondi Cave (Cal. HULU http://www.calpal-on-line.de/).

The sourcing of the Bondi and Ortvale Klde Caves obsidians was tentatively determined from their elemental compositions. In order to fulfill a local authority requierement of non-destructive analysis, all the artefacts compositions were determined by PIXE (particle induced X-ray emission). Five of those were analyzed at *Centre d'Etude Nucléaire de Bordeaux* (CENBG, Gradignan, France) using the nuclear microprobe line of the AIFIRA facility, where the samples are exposed to the particle beam inside a chamber maintained in the accelerator high vacuum (Llabador *et al.*, 1990).

The remaining six artefacts and five geological samples were treated at *Centre de Recherche et de Restauration des Musées de France* (C2RMF, Paris) where the external particle beam of AGLAE facility is particularly adapted to the analysis of large samples, as shown for obsidians in other circumstances (Calligaro *et al.*, 2005, Fig. 1; Le Bourdonnec *et al.*, 2011, Fig. 4). Due to their 'large' sizes, the geological samples and artifact C26d had to be treated at AGLAE. In both PIXE facilities, which were shown to provide concordant element contents (Le Bourdonnec *et al.*, 2005) we used an 3 MeV proton beam. Analytical procedures and data treatments are detailed elsewhere (Lugliè *et al.*, 2007; Bellot-Gurlet *et al.*, 2008; Poupeau *et al.*, 2010).

FIGURE 17 Stone artefacts (blades and bladeleds) from Bondi Cave.

FIGURE 18 Stone artefacts from Bondi Cave.

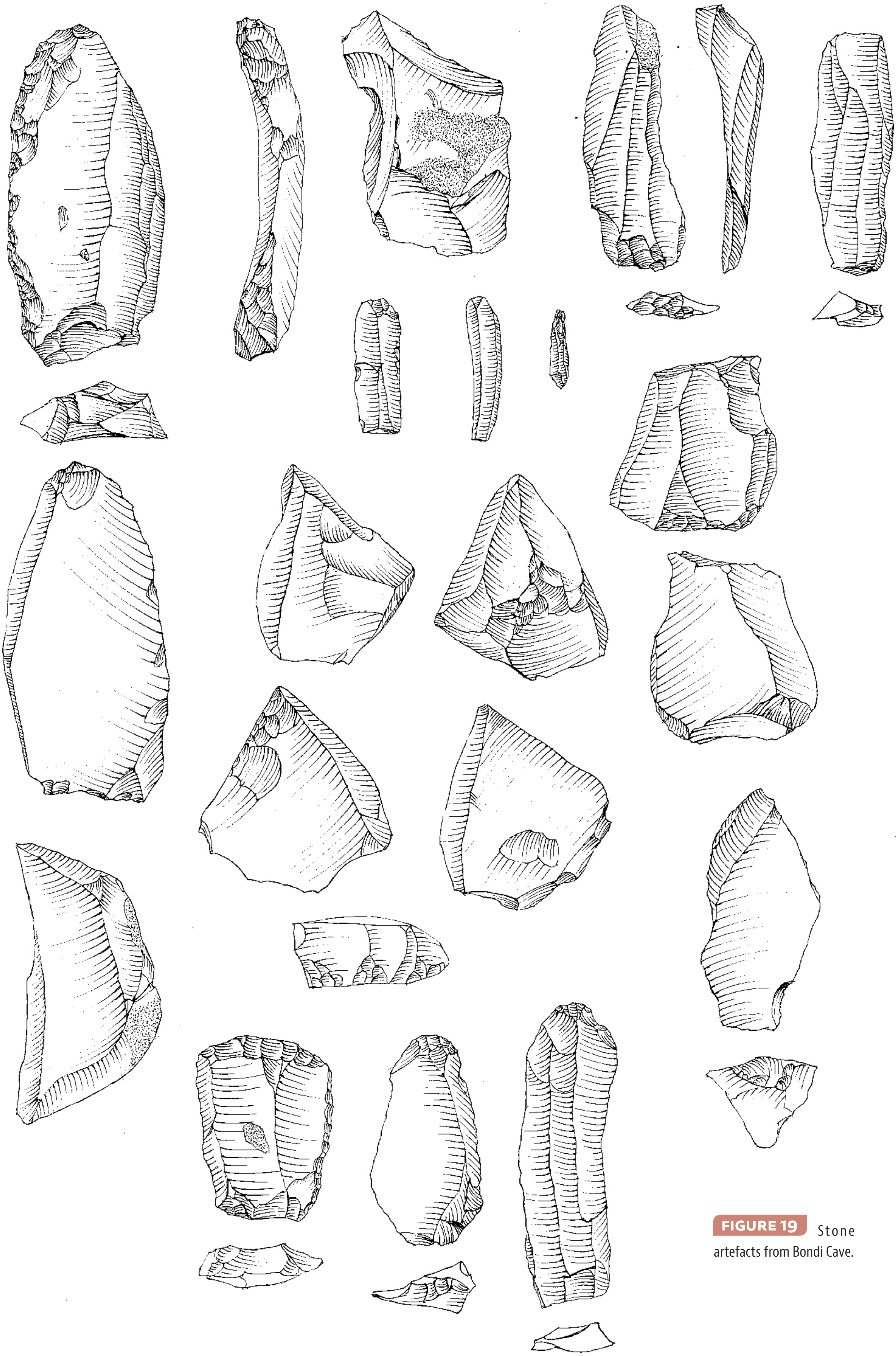


FIGURE 19 Stone artefacts from Bondi Cave.

FIGURE 20 Ornamented bone artefact from Bondi Cave.

It has been possible to clearly identify some obsidian sources of Bondi Cave and Ortvale Klde. It is the Chikiani source of the Lesser Caucasus northern flank. This is one of the nearest sources which lie at linear distances of more than 100 km. (François-Xavier Le Bourdonnec *et al.*).

Bondi stone industry has a common appearance with the Dzudzuana material. Although industry in the Bondi Cave is non-microlythic. There is a huge number of flakes represented. Most of the tools are made of flakes, although blades and microblades are not less in number. Similar to Dzudzuana and Ortvala Klde certain Aurignatian features can be observed, namely, Carinated type forms (cores, burins, planers), also, several end-scrapers made of big size oval items and bladelets, backed blades and microblades (**figure 19**), also, bone tools. It has to be noted, that there are some items made of basalt pebble stones. Items like these are not discovered in the Ortvala Klde, but a small number in different forms can be found in Dzudzuana.

Bones were recovered from all layers (**figures 20** and **21**), and for three of the excavated squares (A4-B4-C3), bone was sampled for radiocarbon ^{14}C dating by Beta Analytic Radiocarbon Dating Laboratory (Miami, USA) and the Centre of radiocarbon dating at the University of Lyon (France).

There are bone items in the cave on which scratches (when processing the bone) can be observed. Apart from this, one bone tool (polished point or burin) and one ornamented fragment of burnt bone have been found in the second layer. Fish bone ornament is made on threefaceted smooth bone rib. The ornaments (scratches) are separated by equal distances in eight rows. The type and function of these symbols are vague yet.

A bead found in the fifth layer, which might have occured here from the upper layers, has to be also noted.

3.1 Paleontological and non-paleontological material

Faunistic remains in Bondi Cave have been found during excavations belong to only eleven species. Bison remains prevail among them. There is Capra caucasica observed as well. [Nikoloz Tushabramishvili *et al.* 2009].

As we see, unlike Ortvala Klde where Capra Caucasica dominates, bison prevails in Bondi cave. Situation is similar in Dzudzuana cave too (G. Bar-Oz *et al.* 2007).

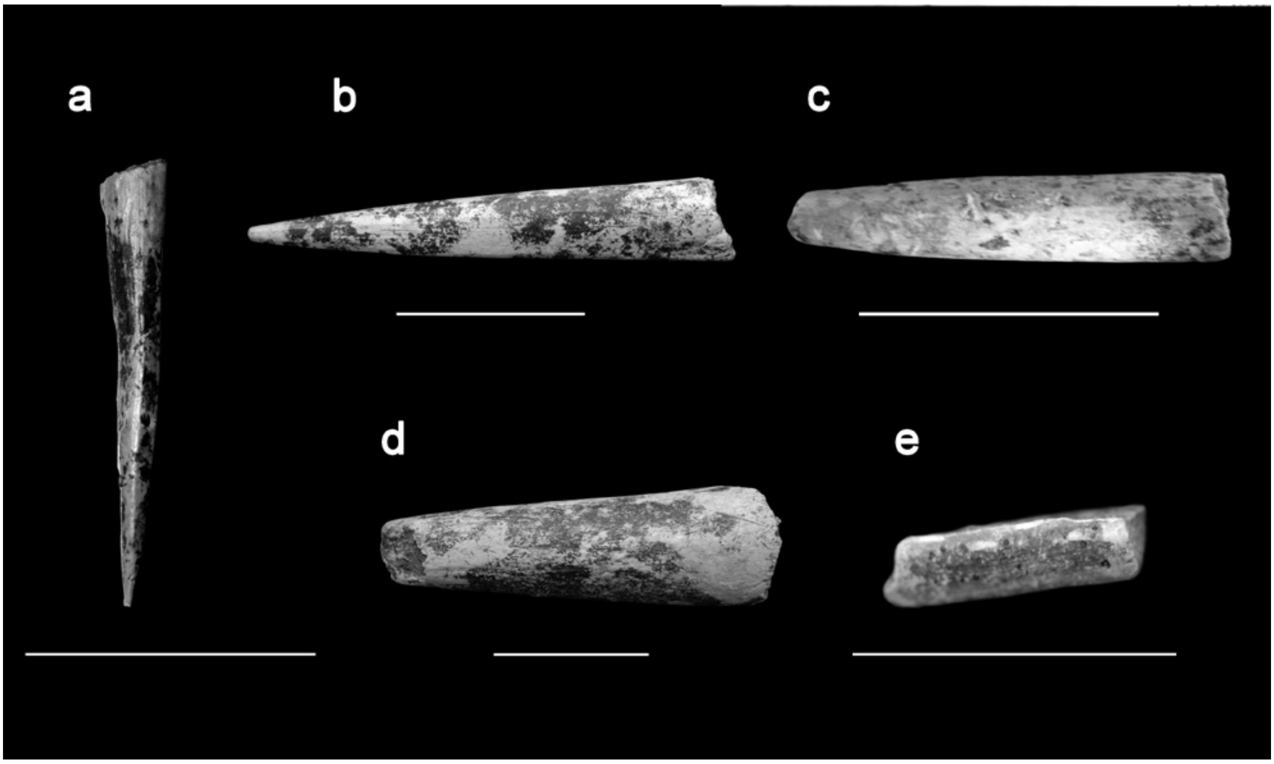


FIGURE 21 Bone tools from Bondi Cave.

Microfaune 3.2

Microfaune has been studied by Doc. Alexsandre Muskhelishvili.

The remains are 9 micromammal species of the site: Microtus arvalis, Chionomys ex. gr. gud-roberti, Prometheomys schaposchnikovi, Pitimys sp., Arvicola terrestris, Mesocricetus sp. Ochotona sp., Clethrionomys glareolus, Cricetulus sp.

Upper Paleolithic fauna of Bondi comprises the species which can have significance for the climat and vegetation at the time.

The first evidence of earliest wool and flax remains was determined in Bondi Cave in 2007 (Э.В. КВАВАДЗЕ, Н.Д. ТУШАБРАМИШВИЛИ. 2008) (**figures 22** and **23**). This kind of discovery was done also in Dzudzuana Cave in 2008.

Both in the Dzudzuana Cave and the Bondi Cave dyed twisted Capra Caucasica wool and flax remains were found in every layer. This is the earliest ever such discovery (35000 BP Bondi cave, 34000 – 32000 BP – Dzudzuana Cave). It should be stressed that their prevailance is confirmed in the layers, where according to Paleoantological and Microfaunistic data rather cold periods were considered. These are IV-VI layers. In colder periods the cave was more intensively mastered. The proof for this is existance of lots of micro remains of burnt pine trees. Also, number of weeds is growing on the sites trampled by people. Number of fibres of Capra Caucasica wool and flax is increasing, including twisted and colored (**figure 24**).

FIGURE 22 Flax from Bondi Cave.

FIGURE 23 Wool and flax remains from Bondi Cave.

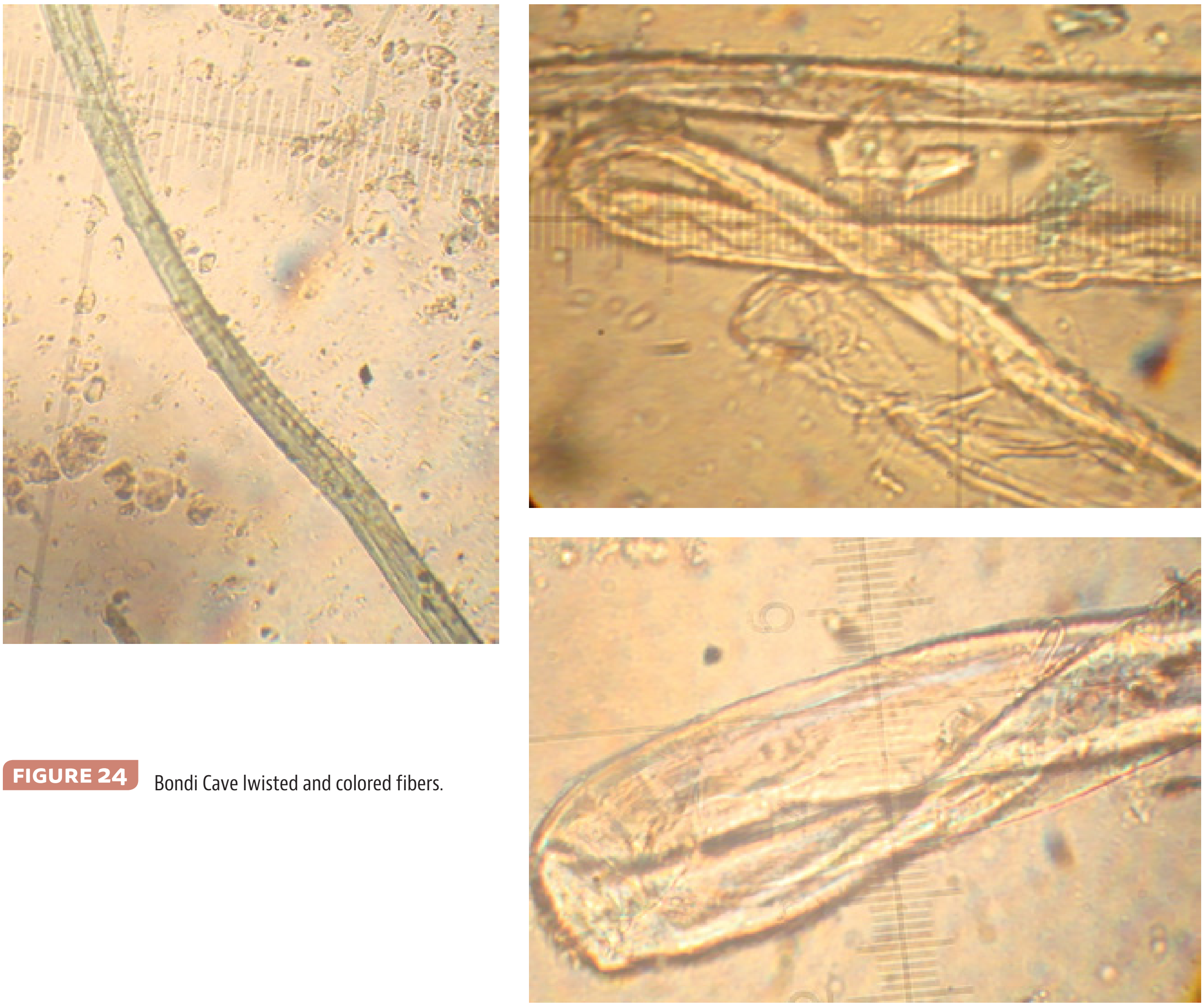


FIGURE 24 Bondi Cave lwisted and colored fibers.

LAYER	SAMPLE	DEPTH	EDIFICATORS		FIBERS LINUM
			MICRO	MACRO	
I	N12	0,90 m	*Asteraceae, Cerealia, Poaceae, Chenopodiaceae, Plantago, Rumex*	*Fabaceae, Cerealia, Poaceae,*	-
II	N11	1,00 m	*Carpinus, Quercus,Fagus, Juglans, Dryopteridaxeae*	*Fabaceae, Poaceae, Polygonum Cladium maritimum*	10
III	N10	1,40 m	*Quercus, Ulmus Betula, Ephedra, Poaceae Asteraceae, Chenopodiaceae*	*Pinus, Poaceae Fabaceae*	8
IV	N9	1,65 m	*Pterocarya pterocarpa Acer Carpinus, Ulmus Quercus, Fagus, Juglans, Aspleniaceae Dryopteridaxeae*		4
Va	N8	1,90 m	*Quercus, Juglans, Carpinus, Polypodiaceae Dryopteridaxea*		6
Vb	N7	2,00 m	*Betula Ephedra Polypodiaceae, Lycopodium*	*Fabaceae Poaceae*	6
Vc	N6	2,10 m	*Ephedra Lycopodium*	*Pinus-macro-*	8
Vd	N5	2,30 m	*Betula Ephedra Polypodiaceae, Lycopodium*	*Fabaceae unnidentif*	
VI	N4 = 5D	2,70 m	*Zelkova Ephedra, Polypodiaceae, Lycopodium*	*Pinus-Asperula Galium*	10
VI	N3	3,085 m	*Fagus,,Quercu Acer Pterocarya pterocarpa Juglans,Ulmus Corylus Dryopteris Aspleniaceae*	*Fabaceae Rosaceae Chenopodium*	4
VII	N2	3,50 m	*Fagus, Quercus Acer Juglans, Ulmus Corylus Pterocarya, Polypodiaceae*	*Fabaceae, Poaceae*	
VII	N1	3,98 m	*Pinus,Pterocarya, Juglans, Fagus, Taxodiaceae Acer Dryopteridaceae*	*Pinus, Hedera helix Apiaceae*	

FIGURE 25 Paleobotanical samples.

This enables us to presume, that at that period thread not only already existed and was used, but the humans could already knit as well. This viewpoint was expressed by scientists earlier (Soffer *et al.* 2000). According to it Upper Paleolithic Venuses wore hats made of flax. Our material prooves this sensational theory.

According to discovered Palinological material during Upper Paleolithic period (**figure 25**) cold periods were longer, than warm ones in the Kolkhis fore-mountainous zone (Э.В. КВАВАДЗЕ, Н.Д. ТУШАБРАМИШВИЛИ. 2008). More or less the same results got Prof. M.Bokeria (Manuscript). According to her: "According to paleobotanical data, during the last Glacial maximum, the plants, which had exist in most parts of western Euro-Asia, in the Colchian refugium, with warm, humid climate so-called Arcto-Terterian relict plants appeared.

4 DZUDZUANA CAVE

Dzudzuana cave is located in 3–4 kilemeters from Bondi, on the territoy of Mgvimevi village, Nikrisi gorge. The cave discovered by Prof. D.Tushabramishvili and studied in 1966. The Cave was studied by him from 1966 to 1975. Since 1983 Dzudzuana Cave is investigated by the Georgian-American-Israel team led by Doc. T. Meshveliani and Prof. O.Bar-Yosef.

Dzudzuana cave upper paleolith can be characterised by the following way: Layer A: ~ 5,000–6,300 BP; layer B: ~ 11,000–13,000 BP: blades flaked from bipolar cores and small size lamells; layer C: ~ 19,000–23,000BP: prevail lamells small size lamells and microliths, endscrapers on flakes Karene type cores; layer D: ~26, 000–32,000BP: microliths, endscrapers on flakes, double and nail shaped endscrapers. Some bone tools have been found as well (**figure 26**).

FIGURE 25 Dzudzuana bone tools.

We would like to note that the excavators date this layer as of 34000. From faunistic material, bison is prevailing. In the Dzudzuana Cave, like in Bondi a horse is represented.

layer D: ~26,000–32,000BP: microliths, endscrapers on flakes, double and nail shaped endscrapers. Some bone tools have been found as well We would like to note that the excavators date this layer as of 34000. From faunistic material, bison is prevailing. In the Dzudzuana Cave, like in Bondi a horse is represented.

As we can see, the periods of mastering of the Dzudzuana and Bondi Caves are nearly the same. Bondi dates somehow fill Dzudzuana hiatuses, although - not fully yet.

5 CONCLUSION

Thus, in one region and in the same paleo-environment, where climatic conditions and landscape are similar, in the caves separated from each other by several kilometers, inhabited by people at the same time, several different situations have been represented: In the Ortvala Klde early Upper Paleolithic human beings hunted mainly on Capra Caucasica. The inhabitants of the Dzudzuana and Bondi Caves are mainly hunting bisons and, unlike the Ortvala Klde hunters, they also hunted horses. The inhabitants of Dzudzuana and Bondi caves could use Capra Caucasica wool and flax, as well as primitive knitting and coloring.

Nothing similar has been observed in the Ortvala Klde. From the standpoint of material culture Bondi and Dzudzuana are closer to each other, than the Ortvala Klde, although there is still difference between them too (material is more microlithic in the Dzudzuana Cave, than in the Ortvala Klde). It should be also noted, that all these monuments have one thing in common – coexistance of Aurignacian and Gravettian features. It seems, this is typical for Upper Paleolithic of Georgia.

In the cave-sites existing in the region of Upper Imereti existance of slightly, but still diverse stone industry, living and hunting strategies and traditions might be connected with coexistance, adaptation and distribution of natural resources and living areas of the groups of primitives. Although, it is possible that better dating of theis sites could show us chronological differences between them, which, probably will be proving, that the human beings of the same culture in different gorges lived on seasonal basis or at different times, or these groups of human beings used different economy or hunting strategies.

In Undo Cave located in the same region (Upper Imeretian Plateau) in 2 km from Ortvala Klde recent season was determined by Upper Paleolithic layer with Ortvala type lithic material. This layer overlied the Middle Paleolithic layer. So, for the present time we have 4 cave-sites where the Upper Paleolithic Layers are just in contact with the Middle Paleolithic layers. These evidences need and explaining and future investigations.

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REFERENCES

ADLER D.S. (2002) – *Late Middle Palaeolithic Patterns of Lithic Reduction, Mobility, and Land Use in the Southern Caucasus*, Ph.D. Dissertation, Department of Anthropology, Harvard University, Cambridge.

ADLER D.S., BAR-OZ G., BELFER-COHEN A. & BAR-YOSEF O. (2006) – Ahead of the Game. Middle and Upper Palaeolithic Behaviors in the Southern Caucasus, *Current Anthropology* 47(1): 89–118.

ADLER D.S. & TUSHABRAMISHVILI N. (2004) – Middle Paleolithic Patterns of Settlement and Subsistence in the Southern Caucasus. In: Conard N.J. (ed.), *Settlement Dynamics of the Middle Paleolithic and Middle Stone Age*, vol. II. Tübingen, p. 91–133.

ADLER D.S., BAR-YOSEF O., BELFER-COHEN A., TUSHABRAMISHVILI N., BOARETTO E., MERCIER N., VALLADAS N. & RINK W.J. (2008) – Dating the demise: Neandertal extinction and the establishment of modern humans in the southern Caucasus. *Journal of Human Evolution* 55: 817–833.

AKAZAWA T. & MUHESEN S. (2002) – *Neanderthal Burials. Excavations of the Dederiyeh Cave, Afrin, Syria.* International Research Center for Japanese Studies.

ANIKOVICH M.V. *et al.* (2007) – *Science* 315: 223.

ASFAW B. *et al.* (2002) – *Nature* 416: 317.

BADADALYAN R., CHATAIGNER C. & KHOL P. (2004) – *Trans-Caucasian Obsidian: the exploitation of sources and their distribution.*

BAR-OZ G., ADLER D.S., MESHVELIANI T., TUSHABRAMISHVILI N., BELFER-COHEN A. & BAR-YOSEF O. (2002) – Middle and Upper Palaeolithic foragers of the southwest Caucasus: new faunal evidence from Western Georgia. *Archaeology, Ethnology and Anthropology of Eurasia*, 4(12): 45–52.

BAR-OZ G., ADLER D.S., VEKUA A., MESHVELIANI T., TUSHABRAMISHVILI N., BELFER-COHEN A. & BAR-YOSEF O. (2004) – Faunal exploitation patterns along the Southern slopes of the Caucasus during the Late Middle and Early Upper Palaeolithic. In: M. Mondini, S. Muñoz & S. Wickler, *Colonisation, migration, and marginal areas: A zooarchaeological approach*, Oxford, Oxbow Books, p. 46–54.

BAR-OZ G. & ADLER D.S. (2005) – Taphonomic History of the Middle and Upper Palaeolithic Faunal Assemblage from Ortvale Klde. Georgian Republic, *Journal of Taphonomy* 3: 185–211.

BAR-OZ G., BELFER-COHEN A., MESHVELIANI T., DJAKELI N. & BAR-YOSEF O. (2008) – Taphonomy and zooarchaeology of the Upper Palaeolithic Cave of Dzudzuana, Republic of Georgia. *International Journal of Osteoarchaeology*, 18: 131–151.

BAR-YOSEF O., BELFER-COHEN A. & ADLER D.S. (2006) – The implications of the Middle-Upper Palaeolithic chronological boundary in the Caucasus to Eurasian Prehistory. *Anthropologie* 44(1): 49–60.

BAR-YOSEF O. (2002) – *Annual Review of Anthropology* 31: 363.

BARRAT J.A., KELLER F., AMOSSE J., TAYLOR R.N., NESBITT R.W. & HIRATA T. (1996) – Determination of rare earth element in sixteen silicate reference samples by ICPMS after Tm addition and ion exchange separation. *Geostandards newsletter* 20: 133–139.

BENNETT K.D. (2005) – *Documentation for psimpo 114.25 and pscomb 1.03*. Uppsala, Uppsala University.

BIGAZZI G., YEGINGIL Z., ERCAN T., ODDONE M. & ÖZDOGAN M. (1993) – Fission Track Dating Obsidians in Central and Northern Anatolia. *Bulletin of Volcanology* 55: 588–595.

BRENNAN B. J., RINK W. J., MCGUIRL E.L., SCHWARCZ H.P. & PRESTWICH W.V. (1997) – *Radiation Measurements* 27: 307.

CONARD N.J. & BOLUS M. (2003) – *Journal of Human Evolution* 44, p. 331.

COTTE N.J., LE DEZ A., BAU M., CAROFF M., MAURY R.C., DULSKI P., FOURCADE S., BOHN M. & BROUSSE R. (1995) – Origin of anomalous rare-earth element and yttrium enrichments in subaerial exposed basalts: evidence from French Polynesia. *Chemical Geology* 119: 115–138.

DEREVIANKO A.P. & SHUNKOV M.V. (2004) – *Archaeology Ethnology & Anthropology of Eurasia* 3: 12.

FORSTER P. (2004) – *Philosphical Transactions of the Royal Society London B* 359: 255.

FORSTER P. & MATSUMURA S. (2005) – *Science* 308: 965.

FRAHM E.E. (2010) – The Bronze-Age Obsidian Industry at Tell Mozan (Ancient Urkesh), Syria: Redeveloping Electron Microprobe Analysis for 21st-Century Sourcing Research and The Implications for Obsidian Use and Exchange in Northern Mesopotamia after the Neolithic. University Of Minnesota, *PhD Disseration*.

GABUNIA L. & VEKUA A. (1990) – *L'Anthropologie* 94(4): 643.

GAMBLE C. (1999) – *The Paleolithic societies of Europe*. Cambridge University Press, Cambridge.

GOLOVANOVA L.V., DORONICHEV V.B. & CLEGHORN N.E. (2010) – The emergence of bone-working and ornamental art in the Caucasian Upper Palaeolithic. *Antiquity* 84: 299–320.

GOLOVANOVA L.V. (2000) – Late Acheulian of the Northern Caucasus and the problem of transition of the Middle Palaoelithic. Dans: D. Lorkipanidze *et al.* (eds.), *Les premiers Hommes aux portes de l'Europe*, ERAUL 92, p. 42–65.

GOLOVANOVA L.V. & DORONICHEV V.B. (2003) – The Middle Palaeolithic of the Caucasus. *Journal of World Prehistory* 17(1): 71–138.

HARDY K. (2008) – Prehistoric string theory. How twisted fibres helped to chape the world. *Antiquity* 82: 271–280.

HYLAND D.C., ZHUSCHHIKHOVSKAYA I.S. & MEDVEDEV V.E. (2002) – Pleistocene textiles in the Russian Far East: Impressions arom some of the world's oldest pottery. *Anthropologie*.

INNOCENTI F., MAZZUOLI R., PASQUARE G., DIBROZOLO F. & VILLARI L. (1982) – Tertiary and Quaternary volcanism of the Erzurum-Kars Area (Eatsern Turkey)-Geochronology data and Geodynamic evolution. *Journal of Volcanology and Geothermal Research* 13(3–4): 223–240.

KARAPETIAN S.G., JRBASHIAN R.T. & MNATSAKANIAN A.KH. (2001) – Late collision rhyolitic volcanism in the north-eastern part of the Armenian Highland. *Journal of Volcanology and Geothermal Research* 112 : 189–220.

KIKODZE Z. & KORIDZE I. (1978) – Faravnis dazveviti arqeologiuri eqspediciis mier 1977 cels chatarebuli samushaoebis mokle angarishi. Saqartvelos saxelmcifo muzeumis arqeolohgiuri eqpediciebis angarishi 6 : 19–26, Tbilissi, Metsniereba.

KLEIN R.G. (1999) – *The human career : human biological and cultural origins*. University of Chicago Press, Chicago, 2nd Edition.

KOMAROV A.N., KARAPETY S.G. & SKOVOROD N.V. (1972) – Determination of age of natural Glasses according to Tracks of Uranium fission fragments. *Geokhimiya* 6 : 693–695.

KOPPERS A.A.P. (2002) – ArAr CALC-software for $^{40}Ar/^{39}Ar$ age calculations. *Computer and Geosciences* 28 : 605–619.

KVAVADZE E. & GAGOSHIDZE IU. (2008) – Fibres of silk, cotton and flax in a weaving workshop from the 1-th Cent.A.D. Palace of Dedoplis Gora. *Vegetation History and Archaeobotany* 17(suppl.1) : 211–215.

KVAVADZE E., BAR-YOSEF O., BELFER-COHEN A., BOARETTO E., JAKELI N.,MATSKEVICH Z. & MESHVELIANI T. (2009) – 30 000-years-old Wild Flax Fibers. *Science* 325 : 1359.

LIUBINE V.P. (1977) – *Mustierskie kul'turi Kavkaza* (Mousterian Cultures of the Caucasus). Leningrad, Nauka.

LIUBINE V.P. (1989) – Paleolit Kavkaza (Palaeolithic of the Caucasus), In : *Paleolit Kavkaza I Sredney Azii* (The Palaeolithic of the Caucasus and Northern Asia). Leningrad, Nauka, p. 9–144.

LIUBINE V.P. (2002) – *L'Acheuléen du Caucase*. ERAUL 93.

LIUBINE V.P. & BOSINSKI G. (1995) – The earliest occupation of the Caucasus region. In : W. Roebroeks & T. Van Kolfschoten (eds.)(1993), *The earliest occupation of Europe*, Proceedings of the European Science Foundation workshop at Tautavel, France, University of Leiden, p. 207–235.

LEBEDEV V.A., BUBNOV S.N., DUDAURI OZ. & AL. (2008) – Geochronology of Pliocene volcanism in the Dzhavakheti Highland (the Lesser Caucasus). Part 2 : Eastern part of the Dzhavakheti Highland. Regional geological correlation. *Stratigraphy and geological correlation* 16(5) : 553–574.

LORDKIPANIDZE D.O. (1992) – Osobenosti vzaimodeistvia pervobytnogo obshehestva I prirodnoi sredi vuslovi'akh gornikh teritorii (The interactions of primitive societies and the environments of mountains territories. *PhD Thesis*. University of Moscow, Russia.

MAMATSASHVILI N.S. (1978) – Palynological studies of cave sediments. In : F.F.Davitaya (ed.), *Studies of Colchis caves*. Matsniereba, Tbilisi, p. 75–94.

MEIGNEN L. & TUSHUBRAMISHVILI N. (2006) – Paléolithique moyen laminaire sur les flancs sud du Caucase : productions lithiques et fonctionnement du site de Djurchula 5 géorgie). *Paléorient* 32(2) : 81–104.

MEIGNEN L. & BAR-YOSEF O. (2002) – *Archaeology, Ethnology & Anthropology of Eurasia* 3 : 12.

MEIGNEN L. (1994) – Le Paléolithique moyen au Proche-Orient : le phénomène laminaire. In : Révillion S. & Tuffreau A. (eds.), *Les industries laminaires au Paléolithique moyen*, CNRS, Paris, Dossier de Documentation archéologique 18 : 125–161.

MEIGNEN L. (1998) – Hayonim cave lithic assemblages in the context of the near eastern Middle Paleolithic. In : T. Akazawa, K. Aoki & O. Bar-Yosef, *A Preliminary report, in Neandertals and Modern Humans in Western Asia*, Plenum Press, New York and London, p.165–181.

MEIGNEN L. (2000) – Early Middle Palaeolithic Blade Technology in Southwestern Asia. *Acta Anthropologica Sinica* 19 : 158–168.

MEIGNEN L. & TUSHUBRAMISHVILI N. (2006) – Paléolithique moyen laminaire sur les flancs sud du Caucase : productions lithiques et fonctionnement du site de Djurchula, Géorgie. Paléorient 32 : 81–104.

MELLARS P. (2004) – *Nature* 432 : 461.

MELLARS P. (2006) – *Nature* 439 : 931.

MERCIER N., VALLADAS H. & VALLADAS G. (1995) – *Quaternary Science Reviews* 14 : 351.

MESHVELIANI T.K., TVALCHRELIDZE M.G. & LORDKIPANIDZE D.O. (1990) – Dzurdzuna cave. In : *Chronostratigraphy of the Paleolith of North, Central, East Asia and America*, Novosibirsk, p. 231–234.

MESHVELIANI T., BAR-YOSEF O, & BELFER-COHEN A. (2004) – The Upper Paleolithic of Western Georgia. In : P.J. Brantigham, S.L. Kuhn & K.W. Kerry (eds.), *The Early Upper Paleolithic beyond Western Europe*, University of California Press, Berkeley, CA, p. 129–143.

MESHVELIANI T., BAR-OZ G., BAR-YOSEF O., BELFER-COHEN A., BOARETTO E., JAKELI N., KORIDZE I. & MATSKEVICH Z. (2007) – Mesolithic hunters at Kotias klde, Western Georgia : preliminary results. *Paléorient* 33(2) : 47–58

MOLINES N., MONCEL M.-H. & MONNIER J.-L. (EDS) (2005) – *Données récentes sur les modalités de peuplement et sur le cadre chronostratigraphique, géologique et paléoanthropologique des industries du Paléolithique inférieur et moyen en Europe*, BAR Series Internationales S1364.

MONCEL M.-H., PLEURDEAU D., TUSHABRAMISHVILI N., ORJONIDZE L., AGAPISHVILI T. & SAMKHARADZE G. (2007) – *Rapport de mission 2006 en Géorgie*. Ministère des Affaires Etrangères.

MONCEL M.-H., PLEURDEAU D., VOINCHET P., TUSHABRAMISHVILI N., MGELADZE A., ORJONIDZE L., AGAPISHVILI T. & SAMKHARADZE G. (2008) – *Rapport de mission 2007 en Géorgie*. Ministère des Affaires Etrangères.

MORGAN L.E., RENNE P.R., TAYLOR R.E. & WOLDEGABRIE G. (2009) – Archaeological constraints from extrusion ages of obsidian : Examples from the Middle Awash. *Ethiopia Quaternary Geochronology* 4 : 193–203.

NADEL D., DANIN A., WEKER E., SCHICK T., KISLEV M.E. & STEWART K. (1994) – 19-Year-Old twisted fibers from Ohalo II. *Current Antropology* 35(4) : 451–457.

NOMADE S., RENNE P.R., VOGEL N., DEINO A.L., SHARP W.D., BECKER T.A., JAOUNI A.R. &MUNDIL R. (2005) – Alder creek sanidine (ACs–2) : a Quaternary $^{40}Ar/^{39}Ar$ dating-standard tied to the Cobb Mountain geomagnetic event. *Chemical Geology* 218 : 315–338.

NOMADE S., GAUTHIER A., GUILLOU H., PASTRE J.F. (2010) – $^{40}Ar/^{39}Ar$ temporal framework for the Alleret maar lacustrine sequence (French Massif-Central) : Volcanological and paleoclimatic implications. *Quaternary Geochronology* 5 : 20–27.

OLIVIERI A. *et al.* (2006) – *Science* 314 : 1767.

OVCHININKOV I.V. *et al.* (2000) – *Nature* 404 : 490.

PINHASI R., GASPARIAN B., WILKINSON K., BAILEY R., BAR-OZ G., BRUCH A., CHATAIGNER C., HOFFMANN D., HOVSEPYAN R., NAHAPETYAN S., PIKE A.W.G., SCHREVE D. & STEPHENS M. (2008) – Hovk 1 and the Middle and Upper Paleolithic of Armenia : a preliminary framework. *Journal of Human Evolution* 55 : 803–816.

PLEURDEAU D., TUSHABRAMISHVILI N., NIORADZE, DE LUMLEY M.H. & LORDKIPANIDZE D. (2007) – Les industries lithiques du Paléolithique moyen de Géorgie. *L'Anthropologie* 111 : 400–431.

RINK J. *et al.* (1994) – *J. Arch. Sci.* 21 : 830.

SCAILLET S. & GUILLOU H. (2004) – A critical evaluation of young (near zero) K-Ar Ages. *Earth and Planetary Science Letters* 220 : 265–275.

CHARBIT S., GUILLOU H. & TURPIN L. (1998) – Cross calibration of K–Ar standard minerals using an unspiked Ar measurement technique. *Chemical Geology* 150(1–2) : 147–159.

SHARP W.D. & RENNE P.R. (2005) – The $^{40}Ar/^{39}Ar$ dating of core recovered by the Hawaii Scientific Drilling Project (phase 2). Hilo, Hawaii. *Geochemistry Geophysics Geosystems* 6(4).

SKINNER A.R. *et al.* (2005) – *Applied Radiation and Isotopes* 62 : 219.

SOFFER O., ADOVASIO J. M., HYLAND D.C. (2000) – The "Venus" figures. Textiles, basketry, gender, and status in the Upper Paleolitic. *Current Antropology* 41(4) : 511–537.

SUZUKI H. & TAKAI F. (EDS.) (1994) – *The Amud Man and His Cave Site* (Academic Press of Japan, Tokyo, 1970), pp.; Y. Rak, W. H. Kimbel, E. Hovers, *Journal of Human Evolution* 26, 313.

STEIGER R.H. & JÄGER E. (1977) – Subcommission on geochronology : Convention on the use of decay constants in geo- and cosmochronology. *Earth and Planetary Science Letters* 36 : 359–362.

TRINKAUS E. (2006) – *Current Anthropology* 47 : 597.

TSERETELI L.D., KORKIA L.O., SHATILOVA I.I., KURENKOVA E.I (1989) – Some results of complex studies of the Apiancha cave site. In : *Geochronology of the Quaternary. Moscow*, p. 152–155.

TSERETELI L.D., KORKIA L.O. & SHATILOVA I.I. (1990) – The results of archaeological and paleontological studies of the Apiancha site. In : *Chronostratigraphy of the Paleolithic of North, Central, East Asia and America*, Novosibirsk, p. 296–305.

TSERETELI L.D., KLOPOTOVSKAYA N.B. & KURENKOVA E.I. (1982) – Multi-layer monument of Apiancha. In : A.L.Tsagareli (ed.), *The Quaternary system of Georgia*, Metsniereba, p. 198–212.

TUSHABRAMISHVILI N. (1994) – *Srednii Paleolit Zapadnoi gruzii I etapy ego perekhoda k verkhnemu paleolitu (po materialam Ortvala Klde* (The Middle palaeolithic of Western Georgia and the Stages of its Transition to the Upper Palaeolithic bases on the material from Ortvala Klde), Ph diss., University of Tbilisi.

TUSHABRAMISHVILI N. (2002) – *Les Cavernes de la Géorgie – Les Sites de l'Homme préhistoriques*. Le Guide, Tbilisi (en géorgien, anglais, français).

TUSHABRAMISHVILI N. (2003) – Les industries du Paléolithique inférieur dans le Caucase méridional. *L'Anthropologie* 107 : 565–576.

TUSHABRAMISHVILI N., LORKIPANIDZE D., VEKUA A., TVALCHERLIDZE M., MUSKHELISHVILI A. & ADLER D.S. (1999) – The Middle Palaeolithic Rockshelter of Ortvala Klde (Imereti Region), The Georgian Republic, *Préhistoire Européenne* 15 : 65–77.

TUSHUBRAMISHVILI N., PLEURDEAU D., MONCEL M.H. & MGELADZE A. (2007) – Le complexe Djruchula-Koudaro au Sud Caucase (Géorgie). Remarques sur les assemblages lithiques pléistocènes de Koudaro I. Tsona et Djruchula, *Anthropologie* 45(1) : 1–18.

TUSHABRAMISHVILI N. (1994) – *Srednii Paleolit Zapadnoi gruzii I etapy ego perekhoda k verkhnemu paleolitu (po materialam Ortvala Klde* (The Middle palaeolithic of Western Georgia and the Stages of its Transition to the Upper Palaeolithic bases on the material from Ortvala Klde), University of Tbilisi, Ph diss.

TUSHABRAMISHVILI D. (1984) – Paleolit Gruzii (Palaeolithic of Georgia). *Newsletter of the georgian State Museum* 37B : 5–27.

TUSHABRAMISHVILI N., LORKIPANIDZE D., VEKUA A., TVALCHERLIDZE M., MUSKHELISHVILI A. & ADLER D.S. (1999) – The Middle Palaeolithic Rockshelter of Ortvala Klde (Imereti Region), The Georgian Republic. *Préhistoire Européenne* 15 : 65–77.

TUSHABRAMISHVILI N., ADLER D.S., BAR-YOSEF O. & BELFER-COHEN A. (2002) – *Antiquity* 76 : 927.

TUSHABRAMISHVILI N., PLEURDEAU D., MONCEL M.-H. & MGELADZE A. (2007) – Le complexe Djruchula-Koudaro au sud Caucase (Géorgie). Remarques sur les assemblages lithiques pléistocènes de Koudaro I. Tsona et Djruchula, *Anthropologie* 45(1) : 1–18.

TUSHABRAMISHVILI N. (1991) – Развитие Культуры, Грузия в Антропогене, p. 453.

TUSHABRAMISHVILI N., AGAPISHVILI T., BUKHSIANIDZE M., GOTSIRIDZE T., MONCEL M.-H. & PLEURDEAU D. (2009) – Paleolithic Cave-Undo Klde, Preliminary Results. Bulletin. Georgian National Museum, *Natural Sciences and Prehistory Section* 1 : 47–58.

VALLADAS H. (1992) – *Quaternary Science Reviews* 11 : 1.

VALOCH K. (2007) – Textile in the Upper Palaeolitic? some notes on the matter. *Archeologicke rozhledy* 59(11) : 143–154

VANDERMEERSCH B. (1992) – *The Evolution and Dispersal of Modern Humans in Asia*, p. 29–38.

VAN GEEL B. & ARTROOT A. (2006) – Fossil ascomycetes in Quaternary deposits. *Nova Hedwigia* 82(3–4) : 313–329.

YIZHAQ M. *et al.* (2005) - *Radiocarbon* 47 : 193.

ZILHAO J. & D'ERRICO F. (1999) – *Journal of World Prehistory* 13 : 1.

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Thème II
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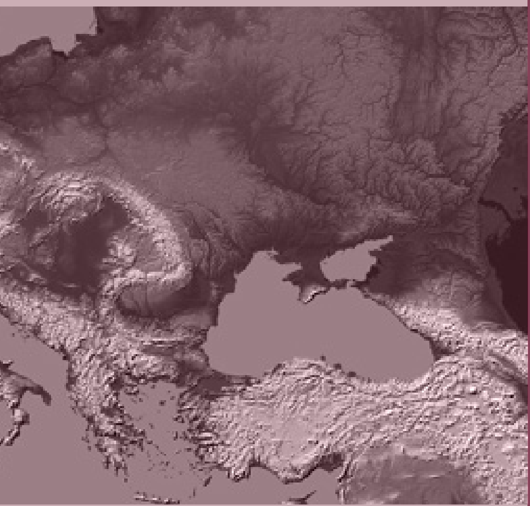


Communautés humaines sur les terrasses des rivières Bistrita, Prut et Dniestr et leur création matérielle et spirituelle pendant le Paléolithique supérieur

Valentin-Codrin CHIRICA

Vasile CHIRICA

Résumé : Dans l'espace géographique pris en considération, situé entre les Carpates Orientaux et le Dniestr, on a identifiées trois zones avec les habitats appartenant au Paléolithique supérieur ancien (Aurignacien) et récent (Gravettien) : les terrasses inférieures et moyennes des rivières Bistrita : Cetatica I et II, Podis, Dartu, Bistricioara-Lutarie, Poiana Ciresului, *etc.* ; Prut : Mitoc-Malu Galben, Ripiceni-Izvor, Crasnaleuca, Cotu Miculinti (Roumanie), Costesti (R. de Moldavie) et Dniestr : Molodova (Ucraine), Cosauti (R. de Moldavie) *etc.* La création matérielle et spirituelle des communautés humaines présente certains éléments communs : la matière première, même allogène, la typologie des outils en pierre et en matières dures animales, pièces d'art et de parure, partout avec les spécificités de leur création matérielle et spirituelle. Nous prenons en considération l'existence des rapports entre les communautés humaines situées sur les terrasses de la Bistrita, avec celles situées sur les terrasses du Prut et du Dniestr, moyennant plusieurs axes d'analyse : 1, matières premières allogènes, identifiées comme supports ou comme pièces finies dans les outillages lithiques de chaque gisement ; 2, la présence des fragments d'ivoire de mammouth en certains sites paléolithiques : à Mitoc, ou sur la Vallée de la Bistriţa, tout comme d'autres restes paléofaunistiques identifiés, représentant une caractéristiques générale ; 3, pièces d'art mobilier ou de parure, découvertes dans les niveaux d'habitat de tout l'espace géographique carpato-dniestréen ; 4, l'identification de certaines cultures ou facies archéologiques spécifiques à la zone géographique pruto-dniestréenne.

Mots-Clés : terrasses fluviatiles ; Paléolithique supérieur ancien ; Paléolithique supérieur récent ; matière première allogène ; matières dures animales ; pièces d'art.

Abstract: In the geographical area taken into consideration, located between the Oriental Carpathians and the Dniester, we identified three areas with habitats belonging to the old Upper Palaeolithic (Aurignacian) and recent (Gravettian): the lower and middle terraces of Bistrita river: Cetatica I et II, Podis, Dartu, Bistricioara-Lutarie, Poiana Ciresului, *etc.*; Pruth: Mitoc-Malu Galben, Ripiceni-Izvor, Crasnaleuca, Cotu Miculinti (Roumanie), Costesti (R. de Moldavie) and Dniestr: Molodova (Ucraine), Cosauti (R. de Moldavie), *etc.* The material and spiritual creation of human communities shows some common elements: the raw material (including coming from outside), the typology of stone tools and hard animal materials, pieces of art and adornment, all with the specifics of their material and spiritual creation. We consider the existence of relationships between human communities on the terraces of the Bistrita river, with those on the terraces of the Prut and the Dniester rivers, through several axes of analysis: 1, raw foreign materials, identified as supports or as finished artifacts in the tool inventory of each site 2, the presence of mammoth ivory fragments in some Paleolithic sites: Mitoc or on the Bistrita Valley, as well as other paleofaunistic identified remains, representing general characteristics; 3 pieces of portable art or adornment, found in the habitat levels throughout the Carpatho - dniestrien geographical area; 4, the identification of certain cultures or specific archaeological facies to pruto-dniestrien geographical area.

Key-Words: *river terraces; Old Upper Paleolithic; Recent Upper Paleolithic; foreign raw material; hard animal materials; pieces of art.*

1 INTRODUCTION

Dans l'espace géographique compris entre les Carpates Orientaux et le Dniestr, il y a trois zones avec les plus importants et riches habitats appartenant au Paléolithique supérieur : les terrasses inférieures et moyennes des rivières Bistrita (Cetatica I et II, Podis, Dartu, Bistricioara-Lutarie, Poiana Ciresului, *etc.*), Prut (Mitoc-Malu Galben, Ripiceni-Izvor, Crasnaleuca, Cotu Miculinti, Costesti) et Dniestr (Molodova, Cosauti, *etc.*).

Si nous prenons en considération le positionnement géochronologique et culturel des nombreux niveaux d'habitat de cet assez vaste aréal géographique, nous pouvons identifier l'existence de certaines identités concernant la création matérielle et spirituelle des communautés humaines, à partir de plusieurs éléments de connexion : la matière première, la typologie des outils en pierre et en matières animales dures, pièces d'art et de parure.

L'extraordinaire mobilité des communautés humaines, à travers de larges espaces géographiques, est déjà bien connue, les directions et les opportunités des déplacements étant identifiées et requises par les conditions d'environnement (y compris les migrations saisonnières des troupeaux de grands herbivores), par la nécessité de l'approvisionnement avec des matières premières de bonne qualité *etc.* (T. Aubry, 2005, 87–98 ; P.-Y. Demars, 1996, 3–25 ; H. Floss, 1991, 103–112 ; J. Renaut-Miskovsky, A.-M. Moigne, 1989, 60–64 ; D. Vialou, 2005, 75–85).

Dans le but d'identifier les éléments de convergences dans le cadre des campements humains des trois grandes zones géographiques, nous présenterons les plus importants sites appartenant au Paléolithique supérieur ancien et récent, avec les spécificités de leur création matérielle et spirituelle, et la matière première allogène.

2 LES TERRASSES DE LA BISTRITA

2.1 Bistricioara-*Lutărie*

À la suite des recherches interdisciplinaires, on a mis en évidence plusieurs niveaux d'habitat, parmi lesquels, le premier apartienne au Paleolithique supérieur ancien. (*cf.* V. Chirica, I. Borziac, N. Chetraru, 1996, 97–98), et les autres, au Paléolithique supérieur recent (V. Chirica, I. Borziac, 2009, 166–180). Tous habitats d'ici contiennent des restes d'habitat, foyers, restes faunistiques, outils tailles en roches locaux ou allogenes (**figures 1** à **6**). Les datations radiometriques sont : niv. I, intre 27.350 + 2.100 – 1500 BP (GX–8844) si 24.760 +–170 BP (GrN–11586) ; niv. II : 20.310 +- 150 BP (GrN–16982) ; niv. III, entre 20.995 ± 875 BP (GX – 8729) et 18.800 ± 1200 BP (GX – 8728) ; niv. IV, 16.150 ± 350 BP (GrN – 10528) et 19.055 ± 925 BP (GX- 8730) (Al. Paunescu, 1998, 120–171).

Dans les niveaux I – V, les restes de dentition se sont préservés en meilleures conditions, et il a été ainsi possible de signaler la présence des herbivores : *Equus caballus fossilis* (niv. II – V), *Bos s. Bison* (niv. II – III) et *Rangifer* sp. (niv. III).

La matière première de tous les sites des terrasses de la Bistriţa est assez diversifiée, le pourcentage du silex du Prut Moyen alternant à celui des roches locales : le niveau I : grès silicieux, 32,40 % ; schiste noir d'Audia, 30,10 % ; ménilithe, 9,30 % ; silex de Prut, 7,70 % ; d'autres roches locales, 8,10 % (**figures 1** à **14**).

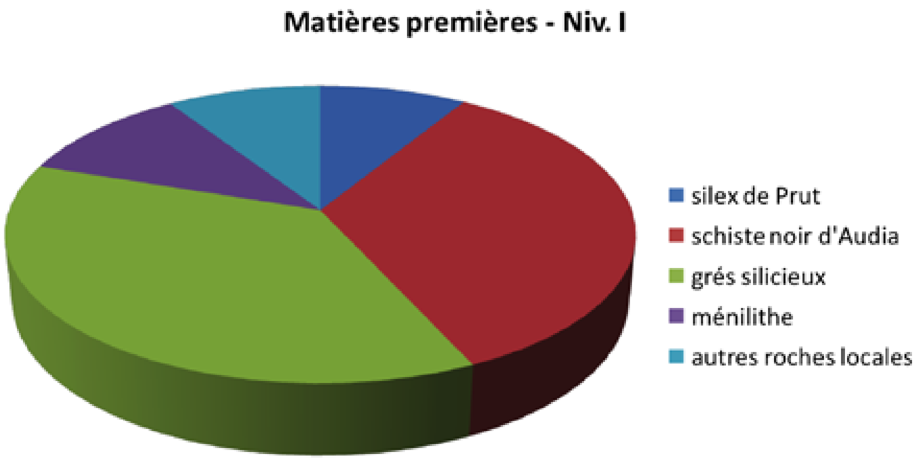


FIGURE 1 Bistricioara-Lutarie. Le niveau I : schiste noir d'Audia, 30 % ; silex de Prut, 34 % ; grès silicieux, 9,25 % ; ménilithe et autres roches, 24,40 %.

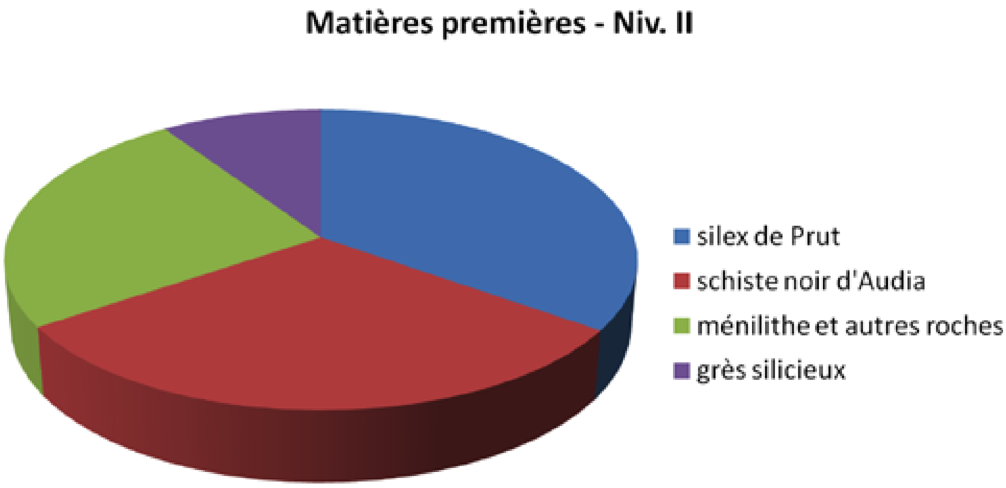


FIGURE 2 Bistricioara-Lutarie. Le niveau II : silex de Prut, 33,30 % ; ménilithe, 28 % ; schiste noir d'Audia, 29 % ; le grès silicieux, 5,40 % ; d'autres roches locales, 2,60 %.

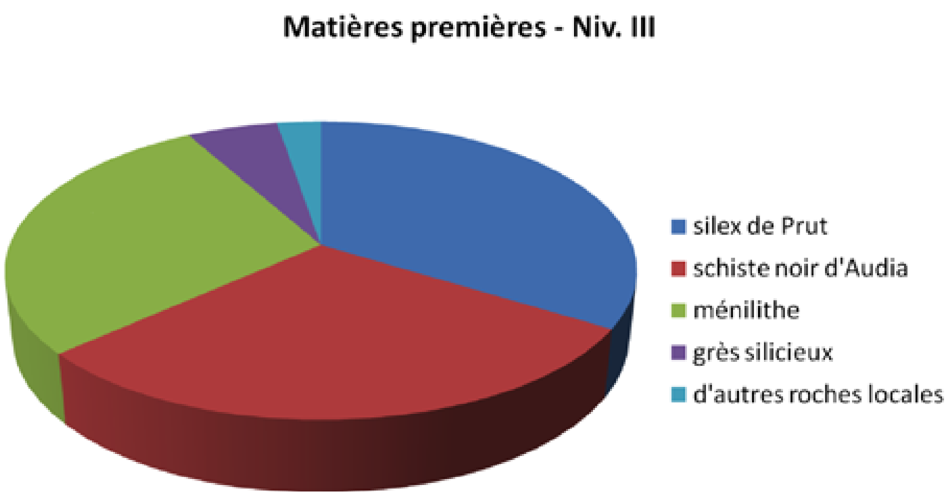


FIGURE 3 Bistricioara-Lutarie. Le niveau III : silex de Prut, 52,69 % ; ménilithe, 32,70 % ; schiste noir d'Audia, 8 % ; grès silicieux, 5,50 %.

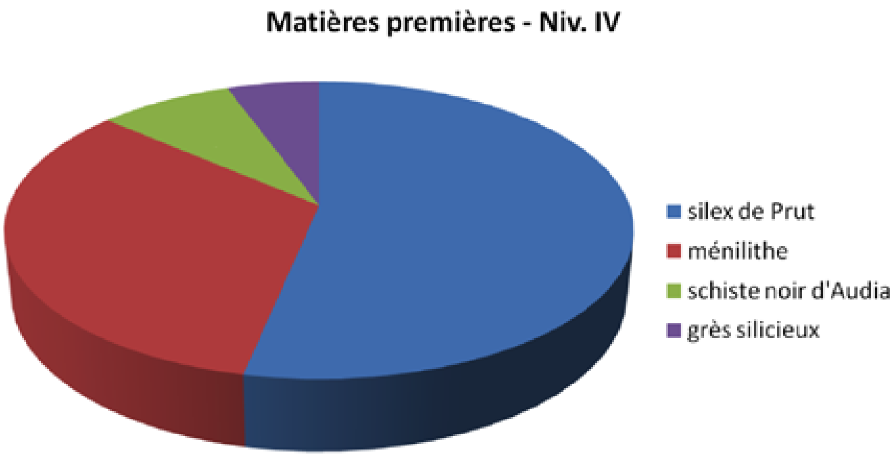


FIGURE 4 stricioara-Lutarie. Le niveau IV : ménilithe, 33,50 % ; silex de Prut, 49,20 % ; schiste noir d'Audia, 11,07 % ; grès silicieux, 2,80 % ; quartzite, 3 %, d'autres roches locales 0,50 %.

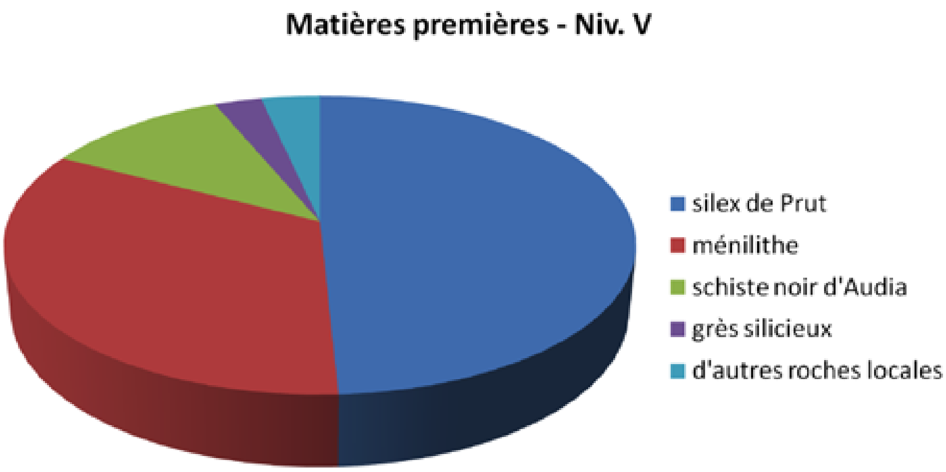


FIGURE 5 Bistricioara-Lutarie. Le niveau V : silex, 49,20 % ; ménilithe, 33,50 % ; schiste noir d'Audia, 11,7 % ; grès silicieux, 2,80 % ; d'autres roches locales, 3,40 %.

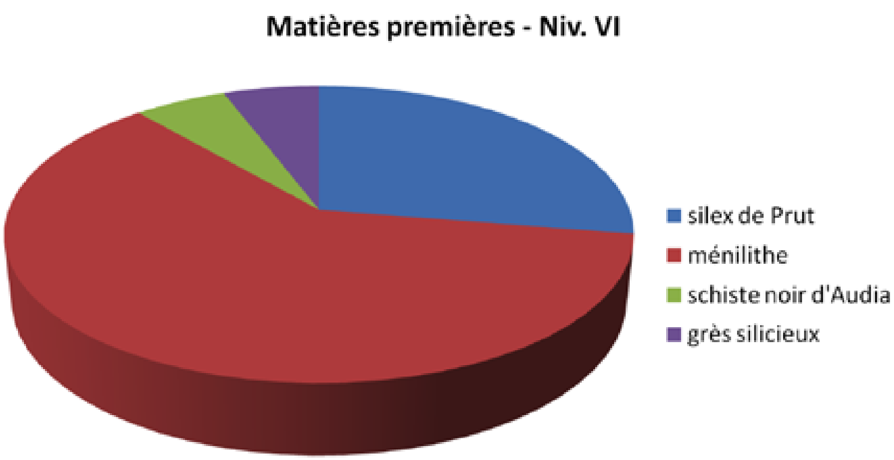


FIGURE 6 Bistricioara-Lutarie. Le niveau VI : ménilithe, 58 % ; silex de Prut, 26,20 % ; schiste noir d'Audia, 5,25 % ; grès silicieux, 5,50 % ; d'autres roches locales, 0,40 % (Al. Paunescu, 1998, 120–171).

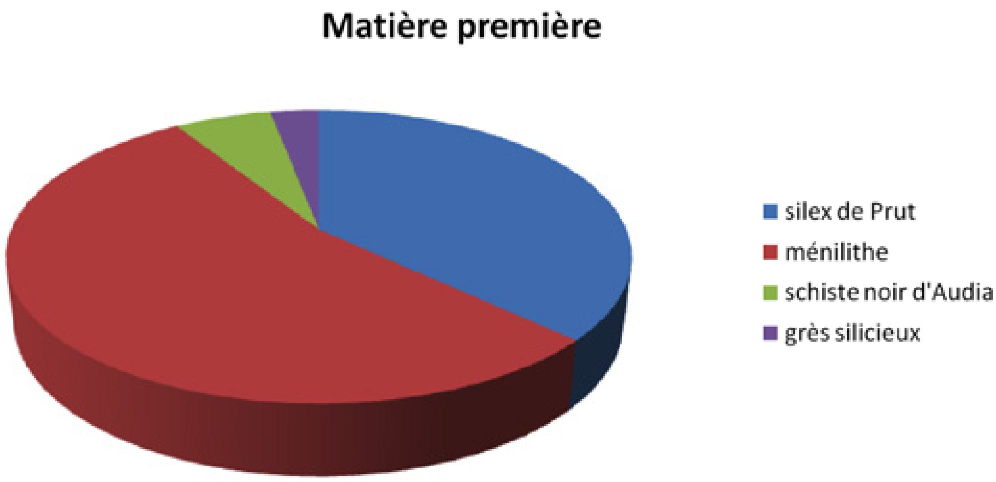


FIGURE 7 Ceahlău-Bofu Mic. La matière première est représentée par : ménilithe, 50 % ; silex de Prut, 37 % ; schiste noir d'Audia, 6 % ; le silicolithe, 3 %, etc.

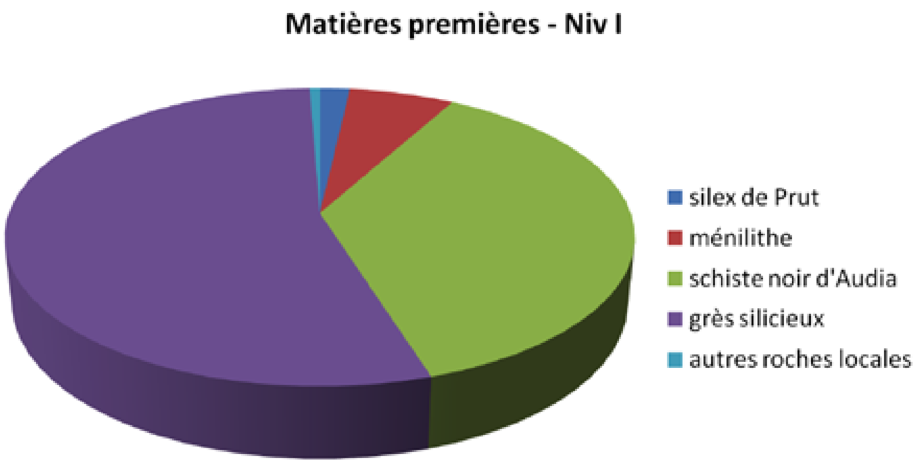


FIGURE 8 Ceahlău-Dârțu. Niv. I, aurignacien : silex de Prut, 7 % ; ménilithe, 12 % ; schiste noir d'Audia, 20 % ; grès silicieux, 57 % ; silicolithe, 3 % ; d'autres roches locales, 1 %.

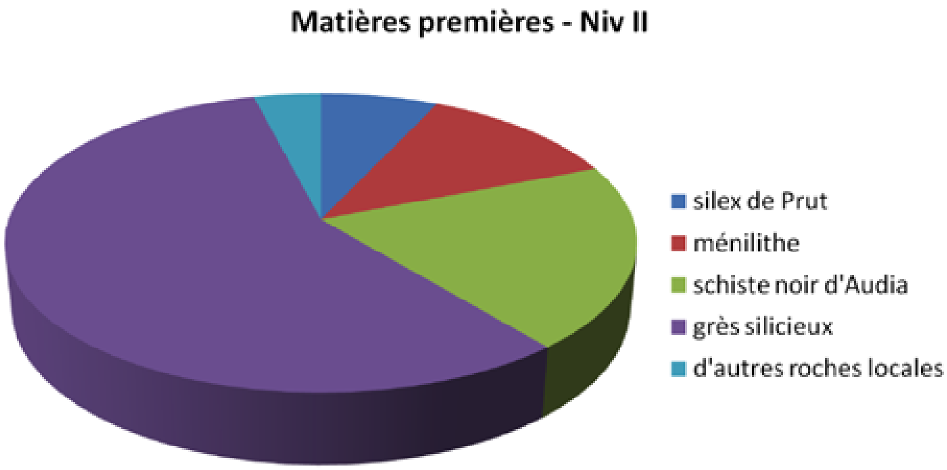


FIGURE 9 Ceahlău-Dârțu. Niv. II, aurignacien : silex, 83 pièces ; ménilithe, 95 pièces ; schiste noir, 11 ; grès, 4 pièces.

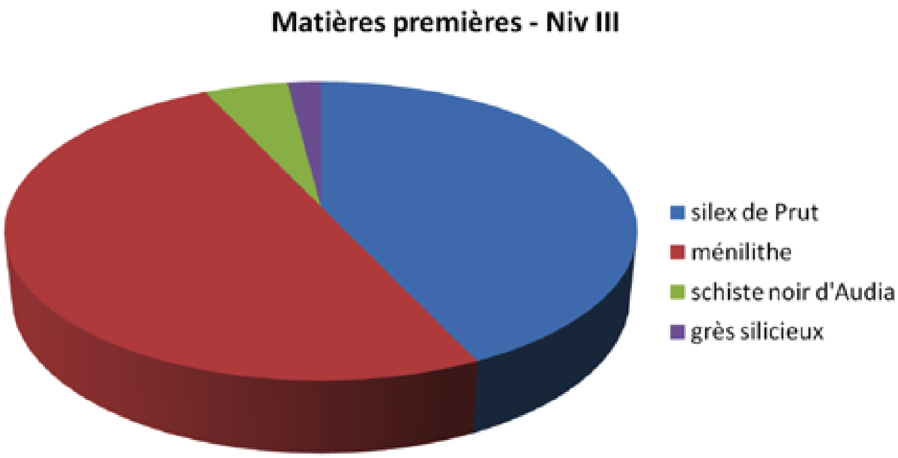


FIGURE 10 Ceahlău-Dârțu. Niv. III, gravettien : silex, 59 % ; ménilithe, 31,14 % ; schiste noir, 6,86 % ; grès siliceux , 1,20 % ; d'autres roches locales, 1,50 %.

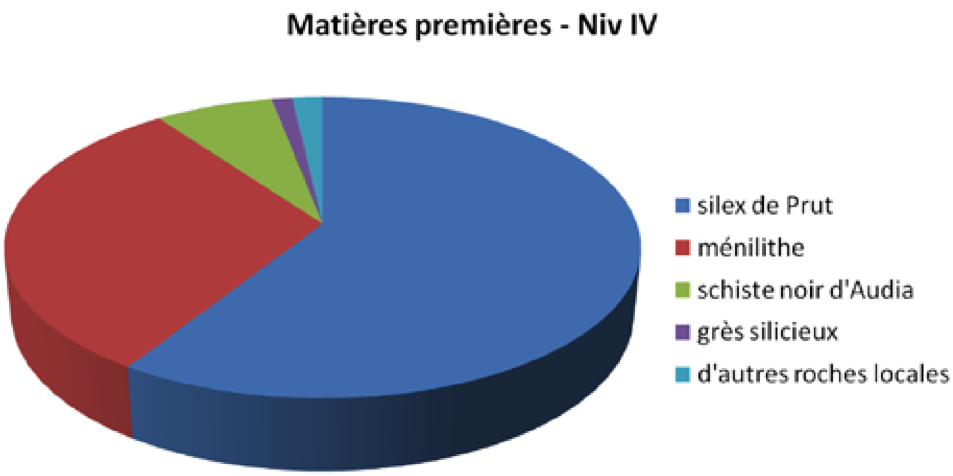


FIGURE 11 Ceahlău-Dârțu. Niv. IV, gravettien.

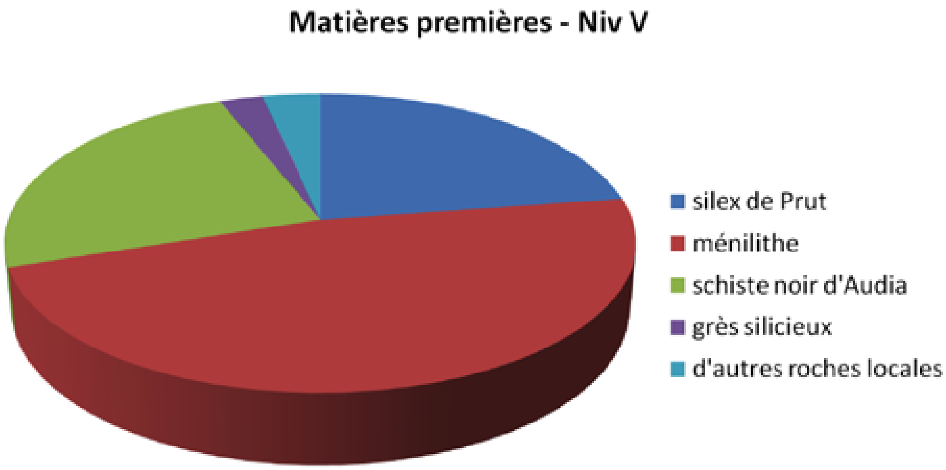


FIGURE 12 Ceahlău-Dârțu. Niv. V, gravettien : ménilithe, 47,20 % ; schiste noir, 24 % ; silex, 22,65 % ; grès, 2,58 % ; d'autres roches locales, 1,42 % (Al. Paunescu, 1998, 192–237).

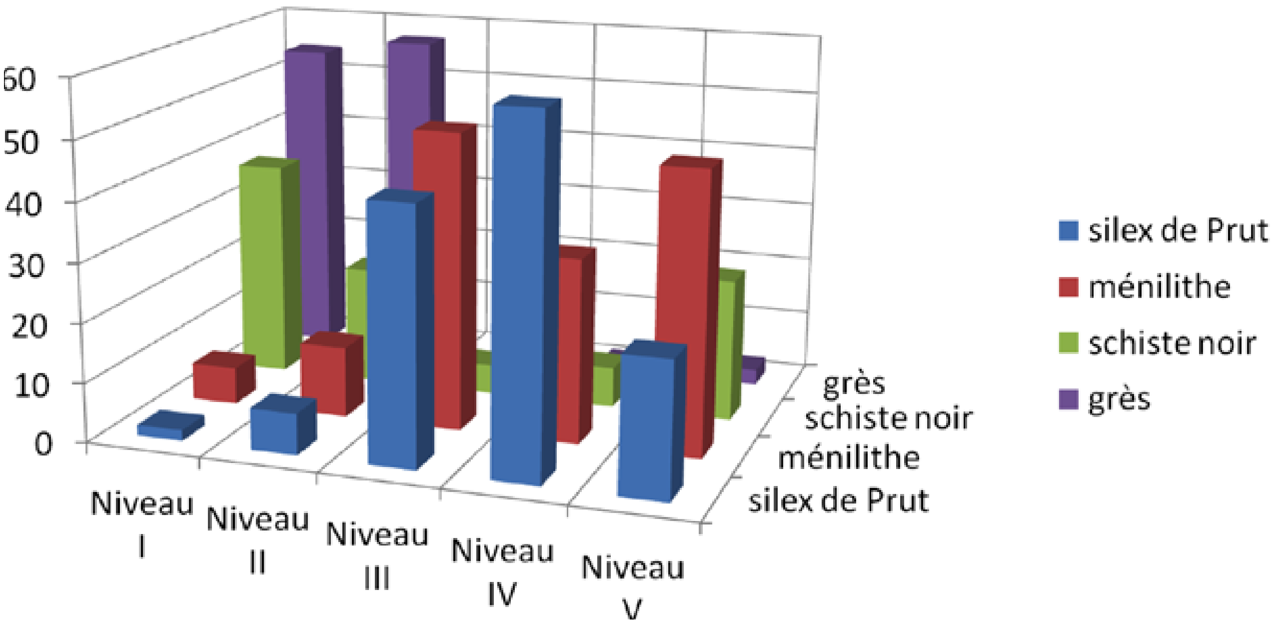


FIGURE 13 Ceahlău-Dârțu. La présence de la matière première dans les 5 niveaux archèologiques.

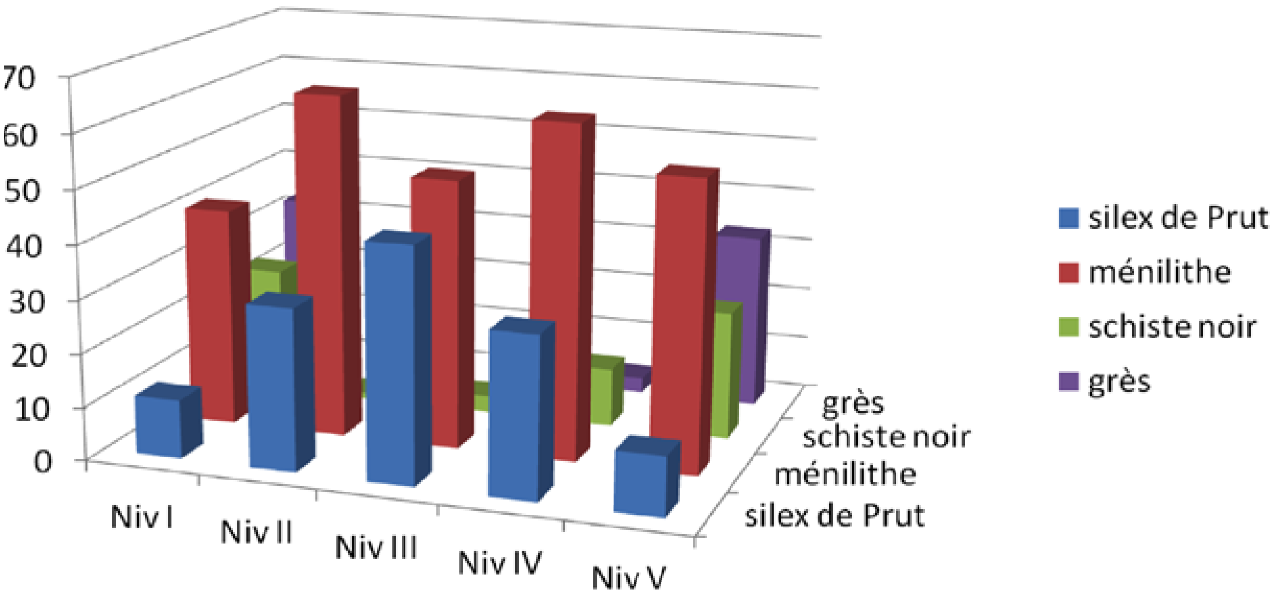


FIGURE 14 Ceahlău-Podiș. La présence de la matière première dans les 5 niveaux archèologiques.

Donc, le premier niveau d'habitat gravettien de Bistricioara – Lutărie (niveau II du site) pourrait appartenir, en fait, à une étape plus tardive, puisque la première étape gravettienne du territoire de la Roumanie (Gravettien inférieur ou ancien) est placée à approximativement 27.000 BP. Le niveau III de Bistricioara – Lutărie, immédiatement antérieur au dernier stade glaciaire (« Maximum Valdai »), devrait être parallélisé à Herculane I – Tursac (*cf.* Abri du Facteur, B_1, Moldova V, 7, Solutré, Paglicci (la grotte), 21 a – c *etc.*). Le niveau III est daté, d'après les analyses de ^{14}C, justement dans la période de « Maximum Valdai », donc en plein stade glaciaire (Würm 3), comme quelques niveaux de Crasnaleuca, Cotu Miculinti, Mitoc-Malu Galben ou Cosauti. Pourtant, il serait possible qu'il existe deux étapes réelles d'habitat, insaisissables stratigraphiquement et technico – typologiquement, datables au début et à la fin du dernier stade glaciaire. Selon nous, ni le niveau IV ne semble correspondre aux encadrements en vigueur, même si le terme utilisé dans la dernière systématisation est très vague. À 16.150 ± 350 B. P., on peut admettre l'existence d'un Gravettien évolué vers le stade final (niveau V), et en ce cas, le dernier niveau (VI) devrait être attribué à une étape épigravettienne, vers la partie finale du Tardiglaciaire.

2.2 Ceahlău-*Bofu Mic*

Deux niveaux d'habitat ont été identifiés dans le sédiment de cette terrasse, les deux à aspect gravettien.

Dans la catégorie « d'autres découvertes », nous mentionnons la présence de rognons d'hématite, utilisée en tant que colorant (Al. Paunescu, 1998, 171–175).

Dans la seconde niveau, parmi les outils on rencontre des éléments allogènes de diverses aires culturelles, à commencer par la présence du silex de Prut (**figure 7**); son utilisation à la réalisation des plus fines pièces – les lamelles à bord abattu et les pointes La Gravette, relève une bonne connaissance des caractéristiques et des qualités de cette matière première, et aussi de la zone de provenance. De ce point de vue, on pourrait admettre l'origine d'est de cette communauté humaine, mais sans dépasser les ensembles culturels du Prut Moyen. La présence de la pièce à cran pourrait être le résultat d'échos culturels de la zone dniestréenne, dans le cas où celle-ci n'est pas due au hasard. De telles pièces ont été signalées aussi dans d'autres sites à niveaux d'habitat appartenant au Gravettien final, mais elles sont toutes atypiques, relevant la reconnaissance complète de la typologie et de la technique de réalisation de telles pièces, qui constituent des séries dans les habitats gravettiens du Dniestr, Dniepr et Don. C'est dans des conditions techniques supérieures qu'on a réalisé des pointes similaires à celles aziliennes, de tradition centrale – européenne, sans connaitre les voies de pénétration de telles influences.

2.3 Ceahlău-*Dârţu*

On a constaté l'existence de deux niveaux d'habitat aurignacien (phase moyenne), le premier étant daté à 24.390 ± 180 BP (GrN–12673).

Deux niveaux (III – IV) gravettiens y suivent, sans interruption d'habitat. Après un dépôt stérile du point de vue archéologique, le dernier niveau d'habitat (V) appartenant au Gravettien final, est daté au début de la période tardiglaciaire.

La matière première est caractérisée par les compositions et pourcentages suivants : niv. I, aurignacien : silex de Prut, 1,80 % ; ménilithe, 6,30 % ; schiste noir d'Audia, 37 % ; grès silicieux, 54,30 % ; d'autres roches locales, sous 1 % (**figures 8** à **13**).

Le pourcentage prédominant des pièces microlithiques pourrait constituer un élément pour son encadrement dans une phase finale du Gravettien, mais il pourrait être dû aussi à la tendance d'utilisation jusqu'à l'épuisement du silex de Prut, de très bonne qualité. De toute façon, puisque le Gravettien final a eu une longue évolution, nous pourrions apprécier que le niveau V de Dârţu peut être daté au début de l'étape gravettienne finale et pourrait être plus ou moins synchronique au niveau IV de Bistricioara – Lutărie et aux niveaux V – III de Lespezi, qui appartiennent à un Gravettien évolué. Pourtant, la présence des pointes à un côté courbé et retouché, similaire aux pointes aziliennes (identifiées aussi à Bistricioara – Lutărie, dans le niveau VI) pourrait constituer un argument pour l'encadrement de la dernière couche gravettienne de Dârţu dans le Tardiglaciaire. Ce dernier niveau d'habitat de Dârţu pourrait être équivalu, du point de vue technico-typologique, au *stade V*, niveau II, de Cosăuţi, sur Dniestr (M. Otte, P. Noiret, V. Chirica, I. Borziac, 1996, 215).

Ceahlău-*Cetăţica I* **2.4** Les niveaux I et II, attribués à l'Aurignacien (Paléolithique supérieur ancien), sont situés dans le dépôt de lœss jaune - grisâtre, respectivement dans le sol rougeâtre - jaunâtre, mais entre eux il y a un dépôt archéologiquement stérile. Le niveau I a été daté à > 24.000 ans, mais Al. Păunescu (1998, 183) l'a équivalu au niveau aurignacien IIa de Ripiceni-Izvor.

Le niveau II, aurignacien, a été daté à 23.890 ± 290 BP (GrN–14630) (Al. Păunescu, 1998, 185). Les niveaux III–V appartiennent au Paléolithique supérieur récent.

La matière première : niv. I et II : des roches locales, le silex noir, de Prut ayant un très bas pourcentage ; niv. III : ménilithe, 132 pièces ; schiste noir, 89 ; grès noirâtre, 51 ; roche marneuse, 17 ; grès siliceux, 37 ; silex de Prut, 56 pièces ; niv. IV : schiste noir, 43 pièces ; grès siliceux, 20 ; grès noirâtre, 11 ; roche marneuse, 22 ; ménilithe, 44 ; silex, 70 ; quartzite, 2 pièces ; niv. V : schiste noir, 28 ; grès, 30 ; silex, 93 pièces.

Une datation de radiocharbon a donné l'âge du niv. III : 19.760 ± 470 BP (GrN–14631), ce qui l'approche de celui de Crasnaleuca, donc datable dans la période du maximum glaciaire (Al. Paunescu, 1998, 178–188).

En l'absence totale du silex de Prut dans le niveau I et tenant compte de la prépondérance de cette roche dans les couches de culture gravettienne, nous constatons l'origine de cet habitat dans la zone du Prut Moyen.

Ceahlău-*Podiş* **2.5** Le dépôt rougeâtre – jaunâtre, épais de 1,10 – 1,20 m, a abrité pas moins de 5 niveaux d'habitat : le niveau I appartient au Paléolithique supérieur ancien ; les niveaux II-V, au Paléolithique supérieur récent ; le niveau III a été daté à 16.970 ± 360 BP (GrN–14640) (Al. Paunescu, 1998, 252).

La matière première : niv. I, aurignacien : silex de Prut, 11 % ; ménilithe, 41 % ; schiste noir, 24 % ; grès siliceux, 33 % ; d'autres roches locales, 1 % ; niv. II, gravettien : silex de Prut, 30,30 % ; ménilithe, 64,10 % ; schiste noir, 1,40 % ; grès siliceux , 3,30 % ; d'autres roches locales, 0,90 % ; niv. III, gravettien : silex de Prut, 43,60 % ; ménilithe, 50,20 % ; schiste noir, 3,20 % ; grès siliceux, 2,20 % ; d'autres roches locales, 0,80 % ; niv. IV, gravettien : silex de Prut, 30 % ; ménilithe, 62,10 % ; schiste noir, 11 % ; grès siliceux, 2,80 % ; d'autres roches locales, 1,10 % ; niv. V, gravettien : silex de Prut, 11 % ; ménilithe, 54 % ; schiste noir, 24 % ; grès siliceux, 33 % (**figure 14**) (Al. Paunescu, 1998, 240–261)

Nous apprécions le technocomplexe du niv. II comme équivalent à celui du niveau IV de Mitoc – Malu Galben ; le niveau III, y compris par la datation de 16.970 ± 360 BP (GrN–14640), est daté à la fin du Gravettien, éventuellement dans le *stade V* , niv. 3b du Gravettien de Cosăuţi. Le niveau IV d'habitat aussi peut être daté dans le Tardiglaciaire, étant de facture épigravettienne. Le technocomplexe du niveau V, à aspect épigravettien, devrait être encadré toujours dans le Tardiglaciaire, contenant un bon nombre de lamelles à dos, même si les lamelles Dufour sont eux aussi nombreuses.

Le site de Podiş est le seul dans lequel le silex de Prut est constamment maintenu en position secondaire, en accomplisant des pourcentages assez hauts à l'exception du niveau II (dans le niveau I, attribué à l'Aurignacien, le silex de Prut est présent dans un pourcentage de seulement 4,40 %). Cette augmentation de l'importance de l'utilisation du silex buglovien de la zone du Prut Moyen démontre à coup sûr l'existence de contactes ou des déplacements des groupes humains pour s'approvisionner avec de matières premières de la meilleure qualité.

3 LES TERRASSES DU PRUT

3.1 Cotu Miculinţi-Gârla Mare

Dans ce gisement on a identifié sept niveaux d'habitat, stratigraphiquement délimité par la position des foyers (Al. Paunescu, 1999).

Dans le I^{er} niveau, à matériaux archéologiques et faunistiques relativement pauvres, ce sont les os de *Rangifer tarandus* qui prédominent. Le II^{e} niveau présente de riches matériaux archéologiques et faunistiques, y compris foyers. La faune est dominée par *Bison priscus*, *Equus caballus*, *Rangifer tarandus*, *Marmota marmota*. Le III^{e} niveau est riche en complexes d'habitat, pièces lithiques, foyers et restes archéologiques, y compris des outils en bois d'animal et os de renne, cerf, bovidés ; on a signalé aussi la découverte de trois fragments de bois, fossilisés, à traces de polissage et d'utilisation. Le IV^{e} niveau contient des ateliers de taille du silex et des restes faunistiques, y compris des outils taillés en os et bois de renne ; les restes faunistiques sont représentés par *Rangifer tarandus* et *Equus caballus*, dont les os ont été utilisés à réaliser des outils et des armes. Le V^{e} niveau contient un foyer et trois ateliers de taille du silex, outils en os et bois d'animal, tandis que la faune est représentée par *Bison priscus* şi *Rangifer tarandus*. Un foyer a donné l'âge de 18.810 ± 300 BP (GrN- 12661), très proche de celui du niveau IV de Crasnaleuca-Stanişte. Le VI^{e} niveau présente des restes d'habitat plus pauvres que ceux des niveaux supérieurs, à cause de la surface réduite des fouilles avec *Equus caballus* et *Rangifer tarandus*. Le VII^{e} niveau avait deux ateliers de taille du silex et à un foyer qui a donné l'âge de l'habitat : 20.140 ± 410 BP (GrN–12662) ; on y a retrouvé les outils en bois d'animal, les restes faunistiques étant représentés par *Rangifer tarandus* et *Bison priscus*.

La matière première est représentée par le silex de Prut, qui se trouvait dans un pourcentage de presque 100 %, seules quelques pièces en ménilithe étant identifiées (existant la possibilité de certaines relations avec les communautés humaines habitant dans la zone des terrasses de Bistrita). Du point de vue de *l'outillage osseux* (**figure 22**, n^{os} 1 à 8), le site de Gârla Mare est unique pendant le Gravettien de la Roumanie et aussi du sud – est et l'est de l'Europe, à l'exception de ceux du groupe Kostenki sur Don, et de Cosauti, sur le Dniestr.

On ne précise pas l'existence des lames de type *à bord abbatu*, mais une seule pointe de type *La Gravette*. L'identification d'un si grand nombre de burins et pièces pour racler (racloirs, rabots) peut être considérée comme normale, tenant compte de la spécialisation des groupes humains de là-bas dans la transformation des os et surtout des bois de renne. La microlithisation accentuée de l'ensemble lithique, spécifique au Gravettien pendant ses dernières phases d'évolution n'est pas vérifiée dans ce site, ni dans ceux de Mitoc, et cet élément est dû surtout à la proximité de la carrière naturelle de matière première – le silex de la base de la terrasse du Prut, sans la nécessité d'économiser la matière première, tel que c'était le cas dans les sites des zones plus éloignées, tels ceux du Plateau de Suceava ou du sud du Plateau de la Moldavie. Admettant le fait que ce phénomène ait pu avoir lieu pendant une période interstadiale, nous exprimons notre opinion en faveur de l'encadrement des niveaux I – IV pendant l'époque d'une oscillation climatique immédiatement antérieure ou postérieure au dernier stade glaciaire (Würm III); les niveaux V – VII peuvent être même plus anciens mais dans cette phase des recherches toute attribution peut être erronée à cause du nombre limité d'éléments qui peuvent être pris en considération à ce but (Al. Paunescu, 1999).

3.2 Crasnaleuca-*Stanişte*

Dans la zone du ruisseau et de la vallée Stanişte on a effectué plusieurs sondages sur la falaise de ce ruisseau, où il a découvert d'importants matériaux archéologiques et paléofaunistiques (Al. Păunescu, 1999, 103–108).

La section de l'endroit dénommé *Lutărie* a été étendue à travers une surface de 60 m^2, approfondie jusqu'à 10,50 m, et dans le dépôt de lœss on a identifié huit niveaux d'habitat.

Jusqu'à présent, la plus grande importance revient aux foyers des niveaux IV et VII dont l'âge absolue est de 19460 ± 220 ans B. P. (Bln–1443), respectivement 21.700 ± 800 BP (GrN–12671).

Dans les huit niveaux d'habitat établis stratigraphiquement, on a aussi découvert des restes paléofaunistiques mieux conservés, appréciés comme appartenant aux bovidés (niveau VII) et aux chevalines (niveau VIII).

Dans une zone tellement riche en gisements de silex, la présence même sporadique de pièces atypiques ou même des outils finis en ménilithe, met le problème de l'existence de relations à des groupes humains d'autres zones géographiques, ou du déplacement de ceux-ci à travers des espaces assez vastes.

Prenant en considération, la datation de 19460 ± 220 B. P. (ce qui crée un intervalle de 19680 – 19240 ans) et celle de 21.700 ± 800 BP (GrN–12671), qui offre un intervalle de 20.900 – 22.500 ans, tout comme la présence des molaires de renne dans les sections I et II, on peut admettre que ce niveau d'habitat avec ses trois ateliers, tout comme les premiers niveaux d'habitat (VIII – V) de *Lutărie* pourrait appartenir à une période de temps immédiatement antérieure au dernier stade glaciaire.

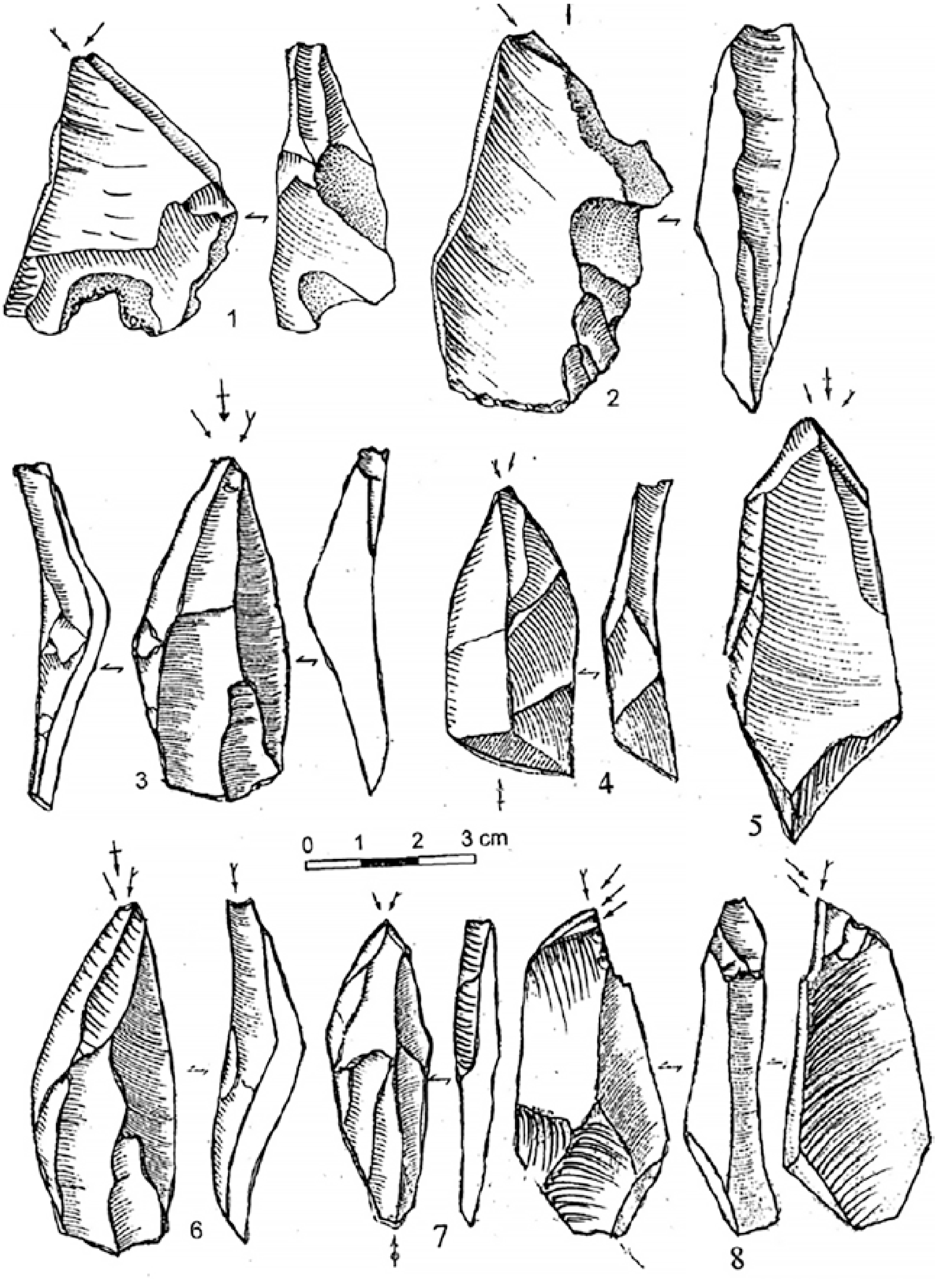


FIGURE 15 Aurignacien ancien, type Mitoc. Mitoc - M. G., niveaux aurignaciens inférieurs.1–8, burins dièdres.

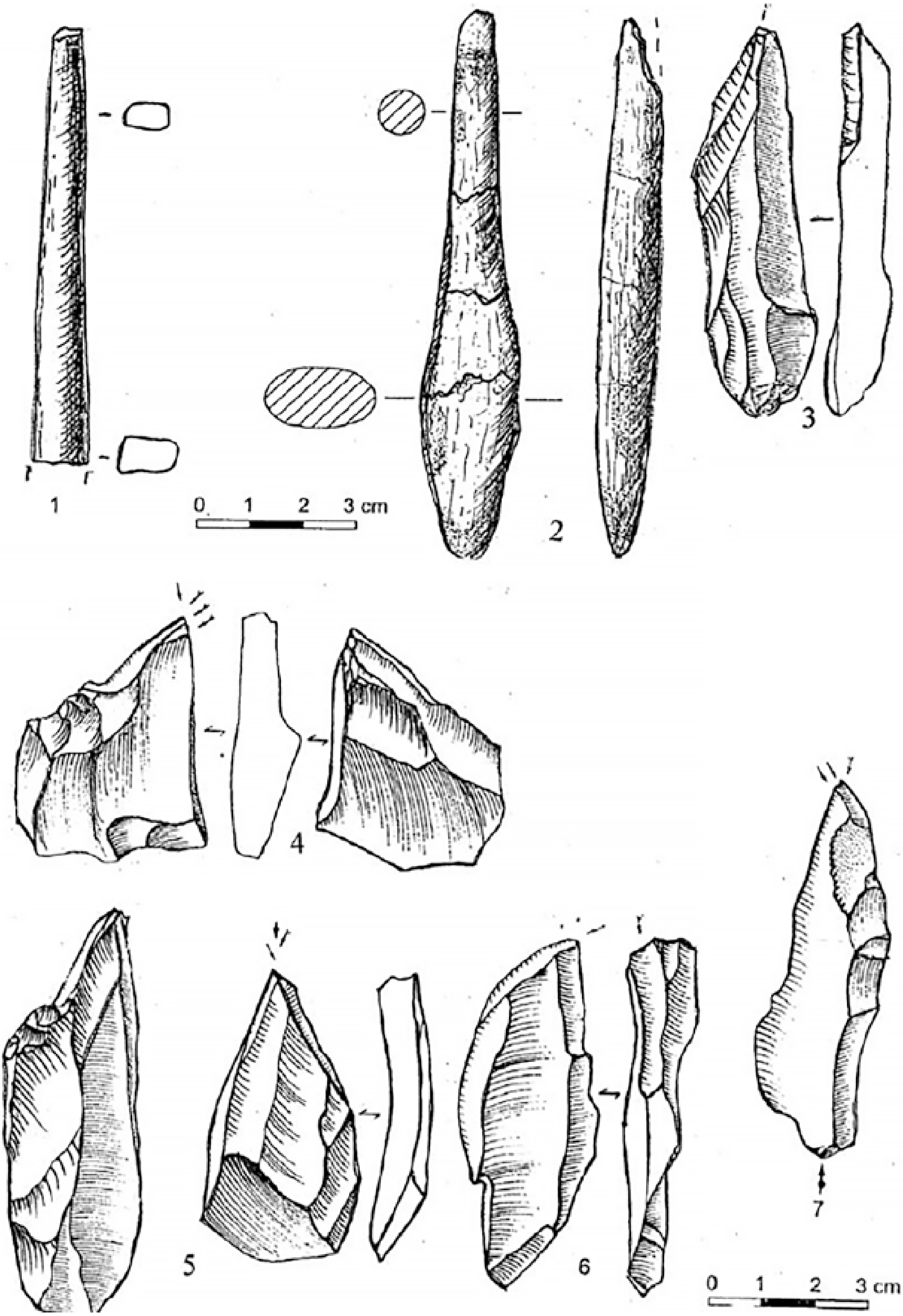


FIGURE 16 Aurignacien ancien, type Mitoc. Mitoc - M. G., niveaux aurignaciens inférieurs.1, fragment de pointe de lance en os ; 2, pointe de lance de type Mladec ; 4, burin caréné ; 5–7, burins dièdres.

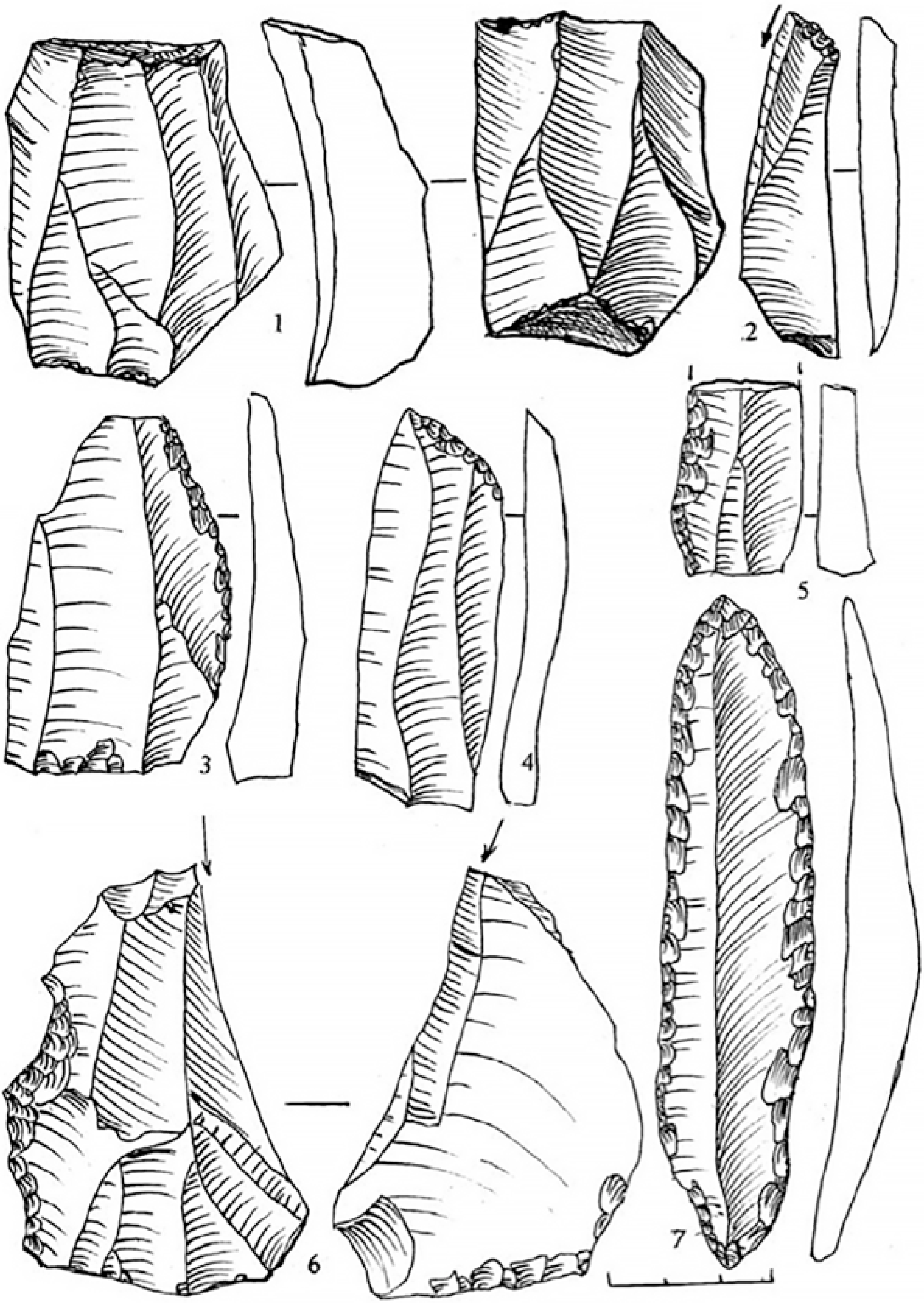


FIGURE 17 Gravettien ancien, type Molodova-Mitoc. Molodova V, niveau 10a : 1, nucléus prismatique ; 2, burin sur troncature retouchée ; 3, racloir sur éclat Levallois ; 4, lame à troncature oblique retouchée ; 5, lame à un bord retouché ; 6, racloir-burin ; 7, (niveau 10), lame double appointée, specifique pour ce facies de type Molodova - Mitoc.

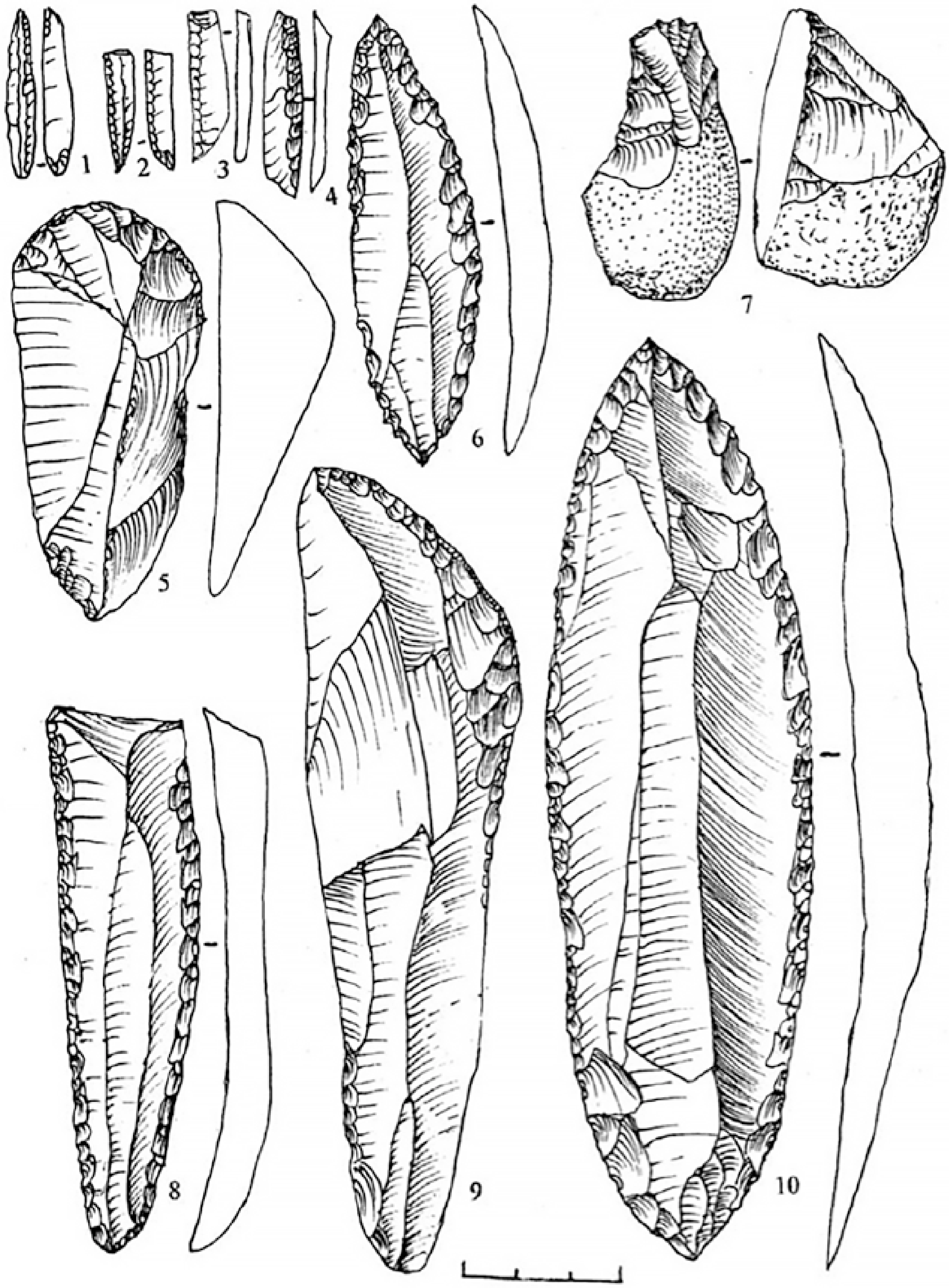


FIGURE 18 Gravettien ancien. Molodova V, niveau 10 : 1–4, lamelles à dos (1, pointe de La Gravette) ; 6, 8, 10, lames appointées ; 5, grattoir massif ; 7, grattoir caréné ; 9, couteau dit « type Molodova ».

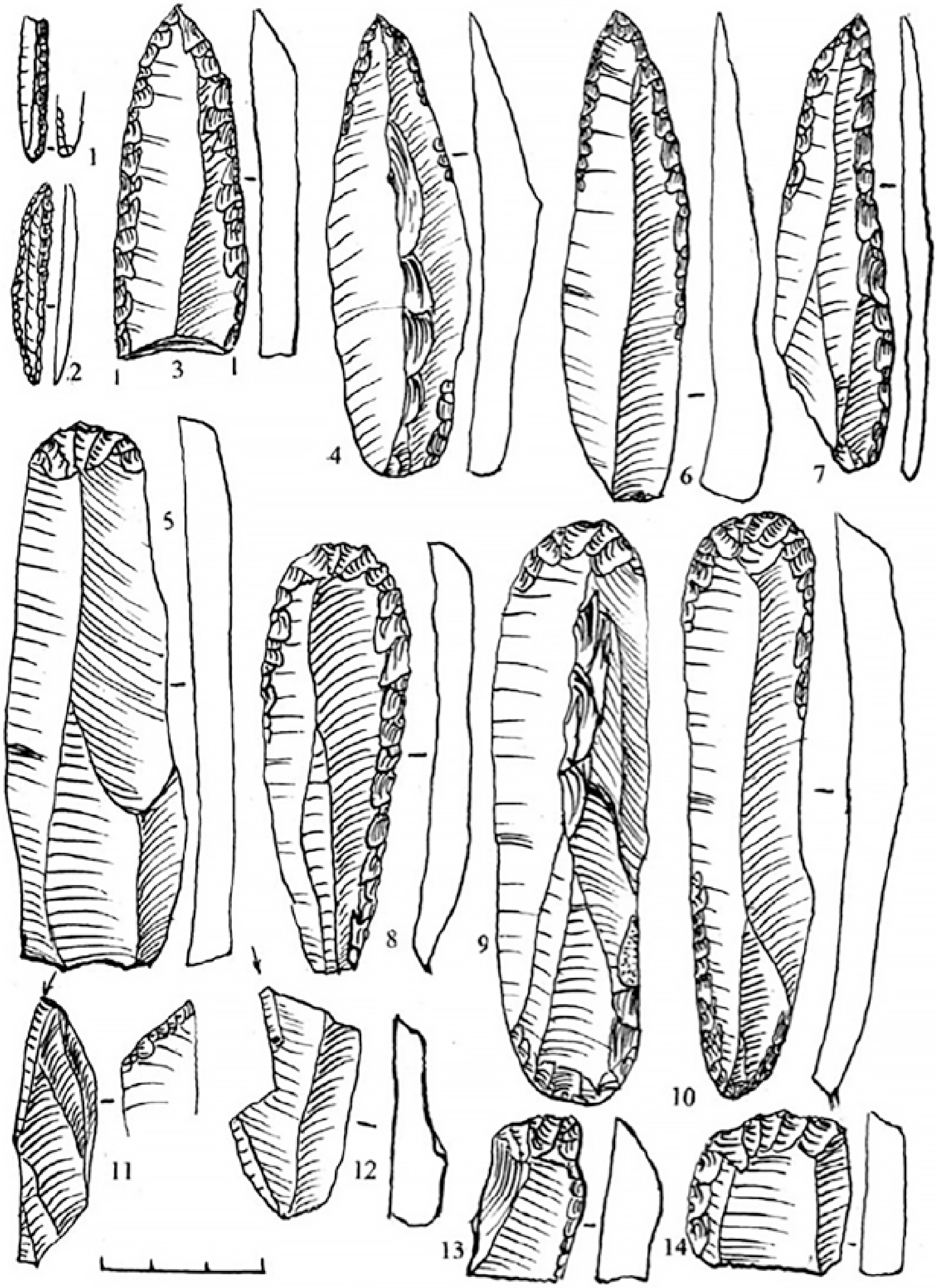


FIGURE 19 Gravettien ancien. Molodova V, niveau 9 : 1–2, lamelles à dos (2, pointe de La Gravette) ; 3–4, 6–7, lames appointées, spécifiques pour ce facies ; 5, 8–10, 13–14, grattoirs ; 11–12, burins.

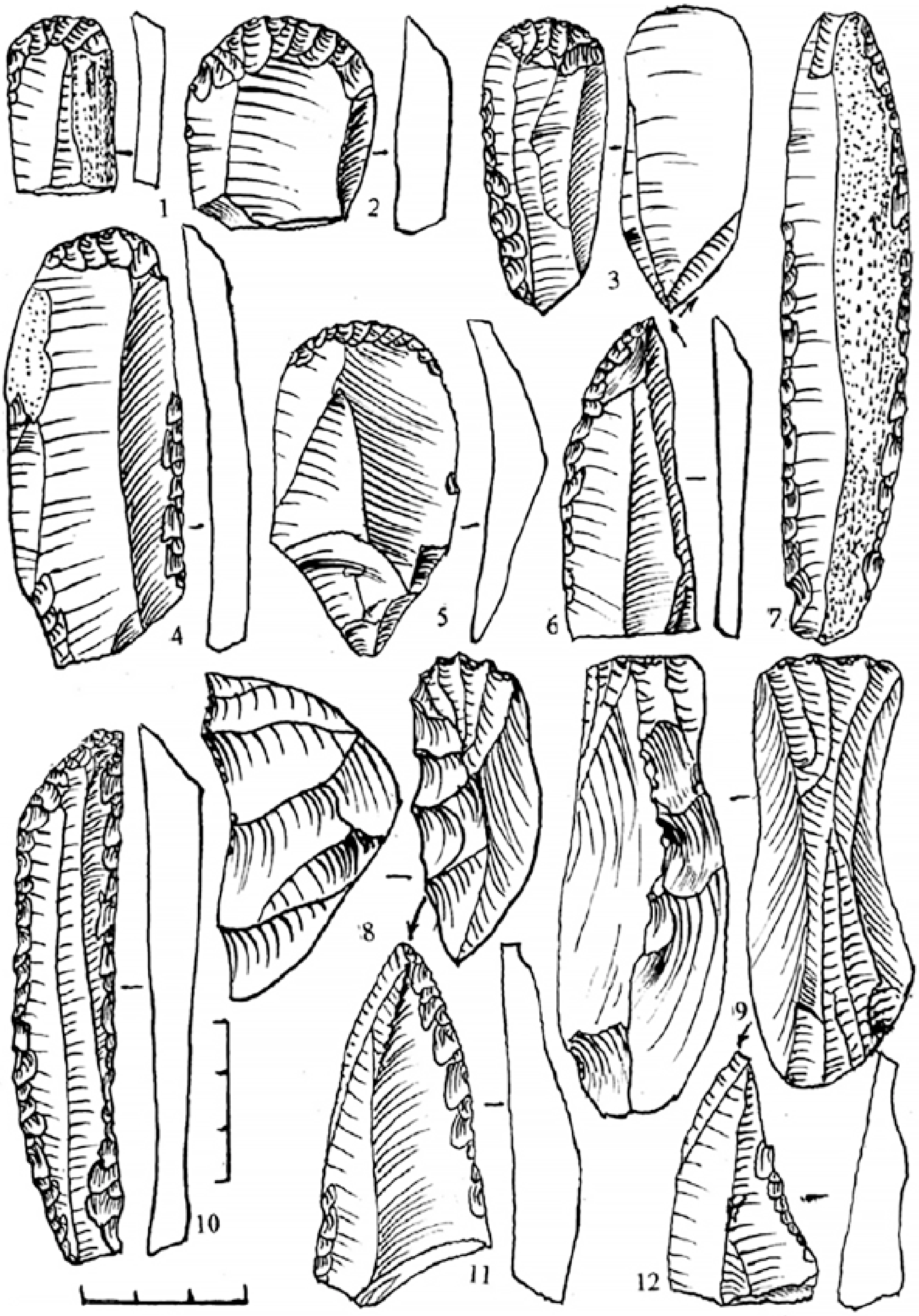


FIGURE 20 Gravettien ancien. Molodova V, niveau 8 : 1–2, 4–5, grattoirs sur lames ; 3, grattoir-burin dièdre ; 6–7, 10, lames retouchées ; 8–9, grattoirs carénés-nucléus de lamelles (?) ; 11–12, burins.

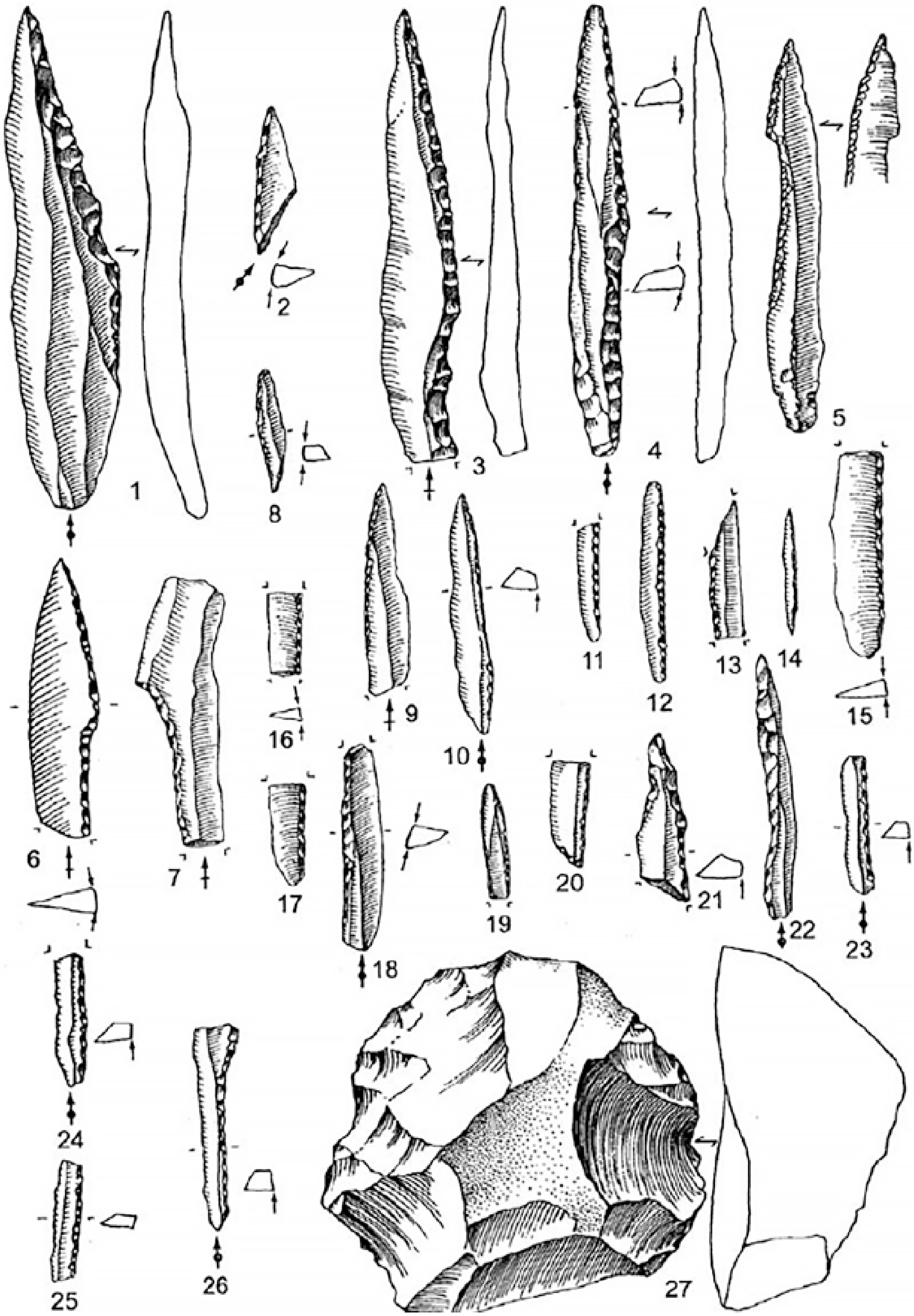


FIGURE 21 Gravettien moyen. Mitoc-Malu Galben. Ensemble gravettien IV : 1, pointe de La Gravette ; 2, micro-burin, type Krukowski ; 3, pointe à gibbosité ; 4, lame à dos ; 5–7, pointes à cran ; 8–22, micro-gravettes ; 23–26, lamelles à dos ; 27, denticulé.

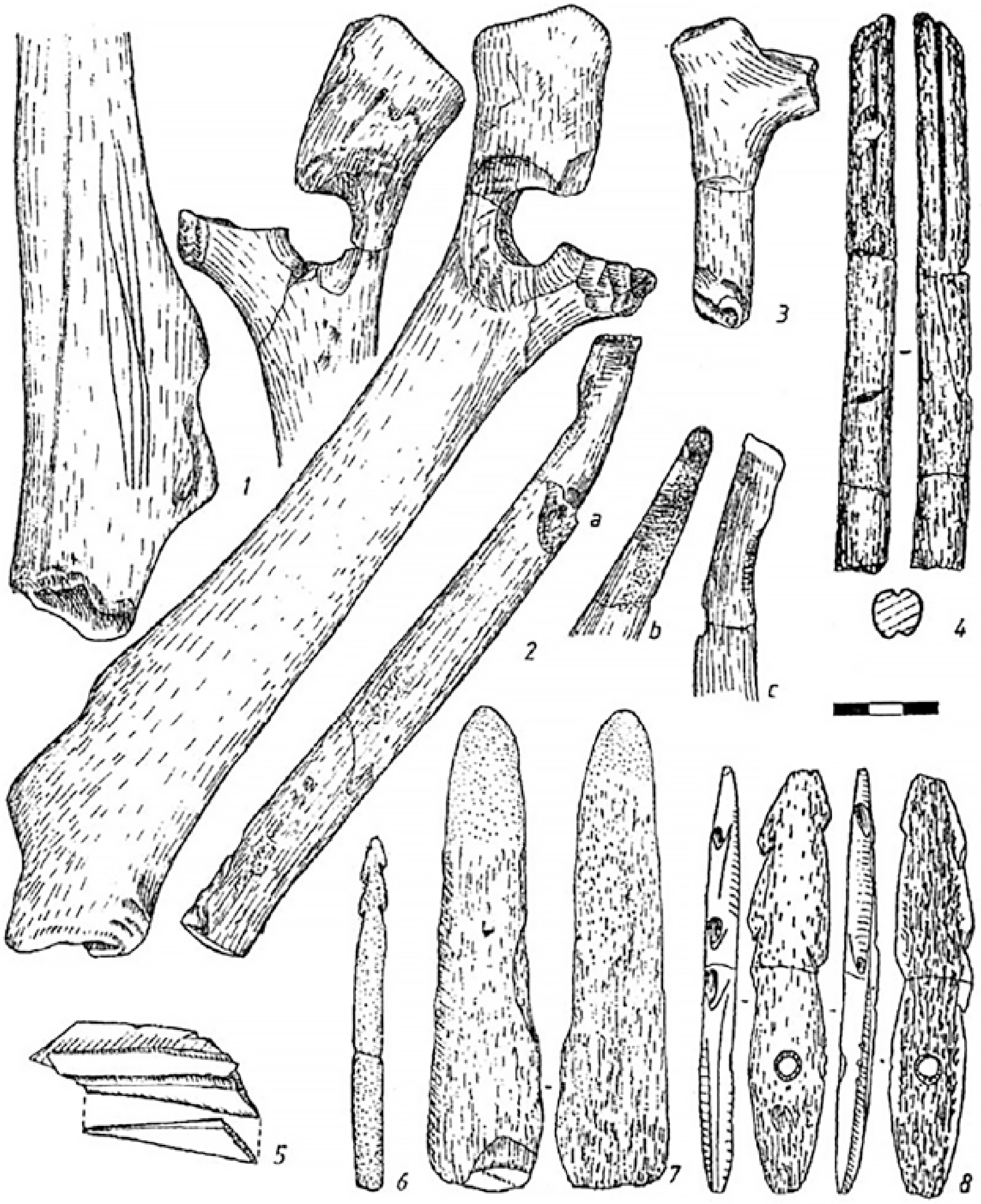


FIGURE 22 Gravettien tardif. Culture MCCM. Cotu Miculinţi-Gârla Mare, niveau II : 1, marteau ou « baton » en bois de renne ; 3, marteau en bois de renne ; 4, fragment de pointe de sagaie, en bois de renne ; 5, fragment de poinçon en omoplate ; niveau III : 2, pointe de lance en bois de renne ; 6, 8, harpons ; niveau IV : 7, lissoir en os (d'après M. Brudiu, 1980).

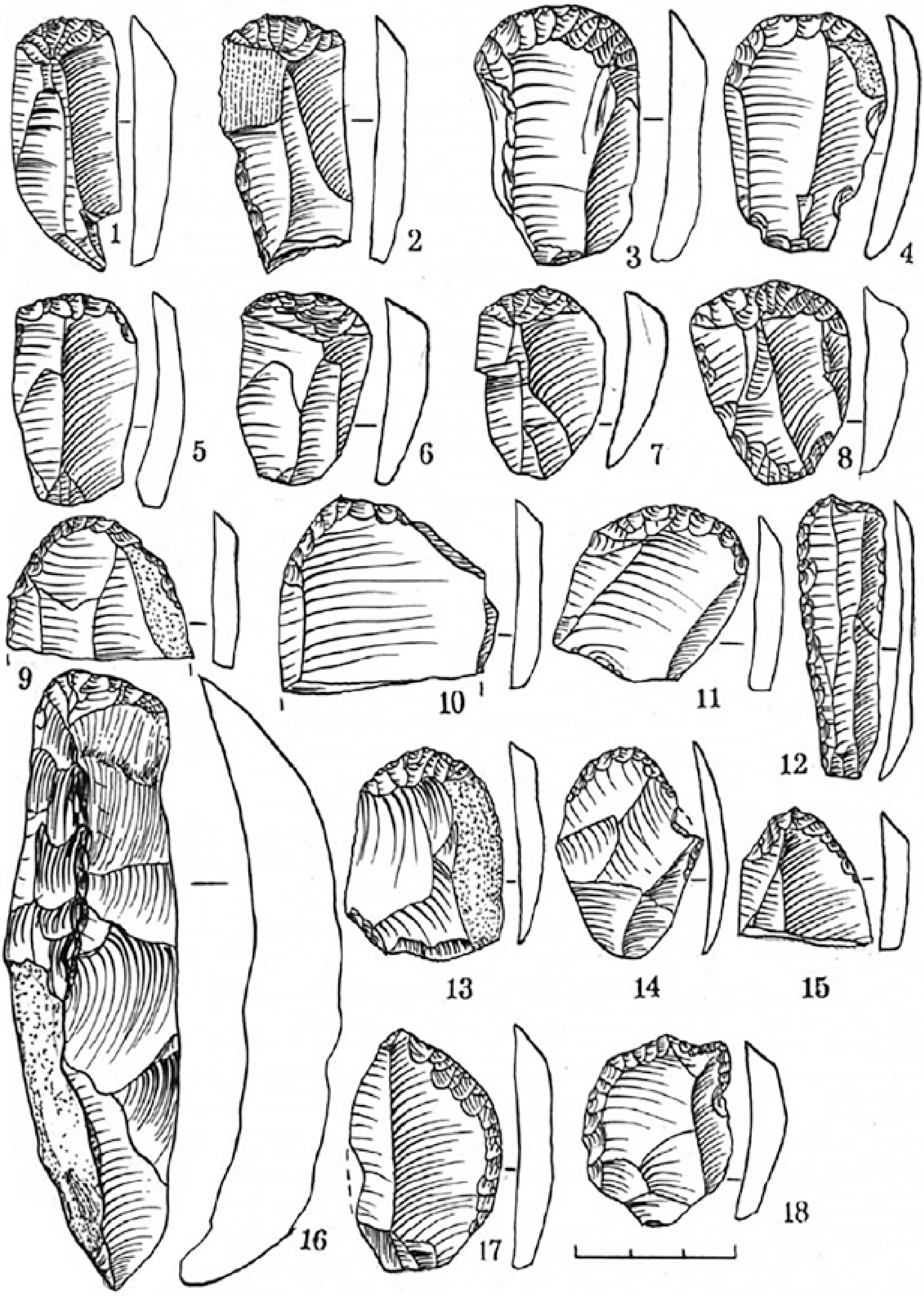


FIGURE 23 Gravettien tardif. Culture MCCM. Costești I : 1–18, grattoirs divers.

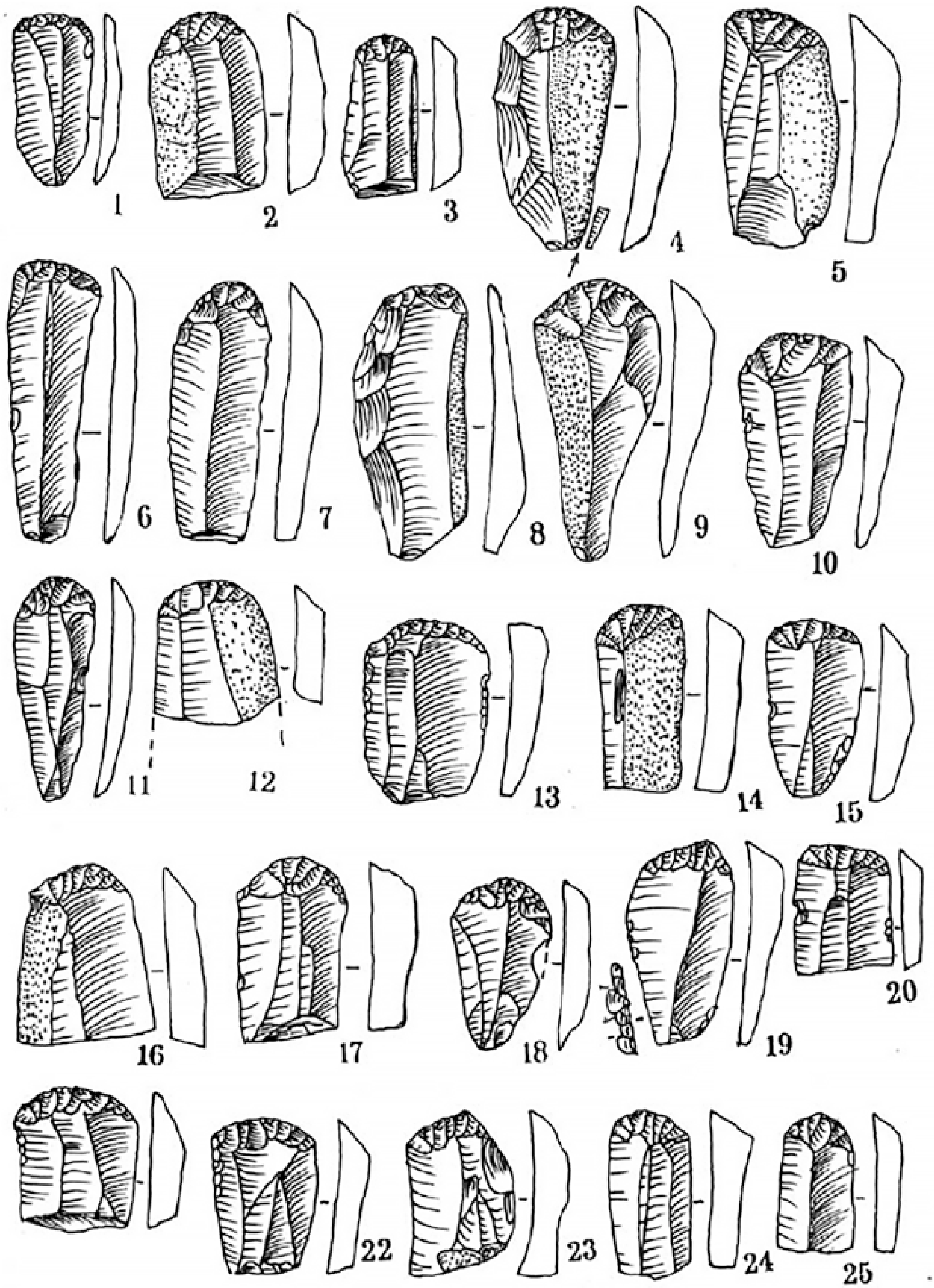


FIGURE 24 Gravettien tardif. Culture MCCM. Costeşti I : 1–25, grattoirs divers.

3.3 Mitoc-Malu Galben

À partir de l'annee 1978, les recherches ont été reprises par V. Chirica, en collaboration avec K. Honea (SUA), pendant la période 1984–1988 ; avec M.Otte, P. Noiret (Liège) et P. Haesaerts (Bruxelles), entre 1991–1995 (N. N.Moroşan, 1938 ; V. Chirica, I. Borziac, N. Chetraru, 1996 ; V. Chirica, I. Borziac, 2009 ; M. Otte, V. Chirica, P. Haesaerts, eds., 2007).

On a découvert quatre niveaux d'habitat gravettien, qui superposent des habitats aurignaciens sûrs, situés dans la partie inférieure du sédiment. On n'a pas constaté l'existence de technocomplexes plus anciens que l'Aurignacien. Deux pendeloques ont été découvertes en contexte gravettien. La première pendeloque provient de l'ensemble Gravettien II et a été découverte en 1981, dans les carrés B/3–5 (–7,10 m), dans l'atelier n°27, qui contenait deux foyers et un amas de débitage réunissant 4.760 artefacts de silex (surtout des déchets et des restes de débitage, ainsi qu'un racloir réutilisé en burin, cinq grattoirs et une pointe de La Gravette). Il s'agit d'une pièce réalisée sur du cortex de silex, de forme à peu près ovale et dont la base est légèrement concave. Elle est incisée sur les deux faces et en-cochée sur le pourtour (7 coches à la base, deux fois 7 coches sur les côtés). Les incisions sont considérées par le fouilleur comme les stylisations d'un cervidé sur une face et d'une silhouette humaine sur l'autre face.

La seconde pendeloque a été découverte en 1993, dans le carré 04 (–6,28 m) soit dans l'ensemble Gravettien dispersé. En fait, elle a été découverte au sein de l'unité sédimentaire 3a, datée entre 20.300 et 20.540 BP ; aucun élément lithique diagnostique n'a été découvert pour cette unité. Elle est fabriquée sur un éclat d'os long, par façonnage partiel de la surface, et est de forme trapézoïdale allongée. Il n'y a pas de décoration, mais bien une perforation biconique.

Les études faites par I. Lopez-Bayon et A. Gautier (dans le volume, édité par M. Otte, V. Chirica, P. Haesaerts, 145–166) ont précisé l'existence des espèces suivantes : *Equus*, *Bison*, *Rangifer*, *Megaceros*, *Cervus* sp., *Coelodonta*, *Elephas*, *Felis leo*. Dans la structure 17, on a découvert une ivoire de mammouth, entier, provenant de l'espace à l'est du Prut, là où le mammouth trouvait encore de bonnes conditions d'environnement (V. Chirica, I. Borziac, 1992, 192–210).

L'outillage gravettien est façonné, dans chacun des ensembles, de manière classique avec l'emploi de retouches abruptes bipolaires pour les armatures à dos ou à cran. Les enlèvements lamellaires, propres aux outils aurignaciens, sont autant appliqués aux grattoirs qu'aux burins de cette tradition. Dans plusieurs cas, le partage entre l'emploi de ces pièces comme outils ou comme nucléus n'est pas aisé. La question de la fonction de tels outils reste donc ouverte, bien qu'ils apparaissent « au même moment » que l'emploi des matières osseuses dans l'outillage avec lesquelles, selon nous, ils entretiennent des rapports d'équivalence technologique.

Outre les outils classiques propres au Gravettien, formés d'un bord abattu on constate la présence de la technique d'amincissement basilaire dite « de Kostienki ». Opposée à un outil façonné (burin double sur cassure), cette méthode consiste en retouches plates longitudinales sur extrémité préparée en une sorte de troncature approximative.

Déjà en partie publiée (M. Otte et V. Chirica, 1993), la séquence aurignacienne comporte assez classiquement les grattoirs et burins carénés ou dièdres (**figure 15**, n^{os} 1 à 8 ; **figure 16**, n^{os} 3 à 7), d'authentiques burins busqués, mais de très rares lames retouchées. Les supports laminaires d'ailleurs assez minces, ne favorisant pas le façonnement de ce type, par ailleurs souvent assez rares dans les séries orientales.

On constate par contre un groupe très homogène de grattoirs ronds, apparement issus d'un même bloc et, en tous les cas, très proches dans l'espace, en plein milieu aurignacien. En ce qui concerne l'outillage en os, on a découvert un fragment de pointe de lance en os et une pointe de lance de type Mladec (**figure 16**, n^{os} 1 à 2).

La séquence gravettienne présente une plus forte variation, au moins partiellement liée à l'évolution diachronique. Les armatures à dos simple (« gravettes » ou « micro-gravettes »), bien que présentes très généralement, sont surtout abondantes dans la partie supérieure de la séquence, dans les entités IV et III. Les micro-gravettes et les pièces à cran caractérisent ces niveaux supérieurs : ensembles 35 et 68, pour l'entité IV (daté de 23 à 24000 B.P.) (**figure 21**, n^{os} 1 à 27), et ensembles 91 à 165 pour l'entité III, daté de 24 à 25000 B.P.). La base de la séquence gravettienne contient comme éléments caractéristiques les lames retouchées et les lames appointées (ensembles 172 à 218, pour les entités II et I, datés de 25500 à 27500 B.P.).

3.3.1 Matériaux extérieurs

Plusieurs ensembles témoignent sur les importations, marquées par le matériau particulier dont ils sont faits, d'origine extérieure à la région.

Nous mentionnons ci-dessous les cas qui selon nous sont dignes d'être mis en évidence, pour les habitats aurignaciens :

- un grattoir a été façonné en silex blanc, manifestement non local ;
- une lame à crête retouchée est réalisée en grès ;
- un burin sur cassure a été façonné en marne (?).

3.3.2 Gravettien

- **Ensemble IV, Lot n°35 :** un grattoir en silex blanc, manifestement non local ;
- **Ensemble IV, Lot n°66 :** une lame à crête retouchée en grès ;
- **Ensemble IV, Lot n°67 :** un burin sur cassure en marne (?) ;
- **Ensemble IV, Lot n°68 :** deux micro-gravettes en silex blanc ;
- **Ensemble IV Lot n°101 :** une lame en roche calcaire ;
- **Ensemble III, Lot n°159 :** une lame appointée en grès ;
- **Ensemble III, Lot n°160 :** un fragment proximal de lame en roche noire mate ;
- **Ensemble II, Lot n°I69 :** cinq lames en silex gris veiné de blanc (Volhynie) ;
- **Ensemble II, Lot n°I77 :** deux grattoirs sur lame en grès ;
- **Ensemble L Lot n°2I5 :** une micro-gravette en schiste noir d'Audia (Carpates).

Donc, il est possible d'intégrer ces témoignages de contacts extérieurs dans un système d'économie plus général inscrit dans le paysage du Paléolithique de la région comprisse entre le Carpates et le Dniestr.

3.4 Ripiceni-Stânca-Ripiceni

Pendant les années 1924 et 1925–1926, N. N. Moroşan (1938), qui a découvert le seul gisement de grotte de l'espace est-carpatique, habité par l'homme paléolithique, y a effectué des recherches systématiques. « Stânca » est un conglomérat calcareux, similaire à ceux qui apparaissent fréquemment dans la zone du Prut Moyen, dont l'origine appartient au Sarmatien.

À l'exception de la première couche géologique, située dans la partie inférieure, formée de blocs de calcaire, tombés du plancher ou des murs, N. N. Moroşanu a identifié les niveaux : I, III, V, VII, à restes d'habitat humain, séparés par les couches II, IV, VI, stériles des points de vue archéologiques et faunistiques.

Dans le niveau I, les gastéropodes sont représentés par *Pupa muscorum* et *Helix hispida*, les mammifères étant représentés par des restes de *Equus caballus fossilis* (environ 50 individus), *Bos primigenius*, *Bison priscus*, *Cervus elaphus*, *Capreolus capreolus*, *Arctomys bobac*, *Canis vulpes* et *Felis leo spelaea* (2 individus d'âges différents).

On a observé des fragments osseux à traces de transformation et même des outils du type du perçoir.

Le niveau III contient des coquilles de *Pupa muscorum*, *Helix pomatia* et *Helix hispida*, entiers ou fragmentaires.

Particulièrement importante est l'apparition des os d'oiseaux : corbeau et colombe (*Colombidae*). Les mammifères sont représentés par *Equus caballus fossilis*, *Equus hemionus*, *Bison priscus*, *Cervus elaphus*, *Rangifer tarandus*, *Arctomys bobac*, *Lepus timidus*, *Canis lupus*, *Canis vulpes*, *Hyaena spelaea*. En cet intervalle d'habitat, le cheval est plus faiblement représenté, mais le pourcentage des bovidés s'est augmenté. La présence des os de renne pourrait conduire à l'identification de détériorations climatiques.

Le niveau V est caractérisé par les mêmes gastéropodes, les oiseaux étant représentés par les os de *Vultur fulvus*, et les mammifères par *Canis lupus*, *Canis vulpes*, *Rangifer tarandus*, *Marmota bobac*, les chevalines et bovidés. Nous constatons donc que la marmotte, animal spécifique aux zones alpines, confirme, à côté du renne, l'existence de conditions climatiques trop peu favorables.

Le niveau VII est plus faible en restes faunistiques : les gastéropodes et les oiseaux sont absents, et parmi les mammifères ce n'est que le cheval qui est présent, tel que les fragments de dentition l'indique.

Notre intérêt est retenu par la tentative de réalisation d'une *pointe à cran*, ultérieurement connue grâce à de nombreuses découvertes dans le site de Kostenki (niv. V). Les pièces de type *à dos* sont relativement fréquentes, tout comme les pointes *La Gravette*, bien que plus faiblement représentées que dans le niveau antérieur, ayant surtout une tendance de microlithisation.

Le niveau III comprend des perçoirs réalisés sur des métacarpiens de cheval ou de bœuf. Un bois de *Cervus elaphus* a été aigu pour être utilisée de la manière de ceux découverts à Predmosti et ultérieurement, à Cotu Miculinţi. D'autres fragments osseux présentent des traces de taille intentionnelle, mais sans finissage.

Le niveau V est plus riche en telles pièces, en os appartenant aux grands herbivores. Une « baguette » à traces de raclage par des stries longitudinales, aigue aux extrémités, ressemble aux pointe de lance de Cotu Miculinţi et Crasnaleuca.

Les fragments de bois de cerf sont relativement nombreux, aigus à l'une des extrémités, probablement utilisés à l'extraction des tubercules et des racines comestibles. Les pièces connues sous le nom de « bâton de comandant » ou de « sceptre » sont eux aussi présents.

Dans la catégorie d'autres découvertes, on peut inclure les galets de quartzite et grès, identifiés dans les niveaux I et V, tout comme dans la concentration d'environ 20 lames de silex, déposées intentionnellement près du mur de rocher, dans le niveau VII. On ne peut omettre non plus les objets de parure : une canine de renard et une autre de loup, et aussi une coquille de *Helix*, perforées, et des rognons d'oxydes de fer, utilisés comme colorants.

Dans le niveau V, la présence de la pièce *à cran* peut être comprise si l'on prend aussi en considération l'observation concernant la présence de certaines pièces en silex dont l'origine n'est pas dans la zone du Prut Moyen. Donc, ce niveau d'habitat pourrait appartenir à une période qui sépare la dernière séquence glaciaire du stade Würm III de la période qui y a suivi.

3.5 Ripiceni-*Izvor*

À la suite des recherches systématiques, effectuées à travers une surface de plus de 3000 m^2, on a identifié plusieurs niveaux archéologiques (Al. Paunescu, 1999).

Dans les niveaux aurignaciens IIa, IIb et dans les niveaux gravettiens 1a, Ib, IIa, IIb, la matière première est constituée du silex local, de Prut, quelques pièces étant taillées en matériaux allogènes (ménilithe, grès, schiste noir, silex de Dniestr).

3.6 Costeşti I

Le site était situé sur la deuxième terrasse du Prut, à gauche de la rivière Ciuhur. Le niveau d'habitat est placé dans les argiles tardiglaciaires et le site paléolithique peut être attribué au Paléolithique final.

Le niveau d'habitat était situé à la profondeur de 2,05–2,20 m, étant représenté par de rare os de mammifères, de pièces en silex et certaines en grès.

La matière première est le silex de couleur grisâtre, plus rarement – noire. On a dépisté aussi de rares pièces en quartzite et silex marronâtre, dit « de Dobroudja ».

On a dépisté une seule pièce en matériel dur d'origine animale – défense de mammouth. Elle représente une serfouette, à manche, ayant le corps quadrangulaire massif, la lame vaguement arrondie et asymétrique.

L'inventaire lithique (**figure 23**, n^{os} 1 à 18 ; **figure 24**, n^{os} 1 à 25) a des dimensions moyennes et grandes, alors que pendant le Gravettien supérieur de l'espace carpatique - dniestréen, on constate la tendance vers une évidente microlithisation des pièces, fait observé dans les industries des sites Molodova V, Cosăuţi, Lespezi, Cotul-Miculinţi, *etc.*

L'âge relatif peut être apprécié d'après sa position dans les argiles tardiglaciaires. Le niveau d'habitat de Costeşti est placé au-dessus d'un niveau de sable fin quartzitique, qui est aussi présent à Molodova V et à Cosăuţi et est daté par l'âge d'environ 16.500 – 14.500 ans BP (P. Haesaerts, I. Borziak, V. Chirica, F. Damblon, L. Koulakovska, J. Van der Plicht, 2003 ; P. Haesaerts, I. Borziak, V. Chirica, F. Damblon, L. Koulakovska, 2004 ; I. Borziac, P. Haesaerts, V. Chirica, 2005). Si nos appréciations stratigraphiques sont correctes, alors on peut attribuer au niveau d'habitat du site Costeşti I l'âge d'environ 14.500–13.000 ans BP. Jusqu'à ce qu'on obtienne des datations radiométriques, nous attribuons ce site à l'étape tardiglaciaire d'évolution du Gravettien supérieur de la zone carpatique - dniestréenne

4 Les terrasses du Dniestr

Molodova V, niveaux 10a et 10

4.1 Les niveaux 10a et 10 ont été étudiés à travers des surfaces d'environ 640 m^2.

La matière première, tout comme dans d'autres sites de la zone du Dniestr Moyen, est représentée par le silex local, mais il y a d'autres types de roches : le schiste siliceux local, le schiste noir d'Audia, le ménilithe, le jaspe *etc.*, qui ne sont pas d'origine locale, et sont réutilisés dans le Paléolithique de la vallée du Dniestr (I. Borziac, V. Chirica, M. Văleanu, 2006).

Comme types significatifs, il faut attirer l'attention sur les pointes faites sur des lames longues, à retouches minces bilatérales, les grattoirs simple faits de lames longues. Ces types d'outils, à côté des lames et les lamelles *á bord abattu*, qui deviennent toujours plus nombreuses dans les niveaux 9 et 8 de Molodova V et dans d'autres niveaux d'habitat, sont les éléments caractéristiques du Gravettien inférieur de l'espace carpatique – dniestréen (**figure 17**, n^{os} 1 à 7; **figure 18**, n^{os} 1 à 10).

Molodova V, niveau 9

4.2 Étudié à travers la même surface, il était situé dans la sous-unité Mol. 10–4 et détient 2 données radiométriques : 29.650±1320 BP (LG–15) et 28.100±100 BP (LG–18). Ces datations anciennes et les outillages lithiques servaient de repère temporel et technologique important pour le commencement du Paléolithique supérieur dniestréen (**figure 19**, n^{os} 1 à 12). Les recherches ultérieures, effectuées par l'équipe composée de P. Haesaerts, I. Borziac, V. Chirica, L. Koulakovska, F. Damblon et A. Sâtnic ont eu comme résultat pas seulement l'obtention de datations plus anciennes pour le Paléolithique supérieur de la Vallée du Dniestr, mais ont essentiellement contribué à l'élaboration d'un nouveau schéma chronostratigraphique est-carpatique (P. Haesaerts, I. Borziak, V. Chirica, F. Damblon, L. Koulakovska, J. Van der Plicht, 2003 ; P. Haesaerts, I. Borziak, V. Chirica, F. Damblon, L. Koulakovska, 2004).

La matière première est représentée par le silex local, mais il y a des supports en roches qui ne sont pas d'origine locale, par exemple, le silex de Volhynie (P. Noiret, 2009, 181).

Molodova V, niveau 8

4.3 Il est situé dans les dépôts de l'oscillation chaude Kesselt (les phases moyennes de l'interstade Stilfried B), les unités stratigraphiques Mol. 11 (ou MG 6). On a étudié une surface de plus de 750 m^2. L'outillage en silex est bien developpe (**figure 20**, n^{os} 1 à 12).

Les pointes *à cran* sont significatives car par leur présence elles nous signalent le début de l'influence du Gravettien central - européen, si cette apparition n'a pas été une invention technique locale, qui s'est développée ultérieurement dans le niv. 7 du site Molodova V, dans les niveaux 2 et 3 gravettiens de Mitoc-Malu Galben, pour qu'elle disparaisse ensuite de l'inventaire gravettien local. Dans ce niveau on a aussi dépisté 2 pièces globulaires en grès, déterminées en tant que pièces de type « bolas », plaquettes et rognons en grès, qui ont été déterminés en tant que pièces auxiliaires, utilisées au débitage du silex.

Cosăuţi I

4.4 Le site pluristratifié Cosăuţi I est situé sur la II^e terrasse du Dniestr, à 0,5 km vers le nord du village Cosăuţi, région Soroca. On a identifié 25 niveaux d'habitat, dont les niveaux moyens (1, 2, 2a, 3b, 3, 3a, 4, 5, 6a, 6b) ont été étudiés à travers une surface de plus de 230 m^2. La profondeur d'emplacement des niveaux d'habitat varie d'environ 1,5 m jusqu'à 16,5 m.

Le site est unique en Europe par le nombre d'horizons d'habitat gravettien, par le degré suffisant de conservation des vestiges et a servi de pilon stratigraphique pour l'élaboration du schéma chronostratigraphique régional d'évolution du Paléolithique supérieur de l'Europe Centrale (P. Haesaerts, I. Borziak, V. Chirica, F. Damblon, L. Koulakovska, J. Van der Plicht, 2003 ; P. Haesaerts, I. Borziak, V. Chirica, F. Damblon, L. Koulakovska, 2004 ; I. Borziac, P. Haesaerts, V. Chirica, 2005 ; P. Haesaerts, 2007).

La matière première est représentée par le silex local, « de Dniestr », mais on signale aussi 7 pièces en obsidienne (niv. 5), et aussi d'autres pièces en silex de Volhynie (I. Borziac, V. Chirica, 1999, 69 ; P. Noiret, 2009, 256).

Les pièces réalisées en matériaux dures d'origine animale sont représentées par les pointes de lance fusiformes rondes et légèrement aplaties, à pointes aplaties, rondes et triangulaires (Cosăuţi), pointes à cannelures longitudinales, aiguilles à coudre (Cosăuţi, Duruitoarea Veche, niv. sup.), serfouettes – stabilisatrices pour traîneaux (?) en bois de renne, manches transversaux pour l'emmanchement des pièces en silex (Molodova V, Podgori I), « bâtons » perforés (Molodova V, Cotu-Miculinţi), harpons (Cotu Miculinţi, Cosăuţi), marteaux – pics en bois de renne, perçoirs, lissoirs, couteaux pour l'écartement des peaux des animaux chassés *etc.* (I. Borziac, V. Chirica, M. Văleanu, 2006).

Les pièces de parure sont représentées par les perles – pendentifs en os (Mitoc MG, Duruitoarea Veche, Cosăuţi), bracelets en ivoire (Cosăuţi), pointes ornementées (Cosăuţi), pendentifs en os, ivoire, marne (Mitoc, Cosăuţi, Molodova), figurines féminines (Cosăuţi, Molodova V), zoomorphes (Cosăuţi) *etc.*

5 DISCUSSION

Nous prenons en considération l'existence des possibles relations entre les communautés humaines de l'espace carpato-dniestréen sur plusieurs directions d'analyse : **1)** matières premières allogènes, identifiées comme supports ou comme pièces finies dans les inventaires lithiques de l'espace considéré ; **2)** la présence des fragments d'ivoire de mammouth en certains sites paléolithiques, à Mitoc, ou sur la Vallée de la Bistriţa, tout comme d'autres restes paléofaunistiques identifiés, représentant une caractéristiques générale (J. Renaut-Miskovsky, A.-M. Moigne, 1989, p. 60–64) ; **3)** pièces d'art mobilier ou de parure, découvertes dans les niveaux d'habitat de tout l'espace géographique carpato-dniestréen ; **4)** l'identification de certaines cultures archéologiques spécifiques à la zone géographique pruto-dniestréenne.

1. Dans notre analyse, nous partons de la présence non-uniforme, du silex « de Prut » dans les niveaux d'habitat appartenant au Paléolithique supérieur ancien ou récent, de terrasses de la Bistriţa. Ceci démontre les mobilités des communautés humaines, des terrasses de la Bistriţa vers la zone du Prut moyen, dans les diverses étapes de l'Aurignacien et du Gravettien, telles que ces deux entités culturelles-chronologiques ont été définies. Évidemment, la présence du silex « de Prut » dans le cadre des composants technico-typologiques des terrasses de la Bistriţa pourrait être considérée seulement comme éléments des simples déplacements à la recherche des ressources de matière première de très bonne qualité ; le fait qu'au cadre des inventaires lithiques des terrasses de la Bistriţa, le silex « de Prut » se trouve seulement sous la forme des produits finis, démontre l'existence de relations directes avec les communautés humaines contemporaines des terrasses du Prut. Le phénomène est spécifique à toutes les communautés humaines paléolithiques (T. Aubry, 2005, 87–98 ; H. Floss, 1991, 103–109).

Nous prenons aussi en considération la présence de certaines pièces en matières premières existantes seulement dans la zone géographique des Subcarpates Orientaux dans les inventaires lithiques de nombreux gisements entre le Prut et le Dniestr ; pour ne pas créer des confusions concernant la provenance des diverses catégories de grès, nous prendrons en compte seulement l'existence des pièces en schiste noir d'Audia (la Dépression Subcarpatique Orientale) dans les campements gravettiens entre le Prut et le Dniestr, bien qu'en certains inventaires lithiques il y a aussi des pièces en ménilithe, ayant la même origine géographique. On a donc découvert des pièces en schiste noir d'Audia à Mitoc-Malu Galben, Ripiceni-Izvor, Gordineşti, Corpaci-Mâs, Babin I, Climăuţi II, Ciuluteşti (V. Chirica, I. Borziac, N. Chetraru, 1996 ; V. Chirica, I. Borziac, 2009 ; P. Noiret, 2009). On peut également lancer l'idée des liaisons entre les communautés humaines de Ripiceni-Izvor et, peut-être, Mitoc-Malu Galben, à celles sur le Dniestr, par la présence du silex spécifique, dans certains niveaux d'habitat aurignacien et gravettien. On ne saurait omettre non plus la présence du silex de Volhynie, à Mitoc-Malu Galben, Cosăuţi et Molodova V, ou des pièces en obsidienne, de l'Ukraine Trans-Carpatique, à Cosăuţi et Voronovitza I (sur le Dniestr). Dans le cadre typologique des technocomplexes lithiques, nous pourrons prendre aussi en considération, par exemple, la présence des lames appointées, à Mitoc-Malu Galben, Molodova V, Ciuluteşti, ou des segments de cercle, présents à Ripiceni-Izvor et Corpaci, comme éléments de relations directes entre les communautés humaines entre le Prut et le Dniestr.

2. La présence d'une défense de mammouth à Mitoc-Malu Galben, structure 17, d'autres fragments de défense de mammouth dans des niveaux d'habitat gravettien des terrasses de la Bistriţa, pose le même problème, de la grande mobilité des communautés humaines de l'espace géographique des terrasses de la Bistriţa et du Prut jusqu'à la zone géographique entre le Prut et le Dniestr.

3. Nous avons constaté, surtout à Cosăuţi, et aussi dans d'autres campements gravettiens à pièces d'art mobilier, l'existence de certains motifs décoratifs presque identiques (I. Borziac, C.-V. Chirica, 1996, 393–400 ; I. Borziac, V. Chirica, 1999, 68–77 ; I. Borziac, V. Chirica, M. Văleanu, 2006 ; P. Noiret, 2009). Nous devons considérer aussi les nombreux pendentifs en dents perforées de nombreux gisements gravettiens à travers l'espace carpato-dniestréen (C. V. Chirica, 1996). De ce point de vue nous pouvons apprécier que l'existence des matières premières allogènes peut être due seulement à la permanence des mobilités humaines paléolithiques, mais l'identité de certaines pièces d'art mobilier, ou de parure, de l'ornementation de celles-ci, doit être déterminée par la possible existence de relations directes entre les communautés humaines, même de certains éléments communs de spiritualité.

4. En divers travaux (I. Borziac, 2004 ; I. Borziac, V. Chirica, A. David, 2007 ; I. Borziac, V. Chirica, M. Văleanu, 2006 ; V. Chirica, I. Borziac, N. Chetraru, 1996 ; V. Chirica, I. Borziac, 2009), nous avons identifié l'existence de certaines entités archéologiques spécifiques à l'espace carpato-dniestréen, auxquelles nous avons attribué des noms spécifiques : la *Culture Ripiceni-Brânzeni* (dénommée par I. Borziac, la *Culture de Prut*), caractéristique du Paléolithique supérieur ancien, la *Culture Molodova-Mitoc*, datée au début du Gravettien (**figure 17**, n^os^ 1 à 7 ; **figure 18**, n^os^ 1 à 10 ; **figure 19**, n^os^ 1 à 12 ; **figure 20**, n^os^ 1 à 12), ou la *Culture Molodova-Cosăuţi-Cotu Miculinţi*, de la fin du Gravettien carpato-dniestréen (**figure 22**, n^os^ 1 à 8 ; **figure 23**, n^os^ 1 à 18 ; **figure 24**, n^os^ 1 à 25).

À notre avis, le Paléolithique supérieur de l'espace compris entre les Carpates et le Dniestr peut être divisé en deux technocomplexes principaux : l'Aurignacien et le Gravettien. L'étape initiale est aussi complétée par les industries symbiotiques du type Brânzeni et Prut. D'après nos estimations (I. Borziac, V. Chirica, 1999 ; I. Borziac, 2004), l'Aurignacien a coexisté dans la zone avec le Gravettien pour environ 10.000 ans. Pendant cette période il est possible qu'entre l'Aurignacien et le Gravettien local ou les migrations d'une part ou d'une autre, des interférences de différents degrés et nuances (D. Vialou, 2005, 75–86) aient eu lieu dans la zone, y compris des phénomènes d'acculturation, qui ont causé dans les industries des métamorphoses de divers types, y inclus d'ordre technique – typologique. Ces processus se sont cristallisés dans les industries qualifiées d'« épiaurignaciennes », ou dans le cadre de la « voie aurignacienne d'évolution », « à éléments typologiques aurignaciens » dont l'industrie du site Raşcov VIII fait aussi partie.

Partout, les technocomplexes lithiques représentent un mélange (mais non pas mécanique), y compris ceux de Raşcov VII, bien que la stratigraphie du site soit essentiellement détériorée par des lavages, mélange objectif de types, en tant que résultat des interférences culturelles entre les communautes de l'Aurignaciens et Gravettiens de l'espace de l'Europe Centrale et de l'Est, y compris de l'espace carpatique - dniestréen et la zone nord – pontique. Il reste encore à établir le commencement de ces interférences et leurs étapes évolutives.

Une première phase du Gravettien de la zone carpatique – dniestréenne inclut les niveaux 10, 9 et 8 de Molodova V, les niveaux inférieurs d'habitat gravettien de Mitoc-Malu Galben, situés dans les cycles pédologiques 7b, 7a, 6b, 6a , les niveaux inférieurs de Babin 1 et Voronoviţa 1, le niveau d'habitat de Ciutuleşti I, en total 8 niveaux d'habitat établis stratigraphiquement, étudiés par des fouilles (M. Otte, P. Noiret, V. Chirica, I. Borziac, 1996 ; I. Borziac, P. Haesaerts, V. Chirica, 2005 ; I. Borziac, V. Chirica, M. Văleanu, 2006)

Le Gravettien supérieur (Épigravettien) – La culture Molodova-Cosăuţi-Cotu Miculinţi (MCCM) caractérise tout le processus des changements de milieu, de climat, faune, flore, auxquels les communautés humaines se sont adaptées, constituant un phénomène culturel-historique et technico-typologique spécifique.

Dans la culture MCCM nous avons inclus un grand nombre de sites à faune et aménagements spatiaux, à un énorme volume de matériel lithique, à important outillage de matériaux durs d'origine animale et à représentations spécifiques des éléments de la spiritualité – art mobilier, des pièces de parure *etc.* La base documentaire principale est constituée par les complexes des sites : Molodova I (2 niv. d'habitat), Molodova V (6–1), Cormani IV (5, 5a–1), Cosăuţi (26 horizons d'habitat), Otaci II, Costeşti I, Ripiceni-Izvor, niveaux supérieurs gravettiens ; Mitoc-MG niveaux du Gravettien supérieur ; Lespezi (niveaux 1–6), Crasnaleuca-Stanişte – 5 niveaux ; Cotu Miculinţi – 7 niveaux, Poiana Cireşului (2 niveaux gravettiens), Bistricioara–Lutărie, Dârţu, Cetăţica I et II, Ceahlău–Bofu Mic, Ceahlău–Bofu Mare (niveaux gravettiens *etc.*). Entre 21.000 et 19.000 ans BP, la population de la zone se raréfie. Les étapes de présence de l'homme d'origine gravettienne finissent à Molodova V (après environ 24.500 ans BP), à Mitoc-MG (après environ 20.000 ans BP), à Cormani IV (après environ 23.000 ans BP). Pendant cette période de nouveaux groupes humains apparaissent. Ceux-ci n'ont pas constitué un massif de population, mais ont représenté des infiltrations singulières, signalées à Climăuţi II.

Dans la zone de pré-montagnes, tout comme à Raşcov VII, temporairement, les Gravettiens se raréfient, mais ils sont encore signalés à Bistricioara–Lutărie, à Mitoc-MG, niv. sup, dans la grotte Ciuntu. La population gravettienne devient significativement plus nombreuse proportionnellement à l'intensification du refroidissement du climat, à la limite de 19.000 ans BP. Les premiers niveaux d'habitat apparaissent à Cosăuţi (environ 19.500 BP), à Cotu Miculinţi, Crasnaleuca-Stanişte, Lespezi, Poiana Cireşului *etc.* (à 18.500–17.200), alors les cycles de vie sont ultérieurement repris à Molodova V, Cormani IV, Ataki I, Dârţu, Ripiceni–Izvor, Podgori. Otaci II *etc.* (à environ 17000–16.000 ans BP). Cette présence croissante dans la zone témoigne sur le refroidissement évident des conditions de vie dans les zones plus nordiques par rapport à la zone analysée par nous; pour ce qui est de la fin de la migration de la population au-delà des Carpates, on constate le flux de la population dans la zone carpatique – dniestréenne, en comparaison à la raréfaction de celle-ci en Europe Centrale (Fr. Djindjian, M. Otte, J. Kozlowski, 1999; Fr. Djinjian, 2002; I. Borziac, V. Chirica, M. Văleanu, 2006). Parallèlement, des traces constantes de vie apparaissent dans les steppes nord-pontiques, lesquelles, jusqu'à cette étape-là, n'étaient qu'occasionnellement occupées par les collectifs humains isolés.

La culture disparaît graduellement, avec l'amplification des changements climatiques de l'époque de transition du Quaternaire à l'Holocène, procès élucidé par nous dans un autre ouvrage (I. Borziac, V. Chirica, 2006, 5–34).

Celle-ci est, selon nous, l'évolution du Paléolithique supérieur de l'espace compris entre le Dniestr et les Carpates Orientaux. Certes, de nouvelles découvertes, datations et interprétations stratigraphiques compléteront ou modifieront nos opinions.

BIBLIOGRAPHIE

AUBRY T. (2005) – Étude de l'approvisionnement en matières premières lithiques d'ensembles archéologiques. Remarques méthodologiques et terminologiques. Dans: D. Vialou, J. Renault-Miskovski & M. Patou-Mathis (dir.), *Comportements des hommes du Paléolithique moyen et supérieur en Europe: territoire et milieu*, Liège, ERAUL 111(2005): 87–99.

BORZIAC I. & CHIRICA C.-V. (1996) – Pièces de marne du Paléolithique supérieur de la Vallée du Dniestr. *Préhistoire Européenne* 9: 393–401.

BORZIAC I. & CHIRICA V. (1999) – Considérations concernant le Gravettien de l'espace compris entre le Dniestr et les Carpates. *Préhistoire Européenne* 14: 67–78.

BORZIAC I. (2004) – *Gravetianul tardiv în spaţiul Carpato-Nistrean. Cultura Molodova-Cosăuţi-Cotu Miculinţi*, in *Studii de istorie veche şi medievală. Studia in honorem Cheorghe Postică*, Chişinău.

BORZIAC I., HAESAERTS P. & CHIRICA V. (2005) – Cadrul cronostratigrafic al Paleoliticului superior cuprins între Carpaţii Orientali şi Nistru. *Revista Arheologică* 1(2): 168–201.

BORZIAC I., CHIRICA V. & DAVID A. (2007) – L'Aurignacien moyen et tardiv de l'espace Carpatique-Dniestréen. Gisement Climautsi II. *BAI* XIX (ed. V. Chirica), Iaşi.

BORZIAC I., CHRICA V. & VALEANU M. (2006) – Culture et sociétés pendant le Paléolithique supérieur de la zone carpato-dniestréenne. *BAM* VI (ed. PIM), Iaşi.

CHIRICA C.-V. (1996) – Arta şi religia Paleoliticului superior în Europa Centrală şi Răsăriteană. *BAI VI*, Helios, Iaşi.

CHIRICA V. & BORZIAC I. (1992) – *La présence et l'utilisation du l'ivoire dans le Paléolithique du SE de l'Europe*. Dans: Le travail et l'usage de l'ivoire au Paléolithique supérieur, *Actes du Col. Int.*, Ravello, p. 199–210.

CHIRICA V., BORZIAC I. & CHETRARU N. (1996) – *Gisements du Paléolithique supérieur ancien entre le Dniestre et la Tissa. BAI* V, Iasi.

CHIRICA V. & BORZIAC I. (2009) – *Gisements du Paléolithique supérieur récent entre le Dniestre et la Tissa*, BAI XXII (ed. PIM), Iaşi.

DEMARS P.-Y. (1996) – Démographie et occupation de l'espace au Paléolithique supérieur et au Mésolithique en France. *Préhistoire Européenne* 8 : 3–26.

DJINDJIAN FR., KOZLOWSKI J. & OTTE M. (1999) – *Le Paléolithique supérieur en Europe*. A. Colin, Paris.

DJIANDJIAN FR. (2002) – Ruptures et continuités dans les industries du maximum glaciaire en Europe centrale et orientale : la question de l`Épigravettien. Dans : A. Sinitsyn, V. Sergin & J. Hoffecker (eds), *Trends in the Evolution of the East European Palaeolithic. Kostenki in the context of the Palaeolithic of Eurasia*. Ser. Research 1, Saint-Petersburg.

FLOSS H. (1991) – Sur l'approvisionnement des matières premières au Magdalénien et Paléolithique final en Rhénanie (Bassin de Neuwied). Dans : A. Montet-White (dir.), *Les Bassins du Rhin et du Danube au Paléolithique supérieur. Environnement, habitat et systèmes d'échange*. Liège, ERAUL 43 : 103–113.

HAESAERTS P., BORZIAK I., CHIRICA V., DAMBLON F., KOULAKOVSKA L. & VAN DER PLICHT J. (2003) – The East-Carpatian loess record : a reference for the midlle and late Pleniglacial stratigraphy in Centrale Europe, *Quaternaire* 14(3).

HAESAERTS P., BORZIAK I., CHIRICA V., DAMBLON F., KOULAKOVSKA L. (2004) – Cadre stratigraphique et chronologique du Gravettien en Europe Centrale. In : J.A. Svoboda, L. Sedlakova (eds.), *The Gravettian along the Danube*. Proceeding of the Miculov Conference, Brno.

HAESAERTS P. (2007) – Mitoc Malu-Galben : cadre stratigraphique et chronologique de Mitoc-Malu Galben, (Roumaine). Dans : M. Otte, V. Chirica & P. Haesaerts (eds.), *L'Aurignacien et le Gravettien de Mitoc Malu Galben*, Liège, ERAUL 72.

MOROSAN N.N. (1938) – Le Pléistocène et le Paléolithique de la Roumanie du Nord-Est (Les dépôts géologiques, leur faune, flore et produits d'industrie). In : *Anuarul Institutului Geologic al României* XIX, Bucureşti.

NOIRET P. (2009) – *Le Paléolithique supérieur de Moldavie. Essai de synthèse d'une évolution multiculturelle*. Liège, ERAUL 121.

OTTE M. & CHIRICA V. (1993) – *Atelier aurignacien à Malu Galben-Mitoc (Moldavie). Préhistoire Européenne* 3 : 55–66.

OTTE M., NOIRET P., CHIRICA V. & BORZIAC I. (1996) – *Rythme évolutif du Gravettien Oriental*. Forli, XIII *Congrès UISPP 6*.

OTTE M., NOIRET P., LOPEZ-BAYON I., BORZIAC I. & CHIRICA V. (1996) – *Recherches sur le Paléolithique supérieur de la Moldavie. Archéologie et Préhistoire*, Bull. Soc. Royale Anthropologie et Préhistoire, Bruxelles, p. 107.

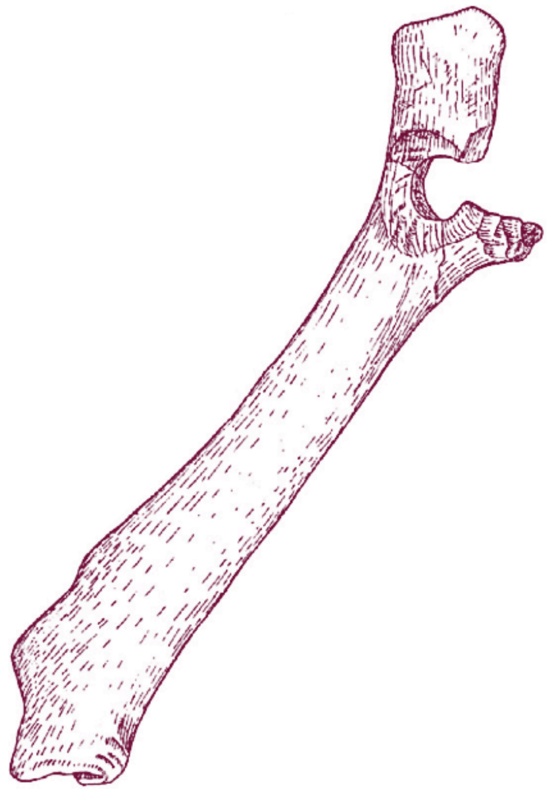
OTTE M., CHIRICA V. & HAESAERTS P. (2007) – *L'Aurignacien et le Gravettien de Mitoc Malu Galben*. Liège, ERAUL 72.

PAUNESCU AL. (1998) – Paleoliticul şi epipaleoliticul de pe teritoriul Moldovei cuprins între Carpaţi şi Siret. *Studiu monographic*, vol. I/1, Ed. Satya Say, Bucureşti.

PAUNESCU AL. (1999) – Paleoliticul şi Mezoliticul de pe teritoriul Moldovei cuprins între Siret şi Prut. *Studiu monografic*, vol. I/2, Ed. Satya Say, Bucureşti.

RENAUT-MISKOVSKY & MOIGNE A.-M. (1989) – La reponse des faunes et des flores aux variations climatiques. Dans : J.-P. Mohen (dir.), *Le Temps de la Préhistoire*, tome II, Soc. Préh, Fr. Ed. Archeologia, p. 60–64.

VIALOU D. (2005) – *Territoires : sédentarités et mobilités*. ERAUL 111 : 75–86.



The great North Black Sea region Early Upper Paleolithic and human migrations into the region from different territories

Yuri E. DEMIDENKO

"Methodologically, the absence of a continental or even intercontinental view restricts the scope of many archaeological interpretations and hinders their scientific evaluation. Archaeology, like geology and astronomy, is not an experimental science but must rely on controlled comparisons to evaluate hypotheses and isolate causes. When such comparisons are too local, control of many variables, especially those which transcend or transgress regions, is lost".

M. Otte & L.H. Keeley, 1990:582

Abstract: The Great North Black Sea region envelopes very most of the south of Eastern Europe. The Early Upper Paleolithic (EUP) starts at ca. 36 ky BP uncalibrated and Late Middle Paleolithic (LMP) only survives until ca. 36 – 35 ky BP uncalibrated there. The EUP period in Great North Black Sea region (ca. 36 – 28 000 BP uncalibrated) is represented by a series of various industries: "Eastern Szeletian" and "Streletskaya culture", Proto-Aurignacian, Southern Caucasus EUP, Late / Evolved Aurignacian, Levantine Aurignacian A, B & C types. The conducted comparative analyses allowed me to propose the following 8 (eight) EUP human migrations into the Great North Black Sea region: from the North, from East European Plain – for "Eastern Szeletian" and "Streletskaya culture" migration; from the West, from Europe – for two Proto-Aurignacian and one Late / Evolved Aurignacian migrations; from the South, from Caucasus – for Southern Caucasus EUP migration; from the South, from the Levant – for Levantine Aurignacian A, B & C migrations. As a result, the south of Eastern Europe was indeed a crossroad for a "crowd" of various EUP human communities.

Key-Words: Great North Black Sea region, Early Upper Paleolithic (EUP), "Eastern Szeletian", Proto-Aurignacian, Southern Caucasus EUP industry, Late / Evolved Aurignacian, Levantine Aurignacian A, B & C industry types.

1 INTRODUCTION

The present paper aims to discuss Early Upper Paleolithic data for the south of Eastern Europe aiming to show some comparable to the known in the region industries archeological materials in other territories, that could serve as indicators of some multidirectional human migrations into the discussing region.

Geographically, the south of Eastern Europe is actually the so-called Great North Black Sea region that formed a rather continuous belt of land in southern Eastern Europe, extending from eastern Balkans in the west to north-western Caucasus in the east, during most of the Würmian Interpleniglacial (Demidenko 2008). It was because of considerable lowering of the level of the Black Sea which was possibly down even to 60 meters comparing with its present day level (**figure 1**). The southern margins of the region were characterized by the total or partial absence of the water-filled basins of the modern Gulf of Odessa and Sea of Azov, among other marine features. Here it should also need to keep in mind that these water-filled basins were never very deep, except of Last Interglacial and only some Holocene periods. For example, the modern Kerch Strait, dividing Kerch peninsula of eastern Crimea and Taman peninsula of north-western Caucasus and being from 4,5 to 15 km wide with a maximum deep 18 meters at present time, was traditionally called by antique Greeks a "cow's ford / passing" ca. 2 000 years ago because of really shallow water there. The Crimea was not the modern peninsula at the Würmian Interpleniglacial but merely formed the central southernmost terrestrial area of the region connected to areas further west and east by the Danube and Kuban rivers (flowing from west to east and east to west respectively). For this reason, the Great North Black Sea region should definitely be included in any discussion of the eastern extension of the Early Upper Paleolithic "Danube Corridor" hypotheses (see Conard & Bolas 2003). Moreover, the terrestrial connection in between Crimea and north-western Caucasus and an easy access from the Caucasian territories into Crimea through Kuban river

FIGURE 1 Site location map of the Great North Black Sea region Early Upper Paleolithic.

valley does not exclude some Paleolithic human group penetrations into Crimea from the east either. Furthermore, the studied region is bounded to the north by various Eastern European upland chains along the courses of the Dniester, Southern Bug, Dnieper and Don rivers that also allow us to suggest some possible human movements into the region from the north following the river valleys during various Paleolithic periods.

Accordingly, the region's Early Upper Paleolithic record should be discussed not separately by an area but in common for a required better understanding of complex Paleolithic cultural processes there.

2 SOME NEWLY PROPOSED CHRONOLOGICAL AND ARCHEOLOGICAL DATA FOR LATE MIDDLE PALEOLITHIC (LMP) – EARLY UPPER PALEOLITHIC (EUP) TRANSITIONAL PERIOD IN THE GREAT NORTH BLACK SEA REGION

Now a new interpretation is on a way of development by the present author for the above-noted transitional period in the region. It significantly changes the previous 2000s concept proposed by Chabai (2000, 2003, 2004, 2008, 2011a) and also supported by me (e.g. Demidenko 2008, 2008–2009, 2012a). Briefly, the 2000s concept can be represented as follows. The region's LMP – EUP transitional period has been proposed to be viewed as a geochronological coexistence of two LMP and three EUP industries during the time interval in between ca. 32 and 28 ky BP (all dates given are uncalibrated) with its internal subdivision into two stages. The EUP industries were represented by so-called Szeletian *sensu lato* ("Eastern Szeletian" and "Streletskaya culture") industry's complexes starting from the 1st transitional stage, while two Early and Late Aurignacian complexes of Krems-Dufour industries / Proto-Aurignacian with Dufour microliths and Late / Evolved Aurignacian with Roc de Combe microliths have been only related to the 2nd transitional stage. At the same time, both LMP industries (Levallois-Mousterian and Micoquian) seemed well survived the whole transitional period, including its 2nd stage up to 28 ky BP. Thus, the transitional period has been seen as a "melting pot" of various LMP and EUP hominins in the region during no less than 4 ky radiocarbon years.

Now using new and/or reconsidering before received different interdisciplinary data and reliable uncalibrated AMS dates, as well as proposing some new archeological interpretations, for the region's three key sites containing both LMP and EUP components in Crimea (Siuren I rock-shelter and Buran-Kaya III grotto) and north-western Caucasus (Mezmaiskaya cave), the following industrial-geochronological EUP sequence can be suggested:

"Eastern Szeletian" in eastern Crimea

2.1 Stadial in between Hengelo and Huneborg / Les Cottes interstadials – Buran-Kaya III grotto, level C with radiocarbon age no younger 36 ky BP uncalibrated. Before the Buran-Kaya III "Eastern Szeletian" level C was related to the younger time period of Huneborg stadial preceding the Arcy interstadial, ca. 32 ky BP.

Proto-Aurignacian in western Crimea

2.2 Stadial in between Hengelo and Huneborg interstadials – Siuren I, Unit H and Huneborg interstadial – Siuren I, Unit G with radiocarbon age certainly older received AMS dates around 31 – 28 ky BP, possibly approaching ca. 36 ky BP as the European well-dated Proto-Aurignacian sites. Before the Siuren I Proto-Aurignacian Units were considered to be no older Arcy interstadial, ca. 30 ky BP.

2.3 Southern Caucasus EUP industry in both eastern Crimea and north-western Caucasus

Huneborg stadial – Buran-Kaya III, levels 6–5 through 6–2 (Crimea) and Mezmaiskaya cave, levels 1C and 1B (north-western Caucasus) and Arcy and Maisières interstadials – Buran-Kaya III, levels 6–1 and 5–2 (Crimea) and Mezmaiskaya cave, level 1A (north-western Caucasus), radiocarbon age in between ca. 35 – 31 ky BP and then around 28 ky BP (see new dates in: Prat *et al.* 2011; Golovanova *et al.* 2010a; Pinhasi *et al.* 2011). Before the Crimean Buran-Kaya III Southern Caucasus EUP industry from lower 6 levels (6–5, 6–4 & 6–3) was archeologically related to Aurignacian *sensu lato*, ca. 27 – 19 000 years BP, and from upper 6 levels (6–2 & 6–1) and level 5–2 were archeologically connected to Epigravettian, ca. 19 – 14 000 years BP (e.g. Yanevich 2000; Yanevich *et al.* 2009). Before the Caucasian Mezmaiskaya Southern Caucasus EUP industry was basically archeologically discussed as belonging to Levantine Early Ahmarian for the time range in between ca. 34 and 28 ky BP (e.g. Golovanova *et al.* 2006), although recently the Mezmaiskaya cave investigators started to underline more and more archeological similarities with EUP assemblages from Dzudzuana cave and Ortvala Klde rock-shelter located in western part of southern Caucasus (Golovanova *et al.* 2010a; 2010b), or well relating to *"characteristics of Epigravettian in the south of Eastern Europe"* (Chabai 2004:277). In this paper it is thus proposed to treat the Upper Paleolithic assemblages from the Crimean and north-western Caucasus sites as one and the same EUP industrial unit. The unit's already proposed name will be explained below during its discussion with the above-noted and some other sites with EUP assemblages known in southern Caucasus.

2.4 Late / Evolved Aurignacian in western Crimea

Arcy and Maisières interstadials – Siuren I, Unit F, radiocarbon age ca. 31 – 29 ky BP on ungulate bone samples and ca. 28 – 26.5 ky BP on bone artifact samples (Demidenko & Noiret 2012a; Demidenko *et al.* in preparation). Before the Siuren I Late / Evolved Aurignacian was archeologically considered the same but with radiocarbon dates only around 28 ky BP.

As a result, chronology for all the four now (sic!) EUP industries and industrial attribution for one of the EUP industries became older and different, both chronologically and archeologically. At the same time, the LMP (Micoquian of Kiik-Koba type) levels and/or separate finds at the two Crimean sites with EUP levels can be geochronologically connected to stadial in between Hengelo and Huneborg interstadials (Siuren I, Unit H) and to Huneborg interstadial (Siuren I, Unit G; Buran-Kaya III, layer B).

Following the EUP and LMP geochronology for Buran-Kaya III and Siuren I, it seems enough reasonable to suggest that Late Micoquian can be no younger Les Cottes / Huneborg interstadial (ca. 36 ky BP) but still geochronologically coexisting with both "Eastern Szeletian" and Proto-Aurignacian industries, while the Southern Caucasus EUP industry and Late / Evolved Aurignacian with Roc de Combe microliths were not coexisting with Micoquian. The latter possible situation well corresponds to the north-western Caucasus Mezmaiskaya cave archeolgical sequence where Micoquian level sequence seems to be ending during Les Cottes / Huneborg interstadial (see in Pinhasi *et al.* 2011).

If the new geochronology version for LMP – EUP interface at two key Crimean sites for the transitional period (Siuren I rock-shelter and Buran-Kaya III grotto) is correct, then the 2000s concept should definitely go through significant changes. First, both "Eastern Szeletian" and Proto-Aurignacian appeared in Crimea at about the same time and there is even a possibility that Proto-Aurignacian *Homo sapiens* of Siuren I, Unit H did come to Crimea before the Szeletians and we still do not have any clear signs who were anthropologically the Szeletian people, although the present author prefers to suggest that they were *Homo sapiens*, too. Then, Late Micoquian Neanderthals were coexisting with the Szeletians and Proto-Aurignacians and people of the three industries did not survive in both western (Siuren I) and eastern (Buran-Kaya III) Crimea until appearance of both Late / Evolved Aurignacian and Southern Caucasus EUP industry *Homo sapiens*. From the anthropological point of view, we do not have actual human remains directly associated with the Siuren I Late / Evolved Aurignacian finds but only *Homo sapiens* are the only possible candidates for the industry's human makers, according to the all known physical anthropology data, while the Buran-Kaya III Southern Caucasus EUP industry was certainly of *Homo sapiens* work (Prat *et al.* 2011).

At the same time, no one archeological level at Siuren I and Buran-Kaya III did not contain Levallois-Mousterian cultural remains, remembering also their complete absence in north-western Caucasus, why their persistence in Crimea during subsequent Huneborg stadial and Arcy interstadial cannot be excluded, according to the 2000s concept (e.g. Chabai 2008, 2011a). On the other hand, stated by the 2000s concept presence of Late Micoquian Neanderthals at some other Crimean sites during Huneborg stadial and Arcy interstadial should be crosschecked. The indicative case with Siuren I, Units H & G AMS dating with too young results in ca. 31 – 28 kyr BP because of collagen problems in animal bone samples can also occur at some other Crimean AMS dated sites (e.g. Kiik-Koba grotto, upper layer – see Demidenko & Uthmeier in press).

All in all, the 2010s new data and considerations do "open a door" for a new geochronology and industrial structure for LMP – EUP transitional period in Crimea and north-western Caucasus influencing the whole region's respective data and interpretations.

3 LMP – EUP LOCAL CULTURAL CONTINUITY OR DISCONTINUITY IN THE REGION?

The above-discussed find complexes of the four Early Upper Paleolithic industries from the three Great North Black Sea region sites can also be added by five more sites still lacking secure geochronological data but, at the same time, having industrially indicative archeological assemblages: Biryuchiya Balka 2 open-air workshop site in Lower Don river area for Szeletian *sensu lato* ("Streletskaya culture"); Chulek I surface find spot in Lower Don river area for Proto-Aurignacian / Archaic Aurignacian, Kamennomostskaya cave, lower layer and Shyrokiy Mys surface find spot in north-western Caucasus for Proto-Aurignacian / Archaic Aurignacian; Gubski rock-shelter I, layer 2 in north-western Caucasus for Late / Evolved Aurignacain. Accordingly, the region's EUP data base becomes more variable and rich for further studies.

But before it is indeed needed to touch the question on a local cultural continuity or discontinuity for the region's LMP and EUP.

The Great North Black sea region LMP industries (Micoquian and Levallois-Mousterian in both Crimea and Lower Don river area, as well as still only Micoquian in north-western Caucasus) have to be considered as being local Middle Paleolithic industries underlying the transitional period from Middle to Upper Paleolithic there. Micoquian is known since the time of Last Interglacial period (ca. 120 000 years BP) and Levallois-Mousterian starts to occur at least from Hosselo stadial preceding Hengelo interstadial (no less than ca. 45 ky BP) (Chabai *et al.* 2005, 2006, 2008; Demidenko 2011a). Both of these LMP industries persist until the appearance of the different EUP industries in the Crimea but not in Lower Don river area and north-western Caucasus.

There are especially clear stratigraphy data for stating the geochronological coexistence of namely Micoquian, from the LMP side, and EUP human communities in the Crimea, when we have a co-occurrence of Micoquian and Proto-Aurignacian artifacts within one and the same levels of the 1920s excavations Lower layer and 1990s excavations Units H and G at Siuren I rock-shelter in western Crimea (Demidenko 2000, 2012b) and the Buran-Kaya III grotto situation where "Eastern Szeletian" level C is actually deposited below *(sic!)* Middle Paleolithic Micoquian layer B (see in: Chabai *et al.* 2004). On the other hand, Late Levallois-Mousterian human groups' geochronological coexistence with EUP humans in the Crimea and Lower Don river area does not have yet similar to the Late Micoquian stratigraphical interstratification support. But Crimean Kabazi II site Late Levallois-Mousterian occupations are still associated with Huneborg stadial and Arcy interstadial identified through AMS radiocarbon and ESR dates in between 30 and 33 000 years BP and the respective pollen studies (see in: Chabai *et al.* 2006), although some additional confirmation for such geochronology would be still very desirable. Such data are really needed as still accepting so late dates for the Crimean Latest Levallois-Mousterian, there is the clear situation with the geochronological coexistence during Arcy and Maisières interstadials (ca. 31 – 29–28 ky BP) of still surviving Levallois-Mousterian human groups, probably Neanderthals, along with already appeared the latest *(sic!)* for the Great North Black Sea region EUP *Homo sapiens* bearing Late / Evolved Aurignacian with Roc de Combe microliths tradition in one and the same small region of western Crimea, known for two sites situated in two rather close one to another Alma (Kabazi II) and Belbek (Siuren I) river valleys.

But coming strictly to the local cultural LMP – EUP continuity / discontinuity subject, it has to be necessarily underlined that there are no real concrete archeological data for any cultural / industrial successions in between LMP and EUP industries in southern Eastern Europe and it was well initially shown by Chabai in the early 2000s (Chabai 2000, 2003, 2004; see also Chabai 2008, 2011a; Demidenko 2008).

Indeed, no one of the LMP industries can be generically connected to any EUP industry in the Great North Black sea region. That's because through all the available archeological data, we do not see presence of any Upper Paleolithic techno-typological traits within the considering Micoquian and Levallois-Mousterian assemblages (even their possible proto-types!) and vice versa – no any Middle Paleolithic techno-typological traits within the EUP assemblages, when we deal, of course, with industrially homogeneous assemblages (e.g. see in: Chabai *et al.* 2004, 2006, 2008; Demidenko 2000, 2012b). Additionally, there is an anthropological factor – the bearers of LMP traditions were Neanderthals, while makers of EUP industries were *Homo sapiens*, basing from all data are available at hand. Respectively, it is very hard even to imagine an anthropological human transition from a Neanderthal man to a *Homo sapiens* man, going together with no (sic!) archeologically visible industrial transformation(s) of LMP complexes into EUP ones in the region.

As a result, there is no other way than to consider all the above-mentioned four EUP industries as being brought into the Great North Black Sea region by their *Homo sapiens* bearers from somewhere and, as strictly archeological artifact data indicate, not from just one but from several geographically different regions.

4 EUP HUMAN MIGRATION INTO THE GREAT NORTH BLACK SEA REGION: THE PROPOSED SUGGESTIONS BASED ON ARCHEOLOGICAL DATA

Thinking on any possible Paleolithic archeological connections in between archeological assemblages situated in various regions and suggesting human migration hypotheses in cases when not just a single / a couple artifact types are similar, otherwise, it might be a convergence or diffusion case, it is really necessary to take into consideration the pointed out by Otte and Keeley yet 22 years ago a need in *"a continental or even intercontinental view"* for *"controlled comparisons"* escaping too local only considerations (see the paper's epigraph). Also, proposing human migrations in Paleolithic, it is good to remember about real geographical barriers that humans were not able to cross or bypass during some Paleolithic epochs but were able to do it during other Paleolithic epochs. Additionally, an initial human migration from one region into another region(s) is also assumed through either the earliest dated such industry in a region or a suggestion on local origin of such industry in a region. On the other hand, absence of any archeological data on a local origin of such industry in a region is logical to view as a place where humans have moved from a source migration region. All "human migration conditions" are in a good correspondence with the present-day EUP record in the Great North Black Sea region.

Coming back to the paper's strict subject, the following directions for EUP human migrations into the regions are assumed now (**figure 2**).

Northern direction is associated with *"Streletskaya culture"* people movements from central part of Eastern Europe (Kostenki in Middle Don river area) down to Lower Don river area (Biryuchiya Balka 2 site) and further south to Crimea (Buran-Kaya III grotto, level C) (Demidenko 2008). There are the following similar features for the two Szeletian *sensu lato* industries (Crimean "Eastern Szeletian" and "Streletskaya culture") in Eastern Europe: absence of any true blade core reduction why blades are either totally or nearly absent being just accidental cases there; the common undeveloped core reduction methods (mainly, parallel rather primitive ones) that's why flakes and many flint plaquettes and even chunks were used for tool production; the common both occurrence of serial fan-shaped end-scrapers and, at the same time, nearly absence of any burins; presence of numerous bifacial points manufactured through Upper Paleolithic "bi-convex" manner and used soft-hammer technique with even sometimes additional pressure technique applied for finalizing a bifacial point fabrication that puts the discussing EUP bifacial tools in the same technological row with, however, chronologically much later Solutrean and Clovis bifacial point production manners and techniques; bifacial tool production was also leading to removing of flakes and chips that were then very often used as blanks for production of small-sized (!) bifacial and partly-bifacial points (the "Streletskaya culture" case) and partly-bifacial trapezes (the Buran-Kaya III case). Basically, the only typological difference for the discussing two East European Szeletian industries is restricted to presence of serial large-sized and small-sized bifacial / partly-bifacial triangular points with a concave base in "Streletskaya culture" assemblages and their absence (in the strict typological sense in the Crimean assemblage), although the partly-bifacial trapezes with a concave base can be well viewed as a modification (sub-type) of the Streletskaya small-sized points with a concave base (see in: Chabai 2004, fig. 8–3 on p. 275; 2011b, fig. 6 on p. 140).

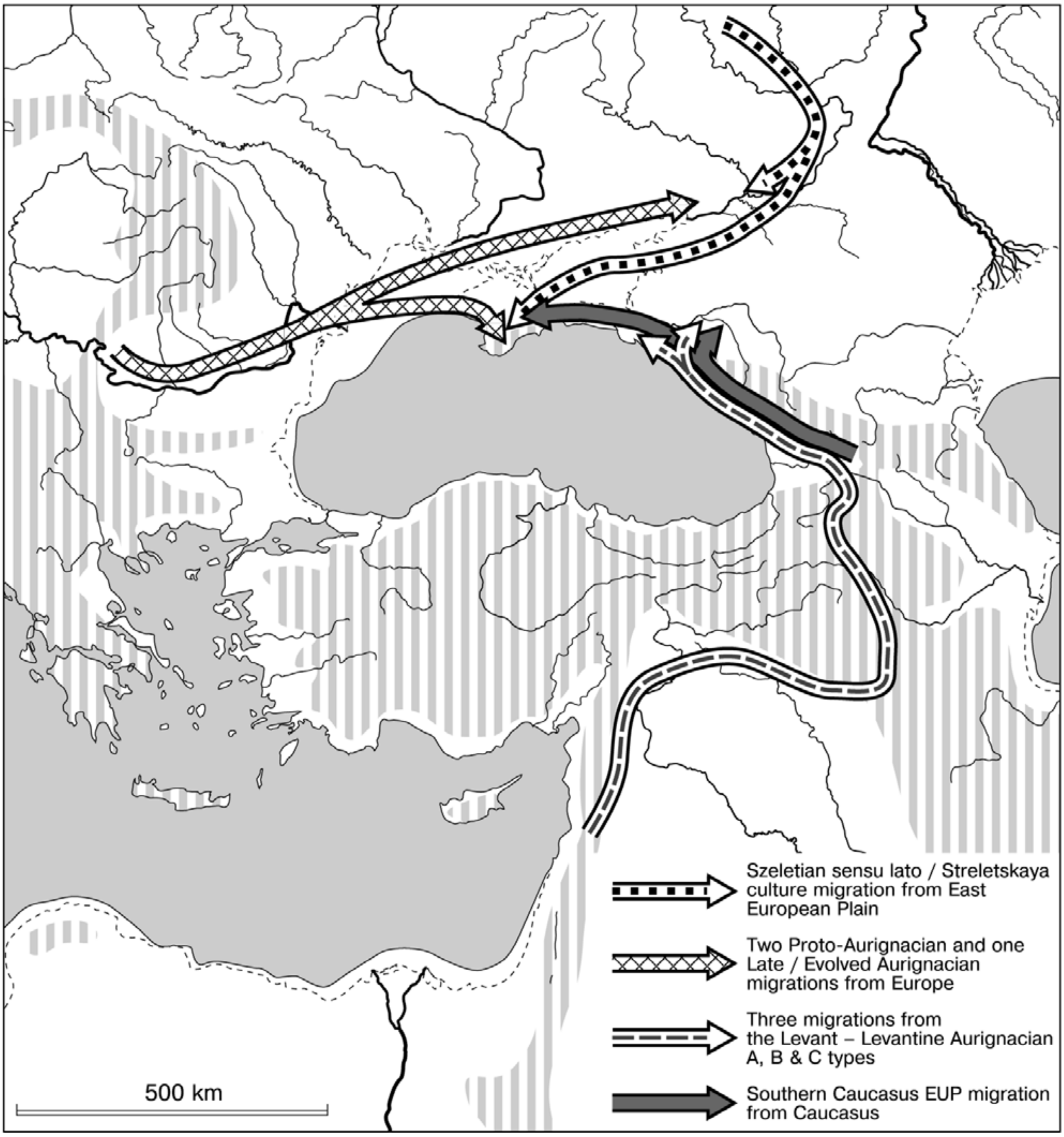


FIGURE 2 The proposed human migration directions into the Great North Black Sea region during Early Upper Paleolithic time period.

All the above-represented techno-typological data allow me to support the discussing human migration idea from Don river areas to the south, into Crimea, during a stadial (continental!) climate conditions in between Hengelo and Huneborg / Les Cottes interstadials, why some "Streletskaya culture" people had to move to the south for survival. By the way, it is of interest to note that the East European "Eastern Szeletian" / "Streletskaya culture" tradition to manufacture small-sized bifacial and partly-bifacial points on flakes and chips originating from large-sized bifacial point production and rejuvenation processes was also well noted by me in 1990 during studies of concrete materials coming from famous Szeletian Moravany-Dlha site at Nitra Archeological Institute and Piestany museum in Western Slovakia, excavated in 1943 by L. Zotz and in 1946 by K. Absolon (see Barta 1960), having numerous bifacial and partly-bifacial "bi-convex" points with a convex rounded base, so-called "Moravany-Dlha leaf points of poplar type". Accordingly, such bifacial and partly-bifacial point making tradition with some shape variability for the points can be regarded as a common feature for a series of Szeletian industries in both Central and Eastern Europe.

Western direction is connected to *European Proto-Aurignacians* migrations to Crimea (Siuren I, Units H & G) and Lower Don river area (Chulek I) and *European Late / Evolved Aurignacians* with Roc de Combe microliths to Crimea (Siuren I, Unit F) (e.g. Demidenko 2000–2001, 2004, 2008, 2008–2009, 2009, 2011a, 2011b, 2012c, 2012d; Demidenko & Otte 2000–2001, 2007; Demidenko & Noiret 2012b).

According to artifact characteristics, *European Proto-Aurignacian Homo sapiens* penetrated into the southern territories of Eastern Europe in a view of two its *Homo sapiens* groups. One Proto-Aurignacians' group that is known for Siuren I respective Units H and G materials in Crimea does represent industrially the so-called classical European Proto-Aurignacian assemblages, like from Cueva Morin (Cantabria, Spain) in Western Europe and Krems-Hundssteig (Lower Austria) in Central Europe, taking just two good European comparable examples, is characterized, first of all, by numerous carinated cores and end-scrapers but not at all or very few carinated burins and also serial Dufour bladelets of Dufour sub-type and Font-Yves / Krems points. Another Proto-Aurignacians' group is recognized through Chulek I artifacts in Lower Don river area. In addition to the above-described common European Proto-Aurignacian features, the Chulek I assemblage shows a peculiar secondary modification of microliths – their basal ventral thinning, traced on 11 from all 39 microliths there (28.2 %). Such microlith basal ventral thinning yet 10 years ago I called *"Chulek I type"* (Demidenko 2000–2001:151) and showed its presence in such famous Proto-Aurignacian complex as Fumane grotto in Italy (Bartolomei *et al.* 1992, fig. 24:22–23; fig. 26:21, 27; see also Broglio *et al.* 2005, fig. 9, 30–35, 37, 39).

The appearance of *Homo sapiens*, bearing two possible sub-types of the European Proto-Aurignacian in the Great North Black Sea region (Crimea and Lower Don river area) could be explained through general occupation of southern European territories by the Proto-Aurignacian humans before Arcy interstadial (ca. 30 ky BP), where very most of their known sites are located in the same southern geographical band in Europe – somewhat between 40° N latitude and 46° N latitude. The seemingly only two exceptions in Central and Eastern Europe (Krems-Hundssteig and Chulek I) mark the northern extension of the Proto-Aurignacian to around 48° N latitude, that can be still explained as being within the range of a single common human adaptation system materially expressed by one basic flint and bone treatment and use tradition for survival in temperate climate of south European foothill forest and varying steppe landscapes with hunting of different ungulate species possibilities and access to river and/or sea aquatic resources.

European Late / Evolved Aurignacians with Roc de Combe microliths are well registered on the respective materials of Siuren I Unit F having the "complete package" of all carinated types' of pieces – cores, end-scrapers and burins (including busque ones), as well as numerous Dufour and pseudo-Dufour microblades of Roc de Combe sub-type. Exactly the same assemblages and at the same time range (ca. 31 – 28 000 years BP – Arcy and Maisières interstadials) are known in Western Europe where the Roc de Combe microliths and all the objects from which their blanks were flaked (carinated cores, end-scrapers and burins) have been actually identified. In contrast to the European Proto-Aurignacian, the Late / Evolved Aurignacian is not restricted to just southern territories in Europe, being well known throughout almost all the Europe for the noted time period.

At the same time, its particular variant with Roc de Combe microblades, because of site taphonomy, function and excavation techniques, is of rather rare occurrence, why the significance of the Siuren I, Unit F materials is so important, showing also dispersal of *Homo sapiens* of this type of Late / Evolved Aurignacian into the Great North Black sea region, too.

Southern direction is represented by 4 (four!) possible waves of EUP human migrations into the Great North Black sea region.

First migration wave (Demidenko 2008–2009, 2009, 2011a, 2011b, 2012c, 2012d; Demidenko & Noiret 2012b) is suggested for Archaic Aurignacians of Levantine Aurignacian A or Ksar Akil Phase 3 (see Williams & Bergman 2010), the best known on materials from the 1930s excavations levels XII and XI at Ksar Akil rock-shelter in Lebanon, also added by assemblages from Umm el Tlel, secteur 2, locus Sud-Ouest, couche 14'b'; secteur 2, locus Nord, couche II2b; secteur 5, couche P1c (see Ploux & Soriano 2003) and now also related to this industry type by me materials from Yabrud II, layer 3 in Syria and possibly lower levels of layer C at Shanidar cave in Zagros (Solecki 1955; Otte & Kozlowski 2007). The techno-typologically well comparable to them materials do originate from Kamennomostskaya cave, lower layer (north-western Caucasus, Russia) (Demidenko 2000–2001). Their common features are as follows: blade / bladelet core reductions, rare carinated end-scrapers, while carinated burins and lateral carinated pieces (!) are serially represented, why the microliths, bearing mostly dorsal retouch, often have twisted profiles and off-axis orientation.

Second migration wave (Demidenko 2008–2009, 2009, 2011a, 2011b, 2012c, 2012d; Demidenko & Noiret 2012b) is proposed to be viewed again for *Archaic Aurignacians* but of industrially different type – Levantine Aurignacian B or Ksar Akil Phase 4 (see Williams & Bergman 2010), and again the best expressed by materials from the 1930s excavations level X at Ksar Akil rock-shelter in Lebanon, as well as some other Lebanese materials from Antelias cave, level IV and Abu Halka cave, level IVc (see Azoury 1986; Bergman 1981, 1987, 2003). Much similar to these Lebanese assemblages are finds of Early Zagros Aurignacian (like the ones from Yafteh cave, levels 23 – 15) in Iran (see Otte & Kozlowski 2007; 2009; Otte *et al.* 2007; Bordes & Shidrang 2009) and Archaic Aurignacian finds from Shyrokiy Mys in north-western Caucasus, Russia (Shchelinsky 2007). There are the following uniting industrial features for the 3 assemblage groups here: numerous carinated cores and end-scrapers and a subordinate position of carinated burins for the Levantine assemblages and their nearly absence in the Zagros and north-western Caucasus assemblages, a small number of alternately and ventrally retouched microliths, including some "Abu Halka / El Wad variant" points with partial ventral retouch at proximal end (*sensu* I. Azoury and C. Bergman), many pointed bladelets and a majority of other dorsally retouched microliths with either projectile distal damage or Ouchtata fine retouch.

Third migration wave (Demidenko 2009) is possibly associated with *Late / Evolved Aurignacians* of Levantine Aurignacian C or Ksar Akil Phases 6 & 7 (see Williams & Bergman 2010) with lateral carinated pieces, as well as with carinated cores, end-scrapers and burins, to north-western Caucasus (Gubski rock-shelter I, layer 2) (see Amirkhanov 1986). It has to be made a reservation regarding the Cubski rock-shelter materials and their inclusion into the human migration hypothesis here. The rock-shelter's artifacts are stored in Maikop town (Republic of Adygea, north-western Caucasus, Russia) and only these EUP materials from the Great North Black Sea region were not studied by me personally, why published information was only used.

Finally, *fourth southern migration wave* was just proposed during the Liege May 2012 conference (Demidenko 2012e) for again newly defined industry in eastern Crimea and north-western Caucasus. Accordingly, it is suggested the Southern Caucasus EUP industry people movement from north-western Caucasus (Mezmaiskaya cave, levels 1C through 1A – dates between 33 – 28 ky BP) into eastern Crimea (Buran-Kaya III grotto, levels 6–5 through 6–1 & 5–2 – dates between 34 – 30 ky BP). The Caucasian and Crimean assemblages are similar by: flint artifacts – technologically, predominant primary reductions of both unidirectional bladelet cores and multifaceted (not carinated!) burins producing numerous incurvate and also often twisted narrow bladelets and especially microblades, and, typologically, a great prevalence of "non-geometric microliths" with a fine backed dorsal retouch where up to a half of them or even more is represented by points and among them occur many points with bilateral fine retouch; bone tools – numerous points and awls; personal ornaments – different and serial perforated shells, mammal teeth and even mammoth ivory beads (see Yanevich *et al.* 2009; Prat *et al.* 2011; Golovanova *et al.* 2006, 2010a, 2010b).

My migration idea for the discussing north-western Caucasus and eastern Crimean EUP industry humans (remembering here on *Homo sapiens* remains found in 2001 by A. Yanevich in level 6–1 at Buran-Kaya III grotto – Prat *et al.* 2011) further becomes more interesting as before colleagues working in northern and southern Caucasus also established a significant similarity in between the Mezmaiskaya materials and two sites in Southern Caucasus, western Georgia (Dzudzuana cave, layer D, dates between 32 – 27 ky BP; Ortvala Klde rock-shelter, layers 4d and 4c, dates between 38–34 – 30 ky BP) (Adler *et al.* 2008, Adler 2009; Golovanova et al 2010a; 2010b; Bar-Yosef *et al.* 2011; see also Bar-Ysofe *et al.* 2006). Moreover, one more site with similar EUP artifacts was reported by A. Kandel during the Liege May 2012 conference from Southern Caucasus but in southern Armenia, Aghitu 3 cave, with dates between 30 and 28 ky BP (Kandel *et al.* 2011, 2012; see also this volume). Having no any industrial roots for such EUP industry in Crimea and north-western Caucasus, as well as seemingly in the whole Eastern Europe, presence of the similar assemblages in Georgia and Armenia with some possible indications on the industry's survival later on there and, at the same time, possible presence of some more similar assemblages at very newly excavated sites in different regions of Iran (e.g. Ghar-e Boof cave, AH IV – III with radiocarbon dates in between ca. 37 – 31 ky BP – see Conard & Ghasidian 2011; Garm Roud 2 open-air site with a radiocarbon date ca. 30 – 29 ky BP – see Berillon *et al.* 2009), indeed allows me to name tentatively the industry as the Southern Caucasus EUP one and to propose its human bearers' migrations from southern to northern Caucasus and not *vice versa* direction. So, it is suggested to explain presence of the Buran-Kaya III EUP industry in eastern Crimea as a result of human migrations from southern Caucasus via north-western Caucasus to the Crimea, having even possibly its roots further to the south, remembering about the new discoveries in Iran.

5 SHORT CONCLUDING REMARKS

In total, there are suggested (**figure 2**) one human migration from the north, three human migrations from the west and four human migrations from the south for the Great North Black Sea region Early Upper Paleolithic.

Finally, now the geochronological sequence of the EUP industries and its peculiarities in the Great North Black Sea region are assumed to be as follows.

The "Eastern Szeletian" and Proto-Aurignacian humans surely geochronologically coexisted with Micoquian Neanderthals in eastern Crimea (Buran-Kaya III grotto's data) and western Crimea (Siuren I rock-shelter's data). These industries' time period might be connected to occupational hiatuses of archeologically sterile both level D between Late Micoquian and Southern Caucasus EUP industry levels at Mezmaiskaya cave and geological levels 13 through 9 between Late Micoquian archeological layer 1 and Late / Evolved Aurignacian archeological layer 2 at Gubski rock-shelter I in north-western Caucasus. Accordingly, the Southern Caucasus EUP and Late / Evolved Aurignacian humans were, high likely, living in the region with no any geochronologically contemporaneous for them Micoquian Neanderthals in between ca. 36–34 and 28 000 BP. At the same time, the geochronological positions of Levantine Aurignacian A-like materials from Kamennomostskaya cave, lower layer and Levantine Aurignacian B-like materials from Shyrokiy Mys site in north-western Caucasus still remain unclear within the region's EUP sequence.

Anyway, having such a "crowd" of different LMP and especially EUP human groups in the Great North Black Sea region, there is again, however, no one evidence on presence of any archeologically recognizable features due to mutual influence in artifact materials of the contemporary industries. Indeed, humans of no one either LMP or EUP industry borrowed any other industry's traits. Therefore, the term geochronological coexistence (Demidenko 2008) for Micoquian, "Eastern Szeletian" and Proto-Aurignacian industries in Crimea at best reflects the situation of probable movement of different human groups around with many chances not to meet each other in the region. As a result, any acculturation processes have been not noted there.

So, it is again, as already in the 2000s, but in a more detailed way possible to conclude that the south of Eastern Europe acted as a crossroad for migration routes of many EUP hominins making very complex the human history at that time there.

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REFERENCES

ADLER D.S. (2009) – Cultural, behavioral, and biological discontinuities at the Middle-Upper Paleolithic transition in the southern Caucasus. In: J.J. Shea & D.E. Lieberman (eds.), *Transitions in prehistory: essays in honor of Ofer Bar-Yosef*, Oxford, Oxbow Books, p. 143–164.

ADLER D.S., BAR-YOSEF O., BELFER-COHEN A., TUSHABRAMISHVILI N., BOARETTO E., MERCIER N., VALLADAS H. & RINK W.J. (2008) – Dating the demise: Neandertal extinction and the establishment of modern humans in the southern Caucasus. *Journal of Human Evolution* 55:817–833.

AMIRKHANOV KH.A. (1986) – *Upper Paleolithic of Kuban area*. Moscow, Nauka. (In Russian)

AZOURY I. (ED.) (1986) – *Ksar Akil, Lebanon: A Technological and Typological Analysis of the Transitional and Early Upper Palaeolithic Levels of Ksar Akil and Abu Halka*. Oxford, BAR International Series 289.

BARTA J. (1960) – K problemu listovitych hrotov typu Moravany-Dlha. *Slovenska Archeologia* (Bratislava) 8(2):295–324.

BARTOLOMEI G., BROGLIO A., CASSOLI P., CASTELLETTI L., CREMASCHI M., GIACOBINI G., MALERBA G., MASPERO A., PERESANI M., SARTORELLI A. & TAGLIACOZZO A. (1992) – La Grotte de Fumane : un site aurignacien au pied des Alpes. *Preistoria Alpina* 28:131–179.

BAR-YOSEF O., BELFER-COHEN A. & ADLER D.S. (2006) – The implications of the Middle-Upper Paleolithic chronological boundary in the Caucasus to Eurasian Prehistory. *Anthropologie* (Brno) 44:49–60.

BAR-YOSEF O., BELFER-COHEN A., MESHVILLIANI T., JAKELI N., BAR-OZ G., BOARETTO E., GOLDBERG P., KVAVADZE E. & MATSKEVICH Z. (2011) – Dzudzuana: an Upper Palaeolithic cave site in the Caucasus foothills (Georgia). *Antiquity* 85:331–349.

BERGMAN C.A. (1981) – Point types in the Upper Palaeolithic sequence at Ksar Akil, Lebanon. Dans : J. Cauvin & P. Sanlaville (eds.), *Préhistoire du Levant*. Paris, CNRS, p. 319–330.

BERGMAN C.A. (1987) – *Ksar Akil, Lebanon: a technological and typological analysis of the later Paleolithic levels of Ksar Akil. vol. II: levels XIII–VI*. Oxford, BAR international series 329.

BERGMAN C.A. (2003) – Twisted debitage and the Levantine Aurignacian problem. In: A.N.Goring-Morris & A. Belfer-Cohen (eds.), *More than meets the eye: Studies on Upper Palaeolithic Diversity in the Near East*. Oxford, Oxbow Books, p. 185–195.

BORDES J.-G. & SHIDRANG S. (2009) – La séquence Baradostienne de Yafteh (Khorramabad, Lorestan, Iran). In: M. Otte, F. Biglari & J. Jaubert (eds.), *Iran Paleolithic*. Oxford, BAR international series 1968, p. 85–100.

BROGLIO A., BERTOLA S., DE STEFANI M., MARINI D., LEMORINI C. & ROSSETTI P. (2005) – La production lamellaire et les armatures lamellaires de l'Aurignacien Ancien de la grotte de Fumane (Monts Lessini, Venetie). Dans : F. Le Brun-Ricalens (ed.), *Productions lamellaires attribuees a l'Aurignacien: chaines operatoires et perspectives technoculturelles*. ArcheoLogiques. T. 1. Luxembourg, Musee National d'histoire et d'art, p. 415–436.

CHABAI V.P. (2000) – The evolution of Western Crimean Mousterian industry. In: J. Orschiedt & G.-Ch. Weniger (eds.), *Neanderthals and Modern Humans – discussing the transition: central and Eastern Europe from 50 000 – 30 000 B.P.*, Mettmann, Neanderthal Museum, p. 196–211.

CHABAI V.P. (2003) – The chronological and industrial variability of the Middle to Upper Paleolithic transition in Eastern Europe. In: J. Zilhao & D. d'Errico (eds.), *The chronology of the Aurignacian and of the Transitional technocomplexes*. Lisboa, Trabalhos de Arqueologia 33, p. 71–86.

CHABAI V.P. (2004) – *The Middle Paleolithic of Crimea: stratigraphy, chronology, typological variability & Eastern European context.* Simferopol, Shlyakh. (In Russian)

CHABAI V.P. (2008) – Kabazi V in the context of the Crimean Middle Palaeolithic. In: V.P. Chabai, J. Richter & Th. Uthmeier (eds.) - Kabazi V: interstratification of Micoquian & Levallois-Mousterian camp sites, Simferopol – Cologne, Schlyakh, Palaeolithic Sites of Crimea 3(2):509–524.

CHABAI V.P. (2011a) – The chronological frames and environmental conditions of the Crimean Middle and Early Upper Paleolithic: the state of art. In: N.P. Gerasimenko (ed.), *Quaternary studies in Ukraine. To the XVIII congress of the INQUA, Bern 2011*. Kyiv, p. 140–157.

CHABAI V.P. (2011b) – The problem of Crimean Micoquian and Streletskaya culture specific tool types' similarity. In: K. Gavrilov (ed.), *The Paleolithic and Mesolithic of Eastern Europe. In honor of 60th anniversary of Khizri A. Amirkhanov*. Moscow, Institute of Archeology RAS, p. 119–140. (In Russian)

CHABAI V.P., MONIGAL K. & MARKS A.E. (EDS.) (2004) – *The Middle Paleolithic and Early Upper Paleolithic of Eastern Crimea*. Liège, ERAUL 104(3).

CHABAI V.P., RICHTER J. & UTHMEIER TH. (EDS.) (2005) – *Kabazi II: Last Interglacial occupation, environment & subsistence*, Palaeolithic Sites of Crimea 1, Simferopol – Cologne, Shlyakh.

CHABAI V.P., RICHTER J. & UTHMEIER TH. (EDS.) (2006) – *Kabazi II: the 70 000 years since the Last Interglacial*, Palaeolithic Sites of Crimea 2, Simferopol – Cologne, Schlyakh.

CHABAI V.P., RICHTER J. & UTHMEIER TH. (EDS.) (2008) – *Kabazi V: interstratification of Micoquian & Levallois-Mousterian camp sites*, Palaeolithic Sites of Crimea 3(2), Simferopol – Cologne, Schlyakh.

CONARD N.J. & BOLUS M. (2003) – Radiocarbon dating the appearance of modern humans and timing of cultural innovations in Europe: new results and new challenges. *Journal of Human Evolution* 44:331–371.

CONARD N.J. & GHASIDIAN E. (2011) – The Rostamian cultural group and the taxonomy of the Iranian Upper Paleolithic. In: N.J. Conard, Ph. Drechsler & A. Morales (eds.), *Between Sand and Sea. The Archaeology and Human Ecology of Southwestern Asia. Festschrift in honor of Hans-Peter Uerpmann*. Tuebingen, Kerns Verlag, p. 33–52.

DEMIDENKO YU.E. (2000) – "Crimean Enigma" – Middle Paleolithic artifacts within Early Aurignacian of Krems-Dufour complexes at Siuren I: alternative hypothesis for solution of the problem. *Stratum plus* (St.-Petersburg – Kishinev – Odessa - Bucharest) 1:97–124. (In Russian)

DEMIDENKO YU.E. (2000–2001) – The European Early Aurignacian of Krems-Dufour type industries: a view from Eastern Europe. *European Prehistory* 16–17:147–162.

DEMIDENKO YU.E. (2004) – Eastern Europe in the context of European Aurignacian problematic. *Archeological Almanac* (Donetsk) 16:161–194. (In Russian)

DEMIDENKO YU.E. (2008) – The Early and Mid-Upper Palaeolithic of the North Black sea region: an overview. *Quartaer* 55:91–106.

DEMIDENKO YU.E. (2008–2009) – East European Aurignacian and its Early / Archaic industry of Krems-Dufour type in Great North Black Sea region. *Praehistoria* (Miskolc) 9–10:149–182.

DEMIDENKO YU.E. (2009) – The Great North Black Sea region Aurignacian: an overview of common and particular industrial-chronological characteristics. Archeological Almanac (Donetsk) 20:159–186. (In Russian)

DEMIDENKO YU.E. (2011a) – The Late Middle Palaeolithhic and Early Upper Palaeolithic of the Northeastern and Eastern Edges of the Great Mediterranean (South of Eastern Europe and Levant): any archaeological similarities? In: J.-M. Le Tensorer, R. Jagher & M. Otte (eds.), *The Lower and Middle Palaeolitihic in the Middle East and Neighbouring Regions*, Proceedings of the Basel Symposium (May 8–10 2008). Liège, ERAUL 126:151–167.

DEMIDENKO YU.E. (2011b) – North Black Sea region Archaic Aurignacian complexes with different microliths and their role for Western Eurasia Aurignacian variability and origin studies. In: *Abstracts of European Society for the study of Human Evolution*, September 23 – 24, Leipzig, Germany, p. 26.

DEMIDENKO YU.E. (2012a) – Siuren I archaeological industrial sequence seen through the site's human occupation events. In: Yu.E. Demidenko, M. Otte & P. Noiret (eds.), *Siuren I rock-shelter. From Late Middle Paleolithic and Early Upper Paleolithic to Epi-Paleolithic in Crimea*. Liege, ERAUL 129:375–385.

DEMIDENKO YU.E. (2012b) – Interpretation of the Middle Paleolithic component in the Early Aurignacian Units H and G and the 1920s Lower Layer. In: Yu.E. Demidenko, M. Otte & P. Noiret (eds.), *Siuren I rock-shelter. From Late Middle Paleolithic and Early Upper Paleolithic to Epi-Paleolithic in Crimea*. Liege, ERAUL 129:321–331.

DEMIDENKO YU.E. (2012c) – Concluding considerations. In: Yu.E. Demidenko, M. Otte & P. Noiret (eds.), *Siuren I rock-shelter. From Late Middle Paleolithic and Early Upper Paleolithic to Epi-Paleolithic in Crimea*. Liege, ERAUL 129:389–401.

DEMIDENKO YU.E. (2012d) – North Black Sea Archaic Aurignacian and both Aurignacian industrial variability and origin questions. In: *The man in history and culture. In memoriam of V.N. Stanko* 2, Odessa, University Press, p. 141–152.

DEMIDENKO YU.E. (2012e) – North Black Sea region Early Upper Paleolithic and human migrations into the region from different territories. In: *Modes of contact and displacements during the Eurasian Palaeolithic. Colloque international dans le cadre de la commission 8 (Paleolithique superieur) de l'UISPP.* Universite de Liege (Belgique), 29–30–31 mai 2012, p. 19.

DEMIDENKO YU.E., NIGST PH., TALAMO S., NOIRET P., OTTE M., DAVIES W., AKHMETGALEEVA N.B., RICHARDS M. & HUBLIN J.-J. (IN PREPARATION) – AMS ^{14}C dating of bone samples for the Micoquian and Proto-Aurignacian, and Late / Evolved Aurignacian interfaces at Siuren I, Crimea (Ukraine).

DEMIDENKO YU.E. & OTTE M. (2000–2001) – Siuren I (Crimea) in the context of a European Aurignacian. *European Prehistory* 16–17:133–146.

DEMIDENKO YU.E. & OTTE M. (2007) – Siuren I (Crimea) as a key site for Aurignacian industries of Krems-Dufour type in Eastern Europe. In: N.F. Bicho (ed.), *From the Mediterranean basin to the Portuguese Atlantic shore: papers in honor of Anthony Marks.* Promontoria Monografica 07. Centro de Estudos de Patrimonio, Departamento de Historia, Arqueologia e Patrimonio, Universidade do Algarve, p. 101–107.

DEMIDENKO YU.E. & NOIRET P. (2012a) – Radiocarbon dates. In: Yu.E. Demidenko, M. Otte & P. Noiret (eds.), *Siuren I rock-shelter. From Late Middle Paleolithic and Early Upper Paleolithic to Epi-Paleolithic in Crimea*. Liege, ERAUL 129:49–53.

DEMIDENKO YU.E. & NOIRET P. (2012b) – The Siuren I Aurignacian of Krems-Dufour type industries in the context of the European Aurignacian. In: Yu.E. Demidenko, M. Otte & P. Noiret (eds.), *Siuren I rock-shelter. From Late Middle Paleolithic and Early Upper Paleolithic to Epi-Paleolithic in Crimea*. Liege, ERAUL 129:343–357.

DEMIDENKO YU.E. & UTHMEIER TH. (IN PRESS) – Kiik-Koba grotto, Micoquian layer IV re-analysis data: an overview. In: Yu. E. Demidenko, J. Richter J. & Th. Uthmeier (eds.), *Micoquian of Kiik-Koba grotto, lithological layer IV (Crimea): complex re-analyses of 1920s excavations materials*. Cologne.

GOLOVANOVA L.V., CLEGHORN N.E., DORONICHEV V.B., HOFFECKER J.F., BURR G.S. & SULERGIZKIY L.D. (2006) – The Early Upper Paleolithic in the Northern Caucasus (new data from Mezmaiskaya cave, 1997 excavation). *Eurasian Prehistory* 4(1–2):43–78.

GOLOVANOVA L.V., DORONICHEV V.B., CLEGHORN N.E., KOULKOVA M.A., SAPELKO T.V. & SHACKLEY M.S. (2010a) – Significance of ecological factors in the Middle to Upper Paleolithic transition. *Current Anthropology* 51(5):655–691.

GOLOVANOVA L.V., DORONICHEV V.B. & CLEGHORN N.E. (2010b) – The emergence of bone-working and ornamental art in the Caucasian Upper Palaeolithic. *Antiquity* 84:299–320.

KANDEL A.W., GASPARYAN B., BRUCH A.A., WEISSBROD L. & ZARDARYAN D. (2011) – Introducing Aghitu–3, the First Upper Paleolithic Cave Site in Armenia. *Aramazd, Armenian Journal of Near Eastern Studies* (Yerevan) 2:7–23.

KANDEL A.W., TALLER A. & GASPARYAN B. (2012) – The Upper Paleolithic settlement of the Armenian highlands. In: *Modes of contact and displacements during the Eurasian Palaeolithic. Colloque international dans le cadre de la commission 8 (Paleolithique superieur) de l'UISPP.* Universite de Liege (Belgique), 29–30–31 mai 2012, p. 9.

OTTE M. & KEELEY L.H. (1990) – The impact of regionalism on Palaeolithic studies. *Current Anthropology* 31 (3):577–582.

OTTE M. & KOZLOWSKI J.K. (2007) – *L'Aurignacien du Zagros*. Liege, ERAUL 118.

OTTE M. & KOZLOWSKI J.K. (2009) – Origines du Paleolithique supérieur en Asie Occidentale. In: M. Otte, F. Biglari & J. Jaubert (eds.), *Iran Paleolithic.* Oxford, BAR international series 1968, p. 85–100.

OTTE M., BIGLARI F., FLAS D., SHIDRANG S., ZWYNS N., MASHKOUR M., NADERI R., MOHASEB A., HASHEMI N., DARVISH J. & RADU V. (2007) – The Aurignacian in the Zagros region: new research at Yafteh Cave, Lorestan, Iran. *Antiquity* 81:82–96.

PINHASI R., HIGHAM T.F.G, GOLOVANOVA L.V. & DORONICHEV V.B. (2011) – Revised age of late Neanderthal occupation and the end of the Middle Paleolithic in the northern Caucasus. *PNAS* 108(21):8611–8616.

PLOUX S. & SORIANO S. (2003) – Umm el Tlel, une séquence du Paléolithique supérieur en Syrie centrale. Industries lithiques et chronologie culturelle. *Paléorient* 29(2):5–34.

PRAT S., PEAN S.C., CREPIN L., DRUCKER D.G., PUAUD S.J., VALLADAS H., LAZNICKOVA-GALETOVA M., VAN DER PLICHT J. & YANEVICH A. (2011) – The Oldest Anatomically Modern Humans from far Southeast Europe: direct dating, culture and behavior. *PLoS ONE* 6 (6): e20834. doi:10.1371/journal.pone.0020834.

SHCHELINSKY V.E. (2007) – *The Paleolithic of the Black Sea shore of Northwest Caucasus (the sites in the open air)*. St.-Petersburg, Evropeisky Dom. (In Russian)

SOLECKI R.S. (1955) – Shanidar Cave, a Paleolithic site in Northern Iraq. *Annual Report of the Smithsonian Institution for 1954*, p. 389–425.

YANEVICH A.A. (2000) – Buran-Kaya Gravettian culture in Crimea. *Archeology (Kyiv)* 2:11–19. (In Ukrainian)

YANEVICH A., PEAN S., CREPIN L., LAZNICKOVA-GALETOVA M., PRAT S. & PRYSYAJNUK V. (2009) – Upper Palaeolithic settlements in Buran-Kaya 3 (Crimea, Ukraine): new interdisciplinary researches of the layers 5–2, 6–1 and 6–2. *Archeological Almanac* (Donetk) 20:187–202. (In Russian)

WILLIAMS J.K. & BERGMAN C.A. (2010) – Upper Paleolithic levels XIII-VI (A and B) from the 1937–1938 and 1947–1948 Boston College excavations and the Levantine Aurignacian at Ksar Akil, Lebanon. *Paleorient* 36(2):117–161.

Stratigraphy, palaeoenvironment and chronostratigraphic background of the Mira succession (Zaporozhiye, Central Ukraine), midway between Carpathians and Don

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Abstract: Located along the Dnieper, south of Dniepropetrovsk, the Mira site shows a thick succession of fluviatile sands capped by loess-like deposits. It included two cultural layers dated between 27.8 and 26.6 ka BP, preserved in a 55 cm thick fine alluvial deposit interbedded in the sands. Data on palaeopedology and palynology point to rather cool and dry conditions during a final phase of the Middle Pleniglacial, with meadow vegetation along the river banks and steppe vegetation on plateau. The upper cultural layer with abundant faunal remains and lithics included an archaic industry combining both Middle and Upper Palaeolithic features, and contained a remain of anatomically modern human. The lower cultural layer included a more advanced industry of Upper Palaeolithic appearance. With regard to its geographical position between Kostienki on the Don and the Carpathians, the Mira site provides new insight on the diversity of the Early Upper Palaeolithic at the end of the Middle Pleniglacial in the Russian Plain.

1 INTRODUCTION

The Palaeolithic open-air site of Mira is located in Central Ukraine on the right bank of the river Dnieper nearby Kanevskoye village about 30 km South of Dniepopetrovsk (47°40' of N latitude and 34°50' of E longitude). The site is connected to an alluvial terrace at the altitude of ca. 18–20 m above river level and 40 m a.s.l. The body of the terrace is cut by small modern ravine, oriented SE-NW and opened toward the Dnieper Valley (**figure 1**). First Palaeolithic finds were recovered here by engineer I.B. Pisaryev in 1995 due to slope erosion of the ravine. A trench installed at the site in 1997 revealed the stratified character of the Palaeolithic remains related to two cultural layers, which occurred at the depth of ca. 10 m below the surface and were preserved in a dark grey sandy loam belonging to the Upper Pleistocene terrace (Stepanchuk *et al.* 1998; Cohen & Stepanchuk 2000–2001). Large-scale excavations were conducted at the site in 2000, uncovering about 60 squares metres of culture-bearing sediments (Stepanchuk & Cohen 2001); additional stratigraphical survey was conducted at the site in June 2001.

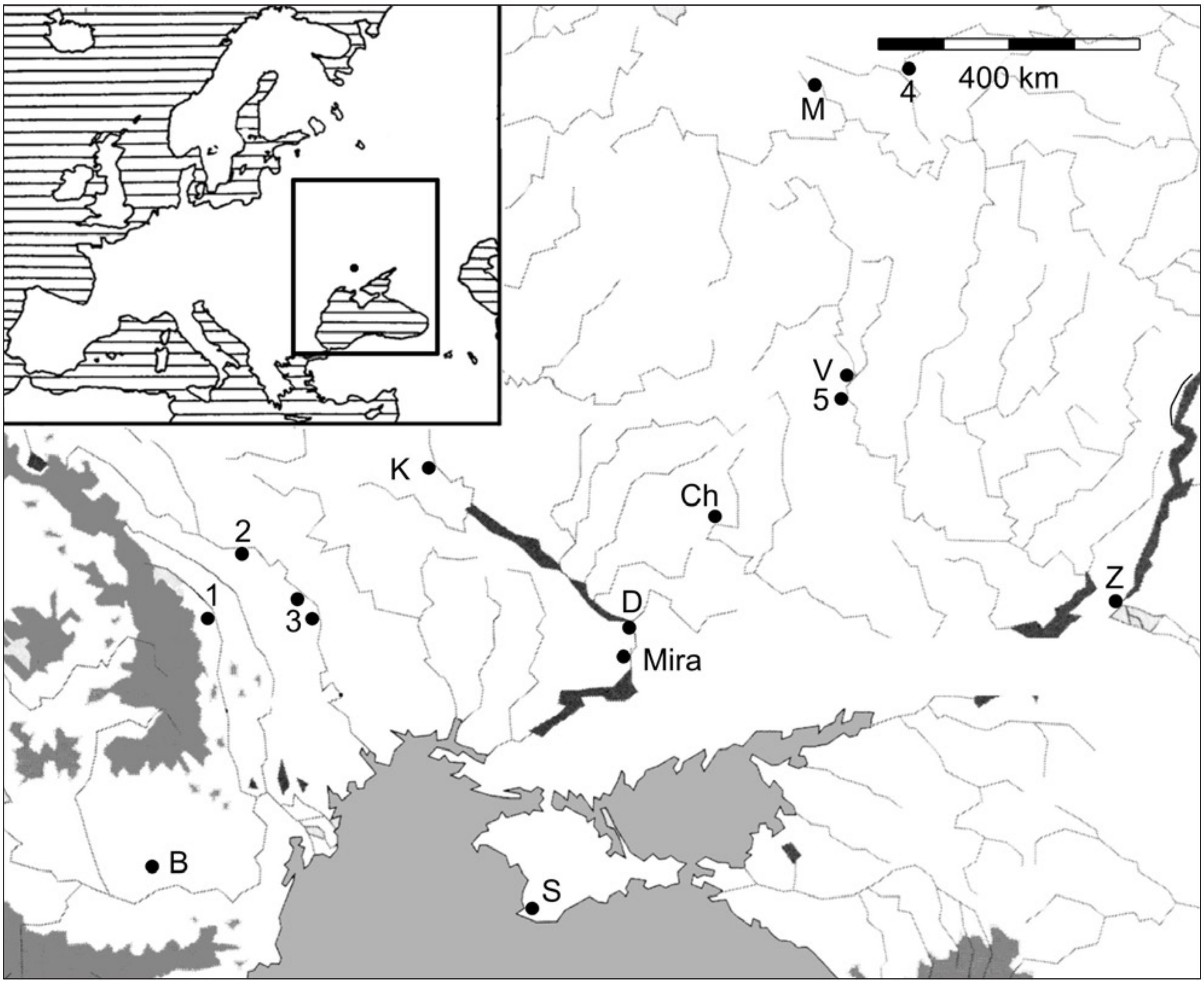


FIGURE 1 (Location map) – B. Bucharest; Ch. Charkov; D. Dniepropetrovsk; K. Kiev; M. Moscow; S. Sebastopol; V. Voronesh; Z. Zarizyn. Archaeological sites: 1. Mitoc-Malu Galben (Romania); 2. Molodova V (Western Ukraine); 3. Cosautsi and Climautsi (Republic of Moldova); 4. Sungir; 5. Kostienki (Russia).

2 STRATIGRAPHIC SUCCESSION (P.H. & N.G.)

The stratigraphical record of the Mira section encompasses almost 12 m of sedimentary succession exposed along the slope of the ravine opening to the Dnieper. The 50 cm thick dark grey sandy loam containing the two cultural layers could be followed laterally over several tens of meters; it occurred horizontally in between two sandy bodies of Dnieper alluvia which are passing upward to sub-aerial deposits capped by the Holocene pedocomplex (**figure 2**). From top to bottom, following succession was described at the excavation site in June 2001.

2.1 Subunit IA (layers 1 to 7: 0.00 to 2.00 m)

- L 1 (0.00 to 0.12 m) - Dark grey sandy loam with grass roots (Ao horizon);
- L 2 (0.12 to 0.37 m) - Light grey loose silty sand;
- L 3 (0.37 to 0.54 m) - Dark grey slightly compacted silty sand: with weak granular structure and earth-worm tracks (A1 horizon); gradual lower limit;
- L 4 (0.54 to 1.05 m) - Light grey slightly compacted silty sand, with krotovinas and worm routes; distinct lower limit;
- L 5 (1.05 to 1.50 m) - Dark grey slightly compacted sandy loam with granular structure and abundant krotovinas and worm galleries (A1 horizon); very gradual lower limit;
- L 6 (1.50 to 1.73 m) - Grey silty sand with mole and worm routes; pocket-like lower limit;
- L 7 (1.73 to 2.00 m) - Pale yellowish grey slightly compacted silty sand with many krotovinas and worm routes in the upper part. The lower limit is sharp, but the silty sand penetrates in the underlying deposit along thin fissures or in small pocket-like structures.

2.2 Subunit IB (layers 8 to 11: 2.00 to 4.50 m)

- L 8 (2.00 to 3.05 m) - Pale brown sandy loam with undulated compacted brown clayey bands and prismatic structure (banded Bt horizon); gradual lower limit.
- L 9 (3.05 to 3.80 m) - Compact pale brown sandy loam with fine banding and prismatic structure (transition from Bt to C horizon); fairly distinct lower limit.
- L 10 (3.80 to 4.10 m) - Pale yellow loess-like sandy loam; distinct lower limit.
- L 11 (4.10 to 4.50 m) - Bedded pale yellow sand, filling a gully cutting through layer 12.

2.3 Subunit IIA (layers 12 to 16: 4.10 to 6.90 m)

- L 12 (4.10 to 4.45 m) - Greyish brown silty sand occurring as an initial humic horizon.
- L 13 (4.45 to 5.00 m) - Light grey brown sandy loam; the thickness increases in accordance with the slope of the present gully opening to the Dnieper.
- L 14 (5.00 to 5.40 m) - Light grey sand with fine cross-bedding.
- L 15 (5.40 to 6.20 m) - Pale brown silty sand, mottled with Fe-Mn hydroxides and gley patches. The upper part of the layer is darker, the lower part is more gleyed. Downslope, layer 15 is horizontally bedded, with thin greyish brown bands and worm burrows.

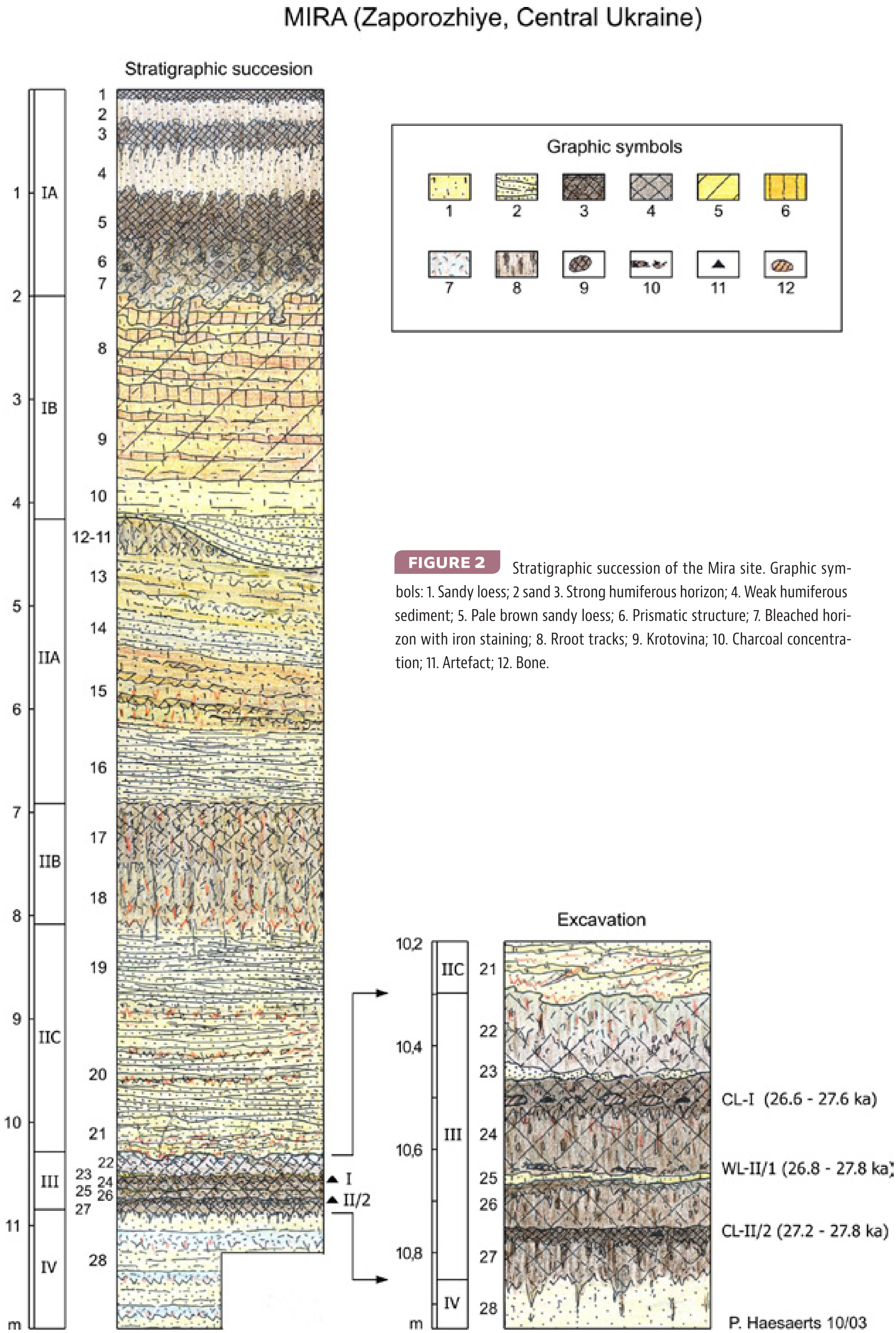


FIGURE 2 Stratigraphic succession of the Mira site. Graphic symbols: 1. Sandy loess; 2 sand 3. Strong humiferous horizon; 4. Weak humiferous sediment; 5. Pale brown sandy loess; 6. Prismatic structure; 7. Bleached horizon with iron staining; 8. Rroot tracks; 9. Krotovina; 10. Charcoal concentration; 11. Artefact; 12. Bone.

- L 16 (6.20 to 6.90 m) - Light grey sand horizontally stratified, with fine cross-bedding; sharp and erosional lower limit. The top of the sand is cut downslope by the base of layer 15.

Subunit IIB (layers 17 and 18: 6.90 to 8.10 m)

2.4

- L 17 (6.90 to 7.60 m) - Brown, mottled sandy loam with spots of iron hydroxides and gley patches. The matrix of this horizon is weakly humic, compacted, with prismatic structure, abundant worm burrows and iron-stained root tracks; gradual lower limit.

- L 18 (7.60 to 8.10 m) - Greyish iron-stained compacted loamy sand with abundant concretions and Mn staining. The lower limit of this hydromorphic horizon is gradual, underlined by iron hydroxides.

Subunit II C (layers 19 to 21: 8.10 to 10.30 m)

2.5

- L 19 (8.10 to 9.50 m) - Light grey fine sands with horizontal and diagonal laminations.

- L 20 (9.50–10.00) - Light grey sands with thick diagonal and horizontal bedding. The sands are fine grained and contain thin grey silty bands with iron hydroxides. The lower boundary is erosional. Locally the sands are disturbed by involutions and penetrate into the underlying layer L 21 along thin cryo-desiccation cracks up to 30 cm deep.

- L 21 (10.16–10.30 m) - Alternation of greenish-grey silty bands and white sandy bands; the beds were subjected to involutions and form a net of loops and pockets. The sediments are crossed by ochre strips of iron hydroxides; the lower contact is sharp and undulated.

Unit III (layers 22 to 27: 10.30 to 10.85)

2.6

- L 22 (10.30 to 10.44 m) - Grey compacted sandy loam; poorly developed mottled gley with dark grey worm burrows and iron staining along root tracks, thin soot interlayers and scattered small charcoal fragments. The lower and upper limits are undulating at the contact with the white sands of layers 21 and 23.

- L 23 (10.44 to 10.47 m) - Thin layer of white fine sand filling dessication-cracks. In places, it is substituted by pale yellow sandy loam up to 0.2 m thick, crossed by ochre bands and worm burrows.

- L 24 (10.47 to 10.64 m) - Pale brownish grey sandy loam mottled and strongly bioturbated, with iron staining, small white sandy spots and fragments of charcoal. The upper part (10,47 to 10.53 m) is more humiferous and has a darker colour; this A1 horizon includes cultural layer I at the depth of 10.50 m: bones, lithic implements and charcoal are horizontally distributed along one continuous concentration. A second concentration of charcoal is present in the lowermost part of layer 24 (wood layer II/2), occurring as a set of burnt branches, some of them being inter crossed; no archaeological evidence nor bones were observed at this level.

- L 25 (10.64–10.68 m) - Thin layer of light grey sand, passing laterally to pale yellowish grey sandy loam. The lower limit is sharp, with small sandy pockets.

- L 26 (10.68–10.73 m) - Pale brownish grey sandy loam similar to layer 24; locally the upper part of layer 26 is underlined by a thin greyish brown horizon, with bioturbated lower limit.

- L 27 (10.73–10.85 m) - Pale brownish grey silty sand, mottled with abundant worm burrows and root tracks; the lower limit is distinct, with small pockets of sand injections. On top, layer 27 shows a distinct 0.05 m thick dark grey strongly bioturbated horizon, almost continuous; it contains the second cultural layer (Cl-II/2) characterised by a linear concentration of charcoal with some bone fragments and scattered lithic implements.

Unit IV **2.7**

- L 28 (10.85 to 14.85 m) - Light grey fine sand, horizontally bedded and light greenish grey sandy loam beds with worm burrows, iron hydroxides bedding and injections of the grey sand.

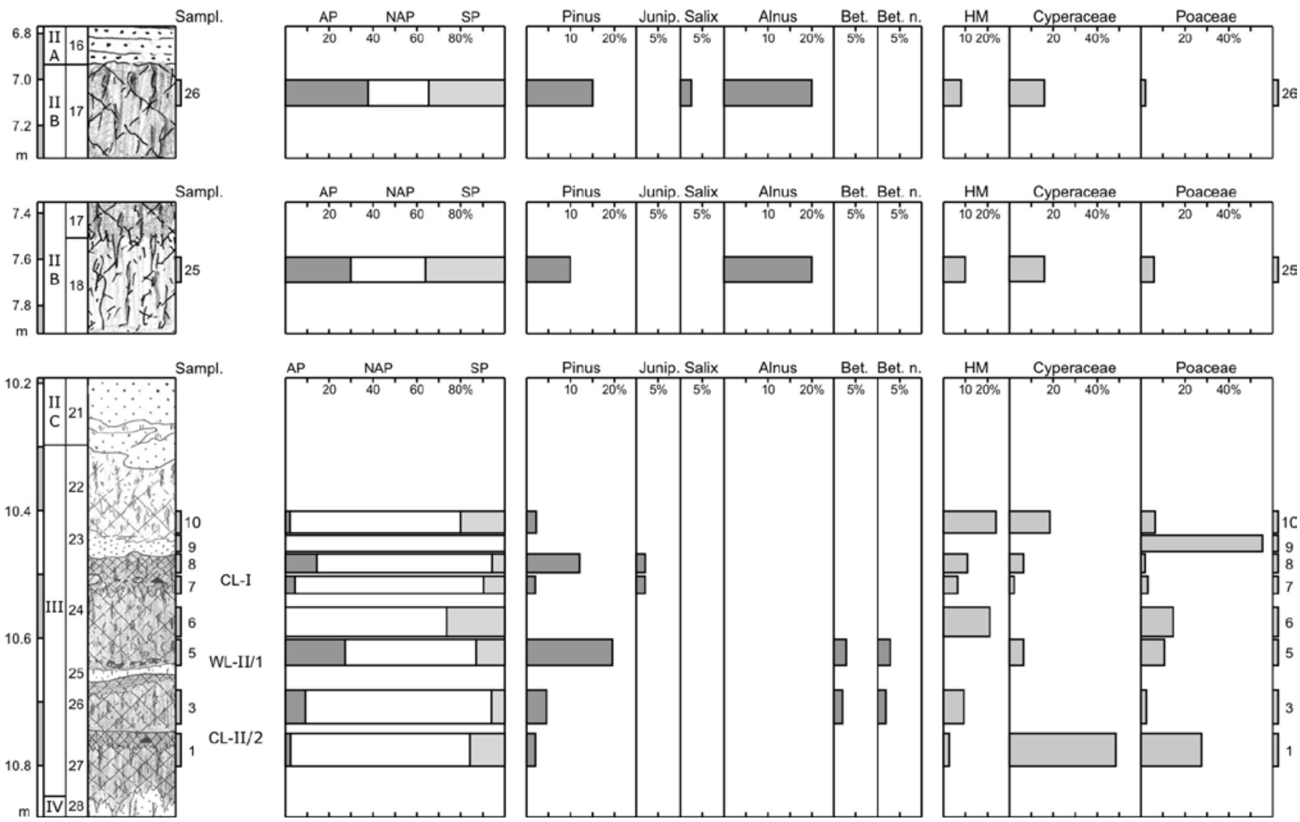
3 ANTHRACOLOGY (F.D.)

3.1 Origin of the Material and Methods

Various samples of loamy sediment from unit III containing charcoal were collected for dating by the excavators in 2000. Three of theses samples were taken back to Belgium in June of 2001 by one of us (PH) with the aim of selecting the best material for charcoal analysis and dating.

A first sample was taken out of the archaeological layer I in the upper third of geological layer 24 (**figures 2** and **4**). The second sample comes from the concentration of burnt wood remains labelled II/1 just at the base of the same layer 24 but this time without artefact. This accumulation was made of various carbonised wood remains comprising brittle inter crossed branches. Lastly, the third sample was collected in the upper part of layer 27 which contained cultural layer II/2.

FIGURE 3 (Mira) – Polllen diagram of units III and II.



Charcoal was prepared and selected following the specific methodology presented in Damblon & Haesaerts 2002: separation of charcoal from sediment by water with sodium pyrophosphate, cleaning charcoal by acids (HF, HCl), charcoal extraction by sieving at each step, drying of charcoal fragments, identification with binocular and microscope and finally selection of the best fragments for dating.

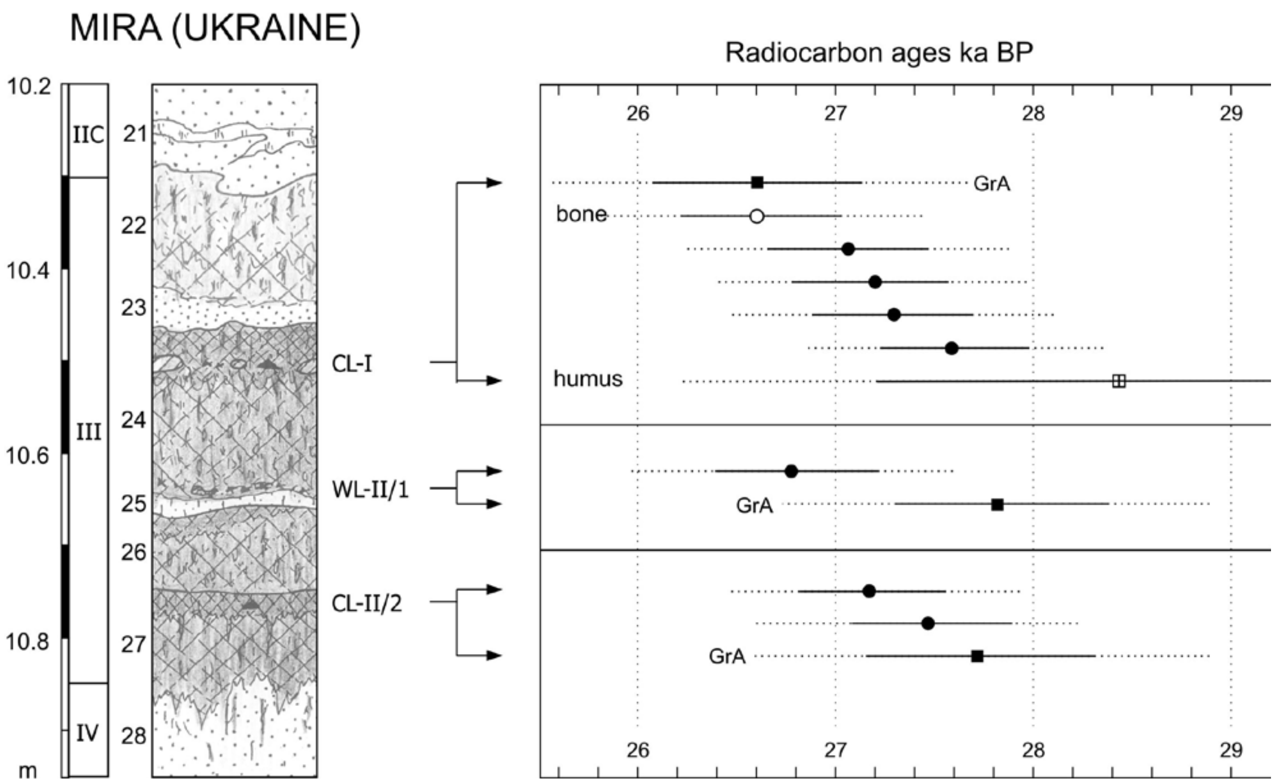
3.2 Charcoal Analysis

All fragments of charcoal and burnt wood from the three layers belong to the same taxon, the Scot's pine type, which can be recognised notably by the resin canals with soft thin-walled epithelial secretory cells (most often destroyed in charcoal), by the two or three superposed lines of ray tracheids, by the large window-like pit (pinoid pit) on the parenchyma cells of the cross fields and by the numerous tooth-like structures on the wall of the ray tracheids (**figure 5**: 1–6). It is worth to recall that Scot's pine anatomical type of wood is encountered in both species *Pinus sylvestris* and *P. mugo* (see notably Schweingruber 1990).

These speciescorrespond to some different ecological conditions but, for the region of Southern Ukraine and for the period considered, it seems difficult to decide which is the best candidate. Moreover, by numerous charcoal fragments from the three samples, the transversal section presented a very sharp transition from early to latewood (**figure 5**: 6) suggesting contrasted ecological conditions. Both pines are able to survive in hard environments and are adapted to withstand low temperatures, strong winds, snow and dryness.

It is also worth to point out the occurrence of micro-charcoal in the pollen slides (see N.G., § 4) prepared from layer 27 (cultural layer II/2) and base of layer 24 (wood layer II/1). Moreover, a number of *Pinus* pollen air-sacks were black-burnt testifying wildfires in springtime. Together with charred remains of pine branches this shows the importance od wildfire at the regiona scale.

FIGURE 4 Groningen (GrA) and Kiev (Ki) radiocarbon dates: Groningen dates on charcoal (black square); Kiev conventional date on humus (crossed square); Kiev conventional dates on charcoal (black circles); Kiev conventional date on bone (white circle); one sigma (full line); two sigmas (dotted line).



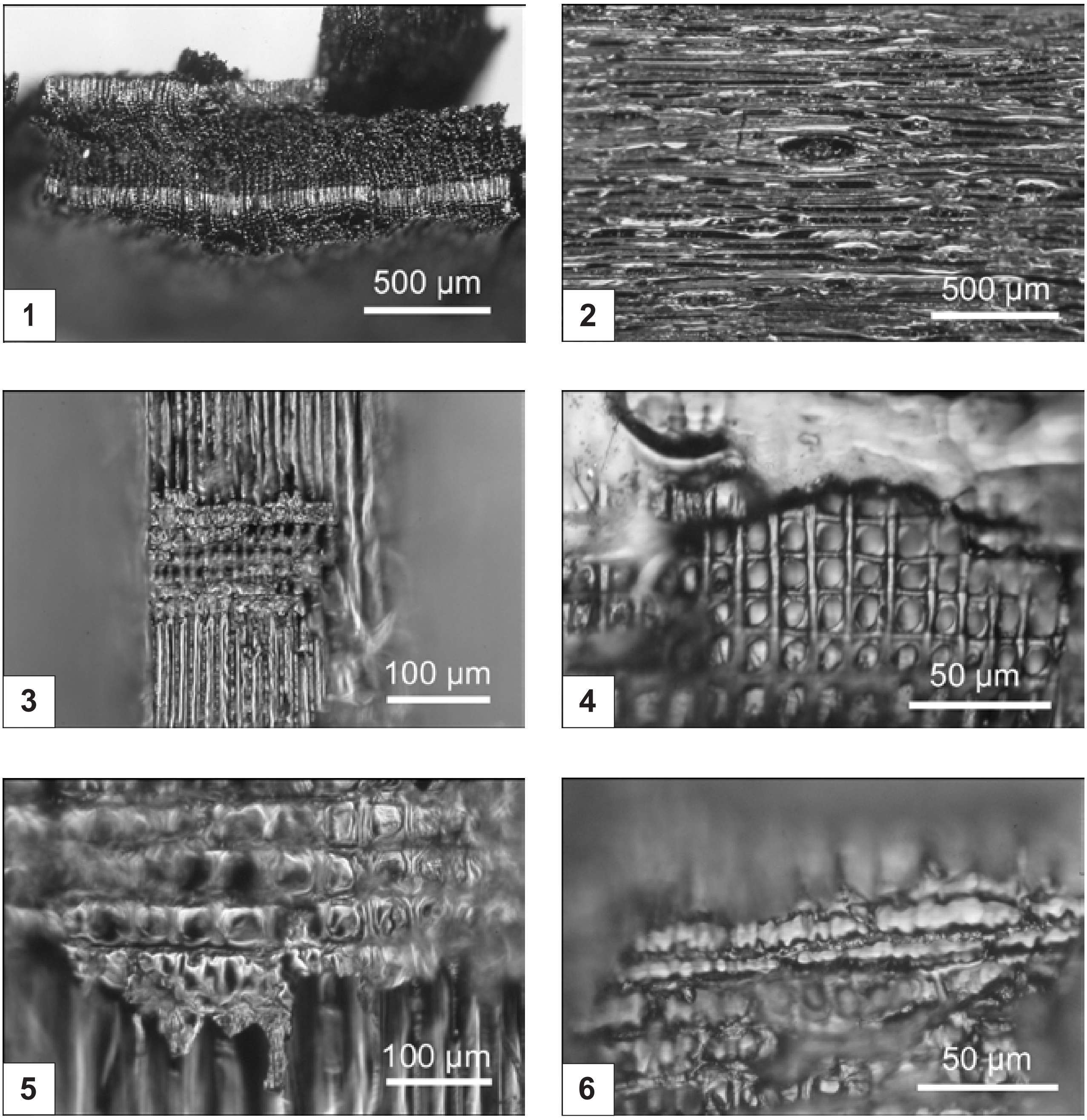


FIGURE 5 *Pinus sylvestris*-type of charcoal. Anatomy of the structures in transversal, tangential and radial sections: 1. Transversal section showing sharp transition from early (black zone) to late wood (whitish zone); (wood layer II/1, A–1085); 2. Tangential section (turned to 90°) with one resin canal and multiple uniseriate rays cut transversally; (wood layer II/1, A–1085); 3. Radial section showing an horizontal ray crossing vertical tracheids. window-like pits are visible on the three lines of parenchyma ray cells bordered upwards and downwards by two lines of ray tracheids; (wood layer II/1, A–1085); 4. Radial section showing cross fields with large window-like pinoid pits; (cultural layer I, A–1084); 5 & 6. Radial sections showing ray tracheids with areolate pits and tooth-like structures on the walls of the ray tracheids (cultural layer I, A–1084).

4 PALYNOLOGY (N.G.)

4.1 Pollen Data

Only small amounts of microfossils have been extracted from specific layers of the Mira section, (**figures 3** and **6**) respectively from unit III (layers 27 to 22) and subunit IIB (layer 18 and 17). Moreover, all charcoal samples analysed from both cultural layers (II/2 and I) and from the layer of burnt wood (II/1) belong to *Pinus* (*cf.* § 3).

In unit III, the humiferous horizon of layer 27 (sample n°1) with cultural layer II/2 provided 34 pollen grains; they belong mainly to Cyperaceae, Poaceae (Gramineae) and a single Rosaceae; few spores of Bryales and Lycopodiaceae, and one pollen grain of *Pinus* were also present together with abundant micro-fragments of charcoal (**figures 3** and **6**).

FIGURE 6 Pollen counts from units III and II of Mira.

UNITS	III	III	III	III	III	III	III	III	II	II
LAYERS	27	26	24	24	24	24	23	22	18	17
DEPTH (M)	10.75–10.8	10.68–10.73	10.60–10.64	10.55–10.6	10.50–10.53	10.47–10.5	10.44–10.47	10.40–10.44	7.60–7.70	7.00–7.10
SAMPLE NUMBER	1	3	5	6	7	8	9	10	25	26
Pinus	1	4	5	-	1	5	-	1	3	7
Juniperus	-	-	-	-	1	1	-	-	-	-
Salix	-	-	-	-	-	-	-	-	-	1
Alnus	-	-	-	-	-	-	-	-	6	10
Betula sect. Albae	-	2	1	-	-	-	-	-	-	-
Betula sect. Nanae	-	2	1	-	-	-	-	-	-	-
Subtotal AP	1	8	7	-	2	6	-	1	9	18
Brassicaceae	-	1	-	-	-	-	-	-	-	-
Apiaceae	-	1	-	-	-	1	-	3	-	-
Lamiaceae	-	2	-	-	3	-	-	-	1	1
Ranunculaceae	-	1	-	3	-	2	-	2	-	-
Rosacae	1	3	-	4	-	2	-	4	2	3
Asteroideae	-	35	6	9	29	23	-	9	-	-
Cichorioideae	-	22	-	-	-	-	-	-	-	-
Artemisia	-	3	4	2	-	-	8	-	-	-
Ephedra	-	-	-	-	-	-	1	-	-	-
Poaceae	10	2	3	5	2	1	12	3	2	1
Cyperaceae	17	-	2	-	1	3	-	7	5	8
Butomaceae	-	-	-	-	1	-	-	-	-	-
Subtotal NAP	28	70	15	23	36	32	21	28	10	13
Bryales	-	3	3	8	4	2	-	7	6	7
Filicales	2	-	-	-	-	-	-	-	4	9
Lycopodiales	3	1	-	-	-	-	-	-	-	-
Subtotal Spores	5	4	3	8	4	2	-	7	10	16
Total	34	82	25	31	42	40	21	36	29	47

AP: Arboreal pollen; NAP: Non arboreal pollen

Layer 26 (sample n°3) is the richest in pollen in the section, with 82 pollen grains. Herbaceous pollen group strongly dominates with diverse composition and good preservation: Poaceae, Ranunculaceae, Brassicaceae, Rosaceae, Lamiaceae, Apiaceae, Asteroideae, Cichorioideae and *Artemisia*. Almost 68 % pollen grains of this herbaceous group belong to the Asteroideae sub-family with mainly pollen type of *Eupatorium* and 20 % of Cichorioideae. Rosaceae and *Artemisia* are next in abundance. Arboreal pollen grains (10 %) are represented by *Pinus* and *Betula* in equal portions, some pollen grains of *Pinus* with black air-sacks being probably burnt; pollen grains of *Betula* sp. and of *Betula* sect. Nanae et Fruticosae as well as few spores of Bryales and Lycopodiaceae were also observed.

In layer 24 (sample n°5), the lower part with burnt branches (cultural layer II/1) provided only 25 pollen grains, including *Pinus*, *Betula*, Poaceae, Cyperaceae, Asteroideae, *Artemisia* and Bryales; 11 pollen grains of *Pinus* have burnt air-sacks. One pollen grain of *Betula* belongs to *Betula* sect. Nanae et Fruticosae. As for layer 27, the sample contained many micro-fragments of charcoal.

The middle part of layer 24 (sample n°6) contained a total of 31 pollen of herbs and Bryales spores; the herbs are represented by Poaceae, Ranunculaceae, Rosaceae, Asteroideae and *Artemisia*.

The upper part of layer 24 (sample n°7) with archaeological layer I yielded 42 pollen grains

with abundance of Asteroideae and single grains of *Pinus*, *Juniperus*, Poaceae, Cyperaceae, Lamiaceae, Butomaceae and Bryales.

The uppermost part of layer 24 (sample n°8) provided 40 pollen grains; the proportion of *Pinus* pollen grains is higher at this level (14 %) and some of them have black air-sacks. Asteroideae dominates in herbaceous pollen together with few Poaceae, Cyperaceae, Ranunculaceae, Rosaceae and Apiaceae.

In the thin sandy deposit of layer 23 (sample n°9) only 21 pollen grains of Poaceae, *Artemisia* and a single *Ephedra* were extracted.

In layer 22 (sample n°10) the lower part of the gley yielded 36 pollen grains of various herbs: Poaceae, Cyperaceae, Rosaceae, Lamiacaeae, Apiaceae, Asteroideae, Cichorioideae, with Cyperaceae and Asteroideae dominating. One pollen grain of *Pinus* and relatively abundant Bryales spores were present.

In the hydromorphic horizons of subunit IIB, layers 18 (sample n°25) and 17 (sample n°26) provided respectively 29 and 47 arboreal pollen, herbaceous pollen and spores in equal proportions. The arboreal pollen consists of *Pinus*, *Alnus* (dominating) and one grain of *Salix*; herbaceous pollen includes Cyperaceae (dominating), Poaceae, Rosaceae and Lamiaceae; Polypodiaceae spores are also relatively abundant.

4.2 Interpretation

The small pollen number in each layer allows only a tentative reconstruction of the vegetation evolution at the Mira site. Despite this situation, the successive palynological records give valuable information on the plant cover, mainly during deposition of unit III, which was dominated by herbs (**figure 3**).

During the development of the humiferous horizon of layer 27 containing the cultural layer II/2, Poaceae and Cyperaceae coenoses existed on the flood plain. Later, during deposition of layer 26, meadow vegetation started to spread with the development of diverse Herbetum mixtum. At that time Poaceae were covering the low part of the flood plain near the river channel, whereas Herbetum mixtum meadow occupied the central part of the flood plain, with more stable surface and betterdeveloped soil cover. At this level the share of Asteroideae and Cichorioideae is very high; these families include psammophyts and plants growing on fresh alluvial surfaces. The dominance of Asteroideae pollen is in a good correspondence with the initial pedogenic processes. Despite the alluvial component of layer 26, the 10 % of *Pinus* and *Betula* pollen grains could be interpreted as a possible presence of these trees in the vicinity of the site.

During deposition of layer 24, a same type of vegetation existed around the site. Still, the presence of burnt branches of pine at the base of the deposit (wood layer II/1) forms direct evidence that this tree participated in the vegetation cover of the region (*cf.* § 5). In the sediment above the level of burnt branches (sample 6), arboreal pollen grains were not observed and *Betula* pollen does not reappear higher up. Concerning the upper part of layer 24 (cultural layer layer I), the extensive distribution of Asteroideae sub-family plants occurred firstly. Pollen grain of Butomaceae indicates the periodical flooding of the site. Later on, meadow Herbetum mixtum sbsisted with probable presence of pine in the site vicinity, accompanied by heliophytic shrub *Juniperus*, but without *Betula*.

Further, the dominance of steppic elements with *Ephedra*, *Artemisia* and Poaceae and absence of Herbetum mixtum in the sandy layer 23 could be ascribed to an increase of aridity. Nevertheless, as layer 23 records an episode of high flood, one may consider that this dominance is not related to local vegetation but to fluviatile supply from the regional steppe background. On the contrary, the pollen assemblage of layer 22, related to meadow vegetation, reflects again local situation during the formation of the gley loam.

Finally, during the development of the hydromorphic horizons of subunit IIB (layers 18 and 17), pollen data shows the presence of *Alnus* associations with Polypodiaceae ferns in undergrowth on the river side, a type of vegetation rather different from the meadow communities existing during the formation of unit III.

From the whole pollen sequence it seems that the regional steppe landscape, with scattered pine (*Pinus*) as main tree components, did not vary fundamentally while variations in the fluvial regime during the period considered had influenced the plant cover on the river bank and flood plain where meadows and riparian communities developed. The occurrences of alder (*Alnus*) and willow (*Salix*) pollen in unit II point to local more humid conditions. In the same time, it seems that the steppe landscape was submitted to frequent wildfires as suggested by occurrences of micro-fragments of charcoal and black air-sacks of pine in the unit III.

5 Radiocarbon dates (F.D. & P.H.)

Results **5.1** Up to now, nine conventional radiocarbon dates were obtained in the Kiev laboratory (Ki-) and three AMS in Groningen GrA-), the latter ones on the samples analysed for charcoal in Brussels. The aim of the present chapter is to discuss both sets of comparable dates (**figure 7**).

The three AMS Groningen dates are shown in **figure 7** together with the conventional Kiev dates. **Figure 8** gives the results of calibration based on OxCal and CalPal.

N°	Geological layer	Layer	Material	C weight dated (g)	N° date	^{14}C age (BP)	Cal age (BP CalPal	Cal age (BP) OxCal
1	III–24 upper part	CL-I	*Pinus* charcoal	0,4	GrA–20019	26,590 ± 490/460	30,802 – 31,747	30,803 – 31,416
2			bone	-	Ki–10283	26,610 ± 400	30,847 – 31,729	30,890 – 31,375
3			charcoal	-	Ki–10284	27,080 ± 400	31,441 – 32,089	31,107 – 31,635
4			charcoal	-	Ki–8153a	27,200 ± 380	31,614 – 32,149	31,157 – 31,720
5			charcoal	-	Ki–8154	27,300 ± 390	31,692 – 32,325	31,195 – 31,860
6			charcoal	-	Ki–8152	27,600 ± 370	31,897 – 32,627	31,350 – 32,189
7			soil	-	Ki–8381	28,450 ± 1100	–	–
8	III–24 base	WL-II/1	charcoal	-	Ki–8155	26,800 ± 390	30,995 – 31,855	31,015 – 31,450
9			*Pinus* charcoal	0,65	GrA–20020	27,830 ± 580/540	31,983 – 33,004	31,472 – 32,758
10	III–27 upper part	CL-II/2	charcoal	-	Ki–8156	27,200 ± 360	31,632 – 32,173	31,168 – 31,684
11			charcoal	-	Ki–8201	27,510 ± 400	31,833 – 32,577	31,289 – 32,128
12			*Pinus* charcoal	0,22	GrA–20033	27,750 ± 590/550	31,928 – 32,948	31,414 – 32,691

FIGURE 7 (Mira) – Radiocarbon dates from stratigraphic unit III: cultural layers I and II/1, wood layer II/2.

The three Groningen dates (GrA-) seem to be ordered in two sets with one date around 26 600 BP in cultural layer I and two dates around 27 800 BP in wood layer II/1 and cultural layer II/2 (**figure 4**). However, such a distribution is not so clear when considering the nine conventional dates (Ki-) obtained on charcoal, bone and humus by the Kiev laboratory. Indeed, the distribution of the six Kiev dates in cultural layer I ranges from 28 450 BP up to 26 610 BP whereas the GrA date (26,590 BP) is the youngest one. Moreover, the four Kiev dates on charcoal show regular distribution between 27 600 and 27 080 BP. In other respects, in wood layer II/1, the two dates of 27 830 and 26 800 BP are separated by about one millennium whereas in cultural layer II/2 the three dates appear more regrouped between 27 750 and 27 200 BP.

Discussion 5.2

The first question is to understand the significance of the pine charcoal concentrations in the successive layers. In cultural layer I, charcoal is clearly associated with hearth structures, bone remains and flint artefacts. In cultural layer II/2, charcoal is also associated with bone and artefacts. Clearly the charcoal concentrations in both cultural layers come from wood collected by man.

On the contrary, in wood layer II/1, charcoal is not associated with artefact and cannot be considered of anthropic but rather of natural origin. Moreover, the local concentration of brittle burnt remains of branches with ramifications strongly suggests that charcoal material from sample dated in Groningen comes from local trees or wood debris which had burned *in situ* due to wildfire. Notice here that this layer II/1 contained the highest amount (20 %) of *Pinus* pollen in the sequence largely dominated by steppe herbs (see N.G. § 4). This pollen record may be interpreted as a result of scattered trees in the region whilst charred brittle branches rather point to local burnt wood. This may also explain the incomplete carbonization state of the charred wood remains in layer II/1. Consequently the charred wood remains are considered contemporaneous to the sedimentation phase.

In cultural layer I, the growing ages of the five dates on charcoal may come from successive inputs of wood debris on the river bank and this leads to infer that man, following the law of the least effort (Shackleton & Prins 1992), collected drift wood for fuel notably dead wood pieces reworked by the river from older deposits along the banks and deposited by flooding. This of course will have consequences in the interpretation of the radiocarbon data.

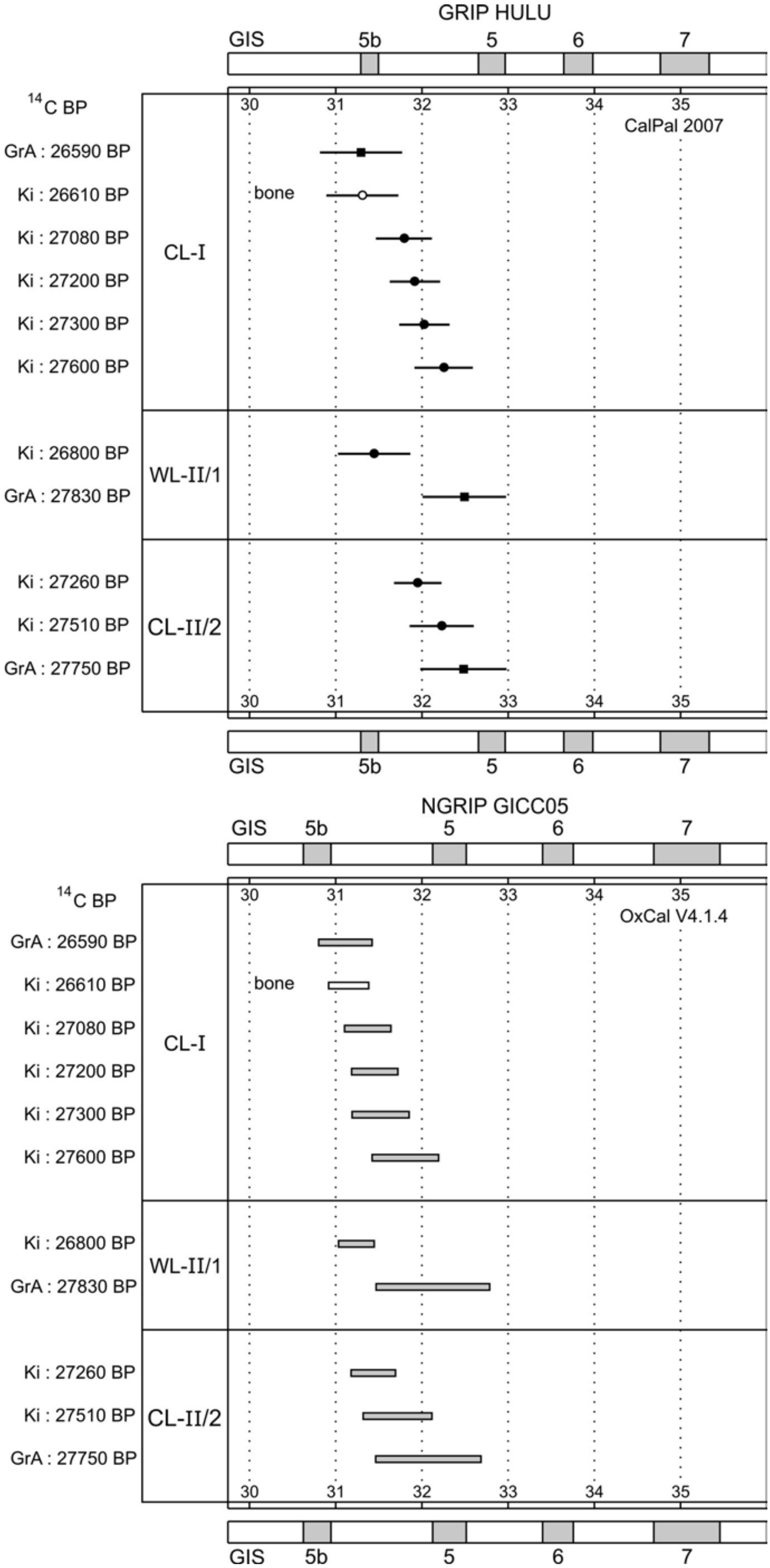


FIGURE 8 (Mira) – Calibration ages following CalPal (A) versus $NGRIP_{HULU}$ (Weninger & Jöris 2008) and OxCal (B) versus NGRIP GICC05 (Svensson *et al.* 2006).

The fact that the GrA date 27,750 BP in cultural layer II/2 appears very close to GrA date 27,830 BP in wood layer II/1 suggests very fast sedimentation process. This reinforces the scenario of a rapid sedimentation rate in stratigraphic unit III. Other arguments to interpret the set of dates in cultural layer II/2 are discussed below.

A second question which comes from the comparison of the AMS results from Groningen with the conventional dates obtained in the Kiev laboratory (**figure 4**) is how to interpret the whole set of radiometric data. The first problem is to evaluate the significance of the GrA and Ki dates. It is important here to stress the fact that the accuracy, precision and reproductibility of the GrA dates were positively tested on charcoal in various loess sites from west and central Europe to Siberia (Haesaerts *et al.* 2005, 2010).

In cultural layer I, the GrA date 26 590 BP is the youngest one with regard to the Ki dates (from 27 600 to 27 080 BP), taken apart the date on bone (Ki–10283: 26 610 BP) from the same layer and the date Ki–8381 28 450 ± 1 100 BP on humus which appears too old and shows a too large σ uncertainty. Such a dispersion of the Ki dates may originate from either statistical differences linked to the Kiev laboratory or from the use of drift older wood supply by Palaeolithics. This latter hypothesis is more convincing with regard to stratigraphical data and the comparison of the radiocarbon dates in the whole sequence. Consequently the GrA date on charcoal and the Ki date on bone appear in good agreement and the most probable for the human occupation in cultural layer I

In cultural layer II/2, the Ki dates show a coherent distribution over a time period of ca 1 000 years. In the present context, the GrA date 27 750 BP seems acceptable and appears to be contemporaneous with the formation of the humic horizon when the Ki dates are younger and show overlap for 2 Ki dates over a time-lag of ca 500 years.

Now a last question is the identification of climatic events recorded in the sequence.

First notice that cultural layers II/2 and I are both directly associated with a well developed humiferous horizon which point to a stabilization phase of the alluvial plain with an herbaceous plant cover (see P.H. & N.G. § 4). Yet, in Eastern Europe (East Carpathians, Kostienki), this type of pedogenesis has been associated to interstadial phases notably between 30 and 25 ka BP and put in parallel with the Greenland Interstadial Stages (GIS) 7, 6, 5 and 5b of the ice sequences (Haesaerts *et al.* 2009, 2010).

The present hypothesis can be tested by calibration of the GrA and Ki dates as shown in **figure 8** following two different systems. The CalPal system is a reference system based on the chronological scale of the GIS (GreenlandInterStadial) events in the NGRIP sequence but constrained and matched by the Hulu cave sequence (Weninger and Jöris 2008). The OxCal system (v.4.1.4) is based on the chronological scale of the GIS events in the NGRIP sequence (Svensson *et al.* 2006) referring to Incal 9 (Reimer *et al.* 2009). **Figure 8** clearly shows differences in the distribution in time of the climatic events GIS 5 and 5b between 30 and 33 ka BP.

Here the CalPal calibration points to a correspondence of archaeological occupations I and II/2 with GIS 5b and 5 respectively. Such a distribution in time is in a very good agreement with the pedosedimentary record where each cultural layer is embedded in a humic horizon pointing to climate improvement.

On the contrary, the OxCal calibration leads to time intervals in the event GIS 5 for cultural layer II/2 whilst the cultural layer I fits with a cold period between GIS 5 and 5b. This latter correlation cannot be accepted as charcoal concentration and artefacts were also included in a humifc horizon.

In conclusion, the CalPal Calibration system appears in the present situation as the most adequate in agreement with the pedosedimentary record at Mira where cultural layers II/2 and I both occurred in a well developed humic horizon. In this manner, the cultural layer II/2 can be attributed to the interstadial episode GIS 5b evaluated ca 31.3 cal BP while the cultural layer I may be attributed to the interstadial event GIS 5 around 32.5 cal BP.

6 ENVIRONMENTAL EVOLUTION (N.G. & P.H.)

The combined information on stratigraphy, sedimentology, pedology, palaeobotany and radiocarbon chronology gained for the Mira sequence allow a first attempt to reconstruct the palaeoenvironmental evolution; this approach takes into account the situation of the site along the Dnieper River, downstream the narrowing of the valley north of Zaporozhiye.

6.1 Unit IV (layer 28)

The sandy deposits of layer 28 correspond to the alluvial suite of the Dnieper terrace; it belongs to the upper part of channel alluvium at the transition to the overbank facies.

6.2 Unit III (layers 27 to 22)

This unit shows the overbank facies of the terrace alluvium with interbedded three initial humic soils (the top of layers 27, 26 and the upper part of the layer 24). Each A1 horizon of these soils marks stable surface of the flood plain and relatively low and infrequent floods, whereas the sandy bands in between (layers 25 and 23) mark high floods.

The Palaeolithic man settled firstly on the flood plain during the soil formation at the top of layer 27 (cultural layer II/2). The second evidence of presence of man at the site corresponds to cultural layer I at the base of the A1 horizon of layer 24. Both cultural layers thus belong to the soil-sedimentary processes; they were probably buried quickly after the occupation, this situation providing good preservation of the remains of human activities. In both cases the camp sites were located in the alluvial plain of the Dnieper, at some distance from the valley slope, probably in the vicinity of the fluviatile channel.

The A1 horizon of the soil related to the first Palaeolithic occupation (II/2) on top of layer 27 is most expressed, although rather thin. Humus accumulation and rather intense bioactivity were typical for the pedogenesis. At that time, pioneer vegetation with grasses and sedges occupied the site and obviously produced the well developed humic layer. Later, it was buried by the overbank alluvium.

The second alluvial soil (top of the layer 26) is poorly developed, discontinuous and more gleyed. It was formed under meadow coenoses. Diverse herbs grew in the site surroundings, but representatives of Asteroideae and Cichorioideae sub-families, less demanding to the soil fertility and surface stability, strongly dominated. Arboreal vegetation of the site vicinity was not abundant and included probably a few pines and birches, together with arcto-boreal shrub forms of birch. The soil was buried under the high flood-plain deposition of layer 25.

As demonstrated by the *Pinus* burnt wood concentration, the pine was growing locally during the deposition of lower part of layer 24. After some input of overbank alluvium (middle part of the unit 24), meadow vegetation prevailed when Palaeolithic man settled for the second time on the site (cultural layer I); this type of plant community continued during the period of soil formation in the upper part of layer 24, firstly strongly dominated by Asteroideae plants, later on possibly with occurrence of pine and juniper in the vincinity.

Layer 23 records the input of silt and overbank sands on the flood-plain, together with a noticeable share of *Artemisia* and presence of *Ephedra* in vegetation cover. Such extent of steppic elements in layer 23, tentatively ascribed to an increase of climatic aridity, could rather reflect regional background related to the high flood fluviatile supply.

Nevertheless, meadow vegetation is again present on the flood plain during the development of the gley soil with strong water logging in the upper part of layer 22. This soil is also affected by distinct cryogenic features which might announce the start of the important cooling recorded in the overlying subunit IIC

Altogether, unit III records a rather homogeneous set of overbank sedimentary events with development of ephemethral humiferous soils, under meadow vegetation reflecting a relatively cool climate; this is also indicated by the poor diversity of boreal-tree taxa and their low contribution to the vegetation cover. According to the radiometric dates of layers 27 and 24 (see § 5), deposition of unit III should fit in between ca 28.000 and 26.000 BP, a period which corresponds to the gradual transition through the boundary between Middle and Late Pleniglacial (*cf.* § 8).

Subunit IIC (layer s 21 and 20)

6.3 Layers 20 and 19 show the transition from flood plain to channel facies with sedimentation of cross-bedded sands, cryoturbation and secondary enrichment in iron hydroxides connected with water logging in the lower part (layer 20). The river flow (or one of its channels) came again to the area, the change in the hydrological regime being possibly controlled by climatic cooling; the cryoturbation observed at the base of the sequence, might confirm this suggestion.

Subunit IIB (layers 18 and 17)

6.4 This subunit demonstrates two hydromorphic soils, developed on the flood plain. The lower one is a weak initial gley soil, formed on sandy substratum, with abundant manganese concretions. The upper soil is better pronounced, strongly gleyed, but with some humus accumulation and soil structure, abundant worm routes and root tracks. The vegetation was dominated by alder groves with Polypodiaceae ferns in undergrowth; few willows and sedges also occurred. Soil characteristics and hygrophytic type of vegetation indicate a rather wet local environment under cool climate, possibly during a weak interstadial.

Subunits IIA and IB (layers 16 to 12 and layers 11 to 8)

6.5 These subunits record a first set of sub-aerial sediments following up the alluvial suite of subunits IIC and IIB. The lower part of subunit IIA consists of horizontally layered aeolian sands (layer 16) that gives evidence of intense wind activity and depletion of vegetation cover on the terrace surface, following a lateral migration of the river in its alluvial plain.

On the other hand, layers 15 to 13 combine aeolian deposits, pedosediments and initial soils, recovering the valley slope after the surface of the terrace was cut by a gully. Gleying, biologic activity and development of tiny brown sandy soil, recorded at this level together with the erosive processes, demonstrate some increase in climatic humidity. This set of sedimentary events ends with an initial soil developed on the slope, characterised by weak humus accumulation (layer 12), possibly related to a short interstadial.

After the formation of the initial soil, a new gully filled with sand (layer 11) developed on the valley slope demonstrating again sedimentary processes dominated by wind dynamics, as well as poor vegetation cover. Later on aeolian loamy sand and colluviated sediments completed the filling of the gully (layers 10 and 9–8 pro parte); these deposits were subjected to cryo-sorting, a process which provided a pronounced lamellar fabric of the sediments - a base for the banded Bt horizon recorded in layers 9 and 8. This horizon developed from the top of layer 8, belongs to the forest soil formed during Early Holocene (*cf.* P.H. & N.G. § 8). In Southern Ukraine this type of soil is related to a strong increase of edaphic humidity and high precipitation, as well as to the presence of a forest cover in the area at that time.

Subunit IA (layers 7 to 1)

6.6 The upper part of Mira sequence consists of three sandy deposits (layers 7, 4 and 2) alternating with humiferous soils (respectively layers 6 and 5, layer 3 and layer 1). The accumulation of sands above the forest soil of layer 8 reflects the return of dry conditions with an intense wind activity and formation of desiccation fissures on the Bt horizon surface.

The first humic soil (layers 6–5) can be regarded as a "borovoy chernozem", according to the nomenclature of the present soils of Ukraine; developed on sandy substrata, mainly on river terraces, this type of soil is usually formed under dense herb cover, sometimes with sparse pine woodlands. At that time the climate was very different from one of the Holocene forest pedogenesis, though still much wetter than during the sandy sedimentation of layer 7.

A second short period of climatic aridification corresponds to the sandy layer 4; it precedes the development of the chernozem-type soil of layer 3, which is less enriched in humus than the former one. Finally, sandy layer 2 shows the last aeolian input in the Holocene sequence, prior to the humus accumulation and biological activity of the surface soil (layer 1).

7 ARCHAEOLOGICAL OCCURENCES (V.S. & V.C.)

The sequence of Mira includes evidences of two Palaeolithic concentrations, namely cultural layer II/2 and I. The lowermost layer II/2 is associated with the thin humiferous horizon on top of layer 27, whilst cultural layer I occurs in the lower part of the weak humiferous horizon capping layer 24. Taphonomic study of data provided by cultural layers allows to conclude on very good state of preservation of archaeological remains and to emphasise the *in situ* character of both Palaeolithic layers (Stepanchuk & Cohen 2001; Stepanchuk *et al.* 2004).

Cultural layer II/2

7.1 This cultural layer preserved in the humiferous horizon of layer 27 was uncovered on an area of ca. 60 square meters. It provided several dozens of splintered bones of bison and wild horse and about 200 knapped flints related to several pits. The lithic industry includes backed blades of very original appearance (**figure 9**). Broad analogies of these implements may be seen in Gravettian assemblages (e.g. Otte 1985; Kozlowski 1986; Svoboda *et al.* 1996; Amirkhanov 1998). But the most close resemblance of Mira II/2 backed implements is provided by South Italian Aurignacian horizon 24A1 at Paglicci, proclaimed to be demonstrating evolutionary shift toward Gravettian (Palma di Cesnola 1996, 2000). Accordingly to its petrographic characteristics, the lithic material could originate somewhere from a locality of Western Ukraine, at least 350 km from Mira (Stepanchuk *et al.* 2009).

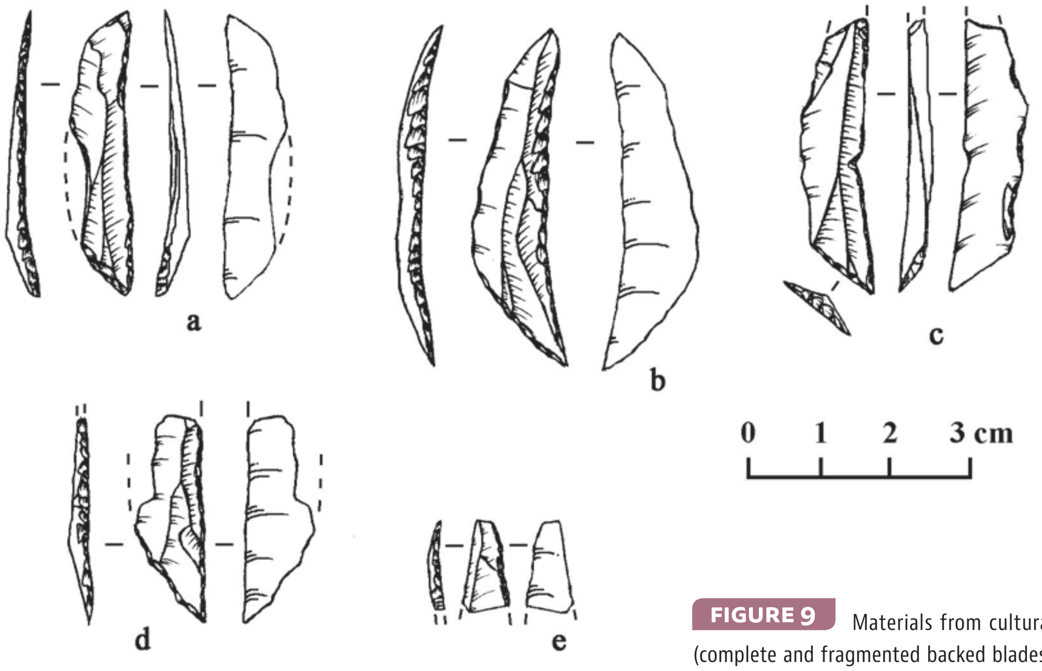


FIGURE 9 Materials from cultural layer II/2 (complete and fragmented backed blades of Paglicci 24A1 type).

Cultural layer I 7.2

The second archaeological layer excavated over about 50 square meters represents intensively utilised area with hearths, various pits, abundant paleontological remains and knapped flints (**figure 10**). To the contrary of West Ukrainian origins of flints from cultural layer II/2, peculiarities and original association of flints and rocks allow to recognise the East Carpathian origin of the main part of them. Presence of quantitatively rare typical flints, probably from valleys of main rivers located between East Carpathians Area and river Dnieper, might points to comparatively rapid migration.

Paleontological series provides predominant wild horse (71,8 % of NIB), following by fox, steppe and polar fox (21,6 %). *Asinus hydruntinus*, giant deer, red deer, reindeer, bison, mammoth and wild boar are represented but crucially subdominant. Composition of horse remains allow to reconstruct one episode of hunting on harem group of horses consisting of stallion accompanied by seven adults, two semi-adults and six young individuals. Peculiarities of spatial distribution of various pits, especially postholes and hearths, as well as localisation of "meaty" and "not-meaty" parts of skeleton of large animals, remains of carnivores, concentration of wastes of flint working etc… allow to reconstruct dwelling construction in the SE part of uncovered area. The distribution of the material suggests a permanent carcass spherical dwelling, opened to the river, with an area of ca. 15 sq. meters. Fragment of human molar identified as belonging to *Homo sapiens sapiens* was discovered inside the dwelling construction, together with the majority of pierced carnivore teeth and fragments of engraved bone pieces.

Flint industry comprises both Middle and Upper Palaeolithic features in technology and typology (**figure 11**). Flake products comprise both facetting butts and evidence of soft hammer stone technique. Middle Palaeolithic types are represented by points and side scrapers on flakes. The presence of canted points, various side scrapers, and both thinned side scrapers and points should be stressed.

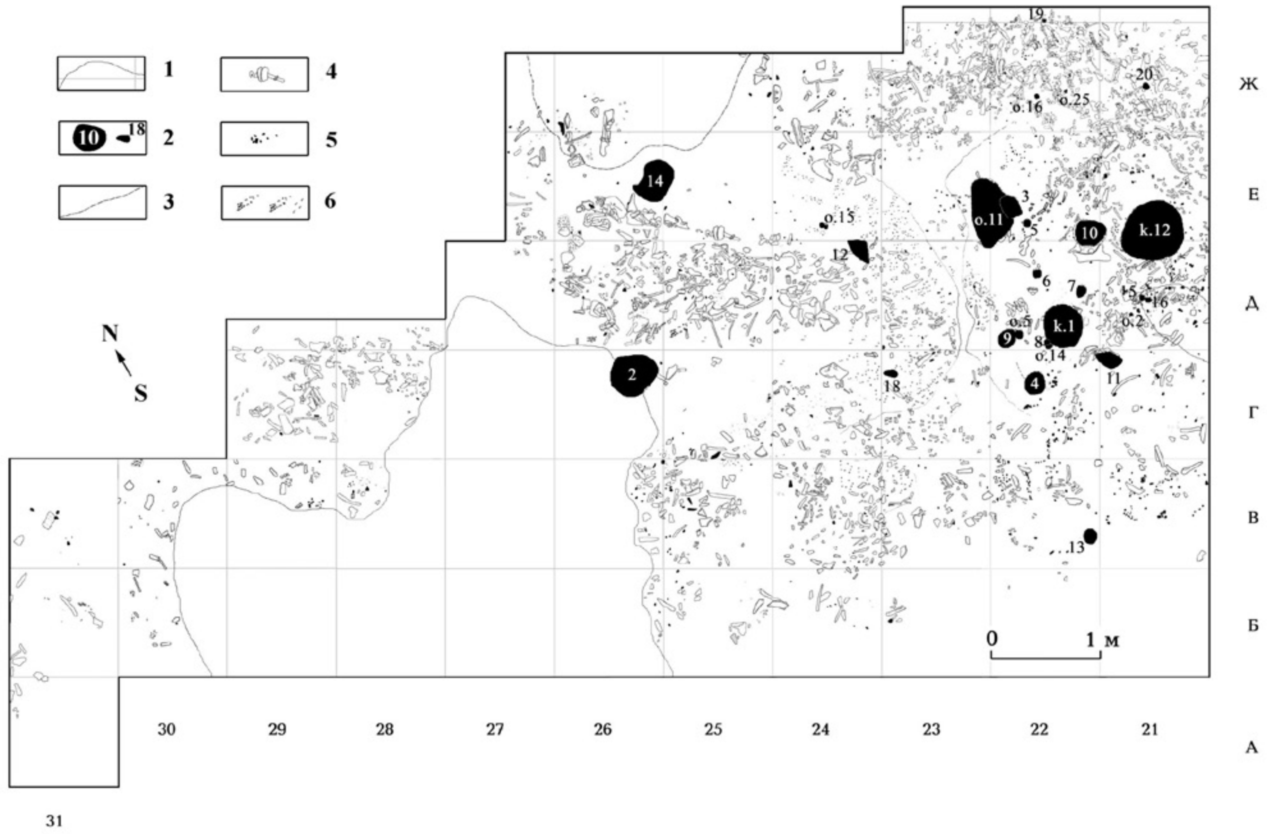


FIGURE 10 (Mira) – Cultural layer I, general plan of area exavated between 1995-2000. Graphic symbols: 1. Border of amateur excavations of 1995-1996; 2. Objects (pits, postholes, hearths); 3. Border of area saturated with tiny charcoals and ash; 4. Bones; 5. Lithics; 6. Wood charcoal.

Upper Palaeolithic types include micro-implements of Aurignacian appearance and highly original series of non-geometrical microliths. They are also represented by preponderant end scrapers, embracing several types, of which the most morphologically stable is sub-triangular end scraper with retouched laterals.

There are no Aurignacian high forms, though many of end scrapers are rather thick. Burins are few and show no extra-routine signs; angle burins prevail. Bifacial component includes plano-convex types similar to known in Middle Palaeolithic of Micoquian type and several leaf-points. There are numerous combined tools among which end scrapers point are very expressive. There are rather atypical inversely retouched lamelles and Krems-Dufour points, micro-truncations and series of morphologically unstable pieces with light, often partial, edge retouch.

Highly original feature of Mira cultural layer I assemblage consists in presence of large series of micro-flakes with blunted edges, either intentionally retouched or showing use-wear retouch. It cannot be excluded that the genesis of original micro-component of Mira layer I, as well as Aurignacian-related bladelet component, is rooted in hard scarcity of available raw materials and, therefore, represents example of independent innovation. By the other hand, it cannot be excluded the either direct or indirect impacts of outer "very likely Aurignacian" influences, which resulted just in the production of micro implements. In any case, currently available data is too scarce for solution the question. Lithic series is accompanied with numerous retouches made of fragments of long bones mostly typical for Middle Palaeolithic. Nevertheless, there are also fragmented points or awls and polishers. Probable bone pendant (or needle eye), remains of likely bone shaft and amber pendant complement the series of finds.

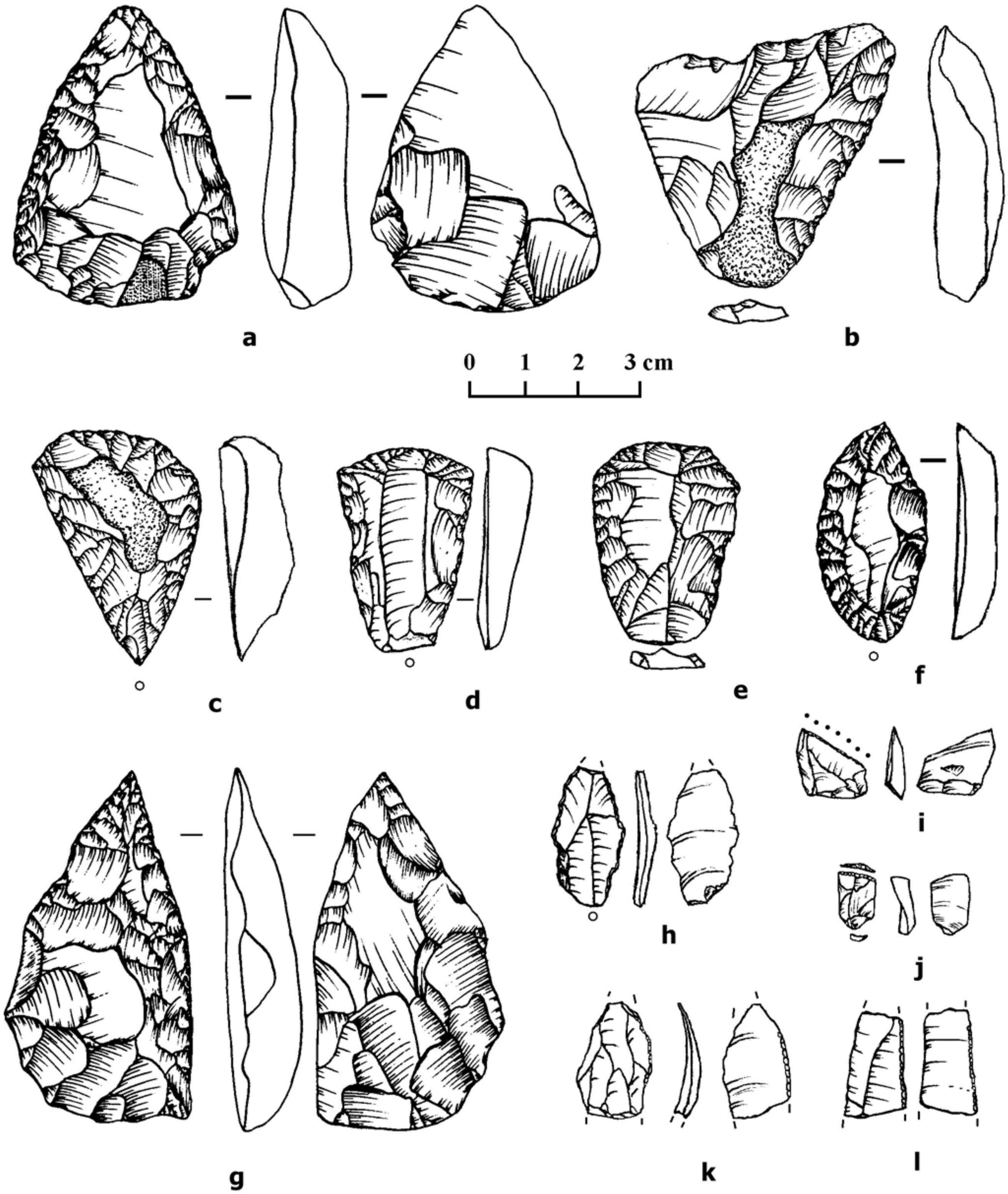


FIGURE 11 (Mira) – Materials from cultural layer I: a. Mousterian-type point with ventral thinned base; b. Double canted side scraper; c. Mousterian-type point-endscraper on flake; d and e. Bilateral retouched end scrapers on blades and blade flakes; f. Double convergent side scraper (limace); g. Plano-convex bifacial point with back or backed knife; h. Krems-Dufour point; i. Non geometrical microliths of Mira-type on waste flake of resharpening of bifacial tool; j. Non geometrical microliths of Mira-type on waste flake of resharpening of flake tool; k and l. Dufour bladelets.

8 CHRONOSTRATIGRAPHIC BACKGROUND (P.H. & N.G.)

The chronostratigraphic approach of the Mira succession rests mainly on two sets of data. On the one hand, three sedimentary bodies belong to the lower Dnieper terrace (units IV and III, subunits IIC and IIB), grading into sub-aerial cover deposits (subunits IIA and IB pro parte) which are capped by the Holocene pedocomplex (subunits IB pro parte and IA). On the other hand, the fine grained alluvial deposits of unit III are preserved in between the fluviatile sandy bodies which contains the Palaeolithic cultural layers I and II/2. Moreover, unit III records a fairly homogenous episode of sedimentation close to the main channel of the Dnieper, under a cool and steppic environment. It corresponds to a rather short period of time, radiocarbon dated in between ca 28,000 and 26,000 BP, almost at the end of the Middle Pleniglacial and prior to the cooling recorded by the restart of the sandy fluviatile sedimentation (subunit IIC).

Taking into account the geographic situation of Mira in Central Ukraine, only a limited number of well documented stratigraphic loess successions could be used as a reference for comparisons. It is the case of the East Carpathian Area with the Palaeolithic sites Molodova V (Western Ukraine), Mitoc-Malu Galben (Romania) and Cosautsi (Republic of Moldova). The combined stratigraphies of these sites provide a well dated high-resolution pedosedimentary and climatic sequence (**figure 12**) covering the whole period between ca 33 ka BP and the Holocene (Haesaerts 2004; Haesaerts *et al.* 2003). In particular, the most complete pedosedimentary sequence for the transition from Middle to Late Pleniglacial is recorded at Mitoc-Malu Galben, with a succession of four distinct interstadial humic horizons of decreasing intensity: respectively MG 11 (around 30 500 BP), MG 10 (around 28 600 BP) MG 9 (around 27 800 BP) and MG 8 (close to 27 000 BP). This succession is capped by a well developed tundra gley related to a drastic cooling precisely dated between 26 300 and 25 760 BP, which ends the Middle Pleniglacial (Haesaerts *et al.* 2007; 2010).

Considering the East Carpathian sequence, unit III at Mira fits in with the final part of the Middle Pleniglacial, the humic horizons containing cultural layers II/2 and I which are ascribed to the interstadial events MG 9 and MG 8 (**figures 12** and **13**). In this way, the cryoturbated gley horizon of layer 22 capping unit III may be related to the toundra gley dated around 26 000 BP at Mitoc-Malu Galben. With regard to this scheme, the upper fluviatile record at Mira (subunits IIC and IIB), as well as the cover deposits of subunit IB, could be ascribed to the first half of the Late Pleniglacial, with a possible connection between the hydromorphic alluvial soil of layers 18 and 17 and the well developed tundra gley dated around 23 000 BP in the East Carpathian Area. In a similar way, the upper sandy loam cover at Mira (subunit IIC and subunit IB) belongs probably to the second part of the Late Pleniglacial recorded for the best at Cosautsi along the Dnieper (Haesaerts *et al.* 2003).

The banded Bt horizon of the forest soil developed from the top of subunit IB (layers 9 and 8) is ascribed to the Early Holocene, a period characterised by rather humid climate, favouring forest distribution, in the steppe zone of Ukraine (Gerasimenko 1995, 1997). Moreover, the sandy layer 7 at the base of subunit IA, above the forest soil, reflects an episode of dry conditions with an intense wind activity known in the steppe zone around 8 and 4 ka BP. (Gerasimenko 1995, 1997), whereas the climatic optimum of broad-leaved forest distribution occurred around 5.5 ka BP (Hotinsky 1982). The "borovoy chernozem" of layers 6 and 5 containing Bronze Age implements dated around the 14^{th} and 13^{th} centuries BC, most probably records the wet interval of the Subboreal (Gerasimenko

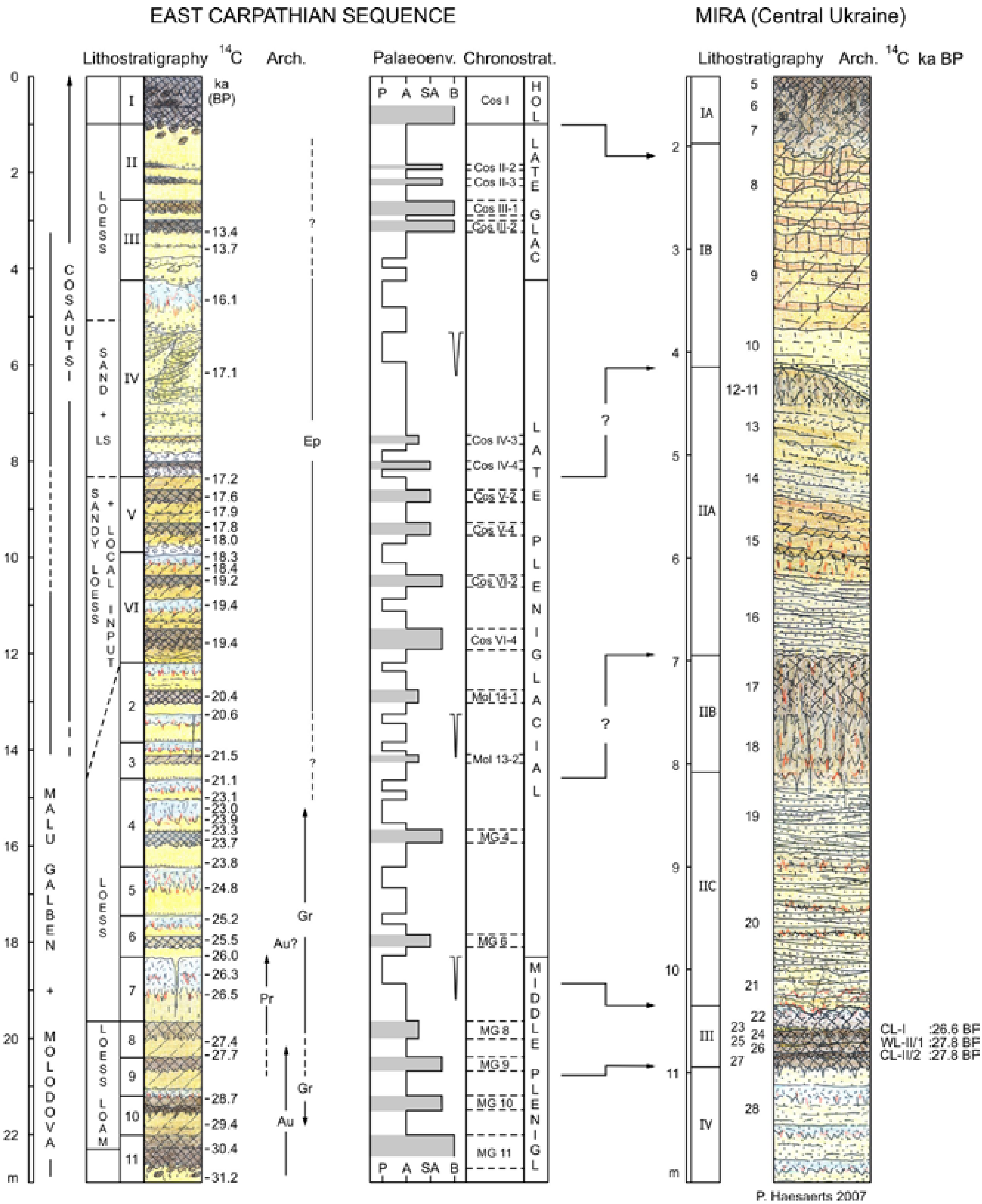


FIGURE 12 (Mira) – Correlative scheme with the East Carpathian Area (Haesaerts et al. 2003, 2010). Graphic symbols as in figure 10. Abbreviations: (Arch) Archaeology; (Au) Aurignacian; (Gr) Gravettian; (Ep) Erigravettian; (Palaeoenv) Palaeoenvironment; (P) Permafrost conditions or deep frost; (A) Arctic; (SA) Subarctic; (B) Boreal; (Chr) Chronostrat-interstadials; (Cos) Cosautsi; (Mol) Molodova; (MG) Malu Galben.

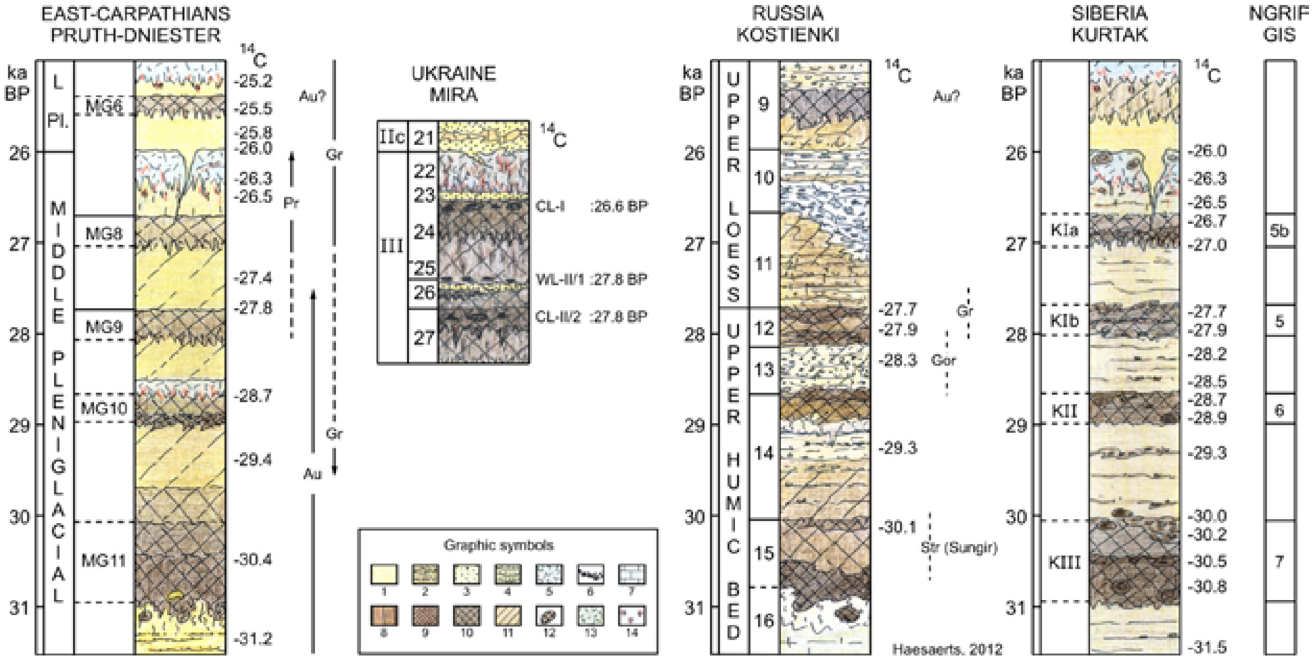


FIGURE 13 Overview of the correlation scheme linking Mira unit III sequence with the surrounding loess areas. The Siberian sequence of Kurtak (Haesaerts *et al.* 2005) is used as reference for proxy-correlation with GIS of NGRIP (Haesaerts *et al.* 2009). Graphic symbols: 1. Loess; 2. Loan; 3. Silty sand; 4. Sand; 5. Chalky flow; 6. Gravel; 7. Limestone; 8. Illuviated soil; 9. Strong humic horizon; 10. Weak humic horizon; 11. Yellowish brown bioturbated horizon; 12. Krotovinas: 13. Bleached horizon (tundra gley); 14. Iron staining. Abbreviations; Arch: archaeology; Gr: Gravettian; Pr: Pruth Culture; Au: Aurignacian; Gor: Gorodsovian: Str; Streletskian.

1997). In a similar way, the second chernozem-like soil (layer 3) with ceramics dated to 5–4 centuries BC is related to the Early Subatlantic also known as a humid period (Hotinsky 1982). Within this system, the dry period corresponding to sandy layer 4 could be related to the 9th–7th centuries BC, while sandy layer 2 which wears the surface humiferous horizon (layer 1), shows the last Subatlantic aeolian input of the Holocene sequence.

9 ARCHAEOLOGICAL BACKGROUND (P.H. & V.S.)

Geological, paleontological and radiocarbon chronology data unanimously demonstrate two successive Palaeolithic occupations at Mira during rather cool interstadial episodes characterised by meadow communities in the bottom valley. This episode was radiocarbon dated between ca 28,000 and ± 26,500 BP at the end of the Middle Pleniglacial. Palaeolithic man settled twice in the alluvial plain of the Dnieper probably close to the fluviatile channel. Each archaeological layer was buried by fine grained alluvia quickly after the occupation, a situation leading to good preservation of the remains of human activities.

Taphonomic characteristics and richness of cultural remains make Mira an ideal case study. The site provides clear instance of superposition of technologically and typologically more advanced layer II/2 industry of definitely Upper Palaeolithic appearance by more archaic layer I industry comprised both Middle and Upper Palaeolithic features and associated with anatomically modern humans. Mira cultural layer I assemblage yields fusion of traits of Crimean Middle Palaeolithic Micoquian (Kolosov *et al.* 1993), of Upper Palaeolithic Aurignacian and of Eastern early Upper Palaeolithic of River Don Area (Sinitsyn 1996, 2000).

Fusion of Middle and Upper Palaeolithic features in materials of Mira cultural layer I allows to regard it as directly related to the problem of Middle to Upper Palaeolithic transition in the territory of Eastern Europe. Cultural Layer I industry cannot be estimated as belonging to a genuine initial Upper Palaeolithic in understanding of the earliest appearance of new technologies and behaviour strategies, though there are grounds to consider it as transitional one.

Nevertheless, occurring midway between the East Carpathian Area and the Don, the distribution of the Mira cultural assemblages appears to be somehow consistent with the archaeological background of the final part of the Middle Pleniglacial at the scale of the East-European loess domain (**figure 13**). On one side, in the Dniester and Prut basins Aurignacian is well documented up to ca 27 700 BP, the full development of the classic Gravettian starting around 27 000 BP, some Early Gravettian occurrences being dated 29 350 BP at Molodova V (CL 10 and 9, *cf.* Haesaerts *et al.* 2003, 2010). Still, in this region Aurignacian and Gravettian are co-existing with some cultural assemblages containing bifacial tool-kit, reported to the "Pruth Culture" dated between 28 000 and 26 000 BP (Noiret 2009). On the other side, to the East of Moscow Streletskian is presently dated 30 100 BP at Sungir (Marom *et al.* 2012), whilst at Kostienki 14 the Gorodsovian is reported around 28,300 BP (Sinitsyn, 1996; Haesaerts *et al.*, 2004; Velichko *et al.* 2009), prior to the first Gravettian occupation dated 27 700 BP at Kostienki 8 (Praslov & Rogachev 1982). Finally, on both sides of the Russian Plain Late Aurignacian is recorded around 25 000 BP at the onset of the Late Pleniglacial, respectively at Climautsi along the Dniester (Chirica *et al.* 1996; Noiret 2009) and at Kostienki 1 as part of cultural layer III (Damblon *et al.* 1996; Sinitsyn 1996; Sinitsyn & Hoffecker 2006).

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REFERENCES

AMIRKHANOV H.A. (ED.) (1998) – *The Eastern Gravettian*. Moscow, Scientific World (in russian).

CHIRICA V., BORZIAC I.A. & CHETRARU N. (1996) – Gisements du Paléolithique supérieur ancien entre le Dniestr et la Tissa. Bibliotheca Archeologica Iassensis, *Helios V*.

COHEN V.Y. & STEPANCHUK V.N. (2000–2001) – Middle to Upper Palaeolithic transition in the Eastern Europe. *Préhistoire Européenne* 16–17:111–132.

DAMBLON F., HAESAERTS P. & VAN DER PLICHT J. (1996) – New datings and considerations on the chronology of Upper Palaeolithic sites in the Great Eurasian plain. *Préhistoire Européenne* 9:177–23.

DAMBLON, F., HAESAERTS, P. (2002) – *Anthracology and radiochronology of the Upper Pleistocene in the loessic areas of Eurasia*. BAR International Series 1063:65–71.

GERASIMENKO N. (1995) – Holocene landscapes and climate changes in Southeastern Ukraine. In: A.A Velichko (ed.), *Climate and environmental changes of eastern Europe during the Holocene*. Institute of Geography of the Russian Academy of Science, p. 38–48.

GERASIMENKO N. (1997) – Environmental and climatic changes between 3 and 5 ka BP in Southeastern Ukraine. In: H.N.Dalfes, G.Kukla & H.Weiss (eds), *Third Millennium BC Climate Change and Old World Collapse*. Berlin Heidelberg, Springer-Verlag, p. 371–399.

HAESAERTS P. (2007) – Mitoc-Malu Galben: cadre stratigraphique et chronologique. In: M. Otte, Haesaerts, P. & Chirica, V. (eds), *L'Aurignacien et le Gravetien de Mitoc-Malu Galben (Moldavie roumaine)*. ERAUL 72:15–41.

HAESAERTS P., BORZIAK I., CHIRICA V., DAMBLON F., KOULAKOVSKA L. & VAN DER PLICHT J. (2003) – The East Carpathian loess record: a reference for the middle and late pleniglacial stratigraphy in Central Europe. *Quaternaire* 14(3):163–188.

HAESAERTS P., DAMBLON F., SINITSYN A.A. & VAN DER PLICHT J. (2004) – Kostienki 14 (Voronezh, Central Russia): new data on stratigraphy and radiocarbon chronology. In: *Acts of the XIVth UISPP Congres (Liège, 2001); General Sessions and Posters*, BAR International Series, Oxford 1240:169–180.

HAESAERTS P., CHEKHA V.P., DAMBLON F., DROZDOV N.I., ORLOVA L.A. & VAN DER PLICHT J. (2005) – The loess-palaosol succession of Kurtak (Yenisei Basin, Siberia): a reference recor for the Karga Stage (MIS 3). *Quaternaire* 16(1):3–24.

HAESAERTS P., BORZIAK I., CHIRICA V., DAMBLON F. & KOULAKOVSKA L. (2007) – Cadre stratigraphique et chronologique du Gravettien en Europe centrale. *Paleo* 19:31–52.

HAESAERTS P., BORZIAK I., CHEKHA V.P., CHIRICA V., DAMBLON F., DROZDOV N.I., ORLOVA L.A., PIRSON S. & VAN DER PLICHT J. (2009) – Climatic signature and radiocarbon chronology of middle and late pleniglacial loess from Eurasia: comparison with the marine and Greenland records. *Radiocarbon* 51(1):301–318.

HAESAERTS P., BORZIAC I., CHEKHA V.P., CHIRICA V., DROZDOV N.I., KOULAKOVSKA L., ORLOVA L.A., VAN DER PLICHT J. & DAMBLON F. (2010) – Charcoal and wood remains for radiocarbon dating Upper Pleistocene loess sequences in Eastern Europe and Central Siberia. *Palaeogeography, Palaeoclimatology, Palaeoecology* 291:106–127.

HOTINSKY N.A. (1982) – Paleogeographical principles of the definition and subdivision of the Holocene of the USSR. *Striae* 16: 95–8.

KOLOSOV Y.G., STEPANCHUK V.N. & CHABAI V.P. (1993) – *Early Palaeolithic of the Crimea*. Kiev, Naukova Dumka (in russian).

KOZLOWSKI J.K. (1986) – The Gravettian in Central and Eastern Europe. *Advances in World Archaeology* 5:131–200.

MAROM A., MACCULLAG J.S., HIGHAM T.F., SINITSYN A.A. & HEDGES R.E. (2012) – Single amino acid radiocarbon dating of Upper Paleolithic modern humans. *PNAS* 1116328109:1–4.

NOIRET P. (2009) – *Le Paléolithique supérieur de Moldavie*. ERAUL 121.

OTTE M. (1985) – Le Gravettien en Europe. Paris, *L'Anthropologie* 89–4:479–503.

PALMA DI CESNOLA A. (1996) – Le Gravettien le plus ancien en Italie. In: A. Montet-White, A. Palma di Cesnola & K. Valoch (eds), The Upper Palaeolithic, Forli: *A.B.A.C.O. Edizioni*, p. 227–235.

PALMA DI CESNOLA A. (2000) – *L'Aurignacien à lamelles à dos marginal de la Grotte Paglicci au Mont Garnago (Pouilles - Italie du Sud)*. ERAUL 95:305–310.

PRASLOV N.D. & ROGACHEV A.N. (EDS.) (1982) – Palaeolithic of Kostenki-Borschevo Region on River Don. Leningrad, Nauka (in russian).

REIMER P.J., BAILLIE M.G.L., BARD E., BAYLISS A., BECK J.W., BLACKWELL P.G., BRONK RAMSEY C., BUCK C.E., BURR G.S., EDWARDS R.L., FRIEDRICH M., GROOTES P.M., GUILDERSON T.P., HAJDAS I., HEATON T.J., HOGG A.G., HUGHEN K.A., KAISER K.F., KROMER B., MCCORMAC F.G., MANNING S.W., REIMER R.W., RICHARDS D.A., SOUTHON J.R., TALAMO S., TURNEY C.S.M., VAN DER PLICHT J. & WEYHENMEYER C.E. (2009) – Intcal09 and marine09 radiocarbon age calibration curves, 0–50,000 years cal BP. *Radiocarbon* 51(4):1111–1150.

SCHWEINGRUBER F.H. (1990) – *Anatomie europäischer Hölzer. Ein Atlas zur Bestimmung europäischer Baum-, Strauch- und Zwergstrauchhölzer*. Bern u. Stuttgart, P. Haupt.

SINITSYN A.A. (1996) – Kostienki 14 (Markina Gora): Data, Problems and Perspectives. Liège, *Préhistoire Européenne* 9:273–313.

SINITSYN A.A. (2000) – *Composants archaïques de l'assemblage lithique de Kostenki XIV (Couch 2)*. ERAUL 95:295–307.

SINITSYN A.A. & HOFFECKER J.F. (2006) – Radiocarbon dating and chronology of the Early Upper Palaeolithic au Kostienki (Russia). *Quaternary International* 152–153:175–185.

SHACKLETON C.M. & PRINS F. (1992) – Charcoal analysis and the "Principle of least effort" – A conceptual model. *Journal of Archaeological Science* 19(6):631–637.

STEPANCHUK V.N. & COHEN V.Y. (2001) – *Field works at the site of Mira in 2000. In: Archaeological Discoveries in Ukraine in the years 1999–2000*, p. 221–224 (in russian).

STEPANCHUK V.N., COHEN V.Y. & PISARYEV I.B. (1998) – Mira, a New Late Pleistocene Site in the Middle Dnieper, Ukraine (Preliminary Report). *Pyrena* 29:195–204.

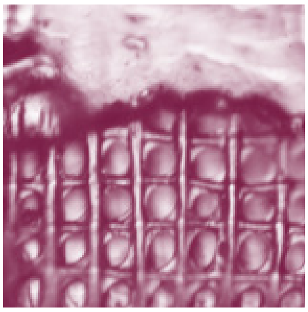
STEPANCHUK V.M., COHEN V.YU., GERASIMENKO N.P., HAESEARTS P., DAMBLON F., ZHURAVLEV O.P., KOVALYUKH N.N., PETROUGNE V.F., VAN DER PLICHT J., PUTSHKOV P.V., REKOVETS L.I. & TURNER C.G. (2004) – The multilayered open-vair site of Mira in Middle Dnieper area: the main results of 2000 year field campaign. Kamyana doba Ukrainy, Shlyah, *Kyiv* 5:62–98 (in ukrainian).

SVENSSON A., ANDERSEN K., BIGLER M., CLAUSEN H.B., DAHL-JENSEN D., DAVIES S.M., JOHNSEN S.J., MUSCHELER R., RASMUSSEN S.O., RÖTHLISBERGER R., STEFFENSEN J.P. & VINTHER B.M. (2006) – The Greenland Ice Core Chronology 2005, 15–42 ka. Part 2: comparison to other records. *Quaternary Science Reviews* 25:3258–3267.

SVOBODA J., LOZEK V. & VCEK E. (1996) – *Hunters between East and West: The Paleolithic of Moravia)*. New-York, Plenum Press.

VELICHKO A.A., PISAREVA V.V., SEDOV S.N., SINITSYN A.A. & TIMIREVA S.N. (2009) – Paleogeography of Kostienki–14 (Markina Gora). *Archaeology, Ethnography & Anthropology of Eurasia* 34(4):35–50.

WENINGER B. & JÖRIS O. (2008) – Towards an absolute chronology at the Middle to Upper Palaeolithic transition in Western Eurasia: a new GreenlandHulu time-scale based on U/Th ages. *Journal of Human Evolution* 55:772–781.



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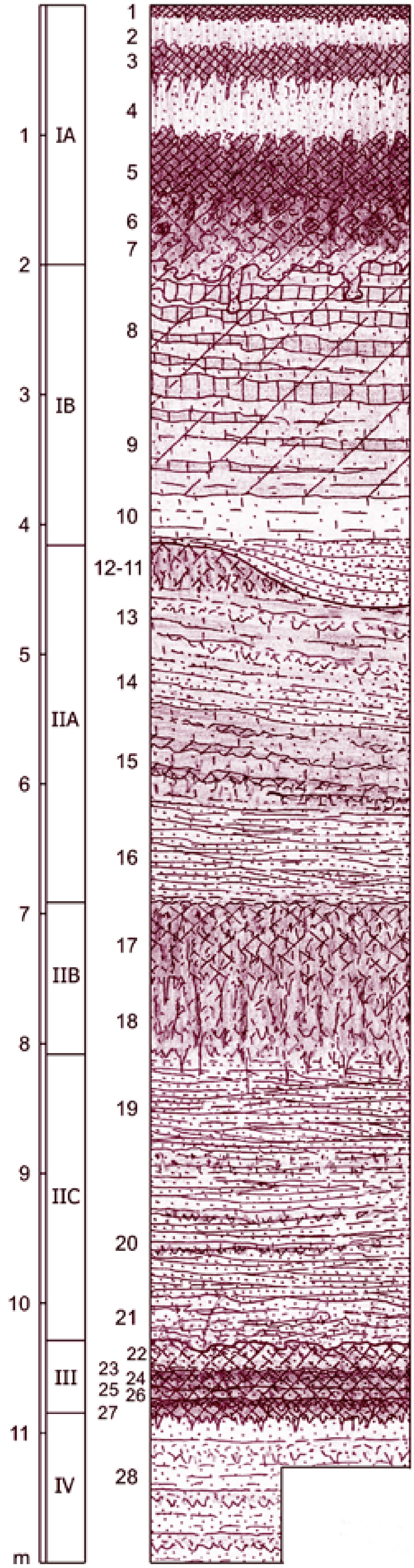


L'habitat à cabanes en os de mammouths de Gontsy (Ukraine) : une référence pour la reconstitution d'un système de chasseurs-cueilleurs dans son territoire basé sur l'économie du Mammouth

Lioudmila IAKOVLEVA

François DJINDJIAN

Abstract : *The long-term excavations of the LUP settlement of Gontsy (Ukraine), with its mammoth bone huts and associated with a mammoth bone bed, has allowed to reconstitute quite all the pieces of the puzzle of this type of settlements and the major role of the economy of mammoth in the Mezinian peopling of the middle and upper Dnepr basin (Ukraine and Russia). The settlements are generally sharing the same geomorphology of the location on a promontory cut by ravines on the slope of a river valley. The dwelling area is organized around mammoth bone huts, numerous pits around each hut, large working areas with hearths, dumping areas, butchering area for small and medium mammals and the existence of a mammoth bone bed, which has been largely exploited during the occupation of the settlement. The landscape analysis, using the information from the mapping, the functions and the seasonality of the settlements, is characterizing a particular system based on the economy of mammoth, limited to a short period between 15 000 and 14 000 BP at the beginning of the climatic change ending the last ice age. The network connections are supported by the raw material procurement on outcrops, particularly the flint and the shells, but also the amber, demonstrating the long distance travelling of the hunter-gatherer groups, both for the yearly discovery of the next settlement and during the annual cycle for various seasonal procurement.*

1 INTRODUCTION

Le site de Gontsy (Gintsy dans la langue ukrainienne) est situé sur le versant sud de la rivière Udaï (affluent de la Soula, bassin moyen du Dniepr) près de la ville de Lubny dans la région de Poltava (Ukraine). La découverte du site en 1871 a marqué le début des recherches paléolithiques en Europe orientale. Plusieurs sites d'habitats à cabanes en os de mammouths ont été fouillés dans les cent quarante dernières années par de nombreux archéologues (Iakovleva 2010) dans le bassin moyen et supérieur du Dniepr (**figure 1**), identifiant un territoire de peuplement de groupes de chasseurs-cueilleurs, spécialisés dans l'économie du mammouth, pendant une période courte de 15 000 à 14 000 BP (Djindjian *et al.* 1999 ; Iakovleva 1999, 2009a).

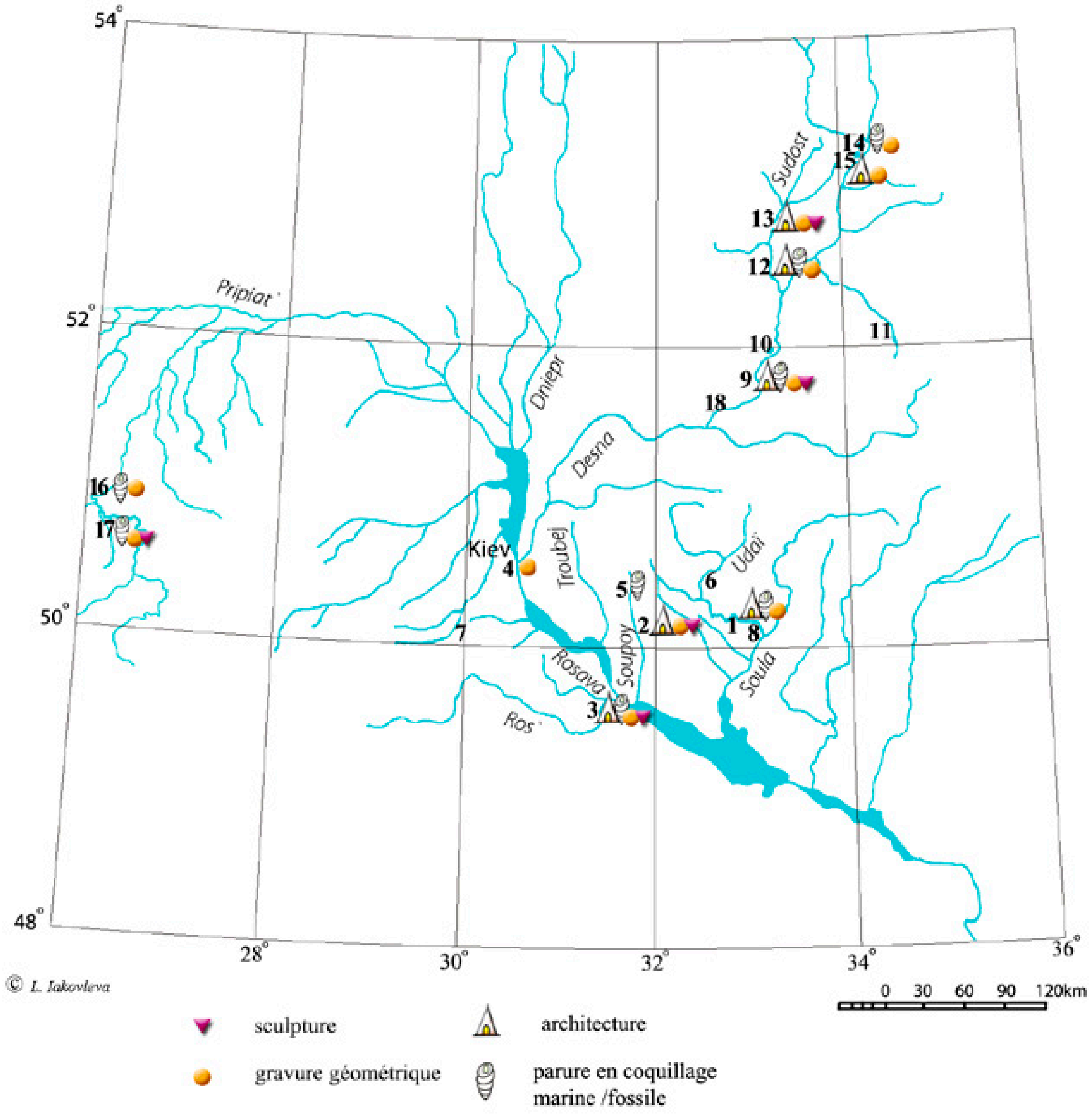


FIGURE 1 Carte des sites du Mézinien datés entre 15 000 et 14 000 BP des régions du Dniepr moyen et supérieur et de la Desna (Ukraine et Russie) : 1. Gontsy, 2. Dobranichivka, 3. Mejiriche, 4. Kiev-Kirilovskaia, 5. Semenivka, 6. Jouravka, 7. Fastiv, 8. Vilchanka, 9. Mezine, 10. Chulatovo, 11. Sevsk, 12. Ioudinovo, 13. Elisseevichi, 14. Timonovka, 15. Suponevo, 16. Gorodok, 17. Barmaki, 18. Boujanka, 19. Obolonia.

2 L'HISTORIQUE DES FOUILLES ARCHÉOLOGIQUES SUR LE SITE DE GONTSY (1871–2012)

Après la découverte du site par G.S. Kyriakov en 1871, les premières fouilles ont été menées en 1873 par F.I. Kaminski qui en publia avec le géologue K.M. Feofilactov les premiers résultats au 3e congrès d'archéologie russe de Kiev en 1878 (Kaminski 1878). Le site fut ensuite fouillé en 1905 par un amateur, Guelvig, puis en 1914–15 par V.M. Scherbakivski, conservateur du musée de Poltava, qui trouva la cabane n°1 (Scherbakivski 1919, 1926 ; Gorodtsov 1926), puis en 1935 par I.F. Levitski et A.I. Brusov, qui fouillèrent principalement l'accumulation d'ossements de mammouths (Brusov 1940 ; Levitski 1947) et en 1977–81 par V.I. Sergin qui retrouva et démonta la cabane n°1 protégée et laissée en place par Scherbakivski (Sergin 1981, 1983).

En 1993, un nouveau projet de recherches dirigé par L.A. Iakovleva (I.A. NASU) et F. Djindjian (Université de Paris 1 Panthéon Sorbonne) a démarré un programme de fouilles de longue durée dont l'objectif était de reconstituer le campement entier dans son environnement (Iakovleva & Djindjian, 2000, 2005, 2010, 2012). Après vingt années de fouilles, le site de Gontsy a révélé plusieurs cabanes en os de mammouths de différentes tailles, entourées de nombreuses fosses, des zones multiples d'activités, de rejets et de boucherie autour des cabanes et des foyers extérieurs, et à proximité immédiate au fond d'une paléoravine, une vaste accumulation d'ossements de mammouths , l'ensemble permettant pour la première fois une reconstitution quasi complète du campement (**figure 2**).

3 PRÉSENTATION GÉNÉRALE DU SITE DE GONTSY

Le site de Gontsy est situé sur un versant de la vallée de l'Udaï, sur le promontoire d'une terrasse découpée par la convergence de deux paléoravines, descendant de la plaine (**figure 3**). La stratigraphie du site a été établie à partir de nombreuses coupes réalisées sur le promontoire et dans les paléoravines, permettant de reconstituer une géomorphologie du versant. Les coupes révèlent un site à occupation multiple avec deux niveaux archéologiques (niveau supérieur et niveau inférieur), démontrant que le site a été occupé deux fois dans une courte période (moins de 500 ans considérant l'écart-type des dates ^{14}C qui se recouvrent). La différence de profondeur entre les deux niveaux est plus grande dans la paléoravine (75 cm de laminations de fonte de neige), où la sédimentation a été plus rapide que dans la zone de l'habitat sur le promontoire (20 cm de lœss). Dans le niveau inférieur, la densité des vestiges archéologiques est très élevée et les cabanes en os de mammouths, les fosses, les zones d'activités, de rejet et de boucherie sont directement et stratigraphiquement associées avec l'accumulation d'ossements de mammouths le long de la pente du promontoire vers le fond de la paléoravine. Dans le niveau supérieur, la densité des vestiges archéologiques est pauvre, et l'occupation a été courte et s'est installée entre les cabanes effondrées et presque entièrement recouvertes de lœss et au-dessus de la paléoravine alors déjà comblée. La récupération et la réutilisation d'ossements de mammouths des cabanes effondrées dans certains endroits de l'habitat ont été confirmées par des études microstratigraphiques.

Le site a été daté par le laboratoire de radiocarbone d'Oxford par une série de treize dates, entre 14 110 et 14 620 BP, sur des échantillons sélectionnés dans les niveaux inférieur et supérieur, dans les différentes zones de l'habitat et dans l'accumulation d'ossements de mammouths. Les datations ^{14}C sur l'ensemble des sites à cabanes en os de mammouths du bassin moyen et supérieur du Dniepr ont été récemment revues, et la durée de ce peuplement a été réduite de l'intervalle 22 000 - 12 000 BP à l'intervalle 15 000 – 14 000 BP (Iakovleva 1999 ; Iakovleva & Djindjian 2005).

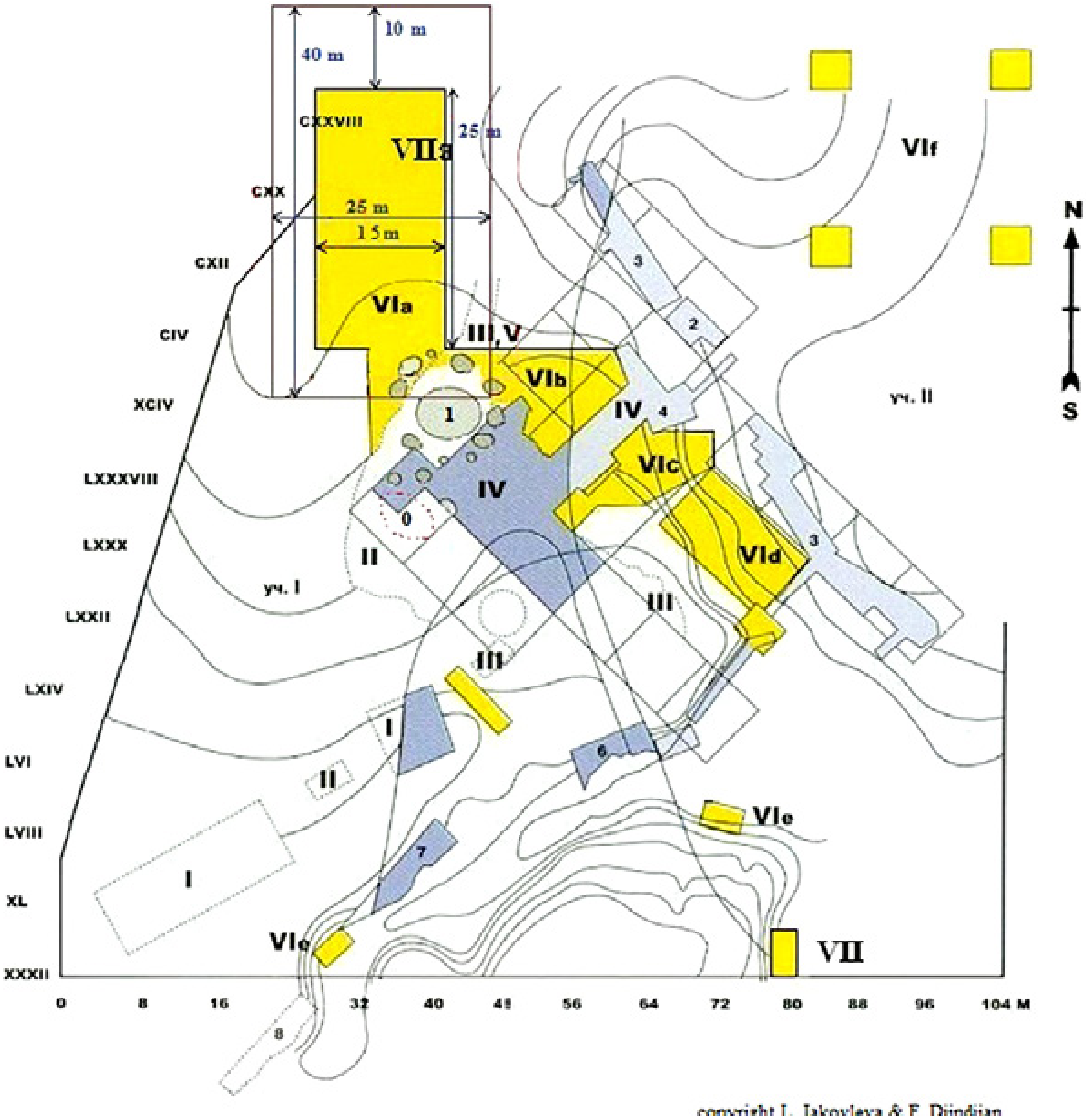


FIGURE 2 Plan de l'historique des fouilles de Gontsy (Ukraine).

L'analyse spatiale du niveau d'occupation inférieur met en évidence plusieurs zones d'activités spécialisées, numérotées A à D :

- **A :** la zone centrale des cabanes en os de mammouths et leurs fosses environnantes ; séparées entre elles par des zones d'activités A' organisées autour de foyers extérieurs,

- **B :** les zones de rejet et de vidange, incluant des vidanges de foyers et des rejets d'activités de taille ;

- **C :** les zones de boucherie, limitées aux petits et moyens mammifères chassés et ramenés entiers sur le site (renne, carnivores, rongeurs) ;

D : sur la pente et le fond de la paléoravine, une accumulation d'ossements de mammouths où quelques ossements d'autres mammifères sont trouvés mélangés, est le résultat d'une exploitation humaine intensive, démontrée par la présence de nombreux petits foyers, d'outils en silex et en matière dure animale disséminés au milieu des carcasses.

FIGURE 3 Géomorphologie du versant de la vallée de l'Udaï et localisation du site de Gontsy sur un promontoire découpé par deux ravines.

Depuis les années 2000, les fouilles archéologiques sont menées sous de grands hangars qui permettent de décaper les niveaux archéologiques, sans contraintes de temps et de météo, et de garder en place les cabanes effondrées et les niveaux archéologiques. Le hangar n°2 a été érigé au-dessus de la paléoravine orientale pour permettre le décapage de l'accumulation d'ossements de mammouths sur une surface de 100 m^2. Le hangar n°1 a été érigé sur le promontoire au-dessus d'une vaste zone d'activités. Il a été agrandi vers le Nord (hangar 1a ou 3) pour permettre le décapage d'une grande cabane découverte en 2009. La découverte de deux nouvelles autres cabanes en 2011 a obligé la construction en 2012 d'un très grand hangar de 25 x 40 m^2 (soit 1 000 m^2) au-dessus du précédent pour permettre de décaper entièrement les trois cabanes dans les années à venir et de les conserver en place.

4 LES CABANES EN OS DE MAMMOUTHS

Le promontoire sur lequel s'est installé le campement possède une superficie d'environ 40 x 80 m^2. Dans l'état actuel de nos connaissances, les cabanes semblent être grossièrement alignées dans la direction nord-sud de l'habitat.

La première structure (n°0), située la plus au sud dans le versant, est supposée avoir été trouvée par Guelvig en 1905. Nous ne la connaissons que par trois fosses fouillées par Levitski et Brusov en 1935, qui ont émis l'hypothèse de l'existence de cette cabane.

FIGURE 4 Les cabanes n°3, 4 et 5 en cours de décapage conservées dans le hangar 1a.

La deuxième structure (cabane n°1) a été trouvée durant les fouilles 1914–15 par Scherbakivski. Elle aurait été construite sur les fondations d'un cercle de six mètres de diamètre de 28 crânes de mammouths. Dix fosses l'entouraient (trouvées par Scherbakivski, Levitski et Brusov, Sergin et nous-mêmes). La structure, protégée par une protection en bois et ré-enfouie en 1915 a été malencontreusement démontée par Sergin en 1977.

La troisième structure (petite cabane n°2) est une petite cabane d'environ 2,7 x 1,7 m^2. Construite principalement à partir de deux défenses, un crâne, un os long et des fragments d'alvéoles crâniennes. La cabane est construite au-dessus d'une dépression ovalaire remplie par un sédiment noir résultant de la décomposition d'une litière en matériau organique ou du piégeage des cendres d'un foyer installé au sommet d'une fosse comblée située juste à proximité sud de la cabane. L'intérieur de la cabane n'a livré que trois pièces toutes exceptionnelles : un marteau réalisé sur la base d'un bois de chute d'un gros renne adulte male, un fragment de bassin utilisé comme récipient à colorant et l'extrémité d'une défense gravée d'un jeune mammouth.

La quatrième structure est un petit amas d'ossements de mammouths, comprenant sur une surface de moins de 3 m^2, un minimum de trois bassins, une omoplate, deux défenses, deux os longs et un fragment de crâne. L'amas n'a pas été décapé. Il pourrait s'agir du sommet d'une fosse remplie d'ossements de mammouths.

FIGURE 5 La cabane n°4 après décapage sous le hangar 1a.

La cinquième structure (grande cabane n°3) est une grande cabane de plus de six mètres de diamètre, partiellement fouillée en 2009 et 2010 sur une surface de 25 m^2. Cette structure se trouve en grande partie sous la paroi ouest du hangar de protection et la poursuite de son décapage est actuellement reportée après l'aménagement du nouveau hangar. L'inventaire très provisoire des 179 ossements de la structure est de 103 défenses, 50 omoplates, 8 crânes, 5 mandibules, 4 bassins, 9 os longs, pour une cabane dont nous n'avons probablement que la moitié de la superficie décapée aujourd'hui (**figure 4**).

La sixième structure (cabane n°4), entièrement finie de décaper en 2011, a fait l'objet d'une étude approfondie en 2012 (**figure 5**). C'est une petite cabane de 4 x 2,6 m^2 comprenant 62 gros ossements (15 crânes, 24 défenses, 14 omoplates, 6 bassins, 3 os longs).

Les fondations et les parois sont assurées par un alignement ovalaire de douze crânes. Trois sont restés en place, deux ont basculé vers l'extérieur, six ont basculés vers l'intérieur et un a basculé sur le côté. Des six bassins, quatre étaient en paroi et deux ont été découverts au centre de la structure. Dix omoplates (plus quatre fragments) étaient placées dans la paroi. Vingt-deux défenses ont été trouvées avec une répartition remarquable en périphérie dans les parois, et plus nombreuses dans la paroi Sud que dans la paroi Nord. Trois os longs ont été trouvés : sans doute placés dans les parois, un a basculé vers l'extérieur et deux vers l'intérieur dont le fémur à l'épiphyse gravée d'un signe féminin.

La structure effondrée n'a pas été totalement recouverte par le sédiment quand les seconds occupants du site sont arrivés. Installés dans la zone nord-est, ils ont creusé à l'intérieur de la cabane comme le montre le niveau supérieur à fort pendage à cet endroit-là descendant dans la cabane et le déplacement de quelques gros ossements

Cette sixième structure a été séparée de la cinquième à l'issue de l'étude détaillée de 2012. Ces deux structures sont proches l'une de l'autre, et ne sont séparées que par deux mètres carrés où ont été trouvé deux os longs piqués enfoncés dans le sol, qui ont été interprétés comme les vestiges de piquets, à l'usage encore hypothétique.

La septième structure (grande cabane n°5), qui avait été repérée par un sondage de 2 x 2 m^2 effectué en 2006, est une grande cabane de plus de six mètres de diamètre. Son décapage a commencé en 2011, dans sa partie Sud, sur 40 % de sa périphérie qui a mis en évidence une paroi construite de mandibules entassées en V, de crânes et d'os longs alignés verticalement. En 2012, le décapage de l'intérieur a commencé. Sur les 30 m^2 décapés de cette cabane en 2011 et 2012, l'inventaire des 172 ossements de construction est le suivant : 28 crânes, 7 fragments de crâne, 7 mandibules, 52 défenses, 43 omoplates, 4 bassins, 2 fémurs, 6 humérus, 1 fibula, 1 ulna, 3 tibia, 2 radius, 4 fragments de diaphyse, 6 épiphyses, 6 côtes. Ces 30 m^2 décapés ne représentent que moins de la moitié de la cabane dans sa totalité (**figure 4**).

5 LES ZONES D'ACTIVITÉS

Le décapage d'un site à cabanes en os de mammouths ne s'effectue pas avec la même technique de fouilles que le décapage de fins niveaux d'occupation ou de structures d'habitat comme celles du Magdalénien (Pincevent, Étiolles, Champréveyres, Monruz, *etc.*).

Le décapage atteint d'abord le niveau d'effondrement de la cabane qui est constitué de gros ossements s'étant détachés de la cabane au moment de son effondrement et de nombreux fragments osseux, essentiellement des fragments d'os de crâne, des fragments de molaires et des fragments d'os plats. Ce niveau d'effondrement est présent uniquement à l'intérieur et dans la périphérie extérieure immédiate des cabanes effondrées. Le décapage atteint ensuite le sédiment de colmatage des parois qui a coulé vers l'intérieur et l'extérieur de la cabane tout en conservant en place les gros ossements tombés, jusqu'à découvrir le sol d'occupation de la cabane et ses foyers. Des banquettes de contrôle permettent une approche prudente et maîtrisée du décapage. En aucun cas, le décapage ne continue jusqu'à la base des fondations des parois de la cabane.

Les anciennes fouilles de sites à cabanes en os de mammouths du Mézinien ont généralement démonté le sol d'occupation pour atteindre le niveau de fondation, situé à la base du cercle des crânes de fondations et au fond des fosses, comme à Mejiriche ou Mézine, permettant ainsi le démontage complet de la cabane. Cette approche a laissé aux observateurs extérieurs l'impression d'un vide entre les cabanes alors qu'en fait une fine couche d'occupation est présente partout sur l'ensemble de l'habitat.

Pendant la campagne 1998, une zone d'activités de 40 m^2, située à l'ouest de la cabane n°1, a été décapée.

Elle a fourni, outre la petite cabane n°2 (structure n°3), trois fosses dont une remplie d'ossements de mammouths et surmontée d'un foyer, une deuxième petite fosse remplie d'omoplates et une troisième petite fosse remplie de vestiges de débitage, un foyer de colorant, un micro-amas d'esquilles et une distribution variée de vestiges divers qui ont fait l'objet d'une analyse spatiale et tracéologique (travail de la peau, de l'os et du bois).

Entre 2001 et 2006, protégée sous le hangar 1, une zone d'activités de 66 m^2 a été décapée. Elle a fourni la structure n°4 et plusieurs foyers. Dans cette zone, la couche supérieure et la couche inférieure étaient présentes, séparées par 20 cm d'un loess stérile. Cette zone est en prolongement direct vers le Nord de la zone de 1998 (**figure 6**).

En 2011, le décapage sous le hangar agrandi n°1a, a permis de vérifier la présence de ce niveau d'occupation entre les cabanes n°3, 4 et 5 sur une superficie de 20 m^2. Un niveau d'occupation était donc présent sur l'ensemble du site. Et il l'était donc sur l'ensemble des sites à cabanes en os de mammouths de cette période.

FIGURE 6 Zone d'activités entre les cabanes n°1, 2 et 3 avec niveau supérieur et niveau inférieur conservée sous le hangar 1.

6 LES ZONES DE VIDANGES ET DE REJETS

À l'est de la cabane n°1, au-delà des fosses, s'aligne, sur plusieurs mètres de long et plus de deux mètres de large, une série d'amas de vidanges et de rejets, orientée nord-sud. Ce sont des vidanges de foyers et des rejets de débitage. Les vidanges de foyers sont constituées de cendres et de petits fragments d'os brûlés (de couleur blanche, grise et noire) et possèdent la même composition que les foyers en place des zones d'activités. Les accumulations de rejets de débitage sont constituées de cassons, esquilles, petits éclats corticaux et fragments de lamelles.

7 LA ZONE DE BOUCHERIE

Au-delà de la zone de vidanges et rejets, apparaît une zone, décapée sur environ 10 m^2 durant la campagne 1997, constituée essentiellement de fragments d'ossements de renne, carnivores et rongeurs dont certaines parties sont encore en connexion anatomique (patte de lièvre). Cette zone a été interprétée comme une zone de boucherie de petits et moyens mammifères, rapportés entiers au campement.

8 LA ZONE D'ACCUMULATION D'OSSEMENTS DE MAMMOUTHS

Les premiers ossements de mammouths apparaissent alors que le promontoire commence à plonger dans la paléoravine et en recouvrent totalement la pente et le fond sur une bonne centaine de mètres, dans une orientation nord-sud, suivant la pente du versant. À ce niveau du versant, la ravine n'a plus que deux à trois mètres de profondeur et est déjà largement évasée. Seule la partie occidentale de la ravine a été fouillée entre 1994 et 2006, la partie orientale ayant été fouillée en 1935 par une longue tranchée orientée nord-sud.

La reconstitution du site de Gontsy est ainsi rendue possible à 80 % environ par nos fouilles, complétées par les publications de Kaminski, de Scherbakivski, de Levitski et Brusov et les tentatives de Sergin. Seule la partie sud-ouest du site détruite par les fouilles de Guelvig nous est inconnue.

9 L'ACCUMULATION D'OSSEMENTS DE MAMMOUTHS DE LA PALÉORAVINE ORIENTALE

L'accumulation d'ossements de mammouths de la paléoravine orientale a été fouillée sur une grande superficie durant les fouilles 1935 de Levitski et Brusov et durant nos propres fouilles : pendant les campagnes 1994 à 2000 pour les zones démontées et 2004–2006 pour les zones conservées sous le hangar n°2, sur une superficie totale d'environ 1000 m^2 (**figure 7**).

L'étude détaillée des 80 m^2 de l'accumulation conservée sous le hangar 2 a été récemment publiée (Iakovleva *et al.* 2010), et nous la résumerons rapidement ici en l'intégrant ses résultats dans l'ensemble reconstitué des 1 000 m^2 de l'accumulation.

L'accumulation d'ossements de mammouths est un niveau unique, reposant partout sur une même lamination limono-sableuse, qui peut être suivie sur l'ensemble de la paléoravine.

FIGURE 7 Accumulation d’ossements de mammouths conservée sous le hangar 2.

Les ossements sont tous en place, sauf les fragments osseux les plus fins qui ont été lessivés par l’eau de la fonte des neiges, et qui sont trouvés à un à deux centimètres au-dessus des ossements, et que le décapage atteint en premier.

Il n’y a pas d’ossements en-dessous et au-dessus de l’accumulation d’ossements de mammouths, sauf une exception citée ci-après, et il n’y a pas d’autres accumulations d’ossements de mammouths à une autre altitude dans la paléoravine.

La paléoravine a été comblée très rapidement (en moins de 500 ans) par des laminations limono-sableuses au fond de la ravine, puis par des laminations limono-argileuses au sommet de la paléoravine, conséquences d’un gravité décroissante au fur et à mesure du comblement de la ravine. 75 cm d’altitude séparent le niveau inférieur et le niveau supérieur dans la paléoravine, démontrant une sédimentation rapide et révélant un changement climatique à ce moment-là, sinon en température mais certainement en humidité, à l’origine d’importantes chutes de neige pendant l’hiver.

Le fond de la ravine était sec, durant l’hiver comme durant l’été, réfutant l’hypothèse d’une mare où les mammouths auraient pu venir boire ou manger des argiles.

Les os de mammouths sont intacts. Même s’ils ne sont pas trouvés dans une totale position anatomique du fait de l’exploitation des carcasses, quoique les exemples de quasi-position anatomique soient nombreux, il est possible d’identifier les carcasses dont ils sont les parties anatomiques.

Les os de mammouths sont dans un parfait état de conservation, sans morsure de carnivores et sans altération climatique, indiquant un enfouissement rapide. Les os les plus fragiles du squelette, comme les ossements de fœtus et les os hyoïdes sont présents et bien conservés.

Les ossements les plus nombreux sont les côtes, les vertèbres, les sternums et les extrémités de pieds (phalanges, métapodes, sésamoïdes, carpes, tarses). Ils représentent presque 90 % de la totalité des ossements (en comptant les fragments). Il y a donc une surreprésentation de ces os et une sous-représentation des omoplates, bassins, crânes, défenses, mandibules et os longs. C'est exactement l'inverse dans l'inventaire des ossements utilisés dans la construction des cabanes.

La tentative de reconstituer des individus entiers à partir des ossements a échoué, les os du squelette encore présents n'étant plus en moyenne que 20 % des os du squelette complet, démontrant une exploitation anthropique importante de l'accumulation d'ossements de mammouths.

Les ossements de mammouths ont été utilisés aussi comme combustible dans les nombreux foyers intérieurs des cabanes et extérieurs du camp, ainsi que l'indique les très nombreux charbons d'os trouvés dans ces foyers mai aussi dans les vidanges de foyers, confirmant que ce sont des ossements encore frais qui ont été utilisés dans les foyers, et expliquant le faible pourcentage de parties anatomique par squelette dans l'accumulation, qui a été exploitée systématiquement pour la construction des cabanes, pour le combustible et pour la fabrication d'outils.

Dans une publication précédente (Iakovleva *et al.* 2010), nous avions souligné la découverte à cet endroit des ossements d'un grand male adulte (avec la présence de deux défenses, d'un crâne, d'une mandibule, d'une omoplate, d'un demi-bassin et de plusieurs os longs), qui était une exception à la distribution statistique des parties anatomiques évoquée précédemment et à la composition d'un cortège naturel de mammouths. Une opération de restauration préventive nous a obligés à démonter en 2011 plusieurs de ces grands ossements pour les traiter en laboratoire, ce qui nous a amené à découvrir en-dessous des ossements d'individus subadultes. La révision des données d'altitude de l'ensemble de l'accumulation d'ossements de mammouths, nous a permis de conclure que ce mammouth adulte male n'est pas contemporain de l'accumulation d'ossements de mammouths, mais postérieur à lui et aussi de l'occupation du campement. Nous avons également pu retrouver dans les zones fouillées entre 1993 et 2000, quelques ossements de cet adulte male, eux-aussi situés une dizaine de centimètres au-dessus du niveau d'accumulation d'ossements de mammouths. Il s'agit donc d'un vieux male solitaire venu mourir à cet endroit.

Sur les 80 m^2 de l'accumulation conservée sous le hangar 2, le cortège de mammouths est donc désormais composée de six (6) individus d'âge et de sexe différents incluant une femelle adulte, deux adultes indéterminés, un subadulte et deux juvéniles. Ils correspondent donc bien à un cortège naturel.

Quelques ossements isolés d'autres mammifères sont présents au milieu des ossements de mammouths : Ils proviennent du niveau d'occupation inférieur de l'habitat du promontoire et ont été jetés au fond de la paléoravine, confirmation supplémentaire de la contemporanéité entre l'accumulation d'ossements de mammouths et le niveau inférieur de l'habitat. En 2011, deux ossements d'un même pied de renne ont été remontés, l'un provenant de l'accumulation d'ossements de mammouths de la ravine et l'autre du niveau inférieur de l'habitat sous le hangar 1a.

De nombreux foyers ont été trouvés dans l'accumulation d'ossements de mammouths (dix foyers sur les 80 m^2 du hangar 2) montrant l'important besoin en feu pour l'exploitation de l'accumulation d'ossements de mammouths, qui ne saurait s'expliquer si les carcasses étaient réduites à des ossements : décongélation de la chair, calcination de la peau et des poils, séchage ou fumage de la viande, *etc.*

Des outils ont été trouvés au milieu des ossements de l'accumulation : lames et lamelles, burins, fragments de nucleus présentant généralement un bord coupant (environ 115 artefacts). L'étude de tracéologie effectuée par G. Sapozhnikova a conclu que ces artefacts avaient été utilisés comme couteau à viande pour des activités de boucherie. Les outils en matière dure animale sont également présents comme une extrémité appointée de défense de jeune mammouth et un demi bassin retouché utilisé comme tranchet pour éclater un crâne et ses molaires en centaine de petits fragments, et trouvé parmi eux.

En conclusion, l'étude de l'accumulation d'ossements de mammouths de Gontsy met en évidence l'existence d'un cortège naturel de mammouths, intensément exploitée par l'homme, pour l'approvisionnement en matériaux de construction pour ses cabanes, en combustible pour ses foyers, en matière première pour ses outils et en viande pour son alimentation, définissant une véritable économie du mammouth.

10 LES RELATIONS ENTRE LES ACCUMULATIONS D'OSSEMENTS DE MAMMOUTHS ET LES HABITATS À CABANES EN OS DE MAMMOUTHS DANS LE PALÉOLITHIQUE SUPÉRIEUR EUROPÉEN

Sur le territoire du bassin moyen et supérieur du Dniepr, de nombreuses concentrations d'os de mammouths ont été découvertes :

- certaines de ces accumulations n'ont pas été exploitées. C'est le cas, par exemple, à Jouravka où l'accumulation a été trouvée non loin d'un site de chasse saisonnière aux marmottes, ou à Vilchanka près de Lubny ;

- certaines de ces accumulations ont été peu exploitées, comme par exemple à Sevsk, près de Briansk (Maschenko *et al.* 2006), mais aussi en Sibérie orientale à Berelëkh, fameuse accumulation naturelle associée à un habitat de la culture Dyuktai (Pitulko 2011 ; Abramova 1995a), où cependant les paléontologues y ont trouvés mélangés des artefacts en silex et d'autres ossements ;

- certaines de ces accumulations ont été trouvées associées étroitement avec un habitat, situé très près de l'accumulation, et intensément exploitées, comme à Gontsy.

De retour sur l'inventaire des sites du paléolithique supérieur récent du bassin moyen et supérieur du Dniepr, il est intéressant d'y noter deux différents types de sites (Iakovleva 2009a) :

- les grands habitats à cabanes en os de mammouths comme Gontsy, Kiev-Kirilovskaia, Mézine, Mejiriche, Dobranichivka, Ioudinovo, Elisseevichi 1, 2, Timonovka 1, 2, Suponevo, Barmaki, Boujanka 2 ;

- des camps saisonniers de passage, sans cabanes en os de mammouths comme Bougorok, Jouravka, Fastiv, Semenivka 1, 2, 3. Le niveau supérieur de Gontsy en fait partie.

Pour certains autres sites trop anciennement ou trop partiellement fouillés à une époque où l'existence de cabanes n'était pas reconnue (avant 1950 pour les cabanes en os de mammouth du Mézinien), la distinction entre accumulation d'ossements de mammouths et cabanes en os de mammouths n'a pas été faite (Soffer 1985).

Aujourd'hui, les études taphonomiques d'ossements de mammouths permettent une bien meilleure détermination :

- une représentation complète des parties anatomiques entières et la composition d'un cortège naturel : une accumulation non exploitée d'ossements de mammouths ;

- une surreprésentation des côtes, vertèbres, et des os de pieds ; quelques artefacts en silex et en matière dure animale : une accumulation exploitée d'ossements de mammouths ;

- une surreprésentation des omoplates, bassins, crânes, défenses, mandibules, os longs : une cabane en os de mammouths d'un habitat ;

- très peu d'ossements de mammouths le plus souvent fragmentés et brûlés ou transformés en outils (majoritairement des côtes et des extrémités de défenses de jeunes individus) : une zone d'activités d'un habitat ;

- une pile d'ossements de plusieurs mammouths : une fosse généralement située près d'une cabane d'un habitat ;

- un amas isolé d'ossements provenant d'un seul individu : soit un individu mort naturellement soit un individu chassé et mort à cet endroit, puis dépecé. Seul l'absence de certaines parties anatomiques et la présence d'artefacts ayant servi à le tuer (pointes) ou à le dépecer (couteaux) peuvent permettre de l'identifier.

Dans la littérature, les accumulations d'ossements de mammouths trouvés dans le fond de paléoravines ont souvent été interprétées avant les années 1950 comme des habitats remaniés. L'archéologue a alors considéré que les artefacts, qui ne présentaient pas de concentration spatiale, avaient glissé par solifluxion dans la ravine. C'est le cas des sites de Puchkari II, Kurovo, Novo Bobovichi, qui n'ont été fouillé que durant une seule campagne du fait de la pauvreté des artefacts et des structures archéologiques. Il n'est pas aisé, de nombreuses années après les fouilles, de réviser ces interprétations. Une approche préliminaire est de construire un diagramme croisant deux ratios pour séparer les deux types de sites :

- **R1 :** côtes + vertèbres + sternum + os de pieds + hyoïdes + os fœtus/total des os,

- **R2 :** omoplate + bassin + crâne + mandibule + défense + os longs/total des os

Un deuxième cas concerne les sites où l'archéologue a des difficultés de distinguer dans les zones fouillées entre une accumulation d'ossements de mammouths et une cabane effondrée, comme par exemple dans les sites anciennement fouillés de Kiev-Kirilovskaia ou de Suponevo, mais aussi plus récemment pour les sites situés plus au Nord, où les phénomènes périglaciaires ont significativement perturbé les niveaux d'occupation comme à Elisseevichi (Velichko *et al.* 1997) et Timonovka (Velichko *et al.* 1977).

Un troisième cas concerne les sites où seulement quelques cabanes ont été fouillées comme à Mejiriche (Pidoplichko, 1969, 1976), Dobranichivka (Chovkoplass 1972) et Ioudinovo (Abramova 1995b ; Abramova *et al.* 1997a, 1997b). Dans certains cas, l'archéologue a trouvé par sondages l'emplacement de l'accumulation mais la priorité a été donnée à la fouille plus spectaculaire des cabanes (c'est le cas de Pidoplichko à Mejiriche). Dans d'autres cas, l'accumulation n'a pas été trouvée pour des raisons diverses : des fouilles de sauvetage (Dobranichivka) ou des raisons géomorphologiques (Ioudinovo est un site très proche de la rivière Desna).

11 UN SYSTÈME DE CHASSEURS-CUEILLEURS BASÉ SUR L'ÉCONOMIE DU MAMMOUTH

Nous avons récemment proposé (Iakovleva *et al.* 2011) une nouvelle hypothèse concernant le rôle majeur du mammouth dans l'économie du système Mézinien : « à proximité immédiate de chaque habitat à cabane en os de mammouths, existe une accumulation d'ossements de mammouths, antérieure à et cause de l'installation de l'habitat à cet endroit ».

La question de l'origine de cette accumulation est alors cruciale. Les données actuelles ne permettent pas de statuer définitivement entre l'hypothèse d'une origine naturelle (tempête de neige, famine) et l'hypothèse d'une chasse avec une technique d'extermination en place d'un troupeau de mammouths qui n'a pas encore été démontrée (feu, piégeage en extrémité amont de ravine).

En outre, la capacité des diagrammes de profil d'âge des mammouths pour discriminer entre une origine naturelle et une origine anthropique (Cf. Oliva, 2009, pour une discussion) n'est pas convaincante parce que dans de nombreux cas, différents processus peuvent produire les mêmes diagrammes de profil d'âge.

La présence d'une accumulation d'ossements de mammouths à proximité et associée à l'habitat a été également documentée dans le Pavlovien à Dolni Vestonice (Valoch 1996) et à Milovice (Oliva 2009) et dans le Gravettien oriental à Krakow-Spadzista (Kozlowski 2003).

Il est alors naturel de se demander si les sites du Pavlovien, du Gravettien oriental et du Mézinien n'appartiennent pas à un même système plus global spécialisé dans l'économie du mammouth. Nous avons appelé ce système « stratégie semi-sédentaire » (Djindjian 2009 & ce volume) : un large territoire de près de 100 000 km^2, un habitat occupé près de 8 à 10 mois par an et utilisé comme habitat résidentiel, des déplacements liées à des chasses saisonnières ou spécialisées et à l'approvisionnement en matières premières (silex, ambre, coquillages, ocre). La gestion des ressources alimentaires est principalement basée sur le mammouth, ceux de l'accumulation dont la congélation a dû être suffisamment rapide pour rester consommable et la décongélation suffisamment découverte à temps pour être encore consommable, auxquels il faut ajouter les individus qui ont été chassés hors du site, dépecés à l'endroit de leur épuisement et ramenés par morceaux au camp. Leur taphocénose n'est malheureusement pas distinguable des nombreux individus de l'accumulation.

Sont également présents les rennes, ramenés entiers et dépecés sur l'habitat. Plus rares, sont les chevaux et bisons, et très rares, les rhinocéros et les bœufs musqués, qui ne sont ramenés au camp que par parties dépecées. Tous ensembles, ils ne peuvent contribuer aux ressources alimentaires du groupe sur l'ensemble de la durée d'occupation du camp.

L'approvisionnement en fourrure constitue le deuxième rang de la taphocénose après le mammouth, avec le renard commun et l'isatis, le glouton, le loup, la marmotte et le lièvre.

Cette économie du mammouth est peu fréquente dans le Paléolithique supérieur européen et possède une durée de vie courte, liée à des conditions climatiques exceptionnelles, un climat froid et surtout très sec : Pavlovien (28 000–26 000 BP), Gravettien oriental (24–21 000 BP) et Mézinien (15 000–14 000 BP).

La géomorphologie joue un rôle important dans la localisation des sites d'habitat. Ils sont situés sur une terrasse de versant de vallée, découpée par un système de ravine (Gontsy, Mejiriche, Kiev-Kirilovskaia, Mezine, *etc.*), ou sur le versant d'une colline (sites de Pavlov, Krakow-Spadzista). Ils sont adossés au versant et ont une large vue sur la vallée ou sur les rivages d'un lac.

À Gontsy, les études de saisonnalité qui sont basées sur la présence des fœtus de mammouths, des bois de rennes, des marmottes et des ossements d'animaux à fourrure, révèlent une longue période d'occupation du site du début du printemps jusqu'en hiver.

Il est logique de considérer que le site a été abandonné quand les ressources de l'accumulation ont été épuisées (nourriture, combustible), probablement à la fin de l'hiver. C'est le moment où les chasseurs prospectent le territoire pour découvrir à la fonte des neiges un autre troupeau congelé et installer un nouveau campement à proximité. Dans ce modèle, la durée d'occupation d'un site n'excède pas le cycle annuel. Les cabanes sont abandonnées et finissent par s'effondrer. Le loess sédimente et enfoui les structures. Il n'y a pas réoccupation du site, ce qui explique la découverte à la fouille de structures nettes et spectaculaires.

Cependant, nous connaissons des cas de seconde réoccupation dans plusieurs sites, comme à Gontsy, Mejiriche et Kiev-Kirilovskaia, mais après un certain temps. À Gontsy, il y a 20 cm de loess stérile entre les deux niveaux d'occupation. La ravine était presque entièrement comblée au moment de l'arrivée des seconds occupants. Les cabanes effondrées émergeaient encore du sédiment par quelques ossements révélant l'existence d'un ancien habitat. Les occupants se sont installés entre les cabanes et au-dessus de la ravine comblée, n'y laissant que des foyers et des zones d'activités, témoignant donc d'une occupation courte, saisonnière ou même d'un bivouac, profitant de la bonne situation du site ou de la récupération possible de matériaux.

12 L'APPROVISIONNEMENT EN SILEX

Les gîtes de matières premières lithiques sont encore très mal connus en Ukraine. Les études initiées par les géologues ukrainiens dans les années d'après-guerre n'ont malheureusement pas été suivies comme ailleurs de constitution de lithothèques de référence. Dans le cadre du projet Econet n°10148QD, qui associait des spécialistes français, hongrois et ukrainiens, nous avions lancé en 2003 un projet de lithothèque sur l'Ukraine installée dans les locaux de l'Université Taras Chevtchenko à Kiev. Dans ce contexte, les synthèses sur les origines de matières premières n'en sont qu'à leurs balbutiements et ne contribuent que faiblement à la mise en évidence des déplacements des groupes.

À Gontsy, l'étude des matériaux lithiques a fait l'objet de deux classements, par F. Djindjian et par S. Grégoire et d'une étude approfondie par S. Grégoire encore inédite (**figure 8**).

TYPE DE MATÉRIAU (DJINDJIAN)	TYPE DE MATÉRIAU (GRÉGOIRE)	DESCRIPTION	FRÉQUENCE	ORIGINE
Type 1	GS1	silex gris noir tacheté gris blanc avec cortex jaune clair	Fréquent	Cénomanien
Type 2	GS1	silex gris noir mat	Rare	Cénomanien
Type 3	GS1	silex marron foncé translucide avec cortex blanc	Fréquent	Cénomanien
Type 4	GS1	silex beige clair (miel ?) translucide avec cortex noir	Rare	inconnue
Type 5	GS6	silex opalescent clair jaune à cortex fin, lisse blanc	Fréquent	inconnue
Type 6	GS1	silex noir mat avec cortex noir grumeleux	Fréquent	Bathonien
Type 7	GS1	silex noir chocolat avec cortex noir mat	Fréquent	Bathonien
Type 8	GS4	silex gris oolithique	Rare	inconnue
Type 9	GS5	silex gris opaque à bandes blanches	Rare	Moraine
Type 10	GS1	silex couleur caramel lustré	Rare	Cénomanien
Type 11	GS2	silex gris beige à fossiles	Rare	Moraine
Type 12	GS3	Silex gris beige à imprégnations ferrugineuses, avec traces de choc	Rare	Moraine
Type 13	GS7	Cristal de roche	Rare	Kiev
Type 14 (= 10)	GS1	Jaspe orange	Rare	Cénomanien
Type 15	GS9	Schiste	Rare	Moraine
Type 16	GS8	Calcaire silicifié	Rare	Moraine

FIGURE 8 Les types de silex taillés sur le site de Gontsy et leur origine probable.

Plus de 90 % de la matière première est constituée de cinq types (1, 3, 5, 6, 7 ou GS1, GS6). Les types GS1 sont géologiquement originaires du Bathonien et du Cénomanien. Un gîte en place est bien connu dans un fond de ravine, à Kanev, à proximité de Mejiriche, dont la matière première est très majoritairement issue de ce type de gîte. Le type GS6 est d'origine inconnu. Les autres types sont rares. Certains sont d'origine morainique locale. D'autres sont d'origine encore inconnue.

La séquence de fabrication de l'industrie lithique nous apporte des informations supplémentaires.

La séquence de débitage est essentiellement lamellaire et les outils (grattoirs unguiformes, burins, lamelles à dos) sont façonnés sur des petits supports. Cette dimension des supports correspond bien aux quelques rares rognons et galets de silex trouvés intacts ou cassés dans les niveaux archéologiques. Mais il existe exceptionnellement des lames entières ou quasi-entières et surtout des fragments de lames cassées. L'aspect lamellaire de l'industrie semble donc être en relation directe avec l'approvisionnement en rognons de silex de petites dimensions. Mais à l'occasion de déplacements, des rognons de plus grandes dimensions ont été approvisionnés autorisant un débitage laminaire dont les produits ont été soigneusement conservés jusqu'à complète exhaustion.

L'étude des produits de la séquence de débitage des différentes matières premières conduit à mettre en évidence trois catégories de matières premières :

- **types 5, 8, 10, 14 :** les matières premières allochtones rares pour lesquelles nous n'avons que des produits finis (lames, lamelles, outils) ;

- **types 6 et 7 :** les matières premières allochtones fréquentes pour lesquelles nous avons des nucléus, lames, lamelles et outils mais peu de déchets de débitage (cassons, esquilles, petits éclats, microlamelles) ;

- **types 1, 2 et 3 :** les matières premières locales pour lesquelles nous avons la séquence complète du débitage : rognon, éclat d'épannelage, lames et lamelles à crête, éclats corticaux, cassons, esquilles, petits éclats, microlamelles.

La matière première d'étage cénomanien, constituée d'un silex gris noir tacheté à cortex jaune clair et d'un silex marron foncé translucide à cortex blanc, d'origine locale, représente 80 % du silex utilisé sur le site et 65 % des outils. Des rognons de ce silex ont été trouvés dans le site et à proximité. L'ensemble de la séquence de débitage est présent. Les gîtes de silex n'ont pas été trouvés malgré les prospections. Il est possible que cette matière première soit d'origine secondaire.

La deuxième matière première par ordre d'importance, d'étage bathonien, est un silex noir mat avec des inclusions chocolat, d'origine allochtone, qui représente 3 % du débitage total et 12 % de l'outillage total. L'ensemble de la séquence de débitage n'est pas présent. Le silex a été introduit sans le site sous forme de nucléus et de produits. Le gîte de Kanev situé à quelque 150 km de Gontsy pourrait être l'origine de ce silex (**figure 9**).

En conclusion, l'étude des matières premières des artefacts lithiques et de leur séquence de fabrication met en évidence l'existence d'approvisionnements locaux mais aussi distants, témoignant de déplacements lointains (de l'ordre de la centaine de kilomètres et plus) liés à la rareté d'affleurements de silex dans la géologie du bassin du Dniepr.

FIGURE 9 Types de silex et distribution spatiale de leur procédé de fabrication.

ARTEFACTS 1993-2000 EN POURCENTAGE	SILEX NOIR, NOIR TACHETÉ ET MARRON TRANSLUCIDE CÉNOMANIEN (TYPES 1, 3)	SILEX NOIR CHOCOLAT BATHONIEN (TYPE 7)
Outils	5	20
Lame, lamelle, Éclat laminaire	18	41
Crête, tablette, éclat, éclat cortical, éclat d'épannelage, nucleus, fragment nucleus	9	19
Esquille, casson, petit éclat, microlamelle	66	20
Chute de burin	2	0
Total	100 %	100 %

13 L'APPROVISIONNEMENT EN COQUILLAGES

Dans plusieurs sites du bassin du Dniepr, des coquillages de différents taxons d'origine fluviatile, marine et fossile ont été utilisés, principalement comme éléments de parures corporelles. Si les coquillages de rivière ne posent pas de problèmes d'approvisionnement, c'est surtout l'origine des coquillages marins, originaires de la mer Noire et des gîtes fossiles, qui traduit leur importance dans le système symbolique, et notamment dans le domaine de la décoration corporelle des groupes humains de Ioudinovo, Timonovka 1, Mézin, Gontsy, Mejiriche, Semenivka, ainsi que les sites plus occidentaux de Barmaki et de Gorodok 2.

L'utilisation des coquillages d'origine lointaine pose la question toujours actuelle de leur origine précise, qui varie entre une origine marine de la mer Noire, une origine fossile de gîtes du bassin du Dniepr inférieur, notamment dans la région de Nikopol, une origine fossile des gîtes du sud de la Crimée dans le région de Soudak et de la presqu'île de Kertch et une origine fossile des gîtes des régions de Volhynie et de Podolie (Gromov 1948 ; Efimienko 1953, Roudenko 1959 ;

Pidoplichko 1969, 1976 ; Chovkoplass 1967 ; Polikarpovich 1968). Plusieurs hypothèses ont été discutées sur l'arrivée des coquillages d'origine lointaine sur les sites, soit par une migration du Sud vers le Nord, soit par un approvisionnement direct au cours d'un déplacement (Chovkoplass 1967 : 282) ou soit par un système d'échanges (Gorotsov 1935 : 3–13 ; Polikarpovich 1968 : 173).

L'importance de la notion d'identification d'un groupe ou d'une partie d'un groupe par certains types de coquillages marins ou fossiles, peut s'expliquer par la distance importante à la mer Noire, aux lagunes du bord de la mer Noire et aux gîtes fossilifères. Timonovka 1 et Ioudinovo, qui ont fourni des coquillages marins, sont les sites les plus septentrionaux à une distance d'environ 800 km de la mer Noire. Le site de Mézine est à une distance d'environ 640 km, le site de Gontsy et les sites de Semenivka (1, 2, 3) à environ 400 km et le site de Mejiriche à environ 340 km de la mer Noire. Cette distance doit être encore plus longue, si on prend en compte le fait que la mer Noire est un lac à cette époque, et que la ligne de rivage alors est éloignée de plus de 100 km de la ligne actuelle (Iakovleva 2011).

La diversité et la quantité des coquillages d'origine marine, fossile et fluviatile dans les sites ou dans une partie du site, montrent la complexité de la notion de système symbolique. La particularité de ce système dans le domaine de la décoration corporelle se manifeste notamment par l'utilisation de coquillages d'origine lointaine. Ceci peut être illustré par deux points : **1.** par le nombre des coquillages de taxons différents et leur distribution spatiale dans les sites ; **2.** par la connaissance du processus de fabrication et d'utilisation des parures d'origine marine/fossile dans plusieurs sites (Iakovleva 2005 : 26 –37 ; Iakovleva 2006 : 32, 43–44, Iakovleva 2011, Iakovleva 2013 : 132–146).

En effet, à propos de la présence des coquillages d'origine lointaine, la distance du site à l'endroit de l'approvisionnement, que ces coquillages soient d'origine marine ou fossile, n'a pas joué de rôle déterminant. Ceci est bien illustré à propos du site de Mejiriche, qui est plus proche de la Mer Noire, et où pourtant n'ont été trouvé que quelques coquillages de *Nassa reticulata Linné* et seulement à proximité de la cabane n°1 (Pidoplichko 1976 : 144, fig. 50). Dans le site de Gontsy, la particularité de la décoration corporelle par les coquillages d'origine lointaine d'une espèce précise, a été également mise en évidence par la dernière découverte d'un coquillage bivalve *Cerastoderma glaucum cf. umbonatum* Wood. 1850, originaire de la Mer Noire, qui a été trouvé à proximité immédiate de la cabane n°5 et d'un coquillage *Dorsanum corbianum* d'Orbigny, 1844 d'origine fossile d'un gîte du Miocène, qui a été trouvé sur la zone d'activité située à côté de la cabane n°3. En fait dans les habitats résidentiels du bassin du Dniepr moyen, on note la rareté de coquillages marines/fossiles d'espèces précises à Gontsy et à Mejiriche, ainsi que leur absence à Dobranichivka par rapport au nombre plus élevé des espèces diverses (marines/ fossiles) trouvées dans les petites sites saisonniers de courte durée de Semenivka. Le répertoire d'approvisionnement des coquillages sur ces sites montre que les éléments de parures en coquillages ont été composé de *Nassa reticulata Linné, Cyclope neritea et Theodoxus sp.* à Semenivka 2, 3 et complété en plus par *Dorsanum sp.* à Semenivka 2. Dans cette variabilité des espèces des petits sites de Semenivka, on retrouve la cohérence d'éléments de parure de forme semblable par *Nassa reticulata Linné à* Mejiriche et *Dorsanum corbianum* d'Orbigny, 1844 à Gontsy ainsi que par la présence de coquilles d'Unio à Gontsy, à Mejiriche et à Semenivka 3 (Iakovleva 2013 : 143–144, 152–153).

En fait, dans l'ensemble des sites du Dniepr moyen et supérieur, l'utilisation des coquillages d'origine lointaine se traduit aussi par la présence sur le site :

1. de coquillages sans perforation comme une matière première;

2. de coquillages avec une ou deux perforations;

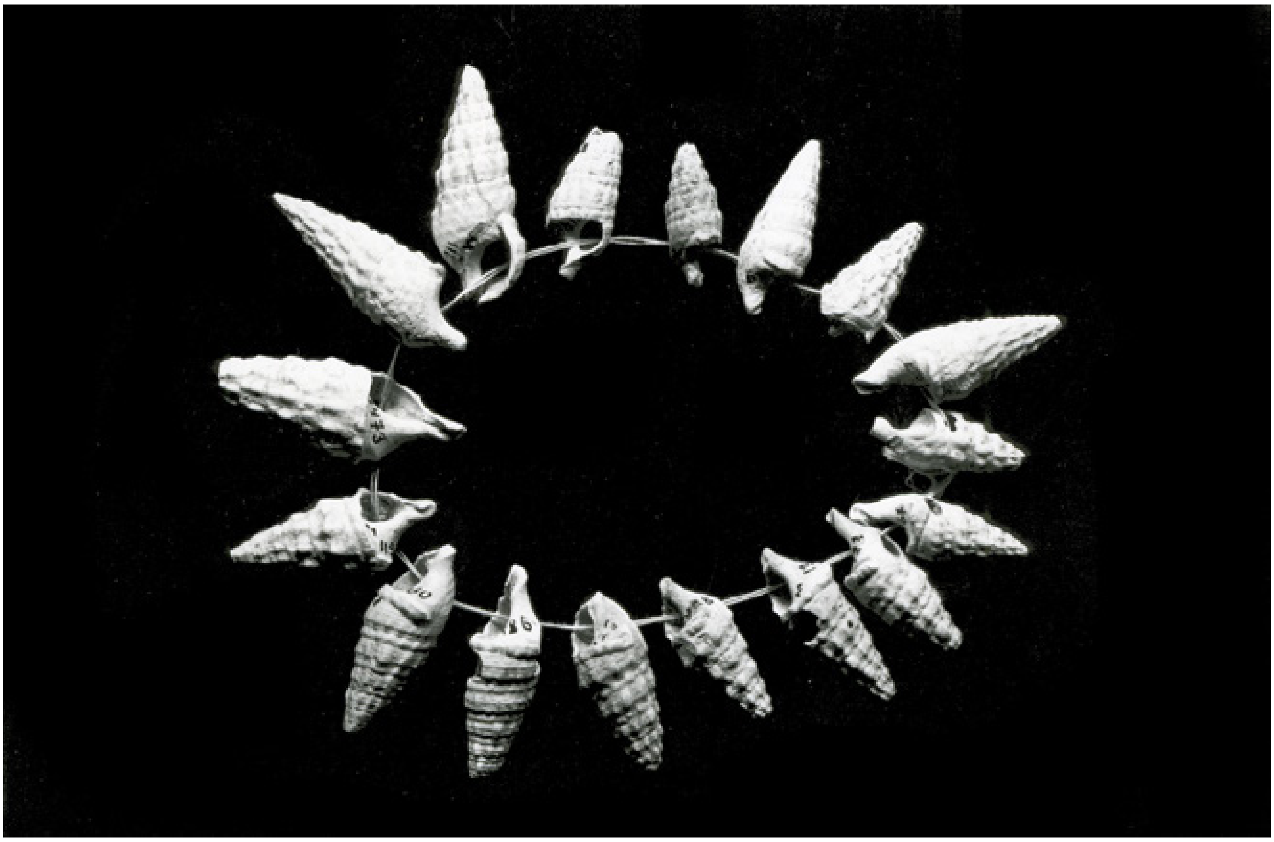
3. de coquillages endommagés ou cassés;

4. de coquillages avec des traces d'usure.

Malgré la variation importante du nombre de coquillages dans chacun des sites, les différentes étapes de leur exploitation sont connues à Gontsy, Mézine, Ioudinovo, Semenivka, Mejiriche. Mais parmi tous ces sites, un seul, Mézine, a livré environ 829 coquillages de 9 taxons différents de forme semblable avec des résidus de fabrication en place, ce qui en fait un véritable atelier de fabrication d'éléments de parure en coquillages, en accord avec la richesse par ailleurs des autres types de parure en ivoire et aussi de l'art mobilier et des ornementations géométriques murales de la cabane n°1. Le choix des espèces de *Nassa, Buccinum* et *Cerithium* en forme de poire et de tire-bouchon avec l'extrémité pointue et un test épais qui possède une ornementation naturelle bien marquée, met en lumière l'attirance pour des coquillages ornés de morphologie bien précise à Mézine (**figure 10**).

En Volhynie, le site de Barmaki confirme aussi l'importance de la parure en coquillage de forme semblable. Les espèces du Miocène de Volhynie (les niveaux inférieurs du Sarmatien moyen) ont approvisionné largement les habitants de Barmaki (environ 500 coquillages sur toute la zone de fouilles). Sur les 104 m² de la surface fouillée de l'habitat, 200 coquillages ont été trouvés, parmi lesquelles dominent nettement *Nassa (Duplicata) cordiana Orb.*, et *Nassa superabile Koles.*

FIGURE 10 Collier de coquillages marins et fossiles de Mézine.



Les coquilles de *Gibbula sulcatopodolika Koles.*, sont peu fréquentes, tandis que *Venerupis (Polititapes) tricuspis Eichw.*, est représentée seulement par quelques exemplaires (Piacetski 1997 : 159). Un nombre important de *Nassa* du Miocène avec une perforation pour la suspension ainsi que la présence de ces coquillages sans perforation et des coquillages endommagés, est concentré en plus grand nombre dans une partie de l'habitat, montrant que les habitants de Barmaki fabriquaient ce type de parure sur place et s'en paraient de préférence.

En effet, la fabrication intensive de parures en coquillages d'origines diverses, mais avec des formes semblables, affirme l'existence d'une même tradition significative d'un mode de parure au choix voulu à Mézine et à Barmaki, sites qui se situent d'est en ouest à une distance d'environ 500 km. L'utilisation de coquillages de diverses espèces originaires de la Mer Noire et des gîtes fossilifères du Miocène met en évidence une relation des groupes du Nord avec les régions du Sud ainsi qu'avec les régions de l'Ouest.

En conclusion la préférence nette pour certains taxons de coquillages et la diversité des assemblages avec d'autres types d'éléments de parure en ivoire, en ambre, en dents de animaux dans plusieurs sites révèlent aussi la complexité de la décoration corporelle perçue comme le reflet d'un système symbolique et social. L'importance de la décoration corporelle se traduit également par l'existence d'ateliers de fabrication d'éléments de parure en coquillages et en ivoire à Mézine, en ivoire à Ioudinovo et en ambre à Mejiriche, qui, peut-être, ont joué un rôle de centre de production spécialisé de ces objets.

14 L'APPROVISIONNEMENT EN AMBRE

Les objets en ambre sont présents pratiquement dans tous les sites du bassin du Dniepr. Bien que cette cette matière première soit disponible en quantité dans le bassin du Dniepr moyen et, entre autres dans les régions de Kiev et de Kanev, leur présence dans les sites est très variable. Kiev-Kirilovskaia, Gontsy, Semenivka 2, Ioudinovo, Chulatovo 2, Elisseevichi 1 ont livré des objets en ambre en faible quantité. Mais à Dobranichivka est connue une représentation féminine très schématisée, réalisée en profitant d'une forme naturelle d'un grand morceau d'ambre jaune foncé, et qui a pu être porté comme une pendeloque. Dobranichivka, Mézine et Mejiriche font une utilisation assez importante de l'ambre dans les habitats. Malheureusement le mauvais état de conservation de cette matière réduit la preuve de leur utilisation à la présence de morceaux naturels d'ambre dans les sites et à la découverte d'objets façonnés en ambre plus au moins conservés (statuette féminine de Dobranichivka, pendeloques et perles de Dobranichivka, Mézine, Mejiriche, Semenivka 2). Un seul site, Mejiriche, illustre l'ampleur de l'utilisation de l'ambre, présent dans les quatre cabanes : 70 exemplaires dans la cabane n° 1 ; 228 exemplaires dans la cabane n° 2 ; 40 exemplaires dans la cabane n°3 (Pidoplichko 1976 : 154).

15 LE SYSTÈME MEZINIEN

En Europe orientale, dans les régions du Dniepr supérieur et moyen et de leurs affluents, un peuplement, le Mézinien (dit parfois « Épigravettien oriental »), est connu par les assemblages d'un même techno complexe dans une période de courte durée entre 15 000 BP et 14 000 BP environ. Cette définition est basée sur une série importante de datations ^{14}C AMS et de leur comparaison critique avec la grande série des anciennes et récentes dates conventionnelles de plusieurs laboratoires d'Ukraine et de Russie.

Dans l'état actuel des connaissances sur le territoire d'installation des sites du Mézinien localisés suivant un axe Nord Sud (de latitude entre 53°12N/ 34°18'E et 49°38'N/ 31°21E), les traits de plus caractéristiques de ce peuplement sont les suivants :

- des habitats résidentiels de plein air avec des structures d'habitat complexes, construites à partir d'un grand nombre d'ossements de mammouths, selon une architecture très élaborée : Gontsy, Dobranichivka, Mejiriche, Ioudinovo, Mézine, Suponevo, Bujanka 2, Elisseevichi 1, 2, Timonovka 1, 2.

- des sites de passage, avec ou sans collecte et stockage de piles d'ossements de mammouths, mais sans constructions, qui révèlent des déplacements rayonnants pour l'approvisionnement en matières premières diverses (silex, coquillages, colorant, os), les chasses spécialisés et pour les échanges nécessaires à la vie du groupe : Bougorok, Jouravka, Fastiv, Semenivka.

- une économie principalement basée sur le mammouth (ressource alimentaire, combustible, matériaux de construction, matière première pour les outils et les armes),

- l'importance de la confection des peaux et des fourrures des différents animaux chassés (renne, cheval, bison, bœuf musqué, renard polaire, loup, ours, lièvre, marmotte) d'une utilisation vitale pour la protection et la couverture des habitations ainsi que pour l'habillement,

- des ressources alimentaires complémentaires, notamment les rennes à Gontsy, Dobranichivka, Mejiriche, Mézine et les chevaux à Mézine et Fastiv. La chasse d'été aux marmottes a été pratiquée à Gontsy et à Jouravka.

- un outillage élaboré et varié en matière dure animale :

  - bois de renne : marteaux, percuteurs et bâtons percés ;

  - os longs, métapodes et phalanges de renard polaire, loup et lièvre : perçoirs, épingles, aiguilles ;

  - ivoire : aiguilles à chas ;

  - extrémité de défense de mammouth : pics, pioche ;

  - côte de mammouths : couteaux ;

- un outillage en silex assez simple et stable (grattoirs unguiformes, burins simples, lamelles à dos), taillé suivant un débitage plus lamellaire que laminaire et standardisé ;

- un art mobilier schématique et géométrique sur ivoire,

- des objets de parure en ivoire ;

- des objets de parure faits avec des dents d'animaux sélectionnées (réduit à quelques espèces de carnivores et de bovidés) ;

- l'utilisation de l'ambre (parures, sculpture) ;

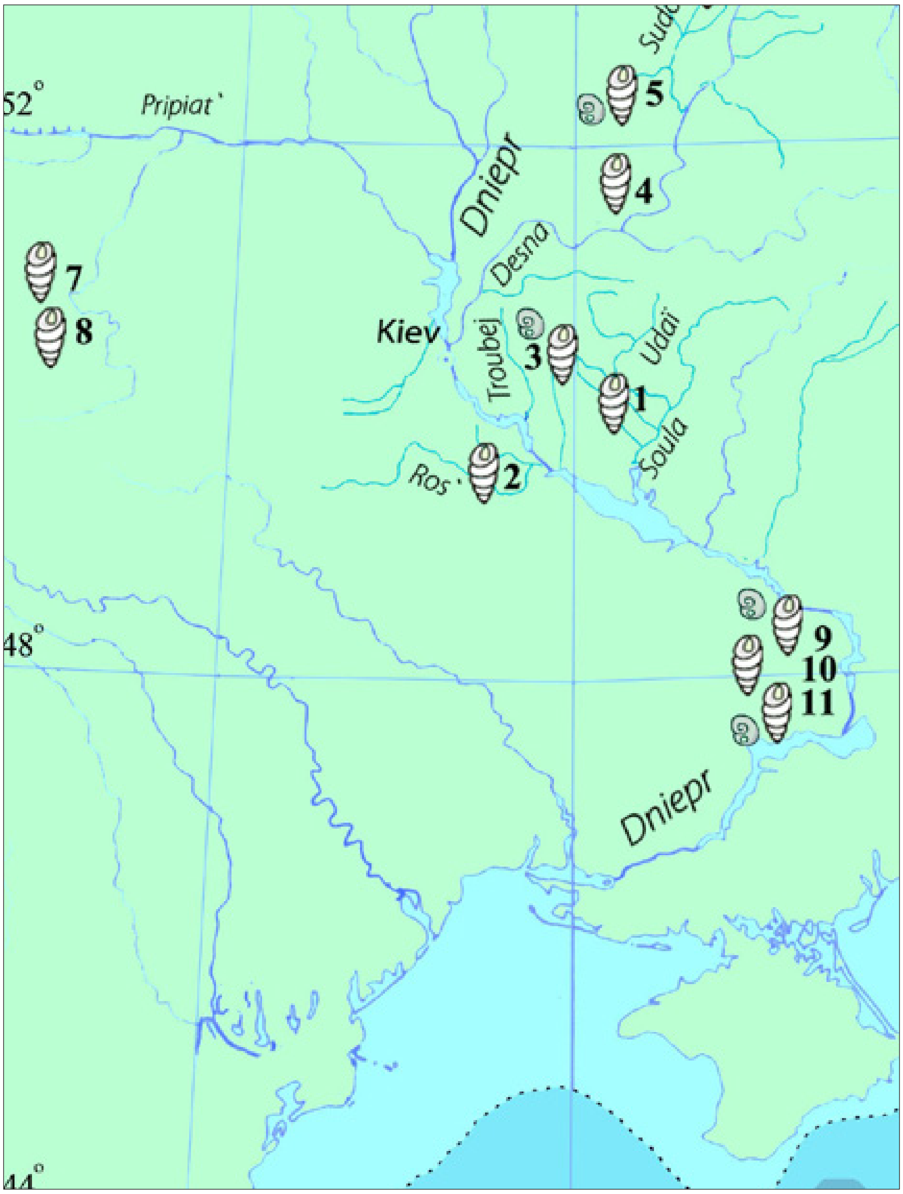


FIGURE 11 Carte des sites du paléolithique supérieur du bassin du Dniepr ayant livré des parures en coquillage d'origine marine ou fossile : 1. Gontsy, 2. Mejiriche, 3. Semenivka, 4. Mezine, 5. Ioudinovo, 6. Timonovka, 7. Gorodok, 8. Barmaki, 9. Doubovaia Balka, 10. Kaistrova Balka, 11. Osokorivka

- des objets de parures en coquillages d'espèces marines et fossiles de préférence d'origine lointaine (**figure 11**) ;
- des ornementations géométriques variées, complexes ou simples, gravées sur des objets utilitaires, sur des parures, sur des statuettes, sur des défenses et des os de mammouths ;
- des ornementations géométriques peintes sur des os de mammouths, éléments des parois des cabanes ;
- des ornementations architecturales des cabanes faites sur des os de mammouths choisis ;
- l'utilisation de colorants minéraux (hématite, jarosite).

La nouvelle hypothèse révélée par les fouilles de Gontsy d'un habitat semi-sédentaire, de longue durée dans le cycle annuel, est fondée principalement à Gontsy sur l'étude archéozoologique des dates d'abattage des rennes et des marmottes et l'abondance des restes de carnivores qui révèlent une occupation du site au printemps pour les rennes à Gontsy (Belan 1982 : 20–26) et en été pour les marmottes (Iakovleva & Djindjian 2005 : 21) comme à Ioudinovo (Sablin 2002 : 107). La saison hivernale pour l'approvisionnement en fourrure des carnivores est aussi représentée (Verechagin et Kusmina 1977 : 77–83). L'existence de fosses creusées dans le permafrost confirme l'hypothèse de L. Binford (Binford 1993 : 108–123), tirée du comparatisme ethnographique des populations Inuit, d'une utilisation l'été (le sol gelé au fond de la fosse faisant office de réfrigérant) et non l'hiver (quand le climat froid et sec permet une conservation à l'air libre mais en hauteur pour éviter la prédation des carnivores). Les sites résidentiels sont occupés à différentes saisons, avec des capacités de stockage alimentaire et de matériaux de constructions dans les fosses, à partir duquel ont lieu de nombreux déplacements rayonnants pour l'approvisionnement en matières premières diverses, les chasses spécialisées ou pour les échanges nécessaires à la vie du groupe (stratégie logistique planifiée (Binford, 1980), stratégie semi-sédentaire (Iakovleva 2000, 2003 ; Iakovleva & Djindjian 2001, 2002, 2004, 2005)).

Les déplacements des groupes humains sont révélés par l'existence de petites sites de passages, sans structures en os de mammouths et aussi par l'utilisation de matières premières non locales de certains types de silex (comme le silex noir chocolat ou la calcédoine), du cristal de roche transparent (région de Kiev, environs de Smela), du cristal de roche gris foncé de région de Kanev, de l'ambre et des coquillages, qui ont été largement utilisés comme les objets des parures corporels dans les sites de bassin du Dniepr.

L'utilisation de coquillages de divers taxons originaires de la Mer Noire met en évidence la liaison des groupes du Nord avec les régions du Sud. Dans ce système socio-culturel les habitats résidentiels apparaissent comme des sites centraux, en charge du marquage culturel, social et spirituel du groupe et des relations inter-groupes dans leur territoire géographique.

16 CONCLUSION

Dans l'étude du paléolithique supérieur européen, le Mézinien est probablement la culture la mieux connue en termes d'habitats et de territoire (Iakovleva 2009b). La raison en est la conservation exceptionnelle dans les séquences de loess, de cabanes en os de qui sont les structures d'habitats préhistoriques les mieux conservées. Ces cabanes en os de mammouths sont si spectaculaires qu'elles ont été depuis les années 1950, la priorité des archéologues (Schovkoplass 1965 ; Pidoplichko 1969 ; Abramova 1995b ; Abramova *et al.* 1997a).

L'intérêt scientifique est maintenant de comprendre le système à l'origine des habitats, et des habitats à l'origine du territoire de peuplement, afin de caractériser le système basée sur une économie du mammouth.

Cette information peut seulement être enregistrée avec la fouille complète d'un site, comme ce que nous avons fait à Gontsy depuis 1993 et avec les moyens de l'archéologie moderne. Il est alors possible de reconstituer non seulement plusieurs cabanes en os de mammouths et leurs fosses associées, mais l'ensemble de l'habitat avec ses cabanes, fosses, foyers, zones d'activités, zones de vidanges et de rejets, zones de boucherie, et leurs interconnections.

Le rôle majeur de la vaste l'accumulation d'ossements de mammouths a été souligné à Gontsy, et ce rôle a pu être généralisé en dépouillant les archives des fouilles des sites fouillés depuis le début du XX° siècle et sera définitivement démontré par la reprise de nouvelles fouilles dans les zones qui entourent les promontoires où sont installés les habitats à cabanes en os de mammouths des sites du bassin moyen et supérieur du Dniepr.

Ce travail est le résultat d'un programme scientifique de la collaboration entre l'Institut d'archéologie de l'Académie Nationale des Sciences d'Ukraine et le laboratoire CNRS UMR 7041 Arscan en France : « Les fouilles de Gontsy dans le cadre des recherches sur le peuplement du Paléolithique supérieur récent du bassin du Dniepr ». Le projet est financé par le programme n°204 de la Direction de l'Archéologie du ministère français des Affaires Étrangères depuis 1994, le projet PAI Dnipro n°09862VJ, le projet Econet n°10148QD et l'Association « Archéologies d'Eurasie ».

REFERENCES

ABRAMOVA Z. (1995a) – *L'Art paléolithique d'Europe orientale et de Sibérie*. Grenoble, Jérôme Millon.

ABRAMOVA Z.A. (1995b) – *Le site paléolithique supérieur d'Ioudinovo* 1. Saint-Petersbourg, Nauka (in russian).

ABRAMOVA Z.A., GRIGORIEVA G.V. & CHRISTENSEN M. (1997a) – *Le site paléolithique supérieur d'Ioudinovo* 3. Saint-Petersbourg, Nauka (in russian).

ABRAMOVA Z.A. & GRIGORIEVA G.V. (1997b) – *Le site paléolithique supérieur d'Ioudinovo* 3. Saint-Petersbourg, Nauka (in russian).

BELAN N.G. (1982) – *Le renne au Pléistocène supérieur dans le bassin du Dniepr*. PIN. Académie des Sciences URSS. Moscow, Nauka, p. 20–26 (in russian).

BINFORD L.R. (1980) – Willow smoke and dog's tails: Hunter-Gatherer Settlement Systems and Archaeological Site Formation. *American Antiquity* 45(1): 4–20.

BINFORD L.R (1993) – Bones for stones: considerations of analogues for features found on the Central Russian plain. In: O. Soffer & N. Praslov (eds), *From Kostienki to Clovis. Upper Paleolithic- Paleo-Indian adaptations*, New-York, Plenum Press, p. 101–124.

BRUSOV A.I. (1940) – Gonthovskaia stoianka (The Gontsy site). *Review of Soviet Archaeology* 5: 88–92 (in russian).

CHOVKOPLASS I.G. (1955) – Dobranicevskaja paleoliticeskaja stojanka. *(The palaeolithic site of Dobranichivka*). Kratkie litic soloscenija, Instituta Istorii Material noij Kultury 53: 32–45 (in russian).

CHOVKOPLASS I.G. (1965) – *Le site de Mezine*. Kiev, Naukova Dumka (in russian).

CHOVKOPLASS I.G. (1972) – Dobranitchevkaia stoianka, Kiev (The Dobranichivka site near Kiev). *MNA* 185: 177–188 (in russian).

DJINDJIAN F., KOZLOWSKI J. & OTTE M. (1999) – *Le Paléolithique supérieur en Europe*. Paris, Armand Colin.

EFIMENKO P.P. (1953) – *Les sociétés primitives.* 3° édition, Kiev (in russian).

GORODTSOV V.A. (1926) – Isledovanie Gontsovskoi paleolititcheskoi stoianki v 1915, Trudi otdelenia archeologii Instituta archeologii i iskustvovedenia, *RANION* 1: 5–35 (in russian).

GORODTSOV V.A. (1935) – L'organisation sociale et économique des anciens habitats du site paléolithique de Timonovka. *Ethnographie soviétique* 3: 3–13 (in russian).

GROMOV V.I. (1948) – *Paleontologitcheskoe i archeologitcheskoe obosnavie stratigrafii kontinentalniche otlogenij thetvertichnogo perioda na territorii SSSR* (Palaeontology and archaeology). (For argumentation of the stratigraphy of the quaternary sedimentation on the SSSR territory). Trudi Geologitheskogo Instituta AN SSSR. (The researches of the Institute of Geology of the Academy of Sciences of SSSR). *Serij Geologii* 17(64) (in russian).

IAKOVLEVA L.A. (1999) – Les datations ^{14}C des habitats de la grande plaine russe orientale. Dans: J. Évin, Ch. Oberlin, J.P. Daugas & J.F. Salles (eds.), 3^{e} *Congrès International 14C et Archéologie, Lyon, Avril 1998*, Paris, Mémoire de la Société. Préhistorique Française 26 et GMPCA, p. 123–131.

IAKOVLEVA L.A. (2000) – Poselenia is jitlami is kistok mamonta Dniprovs'kogo baseiny. (Mammoth bone dwelling settlements of Dnepr bassin). Kiev, *Archeologia* 2 : 72–83 (in ukrainian).

IAKOVLEVA L. (2003) – Les habitats en os de mammouths du paléolithique supérieur d'Europe orientale : les données et leurs interprétations. In : S.A. Vasiliev, O. Soffer & J.K. Kozlowski (eds) (2003), *Perceived landscapes and built environments : the cultural geography of late palaeolithic Eurasia*, Archaeopress, BAR International Series 1122 : 47–57.

IAKOVLEVA L. (2005) – Les parures en coquillages au Paléolithique supérieur récent dans les territoires de peuplement du bassin du Dniepr. *Archemetriai Muhely. Elektronikus folyoriat* 4 : 26–37.

IAKOVLEVA L. (2006) – Le système symbolique des parures dans les peuplements du Paléolithique supérieur récent du bassin du Dniepr. In : *La Cuenca Mediterranea durante el Paleolitico Superior 38 000 – 10 000 anos.* U.I.S.P.P. Commission 8. Fundation Cueva de Nerja, p. 32–44.

IAKOVLEVA L. (2009a) – Le concept de territoire à partir des données des sites des régions du Dniepr au Paléolithique supérieur récent en Europe orientale. Dans : F. Djindjian, J. Kozlowski & N. Bicho (eds.), *Le concept de territoires pour les chasseurs cueilleurs du Paléolithique supérieur européen*. Archaeopress (BAR, International Series 1938 : 41–62.

IAKOVLEVA L. (2009b) – L'art mézinien en Europe orientale dans son contexte chronologique, culturel et spirituel. *L'Anthropologie* 113 : 691–752.

IAKOVLEVA L. (2010) – Les fouilles paléolithiques en Eurasie au XX° siècle dans leur contexte historique. Dans : S. de Beaune (ed.), *Écrire le passé*, Colloque « L'écriture de l'histoire…et de la préhistoire d'hier à aujourd'hui », 14 –16 mai 2008, Lyon, Paris, CNRS, p. 181–194.

IAKOVLEVA L. (2011) – Le parure en coquillages comme d'un élément d'un système socio -symbolique du décore corporelle et vestimentaire (d'après des donnes des sites du paléolithiques supérieur récente d'Ukraine). Kiev, *Archéologie et histoire ancien de l'Ukraine* 6 : 91–98.

IAKOVLEVA L. (2013) – *L'Art des origines en Ukraine*. Kiev, Starodavni Svit (in ukrainian).

IAKOVLEVA L. & DJINDJIAN F. (2000) – The new excavations of the Gontsy site (Ukraine) in the context of Épigravettian camp-sites of the Dnepr basin. In : D. West (éd.), *Proceedings of the International Conference on Mammoth Site Studies*, Lawrence, University of Kansas. Publications in Anthropology 22 : 85–94.

IAKOVLEVA L. & DJINDJIAN F. (2005) – New data on mammoth bone settlements of Eastern Europe in the light of the new excavations of the Gontsy site (Ukraine). *Quaternary International* 126–128 : 195–207.

IAKOVLEVA L., DJINDJIAN, F., MASCHENKO E. & KONIK S. (2010) – The mammoth bone bed of the mammoth bone hut Late Upper Palaeolithic camp-site of Gontsy (Ukraine) : Recent results of the 2004–2006 excavations. In : P. Lazarev, G. Boeskorov & E. Maschenko (eds.), *Proceedings of the IV International mammoth Conference*, IV° Mammoth International Conference, Iakutsk (Sibérie), 18–22 June 2007, Iakustsk, 2010, p. 150–158.

IAKOVLEVA L., DJINDJIAN F., MASCHENKO E.N., KONIK S. & MOIGNE A.M. (2012) – The late upper palaeolithic site of Gontsy (Ukraine) : a reference for the reconstitution of the hunter-gatherer system based on a mammoth economy. *Quaternary International* 255 : 86–93.

KAMINSKI F.I. (1878) – Sledi drevneiychy epoki kamenogo veka por. Sule see pritokam (Les vestiges de l'âge de Pierre dans la vallée de la Soula et de ses affluents). Troudi III arkeologitcheskogo siesda, 1898, T.I. Kiev, *Actes du III° Congrès Archéologique, Kiev. 1898* (in russian).

KOZLOWSKI J. (2003) – Mammoth bone accumulations and dwelling structures. Discussing some arguments around Krakow-Spadzista B street. In : S.A Vasiliev, O. Soffer & J.K. Kozlowski (eds), *Perceived landscapes and built environments : the cultural geography of late palaeolithic Eurasia*. Archaeopress, BAR International Series 1122 : 59–64.

LEVITSKI I. F. (1947) – Gontivska Paleolitichna stojanka za danimi doslidjen' v 1935, (Le site paléolithique de Gontsy : les données des fouilles de 1935), *Le Paléolithique et le Néolithique de l'Ukraine* 1 : 197–248 (in ukrainian).

MASCHENKO E.N., GABLINA S.S., TESAKOV A.S. & SIMAKOVA A.N. (2006) – The Sevsk woolly mammoth (Mammuthus primigenius) site in Russia : Taphonomic, biological and behavioral interpretations. Third International Mammoth Conference, *Quaternary International* 142–143 : 147–165.

OLIVA M. (2009) – Milovice : site of the mammoth people below the Pavlov hills. *Studies in Anthropology, Paleoethnoplogy, Paleontology and Quaternary Geology* 27.

PIACETSKI V.K. (1997) – Le commencement des fouilles de l'habitat paléolithique de Rovno (Barmaki). Moscou. *Archéologie de Russie* 1 : 151–161.

PIDOPLITCHKO I.G. (1969) – *Les habitats du Paléolithique supérieur en os de mammouth en Ukraine*. Kiev, Nauka (in russian).

PIDOPLITCHKO I.G. (1976) – *Les habitats en os de mammouths de Mejeriche*. Kiev, Nauka (in russian).

PIDOPLITCHKO I.G. (1998), TRADUIT DU RUSSE, ÉDITÉ ET AVEC UNE INTRODUCTION DE P. ALLSWORTH-JONES (1998) – *Upper palaeolithic dwellings of Mammoth bones in the Ukraine*, Archaeopress, BAR International Series 712.

PITULKO V.V. (2011) – The Berelekh quest : A review of forty years of research in the mammoth graveyard in northeast Siberia. *Geoarchaeology* 26(1) : 5–32.

POLIKARPOVICH K.M. (1968) – *Paleolit Verchnigo Podneprovia* (Paléolithique du Dniepr supérieur). Minsk (in russian).

RUDENKO A.S. (1959) – Morskie moliuski iz Mezinskoi stoianki. (Mollusques marins du site de Mézine). Kiev. *KSIA Akademi de la Sciance Ukr.RSS* 8 : 110–112 (in russian).

SABLIN M.V. (2002) – Paleozoologia stoianok Verknei Desni : novie danie. (Paléozoologie des sites de la Desna supérieur). *Papiers colloque international – Paléolithique supérieur*, Saint-Petersburg, p. 107–109.

SCHERBAKIVSKI V.M. (1919) – Roskopki paleoliticheskogo selicha v s. Gontsach lybianskogo povity v 1914 i 1915 rr. (Les fouilles de l'habitat paléolithique de Gontsy, près de Lubny, en 1914 et 1915), *Zapiski Ukrainskogo naykovogo tovaristva doslidjenna i okchoroni pam'iatok starovini ta mistetstva na Poltavchini*, (*Notes de l'association scientifique ukrainienne pour la recherche et la conservation des sites et de l'art préhistorique de la région de Poltava*), Poltava 1 : 61–78 (in ukrainian).

SCHERBAKIVSKI V.M. (1926) – Eine paläolithische Station in Honci. *Die Eiszeit*, B.III, H. II, Leipzig (in german).

SERGIN V.I. (1981) – Roskopki jilicha na Gontaskom paleoliticheskom poselenii. *KCIA* (Comptes Rendus de l'Institut d'Archéologie) 165 : 43–50 (in russian).

SERGIN V.I. (1983) – Nasnathenie bolchich kosiajstvenich iam na paleoliticheskich poseleniijak. *KCIA* (Comptes Rendus de l'Institut d'Archéologie) 173 : 23–30 (in russian).

SOFFER O. (1985) – *The Upper Palaeolithic of the Central Russian Plain*. New York, Academic Press, Studies in Archaeology.

VALOCH K. (1996) – *Le paléolithique en Tchéquie et en Slovaquie*. Grenoble, Jérôme Million, Série Préhistoire 3.

VELICHKO A.A., GREKHOVA L.V. & GUBONINA Z.P. (1977) – *L'environnement de l'homme préhistorique des sites de Timonovka*. Moscou, Nauka (in russian).

VELICHKO A.A., GREKHOVA L.V. & UDARCEV V.P. (1997) – *Nouvelles données en Archéologie, géologie et paléogéographie de la station d'Elisseevichi*. Moscou, Paléoécologie de l'homme ancien, p. 96–105.

VERECHAGIN N.K & KUSMINA I.E. (1977) – Les restes de mammifères des sites paléolithiques des vallées du Don et de la Haute Desna. Faunes de mammouths de la plaine russe et de Sibérie orientale. Saint-Pétersbourg, *Publication ZIN Académie des Sciences* 72 : 77–83 (in russian).

Placing the Aurignacian from Banat (Southwestern Romania) into the European Early Upper Paleolithic context

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Abstract: *During the 1983 UISPP congress in Liège, F. Mogoșanu presented the results of his earlier investigations on the Paleolithic in the Romanian Banat. The Upper Paleolithic of this area was viewed as a chronologically late manifestation of the Central European Krems-Dufour type Aurignacian. After a long break in research, new investigations in the settlements at Coșava, Româneşti-Dumbrăviţa and Tincova have been undertaken, leading to an improved knowledge of the regional Upper Paleolithic.*

The present contribution reports the first results of the comparative techno-typological and attribute analysis of the lithic assemblages at Tincova, Coșava and Româneşti-Dumbrăviţa, involving both old and recently excavated collections. Strengthening the conclusions reached by the lithic studies, the first chronometric assessments (TL and OSL) for the recently excavated open-air site of Româneşti-Dumbrăviţa I place the Aurignacian of this site into an early stage of this technocomplex. However, the attempt for incorporating the regional record into the European Early Upper Paleolithic context remains difficult and raises serious issues regarding the acknowledged divisions of the European Aurignacian and, consequently, the expansion of this cultural phenomenon across Europe.

1 INTRODUCTION

The emergence of the European Upper Paleolithic has been a hot topic for Pleistocene archeology for decades. Although the last years witnessed a rapid increase of better resolution chronological, paleoanthropological and archaeological data related to the 'Big Transition', one pillar of the basic scenario - i.e. the allogeny of Anatomically Modern Humans (AMH) in Europe - survived the intense scrutiny. Despite recent hints regarding a possibly earlier presence of AMH in Europe (Benazzi *et al.* 2011; Higham *et al.* 2011) and the notorious lack of paleoanthropological finds securely connected to the first stages of the Aurignacian, the time-honored connection between the modern anatomy and this technocomplex could not have been dismissed either.

Located at the geographical crossroad connecting the Eastern steppes and the Balkans to the wide Carpathian Basin and Central Europe, Romania holds a strategic position in relation to the exogenous model for the emergence of the European Upper Paleolithic and/or AMH arrival into Europe. Yet, the unusually young chronology proposed for the emergence of the local Upper Paleolithic (e.g. Cârciumaru 1999; Păunescu 2001), coupled with the purportedly late survival of the Middle Paleolithic (Cârciumaru *et al.* 2007) has long kept the local archaeological record out of the debates regarding the initial expansion of the Aurignacian phenomenon. Things swiftly changed after the finds at Oase Cave, which documented an unexpectedly old (ca. 40.7 ka cal BP) presence of AMH in the area (Trinkaus *et al.* 2003). Unsurprisingly, lacking an associated archaeological context, the Oase fossils spurred a systematic and currently ongoing reevaluation of the regional Upper and Middle Paleolithic archaeological record (Tuffreau *et al.* 2009; Anghelinu *et al.* 2012; Doboş & Trinkaus 2012; Anghelinu & Niță, in press). Fortunately, several open air settlements (Tincova, Coșava, and Româneşti-Dumbrăviţa) were already known in the neighboring area of Banat (**figure 1**), providing medium to large collections with undisputable Aurignacian features (Mogoșanu 1978). These sites almost naturally became first 'suspects' for a possible correlation with the paleoanthropological finds at Oase.

The original excavator F. Mogoșanu had already promptly compared the Banat occurrences with the finds at Krems-Hundssteig (Austria), a settlement thought to represent an early phase of the Aurignacian technocomplex (Broglio & Laplace 1966; Laplace 1966; Hahn 1977), currently acknowledged as the Krems-Dufour type of Aurignacian (Demidenko 2000–2001; Demidenko & Otte 2007; Demidenko & Noiret 2012), and further associated to the Protoaurignacian/Aurignacian 0 of Mediterranean and Western Europe (Mellars 2006; Zilhão 2006; Teyssandier 2008; on the doubtful integrity of this industry, see Teyssandier 2008:496; Nigst 2006; Nigst & Haesaerts 2012). Despite clear similarities documented between the Banat lithic collections and the Krems-Dufour Aurignacian, the initial pollen-based geochronological estimations pointed nonetheless to a time span considerably younger than any known Eurasian Aurignacian occurrence: Herculane I/Tursac, for the single layer at Tincova and Herculane II/Laugerie, for the main concentration (layer III) at Româneşti-Dumbrăviţa (Mogoșanu 1978; Cârciumaru 1999). Perhaps not surprising, based on the content of the lithic collections, several authors questioned (Chirica *et al.* 1996; Băltean 2011a, b) or simply ignored (Teyssandier 2003, 2007, 2008; Zilhão 2006) these initial assessments and favored older chronological estimations. The single layer Aurignacian at Tincova in particular was explicitly connected to what is currently admitted to have been the earliest manifestation of the Protoaurignacian in Europe, (Teyssandier 2007, 2008; Tsanova *et al.* 2012; Zilhão 2006). Unfortunately, lacking organic material altogether, the Banat Aurignacian sites remained undated.

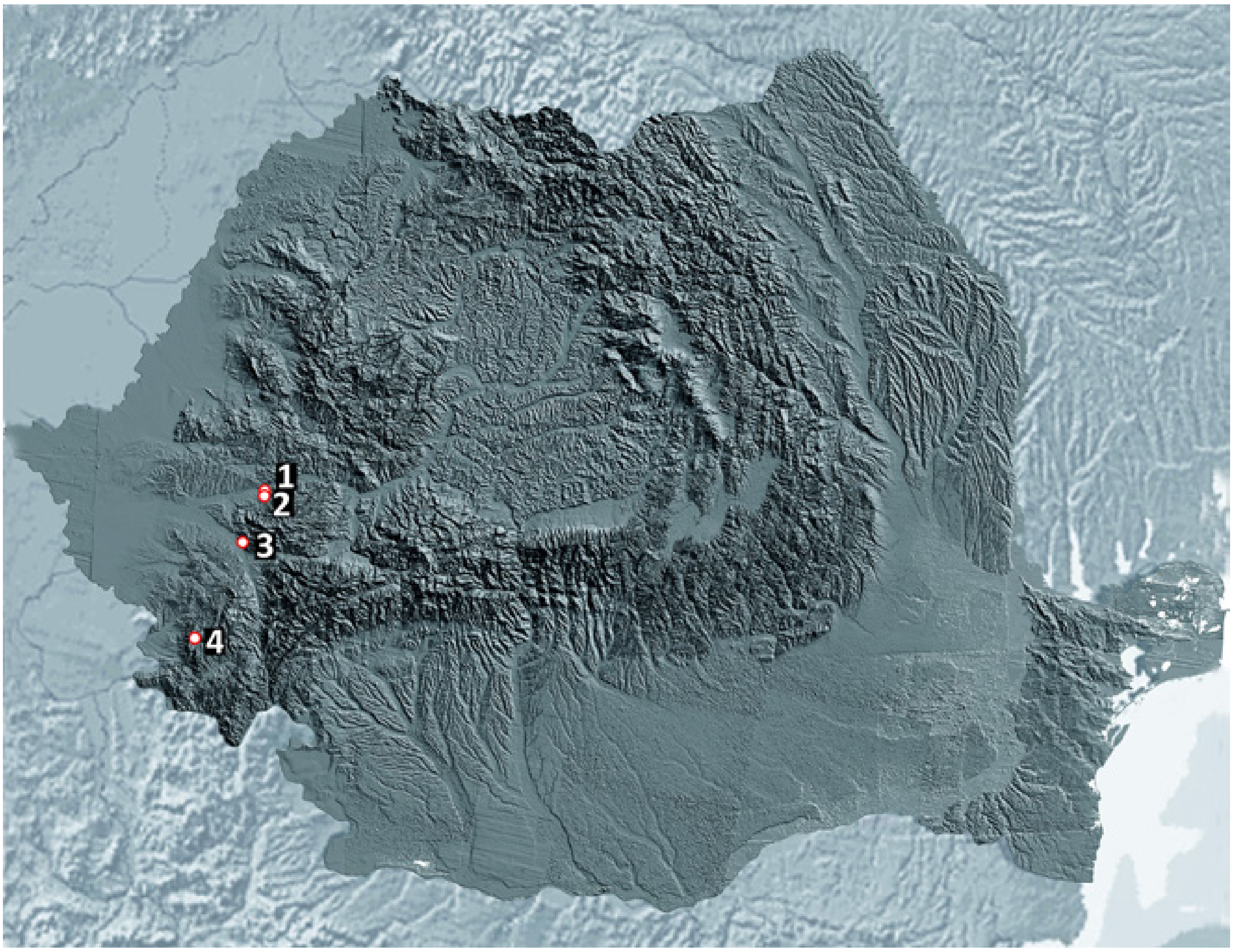


FIGURE 1 Paleolithic sites in Banat, south-western Romania: 1. Coşava; 2. Româneşti-Dumbrăviţa; 3. Tincova; 4. Oase Cave.

The contradiction between the evidence provided by the lithic collections and the young geochronological estimations resulted in new small scale excavations and surveys in the Romanian Banat between 2009 and 2012. A throughout reevaluation, including sedimentological, tephra, OSL and TL sampling/dating, archaeological survey trenches and comprehensive lithic studies including both old and recently excavated collections, was undertaken at Coșava and Româneşti, as part of an international collaborative research project, CRC 806. These studies were supplemented by a reassessment of the old lithic collection at Tincova. The first results from Coșava (Sitlivy *et al.* in press) and Româneşti-Dumbrăviţa I (Sitlivy *et al.* 2012), alongside with the preliminary chronometrical ages (Schmidt *et al.* subm.), have triggered the present attempt at comparing the Aurignacian assemblages from all Banat settlements and hopefully clarify their place in the wider Aurignacian landscape. While confirming in part some prior interpretations, our results nevertheless consistently change the purportedly late chrono-cultural status of the Banat Aurignacian. However, several peculiar features of the Banat assemblages raise doubts on the acknowledged division between the Proto and the Early Aurignacian, as acknowledged in various European areas.

As extensive analysis of stratigraphical contexts lithic collections from Coșava and Româneşti-Dumbrăviţa are already available (Sitlivy *et al.* 2012, in press), we will keep our settlements' description short and focus more on the key features of the lithic toolkits.

2 THE SETTLEMENTS

2.1 Coşava

The Coşava settlement (45°51’11.92’ N, 22°19’32.71’ E) is located 4 km north of Româneşti-Dumbrăviţa, the two being separated by the large Bega valley (**figure 2**). The settlement is situated on a plateau spur up to 282 meters a.s.l. and over 90 m above the Bega river layer (**figure 3**: 1), on the slopes of two hills (‘Cuca Mare’ and ‘Cuca Mică’, correspondingly Coşava I and II). Coşava was first excavated in two stages, 1961–1964 (Stratan 1965) and from 1967 to 1969 (Mogoşanu and Stratan 1966; Mogoşanu 1978). A large area of 226 m^2 was opened in order to recover the rather scattered archaeological remains. According to the original excavators, Coşava represents a horizontally extensive site, partly destroyed by a sand quarry (**figure 3**: 2), though strongly clustered and yielding a proportionally small lithic assemblage buried in a short sequence composed of fossil soils and loess-like sediments. Three distinct archaeological layers were distinguished, of which at least the two lowermost contained Aurignacian tools without mixture (Mogoşanu 1983). According to Mogoşanu (1978), the formal toolkit (116 items) of the most representative layer (I) was dominated by carinated and nosed endscrapers, as well as *nucleiformes* and *rabots* (25 items), while simple endscrapers were less common. They were associated with abundant retouched blades (30), including Aurignacian types (e.g. strangled, notched and denticulated with continuous retouch on one or both sides – 11 pieces), rare dihedral burins (7), as well as single examples of Dufour bladelets and Font-Yves points. The middle layer II comprised a smaller assemblage (56 tools) with a similar composition: a high frequency of endscrapers (15), particularly carinated (9), a limited number of dihedral burins (4) and a single Dufour bladelet were recorded. The least representative, uppermost layer III (24 tools), also contained Dufours (5), carinated endscrapers (2) and one Font-Yves point, as well as some Epipaleolithic pieces.

The stratigraphic and archaeological sequence uncovered in all test pits during the test excavations in 2009 corresponds well to Mogoșanu’s initial description.

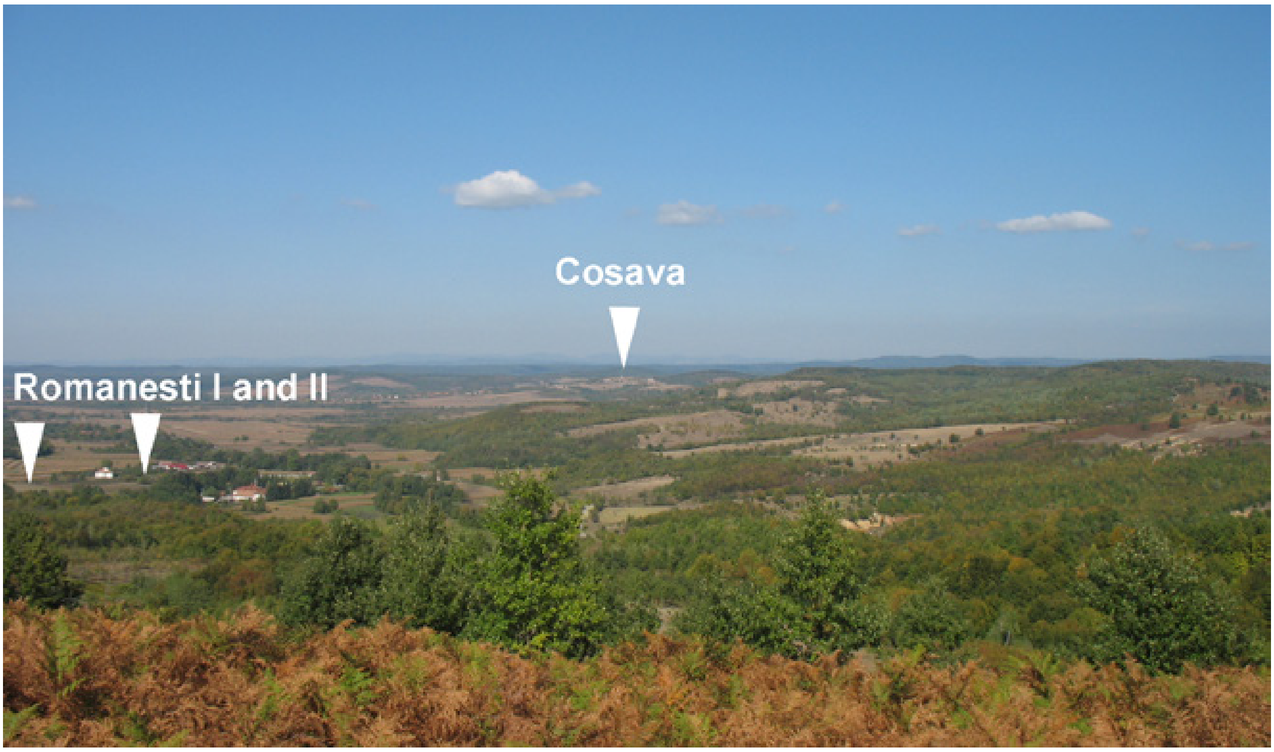


FIGURE 2 View of Coşava and Româneşti-Dumbrăviţa (I, II): sites during field campaign in September 2009.

FIGURE 3 View of Coşava during field campaign in April 2011: 1. Plateau spur; 2. Sand quarry.

Three separate layers with lithic artifacts were distinguished. The lowermost layer was documented in the geological horizon 4 (GH4) and might correspond to Mogoşanu's archaeological layer I. An intermediate layer with artifacts occurred in GH3 (= layer II), and the uppermost lithic scatter appeared in GH1–2 (= layer III). The first OSL dates (61 ± 7 ka and 56 ± 6 ka below lowermost layer I, and very recent at the top: 4.49 ± 0.52 ka) provide the *terminus* frames for the archaeological assemblages here.

Despite the low density of artifacts along and across the sequence, and the inaccurate chronology available, the constant presence of small knapping debris and 'micro' tools in all recently excavated collections point to a rather limited post-depositional impact, at least in what vertical sorting of material was concerned.

The examination of old and new assemblages from Coşava confirms the slight contamination of uppermost layer III by some late Upper Paleolithic material (e.g. isolated small round and nail-shaped endscrapers, and two non-patinated blades of black obsidian). Nevertheless, the Aurignacian attribution of all Coșava assemblages (layers I, II and III) is indisputable (for details see Sitlivy *et al.*, in press). Recent technological and typological studies show few differences in artefact composition throughout the entire sequence, marked by the dominance of flakes and blades and a high proportion of formal tools (**figure 4**). The core category, dominated by carinated, prismatic and narrow faced/burin-like types, is also well represented, especially in the two lowermost layers (**figures 5** and **6**). Flake cores are rare and all but one occur in the lowermost layer I. Many flakes were obtained during different stages of blade core reduction, while massive flakes apparently were brought to site for further carinated (**figure 6**: 1–2) and narrow-faced (**figure 6**: 3) core reduction. The main on-site core reduction was oriented towards blade and bladelet/micro-blade production (rare or virtually absent in old collections, but well represented in the small newly recovered lithic sample). Blade technology was based on the reduction of prismatic cores (**figure 6**: 4), while bladelet production, more variable, resulted from the exploitation of carinated pieces, longitudinal slices of flakes or tool-on flakes (tool recycling) and advanced prismatic blade nuclei. Thus, laminar blank production includes three co-existing systems with continuous reduction of (a) prismatic cores (b) narrow-faced (burin-like) cores, and (c) carinated pieces (cores and tools). The continuity of debitage systems is confirmed by blade/let and micro-blade negatives identified on the flaking surfaces of many of these cores. The formal toolkit (**figure 7**) comprises endscrapers, often thick and carinated (**figure 8**: 7, 10), retouched blades, including Aurignacian blades (**figure 8**: 8–9, 11), numerically significant sidescrapers, non-geometric microliths, especially in newly recovered material (**figure 8**: 1–5), and few burins (**figure 8**: 6). Summing up, the technological and typological features described above closely relate the entire Coşava sequence to the 'classical' Aurignacian (Aurignacian 1).

Tincova 2.2

The archeological settlement at Tincova (45°33'55" N, 22°9'24.8" E) is located in the vicinity of Sacu village, on a plateau, 60 m above the right bank of the Timiş River (**figure 9**). The archaeological settlement lies on the dejection cone on the western edge of the Poiana Ruscă Mountain range. The site was discovered in 1958 and excavated during two years by C. S. Nicolăescu-Plopşor and I. Stratan (Nicolăescu-Plopşor & Stratan, 1961; Stratan, 1962) and then in 1965 and 1966 by F. Mogoşanu and I. Stratan (Mogoşanu, 1972, 1978, 1983). The settlement was extensively dug in the past over an area of about 280 m². The single Aurignacian layer was found on the basis of a reddish clay at about 0.8–1.2 m in depth. It was attributed to a workshop containing abundant waste (2015 fragments, flakes), laminar debitage (369 blades/bladelets) and 10 cores (Mogoşanu 1978). Less is known about cores: 2 prismatic, 1 pyramidal, 7 globular; 55 core fragments and formless specimens were reported (Păunescu 2001). According to Mogoşanu, the toolkit (110) is dominated by endscrapers (31) with carinated, nosed, core-like forms, *rabots* (all in all 12 pieces) and Dufour bladelets (22). Font-Yves points are also present (3), together with rare (8), mostly dihedral (5), burins.

	COŞAVA, I		COŞAVA, II		COŞAVA, III		COŞAVA, GH4		COŞAVA, GH3	
	N	%ESS	N	%ESS	N	%ESS	N	%ESS	N	%ESS
Pre-cores	5	0,73	3	0,57	–	–	–	–	1	2,56
Cores	43	6,28	23	4,37	7	2,35	1	3,85	1	2,56
Flakes	331	48,32	269	51,14	158	53,02	17	65,38	8	20,51
Blades	130	18,98	120	22,81	77	25,84	2	7,69	6	15,38
Bladelets	26	3,80	20	3,80	16	5,37	4	15,38	10	25,64
Micro-blades	2	0,29	–	–	–	–	1	3,85	8	20,51
Tools	145	21,17	91	17,30	39	13,09	1	3,85	5	12,82
Tools/cores	3	0,44	–	–	–	–	–	–	–	–
Burin spalls	–	–	–	–	1	0,34	–	–	–	–
Chips	2	–	2	–	2	–	53	–	72	–
Blank fragments	–	–	–	–	–	–	–	–	–	–
Debris	22	–	7	–	3	–	12	–	14	–
Chunks	38	–	13	–	7	–	–	–	2	–
TOTAL	747	100,00	548	100,00	310	100,00	91	100,00	127	100,00

	COŞAVA, GH1-2		TINCOVA		ROMÂNEŞTI I, II		ROMÂNEŞTI I, III		ROMÂNEŞTI I, IV	
	N	%ESS	N	%ESS	N	%ESS	N	%ESS	N	%ESS
Pre-cores	3	3,80	7	0,50	1	0,32	6	0,24	–	–
Cores	1	1,27	23	1,64	3	0,95	29	1,14	17	1,65
Flakes	40	50,63	777	55,26	165	52,22	1448	56,87	663	64,37
Blades	12	15,19	308	21,91	109	34,49	719	28,24	234	22,72
Bladelets	12	15,19	108	7,68	19	6,01	168	6,60	43	4,17
Micro-blades	2	2,53	6	0,43	2	0,63	7	0,27	3	0,29
Tools	9	11,39	168	11,95	16	5,06	161	6,32	67	6,50
Tools/cores	–	–	–	–	–	–	1	0,04	–	–
Burin spalls	–	–	9	0,64	1	0,32	7	0,27	3	0,29
Chips	81	–	2	–	3	–	58	–	19	–
Blank fragments	–	–	–	–	–	–	–	–	–	–
Debris	32	–	–	–	–	–	23	–	8	–
Chunks	3	–	13	–	4	–	27	–	22	–
TOTAL	195	100,00	1421	100,00	323	100,00	2654	100,00	1079	100,00

	ROMÂNEŞTI I, V		ROMÂNEŞTI I, GH3		ROMÂNEŞTI I, GH4	
	N	%ESS	N	%ESS	N	%ESS
Pre-cores	1	0,14	2	0,08	–	–
Cores	22	3,06	19	0,71	–	–
Flakes	452	62,95	1136	42,74	24	52,17
Blades	162	22,56	260	9,78	5	10,87
Bladelets	38	5,29	471	17,72	5	10,87
Micro-blades	1	0,14	472	17,76	7	15,22
Tools	41	5,71	169	6,36	3	6,52
Tools/cores	–	–	1	0,04	–	–
Burin spalls	1	0,14	88	3,31	2	4,35
Chips	24	–	4440	–	89	–
Blank fragments	–	–	40	1,50	–	–
Debris	–	–	389	–	4	–
Chunks	25	–	18	–	2	–
TOTAL	767	100,00	7505	100,00	141	100,00

FIGURE 4 (Banat Aurignacian) – Artifact totals.

FIGURE 5 (Banat Aurignacian) – Cores.

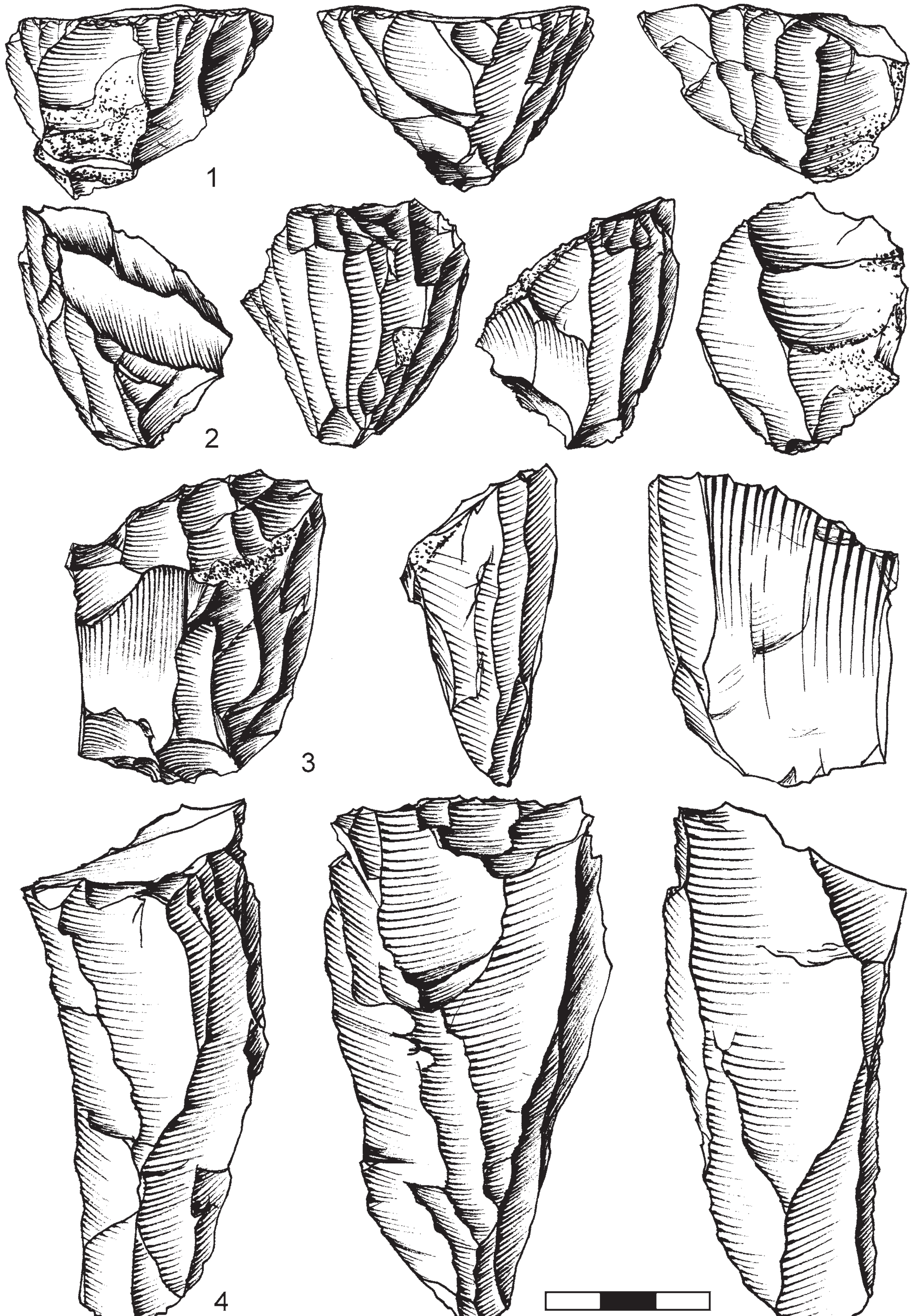
	TINCOVA	ROMÂNEŞTI-DUMBRĂVIŢA I, II	ROMÂNEŞTI-DUMBRĂVIŢA I, III	ROMÂNEŞTI-DUMBRĂVIŢA I, IV	ROMÂNEŞTI-DUMBRĂVIŢA I, V	ROMÂNEŞTI-DUMBRĂVIŢA I, GH3	COŞAVA, I	COŞAVA, II	COŞAVA, III
CARINATED									
unidirectional	5	1	5	2	2	2	10	7	3
bidirectional-adjacent	1	1	1	–	–	–	3	–	–
bidirectional	1	–	2	–	–	–	3	1	–
bidirectional-alternate	–	–	–	–	–	–	1	–	–
orthogonal-alternate	1	–	1	–	–	–	–	–	1
orthogonal-adjacent	1	–	1	–	–	–	2	1	–
perpendicular	–	–	–	–	–	–	–	1	–
BLADELET									
unidirectional	–	–	2	–	–	–	–	2	–
unidirectional, narrow-faced	–	–	1	2	3	–	2	4	1
orthogonal	1	–	–	–	–	–	–	–	–
orthogonal-adjacent, narrow flaking surface	–	–	–	–	1	1	–	–	1
bidirectional	–	–	–	–	–	–	1	–	–
bidirectional, narrow-faced	1	–	–	–	1	–	–	–	1
unidentifiable	–	–	–	–	–	–	4	1	–
BLADE									
unidirectional	–	–	–	–	2	1	2	–	–
unidirectional, narrow-faced	–	–	–	–	–	2	–	–	–
bidirectional	–	–	1	–	2	–	–	–	–
bidirectional-adjacent	–	–	–	1	–	–	–	1	–
BLADE / BLADELET									
unidirectional	1	–	2	–	–	1	3	–	–
unidirectional, narrow-faced	–	–	2	–	–	–	1	2	–
multiridectional, narrow-faced	–	–	1	–	1	–	–	–	–
bidirectional, narrow-faced	–	–	1	–	–	1	1	–	–
bidirectional	–	–	2	–	1	–	1	1	–
orthogonal-adjacent	1	–	–	–	–	–	–	–	–
unidentifiable	1	–	–	–	–	–	–	–	–
BLADE / BLADELET ON TOOL									
change orientation, narrow-faced, on scraper	–	–	–	–	–	1	–	–	–
unidirectional, narrow-faced, on scraper	–	–	–	–	–	1	–	–	–
unidirectional, narrow-faced, on thick endscraper	–	–	–	–	–	–	3	–	–
bidirectional, narrow-faced, on scraper	–	–	1	–	2	–	–	–	–
FLAKE / BLADELET									
unidirectional, rectangular	1	–	–	–	–	–	–	–	–
sub-polyhedral	–	–	–	2	1	1	–	–	–
semi-polyhedral	–	–	–	–	–	–	1	–	–

FIGURE 5 (Banat Aurignacian) – Cores.

	TINCOVA	ROMÂNEŞTI-DUMBRĂVIŢA I, II	ROMÂNEŞTI-DUMBRĂVIŢA I, III	ROMÂNEŞTI-DUMBRĂVIŢA I, IV	ROMÂNEŞTI-DUMBRĂVIŢA I, V	ROMÂNEŞTI-DUMBRĂVIŢA I, GH3	COŞAVA, I	COŞAVA, II	COŞAVA, III
FLAKE									
semi-polyhedral	–	–	–	–	1	–	1	–	–
polyhedral	1	–	–	–	–	–	1	–	–
discoidal	–	–	1	1	–	–	1	–	–
semi-discoidal	–	–	–	–	–	1	–	–	–
crossed, on scraper, Kombewa	–	–	–	–	–	1	–	–	–
bidirectional-transverse	–	–	–	–	–	–	1	–	–
orthogonal, trifacial	–	–	–	1	–	–	–	1	–
unidentifiable	–	–	–	–	–	–	1	–	–
UNIDENTIFIABLE									
core fragments	7	1	6	4	2	4	3	1	–
TOTAL	23	3	30	13	19	17	46	23	7
PRE-CORES	7	–	–	–	–	2	5	3	–

The main excavator, F. Mogoşanu (1983) had promptly noted the similarities (especially in terms of Dufour bladelets and Font-Yves points, as well as carinated endscrapers) between Tincova, Coşava, level I, Româneşti-Dumbrăviţa I, level III, and the UP collection at Krems-Hundssteig (Austria).

Our analysis has shown that the assemblage structure (**figure 4**) is characteristic for a settlement (site-workshop) with on-site blank production accompanied by off-site made debitage, e.g. massive blades. Both on-site and off-site reductions were oriented towards laminar production. On-site reduction of carinated cores/tools, prismatic, narrow-faced/burin-like nuclei with single and multiple striking platforms (**figures 5** and **10**: 16–17) resulted in the production of relatively narrow blanks: bladelets/micro-blades and small-sized blades, which are often twisted. Taking into account the sizes of unmodified flakes, pebbles, chunks, pre-cores, cores, as well as the pre-core and core typology, it is pretty difficult to suggest any kind of continuous reduction strategy (i.e., starting from relatively large pre-core/core for long, wide and thick blades and end up with carinated 'micro' nuclei for bladelets / micro-blades). Thus, blank production was more likely based on three independent reduction schemes of carinated pieces, narrow-faced/burin-like and prismatic cores. The formal toolkit displays a combination of endscrapers (dominance of simple over carinated; presence of thick/nosed), burins (domination of angled items, including on truncations), an abundance of blades with Aurignacian retouch (including those modified into endscraper and truncated pieces), as well as non-geometric microliths (with a dominance of Pseudo-Dufours over Dufours, and an abundance of Font-Yves points contrasting with a complete absence of Krems points) (**figures 7** and **10**: 1–15, 18, 19). The technological and typological characteristics of Tincova assemblage thus partly fit, but also differ from, both definitions of Proto-Aurignacian (Teyssandier 2008) and Krems-Dufour type of Early Aurignacian (Demidenko & Noiret 2012).



1
2
3
4

2.3 Româneşti-Dumbrăviţa I

The open-air site of Româneşti-Dumbrăviţa I is located at the confluence of the rivers Bega Mare and Bega Mica (**figure 2**), and occupies about 4 hectares (**figure 11**). Situated on a flat, slightly inclined top of a 10 m river terrace (45°49'02.41" N, 22°19'15.12" E; elevation ca. 212 m a.s.l.), this huge settlement lies at the periphery of the Poiana Ruscă mountain rim.

F. Mogoşanu excavated the Româneşti-Dumbrăviţa I settlement in two stages (1960–1964 and 1967–1972), opening a large area of about 450 m². He identified 6 archeological layers in a vertical subdivision (Mogoşanu 1972, 1978, 1983). According to him, the Aurignacian layers II, III, IV and V were sandwiched between a 'Quartzitic Mousterian' and a thin Gravettian layer. His layer III provided the richest Aurignacian industry of more than 5 000 artifacts, of which 114 were formal tools (51 endscrapers, including 13 carinated forms, fewer burins (26), eight Dufour bladelets and several retouched blades, including some typical Aurignacian forms). Layer IV (61 tools) was only documented on an excavated area of 20 m² and differed from the previous one by the presence of truncated blades/flakes (8) and a decrease in the frequency of endscrapers (11), with a corresponding increase in burins (25). Layer V consisted in clustered workshops, with an industry rich in knapping waste and only 38 formal tools (especially burins, a few common Aurignacian pieces).

The re-examination of Mogoşanu´s collections shows that the general composition of the four Aurignacian assemblages remains nearly unchanged throughout the entire sequence and is dominated by large debitage products: flakes and blades. The frequency of bladelets, tools, and especially cores, is quite low (**figure 4**). Despite quantitative differences between archaeological levels, cores and tools exhibit similar morphological, technological and typological patterns. Core exploitation usually aimed at on-site laminar production. Long reduction sequences for prismatic, carinated and even narrow-faced cores-on-flakes (burin-like with change orientation/multidirectional) were a common practice at this site (**figure 5**). The main tool categories comprise endscrapers, burins, retouched blades and non-geometric microliths. In the richest layer III, these tool types occur at similar frequencies, while in the overlying layers endscrapers and especially burins are more numerous than non-geometric microliths (**figure 7**).

The new excavations, while small-scaled (7 m²), provided 7505 artifacts (**figure 4**), including 19 pre-cores/cores (**figures 5** and **12**: 26–27) and 169 tools (**figures 7** and **12**: 1–25, 28), the majority of which stem from different altitudes of GH3 (Sitlivy *et al.* 2012). The high crop of finds is to be attributed to the use of wet sieving, a technique not applied during previous excavations. Horizontally, the lithic material was dispersed equally across the entire excavated area. Vertically, the Aurignacian-looking inventory occurs continuously throughout the upper part of GH4 and whole GH3, without sterile sections in between, suggesting repeated occupations/palimpsest. The clear cut vertical distinction between the archaeological layers reported by previous researches could not have been confirmed. However, there is little doubt that the main concentration in GH3 corresponds reasonably well to Mogoșanu's layers II-V (for a detailed discussion see Sitlivy *et al.* 2012). Lithic attributes do not show any significant technological changes across the excavated succession either. In addition, the presence of many chips along with large items, as well as the vertical and horizontal distribution of finds, coupled with few cases of technological refitting and conjoining of broken artifacts, confirm that there was little geological or hydrological sorting of material. Burnt artifacts are common and 12 such samples were used for TL dating (Schmidt *et al.*, 2013; Sitlivy *et al.*, 2012). Preliminary TL and OSL results point to an estimated age between 45 and 40 ka for the main accumulation in GH3.

FIGURE 6 (Coşava) – Level I (1, 2, 4) and level II (3), cores: 1. Bladelet carinated, unidirectional, pyramidal, on flake; 2. Bladelet carinated core, unidirectional, sub-pyramidal, on flake; 3. Bladelet, unidirectional, narrow-faced, on flake; 4. Blade, unidirectional, prismatic.

FIGURE 7 (Banat Aurignacian) – Tools.

	TINCOVA	ROMÂNEŞTI-DUMBRĂVIŢA I, II	ROMÂNEŞTI-DUMBRĂVIŢA I, III	ROMÂNEŞTI-DUMBRĂVIŢA I, IV	ROMÂNEŞTI-DUMBRĂVIŢA I, V	ROMÂNEŞTI-DUMBRĂVIŢA I, GH3	COŞAVA, I	COŞAVA, II	COŞAVA, III
SIDESCRAPERS									
Lateral	1	–	2	1	1	2	4	6	2
Transverse	–	–	3	1	–	1	1	2	–
Double	–	–	–	–	–	–	3	1	–
Convergent	–	–	–	–	–	–	–	2	–
Canted	–	–	–	–	–	–	1	1	–
Alternate	–	–	2	–	–	–	1	–	–
Unidentifiable	–	–	–	–	2	–	–	–	–
ENDSCRAPERS									
Simple	9	1	7	3	2	2	13	5	4
Flat	1	–	–	–	–	–	1	–	–
On Aurignacian blade	2	–	–	–	–	–	2	–	–
Fan-shaped	–	–	–	–	1	–	–	1	1
Ovoid	–	–	–	–	1	–	–	–	–
Nosed	1	–	–	–	–	–	–	–	–
Thick	4	–	6	3	3	–	14	12	–
Carinated	2	–	4	–	–	–	6	2	–
Ogival	–	–	–	–	–	–	–	1	1
Unidentifiable	–	–	1	1	–	–	–	1	–
BURINS									
Angle on snap	5	1	7	6	8	7	3	2	–
Angle on butt	–	–	1	–	–	–	–	–	–
Angle on truncation	4	–	1	1	–	3	1	–	–
Flat	–	–	–	–	–	1	–	–	–
Double-angle on snap	1	–	–	1	–	–	–	–	–
Double-angle on truncation	–	–	1	–	–	–	–	–	–
Double mixed	–	–	1	–	2	–	–	–	–
Double-opposite on ridge / snap / truncation	3	–	–	–	–	–	–	–	–
Transverse	–	–	2	–	–	2	1	–	–
Dihedral	1	–	2	1	–	2	–	–	–
Multiple	–	1	–	–	–	–	–	–	–
Busqué	–	–	1	–	1	–	–	–	–
Carinated	1	–	1	1	1	–	2	1	1
BORERS			1					1	
COMPOSITE TOOLS	–	–	–	–	–	–	–	–	–
Endscraper carinated/thick shouldered & burin double on truncation	1	–	–	–	–	–	–	–	–
Endscraper simple & burin angle on snap	–	1	–	–	–	–	–	–	–
Endscraper thick shouldered & burin transverse	–	–	1	–	–	–	–	–	–
Endscraper simple & truncation	–	–	–	–	1	–	–	–	–

FIGURE 7 (Banat Aurignacian) – Tools.

	TINCOVA	ROMÂNEŞTI-DUMBRĂVIŢA I, II	ROMÂNEŞTI-DUMBRĂVIŢA I, III	ROMÂNEŞTI-DUMBRĂVIŢA I, IV	ROMÂNEŞTI-DUMBRĂVIŢA I, V	ROMÂNEŞTI-DUMBRĂVIŢA I, GH3	COŞAVA, I	COŞAVA, II	COŞAVA, III
BLADES WITH RETOUCH									
Pointed blades	5	–	1	1	1	1	1	1	1
Aurignacian blades	11	–	1	2	1	2	10	10	2
Strangled blades	1	–	–	–	–	–	1	–	–
Retouched blades	30	1	14	8	2	2	20	7	6
NOTCHES									
Proximal	–	1	–	–	–	–	–	–	–
Distal	1	–	–	1	–	–	–	–	–
Lateral	8		6	1	1	4	6	1	1
Lateral/Distal	–	–	2	–	–	–	–	–	–
Double-lateral	1	–		–	–	–	–	–	–
Bilateral	1	–	1	1	–	–	1	–	1
DENTICULATES									
Distal	–	–	2	–	–	–	–	–	–
Lateral	–	–	1	–	–	–	1	2	1
TRUNCATED PIECES									
Truncated flakes	2	–	1	–	–	–	1	–	–
Truncated blades	4	2	4	3		2	2	–	–
Truncated Aurignacian blade	1	1	–	–	–	–	1	–	–
BACKED PIECES									
Backed blades	–	–	–	–	–	–	1	–	–
Backed flakes	–	–	–	–	–	–	1	–	–
SCALED PIECES	1		1	3	1	3			
THINNED PIECES									
Distal	1	–	1	–	–	–	–	–	–
Proximal	1	–	1	–	–	–	–	–	–
Lateral	–	–	3	–	–	–	2	–	1
NON-GEOMETRICAL MICROLITHS									
Font-Yves points	5	–	–	–	1	4	–	–	1
Krems points	–	–	–	–	–	2	–	–	–
Dufour bladelets / micro-blades	6	1	11	1	–	64	–	1	2
Pseudo-Dufour bladelets / micro-blades	18	–	6	3	–	10	3	–	5
Others	–	–	2	3	1	–	–	–	–
RETOUCHED PIECES									
Retouched piece on blades	22	2	24	7	4	16	16	13	6
Retouched piece on flakes	10	–	22	4	–	12	18	15	1
VARIA	–	–	–	–	–	–	1	–	–
UNIDENTIFIABLE									
Unidentifiable	3	4	13	10	6	27	6	3	2
TOTAL	168	16	161	67	41	169	145	91	39

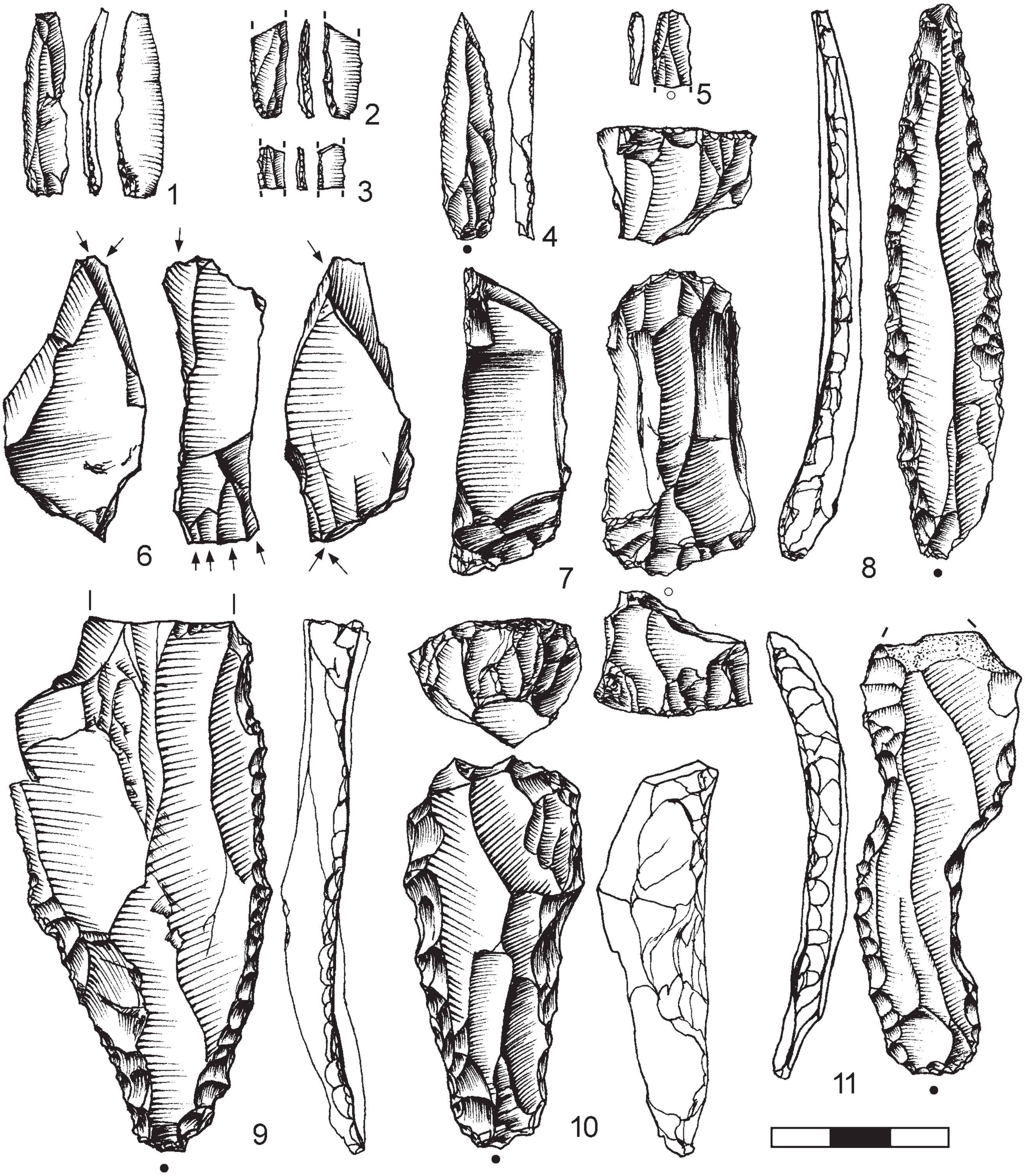


FIGURE 8 (Coşava) - Levels GH1-2 (1, 2, 3), GH3 (5), I (7, 9, 10, 11), III (8, 6), tools: 1. Dufour, on alternatively retouched bladelet; 2-3. Dufour, on alternatively retouched micro-blade; 4. Font-Yves point, on bilaterally retouched bladelet; 5. Pseudo-Dufour, on obversely retouched micro-blade; 6. Burin, carinated dihedral double; 7. Endscraper, carinated double; 8. Pointed blade; 9. Aurignacian blade, bilaterally obversely retouched; 10. Endscraper, carinated, on bilaterally obversely retouched Aurignacian blade; 11. Strangled blade.

FIGURE 9 View of Tincova site and Timiş River Valley, Mai 2011.

Quite expectably, the assemblage from GH3 differs dramatically from Mogoşanu's record due to the dominance of bladelets/microblades (with often straight lateral profile obtained from prismatic, narrow-faced and few carinated cores) and tools produced on these small blanks (ca. 50 % of the tool-kit), especially alternatively retouched Dufours (**figure 12**: 4–18). However, the technological data gathered from both old and new assemblages reflect a common trend, i.e. prevalent laminar/lamellar and occasional flake production. Blade, bladelet and micro-blade production exhibits three dissociated systems based on reduction of (a) prismatic, (b) narrow-faced cores and (c) carinated pieces (cores and tools). The desired laminar blanks include mid-sized blades, quite long and narrow bladelets and tiny micro-blades with straight/curved/twisted profiles. The debitage symmetry (on-axis) of laminar blanks is dominant. These blanks, as well as flakes, were modified into tools with different frequencies. The toolkit comprises 'Aurignacian fossiles directeurs' (carinated and thick ogival, shouldered endscrapers, rare carinated burins, Aurignacian blades/retouch and 'micro instruments', i.e. Dufour sub-type bladelets and some Font-Yves/Krems points), common Upper Paleolithic types (simple endscrapers, abundant angle burins on snap or on truncations, dihedral burins, semi-steep retouched blades and retouched/notched pieces on blades, and truncated pieces on different blanks), as well as a small flake tool component (sidescrapers on flakes/tablets).

In comparison to the old collections, the assemblage composition in "micro/macro" artifacts/tools also contrasts considerably, for various reasons (e.g. different excavated surfaces and recovering methods, diverse artifact clustering). In sum, the general observations are in line with a rather 'archaic/early' Aurignacian character of the corresponding archeological layers (detailed information on the excavations, stratigraphy, dating and lithic analysis of old and newly recovered lithic assemblages is given in Sitlivy *et al.* 2012).

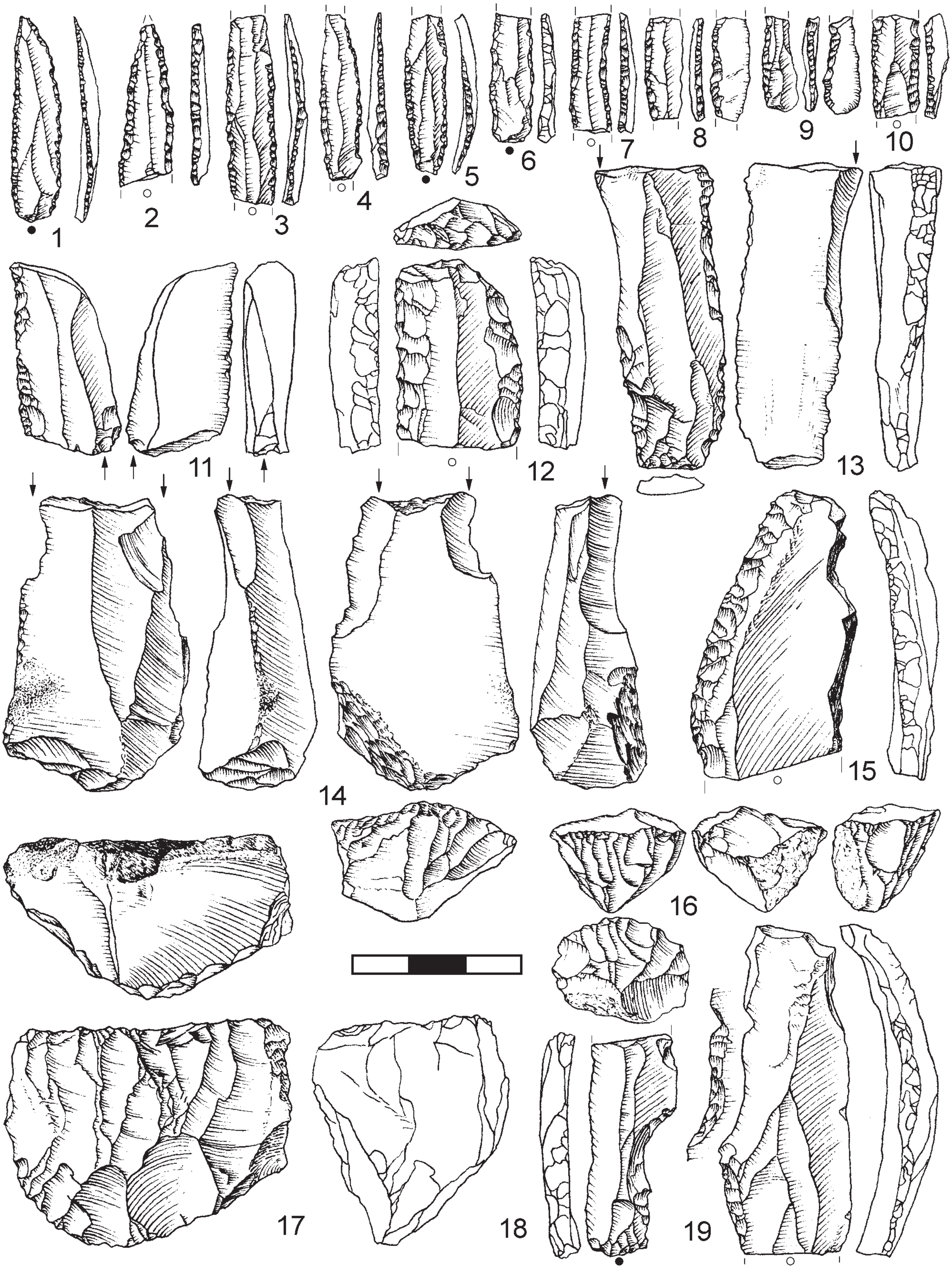

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FIGURE 10 (Tincova) – Artifacts: 1-2. Font-Yves, on bilaterally retouched bladelets; 3, 6, 10. Pseudo-Dufour, on bilaterally retouched bladelets; 4-5, 7. Pseudo-Dufour on bilaterally retouched micro-blades; 8-9. Dufour, on alternatively retouched micro-blades; 11. Angle burin on snap, on obversely retouched blade; 12. Endscraper, on bilaterally retouched Aurignacian blade; 13. Angle burin on snap, on bilaterally obversely retouched blade; 14. Composite tool, double burin on concave truncation / carinated endscraper on laterally obversely retouched blade; 15. Aurignacian blade, laterally obversely retouched; 16. Bladelet carinated core, unidirectional, sub-pyramidal, on flake; 17. Bladelet carinated core, bidirectional; 18. Notch on blade, lateral, obverse; 19. Notch on blade, lateral, alternating.

FIGURE 11 View of Româneşti-Dumbrăviţa I during field campaign in October 2009: localization of Mogosanu's trenches.

3 BANAT INTER-SITE COMPARISON: GENERAL OUTLINE

As noted in the beginning, the lithic assemblages from the three settlements had already been subject for comparisons in the past, a number of typological similarities being repeatedly stressed (e.g. Mogoşanu 1972, 1978; Kozlowski & Kozlowski 1975; Hahn 1977; Chirica *et al.* 1996; Băltean 2011a, b). Our aim here is to provide a more detailed comparison using our extensive attribute analysis and to provide a more refined description of the differences and similarities between Tincova, Româneşti-Dumbrăviţa I and Coșava I.

Româneşti-Dumbrăviţa I is a huge open-air settlement on a low terrace, which, unlike Coșava, contained a set of high-density clusters, documented both by F. Mogoşanu and during the recent survey excavations. The resulting collection is an abundant lithic assemblage (> 15000 artifacts per > 450 m² throughout the whole sequence). This clustering strongly differs from the entire Coșava

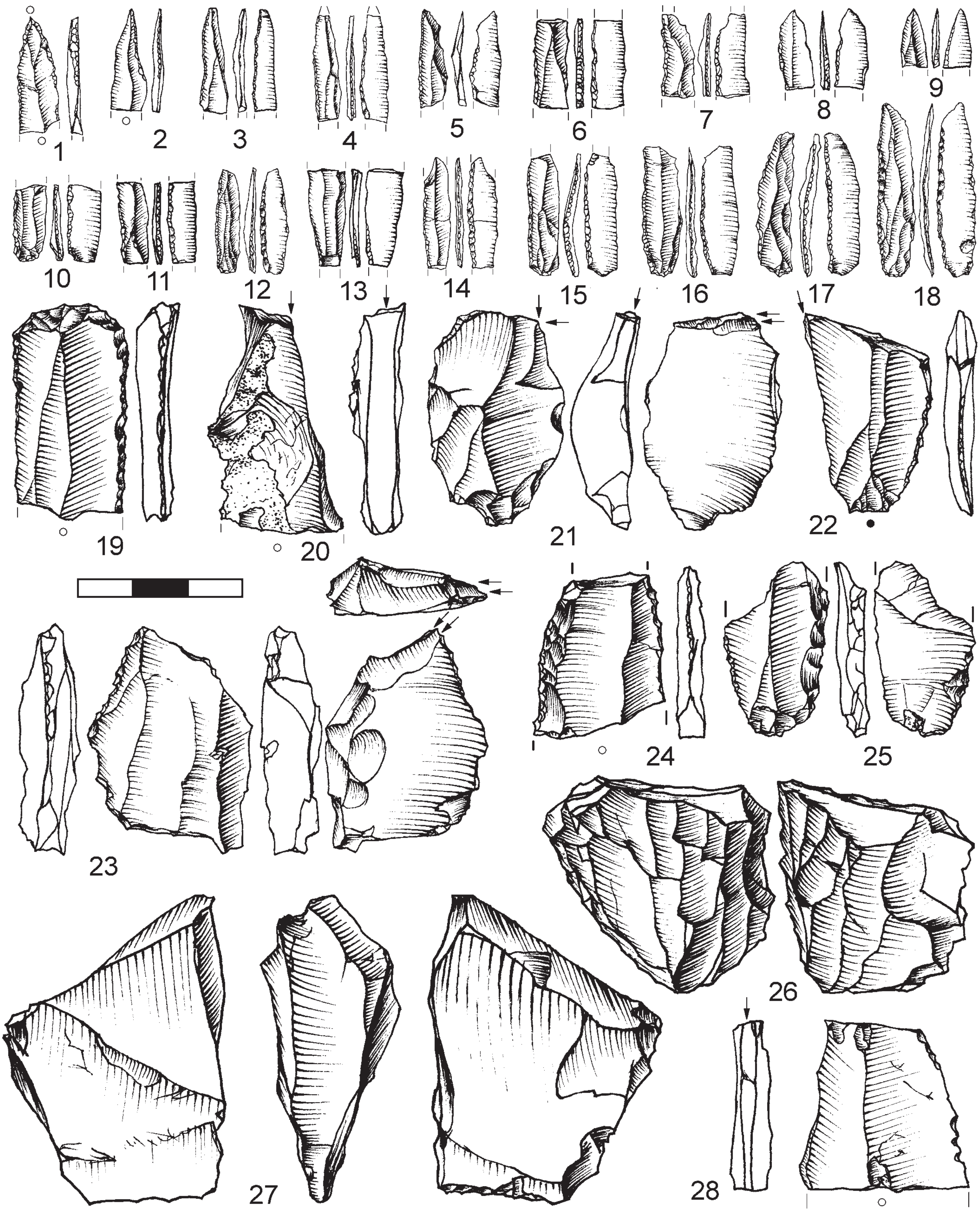

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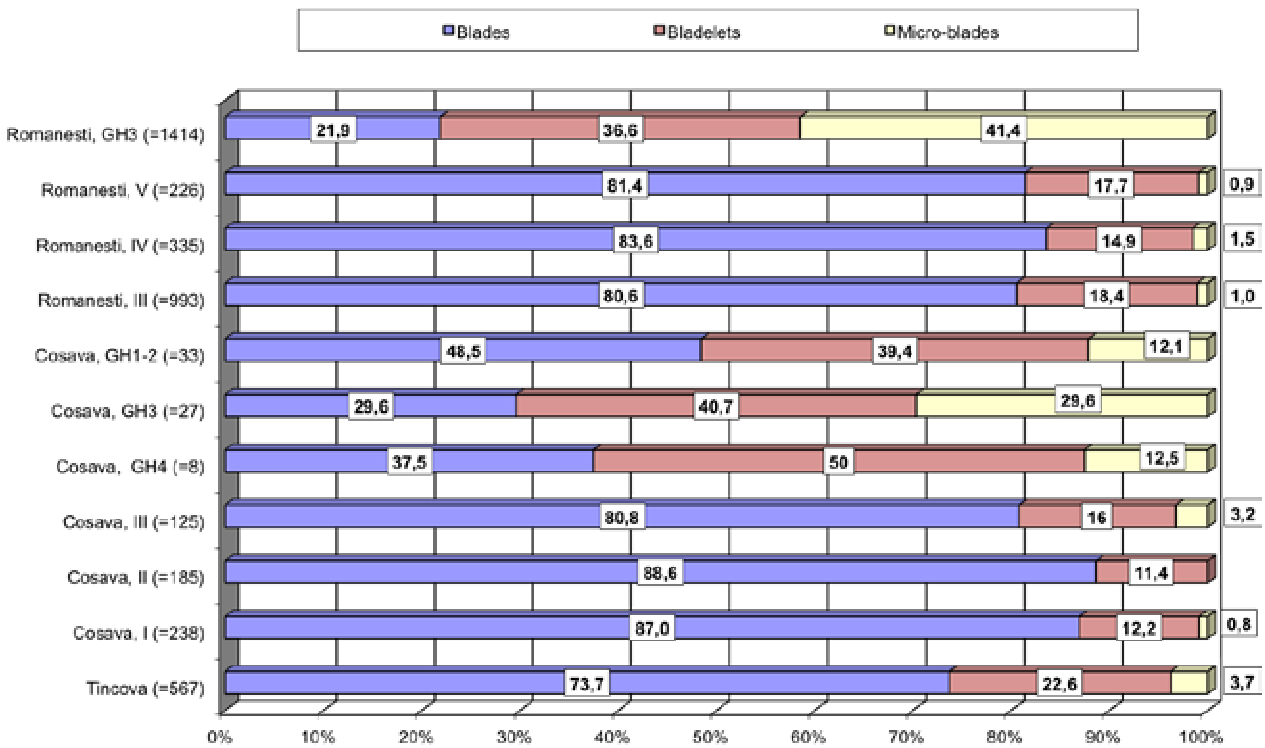
FIGURE 12 Româneşti-Dumbrăviţa I, GH3: 1. Font-Yves point, on bilaterally retouched micro-blade; 2. Font-Yves point, on laterally retouched micro-blade; 3. Krems point, on alternatively retouched micro-blade; 4-8, 10-15, 17. Dufour, on alternatively retouched micro-blades; 9. Dufour, on inversely retouched micro-blade; 16, 18. Dufour, on alternatively retouched bladelets; 19. End-scraper, on bilaterally obversely retouched blade; 20, 28. Angle burin on snap, on blade; 21. Dihedral angle burin, on flake; 22; Angle burin, on snap, on laterally obversely retouched blade; 23. Transverse burin, on retouched blade; 24-25. Aurignacian blades; 26. Bladelet carinated core, unidirectional, sub-pyramidal; 27. Bladelet core, change orientation, narrow-faced, on flake.

FIGURE 13 Banat Aurignacian assemblages. Laminar structure.

record, including both the old collections from layers I, II and III (1605 items total, according to our study – Sitlivy *et al.*, in press) and the new samples (413 items in 2009 from 7 m² and 271 pieces in 2010 from Coşava II, 5 m²). Tincova represents a rather restricted open-air single-layered Aurignacian occupation, located on a vast river terrace and yielding 2 494 artifacts. Coşava is situated in a dominant position, on the summit (up to 282 m a.s.l. and over 90 m above the river layer) and slopes of two hills. Geomorphologically, unlike Tincova and Româneşti-Dumbrăviţa, both located at the periphery of Poiana Ruscă Mountains, this settlement is situated on the hill marking a meridian limit of the vast Lipova Plateau. These differences in topographical settings and accumulation rate of artifacts overtly suggest some functional differences in settlement use, likely interfering with some diachronic trends, at least in the case of the multilayered archives at Româneşti and Coşava. Unfortunately, lacking crucial additional information, like an accurate stratigraphic/topographic recording of old collections or datable organic remains, our observations need to rely entirely on the general structure of lithic collections.

Concerning raw material exploitation, the assemblages at Coşava show a broader diversity in knapped stones and a higher frequency of rare/exotic rocks (usually of better quality than the dominant opal) when compared to Româneşti-Dumbrăviţa and Tincova.

The laminar debitage structure of the newly recovered assemblages evidences the dominance of micro-blades and bladelets over blades, while old collections show the opposite trend, with a stable high (~70–90 %) proportion of blades (**figure 13**). However, the lack of small laminar products due to different sieving strategies should be taken seriously; we may thus envisage a similar high rate of bladelets/micro-blades for the old collections as well. While the tool/core ratio is generally moderate for all analyzed samples, the blank to core ratio is higher in Româneşti original layer III and especially in GH3, showing a high laminar productivity.



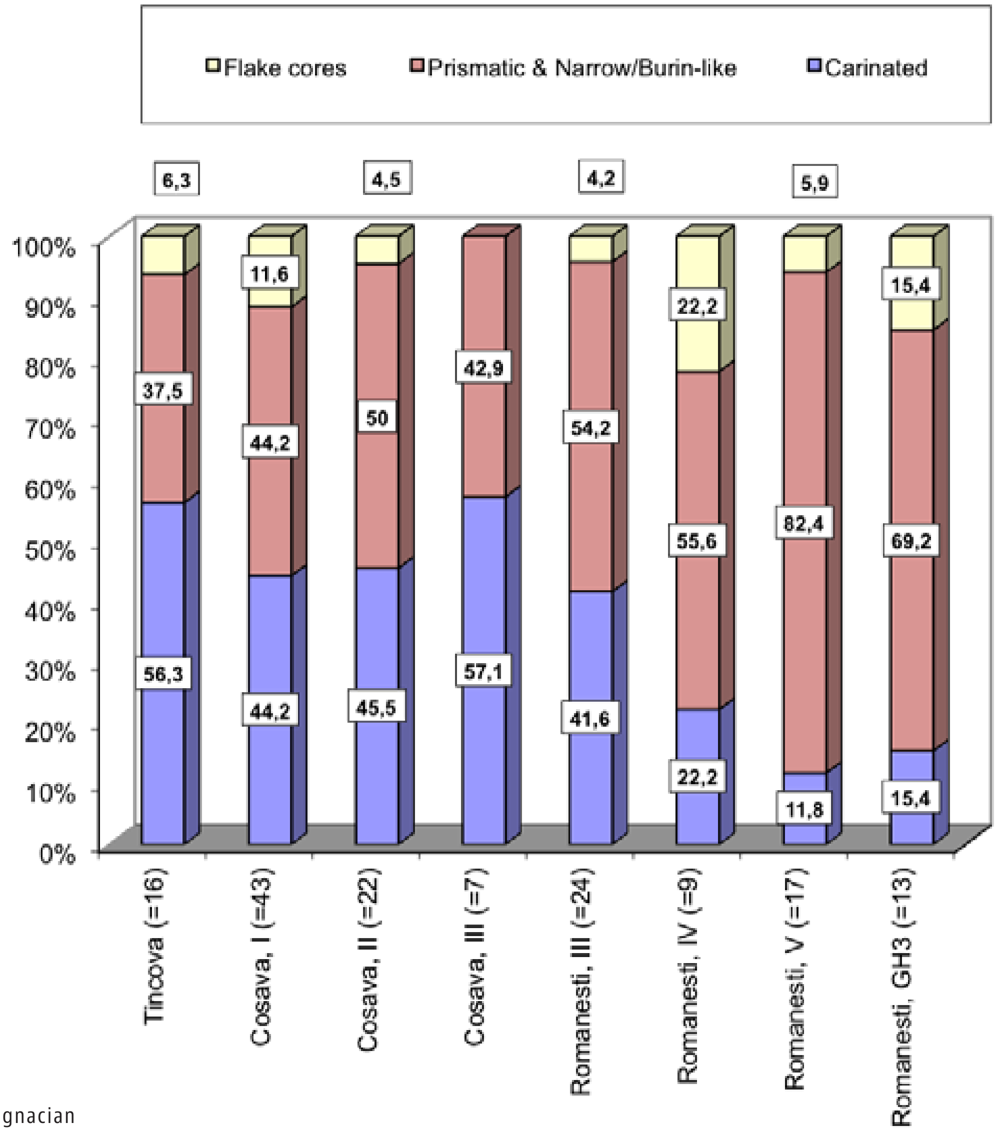


FIGURE 14 Banat Aurignacian assemblages. Main core groups.

The general artifact structure shows that cores/pre-cores in Româneşti layer III/GH3 (1.1 %/0.3 % *contra* up to 7 %) and especially tools (> 6 % *contra* 20 %) are less abundant than in Coşava, layer I. The remaining industries reflect rather low values. The core composition and frequency is quite similar across all assemblages: carinated and prismatic/narrow-faced cores are more common than flake cores. In Româneşti, however, the amount of carinated cores seems to decrease toward the top of the sequence. In the new GH3 assemblage they occur sporadically, being replaced by blade prismatic and especially by blade/let narrow-faced cores-on-flakes. In Coşava, their frequency does not change as much (**figure 14**).

In order to analyze debitage products, a number of attributes were taken into consideration: dorsal scar pattern, cortex presence and position, blank shape and symmetry, lateral and distal profiles, cross-section, butt type, bulb and lipping patterns, internal flaking angles (between ventral face and butt), butt zone trimming (overhang elimination), butt and blank sizes. In most cases, these attributes show similar values when comparing the Banat assemblages and will not be discussed here. However, certain differences have been documented, especially among small laminar blanks. For instance, the lateral profiles of bladelets show some variability: rectilinear (flat) pieces are more common in layer III in

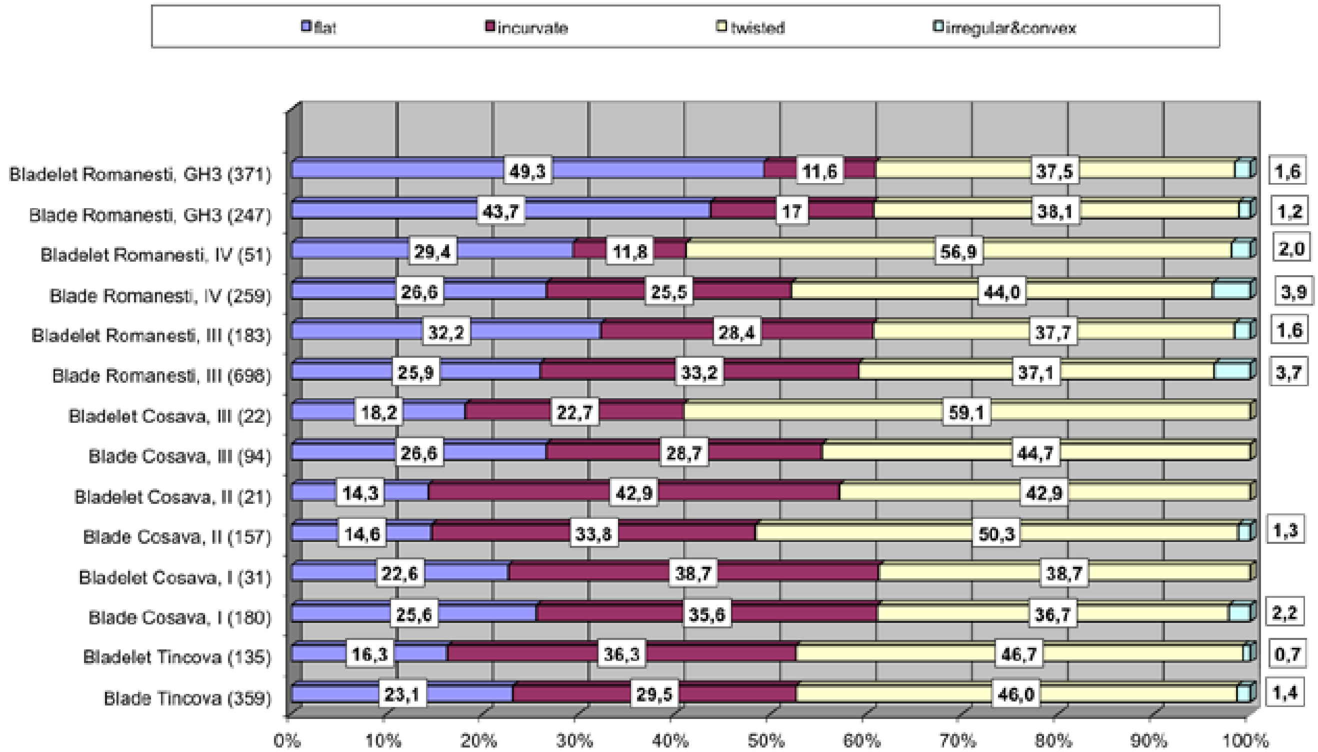


FIGURE 15 Banat Aurignacian assemblages. Laminar lateral profiles.

Româneşti (32.2 %) than in Coşava lowermost layer I (22.6 %), despite the high percentage of twisted blade/lets in both assemblages (37.1/37.7–36.7/38.7 % for blade/lets). The new sample in GH3 at Româneşti also exhibits the dominance of flat (49.3 %) and twisted bladelets (37.5 %), which is not the case in Tincova, where twisted (46.7 %) and curved (36.3 %) profiles are more abundant than flat ones (16.3 %). In sum, the newly recovered bladelets in Româneşti are 'straighter' in comparison to all other assemblages, especially Tincova, while the twisted pattern is common for all analyzed industries (**figure 15**). This trend is coherent with the core structure of all assemblages, in which carinated and 'non-carinated' nuclei were exploited simultaneously, but with different frequency and intensity. Last but not least, the quasi identical profile pattern (when confronting blades and bladelets) points to a continuity of the triple reduction system based on exploitation of carinated, prismatic and narrow-faced cores. Obtuse bladelet flaking angles in Româneşti and Coşava are less frequent than in Tincova (60 %–70 % respectively *contra* 88 %); however, this attribute is dominant for all assemblages. Interestingly, while comparing flaking angles with ~90° among big and small products, it turns out that in all cases right angles are more common to be found on blades than on bladelets (**figure 16**). Bladelet butt lipping (including semi-lipped) is more common for GH3 in Româneşti and Tincova than for other inventories, where unlipped bulbs are quite representative (28.6 %–53.8 %) (**figure 17**). A domination of weak (diffused) bulbs was recorded for all laminar products (**figure 18**).

Bladelet butt edge abrasion is well represented in GH3 at Româneşti (60.9 %) and much less frequent in Mogoşanu's layer III here (32.4 %) and in Coşava layer I (37.5 % is the max. value for this site) (**figure 19**). However, this technique was accompanied by trimming of butt edges with small elongated removals (faceting) in Româneşti layer III (51.5 %) and, to a lesser extent, in Coşava layer I (43.8 %), but much more often (60- > 90 %) in the two uppermost layers of this site (small sample bias?).

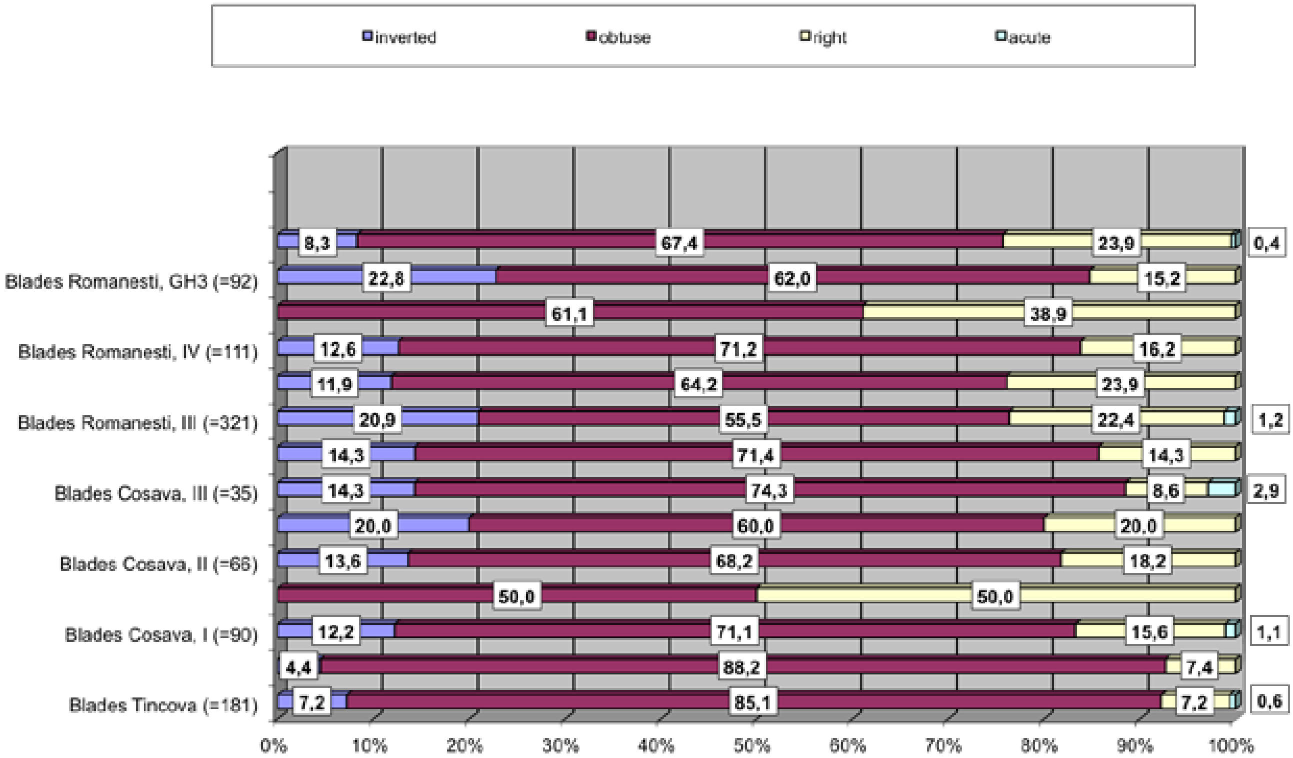


FIGURE 16 Banat Aurignacian assemblages. Laminar butt angles.

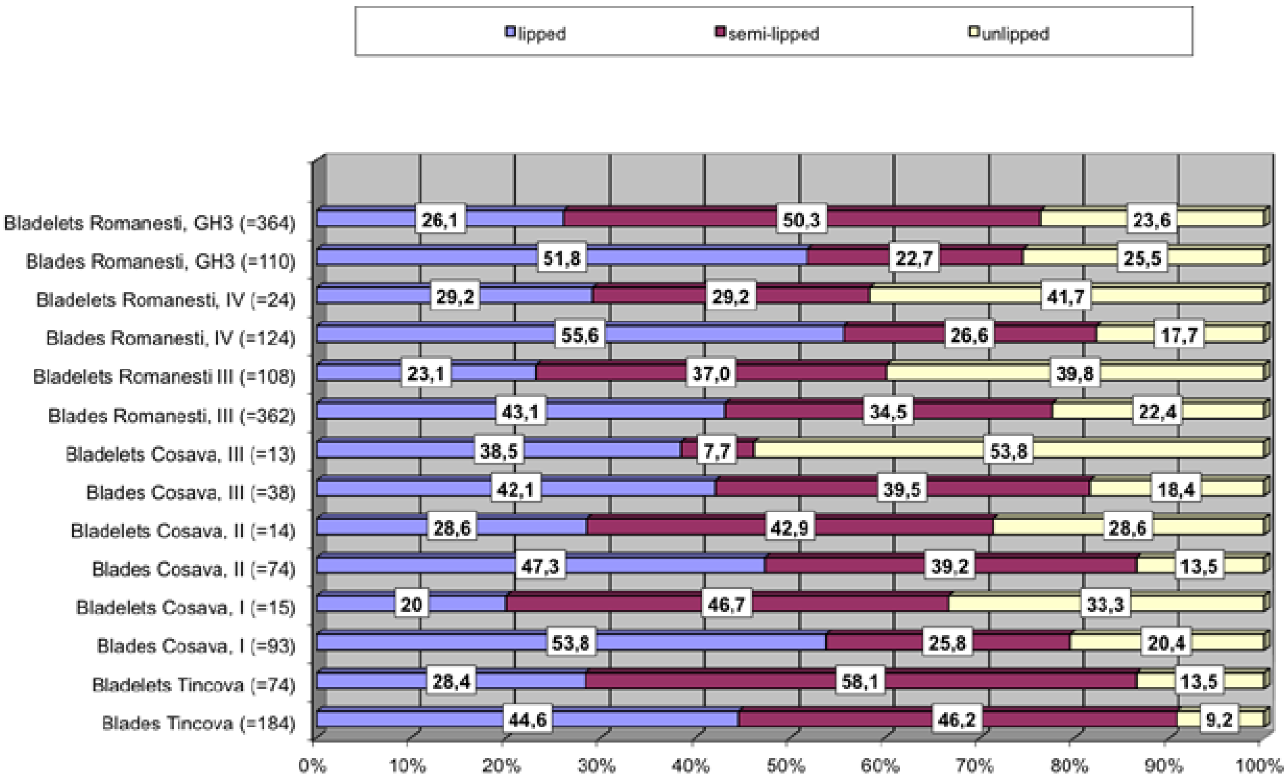


FIGURE 17 Banat Aurignacian assemblages. Laminar butt lipping.

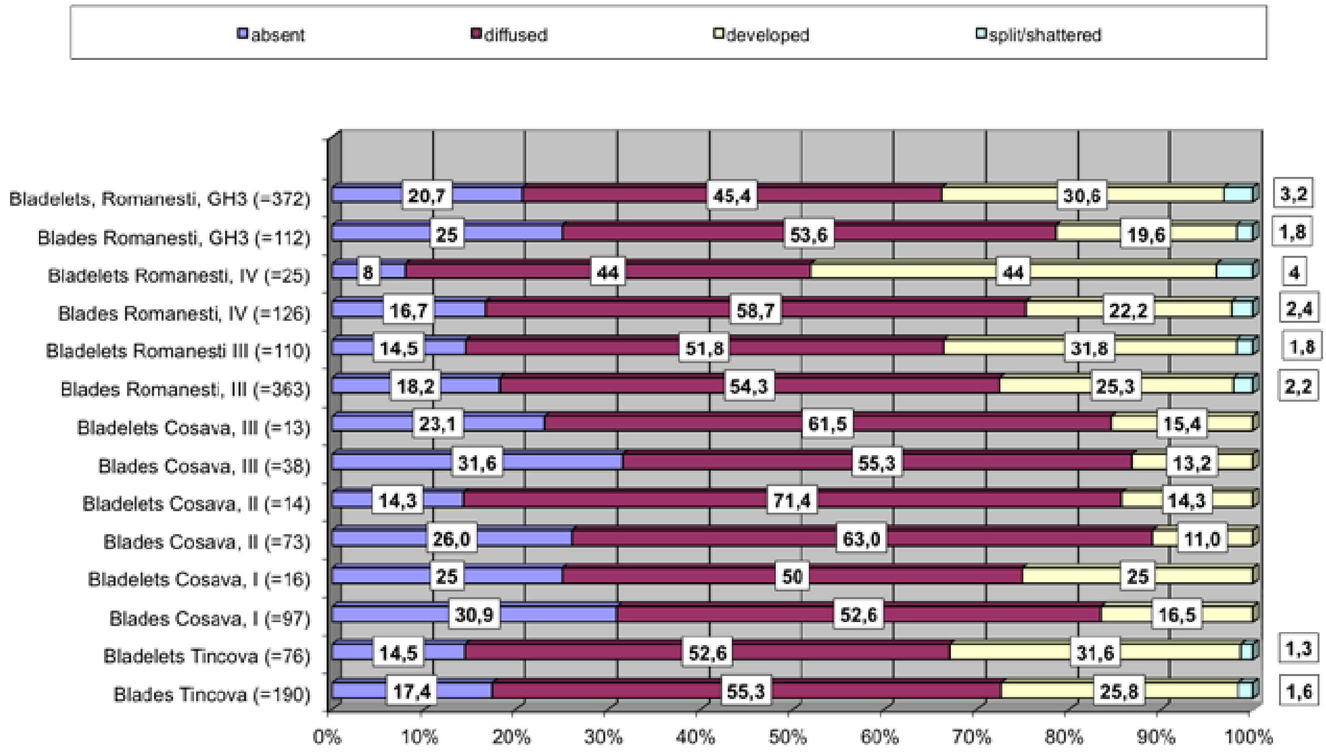


FIGURE 18 Banat Aurignacian assemblages. Laminar bulbs.

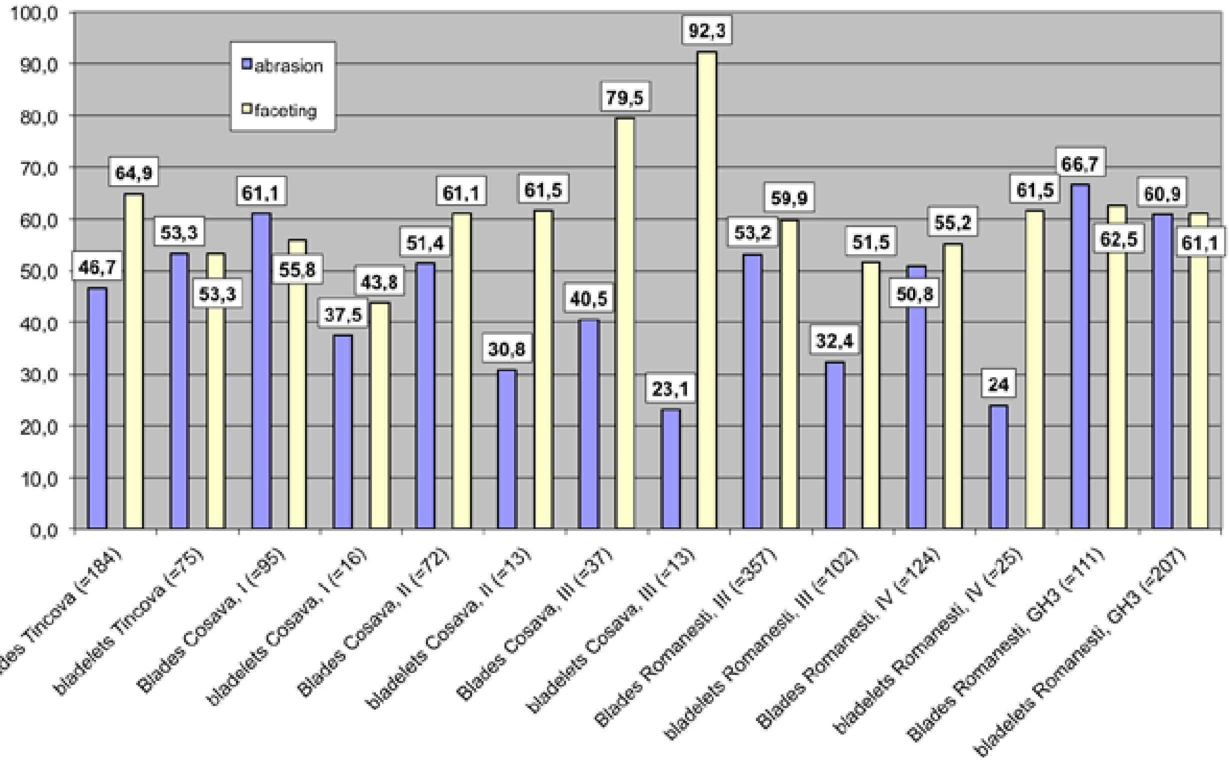


FIGURE 19 Banat Aurignacian assemblages. Laminar overhang trimming.

Also, a comparison of abrasion values between big and small laminar blanks shows that in all cases, except Tincova, the overhang was more often abraded on blades than on bladelets. This negligence *vis-à-vis* some bladelets was partially compensated by faceting of the overhang.

Technology **3.1** Although many tools were produced on flakes, flake production (mainly discoidal or/and polyhedral methods) was unsystematic or limited, occurring only in larger assemblages or practiced out of the excavated area (e.g. importation of large flakes to Coșava). The main flake mass, including tools on flakes, originated from laminar core shaping, re-preparation and failed knapping. Blank production in all of the Banat assemblages was oriented towards the production of blades, bladelets and micro-blades. Laminar technologies were based on co-existing independent reduction of: **1)** carinated pieces (cores and tools); **2)** prismatic (unprepared and with crest installation; uni-/bi-/multidirectional; sub-cylindrical, triangular/keeled and sub-pyramidal) and **3)** narrow-faced cores (uni-/bi-/multi-directional; rectangular/triangular/keeled), including burin-like cores and recycling of some tools in the same manner. However, these reduction chains were used with different intensity, especially in what concerns the participation rate of carinated and "non-carinated" cores (prismatic and narrow-faced).

Technology **3.2** Direct percussion using soft stone and organic tools was mostly applied for the laminar production (indicated by lipping, bulb patterns and invisibility of impact points). In the same time, all Banat assemblages display a peculiar trend when comparing two attributes, i.e. bulbs and lipping characteristics: developed bulbs and unlipped proximal parts appeared more often on bladelets/micro-blades. Although proxies of soft hammer technique prevail for all laminar blanks, a certain part of small blanks (bladelets/micro-blades) were thus detached using hard hammer percussion.

Toolkits **3.3** The main difference between the Banat inventories is the endscraper to burin ratio (**figure 20**). The absence of burin spalls in Coşava (except a single one from the uppermost layer) is correlated to the low frequency of burins (G > B at minimum 5 times). The opposite trend was documented in the two uppermost layers and GH3 in Româneşti. In Româneşti layer III, these tools appear at similar frequency, after several carinated endscrapers were re-attributed to the core category in our study. Burins are also more diverse in Româneşti assemblages. According to Mogoşanu (1978), Tincova yielded only 8 burins (?) and 19 endscrapers (12 carinated and 2 *rabot*), which is similar to the Coşava G/B ratio. However, an equilibrium between endscrapers and burins was recently documented: a double number of burins (15) and 19 endscrapers (9 carinates were included in the core group). Retouched blades, including Aurignacian, are more frequent in the Tincova (28.5 %) and Coşava (*ca.* 20–25 %) sequences, while in Româneşti, especially in GH3, these are less represented (3.5 %). Microliths in the two lowermost layers in Coşava are rather rare when compared to Tincova (17.6 %) and Româneşti (e.g. 12.8 % in layer III). The most abundant microlithic sample, especially Dufours, comes from the new excavations in Româneşti GH3, which differs from all old and new Banat records. Finally, combined tools (endscraper/burin) occur only in small quantity throughout the Aurignacian sequence of Româneşti and Tincova.

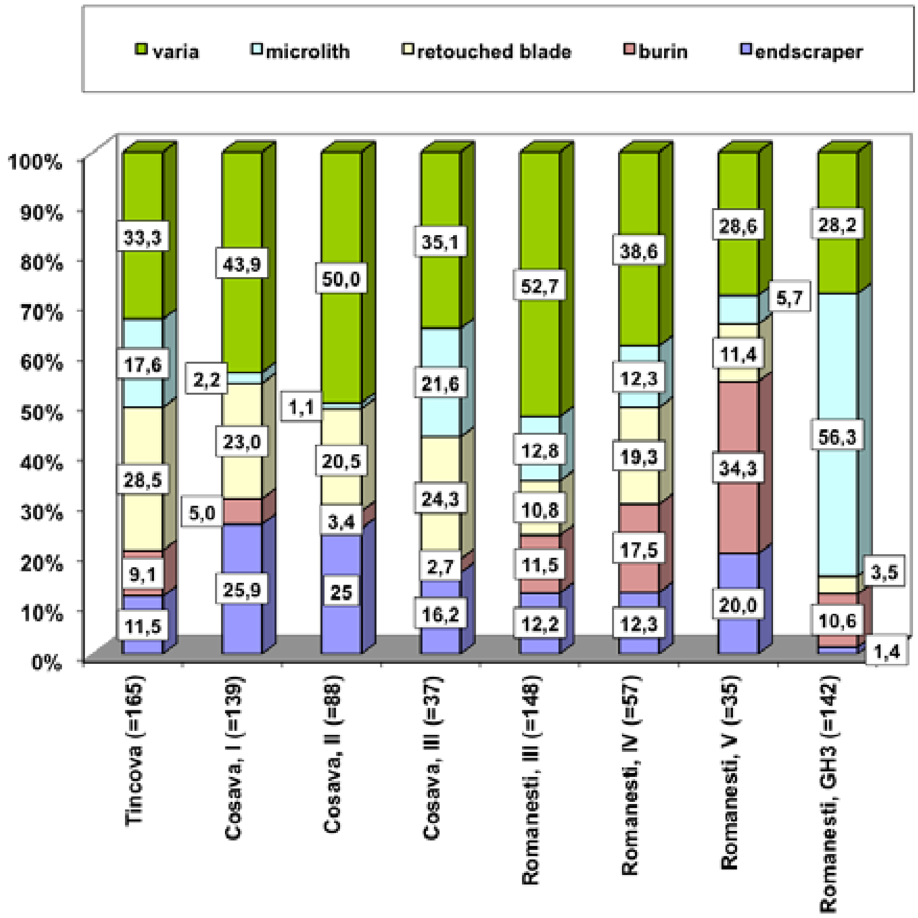


FIGURE 20 Banat Aurignacian assemblages. Main tool groups.

4 DISCUSSION

The information recently gathered allows for a substantial change of the picture regarding the alleged late Krems-type Aurignacian in Banat. While having a general Aurignacian background and a majority of common characteristics, the more or less statistically valid assemblages of Banat sites demonstrate a certain degree of dissimilarity, best expressed by two sets of ratios: **1)** core to tool ratio, and **2)** ratio of pure 'domestic tools' (endscrapers, retouched blades), burins and projectile implements (non-geometric microliths). These ratios document certain tendencies: (a) the decrease in tool percentages parallels the decrease in core percentages (**figure 21**); (b) the increase of 'domestic tools' parallels the decrease of both burins and non-geometric microliths. In other words, (a) the assemblages with large percentages of cores also show the highest percentage of tools (**figure 21**), and (b) the larger the sum of endscrapers and retouched blades, the smaller is the number of both burins and microliths (**figure 22**). According to this perspective, the Banat assemblages compose three groups: (a) Româneşti-Dumbrăviţa I, GH 3; (b) Româneşti-Dumbrăviţa I, levels III, IV, and Tincova; (c) Coşava, levels I and II (**figure 23**).

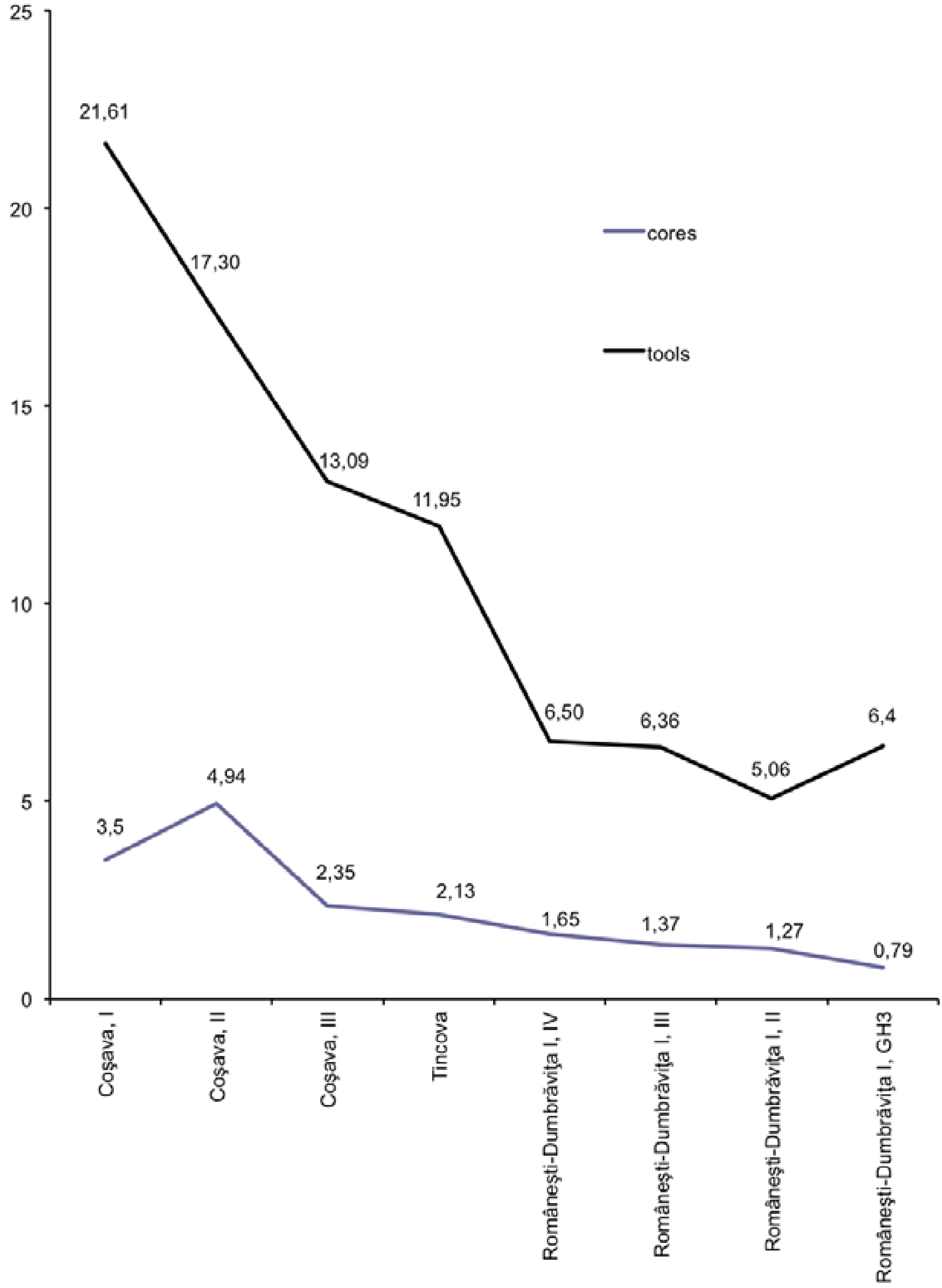


FIGURE 21 Banat Aurignacian assemblages. Relations between cores & tools.

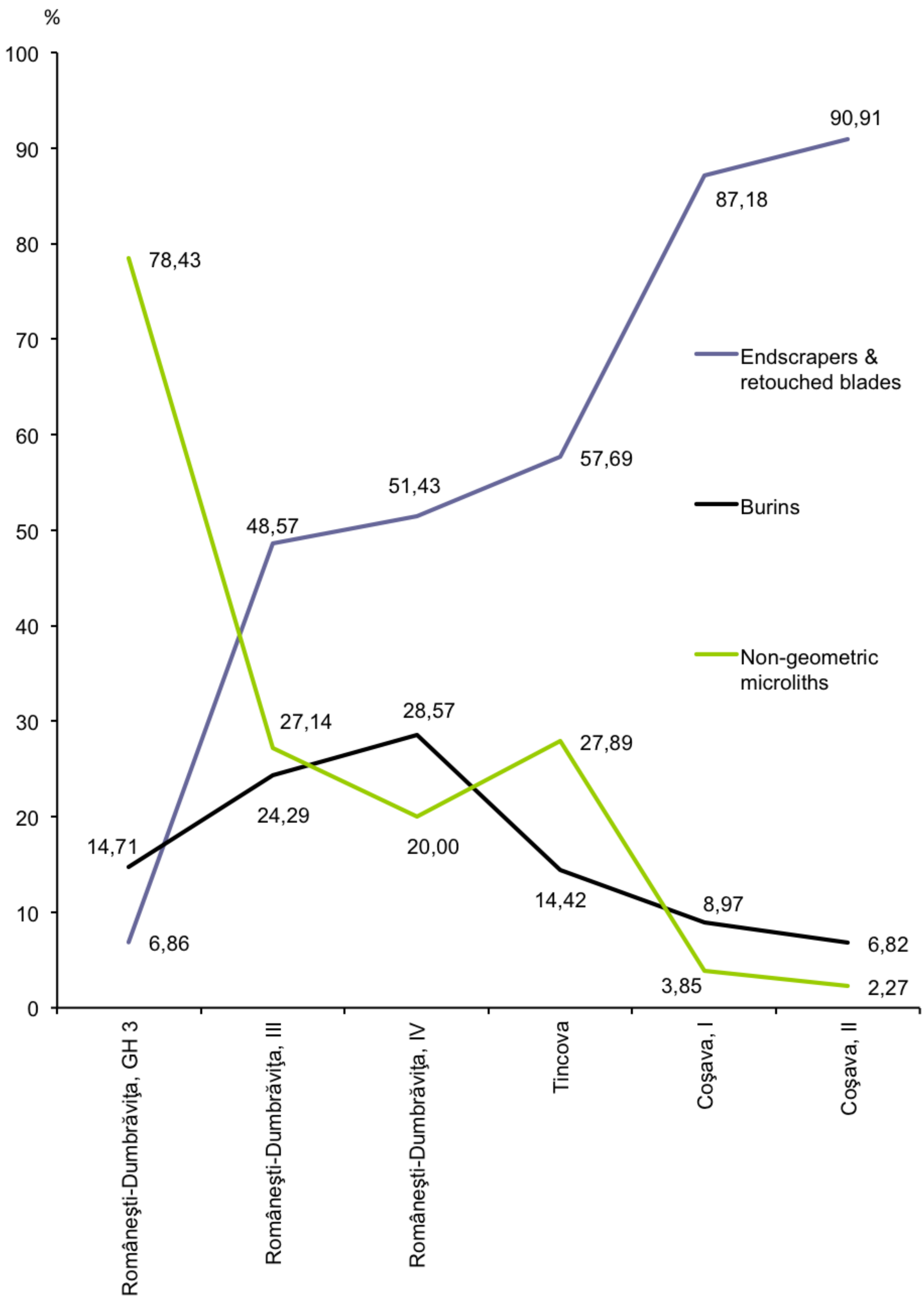


FIGURE 22 Banat Aurignacian assemblages: the relations between endscrapers & retouched blades, burins and non-geometric microliths.

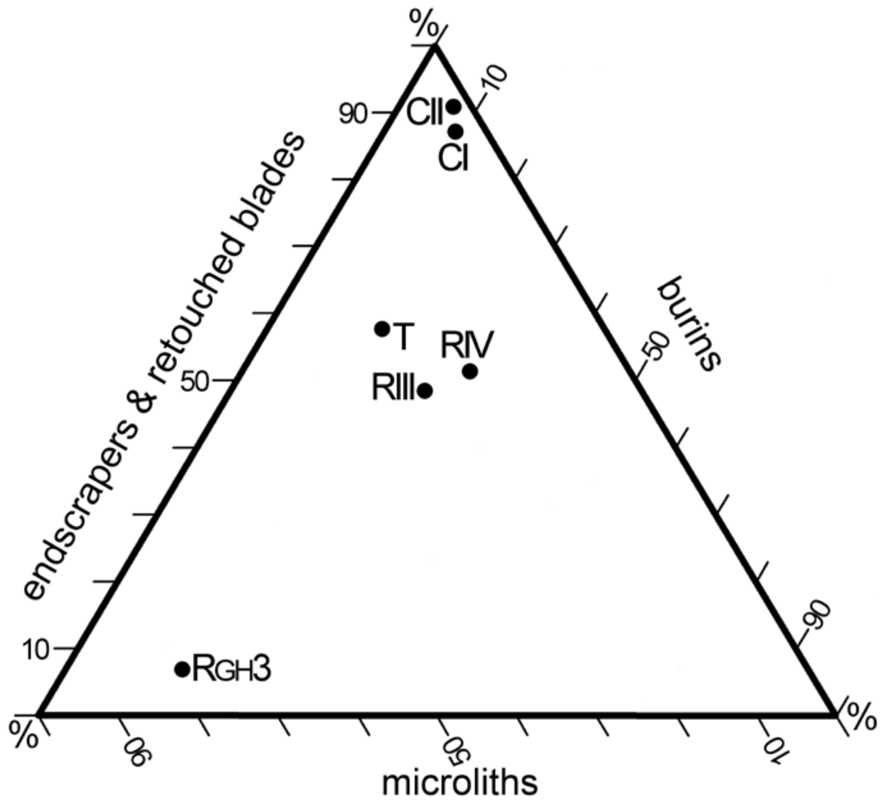


FIGURE 23 Banat Aurignacian assemblages grouped by the relations between endscrapers & retouched blades, burins and non-geometric microliths: CI – Coşava, I; CII – Coşava, II; T – Tincova; RIII – Româneşti-Dumbrăviţa I, III; RIV – Româneşti-Dumbrăviţa I, I; RGH3 – Româneşti-Dumbrăviţa I, GH 3.

Româneşti-Dumbrăviţa I GH 3 assemblage features a tremendous rate of microliths and extremely low percentages of endscrapers (including carinated) and retouched blades (including Aurignacian ones). The same assemblage shows the lowest rates of both tools and cores (**figure 21**). The opposite trend exhibits the assemblages at Coşava, levels I, II and III, with an extremely low percentage of microliths and a high frequency of endscrapers (including carinated) and retouched blades (including Aurignacian ones). These typological features in Coşava assemblages correspond with a high frequency of cores and tools. The intermediate position of Tincova and Româneşti-Dumbrăviţa I levels III and IV, corresponds with medium values of 'domestic' tools (including carinated endscrapers and Aurignacian blades), burins and microliths, but relatively low percentages of cores and tools. It is worth reminding that the latter cluster, which should largely correspond to the newly defined GH3 horizon at Româneşti, is the result of old research. However, while a certain microlithic component was possibly lost, the percentage of cores and larger tools was likely less affected – an aspect which all the more sharpens the distinction above.

Despite their many common characteristics and undisputable Aurignacian affiliation, the assemblages of the Banat sites demonstrate a certain degree of technological and typological variability, which can be interpreted in chronological or functional terms – or both. The unfortunate lack of more accurate chronological landmarks for Tincova and Coșava, and the absence faunal and hence seasonal data, it is currently impossible to elaborate on any of these points. However, the rough chrono-cultural identity of these settlements in terms of stratigraphic position, raw material use, and technological and typological features seems indisputable. Moreover, as the three layers separated by sterile deposits in the obviously low-energy depositional context at Cosava suggest, this cultural phenomenon had a relatively long duration in the Romanian Banat.

Both the content of lithic collections and the TL chronological estimations available for Româneşti point to a rather old stage of the Aurignacian techno-complex, with clear affinities into the Protoaurignacian/Aurignacian 0 stage, as documented by the constant occurrence of Krems/Font Yves points and Dufour bladelets/micro-blades points. However, contrary to some recent proposals (Zilhão 2006; Teyssandier 2008), our reassessment does not allow signaling out Tincova as the sole representative of this Aurignacian trend/stage in the area. In fact, if one would maintain the criteria used by previous authors, the newly recovered industry from GH3 at Româneşti I displays more 'archaic' features than Tincova or other Banat assemblages. Taking into consideration the TL ages (40.0 ± 1.4 ka and 45.0 ± 1.5 ka, using different measurement protocols) and the technological and typological features recorded, this assemblage would fit the Protoaurignacian even better.

In the same time, the constant presence of carinated forms, twisted bladelets and classical Aurignacian blades in all analyzed toolkits recalls more the Aurignacian I. These features seem to threaten the clear-cut separation between the two Aurignacian aspects, at least as documented in other European areas and defended by many scholars (e.g. Mellars 2006). In fact, all Banat assemblages and especially Româneşti-Dumbrăviţa I feature a combination of Proto- and Early Aurignacian traits, quite similar for instance, to the admittedly very distant layer C4c4 at Isturitz (Normand and Turq 2005; Szmidt *et al.* 2010a). Sticking a bit more to existing definitions, based on the commonly adopted approach for the definition of Aurignacian typological variability, Româneşti-Dumbrăviţa I – GH 3 might be evaluated as Proto-Aurignacian/Aurignacian 0, while Coşava, levels I and II, might be attributed to the Early Aurignacian/Aurignacian I. The assemblages from Tincova and the old layers III and IV at Româneşti-Dumbrăviţa I would therefore need to be assigned to an Aurignacian 0.5! In spite of the ironic touch of the last concept, it certainly reflects the actual variability of the Banat assemblages – if rigid definitions are indeed to be followed.

While always a theoretical possibility in the case of Paleolithic palimpsests, a mechanical mixture of two technological traditions – Protoaurignacian/Early Aurignacian – can be barely kept responsible for the 'mixed' features of Banat assemblages. The interstratification of the two alleged cultural phyla has simply not been yet documented – and certainly not in South-Eastern Europe. While scarcely possible at Tincova, where the timespan for the accumulation of the single layer there is unknown, or more likely at Româneşti, where the distinction between living floors remains difficult, such mixture is dismissed by the homogeneity of the three layers at Coșava. Coupled with the many features Coșava holds in common with the other settlements, this diachronic stability argues strongly for a single, internally consistent cultural phenomenon, which apparently defies the acknowledged Aurignacian taxonomy and recalls the technological 'syncretism' once invoked for Krems-Hundssteig (Teyssandier 2007:111). While a reframing of the Banat (at least in part) functional/taphonomic inter-site variability into strict chrono-cultural/evolutionary terms is currently impossible, it is worth asking if it would be indeed useful.

There are obviously no theoretical reasons to expect the Banat Aurignacian sequence to replicate, even imperfectly, any evolutionary succession postulated for Western, Central or Mediterranean Europe. However, if one accepts the reasonable hypothesis that the Banat assemblages do not present a systematic mix of artifacts belonging to two different technological phyla/stages, it is perhaps useful to have a closer look on the definitions of the Protoaurignacian and Early Aurignacian currently in use, all the more as they were recently reinstated (Banks *et al.* 2013). There are enough reasons to do so.

The recent reassessments of the chronology from Geissenklösterle (Higham *et al.* 2012) or Franchthi Cave (Douka *et al.* 2011), much like the older estimation of the 'dissociated' bladelet production at Fumane (Broglio *et al.* 2005), blur the distinction between the Protoaurignacian and the Aurignacian I in precisely those areas where it should have been the clearest (Swabian Jura vs. Mediterranean Europe). Closer to the Banat region, layer 3 at Willendorf II (Danube valley), already dated to around 39 ka - 38 ka uncalBP, has been recently confirmed as belonging to an Early Aurignacian, after the reassessment of a larger lithic sample (Nigst & Haesaerts 2012). These results overtly contradict the postulate of the first Aurignacian industries emerging around 35 ka uncalBP (Banks *et al.* 2013). However, the collection here does include unipolar blade/let cores and carinated/nosed endscrapers bearing traces of regular bladelet production, both thought to represent best the classic Aurignacian. The nearby settlement at Seftenberg, displaying a rather classic Aurignacian component, has also been dated to 36.3 ka uncalBP.

Various occurrences of 'mixed' features (e.g. split base points and Dufour bladelets) are reported from Western Europe as well (Szmidt *et al.* 2010b). Carinated endscrapers and twisted bladelets occur alongside Dufour bladelets at Grotta La Fabbrica (Dini *et al.* 2012). At Riparo Mochi, the distinction between the Protoaurignacian and Aurignacian layers (H-G), although separated by distant radiocarbon ages, is unclear and both contain Dufour bladelets (Douka *et al.* 2012). The occurrence of Dufour subtype bladelets is actually defying the Aurignacian chronological boundary in many Italian contexts (Dini *et al.* 2012). Even the advocates of a geographical segregation (Fumanian vs. classic Aurignacian) comment ambiguously on the presence of Aurignacian types (like typical nosed and carinated scrapers or heavily edge-retouched blades) in Protoaurignacian/Fumanian assemblages: 'these are both less frequent and generally much less typical than in the classic Aurignacian industries' (Mellars 2006:170). As some authors rightly stress, the presence/absence of certain tool-types and characteristic 'cultural or chronological markers' could depend on site function, biases in sampling/excavation areas *etc.*, as well as on digging methods applied in the past (Nigst & Haesaerts 2012:598). In fact, key defenders of the chronological succession between Protoaurignacian and the Aurignacian I concede the presence of carinated forms in some Protoaurignacian contexts, further suggesting a likely mosaic development of regional features (Teyssandier *et al.* 2010). Whatever caused the emergence of the 'classical' Aurignacian technological constellation, imagining an organic and almost synchronous stadial development, climatically-driven or not (Banks *et al.* 2013) is after all unlikely, to say the least.

Moreover, emphasizing solely the (undisputable) polymorphism of Protoaurignacian (e.g. Dini *et al.* 2012:572) by contrasting it with the (disputable) homogeneity of the Aurignacian leaves the impression of some sort of cultural 'maturation' in time. Such a chronologically-based teleology parallels dangerously the older model defending the gradual crystallization of an Eastern-originating Aurignacian, ironically criticized a decade ago (Zilhão & d'Errico 2003:343–344). Taking the risk of a superfluous observation, the Protoaurignacian, if real, is definitely not an immature version of a later or, for that matter, more continental cultural phenomenon.

In the light of all these, it is perhaps worth asking if both the diachronic and the geographic seclusion of the Protoaurignacian from the Early Aurignacian/Aurignacian I, on a continental scale at least, is anything more than a research artifact, due to selective preservation/recovery/description of assemblages and wishful technological 'schemes', aggravated by partially overlapping chronologies. While elaborating on such a far-reaching topic is beyond the scope of this paper, the Banat industries provide some useful food for thought in this respect.

5 NORTHWARD, SOUTHWARD? TRACING THE SOURCE OF THE BANAT AURIGNACIAN

Keeping in mind the uncertainties above, one cannot ignore, however, the many common features which recommend the Banat assemblages as belonging to the huge Aurignacian family in Europe. Their chronological compatibility to the AMH fossils at Oase Cave is a noteworthy bonus for this stage of research, but more data are needed in order to establish a correlation in terms of artisanship. Looking for their origin and possible analogies is the next logical step, a point which brings us closer to the topic of the current meeting, population movements.

The homogeneity of the Aurignacian technocomplex *sensu lato* (Protoaurignacian included) remains puzzling for current Paleolithic research, which still lacks the chronological means for translating material equifinalities at multi-millennial scale (e.g. technocomplexes) into behaviorally meaningful terms. Unfortunately, the latter (innovation, diffusion, acculturation or population movements) often happen at smaller scale and shorter timespans – a reality which explains why the origin and expansion of the Aurignacian across Europe is still fiercely disputed after many decades of intensive researches.

Drawing excessively long arrows binding similar, but essentially random occurrences and presumably tracing past population movements/diffusion waves proved repeatedly wrong in archaeology. In the particular case of Banat occurrences, the situation is even worse, as arrows are pointing in opposite directions. Our results currently support the idea of an early and likely intrusive presence of the Aurignacian technocomplex in the Lower Danube. No ancestry in the local Middle Paleolithic, generally dominated by expedient quartz flake industries, could be proven for these fully articulated laminar industries. Where are they coming from? As the recently documented chronology, which statistically overlaps the age of Oase finds, connects the Banat settlements to some of the oldest Aurignacian *sensu lato* occurrences in Europe, the issue at stake is obvious.

The closest Aurignacian settlement cluster known in Romania (Oaș-Maramureș, to the North) displays only a few 'classical' Aurignacian features, but chronically lacks microlithic implements or a secure chronology (Anghelinu and Niță, in press). In the lack of closer alternatives, the Banat Aurignacian can be thus seen as holding an intermediate geographical position between the Balkans (e.g. Kozarnika, ≈39 ka uncal BP; Sirakov *et al.* 2007; Tsanova *et al.* 2012) and some Central/Eastern European (e.g. Krems-Hundssteig, Willendorf II, layer 3, Beregovo I) comparable occurrences (Protoaurignacian/Early Aurignacian). Krems provides a poor analogical pillar, as the integrity of the collection there is dubious and the related chronology unclear (Teyssandier 2007; Nigst & Haesaerts 2012). Willendorf II delivered only a small lithic sample, lacking non-geometric microliths. The new investigations at Beregovo I (Ukrainian Transcarpathia) brought up an industry with numerous classically retouched Dufour microblades/bladelets, some narrow-faced cores, carinated and thick endscrapers, as well as few burins, including carinated and on truncation (Usik 2008). Such artifact composition recalls data which were obtained from the newly excavated Româneşti-Dumbrăviţa I – GH 3. According to V. Usik, the Beregovo I assemblage, attributed to an Early Aurignacian of Krems-Dufour type, should be older than ca. 30 ka BP, as the finds occurred below the complex of soils covered by the Denekamp paleosoil. Looking to the East, similar assemblages at Siuren I rock shelter, Units H and G can also be assigned to this group (e.g. Demidenko & Otte 2007; Demidenko & Noiret 2012). While the young chronology here clearly separates these industries from the Banat settlements, they prove once more the chronological ubiquity of the Dufour phenomenon.

Apart from the chronological compatibility, Kozarnika (layer 7) is not only closer (ca. 200 km from Tincova as the crow flies), but also stratigraphically secure, and statistically more relevant. The massive use of local raw material in all these industries is a first common feature. Multiple laminar reduction strategies (from unipolar/carinated, narrow-faced or, more rarely, bipolar cores) were also reported at Kozarnika. While the continuous production of blade/bladelets from the same nuclei is usually stressed for Kozarnika, it is perhaps worth mentioning the small size (3–6 cm) of the natural nodules used (Tsanova *et al.* 2012:474) rendering somehow superfluous such a continuity. The general structure of the assemblages display many similarities: dominance of knapping waste, soft hammer percussion, laminar oriented production, a small amount of retouched tools (of which 40 % are made on flakes), several truncated pieces *etc.* The bladelets morphometric features, including Dufour and pseudo-Dufour types are also comparable, although at Kozarnika there are more points with bilateral direct retouch (also present in the Banat collections, e.g. Tincova) than Dufours. Some endscrapers on retouched blades were also reported. Contrary to the Banat assemblages, however, the Kozarnika assemblage includes several bifacial points, very few burins and several marginally retouched large blades (Tsanova *et al.* 2012:479, fig. 5).

Unfortunately, apart from Kozarnika, a settlement itself isolated among other well-known Early Upper Paleolithic manifestations (e.g. Temnata, Bacho Kiro), no other occurrences can presently help tracing the origin of the Banat Aurignacian phenomenon to the South. A Central European source for the Banat phenomenon cannot thus be excluded with the data at hand. After all, the Danubian corridor, if indeed real, may have worked both ways. While the Near East/Anatolian connection systematically failed in getting empirically substantiated, the recent reassessments of Central European Aurignacian, especially if confirmed and multiplied by further researches, could lead to a major shift in mapping (one of) the homeland(s) of this technocomplex – if such as objective is ever achievable by current archaeological means (Zilhão & d'Errico 2003:344–345). In fact, a purely European origin for the Aurignacian has already been proposed (Teyssandier 2007). It is perhaps worth noticing that the few exotic raw materials identified in layer 3 at Willendorf II point to Northern, Moravian or Polish, sources (Nigst & Haesaerts 2012). Hopefully, several obsidian samples, a definitely distant exotic raw material, recovered from both Românești-Dumbrăvița I (GH 3, GH 4) and Coșava will help us point more firmly in one direction or the other.

Whatever the source of this technological 'idea' (Tsanova *et al.* 2012), once certificated its old age in the Banat area, Romania's key geographical position for a better understanding of the early stages of the European Upper Paleolithic is reinforced. We can only hope that further researches in the area will substantiate it with new settlements.

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REFERENCES

ANGHELINU M. & NIŢĂ L. (IN PRESS) – What's in a name: the Aurignacian in Romania, *Quaternary International* (2012) (doi:10.1016/j.quaint.2012.03.013).

ANGHELINU M., NIŢĂ L., SITLIVY V., UTHMEIER T. & BĂLTEAN I. (2012) – Looking around Peştera Cu Oase: The beginnings of Upper Paleolithic in Romania. *Quaternary International* 274:136–157.

BANKS W.E., D'ERRICO F. & ZILHAO J. (2013) – Human-climate interaction during the Early Upper Paleolithic: testing the hypothesis of an adaptive shift between the Proto-Aurignacian and the Early Aurignacian. *Journal of Human Evolution* 64:39–55.

BĂLTEAN I. (2011a) – The Palaeolithic in Banat. In: N. Tasic & F. Drasovean (eds.), The Prehistory of Banat, I. *The Palaeolithic and Mesolithic*. Bucureşti, Academiei, p. 21–76.

BĂLTEAN I. (2011b) – *Paleoliticul superior din Banat în contextul paleoliticului superior din spaţiul central-est European*. Unpublished PHd. thesis, Archaeological Institute, Iași: Romanian Academy.

BENAZZI S., DOUKA K., FORNAI C., BAUER C., KULLMER O., SVOBODA J., PAP I., MALLEGNI F., BAYLE P., COQUERELLE M., CONDEMI S., RONCHITELLI A., HARVATI K. & WEBER G.W. (2011) – Early dispersal of modern humans in Europe and implications for Neanderthal behaviour. *Nature* 479:526–529.

BROGLIO A. & LAPLACE G. (1966) – Études de typologique analytique des complexes leptolithiques de l'Europe centrale. Les complexes aurignacoïdes de la Basse Autriche. *Rivista di Science Preistoriche* 21(1):61–121.

BROGLIO A., BERTOLA S., DE STEFANI M., MARINI D., LEMORINI C. & ROSSETTI P. (2005) – La production lamellaire et les armatures lamellaires de l'Aurignacien ancien de la grotte de Fumane (Monts Lessini, Venetie). Dans : F. Le Brun-Ricalens, J.-G. Bordes & F. Bon (eds.), *Productions lamellaires attribuées à l'Aurignacien : chaînes opératoires et perspectives technoculturelles*, ArchéoLogiques 1, Luxembourg, Musée national d'histoire et d'art, p. 415–436.

CARCIUMARU M. (1999) – *Le paléolithique en Roumanie*. Grenoble, J. Millon.

CARCIUMARU M., ANGHELINU M., NITU E.C., COSAC M. & MURATOREANU G., (2007) – *Géo-archéologie du paléolithique moyen, paléolithique supérieur, epi paléolithique et mésolithique en Roumanie*. Targoviste.

CHIRICA V., BORZIAC I. & CHETRARU N. (1996) – *Gisements du Paléolithique supérieur ancien entre le Dniestr et la Tissa*. Iaşi, Helios.

DEMIDENKO Y.E. (2000–2001) – The European Early Aurignacian of Krems-Dufour type industries: a view from Eastern Europe. *Préhistoire Européenne* 16–17:147–162.

DEMIDENKO Y.E. & OTTE M. (2007) – Siuren I (Crimea) as a key site for Aurignacian industries of Krems-Dufour type in Eastern Europe. In: N.F. Bicho (ed.), *From the Mediterranean basin to the Portuguese Atlantic shore: papers in honor of Anthony Marks*. Promontoria Monografica 07. Centro de Estudos de Patrimonio, Departamento de Historia, Arqueologia e Patrimonio, Universidade do Algarve, p. 101–107.

DEMIDENKO Y.E. & NOIRET P. (2012) – The Siuren-I Aurignacian of Krems-Dufour Type Industries in the Context of the European Aurignacian. In: Yu. E. Demidenko, M. Otte & P. Noiret (eds.), *Siuren I Rock-shelter. From Late Middle and Early Upper Paleolithic to Epi-Paleolithic in Crimea*, ERAUL 129:343–357.

DINI M., BAILLS H., CONFORTI J. & TOZZI C. (2012) – Le Protoaurignacien de la Grotte La Fabbrica (Grosseto, Italie) dans le contexte de l'arc nord méditerranéen. *L'Anthropologie* 116:550–574.

DOBOŞ A. & TRINKAUS E. (2012) – A new AMS radiocarbon date for Middle Paleolithic Layer 4 of Ripiceni-Izvor, Romania. *Materiale și cercetări arheologice (serie nouă)* 7:7–10.

DOUKA K., PERLES C., VALLADAS H., VANHAEREN M. & HEDGES R.E.M. (2011) – Franchthi Cave revisited: the age of the Aurignacian in south-eastern Europe. *Antiquity* 85:1131–1150.

DOUKA K., GRIMALDI S., BOSCHIAN G., DEL LUCCHESE A. & HIGHAM T.F.G. (2012) – A new chronostratigraphic framework for the Upper Palaeolithic of Riparo Mochi (Italy). *Journal of Human Evolution* 62:286–299.

HAHN J. (1977) – *Aurignacien, das ältere Jungpaläolithikum in Mittel- und Osteuropa*. Fundamenta, Reihe A, Bd. 9. Böhlau, Köln, Wien.

HIGHAM T., COPMTON T., STRINGER C., JACOBI R., SHAPIRO B., TRINKAUS E., CHANDLER B., GRÖNING F., COLLINS C., HILLSON S., O'HIGGINS P., FITZGERALD C. & FAGAN M. (2011) – The earliest evidence for anatomically modern humans in northwestern Europe. *Nature* 479:521–524.

HIGHAM T., BASSEL L., JACOBI R., WOOD R., BRONK RAMSEY C. & CONARD N.J. (2012) – Testing models for the beginnings of the Aurignacian and the advent of figurative, art and music: The radiocarbon chronology of Geißenklösterle. *Journal of Human Evolution* 62:664–676.

KOZLOWSKI J.K. & KOZLOWSKI S.K. (1975) – *Pradzieje Europy od XL do IV tysiaclecia p.n.e.* Panstwowe Wydawnictwo Naukowe, Warszawa.

LAPLACE G. (1966) – *Recherches sur l'origine et l'évolution des complexes leptolithiques*. École française de Rome, Mélanges d'Archéologie et d'Histoire, Suppléments 4. Paris, De Boccard.

MELLARS P.A. (2006) – Archaeology and the dispersal of modern humans in Europe: deconstructing the "Aurignacian". *Evolutionary Anthropology* 15:167–182.

MOGOSANU F. (1972) – Information générale sur le Paléolithique du Banat (Sud-Ouest de la Romanie). *Dacia* (N.S.) 16:5–27.

MOGOSANU F. (1978) – *Paleoliticul din Banat*. Biblioteca de Arheologie 32, Academiei, Bucureşti.

MOGOSANU F. (1983) – L'Aurignacien du Banat. Dans : M. Otte (ed.), *Aurignacien et Gravettien en Europe I*. ERAUL 13:223–237.

MOGOSANU F. & STRATAN I. (1966) – Noi descoperiri palaeolitice în Banat. *Studii şi Cercetari de Istorie Veche* 17(2):335–344.

NICOLAESCU-PLOPSOR C.S. & STRATAN I. (1961) – Săpăturile de la Tincova. *Materiale* 7: 29–31.

NIGST P. (2006) – The first modern humans in the Middle Danube Area? New evidence from Willendorf II (Eastern Austria). In: N.J. Conard (ed.). *When Neanderthals and modern humans met*. Kerns Verlag, Tubingen, p. 269–304.

NIGST P. & HAESAERTS P. (2012) – L'Aurignacien en Basse Autriche : résultats préliminaires de l'analyse technologique de la couche culturelle 3 de Willendorf II et ses implications pour la chronologie du Paléolithique supérieur ancien en Europe centrale. *L'Anthropologie* 116:575–608.

NORMAND C. & TURQ A. (2005) – L'Aurignacien de la grotte d'Isturitz (France): la production lamellaire dans la séquence de la salle de Saint-Martin. In: Le Brun-Ricalens, F. J.-G. Bordes & F. Bon (eds.) (2005), *Productions lamellaires attribuées à l'Aurignacien: chaînes opératoires et perspectives technoculturelles*, ArchéoLogiques 1, Luxembourg, Musée national d'histoire et d'art, p. 375–392.

PĂUNESCU A. (2001) – *Paleoliticul şi mezoliticul din spaţiul transilvan*. Agir, Bucureşti.

SCHMIDT C., SITLIVY V., ANGHELINU M., CHABAI V., KELS H., UTHMEIER T., HAUCK T., BALTEAN I., HILGERS A., RICHTER J. & RADTKE U. (2013) – First chronometric dates (TL and OSL) for the Aurignacian open-air site of Romaneşti-Dumbrăviţa I, Romania. *Journal of Archaeological Science 40, 3740–3753.*

SIRAKOV N., TSANOVA T., SIRAKOVA S., TANEVA S., KRUMOV I., DIMITROVA I. & KOVACHEVA N. (2007) – Un nouveau faciès lamellaire du début de Paléolithique supérieur dans les Balkans. *Paléo* 19:131–144.

SITLIVY V., CHABAI V., ANGHELINU M., UTHMEIER TH., KELS H., HILGERS H., SCHMIDT CH., NIŢĂ L., ION BĂLTEAN I., VESELSKY A. & HAUCK T. (2012) – The earliest Aurignacian in Romania: New investigations at the open air site of Româneşti-Dumbrăviţa I (Banat). *Quartär* 59:85–130.

SITLIVY V., CHABAI V., ANGHELINU M., UTHMEIER T., KELS H., NIŢĂ L., BĂLTEAN I., VESSELSKY A. & ŢUŢU C. (IN PRESS) – Preliminary reassessment of the Aurignacian in Banat (Southwestern Romania). *Quaternary International* (2012), http://dx.doi.org/10.1016/j.quaint.2012.07.024.

STRATAN I. (1962) – Şantierul Tincova. *Materiale* 8:123–125.

STRATAN I. (1965) – Aşezarea palaeolitică de la Coşava. *Revista Muzeelor* 2:412.

SZMIDT C.C., NORMAND C., BURR G.S., HODGINS G.W.L. & LAMOTTA S. (2010a) – AMS ^{14}C dating the Protoaurignacian/Early Aurignacian of Isturitz, France. Implications for Neanderthal-modern human interaction and the timing of technical and cultural innovations in Europe. *Journal of Archaeological Science* 37(4):758–768.

SZMIDT C.C., BROU L. & JACCOTTEY L. (2010b) – Direct radiocarbon (AMS) dating of split-based points from the (Proto) Aurignacian of Trou de la Mère Clochette, Northeastern France. Implications for the characterization of the Aurignacian and the timing of technical innovations in Europe. *Journal of Archaeological Science* 37(12):3320–3337.

TEYSSANDIER N. (2003) – *Les débuts de l'Aurignacien en Europe. Discussion à partir des sites de Geissenklösterle, Willendorf II, Krems-Hundssteig et Bacho Kiro*. Thèse de doctorat, Université de Paris X, Nanterre.

TEYSSANDIER N. (2007) – *En route vers l`Ouest. Les débuts de l´Aurignacien en Europe*. British Archaeological Reports (B.A.R.) International Series 1638, Archaeopress, Oxford.

TEYSSANDIER N. (2008) – Revolution or evolution: the emergence of the Upper Paleolithic in Europe. *World Archaeology* 40(4):493–519.

TEYSSANDIER N., BON F. & BORDES J-G. (2010) – Within projectile range. Some thoughts on the appearance of the Aurignacian in Europe. *Journal of Anthropological Research* 66:209–229.

TRINKAUS E., MILOTA Ş., RODRIGO R., GHERASE M. & MOLDOVAN O. (2003) – Early modern human cranial remains from the Peştera cu Oase, Romania. *Journal of Human Evolution* 45:245–253.

TSANOVA T. (2006) – *Les débuts du Paléolithique supérieur dans l'Est des Balkans. Réflexion à partir de l'étude taphonomique et tehcnoéconomique des ensembles lithiques des sites de Bacho Kiro (couche 11), Temnata (couches VI et 4) et Kozarnika (niveau VII).* Thèse de doctorat de l'Université Bordeaux 1.

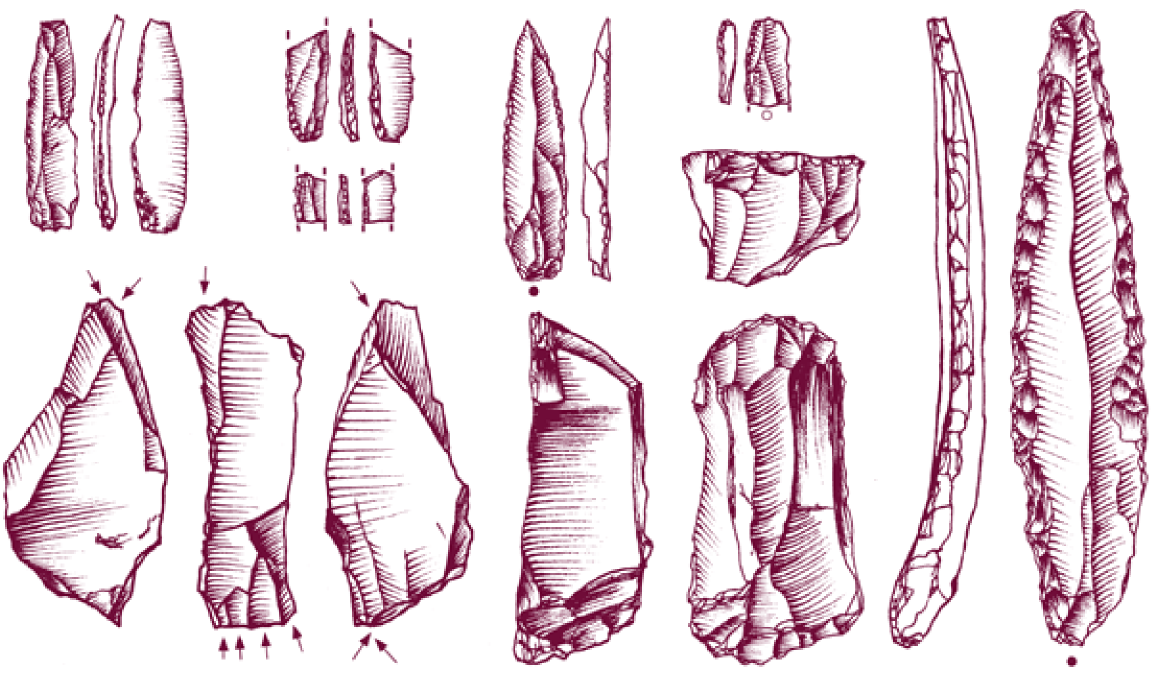
TSANOVA T., ZWYNS N., EIZENBERG L., TEYSSANDIER N., LE BRUN-RICALENS F. & OTTE M. (2012) – Le plus petit dénominateur commun : réflexion sur la variabilité des ensembles lamellaires du Paléolithique supérieur ancien d'Eurasie. Un bilan autour des exemples de Kozarnika (Est des Balkans) et Yafteh (Zagros central). *L'Anthropologie* 169:469–509.

TUFFREAU A., CHIRICA V., BALESCU S. & HAESAERTS P. (2009) – Nouvelles recherches sur le gisement paléolithique de Mitoc-Valea Izvorului (dép. de Botoşani), Fouilles 2003–2004. *Materiale şi Cercetări Arheologice* (NS) 5:21–31.

USIK V.I. (2008) – The Upper Paleolithic of Transcarpathia: chronology and cultural affinity of Beregovo I Aurignacian. *Materials and investigations of Carpathian and Volyn archeology* 12:49–67 (in russian).

ZILHÃO J. (2006) – Neanderthals and moderns mixed, and it matters. *Evolutionary Anthropology* 15:183–195.

ZILHÃO J. & D'ERRICO F. (2003) – The chronology of the Aurignacian and the transitional technocomplexes. Where do we stand? *In*: J. Zilhão & F. d'Errico (eds.), *The chronology of the Aurignacian and the transitional technocomplexes. Dating, stratigraphies, cultural implications*, Trabalhos de Arqueologia 33:313–349.



Occupations du Paléolithique supérieur ancien dans la plaine roumaine du Danube à Vădastra-Măgura Fetelor et à Ciuperceni-La Vii 1 : industries lithiques, matières premières et déplacements

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Résumé : De nouveaux travaux de terrain et une réévaluation de séries lithiques provenant de fouilles réalisées lors des dernières décennies permettent de mieux caractériser le Paléolithique supérieur ancien de la Plaine roumaine du Danube. Le matériel paléolithique de Vădastra est attribuable à un Aurignacien ancien par la présence, notamment, de lames aurignaciennes, de grattoirs sur bout de lame, de grattoirs carénés en nombre important ainsi que par la rareté des burins. La série lithique principale de Ciuperceni-La Vii 1, dont l'âge est plus ancien que 30 ± 3 ka (date IRSL obtenue dans le loess sus-jacent) correspond à un atelier dont le débitage est orienté vers la production de lames, lamelles et éclats. Le faible nombre des outils, qui comprennent notamment des « rabots », ne facilite pas une attribution culturelle. La situation est la même pour le matériel plus récent de Giurgiu-Malu Roşu qui correspond également à faciès d'atelier. Les caractéristiques des matières premières utilisées donnent quelques indications sur l'exploitation du paysage dans la Plaine du Danube. La rareté des industries lithiques du Paléolithique supérieur ancien dans la Plaine roumaine du Danube semble être plus la conséquence de facteurs taphonomiques que d'une faible présence humaine.

Abstract : *New field project together with reassessment of lithic assemblages collected during the last decades help to better characterize the Early Upper Paleolithic in Romanian Danube Plain. The Vădastra Palaeolithic material present features (aurignacian blades, endsrapers on blades, carinated endscrapers and scarcity of the burins) which are characteristic of an "Early" Aurignacian. The main assemblage of Ciuperceni-la Vii1 whose age is older than 30 ± 3 ka (IRSL date for the upperlying loess) indicate a locale of knapping activity where blades, bladelets and flakes where produced. The low number of retouched pieces most of them are not diagnostic to a specific cultural affinity. An exceptional tool type is rabots which could not assist in attributing the assemblage to a particular techno-complex. The scarcity of tool in the assemblage is similar to the assemblage of Giurgiu-Malu Roşu whose age is younger. Raw material acquisition indicates a wider exploitation of the landscape within the Danube Plain. The low number of Early Upper Palaeolithic sites in the Romanian Danube Plain is most probably a result of taphonomic effects rather than an outcome of rare human presence.*

1 INTRODUCTION

En Roumanie, les industries lithiques attribuables au Paléolithique supérieur ancien sont assez nombreuses (Cârciumaru 1999 ; Chirica *et al.* 1996). Les contextes karstiques prédominent dans les Carpates méridionales (Păunescu, 2000a). Ailleurs, il s'agit d'occupations en plein air dont les restes sont inclus dans des séquences limono-sableuses, plus rarement dans des loess, au nord-ouest, dans le bassin de l'Oaş (Bitiri 1972 ; Dobrescu 2008), à l'est dans les vallées du Prut et de la Bistriţa (Nicolăescu-Plopşor *et al.* 1966 Păunescu 1998–1999) au sud-ouest dans celles du Banat (Băltean 2011 ; Mogoşanu 1978), au sud, dans la Plaine du Danube (Păunescu 2000a). Le plus souvent, le calage chronologique demeure peu assuré en raison de l'utilisation abusive et non critiquée de datations ^{14}C au-delà de la limite d'utilisation de la méthode (Auguste 1999 ; Djindjian 2000). L'absence de prise en compte des facteurs taphonomiques affectant les contextes sédimentaires (séquences peu épaisses et souvent remaniées dans les grottes, nombreuses krotovines dans les sites de plein air modifiant la position originelle des pièces lithiques et des charbons de bois ayant servi pour des datations) constitue un handicap supplémentaire. Toutefois, des recherches récentes ont permis de mieux caractériser les séquences loessiques et leurs industries lithiques dans les vallées du Prut (Haesaerts *et al.* 2003 ; Noiret 2009 ; Otte *et al.* 2007a ; Tuffreau *et al.* 2009) et de la Bistriţa (Cârciumaru *et al.* 2006–2007) ainsi que dans la Plaine du Danube (Alexandrescu *et al.* 2003 ; Balescu *et al.* 2003, 2010). Les caractéristiques technologiques et typologiques de quelques industries aurignaciennes et plus généralement de celles de la phase ancienne du Paléolithique supérieur, antérieure au Dernier Maximum Glaciaire, ont pu être précisées (Anghelinu & Niţă 2012 ; Dobrescu 2008 ; Otte *et al.* 2007b ; Sitlivy *et al.* 2012). Ces recherches ont contribué à replacer la Roumanie au choeur des problématiques traitant des débuts du Paléolithique supérieur en Europe centrale (Cârciumaru & Anghelinu 2000 ; Djindjian *et al.* 2003 ; Teyssandier 2007 ; Tsanova 2008). Cependant, dans cette partie de l'Europe, le décalage existant entre les données biologiques et les cultures persiste. Les plus anciens Hommes anatomiquement modernes sont mieux connus par leurs restes (Doboş *et al.* 2010 ; Soficaru *et al.* 2006, 2007 ; Trinkaus *et al.* 2003) que par les cultures qui pourraient leur être attribuées.

2 LE CONTEXTE RÉGIONAL

La Plaine roumaine du Danube est limitée au nord par les Carpates méridionales et au sud par le Danube qui longe le massif karstique de la Bulgarie où le Paléolithique supérieur ancien est surtout connu en contexte karstique (Ianova & Sirakova 1995 ; Tsanova 2008). Les dépôts pléistocènes de la Plaine roumaine sont constitués de sédiments de l'ancien bassin dacique, d'alluvions du Danube dont le cours s'est déplacé vers le sud ainsi que de ses affluents, le Jiu, l'Olt et l'Argeş. Les terrasses sont recouvertes par des séquences loessiques localement importantes présentant la trace d'anciens paléosols interglaciaires bien développés vers l'est en direction de la Dobroudja (Balescu *et al.* 2003, 2010). L'exploitation de ces loess dans des carrières a amené la découverte en de multiples lieux de pièces qui ont été attribuées au Paléolithique supérieur. Il s'agit le plus souvent d'ensembles dont la diagnose est délicate à établir en raison de leur faiblesse numérique (Păunescu 2000a). Seuls ceux mis au jour au sud de la Plaine du Danube, à Vădastra-Măgura Fetelor (département de l'Olt), Ciuperceni la Vii1 (département de Téléorman), à Giurgiu-Malu Roşu (département de Giurgiu) ainsi qu'à Lapoş-Poiana Roman (département de Prahova), au pied des collines subcarpatiques, ont un matériel lithique abondant. Les outils retouchés sont rares à l'exception de Vădastra-Măgura Fetelor (**figure 1**).

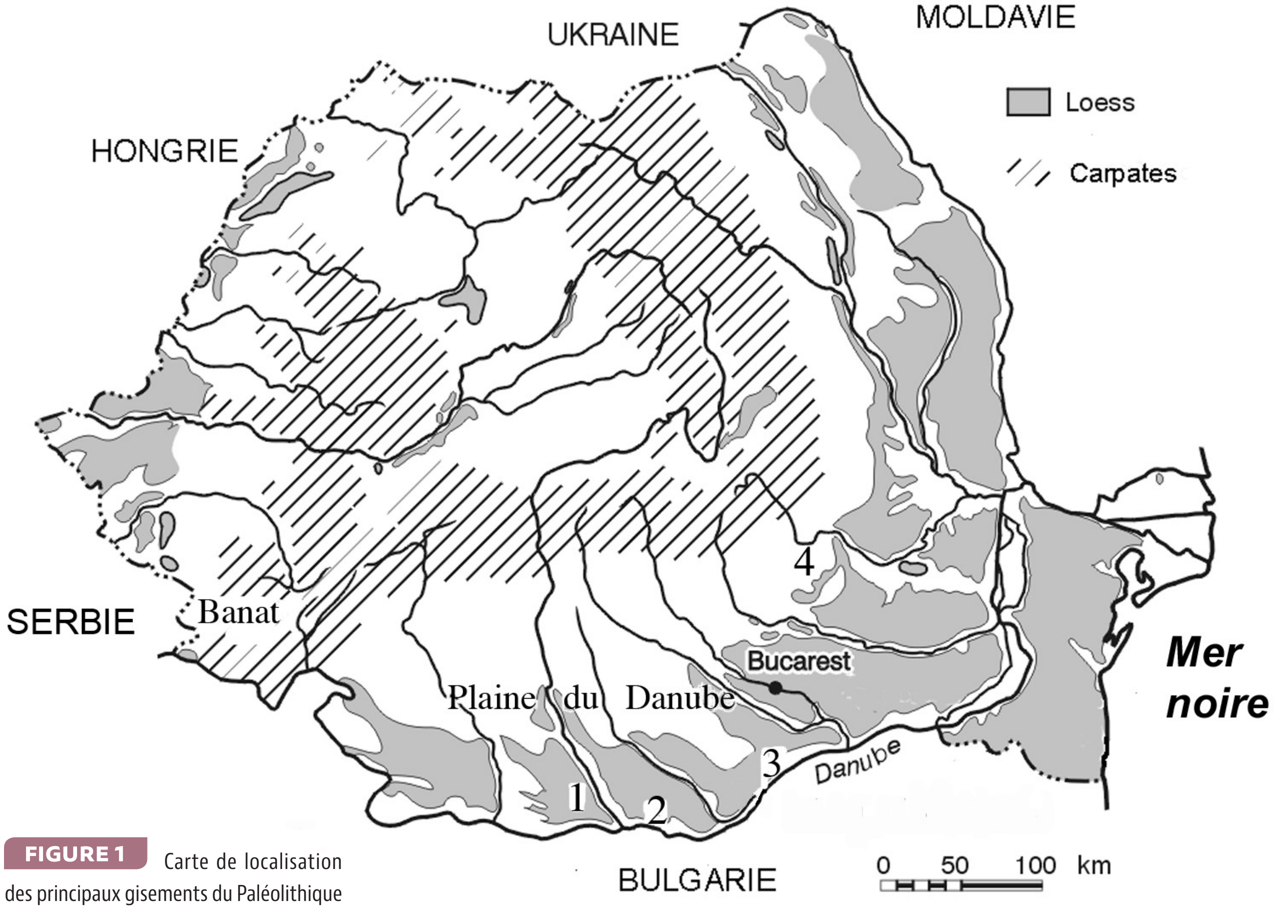


FIGURE 1 Carte de localisation des principaux gisements du Paléolithique supérieur ancien dans la Plaine roumaine du Danube : 1. Vadăstra ; 2. Ciuperceni-La Vii 1 ; 3. Giurgiu- Malu Roşu ; 4. Lapoş-Poiana Roman.

Toutes ces industries lithiques ont été attribuées à de l'Aurignacien (Anghelinu & Niţă 2012 ; Cârciumaru & Anghelinu 2000 ; Păunescu 2000a). Cette interprétation ne pose de problème pour Vădastra-Măgura Fetelor où des pièces caractéristiques sont présentes (Hahn 1977). Il n'en est pas de même pour l'industrie lithique de Giurgiu-Malu Roşu (Păunescu & Alexandrescu 1997) qui, bien que datée de 21, 14 + 0,12 et 22, 79 + ka BP (âges ^{14}C non calibrés obtenus sur des charbons de bois provenant d'un foyer), a été attribuée à un Aurignacien « tardif » en raison de la présence de quelques grattoirs dont la morphologie évoque celle de grattoirs carénés. Le calage chronologique du matériel lithique a été confirmé par un âge IRSL corrigé de 24 + 2 ka obtenu sur grains de feldspaths à partir d'un prélèvement provenant du loess situé juste en dessous du niveau archéologique (Alexandrescu *et al.* 2003 ; Balescu *et al.* 2010). Nous n'avons pas beaucoup d'informations sur le matériel lithique de Lapoş-Poiana Roman (Cârciumaru 1999 ; Păunescu 2000a) qui souffre d'un manque de description détaillée et d'un calage chronologique. Il en est de même pour celui de Ciuperceni-La Vii (Boroneanţ 1980).

Des fouilles entreprises à Vădastra-Măgura Fetelor en 2011 et à Ciuperceni-La Vii 1 de 2006 à 2010[1] ont permis de préciser les caractéristiques des industries lithiques. L'étude des matières premières utilisées apporte quelques éléments de nature à nous renseigner sur les territoires et les déplacements que purent effectuer les groupes humains du Paléolithique supérieur ancien dans la Plaine du Danube.

1. Les fouilles effectuées à Ciuperceni-La Vii 1 et à Vadastra ont été réalisées dans le cadre d'une collaboration entre la mission archéologique « Le Paléolithique de Roumanie » (Ministère des Affaires étrangères et européennes, France) et l'Institut d'Archéologie « Vasile Pârvan » de Bucarest.

3 VĂDASTRA-MĂGURA FETELOR

Le gisement de Vădastra (département de l'Olt), situé dans la Plaine du Danube, à l'ouest de l'Olt, sur une colline dénommée « Dealul Cişmelei » dominant le ruisseau Obârşia, est surtout connu pour le riche matériel néolithique et protohistorique mis au jour lors d'importantes fouilles dont les dernières furent menées sur une superficie de 2400 m^2 de 1946 à 1974 par C. Mateescu (1959, 1970).

Le site archéologique, qui correspond à un très léger tertre, dénommé « Măgura Fetelor », se situe dans la partie ouest du village, sur la colline « Dealul Cişmelei ». Celle-ci domine la vallée du ruisseau Obârşia qui entaille une moyenne terrasse du Danube.

Les méthodes de fouilles mises en œuvre par C. Mateescu furent suffisamment minutieuses pour permettre la collecte d'un matériel lithique paléolithique mis au jour dans la partie supérieure du loess au sommet de la colline, à une profondeur d'environ 2,6 m ou, en position secondaire, dans les structures néolithiques ou protohistoriques creusées dans le sédiment sous-jacent (Protopopescu *et al.* 1969). Les pièces paléolithiques se différencient aisément du matériel lithique néolithique par leur patine blanchâtre à beige. Les matériaux utilisés sont variés: opale, jaspe, agate, quartzite, calcédoine, avec une prédominance du silex. Le contexte stratigraphique et environnemental de l'occupation paléolithique a fait l'objet d'une description par Arl. Leroi-Gourhan *et al.* (1967). Les analyses palynologiques indiquent un paysage steppique avec la présence de quelques espèces arborées, des pins et aussi des feuillus (*Betula, Alnus, Corylus, Quercus, Tilla, Ulmus, Hedera*) témoignant d'une amélioration climatique qui pourrait correspondre à l'interstade de Paudorf. Les restes fauniques sont peu nombreux: *Cervus* sp. (2 frg.), *Canis lupus*. Les Gastéropodes comprennent des espèces de steppe: *Helicopsis striata* Müll., *Jaminia tridens* Müll.) et de sylvo-steppe (*Vitrea inopinata, Caracolina corcyrensis, Cepaea vindobonensis, Pomatias elegans* Müll., *Ceciliodes acicula Müll., Vallonia pulchella* Müll.).

Le matériel lithique n'a été que très brièvement décrit par J. Hahn (1977) qui l'a attribué à un Aurignacien typique. A. Păunescu (2000) se basant sur des considérations typologiques distingua une série moustérienne (490 pièces) et une série aurignacienne (1601 pièces) que rien dans l'état physique des pièces ne permet pas différencier. Il en déduit qu'il devait exister deux couches paléolithiques distinctes ce qui ne correspond pas aux descriptions faites par C. Mateescu.

3.1 Le sondage effectué en 2011

Un sondage d'une quinzaine de m^2 (43° 51' 56 N, 024° 22' 04 E, altitude: 77 m) et d'une profondeur d'un peu plus de 3 mètres a été ouvert à 70 m au nord-est du sommet d'un léger tertre « Măgura Fetelor » qui n'est actuellement plus discernable dans la paysage (Dobrescu *et al.* 2012). La séquence stratigraphique suivante (**figure 2**) a été observée à l'emplacement du sondage:

- Limon humifère brun foncé, chernozem de surface, comprenant de nombreux fragments de poterie, ép. max.: 0,40 m;

- Limon humifère brun et différentes fosses d'époque néolithique à historique, ép.: 0,40 à 0, 60 m;

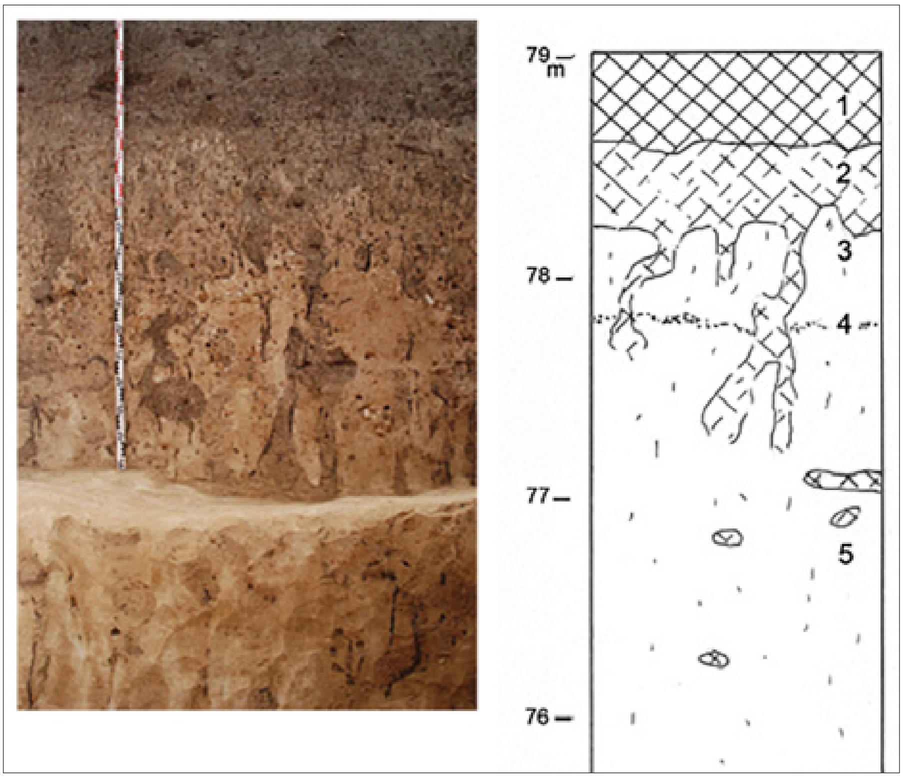


FIGURE 2 (Vadăstra) – Profil stratigraphique du sondage : 1. Chernozem ; 2. Limon brunâtre avec matériel néolithique et protohistorique ; 3. Loess jaune-brunâtre ; 4. Cailloutis de granules de craie ; 5. Loess jaune brunâtre.

- Loess jaune-brunâtre affecté par des krotovines qui, localement, peuvent atteindre le loess sous-jacent, ép. : 0,40 m ;

- Cailloutis irrégulier de granules de craie, ép. max. : 0,10 m ;

- Loess jaune brunâtre, présentant quelques concrétions calcaires, observé sur une épaisseur de 1,80 m (fond du sondage), et surmontant des limons sableux reconnus à la tarière ;

Latéralement, vers l'ouest, un complexe pédologique est observable dans le front de taille d'une ancienne extraction de limons.

Le profil stratigraphique observable dans les parois du sondage montre la présence, sous un limon humifère brun foncé, d'un chernozem de surface, comprenant de nombreux fragments de poterie puis d'un loess jaune brunâtre subdivisé par un cailloutis de granules de craie. Plus bas, la sédimentation observée dans un carottage à la tarière devient sableuse. L'ensemble est attribuable, au stade isotopique marin (MIS) 3 en raison de la découverte d'un matériel lithique aurignacien lors des anciennes fouilles. Il n'a pas été possible de trouver de silex taillés à l'état physique comparable à ceux de l'assemblage paléolithique supérieur ce qui n'est pas surprenant en raison de la superficie restreinte du sondage par rapport aux fouilles de C. Mateescu qui se sont déroulées pendant 28 ans et ont couvert une superficie importante. La présence de krotovines avec les mélanges de sédiments que cela implique ne peut que laisser dubitatif sur la validité des analyses palynologiques réalisées par Arlette Leroi-Gourhan.

3.2 L'industrie lithique de Vădastra

3.2.1 Pétrographie du matériel lithique

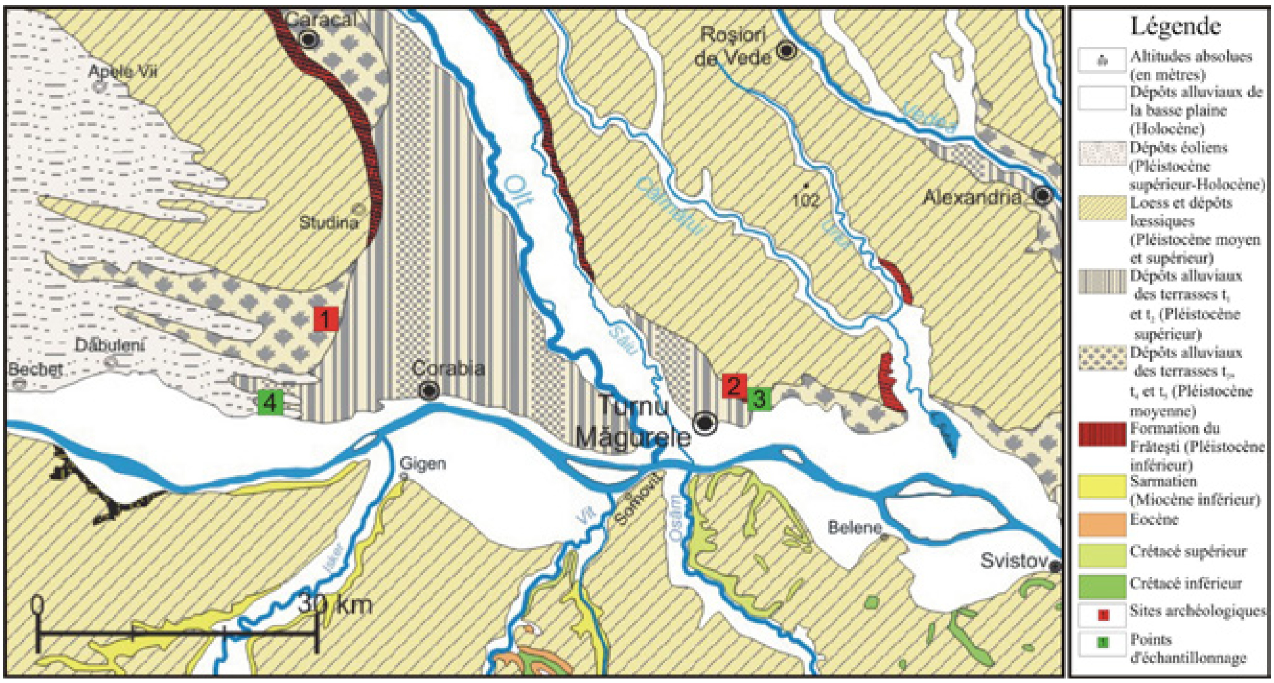
Un examen macroscopique (couleur, aspect physique du cortex, caractéristiques internes de la matrice après fracturation) et microscopique (analyses au microscope et analyses par diffraction au rayons X sur lames minces) a permis de caractériser les silex de Vădastra. Les échantillons ont un cortex jaune-blanchâtre ou gris-blanchâtre avec des taches de rouille, des protubérances roulées et ébréchées (présence de fissures très minces sans remplissage, ne montrant pas d'orientations préférentielle ce qui pourrait résulter d'un transport par l'eau) mais aussi des surfaces très roulées de couleur jaune, rouille, gris-rouille ou jaune-blanchâtre.

La plupart des pièces sans cortex ou avec peu de cortex ont des surfaces altérées d'épaisseur variable qui modifient l'aspect et la couleur réelle de la silicification. Du point de vue minéralogique, on observe la prédominance du quartz microcristallin associé à la calcédoine, le mégaquartz et la calcite. Les constituants primaires sont le cément siliceux, les fossiles déterminés au niveau du phylum (foraminifères, échinodermes, spicules d'éponge) sans qu'il soit possible de préciser l'étage géologique.

Cinq variétés de silicification ont été reconnues (description détaillée dans Ciornei 2013) : zonée (Văd-MF 23 et 24, bande blanchâtre et opaque), châtain (Văd-MF 26 et 29), gris-marron (Văd-MF 69 et 70), chocolatée translucide (Văd-MF 3), gris-marron opaque (Văd-MF 44).

Pour tester l'hypothèse d'une collecte de la matière première dans les alluvions du Danube, des rognons de silex ont été prélevés dans la nappe alluviale de Grojdibodu-Cariera de la Vest de Sat (terrasse inférieure, d'âge Pléistocène supérieur), à une dizaine de kilomètres au sud de Vădastra (**figure 3**). Les échantillons prélevés dans cet endroit ne présentent aucune similarité avec les silex du site de Vădastra. Les deux variétés de silicolites de Vădastra (échantillons Văd-MF [26], [29], [69] et [70]) présentent des ressemblances macroscopiques avec la variété siliceuse gris foncé de Ciuperceni (échantillons Ciup-Ca [6], [16], [19]). Ces ressemblances ne sont pas confirmées par l'analyse microscopique, ce qui pourrait infirmer l'hypothèse d'un approvisionnement de la zone de Ciuperceni pour le site de Vădastra.

FIGURE 3 Carte géologique dans le secteur de la confluence de l'Olt avec le Danube. 1. Vadăstra ; 2. Ciuperceni-La Vii 1 ; 3–4. Lieux d'échantillonnage pour les matières premières.



Un autre échantillon, Văd-MF [23], présente au niveau macroscopique des ressemblances avec des pièces en matière première locale provenant du niveau 4 (Paléolithique supérieur) de Temnata Dupka (Tsanova 2008).

En tenant compte des caractéristiques du cortex, il est très probable que la source d'approvisionnement soit représentée par un dépôt alluvial similaire à ceux de Ciuperceni ou Ghizdaru, au Nord-Ouest de Giurgiu-Malu Roşu où la Formation de Frăteşti, observable dans une carrière, comprend plusieurs variétés de silex. Cette source se situerait dans la formation de Frăteşti qui affleure sur la rive droite de l'Olt, soit à une distance pouvant atteindre 20 à 30 kilomètres. Cette formation, mise en place au Pléistocène inférieur, est constituée d'apports de matériaux par des rivières provenant de la plateforme prébalkanique d'où proviennent les silex qu'elle contient.

Le jaspe qui avait été identifié dans les pièces paléolithiques correspond en fait au silex gris marron opaque Văd-MF 44. Aucune pièce n'est en calcédoine ou en opale, contrairement à ce qui avait été affirmé dans les publications de C. et E. Packe-Protopopescu.

3.2.2 Caractéristiques technologiques et typologiques de l'industrie lithique

La série lithique réunie par C. Mateescu et conservée à l'Institut d'Archéologie « Vasile Pârvan » est en cours d'étude.

Sur un total de 42 pièces, les nucleus à lames (28,57 %) et ceux à lamelles (31 %) dominent avec pour les ¾ d'entre eux un débitage semi-tournant sur un ou deux flancs, les autres présentant un débitage tournant. Les nucleus à éclats sont moins nombreux (un tiers des pièces).

Les supports laminaires bruts comprennent une majorité de lames (312 exemplaires dont 14 entiers, 144 fragments proximaux, 127 mésiaux et 27 distaux), assez larges (longueur moyenne des pièces entières : 51 mm pour une largeur moyenne de 22 mm), obtenues par percussion dure pour les 4/5^{e} d'entre elles. Leurs talons sont en majorité lisses. Quelques pièces attestent des différentes phases technologiques (lames corticales : 3, lames à crête : 11, sous-crête : 21, lames de plein débitage : 227, réaménagement table/ flanc : 45). Les fractures résultent du débitage (40,7 %), d'une action de flexion (40,7 %) ou des deux.

Les lamelles, assez nombreuses (63 pièces), sont très fragmentées : 5 entières (longueur moyenne 32,39 mm), 24 fragments proximaux, 22 fragments mésiaux et 12 fragments distaux. Obtenues en majorité (82 %) par percussion tendre, elles correspondent surtout à un plein débitage (76,19 %) et présentent pour la plupart d'entre elles une rectitude affirmée.

La **figure 4** présente le décompte des outils (249 pièces sur 229 supports) avec la dominance des lames retouchées (21,4 %) parmi lesquelles on relève des lames aurignaciennes (16 % des lames retouchées). En deuxième position viennent les grattoirs (**figure 5**). En réalité, ces derniers sont majoritaires si l'on prend en comptes les outils composites (11 fronts de grattoirs, dont 6 carénés, 2 à museau, 2 en bout de lame et 1 sur éclat). Les huit lames aurignaciennes présentent une retouche écailleuse typique de l'Aurignacien. Une des caractéristiques de l'outillage est la présence de légères denticulations sur les lames retouchées et sur les fronts des grattoirs. Même si l'on prend en compte les outils composites, les burins (burins dièdres, d'angle sur cassure ou sur troncature, burins carénés, burins busqués) constituent une catégorie assez mal représentée. Par contre, les outils de type paléolithique moyen (racloirs, denticulés, encoches…) sont nombreux (33,62 % de l'outillage).

	NOMBRE	POURCENTAGE
Grattoirs	49	21,40 %
Grattoirs carénés	13	26,53 % des grattoirs
Grattoirs sur bout de lame	23	46,93 % des grattoirs
Grattoirs sur lame retouchée	11	22,44 % des grattoirs
Grattoirs sur éclat	2	4,08 % des grattoirs
Lames retouchées	50	21,83 %
Lames retouchées sur 1 ou 2 bords	42	84 % des lames retouchées
Lames aurignaciennes	8	16 % des lames retouchées
Troncatures	10	4,36 %
Burins	6	2,62 %
Becs	2	0,87 %
Racloirs	25	10,92 %
Outils composites	18	7,86 %
Pointes moustériennes	3	1,31 %
Limace	1	0,43 %
Pièces bifaciales	2	0,87 %
Éclats retouchés	13	5,67 %
Denticulés	23	10,04 %
Encoches	26	11,35 %
Fragment d'outil	1	0,43 %
Total	229	

FIGURE 4 Vădastra, décompte des outils.

FIGURE 5 Vadăstra. Grattoirs.

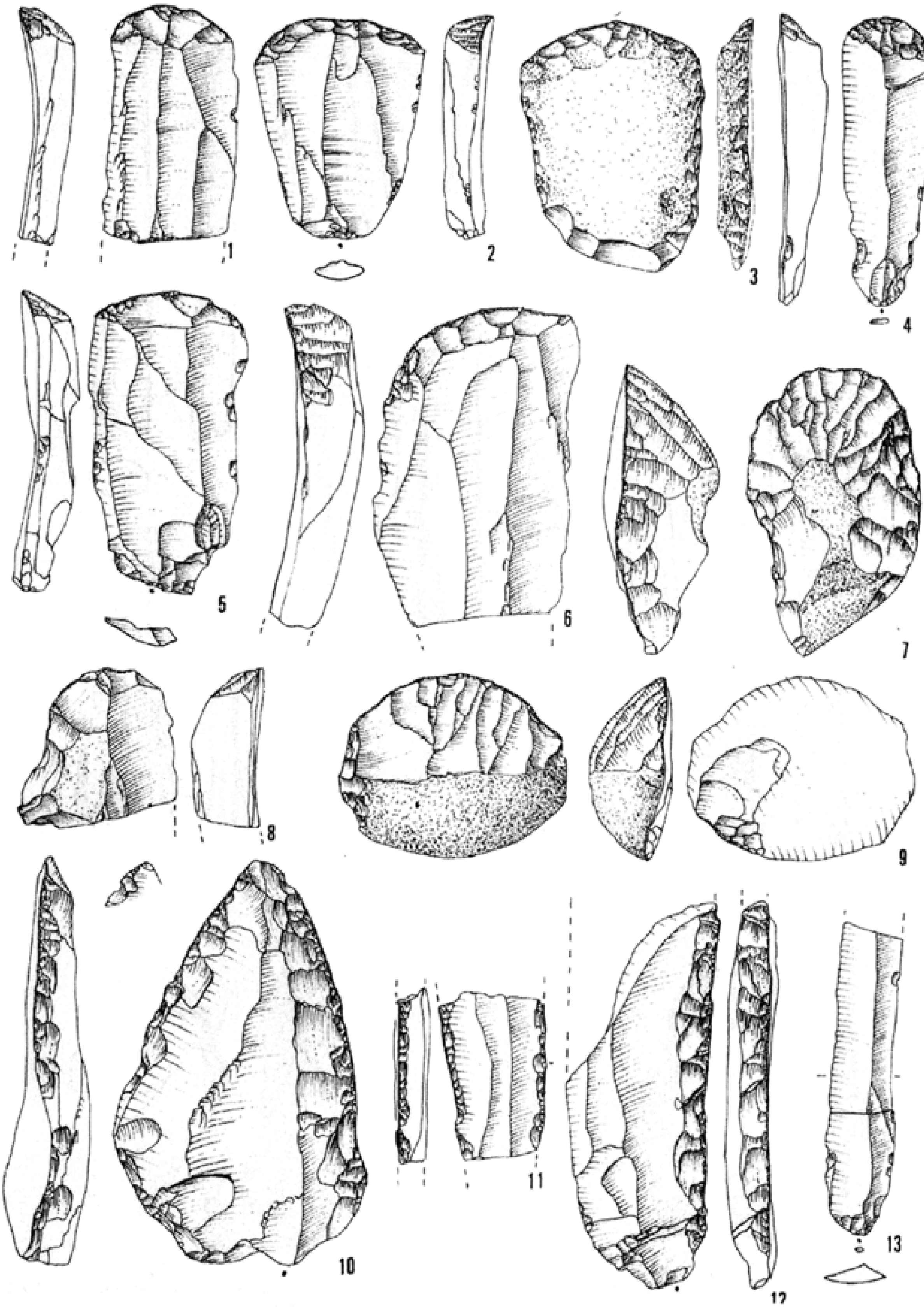


FIGURE 6 (Vadăstra) – 1, 4, 5, 6 et 8. Grattoirs sur bout de lame ; 2–3. Grattoirs sur éclat ; 7 et 9. Grattoirs carénés ; 10. Racloir ; 11. Lame retouchée ; 12. Lame aurignacienne ; 13. Lame (d'après J. Hahn).

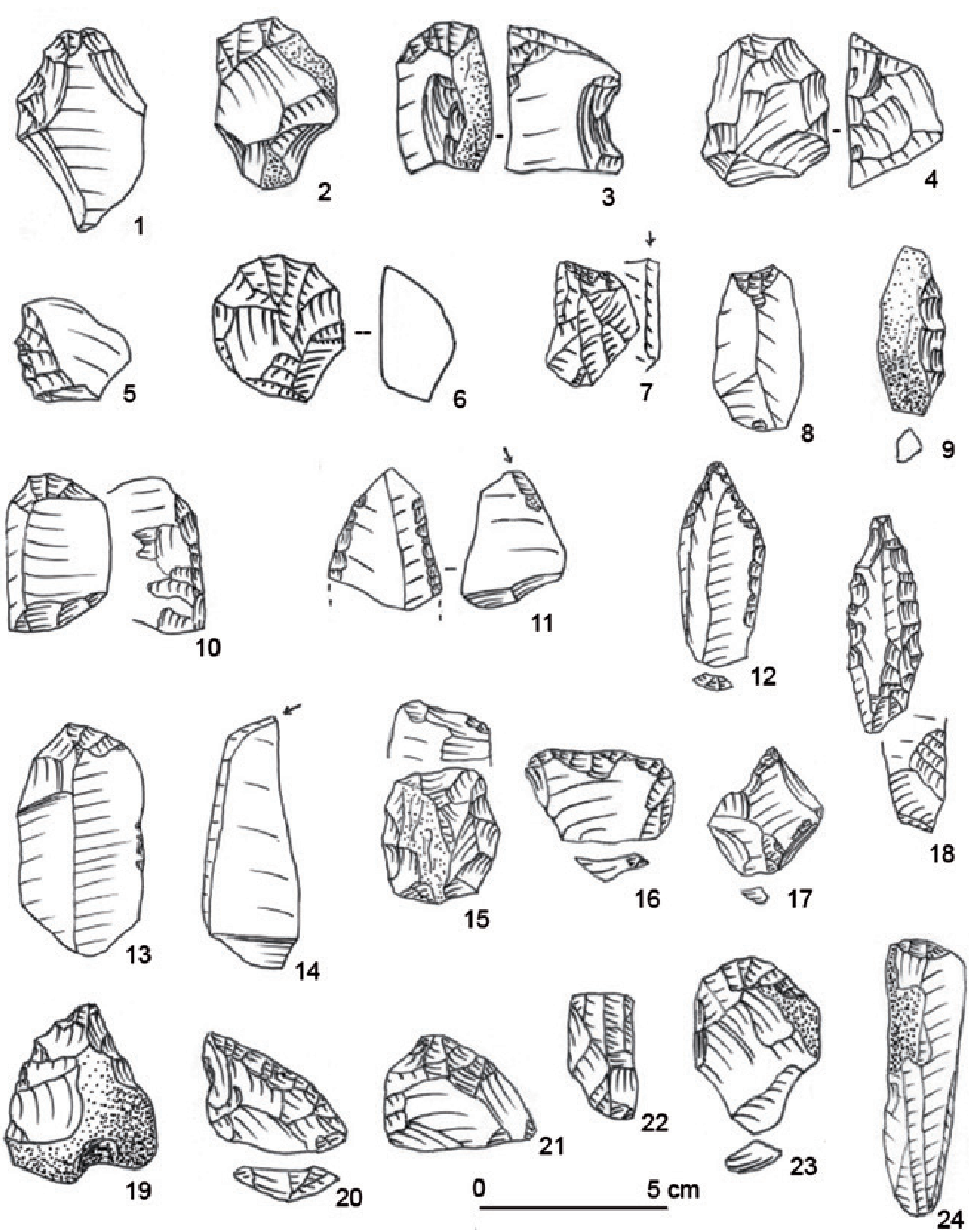


FIGURE 7 (Vadăstra) – 1 à 4, 6, 10, 21 et 23. Grattoirs carénés ; 5 et 9. Denticulés ; 7 et 14. Burins ; 8. Troncature ; 12. Lame appointée ; 13 et 24. Grattoirs sur lame ; 15. Éclat avec amincissements de type kostienki ; 16, 19 et 20. Racloirs ; 17. Perçoir ; 18. Lame aurignacienne appointée ; 22. Nucleus à lamelles.

Il faut souligner l'absence de lamelles retouchées ce qui ne peut être imputable aux méthodes de fouille car les lamelles brutes sont assez nombreuses (**figures 6** et **7**).

La présence de lames aurignaciennes, de nombreux grattoirs dont des grattoirs carénés, la rareté des grattoirs à museau et des burins indiquent la présence d'un Aurignacien ancien, faciès qui pour l'instant est peu représenté en Roumanie.

4 CIUPERCENI-LA VII 1

Le gisement de La Vii 1, à Ciuperceni (département de Téléorman), à une quarantaine de kilomètres au sud-ouest d'Alexandria, se situe en bordure d'une ancienne carrière (43°45'48.81 N, 24°57'35.35 E, altitude : 87 m), qui exploitait la couverture limoneuse et les anciennes alluvions du Danube. Les premières recherches archéologiques ont été menées par V. Boroneanţ de 1977 à 1979 (Boroneanţ 1980).

4.1 Les fouilles récentes

L'objectif des nouvelles fouilles (2006 à 2008 et 2010) était de préciser le cadre stratigraphique du matériel lithique et d'en établir les caractéristiques techno-typologiques. Les travaux ont concerné un secteur jouxtant à l'est des fouilles de V. Boroneanţ, en bordure de l'ancien front d'exploitation de la carrière. La superficie fouillée est de 34 m² sur une profondeur maximale de 7 mètres (Dobrescu *et al.* 2008, 2009, 2011).

4.1.1 Stratigraphie

Plusieurs niveaux archéologiques (A, B, C, D1 et CR), uniquement identifiables par la présence de silex taillés, sont observables dans une séquence de loess et de limons argileux qui colmatent une dépression entamant un pédocomplexe fortement argileux incluant d'abondantes concrétions calcaires (**figure 8**).

L'ensemble de la séquence repose sur les dépôts fluviatiles de la « basse » terrasse du Danube.

La séquence stratigraphique suivante a pu être observée à l'emplacement de la fouille. De haut en bas :

1. Chernozem (épaisseur : 0,7 m). Un premier niveau de silex taillés (A) est observable à la base du chernozem.

2. Loess brun jaunâtre (10 YR 5/4), homogène, plus argileux à la partie supérieure, présentant des concrétions calcaires dans la moitié inférieure du dépôt. Épaisseur : 2,10 à 2,40 m.

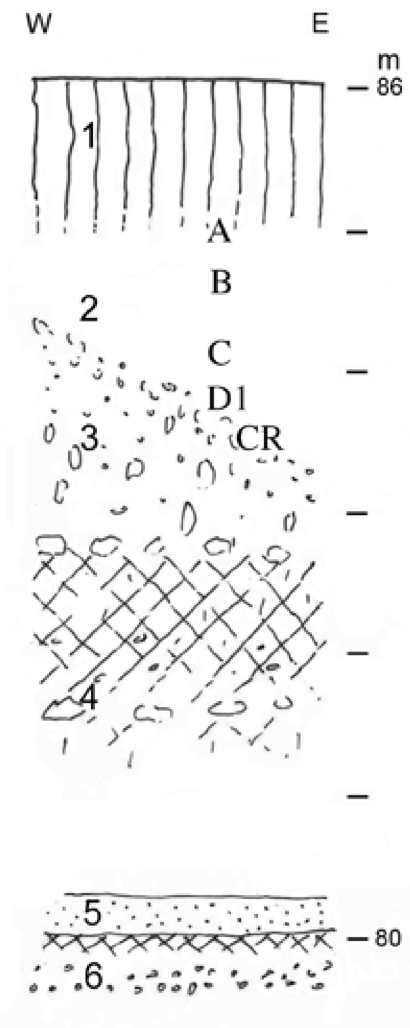


FIGURE 8 (Ciuperceni-La VII) – 1. Profil stratigraphique :
1. Chernozem ; 2. Loess brun jaunâtre (niveaux archéologique B, C et D1) ; 3. Limon argileux lité ; 4. Pédocomplexe brun rougeâtre 5. Sable fluviatile ; 6. Graviers fluviatiles surmontés par un encroûtement. A, B, C, D1 et CR : niveaux archéologiques.

Trois niveaux archéologiques ont été reconnus : B dans la partie supérieure du loess brun jaunâtre ; C dans la partie inférieure de ce loess et D1 à la base.

3. Limon argileux lité, brunâtre (10 YR 5/3), à passées brun grisâtre (10 YR 5/2), montrant de nombreuses traces de manganèse et comprenant d'abondantes concrétions calcaires de dimensions décimétriques. Épaisseur : 1 m. De nombreux silex taillés (CR) sont dispersés dans ce limon, qui est affecté par un fort pendage en direction de la plaine alluviale du Danube.

4. Paléosol brun rougeâtre (7,5 YR 5/4), épais de 3 mètres, visible directement sous le chernozem vers le nord et vers l'ouest, au-delà des anciennes fouilles de V. Boroneanţ.

5. Sable fluviatile grossier. Épaisseur : 0,3 m.

6. Graviers fluviatiles surmontés par un encroûtement calcaire observable sur une quinzaine de centimètres.

4.1.2 Datation par luminescence de la séquence loessique de Ciuperceni- La Vii 1

La datation par luminescence IRSL (Infrared Stimulated Luminescence ; Hütt *et al.* 1988), qui est une forme particulière d'OSL (Optically Stimulated Luminescence) réservée aux feldspaths, a été appliquée aux loess de Roumanie. Elle a permis d'y établir un cadre chronologique de référence pour les loess du Pléistocène supérieur et moyen (Balescu *et al.*, 2003, 2010). Les méthodes de datation IRSL sur feldspaths et OSL sur quartz ont également été utilisées pour préciser la chronologie des gisements paléolithiques intraloessiques (Alexandrescu *et al.* 2004, Fitzsimmons *et al.* 2012 ; Iovită *et al.* 2012 ; Sitlivy *et al.* 2012 ; Tuffreau *et al.* 2009).

La méthode ^{14}C étant inapplicable à Vii 1 en raison de l'absence de matière organique au sein de la séquence loessique et des niveaux archéologiques, nous avons eu recours à la méthode de datation IRSL sur feldspaths. Lorsque ces minéraux sont stimulés par des photons du proche-infrarouge ($\lambda = 880$ nm), ils émettent un signal IRSL qui mesure le temps écoulé depuis leur dépôt ou leur dernière exposition à la lumière solaire.

Les échantillons destinés à la datation IRSL ont été prélevés dans le lœss calcaire, sous le chernozem, au-dessus du niveau C (VIC–1sup) et dans le sol rougeâtre (VI08–1) situé à la base de la séquence.

La technique de datation IRSL mise en oeuvre est celle des doses γ additives (MDA) appliquée aux grains de feldspaths alcalins (60–80 µm). Elle est identique à celle appliquée par Balescu *et al.* (2003, 2010) aux séquences loessiques de Tuzla et Mircea Voda en Dobroudja et de Mostiştea dans la Plaine du Danube.

Pour remédier au problème de sous-estimation des âges IRSL sur feldspaths consécutive à l'instabilité thermique du signal de luminescence des feldspaths (appelée « *fading* ») qui se traduit par une perte spontanée de signal au cours du temps et donc une sous-estimation des âges IRSL, la procédure corrective de V. Mejdahl (1988) pour le fading à long-terme fut mise en œuvre et appliquée aux âges IRSL mesurés.

L'âge IRSL corrigé pour le fading du loess qui surmonte le niveau C (VIC1sup) est de 30 ± 3 ka (âge du dépôt). La dose annuelle est estimée à 3,01 ± 0,24 Gy/ka.

L'âge IRSL corrigé du loess inférieur pédogénéisé (VI08–1) est de 329 ± 51 ka. La dose annuelle est estimée à 2,64 ± 0,21 Gy/ka. Ce loess est vraisemblablement l'équivalent du loess L4, mis en place au MIS 10. Son âge IRSL corrigé est supérieur à ceux mesurés pour le loess L3 (250–281 ka ; Balescu *et al.* 2010) de Dobroudja et de Mostiştea. La couleur brun rougeâtre du paléosol s'apparente à celle du paléosol S3 (sol brun-rouge forestier) observé au sein des coupes de Tuzla, Mircea Voda et Mostiştea (Balescu *et al.* 2010). Il y aurait donc une importante lacune au sein de cette séquence loessique : les loess L2 et L3 du MIS 6 et du MIS 8 y sont absents.

4.1.3 Interprétation chronostratigraphique

La séquence observable à « La Vii 1 » correspond à une couverture de loess du Pléniglaciaire weichsélien moyen (MIS 3) surmontée par un chernozem et reposant sur un paléosol développé dans un loess mis en place au MIS 10 (Balescu *et al.* 2003, 2010). À l'emplacement de la fouille, le limon argileux lité brunâtre qui repose sur le loess inférieur pédogénéisé brun rougeâtre inclut de nombreux silex taillés (CR) appartenant à une industrie lithique du Paléolithique supérieur. Son âge est supérieur à 30 ± 3 ka, âge IRSL corrigé obtenu sur feldspaths provenant du loess brun jaunâtre sus-jacent surmontant le niveau archéologique C.

4.2 Les séries lithiques

4.2.1 Caractéristiques générales

Le matériel lithique des différents niveaux de La Vii1 présente un certain nombre de caractéristiques communes (**figure 9**) :

- même matière première, le silex de la craie, provenant des alluvions du Danube ;
- débitage laminaire au percuteur dur ;
- prédominance des produits de débitage, nombre élevé d'esquilles ;
- net faciès d'atelier ;
- outillage peu abondant : grattoirs sur bout de lame, grattoirs carénés, burins, lames tronquées, encoches, denticulés. Il faut souligner la présence dans la série CR de rabots dont la partie fonctionnelle a été aménagée sur des rognons de silex qui ont gardé une grande partie de leur cortex.

Les pièces des niveaux A et B appartiennent à la même industrie lithique. Les nucléus ont pour une grande partie d'entre eux étaient apportés préformés car les éclats corticaux ne sont pas très nombreux. Les nucléus montrent l'existence d'un débitage laminaire ½ tournant ou d'un débitage réalisé à partir d'une surface de débitage unipolaire ou bipolaire. Le débitage est similaire dans la série D1.

Il n'en est pas de même pour le niveau CR où le pourcentage des éclats corticaux est nettement plus élevé. La part prise par le silex local au cortex très frais est plus importante ce qui dénote d'une collecte de rognons de silex dans un affleurement proche. Dans l'ensemble la qualité du silex utilisé est assez médiocre.

Les nucléus à débitage laminaire semi tournant et les nucléus à lames à un ou deux plans de frappe dominent nettement avec des changements de direction fréquents. La préparation des blocs du niveau CR est peu marquée et les plans de frappe sont sommairement mis en forme. Il faut relever la présence de nucléus à lamelles.

Les lames du niveau CR sont allongées et légèrement arquées.

Quelques outils sont présents : grattoirs, burins, lame appointée, denticulés, encoches. Il faut souligner le nombre relativement important des rabots dont la partie fonctionnelle a été aménagée sur des rognons de silex qui ont gardé une grande partie de leur cortex.

	SÉRIE A	SÉRIE B	SÉRIE C	SÉRIE D1	SÉRIE CR
Nucléus à lames	5	4		3	26
Nucléus à lamelles				1	5
nucléus à éclats				2	11
Nucléus en phase de préparation				1	
Fragment de nucléus	1	1			
Bloc testé					7
Casson	35	27	1	16	153
Éclat	82	74	8	39	708
Lame	59	47	4	24	408
Lamelle	12	14		4	103
Esquille	63	67		35	299
Grattoir sur lame					1
Grattoir sur lame retouchée					1
Grattoir caréné					1
Grattoir sur nucléus à lamelles	1				
Burin sur cassure					2
Chute de burin				1	
Troncature	1				5
Lame retouchée sur 1 bord	3	4			5
Lame retouchée sur 2 bords					1
Bec					1
Racloir				1	2
Denticulé	3	2			
Encoche	3	4		1	6
Outil mixte				1	
Éclat retouché	1	1	1		1
Rabot				1	3
Percuteur				1	3
Divers					2
Total	269	245	14	131	1755

FIGURE 9 Ciuperceni-La Vii 1, décompte du matériel lithique.

Signalons la présence d'une lame tronquée à bords retouchés présentant la trace probable d'ocre.

4.2.2 Pétrographie et analyse comparative des silex de Ciuperceni-La Vii 1 et de Ciuperceni-La Carieră

Des analyses macroscopiques, microscopiques et diffractométriques ont été réalisées sur 7 échantillons du niveau CR et sur 23 échantillons d'une séquence alluviale, la formation de Frătesti, visible dans la carrière voisine (Ciuperceni-La Carieră) qui exploite un dépôt de sables surmontant des conglomérats polimictiques, riche en rognons de silex, à stratification horizontale (Ciornei 2013). Cette formation a été supposée être un gîte probable d'approvisionnement. Nous avons déterminé onze variétés de silex pour Ciuperceni-La Carieră et six variétés pour le site de Ciuperceni-La Vii 1 qui correspondent à certaines variétés de Ciuperceni-La Carieră (**figure 3**). Il s'agit de variétés suivantes :

- Ciup-Vii [1] = Ciup-Ca [18] : silicification nodulaire grise foncée à marron, très translucide, avec une petite quantité de micrite (< 4 µm), présence de quelques fossiles très légèrement dispersés (spicules d'éponge, foraminifères de type *Textulariina* et *Miliolina*), nombreuses fissures tellogénétiques, remplies par de la calcédoine.

- Ciup-Vii [3] = Ciup-Ca [9] : silicification lenticulaire jaune-marron, semi-translucide, cortex lisse, peu de fossiles (spicules d'éponge, foraminifères de type *Textulariina*, échinodermes), avec une quantité de micrite plus élevée que pour la variété antérieure.

- Ciup-Vii [5] = Ciup-Ca [22] : silicification nodulaire beige avec une grande quantité de micrite (< 4 µm) et fossiles dispersés (spicules d'éponge, foraminifères), nombreuses perforations tubulaires recouvrant la surface extérieure, quelques-unes traversant le rognon Certaines sont estompées et continuent à l'intérieur par un remplissage de quartz microcristalline avec une petite quantité de micrite (taches plus ou moins circulaires, grises-marron claires et translucides).

- Ciup-Vii [6], [7] = Ciup-Ca [3], [7] : silicification nodulaire crème avec une grande quantité de micrite (< 4 µm). Les fossiles, peu nombreux, sont légèrement dispersés (spicules d'éponge, foraminifères, bivalves, corail tabulaire). Le cortex est épais avec une surface poreuse.

- Ciup-Vii [2] = Ciup-Ca [5], [15], [23] : silicification nodulaire gris-marron avec de nombreuses fossiles très fragmentés et agglomérés (spicules d'éponge, échinodermes, ostracodes bivalves, foraminifères de type *Miliolina* et le genre *Rotalipora*), insérée dans une matrice de micrite (> 4 µm) ; présence de fissures tellogénétiques (remplissage avec des méga-quartz, de la calcédoine ou de la calcite).

- Ciup-Vii [4] = Ciup-Ca [6], [16], [19] : silicification nodulaire, cortex mince gris foncé avec une quantité importante de fossiles très fragmentés et agglomérés (spicules d'éponge, échinodermes, bivalves, foraminifères de type *Miliolina*) dans une matrice de micrite (> 4 µm), en quantité plus faible que pour l'échantillon précédent.

Les échantillons de Ciuperceni-La Carieră ont le cortex très frais, une couleur blanche-grise à jaunâtre avec une surface poreuse à lisse. Ils montrent des signes de transport par l'eau (surfaces lisses et poreuses sans craie, craie lisse, coins et crêtes lisses, traces de coups, néocortex gris-beige, marron-rouille). Les éclats du niveau CR ont des traits externes similaires à ceux trouvés à Ciuperceni-La Carieră. Les six variétés de silex observées dans le site paléolithique sont présentes dans celles identifiées dans la carrière ce qui signifie que la source d'approvisionnement est la formation de Frăteşti d'autant que la basse terrasse du Danube a une composition pétrographique différente (échantillons prélevés à Poiana à quelques kilomètres au Sud de Ciuperceni-la Vii 1). Le grand nombre des éclats et des lames ayant gardé d'importantes plages à Ciuperceni-La Vii confirme que la source d'approvisionnement doit être à faible distance du site.

4.2.3 Caractéristiques technologiques et typologiques de la série lithique CR

Les nucléus

Ils se répartissent en nucléus à lames, les plus nombreux (26), en nucléus à lamelles (5) et en nucléus à éclats (11).

La production laminaire s'est faite pour plus des 4/5e des cas à partir d'un rognon. La table a été obtenue après une préparation en crête antérieure ou en crête latérale. Les nucléus à un plan de frappe (17) sont un peu plus nombreux que ceux à deux plans de frappe (14). Les angles formés par l'intersection du plan de frappe avec la table de débitage sont très aigus à presque droits (53° et 89°). La progression du débitage est surtout semi tournante sur les flancs. Les enlèvements laminaires investissent les flancs ce qui a comme résultat une production plus importante de lames que pour un débitage frontal. La présence de néo-crêtes se situant sur les flancs, sur la table et sur le dos témoigne des phases de réaménagement des nucléus laminaires. Les nucléus ont été abandonnés à la suite de leur trop forte réduction, d'accidents de taille ou de la présence d'inclusions de quartz.

Les nucléus à éclats ont un à quatre plans de frappe. La mauvaise qualité de la matière première qui produit beaucoup d'accidents est la principale cause de leur abandon.

Les produits laminaires bruts : lames et lamelles (figures 10 et 11)

Le taux de fragmentation des produits laminaires (408 lames et 103 lamelles) est important. Il n'y a que 47 lames entières pour 166 parties proximales, 118 parties mésiales et 77 parties distales. Il en est de même pour les lamelles : 12 lamelles entières, 43 parties proximales, 33 parties mésiales et 15 parties distales.

En ce qui concerne la régularité des lames et des lamelles, on remarque la prédominance des pièces à régularité moyenne. Toutefois, pour les lamelles, le débitage est plus soigné. La plupart des produits laminaires sont plats mais un pourcentage assez important des lames et des lamelles présente une torsion.

La longueur des lames entières se situe entre 29 et113 mm et leur largeur moyenne est de 19 mm. Les épaisseurs sont très variables allant de 1,3 mm à 26 mm avec une moyenne de 6,3 mm. Les lames très épaisses sont des lames à crêtes ou de réaménagement.

La longueur des lamelles est réduite (7 à 49,5 mm) avec une largeur moyenne de 9,5 mm.

L'épaisseur moyenne des lamelles est de 2,4 mm. La plupart des lamelles (70,8 %) sont fines.

FIGURE 10 Phases technologiques des lames de la série CR.

<table>
<tr><th colspan="8">LAMES</th></tr>
<tr><th>Préparation</th><th>Nbre</th><th>Début du débitage</th><th>Nbre</th><th>Plein débitage</th><th>Nbre</th><th>Réaménagement</th><th>Nbre</th></tr>
<tr><td>Lames corticales</td><td>15</td><td>Lame à crête</td><td>15</td><td>PD de table</td><td>145</td><td>Table</td><td>43</td></tr>
<tr><td rowspan="4">Lames de préparation</td><td rowspan="4">10</td><td>Lame à crête à 1 versant</td><td>4</td><td rowspan="4">PD de flanc</td><td rowspan="4">86</td><td>Flanc</td><td>36</td></tr>
<tr><td>Lame à crête partielle</td><td>1</td><td rowspan="3">Néo-crêtes</td><td rowspan="3">18</td></tr>
<tr><td>Sous-crête tabulaire</td><td>16</td></tr>
<tr><td>Sous-crête dorsale</td><td>19</td></tr>
<tr><td>Total</td><td>25</td><td>Total</td><td>55</td><td>Total</td><td>231</td><td>Total</td><td>97</td></tr>
</table>

LAMELLES							
Préparation	Nbre	Début du débitage	Nbre	Plein débitage	Nbre	Réaménagement	Nbre
		Lamelle à crête	3	PD de table	78	Néo-crête	1
		Sous-crête tabulaire	5	PD de flanc	13	Tablette	1
		Sous-crête dorsale	2				
Total	0	Total	10	Total	91	Total	2

FIGURE 11 Phases technologiques des lamelles de la série CR.

Les talons lisses sont les plus nombreux pour les lames et les talons punctiformes et linéaires pour les lamelles.

Pour tous les produits laminaires la percussion directe à la pierre est prédominante. Occasionnellement, quelques produits ont été débités avec une percussion directe tendre.

Les éclats

Au nombre de 708 exemplaires, les éclats n'ont pas un taux de fragmentation aussi important que celui des produits laminaires : éclats entiers (496), fragments proximaux (92), mésiaux (24), distaux (92). Quatre exemplaires sont des éclats de gel. Leurs longueurs sont comprises entre 9,4 et 156 mm (moyenne : 43 mm) et les largeurs entre 10 et 108 mm (moyenne : 37 mm) avec des épaisseurs entre 1,4 et 54 mm (moyenne : 10 mm). Le cortex est présent sur 59,23 % des pièces ce qui montre que la matière première a été apportée en grande partie à l'état brut à l'endroit où s'est opéré le débitage. Presque la moitié des talons identifiés sont lisses. La percussion directe à la pierre est prédominante. Comme c'est le cas pour les produits laminaires, très peu d'éclats ont été débités par une percussion directe au percuteur tendre.

Près de la moitié (46,31 %) correspondent à la phase de mise en forme lors du débitage (entames, éclats corticaux, de crêtes, d'installation du plan de frappe). Le plein débitage concerne un peu plus du quart des pièces (26,7 %) et le réaménagement autour de 19 %

Les outils

Les outils, en majorité sur lames, sont peu nombreux (31 pièces). Ils représentent 1,76 % de l'ensemble de l'industrie lithique. Si l'on fait abstraction des encoches, les lames retouchées sont les plus abondantes suivies par les troncatures, (dont une sur lame retouchée sur les deux bords présentant des traces probables d'ocre), les grattoirs dont un caréné et un sur lame, les burins sur cassure, les rabots, et les racloirs.

Les chaînes opératoires

Trois chaînes opératoires peuvent être identifiées : production de lames et de lamelles intégrées dans la même chaîne opératoire où les lamelles sont obtenues à partir de nucléus à lames réduits, production exclusive de lamelles et production d'éclats.

La 2e chaîne opératoire est destinée seulement à la production des lamelles. Les supports sont des petits galets, des rabots porteurs des négatifs lamellaires, des grattoirs carénés ou des éclats. La production lamellaire est assez importante ; elle représente 20,15 % des produits laminaires. Il ne s'agit pas de simples déchets mais de pièces dont le débitage est intentionnel. Cependant, aucune lamelle n'a été retouchée.

Il ressort de l'examen des lamelles brutes que l'intention du débitage laminaire et lamellaire est principalement orientée vers la production des lames assez larges et épaisses, à profil rectiligne à légèrement courbe et à section le plus souvent trapézoïdale et de lamelles assez larges mais fines, à profil plat à légèrement courbe et à section trapézoïdale ou triangulaire.

4.2.4 Attribution culturelle de la série lithique CR

Le matériel lithique correspond à un faciès d'atelier avec un faible nombre d'outils ce qui rend difficile l'attribution culturelle de l'assemblage CR à une industrie lithique particulière qu'il convient de situer durant une phase ancienne du Paléolithique supérieur (**figures 12** et **13**). Il pourrait s'agir d'un aurignacien assez récent ou même d'une industrie gravettienne, comme le montre l'âge IRSL obtenu dans le loess brun jaunâtre situé 2 m au-dessus des sédiments contenant la série lithique CR.

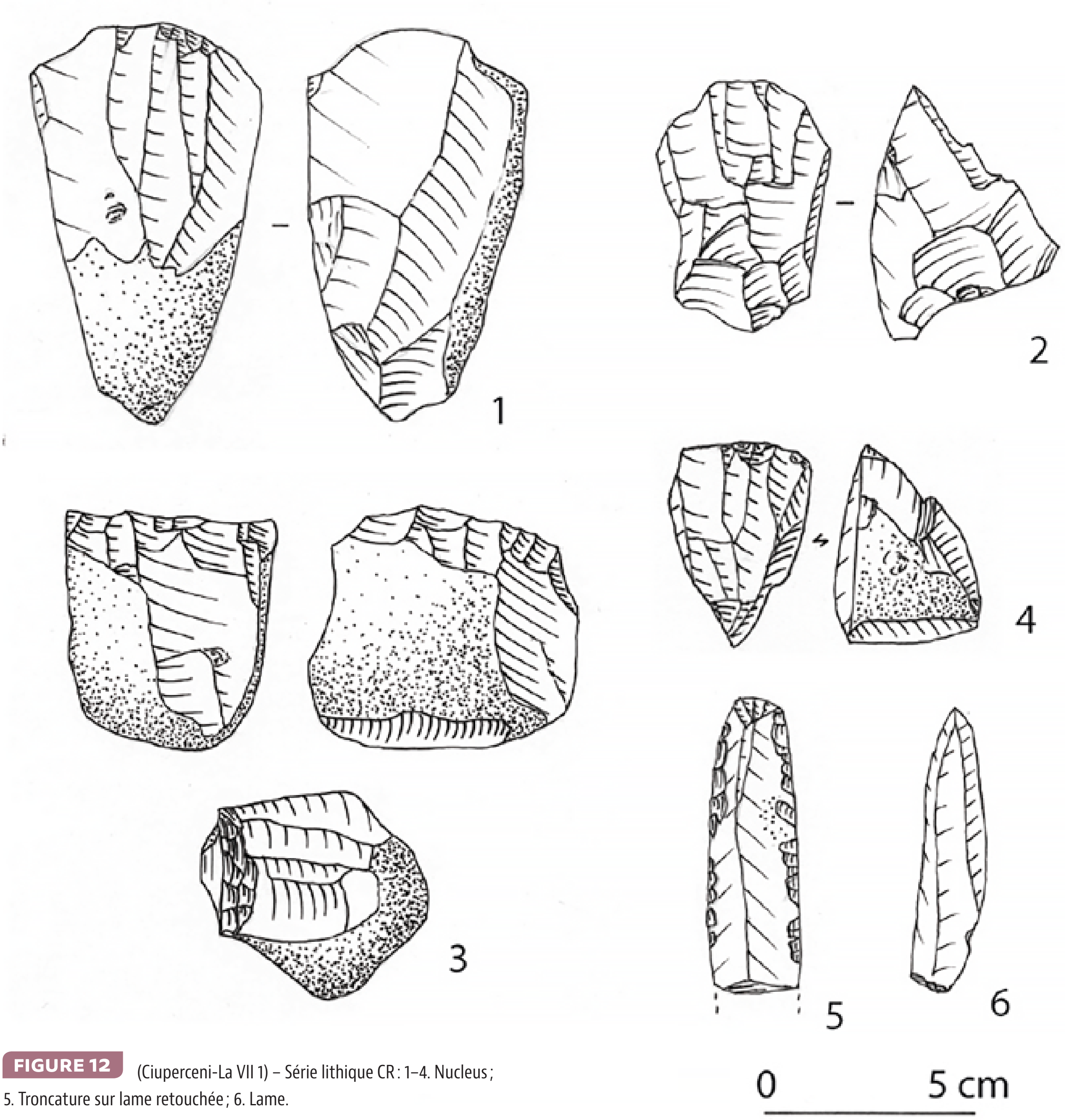


FIGURE 12 (Ciuperceni-La VII 1) – Série lithique CR : 1–4. Nucleus ; 5. Troncature sur lame retouchée ; 6. Lame.

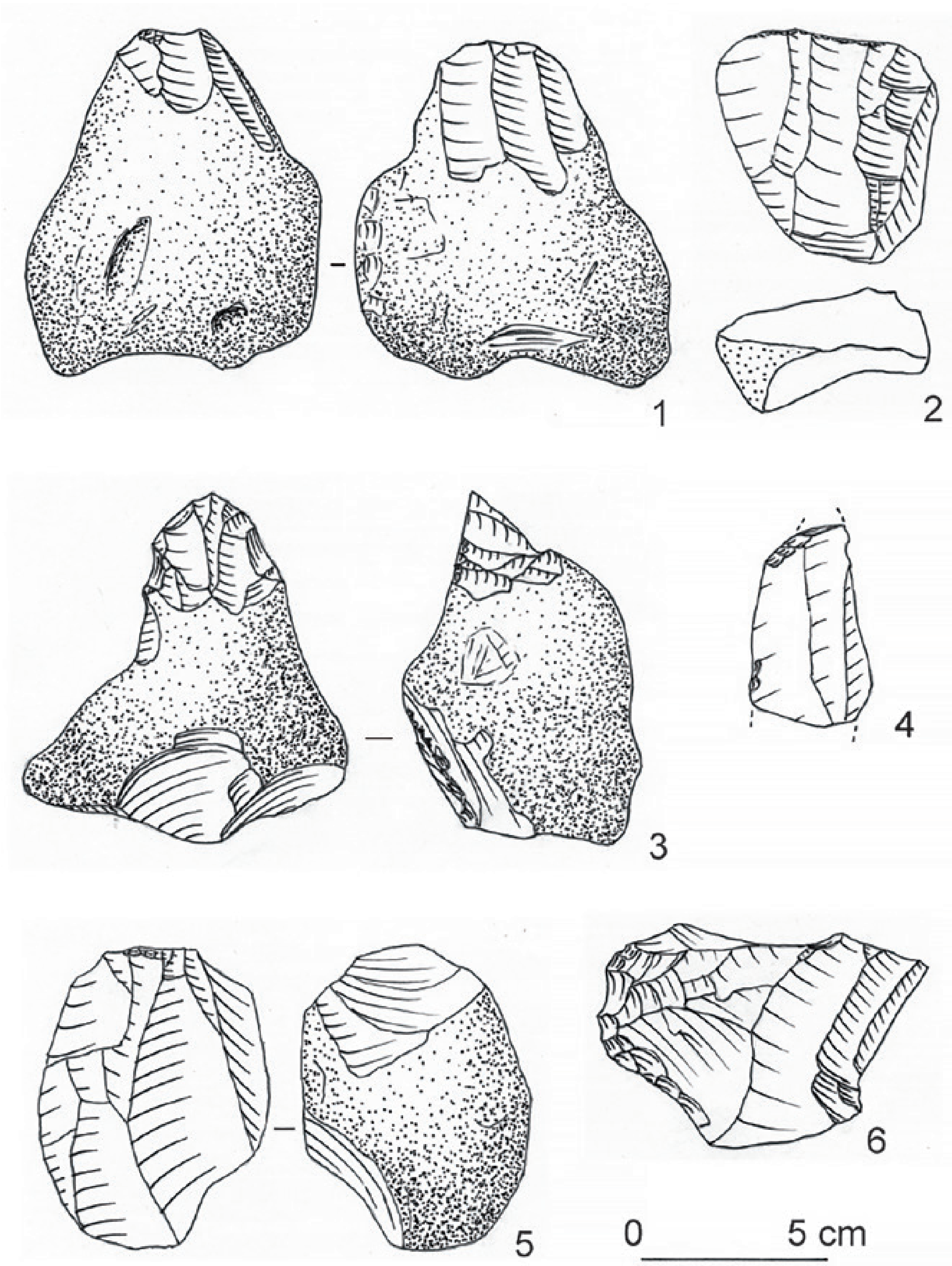


FIGURE 13 (Ciuperceni-La VII 1) – Série lithique CR : 1–2 et 5. Nucleus ; 3. Rabot ; 4. Lame tronquée ; 6. Grattoir caréné sur nucleus.

La présence d'un grattoir caréné dans la série A et de deux autres carénés dans la série B ne saurait suffire pour envisager un rattachement à de l'Aurignacien. Le débitage est nettement orienté vers une production de lames assez larges et épaisses ainsi que de lamelles. Il a été obtenu à partir d'une percussion dure à la différence de Mitoc-Malu Galben, dans la vallée du Prut, où l'usage du percuteur tendre est observable dans les séries aurignaciennes (Noiret 2009, Otte *et al.* 2007b). L'aspect peu caractéristique des ensembles lithiques du gisement de Ripiceni-Izvor (Păunescu, 1993), dont l'individualisation stratigraphique est incertaine (Noiret 2009), empêche tout rapprochement. Dans la Plaine du Danube, les seules industries lithiques clairement identifiables sont très différentes de celles de Ciuperceni-La Vii 1. Il s'agit de celles de Vădastra, attribuable à un Aurignacien ancien et de celle, beaucoup plus tardive, de Malu Roşu (Alexandrescu *et al.* 2004).

Il est également difficile d'établir des comparaisons avec les données obtenues au sud de la Plaine du Danube, dans la partie septentrionale du massif balkanique où le matériel lithique provient surtout de contextes karstiques (Ivanova & Sirakova 1995 ; Tsanova 2008). La présence de rabots à la morphologie particulière, bien différente de ceux que l'on observe dans le matériel aurignacien de Româneşti-Dumbrăviţa, dans le Banat (Mogoşanu, 1978) confère aussi au matériel lithique du niveau CR une spécificité qui lui est propre. Compte-tenu de toutes ces observations, nous proposons de rattacher l'industrie lithique du niveau CR à un faciès que nous appellerons « faciès de type Ciuperceni ».

5 DISCUSSION ET CONCLUSION

Le faible nombre de gisements ayant fait l'objet de fouilles récentes demeure une difficulté majeure pour connaître les modalités d'occupation au Paléolithique supérieur dans la Plaine roumaine du Danube. Cependant, nous disposons maintenant avec l'examen du matériel lithique de Vădastra-Măgura Fetelor, des fouilles de Ciuperceni-La Vii 1 et de Giurgiu-Malu-Roşu de marqueurs chronologiques, de précisions sur les attributions culturelles des industries lithiques et de quelques éléments sur la fonction des sites, l'exploitation des territoires et les déplacements des groupes humains.

Contrairement à ce que l'on observe habituellement dans les sites de plein air, le matériel lithique de Vădastra-Măgura Fetelor comprend un nombre important d'outils que l'on peut estimer à près de 9 % de l'ensemble des pièces (348 pièces retouchées pour 3829 nucleus, produits de débitage et outils) d'après les décomptes d'A. Păunescu (2000a). Ce dernier avait séparé artificiellement le matériel lithique en deux séries en se fondant sur des considérations techniques et typologiques considérées comme permettant de différencier des pièces attribuables à du Paléolithique moyen ou à du Paléolithique supérieur. La valeur du pourcentage des outils est sans doute un peu surestimée par rapport à ce que l'on obtiendrait lors d'une fouille actuelle mais elle ne saurait être imputée à une sélection car des produits de débitage de petites dimensions ont été ramassés. La présence d'outils assez nombreux indique que le matériel lithique de Vădastra-Măgura Fetelor ne correspond pas à un faciès d'atelier mais à un site d'habitat aux fonctions multiples que la rareté des restes conservés de mammifères ne permet pas de préciser.

La position de l'occupation humaine est celle d'un site de hauteur dominant la vallée du ruisseau Obârşia, position qui n'est pas liée à la présence de matières premières sur place mais à la possibilité de contrôler les déplacements d'herbivores dans la vallée. Les études concernant la provenance de la matière première semblent indiquer que la collecte n'est pas locale mais que l'approvisionnement devait se faire à une distance assez importante, de l'ordre d'une vingtaine de kilomètres.

Les outils de Vădastra-Măgura Fetelor comprennent un nombre élevé de lames retouchées dont des lames aurignaciennes ainsi que de grattoirs pour près des deux tiers sur lame, parfois retouchée. Les grattoirs sur éclat sont en majorité carénés (plus du quart des grattoirs). Le nombre total des grattoirs en prenant en compte les outils composites est important alors que les burins sont rares, moins bien représentés que les troncatures. Les outils de type paléolithique moyen (encoches, denticulés) atteignent plus du 1/5e de l'ensemble. Quelques lamelles non retouchées sont présentes. Ces caractéristiques sont celles d'un Aurignacien ancien (Bon 2010 ; Djindjian *et al.* 1999, 2003 ; Schmider B. 2002). Des pièces attribuables à ce stade de l'Aurignacien sont présentes, à l'Ouest de la Plaine roumaine, dans plusieurs gisements du Banat où certaines séries lithiques semblent présenter les caractéristiques d'un Proto-Aurignacien (Demidenko & Noiret 2012 ; Mogaşanu 1978 ; Sitlivy *et al.* 2012).

La série lithique CR de Ciuperceni-la Vii 1 provient d'un limon argileux lité situé un mètre sous un prélèvement effectué dans un loess brun jaunâtre dont la date IRSL est de 30 ± 3 ka. L'âge des séries lithiques trouvées dans le loess brun jaunâtre (C et D1) et à la partie inférieure du chernozem (A et B) est proche de cette date IRSL. La série CR, plus ancienne, qui correspond à une industrie lithique, en position secondaire, incluse dans un limon lité remanié sur le versant, est par contre nettement plus ancienne.

Le matériel lithique de Ciuperceni-la Vii 1, surtout celui de la série CR qui est numériquement la plus importante, présente toutes les caractéristiques d'un faciès d'atelier : nucléus bien représentés, très nombreux produits de débitage, outils rares. Les caractéristiques de la matière première utilisée indiquent que le lieu de collecte se situait à faible distance, dans la Formation de Frăteşti présente sur place et qui pouvait être accessible sur le bas du versant de l'époque, dans des ravinements comme celui qui a entrainé le déplacement des pièces de la série CR. L'attribution de la série CR à un technocomplexe particulier du Paléolithique supérieur ancien est problématique en raison du faible nombre des outils. Son âge, supérieur à 30 ± 3 ka, d'après la datation IRSL du loess sus-jacent, semble indiquer une contemporanéité avec un Aurignacien sans qu'il soit possible d'attribuer la série CR ainsi que les séries provenant du loess sus-jacent à cette culture. C'est pourquoi, nous proposons de dénommer pour l'instant la série CR « faciès de type Ciuperceni ».

Les travaux concernant le matériel lithique de Vădastra-Măgura Fetelor et de Ciuperceni-La Vii 1 donnent quelques indications sur la Plaine du Danube au Paléolithique supérieur ancien qui constituait un large couloir de circulation entre les Carpates méridionales et le massif balkanique avec des matières premières aisément accessibles dans des formations fluviatiles transportant des roches siliceuses provenant des Carpates méridionales ou du massif calcaire balkanique.

BIBLIOGRAPHIE

ALEXANDRESCU E., BALESCU S. & TUFFREAU A. (2004) – Nouvelles données chronologiques, technologiques et typologiques sur le Paléolithique supérieur ancien de la Plaine roumaine du Danube : le gisement de Giurgiu-Malu Roşu. *L'Anthropologie*, 108 : 407–423.

ANGHELINU M. & NITĂ L. (2012) – What's in a name : The Aurignacian in Romania. *Quaternary International* (sous presse).

ANGHELINU M., NITĂ L., SITLIVY V., UTHMEIER T. & BĂLTEAN I. (2012) – Looking around Pestera cu Oase : The beginnings of Upper Palaeolithic in Romania. *Quaternary International* 274 : 136–157.

AUGUSTE P. (2009) – Compte-rendu de : M. Cârciumaru, M. Anghelinu, E.-C. Niţu, M. Cosac, G. Murătoreanu : Géo-Archéologie du Paléolithique moyen, Paléolithique supérieur, Épipaléolithique et Mésolithique en Roumanie. *Quaternaire* 20.

BALESCU S., LAMOTHE M., MERCIER N., HUOT S., BALTEANU D., BILLARD A. & HUS J. (2003) – Luminescence chronology of Pleistocene loess deposits from Romania : testing methods of age correction for anomalous fading in alkali feldspars. *Quaternary Geochronology* 22/10–13 : 967–973.

BALESCU S., LAMOTHE M., PANAIOTU C.G. & PANAIOTU E.C. (2010) – La chronologie IRSL des séquences loessiques de l'Est de la Roumanie. *Quaternaire*, 21 : 115–226.

BĂLTEAN I. (2011) – The Palaeolithic in Banat. In : N. Tasic & Draşovean (eds), *The Prehistory of Banat ; I. The Palaeolithic and Mesolithic*, Bucureşti, p. 19–76.

BITIRI M. (1972) – *Paleoliticul în Tara Oaşului. Studiu arheologic*. Bucureşti.

BON F. (2010) – Les Aurignaciens et l'émergence du Paléolithique supérieur. *La France préhistorique, Gallimard, p. 116–141.*

BORONEANŢ V. (1980) – Descoperirile arheologice de la Ciuperceni. *Materiale Istorie şi Muzeogr. 10 : 23–27.*

CÂRCIUMARU M. (1999) – *Le Paléolithique en Roumanie, Grenoble.*

CÂRCIUMARU M. & ANGHELINU M. (2000) – The Carpathian Mousterian and the Transition from Middle to Upper Palaeolithic in Southern Romania. *In* : J. Orschiedt & G.C. Weniger (Eds), *Neanderthals and Modern Humans. Discussing the transition. Central and Eastern Europe from 50 000 – 30 000 B.P.*, Neanderthal Museum, p. 190–195.

CÂRCIUMARU M., ANGHELINU M. & NIŢĂ L. (2006–2007) – The Upper Palaeolithic in the Bistriţa Valley (Northeastern Romania) : a preliminary review. *Annales d'Université « Valahia » Târgoviste, section d'Archéologie et d'Histoire, 8–9 : 107–120.*

CHIRICA V., BORZIAC I. & CHETRARU N. (1996) – *Gisements du Paléolithique supérieur ancien entre le Dniestr et la Tisa, Helios, Iaşi.*

CIORNEI A. (2013) – *Surse de materie primă, strategii de aprovizionare şi de prelucrare a materiei prime în Paleoliticul din Sectorul Valah al Platformei Moesice.* Thèse de doctorat, Université de Bucarest (École doctorale de Géologie, Faculté de Géologie et Géophysique).

DEMIDENKO YU.E. & NOIRET P. (2012) – The Siuren – I Aurignacian of Krems-Dufour type industries in the context of the European Aurignacian. In : Yu.E. Demidenko, M. Otte & P. Noiret (eds), *Siuren I rock-shelter. From Late Middle Paleolithic and Early Upper Paleolithic to Epi-Paleolithic in Crimea*. ERAUL 19 : 343–357.

DJINDJIAN F. (2000) – Compte-rendu de : M. Cârciumaru, Le Paléolithique en Roumanie, 1999. *Bull. Soc. Préhist. Fr.* 97 : 310–312.

DJINDJIAN F., KOZLOWSKI J. & OTTE M. (1999) – *Le Paléolithique supérieur en Europe*. Armand Colin, Paris.

DJINDJIAN F., KOZLOWSKI J.K. & BAZILE F. (2003) – Europe during the early Upper Palaeolithic : a synthesis. In : J. Zilhaŏ & F. d'Errico (eds), The Chronology of the Aurignacian and of the Transitional Complexes. *Trabalhos de Arqueologia*, 33 : 29–47.

DOBOŞ A., SOFICARU A. & TRINKAUS E. (2010) – *The Prehistory and Paleontology of the Peştera Muierii (Romania)*. ERAUL 124.

DOBRESCU R. (2008) – *Aurignacianul din Transilvania*. Studii de preistorie. Supplementum 3 Editura Renaissance, Bucureşti.

DOBRESCU R., **TUFFREAU A., BALESCU S., BORONEANT A., GOVAL E., LEFEVRE B., HÉRISSON D., LOCHERON L., PAHAUT A. & TORCICA I. (2008)** – Ciuperceni – La Vii 1 (jud. Teleorman) **(Campania 2007).** *Cronica cercetărilor arheologice din România, Iaşi, p. 108.*

DOBRESCU R., **TUFFREAU A., BALESCU S., POPESCU G., DOBOS A., GOVAL E., LEFEVRE B., HÉRISSON D. & TORCICA I. (2009)** – Ciuperceni – La Vii 1 (jud. Teleorman) (Campania 2008). *Cronica cercetărilor arheologice din România*, Târgovişte, p. 100–101.

DOBRESCU R., TUFFREAU A., BALESCU S., BORONEANŢ A., RUSU A., LEFEVRE B., HÉRISSON D. & KOSTEK A. (2011) – Ciuperceni – La Vii 1 (jud. Teleorman) **(Campania 2010).** *Cronica cercetărilor arheologice din România, Sibiu, p.33–34.*

DOBRESCU R., **TUFFREAU A., BALESCU S., BORONEANŢ A., TODERAŞ M., CIORNEI A., FLOREA M., GROSU A., KOSTEK A., HULEUX T., MIR A., CHANNEL I. & POPOVICI S. (2012)** – Vădastra – Măgura Fetelor (jud. Olt) (Campania 2011), *Cronica cercetărilor arheologice din România*, Târgu Mureş, p. 166–167.

FITZSIMMONS K.E., MARKOVIĆ S.B. & HAMBACH U. (2012) – Pleistocene environmental dynamics recorded in the loess of the middle and lower Danube basin. *Quaternary Science Reviews* 41 : 104–118.

ENCIU P. (2009) – *Pleistocene and Quaternary of the Western Part of the Dacian Basin*. Editura Academiei Române, Bucureşti.

HAESAERTS P., BORZIAK I., CHIRICA V., DAMBLON F., KOULAKOVSKA L. & VAN DER PLICHT J. (2003) – The east carpathian loess record : a reference for the Middle and Late Pleniglacial stratigraphy in Central Europe. *Quaternaire* 14 : 163–188.

HAHN J. (1977) – *Aurignacien : das ältere jungpaläolithikum in mittel-und Osteuropa*, Fundamenta, A, 9, Köln und Wien.

HÜTT G., JAEK I. & CHONKA J. (1988) – Optical dating : K-feldspars optical response stimulation spectra. *Quaternary Science Reviews* 7 : 381–385.

IOVITA R., FITZSIMMONS K.E., DOBOS A., HAMBACH U., HILGERS A. & ZANDER A. (2012) – Dealul Guran : evidence for Lower Palaeolithic (MIS 11) occupation of the Lower Danube loess steppe. *Antiquity* 86 : 1–16.

IVANOVA S. & SIRAKOVA S. (1995) – Chronology and Culture of Bulgarian Palaeolithic. In : D.W. Bailey and I. Panaiotov (Eds), Prehistoric Bulgaria, *Monographs in World Archaeology* 22 : 9–54.

LEROI-GOURHAN A., .MATEESCO C.N. & PROTOPOPESCO-PAKE E. (1967) – Contribution à l'étude du climat de la station de Vadastra du Paléolithique Supérieur à la fin du Néolithique, *Bull. Ass. Fr. Étude Quatern.* 4 : 271–279.

MATEESCU C.N. (1959) – Săpături arheologice la Vădastra (r. Corabia, reg. Craiova). *Materiale* 5 : 61–64.

MATEESCU C.N. (1970) – Săpături arheologice la Vădastra (1960–1966), *Materiale* 9 : 67–75.

MEJDAHL V. (1988) – Long-term stability of the TL signal in alkali feldspars. *Quaternary Science Reviews* 7 : 357–360.

MOGOŞANU F. (1978) – *Paleoliticul din Banat*. Bucureşti.

NICOLĂESCU-PLOPŞOR C.S., PĂUNESCU A. & MOGOŞANU F. (1966) – Le Paléolithique de Ceahlău. *Dacia*, N.S., 10 : 5–116.

NOIRET P. (2009) – *Le Paléolithique supérieur de Moldavie. ERAUL 121.*

OTTE M., CHIRICA V., HAESAERTS P., (2007a) – *L'Aurignacien et le Gravettien de Mitoc Malu Galben (Moldavie roumaine). ERAUL 72.*

OTTE M., NOIRET P., CHIRICA V. & BORZIAC I.A., (2007b) – L'industrie lithique. In : Otte M., Chirica V., Haesaerts P. (eds), *L'Aurignacien et le Gravettien de Mitoc Malu Galben (Moldavie roumaine)*. ERAUL 72 : 85–135.

PĂUNESCU A. (1993) – *Ripiceni-Izvor. Paleolitic şi Mezolitic. Studiu monografic*. Editura Academiei Romane, Bucureşti.

PĂUNESCU A. (1998–1999) – *Paleoliticul şi epipaleoliticul de pe teritoriul Moldovei cuprins între Carpaţi şi Siret*, vol. I, 1 & 2. Ed. Satya Sai, Bucureşti.

PĂUNESCU A. (2000a) – *Paleoliticul şi Mezoliticul din spatiul cuprins între Carpaţi şi Dunăre*. Ed. Agir, Bucureşti.

PĂUNESCU A., (2000b) – Paleoliticul de la Vădastra, *Buletinul Muzeului „Teohari Antonescu"* 5–6 : 23–39.

PĂUNESCU A. & ALEXANDRESCU E. (1997) – Rezultatele preliminare ale cercetărilor privind aşezarea de la Giurgiu-Malu Roşu (Campaniile 1992–1996). *Cultură şi Civilizaţie la Dunărea de jos, Călăsari, p. 16–59.*

PROTOPOPESCU-PAKE E., MATEESCO C.N. & GROSSU AL.V. (1969) – Formation des couches de civilisation de la station de Vadastra en rapport avec le sol, la faune malacologique et le climat. *Quartär* 20 : 135–162.

SCHMIDER B. DIR. (2002) – *L'Aurignacien de la grotte du Renne. Les fouilles d'André Leroi-Gourhan à Arcy-sur-Cure (Yonne)*, Gallia-Préhistoire, XXXIV[e] supplément, Éd. du CNRS, Paris.

SITLIVY V., CHABAI V., ANGHELINU M., UTHMEIER T., KELS H., NIŢĂ L., BĂLTEAN I., VESELKY A. & ŢUŢU C. (2012) - Preliminary reassesment of the Aurignacian in Banat (South-western Romania), *Quaternary International* 1–20 (http://dx.doi.org/10.1016/j.quaint.2012.07.024).

SOFICARU A., DOBOŞ A. & TRINKAUS E. (2006) – Early modern humans from the Peştera Muierii, Baia de Fier, Romania. *Proceedings of the National Academy of Sciences of United States of America* 103 : 17196–17201.

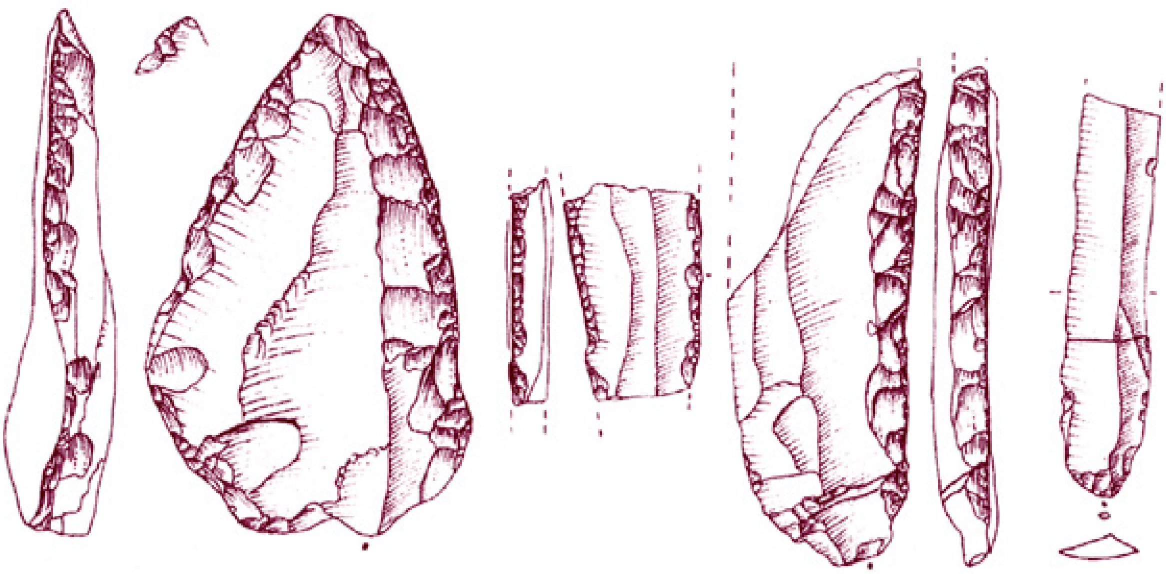
SOFICARU A., PETREA C., DOBOŞ A., TRINKAUS E., (2007) – The Human Cranium from the Peştera Cioclovina Uscată, Romania. Context, Age, Taphonomy, Morphology and Paleopathology, *Current Anthropology* 48 : 611–619.

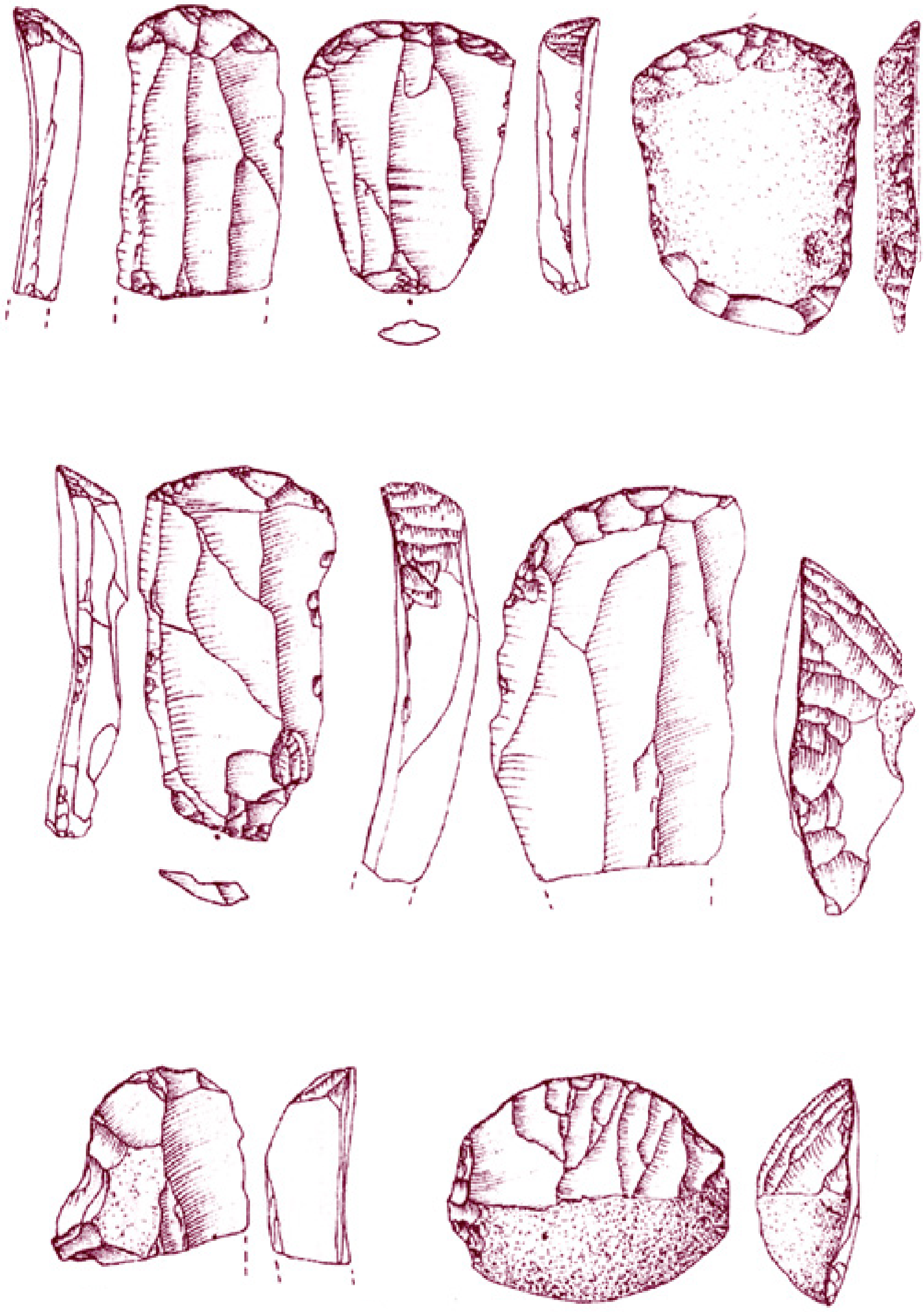
TEYSSANDIER N. (2007) – *En route vers l'Ouest. Les débuts de l'Aurignacien en Europe*, BAR International Series 1638.

TRINKAUS E., MILOTĂ Ş., RODRIGO R., MIRCEA G. & MOLDOVAN O. (2003) – Early modern human cranial remains from the Peştera cu Oase, Romania. *Journal of Human Evolution* 45 : 245–253.

TSANOVA T. (2008) – *Les débuts du Paléolithique supérieur dans l'Est des Balkans. Réflexion à partir de l'étude taphonomique et techno-économique des ensembles lithiques des sites de Bacho Kiro (couche 11), Temnata (couches VI et 4) et Kozarnika (niveau VII). BAR International Series 1752.*

TUFFREAU A., CHIRICA V., BALESCU S. & HAESAERTS P. (2009) – Nouvelles recherches sur le gisement paléolithique de Mitoc Valea Izvorului (département de Botoşani). Fouilles 2003–2004. *Materiale şi cercetari arheologice (serie nouă)* 5 : 21–31.





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Thème III
EUROPE CENTRALE

The role of river courses in organizing the cultural space of the Upper Paleolithic: examples from the Rhine, Rhône, Danube and Garonne

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Abstract: In order to understand human spatial behavior in the Paleolithic and related processes such as dispersal and mobility, it is urgently imperative to focus on a finer grained analysis of human-environment interactions than usually provided. Recent studies tend to overlook the explanatory value of single natural features establishing important anchor points for Paleolithic hunter-gatherer groups. Rivers are good candidates constituting such important natural features. We thus explore the role of salient rivers in the construction of Upper Paleolithic cultural landscapes through time. It is argued that rivers indeed played a crucial role, either as axes of communication and displacement or as referential frontier features in space. On the other hand, it seems clear that human river engagement was never static, but highly dynamic and variable both through space and time, because it is partly shaped by cultural conceptualizations and embedded in semantic webs. We finish our survey with the observation that in the Early Upper Paleolithic, rivers were mainly used to facilitate the flow of people and information, whereas the spatial consolidation after the colonization of Europe was accompanied by a tendency of conceptualizing rivers as frontiers or even boundaries. Only the Central European Magdalenian is again characterized by the use of rivers as spatial trajectories.

1 INTRODUCTION

One of the main issues in the anthropological field concerns the guiding principles and organizational systematics of human presence in space. Clearly, Paleolithic archaeology has the potential to contribute much to our growing knowledge on the spatiality of high mobile groups and how these people deal with environmental constraints, crises and opportunities – in short, how they handle the environment around them. It is interesting, however, that the field has nearly limited its spatial inquiry to the reconstruction of different land use strategies, settlement systems or raw material procurement patterns of Paleolithic hunter-gatherer groups in different regions and different timeframes (e.g. Floss 1994; Conard 2004; Delagnes & Rendu 2011). Consequently, the outcome is the generation of datasets of entire archaeological units and how they are distinctly characterized in terms of their engagement with space. To put it in another way, most authors believe that it is sufficient to deduce a "spatial fingerprint" of each archaeological entity at hand and finally to compare it with other entities. From this perspective, it is almost impossible to touch upon more fundamental principles of human spatial dwelling and their differential sociocultural manifestations.

The issue is complicated by an often implicit adaptationist stance in analyzing how humans inhabit a certain space; sociocultural land use strategies are thought to mirror mere ecological conditions in the sense of providing a solution for environmental troubles, leading to a view in which culture is seen as a derivative of the very natural framework into which it is placed (c.f. Alvard 2003). Without any doubt, people of a hunter-gatherer lifestyle rely heavily on the ecological and climatic backdrops of their immediate surroundings, but their space nevertheless yields a "built" dimension (e.g. Lang 2009). Nature in fact provides powerful stimuli which infiltrate into the sociocultural substratum and essentially shape it, but the processing of this information in cultural terms unleashes a feedback loop, loading natural features with meanings and semantics, what transforms them into places of significance (Tilley 1994; Bradley 2000; Rockman 2003; Meskell & Preucel 2004; Strang 2008; Edgeworth 2011). Space, therefore, is always both nature and culture, constituted and constantly altered by an entanglement of both spheres (Dünne & Günzel 2006; Döring & Thielmann 2008; Günzel 2009; Warf & Arias 2009; Hussain & Floss, in preparation). In order to understand the spatiality of a respective archaeological entity, it is thus necessary to take into account both sides of every single natural feature.

Since it is well known that people do not base their decisions and manners on pure rational grounds, but rather use intuition and fast heuristics – a way of processing spatial information which is explicitly selective and hierarchical – to pilot and behave in space (Kahneman *et al.* 1982; Czerlinski *et al.* 1999; Gigerenzer & Goldstein 1996; Brighton 2006; Chater *et al.* 2003; Gigerenzer & Brighton 2009; Gigerenzer & Gaissmaier 2011), it should be considered a prime imperative to examine the interplay of nature and culture in relation to features in the landscape which have the potential to substantially shape the human spatial performance. Especially in the Pleistocene riparian landscapes of Central and Western Europe, powerful river regimes must be regarded as significant push and pull features in this manner (cf. Malanson 1993; Hilty *et al.* 2003; Hussain & Floss, in preparation). Mighty drainage systems are important spatial reference points for human activity and are often the focus of veneration and ritual behavior due to their flow quality, which dissects the landscape in a natural and perceptive way (Strang 2008; Edgeworth 2011, 68), their pronounced dynamism (e.g. Bonnamour 2000; Bonnamour *et al.* 2005), their high biomass availability (Wohl 2004; Tockner *et al.* 2006), their ability to separate different climatic zones and biomes (cf. Bruxelles & Jarry 2011), and finally their corridor constituting character (Hilty *et al.* 2003). From this perspective, Pleistocene river lines yield a crucial disposition to become contextual focal points in the sense of Schelling (1958, 1981), which would, in turn, grant them the capability to guide human spatial dwelling substantially. Clearly, Paleolithic archaeology can learn a lot about human spatial behavior by investigating the differential configuration of fluidscapes through time and space (cf. Strang 2008).

2 FLUIDSCAPES OF THE EARLY UPPER PALEOLITHIC: DANUBE, CHANNEL RIVER AND RHÔNE-SAÔNE FORMATION

If there has ever been a timeframe in which the role of rivers in the organization of space has become the target of archaeological interest, it would be in the era of the Early Upper Paleolithic (c.f. Davies 2001; Conard & Bolus 2003, 2008; Anikovich *et al*. 2007; Pettitt 2008; Dinnis 2008, 2009, 2012; Floss 2009a). In fact, there is a growing consensus that water played a pivotal role in the dispersion of AMH colonization remains over the European continent (Mellars 2006a, 2006b; Higham *et al*. 2012; Baales 2012). Evidence now hints to a river function of facilitating the opening and access of new land within the dispersal of AMHs into Europe (Conard & Bolus 2003; Anikovich *et al*. 2007; Dinnis 2012). The most elaborated model supporting this notion was first articulated by Conard & Bolus (2003, 2008) on the basis of the stratigraphic, mobile art and radiometric evidence from the Swabian Jura sites in south-western Germany, indicating a very rapid intrusion of Aurignacian people with a distinct material culture along the great Danube River into Central Europe (c.f. Hahn 1993; Floss & Conard 2000; Floss 2007, 2009b; Conard 2003, 2007, 2009; Porr 2010). Most authors accept the early beginning of the Aurignacian there around 40 ka cal. BP (Nigst 2006; Jöris *et al*. 2010; Hublin 2012) which clearly speaks in favor of the Danube corridor hypothesis. Recent re-sampling and -dating of material from the Geißenklösterle key site in the Ach valley, a small tributary of the Danube fluvial system, provided age determinations which place the onset of the Aurignacian occupation in the region to 42 ka cal. BP (Higham *et al*. 2012; Conard, in this volume). Additional evidence for an important east-west axis constituted by the Danube river system is documented in a special raw material procurement pattern which supports the flow of people and objects along the river line (Floss & Kieselbach 2004). It is thus very likely that the Aurignacian material record of the Danube catchment area is a manifestation of a very special engagement of river and people which led to the unfolding of a unique regional cultural heritage, including a distinct ivory figurine and personal ornamentation style (Floss 2007, 2009b; Conard 2007, 2009a, 2009b; Floss & Conard 2009, 2010). The natural character of the Danube River as the most important east-west corridor in the region was thus exploited by AMHs and denotes a crucial vector of human mobility and a critical axis of cultural information exchange during and after the dispersal process (Floss 2003a, 2003b). A good correlate for the Danube's role in Central Europe can be identified with the Don fluvial regime in the Black Sea region, which is believed to serve a similar function in the colonization of unfamiliar landscapes in Eastern Europe (Anikovich *et al*. 2007).

New results from the late Aurignacian of the British Isles support the hypothesis that powerful drainage systems provide important guidelines for human movement and organize the settlement of Europe's periphery as well (Dinnis 2008, 2009, 2012). Although earlier accounts favor a southern origin of the Aurignacian occurrence in Britain due to its striking western distribution (Jacobi 1999; Pettitt 2008), Dinnis (2012) recently made a convincing case for its eastern origin, taking into account the extension of distinct bladelet production methods which indicate a strong affinity to Belgium and north-eastern France (see also Flas *et al.* 2006; Dinnis 2008, 2012). Therefore, it is suggested that AMHs swiftly penetrated Britain via the now submerged Channel River before establishing a steady occupation there (Dinnis 2012). In principle, the significance of rivers for Aurignacian spatiality is well known (e.g. Otte 1979), but has never been put into a broader perspective. The displacement of lithic material in the Périgord, for example, is also channeled by salient river systems, a pattern which is not sustained in later phases of the Upper Paleolithic (Djindjian *et al.* 1999). Rivers are clearly corridors of both natural and social relevance and facilitated the flow of people and ideas over vast distances. Such a view is further consistent with the Aurignacian record of Burgundy in eastern France, where one of the authors has been working for over a decade (Floss 1997, 2000a, 2000b, 2001). The Rhône-Saône formation notably links eastern France with south-western Germany as indicated by a few artifacts, one of which is a diagnostic Aurignacian carinated piece, made of "Bohnerzjaspis" and some blades manufactured in "Jurahornstein" from the Grotte de la Verpillière I. Both raw material units can be sourced in southern Germany in the region near Freiburg and thus crucially emphasize the corridor notion of the valley during the Aurignacian era.

3 FLUIDSCAPES OF THE MIDDLE TO LATE UPPER PALEOLITHIC: THE GARONNE, RHÔNE AND EBRO RIVER SYSTEMS

With the onset of the Middle Upper Paleolithic and the consolidation of the European occupation by AMHs, the engagement pattern with river regimes seems to change, becoming more variable and dynamic, which probably reflects different modes of conceptualization and a shifting quality of embeddedness in the cultural landscape of this period (e.g. Floss 2000, 2002; Simonet 2012; Bruxelles & Jarry 2011, 2012). The presence of other modes of handling a river in the European Upper Paleolithic is already indicated by the spatial imprint of the IUP/EUP technocomplex of the Châtelperronian occupying a significant part of south-western Europe, the spatial extension of which is clearly limited by the Rhône-Saône fluvial system in the East and probably by the Ebro massif in the south, determining the dwelling area of the Châtelperronian people (Floss 2000a, 2002b, 2003a; see also Connet 2002; Pelegrin & Soresi 2007, **figure 1a**). A similar picture emerges if one is tackling the spatial distribution pattern of the Solutrean in Western Europe which is separated from the south-eastern Early Epigravettian and its seemingly distinct technocultural character by the Rhône-Saône formation (Floss 2000a; Mussi 2002; Banks *et al.* 2008; **figure 1b**). Even in the Badegoulian at the end of the Middle Upper Paleolithic, this organizational principle is still visible in the archaeological record on a coarse-grained scale of analysis (Floss 2000a). Sandwiched between the Rhône-Saône river line in the east, the Ebro valley in the south and the Loire fluvial regime in the north (c.f. Banks *et al.* 2011), the Badegoulian sociocultural network displays a striking conceptualization of focal rivers as sociocultural frontiers, constituting a signal for "the end of the Badegoulian world" (**figure 1c**). Interestingly, a glimpse of the attribution of a frontier notion to the Rhône formation is conserved until the Late Upper Paleolithic and is mirrored in the south-western distribution margin of the Magdalenian, which is again marked by the river line isolating the Late Epigravettian in the south-east of Europe (Floss 2000a; Mussi 2002, **figure 1d**). One should be cautious, however, not to over-interpret these patterns because they might be heavily biased by different research traditions and classificatory systems, and thus may be artifacts of their own.

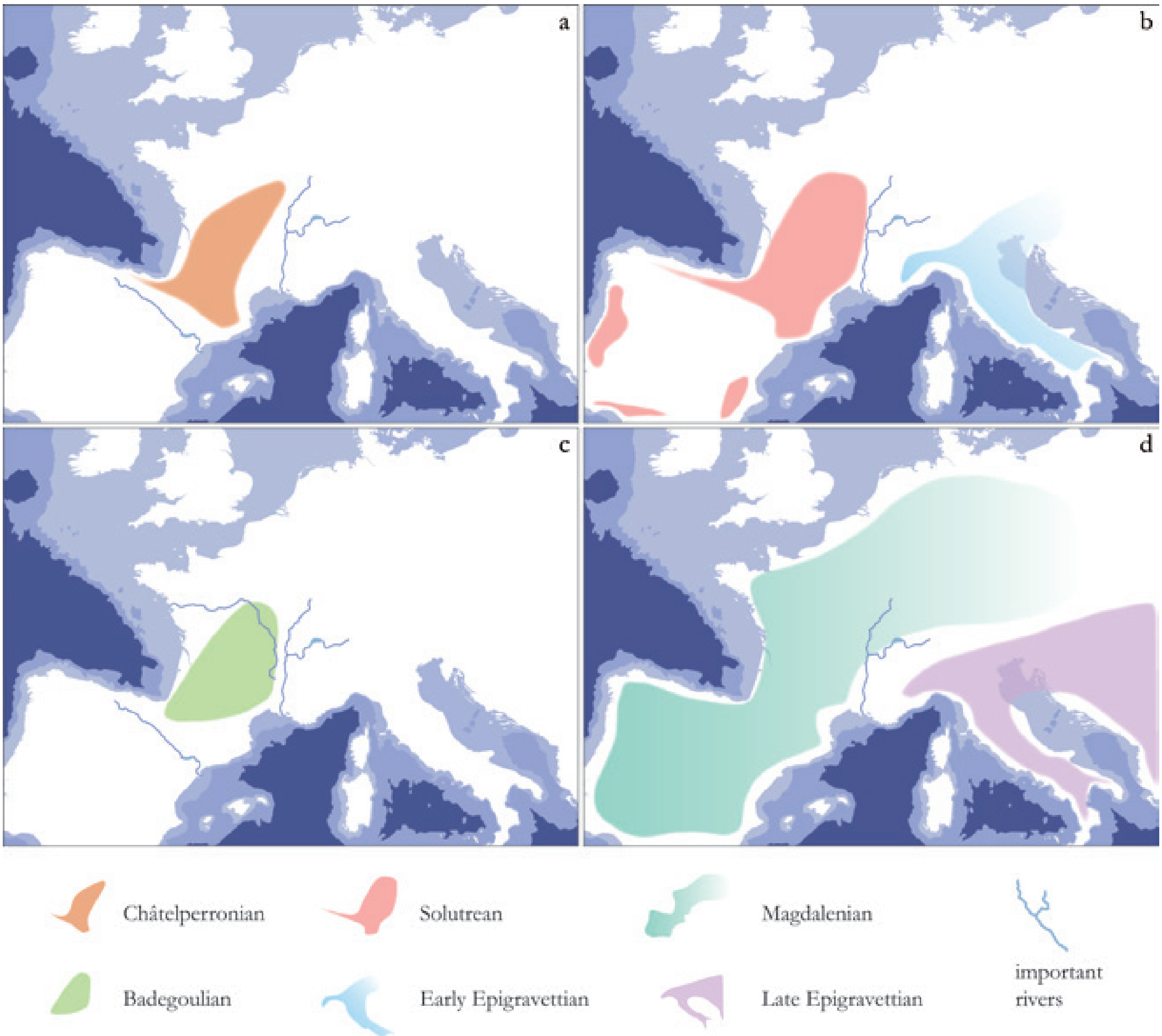


FIGURE 1 Spatial extension of initial and full Upper Paleolithic techno-complexes in relation to important river courses mentioned in the text: a. Châtelperronian of southwest France nestled in Ebro formation and Rhône-Saône river system (Connet 2002; Pelegrin & Soressi 2007); b. Solutrean and Early Epigravettian divided by the Rhône fluvial regime (Mussi 2002; Banks *et al.* 2008); c. Badegoulian framed by the Ebro, Rhône, Saône and Loire river courses (Banks *et al.* 2011); d. Magdalenian and Late Epigravettian separated by the Rhône river line (Mussi 2002). Spatial distributions are of course approximate and claim high accuracy only in relation to the critical river courses.

Additional evidence for a differential treatment of rivers by Middle Upper Paleolithic people has recently become available from the Garonne drainage system in south-western France, where extensive geoarchaeological surveys and drillings have enabled a detailed documentation of an entire archaeological landscape through time (Bruxelles & Jarry 2011; 2012; Jarry & Bruxelles 2012). Surprisingly, comprehensive investigation effort in the Garonne valley could not falsify a human-induced lack of Upper Paleolithic presence as hypothesized by Jaubert (2002), but rather point to an active avoidance of the area over the entire Upper Paleolithic (Jarry & Bruxelles 2012). The Garonne hinterland's occupation pattern cannot be explained by differential preservation or geomorphological causes because the sediments from the period in question are clearly present, but simply lack any trace of human presence (Bruxelles & Jarry 2011, 2012). The robustness of this finding is granted by the extensive research history of the valley documenting a whole range of Middle Paleolithic sites before and several Epipaleolithic or Mesolithic sites after the occupation hiatus in the Upper Paleolithic (**figure 2**). Research bias, therefore, can obviously be excluded as a reason for the virtual nonexistence of Upper Paleolithic sites around the Garonne drainage system. As already proposed by Bruxelles & Jarry (2011, 2012), the Garonne formation can be considered as a feature of spatial avoidance which limited communication

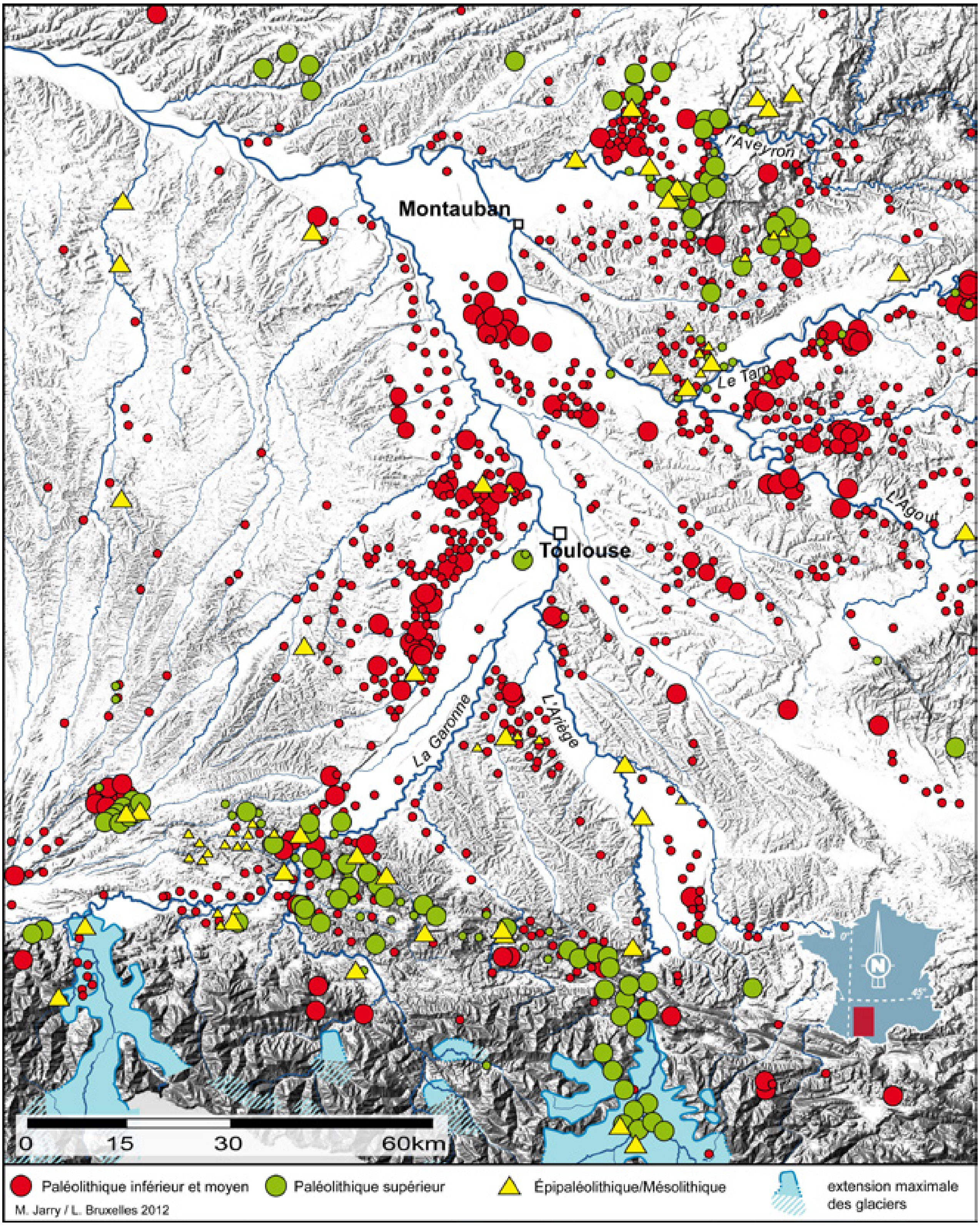


FIGURE 2 Archaeological occurrences in the Upper Garonne valley from the Pleistocene until the Holocene transition showing a differentiated spatial pattern: Upper Paleolithic sites cluster on the edges of the mountainous areas peripheral to the valley but are lacking within it (adapted from Jarry and Bruxelles 2012, fig. 1). Geomorphology and preservation issues cannot be invoked to explain this pattern. With kind permission of Marc Jarry and Laurent Bruxelles (INRAP, University of Toulouse).

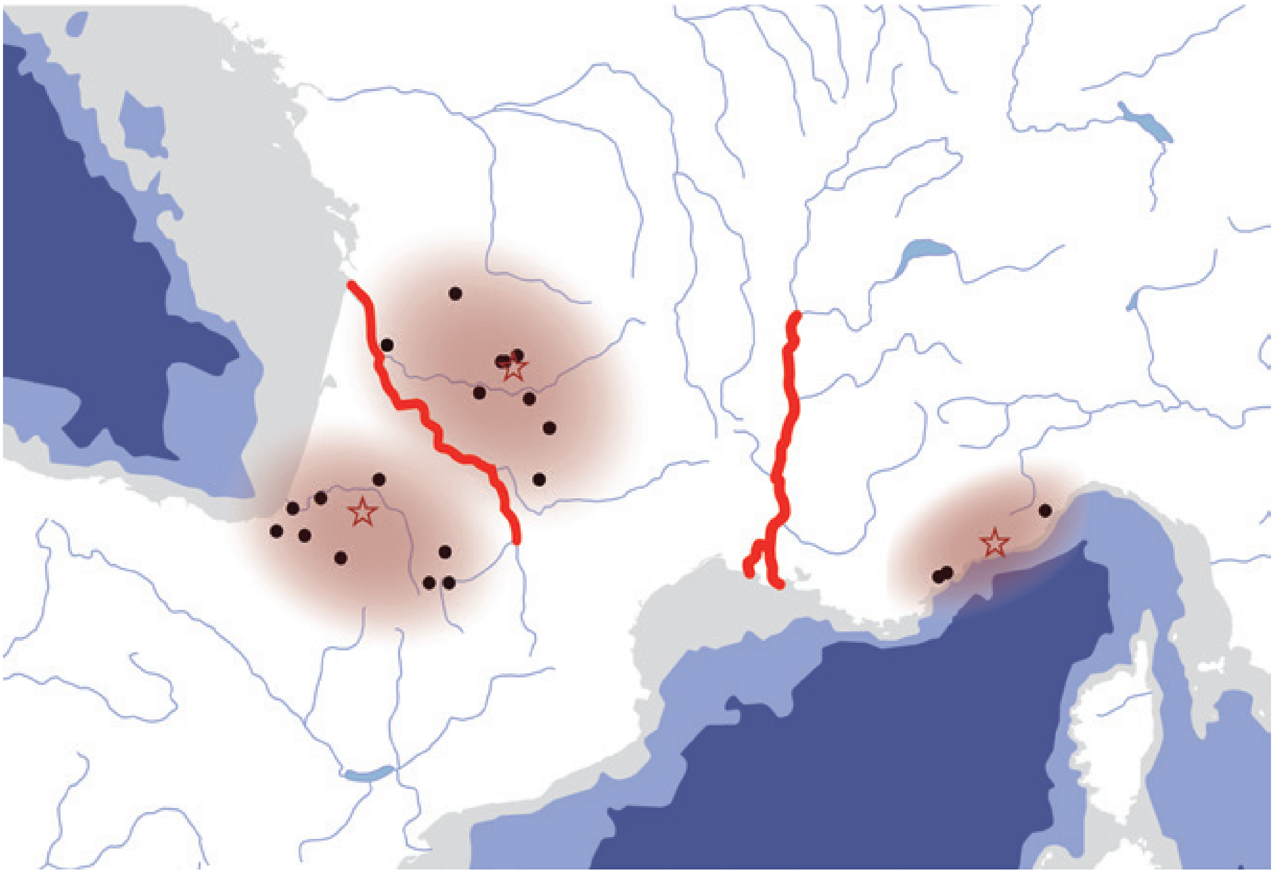


FIGURE 3 Empirical link between river lines and archaeological units interpreted as regional groups; the map shows the distribution of important regional groups in the Gravettian which center around the female figurine sites of Brassempouy, Laussel and Balzi Rossi. The archaeological entities around Brassempouy and Laussel in particular are crucially separated by the Garonne River (redrawn from Simonet 2012, fig. 86)..

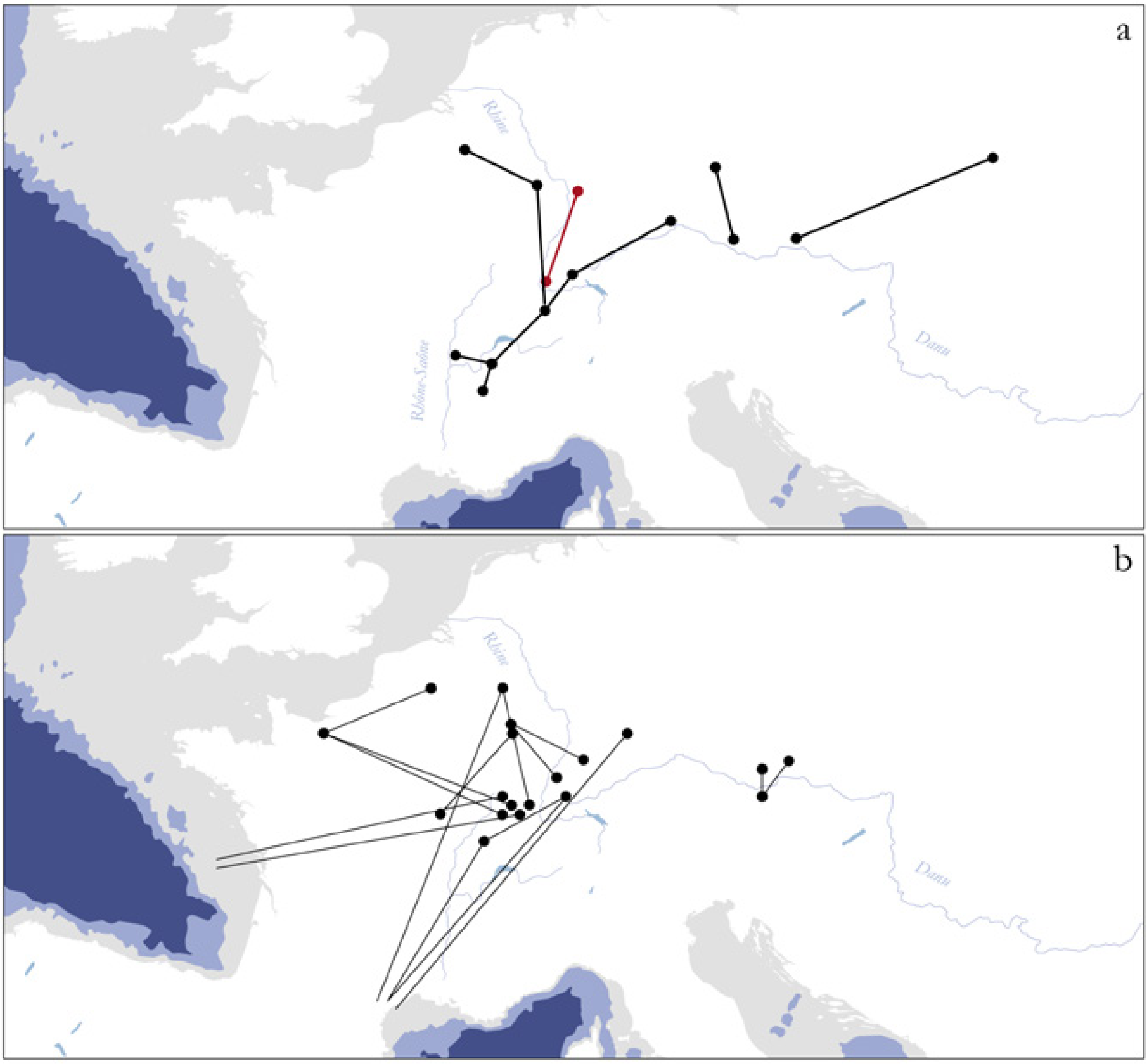
and mobility in the region. The Raysse burin phase of the Gravettian, for example, is limited to the north of the Garonne valley (Klaric 2008), forming one of the internal margins of the Gravettian world (Klaric *et al.* 2009). Although the claim that a climatic deterioration in the very relevant timeframe was responsible for the strict avoidance of the region during the Upper Paleolithic has to be taken seriously (Bruxelles & Jarry 2011, 2012), we prefer a more liberal reading of the evidence at hand and suggest an interpretation which considers climate as one of several factors leading to a cultural reframing of the river system in the sense of a nature-culture entanglement (Hussain & Floss, in preparation).

The significance of the Garonne fluvial system in the Middle Upper Paleolithic, stretching a continuum of river conceptualization from frontier to boundary, was recently highlighted by Simonet (2012) as well, who made a case for the important role of the river in organizing the "spatial fingerprint" of regional groups in south-western France. On the basis of results from Brassempouy, Simonet (2012, 85ff.) argues that raw material catchment areas and affinities in material culture style, for example in portable art, indicate the presence of two distinct regional groups which line up around the female figurine sites of Brassempouy in the south and Laussel in the north. These two regional groups, or more precisely, local networks, are crucially separated by the prominent Garonne River draining the Atlantic Ocean (**figure 3**). A similar argument can probably be deduced from the spatial position of the local network around the female figurine site of Balzi Rossi in northern Italy, the influence of which seems to fade at the Rhône river line, although its chronological determination is of course debatable.

4 FLUIDSCAPES OF THE LATE UPPER PALEOLITHIC: THE RHINE, RHÔNE, SAÔNE AND DANUBE FLUVIAL REGIMES

With the consolidation of Central Europe's re-colonization process after the LGM, the most prominent riverine vectors seem to serve again as mobility and communication axes, facilitating the integration of the Magdalenian's vast socioocultural space (c. f. Floss 1994, 2009a; Terberger *et al*. 2013). Maier (2012) has recently shown that the spatial imprint of the Central European Magdalenian and its site distribution respectively, are almost fully explainable with their spatial position next to main river lines. Particularly influential is the view of a strong interconnectedness of the Rhine rift system, the Saône River line and the Rhône fluvial regime as a crucial feature of the Magdalenian spatiality, which testifies its river engagement pronouncing a corridor notion again (Floss 2000a, 2009a). Bosinski (2008: 11), for example, also emphasized the natural pathway constituted by the Rhine River, which connects the Alps with the German Sea and should thus be seen as a predefined north-south trajectory. Strikingly, the flow of different materials along this route is very well documented, most prominently in the displacement of exotic raw materials and Mediterranean molluscs along

FIGURE 4 Relationship between the fluvial axes constituted by the Rhône-Saône formation, the Rhine River and the Danube fluvial system and raw material (a) and mollusc (b) spatial displacement vectors in the Central European Magdalenian. The spatial link between southwestern Germany and the Main area established by Dreiech-Götzenhain is indicated in red (modified and schematized after Maier 2012).



the Rhine-Saône-Rhône fluvial feature (Floss 1994, 2000, 2002b, 2003b, 2009a; Féblot-Augustins 2009). Non-local raw material flow can be evidenced with the presence of artifacts and nodules of "Bohnerzjaspis" in the famous Magdalenian site of Gönnersdorf, located several hundred kilometers away from the natural outcrops of this raw material type in southern Germany (Floss 1991, 1994, 2009a). Additionally, a small group of artifacts made of chalcedony and "Kieseloolith" which was probably imported from the Mainz Basin, some eighty to one hundred kilometers away, indicates the same spatial vector and thus clearly shows the importance of the Rhine as a mobility and communication trajectory in the Central European Magdalenian (Floss 1994; Street *et al*. 2012). The latest evidence for a strong link between the Lower and the Upper Rhine area comes from the site of Dreiech-Götzenhain near Offenbach, where Terberger *et al*. (2013) could recently identify a special variety of "Hornstein" among the raw material spectrum of the Magdalenian camp site. They attribute this type of "Hornstein" to the outcrops of Isteiner Klotz near Freiburg, thus supporting a crucial north-south trajectory along the Rhine fluvial system as an integral part of the Magdalenian's spatial performance (c.f. Terberger *et al*. 2013). Persuasively, the integration of the Magdalenian's cultural landscape via focal river courses is represented in the special pattern of marine mollusc provision in the Rhineland, plainest displayed in the Magdalenian sites of Gönnersdorf and Andernach-Martinsberg, which establishes a spatial link between this area and the Mediterranean Sea where they originate (Féblot-Augustins 1997, 2009; Floss 2002a; Àlvarez-Fernandez 2009). The occurrence of "Plattenhornstein" in the Magdalenian layers of the Swabian Jura sites in south-western Germany further supports this view because it reveals a similar role of the great Danube River as a feature which enhances the flow of people and communication. Locating the source outcrops of this "Plattenhornstein" variety from the Swabian caves in Bavaria, several hundred kilometers down the river line, sheds light on the east-west axis constituted by the Danube (Floss 1994, 2000a; Burkert & Floss 2005). The importance of the Danube fluvial system in catalyzing sociocultural developments in space is mirrored in the emergence of areas of common cultural heritage along the river course, documented, for example, in the appearance of distinctly decorated stone plaquettes which sketch an area from Hohle Fels in the Swabian Jura to Obere Klause in the Altmühl valley in Bavaria (Conard & Floss 1999; Conard & Uerpmann 2000; Floss & Conard 2001, 2009; Conard & Malina 2010). Clearly, the Danube River must be considered as a mediating feature which is constitutive in the construction of the Central European Magdalenian's cultural landscape. Both the Rhine-Saône-Rhône fluvial system and the Danube river regime therefore contribute much to the seemingly homogeneous outlook of the Magdalenian technocomplex in space (c.g. Maier 2012, fig. 4, fig. 29).

5 CONCLUSION

As an important step on the way of fully understanding human spatial behavior and its realization in past environmental settings, one must shift the emphasis from the primitive reconstruction of landscapes to their interpretation as a space with both a natural and a cultural dimension. If we further accept that, at the moment, much evidence speaks in favour of a highly biased and perceptively organized behavioral foundation of humans in general, it readily becomes clear that single extraordinary features of a landscape can be powerful "agents" in structuring their spatial dwelling. Our exploration of the role of salient river regimes in the Upper Paleolithic of Central and Western Europe should therefore be seen as a first attempt in taking this insight seriously (c.f. Hussain & Floss, in preparation).

Not every river is a feature of spatial reference of course, but the most powerful fluvial axes of Central Europe display a remarkable significance for the European Upper Paleolithic's spatial performance. As a means of constructing and organizing cultural landscapes through time, rivers can tell us much about how humans engage their environment, how they conceptualize it and finally how they structure their space. Since the archaeological record is difficult to read in this respect due to its sampling, classification and research bias, it is important by now to focus on a few very well established case studies exemplifying the changing role of salient rivers throughout the entire Upper Paleolithic. We believe that a general tendency toward a twofold and oscillating pattern of river use can be identified. In the Early Upper Paleolithic and the Aurignacian respectively, human activity, mobility and communication are crucially channeled by the great fluvial lines of Europe. Dispersal is facilitated by the role of river systems as guidelines for human spatial piloting as well as their character as natural pathways allowing for the opening of formerly unfamiliar landscapes. During the Middle Upper Paleolithic, especially during the Gravettian, major drainage systems tend to be conceptualized as frontiers or even cultural boundaries. In principle, river function within the respective cultural settings of the Middle Upper Paleolithic seems to be much more variable than in earlier phases. The Late Upper Paleolithic Madgalenian testifies to the return to a spatial strategy which again integrates river regimes as corridors of communication and material culture flow, constituting spatial trajectories, which is accompanied by the emergence of areas of common cultural heritage, a phenomenon already documented in the Early Upper Paleolithic. We believe that these results very well demonstrate that there is no *a priori* way to think about rivers in the Upper Paleolithic, but rather that we should acknowledge human river engagement as a fruitful empirical and theoretical endeavor stimulating future research efforts.

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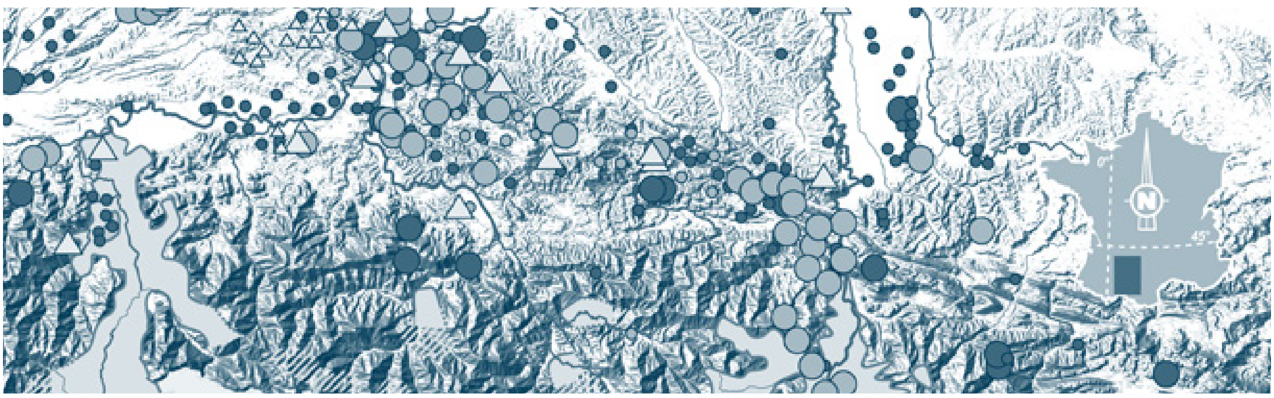

REFERENCES

ALVARD M.S. (2003) – The Adaptive Nature of Culture. *Evolutionary Anthropology* 12:136–149.

ÁLVAREZ-FERNANDEZ E. (2009) – Magdalenian personal ornaments on the Move: A Review of the Current Evidence in Central Europe. *Zephyrus* LXII:45–59.

ANIKOVICH M.V., SINITSYN A.A., HOFFECKER J.F., HOLLIDAY V. T., POPOV V.V., LISITSYN S. N., FORMAN S.L., LEVKOVSKAYA G.M., POSPELOVA G.A., KUZ'MINA I.E., BUROVA N.D., GOLDBERG P., MACPHAIL R.I., GIACCIO B. & PRASLOV N.D. (2007) – Early Upper Paleolithic in Eastern Europe and Implications for the Dispersal of Modern Humans. *Science* 315:223–226.

BAALES M. (2012) – Der pleistozäne Mensch und das Wasser. In: F. Klimscha, R. Eichmann, C. Schuler & H. Fahlbusch (Eds.), *Wasserwirtschaftliche Innovationen im archäologischen Kontext. Von den prähistorischen Anfängen bis zu den Metropolen der Antike*, Leidorf, p. 23–36.

BANKS W.E., D'ERRICO F., TOWNSEND PETERSON A., VANHAEREN M., KAGEYAMA M., SEPULCHRE P., RAMSTEIN G., JOST A. & LUNT D. (2008) – Human ecological niches and ranges during the LGM in Europe derived from an application of eco-cultural niche modeling. *Journal of Archaeological Science* 35:481–491.

BANKS W.E., AUBRY T., D'ERRICO F., ZILHAO J., LIRA-NORIEGA A. & TOWNSEND PETERSON A. (2011) – Eco-cultural niches of the Badegoulian: Unravelling links between cultural adaptation and ecology during the Last Glacial Maximum in France. *Journal of Anthropological Archaeology* 30:359–374.

BONNAMOUR L. (2000) – *Archéologie de la Saône*. Paris.

BONNAMOUR L., DUBOIS D., GIRARDIN R. & MICHEL C. (2005) – *Caprices de Saône. Crues and glaces*. Chalon-sur-Saône.

BOSINSKI G. (2008) – *Urgeschichte am Rhein*. Tübinger Monographien zur Urgeschichte 11, Tübingen.

BRADLEY R. (2000) – *An Archaeology of Natural Places*. London and New York.

BRIGHTON H. (2006) – Robust inferences with simple cognitive models. In: C. Lebière & B. Wray (Eds.), *Between a Rock and a Hard Place: Cognitive Science Principles Meet AI-Hard Problems*. Papers from the AAAI Spring Symposium, Menlo Park: 17–22.

BRUXELLES L. & JARRY M. (2011) – Climatic conditions, settlement patterns and cultures in the Paleolithic: The example of the Garonne Valley (southwest France). *Journal of Human Evolution* 61:538–548.

BRUXELLES L. & JARRY M. (2012) – Climats et cultures paléolithiques : quand la vallée devient frontière. *Archéopages, numéro spécial 10 ans de l'Institut*, p. 72–85.

BURKERT W. & FLOSS H. (2005) – Lithic exploitation areas of the Upper Paleolithic of West and Southwest Germany - a comparative study. In: G. Körlin & G. Weisberger (Eds.), *Stone Age - Mining Age*, Bochum, p. 35–49.

CHATER N., OAKSFORD M., NAKISA R. & REDIGNTON M. (2003) – Fast, frugal and rational: how rational norms explain behavior. *Organizational Behavior and Human Decision Processes* 90:63–86.

CONARD N.J. (2003) – Paleolithic ivory sculptures from southwestern Germany and the origins of figurative art. *Nature* 426:830–832.

CONARD N.J. (2004) – *Settlement dynamics of the Middle Paleolithic and Middle Stone Age. Volume II*. Tübingen Publications in Prehistory, Tübingen.

CONARD N.J. (2007) – Neue Elfenbeinskulpturen aus dem Aurignacien der Schwäbischen Alb und die Entstehung der figürlichen Kunst. In: H. Floss & N. Rouquerol (Eds.), *Les chemins de l'art Aurignacien en europe - Das Aurignacien und die Anfänge der Kunst in Europa*, Aurignac: Éditions Muséeforum Aurignac, p. 317–330.

CONARD N.J. (2009) – A female figurine from the basal Aurignacian of Hohle Fels Cave in southwestern Germany. *Nature* 459:248–252.

CONARD N.J. & FLOSS H. (1999) – Une pierre peinte du Hohle Fels (Baden-Württemberg, Allemagne) et la question de l'art pariétal paléolithique en Europe central. *Paléo* 11:167–176.

CONARD N.J. & FLOSS H. (2000) – Eine Elfenbeinplastik vom Hohle Fels bei Schelklingen und ihre Bedeutung für die Entwicklung des Jungpaläolithikum in Südwestdeutschland. *Archäologisches Korrespondenzblatt* 30:473–480.

CONARD N.J. & UERPMANN H.-P. (2000) – New Evidence for Paleolithic Rock Painting in Central Europe. *Current Anthropology* 41:853–856.

CONARD N.J. & BOLUS M. (2003) – Radiocarbon dating the appearance of modern humans and timing of cultural innovations in Europe: new results and new challenges. *Journal of Human Evolution* 44:331–371.

CONARD N.J. & BOLUS M. (2008) – Radiocarbon dating the late Middle Paleolithic and Aurignacian of the Swabian Jura. *Journal of Human Evolution* 55:886–897.

CONARD N.J. & MALINA M. (2010) – Neue Belege für Malerei aus dem Magdalénien des Hohle Fels. *Archäologische Ausgrabungen Baden-Württemberg* 2009:52–56.

CONNET N. (2002) – *Le Châtelperronien: réflexion sur l'unité and l'identité techno-économique de l'industrie lithique*. Lille.

COUCLELIS H., GOLLEDGE R.G., GALE N. & TOBLER W. (1987) – Exploring the Anchor-Point Hypothesis of Spatial Cognition. *Journal of Environmental Psychology* 7:99–122.

CZERLINSKI J., GIGERENZER G. & GOLDSTEIN D.G. (1999) – How good are simple heuristics. In: G. Gigerenzer, P.M. Todd & the ABC-Research Group (Eds.), *Simple Heuristics that make us smart*, Oxford, p. 97–118.

DAVIES W. (2001) – A very model of a modern human industry: new perspectives on the origins and spread of the Aurignacien in Europe. *Proceedings of the Prehistoric Society* 67:195–217.

DELAGNE A. & RENDU W. (2011) – Shifts in Neandertal mobility, technology and subsistence strategy in western France. *Journal of Archaeological Science* 38:1771–1783.

DINNIS R. (2008) – On the technology of Late Aurignacien burin and scraper production, and the importance of the Paviland lithic assemblage and the Paviland burin. *Lithics: The Journal of the Lithic Studies Society* 29:18–35.

DINNIS R. (2009) – *Understanding the British Aurignacian*. Unpublished PhD dissertation, University of Sheffield.

DINNIS R. (2012) – The Archaeology of Britain's first modern humans. *Antiquity* 86:627–641.

DJINDJIAN F., KOZLOWSKI J. & OTTE M. (1999) – *Le Paléolithique supérieur en Europe*. Paris.

DÖRING J. & THIELMANN T. (2008) – *Spatial Turn. Das Raumparadigma in den Kultur- und Sozialwissenschaften*. Bielefeld.

DÜNNE J. & GÜNZEL S. (2006) – *Raumtheorie. Grundlagentexte aus Philosophie und Kulturwissenschaften*. Frankfurt am Main.

EDGEWORTH M. (2011) – *Fluid Pasts. Archaeology of Flow*. Bristol.

FÉBLOT-AUGUSTINS J. (1997) – *La circulation des matières premières au Paléolithique. Synthèse des données, perspectives comportementales*. Liège.

FÉBLOT-AUGUSTINS J. (2009) – Revisiting European Upper Paleolithic raw material transfers: the demise of the cultural ecological paradigm? In: B. Adams & B.S. Blades (Eds.), *Lithic Materials and Paleolithic Societies*, Oxford, p. 25–46.

FLAS D., MILLER R. & JACOBS B. (2006) – Les 'burins' de l'atelier de débitage aurignacien de Maisières-Canal (Province du Hainaut, Belgique). Dans : J.-P. Bracco, M. de Araujo Igreja & F. Le brun-Ricalens (Eds.), *Burins préhistoriques: formes, fonctionnements, fonctions*, ArchéoLogiques 2. Luxembourg, Musée national d'histoire et d'art, p. 55–74.

FLOSS H. (1991) – Rohmaterialversorgung im Paläolithikum des Mittelrheingebietes. *Archäologische Informationen* 14:113–117.

FLOSS H. (1994) – *Rohmaterialversorgung im Paläolithikum des Mittelrheingebietes*. Monographien des RGZM 21. Bonn.

FLOSS H. (1997) – La découverte d'un grand inconnu : Varennes-lès-Macon, important gisement à pointes à dos dans la basse vallée de la Saône au Sud de Mâcon (Saône-et-Loire, France). *Bulletin de la Société Préhistorique Française* 94:327–330.

FLOSS H. (2000a) – Le couloir Rhin-Saône-Rhône - axe de communication au tardiglaciaire ? *Les dernies chasseurs-cueilleurs d'Europe occidentale (13.000–5.500 av. J.-C.). Actes du Colloque de Besançon, 23.25. octobre 1998*, Besançon, p. 313–321.

FLOSS H. (2000b) – Azé, eine komplexe Höhlen- und Freilandfundstelle im Süden Burgunds. Ein Überblick vom Altpaläolithikum bis zum Magdalénien. *Archäologisches Korrespondenzblatt* 30:307–326.

FLOSS H. (2001) – Les derniers chasseurs paléolithiques dans la basse vallée de la Saône entre Tournus et Lyon. *Bulletin de la Société Préhistorique Luxembourgeoise* 20–21:159–183.

FLOSS H. (2002) – La Saône - Lien ou limite de l'occupation humaine au Paléolithique. Dans : Institut de Recherche du Val de Saône-Mâconnais (Ed.), *La Saône : axe de civilisation*. Congrès International, Mâcon, p. 113–125.

FLOSS H. (2003) – Did they meet or not? Observations on Châtelperronian and Aurignacian settlement patterns in eastern France. In: J. Zilhao & F. d'Errico (Eds.), *The Chronology of the Aurignacian and of the Transitional Technocomplexes.*

Dating, Stratigraphies, Cultural Implications, Trabalhos de Arqueologia. Lisboa, p. 273–287.

FLOSS H. (2007) – Die Kleinkunst des Aurignacien auf der Schwäbischen Alb und ihre Stellung in der paläolithischen Kunst. In: H. Floss & N. Rouquerol (Eds.), *Les chemins de l'art Aurignacien en europe - Das Aurignacien und die Anfänge der Kunst in Europa*, Aurignac, Éditions Musée-forum Aurignac, p. 295–316.

FLOSS H. (2009a) – Menschen mit Migrationshintergrund. Materialien unterwegs. In: Archäologisches Landesmuseum Baden-Württemberg and Abteilung für Ältere Urgeschichte und Quartärökologie Eberhard Karls University Tübingen (Eds.), *Eiszeit. Kunst und Kultur*. Begleitband zur Großen Landesausstellung Eiszeit - Kunst und Kultur im Kunstgebäude Stuttgart, Stuttgart, p. 180–182.

FLOSS H. (2009b) – Kunst schafft Identität. Das Aurignacien und die Zeit der ersten Kunst. In: Archäologisches Landesmuseum Baden-Württemberg and Abteilung für Ältere Urgeschichte und Quartärökologie Eberhard Karls University Tübingen (Eds.), *Eiszeit. Kunst und Kultur*. Begleitband zur Großen Landesausstellung Eiszeit - Kunst und Kultur im Kunstgebäude Stuttgart, Stuttgart, p. 248–257.

FLOSS H. & CONARD N.J. (2001) – Malerei in der Eiszeitkunst des Süddeutsch-Schweizerischen Jura. In: H.-J. Müller-Beck, J. Conard & W. Schürle (Eds.), *Eiszeitkunst im Süddeutsch-Schweizerischen Jura*, Stuttgart, p. 75–87.

FLOSS H. & KIESELBACH P. (2004) – The Danube Corridor after 29.000 BP - New results on raw material procurement patterns in the Gravettian of southwestern Germany. *Mitteilungen der Gesellschaft für Urgeschichte* 13:61–68.

FLOSS H. & CONARD N.J. (2009) – Lascaux auf der Alb? Hinweise auf Höhlenkunst im deutschen Südwesten. In: Archäologisches Landesmuseum Baden-Württemberg and Abteilung für Ältere Urgeschichte und Quartärökologie Eberhard Karls University Tübingen (Eds.), *Eiszeit. Kunst und Kultur*. Begleitband zur Großen Landesausstellung Eiszeit - Kunst und Kultur im Kunstgebäude Stuttgart, Stuttgart, p. 303–306.

FLOSS H. & CONARD N.J. (2010) – L'art mobilier du Jura souabe. Dans : M. Otte (Ed.), *Les Aurignaciens*, Paris, p. 201–214.

GIGERENZER G. & GOLDSTEIN D.G. (1996) – Reasoning the fast and frugal way: models of bounded rationality. *Psychological Review* 104:650–669.

GIGERENZER G. & BRIGHTON H. (2009) – Homo heuristicus: why biased minds make better inferences. *Topics in Cognitive Science* 1:107–143.

GIGERENZER G. & GAISSMAIER W. (2011) – Heuristic Decision Making. *Annual Review of Psychology* 2010:451–482.

GÜNZEL S. (2009) – *Raumwissenschaften*. Frankfurt am Main.

HAHN J. (1993) – Aurignacian art in central Europe. In: H. Knecht, A. Pike-Taya & R. White (Eds.), *Before Lascaux: the Complex record of the Early Upper Paleolithic*, Boca Raton, p. 229–241.

HIGHAM T., BASELL L., JACOBI R., WOOD R., BRONK RAMSEY C. & CONARD N.J. (2012) – Testing models for the beginning of the Aurignacian and the advent of figurative art and music: The radiocarbon chronology of Geißenklösterle. *Journal of Human Evolution* 62:664–676.

HILTY J.A., LIDICKER JR. W.Z. & MERENLENDER A.M. (2003) – *Corridor Ecology. The Science of Linking Landscapes for Biodiversity Conservation*. Washington, Covelo and London.

HUBLIN J.-J. (2012) – The earliest modern human colonization of Europe. *PNAS* 109:13471–13472.

JACOBI R.M. (1999) – Some observations on the British Early Upper Paleolithic. In: W. Davies & R. Charles (Eds.), *Dorothy Garrod and the Progress of the Paleolithic: Studies in Prehistoric Archaeology of the Near East and Europe*, Oxford, p. 35–40.

JARRY M. & BRUXELLES L. (2012) – L'influence des variations climatiques sur les peuplements paléolithiques entre Massif Central et Pyrénées. *Géologues* 173:20–23.

JAUBERT J. (2002) – Le Paléolithique dans le Midi toulousain. Dans : J.-M. Pailler (Ed.), *Tolosa. Nouvelles Recherches sur Toulouse et son Histoire dans l'Antiquité*. Colloque de l'École Francaise de Rome 281, p. 43–52.

JÖRIS O., NEUGEBAUER-MARESCH C., WENINGER B. & STREET M. (2010) – The radiocarbon chronology of the Aurignacian to Mid-Upper Paleolithic Transition along the Middle and Upper Danube. In: C. Neugebauer-Maresch & L.R. Owen (Eds.), *New Aspects of the Central and Eastern European Upper Paleolithic - Methods, Chronology, Technology and Subsistence*. Symposium by the Prehistoric Commission of the Austrian Academy of Sciences, Vienna 2005, November 9–11. Vienna, Mitteilungen der Prähistorischen Kommission 72:101–137.

KAHNEMAN D. (2003) – Maps of bounded rationality: a perspective on intuitive judgment and choice. In: T. Frangsmyr (Ed.), *Les Prix Nobel: The Nobel Prices 2002*, Stockholm, p. 449–489.

KLARIC L. (2008) – Anciennes et nouvelles hypothèse d'interprétation du Gravettien moyen sein de la mosaïque gravettienne. *Paléo* 20:257–276.

KLARIC L., GUILLERMIN P. & AUBRY T. (2009) – Des armatures variées et des modes de productions variables. Réflexions à partir de quelques exemples issus du Gravettien d'Europe occidentale (France, Portugal, Allemagne). *Gallia Préhistoire* 51:113–154.

LANG F. (2009) – Archäologie. In: S. Günzel (Ed.), *Raumwissenschaften*, Frankfurt am Main, p. 30–46.

MAIER A. (2012) – *The Central European Magdalenian. Regional diversity and internal variability*. Unpublished PhD dissertation, University of Cologne.

MALANSON G.P. (1993) – *Riparian landscapes*. Cambridge.

MELLARS P.A. (2006a) – Going East: New Genetic and Archaeological Perspectives on the Modern Human Colonization of Eurasia. *Science* 313:796–800.

MELLARS P.A. (2006b) – Archaeology and the Dispersal of Modern Humans in Europe: Deconstructing the "Aurignacian". *Evolutionary Anthropology* 15:167–182.

MESKELL L. & PREUCEL R.W. (2004) – *A Companion to Social Archaeology*. Oxford.

MUSSI M. (2002) – *Earliest Italy. An Overview of the Italian Paleolithic and Mesolithic*. New York.

NIGST P.R. (2006) – The first modern humans in the Middle Danube area? New evidence from Willendorf II (Eastern Austria). In: N.J. Conard (Ed.), *When Neanderthals and Modern Humans Met*, Tübingen, p. 269–304.

OTTE M. (1979) – *Le paléolithique supérieur ancien en Belgique*. Monographies d'archéologie nationale 5. Bruxelles, Musées royaux d'art et d'histoire.

PELEGRIN J. & SORESSI M. (2007) – Le Châtelperronien et ses rapports avec le Moustérien. Dans : B. Vandermeersch, M. Bruno & Y. Coppens (Eds.), *Les Néandertaliens: Biologie et cultures*, Paris, p. 283–296.

PETTITT P. (2008) – The British Upper Paleolithic. In: Pollard J. (Ed.), *Prehistoric Britain*, London, p. 18–57.

PORR M. (2010) – Paleolithic Art as Cultural Memory: a Case Study of the Aurignacian Art of Southwest Germany. *Cambridge Archaeological Journal* 20:87–108.

ROCKMAN M. (2003) – Knowledge and learning in the archaeology of colonization. In: M. Rockman & J. Steele (Eds.), *Colonization of Unfamiliar Landscapes. The archaeology of adaptation*, Oxon and New York, p. 3–24.

SCHELLING T.C. (1958) – The Strategy of Conflict. Prospectus for a Reorientation of Game Theory. *The Journal of Conflict Resolution* 2:203–264.

SCHELLING T.C. (1981) – *A Strategy of Conflict*. Harvard, Cambridge and London.

STRANG V. (2008) – The Social Construction of Water. In: B. David & J. Thomas (Eds.), *Handbook of Landscape Archaeology* 1:123–130.

STREET M., JÖRIS O. & TURNER E. (2012) – Magdalenian settlement in the German Rhineland - An update. *Quaternary International* 272–273:231–250.

SIMONET A. (2012) – *Brassempouy (Landes, France) ou la matrice gravettienne de l'Europe*. Liège, ERAUL 133.

TILLEY C. (1994) – *A phenomenology of landscape: places, paths and monuments*. London.

TERBERGER T., FLOSS H., HEINZELMANN P., KOTULA A. & SERANGELI J. (2013) – Down the river Rhine c. 16.000 years ago - new evidence from the site Dreieich-Götzenhain, Hesse. In: A. Pastoors & B. Auffermann (Eds.), *Pleistocene foragers: Their culture and environment*. Festschrift in honour of Gerd-Christian Weniger for his sixtieth birthday, Wissenschaftliche Schriften des Neanderthal Museums 6, Mettmann: 101–115.

TOCKNER K., PAETZOLD A., KARAUS U., CLARET C. & ZETTEL J. (2006) – Ecology of braided rivers. In: G.H. Sambrook Smith, J.L. Best, C.S. Bristow & G.E. Petts (Eds.), *Braided Rivers: Process Deposits, Ecology and Management*, Special Publication Number 36 of the International Association of Sedimentologists, Malden, Oxford and Carlton, p. 339–360.

WARF B. & ARIAS S. (2009) – *The Spatial Turn. Interdisciplinary Perspectives*. London and New York.

WOHL E.E. (2004) – *Disconnected Rivers. Linking Rivers to Landscapes*. New Haven and London.

L'approvisionnement en matières premières lithiques pendant le Gravettien tardif en Europe centrale

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Abstract: *In his paper the lithic Raw material supply systems in the Late Gravettian of the western Slovakia and southern Poland were presented. The analysis of raw material structure in the Shouldered Points horizon shows the differences between the sites in the Vah valley and the Upper Vistula and Oder basins. In the Vah valley the meso- and extralocal raw materials are most frequent and their processing concentrated in base camps or ephemeral multi-functional camps. In the Upper Vistula basin independently of multi-functional camps separate specialized activity zones appear: lithic workshops and butchering sites/zones. The different functions could be determined by the seasonality of occupations.*

Key-words: *Upper Palaeolithic, raw materials, flints, radiolarites, functionality and seasonality of site occupations.*

Résumé : L'approvisionnement en matières premières lithiques dans le Gravettien Tardif est presenté sur les deux côtés des Carpathes occidentales : Slovaquie occidentale et Pologne méridionale. L'analyse des sites de l'horizon à pointes a cran montre une différence entre la vallée de Vah en Slovaquie et le bassin supérieur de la Vistule et de l'Oder en Pologne méridionale. Si dans la première région les matières premières méso- et extra-locales prédominent et la taille lithique est concentrée dans les camps de base (éventuellement camps éphémères), dans la deuxième region apparaissent les zones d'activités specialisées comme les ateliers de taille ou les sites de boucherie. Les différences fonctionelles entre les sites pourraient correspondre aussi à leur saisonnalité.

Mots-clés: Paléolithique supérieur, matières premières, silex, radiolarites, fonctionnalité et saisonnalité de sites.

1 INTRODUCTION

Dans cette contribution nous allons présenter les résultats d'études sur l'approvisionnement en matières premières lithiques du Gravettien Tardif dans la partie septentrionale de l'Europe centrale, notamment entre le bassin de Váh (en Slovaquie orientale), les bassins supérieurs de l'Oder et de la Vistule (en Silésie) et de la Petite Pologne.

Nous voulons en particulier proposer quelques modèles de systèmes d'approvisionnement en relation avec :

- la taxonomie culturelle basée sur les caractères techno-stylistiques des outillages lithiques, et en particulier sur les « fossiles directeurs » ;
- la dynamique diachronique des changements dans le cadre de ces entités taxonomiques sur le fond de l'évolution de l'environnement ;
- la saisonnalité et fonctionnalité des sites du Gravettien tardif situés au Sud et au Nord des Carpates et des Sudètes.

Après la fin du Pavlovien (entre 25 et 20 Kyr BP), nous pouvons distinguer dans la zone en question trois entités taxonomiques qui ont évolué parallèlement. Il s'agit de :

1.1 Gravettien à pointes à cran

Il est aussi accompagné de couteaux de Kostenki et, bien sûr, de plusieurs types de lames et/ou pointes à dos. Cette entité est fréquemment distinguée comme le complexe de « Willendorf-Kostenki », et inclus dans le phénomène plus large des industries à pointes à cran, connu aussi bien dans le territoire entre le Dniester et le Don que dans les pays de la Méditerranée septentrionale. Si dans la partie nord de l'Europe centrale ces industries disparaissent pendant le LGM, dans les pays méditerranéens, et partiellement dans le bassin du Don, elles ont évolué jusqu'au début du Tardiglaciaire (Kozłowski 1996, 2008).

1.2 Gravettien à pointes foliacées

Cette entité a été fréquemment considérée comme un épiphénomène du Szeletien. Mais les découvertes récentes ont prouvé qu'il n'a rien à voir avec cette tradition dérivant de la phase ancienne du Paléolithique supérieur. Il représente un phénomène de convergence dans la phase récente du Gravettien. Les datations de sites de la Slovaquie occidentale comme Trenčianske Bohuslavice (Barta 1988), le place dans une période entre 25–23 Kyr, ce qui confirme la discontinuité avec le Szeletien (Kaminska *et al.* 2012 ; Žaár 2007).

1.3 Gravettien récent

Avec des lamelles à dos accompagnées de grattoirs et de lames retouchées, il est probablement un phénomène parallèle au Gravettien à pointes à cran. Ceci est confirmé par les nouvelles datations du site de Moravany-Žakovska (env. 24.2 Kyr BP – Verpoorte 2002), qui suggèrent que certains assemblages qui ont été attribués à l'Épigravettien (l'ancienne datation de Moravany-Žakovska était de 18.1 Kyr BP – Hromada & Kozłowski 1995), ont des racines plus anciennes, contemporaines au Gravettien à pointes à cran. Une industrie similaire a été identifiée dans le site de Nitra-Čermaň dans la concentration supérieure V (Kaminska, Kozłowski 2011). Il est possible que ce facies du Gravettien soit à l'origine de l'Épigravettien dans la vallée de Váh. Nous observons que si le Gravettien à pointes à cran est représenté aussi bien dans le bassin de Váh qu'en Silésie et dans le bassin de la Vistule, les deux autres entités ne sont connues qu'en Slovaquie occidentale et en Moravie septentrionale/Silesie.

Ces entités sont caractérisées par les différents systèmes d'approvisionnement en matières premières lithiques, qui résultent de différentes aires de déplacement saisonniers de populations.

2 L'HORIZON DES POINTES À CRAN

Cet horizon commence entre 24 et 23 Kyr BP aussi bien dans le bassin de Váh que dans le bassin de la Vistule. Dans le bassin de Váh, c'est la période de formation de l'horizon humifère postérieur à 24.4 Kyr BP. Dans cet horizon se placent les sites de Nitra-Čermaň (concentration IV – Kaminska & Kozlowski 2011), et de Moravany-Noviny (Barta, Kazior 2000). Cet horizon est distingué par P. Haesaerts (*et al.* 2004) comme sol de Čermaň. D'après les données malacologiques, il s'agit d'une période caractérisée par la présence d'arbres.

Dans la même période, dans la vallée de la Vistule près de Cracovie, nous avons plusieurs sites du Gravettien à pointes à cran appartenant au complexe de Spadzista (sites : E, C2 niveau III, F, B1 – Sobczyk 1995, Kozłowski 2007). Ces sites, datant de la période entre 24.7 – 24.6 Kyr BP (sites E et F base), et 23.0 Kyr BP (site B1), sont inclus dans la couche solifluée 6b, avec plusieurs horizons de toundra (Kalicki *et al.* 2007).

La période suivante, autour de 23 Kyr BP dans la vallée de Váh, était caractérisée d'après les données paléo-malacologiques par le retour du froid et de l'humidité avec un environnement peu ombrageux. Dans cette période appartiennent les ensembles de Moravany-Podkovica, Banka HFR Tr IV et V (Kozłowski ed. 2000), et probablement aussi Nitra-Cerman des concentrations I à III (Kaminska & Kozłowski 2011). Dans la vallée de la Vistule (près de Cracovie), se sont formés les sites C et F (sup.), situés dans le sommet de la couche 6b.

La période 23/22 Kyr BP a connu dans la vallée de Váh un climat plus doux avec des arbres et des buissons. De cette période nous datons le site Moravany-Lopata II avec plusieurs concentrations regroupées dans les deux niveaux (Kozlowski ed.1998). Les datations radiométriques pour ces deux niveaux (21.4 et 24.1 Kyr BP), sont renversées. Mais probablement l'âge de ces deux occupations se place entre ces dates, étant donné que la date 21.4 Kyr BP est nettement rajeunie (Haesearts *et al.* 2004).

Dans la vallée de la Vistule, nous observons pendant cette période la formation d'un horizon humifère et par la suite d'une couche solifluée (6a). C'est la période où nous n'observons pas de traces d'habitat. Les dates plus récentes de 23 Kyr BP à Krakow-Spadzista sont peu fiables puisque elles sont basées sur les carbonates. Une seule date sur l'os 20.6 Kyr BP a été vérifiée par une nouvelle datation AMS sur charbons qui a donnée l'âge de 23.0 Kyr (Kalicki *et al.* 2007).

Vers la fin de cette période, aussi bien dans la vallée de la Vistule que dans la vallée de Váh, au moins deux générations de coins de glace se sont formées. Par ailleurs, dans certains sites commence après cette période l'accumulation de lœss. Les conditions périglaciaires se sont finalement installées.

Les habitats gravettiens de cette période deviennent rares. Dans le bassin de Váh, nous pouvons supposer que la concentration V à Nitra-Cerman situé dans la base du dernier lœss datée à 22.8 serait le plus récent de ce site. Dans la vallée de Váh nous avons une seule date de 19.0 Kyr BP du site de Ratnovce, l'outillage est pauvre et peu connu. Dans la région de Cracovie nous avons quelques traces de la présence humaine (mais sans définition taxonomique), dans les sites C2 niveau II et BV de niveau supérieur.

3 LES MATIÈRES PREMIÈRES LES PLUS FRÉQUENTES DANS LE GRAVETTIEN SUPÉRIEUR ET LA FONCTION DES SITES

Les systèmes d'approvisionnement en matières lithiques du Gravettien à pointes à cran sont basés sur les sources de silex du Jurassique local pour la région de Cracovie et trois sources importantes (extra et méso-locales) pour le bassin de Váh, notamment :

- le silex erratique de la vallée de l'Oder supérieur, provenant des dépôts de la glaciation d'Elster et de Saale ;
- la radiolarite des Carpates, en particulier de la vallée de Vlara ;
- la limno-quarzite de la Slovaquie centrale et méridionale.

En plus, nous observons la présence d'autres roches (quartz, quartzites, grès, *etc.*), dont l'origine n'a pas été établie.

Les matières premières extra- et méso-locales ont été fournies comme nucléus préformés et exploités sur les sites, afin de produire les supports sur place, transformés en outils retouchés. Les produits des différentes phases de chaines opératoires sont les nucléus, les éclats, les lames et outils retouchés sont représentés par les taux similaires dans les différents assemblages du bassin de Váh. Il s'agit donc, dans ce cas, de camps de base ou les différentes activités ont été performées. L'étendue de ces sites et le nombre d'artefacts lithiques dépendait de leur durée de séjour. Parmi ces camps nous pouvons donc distinguer les camps de base (comme par ex. Moravany-Podkovica) ou camps éphémères (autres sites de la région Banka-Moravany).

Par contre, dans le bassin de la Vistule, le silex local, bien qu'il soit représenté en principe par les produits de différentes phases de chaines opératoires, la fréquence de ces produits diffère considérablement entre les sites. Nous pouvons distinguer les sites ou la fréquence de nucléus est assez basse (< 1.0, exceptionnellement 4.4), mais où l'index des outils retouchés est moyen (4.5 jusqu'à 11.5). Ce sont des sites que nous pouvons considérer comme des camps de base, éventuellement comme des camps éphémères. L'autre groupe est représenté par les sites ou la fréquence des nucléus est basse (moins 1 %), aussi bien que l'index des outils retouchés (< 2), mais où les produits de débitage sont dominants. Dans ce cas il s'agit d'ateliers spécialisés dans la transformation du silex.

Finalement nous avons des sites ou la production sur place de supports est confirmée. Mais l'index des outils retouchés est très élevé (jusqu'à 17.4), et leur composition typologique très particulière (avec la présence surtout de pièces à cran, burins et couteaux de Kostenki). Dans ces sites nous trouvons des accumulations d'ossements de mammouths. Ce sont de sites de boucherie (et peut-être d'abattage ?).

Il est intéressant de noter que ces différentes spécialités fonctionnelles de lieux de séjours sont limitées aux aires séparées du complexe de rue Spadzista, bien que les épisodes de séjour dans ces aires ne soient pas contemporains, mais inter-stratifiées entre eux. Nous pouvons distinguer donc la zone de campements (sondages C.C2, C3), la zone des ateliers de transformation de silex (sondages B III-V, E, F) et la zone de boucherie (sondage B) (Wilczynski *et al.* 2012).

4 SAISONNALITÉ DES CAMPS DU GRAVETTIEN

Cette fonctionnalité différente des habitats gravettiens au Nord et au Sud de Carpates occidentales pourrait correspondre à la saisonnalité des camps. Les sites de la vallée de Vistule sont en principe des camps qui ont fonctionné entre la fin du printemps et la fin de l'été. Seulement deux sites de la région de Cracovie (Krakow-Spadzista F, et éventuellement C), montrent des indices (sur la base de dents d'un renard polaire et de la présence de mammouths nouveau-nés), de persistance jusqu'à la fin de l'automne (West 1996).

Bien que les sites du Pavlovien montrent des indices d'occupation (sur la base de dents du renard polaire et du renne), pendant toute l'année (Nyvltova-Fisakova 2011), les sites de la vallée de Váh montrent des indices de présence des chasseurs de l'horizon à pointes à cran entre la fin de l'automne et le début de l'hiver, voire même jusqu'en février (par ex. Moravany Lopata II). Néanmoins, il existe certains sites avec des indices d'utilisation d'avril jusqu'à juillet (Banka G1, Tr IV) (Nyvltova-Fisakova 2011).

Cette situation nous permet d'émettre l'hypothèse que les groupes du Gravettien à points à cran ont migré entre la vallée de Vistule et la vallée de Váh. Les sites de la vallée de Váh sont principalement des sites d'automne et d'hiver. Par contre, les sites de la vallée de la Vistule ont été occupés entre la fin du printemps et l'été.

Certaines exceptions à cette règle comme la présence de sites d'automne aux environs de Cracovie peuvent être expliquées par la spécialisation de certains groupes en chasse d'animaux de fourrure (ces sites montrent la présence importante du renard polaire). Une autre exception serait l'occupation estivale de sites de la vallée de Váh que nous pouvons éventuellement expliquer par la formation de « task groups » qui ont migré vers la vallée de la Vistule. Par contre, une partie des habitants est resté en Slovaquie occidentale.

5 MOBILITÉ DES GROUPES DU GRAVETTIEN TARDIF

Notre hypothèse de base était que dans le Gravettien à pièces à cran dans la vallée de Váh existait une sériation à partir de relations entre la fréquence de silex erratique et la radiolarite. Nous avons supposé que les contacts entre la Slovaquie occidentale et le sud de la Pologne (toujours à travers les Portes de Moravie), sont plus intensifs au début de l'horizon à pointes à cran, et puis sont devenus plus faibles jusqu'à LGM, ce qui a provoqué une brusque rupture de ces contacts et l'utilisation presque exclusive de radiolarites slovaques (Kozłowski 2000).

Cette hypothèse doit être actuellement vérifiée, surtout à cause de l'étude détaillée des assemblages lithiques de Nitra-Cerman (Kaminska & Kozlowski 2011). Cette analyse a montré que l'occupation la plus ancienne de ce site (concentration IV situe dans le sommet de l'horizon humifère – env 24.2 Kyr BP), est caractérisée seulement par 24.8 % de silex erratique et par 44.0 % de radiolarite.

Par contre, dans la concentration des sites de la vallée de Váh, probablement le plus ancien site de Moravany-Noviny, a fourni 90.9 % de silex erratique et seulement 4.7 % de radiolarite.

Les différences dans la fréquence de silex et de la radiolarite (auquel il faut ajouter aussi le limno-quartzite – Kaminska 1991), existent également dans la période entre 23 et 22 Kyr BP. Nous observons la présence de sites avec la haute fréquence de silex (Banka HFR Tr IV – 87.8 %, Banka HFR Tr V – 66.1 %), mais aussi les sites avec une moyenne fréquence du silex (Moravany-Lopata II, niveau moyen - 36.7 %), et aussi avec une basse fréquence (Nitra-Cerman concentration I – 6.2 %). Dans les sites avec basse et moyenne fréquence du silex la radiolarite accompagné de limno-quartzite ont joué un rôle important (Nitra-Cerman, concentration I – respectivement 58.4 % et 18.5 %, Moravany-Lopata II – respectivement 38.5 % et 3.2 %). Nous observons donc deux types de contacts (Kozłowski 2000).

5.1 Contacts longitudinaux

Ces contacts longitudinaux se situent entre la vallée de l'Oder qui apporte vers le sud le silex erratique. La zone de sources de ce silex – dans la haute vallée de l'Oder – a fourni relativement peu de sites proches de points d'extraction. Nous connaissons seulement un atelier gravettien dont l'âge est imprécis à Cyprzanow (Kozlowski 1964) et quelques camps du Gravettien (Opava, Kozmice – Oliva 2007), y compris un avec pointes à cran (Petrkovice – Svoboda ed. 2008). Le nord-est de la Moravie n'a également fourni que de rares sites datant du Gravettien (Bylnice – Oliva 2007), ce qui est surprenant puisque les contacts entre le bassin de Trenčín sur Váh et le bassin de l'Oder ont dû passer par les cols de Carpates Blanches (Kaminska *et al.* 2007, Vlaciky *et al.* 2011). Il est possible que les nodules de silex erratiques aient été ramassés en surface et qu'il n'y ait pas d'ateliers dans cette zone, sauf des camps éphémères, qui n'ont pas été enregistré au cours des prospections. Notons aussi que dans les sites de la vallée Váh nous observons la présence d'autres silex trans-carpatiques, notamment de silex « Chocolat » de la Vistule moyenne (Moravany Lopata II, concentration A), et de silex jurassique de la région de Cracovie (Moravany-Lopata II, concentration A et C, Banka-Kopanice, Banka-Knazevice), et exceptionnellement de silex du Crétacé de la vallée de Dniester (Moravany-Lopata II, concentration A). Il faut souligner que la distinction de ces types de silex (Jurassique, Crétacé), dans le cas des artefacts patinés, est possible seulement dans le cas de objets avec du cortex.

5.2 Contacts latitudinaux

Ils ont relié le bassin de Váh avec les sources de radiolarites dans la vallée de Vlara et avec les sources de limno-quartzites en Slovaquie centrale et méridionale. Dans la zone de sources de radiolarites nous connaissons des ateliers (par ex. à Nemšová), qui ont été datés du Gravettien plus ancien. Il y a également de nombreux ateliers, probablement paléolithiques, qui n'ont pas fourni des objets diagnostiqués ou des datations. Notons aussi la présence de deux types de silex provenant du Sud (silex de Tevel), et de l'ouest (silex de Krumlovski Les), tous les deux à Moravany-Lopata II, concentration A.

Dans le sens inverse, les contacts de sites du bassin de la Vistule avec la Slovaquie sont confirmés par la présence de rares objets en radiolarite (servant généralement de supports ou d'outils), dans les sites de la région de Cracovie (Krakow-Spadzista F, B-V, E, C2-III), en obsidienne (site F), et en limno-quartzite (sites B-V, C2-II, E, C2-III). Notons aussi la présence de silex « Chocolat » dans plusieurs sites de Kraków-Spadzista (E, C2-III, B, B1, C, D, F).

Dans le cas de ces matières premières extra locales qui apparaissent en petite quantité, il ne s'agit pas de l'approvisionnement du aux expéditions systématiques et orientées vers l'acquisition de matières, mais plutôt d'objets apportés par les groupes de chasseurs pendant les activités de chasse.

BIBLIOGRAPHIE

BARTA J. (1988) – Trenčianske Bohuslavice – Un habitat gravettien en Slovaquie Occidentale. *L'Anthropologie* 92 : 173–182.

BÁRTA J. & KAZIOR B. (2000) – Excavations at Moravany-Noviny in 1963. In : J.K. Kozłowski (ed.), Complex of Upper Palaeolithic sites near Moravany, Western Slovakia 3, *Late Gravettien shouldered points horizon sites in the Moravany – Banka area*, Nitra, p. 13–30.

HAESAERTS P., BORZIAK I., CHIRICA V., DAMBLON F. & KOULAKOVSKA L. (2004) – Cadre stratigraphique et chronologique du Gravettien en Europe Centrale. In : J.A. Svoboda & L. Sedláčková (eds), *The Gravettian along the Danube*, The Dolní Věstonice Studies 11 : 33–56.

HROMADA J. & KOZŁOWSKI J.K. (1995) – *Complex of Upper Palaeolithic sites near Moravany, Western Slovakia* 1, *Moravany-Žakovska (excavations 1991–1992)*. Kraków, Jagellonian University Press.

KALICKI T., KOZLOWSKI J.K., KRZEMIŃSKA A., SOBCZYK K. & WOJTAL P. (2007) – The formation of mammoth bone accumulation at the Gravettian site Kraków-Spadzista B+B1. In : J.K. Kozłowski (ed.), *Man/mammoth interactions : Bone beds and Late Gravettian occupations in Kraków-Spadzista*, Folia Quaternaria 77 : 5–30.

KAMINSKÁ Ľ. (1991) – Význam surovinovej základne pre mladopaleolitickú spoločnosť vo východokarpatskej oblasti. *Slovenská archeológia* 39 : 7–58.

KAMINSKÁ Ľ. & KOZŁOWSKI J.K. (2011) – Nitra I-Čermáň v rámci štruktúry osídlenia gravettienskej kultúry na Slovensku. *Slovenská archeológia* 59 : 1–86.

KAMINSKÁ Ľ., KOZŁOWSKI J.K., SOBCZYK K., SVOBODA J.A. & MICHALÍK T. (2008) – Štruktúra osídlenia mikroregiónu Trenčína v strednom a mladom paleolite. *Slovenská archeológia* 56 : 179–238.

KAMINSKÁ Ľ., KOZŁOWSKI J.K. & ŠKRDLA P. (2012) – New approach to the Szeletian – chronology and cultural variability. *Eurasian Prehistory* 8(1–2) : 29–49.

KOZŁOWSKI J.K. (1964) – *Paleolit na Górnym Śląsku*. Wrocław–Warszawa–Kraków, Wydawnictwo Polskiej Akademii Nauk.

KOZŁOWSKI J.K. (1996) – The Danubian Gravettian as seen from the northern perspective. In : J. Svoboda (ed.), *Paleolithic in the Middle Danube Region*, Brno, p. 11–22.

KOZŁOWSKI J.K. (2000) – The Gravettian/Epigravettian sequence : seriation of lithic assemblages. In : Kozłowski ed. (2000), *Krakow–Nitra*, p. 171–182.

KOZŁOWSKI J.K. (2008) – The shouldered point horizon and the impact of the LGM on human settlement distribution in Europe. In : J.A. Svoboda (ed.), Petřkovice – On Shouldered Points and Female Figurines. *The Dolní Věstonice Studies* 15 : 181–192.

KOZŁOWSKI J.K. (ED.) (1998) – *Complex of Upper Palaeolithic sites near Moravany, Western Slovakia 2, Moravany-Lopata II (excavations 1993–1996)*. Kraków, Jagellonian University, Institute of Archaeology.

KOZLOWSKI J.K. (2000) – *Complex of Upper Palaeolithic sites near Moravany, Western Slovakia 3, Late Gravettien shouldered points horizon sites in the Moravany – Banka Area*. Nitra, Archaeological Institue, Slovak Academy of Sciences.

NÝVLTOVÁ-FIŠÁKOVÁ M. (2011) – Seasonality of Gravettian sites in the Middle Danube Region and adjoining areas of Central Europe. *Quaternary International*.

OLIVA M. (2007) – Gravettien na Moravě, Brno – Praha, *Dissertationes Archaeologicae Brunenses/Pragensesque* 1.

SOBCZYK K. (1995) – *Osadnictwo wschodniograweckie w dolinie Wisły pod Krakowem*. Kraków, Unywersytet Jagielloński.

SVOBODA J. (ED.) (2008) – Petřkovice – On Shouldered Points and Female Figurines. *The Dolní Věstonice Studies* 15.

VERPOORTE A. (2002) – Radiocarbon dating the Upper Palaeolithic of Slovakia : results, problems and prospects. *Archäologisches Korespondezblatt* 32(3) : 311–325.

VLAČIKY M., MICHALÍK T., NÝVLTOVÁ-FIŠÁKOVÁ M., NÝVLT D., MORAVCOVÁ M., KRÁLÍK M., KOVANDA J., PÉKOVÁ K., PŘIHYSTAL A. & DOHNALOVÁ A. (2011) – Gravettian occupation of the Beckov Gate in western Slovakia as viewed from the interdisciplinary research of the Trenčianske Bohuslavice-Pod Tureckom site. *Quaternary International*.

WEST D.L. (1996) – Initial analysis of cementum annuli of fox teeth from Kraków-Spadzista. *Folia Quaternaria* 67 : 35–37.

ŽAÁR O. (2007) – *Gravettienska stanice v Trenčianskich Bohuslavicach*. Unpublished MA thesis, Nitra, Filozofická Fakulta, Univerzita Konštantína Filozofa v Nitre.

Distant connection changes from the Early Gravettian to the Epigravettian in Hungary

György LENGYEL

Abstract: Rock resources in the territory of Hungary yielded a large variety of knapped tool stone materials in the Palaeolithic. Flint materials from north and east of the arch of the Carpathians are also present in the Middle and Late Upper Palaeolithic record of Hungary, especially in Gravettian and Epigravettian assemblages. Distant raw materials are often indicative of connections between remote areas. The Hungarian archaeological record shows that from ca. 28 to 13 k years BP there is decrease in the proportions of distant flints at the Last Glacial Maximum. The highest ratio of distant materials appears after the withdrawal of the ice sheet between 17 and 13 k years BP. Therefore climatic conditions seem to have influenced distant connections. Connections could have been direct, and the distant flints in the archaeological assemblage represents an adherence to high quality materials.

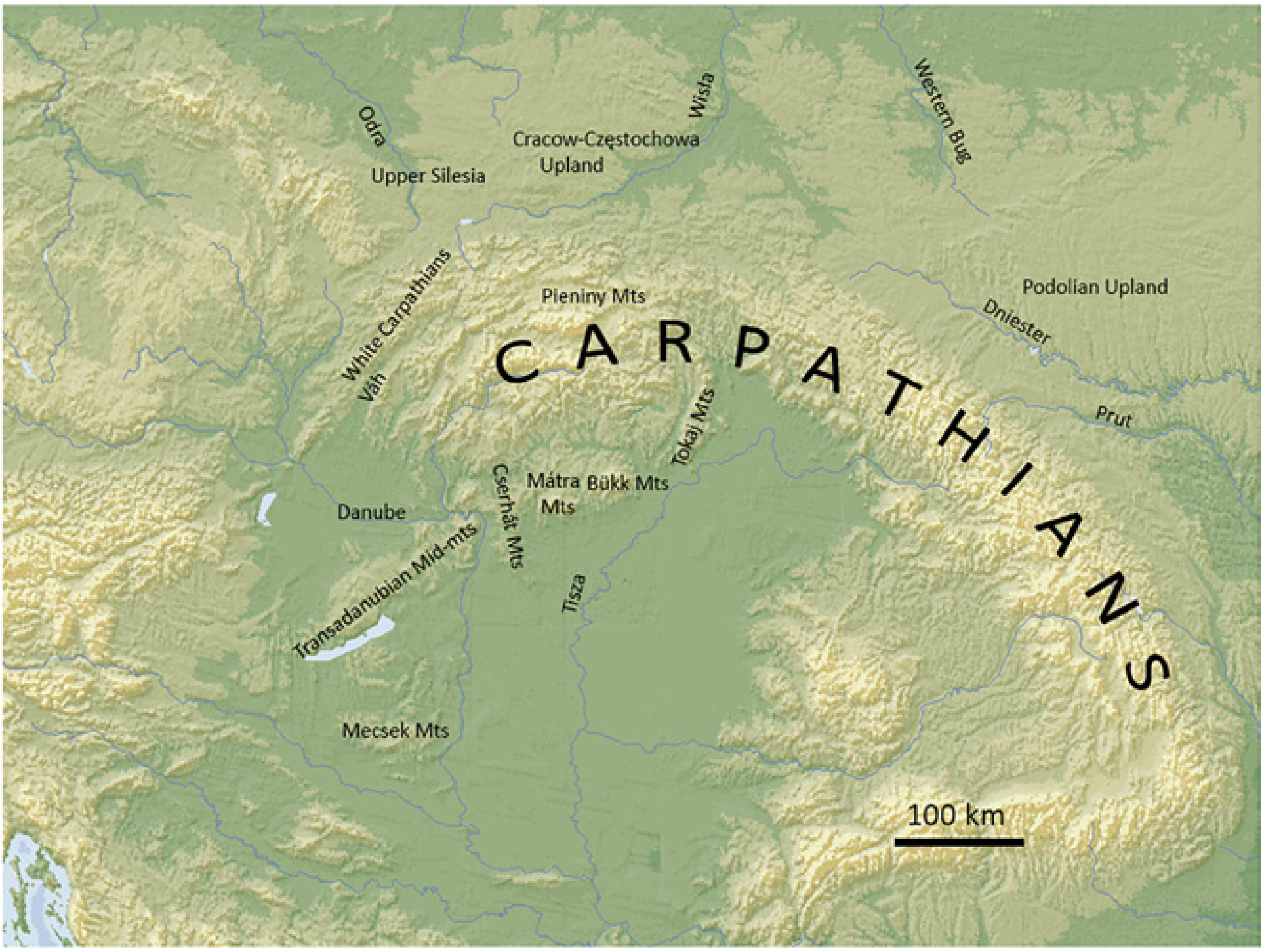
Key-Words: lithic raw material, Gravettian, Epigravettian, Pannonian basin.

1 INTRODUCTION

Rock resources in the territory of Hungary yielded a large variety of knapped tool stone materials in the Palaeolithic (Biró 1986, 1987a, 1987b, 1988, 2009, 2011a; Biró & Dobosi 1991; Biró *et al.* 2000; Dobosi 2000a; Kasztovszki *et al.* 2008; Markó *et al.* 2003; Szekszárdi *et al.* 2010; Vértes & Tóth 1963). This abundance however excludes Cretaceous and Jurassic flints which are plentifully accessible in the present territory of Poland, Romania, Molodova and Ukraine (Féblot-Augustins 1997). In spite of the apparent tool stone availability in the Carpathian basin, flint materials from north and east of the arch of the Carpathians are present in the Upper Palaeolithic record of Hungary, especially in Gravettian and Epigravettian assemblages (Biró 2009; Dobosi 2009b; Simán 1989a). The distance between Hungarian sites and the flint sources is exceptionally great in the Upper Palaeolithic of Europe, varies from 300 to 600 km (Dobosi 2011).

Generally, raw material procurement from a territory exploited for vegetal and animal food resources can be interpreted as an embedded strategy within hunting or food gathering activities (Binford 1979). The presence of distant raw materials in lithic assemblages is commonly interpreted as the trace of connections between territories locating far from each other, which let gaining insight into human land use and mobility (Andrefsky 2009). Besides this, distant raw materials in an archaeological assemblage could also be the expression of immaterial behaviors, such as information exchange (Aubry *et al.* 2012).

FIGURE 1 Physical geographic map of the study area.



Also, there are examples for procuring lesser quality rocks from long distance even though locally better quality was available (Gould & Saggers 1985). Present paper gives an explanation to the changes of connections between the Carpathian basin and the outer territories in the Gravettian, Ságvárian, and Epigravettian cultures on the basis of distant flint proportions in the assemblages.

2 THE "GRAVETTIAN ENTITY" OF HUNGARY

The classification of lithic assemblages containing backed bladelets and Gravette points severally changed in the past 60 years in Hungary (Dobosi 2005; Gábori 1989; Gábori & Gábori-Csánk 1957; Vértes 1960). The term Gravettian became a collective noun for sites dated to between 29 and 12 k years BP and the latest classification model groups these sites into three distinct units under the term "Gravettian Entity" (Dobosi 1999, 2000b, 2005, 2009a).

Gravettian Entity model calls the sites dated to between 29 and 26 k years BP Pavlovian or Older Blade Gravettian. The name Pavlovian refers to both the age and the cultural identity of the sites. The lithic industries are characterized by blade technology, burins, end scrapers, and retouched blades, and a moderate frequency of Gravettian tool types such as backed blades and bladelets, Gravette points, and shouldered blade points.

The next group of sites in the model is called Ságvárian or Pebble Gravettian, dated to between 19 and 17 k years BP. Lithic assemblages are characterized by a special technology that obtained short blades, flakes, and tiny bladelets from pebble raw materials. Stone tool types are similar to those known in Hungarian Pavlovian context, including burins, end scrapers, backed bladelets, and Gravette points, but the proportion of Gravettian tool types is low whilst burins and especially end scrapers are numerous. Because of the pebble raw material use the size of the tools is considerably shorter than in the Pavlovian.

Latest group of sites in the model is called Epigravettian or Younger Blade Gravettian, dated to between 18 and 12 k years BP. Lithic tool types and the technology do not differ from those of the Hungarian Pavlovian. Consequently, the model regards the Epigravettian as the descendant of the Pavlovian.

3 AN ALTERNATIVE DIVISION

The latest review on the radiocarbon dates of the Gravettian Entity pointed out that their majority is inappropriate for absolute chronology (Lengyel 2008–2009). Among all the sites reviewed the Pavlovian sustained a heavy loss of radiometric dates because the organic samples could not have been associated with archaeological features. On the contrary, Ságvárian sites seemed reliably datable to between 20 and 18 k years BP. Epigravettian sites also possessed unreliable dating conditions and finally dates of only two sites assign radiocarbon ages of 17 and 13 k years BP for this cultural phenomenon.

As a consequence of the date revision, the insecurities around the radiocarbon database lead to make the use of relative chronological means to connect sites with archaeological cultures and periods. Although there is no consensus between scholars on the taxonomy of the Gravettian in Eastern Central and East Europe (Kozłowski 2007, 2013; Moreau 2009; Noiret 2009; Oliva 2007; Svoboda 2007), there are some tool types in Gravettian context which seem to be reliable chronological markers. For the earliest period between 30 and 27 k years BP those are the fléchette, microgravette, and pointed blades. This is the Early Pavlovian (Kozłowski 2007; Svoboda 2007) or more convincingly the Early Gravettian (Moreau 2010). In the next period between 27 and 25 k years BP, called Evolved Pavlovian or simply Pavlovian (Moreau 2009), there is a remarkable increase of microliths including backed denticulate bladelets and geometrics (Svoboda 2007). After this, in the Late Gravettian, also called Willendorf-Kostenkian, between 25 and 20 K years BP, shouldered points and leaf points are characteristic (Svoboda 2007). Kozłowski (2013) more precisely divides the Late Gravettian period into three contemporaneous units: the Gravettian with shouldered points, the Late Gravettian with leaf points, and the Late Gravettian with backed bladelets. Between 20 and 18 k years the Ságvárian is characterized by short end scrapers, burins and a moderate frequency of backed laminar elements (Lengyel 2011; Tolnai-Dobosi 2001). On the other hand, Ságvárian sites were annexed to the Kašovian culture dated to between 20 and 15 k years BP (Svoboda & Novák 2004). Svoboda (2004) sees no genetic relation between Kašovian and the preceding Gravettian thus proposed to restrict the term Epigravettian to the Mediterranean Europe, where backed armatures and microliths proliferated in post Last Glacial Maximum (LGM) assemblages. Kašovian typologically is dominated by short endscrapers and burins, and backed implements are present with low frequency such as in the Ságvárian. The definition of Kašovian seems clear, but the lithic assemblages indeed compose a very heterogeneous group to such extent that not much has been accepted from this proposal by others. The Epigravettian, still is used in the region instead of Kašovian, is characterized by a few types of tools such as burin, endscraper, truncation and backed bladelets between 20 and 17 k years BP, while between 17 and 10 k years BP the assemblages yielded a greater number of backed elements and geometrics (Noiret 2009).

According to the tool kit compositions of the assemblages in Hungary, the Middle Upper Palaeolithic sites can be reclassified (**figure 7**). Contrary to what has been claimed for decades (Vértes 1955), Istállóskő Cave upper stratigraphic proportion is unlikely Aurignacian and it rather can be classified Early Gravettian on the basis of typological similarity with Willendorf II layer 5 (Mester *et al.* 2008). The radiocarbon dates obtained from these levels match the chronological position estimated with the tool types (Davies & Hedges 2008–2009, Adams & Ringer 2004). The Pavlovian sites, especially Bodrogkeresztúr (Vértes 1966), although have some affinity to the Early Gravettian (Moreau 2009), but the fléchettes, microgravettes, and backed truncated bladelets are also characteristic to Late Gravettian dated to between 25 and 22 k years BP (Wilczyński *et al.* in press; Žaár 2007). Therefore, a very early Gravettian presence in Hungary cannot be firmly argued. A single site in Hungary, Hidasnémeti (Simán 1989b), belongs to the shouldered point variant of the Late Gravettian, which was originally classified as Pavlovian (Dobosi 2005). Also there are Gravettian sites with leaf points, such as Hont-Parassa III (Dobosi & Simán 2003), and Szeleta Cave layers 6 and 5, the tool assemblage of which consists of backed bladelets, retouched blades, a shouldered blade, a Gravette point, and leaf points (Kadić 1916). These assemblages in Szeleta Cave already associated with the Gravettian. Between 20 and 18 k years BP a new Ságvárian site is Budapest Corvin-tér (Ringer & Lengyel 2008–2009). Clear Epigravettian sites in Hungary can be those characterized by abundant number of backed elements and some geometrics thus seem to belong to the late phase of this culture (Noiret 2009).

4 POPULAR LITHIC RAW MATERIAL SOURCES OF THE HUNGARIAN UPPER PALAEOLITHIC (FIGURES 2 AND 3)

Radiolarite

4.1 Abundant outcrops of radiolarite are found in Western Hungary. The Transdanubian Midmountains (especially in Bakony Mountains) and Mecsek Mountains have several outcrops mostly of Jurassic age. The most recognized source is at Szentgál in Bakony Mts. Radiolarites are generally cryptocrystalline, fine grained textured, brown, reddish brown colored but there are colors of gray, green, purple and yellow as well (**figure 5**). They are found in distinct beds and as nodules as well. In its primary source those are often cracked and homogeneous parts are rare (Biró 1988; Biró *et al.* 2009). Another source of radiolarite is in gravels of rivers running south from the Carpathians. The primary sources outcrop from the White Carpathians in West Slovakia to the Pieniny Mountains in South Poland and in east Slovakia (Kozłowski *et al.* 1981).

Post volcanic sedimentary siliceous rocks (limnic silicites, limnic and hydro-quartzite)

4.2 The terminology of these rocks is inconsistent (Götze 2010; Přichystal 2010). These rocks are abundant where Miocene volcanism took place such as in Cserhát, Mátra and Tokaj Mountains (Markó 2005; Takács-Biró 1986). These rocks often form thick beds and they can be found in masses. The materials are very diverse in texture and color (**figure 4**). The matrix is very often heterogeneous, include cracks, and inclusions. These materials today are called limnic and hydro-quartzite (Biró 2010).

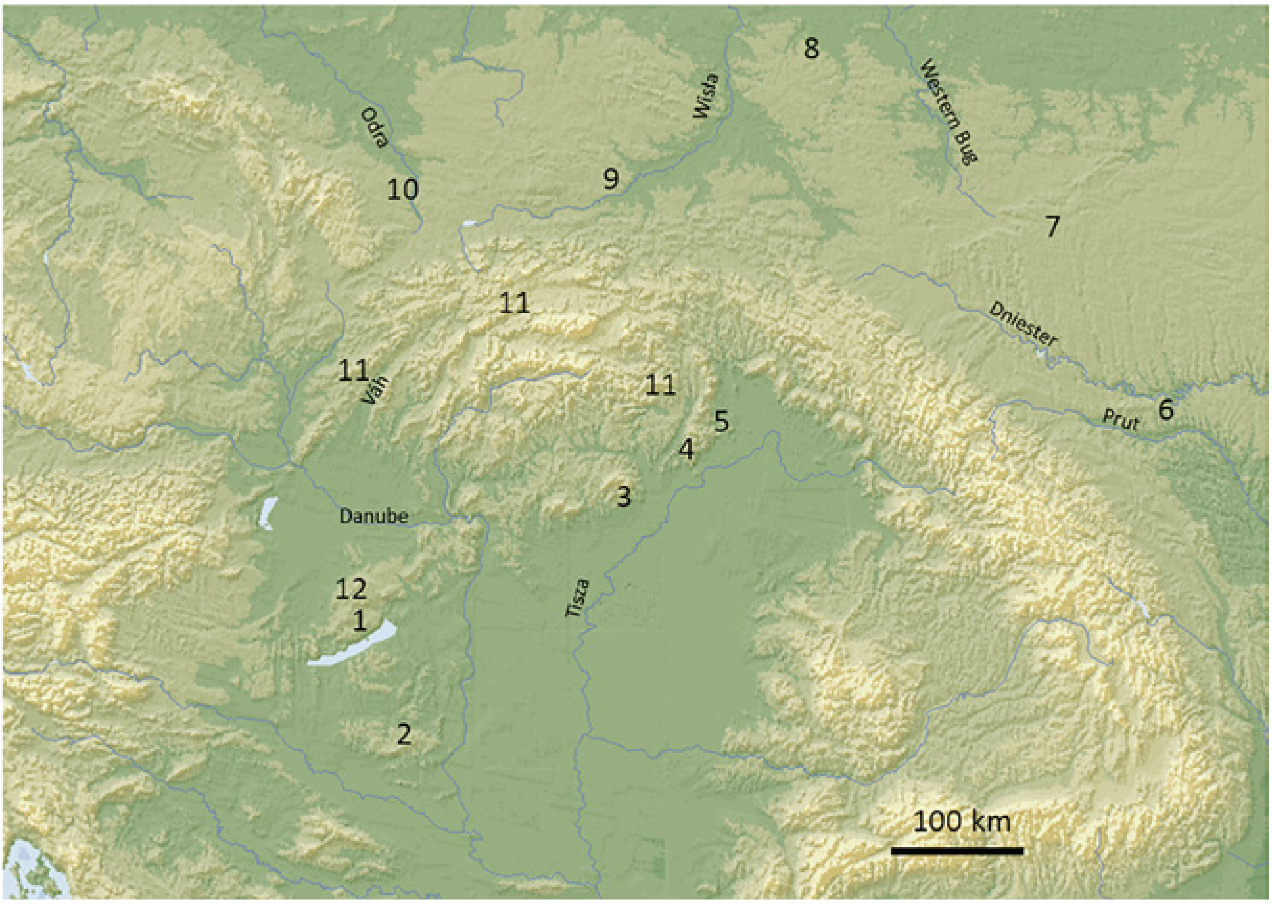


FIGURE 2 Lithic raw material sources mentioned in the text. 1, 2, 11. radiolarite; 3. felsitic porphyry; 4. C2 obsidian (Hungarian) and limnic and hydro-quartzites; 5. C1 obsidian (Slovakian); 6. Prut-Dniester flint; 7. Podolian flint; 8. Swieciechów flint; 9. Jurassic flint; 10. Erratic or Silezian flint; 12. Tevel flint.

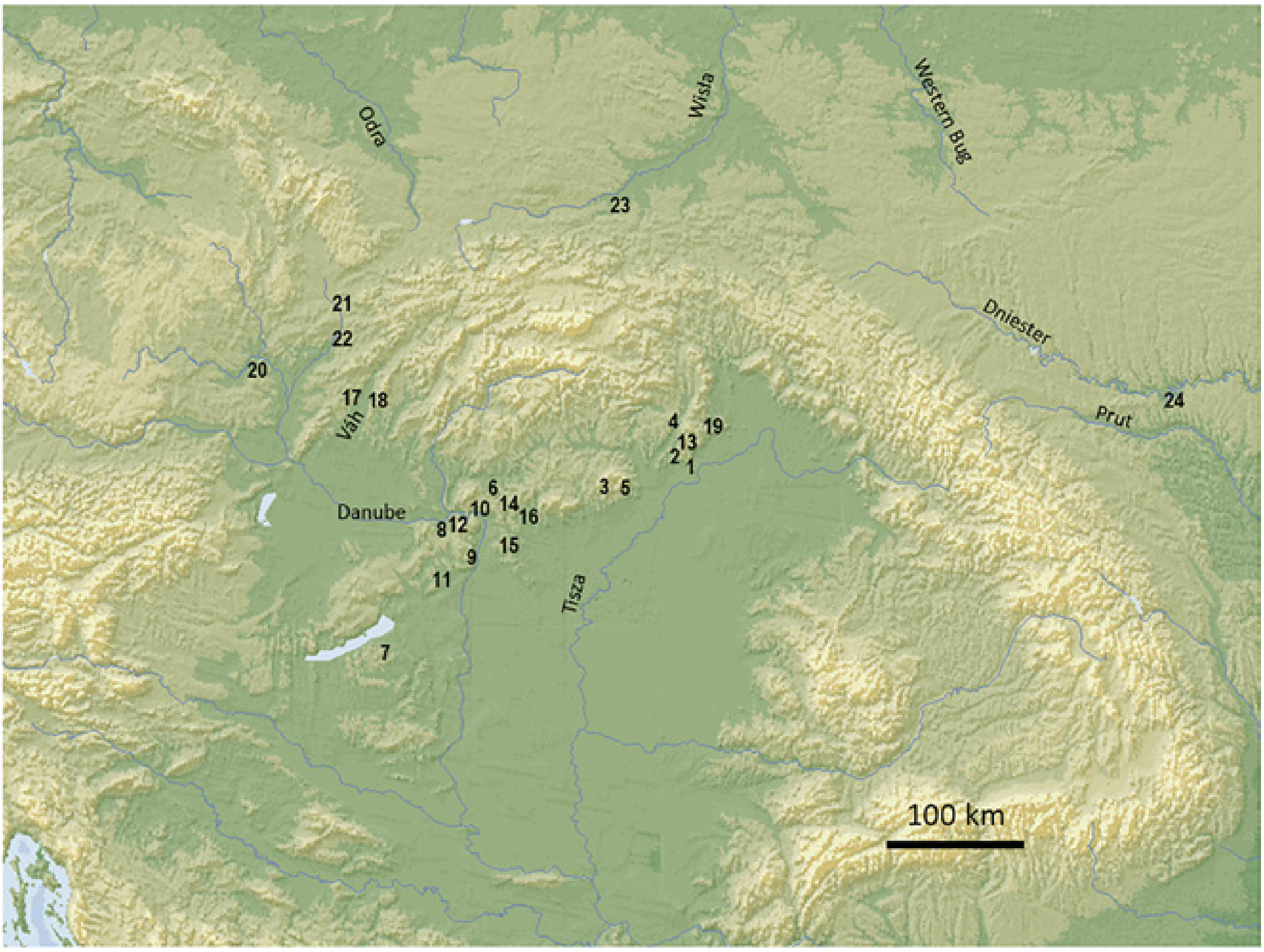


FIGURE 3 Sites mentioned in the text: 1. Bodrogkeresztúr; 2. Megyaszó; 3. Istállóskő Cave; 4. Hidasnémeti; 5. Szeleta Cave; 6. Hont-Parassa III; 7. Ságvár; 8. Mogyorósbánya; 9. Budapest Corvin-tér; 10. Szob; 11. Nadap; 12. Esztergom; 13. Arka; 14. Püspökhatvan; 15. Jászfelsőszentgyörgy; 16. Verseg; 17. Trenčianske Bohuslavice; 18. Moravany sites; 19. Cejkov I and Kašov I; 20. Dolní Vestonice I, Pavlov I, Milovice I/G; 21. Předmostí; 22. Jarošov II and Napajedla; 23. Targowisko 10; 24. Babin I and Voronovitsa I.

Obsidian 4.3

Obsidian sources are located in the Tokaj–Prešov Mountains in Hungary and Slovakia. Their formation is connected to tertiary, Miocene volcanism (Kaminská 1991; Takács-Biró 1986; Williams & Nandris 1977). Slovakian obsidian is also called Carpathian type 1 and the Hungarian Carpathian type 2. The main difference between the two is that the former is translucent while the latter is thick black or dark grey non translucent (**figure 3**) (Williams-Thrope *et al.* 1984). There is a reddish variety of the obsidian in the Hungarian sources (Biró *et al.* 2005). The obsidian nodules are in secondary deposition and today their size hardly larger than 5 cm and the majority is even smaller. In archaeological assemblages also this size is the most common, but there are knapped specimens referring to much larger nodules as well.

Felsitic porphyry 4.4

Felsitic porphyry or metarhyolite was widely applied in the leaf point and bifacial lithic industries in East Hungary (Markó *et al.* 2003; Kasztovszky *et al.* 2008). This material forms large masses and beds in the eastern Bükk Mountains. Its general feature is a laminated structure that makes it often heterogeneous. It has a vitreous appearance and light to dark gray color (**figure 5**).

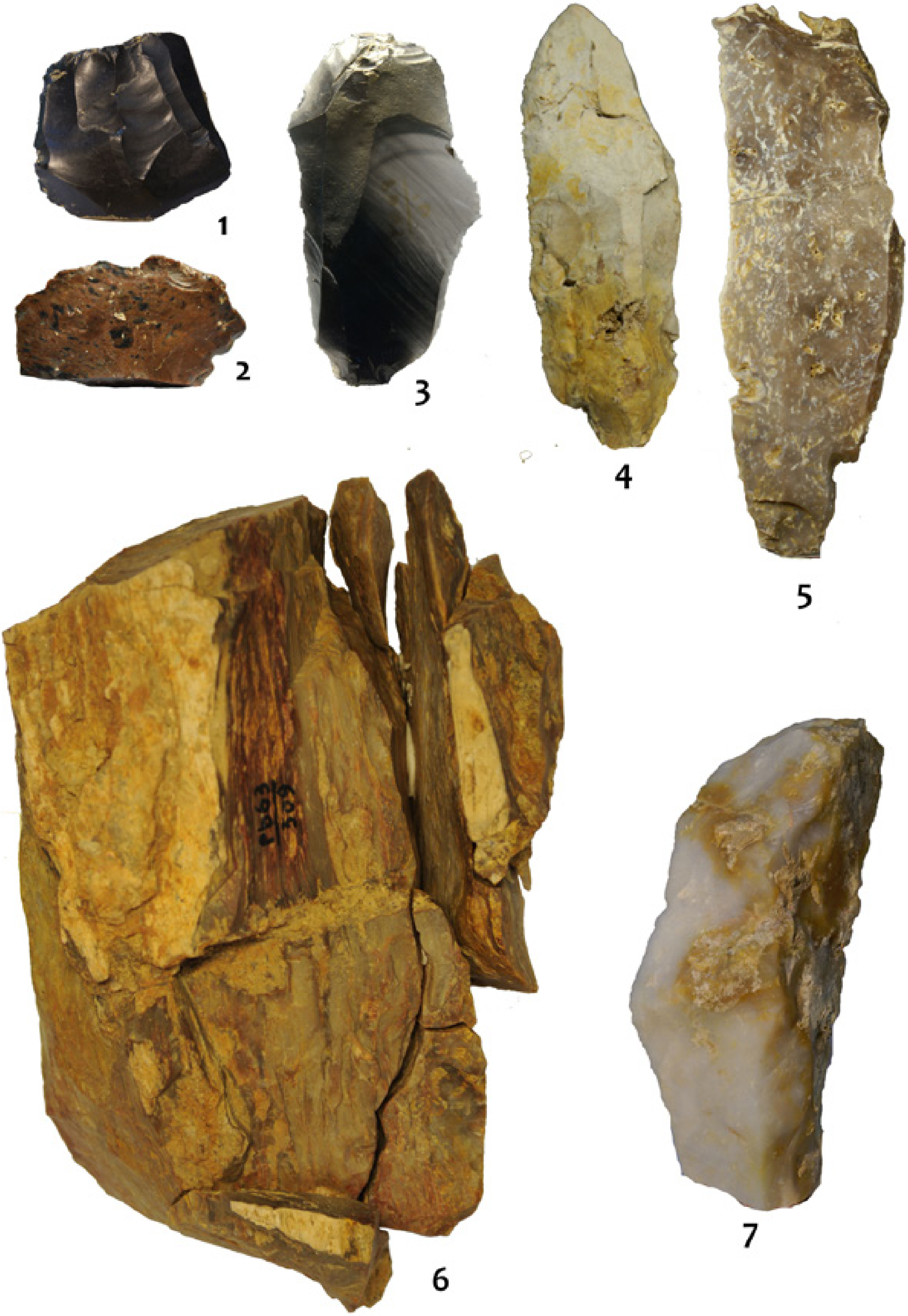


FIGURE 4 Lithic raw materials of the Carpathian basin: 1-2. C2 obsidian; 3. C1 obsidian; 4-7. limnic quartzites from Tokaj–Prešov Mountains. Items 1, 3-5, 7 are from Bodrogkeresztúr; items 2 and 6 are from Arka.

FIGURE 5 Lithic raw materials of the Carpathian basin: 1. Radiolarite from Mecsek Mountains; 2-3. Radiolarite from Bakony Mountains; 4-5. Radiolarite of Carpathians; 6. Felsitic porphyry. Items 1-3 are from Ságvár; 4 is from Arka; 5 is from Bodrogkeresztúr; 6 is from Szeleta Cave.

4.5 Flints from north and east to the Carpathians

The term flint herein refers to the cryptocrystalline sedimentary rock composed of silica gel that appears as nodules in marine sedimentary lithological environment (Götze 2010). In Eastern Central Europe flint nodules can be found in Cretaceous and Jurassic formations (Féblot-Augustains 1997).

Commonly, Cretaceous flint is a very fine grained rock (**figure 6**). Held against light it is brown colored otherwise it is deep blue-grayish. It encloses rarely small to large non-translucent light grey patches. Source of this flint are in the Prut and Dniester valleys, in the Podolian upland, and in the glacial moraines of Silesia (Biró 2011b; Dmochowski 2006; Féblot-Augustains 1997; Noiret 2009).

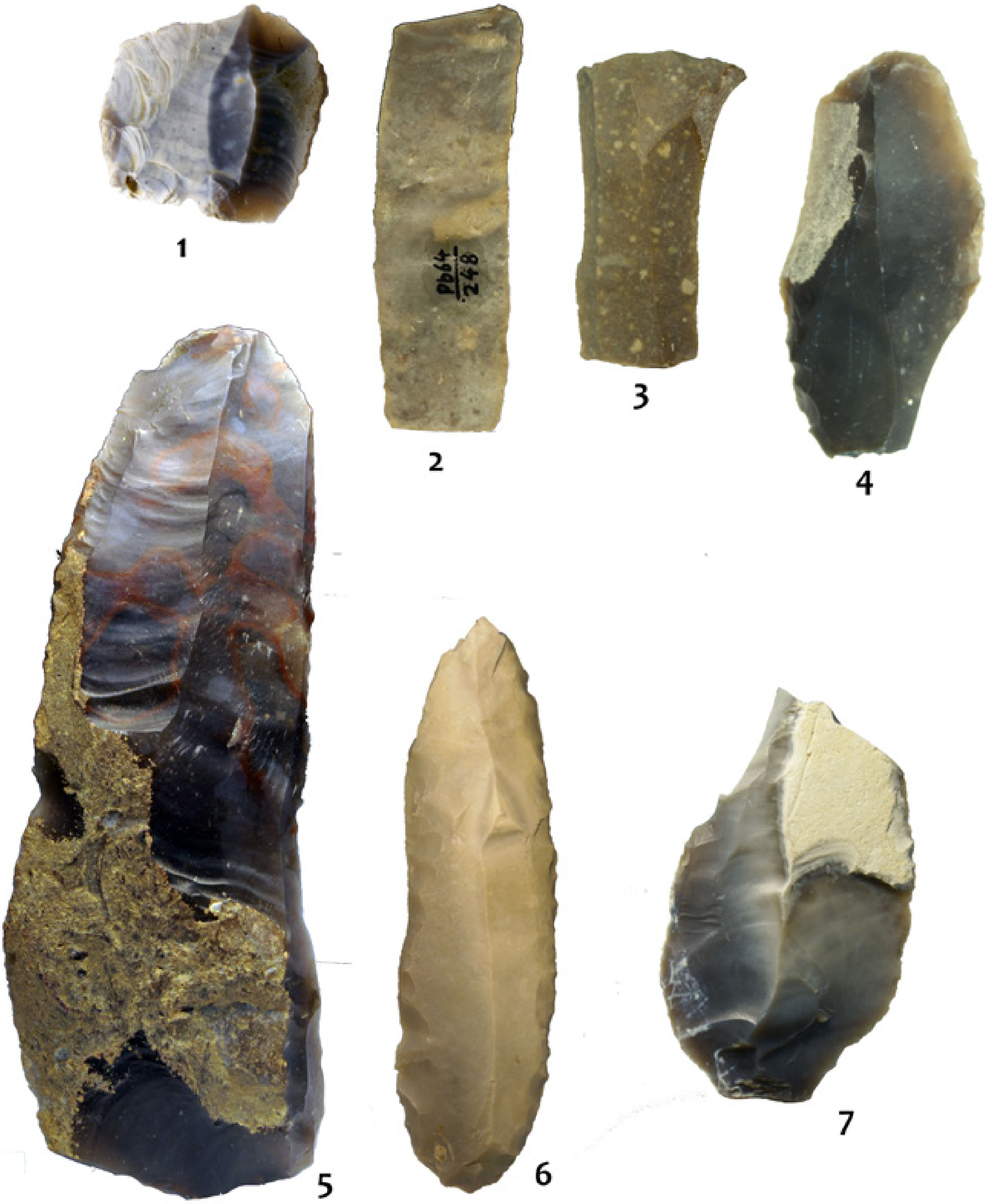


FIGURE 6 Flint materials: 1, 7. Erratic flint; 2. Jurassic flint; 3. Swieciechów flint; 4, 6. Prut-Dniester flint; 5. Podolian flint. Items 1-4, 6, 7 are from Bodrogkeresztúr; 5 is from Arka.

A special Cretaceous flint is the Swieciechów type, that has a source in Poland in Holy Cross Mountains (Balcer 1976). It is easily recognizable due to the white-grayish dots in its grayish brown body (**figure 6**).

Jurassic flint originates northwest to the city Krakow in South Poland. The flint is translucent grayish-brown, fine grained that encloses small fossils (Kaczanowska & Kozłowski 1976).

5 RATIO OF FLINTS IN LITHIC ASSEMBLAGES OF GRAVETTIAN, SÁGVÁRIAN AND EPIGRAVETTIAN

Plotting the flint quantity in the assemblages in the order of the newly proposed chronology of the sites, the proportions draw a tendency (**figure 7**). The Early Gravettian yield ~64 % of flints from outside of the Carpathians. After a chronological gap, which represents the lack of Pavlovian, the period between 25 and 20 k years, shows a drastic drop in the proportions of flints between 3,6 and 0,6 %. Averagely lower percentages characterize the assemblages between 20 and 18 k years BP. From 17 k years BP the proportion of flints starts increasing with the Epigravettian. Earlier, Dobosi (1997) claimed a homogeneous use of raw materials from sites between 28 and 18 k years BP (sites at Püspökhatvan, Mogyorósbánya, Jászfelsőszentgyörgy, Verseg and Nadap). Later Dobosi (2009b) concluded that the increased utilization of long distance raw materials was parallel with the deterioration of climatic conditions between about 28–16 k years BP. Present results disagree with Dobosi (2009b), because having compared the data with the climate of the last glacial cycle the decrease of flint use falls within the LGM between 24 and 18 k years BP (Markova *et al.* 2009; Monegato *et al.* 2007) and the proliferation of distant raw material use started after the end of LGM.

Toward the northern margin of the basin, in Slovakia, there is a different pattern of raw material use. While the very few early Gravettian sites mostly used local lithic raw materials (Kaminská 2001), the number of human occupations increased between 25 and 20 k years BP in the Váh valley, western Slovakia, and there was a frequent use of Silezian flint at the sites. Trenčianske Bohuslavice leaf point Gravettian site dated to roughly 25–22 k years BP yielded 23,8 % flint of Polish origin and the largest portion of the raw materials is radiolarite of local origin.

FIGURE 7 Hungarian sites with their cultural classification and the percentages of local and flint in the lithic assemblages (counts). References for the sites: Bodrogkeresztúr, Szeleta Cave, Ságvár, Esztergom, Arka (personal counts); Megyaszó (Dobosi & Simán 1996); Istállóskő Cave (Mester *et al.* 2008); Hont-Parassa III (Dobosi & Simán 2003); Mogyorósbánya (Dobosi 2009b); Szob (Markó 2007, 2008-2010); Nadap (Dobosi *et al.* 1988).

ESTIMATED AGE K YEARS UNCAL. BP.	RECENT CULTURAL CLASSIFICATION	SITE	LOCAL %	FLINT %
30–27	Early Gravettian	Bodrogkeresztúr (tentative)	88,6	11,4
		Megyaszó (tentative)	96,5	3,5
		Istállóskő Cave upper	35,8	64,2
25–20	Gravettian with shouldered point	Hidasnémeti	99,4	0,6
	Gravettian with leaf point	Szeleta Cave layer 5-6	96,4	3,6
		Hont-Parassa III	99,4	0,6
20–18	Ságvárian	Ságvár	99,3	0,7
		Mogyorósbánya	96,7	3,3
		Budapest Corvin-tér	100,0	0,0
		Szob	100,0	0,0
17–13	Epigravettian	Nadap	35,0	65,0
		Esztergom	7,2	92,8
		Arka	95,0	5,0

Besides these materials, obsidian also is present in the assemblages with low number (Vlaciky *et al.* in press; Žaar 2007). Moravany Lopata II, dated to 21–24 k years BP (Verpoorte 2002), yielded 6 pieces of Tevel flint from Transdanubian Midmountains in Hungary and the proportion of Silezian flint is 38 % plus 0,4 % from Dniester area (Kazior *et al.* 1998). Banka shouldered point Gravettian site yielded 87,8 % flint from within trench IV (Kaminská 2001, Kozłowski 2000), dated to 22 k years BP (Verpoorte 2002). Moravany Žakovska dated to 24 k years BP however yielded only 1,3 % of flint and the rest of the raw material is local radiolarite (Hromada & Kozłowski 1995). In East Slovakia shouldered point Gravettian sites are almost missing. Cejkov I site is dated to that period and local raw materials dominate the assemblages (Kaminská and Tomášková 2004). Basically, after ca. 22 k years there are no sites in the western Slovakia (Verpoorte 2002). However, in the center of the Carpathian basin in Hungary and East Slovakia Ságvárian and Epigravettian sites are quite abundant (Kaminská 2001). In east Slovakia Kašov I lower layer dated to 20 k years BP yielded 49 % Cretaceous flint either from Poland or the Dniestr area (Novák 2004). Kašov I upper layer Epigravettian dated to ca 18 k years BP used local raw material obsidian (Kaminská 2001).

Outside of the Carpathian basin, in the areas of northern flint sources, the proportion of Carpathian raw materials in Gravettian assemblages is almost zero. Although radiolarite of Carpathians is present, but other materials from further south, including the obsidian is very occasional in the lithic assemblages. The sites commonly preserved the use of local raw materials (Kozłowski 1987). The first relatively significant appearance of Carpathian basin raw material north to the Carpathian arch is dated to ca. 15 k years BP at Targowisko 10 Epigravettian site in south Poland at which 2,5 % of the recovered material is obsidian of Tokaj–Prešov Mountains in East Hungary and East Slovakia (Wilczińsky 2009).

East to the Carpathians, at the Prut and Dniester regions, sites of Gravettian yielded assemblages highly dominated by local raw materials (Noiret 2009). Extremely rarely, in Gravettian tool kit context the radiolarite of the Carpathians occurred as at Babin I lower level (no dates) (Noiret 2009:231). In the Epigravettian also local raw materials dominate the assemblages, but there are slightly more traces of connection toward west with the Carpathian basin than in the Gravettian. The obsidian is present with a very few specimens at two sites in the Dniester valley (Voronovitsa I, no radiometric dates, 2 items; Cosăuţi level 5 dated to ca. 17–18 k years BP, 7 items) (Noiret 2009:457).

From west to the Carpathians raw materials hardly entered the territory of Hungary. The only material is the rock crystal that is sporadic at sites dated to between 29 and 26 k years BP and the greatest collection (51 items) derives from four adjacent sites at Pilismarót in the Danube bend dated to ca. 18 k years BP (Dobosi 2009b, Dobosi & Gatter 1996). Rocks from Hungarian sources are also rarely found at some sites on the west. For example, in Moravia, Pavlovian sites are abundant in moraine flint from Oder valley (Kozłowski 1987), although some obsidian items in the assemblages of Dolní Věstonice I, Pavlov I, Milovice I/G, Předmostí, Jarošov II and Napajedla were observed (Oliva 2007:202; Škrdla 2005:37). Grubgraben site, Austria, also dated to ca 18–19 k years BP, probably used some radiolarites from Hungary because the Váh origin was not proven (Pawlikowksi 1990) while many tools were made of flint of Silezian origin (West & Montet-White 1990).

6 DISCUSSION

Data presented above shows that the raw material circulation between sites in Hungary and at the flint sources is unbalanced. It means that at areas where good quality flints are available, there are hardly any stones from the areas where the Hungarian cultural counterparts are found. This may be explained with the quality of the siliceous rocks. Recently, results of knapping experiments on the Early Gravettian of Hungary pointed out good quality flints tend to yield significantly higher percentage of laminar elements than low quality limnic quartzites (Lengyel 2013). A good quality material can be consumed more efficiently because the same weighted block lasts longer in the processing without accidents and consequently yields significantly more blanks than low quality rocks. This is also an effect of raw material quality upon the lithic technology (Andrefsky 1994, Borrazzo 2012). It could thus be supposed that the presence of quality material in the lithic assemblages had simply material and ecological reasons and only the better quality and the more productive knapping properties make them attractive to transport as raw material for tool kit for travelling long distances. Therefore, what Aubry *et al.* (2012) claim that distant raw materials in an archaeological assemblage could be the expression of immaterial behaviors cannot be read out of the Hungarian Gravettian record. This conclusion is similar to, for example, Verpoorte's (2009) assertion that the mobility of human groups (and the long-term human survival) in the Gravettian depends upon ecological constraints, available prey animal resources, and no social process.

Plotting the percent of flints by the (estimated) age of the sites against the climatic curve of the Pleniglacial, the drastic drop in flint proportion in the territory of Hungary shows a clear relation with the LGM dated to about 24 and 17 k years BP (Markova *et al.* 2009). The series of Hungarian assemblages datable close to the peak of the LGM (Marks 2002) contain the least number of flints. While in the territory of Hungary flints from the north are rare at sites during the LGM, the northwestern part of the Carpathian basin, the Váh valley sites still prove northward connections. Therefore, the northern flint import stopped in the northwestern periphery of the Carpathian basin, at Váh valley, in the first half of the LGM and not between the inner and outer territories of the Carpathians. However, the connections between northwest and the inner area were not completely lost because Trenčianske Bohuslavice assemblage contains dozens of obsidian finds. The second half of the LGM still presents a very few flint material within the Carpathian basin. Sites close to the edge of the basin (Váh valley) where abundant occupations are recorded between 25 and 21 k years BP disappeared and the human settlements are concentrated inside the basin (Verpoorte 2004). According to Verpoorte (2004), raw materials and site distributions indicate the use of an enormous territory during the LGM. In the view of current data Verpoorte's opinion is acceptable only for the first half of the LGM between 24 and 20 k years BP. The raw material data rather show minimal or no extensive mobility of humans between 20 and 17 k years BP. Verpoorte (2004) also concludes the Carpathian basin was abandoned by 17 k years BP, due to arid climate take over that affected the vegetation and thus the herbivore and human subsistence. Yet sites from the period after 17 k years are indeed rarely known, but the Epigravettian, after the LGM, made use of flint from the east in amounts undetected in earlier periods. Consequently the connections between Prut-Dniester and inner Carpathian basin could have been intense in spite of the apparent scarcity of sites. The connection intensity can also be proven by the few obsidian finds in the Dniester area in Epigravettian times where inner Carpathian lithic materials are unknown from earlier periods of the Gravettian.

7 CONCLUSION

LGM seems to make a major effect upon the raw material circulation of the whole Gravettian and related cultural phenomena in the territory of Hungary. The presence of distant raw materials is rather the expression of adherence to good quality raw material and economic use than of any immaterial behaviors.

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REFERENCES

ADAMS B. & RINGER Á. (2004) – New ^{14}C dates for the Hungarian Early Upper Palaeolithic. *Current Anthropology* 45:541–551.

AUBRY T., LUÍS L., LLACH J.M. & MATIAS H. (2012) – We will be known by the tracks we leave behind: Exotic lithic raw materials, mobility and social networking among the Coa Valley foragers (Portugal). *Journal of Anthropological Archaeology* 31(4):528–550.

ANDREFSKY W.JR. (1994) – The Geological Occurrence of Lithic Material and Stone Tool Production Strategies. *Geoarchaeology: An International Journal* 9:345–62.

ANDREFSKY W.JR. (2009) – The Analysis of Stone Tool Procurement, Production, and Maintenance. *Journal of Archaeological Research* 17(1):65–103.

BALCER B. (1976) – Position and stratigraphy of flint deposits, development of exploitation and importance of the Świeciechów flint in Prehistory. *Acta Archaeologica Carpathica* 16:179–199.

BINFORD L.R. (1979) – Organization and Formation Processes: Looking at Curated Technologies. *Journal of Anthropological Research* 35(3):255–273.

BIRÓ K.T. (ED.) (1986) – Őskori kovabányászat és kőeszköz-nyersanyag azonosítás a Kárpát medencében (International Conference on prehistoric flint mining and lithic raw material identification in the Carpathian Basin). Budapest, Sümeg Papers 1.

BIRÓ K.T. (ED.) (1987a) – Őskori kovabányászat és kőeszköz-nyersanyag azonosítás a Kárpát medencében (International Conference on prehistoric flint mining and lithic raw material identification in the Carpathian Basin). Budapest, Sümeg Papers 2.

BIRÓ K.T. (1987b) – Fluctuation of the lithic raw material access and utilization from the Palaeolithic till historical times. In: M. Pécsi (ed.), *Pleistocene environment in Hungary*. Budapest, p. 143–159.

BIRÓ K.T. (1988) – Distribution of lithic raw materials on prehistoric sites, an interim report. *Acta Archaeologia Hungariae* 40:251–274.

BIRÓ K.T. (2009) – Sourcing Raw Material for Chipped Stone Artifacts: The State-of-Art in Hungary and the Carpathian Basin. In: B. Adams & B.S. Blades, *Lithic Materials and Paleolithic Societies*. Oxford, p. 47–53.

BIRÓ K.T. (2010) – Terminological practice for siliceous rocks in Hungary from petroarchaeological point of view. *Archeometriai Műhely* 7(3):195–202.

BIRÓ K.T. (2011a) – Comparative raw material collections in support of petroarchaeological studies: an overview / Összehasonlító nyersanyaggyűjtemények a petroarcheológiai vizsgálatok szolgálatában: áttekintés. In: K.T. Biró & A. Markó (eds.), *Emlékkönyv Violának*. Tanulmányok T. Dobosi Viola tiszteletére / Papers in honour of Viola T. Dobosi Magyar Nemzeti Múzeum Budapest, p. 225–244.

BIRÓ K.T. (2011b) – Magyarországi kovakőzetek kutatása. *Archeometriai Műhely* 8(3):211–218.

BIRÓ K.T. & DOBOSI V.T. (1991) – *LITHOTECA – The Comparative Raw Material Collection of the Hungarian National Museum*. Magyar Nemzeti Múzeum, Budapest.

BIRÓ K.T., DOBOSI V. T. & SCHLÉDER ZS. (2000) – *LITHOTECA - The Comparative Raw Material Collection of the Hungarian National Museum*. Magyar Nemzeti Múzeum, Budapest.

BIRÓ K.T., MARKÓ A. & KASZTOVSZKY ZS. (2005) – 'Red' obsidian in the Hungarian Palaeolithic characterisation studies by PGAA. *Praehistoria* 6:91–101.

BIRÓ K.T., SZILÁGYI V. & KASZTOVSZKY ZS. (2009) – Új adatok a kárpát-medence régészeti radiolarit forrásainak ismeretéhez. *Archeometriai Műhely* 6(3):25–43.

BORRAZZO K.B. (2012) – Raw material availability, flaking quality, and hunter–gatherer technological decision making in northern Tierra del Fuego Island (southern South America). *Journal of Archaeological Science* 39(8):2643–2654.

DAVIES W. & HEDGES R. (2008–2009) – Dating a Type Site: Fitting Szeleta Cave into Its Regional Chronometric Context. *Praehistoria* 9–10:35–45.

DOBOSI V.T. (1997) – Raw material management of the Upper Palaeolithic (a case study of five new sites, Hungary). In: R. Schild & Z. Sulgostowska (eds.) *Man and Flint*. Proceedings of the VIIth International Flint Symposium Warszawa – Ostrowice Swietokrzyski, September 1995, Warszawa, p. 189–193.

DOBOSI V.T. (1999) – Interior parts of the Carpathian Basin between 30.000 and 20.000 BP. In: W. Roebroeks, M. Mussi, J. Svoboda & K. Fennema (eds.), *Hunters Of The Golden Age. The Mid Upper Palaeolithic Of Eurasia 30 000 – 20 000 BP* . Faculty Of Archaeology University Of Leiden, p. 231–239.

DOBOSI V.T. (ED.) (2000a) – *Bodrogkeresztúr–Henye (NE Hungary), Upper Palaeolithic site*. Hungarian National Museum, Budapest.

DOBOSI V.T. (2000b) – Upper Palaeolithic research in Hungary – a situation report from 2000. *Praehistoria* 1:149–159.

DOBOSI V.T. (2005) – Cadastre of Palaeolithic finds in Hungary. State of art 2005. *Communicationes Archaeologicae Hungariae*, p. 49–81.

DOBOSI V.T. (2009a) – Constancy and Change in Upper Palaeolithic, Hungary. In: F. Djindjian, J.K. Kozłowski & N. Bicho (eds.), *Le concept de territoires dans le Paléolithique supérieur européen*. 15th International Congress of Prehistoric and Protohistoric Sciences (15th: 2006: Lisbon, Portugal). Proceedings of the XV World Congress (Lisbon, 4–9 September 2006), BAR 3:123–133.

DOBOSI V.T. (2009b) – Filling the void: Lithic raw material utilization during the Hungarian Gravettian. In: B. Adams & B.S. Blades (eds.), *Lithic Materials and Paleolithic Societies*. Oxford, p. 116–126.

DOBOSI V.T. (2011) – Prut flint at the top: Esztergom – Gyurgyalag Hungary. *Transkarpackie kontakty kulturowe w epoce kamienia, brązu i wczesnej epoce żelaza*, Krosno, p. 99–113.

DOBOSI V.T. & GATTER I. (1996) – Palaeolithic tools made of rock crystal and their preliminary fluid inclusion investigation. *Folia Archaeologica* 45:31–50.

DOBOSI V.T. & KÖVECSES-VARGA E. (1991) – Upper Palaeolithic Site at Esztergom-Gyurgyalag. *Acta Archaeologica Academiae Scientiarum Hungaricae* 43:233–255.

DOBOSI V.T. & SIMÁN K. (1996) – New Upper Paleolitic Site at Megyaszó-Szelestető. *Communicationes Archaeologicae Hungariae*, p. 522.

DOBOSI V.T. & SIMÁN K. (2003) – Hont-Parassa III. Orgonás, Upper Palaeolithic Settlement. *Communicationes Archaeologicae Hungariae*, p. 15–29.

DOBOSI V.T., JUNGBERT B., RINGER Á. & VÖRÖS I. (1988) – Palaeolithic settlement in Nadap. *Folia Archaeologica* 39:13–40.

DMOCHOWSKI P. (2006) – A new classification of erratic flint from western Poland. In: A. Wiśniewski, T. Płonka & J.M. Burdukiewicz (eds.), *The Stone: Technique and Technology*. Uniwersytet Wrocławski. Wrocław, p. 217–226.

FÉBLOT-AUGUSTINS J. (1997) – *La circulation des matieres premieres au paléolithique. Synthese des données perspectives comportementales*. Liège, ERAUL 75(2).

GÁBORI M. (1989) – Die letzte Phase des Paläolithikums in Ungarn. *Quaträr* 39–40:131–140.

GÁBORI M. & GÁBORI-CSÁNK V. (1957) – Études archéologiques et stratigraphiques dans les stations de loess paléolithiques de Hongrie. *Acta Archaeologica Academiae Scientiarum Hungaricae* 8:3–117.

GOULD R.A. & SAGGERS SH. (1985) – Lithic Procurement in Central Australia: A Closer Look at Binford's Idea of Embeddedness in Archaeology. *American Antiquity* 50(1):117–136.

GÖTZE J. (2010) – Origin, mineralogy, nomenclature and provenance of Silica and SiO2 rocks. *Archeometriai Műhely* 7(3):163–176.

HROMADA J. & KOZŁOWSKI J.K. (1995) – *Complex of Upper Palaeolithic sites near Moravany, Western Slovakia, Moravany-Žakovska (excavations 1991–1992)*, Kraków, vol. 1.

KADIĆ O. (1916) – Ergebnisse der Erforschung der Szeletahöhle. *Mitteilungen aus dem Jahrbuch der kgl. Ungarischen Geologischen Reichsanstalt* 23:161–301.

KACZANOWSKA M. & KOZŁOWSKI J.K. (1976) – Studia nad surowcami krzemiennymi południowej części wyzyny Krakowsko-Częstochowskiej. *Acta Archaeologica Carpathica* 16:201–216.

KAMINSKÁ L. (1991) – Vyznam surovinovej základne pre mladopaleolitickú spolocnost vo vychodokarpatskej oblasti. *Slovenská Archeológia* 39(1–2):7–58.

KAMINSKÁ L. (2001) – Die Nutzung von Steinrohmaterialien im Paläolitikum der Slowakei. *Quartär* 51–52:81–106.

KAMINSKÁ L. & TOMÁSKOVÁ S. (2004) – Time space systematics of Gravettian finds from Cejkov I. In: J.A. Svoboda & L. Sedlácková (eds.), *The Gravettian Along the Danube.* Proceedings of the Mikulov Conference, The Dolní Vestonice Studies, Brno, 11:186–216.

KASZTOVSZKY ZS., BIRÓ K., MARKÓ A. & DOBOSI V. (2008) – Cold neutron Prompt Gamma Activation Analysis – a non-destructive method for characterization of high silica content raw materials. *Archaeometry* 50:12–29.

KAZIOR B., KOZŁOWSKI J.K. & SOBCZYK K. (1998) – Lithic inventories. In: J.K. Kozłowski (ed.), *Complex of Upper Palaeolithic sites near Moravany, Western Slovakia, Moravany-Lopata II (excavations 1993–1996)*, Kraków, Jagellonian University, Institute of Archaeology 2:43–83.

KOZŁOWSKI J.K. (1987) – Changes in the raw material economy of the Gravettian Technocomplex in Northern Central Europe. In: T.K. Biró (ed.), Őskori kovabányászat és kőeszköz-nyersanyag azonosítás a Kárpát medencében (International Conference on prehistoric flint mining and lithic raw material identification in the Carpathian Basin). Sümeg Papers 2, Budapest, p. 65–79.

KOZŁOWSKI J.K. (ED.) (2000) – *Complex of Upper Palaeolithic sites near Moravany, Western Slovakia, Late Gravettien shouldered points horizon sites in the Moravany – Banka area*, Nitra, vol. 3.

KOZŁOWSKI J.K. (2007) – Gravettian North of the Carpathians and of the Sudetes. *Paléo* 19:221–241.

KOZŁOWSKI J.K. (2013) – Raw materials procurement in the Late Gravettian of the Carpathian Basin. In: Zs. Mester (ed.), *The lithic raw material sources and the interregional human contacts in the Northern Carpathian regions*. Kraków-Budapest, p. 63–85

KOZŁOWSKI J.K., MANECKI A., RYDLEWSKI J., VALDE-NOVAK P. & WRZAK J. (1981) – Mineralogico-Geochemical Characteristic of Radiolarites used int he Stone Age in Poland and Slovakia. *Acta Archaeologica Carpathica* 21:171–210.

LENGYEL GY. (2009–2008) – Radiocarbon dates of the "Gravettian Entity" in Hungary. *Praehistoria* 9–10:241–263.

LENGYEL GY. (2011) – The pebble, the block and the tabular. Lithic raw material use at Ságvár Lyukas-domb Upper Palaeolithic site. In: T.K. Biró & A. Markó (eds.), *Emlékkönyv Violának. Tanulmányok T. Dobosi Viola tiszteletére. Papers in Honour of Viola T. Dobosi*. Magyar Nemzeti Múzeum, Budapest. p. 93–102.

LENGYEL GY. (2013) – Knapping experiments on lithic raw materials of the Early Gravettian in Hungary. In: Zs. Mester (ed.), *The lithic raw material sources and the interregional human contacts in the Northern Carpathian regions*. Kraków-Budapest, p. 39–51.

MARKÓ A. (2005) – Limnokvarcit a Cserhát hegységben. *Archaeometriai Műhely* 2(4):52–55.

MARKÓ A. (2007) – The Upper Palaeolithic site at Szob. *Folia Archaeologica* 53:7–22.

MARKÓ A. (2008–2010) – A little puzzle: further studies on the Upper Palaeolithic assemblage of Szob. *Folia Archaeologica* 54:9–24.

MARKÓ A., BIRÓ K. & KASZTOVSZKY ZS. (2003) – Szeletian felsitic porphyry: non-destructive analysis of a classical palaeolithic raw material. *Acta Archaeologica Academiae Scientiarum Hungaricae* 54:297–314.

MARKOVA A.K, SIMAKOVA A.N. & PUZACHENKO A.YU. (2009) – Ecosystems of Eastern Europe at the time of maximum cooling of the Valdai glaciation (24–18 kyr BP) inferred from data on plant communities and mammal assemblages. *Quaternary International* 201(1–2):53–59.

MARKS L. (2002) – Last Glacial Maximum in Poland. *Quaternary Science Reviews* 21:103–110.

MESTER ZS., VERCOUTÈRE C., PATHOU-MATHIS M., MARKÓ A., LENGYEL GY. & SZOLYÁK P. (2008) – Upper Palaeolithic occupations at Istállóskö Cave, Northeast Hungary: archaezoology and artefact technology. Paper presented at the Venus08 – Art and Lifestyle Symposium: Cultural development of the European Upper Palaeolithic (Aspects of Gender, Anthropology, Settlement structures and Subsistence Strategies). Vienna 2008 November, p. 10–14.

MONEGATO G., RAVAZZI C., DONEGANA M., PINI R., CALDERONI G. & WICK L. (2007) – Evidence of a two-fold glacial advance during the last glacial maximum in the Tagliamento end moraine system (eastern Alps). *Quaternary Research* 68(2):284–302.

MOREAU L. (2009) – *Geißenklösterle. Das Gravettien der Schwäbischen Alb im europäischen Kontext*. Kerns Verlag, Tübingen.

MOREAU L. (2010) – Geißenklösterle. The Swabian Gravettian in its European context. *Quartär* 57:79–93.

NOIRET P. (2009) – *Le Paléolithique supérieur de Moldavie*. Liège, ERAUL 121.

NOVÁK M. (2004) – Gravettian occupation in the lower layer of Kašov I. In: J.A. Svoboda & L. Sedlácková (eds.), *The Gravettian Along the Danube*. Proceedings of the Mikulov Conference. Brno, The Dolní Vestonice Studies 11:217–242.

OLIVA M. (2007) – *Gravettien na Moravě*. DABP1, Brno – Praha.

PAWLIKOWSKI M. (1990) – Origin of the lithic raw materials. In: A. Montet-White (ed.), *The Epigravettian Site of Grubgraben, Lower Austria: The 1986 and 1987 Excavations*. Liège, ERAUL 40:93–120.

PŘICHYSTAL A. (2010) – Classification of lithic raw materials used for Prehistoric chipped artefacts in general and Siliceous sediments (silicites) in particular: the czech Proposal. *Archeometriai Műhely* 7(3):177–182.

RINGER Á. & LENGYEL GY. (2008–2009) – The Upper Palaeolithic Site at Budapest Corvin-tér. *Praehistoria* 9–10:205–211.

SIMÁN K. (1989a) – Northern flint in the Hungarian Palaeolithic. In: J.K. Kozłowski (ed.), *"Northern" (erratic and jurassic) flint of South Polish origin in the Upper Palaeolithic of Europe Central*. Kraków, p. 87–94.

SIMÁN K. (1989b) – Hidasnémeti – Upper Palaeolithic Site in the Hernád valley (Northeast Hungary). *Acta Archaeologica Carpathica* 28:5–24.

SIMÁN K. (1995) – La grotte Szeleta et le Szélétien. Dans : *Les industries à pointes foliacées d'Europe centrale. Actes du Colloque de Miskolc, 10–15 septembre 1991*. Paléo (supplément) 1:37–43.

ŠKRDLA P. (2005) – *The Upper Paleolithic on the Middle Course of the Morava River*. Brno, DVS 13.

SVOBODA J.A. (2004) – Afterwords: The pavlovian as a part of the gravettian mosaic. In: J.A. Svoboda & L. Sedlácková (eds.), *The Gravettian Along the Danube*. Proceedings of the Mikulov Conference, Brno, The Dolní Vestonice Studies 11:283–297.

SVOBODA J.A. (2007) – The Gravettian on the Middle Danube. *Paléo* 19:203–220.

SVOBODA J.A. & NOVÁK M. (2004) – Eastern Central Europe after the upper pleniglacial: Changing points of observation. *Archäologisches Korrespondenzblatt* 34:463–477.

SZEKSZÁRDI A., SZAKMÁNY GY. & BIRÓ K.T. (2010) – Tokaji-hegységi limnokvarcit, limnoopalit nyersanyagok és pattintott kőeszközök archeometriai vizsgálata I.: földtani viszonyok, petrográfia. *Archeometriai Műhely* 7(1):1–18.

TAKÁCS-BIRÓ K. (1986) – The raw material stock for chipped stone artefacts in the northern Mid-Mountains tertiary in Hungary. In: T.K. Biró (ed.), International Conference on prehistoric flint mining and lithic raw material identification in the Carpathian Basin. Sümeg Papers 1, Budapest-Sümeg, p. 183–195.

TOLNAI-DOBOSI V. (2001) – About Ságvárian: chronological-cultural sketch of the Upper Palaeolithic in Hungary. In: B. Ginter, B. Drobniewicz, B. Kazior, M. Nowak & M. Poltowicz (eds.), *Problems of the Stone Age in the Old World*. Jagellonian University, Institute of Archaeology, Kraków, p. 195–201.

VLAČIKY M., MICHALÍK T., FIŠÁKOVÁ M.N., NÝVLT D., MORAVCOVÁ M., KRÁLÍK M., KOVANDA M., PÉKOVÁ K., PŘICHYSTAL A. & DOHNALOVÁ A. (IN PRESS) – Gravettian occupation of the Beckov Gate in Western Slovakia as viewed from the interdisciplinary research of the Trenčianske Bohuslavice-Pod Tureckom site. *Quaternary* International (2011) doi:10.1016/j.quaint.2011.09.004

VERPOORTE A. (2002) – Radiocarbon dating the Upper Palaeolithic of Slovakia: results, problems and prospects. *Archäologisches Korrespondenzblatt* 32–33:311–325.

VERPOORTE A. (2004) – Eastern Central Europe during the Pleniglacial. *Antiquity* 78:257–266.

VERPOORTE A. (2009) – Limiting Factors on Early Modern Human Dispersals: the human biogeography of Late Pleniglacial Europe. *Quaternary International* 201(1–2):77–85.

VÉRTES L. (1955) – Neuere Ausgrabungen und paläolithische Funde in der Höhle von Istállóskő. *Acta Archaeologica Academiae Scientarium Hungaricae* 5:111–131.

VÉRTES L. (1960) – Die Altsteinzeit der südlichen Donaugebiete. *Quartär* 12:53–105.

VÉRTES L. (1966) – The Upper Palaeolithic Site on Mt. Henye at Bodrogkeresztúr. *Acta Archaeologica Academiae Scientiarum Hungaricae* 18:3–14.

VÉRTES L. & TÓTH L. (1963) – Der Gebrauch des glasigen Quarzporphyres im Paläolithikum des Bükk-Gebirges. *Acta Archaeologica Academiae Scientiarum Hungaricae* 15:3–10.

WEST D. & MONTET-WHITE A. (1990) – Raw material use. In: A. Montet-White (ed.), *The Epigravettian Site of Grubgraben, Lower Austria*: The 1986 and 1987 Excavations. Liège, ERAUL 40:121–132.

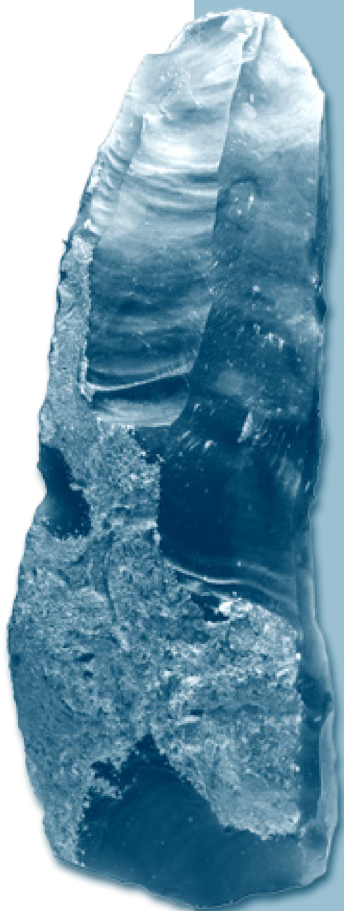
WILCZYŃSKI J. (2009) – Targowisko – a new Late Glacial site in southern Poland, *Eurasian Prehistory* 6:95–118.

WILCZYŃSKI J., WOJTAL P., ŁANCZONT M., MROCZEK P., SOBIERAJ D. & FEDOROWICZ S. (IN PRESS) – Loess, flints and bones: Multidisciplinary research at Jaksice II Gravettian site (southern Poland), *Quaternary International* (2014), http://dx.doi.org/10.1016/j.quaint.2014.04.002

WILLIAMS O. & NANDRIS J. (1977) – The Hungarian and Slovak sources of archaeological obsidian: an interim report on further fieldwork, with a note on tektites. *Journal of Archaeological Science* 4(3):207–219.

WILLIAMS THORPE O., WARREN S.E. & NANDRIS J.G. (1984) – The distribution and provenance of archaeological obsidian in Central and Eastern Europe. *Journal of Archaeological Sciences* 11(3):183–212.

ŽAÁR O. (2007) – *Gravettienska stanice v Trenčianskich Bohuslavicach*. Unpublished MA thesis, Filozofická Fakulta, Univerzita Konštantína Filozofa v Nitre.



Modes de contacts des Aurignaciens du site d'Andornaktálya (Hongrie) à la lumière de leur économie particulière de matières premières

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Résumé : Andornaktálya-Zúgó est un des sites en plein air de la région d'Eger au pied de la montagne de Bükk (Hongrie du nord). Découvert par prospections d'amateur dans les années 1980, sa particularité résidait dans la forte présence de silex d'origine polonaise. Pour cette raison, il a été fouillé par une équipe hongro-polonaise en 2002 et 2004. La stratigraphie a révélé l'existence d'un paléosol brunâtre, daté à 30 ka BP par AMS sur charbon de bois. Les artefacts ont été mis au jour dans la partie supérieure du paléosol, partiellement perturbée par l'agriculture. L'industrie est homogène et peut être attribuée à l'Aurignacien tardif, connu sur les sites de la Slovaquie orientale (Barca, Seňa, Kechnec) et de la Moravie (Karolín I, Určice) qui datent d'entre 28 et 24,5 ka BP.

L'assemblage lithique du site d'Andornaktálya-Zúgó présente une gamme de matières premières dominée par l'obsidienne, le silex de la Silésie et certains limnoquartzites. Ils sont accompagnés de radiolarites, quartz-porphyre, opalites, chaille, marne silicifiée, grès silicifié, et d'autres silex de la Pologne du sud et de l'Ukraine de l'ouest. Tenant compte des conditions géographiques et des distances qui influencent l'accessibilité des sources, nous avons distingué six zones d'approvisionnement des habitants du site. La zone I embrasse les sources proches du site au pied de la montagne. La zone II comprend les sources se situant au côté opposé ou à l'intérieur de la montagne de Bükk. La zone III se constitue des montagnes voisines dont celle de Tokaj-Prešov qui s'étand jusqu'en Slovaquie de l'est. La zone IV signifie les sources de radiolarites de la Slovaquie de l'ouest. La zone V est représentée par les sources de silex en Pologne du sud devant la chaîne des Carpates, tandis que la zone VI l'est par les sources de silex plus lointaines (Świeciechów et la vallée du Dniestr).

L'étude technologique de l'assemblage lithique a démontré que les hommes préhistoriques avaient traité l'obsidienne (provenant d'une distance de 80–120 km – zone III) et le silex de Silésie (350–400 km – zone V) à la même manière que les matières premières locales. Les zones III et V concernent les territoires où se trouvent des industries d'attribution taxonomique similaire. La stratégie particulière d'économie de matière première à Andornaktálya nous permet de concluer à l'existences de contacts directs et réguliers avec les autres groupes mentionnés. D'après certaines considérations, la réalisation de ces contacts est envisagée sous forme d'expéditions.

1 MODES DE CONTACTS DES SOCIÉTÉS PALÉOLITHIQUES

La vie en groupes des êtres humains se réalise à plusieurs niveaux, se graduant de l'unité la plus petite, la famille jusqu'à la plus grande, la mégapopulation globalisée de nos jours actuels. L'éthologie des primates nous apprend que c'est un héritage phylogénétique qui est en quelque sorte une solution compromissoire, élaborée par l'évolution entre nécessités divergentes : la quantité de ressources nutritives accessibles sur le territoire du groupe donné limite le nombre d'individus formant le groupe, tandis que l'assurance de la diversité génétique et de la sécurité exige la co-existence d'un nombre minimal d'individus plus élevé.

Chez les papions, quatre niveaux d'organisation se distinguent (Csányi 1999 : 43) :

- la famille ou le harem (2 à 10 individus) est le groupe élémentaire, se composant du mâle, de ses femelles et de leurs petits ;
- le clan (10 à 20 individus) comprend plusieurs familles qui cherchent ensemble la nourriture ;
- la bande (70 à 100 individus) se forme de plusieurs clans se regroupant souvent pendant la journée ;
- la troupe (300 à 500 individus) est l'ensemble de plusieurs bandes se réunissant pour la nuit pour se défendre contre les carnivores.

Chez les chimpanzés, ces niveaux correspondent à la famille (2 à 10 individus), à la bande (30 à 50 individus), à la fission-fusion (100 à 150 individus) et à la troupe (300 à 500 individus) (Csányi 1999 : 150). Pour établir et maintenir ces structures, il y a fort besoin de contacts et d'interactions sociales entre les membres des groupes. L'épouillage mutuel (social grooming) en constitue le moyen pricipal. C'est tellement important qu'une corrélation stricte a été démontrée entre la taille des groupes et le temps investi à réaffirmer et à renforcer ces relations inter-individuelles chez les primates (Dunbar 1992 ; Dunbar & Schultz 2007).

Ces niveaux sont également reconnaissables chez les chasseurs-cueilleurs (Birdsell 1958, 1968 ; Gamble 1998 : 437) :

- la famille (nucléaire) compte 5 personnes ;
- la bande (ou groupe local) comprend plusieurs familles (20 à 70 individus) qui font des activités communes d'une manière permanente ; c'est l'unité de base de la subsistance ;
- l'unité matrimoniale signifie le groupe de plusieurs bandes apparentées (150 à 200 individus) qui échangent de conjoints dans le cadre de l'exogamie ; cela permet d'éviter les dangers démographiques ou génétiques (Wobst 1974) ;
- la tribu (ou bande maximale) regroupe des bandes (300 à 500 individus) qui partagent des traditions culturelles et linguistiques.

Sous certaines réserves dues aux conditions spécifiques de la période du Pléistocène, nous pouvons appliquer les modèles ethnologiques et éthologiques aux structures et aux vies des sociétés du Paléolithique aussi, en tenant compte des données archéologiques (Birdsell 1968 ; Gamble 1999 ; Sheehan 2004 ; Gamble *et al.* 2011 ; Gowlett *et al.* 2012).

Pour rassurer les conditions d'une longue survie, les populations humaines ont besoin de toutes ces dimensions démographiques. Chez les hommes, les processus d'encéphalisation et du développement cérébrale ont fourni un nouveau moyen d'entretenir les relations sociales : le langage, ainsi que la conversation et la cérémonie qui en découlent. La conversation – comme une sorte d'« épouillage verbal » (vocal grooming) – se révèle plus efficace pour établir et renforcer relations sociales que l'épouillage mutuel des primates (Dunbar 1993 ; Aiello & Dunbar 1993). Cela permet non seulement d'augmenter le nombre de partenaires avec lesquels un individu est capable d'avoir d'interaction sociale en même temps, mais il permet également d'enrichir l'expérience sociale de l'individu en recueillant d'informations primordiales sur le comportement d'autres personnes sans avoir d'observations ou de contacts directes avec eux. Cette connaissance devient indispensable dans le futur dans les situations inprévisibles des différentes activités sociales et dans celles de l'établissement des réseaux sociaux.

Ces réseaux donnent la possibilité aux groupes humains de constituer la population à dimension adéquate selon les contraintes ou exigences biologiques, écologiques ou socio-culturelles. Mais la nécessité de cela a une temporalité. La conséquence en est une organisation spatio-temporelle des réseaux. Leur maintenance et leur fonctionnement exigent l'existence d'interactions, de contacts périodiques entre groupes humains ou individus qui les composent (Gamble 1998, 1999 ; Whallon 2006). La forme concrète de ces interactions devait être très variée : à partir de simples rencontres à travers de différentes échanges (de cadeaux) jusqu'aux cérémonies ou opérations communes. Bien entendu, il semble impossible d'avoir de connaissances directes sur la nature de ces contacts, sur leurs déroulements au Paléolithique. Nous pouvons quand même en chercher les témoins dans les phénomènes, archéologiquement observables, qui ont la possibilité de démontrer l'existence de contacts entre régions géographiques.

Les matières premières lithiques se prêtent particulièrement à ces études. Elles sont relativement bien identifiables et leurs sources peuvent être relativement bien localisées étant donné leurs extensions géographiquement limitées. Selon le témoignage des assemblages archéologiques, elles ont pu être déplacées à plusieurs centaines de kilomètres au Paléolithique supérieur (Féblot-Augustins 1997, 2009). Pour estimer l'importance et la signification de ces déplacements, il faut également tenir compte de la composition technologique de l'assemblage fait sur une matière première donnée qui démontre le comportement des hommes du site face à cette roche (Geneste 1988, 1989). Dans l'étude du matériel lithique du site d'Andornaktálya, cette double approche nous a fourni des résultats particuliers à travers lesquels nous pouvons essayer de reconstituer la nature des contacts des habitants du site.

2 LE SITE D'ANDORNAKTÁLYA

Andornaktálya-Zúgó est un des sites en plein air de la région d'Eger qui s'étend au pied de la montagne de Bükk (Hongrie du nord-est) (**figure 1**). Cette région, de caractère de piedmont d'une altitude de 126 à 331 m, comprend les environs de la ville d'Eger et la vallée du ruisseau du même nom. La vallée de direction nord-ouest–sud-est est suivie par des chaînes de collines sur lesquelles plusieurs sites furent découverts après la deuxième guerre mondiale (Fodor 1984 ; Zandler 2006). Andornaktálya-Zúgó se trouve sur le sommet de la colline Zúgó-tető (190 m d'altitude) sur le territoire du village d'Andornaktálya au sud de la ville d'Eger. La colline fait partie de la terrasse IIb, âgée du Pléistocène supérieur, du ruisseau d'Eger (Hevesi & Ringer 2003–2004).

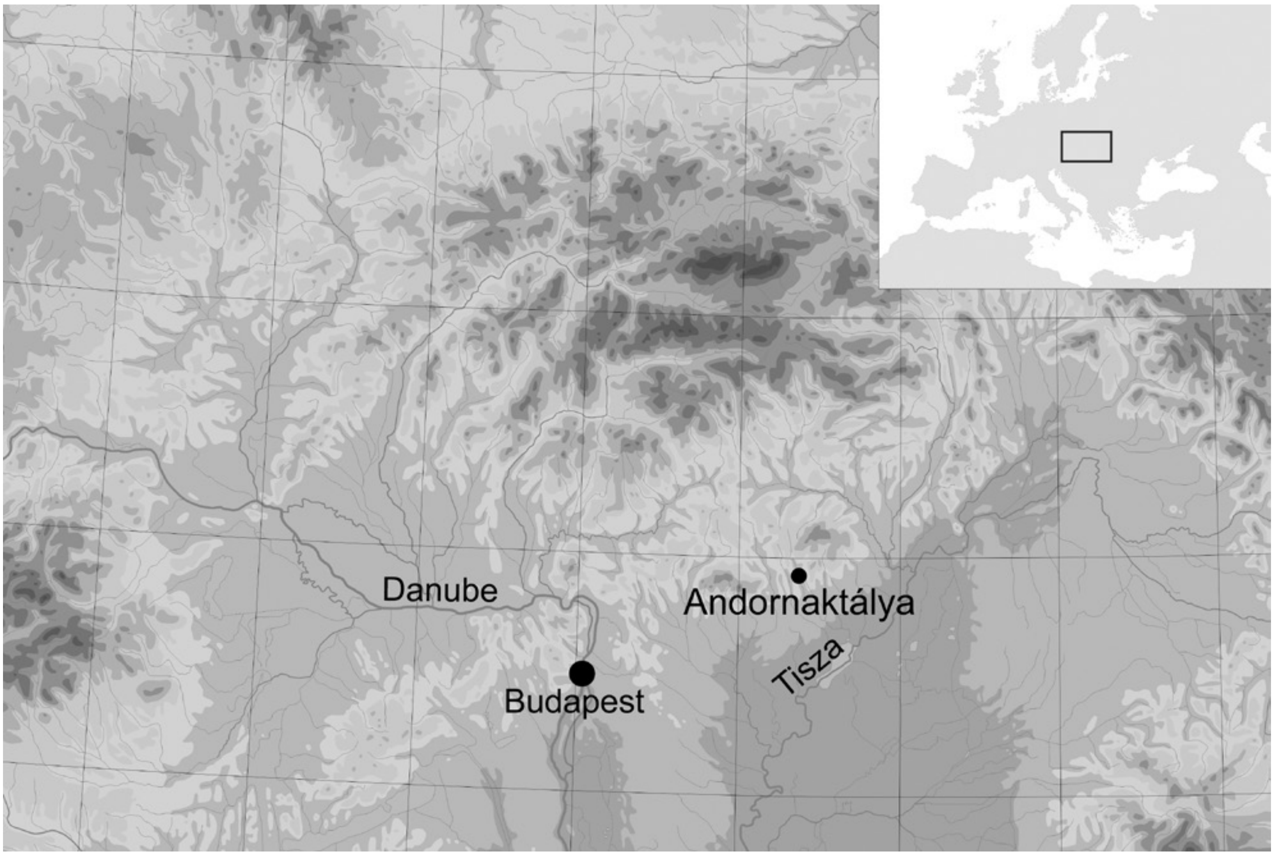


FIGURE 1 Localisation du site d'Andornaktálya-Zúgó.

Découvert et prospecté par l'amateur György Salétli, le site a été fouillé et étudié entre 2002 et 2004 dans le cadre des recherches hongro-polonaises de la région d'Eger (Kozłowski & Mester 2003–2004; Budek & Kalicki 2003–2004; Kozłowski *et al.* 2009, 2012). Les fouilles ont démontré que le matériel archéologique est lié au paléosol brunâtre dont la partie supérieure fut perturbée par les activités agricoles. Une pièce de charbon de bois s'associant au niveau le plus inférieur des artefacts a daté le paléosol de l'Interpléniglaciaire à 30.180 ± 330 ans BP (Budek & Kalicki 2003–2004; Budek *et al.* 2013).

3 L'INDUSTRIE LITHIQUE

Les pièces de pierre taillée, provenant de ramassage en surface et de décapage en fouille, forment un matériel lithique homogène du point de vue typologique, technologique et de composition de matières premières également (Kozłowski & Mester 2003–2004) (**figure 2**). L'industrie assez pauvre du niveau inférieur, provenant du paléosol non-perturbé et datée donc autour de 30 ka BP, montre un outillage proche de l'Aurignacien de plusieurs sites dans la vallée de Hornád en Slovaquie de l'est (Barca I et II, Svetlá [Barca III], Seňa, Kechnec – Bánesz 1959, 1960, 1967, 1968). Ces outillages sont caractérisés par un taux assez faible des grattoirs aurignaciens, remplacés par les grattoirs courts sur lames ou éclats, associés avec des pièces esquillées (**figure 3**). L'industrie trouvée dans la partie perturbée du paléosol et sur la surface présente une certaine continuation de tradition techno-typologique de celle du niveau inférieur (par ex. présence des grattoirs courts et des pièces esquillées). Comme éléments nouveaux apparaissent les troncatures retouchées très abruptes, lamelles à retouches fines, gros perçoirs, burins transversaux à plusieurs pans (**figure 4**). Ces éléments peuvent indiquer qu'il s'agit de la phase récente de l'Aurignacien, bien que nous ne disposons pas

MAT. PREM.	RAMASSAGE				FOUILLES		TOTAL	
	N	%	G	%	NIV. SUP. (N)	NIV. INF. (N)	N	%
MP1	378	27,37	680	7,26	16		394	25,57
MP1a	321	23,24	400	4,27	16		337	21,87
MP1b	47	3,40	220	2,35			47	3,05
MP1c	10	0,72	60	0,64			10	0,65
MP2	56	4,06	560	5,98	33	4	93	6,04
MP2a	24	1,74	130	1,39	11	2	37	2,40
MP2b	32	2,32	430	4,59	22	2	56	3,63
MP3	17	1,23	90	0,96	1	2	20	1,30
MP4	332	24,04	660	7,05	14	1	347	22,52
MP4a	313	22,66	530	5,66	4		317	20,57
MP4b	9	0,65	60	0,64	4		13	0,84
MP4c	9	0,65	50	0,53	4		13	0,84
MP4d	1	0,07	20	0,21			1	0,06
MP4e					2	1	3	0,19
MP5	39	2,82	390	4,17	11		50	3,24
MP6	293	21,22	2850	30,45	34	2	329	21,35
MP6a	80	5,79	750	8,01	5	2	87	5,65
MP6b	63	4,56	700	7,48	23		86	5,58
MP6c	150	10,86	1400	14,96	6		156	10,12
MP7	112	8,11	1210	12,93	27	9	148	9,60
MP8	83	6,01	1720	18,38			83	5,39
MP9	37	2,68	450	4,81	4	2	43	2,79
MP10	34	2,46	750	8,01			34	2,21
total	1381	100,00	9360	100,00	140	20	1541	100,00

FIGURE 2 Composition du matériel lithique d'Andornaktálya-Zúgó selon les matières premières. Les descriptions de M1 à M10 se trouvent dans le texte.

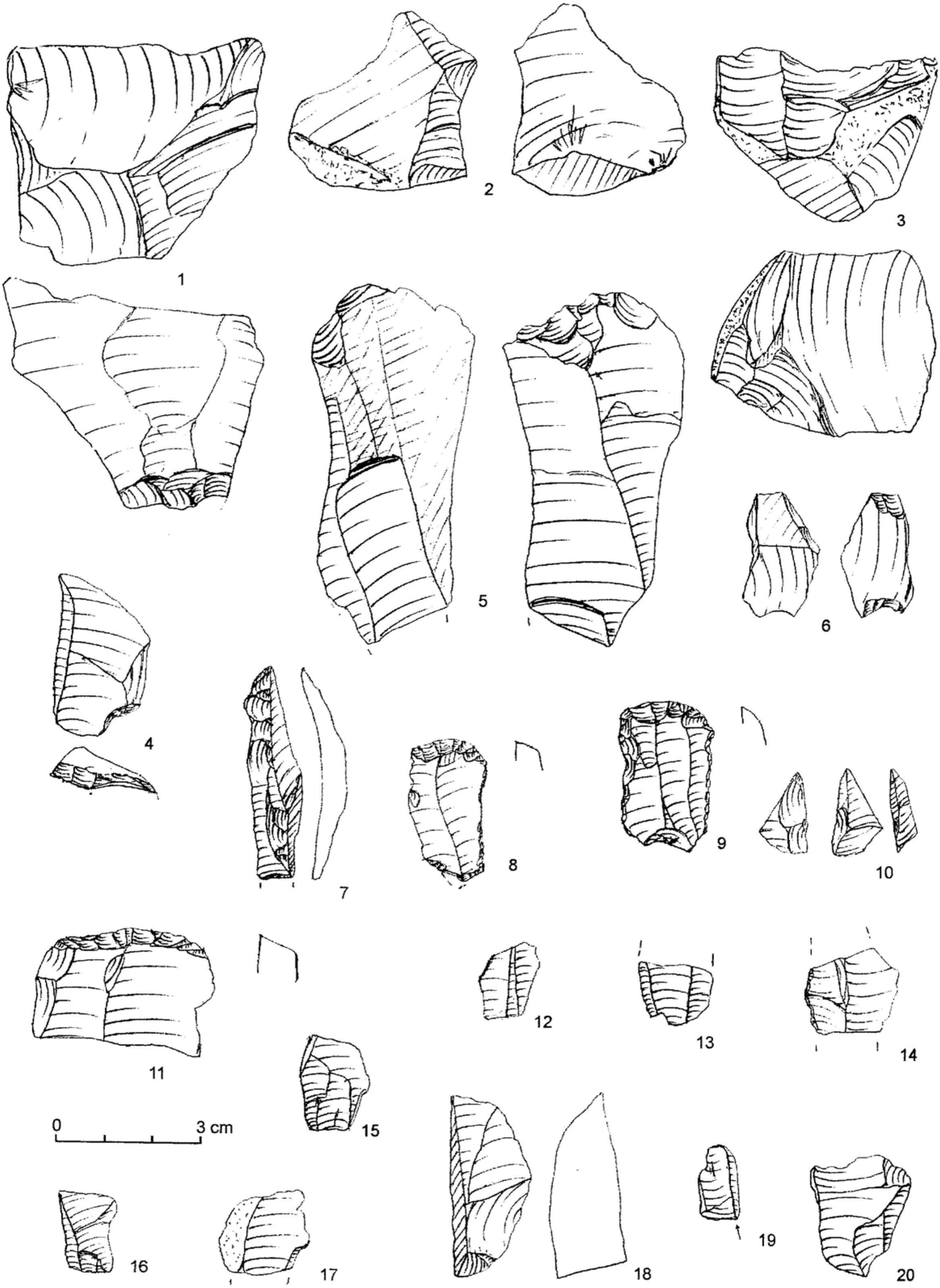
de datations radiométriques. Outillages semblables sont connus sur des sites épiaurignaciens de la Moravie (Karolin I, Určice, Ondratice II – Oliva 1986, 1996). Cette phase récente de l'Aurignacien (dite « épiaurignacienne ») est datée en Basse-Autriche entre 23 et 20 ka BP (Kozłowski 1996). Néanmoins, ces éléments diagnostiques sont aussi présents dans les sites de l'Épigravettien post-Pléniglaciaire dont le niveau supérieur du site de Kašov en Slovaquie de l'est (Bánesz *et al.* 1992 ; Kozłowski 1996).

3.1 Les matières premières et ses sources

Les habitants préhistoriques du site d'Andornaktálya ont utilisé une gamme de matières premières pour la confection de leurs outils lithiques. Étant donné la grande variété des matériaux utilisés, nous avons classé ceux-ci dans dix catégories d'après leurs caractéristiques macroscopiques (MP1 à MP10 – **figure 2**).

3.1.1 MP1 – obsidiennes

L'utilisation préhistorique de l'obsidienne locale en Hongrie du nord-est fut reconnue très tôt par les spécialistes (Szabó 1877). Une fois découverte leur importance préhistorique, les sources d'obsidienne du bassin des Carpates ont été intensivement étudiées (Nandris 1975 ; Williams-Thorpe *et al.* 1984). L'application des méthodes d'analyses physiques (par ex. Biró *et al.* 1986 ; Williams-Thorpe *et al.* 1987 ; Oddone *et al.* 1999 ; Kasztovszky & Biró 2006) a abouti à distinguer deux types principaux : l'obsidienne de type Carpatique 1 qui est transparente et de couleur noir ou gris foncé, ainsi que l'obsidienne de type Carpatique 2 qui est de couleur noir, non transparente mais plus ou moins translucide sur les bords des éclats.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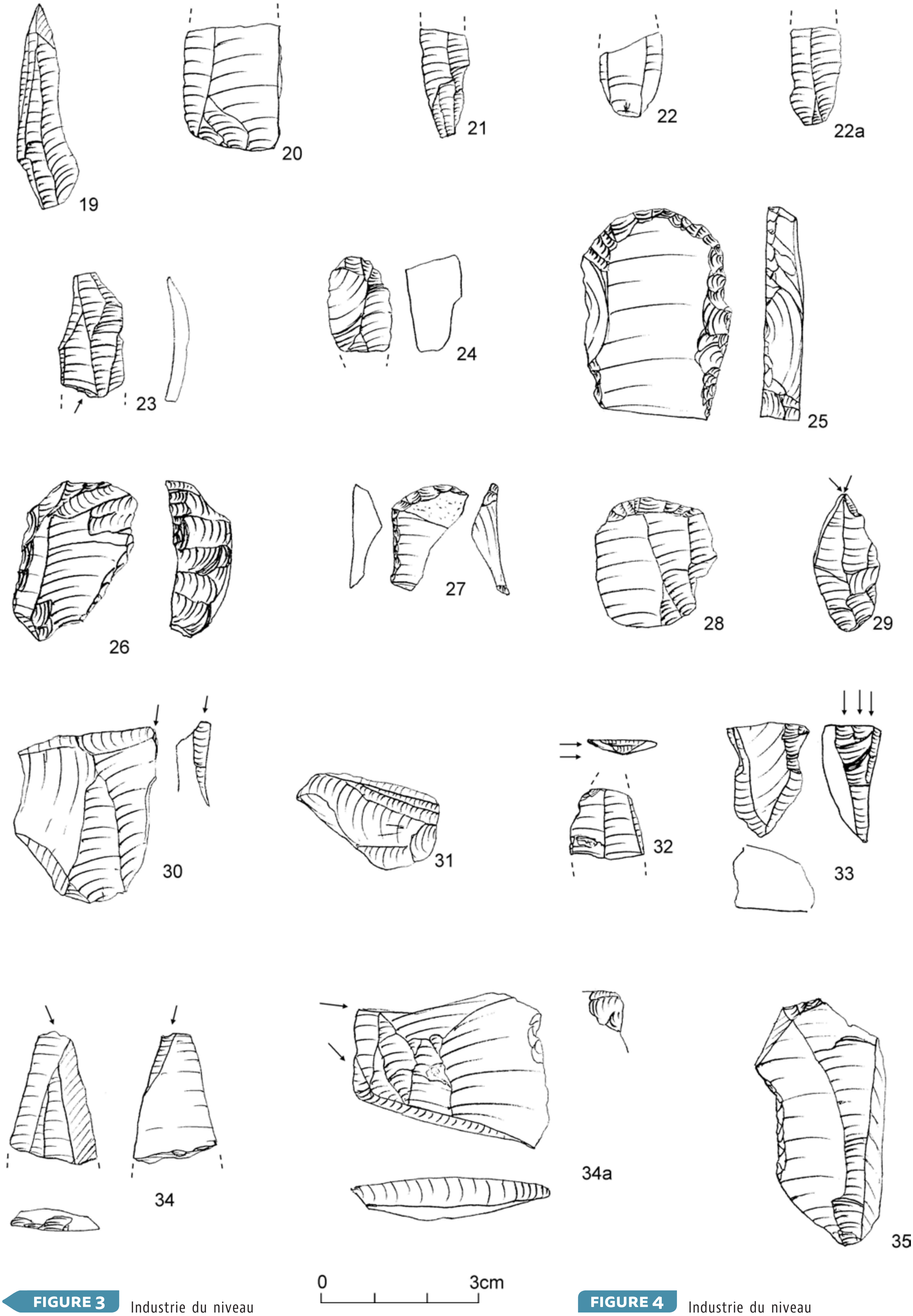

FIGURE 3 Industrie du niveau inférieur (d'après Kozłowski & Mester 2003–2004, fig. 8).

FIGURE 4 Industrie du niveau supérieur (d'après Kozłowski & Mester 2003–2004, fig. 10).

Récemment, un nouveau type a été décrit, l'obsidienne de type Carpatique 3 qui est également translucide et de couleur noir mais qui se reconnaît par les phénocristaux visibles dans la structure vitreuse (Rosania *et al.* 2008; Rácz 2013). Ses sources sont limitées aux environs de Rokosovo en Ukraine transcarpatique. Le type Carpatique 1 (MP1a) et deux variétés du type Carpatique 2 (MP1b, MP1c) se rencontrent dans les assemblages d'Andornaktálya. D'après nos connaissances actuelles, les sources du premier type (MP1a) sont connues dans la montagne de Zemplín en Slovaquie orientale, tandis que celles des deux variétés de l'autre type dans la montagne de Tokaj en Hongrie du nord-est, notamment aux environs de Tolcsva (MP1b), de Mád et d'Erdőbénye (MP1c) (**figure 5**, n^{os}1–5 et 9).

3.1.2 MP2 – radiolarites

Ce sont des roches sédimentaires d'âge mésozoïque, de couleur brun, parfois jaunâtre, rarement gris verdâtre. Parmi les radiolarites des assemblages étudiées d'Andornaktálya, un groupe se distingue par sa couleur brun foncé et surtout par son aspect brillant (MP2a). Les sources de cette variété bien reconnaissable (nommée aussi radiolarite carpatique) ont été identifiées dans la zone de la ceinture rocheuse (Klippen Belt) des Carpates de nord-ouest, s'étendant de la région de Trenčín en Slovaquie de l'ouest à travers les Piénines en Pologne du sud jusqu'à la région de Sabinov en Slovaquie de l'est (Valde-Nowak 1995; Kaminská 2001). Le reste des radiolarites à Andornaktálya (MP2b) est considéré comme d'origine locale sans en avoir plus de précision. Les recherches géologiques récentes de la montagne de Bükk ont révélé la présence de plusieurs formations encaissant des corps de radiolarite, ainsi que celle de nappes de graviers contenant de galets de radiolarite (Pelikán 1986, 2002) (**figure 5**, n°15; **figure 6**, n^{os}2–3 et 10).

3.1.3 MP3 – quartzporphyre

Il s'agit d'une des plus fameuses matières premières du Paléolithique de la Hongrie. Dans les publications, elle est appelée d'abord calcédoine gris (Kadić 1916), puis quartzporphyre à texture vitreuse (Vértes & Tóth 1963), plus tard quartzporphyre à texture felsitique (Simán 1986), enfin porphyre à texture felsitique du Szélétien (Biró & Dobosi 1991). En réalité, c'est une sorte de métarhyolite formée par le volcanisme au Triassique (Pelikán 2005). Elle est de couleur gris clair ou foncé, à texture vitreuse ou feuilletée. La patine – s'il y en a – est blanche. Elle est très caractéristique et bien reconnaissable sur les sites du Paléolithique d'Europe centrale (Markó *et al.* 2003). Ses sources ne sont connues actuellement que dans la partie orientale de la montagne de Bükk, aux environs de Bükkszentlászló (**figure 5**, n°14).

3.1.4 MP4 – silex du Nord

Cette catégorie regroupe de différents silex bien reconnaissables dont les sources connues se trouvent outre la chaîne montagneuse des Carpates vers le Nord ou vers l'Est. Ils sont de bonne ou même de très bonne qualité. Cinq types en ont été identifiés. Le premier (MP4a) est presque translucide, de couleur gris brunâtre, avec une structure très homogène. Le cortex est mince et assez fin, de couleur brun clair. La patine blanche un peu bleuâtre de ce silex se développe à partir des points parsemés sur la surface. Ce matériau provient de la Silésie en Pologne du sud-ouest (Kozłowski & Pawlikowski 1989) (**figure 5**, n^{os}6–8 et 10; **figure 6**, n^{os}5 et 8). Le second type (MP4b) est de couleur gris foncé, mais sa structure est plus compacte. Il paraît identique au silex du Jurassique des environs de Cracovie en Pologne du sud (Kozłowski 1991). Le troisième type (MP4c) est brun plus ou moins clair, à structure très homogène, un peu translucide. Il provient probablement de la région du Dniestr en Ukraine de l'ouest (Konoplya 1998) (**figure 6**, n°13). Le quatrième type (MP4d) est très caractéritique, sa présence dans le Paléolithique de la montagne de Bükk est démontrée depuis longtemps (Vértes 1960; Kozłowski 1962). Il s'agit d'un silex de couleur gris brunâtre ou verdâtre avec des taches blanches plus ou moins grandes. Ses sources sont connues uniquement

FIGURE 5 Assemblage ramassé sur la surface, illustrant la gamme des matières premières (d'après Kozłowski & Mester 2003–2004, fig. 14) : 1–5, 9. Obsidienne (MP1a) ; 6-8, 10. Silex de Silésie (MP4a) ; 11–12. Opalite (MP5) ; 13, 18. Limnoquartzite de l'Avas (MP6a) ; 14. Quartzporphyre (MP3) ; 15. Radiolarite carpatique (MP2a).

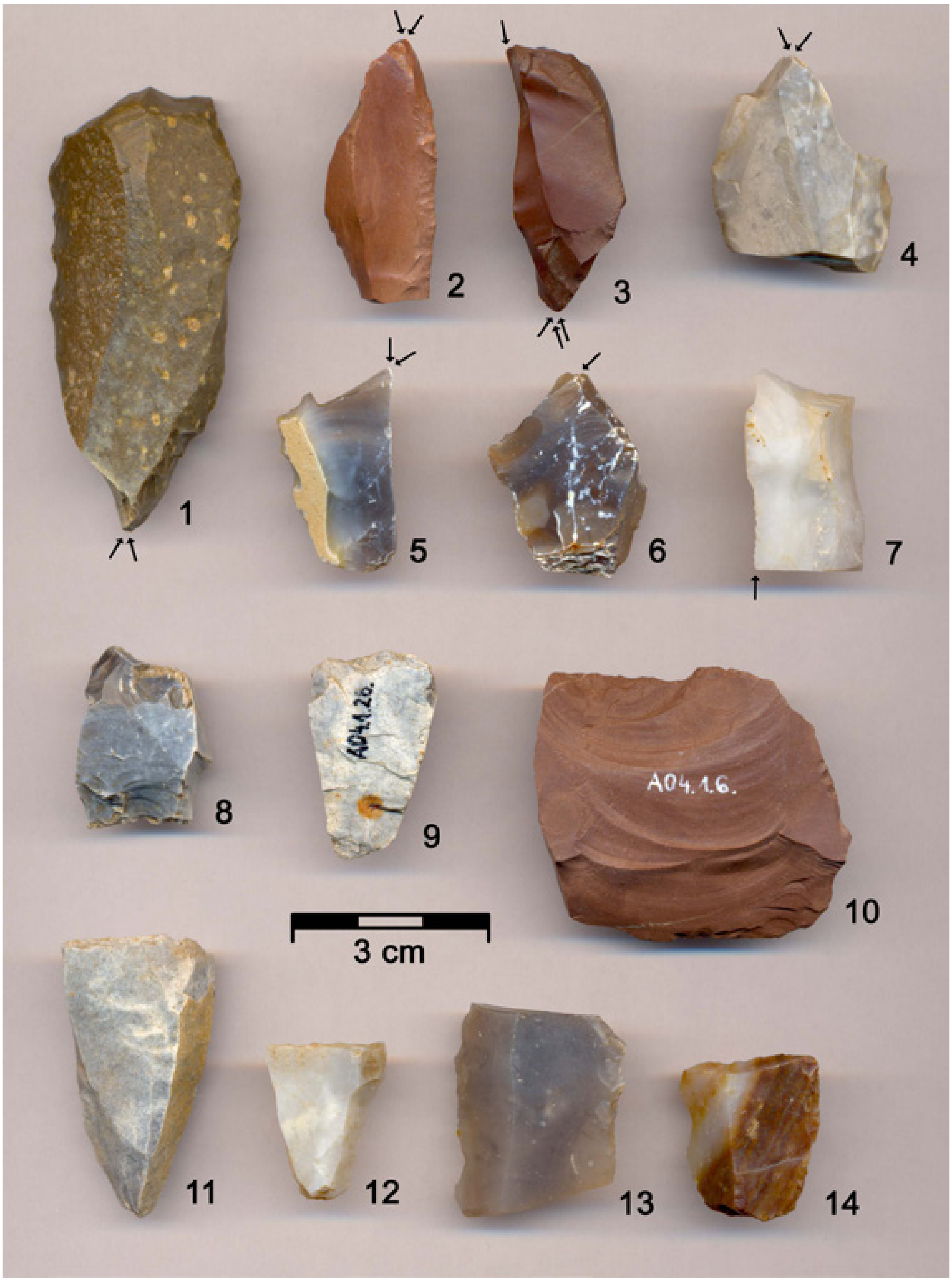

FIGURE 6 Assemblage ramassé sur la surface, illustrant la gamme des matières premières (d'après Kozłowski & Mester 2003-2004, fig. 15) : 1. Silex de Świeciechów (MP4d) ; 2-3. Radiolarite carpatique (MP2a) ; 4. Opalite (MP5) ; 5, 8. Silex de Silésie (MP4a) ; 6. Limnoquartzite de la montagne de Bükk (MP6b) ; 7, 12. Limnoquartzite d'origine inconnue (MP6c) ; 9, 11. Grès silicifié d'Egerbakta (MP9) ; 10. Radiolarite de la montagne de Bükk (MP2b) ; 13. Silex de la région du Dniestr (MP4c) ; 14. Limnoquartzite de l'Avas (MP6a).

dans la vallée moyenne de la Vistule aux environs de Świeciechów (Balcer 1976; Kaczanowska & Kozłowski 2005) (**figure 6**, n°1). Le cinquième type (MP4e) est un silex brun, brun grisâtre ou gris verdâtre, identique à la chaille d'Ondava dont les sources se situent dans la vallée de la rivière Ondava en Slovaquie de l'est (Kaminská 2001).

MP5 – opalites **3.1.5** Les matériaux appartenant à cette catégorie sont de couleur varié: blanc, beige, brun ou gris. Ils sont apparemment de meilleure qualité. Parfois leur surface est brillante. À notre connaissance actuelle, leurs sources ne sont pas identifiables. Les affleurements sont à chercher dans les formations d'origine volcanique du Néogène de la chaîne de montagnes du nord de la Hongrie (Takács-Biró 1986). À noter cependant qu'il y en a également en Slovaquie (Kaminská 2001) (**figure 5**, n^os^11–12; **figure 6**, n°4).

MP6 – hydro- et limnoquartzites **3.1.6** Les formations précitées du Néogène contiennent également des roches siliceuses d'origine hydrothermale (Takács-Biró 1986). Ces roches sont nommées hydro- et limnoquartzites dans la littérature archéologique, bien qu'elles disposent de caractéristiques pétrographiques exrêmement variées suivant les conditions physico-chimiques de leur formation. Récemment, les collègues tchèques et slovaques ont tendance à les nommer limnosilicites qui est une dénomination plus générale (Přichystal 2010; Kaminská 2013). À l'intérieur de cette catégorie à Andornaktálya, nous avons distingué trois groupes par raison d'importance quantitative. Le premier groupe (MP6a) comprend les roches caractéristiques provenant du mont Avas à Miskolc. Elles sont de couleur polychrome qui se compose de parties blanches, jaunes et brunes, parfois rouge, formant des tâches ou des bandes de raies (**figure 5**, n^os^13 et 16; **figure 6**, n°14). Le deuxième groupe (MP6b) représente une variété également caractéristique d'hydroquartzite, de couleur brune, plutôt foncée, plus ou moins translucide. Nous ne pouvons pas exactement localiser sa source mais elle doit se trouver dans les formations du Tertiaire s'étendant au sud de la montagne de Bükk (**figure 6**, n°6). Le troisième groupe (MP6c) embrasse toutes les autres variétés dont certaines peuvent provenir de plus grande distance (région de la montagne de Mátra vers l'ouest ou celle de la montagne de Tokaj vers l'est).

MP7 – chaille **3.1.7** Ce matériau est également nommé silex corné *(Hornstein, hornstone)* dans la littérature archéologique hongroise. Il est de couleur noir ou gris pour la plupart et parfois verdâtre ou brunâtre. Certaines pièces portent un cortex lisse et arrondi, ce qui fait penser à des galets comme formes originelles des blocs. Les sources sont connues dans la partie du Sud-ouest de la montagne de Bükk, notamment aux environs de Bükkzsérc (Pelikán 2002). Il faut y ajouter que de chailles ménilitiques noires sont également connus en Slovaquie de l'est (Kaminská 2001) qui ont été utilisés au Paléolithique moyen et supérieur de la région.

MP8 – marne silicifiée **3.1.8** Il s'agit de roches siliceuses de couleur gris verdâtre ou vert grisâtre dans lesquelles on peut souvent voir des veines noires. C'est une matière de qualité médiocre pour la taille, quand même elle est généralement présente dans les industries des sites de la partie méridionale de la région de la montagne de Bükk (Kozłowski *et al.* 2009, 2012). Ses sources sont à chercher dans les formations du Tertiaire de la même région.

MP9 – grès silicifié **3.1.9** C'est un matériau très caractéristique et bien connu dans le Paléolithique de la région (Kozłowski *et al.* 2009, 2012). Il est facilement reconnaissable de sa surface grenue, de sa couleur grise claire ou brune claire, avec la surface naturelle toujours brune claire et la patine blanche. Ses affleurements se trouvent vers le Nord-ouest à environ 15 km du site près d'Egerbakta (**figure 6**, n^os^9 et 11).

3.1.10 MP10 – divers

Cette catégorie regroupe les pièces dont la matière première ne correspond pas – par son aspect macroscopique – à aucune des catégories précédentes. Entre autres, du quartz, du quartzite, du calcaire, du calcédoine se rencontrent ici. Leur sources sont également inconnues.

3.2 Les zones d'approvisionnement

Pour évaluer la relation entre le site et les sources des matières premières utilisées, les études tiennent compte généralement de leur distance et appliquent trois catégories : locale, régionale et éloignée (Geneste 1988). Les limites de distance de ces catégories varient largement dans le temps et dans l'espace, et se modifient suivant les données des nouvelles découvertes (Féblot-Augustins 1997, 2009). Puisque de tracer des cercles autour du site à 25, 50, 100 ou 200 km nous paraît trop arbitraire et sans signification réelle, nous avons choisi une approche plus « pratique » qui essaie de tenir compte de l'accessibilité des sources. Probablement, il était plus difficile aux hommes préhistoriques à s'approvisionner d'une roche dont les affleurements se trouvaient à 10 km mais sur l'autre rive d'une grande rivière que d'une autre dont les sources étaient à 60 km mais de ce côté. En tenant compte des situations géographiques des sources des matières premières présentes à Andornaktálya, nous avons subdivisé le territoire d'approvisionnement en six zones qui devaient représenter des unités réelles de circulation (**figure 7**).

La zone I est comprise jusqu'à une distance de 20 km du site. Ce sont les matières premières locales *sensu stricto* dont les sources sont facilement accessibles, c'est-à-dire sans obstacle géographique. MP6b, MP7 (sauf les variétés qui peuvent être de la Slovaquie), MP8 et MP9 appartiennent à cette zone se situant dans la partie proche de la région de Bükk. La zone II embrasse les gîtes se situant à 20 à 40 km. Ils sont assez proches mais il faut traverser la montagne de Bükk pour y avoir accès. MP2b se trouve au centre, tandis que MP3 et MP6a sont au côté opposé de la région montagneuse. La zone III, entre 80 et 120 km, représente les sources de l'obsidienne (MP1a, MP1b, MP1c) dans la montagne voisine où l'on peut arriver

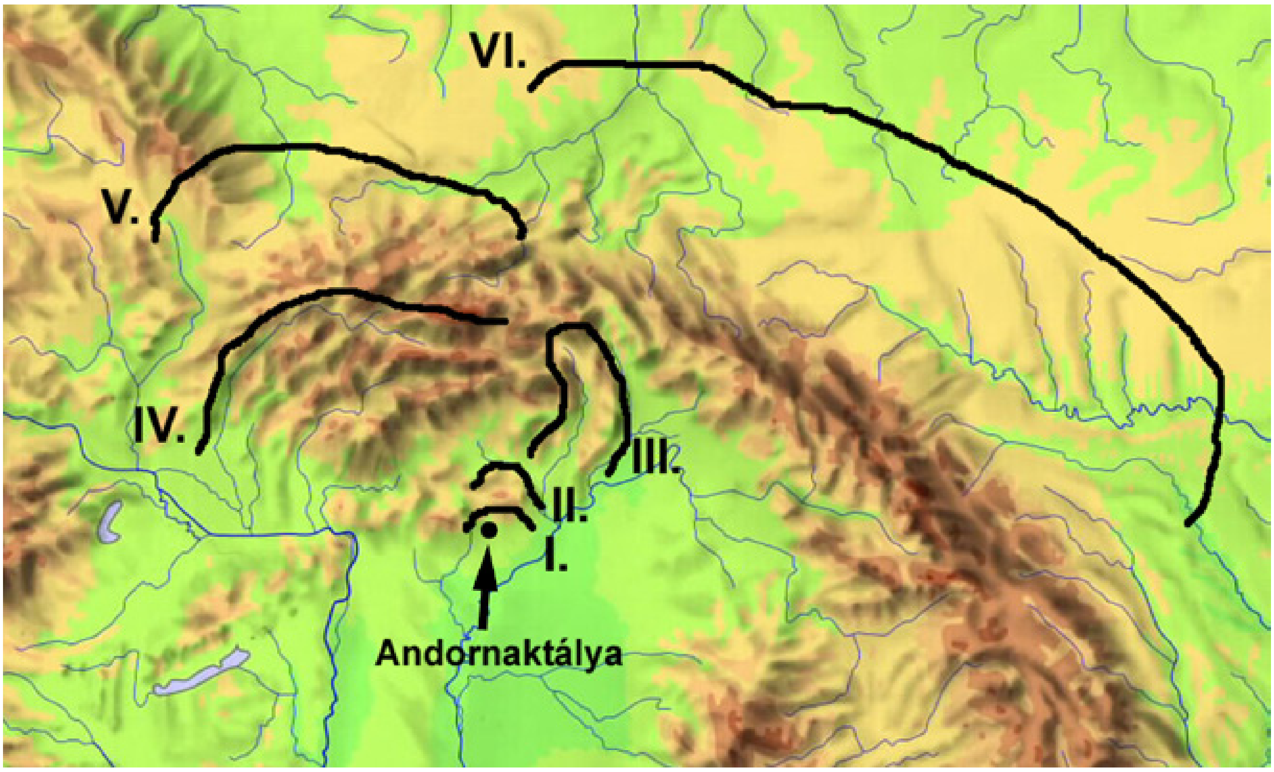

FIGURE 7 Zones d'approvisionnement des habitants du site d'Andornaktálya (d'après Mester 2009, fig. 6).

en traversant des cours d'eau (au moins la rivière Hernád). La zone IV signifie déjà des sources éloignées avec les distances comprises entre 150 et 210 km. Elles sont lointaines mais encore en deçà de la chaîne des Carpates. Les affleurements de MP2a et MP4e (et éventuellement certaines variétés de MP7) sont dans cette zone. La zone V, entre 250 et 300 km, manifeste plus de difficultés d'accès. Appartenant à cette zone, MP4a et MP4b se situe déjà sur l'autre côté de la chaîne des Carpates en Pologne du sud-ouest. La zone VI représente les gîtes de MP4c et MP4d, vraiment très éloignés (entre 350 et 400 km). Enfin, les sources inconnues de MP5, MP6c et MP10 appartiennent probablement à l'une ou même à plusieurs des zones précédentes, mais nous sommes obligés de les traiter à part.

3.3 Comportement face aux matières premières

La composition de matières premières de l'industrie d'Andornaktálya selon les catégories énumérées a montré une économie intéressante (**figure 2**). Celle-ci a eu trois piliers : les obsidiennes (MP1 – 25,57 %), les silex extra-carpatiques (MP4 – 22,52 %) et les hydro- et limnoquartzites (MP6 – 21,35 %). Ces trois catégories dominent l'assemblage, les autres roches – même locales – sont nettement moins présentes (MP7 – 9,60 %, MP2 – 6,04 %, MP8 – 5,39 %). En plus, bien que la composition de la catégorie des hydro- et limnoquartzites (MP6) soit assez équilibrée, les obsidiennes et les silex extra-carpatiques sont prédominés par l'une des types : l'obsidienne de la Slovaquie (MP1a) et le silex de la Silésie (MP4a) représentent respectivement 85,53 % et 91,36 % de sa catégorie. Un phénomène intéressant est ici la présence anecdotique du quartzporphyre qui est parmi les matières premières les plus préférées dans la région de la montagne de Bükk durant le Paléolithique moyen et supérieur ancien. Dans les deux industries moustériennes de la grotte Subalyuk, le quartzporphyre gris occupe la sixième et la seconde place dans l'ordre de fréquence avec 5,80 % et 18,18 % respectivement (Mester 2004). Sur les sites en plein air de la région d'Eger, il atteigne toujours 10–20 % dans les assemblages à outils foliacés attribués au Szélétien, tandis qu'il ne fait que 1–3 % dans les industries sans pièces foliacées attribuées à l'Aurignacien (Zandler 2006).

Une autre curiosité de la composition de matières premières de l'industrie réside dans les proportions des différentes zones d'approvisionnement. Il est une observation générale dans les industries du Paléolithique moyen et supérieur ancien de l'Europe que le pourcentage des roches, utilisées pour la confection des outils, se diminue parallèlement à la distance de leurs sources par rapport au site, tandis que le degrée de l'élaboration augmente (Geneste 1988 ; Féblot-Augustins 1997, 1999). L'assemblage d'Andornaktálya s'oppose à ce modèle parce que les matières premières des zones III et V jouent un rôle aussi important que celles de la zone I (**figure 8**). En plus, leur répartition selon les catégories technologiques démontre qu'elles ont été consommées de la manière des matériaux locaux (**figure 9**). Cette analogie est également confirmée par le taux des pièces corticales : il est de 8,72 % pour MP1a, de 10,54 % pour MP4a, de même il varie entre 10,81 % et 14,29 % pour les quatre roches de la zone I.

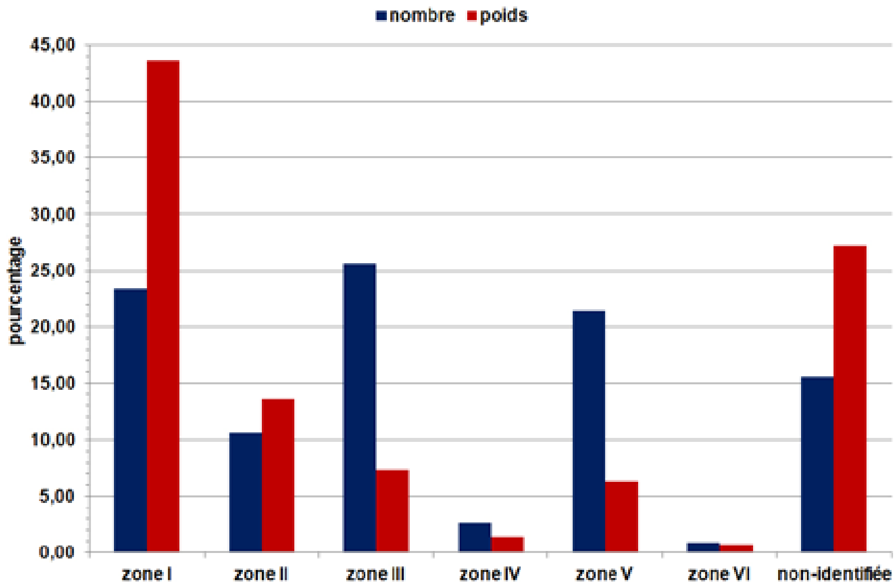

FIGURE 8 Pourcentages des matières premières selon les zones d'approvisionnement.

4 MODE DE CONTACTS

En général, l'acquisition des matières premières est interprétée dans le cadre des mobilités des groupes et/ou des échanges dans les réseaux relationnels (Geneste 1988; Turq 1996; Gamble 1998, 1999; Féblot-Augustins 1999; Whallon 2006). Dans le cas du site d'Andornaktálya, deux zones éloignées du territoire d'approvisionnement jouent un rôle apparemment aussi primordial que la zone strictement locale. À notre avis, il est très difficile à expliquer ce phénomène par la mobilité du même groupe. Pour cela, il faudrait supposer un vaste territoire – de la Silésie à la Slovaquie de l'est – d'environ 45 000 km^2, parcouru au moins périodiquement. Cette superficie correspond mieux au territoire d'une tribu (ou bande maximale) d'après les estimations basées sur les données du Magdalénien de l'Allemagne du sud (Whallon 2006: 267). Ainsi, on doit envisager plutôt la possibilité d'une interprétation par réseau relationnel. Dans cette optique, il est important que les zones primordiales précitées sont en relation avec les régions mentionnées plus haut où se trouvent des industries similaires de la phase récente de l'Aurignacien.

L'économie de matières premières de l'Aurignacien des sites dans la vallée de Hornád en Slovaquie de l'est est essentiellement basée sur les limnoquartzites: l'industries de Barca II, Seňa I et Kechnec I sont largement prédominées par ce type de roche dont le pourcentage varie entre 71,84 et 99,01 (Kaminská 2001: 91–94). Les limnoquartzites y sont complétés surtout par les radiolarites. L'assemblage très pauvre du niveau inférieur du site d'Andornaktálya ne contredit pas à cela (**figure 2**).

Au site de Tibava qui représente une phase plus développée de l'Aurignacien de la Slovaquie de l'est, la composition de matières premières est tout à fait différente (Kaminská 2001: 94). Les limnoquartzites n'y occupent que la sixième place dans l'ordre de fréquence. La matière la plus nombreuse est le quartzite carpatique (37 %), suivie par l'obsidienne (19 %), l'opalite (14 %), la chaille (12 %) et la radiolarite (11 %). Le quartzite carpatique est un grès silicifié dont les sources se trouvent dans la chaîne de montagnes de Vihorlat–Gutin dans les Carpates du nord-est (Rácz 2013). Ce matériau est inconnu à Andornaktálya. Il faut y ajouter que l'obsidienne à Tibava appartient probablement au type Carpatique 2 (Kaminská 2001: 94) qui est rare à Andornaktálya.

MAT. PREM.	OUTIL	ÉCLAT*	LAME / LAMELLE*	ÉCLAT DE RETOUCHE	ÉCLAT DE PRÉPARATION	NUCLÉUS	BLOC	FRAGMENT**	TOTAL
MP6b	4	4	4		20	4	2	25	63
MP7		4	23	9	33	10	8	25	112
MP8	1	8	12		33	5	4	20	83
MP9	3	6	9		10		2	7	37
zone I	8 2,71 %	22 7,46 %	48 16,27 %	9 3,05 %	96 32,54 %	19 6,44 %	16 5,42 %	77 26,10 %	295 100 %
MP2b	9	1	4		8	5	1	4	32
MP3	2				5	1		9	17
MP6a	13	7	10		24	5	3	18	80
zone II	24 18,61 %	8 6,20 %	14 10,85 %		37 28,68 %	11 8,53 %	4 3,10 %	31 24,03 %	129 100 %
MP1a	10	48	55	37	115	5		51	321
MP1b	10	3	9		13	5		7	47
MP1c		4			3	1		2	10
zone III	20 5,29 %	55 14,55 %	64 16,93 %	37 9,79 %	131 34,66 %	11 2,91 %		60 15,87 %	378 100 %
MP2a	2	2	7		8	3		2	24
zone IV	2 8,33 %	2 8,33 %	7 29,17 %		8 33,33 %	3 12,50 %		2 8,33 %	24 100 %
MP4a	26	17	85	34	96	6	1	48	313
MP4b	1	2	2		2	2			9
zone V	27 8,39 %	19 5,90 %	87 27,02 %	34 10,56 %	98 30,43 %	8 2,48 %	1 0,31 %	48 14,91 %	322 100 %
MP4c	1	1	3		2			2	9
MP4d	1								1
zone VI	2 20,00 %	1 10,00 %	3 30,00 %		2 20,00 %			2 20,00 %	10 100 %
MP5	7	4	4		5	4	5	10	39
MP6c	15	14	29	8	42	4	1	37	150
MP10	2	8	1		3	1	6	13	34
divers	24 10,76 %	26 11,66 %	34 15,25 %	8 3,59 %	50 22,42 %	9 4,04 %	12 5,38 %	60 26,91 %	223 100 %

* produit de débitage ** dont l'appartenance à l'une des autres catégories n'est pas décelable

FIGURE 9 Répartition des assemblages de chaque matière première, regroupés par zones, selon les catégories technologiques.

Quant aux sites de l'Épiaurignacien en Moravie, la matière première préférée y est le silex erratique d'origine du nord qui diffère de celui de la partie morave de la Silésie (Oliva 1996, 2005). La radiolarite, provenant des Carpates blanches en Slovaquie de l'ouest, y est rare et l'obsidienne fait défaut. À Lhotka en Moravie de l'est se rencontrent même des silex de type chocolat dont les sources sont connues dans la montagne de Sainte Croix en Pologne centrale. Cela confirme l'existence de fortes relations vers le Nord. Pour ce qui concerne l'industrie d'Andornaktálya, l'importance du silex de la Silésie et la rareté de la radiolarite carpatique montrent des similitude avec l'économie des sites de la Moravie.

À propos des éléments diagnostiques de l'outillage du niveau supérieur d'Andornaktálya, l'analogie avec l'industrie du niveau supérieur de Kašov en Slovaquie de l'est a également été relevée. La composition de matières premières de cet assemblage est très intéressant de notre point de vue. Elle est caratérisée par la prédominance de l'obsidienne (81,73 %), suivie par les limnoquatzites (9,92 %), la radiolarite (3,11 %), le silex de la Silésie (2,45 %), ainsi que la présence du silex de la région du Dniestr et du quartzporphyre de la montagne de Bükk mérite d'être mentionnée (Kaminská 2001 : 99). Cette composition évoque celle du site d'Andornaktálya, exception faite de la prédominance de l'obsidienne et la relative rareté du silex de la Silésie.

Quoiqu'il en soit, les habitants du site d'Andornaktálya ont eu certains contacts avec ceux des deux régions. Si l'on admet que les groupes qui habitaient ces trois régions (Moravie, montagne de Bükk, Slovaquie orientale) ont fait partie d'un réseau relationnel, l'acquisition de l'obsidienne et du silex de la Silésie pouvait s'effectuée à l'occasion des interactions sociales entre groupes. Cela pouvait signifier de simples visites de délégations, des rencontres pour échanges, ou même des fêtes et des cérémonies (Whallon 2006 : 263). De cette manière, les hommes d'Andornaktálya ont pu avoir de quantité de matières pour raison économique aussi bien que de pièces particulières pour cadeaux ou actions symboliques. Dans ce raisonnement, la présence anecdotique de certaines matières (silex de Świeciechów, silex de la vallée du Dniestr) peut trouver son explication.

REFERENCES

AIELLO L.C. & DUNBAR R.I.M. (1993) – Neocortex size, group size, and the evolution of language. *Current Anthropology* 34(2) : 184–193.

BÁNESZ L. (1959) – Paleolitické stanice pri Kechneci. *Slovenská Archeológia* 7 : 205–240.

BÁNESZ L. (1960) – Aurignacké nálezy v Seni I v r. 1959. *Archeologické rozhledy* 12 : 428–430.

BÁNESZ L. (1967) – Paleolitické sídliskové objekty z Barce-Svetlej III. *Archeologické rozhledy* 19 : 285–295.

BÁNESZ L. (1968) – *Barca bei Košice - Paläolithische Fundstelle*. Archaeologica Slovaca Fontes 8, Vydalvateľstvo Slovenskej Akadémie Vied, Bratislava.

BÁNESZ L., HROMADA J., DESBROSSE R., MARGERAND I., KOZŁOWSKI J.K., SOBCZYK K. & PAWLIKOWSKI M. (1992) – Le site de plein air du Paléolithique supérieur de Kašov en Slovaquie orientale (Étude préliminaire d'une structure spatiale des outillages épigravettiens en obisidienne). *Slovenská Archeológia* 40 : 5–28.

BIRDSELL J.B. (1958) – On population structure in generalized hunting and collecting populations. *Evolution* 12(2) : 189–205.

BIRDSELL J.B. (1968) – Some predictions for the Pleistocene based on equilibrium systems among recent hunter-gatherers. *In* : R. B. Lee & I. De Vore (eds), *Man the hunter*. Aldine Publishing Company, Chicago, p. 229–240.

BIRÓ K. & DOBOSI V. (1991) – *Lithotheca - Comparative Raw Material Collection of the Hungarian National Museum*. Magyar Nemzeti Múzeum, Budapest.

BIRÓ K.T., POZSGAI I. & VLADÁR A. (1986) – Electron beam microanalyses of obsidian samples from geological and archaeological sites. *Acta Archaeologica Academiae Scientiarum Hungaricae* 38 : 257–278.

BUDEK A. & KALICKI T. (2003–2004) – Sedimentological and micromorphological studies of T11 section at Andornaktálya. *Praehistoria* 4–5 : 145–152.

BUDEK A., KALICKI T., KAMINSKÁ Ľ., KOZŁOWSKI J.K. & MESTER ZS. (2013) – Interpleniglacial profiles on open-air sites in Hungary and Slovakia. *In:* L. Lisa & M.K. Jones(eds), MIS 3 in Central Europe. *Quaternary International*, 294: 82-98.

CSÁNYI V. (1999) – *Az emberi természet. Humánetológia*. Vince Kiadó, Budapest.

DUNBAR R.I.M. (1992) – Neocortex size as a constraint on group size in primates. *Journal of Human Evolution* 20 : 469–493.

DUNBAR R.I.M. (1993) – Coevolution of neocortical size, group size and language in humans. *Behavioral and Brain Sciences* 16(4) : 681–735.

DUNBAR R.I.M. & SCHULTZ S. (2007) – Understanding primates brain evolution. *Philosophical Transactions of the Royal Society B* 362 : 649–658.

FÉBLOT-AUGUSTINS J. (1997) – *La circulation des matières premières au Paléolithique*. Liège, ERAUL 75(II).

FÉBLOT-AUGUSTINS J. (1999) – La mobilité des groupes paléolithiques. *Bulletins et Mémoires de la Société d'Anthropologie de Paris* 11(3–4) : 219–260.

FÉBLOT-AUGUSTINS J. (2009) – Revisiting European Upper Paleolithic raw material transfers : the demise of the cultural ecological paradigm? *In* : B. Adams & B.S. Blades (eds), *Lithic Materials and Paleolithic Societies*. Blackwell Publishing, Oxford, p. 25–46.

FODOR L. (1984) – Néhány őskori lelőhely Eger környékén. *Agria* 20 : 73–116.

GAMBLE C. (1998) – Palaeolithic society and the release from proximity : A network approach to intimate relations. *World Archaeology* 29(3) : 426–449.

GAMBLE C. (1999) – *The Palaeolithic societies of Europe*. Cambridge University Press, Cambridge.

GAMBLE C., GOWLETT J. & DUNBAR R. (2011) – The social brain and the shape of the Palaeolithic. *Cambridge Archaeological Journal* 21(1) : 115–135.

GENESTE J.-M. (1988) – Systèmes d'approvisionnement en matières premières au Paléolithique moyen et au Paléolithique supérieur en Aquitaine. *In:* J. K. Kozlowski (coord.), *L'Homme de Néandertal : Actes du colloque international de Liège (4–7 décembre 1986). Volume 8 : La mutation*. Liège, ERAUL 35 : 61–70.

GENESTE J.-M. (1989) – Économie des ressources lithiques dans le Moustérien du Sud-Ouest de la France. Dans : L. Freeman & M. Patou (coords.), *L'Homme de Néandertal : Actes du colloque international de Liège (4–7 décembre 1986). Volume 6 : La subsistance*. Liège, ERAUL 33 : 75–97.

GOWLETT J., GAMBLE C. & DUNBAR R. (2012) – Human evolution and the archaeology of the social brain. *Current Anthropology* 53(6) : 693–722.

HEVESI A. & RINGER Á. (2003–2004) – The geoarchaeological studies of the site "Zúgó-dűlő" at Andornaktálya. *Praehistoria* 4–5 : 141–144.

KACZANOWSKA M. & KOZŁOWSKI J.K. (2005) – L'importance de silex de Świeciechów dans l'Âge de la Pierre : indicateur de changements de relations culturelles autour des Carpates occidentales. *Praehistoria* 6 : 71–83.

KADIĆ O. (1916) – Ergebnisse der Erforschung der Szeletahöhle. *Mitteilungen aus dem Jahrbuche der königlichen Ungarischen Geologischen Reichsanstalt* 23 : 161–301.

KAMINSKÁ Ľ. (2001) – Die Nutzung von Steinrohmaterialien im Paläolithikum der Slowakei. *Quartär* 51–52 : 81–106.

KAMINSKÁ Ľ. (2013) – Sources of raw materials and their use in the Palaeolithic of Slovakia. *In* : Zs. Mester (ed.), *The lithic raw material sources and interregional human contacts in the Northern Carpathian regions*. Polish Academy of Arts and Sciences–Institute of Archaeological Sciences of the Eötvös Loránd University, Kraków–Budapest, p. 99–109.

KASZTOVSKY ZS. & BIRÓ K.T. (2006) – Fingerprinting Carpathian obsidians by PGAA : first results on geological and archaeological specimens. *In : 34*[th] *International Symposium on Archaeometry, 3–7 May 2004 Zaragoza*, Spain. Institución "Fernando el Católico" (C.S.I.C.), Zaragoza, p. 301–308.

KONOPLYA V. [КОНОПЛЯ В.] (1998) – Класифікація крем'яної сировини Заходу України. *Наукові записки* 7 : 139–157.

KOZLOWSKI J.K. (1962) – Nowe znalezisko importu z krzemienia świeciechowskiego na terenie Węgier (A new finding of an imported object made of świeciechowski flint in Hungary). *Archeologia Polski* 7 : 331–335.

KOZŁOWSKI J.K. (1991) – Raw material procurement in the Upper Paleolithic of Central Europe. *In* : A. Montet-White & S. Holen (eds), *Raw material economies among Prehistoric hunter-gatherers*. Publications in Anthropology 19, University of Kansas, Lawrence, p. 187–196.

KOZŁOWSKI J.K. (1996) – The Latest Aurignacian and "aurignacoid" elements in the Epigravettian of the Carpathian Basin. *In* : A. Palma di Cesnola, A. Montet-White & K. Valoch (eds), *XIII International Congress of Prehistoric and Protohistoric Sciences, Forlì – Italia - 8/14 September 1996, Colloquia 6, The Upper Palaeolithic*. A.B.A.C.O. Edizioni, Forlì, p. 83–98.

KOZŁOWSKI J.K. & MESTER ZS. (2003–2004) – Un nouveau site du Paléolithique supérieur dans la région d'Eger (Nord-est de la Hongrie). *Praehistoria* 4–5 : 109–140.

KOZŁOWSKI J.K. & PAWLIKOWSKI M. (1989) – Investigations into the northern lithic raw materials in upper Silesia (Poland). *In*: J. K. Kozłowski (ed.), *"Northern" (erratic and jurassic) flint of south polish origin in the Upper Palaeolithic of Central Europe*. Institute of Archaeology Jagellonian University - Cracovia, Department of Anthropology University of Kansas - Lawrence, Kraków, p. 17–46.

KOZŁOWSKI J.K., MESTER ZS., ZANDLER K., BUDEK A., KALICKI T., MOSKAL M. & RINGER Á. (2009) – Le Paléolithique moyen et supérieur de la Hongrie du nord: nouvelles investigations dans la région d'Eger. *L'Anthropologie* 113(2): 399–453.

KOZŁOWSKI J.K., MESTER ZS., BUDEK A., KALICKI T., MOSKAL-DEL HOYO M., ZANDLER K., BÉRES S. (2012) – La mise en valeur d'un ancien site éponyme: Eger-Kőporos dans le Paléolithique moyen et supérieur de la Hongrie du nord. *L'Anthropologie* 116(3): 405–465.

MARKÓ A., BIRÓ K.T. & KASZTOVSKY ZS. (2003) – Szeletian felsitic porphyry: non-destructive analysis of a classical Palaeolithic raw material. *Acta Archaeologica Academiae Scientiarum Hungaricae* 54: 297–314.

MESTER ZS. (2004) – Technologie des industries moustériennes de la grotte Subalyuk (Hongrie). *In*: Le Secrétariat du Congrès (éd.), *Actes du XIVe Congrès UISPP, Université de Liège, Belgique, 2–8 septembre 2001. Section 5: Le Paléolithique moyen: Sessions générales et posters*. BAR International Series 1239, Archaeopress, Oxford, p. 127–133.

MESTER ZS. (2009) – Nyersanyagbeszerzés és -feldolgozás egy felső paleolit telepen: Andornaktálya-Zúgó-dűlő (Raw material acquisition and processing at an Upper Palaeolithic settlement: Andornaktálya–Zúgó-dűlő). In: G. Ilon (szerk.), *ΜΩΜΟΣ VI. - Őskoros Kutatók VI. Összejövetelének konferenciakötete. Nyersanyagok és kereskedelem. Kőszeg*, 2009. március 19 – 21. Szombathely, p. 239–254.

NANDRIS J. (1975) – A re-consideration of the South-east European sources of archaeological obsidian. *Bulletin of the Institute of Archaeology, University of London* 12: 71–94.

ODDONE M., MÁRTON P., BIGAZZI G. & BIRÓ K.T. (1999) – Chemical characterisations of Carpathian obsidian sources by instrumental and epithermal neutron activation analysis. *Journal of Radioanalytical and Nuclear Chemistry* 240(1): 147–153.

OLIVA M. (1986) – Finds from the Pleniglacial B from the territory of Czechoslvakia and the question of the Epiaurignacian settlement. *The World Archaeological Congress, The Pleistocene Perspective*, Vol. II., Southampton, p. 1–6.

OLIVA M. (1996) – Epiaurignacien en Moravie: le changement économique pendant le deuxième interpléniglaciaire wurmien. *In*: A. Palma di Cesnola, A. Montet-White & K. Valoch (eds), *XIII International Congress of Prehistoric and Protohistoric Sciences, Forlì – Italia - 8/14 September 1996, Colloquia 6, The Upper Palaeolithic*. A.B.A.C.O. Edizioni, Forlì, p. 69–81.

OLIVA M. (2005) – L'exploitation du paysage et des ressources lithiques au Paléolithique en République tchèque. *In*: D. Vialou, J. Renault-Miskovsky & M. Patou-Mathis (dir.), *Comportements des hommes du Paléolithique moyen et supérieur en Europe: territoires et milieux. Actes du Colloque du G.D.R. 1945 du CNRS, Paris, 8–10 janvier 2003*. Liège, ERAUL 111: 107–120.

PELIKÁN P. (1986) – The Mesozoic siliceous rocks of the Bükk Mountains. *In*: K.T. Biró (ed.), *Papers for the 1st International Conference on Prehistoric Flint Mining and Lithic Raw Material Identification in the Carpathian Basin, Budapest–Sümeg 1986*. Magyar Nemzeti Múzeum, Budapest, p. 177–180.

PELIKÁN P. (2002) – Földtani felépítés, rétegtani áttekintés. In: Cs. Baráz (szerk.), *A Bükki Nemzeti Park. Hegyek, erdők, emberek*. Bükki Nemzeti Park Igazgatóság, Eger, p. 23–49.

PELIKÁN P. (ED.) (2005) – *A Bükk hegység földtana - Geology of the Bükk Mountains*. Magyar Állami Földtani Intézet, Budapest.

PŘICHYSTAL A. (2010) – Classification of lithic raw materials used for Prehistoric chipped artefacts in general and siliceous sediments (silicites) in particular: the Czech proposal. *Archeometriai Műhely* 2010(3): 177–181.

RÁCZ B. (2013) – Main raw materials of the Palaeolithic in Transcarpathian Ukraine: geological and petrographical overview. *In*: Zs. Mester (ed.), *The lithic raw material sources and interregional human contacts in the Northern Carpathian regions*. Polish Academy of Arts and Sciences–Institute of Archaeological Sciences of the Eötvös Loránd University, Kraków–Budapest, 131–146.

ROSANIA C.N., BOULANGER M.T., BIRÓ K., RYZHOV S., TRNKA G. & GLASCOCK M.D. (2008) – Revisiting Carpathian obsidian. *Antiquity* 82(318), http: //antiquity.ac.uk/projgall/rosania.

SHEEHAN M.S. (2004) – Ethnographic models, archaeological data and the applicability of modern foraging theory. *In*: A. Barnard (ed.), *Hunter-gatherers in history, archaeology and anthropology*. Berg, Oxford–New York, p. 163–173.

SIMÁN K. (1986) – Felsitic quartz porphyry. *In*: K.T. Biró (ed.), *Papers for the 1st International Conference on Prehistoric Flint Mining and Lithic Raw Material Identification in the Carpathian Basin, Budapest–Sümeg 1986*. Magyar Nemzeti Múzeum, Budapest, p. 271–275.

SZABÓ J. (1877) – L'obsidienne préhistorique en Hongrie et en Grèce. *In: Congrès International d'Anthropologie et d'Archéologie Préhistorique, Compte-rendu de la huitième session à Budapest 1876*. Franklin-Társulat, Budapest, p. 96–100.

TAKÁCS-BIRÓ K. (1986) – The raw material stock for chipped stone artefacts in the Northern Mid-Mountains Tertiary in Hungary. *In*: K.T. Biró (ed.), *Papers for the 1st International Conference on Prehistoric Flint Mining and Lithic Raw Material Identification in the Carpathian Basin, Budapest–Sümeg 1986*. Magyar Nemzeti Múzeum, Budapest, p. 183–195.

TURQ A. (1996) – L'approvisionnement en matières premières lithiques au Moustérien : quelques observations et réflexions. *In*: D. Bonjean (éd.), *Néandertal*. Andennes, p. 168–179.

VALDE-NOWAK P. (1995) – North-Carpathians Province of lithic raw Materials in Stone and Bronze Age. *Archeologia Polona* 33 : 111–118.

VÉRTES L. (1960) – Aus Polen stammendes Silexmaterial im ungarischen Paläolithikum und Mesolithikum. Ein Beitrag zur Archäologie der Karpathen. *Acta Archaeologica Carpathica* 1 : 167–172.

VÉRTES L. & TÓTH L. (1963) – Der Gebrauch des glasigen Quarzporphyrs im Paläolithikum des Bükk-Gebirges. *Acta Archaeologica Academiae Scientiarum Hungaricae* 15 : 3–10.

WHALLON R. (2006) – Social networks and information : Non-"utilitarian" mobility among hunter-gatherers. *Journal of Anthropological Archaeology* 25 : 259–270.

WILLIAMS THORPE O., WARREN S.E. & NANDRIS J.G. (1984) – The distribution and provenance of archaeological obsidian in Central and Eastern Europe. *Journal of Archaeological Sciences* 11 : 183–212.

WILLIAMS-THORPE O., WARREN S.E. & NANDRIS J.G. (1987) – Characterization of obsidian sources and artefacts from Central and Eastern Europe, using instrumental neutron activating analysis. *In* : K.T. Biró (ed.), *Proceedings of the 1st International Conference on Prehistoric Flint Mining and Lithic Raw Material Identification in the Carpathian Basin, Budapest–Sümeg 1986*, vol. 2. Magyar Nemzeti Múzeum, Budapest, p. 271–279.

WOBST H.M. (1974) – Boundary conditions for Paleolithic social systems : A simulation approach. *American Antiquity* 39(2) : 147–178.

ZANDLER K. (2006) – *Paleolit lelőhelyek Eger környékén*. Thèse MA, Université Eötvös Loránd, Budapest, manuscrit.

Population dynamics and cultural changes in the Early Upper Palaeolithic of the Central Balkans

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Abstract: Recent investigations in Serbia and Montenegro have filled the gap in our knowledge of the Middle and Upper Palaeolithic in the Balkans providing us with a better understanding of the factors which influenced the appearance of the earliest Upper Palaeolithic techno-complexes in this region. In contrast to the east Balkans, the continuity between Middle and Upper Palaeolithic do exist when it concerns the inhabiting of primary ecological zones but it could not be followed when technology and settlement pattern are concerned. The dating of Šalitrena cave has revealed that Vindija cave can no longer be regarded as an isolated example of the late Neanderthal occupation in the west of the Balkans and that there are strong possibilities that Neanderthals survived in the western Balkans and the interior of the Dinarides somewhat longer than in other parts of the peninsula. We posit that the volcanic eruption before 40 ka which resulted in the Campanian Ignimbrite (CI) tephra deposition, could have had a more significant impact on the Adriatic zone where Middle Palaeolithic population density was the greatest, but had no long-term effect in the northeast part of the peninsula. We suggest that there was a temporal trend in the spread of the Upper Palaeolithic from the east to the west of the Balkans and that the Danube corridor had a significant role in its distribution. We dispute statements that the CI tephra covered the Upper Palaeolithic at several sites in the central Balkans and call into question the conclusion that there was evidence for the existence of Upper Palaeolithic communities in this area before the eruption.

1 INTRODUCTION

The south Carpathian region and the eastern Balkans hold enormous potential for the study of the Middle to Upper Palaeolithic transition in Europe. Very early evidence for the appearance of anatomically modern humans (Trinkaus *et al.* 2003) and their material culture (Tsanova 2008; Sitlivy *et al.* 2012) including cave art (Ghemiş *et al.* 2011) have recently been reported for northern Bulgaria and southwestern Romania., while very late remains of Neanderthals at Vindija cave confirm longer-lasting coexistence of Neanderthals and modern humans in the Balkans (Higham *et al.* 2006). Still, the mod, pathways, and tempo of this expansion of modern humans into Europe remain unsolved, and the question of interactions between the Neanderthals and modern humans remains. The reason for this rests partially on the fact that until recently the central Balkan region had not been thoroughly investigated and so it was not possible to connect phenomena in the east and the west of peninsula. Recent Palaeolithic investigations in Serbia and Montenegro are beginning to fill the gap in our knowledge of the nature and timing of the Middle to Upper Palaeolithic transition. Here we examine to what extent this newly gathered information could contribute towards a more thorough comprehension of cultural changes and population movements in this period.

2 MIDDLE PALAEOLITHIC AND UPPER PALAEOLITHIC SITES: REGIONAL OVERVIEW

Until recently, the Middle Palaeolithic of Serbia could only be discussed on the basis of finds from Risovača where a Middle Palaeolithic industry with leafpoints was excavated in the 1950s (Gavela 1988). Of Upper Palaeolithic sites there was only Crvenka-At with a rich assemblage of Aurignacian finds was gathered in the 1960s and early 1970s (Mihailović 1992). Some attempts to resurrect Palaeolithic research in Serbia were made in the 1980s but the decisive breakthrough occured only around decade ago with the investigations of Petrovaradin Fortress in Vojvodina (Mihailović 2009a), followed by more systematic surveys and both small and large-scale excavations in a number of caves and rock-shelters in east and west Serbia (Mihailović 2008; Mihailović *et al.* 2011).

The course of Palaeolithic research in Montenegro followed a somewhat different trajectory. Very soon after excavations commenced at Crvena Stijena in the mid–1950s it was soon recognized that this site was one of key sites in the region, with cultural deposits exceeding 20 meters and encompassing over twenty Palaeolithic horizons (Basler 1975). Mališina Stijena rock-shelter was excavated in the 1980s (Radovanović 1986) and produced several Middle Palaeolithic horizons, while Bioče cave - excavated in the 1990s - produced a large number of Middle Palaeolithic artifacts (Đuričić 2006). However, neither site has been published in detail and comprehensive technological analyses of artifacts from Crvena Stijena has only recently been completed. Excavations at Crvena Stijena and Bioče have been recently resumed (Baković *et al.* 2009; Derevjanko *et al.* 2012). The industry from layer X at Crvena Stijena was until recently considered to have Aurignacian connections (Benac, Brodar 1958, Basler 1975), but subsequent analyses revealed that such a determination is not reliable (Mihailović 2009b).

In the course of excavations in the area of Petrovaradin Fortress, located high above the right Danube bank of the Danube, we have excavated over one thousands of Middle Palaeolithic artifacts. In this industry mostly based on quartz as a raw material, the Taubachian-Charentian is the most prevalent component, although there are Levallois artifacts as well as backed sidescrapers of somewhat larger size (Mihailović 2009a).

Levallois artifacts were also confirmed in the assemblages gathered at Kozluk near Vršac (Radovanović 1984) and in Zemun, near Belgrade, underneath loess profiles on the bank of the Danube (Šarić 2008).

On the fringe of the Vršac depression, the Crvenka and at complex produced thousands of Upper Palaeolithic artifacts from sand layers (**figure 1**). The industry has homogeneous characteristics and could be ascribed almost completely to the Aurignacian, although a small number of artifacts reveal either Middle Palaeolithic or Gravettian characteristics (Mihailović 1992, Mihailović *et al.* 2011). The Crvenka assemblages consists of artifacts characteristic of the Krems group, including pyramidal bladelet cores, conical endscrapers and few Dufour bladelets, but the elements of Typical Aurignacian nosed and carinated endscrapers *etc.*) are also present . Dihedral burins, carinated and pointed endscrapers, and large sidescrapers are characteristic of the At assemblages, coupled with a somewhat greater incidence of Middle Palaeolithic elements. At the nearby site of Balata, the assemblage was characterized by lower frequencies of Aurignacian elements and a more prominent Middle Palaeolithic (Levallois) component.

Investigations in eastern Serbia have been undertaken in the Iron Gates region and in the Timok and Nišava river basins. Two Palaeolithic horizons have recently been identified at Tabula Traiana cave in the Iron Gates (Borić *et al.* 2012). Several artifacts of Middle Palaeolithic type were found in layer 206, while in layer 207, dated broadly to 41.300 to 34 500 cal BP (bones with cut marks in 34 200 ± 550 BP and 33 450 ± 500 BP), one thick bilaterally retouched blade and one marginally retouched bladelet have been recorded. While ibex remains prevail among the fauna in the Upper Palaeolithic, there were numerous remains of carnivores including cave lion, cave hyena, cave bear, brown bear, wolf, lynx and fox.

An almost identical situation has been encountered in nearby Baranica situated on the bank of Trgoviški Timok (Mihailović *et al.* 2011). Only a very few quartz artifacts were found in layer 4c, while in layer 4a/4b, dated to 35 780 +/- 320 BP (OxA – 13 828), we found flakes, three unretouched blades, endscraper on thick retouched blade and an atypical carinated endscraper on a massive retouched flake (**figure 2**). The variety of raw materials used in the manufacture of the artifacts, and the fact that ready-made tools had been brought to the site, confirms that the cave had been used as transitory station. This is also indicated by the bones of carnivores (hyena in particular), which were found in large quantity in the Upper Palaeolithic layers (Dimitrijević 2011), confirming regular breaks in human occupation.

In contrast to the northern part of eastern Serbia where many Upper Palaeolithic sites were recorded, in the southern part of this region, we identified numerous sites with Middle Palaeolithic industries and no early Upper Palaeolithic. In the Balanica cave complex, near Niš, the remains of Homo erectus s.l. have been identified (Roksandić *et al.* 2011) dated to 392 to 525 ka (Rink *et al.* 2013). In Balanica we have also identified Charentian layers (Mihailović 2008) which probable date from the Middle Pleistocene. In Pešturina cave, situated in adjacent Jelašnica, layers representing at least two Middle Palaeolithic occupational phases have been recorded: a Charentian assemblage in the lower layer, and a Denticulate Mousterian assemblage in the upper layer. Overlaying them is the layer with artifacts, which probably belong to the Gravettian or early Epigravettian (Mihailović, Milošević 2012). The Middle Palaeolithic was also documented at many other sites in eastern Serbia, both those known from previous investigations, such as Golema Dupka (Prekonoška cave) near Svrljig and Pećurski Kamen near Sokobanja (Mihailović *et al.* 1997), as well as those excavated recently with S. Kuhn, such as Milušinačka cave and Sokograd rock-shelter near Sokobanja and Selačka cave near Knjaževac.

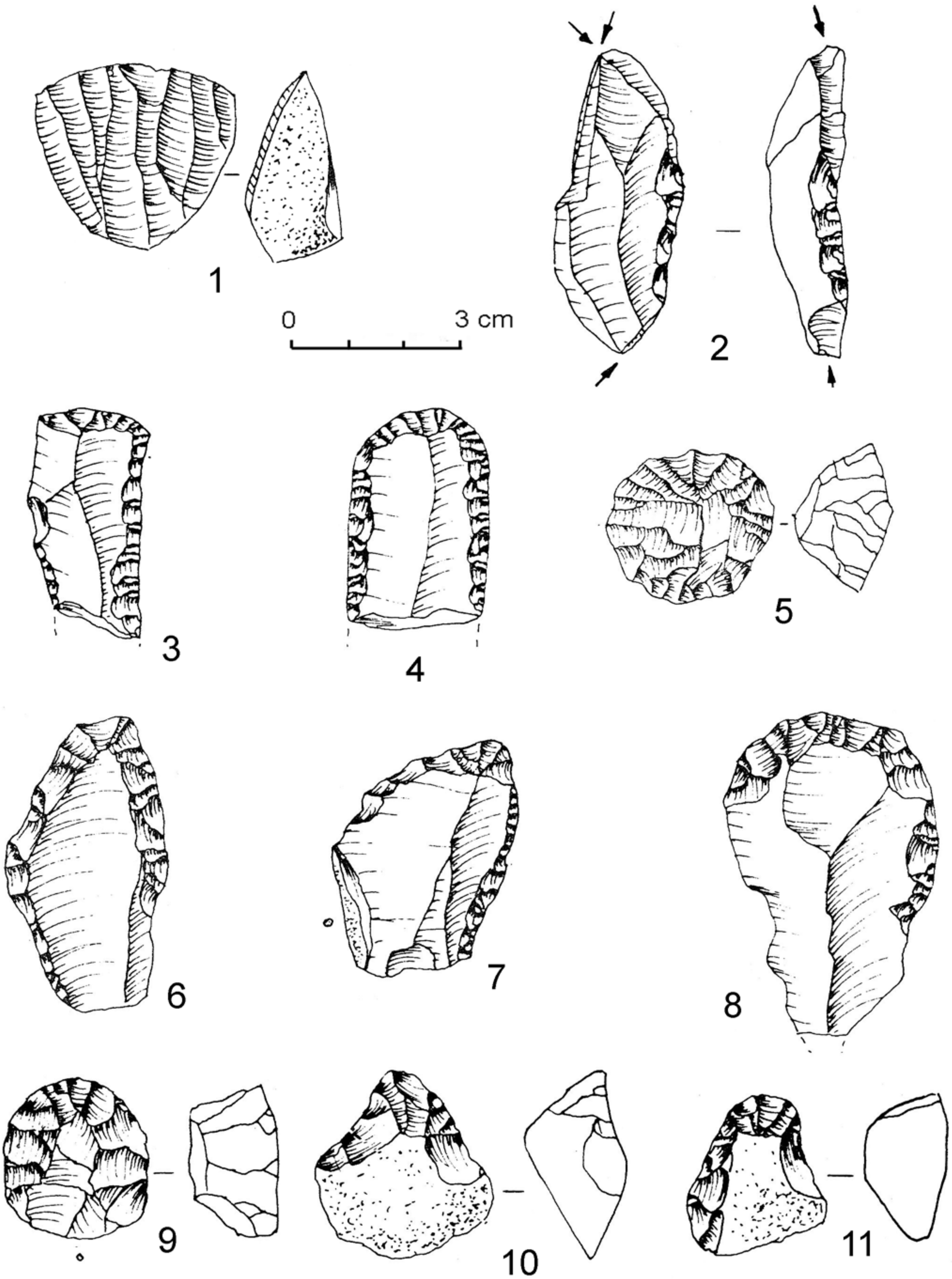

FIGURE 1 Stone artifacts from Crvenka-At.

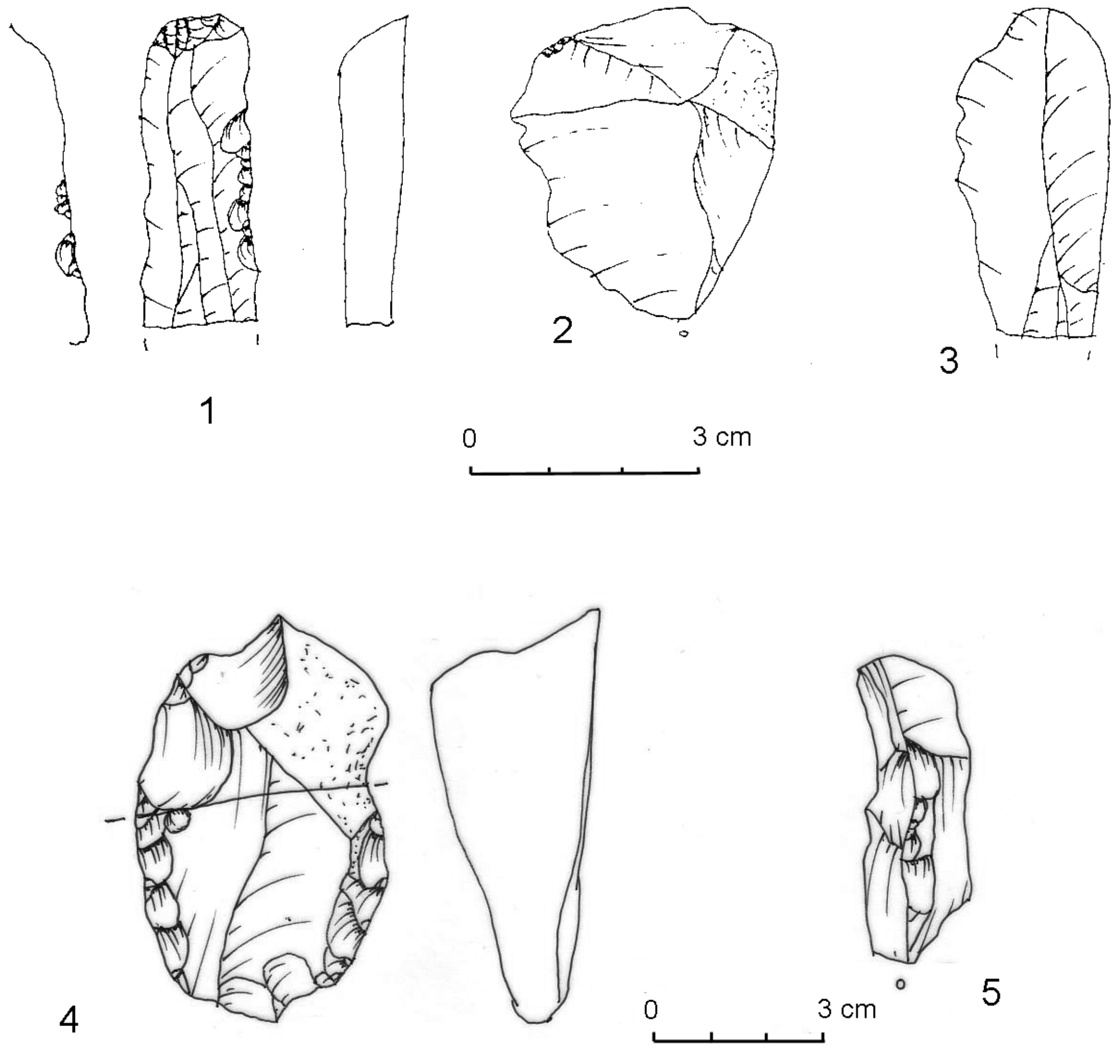

FIGURE 2 Stone artifacts from Baranica.

In western Serbia, Šalitrena cave has been focus of excavations for the last years. The most substantial part of the site sequence belongs to the Upper Palaeolithic, although there are Middle Palaeolithic layers (Mihailović & Mihailović 2009). Relatively young dates (37 990 +/- 750 - Beta 237 686; 37 760 +/- 520 BP - Beta – 237 690) were obtained for the Middle Palaeolithic layers 6a–6d. The Middle Palaeolithic toolkit consists of Levallois flakes produced by the preferential method, atypical Mousterian points (one elongated and two made on irregular flakes), sparse lateral sidescrapers and denticulated artifacts. The Aurignacian layer (5) was dated to 31–32 ka (31 980 +/- 360 BP - Beta – 237 688; 30 190 +/- 400 BP - Beta – 224 720). It consisted of a large number of wedge-shaped and burin-like cores and typical carinated endscrapers and burins. There is also a moderate quantity of retouched blades, lateral sidescrapers of somewhat larger size and denticulated tools, while plain endscrapers and burins are relatively less frequent. The larger blades with deep semi-steep retouch were only recorded in the cave interior.

No Upper Palaeolithic sites have been confirmed so far in central and south parts of western Serbia. In the course of systematic site survey, conducted in 2010–2012 in the Western Morava valley, we identified over 30 Middle Palaeolithic open-air sites (Mihailović, Bogosavljević-Petrović 2009).

Levallois artifacts were encountered at most sites, while sidescrapers (except at site Samaila) are very infrequent. In Hadži Prodanova cave, Levallois artifacts were recorded only in lower layers (5b–5c) which, judging by the present micro-fauna (Bogićević 2008) probably belong to MIS 5a or MIS5c. Quartz artifacts and lateral sidescrapers of Middle Palaeolithic type (Mihailović & Mihailović 2006) were found in layers 5a and 4. The remains of carnivores prevail in the cave (of cave bear and wolf in particular) while remains of ibex predominate among the prey animals (Milošević 2010). In Smolućka cave, situated in the far southwest corner of Serbia, were encountered sparse Levallois and quartz artifacts and the remains of cave bear along with remains of ibex, chamois, red deer and wild cattle or bison prevail among animal bones (Kaluđerović 1985; Dimitrijević 1997). The lower layer of the cave is radiocarbon dated to > 38 000 BP (Hedges *et al.* 1990).

In the mountainous area of northern Montenegro, to the southwest of Smolućka cave, many rock-shelters have been investigated. At Mališina Stijena many Mousterian artifacts have been encountered in layers dated to > 38 000 BP, and among them were very few artifacts of Upper Palaeolithic type (Radovanović 1986, Hedges *et al.* 1990). At Crvena Stijena, situated in southwest Montenegro, layer XII has been radiometrically dated to 40 777± 900 BP, and immediately underlies an *in situ* exposure of the Campanian Ignimbrite (CI) tephra (Morley & Woodward 2011) – dated to 40 ka and according to sedimentological analyses possibly belonging to MIS 3 (Morley 2007). In this layer there is a very distinct industry with a high proportion of utilized cores and ad hoc tools (mostly denticulated) on small and asymmetrical "débordant" flakes and pseudo-Levallois points. Levallois specimens are present, while Upper Palaeolithic artifacts are atypical and present in only small quantity. Raised retouched blades and one semi-abrupt retouched point were identified in the assemblage, but diagnostic Aurignacian tools have not been recorded (Mihailović 2009b). As far as Bioče is concerned, a Middle Palaeolithic industry similar to the one at Crvena Stijena was confirmed at that site but it seems that Mousterian types of tools (lateral sidescrapers, points and Levallois artifacts) are more frequent (Đuričić 2006; Derevjanko *et al.* 2011).

3 QUESTION OF CONTINUITY BETWEEN MIDDLE AND UPPER PALAEOLITHIC

Two or three types of Mousterian industries were actually in use in the time preceding the appearance of the Upper Palaeolithic in Serbia and Montenegro. The first group includes industries of the Typical Mousterian, which has a long tradition in the Balkan Peninsula, appearing in eastern as well as in western Serbia. The Mousterian of western Serbia, which is territorially connected with the Mousterian found in northern Bosnia, includes a more dominant Levallois component - which is logical if we bear in mind the frequency of high quality radiolarite occurring in the limestone rocks of the Inner Dinarides. On the other hand, Denticulate or Micro-Mousterian of the Adriatic-Ionian zone is mostly characterized by expedient technology based on the production of ad hoc tools manufactured from low quality raw material. Its appearance was probably the consequence of reduced mobility/territoriality in MIS3 although other factors could not be disregarded. Finally, Denticulate Mousterian in the Balkans interior (Pešturina), judging by the low frequency of typical denticulated tools (but also the occurrence of the Levallois), could also be characterized as taphonomic/economic rather than cultural facies (Thiéabut 2010). In contrast to neighboring Bulgaria the industries of "transitional" type like Bohunician or Bachokirian have not been confirmed at any site in Serbia and Montenegro (except eventually at Balata).

Chronological overlapping of the late Middle Palaeolithic in the west of the Balkans and early Upper Palaeolithic in the east has so far not been confirmed at the regional level. At Šalitrena cave there is a 6 000 years gap between the Mousterian and the Aurignacian,, while Middle Palaeolithic layers at Baranica and Tabula Traiana cave have so far not been dated. Nevertheless, it should be borne in mind that radiocarbon dating of layers from that period is fraught with considerable problems (Blockley *et al.* 2008; Jöris *et al.* 2011). Layer 207 at Tabula Traiana cave spans a period of time equivalent to around 7000 years (Borić *et al.* 2012), so the fact that bones with cut marks are dated to 34–35 ka does not guarantee that artifacts also date from the same period. The CI microtephra reported as being found throughout layer 207 (Borić *et al.* 2012) is also contradictory to the claim that the same CI microtephra covers the Upper Palaeolithic layer at this site (Lowe *et al.* 2012). Different dates were also obtained for Middle Palaeolithic layer 3 in Pešturina, so only a new program of absolute dating (^{14}C, OSL, ESR) allied with systematic microstratigraphic analysis of the stratigraphical sequence allow these problems to be overcome (Alex *et al.* 2012). A similar situation has also been confirmed at other sites in the Balkans, e.g. in Temnata and Vindija (Drobniewicz *et al.* 2000, Janković *et al.* 2011) and until more high-resolution geochronology and microstratigraphic analysis are undertaken at these sites there is a considerable impediment to the drawing of far-reaching conclusions about the Middle to Upper Palaeolithic transition in the region.

The impoverished lithic assemblages from Tabula Traiana cave and Baranica do not provide the grounds for a precise cultural attribution, while industries from Crvenka-At and Šalitrena cave undoubtedly belong to the Aurignacian. Material from Crvenka and At is very similar to the material from sites in Romanian Banat (to such an extent that we could speak about the Banat group), but as it is also the case with the Romanian sites it could be rather related to the Aurignacian of the Krems type than to the Proto-Aurignacian (Sitlivy *et al.* 2012). The industry from Šalitrena (dated to 31–32 ka) certainly also originates from the Middle Aurignacian, and considering the frequency and variability of carinated endscrapers and burins it is more similar to the Aurignacian of the middle Danube basin (Hahn 1977; Svoboda 2006) than the Aurignacian of northern Bosnia (Basler 1979).

There are also differences when we consider settlement pattern and systems of raw material procurement. Although Middle Palaeolithic and Upper Palaeolithic populations inhabited the same geographical area and visited the same habitations the settlement pattern in these two periods was essentially different. The Neanderthal communities inhabited not only low lands but also mountainous regions of the Carpatho-Balkanides and the Dinarides, and they often used techno-economic model based on the curation of flint tools and the production of expedient tools of quartz. Such a model appears very early (in Mala Balanica) and it has been confirmed at most of the later sites: in Hadži Prodanova cave, in both layers of Pešturina and in Smolućka cave. In contrast to this, Upper Palaeolithic communities rarely inhabited so-called marginal zones and stayed in caves for short periods of time using mostly flint-made tools. Only future investigations will show whether populations in the Upper Palaeolithic were concentrated in river valleys and low lands, and whether their settlements could actually be associated with a logistical type of mobility.

4 ADVANCING OF THE UPPER PALAEOLITHIC AND WITHDRAWING OF THE MIDDLE PALAEOLITHIC

Regardless of doubts concerning the stratigraphy and chronology of sites, recent investigations indicate that there is an evident trend in the expansion of the Upper Palaeolithic from the east toward the west of the Balkans. If we are to draw isochrones between ^{14}C dated sites in the region (**figure 3**) we will see that the Upper Palaeolithic spread diffusely in a wave-like movements, but also that the Danubian corridor was really the main communication for advancing of Upper Palaeolithic groups (Conard & Bolus 2003). The impression of the importance of this corridor is additionally supported by the fact that there are no reliably identified Upper Palaeolithic sites dating between 30 ka and 40 ka in the Dinarides and along the coast from the Peloponnesus to the north Italy (Mihailović 2009b). At many sites in that region either only Mousterian has been identified or there is a habitation gap from the Mousterian to the Gravettian.

The trend towards the retreat of the Middle Palaeolithic differs only slightly. In the east of the Balkans and along the coast the Middle Palaeolithic lasted until before 40 ka and in Šalitrena cave survived until 38 ka, while the Neanderthals in Vindija remained until before 32–33 ka (Higham *et al.* 2006). All this suggests that Middle Palaeolithic was withdrawing westward and that there is the possibility that the western - and perhaps also central part of the peninsula - represented a Neanderthal refugium when the Upper Palaeolithic appeared in the Danube basin. On the other hand, considering that the Middle Palaeolithic came to an end around 40 ka at Mujina cave, Crvena Stijena and Asprochaliko (Basler 1975; Rink *et al.* 2002, Runnels & van Andel 2003) where there was no Aurignacian, the question could be asked how the volcanic eruptions of the Phlegraean fields and Heinrich Event 4 influenced those processes. It is not impossible that the impact was great in the coastal zone and it is particularly conspicuous at Crvena Stijena where deposits of tephra reach a thickness of 10–20 centimeters (Morley & Woodward 2011). It is however difficult to assume that this eruption left long-lasting consequences in the north of peninsula behind the barrier created by the Dinaric mountain range. This is also indicated by ^{14}C dates obtained from Bulgarian sites, that even if we leave aside perplexities related to the earliest dates definitely reach the age of 38–39 ka (Tsanova 2008).

No little confusion has been added to these problems by recent results of microtephra analysis according to which the start of Upper Palaeolithic habitation of some cave sites precedes deposition of CI microtephra (Lowe *et al.* 2012). This question deserves more detailed discussion but even in this stage it could be concluded that the evidence from at least two (of the four) suggested sites is not valid: a) we already described the situation in Tabula Traiana cave above, while b) the claim that in Golema Pesht, Macedonia, the microtephra overlies an Upper Palaeolithic layer is not correct as layer 3 yielded no confirmed diagnostic artifacts but only quartz finds, which are much more difficult to attribute (Salamanov-Korobar 2008). If we add the possibility that material from layers 6/7 at Kozarnika is postpositional mixture (Tsanova 2008), we arrive at the conclusion that in the Balkans only the Uluzzian of Klissoura precedes the accumulation of microtephra with some certainty (Kuhn *et al.* 2010; Lowe *et al.* 2012).

We do, however, agree with the assumption that modern humans proved “a greater competitive threat to indigenous populations than natural disasters” (Lowe *et al.* 2012), at least where northern parts of the Balkans are concerned. The monotonous succession of the Middle and Upper Palaeolithic and shifting of borders of advancement without any evidence of interactions bear witness not only to ecological, but also to social competition between the Neanderthals and modern humans (Mihailović 2004).

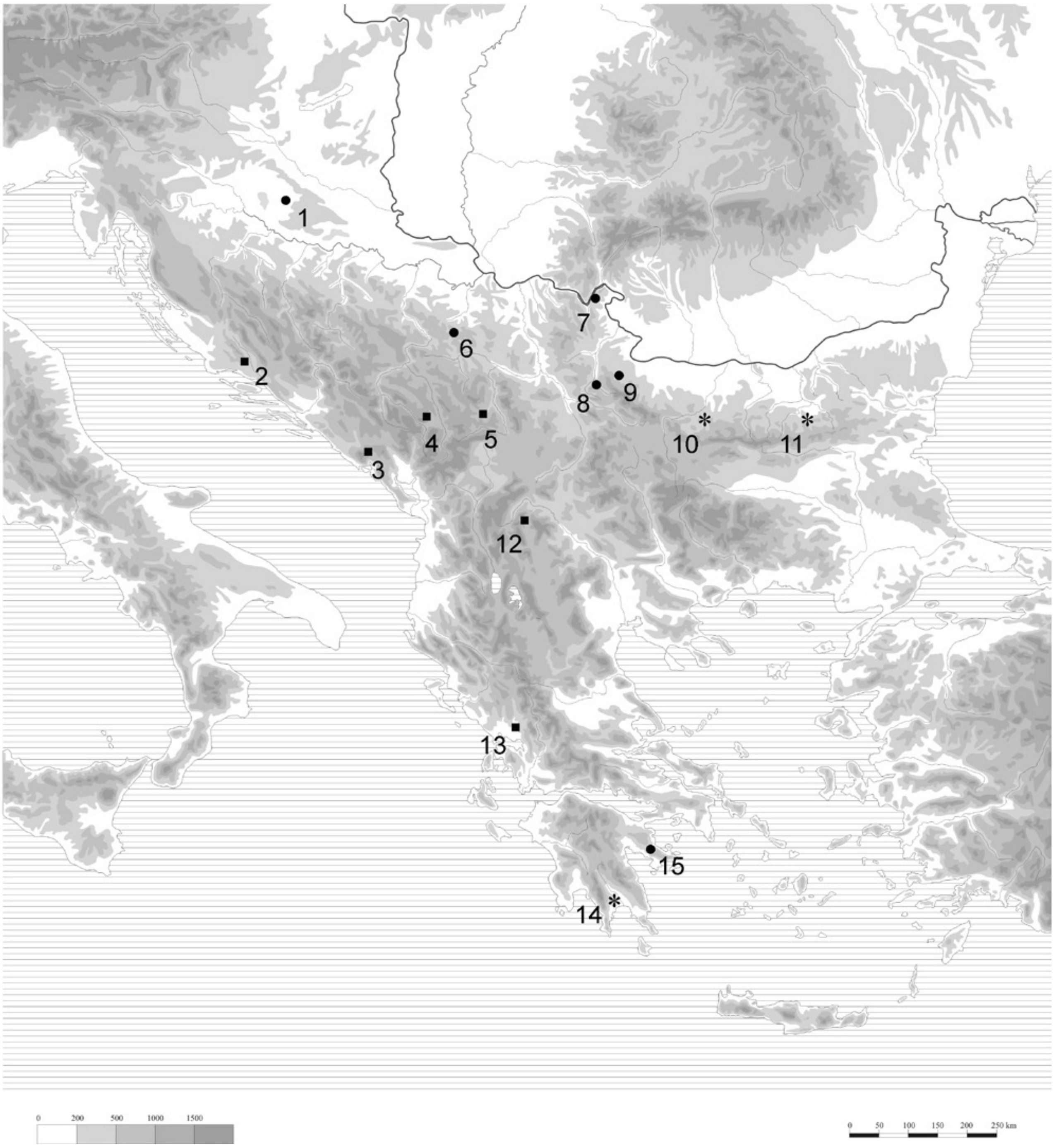

FIGURE 2 ^{14}C dated Late Middle Palaeolithic sites (■), Middle and Early Upper Palaeolithic sites (●), and sites with "transitional" industries (*), mentioned in the text: 1. Vindija; 2. Mujina cave; 3. Crvena stijena; 4. Mališina stijena; 5. Smolućka cave; 6. Šalitrena cave; 7. Tabula Traiana cave; 8. Baranica; 9. Kozarnika; 10. Temnata; 11. Bacho Kiro; 12. Golema Pesht; 13. Asprochaliko; 14. Lakonis; 15. Klissoura.

It is quite possible in this context that social factors also had a considerable impact on the low level of hybridization between the Neanderthals and modern humans. On the other hand it is not easy to establish the degree of cultural interactions with the newcomers considering problems in the interpretation of sites (Bacho Kiro, Vindija, Kozarnika, Lakonis) where human remains and archaeological finds were encountered in association (Churchill & Smith 2000; Tsanova 2008; Harvati *et al.* 2009). Possibilities of the coexistence of two populations could be tested if future investigations are carried out in the territory along the borders and possible directions of advancement of the Upper Palaeolithic communities (including the Sava valley).The results of the analysis of material from the rockshelter Mezzena in north Italy also suggest that such coexistence was possible (Longo *et al.* 2012).

5 CONCLUSION

The bearers of Middle and Upper Palaeolithic industries in the Balkans inhabited the same geographic area and primary ecological zones, but differences in technology, distribution and settlement pattern suggest that these were different populations. Whether the bearers of changes were anatomically modern humans and whether transitional industries from Temnata and Bacho Kiro and Uluzzian from Klissoura could (eventually) be related to the Neanderthals remains an open question. Yet, what new investigations in the region have revealed is that there is a temporal trend in the spread of the Upper Palaeolithic from the east toward the west of the Balkans as well as the fact that there is a strong possibility that Neanderthals survived in the western Balkans and in the interior of the Dinarides somewhat longer than in other parts of the peninsula. It could be expected that current investigations will very soon provide the answer to the questions we have posed in this work. If in the southern regions, in the interior of the Dinarides and in the coastal zone, we encounter sites from the initial phases of the early Upper Palaeolithic the suggested scenario of settling in the Balkans at the transition from the Middle to the Upper Palaeolithic will have to undergo certain changes.

REFERENCES

ALEX B., MIHAILOVIĆ D., MILOŠEVIĆ S., MORLEY M. & ROKSANDIĆ M. (2012) – Radiocarbon Sampling of a Middle to Upper Palaeolithic Palimpsest in the Balkans. *Abstracts of the Society for American Archaeology, 77th Annual Meeting, April 18–22.* Memphis - Tennessee, p. 29 (http://www.saa.org/Portals/0/SAA/Meetings/Abstracts/individualAbstracts.pdf).

BAKOVIĆ M., MIHAILOVIĆ B., MIHAILOVIĆ D., MORLEY M., VUŠOVIĆ-LUČIĆ Z., WHALLON R. & WOODWARD J. (2009) – Crvena Stijena excavations 2004–2006, preliminary report. *Eurasian Prehistory* 6(1–2):3–31.

BASLER Đ. (1975) – Stariji litički periodu u Crvenoj stijeni. In: Đ. Basler (ed.), *Crvena stijena – zbornik radova*. Nikšić, Zajednica kulturnih ustanova, p. 11–120.

BASLER Đ. (1979) – Život i kultura paleolitskog i mezolitskog čovjeka na tlu jugoslavenskih zemalja. In: A. Benac (ed.), *Praistorija jugoslavenskih zemalja*, Vol. I. Sarajevo, Centar za balkanološka ispitivanja ANUBiH, p. 103–114.

BENAC A. & BRODAR M. (1958) – Crvena Stijena - 1956. *Glasnik Zemaljskog Muzeja* (Ser. A) N.S. 13:21–65.

BLOCKLEY S.P.E., BRONK RAMSEY C. & HIGHAM T F.G. (2008) – The Middle to Upper Paleolithic transition: dating, stratigraphy, and isochronous markers. *Journal of Human Evolution* 55:764–771.

BOGIĆEVIĆ K. (2008) – *Pleistocenski glodari (Rodentia) Srbije*. Doktorska disertacija, Beograd, Rudarsko-geološki fakultet.

BORIĆ D., DIMITRIJEVIĆ V., WHITE D., LANE C., FRENCH C. & CRISTIANI E. (2012) – Early Modern Human settling of the Danube corridor: the Middle to Upper Palaeolithic site of Tabula Traiana Cave in the Danube Gorges (Serbia). *Antiquity* 86(334) (http://antiquity.ac.uk/projgall/boric334/).

CHURCHILL S.E. & SMITH F.H. (2000) – Makers of the early Aurignacian of Europe. *American Journal of Physical Anthropology* 113(31):61–115.

CONARD N.J. & BOLUS M. (2003) – Radiocarbon dating the appearance of modern humans and timing of cultural innovations in Europe: new results and new challenges. *Journal of Human Evolution* 44:331–371.

DEREVJANKO A.P., ŠUNKOV M.V., BAKOVIĆ M., CIBANKOV A.A., ULJANOV V.A. & KANDIBA A.V. (2012) – Nova etapa u proučavanju potkapine Bioče u Crnoj Gori. *Davnine* 1:33–43.

DIMITRIJEVIĆ V. (1997) – Pleistocenska sisarska fauna istočne Srbije. In: M. Lazić (ed.), *Arheologija istočne Srbije*, Beograd, Centar za arheološka istraživanja Filozofskog fakulteta, p. 45–53.

DIMITRIJEVIĆ V. (2011) – Late Pleistocene hyaena Crocuta crocuta spelaea (Goldfuss, 1823) from Baranica Cave (southeast Serbia): competition for a den site. *In*: B. Toskan (ed.), *Drobci ledenodobnega okolja. Zbornik ob življenjskem jubileju Ivana Turka*, Opera Instituti Archaeologici Sloveniae 21, Ljubljana, Inštitut za arheologijo ZRC SAZU, Založba ZRC, p. 69–84.

DROBNIEWICZ B., GINTER B., KAZIOR B. & KOZŁOWSKI J.K. (2000) – Early Upper Palaeolithic assemblages from layer 4, trench TD-I. *In*: B. Ginter, J.K. Kozlowski, J.-L. Guadelli & H. Laville (eds.), *Temnata Cave: Excavations in Karlukovo Karst Area – Bulgaria*, Kraków, Jagellonian University, 2(1):333–418.

ĐURIČIĆ L.J. (2006) – A contribution to research on Bioče Mousterian. *Glasnik Srpskog arheološkog društva* 22:179–196.

GAVELA B. (1988) – *Paleolit Srbije*. Beograd , Muzej u Aranđelovcu - Centar za arheološka istraživanja Filozofskog fakultet u Beogradu.

GHEMIŞ C., CLOTTES J., GÉLY B. & PRUDHOMME F. (2011) – An exceptional archaeological discovery — the "Art Galery" in Coliboaia Cave, Apuseni Mountains, Romania. *Acta Archaeologica Carpathica* 46:5–18.

HAHN J. (1977) – *Aurignacien: Das Altere Jungpaläolithikum in Mittel- und Osteuropa*. Fundamenta A9. Köln-Graz.

HARVATI K., PANAGOPOULOU E. & RUNNELS C. (2009) – The paleoanthropology of Greece. *Evolutionary Anthropology* 18:131–143.

HEDGES R.E. M., HOUSLEY R.A., BRONK C.R. & VAN KLINKEN G.J. (1990) – Radiocarbon dates from Oxford AMS system: Archaeometry Datelist 11. *Archaeometry* 32:211–237.

HIGHAM T., BRONK RAMSEY C., KARAVANIĆ I., SMITH F.H. & TRINKAUS E. (2006) – Revised direct radiocarbon dating of the Vindija G1 Upper Palaeolithic Neandertals. *Proceedings of the National Academy of Sciences of the United States of America* 103(3):553–557.

JANKOVIĆ I., KARAVANIĆ I, AHERN J.C.M., BRAJKOVIĆ D., MAUCH LENARDIĆ J. & SMITH F.H. (2011) – Archaeological, paleontological and Genomic Perspectives on Late European Neandertals ad Vindija Cave, Croatia. *In*: S. Condemi & G.-C. Weniger (eds), *Continuity and Discontinuity in the Peopling of Europe. One Hundred Fifty Years of Neanderthal Study*. Dodrecht, Springer, p. 299–313.

JÖRIS O., STREET M., TERBERGER T. & WENINGER B. (2011) – Radiocarbon Dating the Middle to Upper Palaeolithic Transition: The Demise of the Last Neanderthals and the First Appearance of Anatomically Modern Humans in Europe. *In*: S. Condemi & G.-C. Weniger (eds), *Continuity and Discontinuity in the Peopling of Europe. One Hundred Fifty Years of Neanderthal Study*. Dodrecht, Springer, p. 239–298.

KALUĐEROVIĆ Z. (1985) – Istraživanja Smolućke pećine 1984–1985. *Novopazarski zbornik* 9:5–18.

KUHN S., PIGATI J., KARKANAS P., KOUMOUZELIS M., KOZLOWSKI J., NTINOU M. & STINER M. (2010) – Radiocarbon dating results for the Early Upper Palaeolithic of Klissoura cave 1. *Eurasian Prehistory* 7(2):37–46.

LONGO L., BOARETTO E., CARAMELLI D., GIUNTI P., LARI M., MILANI L., MANNINO M., SALA B., THUN HOHENSTEIN U. & CONDEMI S. (2012) – Did Neandertals and anatomically modern humans coexist in northern Italy during the late MIS 3? *Quaternary International* 259:102–112.

LOWE J., BARTON N., BLOCKLEY S., BRONK RAMSEY C., CULLEN V, DAVIES W., GAMBLE C., GRANT K., HARDIMAN M., HOUSLEY R., LANE C., LEE, LEWIS M., MACLEOD A., MENZIES M., MÜLLER W., POLLARD M., PRICE C., ROBERTS A., ROHLING E., SATOW C., SMITH V., STRINGER C., TOMLINSON E., WHITE D., ALBERT P., G, ARIENZO I., BARKER G., BORIĆ D., CARANDENTE A., CIVETTA L., FERRIER C., GUADELLI J.-L., KARKANAS P., KOUMOUZELIS M., MÜLLER U., ORSI G., PROSS J., ROSI M., SHALAMANOV-KOROBAR L.J., SIRAKOV N. & TZEDAKIS P. (2012) – Volcanic ash layers illuminate the resilience of Neanderthals and early modern humans to natural hazards. *Proceedings of the National Academy of Sciences of the United States of America* 109(34):13532–13537.

MIHAILOVIĆ D. (1992) – *Orinjasijenska kremena industrija sa lokaliteta Crvenka-At u blizini Vršca*. Beograd, Filozofski fakultet - Centar za arheološka istraživanja.

MIHAILOVIĆ D. (2004) – Spirituality and Cultural Identity in the Middle-Upper Palaeolithic Transition in the Balkans. *In*: M. Otte (ed.), *Spiritualité*, ERAUL 106 :11–20.

MIHAILOVIĆ D. (2008) -New data about the Middle Palaeolithic of Serbia. *In*: A. Darlas & D. Mihailović (eds.), *The Palaeolithic of the Balkans*, British Archaeological Reports, International Series 1819, Oxford, Archaeopress, p. 93–100.

MIHAILOVIĆ D. (2009a) – *Middle Palaeolithic Settlement at Petrovaradin Fortress*. Petrovaradin edition, Vol. II, Novi Sad, The City Museum of Novi Sad.

MIHAILOVIĆ D. (2009b) – *Upper Palaeolithic and Mesolithic chipped stone industries from Crvena stijena*. Belgrade, Faculty of Philosophy, Center for Archaeological Resarch.

MIHAILOVIĆ D. & BOGOSAVLJEVIĆ-PETROVIĆ V. (2009) – Samaila – Vlaška glava, paleolitsko nalazište na otvorenom prostoru. *Naša prošlost* 10:21–44.

MIHAILOVIĆ D., ĐURIČIĆ LJ. & KALUĐEROVIĆ Z. (1997) – Istraživanje paleolita na području istočne Srbije. In: M. Lazić (ed.), *Arheologija istočne Srbije*. Beograd, Filozofski fakultet - Centar za arheološka istraživanja, p. 33–44.

MIHAILOVIĆ D. & MIHAILOVIĆ B. (2006) – The Palaeolithic Site Hadži Prodan's Cave by Ivanjica. *Arheološki pregled Srpskog arheološkog društva* 1/2003(2006):13–16.

MIHAILOVIĆ D. & MIHAILOVIĆ B. (2009) – Cultural Regionalization in the Palaeolithic of the Middle Danube Basine and Western Balkans. *In*: Fr. Djindjian, J.K. Kozlowski & N. Bichon (eds.), *Le concept de territoires dans le Paléolithique supérieur européen*, British Archaeological Reports, International Series 1938, p. 93–101.

MIHAILOVIĆ D., MIHAILOVIĆ B. & LOPIČIĆ M. (2011) – The Palaeolithic in Northern Serbia. *In*: F. Drasovean & B. Jovanović (eds.), *The Prehistory of Banat I – The Palaeolithic and Mesolithic*, Bucharest, The Publishing House of the Romanian Academy, p. 77–101.

MIHAILOVIĆ D. & MILOŠEVIĆ S. (2012) – Istraživanja paleolitskog nalazišta Pešturina kod Niša. *Glasnik Srpskog arheološkog društva* 28:87–106.

MILOŠEVIĆ S. (2010) – Reading of Human on-site activities on the basis of faunal taphonomy at the Palaeolithic site of Hadži Prodanova cave (Serbia). *Bone Commons* 1390 (http://alexandriaarchive.org/bonecommons/items/show/1390).

MORLEY M. (2007) – *Mediterranean Quaternary Rockshelter Sediment Records: A Multi-proxy Approach to Environmental Reconstruction*. PhD thesis, Manchester, University of Manchester.

MORLEY M. & WOODWARD J. (2011) – The Campanian Ignimbrite (Y5) tephra at Crvena Stijena Rockshelter, Montenegro. *Quaternary Research* 75:683–696.

RADOVANOVIĆ I. (1984) – Paleolit i mezolit na tlu Vojvodine. *Praistorijske kulture na tlu Vojvodine*, Novi Sad, Vojvođanski muzej, p. 7–8.

RADOVANOVIĆ I. (1986) – Novija istraživanja paleolita i mezolita u Crnoj Gori. *Glasnik Srpskog arheološkog društva* 3:63–76.

RINK W.J., KARAVANIĆ I., PETTIT P.B., VAN DER PLICHT J., SMITH F.H. & BARTOLL J. (2002) – ESR and AMS-based ^{14}C Dating of Mousterian Levels at Mujina Pećina, Dalmatia, Croatia. *Journal of Archaeological Science* 29:943–952.

RINK W.J, MERCIER N., MIHAILOVIĆ D., MORLEY M.W., THOMPSON J.W. & ROKSANDIC M. (2013) – New Radiometric Ages for the BH–1 Hominin from Balanica (Serbia): Implications for Understanding the Role of the Balkans in Middle Pleistocene Human Evolution. *PLoS ONE* 8(2) (e54608. doi:10.1371/journal.pone.0054608).

ROKSANDIC M., MIHAILOVIĆ D., MERCIER N., DIMITRIJEVIĆ V. MORLEY M.W., RAKOČEVIĆ Z., MIHAILOVIĆ B., GUIBERT P. & BABB J. (2011) – A human mandible (BH–1) from the Pleistocene deposits of the Mala Balanica cave (Sićevo Gorge, Niš, Serbia). *Journal of Human Evolution* 61:186–196.

RUNNELS C.N. & VAN ANDEL T.H. (2003) – The Early Stone Age of the Nomos of Preveza: Landscape and Settlement. *In*: J. Wiseman & K. Zachos (eds.), *Landscape archaeology in southern Epirus, Greece*, Hesperia Supplement 32, Princeton, N.J., The American School of Classical Studies at Athens, p. 47–134.

SALAMANOV-KOROBAR L.J. (2008) – First Palaeolithic Researches in the R. Macedonia (FYROM): the Cave "Golema Pesht" Near Village Zdunje – Preliminary Results. *In*: A. Darlas & D. Mihailović (eds.), *The Palaeolithic of the Balkans*, British Archaeological Reports, International series 1819, Oxford, Archaeopress, p. 83–92.

SITLIVY V., CHABAI V., ANGHELINU M., UTHMEIER T., KELS H., NITA L., BALTEAN I., VESELSKY A. & TUTU C. (2012) – Preliminary reassessment of the Aurignacian in Banat (South-western Romania). *Quaternary International* (http://dx.doi.org/10.1016/j.quaint.2012.07.024).

SVOBODA J. (2006) – The Aurignacian and after: chronology, geography and cultural taxonomy in the Middle Danube region. *In*: O. Bar-Yosef & J. Zilhão (eds.), *Towards a definition of the Aurignacian* , Trabalhos de Arqueologia 45, Lisboa, Instituto Português de Arqueologia, p. 259–274.

ŠARIĆ J. (2008) – Paleolithic and Mesolithic finds from profile of the Zemun loess. *Starinar* 58:9–27.

THIÉABUT C. (2010) – Denticulate Mousterian: Myth or Reality? *Acta Universitatis Wratislaviensis* 3207:345–386.

TRINKAUS E., MOLDOVAN O., MILOTA S., BÎLGAR A., SARCINA L., ATHREYA S., BAILEY S.E., RODRIGO R., MIRCEA G., HIGHAM T., BRONK RAMSEY C. & VAN DER PLICHT J. (2003) – An early modern human from the Pestera cu Oase, Romania. *Proceedings of the National Academy of Science* 100(20):11231–11236.

TSANOVA TS. (2008) – *Les débuts du Paléolithique supérieur dans l'Est des Balkans. Réflexion à partir des études taphonomique et techno-économique des ensembles lithiques des grottes Bacho Kiro (couche 11), Temnata (couche VI et 4) et Kozarnika (niveau VII)*. British Archaeological Reports, International Series 1752.

The Magdalenian of Hohle Fels Cave and the Resettlement of the Swabian Jura after the LGM

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Abstract: Hohle Fels Cave is a Magdalenian basecamp in the Swabian Jura. The site yielded an exceptionally rich lithic assemblage including abundant backed pieces, as well as many organic tools and artefacts that express symbolic behaviour. Radiocarbon dates place the occupation before the Meiendorf amelioration which marks the onset of the late glacial interstadial cycle. These dates are in accordance with many other Central European Magdalenian sites and indicate a comprehensive colonization and resettlement of the region during the dry and cold late Pleniglacial. Origins of the Swabian Magdalenian to the west are indicated, and connections in that direction were maintained, as documented by marine shells from the Atlantic Ocean.

1 INTRODUCTION

The southwestern German site of Hohle Fels Cave lies 1,5 km east of Schelklingen in the Valley of the Ach, a small tributary stream which flows into the Danube in Ulm 15 km east. It is situated at the southern margin of the middle Swabian Jura at 534 m above sea level (**figure 1**). Hohle Fels Cave lies within a karstic massif that defines the valley on both sides and opens on the southern face of the valley. The cave is quite large at 500 m² of floor space and 6 000 m³ of volume, making it one of southern Germany´s largest cave halls (Blumentritt & Hahn 1990). The site contains remains from the Middle Palaeolithic, the Aurignacian, Gravettian and Magdalenian. It is famous for its exceptionally rich and very old Aurignacian finds, especially figurative art and musical instruments (see e.g. Conard 2003a, 2009; Conard & Malina 2009; Conard *et al.* 2009) which are among the oldest manifestations of their kind. Hohle Fels also yielded a singularly rich Magdalenian assemblage documenting a base camp occupation, which is currently under investigation. A techno-typological characterization of the lithic assemblage will bring the site into a regional and European perspective. Because of the unexpected scale of the Magdalenian occupation which became clear in recent years, Hohle Fels represents a crucial site for research on the resettlement of Central Europe after the near-hiatus around the last glacial maximum. It can also yield vital information concerning Magdalenian settlement patterns in late Pleistocene Swabia.

Hohle Fels Cave has in its vicinity many more Magdalenian sites including Sirgenstein, Geißenklösterle, Brillenhöhle, Schmiechenfels, Hohle Fels Hütten and others, indicating a comprehensive settlement in the Swabian Jurassic highlands after the last glacial maximum (LGM) and shortly before the onset of the late glacial interstadial cycle. This cycle begins with the Meiendorf-Interstadial at 14 450 calBP according to Litt *et al.* (2007), or, in the more southern parts of Central Europe, probably around 14 650 calBP, according to multi-proxy climatic information from Gerzensee in northern Switzerland (Lotter *et al.* 2012). The Magdalenian of Hohle Fels dates to a late Pleniglacial age of roughly 15 000 calBP.

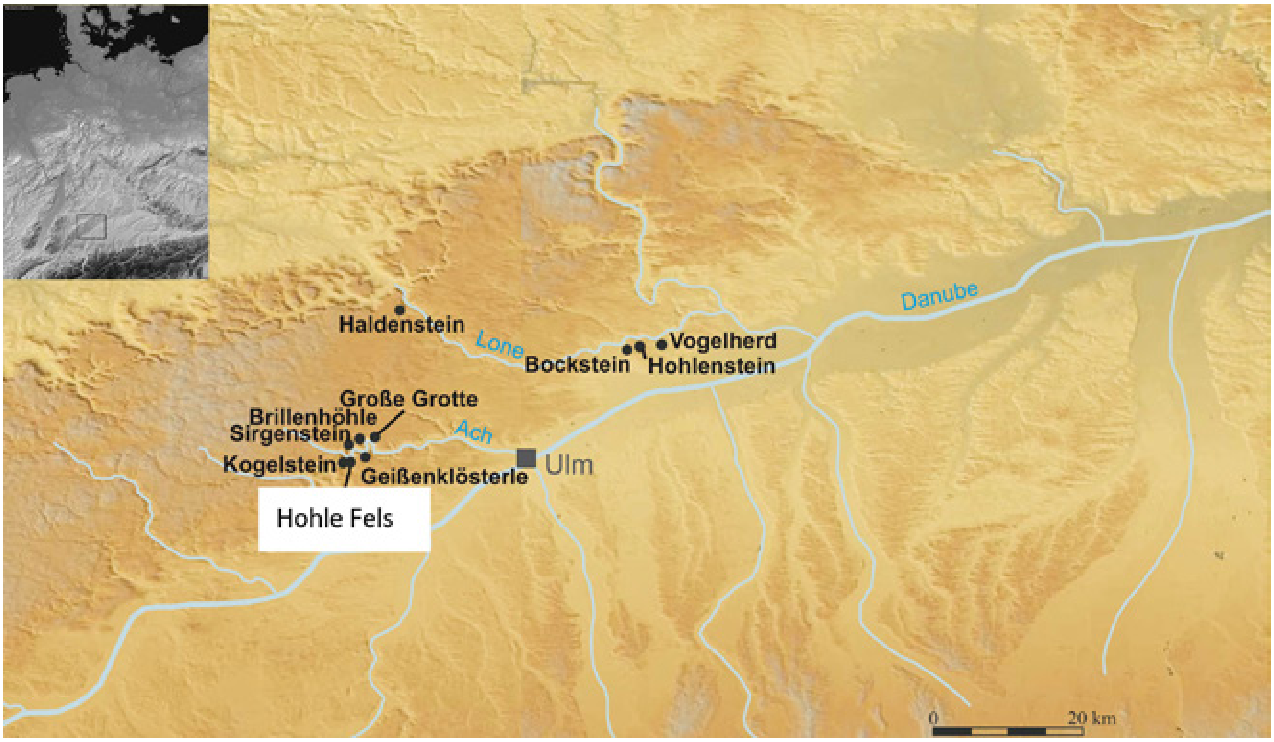


FIGURE 1 Location of Hohle Fels Cave (modified after M. Malina).

Some of the lithic raw materials, but also molluscs from the Mediterranean and the Atlantic Ocean, indicate connections to the west, where the origins of the Swabian Magdalenian seem to lie.

2 TIMEFRAME AND CHRONOSTRATIGRAPHY

The division of the late glacial chronology and the naming of the different climatic phases are inconsistent. Here we explain our view of the late glacial succession of climatic phases and their connection with the Magdalenian settlement. We refer to the results of Litt *et al.* (2007), where they present a climatic sequence based on varve counts from Meerfelder Maar. According to these, the late glacial sequence progresses as depicted in **figure 2**. We indicate the links to the respective GRIP-ice core-phases to clarify this framework (after Baales and Jöris 2001, fig. 1).

We are aware that many researchers consider the time before 14 450 calBP as "Dryas I" or "Oldest Dryas" (e.g. Schmider 1992; Leesch 1997; Richard *et al.* 2000; Rodriguez & Roblin-Jouve 2004; Leesch *et al.* 2012). But we are of the opinion that the chronological framework drawn up by Litt *et al.* (2007) is correct, as it directly refers to the type-sites where the stages have been defined. According to this system, Dryas I is a very short-lived phase (ca. 130 years) between the Meiendorf and Bølling Interstadials corresponding to GRIP-phase 1d (Litt *et al.* 2007; see also Baales and Jöris 2001, fig. 1). The term Bølling has repeatedly been used to describe the first warming of the late glacial interstadial cycle equaling GRIP-phase 1e (e.g. Eriksen 1996; Bosinski 2008; Langlais *et al.* 2012), but the correct denomination in this case is Meiendorf (Litt *et al.* 2007). The latter in turn is separated from the Bølling *sensu stricto* by the Oldest Dryas or Dryas I. For another application of the system followed here see Street *et al.* (2006, 2012).

FIGURE 2 Climatic succession based on varve-counts of Meerfelder Maar (interstadial phases shaded; after Litt *et al.* 2007).

GRIP-PHASE	CLIMATIC STAGE	DATING	DURATION IN YEARS
	Holocene	Beginning 11.590 calBP	To date
1	Dryas III	12.680–11.590 calBP	1090
1c1,1b,1a	Allerød	13.350–12.680 calBP	670
1c2	Dryas II	13.540–13.350 calBP	190
1c3	Bølling	13.670–13540 calBP	130
1d	Dryas I or Oldest Dryas	13.800–13.670 calBP	130
1e	Meiendorf	14.450–13.800 calBP Or 14.6500 calBP after Lotter *et al.* 2012	650
2	Pleniglacial	Until beginning of Meiendorf 14.450 calBP	

3 THE MAGDALENIAN OF HOHLE FELS CAVE - STRATIGRAPHY

The strata containing the Magdalenian remains directly overlie the Gravettian layers in Hohle Fels cave; some admixture between the two in the contact zones is indicated (e.g. Conard & Malina 2012). In part, the Magdalenian deposits represent the filling of channels which had cut into the Gravettian layers (Hahn 1991; Miller 2009). These channels seem to have originated due to erosional events taking place around or after the LGM, most probably in connection with freezing and thawing dynamics. Some of the sediments containing the Magdalenian remains were then deposited in the channels, and it is likely that they are not completely *in situ* but rather were transported there by solifluction or other sedimentational and geological dynamics. The direction of this probable redeposition is inherent in the continuous sloping of the cave floor towards the entrance.

Refittings between all Magdalenian layers at Hohle Fels further stress their homogeneity. We suggest that they represent a relatively short period of occupation.

4 DATING

All dates were calibrated with calpal (Weninger *et al.*: www.calpal-online.de). Twelve of the 21 dates from the Magdalenian of Hohle Fels are problematic, which results mainly from the nature of the stratigraphy and can therefore be explained. Six samples yielded a Gravettian age, but that is not surprising when considering admixture which occured where both layers were in contact. Three samples produced ages dating between the Gravettian and the LGM. Three further dates pointed towards an earlier Pleniglacial age; these, too, are not connected to the Magdalenian. Six of these age estimations were obtained using pre-AMS dating between 1978 and 1988 making the results less certain. Four of the too old dates were measured on bones of *Ursus spelæus*, a species that was already extinct in the Ach Valley in Magdalenian times (Münzel *et al.* 2007, 2011). Besides this, many of the older dates were measured on mixed bone samples of uncertain stratigraphical origin and are therefore of dubious value (Blumentritt & Hahn 1990, see also Housley *et al.* 1997).

The remaining nine dates all give acceptable Magdalenian ages spreading from a cluster at ca.12 600 uncal BP to peak values of ca. 13 300 uncal BP. These dates fit well into other chronological findings for the Central European Magdalenian (e.g. Leesch *et al.* 2012; Leesch & Müller 2012). In terms of calibrated age estimations, the youngest possible date from the Hohle Fels Magdalenian lies at ca. 14 700 calBP, the oldest possible at ca. 16 300 calBP. Bearing in mind the chrono-climatic framework presented earlier, this means that in any way the Magdalenian occupation began and apparently ended before the onset of the late glacial warming with GRIP-phase 1e (or, in other words, the Meiendorf interstadial). This is important to note, since traditionally it had been an accepted “fact” that the recolonization of Central Europe was connected with the onset of the late glacial interstadial cycle. Now it is likely that this was not the case. Recently Leesch *et al.* (2012) have published similar findings on the Magdalenian colonization of Switzerland following the LGM after evaluating new AMS dates. The same can be said for Hohle Fels, where new AMS dates either yield a clearly Gravettian age, when dating intrusive materials like cave bear bones, or give ages clustering around 12 600 uncalBP with only a few dates older than that. Coincidentally, Petersfels also produced dates centering around 12 600 uncalBP, albeit with a few slightly younger exceptions; see Kind 2003).

5 THE ASSEMBLAGE

The Magdalenian of Hohle Fels has yielded one of the richest assemblages in Germany. The history of research dates as far back as 1870/1871, when Oscar Fraas and Theodor Hartmann first excavated in the cave. However many of the Magdalenian artefacts are missing today, as they got lost. Then there was a short dig of G. Riek and G. Matschak 1958–1960. Further pieces are missing due to an illegal dig in the late 1980s. On the other hand, the Department of Early Prehistory and Quaternary Ecology of the University of Tübingen has been excavating in the cave almost uninterrupted since 1978; first under J. Hahn, and since 1997 under N. J. Conard who has conducted annually campaigns ever since. The finds from these excavations form the basis of the present work.

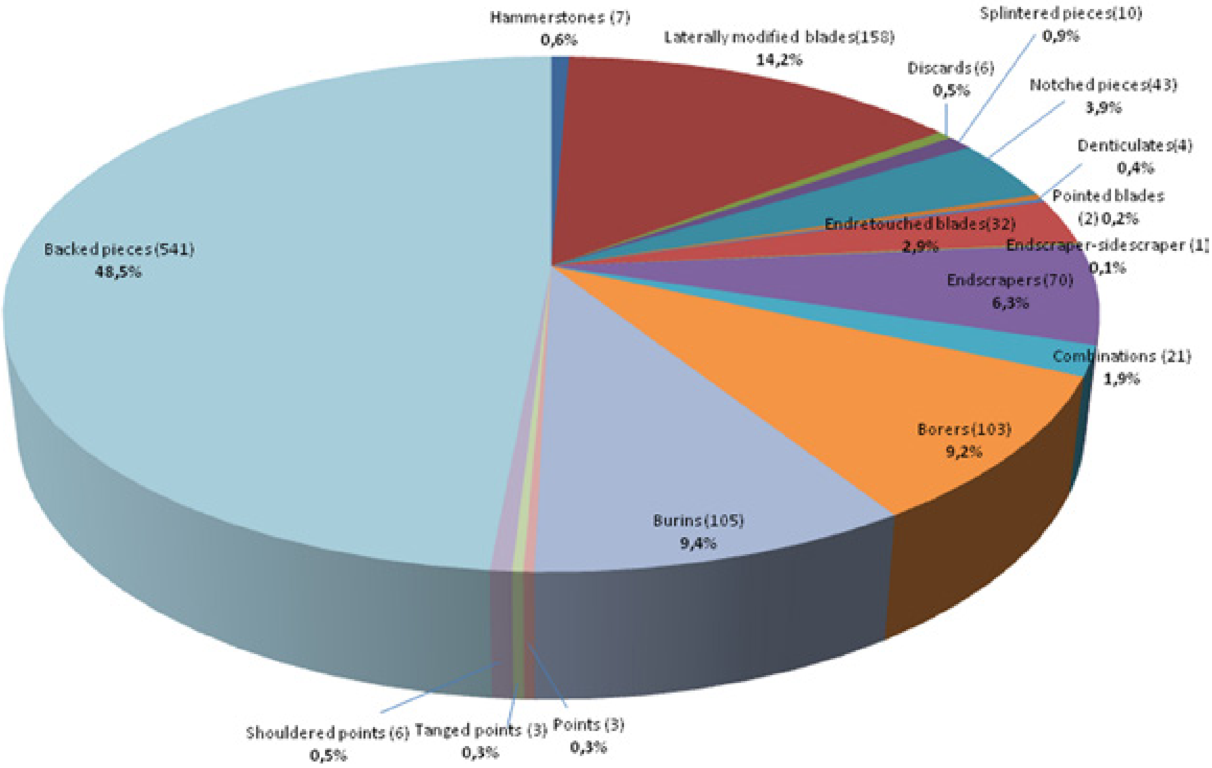
6 LITHIC ARTEFACTS

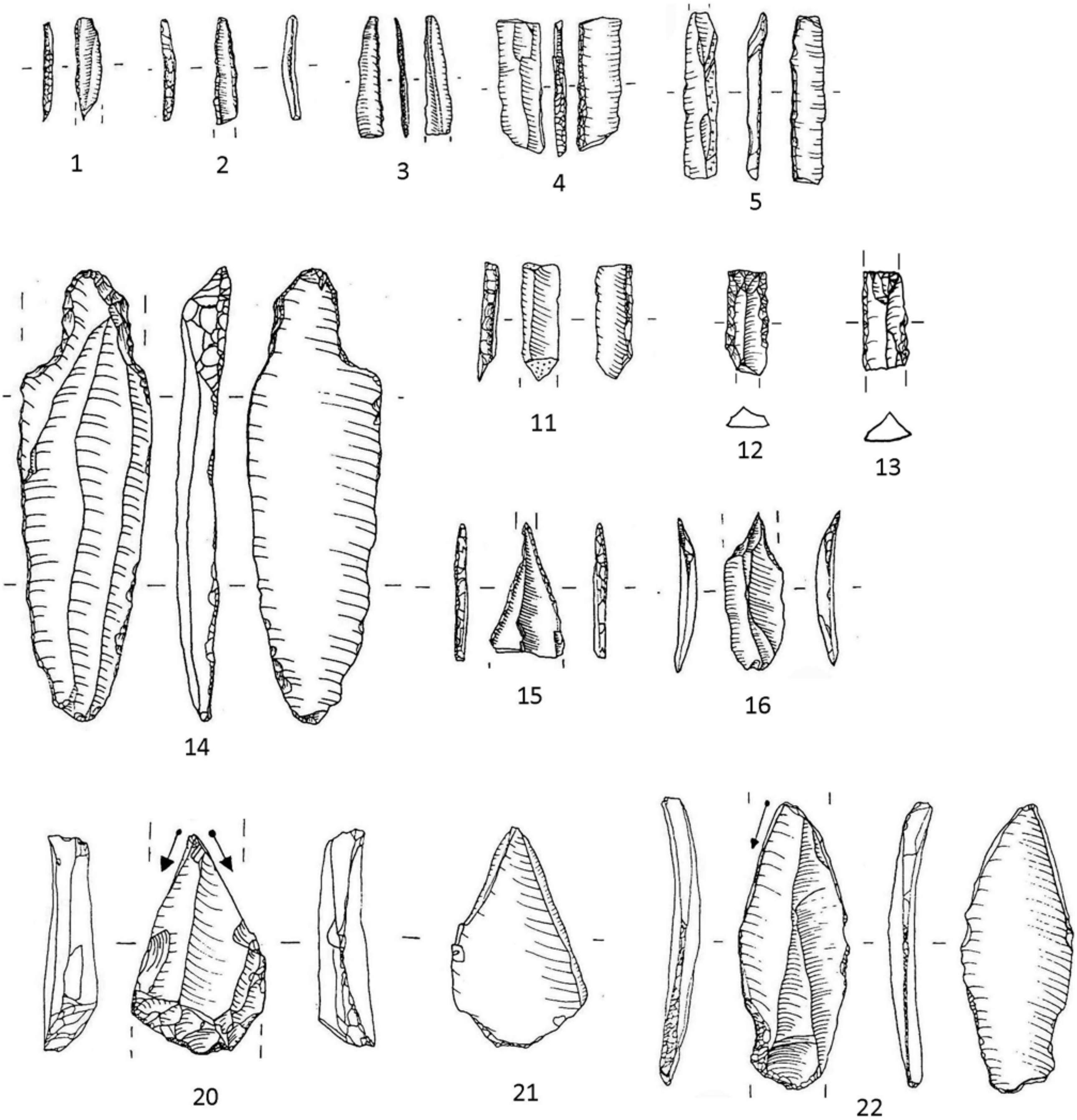
The lithics encompass 8 695 pieces larger than 1 cm and 1 115 tools as well as more than 15,000 pieces of small *débitage*.

The assemblage belongs to the late Magdalenian, as indicated by the general composition (see Schmidt 1912; Bosinski & Hahn 1973: high percentage of backed pieces (n = 541 equaling 48,5 %), many dihedral burins and burins on end retouch, many perforators, well prepared conical bladelet cores, many bone needles) as well as several tool-types that are considered characteristic of the Late Magdalenian: *Federmesser*-type points (convex backed points), Cheddar points with a double-angled back, shouldered points, tanged points, backed pieces with oblique end retouch, antler harpoons with bilateral barbs (**figures 3**, **4** and **7**).

The backed pieces are of special interest, as they make up almost half of all tools. Their abundance suggests that they were crucial for everyday life during the Magdalenian. As they are often traditionally viewed as projectile points/parts *per se*, (Albrecht 1979; Löhr 1988; Höck 2000; Moreau 2009; Floss & Taller 2011) it was decided to do a functional analysis on a small sample. As a result, a good number of the backed pieces indeed served as projectile points or inserts. However, a substantial number was used as cutting knives for very different tasks, like butchering, cutting hide/leather and even vegetable fibres. Some backed knives with an oblique end-retouch had been used as perforators. It seems that backed pieces were not used for a single task, but rather represent a modular technological system which catered for many different needs. Therefore a diverse range of tools can be produced with this multifunctional toolkit (Taller *et al.* 2012).

FIGURE 3 Percentages of tool types (n = 1115).





7 LITHIC TECHNOLOGY AND RAW MATERIALS

The lithic technology is clearly focused on the production of laminar blanks. Of all 9810 pieces larger than 1 cm and tools, 5136 (52,3 %) are either blades or bladelets, thus showing the importance of the laminar concept for their makers. The assemblage also contains 129 cores. Of these, 105 still show traces of systematic blank production. They are all either blade or bladelet cores, or were used to produce both blank types simultaneously. Also 229 preparational removals documenting core maintenance belong to laminar technology. In sum, we can say that at least 5470 (55,7 %) lithic artefacts are connected with laminar blank production.

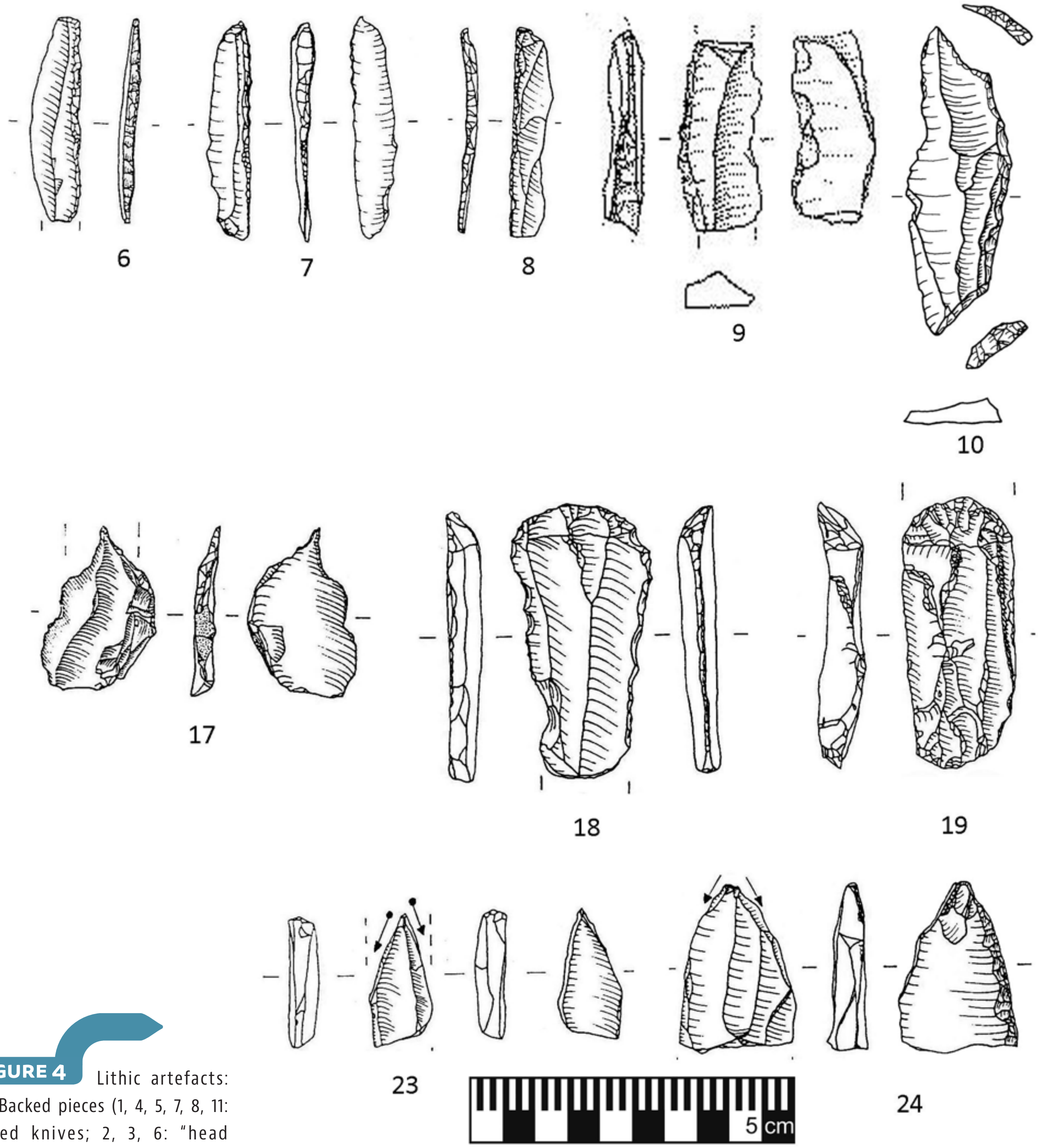


FIGURE 4 Lithic artefacts: 1-13. Backed pieces (1, 4, 5, 7, 8, 11: backed knives; 2, 3, 6: "head bladelet" in the sense of Pétillon *et al.* 2011; 9: convex backed point; 10: Cheddar-style point with double angled back; 12,13: backed knives with *Couze*-technique); 14–17. Perforators; 18–19. Endscrapers; 20-24. Burins (20, 23, 24: dihedral burins); 9-10. Drawings (E. Ghasidian); all others (S. Biedrowski).

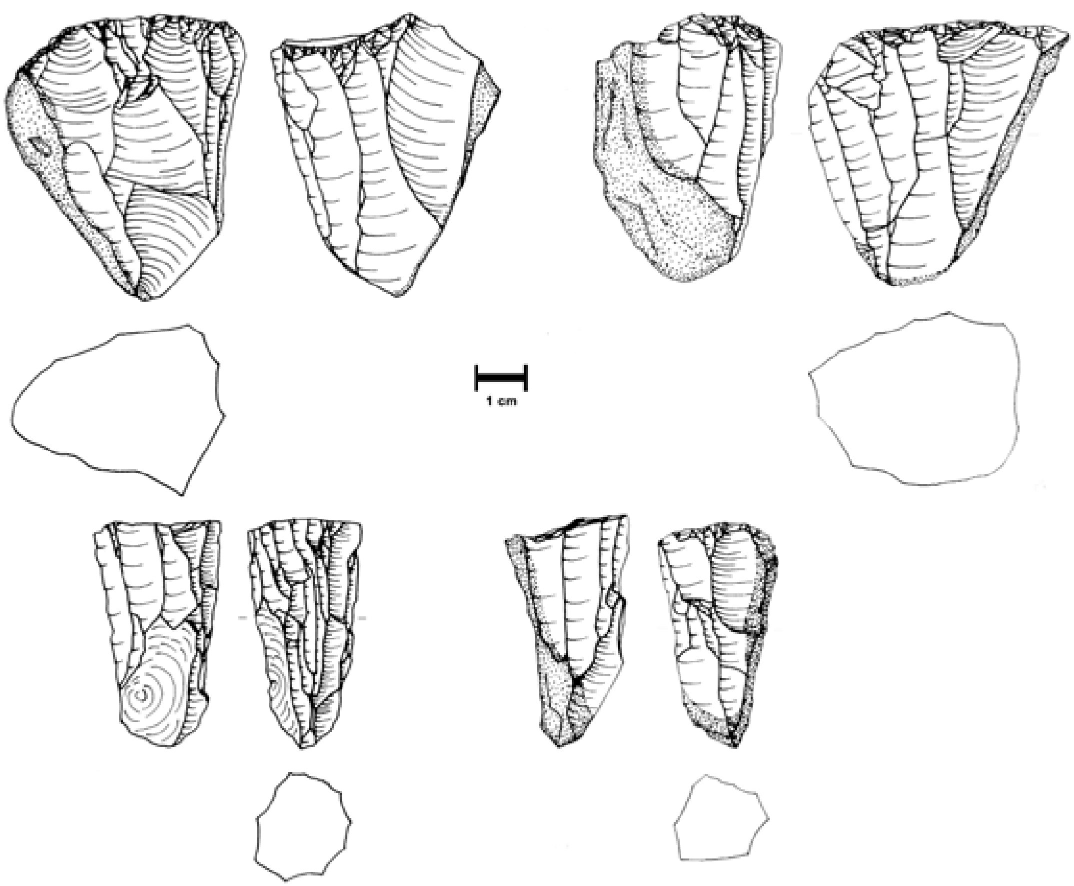
This together with the fact that 953 (85,5 %) of the 1115 tools have been made on laminar blanks stresses the importance of this technological concept for the Swabian Magdalenians. The significance of laminar production for toolmaking is especially visible in the backed pieces, as all of them have been made on laminar blanks: 502 on bladelets and 39 on blades.

Blank production was conducted in an almost exclusively unidirectional fashion. Of the 105 cores analysed, 74 feature only one striking platform and one removal surface. In most cases where cores have a second platform opposing the first, this second one was applied for core maintenance and not for blank production.

These findings – maintaining one striking platform and one removal surface preferentially – have been observed by N. Pigeot for the Magdalenian of Étiolles in the Paris Basin (Pigeot 2004). Where a second removal surface and striking platform exist, they are present on cores that are relatively small through many removals, which had made it impossible to exploit the first platform and removal surface further. Also, considering the fact that the primary nodules of chert and other materials used in Hohle Fels are relatively small with maximum diameters of ca. 10 cm, formal knapping could only be done on sufficiently fine grained material. It comes as no surprise that raw material nodules of good quality have been reduced considerably further than those of less value. The eleven conical cores are the most characteristic core shape produced by the almost exclusive practice of unidirectional blank removal from one striking surface (**figure 5**). On these cores, the concept of coupling one striking platform with one removal surface has been pursued to the extreme. The result is a striking platform in some cases surrounding almost the complete core volume and, through the unidirectional removal of blanks on a longitudinally curved removal surface, the core has acquired conical form.

More than 60 % of the artefacts are made on local Jurassic chert (**figure 6**). Radiolarite and *Bohnerzhornstein* (a variant of chert) originate ca. 20 km south and southwest of the site respectively (Burkert 2001). Tertiary chert comes from a source 40 km northwest, and the *Keuper* chert from sources located 40–60 km to the north. The assemblage also includes a portion of tabular chert from Lower Bavaria, 200 km to the east along the Danube; and Jasper from the Upper Rhine (200 km, southwest). The very few pieces of Crystal Quartz might be of Alpine origin or come from the Black Forest or Vosges Mountains.

FIGURE 5 Four of the conical cores (drawing: E. Ghasidian).



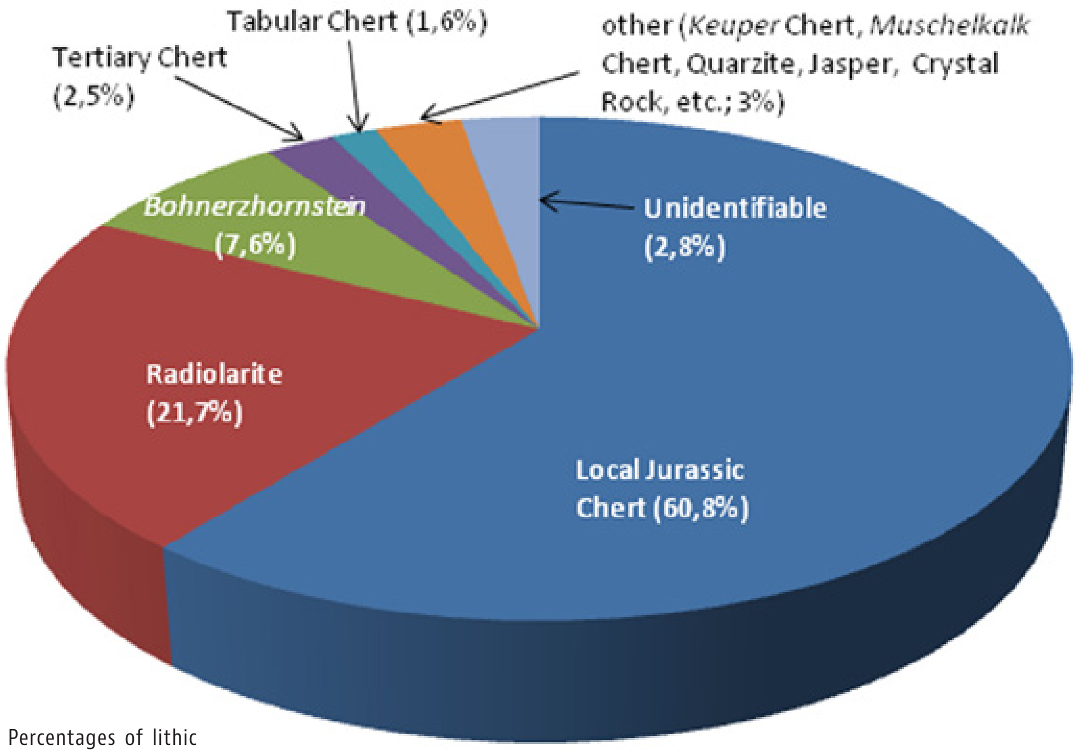


FIGURE 6 Percentages of lithic raw materials (n = 9810).

8 ORGANIC TOOLS & SYMBOLIC EXPRESSIONS

The most striking artefacts of organic raw materials are no doubt the three harpoons with bilateral rows of barbs (**figure 7**). The harpoons are also indicative of an Upper or Late Magdalenian. In addition to them, eleven antler points, both with single and double beveled bases and more than 30 sewing needles have been recovered (Walter 2000). Harpoons, antler points and needles have also been found in Petersfels (Mauser 1970) and Brillenhöhle (Riek 1973).

Among the symbolic expressions, there are many pieces of personal ornaments like cut reindeer incisors as well as perforated horse and red deer teeth. The many perforated marine shells including both fresh and fossil ones and are quite insightful. In the case of the fresh marine shells, they originate from the Atlantic Ocean and the Mediterranean (Rähle 1981; Alvarez Fernández 2001). The fossil molluscs seem to come mainly from the Steinheim Basin (50 km northeast) and the Mainz Basin 300 km northwest (Rähle 1981).

Jet was a material often used in the Magdalenian; in Hohle Fels we have different carved pieces, among them a *rondelle* as well as perforated beads. There are also many worked pieces of jet that are impossible to classify due to fragmentation as well as unworked pieces (Conard 2003b).

Further examples of organic artefacts include a band of ivory with many regularly spaced notches. The use of this piece is unclear. Riek found identical pieces in the Magdalenian of Brillenhöhle only a few kilometers downstream in the Ach Valley and argued that they might have been used as hairpins (Riek 1973).

It is interesting to note that the only evidence for mammoth in Hohle Fels are worked bits of ivory, among them a carved button. It is possible that the mammoth was already extinct at this time and that the ivory was collected as fossil material.

FIGURE 7 Three bilaterally barbed harpoons from Hohle Fels Cave (Photo: Taller).

The most impressive symbolic artefacts are 13 painted pieces of limestone. Especially the five pieces with red double-dot lines are characteristic for Hohle Fels Cave. The only other example of this motif has been found on a small limestone slab from Obere Klause Cave in Lower Bavaria (Floss & Conard 2001; **figure 8**). The site lies in the same region where the tabular chert originates.

One fascinating aspect of the Magdalenian record is documented in its figurative depictions. Here the Swabian Jura differs from the other regions in the paucity of carved three dimensional and engraved artworks. While the sites in the Hegau and northern Switzerland contain small, finely carved female figurines of jet that often served as personal ornaments (Mauser 1970; Höneisen 1993), the Swabian Jura sites lack this kind of depiction almost entirely. Similar motifs were found engraved on schist as well as carved in ivory and antler in Gönnersdorf and Andernach (Bosinski 2008); further female figurines in ivory are also known from Nebra in Thuringia (Toepfer 1965) and other sites. In Hohle Fels we only have the painted rocks, which are only comparable to the pieces from Obere Klause Cave in Lower Bavaria. These symbolic artefacts are hitherto without parallels.

9 MOBILITY/LONG DISTANCE CONTACTS

As depicted in **figure 9**, the origins of various lithic raw materials and also molluscs show, that the Magdalenian occupants of Hohle Fels were part of a quite differentiated web of relations. Some raw materials, like those from sources on the Upper Rhine and the tabular chert from Lower Bavaria (each ca. 200 km as the crow flies) are located far from the site. Concerning the artefacts from these outcrops it is clear that they are relatively few, and usually tools or at least blanks, with cores rare or absent (see Weniger 1990).

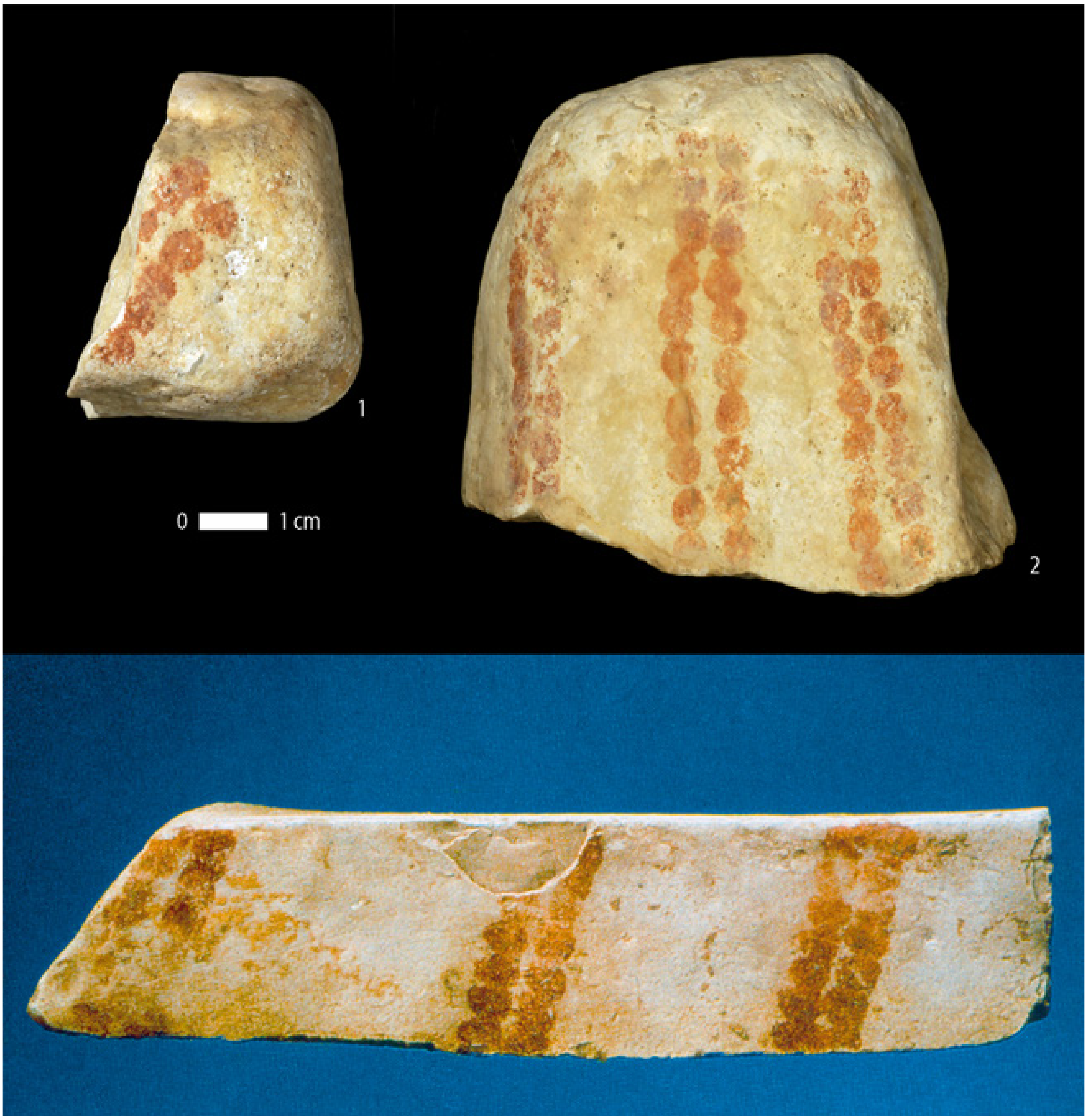


FIGURE 8 Painted limestone rocks. Upper half: Two pieces from Hohle Fels (Conard & Malina 2011). Lower half: piece from Obere Klause Cave (Photo: H. Jensen).

If we accept the fact that the limits of an area explored annually by hunter-gatherers is approximately 200 km (Weniger 1990, 1991; Floss 1994; Binford 1979), all sources of the lithic raw materials found in Hohle Fels Cave could well have been visited by the inhabitants of the site in connection with seasonal and general mobility of Palaeolithic hunter-gatherer groups. Regarding travels to and from the Upper Rhine area, we must assume a distance of 300 km, as the Black Forest massif – which blocks the direct route – seems to have rarely been visited during the Palaeolithic. Instead, a route following the Danube westwards to the source and then south through the Hegau-region, with the large and important Magdalenian open-air and cave site Petersfels, and the High Rhine, with sites like

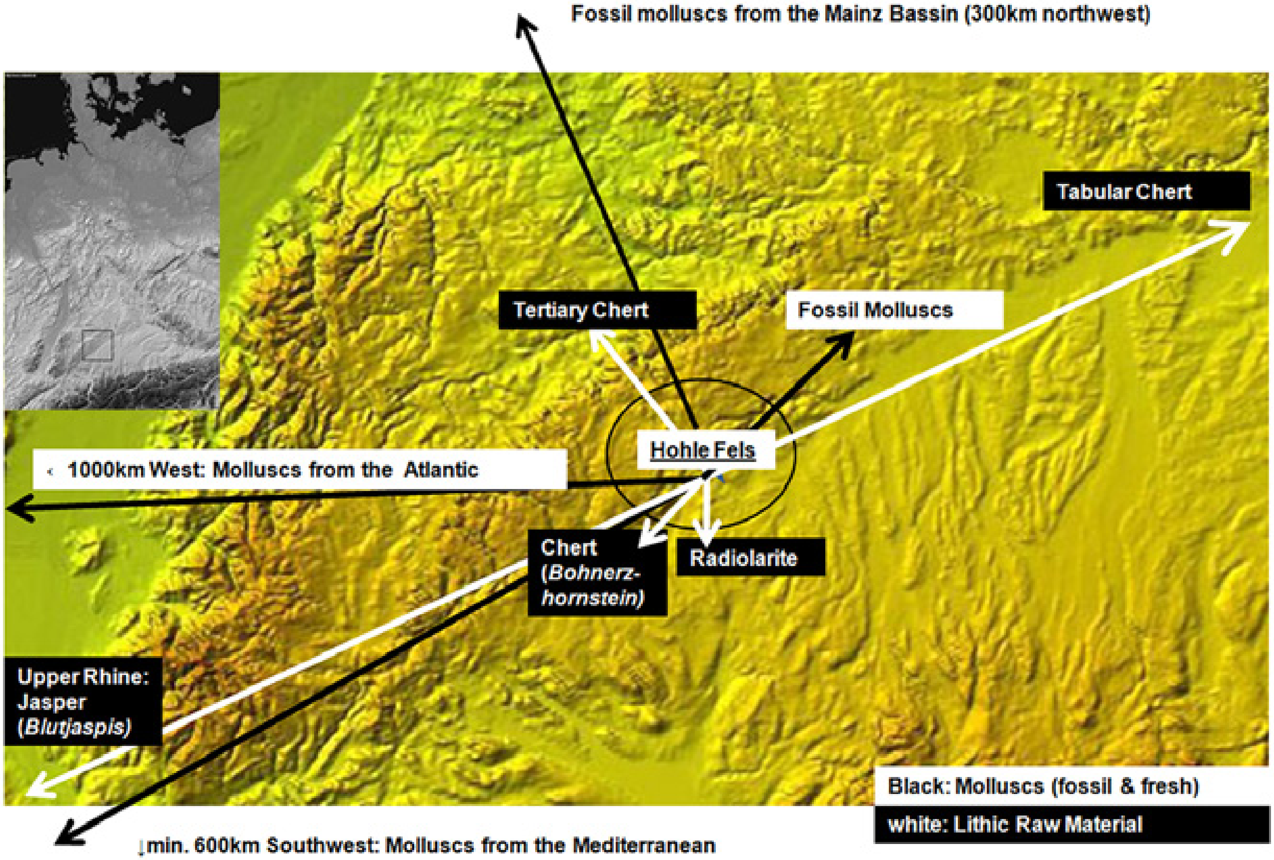


FIGURE 9 Origins of lithic raw materials and molluscs found in the Magdalenian of Hohle Fels (graph based on source map courtesy of www.scilands.de).

Kesslerloch and Schweizersbild on the Swiss side is more plausible. The contacts to Lower Bavaria are especially clear as demonstrated by Obere Klause Cave and the painted limestone slab with the same motif as the one characteristic of Hohle Fels (Floss & Conard 2001). The assemblage of Obere Klause is similar to Hohle Fels too and includes harpoons as well as sewing needles. Therefore we assume that both sites are part of the same area of exploitation, patrolled by groups with shared traditions and traits.

Concerning the molluscs and their provenience, it has been shown ethnoarchaeologically both for Australian and North American hunter-gatherers that the acquisition of exotic raw materials including marine molluscs was frequently accomplished through systems of exchange (Weniger 1991). The high importance of these molluscs for the “inland” Magdalenians is also demonstrated by some finds that imitate the molluscs such as those carved from jet in the Central European sites of Petersfels, Kleine Scheuer and Kesslerloch (Albrecht 1987). Since the Mediterranean is at least 600 km and the Atlantic 1 000 km away from Hohle Fels, a system of exchange must have existed in late Pleistocene Europe. Regarding the possible travel routes to both the Atlantic and Mediterranean, the hypothesis of the Rhine-Rhône corridor as an axis of communication, exchange and travel must be considered (Floss 2000; Alvarez Fernández 2001). This use of natural corridors along river valleys is highly probable and may also have played an important role in the spread of the Magdalenians to Central Europe.

10 RESETTLEMENT OF THE SWABIAN JURA AFTER THE LGM IN A EUROPEAN PERSPECTIVE

In conclusion, the radiometric dates and chrono-cultural attributions place the Magdalenian occupation of Hohle Fels before the onset of the late glacial interstadial cycle. This means that the resettlement of the Swabian Jura in fact took place in the cold and dry conditions of the late Pleniglacial so that ameliorating climatic conditions can no longer be cited as the main cause of resettlement. Instead we argue that the Magdalenian hunters grew in numbers and spread all over Europe so quickly because of their adaptation to very specific environmental conditions. Indeed this argument has been put forward also in regard to the noticeable population increase in Magdalenian times in the core region of Southwestern France (Delpech 1999; Langlais 2011). An increase in grassland, favoured by the cold and dry climate of the late Pleniglacial, enabled a growth in biomass of ungulate herds (Delpech 1999). This in turn posed ideal conditions for the well adapted Palaeolithic hunter-gatherers and allowed for population numbers to grow (Langlais 2011; Bocquet-Appel and Demars 2000 even speak of a "demographic explosion").

After the comparably quick retreat of the glaciers in Central Europe (e.g. Leesch *et al.* 2012), the newly exposed land was then colonized by the Magdalenian hunters. They seem to have followed the spread of an environment that they knew and to which they were adapted. As Leesch *et al.* (2012) have correctly stated, it is appropriate to correlate human colonization of a new landscape with the colonization of the same area by flora and fauna rather than primarily relating it to climatic events *per se*. That the resettlement of Swabia was quick and comprehensive is supported by the Southern German dates which mostly cluster between 12 500 and 13 500 uncalBP (Kind 2003). The Upper Rhine site of Munzingen presents a puzzle in this context, as the dates indicate very early Magdalenian occupations at 17 000 uncalBP and around 15.000 uncalBP (Kind 2003). These early dates have not been undisputed, Housley *et al.* (1997) view Munzingen as a site of unknown age because unmodified bones were dated and the dates did not coincide. The only other Central European site of similar age is Maszycka Cave in southern Poland. This site poses another exception with substantially older dates (ca. 15 000 uncalBP; Kozlowski *et al.* 2012; Street *et al.* 2012). Apart from Munzingen, the southern German Magdalenian sites form a coherent regional entity with relatively little time-depth.

The resettlement of Central Europe followed a southwest-northeast direction, as can be seen in the distribution of sites as well as the dates (e.g. Housley *et al.* 1997; Miller 2012). Another argument for this general direction of recolonization is the fact that southwestern France had comprehensively and consistently been occupied during the LGM (Terberger 2003). The network of contacts and exchange which was maintained by the Magdalenians of Hohle Fels points westwards too. This is evident in the marine molluscs from the Atlantic and the Mediterranean, but also in the lithic raw material from the Upper Rhine region. Considering these relations and the apparent social-economic network, the westward orientation of the Central European Magdalenians seems to be of great importance, which in turn may be attributed to their roots in the southwest. In the lithic raw material from the Upper Rhine we see evidence of how far west the Magdalenian inhabitants of Hohle Fels ranged in pursuit of their economic activities. However, this observation does not necessarily imply that the Upper Rhine area represents the actual limits of the area used and patrolled by the Magdalenian population of Swabia.

We have no answer as to why the Magdalenian occupation of Hohle Fels ended even before the onset of the Meiendorf Interstadial (GRIP-phase 1e). We can assume, however, that this is linked to environmental changes. As hunters of the arid grassland steppe, the Magdalenians might have been affected by the climatic amelioration in southern Central Europe during GRIP 1e and the ensuing significant increase in tree cover coming (Baales and Jöris 2001, fig.1). This might have resulted in a significant change in composition of the fauna and game as well. There are indications that the Azilian in Switzerland was in fact established no later than 12 300 uncalBP; this may also hold true for Southern Germany.

As a comparatively large Magdalenian site surrounded by many small to very small ones, Hohle Fels offers much potential for further research on Magdalenian settlement dynamics in Southwestern Germany.

On a European scale, we include Hohle Fels Cave as a base camp of the Late Magdalenian. The findings from the Magdalenian of Hohle Fels, on the whole, are in good accordance with the neighbouring sites of Southern Germany and Switzerland, where most sites also pre-dated the GRIP–1e climatic phase (e.g. Felsställe, Schussenquelle, Geißenklösterle, most dates from Petersfels, Kesslerloch, Champréveyres, Monruz; see e.g. Kind 2003; Leesch *et al.* 2012). Gönnersdorf and Andernach in the Central Rhineland of Germany date to this time span as well, even though they are possibly slightly older. Some eastern German sites in Thuringia (Nebra, Kniegrotte) also yielded older dates (Housley 1997; Street *et al.* 2012). Nonetheless, this means that all of these sites dated roughly to the same time-span, with only Munzingen on the Upper Rhine and Maszycka in southern Poland posing exceptions to that trend. It is therefore probable that the sites were colonized in the same movement of Magdalenian dispersal, sharing common roots to the southwest.

11 CONCLUSION

Hohle Fels is a base camp site of the late Magdalenian. Based on other sites in surrounding regions, a comprehensive resettlement of southern Central Europe in general and the Swabian Jura specifically occured after the LGM before the onset of the late glacial interstadial cycle. An extensive settlement system existed during the Late Pleniglacial in southern Germany, the German central Rhineland and Switzerland. We have to assume that these sites shared common origins in Southwestern France, which is documented in the long-distance westward contacts maintained throughout this period of colonization. These network-based relations are visible in marine shells as shown by Magdalenian sites in all the above mentioned regions (Alvarez Fernández 2001). Relations between the different Central European Magdalenian find regions are somewhat unclear. In Hohle Fels we can see connections to the east (Lower Bavaria) and southwest (Upper Rhine) through the lithic raw materials. The only indications of contacts to the Middle Rhine are the fossil shells from the Mainz basin. Instead, the Magdalenian inhabitants of Gönnersdorf and Andernach maintained economic contacts to the North and Northwest (Street *et al.* 2012).

It is an idiosyncrasy of the Swabian Jura that the female figurines and engravings, known from various Central European Magdalenian sites, seem to be missing here. In Hohle Fels there are only the painted rocks, to which no real parallels are known besides the piece from Obere Klause Cave in Lower Bavaria. This raises a range of important questions about the details in the pattern of resettlement of Central Europe described here, and the specific nature of the social identity of the various groups of Magdalenian people in Central Europe.

REFERENCES

ALBRECHT G. (1979) – *Magdalénien-Inventare vom Petersfels. Siedlungsarchäologische Ergebnisse der Ausgrabungen 1974–1976*. Tübingen, Archaeologica Venatoria 6.

ALBRECHT G. (1987) – Kunstobjekte aus dem Magdalénien. In: H. Müller-Beck & G. Albrecht (eds) (1987), *Die Anfänge der Kunst vor 30.000 Jahren*, Theiss Verlag, Stuttgart, p. 43–51.

ALVAREZ FERNÁNDEZ E. (2001) – L´axe Rhin-Rhône au Paléolithique supérieur récent : l´exemple des mollusques utilisés comme objets de parure. *L´Anthropologie* 105:547–564.

BAALES M. & JÖRIS O. (2001) – Zwischen Nord und Süd. Ein spätallerödzeitlicher Rückenspitzen-Fundplatz bei Bad Breisig, Kreis Ahrweiler/ Mittelrhein, Rheinland-Pfalz. *Die Kunde* 52:275–292.

BINFORD L.R. (1979) – Organization and formation processes. Looking at curated technologies. *Journal of Anthropological Research* 35:255–273.

BLUMENTRITT R. & HAHN J. (1990) – *Der Hohle Fels*. Schelklinger Archäologische Führer.

BOCQUET-APPEL J.-P. & DEMARS P.-Y. (2000) – Population Kinetics in the Upper Palaeolithic in Western Europe. *Journal of Archaeological Science* 27:551–570.

BOSINSKI G. & HAHN J. (1973) – Der Magdalénien-Fundplatz Andernach. *Rheinische Ausgrabungen* 11:81–257.

BOSINSKI G. (2008) – *Urgeschichte am Rhein*. Kerns Verlag, Tübingen.

BURKERT W. (2001) – *Lithische Rohmaterialversorgung im Jungpaläolithikum des südöstlichen Baden-Württemberg*. Dissertation Universität Tübingen.

CONARD N.J. (2003a) – Palaeolithic ivory sculptures from southwestern Germany and the origins of figurative art. *Nature* 426:830–832.

CONARD N.J. (2003b) – Eiszeitlicher Schmuck auf der Schwäbischen Alb. In: S. Kölbl & N.J. Conard (2003), *Eiszeitschmuck. Status und Schönheit*. Musemsheft 6, Urgeschichtliches Museum Blaubeuren, Blaubeuren, p. 15–49.

CONARD N.J. (2009) – A female figurine from the basal Aurignacian of Hohle Fels Cave in southwestern Germany. *Nature* 459:248–252.

CONARD N.J. & MALINA M. (2009) – Spektakuläre Funde aus dem unteren Aurignacien vom Hohle Fels bei Schelklingen, Alb-Donau-Kreis. *Archäologische Ausgrabungen in Baden-Württemberg* 2008:19–22.

CONARD N.J. & MALINA M. (2011) – Neue Eiszeitkunst und weitere Erkenntnisse über das Magdalénien vom Hohle Fels bei Schelklingen. *Archäologische Ausgrabungen in Baden-Württemberg* 2010:56–60.

CONARD N.J. & MALINA M. (2012) – Neue Forschungen in den Magdalénien-Schichten des Hohle Fels bei Schelklingen. *Archäologische Ausgrabungen in Baden-Württemberg* 2011:56–60.

CONARD N.J., MALINA M. & MÜNZEL S. (2009) – New flutes document the earliest musical tradition in southwestern Germany. *Nature* 460:737–740.

DELPECH F. (1999) – Biomasse d´Ongulés au Paléolithique et inférences sur la démographie. *Paléo* 11:19–42.

ERIKSEN B.V. (1996) – Resource exploitation, subsistence strategies, and adaptiveness in Late Pleistocene-Early Holocene Northwest Europe. In: L.G. Straus, B.V. Eriksen, J.E. Erlandson & D.E. Yesner (eds.) (1996), *Humans at the end of the Ice Age*, Plenum Press, New York and London, p. 101–128.

FLOSS H. (1994) – *Rohmaterialversorgung im Paläolithikum des Mittelrheingebietes*. Dr. Rudolf Habelt GmbH, Bonn.

FLOSS H. (2000) – Le couloir Rhin-Saône-Rhône: Axe de communication au Tardiglaciaire ? In: *Les derniers chasseurs-cueilleurs d´Europe occidentale (13 000 – 5 500 av. J.-C.)*, Actes du colloque international de Besançon (Doubs, France) 23–25 octobre 1998, Presses Universitaires Franche-Comtoises, Besançon.

FLOSS H. & CONARD N. (2001) – Malerei in der Eiszeitkunst des Süddeutsch- Schweizerischen Jura. In: C.-S. Holdermann, H. Müller-Beck & U. Simon (eds.) (2001), *Eiszeitkunst im Süddeutsch- Schweizerischen Jura. Anfänge der Kunst*. Theiss Verlag, Stuttgart, p. 75–87.

FLOSS H. & TALLER A. (2011) – Aspects de la technologie lithique du site gravettien d´Azé-Camping de Rizerolles (Saône-et-Loire, France). In: N. Goutas, L. Klaric, D. Pesesse & P. Guillermin (eds.) (2011), À la recherche des identités gravettiennes. Table ronde sur le Gravettien en France et dans les pays limitrophes, Aix-en-Provence, 6–8 octobre 2008, p. 45–56.

HAHN J. (1991) – Höhlenkunst aus dem Hohle Fels bei Schelklingen, Alb-Donau-Kreis. *Archäologische Ausgrabungen in Baden-Württemberg* 1990:19–22.

HÖCK C. (2000) – *Das Magdalénien der Kniegrotte*. Konrad Theiss Verlag, Stuttgart.

HÖNEISEN M. (1993) – Die Kunst des Jungpaläolithikums in der Schweiz In: J.-M. Le Tensorer & U. Niffeler (eds.) (1993), *Paläolithikum und Mesolithikum – Paleolitico e Mesolitico, Die Schweiz vom Paläolithikum bis zum frühen Mittelalter*, Band 1:187–199.

HOUSLEY R.A., GAMBLE C.S., STREET M. & PETTITT P. (1997) – Radiocarbon evidence for the Lateglacial Human Recolonisation of Northern Europe. *Proceedings of the Prehistoric Society* 63:25–54.

KIND C.J. (2003) – Die absolute Datierung des Magdaléniens und des Mesolithikums in Süddeutschland. In: J.-M. Burdukiewicz, L. Fiedler, W.-D. Heinrich, A. Justus & E. Brühl (eds.), *Erkenntnisjäger. Kultur und Umwelt des frühen Menschen*. Festschrift für Dietrich Mania, Veröffentlichungen des Landesamtes für Archäologie, Band 57, Halle a.d. Saale, p. 303–320.

KOZLOWSKI S.K., POLTOWICZ-BOBAK M., BOBAK D. & TERBERGER T. (2012) – New information from Maszycka Cave and the Late Glacial recolonisation of Central Europe. *Quaternary International* 272–273:288–296.

LANGLAIS M. (2011) – Processes of change in Magdalenian societies in the Pyrenean isthmus (20–16ky cal BP). *Antiquity* 85:715–728.

LANGLAIS M., COSTAMAGNO S., LAROULANDIE V., PÉTILLON J.-M., DISCAMPS E., MALLYE J.-B., COCHARD D. & KUNTZ D. (2012) – The evolution of Magdalenian societies in South-West France between 18 000 and 14 000 cal BP: Changing environments, changing tool kits. *Quaternary International* 272–273:138–149.

LEESCH D. (1997) – *Hauterive-Champréveyres. Un campement magdalénien au bord du lac de Neuchâtel. Contexte, vestiges, activités*. Archéologie neuchâteloise 19, Musée cantonal d´archéologie, Neuchâtel.

LEESCH D., MÛLLER W., NIELSEN E. & BULLINGER J. (2012) – The Magdalenian in Switzerland: recolonization of a newly accessible landscape. *Quaternary International* 272–273:191–208.

LEESCH D. & MÛLLER W. (2012) – Neue Radiokarbondaten an Knochen, Zähnen und Geweih aus Magdalénien-Fundstellen der Schweiz und ihre Bedeutung für die Stellung des Magdalénien innerhalb des Spätglazials. *Jahrbuch Archäologie der Schweiz* 95:1–10.

LITT TH., BEHRE K.E., MEYER K.D., STEPHAN H.J. & WANSA S. (2007) – Stratigraphische Begriffe für das Quartär des norddeutschen Vereisungsgebietes. *Eiszeitalter und Gegenwart* 56(1–2):7–65.

LÖHR H. (1988) – *Der Magdalénien-Fundplatz Alsdorf Kreis Aachen-Land. Ein Beitrag zur Kenntnis der funktionalen Variabilität jungpaläolithischer Stationen*. Dissertation Universität Tübingen.

LOTTER A.F., HEIRI O., BROOKS S., VAN LEEUWEN J.F.N., EICHER U. & AMMANN B. (2012) – Rapid summer temperature changes during Termination 1a: high-resolution multiproxy climate reconstructions from Gerzensee (Switzerland). *Quaternary Science Reviews* 36:103–113.

MAUSER P.F. (1970) – Die jungpaläolithische Höhlenstation Petersfels im Hegau (Gemarkung Bittelbrunn, Landkreis Konstanz). *Badische Fundberichte*, Sonderheft 13.

MILLER CH.E. (2009) – *Formation Processes, Paleoenvironments, and Settlement Dynamics at the Palaeolithic Cave Sites of Hohle Fels and Geißenklösterle: A Geoarchaeological and Micromorphological Perspective*. Dissertation Universität Tübingen.

MILLER R. (2012) – Mapping the expansion of the Northwest Magdalenian. *Quaternary International* 272–273:209–230.

MOREAU L. (2009) – *Geißenklösterle. Das Gravettien der Schwäbischen Alb im europäischen Kontext*, Kerns Verlag, Tübingen.

MÜNZEL S., HOFREITER M., RABEDER G., BOCHERENS H., UERPMANN H.P. & CONARD N.J. (2007) – Correlating genetic results for the replacement of cave bears at 28 000 BP from the Ach Valley (Swabian Jura) with metrical and morphological data. *In*: R. Musil & V. Vávra (eds.) (2007), *Proceedings of the 13th International Cave Bear Symposium*, September 20–24 2007, Brno, Czech Republic. Brno, p. 123–128.

MÛNZEL S.C., HOFREITER M., STILLER M., MITTNIK A., CONARD N.J. & BOCHERENS H. (2011) – Pleistocene bears in the Swabian Jura (Germany): genetic replacement, ecological displacement, extinctions and survival. Quaternary International 245:225–237.

PÉTILLON J.-M., BIGNON O., BODU P., CATTELAIN P., DEBOUT G., LANGLAIS M., LAROULANDIE V., PLISSON H. & VALENTIN B. (2011) – Hard core and cutting edge: experimental manufacture and use of Magdalenian composite projectile tips. *Journal of Archaeological Science* 38:1266–1283.

PIGEOT N. (ED.) (2004) – Les derniers Magdaléniens d´Étiolles. Perspectives culturelles et plaéohistoriques (l´unité d´habitation Q31). XXXVII[e] supplément à *Gallia Préhistoire*, CNRS Éditions, Paris.

RÄHLE W. (1981) – Schmuckschnecken aus jungpaläolithischen Fundschichten vom Hohlen Felsen bei Schelklingen (Alb-Donau-Kreis), *Archäologisches Korrespondenzblatt* 11:179–180.

RICHARD A., CUPILLARD C., RICHARD H. & THÉVENIN A. (2000) – *Les derniers chasseurs-cueilleurs d´Europe occidentale (13 000–5 500 av. J.C.)*, Actes du Colloque international de Besançon (Doubs, France), 23–25 octobre 1998, Presses Universitaires de Franche-Comté, Besançon.

RIEK G. (1973) – *Das Paläolithikum der Brillenhöhle bei Blaubeuren (Schwäbische Alb)*, Verlag Müller & Gräff, Stuttgart.

RODRIGUEZ P. & ROBLIN-JOUVE A. (2004) – Environnement et cadre chronologique de l´implantation Magdalénienne. Dans : N. Pigeot (eds.) (2004), *Les derniers Magdaléniens d´Étiolles. Perspectives culturelles et paléohistoriques (l´unité d´habitation Q31)*. XXXVII[e] supplément à Gallia Préhistoire, CNRS Éditions, Paris, p. 19–30.

SCHMIDER B. (1992) – *Marsangy. Un campement des derniers chasseurs magdaléniens sur les bords de l´Yonne*. Liège, ERAUL 55.

SCHMIDT R.R. (1912) – *Die diluviale Vorzeit Deutschlands*. E. Schweizerbartsche Verlagsbuchhandlung Nägele & Dr. Sproesser, Stuttgart.

STREET M., GELHAUSEN F., GRIMM S., MOSELER F., NIVEN L., SENSBURG M., TURNER E., WENZEL S. & JÔRIS O. (2006) – L´occupation du bassin de Neuwied (Rhénanie centrale, Allemagne) par les Magdaléniens et les groupes à Federmesser (aziliens). *Bulletin de la Société préhistorique française* 103:753–780.

STREET M., JÔRIS O. & TURNER E. (2012) – Magdalenian settlement in the German Rhineland –An update. *Quaternary International* 272–273:231–250.

TALLER A., BEYRIES S., BOLUS M. & CONARD N. J. (2012) – Are the Magdalenian backed pieces from Hohle Fels just projectiles or part of a multifunctional toolkit? *Mitteilungen der Gesellschaft für Urgeschichte* 21:37–54.

TERBERGER T. (2003) – Vom Gravettien zum Magdalénien in Mitteleuropa – Aspekte der menschlichen Besiedlungsgeschichte in der Zeit um das zweite Kältemaximum der letzten Eiszeit. Habilitationsschrift Universität Greifswald, *Archäologisches Nachrichtenblatt Band* 8:55–62.

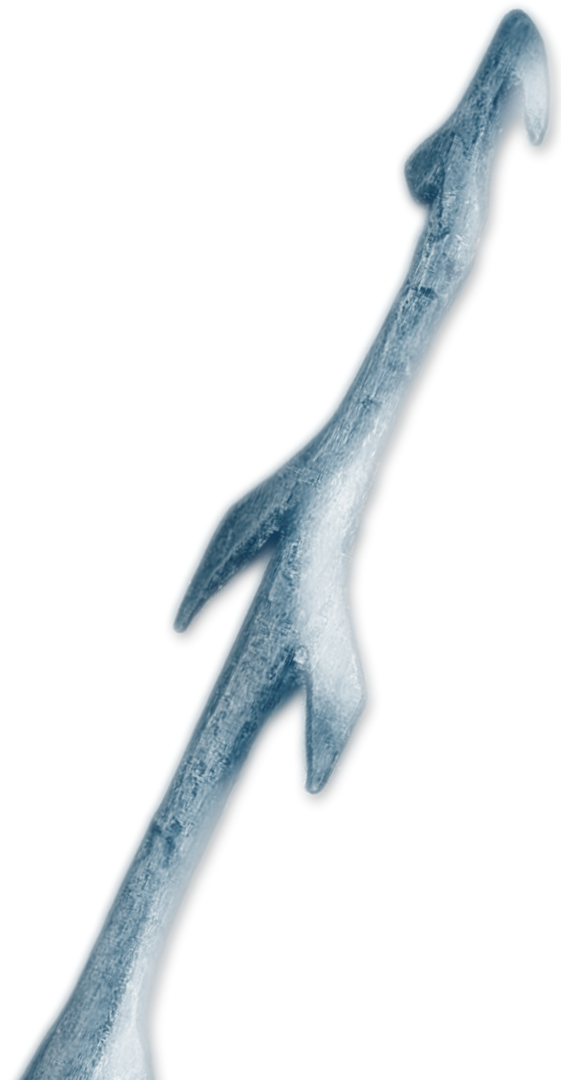
TOEPFER V. (1965) – Drei spätpaläolithische Frauenstatuetten aus dem Unstrut-Tal bei Nebra. *Fundberichte aus Schwaben* N.F. 17 (Festschrift für Gustav Riek), Stuttgart, p. 103–111.

WALTER R. (2000) – *Knochennadeln: Archäologischer Befund, Experiment und Museumspräsentation*. Magisterarbeit Universität Tübingen.

WENIGER G.C. (1990) – Germany at 18.000 BP. In: O. Soffer & C. Gamble (eds.), *The world at 18 000 BP. Vol.1, High latitudes*. Unwin Hyman, London, p. 171–192.

WENIGER G.C. (1991) – Überlegungen zur Mobilität jägerischer Gruppen im Jungpaläolithikum. In: Urgeschichte als Kulturanthropologie. Beiträge zum 70. Geburtstag von Karl J. Narr. *Saeculum* 42:82–103.

WENINGER B, JÖRIS O. & DANZEGLOCKE U. – *calpal*-online (quickcal2007 ver.1.5). Cologne Radiocarbon Calibration & Palaeoclimate Research Package, Universität zu Köln, Institut für Ur- und Frühgeschichte, Radiocarbon Laboratory, Weyertal 125 (www.calpal-online.de).



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Paléolithique supérieur

Thème IV
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Ressources en silex au Paléolithique supérieur dans le Massif central : réseaux locaux et approvisionnements lointains revisités

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Résumé : Le sud du Massif central, réputé terre hostile de peuplement interglaciaire et interstadiaire, est depuis des décennies un terrain privilégié pour l'étude des déplacements humains. Considéré par certains auteurs comme dépourvu de silex de modules propices à une production laminaire, ce terrain se révèle a contrario d'une richesse insoupçonnée en matériaux exploitables. S'il est vrai que les gîtes primaires (silex à l'affleurement), maintenant bien caractérisés, y sont peu nombreux et de superficie restreinte, les épandages détritiques issus des alluvions anciennes de la Loire, de l'Allier et de la Truyère fournissent une réserve abondante en géo-matériaux, exploitée lors des différentes phases d'occupation de l'espace régional. Une méthodologie renouvelée fondée sur le principe de chaîne évolutive des silicifications et ayant fait ses preuves pour le Paléolithique moyen, a été appliquée de façon exhaustive à trois séries « emblématiques » du Paléolithique supérieur régional : l'assemblage lithique de la grotte Chauvet en Ardèche, le Protomagdalénien de l'abri du Blot et le Badegoulien de la grotte du Rond-du-Barry en Haute-Loire. Les premiers résultats renouvellent la vision des approvisionnements en silex proposée depuis les années 1980 pour le Paléolithique supérieur du Massif central. Les comportements d'approvisionnement sont différents selon les cultures considérées. À la grotte Chauvet, on note une augmentation des distances de circulation des objets lithiques par rapport à celles définies à partir des séries moustériennes d'Ardèche. Les Protomagdaléniens du Blot pénètrent dans le Massif central avec des rognons de silex provenant des marges sud-ouest du Bassin parisien (Indre-et-Loire et Loir-et-Cher), situées à plus de 250 km du site vellave et donnent l'image d'une expédition en territoire inconnu. En revanche, les Badegouliens du Rond-du-Barry exploitent un spectre minéral local similaire à celui retrouvé dans l'occupation néandertalienne de la grotte de Sainte-Anne I toute proche ; à cette part de matériaux locaux et semi-locaux vient s'ajouter une composante variée de silex d'origines très lointaines (Loir-et-Cher), illustrant une parfaite connaissance de deux territoires distincts et évoquant une exploitation réfléchie et intégrée de deux zones d'un vaste domaine approprié.

Abstract : *The southern French Massif Central has been considered a hostile land for human populations during interglacial and inter-stadial times but has for decades been a privileged field for the study of human movement. Once believed to be devoid of flint nodules suitable for blade production, this region in fact shows an unsuspected wealth of exploitable materials suitable for stone tool production. Although it is true that primary outcrops of flint are few and have restricted surface exposures they are however, now well characterized. Detrital formations coming from the old alluviums of the Loire, Allier and Truyère rivers also supply an abundant stock of geo-materials that were also exploited during the various occupation phases of the region. A renewed methodology based on the principle of an evolutionary chain of silicification, well proven for the Middle Palaeolithic, was applied exhaustively to three archaeological series belonging to the Upper Palaeolithic; the lithic assemblages of Chauvet cave in the Ardèche, the Proto-Magdalenian of Le Blot rockshelter and the Badegoulian of Le Rond-du-Barry cave both in Haute-Loire. Preliminary results do not confirm the previous observations for the sources of lithic raw materials first proposed in the 1980s for Upper Palaeolithic sites in the Massif Central. Exploitation behaviours for the supply of raw materials vary in accordance with the temporal differences in the cultures. In Chauvet cave, there is a wider acquisition zone for the lithic artefacts compared with that commonly attributed to the Middle Palaeolithic of the Ardèche. The Proto-Magdalenian of le Blot rockshelter in the Massif Central shows that entire flint nodules were transported to the site from the south-west margins of the Paris Basin (Indre-et-Loire and Loir-et-Cher), more than 250 km distant from the Velay site. This suggests that excursions were made into territories further afield than those normally frequented. The Badegoulian occupation of le Rond-du-Barry exploited a local lithic spectrum similar to the one studied at the adjacent Middle Palaeolithic Sainte-Anne I cave site. However, to the local and semi local material is added a variable component of flint from a very distant locality (Loir-et-Cher), illustrating an understanding of the resources available from two distinct and separate environments and planned exploitation of a vast territory.*

1 INTRODUCTION

Dès les débuts de la Préhistoire, l'étude des matières premières - la pétroarchéologie - a identifié des traceurs des déplacements humains (Jouannet 1834 *in* Cleyet-Merle 1990; Audierne 1863; Damour 1865; Pomerol 1888; Boule & Vernière 1899). Des investigations pétrographiques ont été conduites sur du matériel archéologique selon une méthode renouvelée (Fernandes, 2012, Fernandes & Raynal, 2006, Fernandes *et al.* 2007) pour essayer de mieux appréhender les déplacements des matières *i.e* des hommes durant le Paléolithique. L'extension des géo-territoires a été définie par l'ensemble des sources de matières premières lithiques exploitées par l'homme. Couplée aux autres disciplines de la Préhistoire (archéozoologie, technologie lithique, art préhistorique, ...) elle documente *a minima* les territoires culturels entre l'OIS 6–5 et la fin de l'OIS 2 dans le sud du Massif central.

Cette zone géographique présente plusieurs avantages. L'espace minéral y est bien identifié par des opérations programmées: prospection thématique (« L'espace minéral au Paléolithique moyen dans le sud du Massif central », coordination J.-P. Raynal), projet collectif de recherche (« Réseaux de lithothèques en Rhône Alpes », coordination P. Fernandes), et programme collectif de recherche (« Espaces et subsistance au Paléolithique moyen dans le sud du Massif central », coordination J.-P. Raynal et M.-H. Moncel). Des études pluridisciplinaires ont été conduites sur différents sites. Les sites sont assez nombreux dans un espace où la topographie prononcée structure le paysage. De nombreux travaux sur l'origine des matières premières lithiques y ont été conduits (Torti 1980; Masson 1981; Torti-Zannoli 1983, 1985; Surmely *et al.* 1998, 2008a; Surmely & Pasty 2003; Fernandes 2012; Delvigne 2012).

Réputé dépourvu de matières premières aptes à la production laminaire (Bracco 1994, 1996; Surmely & Pasty 2003; Angevin 2010), cet espace regorge pourtant de silicifications en position secondaire et présente des affleurements primaires de matières premières siliceuses, réduits mais de bonne qualité (silcrête de La Collange, silex du Bassin du Puy,...), que les travaux précités ont documenté (Fernandes *op.cit*). Certaines de ces matières premières locales présentent des ubiquités de faciès avec des matériaux considérés comme lointains au sein des assemblages archéologiques. À la lumière de ces nouvelles données, les anciennes collections ont été examinées.

Le terrain d'étude se décompose en deux ensembles distincts (**figure 1**):

- à l'ouest, le Velay est caractérisé par son paysage de moyenne montagne (altitude moyenne de 1000 m), composé de roches cristallines du socle hercynien et de roches volcaniques miocènes à pléistocènes (Mergoil & Boivin 1993). Il est scindé en deux ensembles articulés autour des axes fluviatiles de la Loire à l'est et de l'Allier à l'ouest. Ces deux vallées sont séparées au sud par le vaste plateau basaltique du Devès ou « Monts du Velay » et au nord par les espaces granitiques du Forez méridional (Boule 1892). En dehors des vallées, le climat est rude (Gachon 1953; Raynal & Daugas 1984; Fillod & Bonhomme 1985). Lors des périodes froides du Pléistocène, ce contraste n'en était que plus marqué (Raynal & Daugas *op cit*). Trois sites y ont été étudiés: la grotte de Sainte-Anne I (0IS 6–5), la grotte du Rond-du-Barry (fin OIS 3 et OIS 2) et l'abri du Blot (OIS 2);

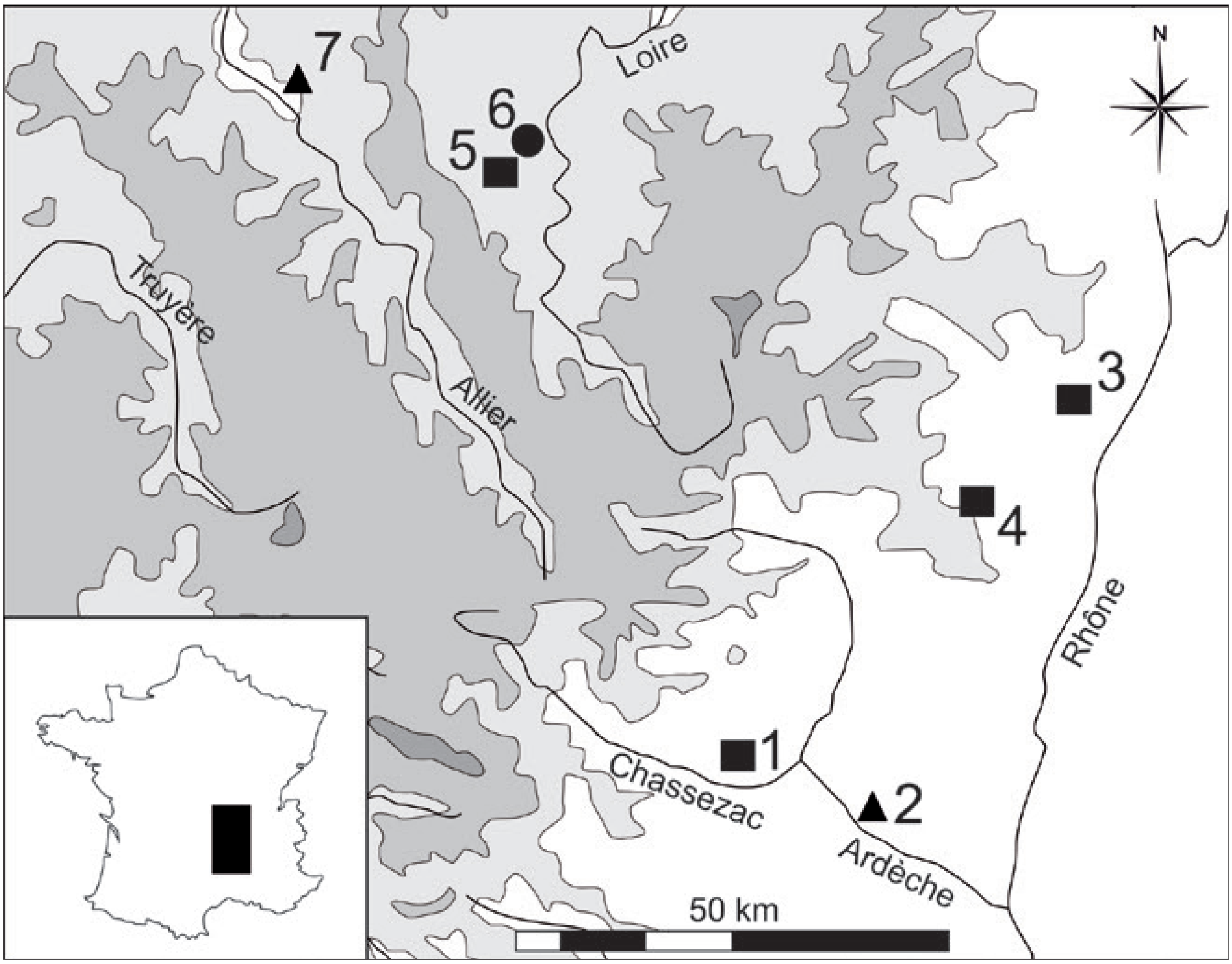


FIGURE 1 Le cadre géographique de l'étude. Les carrés représentent les sites du Paléolithique moyen, les triangles ceux du début du Paléolithique supérieur, et le rond celui de la fin du Paléolithique supérieur : 1. Abri des Pêcheurs ; 2. Grotte Chauvet ; 3. Payre ; 4. Andance ; 5. Sainte-Anne I ; 6. Le Rond-du-Barry ; 7. Abri du Blot.

- à l'est, le Bas-Vivarais est constitué de canyons creusés dans les calcaires jurassiques et crétacés. Les ressources en matières premières y sont inégalement réparties, plus ou moins abondantes et de qualité variable. Ce domaine est séparé du précédent par la frange septentrionale des Cévennes : les monts du Mézenc culminant à 1753 mètres qui a connu un fort enneigement durant les pics de froids du Pléistocène (Raynal & Daugas 1984). Quatre sites y ont été étudiés : Payre (OIS 7 à 5) ; Andance (OIS 5) ; l'Abri des pêcheurs (OIS 5 à 3) ; et la grotte Chauvet (OIS 2).

Nous ne décrirons précisément que les géo-matières des sites du Paléolithique supérieur (encore pour la plupart inédits), celles des sites du Paléolithique moyen ayant déjà fait l'objet de publications (Fernandes *et al.* 2006, 2008, 2010 ; Fernandes & Raynal 2007 ; Bernard-Guelle *et al.* 2011). Il s'agit ici de comprendre l'articulation de ces deux domaines du sud-est du Massif central au cours du Pléistocène moyen final et supérieur et de mettre en évidence les ruptures et les continuités au sein des approvisionnements en matières premières lithiques, notamment lointaines.

2 MÉTHODOLOGIE

Notre étude des matières premières lithiques combine deux approches. Une étude du microfaciès de chacune des pièces archéologiques est réalisée à la loupe binoculaire (grossissement minimal x 50), sans tri à l'œil nu préalable, selon une liste de critères (texture, structure, matrice, identification et description des éléments figurés en terme d'abondance, de taille, de tri, de fragmentation…), issus du protocole d'étude des roches sédimentaires carbonatées pratiquée en particulier par l'industrie pétrolière (Folk 1959). Cette méthode de caractérisation, maintenant classique pour l'étude approfondie des pièces archéologiques, a été développée dans les années 1980 par M. et M.R. Séronie-Vivien dans le bassin d'Aquitaine (Séronie-Vivien M. & M.R. 1987). Un tel travail permet de mettre en évidence les silex dont les types pétrographiques sont peu représentés au sein de l'assemblage et qui sont trop souvent confondus et assimilés à la variabilité des types les plus fréquents. Ce constat avait déjà été fait par d'autres auteurs (Mauger, 1984 ; Linton *et al.* 2008) à propos de certains silex marins présentant une analogie de faciès avec des silex lacustres tertiaires. L'examen systématique à la loupe binoculaire permet de différencier les grands types d'environnements de dépôt (marin, lacustre, continental…), mais également de replacer le silex dans une zone précise de cet environnement d'origine (marin de barrière, lacustre de bord de lac…).

Notre démarche s'inscrit également dans une vision dynamique de l'environnement (Fernandes 2012). Il ne s'agit pas seulement de retrouver l'origine stratigraphique d'un silex (type génétique), mais plutôt son lieu de collecte (type gîtologique).

Nous avons divisé les affleurements de silex (les gîtes) en six grands types (**figure 2**) :

- les gîtes primaires, quand la totalité de la silicification est encore présente dans son encaissant ;
- les gîtes sub-primaires, lorsqu'une partie de la silicification est encore présente dans son encaissant ;
- les altérites et notamment les argiles à silex ;
- les colluvions ;
- les alluvions récentes, soit l'ensemble des silicifications situées dans le lit des cours d'eau actifs ;
- les alluvions anciennes, c'est à dire les silicifications se trouvant dans les dépôts fluviatiles de cours d'eau « fossiles ».

Chacun de ces types de gîte peut être combiné, afin de retracer le plus fidèlement le parcours de transport des silicifications (par exemple : colluvions d'alluvions anciennes).

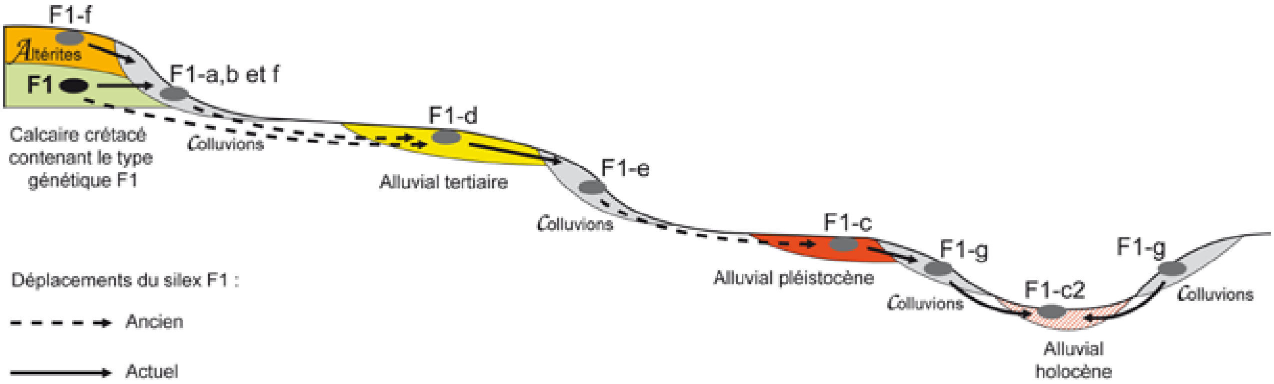


FIGURE 2 Représentation dynamique de l'évolution d'un type de silex du gîte primaire en connexion avec ses gîtes secondaires. PAO : P. Tallet (Fernandes 2012).

Les roches siliceuses se modifient en fonction des environnements physico-chimiques qu'elles traversent. Il s'agit de décrypter les stigmates caractéristiques des différents milieux traversés (Le Ribault 1977, Fernandes & Raynal 2006, Fernandes *et al.* 2007, Fernandes 2012), afin de raccorder l'artefact archéologique à l'histoire de la silicification géologique dont il est issu (Lavin & Prothero 1987, 1992; Arrighi & Borgia 2009; Glauberman & Thorson 2012).

En revanche, des silicifications peuvent demeurer d'origine indéterminée. Il s'agit généralement de roches siliceuses dont la caractérisation ne nous permet pas de les rattacher à un gîte connu. Il convient d'essayer d'identifier sa formation d'origine (milieu et âge du dépôt) et d'engager des prospections géologiques dans la (les) zone(s) potentielle(s) d'affleurement afin de retrouver son positionnement gîtologique, sa variabilité et son origine génétique. Cette roche possède une origine inconnue et non une origine indéterminée. Il peut également s'agir de silicifications dont les faciès sont ubiquistes et difficilement discriminables même après un examen à fort grossissement à la loupe binoculaire. Il en va ainsi des silex mudstone dont la surface d'observation est réduite (< 1 cm^2) et dont l'absence d'éléments figurés ne permet pas de trancher: ce sont des silicifications d'origine indéterminable. Enfin, des silex – quelque soit la taille de l'artefact – présentent des faciès réellement ubiquistes. Cette situation s'illustre avec les silex de type « F034 » (silex jurassique évolué des causses lozériens et repris dans les alluvions anciennes de la Loire, de l'Allier et de la Truyère), et les silex de type « F014 » (silex barrémo-bédoulien de la rive droite du Rhône). Il s'agit ici de silex d'origine indéterminée. Cette indétermination peut être levée par le recours à l'observation microscopique en lames minces. Si le faciès paraît évolué à la loupe binoculaire, les éléments de petites tailles restent conservés à l'échelle microscopique et les faciès originaux sont identifiables dans la plupart des cas. Il est alors possible de remonter au type génétique. De plus, le silex évoluant dans les différents milieux qu'il traverse, les assemblages minéralogiques composant la matrice changent et la proportion des formes de la silice (opale, calcédoine, quartzine, microquartz), varie. En quantifiant la part respective de chacun de ces éléments, il devient possible de resituer précisément la place du silex au sein de sa chaîne évolutive et de remonter au type gîtologique (Fernandes & Raynal 2006; Fernandes *et al.* 2007; Fernandes 2012).

Afin de simplifier la lecture nous avons regroupé les silicifications par domaine de collecte :

- la sphère locale, définie comme le domaine comprenant l'ensemble des silicifications présentes à proximité du site et ne nécessitant pas de déplacements supérieurs à une journée de marche aller-retour du site (r = 15 km) ;

- la sphère lointaine, qui contient l'ensemble des silicifications disponibles à une distance si importante que leur collecte nécessite un changement de camp de base pour se les procurer ou le recours à un réseau d'échanges ;

- la sphère semi locale, définie par défaut, qui comprend l'ensemble des silicifications situées entre ces deux domaines d'acquisition. Leur ramassage nécessite soit des déplacements supérieurs à une journée de marche aller-retour du site au le camp de base, soit à des déplacements du camp de base de proche en proche (une cinquantaine de km) (Binford 1980 ; Audouze 2007 ; Fougère 2011).

3 RÉSULTATS

3.1 L'Ardèche

Mondialement connue et reconnue pour son art pariétal (Clottes 2010), la grotte Chauvet découverte en 1994 se situe à Vallon-Pont-D'arc au lieu dit la Combe d'Arc, sur la rive gauche d'un ancien méandre de l'Ardèche appelé le Cirque d'Estre. Creusée sur environ 500 mètres de long dans les calcaires urgoniens, à 70 mètres au dessus du cours actuel de la rivière, la grotte a très vite fait l'objet d'études scientifiques pluridisciplinaires, d'abord sous la direction de J. Clottes puis sous la direction de l'un d'entre nous (J.-M.G.). Elle est séparée en deux ensembles distincts de superficie à peu près égale : le secteur rouge (à l'entrée de la grotte) et le secteur noir (en fond de grotte). Ces deux secteurs sont définis par leur contenu artistique (Clottes *op. cit.*). La conservation exceptionnelle des parois peintes, mais également des sols portant des empreintes organisées en pistes (Garcia, 2005), interdit toute fouille archéologique (Baffier 2005). Sur la foi des datations radiocarbone, la cavité aurait été fréquentée à l'Aurignacien (entre 33 et 29 ka BP) et au Gravettien (entre 27 et 24,5 ka BP) et la fermeture de la galerie supposée comme la seule entrée paléolithique serait intervenue aux alentours de 20 ka BP (Valladas *et al.* 2005). Les dates anciennes et l'attribution à l'Aurignacien d'une partie des peintures sont critiquées par plusieurs auteurs (voir revue dans Combier et Jouve, 2012). De nombreux silex ont été observés dans l'épaisseur du sédiment dans le soutirage de la salle Hillaire (Geneste 2005 : 141), mais seuls dix-huit sont disponibles pour étude, *« souvent bruts et peu caractéristiques »* (Gély 2005), fruit de la récolte ponctuelle d'artefacts en surface et ne peuvent être rattachés de façon certaine à l'une des deux périodes de fréquentation identifiées.

À la suite des travaux inédits de C. Léandri-Bressy, nous avons cherché à définir plus précisément les types de silex présents dans la grotte Chauvet. Nous avons pu mettre en évidence sept types de silicifications différentes.

L'approvisionnement est largement tourné vers un domaine semi-local identifié comme « le Crétacé supérieur de la rive droite de la vallée du Rhône (Barrémo-Bédoulien) » avec l'exploitation de trois gîtes distincts (**figure 3**).

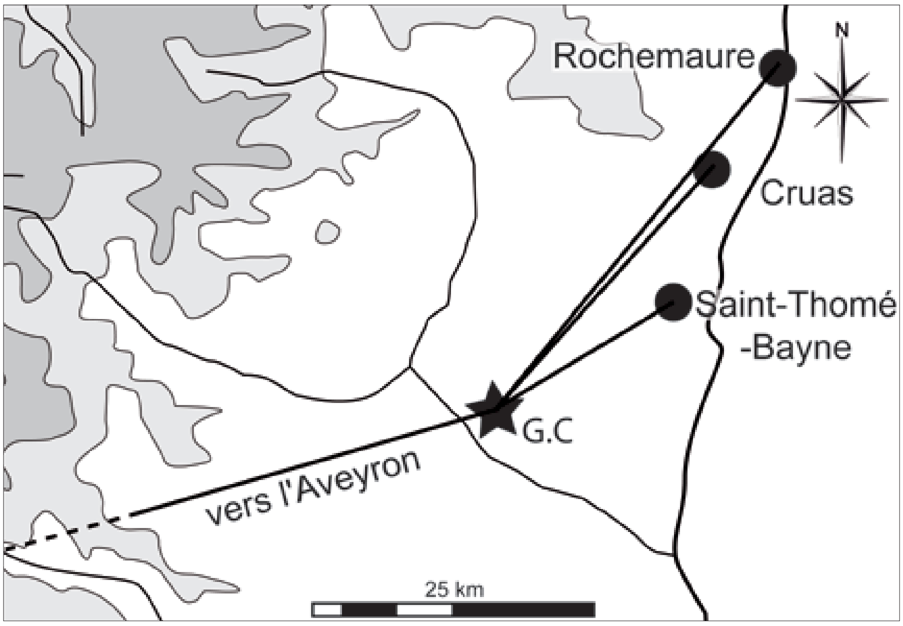


FIGURE 3 Carte des approvisionnements en silicifications (Grotte Chauvet).

Il s'agit :

- des conglomérats oligocènes de la zone de Rochemaure-Cruas (F014.1), à 41 km au nord-est du site, qui contiennent des rognons pluri-décimétriques de silex bédouliens en position secondaire. Cinq artefacts proviennent de cette zone ;

- de la zone de Cruas (F014.2) à 32 km au nord-est du site. L'absence de cortex sur les trois artefacts de ce type nous empêche de conclure de façon certaine sur leur provenance gîtologique. Cependant, la faible évolution des faciès ainsi que l'épaisseur de la zone endo-corticale nous encouragent à rechercher une source assez proche du gîte primaire (biocalcisiltomicrite compacte du Barrémien supérieur) ;

- de la zone de Saint-Thomé-Bayne (F014.3) à 21 km au nord-est de la grotte. En fonction de l'évolution des faciès on distingue deux types gîtologiques au sein de ce type génétique. Un artefact provient d'un rognon ramassé à proximité du gîte primaire, les trois autres sont issus de rognons en position secondaire (gîte secondaire inconnu).

Deux silex restent d'origine indéterminable du fait de leur petite taille et de leur altération. Ce sont des silex d'origine marine attribuables au Crétacé supérieur de la rive droite du Rhône, sans origine gîtologique précise (Barrémo-Bédoulien ?).

Outre cet apport nord-oriental déjà identifié pour la grotte Chauvet et s'intégrant aux schémas d'unité artistique avec le Jura Souabe (Clottes 1995, Clottes & Azéma 2005, Tosello & Fritz 2005, Feruglio 2006), nous avons identifié une silicification provenant de 150 km à l'ouest par delà les Cévennes. Il s'agit d'une « cinérite silicifiée » du Carbonifère supérieur du bassin de Brousse-Broquiès dite « D500 - cinérite de Réquista » (Goloubinoff 1984 ; Guérange-Lozes *et al.* 1995). Cette nouvelle donnée ouvre des perspectives de liens vers un domaine occidental par la vallée du Tarn.

L'exploitation des cinérites de Réquista, bien connue pour le Néolithique, n'avait pas encore été documentée dans les corpus archéologiques pour le début du Paléolithique supérieur (Servelle 1994 ; Allard *et al.* 2005 ; Castel *et al.* 2005, Pétrequin *et al.* 2012).

À ces silicifications d'origine déterminée, s'ajoutent trois types d'origine inconnue :

- un silex tertiaire lacustre très patiné à moule externe de gastéropodes (*Hydrobiidae* ?) et fragments de végétaux, le type D503 ;
- un silex tertiaire lacustre lité à nombreux pellets formant des « volutes » et à rares fragments de characée, ramassé en position colluviale, le type D504 ;
- un silcrète ramassé en position colluviale, le type D505.

Remarquons que ce spectre minéral - réduit par son effectif de pièces étudiées - ne laisse pas de place aux silicifications tertiaires locales (Bassin de Barjac-Issirac à 10 km au sud du site), ou aux silex marins jurassiques (notamment les silex noirs du Kimméridgien de la zone de Païolive – type F168), à 15 km à l'ouest de la grotte.

L'hypothèse d'une introduction sur le site de produits débités et façonnés à l'extérieur de la grotte, avancée précédemment (Geneste 2005 : 141), est confortée par la pétro-archéologie pour les matières d'origines inconnues et lointaines, présentes en un unique exemplaire (en l'état actuel des données disponibles). Pour les silex marins d'origine semi-locale (Barrémo-Bédoulien) cette hypothèse est à tempérer car les matières identifiées pourraient, au vu de leurs évolutions, venir d'un même bloc dont les éléments manquants seraient encore dans la grotte. En effet, de par la faible surface explorée, le faible effectif de pièces et le doute vis à vis de leur attribution chrono-culturelle, il nous est difficile de conclure sur la techno-économie ou sur les modalités d'exploitation du territoire ardéchois au début du Paléolithique supérieur.

Cette exploitation des silex du Barrémo-Bédoulien de la rive droite du Rhône se retrouve pour deux des sites Paléolithique moyen voisins.

Dans le premier - Andance à Saint-Bauzile - la diversité des silex (jurassiques comme crétacés) retrouvés dans le site illustre la diversité des silicifications présentes dans le gîte secondaire des conglomérats oligocènes de la région de Rochemaure-Cruas, situé à 7 km à l'est du site. Seuls cinq artefacts sur 1596 (deux silcrètes et trois silex marins), d'origine inconnue, sembleraient provenir de domaines plus lointains. Les autres roches utilisées sur le site (leucogranite, quartz, quartzite), auraient été collectées lors de différentes activités de subsistance dans les alluvions des cours d'eau cévenols voisins (Bernard-Guelle *et al.* 2011).

Dans le second site - niveau Gb du site de Payre à Rompon - la majorité des artefacts se compose de silex locaux notamment issus du gîte secondaire de la zone de Rochemaure-Cruas. A ces derniers, viennent s'ajouter des silex barrémo-bédouliens de toute la rive droite du Rhône (gîte de Cruas et de Saint-Thomé-Bayne), et des silex lacustres du bassin de Barjac-Issirac (Fernandes *et al.* 2006, 2008).

Le troisième site de comparaison daté du Paléolithique moyen - l'Abri des pêcheurs à Berrias-et-Casteljau – est situé dans les gorges du Chassezac à 20 km en amont de la grotte Chauvet. Il présente un spectre minéral différent des deux sites paléolithiques moyens précédents : ici, les hommes préhistoriques ont préférentiellement taillé le quartz. Les rares silex de types gîtologiques très variés (n = 27) ont été importés sous forme de produits finis. Ils attestent d'un ramassage à plus de 50 km dans le Barrémo-Bédoulien de toute la rive droite du Rhône ainsi que dans le Kimméridgien des bois de Païolive (5 km à l'est du site) et dans le tertiaire du basin de Barjac-Issirac (15 km au sud-est du site), et de Laval-Saint-Roman (27 km sud-est du site) (Fernandes *et al.* 2010). Ce type d'exploitation du milieu minéral semble commun pour les groupes de la fin du Paléolithique moyen en Ardèche, bien que tous les sites n'aient pas bénéficié d'une étude pétro-archéologique détaillée (Raynal *et al.* 2012).

La césure apparente entre le Paléolithique moyen et le Paléolithique supérieur quant à l'exploitation du domaine minéral semble pouvoir s'expliquer de deux manières. D'une part par des territoires différents, avec l'extension de ceux-ci au Paléolithique supérieur (par exemple apport de silex lointains comme « la cinérite de Réquista – type D500 ») et d'autre part par le choix porté sur des silicifications plus distantes, mais présentant des critères morphométriques et de taillabilité différents de ceux des matières locales (gros rognons *vs* plaquettes ou petits modules). En effet, même si les gîtes du Crétacé supérieur de la rive droite du Rhône, exploités dans les phases anciennes du Paléolithique moyen et au début du Paléolithique supérieur, sont identiques, les rapports aux géo-territoires sont nettement différents impliquant des ressources locales au Paléolithique moyen et des ressources semi-locales au Paléolithique supérieur. Les groupes humains du Paléolithique moyen choisissaient l'exploitation privilégiée et en masse des ressources locales aussi bien minérales qu'animales (Daujeard *et al.* 2012). Ainsi, sur le site de l'Abri des Pêcheurs, en contexte géologique proche de celui de la grotte Chauvet, le quartz a été préférentiellement exploité avec l'ajout ponctuel de silex issus d'un vaste spectre minéral à tendance locale, voire semi-locale. C'est une différence avec la grotte Chauvet où les silicifications proviennent en grande partie d'un domaine semi-local (40 km) avec import d'artefacts issus d'un domaine lointain. Cependant, la comparaison entre sites du Paléolithique moyen et du début du Paléolithique supérieur est difficile, de par le statut particulier de la grotte Chauvet et le manque de données pétro-archéologiques pour nombre de sites régionaux ; l'étude des matières premières de l'Aurignacien initial de l'Abri des Pêcheurs permettra d'affiner notre vision et d'aller plus loin dans les hypothèses. Toutefois, il semble bien se dégager une tendance générale autour de l'import de matériaux lointains et semi-locaux et ce, dès les débuts du Paléolithique supérieur.

3.2 Le Velay

Vers l'Ouest, par delà les monts du Vivarais, s'étend le Velay. Cette zone de moyennes montagnes a connu des occupations au Paléolithique inférieur (Solheilhac : Bonifay E. & M.F. 1981 ; Bonifay 1991, 2002 ; Bracco 1991), puis au Paléolithique moyen (Raynal 1983). Le Paléolithique supérieur en Auvergne du sud et *a fortiori* dans le Velay, commence au Gravettien récent et terminal, se développe au Badegoulien et surtout au Magdalénien après une lacune d'occupation au Solutréen (Delporte 1992 ; Bayle des Hermens 1972c).

Pour illustrer les comportements vis à vis du monde minéral de ces différents complexes techno-culturels nous avons choisi d'étudier les niveaux Protomagdaléniens du Blot et les niveaux badegouliens du Rond-du-Barry. Ces résultats seront comparés avec ceux du Paléolithique moyen ancien de l'unité J1 de Sainte-Anne I (Fernandes & Raynal 2007).

Le Blot 3.3

Découvert en 1934 par Mr Estival lors de travaux de captage d'eau, le site du Blot (commune de Cerzat, 490 m d'altitude), s'étend de façon discontinue sur plus de 300 m au pied d'une haute falaise basaltique, orientée au sud-ouest, en rive droite de l'Allier qui coule une dizaine de mètres en contrebas. Le fleuve était plus proche de l'abri au Pléistocène qu'il ne l'est aujourd'hui, comme en témoigne la présence de « sable de crue » au sein de la stratigraphie (Moser 1976; Marguerie 1984).

Averti de ces découvertes J. Combier effectua en 1956 et 1957 un sondage de six mètres de profondeur (futur chantier III). Plusieurs niveaux archéologiques ont été trouvés :

- un premier ensemble de niveaux du Magdalénien terminal;
- un autre ensemble contenant un mobilier d'aspect archaïque en quartz et en silex;
- un dernier ensemble contenant une industrie originale à lames à retouche rasante régulière rappelant celles de l'Aurignacien.

Il effectua également un second sondage (futur chantier 1) positif, à une soixante de mètres au nord-ouest, dans la parcelle voisine de Mr Promeyrat, afin de vérifier l'étendue du gisement. Sur les conseils de J. Combier, H. Delporte et R. de Bayle des Hermens effectuèrent en 1965 une fouille centrée sur le second sondage. Ils découvrirent alors une riche industrie du Magdalénien terminal (Delporte 1966, 1968). De 1966 à 1967 ils effectuèrent un nouveau sondage entre les chantiers 1 et 3, le chantier 2, qui permit la mise au jour de quelques rares pièces du Magdalénien terminal (Delporte 1966) mais l'assemblage archéologique était réduit. La dernière zone de fouille, le chantier 3 (à l'emplacement du sondage 1) confirma la découverte d'un ensemble exceptionnel du Gravettien terminal, les niveaux supérieurs du Magdalénien et du Badegoulien ayant été détruits en grande partie par les travaux Estival. D'abord considéré comme Aurignacien (Delporte 1968) cet ensemble est réattribué au Gravettien terminal ou Protomagdalénien (Delporte 1972). De par l'importance de cette découverte, des campagnes de fouilles sont organisées entre 1967 et 1981 sous la direction conjointe de H. Delporte, J.-P. Daugas et J. Virmont. Ouverte sur plus de 60 m^2, cette zone du gisement présente une stratigraphie complexe (Delporte 1972; Moser 1976) riche de 52 niveaux archéologiques distincts :

- niveau 3 à 7 : Magdalénien supérieur terminal à rapprocher des niveaux Magdalénien du chantier 1 (Delporte 1966; Virmont 1981; Angevin 2010);
- niveau 8 à 20 : cinq ensembles de Badegoulien (Delporte 1968, 1972; Virmont 1981);
- niveau 21 à 36 : quatre ensembles du Protomagdalénien (Delporte 1972; Virmont 1981; Bosselin 1992a, 1992b, 1997, 2007);
- niveau 36 à 52 : Trois ensembles de Gravettien récent (Buisson 1991; Klaric 1999).

Nous nous intéresserons ici au Protomagdalénien des niveaux 21 à 36. Malgré le découpage stratigraphique précis réalisé lors de la fouille du gisement du Blot, B. Bosselin, à la suite de son étude basée sur la distribution verticale des objets (1992a, 1992b, 1997, 2007), a choisi de regrouper les niveaux Protomagdaléniens en quatre ensembles :

- le premier, centré sur le niveau 32 et englobant partiellement les niveaux 31, 33 et 34 ;
- le second comprenant le niveau 30 et une partie des niveaux 29 et 31 ;
- le troisième prenant en compte les niveaux 27 et 28 ainsi qu'une part des niveaux 29 et 26 ;
- le quatrième composé des niveaux 23 à 25 et d'une partie du niveau 26.

Suite à ce découpage et à l'étude typologique de l'industrie lithique, B. Bosselin (1997) conclut à une forte homogénéité des ensembles se caractérisant notamment par une extrême rareté de grattoirs, l'abondance de burins, la présence caractéristique en nombre de lames à retouche rasante bilatérale, la relative abondance de pièces esquillées et la prédominance des microlithes. En plus de cette riche industrie lithique, ces niveaux ont fourni, de nombreux restes osseux attribués majoritairement au renne, (proies apportées entières sur le site ; Chauvière & Fontana 2005 ; Fontana 2012), de l'industrie osseuse (poinçons, os incisés et encochés), de la parure avec trois pendeloques en ivoire (niv. 29) et une « pendeloque-godet » en talcschiste (niv. 23) ainsi que des traces d'activité artistique (plaquette-pendeloque en talcschiste gravée d'une tête de cheval) (Delporte 1972, Delporte & Virmont 1983). L'organisation au sol, encore bien préservée (Daugas J.-P., comm. pers.), a permis la mise en évidence d'une structuration de l'habitat avec des zones de foyers, des zones de débitage et une possible « cabane » (Delporte 1992). Huit datations sur os réalisées pour le Protomagdalénien du Blot indiquent des âges entre 24.800 +/- 247 cal. BP et 26.472 +/- 479 cal. BP (**figure 4**).

FIGURE 4 Dates radiocarbones conventionnelles exprimées en années BP (avant 1950), déviation standard (1 sigma).

UNITÉ *	ZONE	PHASE	NATURE	ANNÉE	LABO	RÉFÉRENCE	AGE BP	AGE BP CALIBRÉ **
Niveau JM	?	?	Terre charboneuse	1970	Lyon	Ly–564	21700 ± 1200	26064 ± 1492
Niveau GJ	?	?	Terre charboneuse	1970	Lyon	Ly–565	21500 ± 700	25848 ± 953
22	I2	3	Os	1968	Lyon	Lyon–1643	21330 ± 210	25487 ± 385
23	I1	3	Os	1969	Lyon	Lyon–1644	21510 ± 220	25677 ± 453
24	I1	3	Os	1970	Lyon	Lyon–1645	22030 ± 230	26472 ± 479
27	J3	2	Os	1970	Lyon	Lyon–1646	22190 ± 220	26802 ± 600
28	K2	2	Os	1975	Lyon	Lyon–1647	20810 ± 140	24800 ± 247
32	J3	1	Os	1977	Lyon	Lyon–1648	21870 ± 230	26187 ± 514

* Attribution stratigraphique du fouilleur.

** Valeurs calculées avec CalPal-2007online (Danzeglocke *et al.*, 2008 ; CalPal-2007online : http://www.calpal-online.de/).
Dates issues de : http://www.archeometrie.mom.fr/banadora/.

Résultats 3.3.1

Notre étude a concerné 6223 artefacts provenant d'une part des collections des fouilles H. Delporte du Musée des antiquités nationales de Saint-Germain-en-Laye (n = 5940 artefacts) et du dépôt du Service Régional d'Archéologie d'Auvergne (n = 1124 artefacts). Tous les éléments coordonnées de taille supérieure à 0,5 x 0,5 x 0,1 cm ont été pris en compte, les autres, plus petits, ne présentant pas de plage d'observation suffisante ont été exclus de l'étude. Nous avons choisi de traiter le matériel archéologique en trois ensembles nommés phase 1, phase 2 et phase 3. Ce découpage se fonde sur les travaux inédits de J.-P. Daugas (comm. pers.) à partir de la stratigraphie archéologique fine du gisement du Blot (**figure 5**). La répartition quantitative des vestiges s'effectue comme suit : Phase 1 = 222 artefacts ; phase 2 = 1625 artefacts ; phase 3 = 3521 artefacts. De plus, 17 pièces sont à réattribuer au Gravettien, 4 au Badegoulien et 18 proviennent des déblais. Quatre pièces sont à l'interface entre phase 1 et 2, 28 entre phase 2 et 3, 63 pièces peuvent appartenir soit à la phase 2, soit à la phase 3, soit au Gravettien, et 721 pièces n'ont pas de provenance stratigraphique claire.

L'étude pétro-archéologique du Protomagdalénien du Blot vient confirmer, en les nuançant, les études précédentes (Masson 1981 ; Surmely & Pasty 2003 ; Surmely *et al.* 2008a, 2008b ; Surmely & Hays 2011). Les pourcentages par phase, par effectif et par poids pour chacun des types de silicifications retrouvés dans les niveaux Protomagdalénien du Blot sont détaillés dans la **figure 6**.

Le domaine local est peu représenté, aussi bien en effectif qu'en poids. Il s'agit en majorité des roches volcaniques et de quartz provenant des alluvions anciennes ou actives de l'Allier à quelques centaines de mètres de l'abri. Ils ont été amenés sur le site sous forme de galets en partie débités sur place pour la production (occasionnelle ?) d'éclats (quartz, basalte), dans toutes les phases ou d'éclats laminaires dans la phase 2 (basalte). Les silicifications locales ne sont présentes que dans la phase 3 sous la forme de deux débris (géofacts ?), de silex « type F021 - jurassique de Lozère évolué » pouvant provenir d'un apport naturel (débordement de l'Allier) et d'une lamelle à dos en silcrète très évolué « type F005 – Saint-Léger-du-Malzieu » collecté en position secondaire dans les alluvions anciennes de l'Allier ou de la paléo-Truyère, à quelques kilomètres en aval du site aux environs de Brioude.

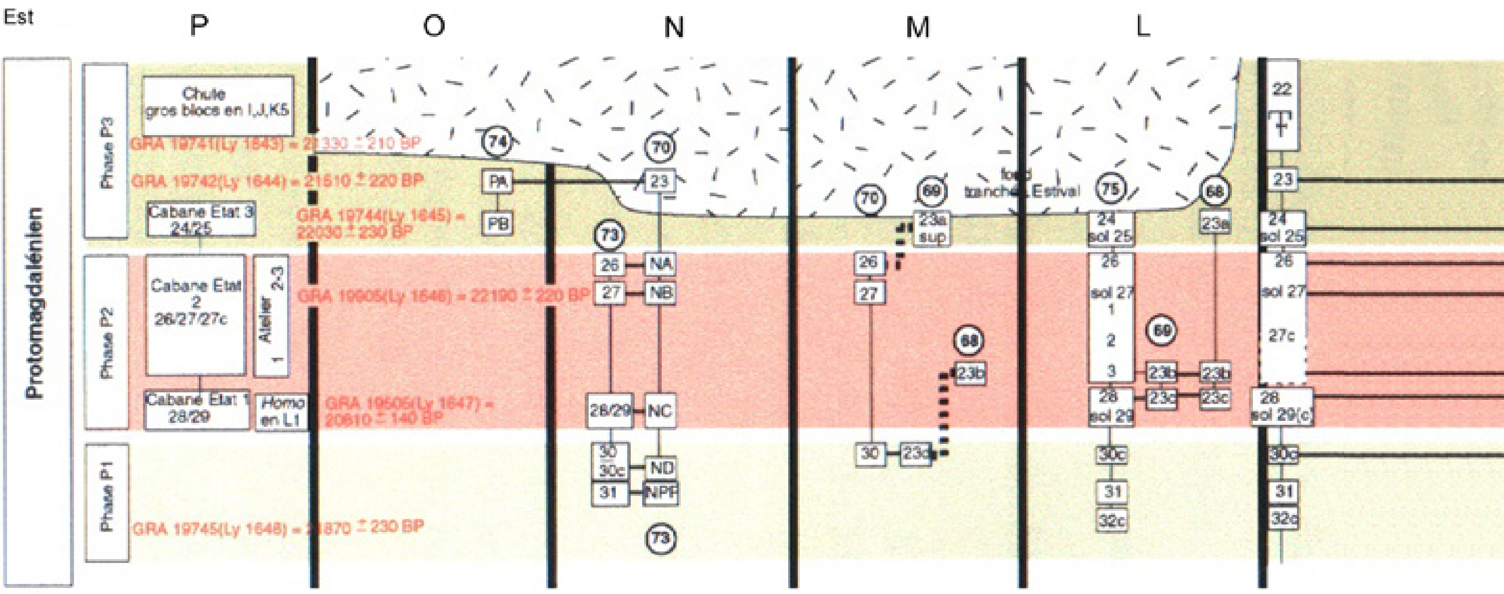


FIGURE 5 Diagramme stratigraphique synthétique (Le Blot – Protomagdalénien). Les relations (archéologiques et géologiques), entre les unités stratigraphiques (rectangles blancs numérotés), permettent la mise en évidence de trois phases. DAO : C. Daugas. (J.-P. Daugas inédit).

Tout comme le domaine local, le domaine semi-local est très peu représenté au sein de l'assemblage lithique du Protomagdalénien du Blot : aucun témoin pour la phase 1 et moins de 1 % de l'effectif ou du poids, aussi bien pour la phase 2 que pour la phase 3. Deux types de silicifications témoignent de cette aire de collecte :

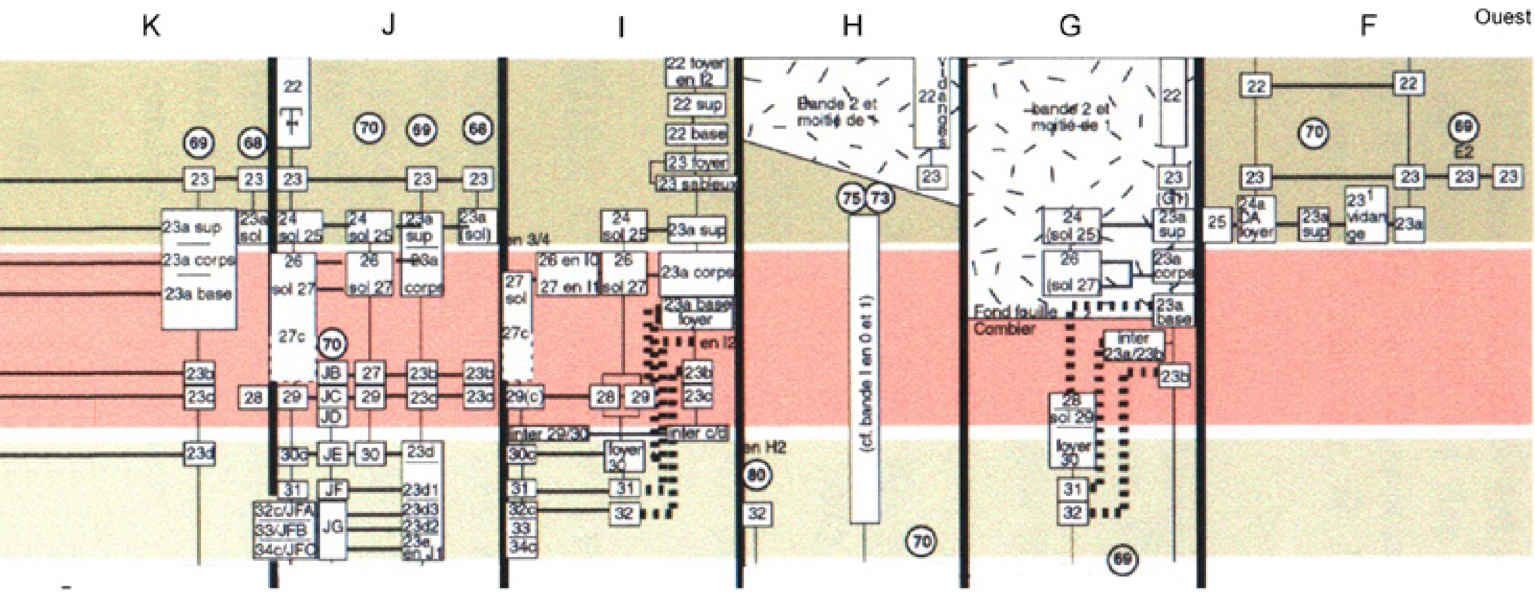
- le « type F012 – silcrète de Laps », présent sous forme de débris, de plaquettes cassées (remontage dans la phase 3) ou de lamelles à dos (n = 2, provenant d'une phase indéterminée). Le cortex porté par les artefacts témoigne d'un ramassage en position colluviale, proche du gîte primaire (60 km au nord du site) ;

- une lame et une lamelle en silex dans la phase 3 de « type D503 – silex lacustre de la Comté d'Auvergne ».

La collecte dans les domaines locaux et semi-locaux est donc belle et bien présente au Blot, contrairement à ce qui a pu être écrit auparavant (Surmely & Pasty, 2003 ; Surmely *et al.* 2008b ; Surmely & Hays 2011), même si la proportion de ces silicifications est ténue.

La collecte dans le domaine lointain est quant à elle exceptionnellement bien représentée dans le Protomagdalénien du Blot (> 95 % de l'effectif pour toutes les phases). Comme cela avait été identifié avant nous (Masson 1981 ; Virmont 1981 ; Bosselin 1992a, 1992b, 1997, 2007 ; Surmely & Pasty 2003 ; Surmely *et al.* 2008a, 2008b ; Surmely & Hays 2011), deux aires principales de collecte se dégagent : le Turonien inférieur du Berry et le Turonien supérieur d'Indre-et-Loire. Les proportions en effectif ou en poids de ces deux familles de silex sont soit identiques (phases 1 et 3), à hauteur de 45 % de l'assemblage lithique (poids ou effectif), soit en faveur du Turonien supérieur (phase 2) près de 65 % du poids (55 % de l'effectif).

Les différents types de silex du Turonien inférieur retrouvés sur le site illustrent une multiplicité de gîtes fréquentés et centrés sur le Berry (> 250 km au nord du site) (type 07 de Masson 1981 ; type C3a et dérivés de Aubry 1991). Les rares pièces corticales ainsi que l'évolution des matrices et éléments figurés indiquent un ramassage préférentiel dans les argiles à silex et les colluvions d'argiles à silex.



TYPE	DOMAINE	AGE	LOCALITÉ TYPE	PHASE 1	EFF	%	POIDS	%
D001	Lointain	Turonien inf	Vallée du Renon	x	17	7,7	128,0	15,4
D012	Lointain	Turonien inf	Loire-et-Cher	x	2	1,0	3,0	0,4
D013	Lointain	Turonien inf	Vallée du Nahon	x	3	1,4	4,5	0,5
D018	Lointain	Turonien sup	Coussay-les-bois	x	26	11,7	69,0	8,3
D018e	Lointain	Turonien sup	Grand-Pressigny	x	65	29,2	262,3	31,6
D018f	Lointain	Turonien sup	Bossay-sur-Claise	x	9	4,1	39,2	4,7
D018g	Lointain	Turonien sup	Chinon	x	5	2,3	16,8	2,0
D033	Lointain	Turonien inf	Gien	x	2	1,0	5,0	0,6
D102	Lointain	Hettangien	Saint-Jeanvrin	/	/	/	/	/
D503	Semi-Local	Cénozoïque	La Comté d'Auvergne	/	/	/	/	/
F005	Local	Eocène	Saint-Léger-du-Malzieu	/	/	/	/	/
F012	Semi-Local	Miocène	Laps	/	/	/	/	/
F021	Local	Bajocien	Alluvions de l'Allier	/	/	/	/	/
F034	Étude en cours	Étude en cours	Étude en cours	/	/	/	/	/
F038	Lointain	Turonien inf	Meusnes	x	84	37,8	242,6	29,3
I500	Lointain	Turonien sup	Inconnue	x	1	0,4	23	2,8
I501	Lointain	Malm	Inconnue	/	/	/	/	/
I504	Inconnue	Inconnue	Inconnue	x	1	0,4	4,3	0,5
I507	Lointain	Turonien moy	Indre-et-Loire	x	1	0,4	2,9	0,3
I508	Inconnue	Inconnue	Inconnue	x	1*	0,4*	8,4*	1,0*
I510	Inconnue	Inconnue	Inconnue	/	/	/	/	/
I511	Lointain	Hettangien	Saint-Jeanvrin	x	1	0,4	0,2	< 0,1
I512	Inconnue	Tertiaire	Inconnue	x	1	0,4	17,9	2,2
I515	Inconnue	Tertiaire	Inconnue	/	/	/	/	/
I516	Inconnue	Tertiaire	Inconnue	/	/	/	/	/
I517	Lointain	Crétacé sup	Inconnue	/	/	/	/	/
I519	Inconnue	Tertiaire	Inconnue	/	/	/	/	/
I521	Inconnue	Tertiaire	Inconnue	/	/	/	/	/
I523	Inconnue	Tertiaire	Inconnue	/	/	/	/	/
I529	Inconnue	Tertiaire	Inconnue	/	/	/	/	/
Indet	Indéterminable	Indéterminable	Indéterminable	x	2	1,0	0,3	< 0,1
Basalte	Local	Non renseigné	Non renseigné	/	/	/	/	/
Granite	Local	Non renseigné	Non renseigné	/	/	/	/	/
Quartz	Local	Non renseigné	Non renseigné	x	1	0,4	2	0,2
					221	99,6	821,0	100,0
		Local			1	0,4	2	0,2
		Semi-local			/	/	/	/
		Lointain			216	97,3	796,5	96,0

Turonien inf / type 07 Masson		106	47,7	378,1	45,6
Turonien sup / type 23 Masson		105	47,3	387,3	46,7

FIGURE 6 Le Blot, Protomagdalénien : Fréquence et poids des types de silicifications par phase.

PHASE 2	EFF	%	POIDS	%	PHASE 3	EFF	%	POIDS	%
x	130	8,0	554,8	11,5	x	196	5,6	345,1	8,5
x	5	0,3	25,2	0,5	x	1	< 0,1	4,5	0,1
x	6	0,4	10,2	0,2	x	28	0,8	42,6	1,1
x	176	10,8	561,7	11,7	x	140	4,0	218,3	5,4
x	599	36,8	2240,5	46,5	x	1399	39,7	1285,6	31,8
x	85	5,2	246,1	5,1	x	128	3,6	177,2	4,4
x	41	2,5	55,3	1,1	x	84	2,4	96,6	2,4
x	48	3,0	136,3	2,8	x	76	2,2	92,9	2,3
x	1	0,1	1,2	< 0,1	x	3	0,1	2,5	0,1
/	/	/	/	/	x	2	0,1	1,1	< 0,1
/	/	/	/	/	x	1	< 0,1	0,5	< 0,1
x	3	0,2	11,7	0,2	x	4	0,1	27,5	0,7
/	/	/	/	/	x	2	0,1	1,1	< 0,1
/	/	/	/	/	x	1	< 0,1	9,7	0,2
x	454	27,8	729,9	15,1	x	1341	38,1	1468,5	36,3
x	2	0,1	0,2	< 0,1	x	1	< 0,1	0,8	< 0,1
x	9	0,6	21,0	0,4	x	4	0,1	3,4	0,1
/	/	/	/	/	/	/	/	/	/
x	3	0,2	10,7	0,2	x	3	0,1	0,8	< 0,1
x	7	0,4	5,9	0,1	x	6	0,2	4,8	0,1
x	5	0,3	23,5	0,5	x	2	0,1	2,5	0,1
x	5	0,3	8,7	0,2	x	14	0,4	13,5	0,3
/	/	/	/	/	/	/	/	/	/
x	1	0,1	0,4	< 0,1	/	/	/	/	/
x	1	0,1	2,1	< 0,1	/	/	/	/	/
x	24	1,5	74,7	1,6	x	35	1,0	39,1	1,0
x	1	0,1	9,1	0,2	/	/	/	/	/
/	/	/	/	/	x	1	< 0,1	0,7	< 0,1
/	/	/	/	/	x	1	< 0,1	0,1	< 0,1
x	1	0,1	1,3	< 0,1	/	/	/	/	/
x	5	0,3	12,3	0,3	x	11	0,3	6,8	0,2
x	2	0,1	18,0	0,4	x	3	0,1	22,4	0,6
/	/	/	/	/	x	1	< 0,1	12,1	0,3
x	11	0,7	57,4	1,2	x	33	0,9	161,9	4,0
	1625	100,0	4818,2	100,0		3521	100,0	4042,6	100,0
	13	0,8	75,4	1,6		40	1,14	198,0	4,9
	3	0,2	11,7	0,2		6	0,2	28,6	0,7
	1588	97,7	4676,5	97,0		3453	98,1	3791,4	93,8

	595	36,6	1320,1	27,4		1566	44,5	1860,7	46
	901	55,4	3103,6	64,4		1751	49,7	1777,7	44

* Attribution stratigraphique douteuse.

Cependant certaines pièces archéologiques ont été taillées à partir de bloc de silex collectés dans les alluvions anciennes et notamment les épandages éocènes remaniant les silicifications du Turonien inférieur. Ces silex ont été apportés sur le site sous forme de préforme et de produits finis. Tous les produits du débitage sont présents sur le site (produits d'entretien produits bruts, outils), mais seule la phase 3 contient des nucléus (n = 2). Il existe donc un déficit de nucléus pour les types du Turonien inférieur du Berry, explicable soit par un export de telles pièces lors du départ des occupants, soit par la localisation de ces pièces dans une zone non fouillée du gisement. Cette dernière hypothèse paraît peu vraisemblable au vu de l'extension de la zone fouillée, de la qualité de la fouille et de l'organisation du gisement et nous préférons, comme d'autres avant nous, retenir l'hypothèse anthropique (Surmely *et al.* 2008b ; Surmely & Hays 2011).

Le comportement vis à vis des matières du Turonien supérieur est sensiblement le même que pour le Turonien inférieur : multiplicité des sources et des types de gîtes avec prélèvement préférentiel dans les argiles à silex. Le type le plus utilisé est le silex bien connu « D018e – Grand-Pressigny » puis viennent dans l'ordre ses variations de faciès « D018 – Coussay-les-bois » ; « D018f – Bossay-sur-Claise » ou plus au Nord-Ouest « D018 g – Chinon » (**figure 6**) (Valensi 1957 ; type 23 de Masson 1981 ; Giot *et al.* 1986 ; type C3c et dérivés de Aubry 1991 ; Affolter 2001 ; Primault 2003). Nous avons également retrouvé un silex du Turonien supérieur très évolué et portant un cortex noir typiquement alluvial ancien, illustrant un ramassage dans les alluvions anciennes de la Creuse ou à proximité du gîte de Confluent (C3c–4 ; Aubry 1991). La gestion de cette matière sur le site est semblable à celle du Turonien inférieur (*supra*), à la différence majeure d'un import sur le site, lors de la phase 2, d'au moins deux blocs pluri-décimétriques non préparés comme en témoignent les remontages et les nombreux éclats de décorticage (Surmely *et al.* 2008b ; Surmely & Hays 2011). Les nucléus (*s.s* et burin nucléiformes) sont plus nombreux : 5 dans les phases 2 et 3 dans la phase 3. Ceux-ci témoignent d'une exploitation en vue de la production de lames poussée à son maximum.

En plus de ces deux pôles principaux de collecte, quelques matières présentes en moindre quantité témoignent d'une collecte extensive de la frange sud du Bassin parisien lors des différentes phases et notamment :

- le type « I505 – Turonien inférieur de Gien », probablement ramassé dans les argiles à silex et importé sous forme de préformes d'une dizaine de centimètres de longueur ayant servi à la production d'éclats, de lames et de lamelles ;

- les quelques pièces en silice hydrothermale (jaspéroïdes) de l'Hettangien « D102 et I511 – Saint-Jeanvrin », amenés sous forme de produits finis et retouchés en partie sur le site, comme en témoignent les quelques éclats de retouche présents ;

- le type « I507 – Turonien moyen de l'Indre et Loire » importé sous forme de produits finis.

De plus, les quelques pièces en silex marin « type I500 – Turonien supérieur d'origine inconnue » ne sont pas sans rappeler le silex de Larcy (C3c–3 ; Aubry 1991 ; Primault 2003). Des études micro-faciologiques doivent confirmer ce rapprochement. Associées au Turonien supérieur et au Turonien inférieur, ces différentes silicifications illustrent bien la variété minérale du sud du Bassin parisien.

Parmi les types d'origine inconnue, quatre sont présents en plusieurs exemplaires dans les phases 2 et 3 :

- une silice (hydrothermale ?) affectant un calcaire marin du Jurassique moyen riche en Foraminifère *Textulariidae* (I501) ;

- un silcrète (I508) ;

- un silex gris à nombreux éléments détritiques infra-millimétriques et ramassé en position sub-primaire (I510) ;

- un silex marin du Crétacé supérieur ramassé en position secondaire dans des argiles à silex, à zone endocorticale noire et zone interne grise parcourue de terriers de vers à silicification différentielle (I517).

Enfin, les silicifications tertiaires de sources inconnues présentes en un unique exemplaire et importées sur le site en tant que produits finis (*ex : lame typique du Protomagdalénien en silex lacustre I512*) pourraient être à rapprocher, au vu de la polarité des imports, de la frange sud du Bassin parisien. Cependant, les silicifications tertiaires de ce vaste bassin sédimentaire demeurent encore mal connues et nécessitent des travaux de terrain supplémentaires avant d'avancer des conclusions d'ordre pétro-archéologiques.

Au vu de la diversité de silicifications originaires du Sud du Bassin parisien et de la rareté des pièces en silex local, la frange sud du Bassin parisien apparaît comme un espace d'occupation privilégié par ces groupes de la fin du Gravettien qui ont occupé la haute vallée de l'Allier. Il est donc légitime d'envisager un import direct de silicifications collectées à même les gîtes, plutôt qu'une acquisition indirecte (échange) comme proposée par F. Surmely et M. Hays (2011). Le déplacement de modules pesant plusieurs kilogrammes sur plusieurs centaines de kilomètres pourrait s'expliquer en réponse à la nécessité d'obtention de grandes lames, si de tels modules n'existaient pas dans l'environnement du Blot. Un tel comportement se retrouverait en Auvergne au Protomagdalénien et au Magdalénien moyen, techno-complexes connus pour leur production de grandes lames, où l'import de silicifications lointaines serait dominant (Angevin, com. pers). Cependant, un tel constat ignore la richesse minérale de l'Auvergne où des affleurements, certes réduits mais présentant de tels modules, existent pour des matériaux aptes à une production laminaire, comme le montre les prospections réalisées ces dernières années (Fernandes 2012). La contrainte technique n'est donc pas un argument suffisant. Pour nous, outre l'aspect culturel matériel, ou cultuel qui reste inaccessible, l'import d'une telle quantité de matériaux sur une si grande distance traduit une réponse technique à une méconnaissance de l'environnement minéral et non un choix délibéré de ne pas utiliser des matériaux locaux. Cette impression est renforcée par le comportement de subsistance des Protomagdaléniens, chasseurs quasi-exclusifs de rennes, dont l'installation au Blot semble tournée vers des activités spécialisées, très ponctuelles et rythmées par les saisons (Chauvière & Fontana 2005 ; Surmely & Hays 2011 ; Fontana 2012). L'incursion dans la haute vallée de l'Allier pourrait correspondre à une remontée ponctuelle le long de cette rivière à un moment particulier de la vie des rennes et bien connu des hommes du sud du Bassin parisien, le site du Blot correspondant à un emplacement stratégique du passage des troupeaux. Il est donc possible de concevoir le site du Blot *i.e* la haute vallée de l'Allier comme une des marges méridionales lointaines d'un territoire centré sur le sud du Bassin parisien (Berry, Touraine) à 250 km au Nord (**figure 7**).

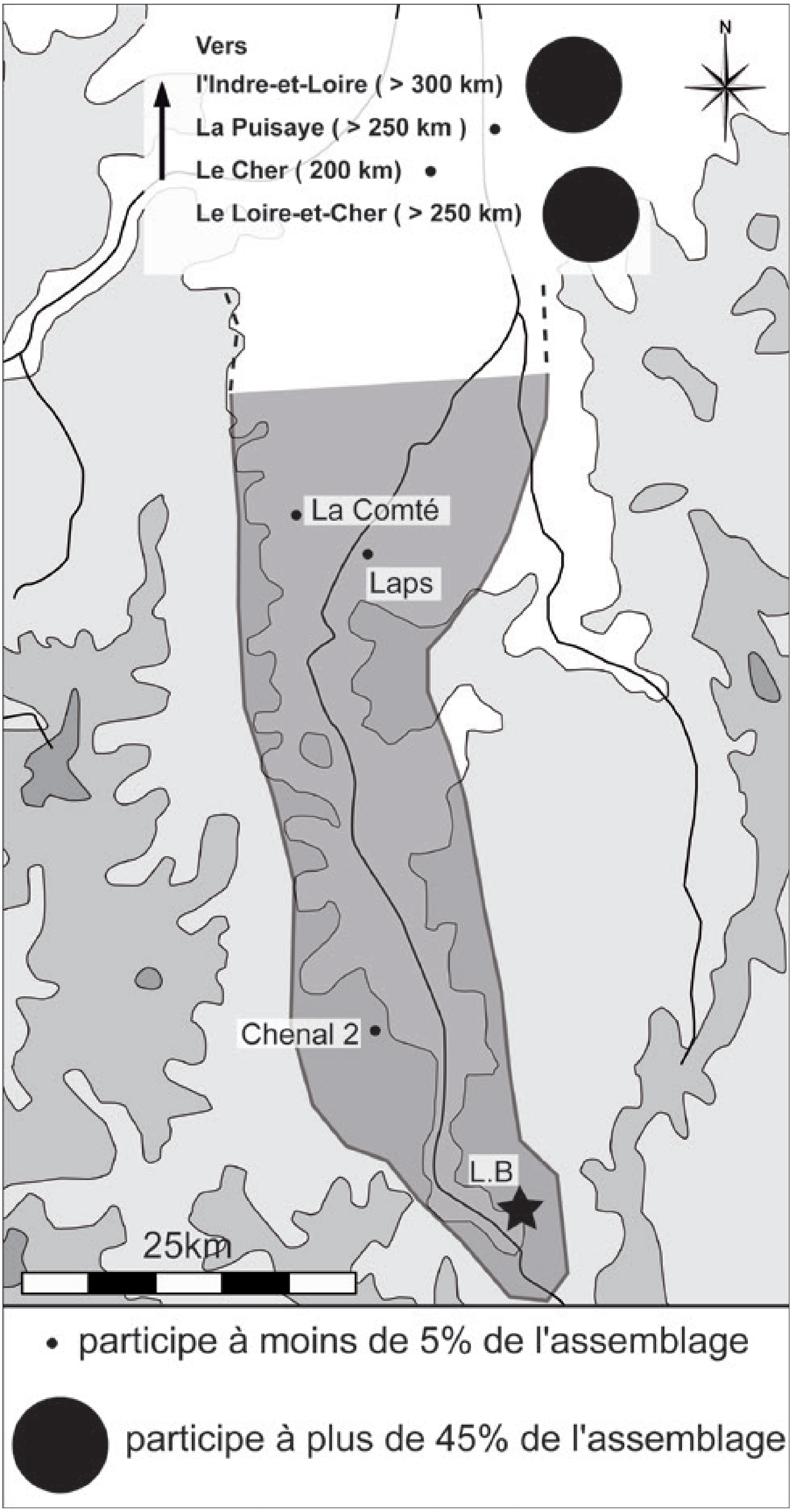


FIGURE 7 Carte des approvisionnements en silicifications (Abri du Blot, Proto-magdalénien).

Cependant, les traces de Protomagdalénien sont très tenues dans cet espace septentrional (Klaric, comm. pers.) et seul le site de Mancy dans le Loiret présente potentiellement des traces de Gravettien récent / terminal (Chehmana *et al.* 2008). Les sites Protomagdaléniens les plus proches se situent en Dordogne (abri Pataud, Clay 1995 et Laugerie-Haute Est, Bordes 1978) et dans le Lot (Les Peyrugues, Allard *et al.* 1997). Concernant le gisement périgourdin de Laugerie-Haute, peu de données pétroarchéologiques sont disponibles (Demars 1998) et empêchent la comparaison avec le site du Blot. Les résultats de l'étude pétro-archéologique fine de silex du Protomagdalénien de l'abri Pataud illustrent un domaine de collecte majoritairement (voire strictement) local (Valensi 1960). Au contraire, Allard *et al.* (2005) soulignent la prédominance, au sein de l'assemblage lithique du Protomagdalénien des Peyrugues, de matières premières allochtones à hauteur de 99 % et notamment de 40 % et de silex du Bergeracois situé à 100 km au nord-ouest du site ; ils postulent que *« le groupe de chasseurs qui s'est installé aux Peyrugues vers 22 500 BP, venait des confins du Périgord dans la basse vallée de la Dordogne »*. Ce déplacement en masse de matières premières lithiques à la fin du Gravettien n'est donc pas un cas isolé et l'acquisition de données relatives à la saisonnalité sur les sites Protomagdaléniens du Lot et de la Dordogne permettrait de mieux comprendre les liens entre ces deux espaces. Cette situation d'un territoire partagé en deux unités géographiques n'est pas sans rappeler la situation évoquée pour le Blot. La dualité Périgord / Quercy – respectivement territoire de bonne saison et de mauvaise saison - documentée pour les périodes plus récentes (Jarry *et al.* 2008) est un modèle à considérer fortement concernant les liens unissant Bassin parisien et Auvergne et ce, dès les débuts du Paléolithique supérieur auvergnat.

3.4 Le Rond du Barry

Il s'agit maintenant de déterminer si (et le cas échéant comment) ce lien fort, entrevu entre Bassin parisien et Velay pour les débuts du Paléolithique supérieur en Auvergne, perdure dans les époques plus récentes. Nous avons choisi le cas du Badegoulien du gisement du Rond-du-Barry à Sinzelles (commune de Polignac, Haute-Loire).

Cette cavité, la plus vaste de Haute-Loire (42 m de long, 14 m de large et 12 m de haut), est située à 785 m d'altitude en rive gauche de la Borne dont la confluence avec la Loire se situe à 5 km au sud-est. Elle est creusée dans un ensemble de brèches basanitiques, dernier témoin du volcan de Sainte-Anne, aujourd'hui effacé par le travail de l'érosion plioquaternaire. Deux autres grottes ayant connu une occupation préhistorique s'ouvrent dans cette ligne de falaise : La grotte de Sainte-Anne I qui a livré des industries du début du Paléolithique moyen (OIS 6–5) (Raynal 2007) et la grotte de Sainte-Anne II, fouillée par R. et J.-M. Séguy, contenant une industrie de la fin du Magdalénien ainsi qu'un dépôt funéraire du Néolithique (Séguy R. & J.-M. 1972).

Mentionnée pour la première fois dans la littérature par F. Robert (1837), le Rond-du-Barry fit l'objet, avant la première guerre mondiale, d'une petite fouille dans le fond de la grotte par J. Pénide - instituteur au Puy en Velay – et ses élèves. Les découvertes et documents relatifs ces fouilles sont aujourd'hui perdus. Une cinquantaine d'années plus tard, en 1965, A. Laborde effectua sondage qui atteignit les premiers niveaux d'occupation préhistorique. R. de Bayle des Hermens y entreprit ensuite des fouilles de 1966 à 1985 (Bayle des Hermens (de) 1986). Il mit en évidence une épaisse succession de couches de la fin du Pléistocène :

- trois unités archéologiques perturbées A, B et C contenant des vestiges de différentes époques attribués au Moyen-âge, au Néolithique et au Magdalénien ;

- trois unités en place de la fin du Paléolithique supérieur, D, E, F, attribuées respectivement au Magdalénien terminal, au Magdalénien supérieur et au Magdalénien ancien I (Bayle des Hermens 1971, 1972a, 1972b, 1974, 1978, 1979a, 1979b) ;

- une unité stérile G recouvrant un ensemble Moustérien, l'unité H (Bayle des Hermens 1987).

Nous nous intéresserons plus particulièrement ici au niveau F2, sous-unité stratigraphique de l'ensemble F comprise entre les couches F1 et F3 stériles (Bayle des Hermens, 1972a).

Cette unité archéo-stratigraphique a livré un riche matériel aussi bien lithique (n = 10409, esquilles comprises) que osseux (plus de 22 000 restes). Les taxons les mieux représentés correspondent à ceux du milieu non arctique, indicateur d'un environnement steppique froid (Aajane 1986 ; Costamagno 1999). Ces résultats sont modérés par ceux issus de l'étude de la microfaune (Bayle des Hermens 1972b ; Marquet et Chaline, à paraître) et des pollens fossiles (Bayle des Hermens (de) 1972 b ; Méon, à paraître) qui esquissent un paysage en mosaïque, boisé dans les vallées (froid humide) et steppique sur les plateaux.

Cette couche archéologique contient également une riche industrie osseuse (Rémy et Bayle des Hermens (de), à paraitre), fait rare pour la région, de la parure (coquillages perforés de diverses origines, perles en ivoire et en os, dents incisées ou perforées) et le *calvarium* d'un homme d'une cinquantaine d'année, déposé dans un caisson identifié comme une sépulture secondaire et considéré jusqu'à présent comme « le plus vieil homme du Velay » (Bayle des Hermens (de) et Heim 1989).

L'industrie lithique de cette couche, atteinte en 1968, a vite été attribuée par R. de Bayle des Hermens au Magdalénien ancien (Bayle des Hermens 1972a) puis au Magdalénien I à raclettes (Bayle des Hermens (de), 1978). De nouvelles études typo-technologiques réalisées par l'une d'entre nous (A.L.) viennent confirmer ces premières impressions et replacent l'industrie lithique de la couche F2 du Rond-du-Barry au sein de la variabilité du Badegoulien du Massif central (Lafarge *et al.* 2012 et soumis). Une série de datations AMS sur bois de rennes a été effectuée plaçant la couche F2 entre 23.423 + 340 cal. BP et 15.820 + 404 cal. BP (Raynal *et al.* sous presse).

En plus de la division par unité stratigraphique, cinq secteurs ont été distingués dans la cavité : secteur 1 « avant grotte » ; secteur 2 « fond de grotte » ; secteur 3 « porche de grotte est » ; secteur 4 « porche de grotte ouest » ; secteur 5 « abri », tous organisés autour d'un grand éboulis d'une dizaine de mètres d'épaisseur dont la base n'a jamais été atteinte. Nous considérerons dans cet article les secteurs 1 (mélange de Badegoulien récent et de Magdalénien), 3 (Badegoulien récent) et 2 (Badegoulien ancien).

Résultats **3.4.1**

Cette étude porte sur l'ensemble des pièces géo-référencées et inventoriées dans les secteurs badegouliens. Sur les 10 409 artefacts étudiés pour la couche F2, nous ne considérerons donc que les 2 675 objets du « secteur 1 », les 834 pièces du « secteur 2 » et les 434 artefacts du « secteur 3 ». La proportion en effectif de chacun des types de silicification par domaine d'acquisition est détaillée dans la **figure 8**.

La description des différents types de silex n'étant pas le but de cet article, nous renvoyons le lecteur aux publications antérieures (Fernandes & Raynal 2007, Fernandes 2012, Delvigne 2012 et sous presse, Lafarge *et al.* 2012).

Contrairement au site du Blot, où quelque soit la phase considérée, le comportement vis à vis de la matière première est monotone (domaine lointain > semi local > local), les proportions de chacun des domaines d'acquisition varient au Rond-du Barry en fonction du secteur considéré (**figure 9**). Le secteur 2 présente une fréquence de matériaux par domaine correspondant au schéma d'acquisition en matières premières illustré dans les études précédentes pour le Magdalénien et le Badegoulien d'Auvergne (Masson 1981 ; Bracco 1994, 1995, 1996 ; Surmely 2000) : domaine lointain > semi local > local. Cependant, dans les autres secteurs, la proportion de matières premières locales tend à égaler celle matières lointaines (secteur 3), voire à la dominer (secteur 1). Tout comme la proportion de silicifications d'origine semi-locale, celle de silex d'origine indéterminée – « type F034 » et possible témoin d'approvisionnement lointain méridionaux (étude en cours) - varie peu en fonction du secteur considéré. Enfin les silicifications d'origine inconnue, les silicifications d'origine indéterminable et les autres roches (quartz, basalte, arkose, quartzite) représentent une part minime de l'assemblage lithique et ne peuvent faire varier les proportions exposées *supra*. Le réel changement dans le rapport au géo-territoire se situe donc dans la dichotomie entre silex lointains et silex locaux et leurs fréquences respectives. Notons que la forte proportion de matériaux locaux dans le « secteur 1 » est sans doute due, *pro parte*, à une pollution par les niveaux magdaléniens sus-jacents : nous en voulons pour preuve la présence d'un silex jaspéroïde de Saint-Jeanvrin (D102), sous la forme d'un petit nucléus à lamelles attribuable sans aucun doute au Magdalénien.

Pour le domaine local, la collecte de silicifications s'effectue préférentiellement dans les alluvions anciennes, puis dans les colluvions, les alluvions et de façon plus anecdotique sur les gîtes sub-primaires. Ce schéma de collecte, s'il est validé pour les secteurs 1 et 2, ne se vérifie pas pour le secteur 3 où la collecte dans les colluvions dépasse celle dans les alluvions anciennes. La diversité des types de silicifications ramassés dans les alluvions anciennes (**figure 9**) est représentative de celle observée au cœur du bassin du Puy-en-Velay, à seulement 2 km au nord-est du site, sur le gîte secondaire multiple de Bilhac (commune de Polignac). La récolte à même les gîtes primaires ou secondaires proches (position colluviale et sub-primaire) est documentée pour les types « F003 » et « F003c » – Bassin du Puy *s.l* et « F003b » - Espaly (respectivement à 3,5 km au nord-ouest et 3,5 km au sud-est en suivant la Borne), « F004 » - La Collange (16 km au sud-est du site) et « F009 » - Saint-Pierre-Eynac (16 km à l'est du site) (**figure 10**). Il apparaît donc que le gîte de Bilhac a été fréquenté pendant toutes les occupations badegouliennes du Rond-du-Barry, certainement en raison de sa proximité avec le site et de la recherche de silex de meilleure qualité (silex à l'origine diaclasés dont le transport fluviatile n'a conservé que les parties résistantes). Les gîtes primaires proches ont probablement été visités dans le cadre d'expéditions logistiques pour la recherche de modules spécifiques (silex en plaquette pour le débitage sur face étroite de nucléus) (Lafarge *et al.*, soumis). Les gîtes plus distants ont été fréquentés à l'occasion d'autres activités de subsistance (chasse) (Binford 1979).

Les silex d'origine semi-locale témoignent d'une récolte dans tous les types de gîtes secondaires (alluvions anciennes, alluvions, colluvions). Les plages corticales sont peu représentées sur les artefacts importés sous forme de produits finis ou de préformes.

TYPE	DOMAINE	ÂGE	LOCALITÉ TYPE	SECTEUR 1	EFF	%	SECTEUR 2	EFF	%	SECTEUR 3	EFF	%
Autres	Non renseigné	Non renseigné	Non renseigné	x	29	1,08	x	3	0,36	x	2	0,46
D001	Lointain	Crétacé sup	Vallée du Renon	x	85	3,18	x	59	7,00	x	28	6,45
D002	Inconnu	Eocène ?	Inconnue	x	6	0,22	x	2	0,24			
D003	Inconnu	Tertiaire	Inconnue	x	6	0,22	x	2	0,24			
D004	Lointain	Turonien inf	Selles-sur-Cher	x	26	0,97	x	41	4,86	x	13	3,00
D005	Inconnu	Inconnu	Inconnue				x	1	0,12			
D006	Inconnu	Inconnu	Inconnue	x	1	0,04						
D007	Lointain	Turonien inf	Loire-et-Cher	x	1	0,04	x	5	0,59	x	2	0,46
D011	Inconnu	Inconnu	Inconnue	x	11	0,41	x	1	0,12	x	2	0,46
D012	Lointain	Turonien inf	Loire-et-Cher	x	27	1,01	x	8	0,95	x	13	3,00
D013	Lointain	Turonien inf	Vallée du Nahon	x	49	1,83	x	3	0,36	x	3	0,69
D014	Inconnu	Tertiaire	Inconnue	x	1	0,04						
D015	Inconnu	Tertiaire	Inconnue	x	1	0,04						
D017	Inconnu	Indéterminé	Inconnue							x	1	0,23
D018	Lointain	Turonien sup	Coussay-les-bois	x	14	0,52	x	10	1,19	x	2	0,46
D018e	lointain	Turonien sup	Grand-Pressigny	x	1	0,04	x	3	0,36	x	1	0,23
D018g	Lointain	Turonien sup	Chinon	x	6	0,22						
D020	Inconnu	Inconnu	Inconnue	x	1	0,04						
D033	Lointain	Turonien inf	Gien	x	6	0,22	x	42	4,98	x	1	0,23
D034	Local	Miocène	Saint-Pierre-Eynac	x	1	0,04						
D035	Local	Miocène	Alluvions de la Loire				x	1	0,12			
D036	Semi-local	Miocène	Laps				x	1	0,12			
D039	Lointain	Turonien inf	Gien ?							x	1	0,23
D066	Lointain	Turonien sup	Yonne	x	1	0,04	x	25	2,97	x	3	0,69
D068	Inconnu	Tertiaire	Inconnue				x	1	0,12			
D069	Semi-local	Oligocène	Beaumont	x	7	0,26						
D303	Semi-local	Oligocène	La Sauvetat	x	1	0,04	x	2	0,24			
D1105	Lointain	Bathonien	Cher	x	7	0,26	x	4	0,47	x	2	0,46
F003	Local	Rupélien	Bassin du Puy	x	368	13,76	x	58	6,88	x	13	3,00
F003b	Local	Rupélien	Espaly	x	72	2,69	x	20	2,37	x	16	3,69
F003c	Local	Rupélien	Bilhac	x	100	3,74	x	24	2,85	x	10	2,30
F003d	Local	Rupélien	Bassin du Puy	x	19	0,71	x	2	0,24	x	1	0,23
F003e	Local	Rupélien	Bassin du Puy	x	4	0,15	x	1	0,12			
F003g	Local	Rupélien	Bassin du Puy	x	2	0,07						
F004	Local	Miocène	La Collange	x	88	3,29	x	25	2,97	x	11	2,53
F005	Semi-local	Eocène	Saint-Léger-du-Malzieu	x	70	2,62	x	9	1,07	x	8	1,84
F007b	Semi-local	Mio-Pliocène	Madriat	x	3	0,11	x	1	0,12			
F009	Local	Miocène	Saint-Pierre-Eynac	x	110	4,11	x	6	0,71	x	5	1,15
F009b	Local	Miocène	Saint-Pierre-Eynac				x	3	0,36			
F009d	Local	Miocène	Saint-Pierre-Eynac				x	1	0,12			
F012	Semi-local	Miocène	Laps	x	4	0,15	x	1	0,12			
F020	Semi-local	Miocène ?	Le Mazet-Saint-Voy	x	10	0,37						
F021	Local	Bajocien	Alluvions de la Loire	x	78	2,92	x	15	1,78	x	22	5,07
F034	Etude en cours	Etude en cours	Etude en cours	x	463	17,31	x	93	11,03	x	66	15,21
F036	Local	Miocène	Araules	x	25	0,93	x	6	0,71	x	1	0,23

TYPE	DOMAINE	ÂGE	LOCALITÉ TYPE	SECTEUR 1	EFF	%	SECTEUR 2	EFF	%	SECTEUR 3	EFF	%
F037	Semi-local	Inconnu	Paléo-Truyère	x	3	0,11				x	2	0,46
F038	Lointain	Turonien inf	Meusnes	x	348	13,01	x	235	27,88	x	90	20,74
F044	Semi-local	Indéterminée	Arlanc	x	123	4,60	x	28	3,32	x	15	3,46
F140	Local	Aalénien/Bajocien	Alluvions de la Loire	x	284	10,62	x	80	9,49	x	80	18,43
F155	Inconnu	Inconnu	Inconnue	x	1	0,04				x	4	0,92
F182	Local	Rupélien	Inconnue	x	136	5,08	x	5	0,59	x	3	0,69
I001	Inconnu	Inconnu	Inconnue				x	1	0,12			
I002	Local	Miocène	Saint-Pierre-Eynac	x	1	0,04						
I004	Lointain	Sennonien	Yonne	x	1	0,04						
I006	Inconnu	Tertiaire	Inconnue	x	1	0,04						
I008	Inconnu	Inconnu	Inconnue	x	1	0,04						
I009	Inconnu	Inconnu	Inconnue	x	1	0,04						
I010	Inconnu	Inconnu	Inconnue				x	1	0,12			
I011	Inconnu	Inconnu	Inconnue	x	1	0,04						
I014	Lointain	Crétacé sup	Inconnue							x	3	0,69
I015	Lointain	Crétacé sup	Inconnue	x	3	0,11	x	2	0,24			
I016	Lointain	Crétacé	Inconnue	x	4	0,15	x	2	0,24	x	4	0,92
I017	Inconnu	Inconnu	Inconnue	x	1	0,04						
I018	Inconnu	Inconnu	Inconnue							x	1	0,23
I021	Inconnu	Inconnu	Inconnue	x	6	0,22						
I024	Inconnu	Inconnu	Inconnue	x	2	0,07						
I028	Inconnu	Inconnu	Inconnue	x	3	0,11						
Indet	Indéterminable	Indéterminable	Indéterminable	x	50	1,87	x	10	1,19	x	5	1,15
				Total	2674	100	Total	843	100	Total	434	100,00

FIGURE 8 Le Rond-du-Barry : F2 - Fréquence des types de silicifications par secteur.

FIGURE 9 Le Rond-du-Barry : F2 - Fréquence et diversité des silicifications par domaine d'acquisition et par secteur.

	DIV S1	%	EFF S1	%	DIV S2	%	EFF S2	%	DIV S3	%	EFF S3	%
Local	14	25,5	1288	48,1	11	29,0	247	29,3	10	31,2	162	37,3
Semi-local	8	14,6	221	8,3	6	15,8	42	5,0	3	9,4	25	5,8
Lointain	16	29,0	580	21,7	13	34,2	439	52,0	14	43,8	166	38,2
Inconnu	16	29,0	44	1,6	7	18,4	9	1,1	4	12,5	8	1,8
Indéterminé	1	1,9	463	17,3	1	2,6	93	11,0	1	3,1	66	15,2
Indéterminable	/	/	50	1,9	/	/	10	1,2	/	/	5	1,2
Autre roches	/	/	29	1,1	/	/	3	0,4	/	/	2	0,5
total	55	100,0	2675	100,0	38	100,0	843	100,0	32	100,0	434	100,0

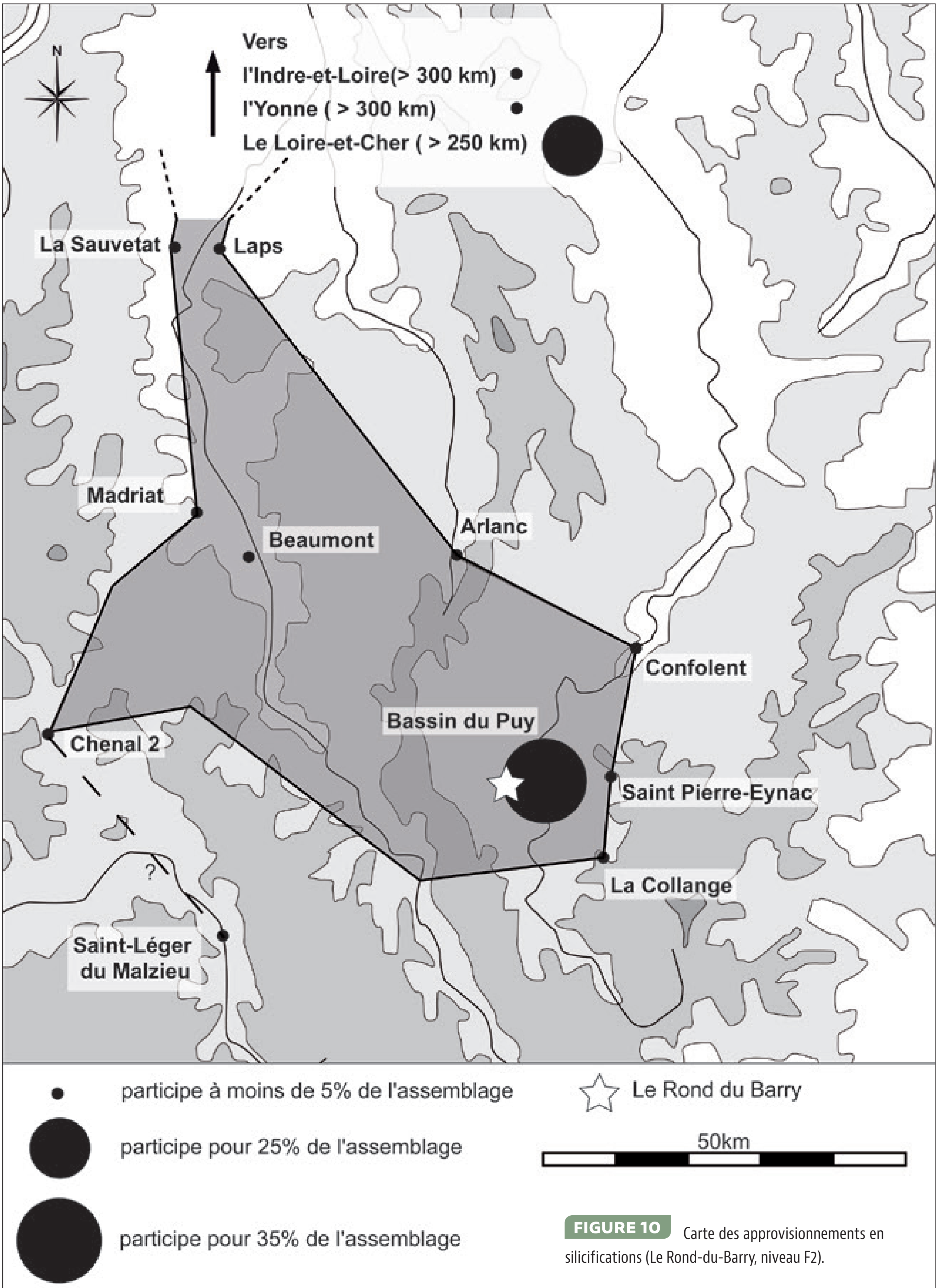


FIGURE 10 Carte des approvisionnements en silicifications (Le Rond-du-Barry, niveau F2).

Les types « F005 » – silcrète de Saint-Léger-du-Malzieu, « F044 » - silcrète de Arlanc, « F037 » silex palustre du Chenal 2 et « F012 » - silcrète de Laps, attestent d'une fréquentation des berges de l'Allier en aval de Brioude et d'une récolte dans les dépôts détritiques de la paléo-Truyère (Chenal 2, Fernandes 2012), à une quarantaine de kilomètres au nord-ouest du Rond-du-Barry. Le type « F020 » - silcrète du Mazet-Saint-Voy, illustre une récolte dans la vallée du Lignon ou de la Loire, à hauteur de Confolent (31 km au nord-est du site). La récolte en position colluviale, proche des gîtes originels, est attestée pour le secteur 1 pour deux types : le type « D069 » - silcrète de Baumont et le type « F005 » - silcrète de Saint-Léger-du-Malzieu. Il faut néanmoins se demander si les deux éclats représentant ce dernier ne résulteraient pas d'une « pollution » magdalénienne. En effet, tous les types « F005 » des secteurs 2 et 3 présentent des faciès très évolués, caractéristiques d'un ramassage dans les alluvions anciennes et les deux seuls autres artefacts de type « F005 » portant un cortex colluvial appartiennent au secteur 5, en grande partie attribuable au Magdalénien. Pour les secteurs 2 et 3, le ramassage à proximité des gîtes primaires est attesté pour le type « F044 » et « F012 ».

Enfin, concernant le domaine lointain, quel que soit le secteur considéré, on observe la tendance suivante : argile à silex / colluvions > Eocène détritique > sub-primaire. Pour le secteur 1, toute la diversité des silex du Turonien inférieur du Berry (« F038 », « D001 », « D004 », « D012 », « D013 ») et du Turonien supérieur de l'Indre-et-Loire (« D018 », « D018e », « D018 g ») a été collectée soit dans les argiles à silex (50 %), soit dans les formations éocènes détritiques (20 %). La part de silicifications issue de ces dernières formations diminue dans les secteurs 2 (12 %) et 3 (5 %) et n'affecte plus que les types « F038 » et « D004 ». Au cortège minéral collecté dans les argiles à silex et identifié pour le secteur 1, s'ajoutent dans les secteurs 2 et 3 des silex issus de la région de la Puisaye (« D033 », « D039 ») et du Sénonais (« D066 », « I064 »). Bien que n'ayant pas de pièces corticales, les différents faciès du type « D1105 » - silex oolithique du Bathonien du Cher (La Celle-Bruère) - attestent d'une récolte en différents points du réseau hydrographique.

Le site du Rond-du-Barry est défini comme un camp résidentiel de longue durée occupé à la bonne saison par les badegouliens (Bracco 1991, 1996 ; Costamagno 1999). L'acquisition de matières premières locales peut avoir été effectuée dans le cadre d'activités de subsistance et relève d'une exploitation poussée du milieu local (gîte de Bilhac, gîtes de la vallée de la Borne). Les silicifications semi-locales reflètent-elles également ce mode d'exploitation ponctuelle à l'occasion d'activités cynégétiques, ou sont-elles l'illustration de changements successifs de camps de base à l'image des *serial specialist* magdaléniens du centre du Bassin parisien (Audouze 2007) ? Quoiqu'il en soit, on constante que les badegouliens du Velay ont exploité leur géo-territoire de la même façon au Blot niv. 9 à 15 (Virmont 1981), à la Roche à Tavernat (Bracco 1992) ou à la grotte Cottier à Retournac (étude en cours). À une part de matériaux locaux, s'ajoute une part non négligeable de matériaux très lointains et en petite quantité, des matériaux d'origine semi-locale. Des études pluridisciplinaires sont maintenant nécessaires pour mieux appréhender le territoire des badegouliens du Velay et comprendre l'articulation des vallées de la Loire et de l'Allier dans un système intégré sans nul doute plus vaste.

Ce mode d'exploitation du géo-territoire local et semi-local n'est pas sans rappeler celui mis en évidence pour le niveau J1 de Sainte-Anne 1 (Fernandes & Raynal 2007). On constate la persistance des zones d'approvisionnement sur des échelles de temps qui transcendent les cultures archéologiques et les humanités.

Les zones d'affleurement parfois restreintes ou cachées de certaines silicifications illustrent une bonne connaissance du géo-territoire local et si ce ne semble pas vrai pour le Protomagdalénien du Blot, c'est certain pour le Paléolithique moyen / ancien ou le Badegoulien. Une telle connaissance est l'illustration d'un long apprentissage sur plusieurs générations et d'une transmission des savoirs empiriques de génération en génération, le site archéologique s'inscrivant dans un parcours (physique ou psychique) cyclique mais pas forcément annuel et tributaire d'une perception temporelle et de facteurs culturels.

Il apparaît à la lumière de cette étude que le flux de silex provenant d'un domaine lointain septentrional perdure au Badegoulien. Les modalités d'acquisition et la place tenue par ces silicifications diffèrent cependant grandement d'un techno-complexe à l'autre. En effet, si la matière première lointaine est ultra-dominante dans le Protomagdalénien du Blot, avec import de blocs entiers de silex de Touraine, il en va tout autrement pour le Badegoulien du Rond-du-Barry. En effet, la diversité et la quantité maximale de silex lointains apportés dans le site provient du Berry (possible import d'un bloc entier dans le secteur 2), et il conviendrait donc de restreindre l'aire d'acquisition lointaine à cette seule région. Les silicifications encore plus lointaines présentes en petite quantité et arrivées sous forme de produits finis (Touraine, Sénonais) et/ou de préformes (Puisaye) pourraient correspondre à des acquisitions indirectes. Les données de l'archéozoologie et de la paléontologie (Aajane 1980 ; Costamagno 1999) indiquent un abandon de la grotte durant l'hiver, ce que les études à l'échelle régionale confirment et étendent à l'ensemble de l'Auvergne (Fontana 2005 ; Fontana *et al.* 2009). Comme déjà proposé par Daugas et Raynal (2007), il est possible d'envisager, dès le Badegoulien, de grands déplacements hivernaux du (des) groupe(s) humain(s) du Velay vers un territoire de plaines au nord (le Berry) où s'effectueraient des rassemblements de grande ampleur, lieu d'échanges et de contacts nécessaires entre groupes voisins de l'Auvergne, du Bassin parisien (Vignard & Vacher 1965 ; Bodu *et al.* 2007) et de la Vallée de la Claise (Aubry 1991 ; Chehmana *et al.* 2007). Cependant, en l'état actuel de nos connaissances, les motivations intrinsèques poussant à la bipartition de ce territoire nous restent inaccessibles mais sont probablement le résultat de dynamiques complexes d'ordre économique, social, culturel et cultuel et la seule étude des matières premières lithiques ne peut permettre d'y accéder.

4 CONCLUSION

L'étude de l'origine des matières premières lithiques de la grotte Chauvet, de l'abri du Blot et de la grotte du Rond-du-Barry, représentatifs de moments successifs du Paléolithique supérieur, révèle quelques traits marquants de la structuration des approvisionnements. Dès les débuts du Paléolithique supérieur, les distances d'approvisionnement s'allongent, les polarités des déplacements changent et la gestion des ressources en matières premières lithiques locales et semi-locales se modifie. Ce constat, établi en Ardèche, est vérifié pour les deux sites plus récents du Velay. Des différences dans la gestion des matières premières lithiques, donc des géo-territoires, apparaissent ; les Protomagdaléniens du Blot semblent regarder la haute vallée de l'Allier comme une marge d'un territoire plus vaste ; les incursions dans le Velay seraient le fait d'activités récurrentes spécialisées et brèves, complémentaires de celles pratiquées dans un espace d'occupation privilégié centré sur le sud du Bassin parisien (Touraine / Berry). L'import en masse de matériaux d'origine lointaine (> 95 %) illustrerait une méconnaissance de l'environnement minéral par les hommes de la fin du Gravettien.

A contrario, le Velay semble être partie intégrante d'un vaste territoire pour les hommes du Badegoulien avec l'exploitation d'un espace de mauvaise saison centré sur le Berry - lieu de possibles grands rassemblements avec des groupes exploitant les territoires adjacents (complexe Puisaye/Sénonais et Touraine) - et un espace de bonne saison centré sur le Velay. L'exploitation du territoire pourrait être de type *serial specialist* avec l'établissement de camps de base de moyenne durée exploitant abondamment l'environnement local, puis se déplaçant dans un espace adjacent situé à une cinquantaine de kilomètres. Des recherches supplémentaires et la mise en commun des résultats avec ceux obtenus dans le cadre des études typo-technologiques, géologiques et archéo-zoologiques permettront dans le futur de mieux appréhender le(s) territoire(s) de ce(s) groupe(s) humain(s).

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BIBLIOGRAPHIE

AAJJANE A. (1980) – *Contribution à l'étude des faunes du Würm récent en Haute Loire. Les niveaux magdaléniens du Rond du Barry*. Thèse de doctorat, Université de Bordeaux–1.

AFFOLTER J. (2001) – Séminaire sur le silex du Grand-Pressigny (27–28 avril 2000). *Bulletin des Amis du Musée de Préhistoire du Grand-Pressigny* 52 : 18–20.

ALLARD M., DREUX M., JARRY M., POMIES M.-P. & RODIERE J. (1997) – Perles en bois de renne du niveau 18 des Peyrugues, à Orniac (Lot) : Hypothèse sur l'origine du Protomagdalénien. *Paleo* 9 : 355–369.

ALLARD M., CHALARD P. & MARTIN H. (2005) – Témoins de mobilité humaine aux Peyrugues (Orniac, Lot) durant le Paléolithique supérieur, signification spatio-temporelle. Dans : J. Jaubert & M. Barbaza (dir.), *Territoires, déplacements, mobilités, échanges durant la Préhistoire. Terres et Hommes du Sud*. Actes des congrès nationaux des sociétés historiques et scientifiques, 126e Toulouse, 2001. Paris, CTHS (Ed.), p. 219–231.

ANGEVIN R. (2010) – Les lamelles à dos magdaléniennes du Blot (Cerzat, Haute-Loire). Observations liminaires sur la production, le statut et la fonction des microlithes dans les industries lithiques du Sud de la France entre 15 000 BP et 13 500 BP. *Bulletin de Préhistoire du Sud-Ouest* 18(2) : 171–191.

ARRIGHI S. & BORGIA V. (2009) – Surface modifications of flint tools and their functional meaning. *Materials and Manufacturing Processes* 24(9) : 922–927.

AUBRY T. (1991) – *L'exploitation des ressources en matières premières lithiques dans les gisements solutréens et badegouliens du bassin versant de la Creuse (France)*. Thèse de doctorat, Université Bordeaux–1.

AUDIERNE J.-G., L'ABBÉ (1863) – *De l'origine et de l'enfance des arts en Périgord*. Périgueux, Dupont & Cie.

AUDOUZE F. (2007) – Mobilité résidentielle et stratégie de subsistance dans le Magdalénien du Bassin parisien. Dans : P. Rouillar, C. Perlès & E. Grimaud (eds.), *Mobilités, immobilismes. Imitation, transfert et refus d'emprunt*. Actes du colloque de Nanterre 8–9 juin 2006, p. 27–44.

BAFFIER D. (2005) – La grotte Chauvet : conservation d'un patrimoine. *Bulletin de la Société Préhistorique Française* 102(1) : 11–16.

BAYLE DES HERMENS DE R. (1971) – Le Magdalénien final de la couche E de la grotte du Rond-du-Barry. *L'anthropologie* 75(7–8) : 586–604.

BAYLE DES HERMENS DE R. (1972a) – Le Magdalénien ancien de la couche F2 de la grotte du Rond-du-Barry. Etude préliminaire. *Comptes rendus d'activités annuelles de l'Association régionale pour le développement des recherches de paléontologie et de préhistoire et des Amis du Muséum de Lyon*, p. 17–24.

BAYLE DES HERMENS DE R. (1972b) – Le Magdalénien final de la grotte du Rond-du-Barry, commune de Polignac, en Haute-Loire. Dans : H. Delporte (dir.), *Compte-rendu de la XIXe session du congrès préhistorique de France, Auvergne*, Société préhistorique de France, p. 37–57.

BAYLE DES HERMENS DE R. (1972c) – Atlas préhistorique du département de la Haute-Loire. Dans : H. Delporte (dir.), *Compte-rendu de la XIXe session du congrès préhistorique de France, Auvergne*, Société préhistorique de France, p. 71–98.

BAYLE DES HERMENS DE R. (1978) – Campagnes de fouilles 1977 et 1978 dans la grotte du Rond-du-Barry. Polignac, Haute-Loire. *Nouvelles archives du Muséum d'histoire naturelle de Lyon* 16 : 17–23.

BAYLE DES HERMENS DE R. (1979a) – Les niveaux supérieurs du Magdalénien de la grotte du Rond-du-Barry, Polignac (Haute-Loire). Dans : D. Sonneville-Bordes (ed.), *La fin des temps glaciaire en Europe. Chronologie et écologie des cultures du Paléolithique final*. Talence, 24–28 mai 1977. Paris : CNRS, p. 601–611.

BAYLE DES HERMENS DE R. (1979b) – Un nouveau niveau magdalénien dans la grotte du Rond-du-Barry. Note préliminaire. *L'Anthropologie* 83(2) : 281–290.

BAYLE DES HERMENS DE R. (1986) – Le magdalénien du Velay et la grotte du Rond-du-Barry. Polignac (Haute-Loire). *Société d'étude et de recherches préhistoriques des Eyzies* 35 : 43–50.

BAYLE DES HERMENS DE R. (1987) – Le moustérien de la grotte du Rond-du-Barry, Polignac, Haute-Loire. *L'Anthropologie* 91 : 321–328.

BAYLE DES HERMENS DE R. & HEIM J.-L. (1989) – Découverte d'un crâne humain dans une sépulture secondaire du Magdalénien I de la grotte du Rond-du-Barry, Polignac, Haute-Loire. *Comptes rendus de l'Académie des sciences. Série 2, Mécanique, Physique, Chimie, Sciences de l'univers, Sciences de la Terre* 309(12) : 1349–1352.

BERNARD-GUELLE S., RUÉ M., FERNANDES P., COURTY M.-A., PIBOULE M., COUDENNEAU A., ARGANT J., PICAVET R. & DAWSON M.-C. (2011) – Le site moustérien d'Andance (Saint Bauzile, Ardèche) : un habitat de hauteur en contexte basaltique dans la moyenne vallée du Rhône. *Bulletin de la Société Préhistorique Française* 108(4) : 671–695.

BINFORD L.R. (1979) – Organization and formation Processes looking at curated technologies. *Journal of Anthropological Research* 35 : 255–273.

BINFORD L.R. (1980) – Willow smoke and dog's tail : hunter gatherer settlement systems and archeological site formation. *American Antiquity* 45(1) : 4–20.

BODU P., CHEHMANA L. & DEBOUT G. (2007) – Le Badegoulien de la moitié nord de la France. Un état des connaissances. *Bulletin de la Société Préhistorique Française* 104(4) : 661–679.

BONIFAY E. & BONIFAY M.-F. (1981) – Le gisement préhistorique de Soleilhac (Blanzac, Haute-Loire). Dans : *Le Bassin du Puy aux temps préhistoriques. Recherches récentes*. Le Puy-en-Velay : musée Crozatier, p. 19–36.

BONIFAY E. (1991) – Les premières industries du sud-est de la France et du Massif-Central. Dans : E. Bonifay & B. Vandermeersch (dir.), *Les premiers européens*. Actes du 114e Congrès national des sociétés savantes. Paris, 3–9 avril 1989. Paris : CTHS, p. 63–80.

BONIFAY E. (2002) – *Les premiers peuplements de l'Europe*. Paris, La maison des Roches.

BORDES F. (1978) – Le Protomagdalénien de Laugerie-Haute Est (fouilles F. Bordes). *Bulletin de la Société Préhistorique Française* 75 (11–12) : 501–521.

BOSSELIN, B. (1992a) – Le Protomagdalénien du Blot, étude typologique comparée. *Bulletin de la Société Préhistorique Française* 89(3) : 82–96.

BOSSELIN B. (1992b) – *Les industries du Protomagdalénien à la lueur des données du site du Blot à Cerzat (Haute-Loire)*. Thèse de doctorat, Université de Franche-Comté, Besançon.

BOSSELIN B. (1997) – *Le Protomagdalénien du Blot. Les industries lithiques dans le contexte culturel du Gravettien français*. Liège, ERAUL.

BOSSELIN B. (2007) – Le Protomagdalénien du Blot : industrie de carence ou utilisation optimale des matières premières ? Dans : R. Debrosse & A. Thévenin (dir.) *Arts et cultures de la Préhistoire : hommage à Henri Delporte*. Paris : CTHS, p. 169–183.

BOULE M. (1892) – *Description géologique du Velay*. Thèse de doctorat, Université de Paris.

BOULE M. & VERNIÈRE A. (1899) – L'abri sous roche du Rond, près de Saint-Arcons d'Allier, Haute-Loire. *L'Anthropologie* 10 : 385–396.

BRACCO J.-P. (1991) – Typologie, technologie et matières premières des industries du très ancien Paléolithique en Velay (Massif Central, France). Premiers résultats. Dans : E. Bonifay & B. Vandermeersch (dir.), *Les premiers européens*. Actes du 114e Congrès national des sociétés savantes. Paris, 3–9 avril 1989. Paris : CTHS, p. 93–100.

BRACCO J.-P. (1992) – *Le Paléolithique supérieur du Velay et de ses abords : recherches sur la dynamique des peuplements et l'occupation du sol dans un milieu volcanique de moyenne montagne*. Thèse de doctorat, Université Aix-Marseille–1.

BRACCO J.-P. (1994) – Colonisation et peuplement en moyenne montagne volcanique au Würm récent : le campement badegoulien de la roche à Tavernat (Massif central). *Bulletin de la Société Préhistorique Française* 91(2) : 113–118.

BRACCO J.-P. (1995) – Déplacements des groupes humains et nature de l'occupation du sol en Velay (Massif central, France) au Paléolithique supérieur : intérêts de la détermination de l'origine des matières premières lithiques. Dans : R. Chenorkian (dir.) *L'homme méditerranéen*. Aix-en-Provence : Université de Provence, p. 285–292.

BRACCO J.-P. (1996) – Du site au territoire : l'occupation du sol dans les hautes vallées de la Loire et de l'Allier au Paléolithique supérieur (Massif Central). *Gallia Préhistoire* 38 : 43–67.

BUISSON D. (1991) – Le Périgordien du Blot (Cerzat, Haute-Loire). *Bulletin de la Société Préhistorique Française* 88(4) : 104–108.

CASTEL J.-C., CHADELLE J.-P. & GENESTE J.-M. (2005) – Nouvelle approche des territoires solutréens du sud-ouest de la France. Dans : J. Jaubert & M. Barbaza (dir.), *Territoires, déplacements, mobilités, échanges durant la Préhistoire. Terres et Hommes du Sud*. Actes des congrès nationaux des sociétés historiques et scientifiques, 126e Toulouse, 2001. Paris : CTHS, p. 279–294.

CHAUVIÈRE F.-X. & FONTANA L. (2005) – Modalités d'exploitation des rennes dans le Protomagdalénien du Blot (Haute-Loire, France). Dans : V. Dujardin (dir.), *Industrie osseuse et parures du Solutréen au Magdalénien en Europe*. Société préhistorique française, Mémoire 39 : 137–147.

CHEHMANA L., LIARD M. & BODU P. (2007) – De nouveaux arguments pour un rattachement au Badegoulien des séries dites « à grands burins transversaux » de la vallée de la Claise. *Bulletin de la Société Préhistorique Française* 104(4) : 681–698.

CHEHMANA L., DEBOUT G., VALENTIN B., BAZIN P. & BIGNON O. (2008) – Quels auteurs pour l'industrie de Mancy à Saint-Brisson-sur-Loire (Loiret) ? Réévaluation d'un assemblage présumé magdalénien en région Centre. *Bulletin de la Société Préhistorique Française* 105(2) : 283–290.

CLAY R.B. (1995) – Le Protomagdalénien de l'abri Pataud, niveau 2. Dans : H.M. Bricker (dir.), *Le Paléolithique supérieur de l'abri Pataud (Dordogne) : les fouilles de H.L. Movius Jr*. Paris, Maison des sciences de l'Homme, Documents d'archéologie française 50 : 11–29.

CLEYET-MERLE J.-J. (1990) – François de Jouannet. *Paléo* (hors-série) 7–8.

CLOTTES J. (1995) – Changements thématiques dans l'art du paléolithique supérieur. *Bulletin de la Société préhistorique de l'Ariège - Pyrénées* 50 : 13–34.

CLOTTES J. ET AZEMA M. (2005) – Les images de félins de la grotte Chauvet. *Bulletin de la Société Préhistorique Française* 102(1) : 173–182.

CLOTTES J. (2010) – *La grotte Chauvet. L'art des origines*. Paris, Seuil.

COMBIER J. & JOUVE G. (2012) – Chauvet cave's art is not Aurignacien : a new examination of the archaeological évidence and dating procedures. *Quartär* 59 : 131–152.

COSTAMAGNO S. (1999) – *Stratégies de chasse et fonction des sites au Magdalénien dans le sud de la France*. Thèse de doctorat, Université Bordeaux–1.

DAMOUR A. (1865) – Sur la composition des haches en pierres trouvées dans les monuments celtiques et chez les sauvages. *Compte rendu de l'Académie des Sciences* 61 : 1–13.

DANZEGLOCKE U., JÖRIS O. & WENINGER B. (2008) – CalPal–2007online : http : //www.calpal-online.de/. Accessed 31 October 2008.

DAUJEARD C., FERNANDES P., GUADELLI J.-L., MONCEL M.-H. , SANTAGATA C. & RAYNAL J.-P. (2012) – Neanderthal subsistence strategies in Southeastern France between the plains of the Rhone Valley and the mid-mountains of the Massif Central (MIS 7 to MIS 3). *Quaternary international* 252 : 32–47.

DELPORTE H. (1966) – Le Paléolithique dans le Massif Central : I- Le Magdalénien des vallées supérieures de la Loire et de l'Allier. *Bulletin de la Société Préhistorique Française* 63 (1) : 181–207.

DELPORTE H. (1968) – Informations archéologiques. Circonscription d'Auvergne et Limousin. *Gallia Préhistoire* 11(2) : 421–454.

DELPORTE H. (1972) – Le Proto-Magdalénien du Blot commune de Cerzat (Haute-Loire). Etude préliminaire. Dans : H. Delporte (dir.), *Compte-rendu de la XIX*^e^ *session du congrès préhistorique de France, Auvergne*. Société préhistorique de France, p. 190–199.

DELPORTE H. & VIRMONT J. (1983) – Les débuts du Paléolithique supérieur en Auvergne et en Bourbonnais et la séquence périgordienne. Dans : *Les inédits de la Préhistoire auvergnate*. Clermont-Ferrand : Musée Bargoin, p. 129–141.

DELPORTE H. (1992) – Les chasseurs de renne du Paléolithique supérieur. Dans : *Préhistoire de la Haute-Loire*. Clermont-Ferrand : Service Régional de l'Archéologie - DRAC, p. 23–29.

DELVIGNE V. (2012) – Étude pétroarchéologique de l'unité archéo-stratigraphique F2 de la grotte du Rond du Barry (Polignac, Haute-Loire), premiers résultats. *Comptes rendus Palevol* 11(4) : 293–304.

DELVIGNE V., LAFARGE A., FERNANDES P., PIBOULE M. & RAYNAL J.-P. (SOUS PRESSE) – Un exemple de gestion des géo-ressources au Paléolithique supérieur en moyenne montagne : le Badegoulien de la grotte du Rond-du-Barry (Sinzelles, Polignac, Haute-Loire). *L'Anthropologie*.

DEMARS P.-Y. (1998) – Circulation des silex dans le Nord de l'Aquitaine au Paléolithique supérieur. L'occupation de l'espace par les derniers chasseurs cueilleurs. *Gallia Préhistoire* 40 : 1–28.

FERNANDES P. & RAYNAL J.-P. (2006) – Petroarchéologie du silex : un retour aux sources. *Comptes rendus Palevol* 5 : 829–837.

FERNANDES P., RAYNAL J.-P. & MONCEL M.-H. (2006) – L'espace minéral au Paléolithique moyen dans le Sud du Massif central : premiers résultats pétroarchéologiques. *Comptes rendus Palevol* 5 : 981–993.

FERNANDES P. & RAYNAL J.-P. (2007) – Pétroarchéologie du silex. Dans : J.-P. Raynal (dir.) *La grotte Sainte Anne 1. Le Paléolithique moyen de l'unité J1*. Lausonne, Archéo-Logis/ CDERAD, les dossiers de l'Archéo-Logis 3 : 59–98.

FERNANDES P., LE BOURDONNEC F.-X., RAYNAL J.-P., POUPEAU G., PIBOULE M. & MONCEL M.-H. (2007) – Origins of prehistoric flints: The neocortex memory revealed by scanning electron microscopy. *Comptes rendus Palevol* 6: 557–568.

FERNANDES P., RAYNAL J.-P. & MONCEL M.-H. (2008) – Middle Palaeolithic raw material gathering territories and human mobility in the southern Massif Central, France: first results from a petro-archaeological study on flint. *Journal of Archaeological Science* 35: 2357–2370.

FERNANDES P., MONCEL M.-H. & LHOMME G. (2010) – Analyse des comportements face aux ressources minérales de deux sites du Paléolithique moyen: Payre, Abris des Pêcheurs (Ardèche, France). *Rivista di scienze preistoriche* 57: 31–42.

FERNANDES P. (2012) – *Itinéraires et transformations du silex: une pétroarchéologie refondée, application au Paléolithique moyen*. Thèse de doctorat, Université Bordeaux–1.

FERUGLIO V. (2006) – De la faune au bestiaire - la grotte Chauvet - Pont-d'Arc, aux origines de l'art pariétal paléolithique. *Comptes rendus Palevol* 5: 213–222.

FILLOD A. & BONHOMME J. (1985) – *Le climat de la Haute-Loire*. Centre d'étude de la Borne.

FOLK R. L. (1959) – Practical classification of limestone. *American Association of Petroleum Geologists Bulletin* 43: 1–38.

FONTANA L. (2005) – Territoires, mobilité et échanges, au Magdalénien dans l'Aude et la Massif central (France): approche comparative, modélisation et perspectives. Dans: J. Jaubert & M. Barbaza (dir.), *Territoires, déplacements, mobilités, échanges durant la Préhistoire. Terres et Hommes du Sud*. Actes des congrès nationaux des sociétés historiques et scientifiques, 126e Toulouse, 2001. Paris: CTHS, p. 355–370.

FONTANA L., DIGAN M., AUBRY T., LLACH J.-M. & CHAUVIÈRE F.-X. (2009) – Exploitation des ressources et territoire dans la Massif central français au Paléolithique supérieur: approche méthodologique et hypothèses. Dans: F. Djindjian, J. Kozlowski, N. Bicho (dir.), *Le concept de territoires dans la Paléolithique supérieur européen*. BAR International Serie, p. 201–215.

FONTANA L. (2012) – *L'Homme et le renne*. Paris, CNRS.

FOUGÈRE F. (2011) – Pour une modélisation du cycle annuel de nomadisation des chasseurs-cueilleurs: données ethnographiques et conditions d'application archéologique. *Bulletin de la Société Préhistorique Française* 108(2): 201–220.

GACHON L. (1953) – P. Bout, le climat du Velay au Quaternaire et au Postglaciaire. *Revue de géographie de Lyon* 28(3): 246–247.

GARCIA M.-A. (2005) – Ichnologie générale de la grotte Chauvet. *Bulletin de la Société Préhistorique Française* 102(1): 103–108.

GELY B. (2005) – La grotte Chauvet à Vallon-Pont-d'Arc (Ardèche). Le contexte régional paléolithique. *Bulletin de la Société Préhistorique Française* 102(1): 17–33.

GENESTE J.-M. (2005) – L'archéologie des vestiges matériels dans la grotte Chauvet-Pont-d'Arc. *Bulletin de la Société Préhistorique Française* 102(1): 135–144.

GIOT D., MALLET N. & MILLET D. (1986) – Les silex de la région du Grand-Pressigny. Recherche géologique et analyse pétrographique. *Revue archéologique du Centre de la France* 25(1): 21–36.

GLAUBERMAN P. & THORSON M. (2012) – Flint patina as an aspect of "Flaked stone taphonomy": A case study from the lœss terrain of the Netherlands and Belgium. *Journal of Taphonomy* 10(1): 21–23.

GOLOUBINOFF C. (1979) – *Le Permo-houiller du bassin de Saint-Affrique*. Thèse de 3e cycle, Université Paris-Sud. Document du BRGM 16.

GUERANGE-LOZES J., BURG J.-P., VINCHON C., ALABOUVETTE B., DEFAUT B., ASTRUC J.G., CALHARAGUE J., LEYRELOUP A., MICHARD A.G., PERRIN C. & SERVELLE C. (1995) – *Notice explicative de la carte géologique de France (1/50000), feuille de Requista (934)*. Orléans, BRGM.

JARRY M., MARTIN H., LE GALL O. & DEMARS P.-Y. (2008) – Territoires et saisons au Paléolithique. Éléments de réflexions. *Archeopages* 21: 6–15.

KLARIC L. (1999) – *Un schéma de production lamellaire originale dans l'industrie gravettienne de l'ensemble moyen du gisement du Blot à Cerzat (Haute-Loire)*. Mémoire de DEA, Université Paris 1 Panthéon – Sorbonne.

LAFARGE A., DELVIGNE V., RÉMY D., FERNANDES P. & RAYNAL J.-P. (2012) – Ancient Magdalenian of the French Massif Central revisited: a reapraisal of unit F2 of the Rond du Barry cave (Polignac, Haute-Loire, France). Dans: K. Ruebens, I. Romanowska & R. Binoe (dir.), *Unravelling the Palaeolithic. Ten years of reasearch at the Center for the Archaeology of Human Origins (CAHO, University of Southampton)*. BAR International Serie, p. 109–129.

LAFARGE A., PIBOULE M., PIBOULE M., DELVIGNE V. & RAYNAL J.-P. (SOUMIS 2013) – Le Badegoulien dans le Massif central : parcours, techniques et subsistance entre plaines et montagnes. *Bulletin de la Société Préhistorique de France*.

LAVIN L. & PROTHERO D.R. (1987) – Identification of "jasper" sources in parts of the Northeast and Mid-Atlantic regions. *Bulletin of the New Jersey Archaeological Society* 42 : 11–23.

LAVIN L. & PROTHERO D.R. (1992) – Prehistoric procurement of secondary sources : The case for characterization. *North American Archaeologist* 13(2) : 97–113.

LE RIBAULT L. (1977) – *L'exoscopie des quartzs*. Paris, Masson.

LINTON J., AFFOLTER J. & SESTIER C. (2008) – Des lames en silex rubané tertiaire de la collection des fouilles anciennes du camp de Chassey (Saône-et-Loire). *Revue archéologique de l'Est* 57 : 3–17.

MARGUERIE D. (1984) – Les formations alluviales de l'Allier dans le gisement préhistorique du Blot (Cerzat, Haute-Loire). Eléments de dynamique fluviale. *Bulletin de l'Association Française pour l'Etude du Quaternaire* 21(1–3) : 73–78.

MARQUET J.-C. & CHALINE J. (À PARAÎTRE) – Les rongeurs de la grotte du Rond-du-Barry. *In* : *Les Magdaléniens du Rond-du-Barry*.

MASSON A. (1981) – *Pétroarchéologie des roches siliceuses, intérêt en Préhistoire*. Thèse de doctorat, Université de Lyon.

MAUGER M. (1984) – L'apport des microfossiles dans l'identification des silex. Exemple du Magdalénien de l'Ile de France. *Bulletin de la Société Préhistorique Française* 81(7) : 216–220.

MÉON H. (À PARAÎTRE) – Aperçu sur la végétation d'après les résultats sporopolliniques. Dans : *Les Magdaléniens du Rond-du-Barry*.

MERGOIL J. & BOIVIN P. (1993) – Le Velay. Son volcanisme et les formes associées. Notice de la carte au 1/100000. *Géologie de la France* 93 : 3–96.

MOSER F. (1976) – *La sédimentologie des remplissages d'abris sous-basaltiques en Haute-Loire et ses implications climatiques au Würm récent et au Post-Würm*. Diplôme de l'école pratique des Hautes études.

PÉTREQUIN P., GAUTHIER E., JACCOTEY L., JEUDY F., MAITRE A. & VAQUER J. (2012) – Les exploitations de Réquista (Aveyron) et de Plancher-les-mines (Haute-Saône, France). Exemples de diffusion de haches à moyenne distance. Dans : P. Pétrequin, S. Cassen, L. Klassen, A. Sheridan & A.-M. Pétrequin (dir.), *Jade. Grandes haches alpines du Néolithique européen. V*[e] *et IV*[e] *millénaires av. J.-C.*, Ledoux, Presses universitaires de Franche Comté, p. 544–573.

POMEROL F. (1888) – L'abri sous roche de Blanzat. *In* : *Compte rendu de la 18*[e] *session du congrès de l'Association Française pour l'Avancement des Sciences*. Paris, Association Française pour l'Avancement des Sciences, p. 637–640.

PRIMAULT J. (2003) – *Exploitation et diffusion des silex de la région du Grand-Pressigny au Paléolithique*. Thèse de doctorat, Université Paris X.

RAYNAL J.-P. (1983) – Aspects du Paléolithique moyen en auvergne. *In* : *Les inédits de la Préhistoire auvergnate*. Clermont-Ferrand, Musée Bargoin, p. 105–128.

RAYNAL J.-P. & DAUGAS J.-P. (1984) – Volcanisme et occupation humaine dans le Massif central français : quelques observations. *Revue archéologique du Centre de la France* 23(1) : 7–19.

RAYNAL J.-P. (DIR.) (2007) – *La grotte Sainte Anne 1. Le Paléolithique moyen de l'unité J1*. Lausonne : Archéo-Logis/CDERAD (Ed.), Les dossiers de l'Archéo-Logis 3.

RAYNAL J.-P., MONCEL M.-H., DEAUJARD C., FERNANDES P., FIORE I., TAGLIACOZZO A., LECORRE-LE BEUX M., NAVARRO G.-C. & THEODOROPOULOU A. (2012) – Neanderthal land-use and related tool-kit at the AMS 5/4 boudary in the South east portion of the French Massif Central. Dans : K. Ruebens, I. Romanowska & R. Binoe (dir.), *Unravelling the Palaeolithic. Ten years of reasearch at the Center for the Archaeology of Human Origins (CAHO, University of Southampton)*. Oxford, BAR International Serie, p. 53–72.

RAYNAL J.-P., LAFARGE A., RÉMY D., DELVIGNE V., GUADELLI J.-L., FERNANDES P., LE CORRE-LE-BEUX M., COSTAMAGNO S., VERNET G., VIVENT D., BAZILE F. & LEFÈVRE D. (SOUS PRESSE) – Datations SMA et nouveaux regards sur l'archéo-séquence du Rond-du-Barry (Polignac, Haute-Loire). *Compte rendu Palevol*.

RÉMY D. ET BAYLE DES HERMENS DE R. (À PARAÎTRE) – Reindeer antler industry in the upper Magdalenian from le Rond du Barry, Polignac, Haute-Loire, France. Dans : N. Sykes, K. Baker & R. Carden (dir.), *Deer and People : Past, Present and Future*. Proceedings of the International Conference. University of Lincoln, 8–11 september 2011, Windgather press.

ROBERT F. (1837) – Mémoire géologique sur le Bassin du Puy. *Annales de la société d'agriculture de Haute-Loire* 1835–1836 (7–8 : 53–93).

SEGUY R. & SEGUY J.-M. (1972) – Le gisement de Sainte Anne II. Dans: H. Delporte (dir.), *Compte-rendu de la XIX^e session du congrès préhistorique de France, Auvergne*. Société préhistorique de France, p. 338–340.

SÉRONIE-VIVIEN M. & SÉRONIE-VIVIEN M.-R. (1987) – *Les silex du Mesozoïque nord-aquitain. Approche géologique de l'étude des silex pour servir à la recherche préhistorique*. Bordeaux: Supplément au Tome 15, Bulletin de la Société Linéenne de Bordeaux.

SERVELLE C. (1994) – Exploitation et diffusion des matières premières minérales destinées à la fabrication de l'outillage en Pierre polie dans le sud de la France. Le cas exceptionnel des cinérites siliceuses du Rouergue. *In: Echanges. Circulation d'objets et commerce en Rouergue de la Préhistoire au Moyen-âge*. Montrozier, Musée du Rouergue, guide d'archéologie 2: 39–50.

SURMELY F., BARRIER P., BRACCO J.-P., CHARLY N. & LIABEUF R. (1998) – Caractérisation des matières premières siliceuses par l'étude des microfaciès et application à la connaissance du peuplement préhistorique de l'Auvergne. *Compte rendu de l'Académie des Sciences* 326: 595–601.

SURMELY F. (2000) – Le peuplement magdalénien de l'Auvergne. *In*: Pion, G. (Dir.), *Le Paléolithique Supérieur récent. Nouvelles données sur le peuplement et l'environnement*. Actes de la Table Ronde de Chambéry. Paris, SPF, Mémoires de la Société préhistorique française 28: 165–175.

SURMELY F. & PASTY J.-F. (2003) – L'importation de silex en Auvergne durant la Préhistoire. Dans: F. Surmely (dir.) *Les matières premières lithiques en Préhistoire*. Actes de la Table ronde internationale d'Aurillac. Cressensac, Association de préhistoire du Sud-Ouest, Préhistoire du Sud-Ouest, supplément 5: 327–342.

SURMELY F., BOUDON P., BRIOT D. & PIN C. (2008a) – La diffusion des silex crétacés dans le centre du Massif central durant la Préhistoire (Paléolithique, Mésolithique, Néolithique). Contribution à l'étude de la circulation des matières premières sur de longues distances. *Paleo* 20: 115–144.

SURMELY F., COSTAMAGNO S., HAYS M., ALIX P. & PASTY J.-F. (2008b) – Le Gravettien et le Protomagdalénien en Auvergne. *Paleo* 20: 73–98.

SURMELY F. & HAYS M. (2011) – Nouvelles données sur les industries lithiques des niveaux protomagdaléniens du site du Blot (Cerzat, Haute-Loire). Dans: N. Goutas, L. Klaric, D. Pesesse & P. Guillermin (dir.), *A la recherche des identités gravetiennes*. Société préhistorique française, Mémoire 52: 111–127.

TORTI C. (1980) – *Recherches sur l'implantation humaine en Limagne au Paléolithique moyen et supérieur*. Thèse de 3^e Cycle, Université Bordeaux–1.

TORTI-ZANNOLI C. (1983) – Contribution à l'étude paléogéographique du Massif central au Paléolithique moyen. *Bulletin de la Société Préhistorique Française* 80(10–12): 300–307.

TORTI-ZANNOLI C. (1985) – Les matières premières lithiques du Magdalénien ancien et terminal de la grotte du Rond-du-Barry (Haute-Loire). *Revue archéologique du Centre de la France* 24(2): 135–143.

TOSELLO G. & FRITZ C. (2005) – Les dessins noirs de la grotte Chauvet - Pont-d'Arc: essai sur leur originalité dans le site et leur place dans l'art aurignacien. *Bulletin de la Société Préhistorique Française* 102(1): 159–171.

VALENSI L. (1957) – Micropaléontologie des silex du Grand-Pressigny. *Bulletin de la Société Géologique Française* 7: 1083–1090.

VALENSI L. (1960) – De l'origine des silex protomagdaléniens de l'abri Pataud, Les Eyzies. *Bulletin de la Société préhistorique française* 57(1–2): 80–84.

VALLADAS H., TISNÉRAT-LABORDE N., CACHIER H., KALTNECKER E., ARNOLD M., OBERLIN C. & EVIN J. (2005) – Bilan des datations carbones 14 effectuées sur des charbons de bois de la grotte Chauvet. *Bulletin de la Société Préhistorique Française* 102(1): 109–113.

VIGNARD E. & VACHER G. (1965) – Quinze années de fouilles dans les gros Monts des Beauregards de Nemours (Seine et Marne). *Bulletin de la Société Préhistorique Française* 62(1): 84–97.

VIRMONT J. (1981) – *Le Bassin de l'Allier au Paléolithique supérieur. Industrie et phases de peuplement*. Thèse de troisième cycle, Université Aix-Marseille.

Réflexions sur les modalités de circulation à distance des silex et la gestion du territoire à la fin du Paléolithique moyen dans l'angle nord-ouest de la Méditerranée

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Résumé : Les avancées de ces dix dernières années dans la caractérisation et la cartographie des ressources lithiques dans l'angle nord-ouest de la Méditerranée ouvrent de nouvelles perspectives pour l'étude du Moustérien régional, via le développement des approches techno-économiques. Ce travail, qui propose un premier bilan des stratégies d'approvisionnement, a permis de souligner la diversité des formes techniques sous lesquelles circulent les roches, tant à courte qu'à longue distance, notamment illustré par le transport fréquent de nucléus sur 80 à 100 km. La multiplication d'études de cas met par ailleurs en évidence une exploitation récurrente des mêmes matériaux qui, outre le rôle central joué par certains d'entre eux dans l'économie des groupes, délimite un espace de circulation compris entre mer et montagne. Cette homogénéité territoriale, également confirmée sur le plan technologique par un recours massif au débitage Levallois récurrent, suggère l'existence de caractères culturels propres à l'espace méditerranéen.

Abstract : *The last ten years progresses in characterization and cartography of the Mediterranean northwestern corner lithic resources open new perspectives for the study of the regional Mousterian through the development of techno-economic approaches. Proposing a first overview of the procurement strategies, this paper underlines no matter the distance the diverse forms of flint transport especially illustrated by the frequent circulation of cores upon 80 to 100 km. The multiplication of case studies shows a recurrent exploitation of the same materials which, besides the central role played by some of them in the human groups economy, mark out a circulation area between sea and mountains. This territorial homogeneity also confirmed on a technological plan by a massive use of the recurrent Levallois system suggests the existence of Mediterranean area specific cultural characters.*

1 INTRODUCTION

La connaissance des populations préhistoriques repose sur notre capacité à interpréter les lieux où elles ont séjourné et les vestiges qui sont parvenus jusqu'à nous. Depuis une quarantaine d'années, l'intérêt porté d'abord aux roches utilisées par ces populations (Tixier *et al.* 1980) nous a progressivement permis d'approcher les territoires parcourus par tel ou tel groupe, de comprendre comment ils géraient dans le temps et l'espace ces ressources lithiques et d'appréhender certains aspects de leur comportement par comparaison avec les approches ethnographiques. Peu à peu, le croisement de ces connaissances avec celles issues des approches archéologiques commence à nous révéler, au niveau régional, les stratégies de subsistance de ces groupes, leurs comportements territoriaux et leurs déplacements.

Dans cette approche, le Paléolithique moyen et les travaux réalisés dans quelques régions (Périgord, Maroc oriental) ont joué un rôle important. D'autres connaissances plus récentes portent pour la France sur le couloir rhodanien (Slimak 2003 ; Moncel 2003), la Provence (Porraz 2005), la Ligurie (Rossoni 2011). Dans ce contexte, il était intéressant de confronter ces données avec celles de l'angle nord-ouest du bassin méditerranéen, qui concernent essentiellement les populations de la fin du Paléolithique moyen (MIS 4 et 3), à un moment où le nombre relativement important de sites laisse supposer une certaine expansion démographique. L'étude des différences de comportements entre les Néandertaliens et les Hommes anatomiquement modernes repose d'ailleurs aujourd'hui très largement sur ces questions d'économie lithique et d'organisation territoriale. La caractérisation précise des modalités d'acquisition des matières premières à la fin du Paléolithique moyen, tenant compte de leurs formes et distances de circulation, s'avère donc d'une importance capitale pour la compréhension des changements survenant avec l'avènement du Paléolithique supérieur en Europe occidentale. L'enjeu est en effet de percevoir, outre l'aspect technique évident, quels ont été les bouleversements et les évolutions dans la manière dont ces populations de chasseurs-cueilleurs, par essence mobiles, ont géré des ressources minérales qui, elles, sont fixes. Cette opposition entre circulation des groupes d'une part et permanence des ressources lithiques au sein de l'environnement d'autre part, permet surtout d'aborder les notions d'économie et d'anticipation qui régissent les stratégies de mobilité et d'approvisionnement en matières premières.

La présente contribution propose donc une évaluation de ces mécanismes et des implications socio-économiques qui en découlent à partir d'exemples choisis dans le Moustérien récent du pourtour méditerranéen français. L'appréciation des comportements techno-économiques adoptés par les dernières populations néandertaliennes repose dans ce cas sur une approche croisée, s'intéressant aussi bien au contexte d'abandon des matériaux - le site et les modalités d'approvisionnement de celui-ci - qu'à la circulation de certains matériaux (traceurs) au niveau régional et à leur rôle dans l'organisation globale du territoire.

2 PERSPECTIVES GÉNÉRALES

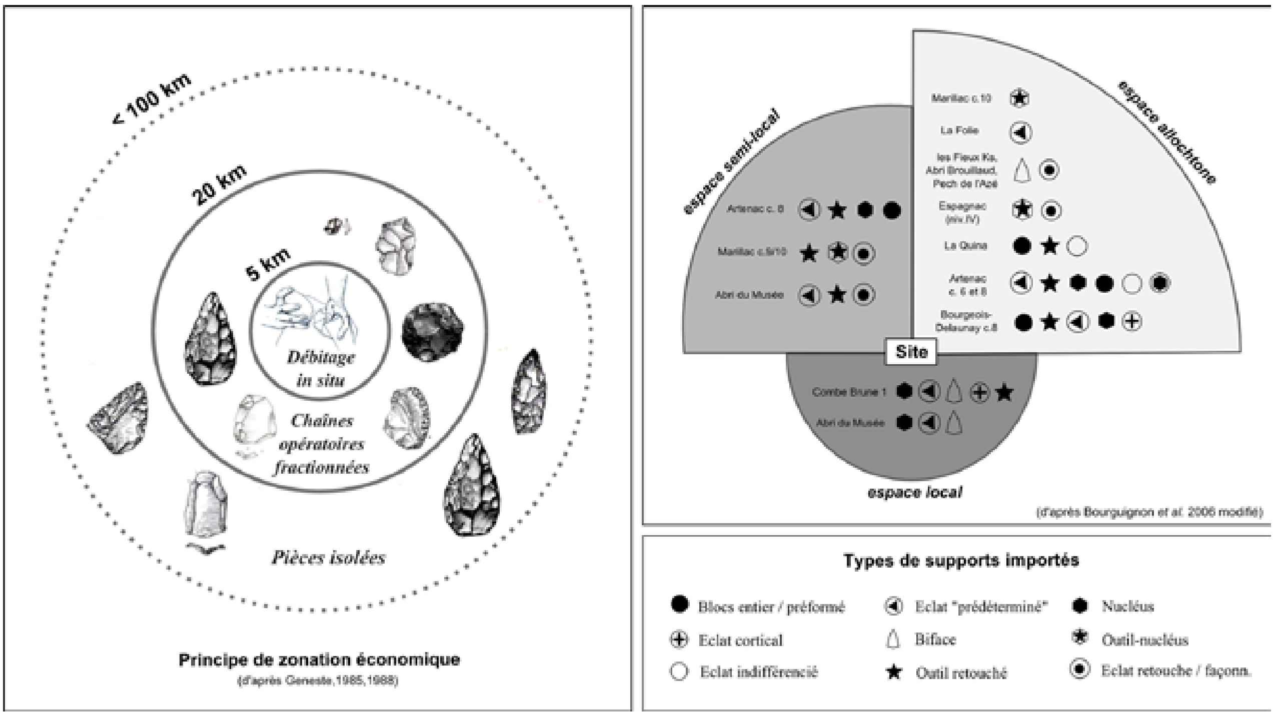
Pister la circulation des matériaux, et par corollaire celle des groupes humains, constitue un thème de recherche largement développé en archéologie préhistorique (Masson 1981; Demars 1982; Tavoso 1984; Geneste 1985; Turq 1990; Wengler 1990a-b, 1991). L'essor de ces problématiques est directement lié au développement d'une méthode de caractérisation des matériaux utilisés par les hommes préhistoriques, basée sur leurs caractéristiques morphoscopiques, microstructurales et micropaléontologiques: la pétroarchéologie. Celle-ci permet de les distinguer selon leur origine géologique et leur contexte de formation. Son couplage avec une systématisation croissante des prospections lithologiques permet désormais de répondre à une série de questions essentielles à la perception des territoires préhistoriques. D'où proviennent les différents matériaux exploités? Dans quelles proportions ont-ils été collectés? Sur quelles distances minimales ont-ils été transportés? L'identification des sources de matières premières lithiques fréquentées par les Préhistoriques conduit ainsi à esquisser, autour de chaque site, un espace minéral minimum parcouru (*i.e.* Raynal *et al.* 2007) ainsi que des axes de déplacement privilégiés pour son approvisionnement, les routes exactes empruntées par les populations de chasseurs-cueilleurs restant, elles, globalement hypothétiques en fonction des reliefs. L'étude plus spécifique de la diffusion d'une matière première, souvent adoptée dans le cadre de travaux régionaux et/ou diachroniques (*i.e.* Primault 2003; Bernard-Guelle 2005; Porraz 2010; Lebègue 2012) permet aussi, en considérant l'ensemble des sites connus où ce matériau a été identifié, d'apprécier la fréquence de son exploitation tout comme son aire de diffusion maximale. Elle rend en même temps compte de la configuration spatiale des voies de diffusion, en soulignant notamment la récurrence de certains trajets.

Au-delà de ces inévitables, et nécessaires, représentations cartographiques, l'étude du transport des matières premières s'inscrit aussi et surtout dans une approche dynamique, qui va du lieu d'acquisition des roches jusqu'à l'endroit de leur abandon. L'intégration aux méthodes d'investigations d'outils comme le concept de chaîne opératoire (Lemonnier 1976; Cresswell 1982; Karlin *et al.* 1991) et la détermination des systèmes de techniques, rend perceptible la gestion des ressources lithiques dans le temps et dans l'espace. Ce principe éprouvé de la démarche techno-économique (Perlès 1980, 1991; Geneste 1985, 1988, 1991; Pelegrin *et al.* 1988; Boëda *et al.* 1990), aujourd'hui généralisé et couplé à l'emprunt d'hypothèses issues de l'ethnoarchéologie (Binford 1980, 1989; Kelly 1983; Kuhn 1992), conduit à considérer les logiques comportementales des populations préhistoriques à l'échelle d'un système, d'un réseau d'occupation. De ce point de vue, la détermination des formes et états d'introduction, voire d'exportation, des matières premières, de même que la caractérisation des activités de taille réalisées sur les sites, sont devenues des étapes essentielles du protocole d'analyse. Ce questionnement relatif aux dynamiques de formation des assemblages lithiques permet ainsi de discuter des schémas de mobilité et des formes d'anticipation des besoins techniques en même temps qu'il ouvre sur des considérations d'ordre socio-économique, voire culturel.

Concernant le Paléolithique moyen, la multiplication des recherches conduit, depuis la fin des années 1970, à identifier de véritables stratégies d'acquisition et de gestion des matériaux, respectant globalement des règles liées aux distances et coûts énergétiques de transport. Pour ce faire, une subdivision théorique du territoire d'approvisionnement en trois zones concentriques est généralement adoptée (principe de zonation économique). Celle-ci permet notamment de rendre compte de formes de circulation différentes selon la provenance des matériaux, avec une corrélation nette entre éloignement des sources et réduction du nombre et du type de produit (Geneste 1985, 1988a; Féblot-Augustins 1997, 1999). Les objets techniquement élaborés, issus des stades terminaux des chaînes opératoires, comme les produits prédéterminés, les outils retouchés ou les bifaces, sont vus comme très mobiles, au contraire des produits corticaux, des éclats ordinaires et des nucléus, considérés comme restant généralement sur les lieux de production (**figure 1**).

Pour le Moustérien, la tendance globale observée est donc celle d'un approvisionnement radiant, réalisé principalement au sein de l'environnement local (0 à 5 km), voire proche (5 à 30 km), selon la qualité et la disponibilité des ressources strictement locales. L'exploitation des espaces plus éloignés (30 à 100 km) et lointains (> 100 km) apparaît, elle, comme davantage rare, voire exceptionnelle et signale plutôt la zone de provenance d'un groupe (Wengler 1990a). Ces matériaux non locaux sont importés sous forme déjà transformée, tandis que les matériaux locaux, transportés souvent massivement sur les sites, l'ont été à l'état brut ou seulement testé pour y être transformés et utilisés sur place. Autrement dit, la segmentation de la chaîne opératoire augmente à mesure que les distances d'acquisition des roches s'allongent. Le contraste est ainsi très marqué avec les stratégies d'approvisionnement documentées pour le Paléolithique supérieur, tant en termes de distances parcourues, nettement plus faibles, que de fréquence et nombre de vestiges exotiques présents dans les séries (Féblot-Augustins 1997).

FIGURE 1 Confrontation de la modélisation des zones d'approvisionnement en matières premières lithiques (d'après Geneste 1985, 1988) et des données archéologiques récentes concernant les types de produits importés dans les sites moustériens du Sud-Ouest de la France (Bourguignon *et al* 2006, *modifié*.).



Ceci étant, les données issues des travaux récents sur la circulation des matières premières à la fin du Paléolithique moyen viennent de plus en plus nuancer ce modèle de zonation économique précédemment décrit. En cause, la généralisation des approches techno-économiques et la multiplication des lithothèques, notamment dans le sud de la France, qui favorisent une vision extrarégionale des modalités d'approvisionnement. Si globalement l'approvisionnement reste majoritairement local, les modalités d'introduction sont loin de se limiter aux seuls blocs ou nucléus préformés. De plus, un nombre croissant d'études de cas montre des quantités non négligeables de matériaux de provenance plus lointaine : 20 km et au-delà (Slimak 2004 ; Porraz 2005 ; Meignen *et al.* 2007 ; Jaubert & Delagnes 2007 ; Park & Féblot-Augustins 2010 ; Delagnes 2010 ; Rossoni 2011 ; Lebègue 2012). Leurs proportions, importantes dans certaines séries, fluctuent tant selon la disponibilité et la qualité des ressources locales que la nature des occupations. Le déplacement d'objets sur de très longues distances reste par contre limité, tant en termes d'occurrences ou de nombre de vestiges transportés que de distances absolues parcourues (Jaubert *et al.* 2001 ; Slimak 2004 ; Fernandes *et al.* 2006). Les supports techniquement élaborés, produits Levallois ou racloirs, ne sont toutefois plus les seuls à se voir attribuer une forte mobilité. Les pièces transportées sur plus de 20 km sont davantage diversifiées que ce que l'on pensait. Ainsi, dans le Moustérien d'Aquitaine, il n'est plus rare de voir des produits corticaux, des nucléus et même des blocs préformés importés sur de plus ou moins grandes distances (**figure 1**). C'est par exemple le cas à La Quina ou encore à Artenac, couche 8 (voir Bourguignon *et al.* 2006 et références citées). Ces supports qui circulent aux côtés des traditionnels outils retouchés, produits prédéterminés et bifaces, semblent avoir été transportés pour la réserve de matière première qu'ils représentent (pièces à débiter, à retoucher/façonner voire à utiliser telles quelles). Ceci avait déjà été constaté dans divers sites du Maroc oriental (Wengler 1993, 1995). Cette diversité dans les formes de circulation à distance des matières premières, bien perçue dans différentes régions, semble correspondre à des comportements techno-économiques communs à l'ensemble des groupes moustériens d'origine néandertalienne ou d'Hommes anatomiquement modernes (Afrique du Nord) ; cependant, en Aquitaine, il est nécessaire de se demander si cette diversité est, ou non, une conséquence du développement accru des industries à production polyvalente et potentiellement mobiles (Discoïdes et Quina) caractérisant les groupes néandertaliens aquitains les plus récents (Delagnes & Meignen 2006 ; Delagnes *et al.* 2007 ; Delagnes 2010).

Ces formes de circulation variées semblent dans tous les cas répondre au besoin d'une technologie transportable pouvant s'adapter facilement à divers types d'activités. La multiplication des cas d'étude, dans d'autres secteurs géographiques, doit aider à mieux saisir la nature de ces stratégies d'approvisionnement et de renouvellement de l'outillage. Elle conduira certainement à discuter leur éventuelle relation avec l'émergence de nouvelles formes de mobilité et d'exploitation du territoire au cours de la période d'instabilité climatique du stade 3, précédant l'arrivée des premiers hommes modernes.

3 LE DOMAINE MÉDITERRANÉEN FRANÇAIS : UN CADRE D'INVESTIGATION PROPICE

Le pourtour méditerranéen français constitue de ce point de vue un secteur d'étude privilégié en Europe occidentale, compte tenu de l'arrivée précoce des premiers aurignaciens le long du littoral et de sa forte occupation moustérienne lors du Dernier Glaciaire (**figure 2**). Resté en marge du développement des problématiques techno-économiques, il bénéficie depuis une dizaine d'années d'un important renouvellement des données (*i.e.* Texier *et al.* 1998, 2005 ; Slimak 2004, Slimak & Giraud 2007 ; Porraz 2005, 2007 ; Moles 2008 ; Menras 2009 ; Bourguignon & Meignen 2010 ; Lebègue 2010, 2012 ; Rossoni 2011). Parmi les moteurs de ce renouveau de la recherche régionale, la systématisation des études sur les ressources minérales occupe une place centrale (Masson 1984 ; Wilson 1986, 1996 ; Binder 1998 ; Briois *et al.* 2000 ; Grégoire 2000 ; Bazile 2002 ; Bressy 2003 ; Porraz 2005 ; Fernandes *et al.* 2006 ; Bressy & Platschek 2008 ; Grégoire *et al.* 2009 ; Bressy *et al.* 2010).

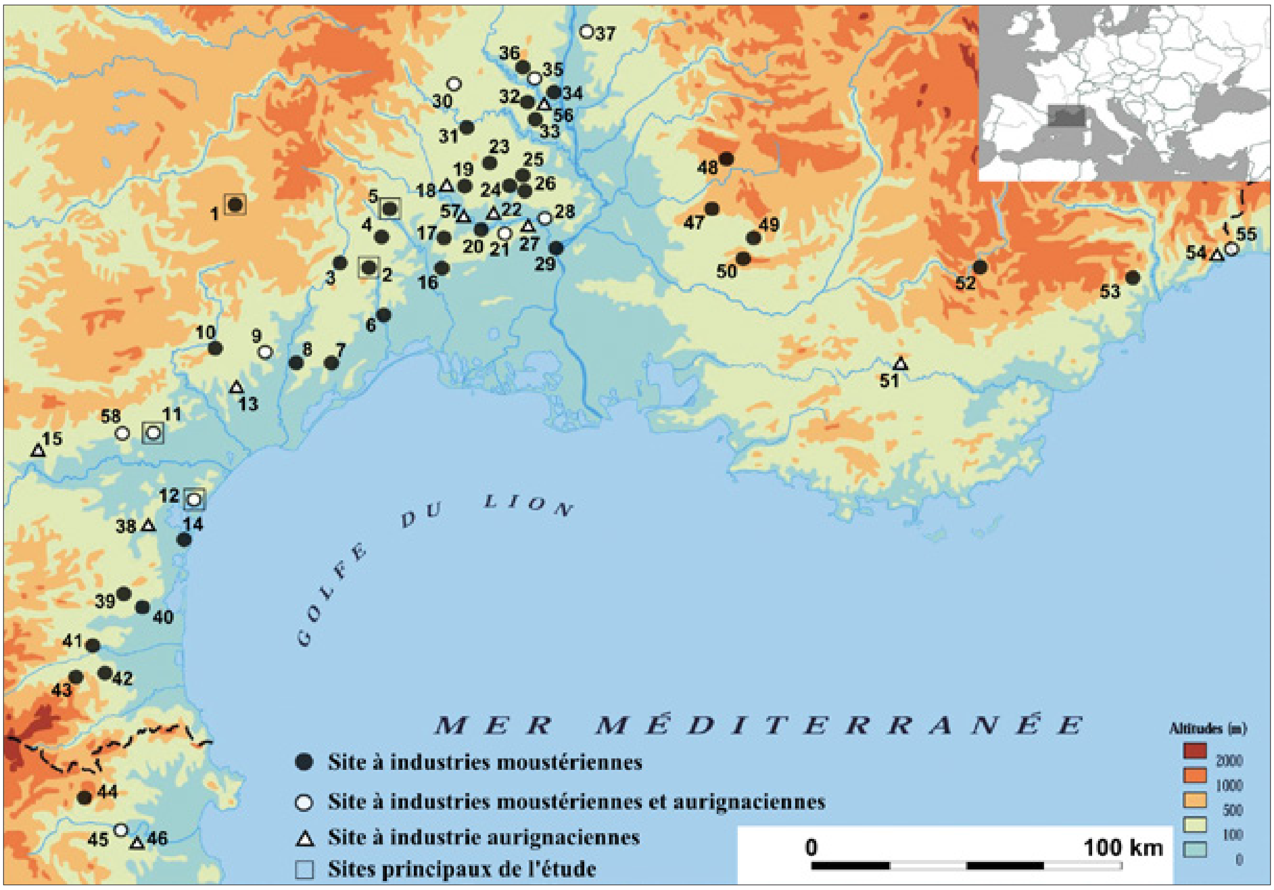


FIGURE 2 Localisation des principaux sites moustériens et aurignaciens du Sud-est de la France. 1. Canalettes, 2. Hortus, 3. Cayla, 4. Salpètre de Pompignan, 5. Roquette 2, 6. Bourgade, 7. Baumasse d'Antonègue, 8. Cours, 9. Rothschild, 10. Cadenas, 11. Bize, 12. Crouzade, 13. Régismont-le-Haut, 14. Ramandils, 15. Canecaude, 16. Bézal de Sauvignargues, 17. Macassargues, 18. Nicolas, 19. Foissaguet, 20. Calmette, 21. Esquicho Grapaou, 22. La Laouza, 23. Fontarèche, 24. Rouziganet, 25. Brugas, 26. Coucouyon, 27. Salpêtrière, 28. Balauzière, 29. Ioton, 30. Pêcheur, 31. Cros de Peyrols, 32. Flandrin, 33. Orgnac, 34. Maras, 35. Figuier, 36. St-Marcel, 37. Mandrin, 38. Traouc de la Fado, 39. Arago, 40. Moutou la Joliette, 41. Anecs, 42. Montou, 43. El Mig, 44. Cova 120, 45. Arbreda, 46. Reclau Viver, 47. Bérigoule, 48. Bau de l'Aubesier, 49. Peyrards, 50. Combette, 51. Rainaude, 52. Baume Bonne, 53. Pié Lombard, 54. Observatoire, 55. Balzi Rossi ; 56. Chauvet, 57. Baume Latrone, 58. Aldène.

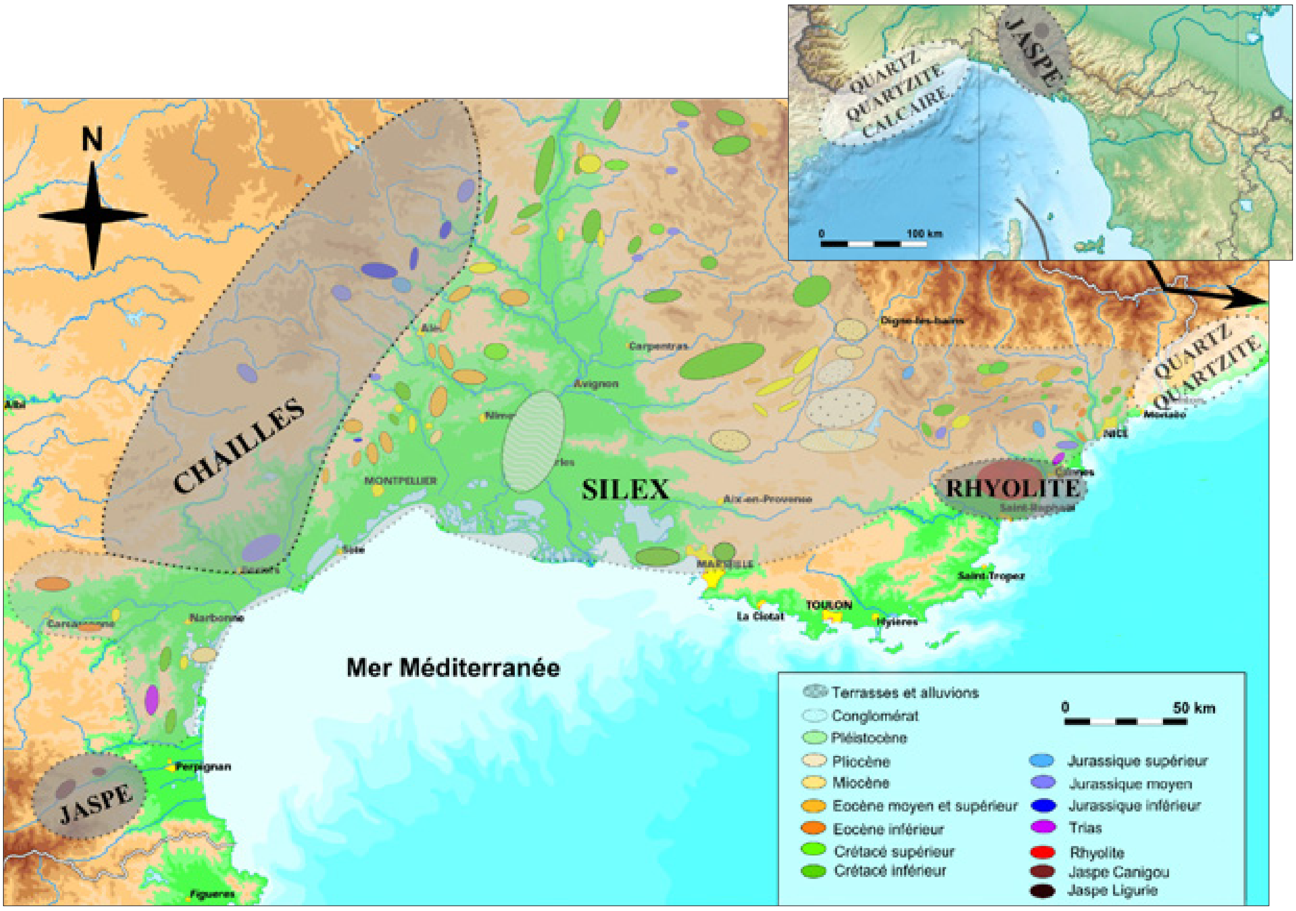


FIGURE 3 Configuration lithologique du Sud-est de la France, du Roussillon à la Ligurie orientale.

Une cartographie relativement précise de leur répartition entre la frange orientale des Pyrénées et le versant méridional de l'arc alpin est désormais possible (**figure 3**), ouvrant la porte à de nouvelles perspectives méthodologiques. Les matières premières exploitables sont nombreuses au sein de cette aire géographique qui comprend le Roussillon, le Languedoc, la frange méridionale des grands Causses, la basse vallée du Rhône, la Provence ainsi que la Ligurie. La forte diversité topographique et le caractère parcellé des formations géologiques déterminent néanmoins des espaces économiques contrastés, auxquels les populations humaines ont dû s'adapter. Une subdivision schématique en cinq principaux secteurs lithologiques se dégage avec, d'Ouest en Est : les jaspes du Massif du Canigou, les chailles des formations jurassiques des contreforts du Larzac et de la Montagne Noire, les formations sédimentaires à silex des plaines et collines du Languedoc, de la vallée du Rhône et de la Provence, les rhyolites du massif de l'Estérel, ainsi que les microquartzites et calcaires siliceux de la Ligurie occidentale. Enfin, en Ligurie orientale, d'importants affleurements de jaspes sont accessibles au sein des formations jurassiques de la partie septentrionale des Apennins.

Cette relative disparité, tant en ce qui concerne la qualité que la disponibilité des matériaux s'annonce favorable à l'identification du transport à longue distance des roches à travers l'espace régional. Plusieurs matériaux « traceurs » peuvent d'ailleurs être individualisés. Citons par exemple le silex des Costières pour le Languedoc et la Catalogne (Grégoire & Bazile 2005), le silex de Forcalquier pour la Provence, les rhyolites, les silex de l'Hauterivien-Valanginien ou encore les jaspes de Ligurie pour l'aire liguro-provençale (Cauche *et al.* 2002 ; Cauche & Lebègue 2008 ; Negrino & Starmini 2003 ; Porraz & Négrino 2008 ; Porraz 2010).

Gisements		Loc.	Chronol.	Systèmes Dominants	Systèmes Secondaires	Matières premières	Attribution « culturelle »	Références principales
Arbreda	G	Catalogne (Esp.)	OIS 3	Unipol/plyédriq.	LRC/D	Q+Qzt+S	M. « final »	Maroto *et al.*, 2001; Duran 2002
Cova 120	G	Catalogne (Esp.)	> OIS 3	D	-	Q+Corn+Qzt	-	Terradas *et al.*, 1998
Cova del Mig	G	P-O.	?	D	-	Q+J+Qzt	MD ?	Blaize, 1987
Montou	G	P-O.	OIS 3	D	LRC	Q+Qzt+S	-	Claustre, 1987; Lebègue,Wengler 2013
les Anecs	S	P-O.	?	LRC	D	Qzt+J+Q	MD	Blaize, 1989-1990 ;Duran, 2002
Moutou la Joliette	S	P-O.	?	LRC / LP	D	S + Qz	MTA ?	Duran, 2002 ; Duran, Abelanet 2004
Arago (terres brunes)	G	P-O.	OIS 4–3	D	LRC	Qz+S+Qzt	M. tardif ?	Duran, 2002
Ramandils	G	Aude	OIS 5–3	LRC	D	S+Q+Qzt	T	Moles, 2008, 2010
Crouzade (C6-8)	G	Aude	OIS 4–3	LRC	Unipol.	S+Qzt	~~P~~	Lebègue, 2004, 2012
Bize-Tournal (f. Tavoso)	G	Aude	OIS 3	LRC	D	Qzt	MD	Lebegue, 2012
Cadenas	S	Hérault	?	LRC	LP	Ch	T	Menras, 2008
Les Cours	S	Hérault	?	LRC	-	S + Qz	T	Menras, 2008
Baumasse d'Antonègue	G	Hérault	OIS 3?	LRC	-	S	T	Lebegue, 2012
Bourgade	PR	Hérault	OIS 5–3 ?	LRC	-	S	T	Lumley-Woodyear, 1971; Lebègue, 2012
Cayla	G	Hérault	OIS 3 ?	LRC ?	-	S	~~Ch atyp~~	Lumley-Woodyear, 1971; Lebègue, 2012
Hortus (Gd fossé)	G	Hérault	OIS 4–3	LRC	Unipol.	S	T	Lumley, 1972; Lebègue, 2010, 2012
Canalettes (C2-C4)	A	Aveyron	OIS 5a	LRC	LRU+L	Ch	T	Meignen, 1993 ; Lebegue, 2012
Roquette II (C2-C3)	G	Gard	OIS 3	LRC	D ?	S	~~MTQ~~	Lebègue, 2012
Verrerie Macassargues	G	Gard	OIS 5a	LRC	LRU/B	S	T	Lebègue, Wengler étude en cours
Bézal de Souvignargues	G	Gard	OIS 5–3 ?	LRC/LRU-B	-	S	T	Lumley-Woodyear, 1971
La Calmette	G	Gard	OIS 5–4 ?	LRC/ LRU	-	S	T	Lumley-Woodyear, 1971
La Balauzière	G	Gard	OIS 3 ?	LRC/D?	LRC ?	S+Q	MTQ ?	Lumley-Woodyear, 1971
Esquicho Grapaou	G	Gard	OIS 3	Q ?	LRC	S+Qzt	MTQ	Lumley-Woodyear, 1971; Bourguignon, 1997
Ioton	PR	Gard	OIS 3	LRC	-	S	~~Ch atyp~~	Meignen, 1976; Bourguignon, Meignen, 2010
Brugas (C4)	G	Gard	OIS 4–3	LRC	LRU	S	Ch atyp ?	Meignen, 1981
Serre du Coucouyon	S	Gard	?	LRC/LRU	LP	S	T	Menras, 2008
Cros des Peyrols	S	Gard	OIS 5–4 ?	LRC	LRU/B	S	T	Lumley-Woodyear, 1971
Foissaguet	S	Gard	OIS 5–4 ?	LRU-B/LRC	LP	S	T	Lumley-Woodyear, 1971
Rouziganet	S	Gard	OIS 5 ?	LRU-B/LRC	LP / D	S	T	Meignen, 1972
Flandin	G	Ardèche	OIS 5 ?	LRC/LRU	L	S	T	Moncel, 2003, 2011
Maras	G	Ardèche	OIS 5–3	LRC/LRU	L/D	S	T/F/Q ?	Moncel, 1996, 2011
Saint-Marcel	G	Ardèche	OIS 5–3 ?	D	-	S	T	Moncel, 1998, 2003; 2011
Le Figuier	G	Ardèche	OIS 5	D	-	Q+S	~~MTQ ?~~	Moncel, 2003, 2011
Baume de Néron	G	Ardèche	OIS 4	D	LRU-B/LP	S	MTQ ?	Slimak, 2004, 2005
Mandrin (C1-C4)	G	Drôme	OIS 4–3 ?	LRU/LRUc	D/L	S	-	Slimak, 2004, 2005

GISEMENTS		LOC.	CHRONOL.	SYSTÈMES		MATIÈRES PREMIÈRES	ATTRIBUTION « CULTURELLE »	RÉFÉRENCES PRINCIPALES
				DOMINANTS	SECONDAIRES			
Berigoule (C1)	S	Vaucluse	OIS 5 ?	LRU/LRC	-	S	F	Texier, Ortega, 1995
Les Peyrards	G	Vaucluse		LRU/LRB	LRC	S	F	Lumley-Woodyear, 1971 ; Porraz, 2001-2002
la Combette D/E/F	A	Vaucluse	OIS 4–3	LRC/D	Q	S	T/F/MTQ ?	Texier *et al.*, 1998, 2003, 2005
Baume Bonne (IV-M)	G	Alpes de Hte Pr.	OIS 6–3	LRC/LRU/D	Unipol.	S+Qzt+Gr+Q	M. s.l./ MTQ	Gagnepain, Gaillard, 2005; Notter 2007
Pié Lombard	A	Alpes maritimes	OIS 4	LRC	-	S	T	Texier, 1974; Porraz, 2005, 2010
Grotte du Prince	G	Vintimille (Italie)	< OIS 5e	LRU-B/LRC	LP+L ?	Qzt+S+Rhy+J	T	Cauche, Lebegue, 2008; Rosonni, 2011
Grotte du Cavillon	G	Vintimille (Italie)	?	LRC/L	LP+L ?	S+Qzt	T	Cauche, Lebegue, 2008; Rosonni, 2011
Madonna dell'Arma	G	San Remo (Italie)	OIS 5–4	LRC	D + L	Qzt+C+S	T	Cauche, 2002, 2007
Caverna delle Fate	G	Savona (Italie)	OIS 5–4	LRC	?	Qzt+C+J	T	Giacobini, Lumley, 1988

FIGURE 4 Données technologiques et économiques synthétiques des principaux sites du Paléolithique moyen récent des Pyrénées à l'arc alpin. – **A** : abri-sous-roche ; **G** : site en grotte ; **S** : station de surface ; **PR** : Pied de roche – **LRC** : Levallois récurrent centripète ; **LRU-B** : Levallois récurrent unipolaire et/ou bipolaire ; **LP** : Levallois préférentiel ; **L** : débitage laminaire ; **D** : débitage Discoïde ; **Unipol**. : débitage par séquences d'enlèvements unipolaires ; **Polyédriq**. : débitage polyédrique ; **Q** : débitage Quina – **M**. : Moustérien ; **M. s.l.** : Moustérien au sens large ; T : Moustérien typique ; **F** : Moustérien de type Ferrassie ; **MTQ** : Moustérien de type Quina ; **Ch atyp**. : Charentien atypique ; **P** : Para-charentien ; **MD** : Moustérien à denticulé ; **MTA** : Moustérien de tradition acheuléenne ; (en barré) : attributions culturelles récemment remises en question – **S** : silex ; **Ch** : chaille ; **Q** : quartz ; **Qzt** : quartzite ; **Gr**. : grès ; **Corn**. : Cornéenne ; **J** : jaspe ; **Rhyol**. : rhyolite

Le domaine méditerranéen français constitue donc une trame propice tant à l'expression de comportements d'approvisionnement variés qu'à leur restitution archéologique. Autre atout analytique de cette région, la forte cohérence qui transparaît au niveau des modes de production mis en œuvre (Lebègue 2012). Le débitage Levallois récurrent centripète est omniprésent et très souvent dominant au sein des séries attribuées au Pléistocène supérieur (**figure 4**). Cette homogénéité macro-régionale n'exclut pas le débitage Discoïde identifié dans quelques sites catalans, rhodaniens et ligures (Slimak 2003 ; Moncel 2011 ; Vaquero 1999 ; Cauche *et al.* 2002), mais elle permet néanmoins ici d'écarter de notre étude des comportements d'approvisionnement un facteur de variation majeur qu'est le système technique adopté.

4 FOCUS SUR UN SECTEUR PARTICULIER…

Compte tenu de l'ampleur des espaces considérés, équivalant *grosso modo* au quart sud-est de la France, et des impératifs méthodologiques inhérents aux approches entreprises, des choix ont dû être faits pour cet article. Plutôt qu'une approche exhaustive de la documentation régionale, nous avons privilégié, dans un premier temps, de croiser les informations relatives au transport des matériaux (nature des roches et types de supports) obtenues sur les séries lithiques de cinq gisements rapportés à la phase récente du Paléolithique moyen : les Canalettes (couches 3 et 4), l'Hortus (ensembles IVa à Vc), la Roquette (couches 2 et 3), la Crouzade (couches 6 à 8) et Bize (couche B, fouilles Tavoso).

Ces gisements, en grotte ou sous abri, sont tous localisés dans un secteur jusqu'alors inexploré en termes d'approches techno-économiques : le Languedoc méditerranéen. La corrélation de ces résultats avec les données collectées sur les séries avoisinantes, et leur confrontation avec les observations faites dans les autres secteurs régionaux (vallée du Rhône, Provence, Ligurie) conduira, dans un second temps, à discuter et modéliser la composition des ensembles lithiques et les stratégies de renouvellement de l'outillage qui accompagne les groupes dans leurs déplacements.

5 SYNTHÈSE DES STRATÉGIES D'APPROVISIONNEMENT ET DES MODALITÉS D'INTRODUCTION DES ROCHES NON LOCALES SUR LES SITES ÉTUDIÉS

5.1 L'abri des Canalettes

Situé à la frontière occidentale de l'espace géographique considéré, l'abri des Canalettes (Nant, Aveyron) constitue l'une des rares traces d'occupation moustérienne sur la frange sud du Causse du Larzac (**figure 2**). Les fouilles de ce vaste abri, menées par L. Meignen de 1979 à 1996, ont mis au jour les vestiges de quatre importants niveaux d'occupation moustériens attribués au stade isotopique 5a et au tout début du stade 4 (Meignen 1993). L'abondante industrie (40 000 vestiges lithiques) est essentiellement confectionnée sur la chaille bajocienne locale. Le concept de production Levallois, marqué par une forte récurrence opératoire et une ramification du débitage, y domine très largement. Il s'accompagne également d'une petite production Laminaire autonome, parmi les plus anciennes du Sud de la France. Du quartz filonien d'origine cévenole, prélevé sur le cours de la Dourbie en contrebas du Causse, complète l'approvisionnement principal du site. Ce matériau d'origine semi-locale semble pour sa part avoir servi aussi bien pour de courtes séquences de débitage (Discoïde) que dans le cadre d'actions de percussion liées au débitage ou à l'exploitation de ressources carnées.

De manière générale, les chaînes opératoires, marquées par une faible transformation des supports (en racloir pour la plupart), ont été presque entièrement réalisées *in situ* pour ces deux matériaux principaux. Enfin, un appoint en silex d'origine languedocienne est également signalé, avec au moins trois variétés bien distinctes (Lebègue 2012) : le silex hauterivien de la moyenne vallée du Vidourle, le silex des Costières (à néocortex alluvial caractéristique), et un ensemble de silex tertiaires dont les affleurements tapissent l'arrière-pays montpelliérain. Représentant à peine plus d'1 % de l'industrie, ces silex, transportés sur des distances minimales de 50 à 100 km (à vol d'oiseau), rassemblent tout de même 915 pièces, tous modules confondus (dont 271 éclats > 20 mm pour la couche 3 et 115 pour la couche 4).

L'étude de ces produits révèle des modalités d'introduction et des états d'abandon divers, mais également variables selon les matériaux. Sans surprise, les éclats Levallois de plein débitage et les supports retouchés (des racloirs et quelques denticulés) sont abondants parmi les silex hauteriviens et tertiaires. À côté de ces produits finis, bruts ou retouchés, se trouvent également des éclats corticaux, divers produits de (re-)mise en forme, des petits éclats, quelques cassons et plusieurs nucléus (sur éclat, sur outil mais aussi sur bloc), attestant d'activités de production, pour partie conduites *in situ* (**figure 5**). Ces dernières demeurent toutefois d'ampleur trop limitée pour être, seules, à l'origine de l'ensemble des produits finis qui paraissent avoir été en partie introduits tels quels sur le site. De la même façon, si le grand nombre d'éclats de retouche indique qu'une partie importante de l'outillage a vraisemblablement été confectionné, réaffûté voire recyclé (*cf.* nucléus reconfigurés en outils) à même le site, l'introduction de supports déjà retouchés ne doit en aucun cas être sous-estimée.

En ce qui concerne le silex des Costières, exclusivement introduit en tant que produits finis (bruts ou retouchés), la situation est bien différente : ceux-ci n'ont apparemment fait l'objet d'aucune volonté d'entretien particulier.

La grotte de l'Hortus 5.2

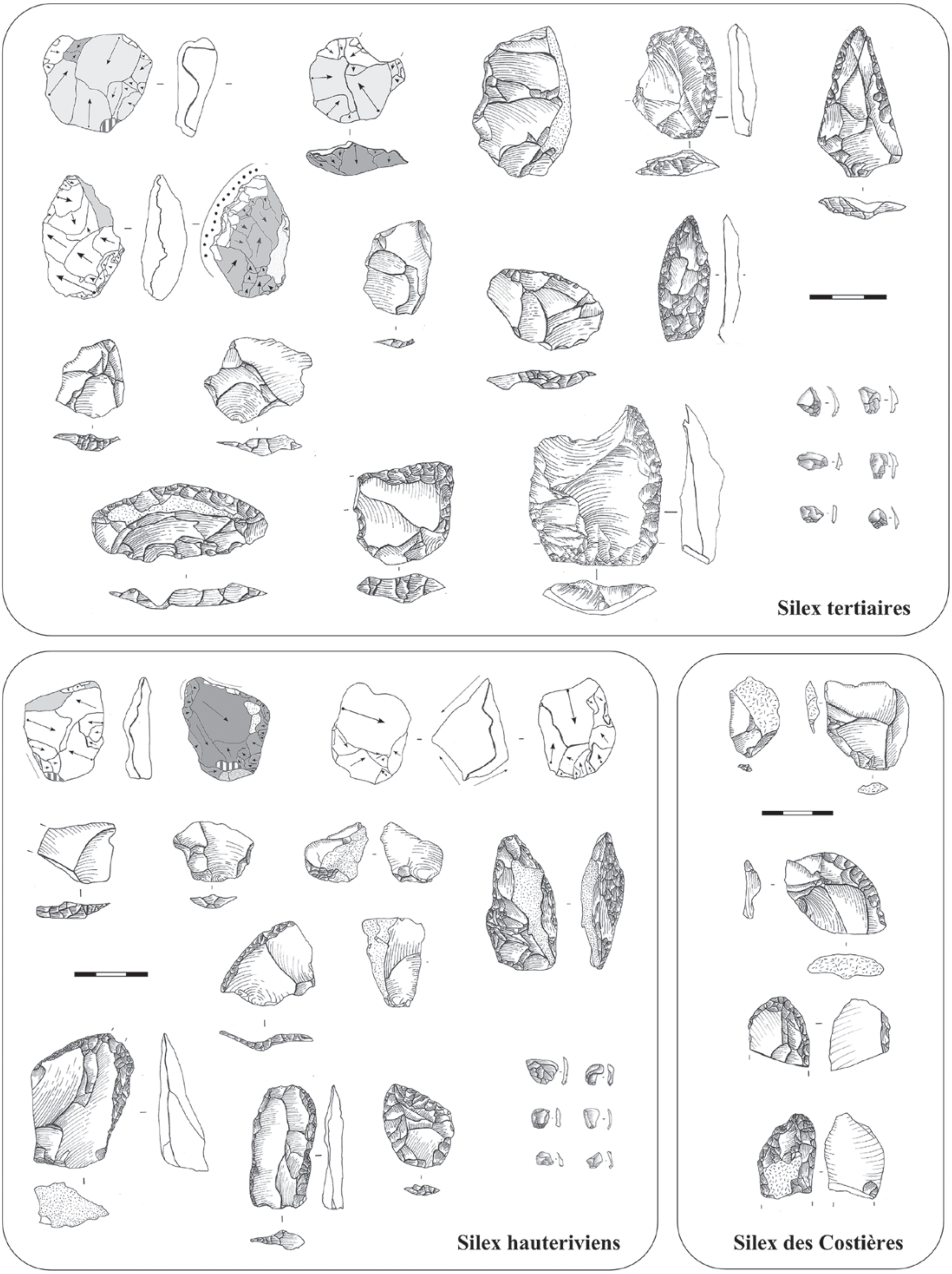
C'est plus à l'est que se trouve la grotte de l'Hortus (Valflaunès, Hérault), au cœur du domaine collinéen qui forme les contreforts du Larzac (**figure 2**). Ce site, connu essentiellement pour les nombreux restes néandertaliens qu'il a livrés (Lumley-Woodyear 1973), a fait l'objet de plusieurs fouilles au cours du 20e siècle. Les plus importantes campagnes ont été menées par H. de Lumley entre 1960 et 1964. Celles-ci concernaient essentiellement le remplissage du grand-fossé du porche Est, principal dépôt à avoir résisté aux phases érosives du début de l'Holocène (Lumley 1972). Trois des cinq ensembles stratigraphiques distingués (III, IV et V) ont livré des vestiges archéologiques attribués à la fin du stade isotopique 4 et au stade 3. En partie remanié au Postglaciaire, le remplissage de ce fossé (dépotoir ?) fournit une image biaisée des occupations moustériennes, localisées vraisemblablement dans le couloir d'entrée. Si les nombreux biais taphonomiques limitent les investigations, l'analyse du matériel lithique issu des niveaux encore en place (n = 1115 pièces) permet d'esquisser les stratégies générales d'approvisionnement, d'ailleurs relativement stables à travers le remplissage.

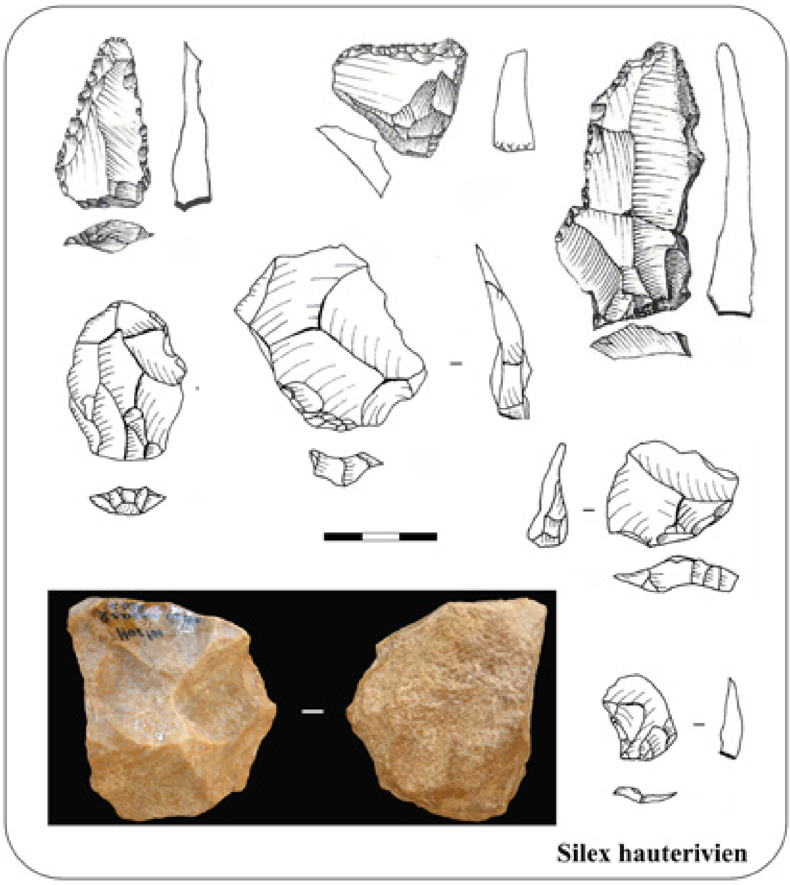
L'industrie est quasi entièrement confectionnée sur le silex lutétien local (5–7 km) au moyen de chaînes opératoires Levallois (Lumley 1972 ; Lebègue 2010, 2012). Hormis les premières phases de décorticage, celles-ci ont été entièrement réalisées *in situ* (production / transformation des supports), à partir de blocs déjà préparés et de gros éclats. Très peu exploitées, les autres roches locales (silex jurassique ou carixien, quartz, calcaire siliceux) témoignent de chaînes opératoires totalement fractionnées et d'un import de supports déjà débités. Même constat pour les silex hauteriviens, qui ont été identifiés dans tous les niveaux archéologiques, et dont les gîtes les plus proches se trouvent à plus de 15 km au nord-est de la grotte. Comme aux Canalettes, ce matériau est importé sous diverses formes (**figure 6**) : racloirs peu réaffûtés, produits débités (éclats Levallois, ordinaires ou Kombewa) voire nucléus. L'unique exemplaire prélevé, de modalité opératoire Levallois, ne provient toutefois pas des niveaux en place.

Quelques pièces isolées d'origines plus lointaines complètent l'industrie (Lebègue *et al.* 2010 ; **figure 6**). Il s'agit d'un éclat Levallois, d'un fragment de nucléus et d'un épais racloir épuisé en silex des Costières (> 30 km vers l'est) d'une part, et d'un grand éclat Levallois en silex cénomanien provenant des formations de l'Uzégeois (> 50 km au nord-est) d'autre part. Malheureusement, au vu du contexte archéologique, il demeure difficile de préciser si ces supports importés depuis des espaces plus ou moins lointains ont fait, ou non, l'objet d'un entretien particulier une fois sur le site (*i.e.* retouche, réaffûtage ou courte séquence de production).

La grotte de Bize 5.3

Située en bas Languedoc, la grande grotte de Bize (Bize-Minervois, Aude), aussi appelée grotte Tournal du nom de son inventeur, s'ouvre sur la vallée de la Cesse, un affluent de l'Aude (**figure 2**). Ce gisement d'une richesse exceptionnelle a été fouillé de manière relativement désordonnée dès 1828. Il faut cependant attendre 1970 pour que des fouilles systématiques y soient menées par A. Tavoso dans les deux secteurs préservés du remplissage, le principal se trouvant à 50 m de l'entrée (Tavoso 1987a). L'importante stratigraphie, qui couvre la seconde moitié du pléistocène supérieur, renferme à sa base quatre niveaux moustériens (I_A, II_B, II_C, II_D), attribués à un Paléolithique moyen tardif d'après les dates obtenues par ESR et radiocarbone (Yokoyama *et al.* 1987 ; Bischoff *et al.* 1988). Le matériel archéologique moustérien prélevé lors des différentes fouilles est très abondant, avec notamment plusieurs dizaines de milliers de pièces lithiques, dont plus de 7700 issues de la seule « couche à ours » (II_B) d'A. Tavoso.


Silex tertiaires
Silex hauteriviens
Silex des Costières



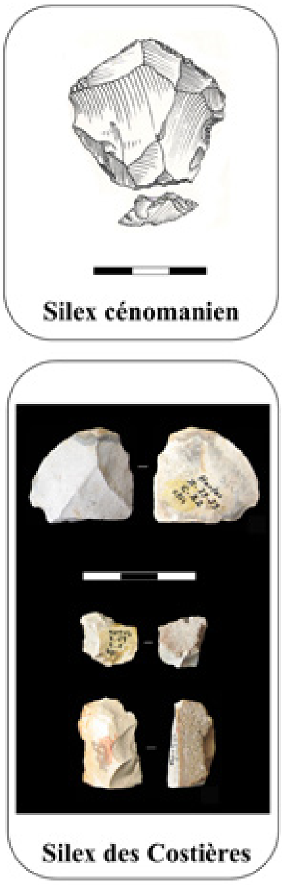


FIGURE 5 Matériel en silex allochtones des couches 3 et 4 de l'abri des Canalettes (Nant, Aveyron) (dessins F. Lebègue et D. Sabatini).

FIGURE 6 Matériel en silex allochtones des niveaux moustériens du grand fossé de la grotte de l'Hortus (Valflaunès, Hérault) (dessins H. de Lumley et F. Lebègue, clichés F. Lebègue).

Cette industrie est principalement aménagée sur des grès-quartzites, plus rarement du quartz ou du calcaire, prélevés sous la forme de gros galets au pied de la grotte et entièrement exploités sous le porche. La présence de nombreux galets entiers (en réserve) valide cette hypothèse, tout en suggérant une volonté de thésaurisation probablement liée au caractère récurrent et multi-saisonnier des installations (Magniez 2010). La production, dominée par le concept Levallois, s'accompagne d'une composante Discoïde non autonome (Tavoso 1987b ; Lebègue 2012). Appartenant au même *continuum* technologique, celle-ci résulte de fortes flexibilités opératoires et de réorientations du débitage induites par les contraintes de matières premières (morphologie, propriétés mécaniques hétérogènes, *etc.*). La particularité de cette industrie tient également dans la très faible transformation des supports où les denticulés occupent une place prépondérante.

L'approvisionnement à distance ne représente au final qu'à peine 2 % de l'industrie. Et à l'exception d'un éclat cortical en chaille jurassique (secteur de Narbonne-Bizanet), tous les supports importés ont fait l'objet de déplacements de 25 - 35 km minimum (Lebègue 2012). Parmi ceux-ci, les silex provenant des formations oligo-miocènes de Narbonne-Sigean forment le plus gros contingent (n = 127 pièces, tous modules confondus).

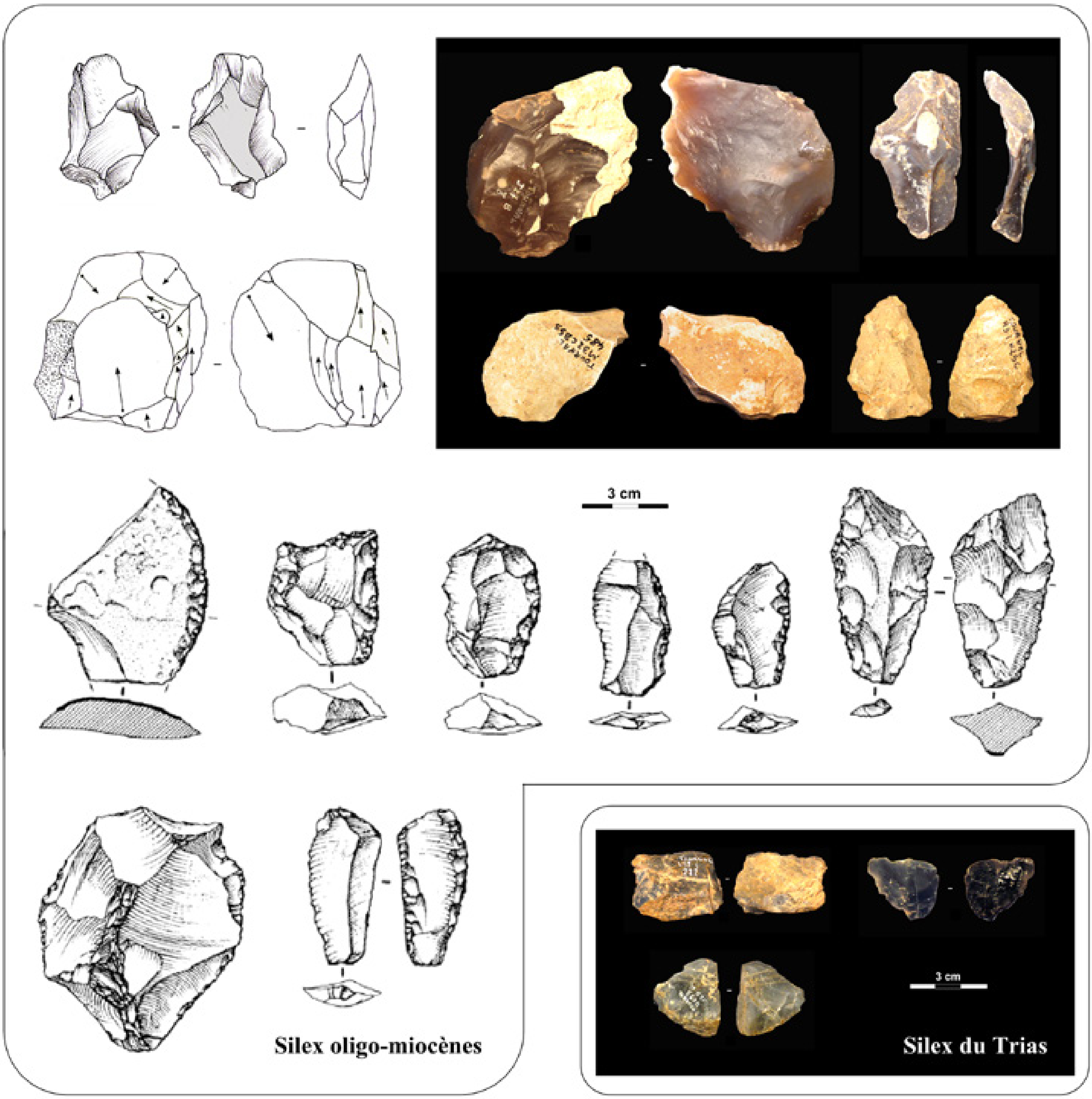


FIGURE 7 Matériel en silex allochtones de la « couche à Ours » de la grotte Tournal (Bize-Minervois, Aude), niveaux B et C, fouilles A. Tavoso (dessins J. Jaubert et F. Lebègue, clichés F. Lebègue).

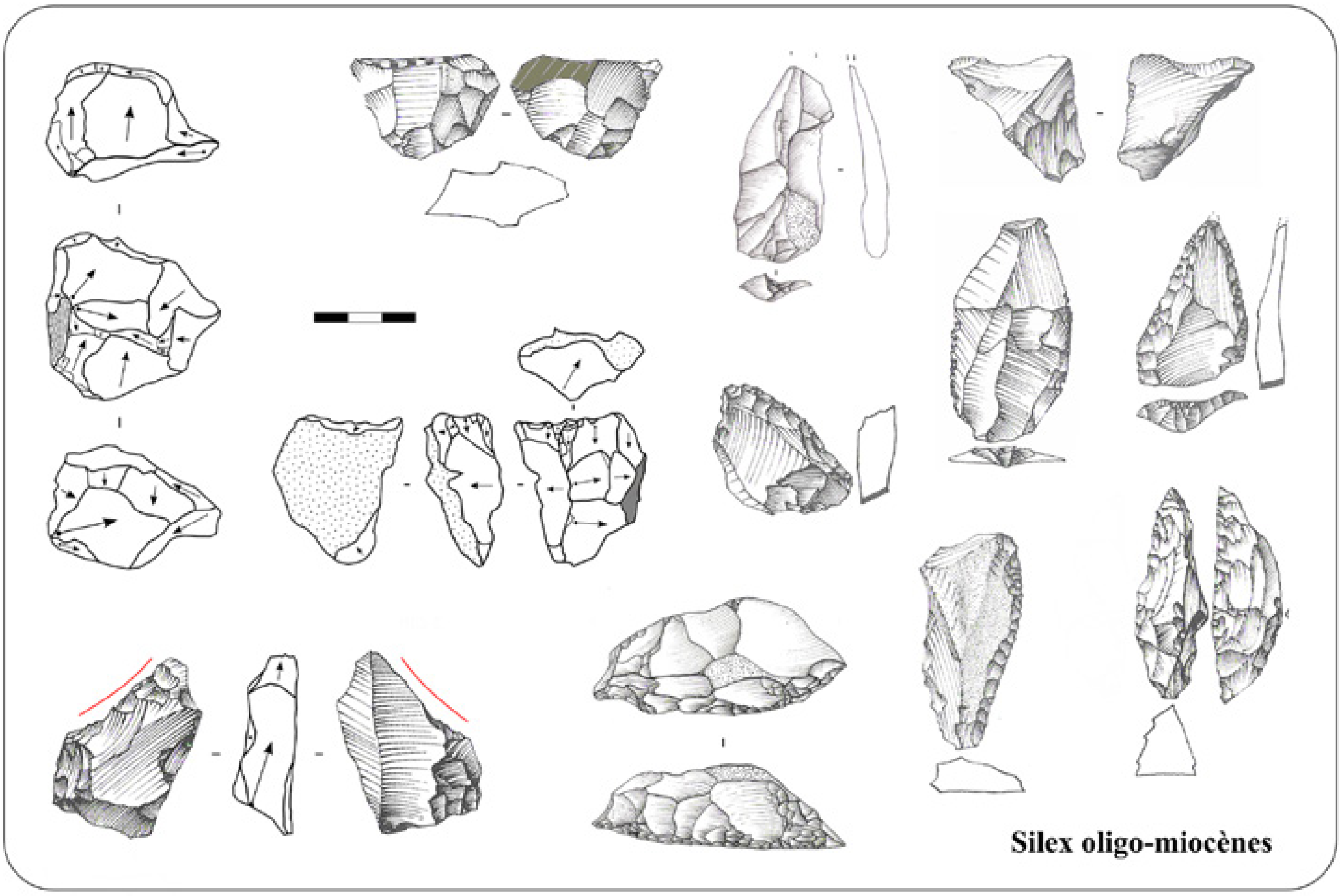
Outre les habituels produits finis (éclats Levallois et outils retouchés), l'équipement en silex se compose également d'éclats corticaux, d'éclats de remise en forme et de cinq nucléus dépareillés, dont 4 éclats-matrices (**figure 7**). La présence de déchets de taille et de quelques éclats de retouche indique que cet équipement a été ponctuellement entretenu une fois sur le site, *via* de courtes séquences de production ou la transformation/réaffûtage de certains supports. Une quinzaine de pièces en silex triasique, identique à celui affleurant dans le Muschkalk de la nappe des Corbières, complète l'assemblage (Lebègue 2012). Il s'agit exclusivement de produits finis, dont 3 sont retouchés et 4 conservent des plages de néocortex alluvial. De tels galets sont signalés dans les alluvions de la Berre (Grégoire 2000), dont le cours traverse les formations sédimentaires du bassin de Narbonne-Sigean. La récolte de ces silex a donc très bien pu se faire parallèlement à l'exploitation des silex oligo-miocènes, pour lesquels plusieurs gîtes ont été fréquentés (Roquefort-des-Corbières, Portel-des-Corbières Peyriac-de-Mer et le Lac). Enfin, signalons la présence de quelques pièces isolées en silex des Costières (éclats, outils retouchés) parmi le matériel moustérien des fouilles Héléna (couches 1, 2 et 3), témoignant dans ce cas d'un transport sur plus de 90 km (Lebègue 2012).

Avec une composante locale majoritaire (> 90 %) et des formes diversifiées de transport des matériaux à plus de 20 km, les modalités d'approvisionnement de ces trois sites sont comparables à celles observées dans Moustérien du Sud-ouest français (Bourguignon *et al.*, 2006). Toutefois, ces stratégies fondées sur une diminution des quantités de matériaux retrouvés selon l'éloignement des gîtes ne peuvent recouvrir l'ensemble des logiques structurant les comportements d'approvisionnement. Deux des sites considérés au sein de l'espace languedocien, la Crouzade et la Roquette, en sont de parfaits exemples. Ils confirment que ce principe de décroissance monotone doit être discuté et vraisemblablement nuancé au regard des contextes archéologiques (Renfrew 1975; Geneste 1991; Porraz 2005).

5.4 La grotte de la Crouzade

Cette grotte de la commune de Gruissan (Aude) s'ouvre sur la bordure sud du massif de la Clape, extrémité orientale de la nappe des Corbières (**figure 2**). Proche du rivage méditerranéen actuel, cette cavité a fait l'objet de très nombreuses fouilles entre la fin du 19e et le début du 20e siècle. Les principaux travaux ont été menés de manière discontinue, par T. et Ph. Héléna entre 1906 et 1946. Trois niveaux paléolithiques moyens (couches 6, 7 et 8) ont été mis au jour et partiellement fouillés sous un ensemble d'occupations s'échelonnant du Néolithique à l'Aurignacien ancien (Héléna 1928; Sacchi 1986; Bon 2002). Non datés, ils ont été rapprochés du stade isotopique 3 d'après les données sédimentologiques (Saos 2003) et paléontologiques (*cf.* taille des rennes; Magniez 2010). L'industrie moustérienne recueillie est peu abondante (n = 735 pièces au total), mais comporte tous les types d'artefacts, avec une certaine abondance des éclats. Ces faibles effectifs s'expliquent en partie par les méthodes de fouilles anciennes (non tamisage des déblais, prélèvements archéologiques non exhaustifs). Plusieurs informations techno-économiques d'importance peuvent toutefois en être extraites (Lebègue 2012, *sous presse*), notamment en termes d'approvisionnement.

La majorité de l'industrie (environ 76 %, tous niveaux confondus) a été confectionnée sur des silex miocènes et oligocènes, dont les affleurements sont distants de 10 à 15 km pour les uns et de 18 km pour les autres (Grégoire 2000). Le fractionnement des chaînes opératoires et les faibles traces de production *in situ* suggèrent que ces matériaux semi-locaux ont été, une fois encore, introduits sous formes de produits débités (notamment Levallois), de nucléus partiellement épuisés et de nombreux outils (**figure 8**).



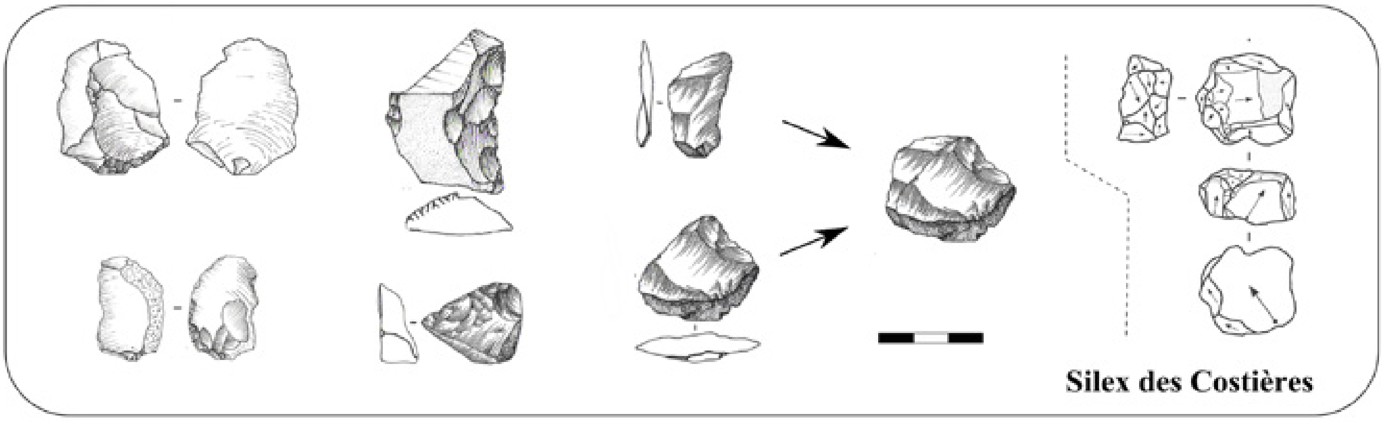


FIGURE 8 Matériel en silex allochtones des niveaux moustériens de la grotte de la Crouzade (Gruissan, Aude) (dessins H. de Lumley, F. Lebègue et C. Milizia)

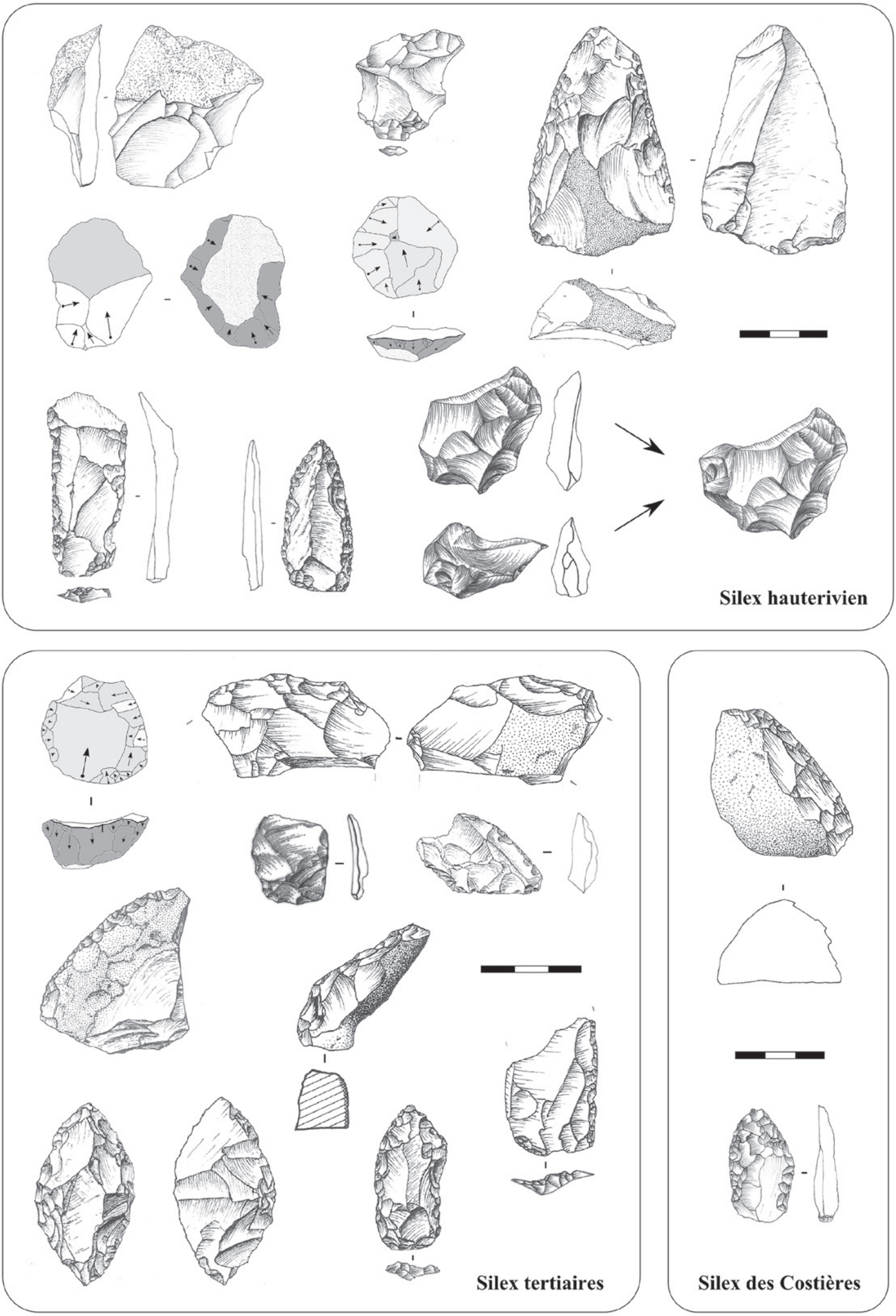
Les taux de transformation sont de 40 à 50 % selon les couches et les supports d'outils diversifiés (Levallois, ordinaires, corticaux). Malheureusement, le non prélèvement de la fraction fine de l'industrie (< 2 cm) empêche d'apprécier l'ampleur des éventuelles activités de confection et d'entretien de cet outillage sur le site. En plus d'être minoritaires, les roches locales (quartz, quartzite, cornéenne) témoignent, elles aussi, de formes d'introduction diversifiées où dominent les produits finis, débités et retouchés. Ce fractionnement systématique des chaînes opératoires, quelle que soit la provenance des matériaux, doit sans doute être mis, dans ce cas, en relation avec le fonctionnement des occupations (Lebègue 2012).

Enfin, quelques pièces en silex des Costières ont également été identifiées dans deux niveaux moustériens (Couche 6 : n = 1 ; Couches 7 : n = 6). Il s'agit exclusivement de produits finis, pour la plupart introduits sous la forme d'outils retouchés, et conservant tous des surfaces néocorticales résiduelles (**figure 8**). Les deux seuls éclats bruts présents appartiennent, quant à eux, à une même séquence de débitage, vraisemblablement centripète (nucléus fantôme ?). Et, si rien n'indique que celle-ci a bien eu lieu sur le site, la présence de ce remontage, conjuguée à celle d'un petit nucléus épuisé au sein du remanié, traduit toutefois une certaine variabilité dans les formes de circulation de ces silex alluviaux. Outre les outils, des nucléus voire de petits galets ont donc également pu être transportés sur plus de 100 km. Cette souplesse dans les stratégies de circulation à distance semble souligner le rôle particulier de ce matériau (accessible sous des modules aisément transportables) dans l'organisation territoriale régionale.

5.5 La Roquette II

Enfin, le site de la Roquette II (Conqueyrac, Gard) présente, lui-aussi, quelques originalités en ce qui concerne l'approvisionnement en matières premières lithiques. L'industrie prélevée par L. Meignen dans cette petite cavité de la vallée du Vidourle (fouilles 1975–1980) est peu abondante (n = 1911 pièces, dont 884 > 2 cm) et marquée par une forte diversité des matières premières (Meignen & Coularou 1981). Dans les deux couches (C2 et C3), on observe un fractionnement systématique des chaînes opératoires et de très faibles indices de débitage *in situ* (sous-représentation de certaines catégories technologiques, rareté des remontages), quelle que soit la provenance des matériaux.

Les roches strictement locales (quartz, deux types de chailles jurassiques) représentent d'ailleurs moins de la moitié de l'ensemble lithique (1/3 en C3), leur introduction s'étant surtout réalisée sous la forme de produits finis *l.s.*, plus rarement de bloc ou de nucléus (Lebègue 2012). Ce sont donc les silex semi-locaux qui sont majoritaires dans l'industrie, avec deux formations principalement exploitées : l'Hauterivien des environs de Quissac (7–15 km) et le Ludien du bassin de St-Mamert (20–23 km). À eux seuls, les silex ludiens représentent de 33 à 40 % de l'outillage (selon les couches), contre 18 à 27 % pour les silex hauteriviens, déjà identifiés aux Canalettes et à l'Hortus. Tous deux témoignent de modalités d'introduction diverses et d'une forte présence des supports retouchés (entre 20 et 35 % selon les matériaux et les couches). Ces silex ont été transportés jusqu'au site sous la forme de produits finis, d'éclats-matrices, de supports à vocation polyvalente (outils-matrices), mais aussi de nucléus (souvent Levallois) déjà quasiment épuisés voire retouchés (**figure 9**). Certains outils ou nucléus n'ont fait que « transiter » par le site, comme le suggère le remontage de deux éclats en silex hauterivien et la présence de deux éclats de ravivage/recyclage de racloirs Quina en silex ludien, tous dépareillés par rapport au reste de l'assemblage (*cf.* dimensions, microfaciès des silex, *etc.*). Le faible investissement consacré à la production contraste fortement avec l'importance accordée à la confection et au réaffûtage/reconfiguration d'outils à même le site. L'importance des éclats de retouche, comme la fréquence et l'amplitude des tranchants retouchés traduit ici une réelle volonté d'entretien de l'outillage importé (*curation strategy* ; Binford 1979), dans le cadre d'occupations répétées et de courtes durées (Lebègue 2012). Enfin, l'équipement transporté sur le site intégrait également quelques pièces isolées en silex des Costières (environ 50 km), dont une pointe moustérienne et un racloir demi-Quina aminci provenant des niveaux en place.


Silex hauterivien
Silex tertiaires
Silex des Costières

6 DISTINCTION DE PLUSIEURS MATÉRIAUX TRACEURS POUR LE PALÉOLITHIQUE MOYEN DU LANGUEDOC

La révision du Moustérien régional sous un angle résolument techno-économique conduit à pointer certaines récurrences en termes de circulation de matières à plus ou moins longue distance. Dans ce contexte, l'individualisation de silex aux faciès spécifiques, remarquables parfois même macroscopiquement, a permis d'isoler quelques bons marqueurs territoriaux.

Le premier est le silex dit « des Costières », contenu dans les anciennes terrasses alluviales du Rhône qui recouvrent la partie sommitale des Costières du Gard, à l'est de la plaine littorale languedocienne. Ce silex regroupe en réalité plusieurs types de silicifications fines, de couleur variée et d'origine diverse, charriées depuis les bassins versants du Rhône et de la Durance, et dont l'unité est donnée par leur néocortex alluvial caractéristique, de couleur ocre, de moins de 2 mm d'épaisseur et montrant de nombreuses micro-géodes de quartz, souvent souligné par une zonation parallèle (Grégoire & Bazile 2005). Ces caractéristiques, conjuguées à la quasi-absence de silex dans les alluvions des fleuves côtiers (Vidourle, Hérault, Orb, Aude, *etc.*), assurent une identification aisée de ce matériau qui dénote par rapport aux autres silex régionaux. Reconnu depuis longtemps au sein des séries du Paléolithique ancien et moyen de la Costière méridionale et des gorges du Gardon (*i.e.* la Balauzière, l'Esquicho-Grapaou : Bazile 1976, 1998), ce silex ne semblait toutefois circuler sur de grandes distances qu'à partir du Paléolithique supérieur, et notamment au Magdalénien (Baills *et al.* 2003 ; Langlais 2007). Les récents travaux menés sur le Moustérien régional montrent qu'en réalité sa diffusion était déjà importante au Paléolithique moyen récent, avec des transports à travers tout l'espace languedocien (**figure 10**). Au nord du Gardon, on le retrouve par exemple sous forme de produits finis au sein des séries de surface du Serre du Coucouyon (Menras 2008) et du Foissaguet (Lebègue 2012), situées à même les gîtes à silex du Ludien de Collorgues-Aubussargues. Plus à l'ouest, entre les vallées du Vidourle et de l'Hérault, il est identifié sous forme d'éclats, d'outils ou de nucléus dans les séries de la Roquette, de l'Hortus, du Cayla ou encore de la Baumasse d'Antonègue (Lebègue 2010, 2012). Enfin, ce silex a également été transporté jusqu'aux Canalettes sur le Causse du Larzac (éclats, outils) et jusqu'à Bize et la Crouzade (outils, éclats, nucléus), aux confins du massif des Corbières (Lebègue 2004, 2012). À l'heure actuelle, ces trois sites marquent l'extension maximale de l'aire de circulation connue des silex des Costières au Moustérien, soit un rayon d'un peu plus d'une centaine de kilomètres[1] vers l'ouest et le sud-ouest. La question de savoir si ce matériau a franchi la barrière pyrénéenne reste cependant ouverte, d'autant qu'au Moustérien de tels passages sont avérés pour d'autres matériaux (Grégoire 2000). Par contre, s'ils participent largement à la mobilité des groupes néandertaliens le long de la Méditerranée, depuis la basse vallée du Rhône jusqu'au massif des Corbières, ces silex alluviaux à néocortex caractéristique restent peu signalés dans et à l'est du couloir rhodanien. Cette rareté peut en partie s'expliquer par leur proximité macroscopique avec les silex crétacés (bédouliens, barrémo-bédouliens) de la moyenne vallée du Rhône, systématiquement exploités dans le Moustérien régional (Moncel 2003, 2011 ; Slimak 2004), ainsi que par l'absence d'éléments figurés minéralogiques ou micropaléontologiques qui auraient pu les distinguer (Grégoire *et al.* 2009).

Les silex oligo-miocènes du bassin de Narbonne-Sigean apparaissent également comme de bons traceurs. De couleur gris plus ou moins foncé à beige, ils contiennent des bioclastes et surtout des gastéropodes. Leur caractérisation pétrographique précise (Wilson 1986 ; Giresse 2005), mais aussi la faible disponibilité en silex et surtout l'absence de matériaux d'origine lacustre entre les Corbières et les Pyrénées en facilite grandement l'identification.

FIGURE 9 Matériel en silex allochtones des couches 2 et 3 de la grotte de la Roquette 2 (Conqueyrac, Gard) (dessins J. Coularou, F. Lebègue et C. Milizia).

1. *La méconnaissance de la disponibilité en silex des terrasses rhodaniennes actuellement immergées laisse toutefois planer une incertitude quant à la validité des distances de circulation estimées pour ces matériaux dans la plupart des sites moustériens. Seul l'abri des Canalettes, qui reflète des déplacements, non plus le long de la Méditerranée, mais vers l'intérieur des terres, permet au final d'assurer l'existence de transports sur de grandes distances.*

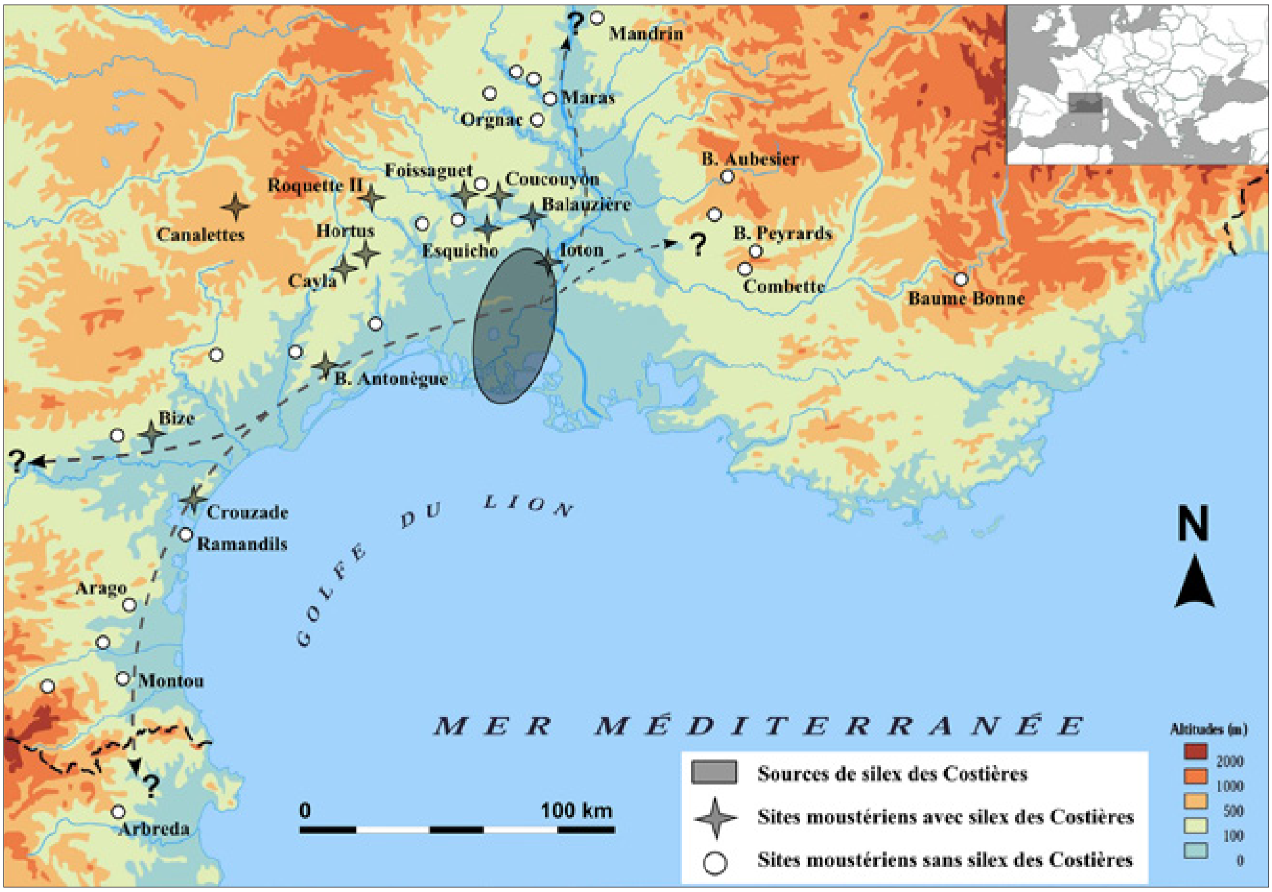


FIGURE 10 Localisation des zones d'acquisition potentielles en silex des Costières (d'après Grégoire et Bazile, 2005) et séries moustériennes où ceux-ci ont été identifiés.

Au Moustérien, ces silex tertiaires ont circulé de manière importante, tant en fréquence qu'en amplitude (**figure 11**). Omniprésents au sein des séries lithiques dans un rayon de 20–25 km autour des affleurements, dans des proportions ne diminuant pas nécessairement selon l'éloignement (*i.e.* Ramandils *v.s.* la Crouzade), leur diffusion ne se limite pas au seul bas-Languedoc. Ils ont aussi été transportés sur des distances plus importantes, avec deux principaux axes qui se dessinent. Le premier vers le Nord-Ouest, le long de la vallée de l'Aude, jusqu'à la grotte de Bize à 25–30 km. Le second vers le Sud, à travers les Corbières et la plaine du Roussillon jusque sur les contreforts de la chaîne pyrénéenne. On les retrouve par exemple à la Caune de l'Arago, à Moutou la Joliette ou encore à la grotte de Montou, ce qui correspond à des déplacements de l'ordre de 30 à 50 km (Grégoire 2000; Duran 2002; Lebègue 2004). Quelques pièces isolées en silex tertiaires du bassin de Narbonne-Sigean sont également signalées dans l'industrie de la grotte de l'Arbreda (Duran 2002), sur le versant méridional des Pyrénées. Elles témoignent dans ce cas de déplacements d'environ 100 km et confirment le passage de groupes vers les plaines et plateaux de l'Emporda, soit via le cordon littoral soit par le franchissement de cols pyrénéens, comme celui du Perthus par exemple. Enfin, l'analyse en cours de petites panoplies en silex identifiées dans certaines séries de la plaine biterroise (Menras 2008), secteur pauvre en affleurements siliceux, devrait permettre de statuer sur la possible diffusion de ces silex vers le nord. Les gîtes du bassin tertiaire de Narbonne-Sigean, fréquentés de manière récurrente du Paléolithique inférieur au Néolithique (Wilson 1986; Sacchi 1986; Vaquer 1993; Barsky 2001), ont vraisemblablement constitué un important pôle d'exploitation des matières premières.

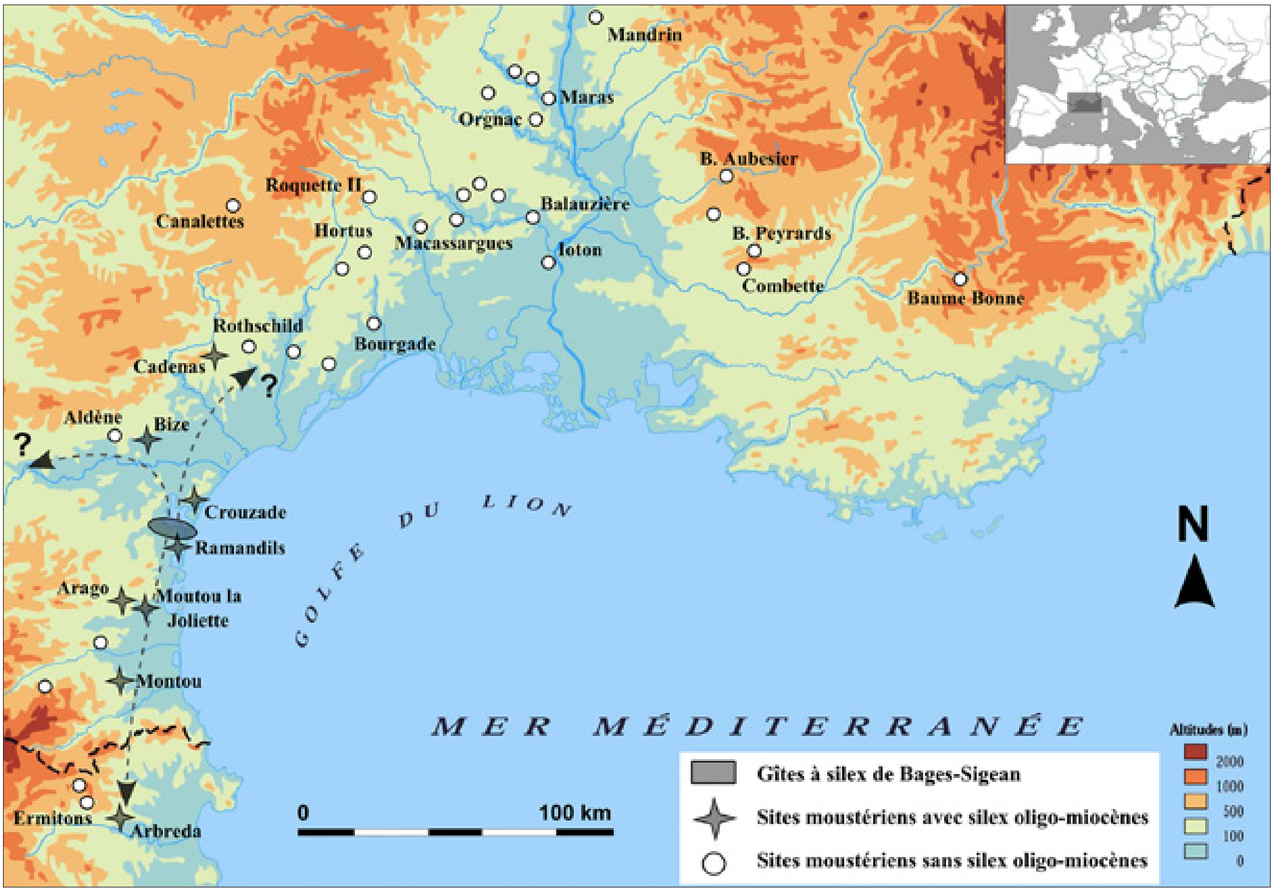


FIGURE 11 Localisation des affleurements de silex oligo-miocènes du bassin de Narbonne-Sigean (d'après Briois *et al.*, 1997) et séries moustériennes où ceux-ci ont été identifiés.

La présence d'ateliers de taille moustériens (Briois *et al.* 2000) et la forte diffusion des silex confirment le rôle clé occupé par ces affleurements, localisés au carrefour de la plaine littorale et du sillon audois, dans la dynamique d'approvisionnement et de circulation des groupes néandertaliens autour de la frange orientale des Pyrénées.

Le statut des silex hauterivien et cénomanien est bien différent. Les silex de l'Hauterivien des environs de Quissac et Sauve, dans la moyenne vallée du Vidourle, sont aisément identifiables par leur aspect zoné beige-brun et leur cortex d'altérite jaune-orangé recouvrant les blocs et plaquettes (Dubois 2003). Ils proviennent des éboulis voisins des affleurements. Quant au silex en blocs de très bonne qualité du Cénomanien de la frange nord du bassin d'Uzès, sa teinte généralement marron plus ou moins clair varie jusqu'au rouge tirant sur le violet (Menras 2008). Leur diffusion au Paléolithique moyen, bien que forte, semble se limiter au Languedoc oriental et à la bordure des Causses, soit tout de même des circulations de l'ordre de 50 à 70 km au maximum, bien au-delà de l'espace semi-local.

7 Transport à longue distance des matières premières et composition de l'équipement mobile au Paléolithique moyen dans l'angle nord-ouest de la Méditerranée : un premier état des lieux…

Les données récemment obtenues dans le Sud-est de la France, tant en Languedoc, qu'en vallée du Rhône et en Ligurie (Slimak 2004 ; Porraz 2005 ; Rossoni 2011 ; Lebègue 2012), confirment les observations faites sur le Moustérien aquitain. À savoir, une forte diversité dans les types de supports transportés, et ce malgré une diminution en quantité et en proportion des matériaux de provenance lointaine. Quelles que soient les roches (silex ou jaspe), l'équipement mobile comprend régulièrement des produits de plein débitage (éclats ordinaires, de mise en forme ou Levallois), des produits corticaux ainsi que des outils pouvant servir de matrices polyvalentes, c'est-à-dire d'objets conjuguant des possibilités de production et d'utilisation. Outre ces produits finis, aux fortes potentialités, des nucléus préformés sont également transportés sur d'assez longues distances, tant le long de la frange côtière que vers l'arrière-pays. Leur circulation, suggérée par les travaux ethnologiques (Kuhn, 1992, 1994) et aujourd'hui régulièrement illustrée par la documentation archéologique, apparaît pourtant comme souvent inférieure à 50 km (*i.e.* Bourguignon *et al.* 2006 ; Delagnes 2010 ; Meignen *et al.* 2009 ; Park 2007 ; Park & Féblot-Augustins 2010). C'est par exemple le cas à la Baume de Néron, en moyenne vallée du Rhône, où l'industrie des niveaux II et III témoigne d'une introduction de nucléus en silex barrémo-bédoulien dont les affleurements sont distants de 20 à 40 km (Slimak 2004).

En Languedoc, les séries de Bize, de l'Hortus ou de la Roquette II, montrent, elles aussi, des trajets d'ampleur équivalente pour plusieurs nucléus en silex (*cf. supra*). Les recherches menées dans l'angle nord-ouest de la Méditerranée (Cauche 2002, 2007, 2012 ; Porraz 2005 ; Porraz & Negrino 2008 ; Lebègue 2012, *sous presse*) signalent toutefois de nombreux cas de nucléus préformés déplacés sur des distances bien plus importantes, qui plus est en mesures euclidiennes. Les nucléus en silex hauterivien et tertiaires de l'abri des Canalettes (C3 : n = 10, C4 : n = 6) ont ainsi été transportés sur plus de 70 km entre leurs affleurements, au cœur du domaine collinéen languedocien, et le Causse du Larzac (**figure 2**). À la Crouzade, le petit nucléus épuisé en silex des Costières a, lui, circulé au minimum sur 100 km avant d'être abandonné. La distance parcourue est vraisemblablement supérieure encore pour le nucléus « en transit » dont seraient issus les deux éclats remontés de la couche 7 (**figure 8**). Les niveaux moustériens des sites de la Caverna delle Fate et d'Arma delle Manie (Province de Savona, Italie) livrent pour leur part des nucléus en jaspe (n = 6 dans les deux cas), transportés sur près de 90 à 100 km depuis la Ligurie orientale. Ces nucléus préformés sont, ici encore, accompagnés d'outils retouchés et de divers types de produits de débitage. La présence de quelques cassons, petits éclats et éclats de retouche atteste, comme aux Canalettes, d'activités de taille diversifiées (production, confection/ravivage d'outils) pour partie conduites directement sur les sites (Cauche 2007, 2012 ; Porraz 2010). Ce phénomène est aussi connu au Maroc nord-oriental pour les niveaux moustériens de la grotte du Rhafas et des sites de la plaine d'Oujda ainsi que pour ceux du bassin de l'Oued El Haÿ attribuables à la fin du stade isotopique 5. Dans ces gisements, la présence de nucléus et/ou d'éclats divers respectivement en calcédoine de l'Oued El Hay et en schiste vert silicifié témoigne du débitage dans les sites après transport sur des distances de 60 à 120 km de nucléus préformés (Wengler 1995, 2001).

Ces données contrastent par rapport aux comportements habituellement décrits pour le Paléolithique moyen d'Europe occidentale, tant au niveau des formes que des distances de circulation des matériaux. D'ailleurs, le nombre croissant de cas d'objets déplacés sur 100 km et plus conduit à considérer cette limite kilométrique, non plus comme une distance maximale de diffusion d'une matière première, mais davantage comme un seuil à partir duquel la diversité des comportements techno-économiques ne s'exprime plus, ou se restreint notablement.

Au-delà, en effet, ce sont essentiellement des produits finis (bruts ou retouchés) qui semblent circuler, le plus souvent en quantités réduites, comme à Espagnac (Lot) où seuls un racloir Quina et le remontage de deux éclats de recyclage en silex du « Bergeracois » témoignent de ce type d'approvisionnement (Jaubert *et al.* 2001). En Midi Méditerranéen, deux pièces en silex rubané oligocène du bassin lacustre d'Apt-Forcalquier (une lame Levallois retouchée et un éclat débordant) sont par exemple signalées parmi le Moustérien de la grotte du Prince (Vintimille, Italie). Dans la grotte voisine du Cavillon, une pointe moustérienne, sur ce même matériau, est également présente (Rossoni 2011). Ces pièces indiquent des déplacements d'environ 140 km à vol d'oiseau depuis la vallée de la Durance jusqu'aux Balzi-Rossi. Au sein des niveaux du Moustérien récent de l'abri Bombrini et de la grotte de l'Ex-Casino, appartenant à ce même complexe de sites de la frontière franco-italienne (**figure 2**), ce sont plusieurs éclats retouchés en jaspe de Ligurie qui ont été identifiés (Negrino & Starnini 2003; Porraz 2005). Ces pièces se trouvent ici à plus de 180 km de leurs secteurs d'affleurement, situés dans la partie nord des Apennins (**figure 3**). Ces matériaux sont également présents dans la série du Pié-Lombard (Tourrettes-sur-Loup, France), sous la forme de deux racloirs dont l'un à dos aminci. Ce dernier site marque d'ailleurs l'actuelle limite occidentale de diffusion des jaspes ligures au Paléolithique moyen, avec un transport sur tout de même 230 à 250 km le long de la frange côtière.

Si le contexte topographique régional (étroit corridor littoral entre la mer et les Alpes) peut avoir, dans ce cas précis, entraîné un étirement des distances de circulation, des déplacements équivalents, voire supérieurs, sont signalés dans certains sites de la vallée de la Loire et du Rhône. À Champ Grand, l'étude des matériaux allochtones a ainsi mis en évidence des silex de provenances très variées (Slimak 2004, Slimak & Giraud 2007) : au nord le Berry et le Bassin parisien (200 km), à l'est le Mâconnais (80 km) et enfin au sud l'aire méditerranéenne, en particulier la basse vallée du Rhône (160–180 km). Mais outre l'importance des contingents importés à très longue distance, notamment depuis les secteurs septentrionaux (> 500 pièces) qui semble exclure les échanges de matériau entre groupes, ce sont aussi les formes techniques sous lesquelles ces silex ont été transportés qu'il faut souligner. Outils retouchés, éclats, mais également nucléus épuisés et matrices polyvalentes (outils/nucléus) composent les panoplies importées et partiellement exploitées sur le site (*cf.* fréquence des éclats cassés et des éclats de retouche ; Slimak 2004). Les activités de taille semblent dans ce cas essentiellement articulées autour de l'entretien et du réaffûtage des tranchants de certaines limaces par façonnage unifacial plano-convexe permettant la création d'un nouveau front de retouche. Les éclats produits par ces « amincissements », semblables à ceux observés dans les contextes Quina du Sud-Ouest (Jonzac, la Quina…), portent d'ailleurs souvent des traces d'utilisation.

8 DISCUSSIONS GÉNÉRALES

Les référentiels ethnoarchéologiques indiquent que le transport d'un équipement mobile est un comportement récurrent chez les populations de chasseurs-cueilleurs (Binford 1979; Kuhn 1995 et références citées). Ces travaux mettent également en évidence que, si la composition de cet équipement varie en fonction des ressources disponibles, des schémas de mobilité adoptés et des fonctions des sites (lieux, type et durée d'occupation, activités menées), sa portabilité reste le critère primordial. Les panoplies transportées se composent ainsi le plus souvent d'outils non spécialisés aux diverses potentialités (*general-purpose tools*, Kuhn 1995), offrant une sorte de compromis entre coût énergétique de transport et potentiel d'utilisation (Kuhn 1992). Sans nécessairement couvrir toute la complexité des données ethnographiques, la recherche paléolithique tend de plus en plus à mettre en évidence des comportements techno-économiques se rapprochant de ceux décrits pour les chasseurs-cueilleurs subactuels. Ces modèles, qui peuvent servir d'éléments de comparaison et de réflexion, doivent toutefois être manipulés avec précaution (Binford 1989; Henry 1998; Conard 2001), en particulier lorsque l'étude porte sur des populations d'un passé lointain.

Pour le Paléolithique moyen, les investigations récentes montrent un outillage mobile bien plus varié que le laissaient supposer les stratégies d'approvisionnement habituellement admises pour cette période. Des outils retouchés, des éclats de tous types (ordinaires, Levallois, corticaux ou de mise en forme) et même des nucléus préformés (sur bloc ou éclat) composent l'équipement minimal accompagnant les groupes lors de leurs expéditions. La présence de ces supports pouvant fonctionner comme des matrices, c'est-à-dire en tant que volume à débiter, à utiliser ou à retoucher, apparaît donc comme un élément récurrent au sein des imports en roches exogènes, voire « exotiques » (déplacements supérieurs à 100 km). Mais des cas de moins en moins rares font aussi état d'un comportement identique pour des matériaux strictement locaux. Ces exemples restent toutefois limités, pour l'instant, à des contextes de sites particuliers (Soressi 2004; Porraz 2005; Faivre 2008; Lebègue 2012).

Plutôt que des objets spécialisés ou certains types d'outils, les groupes du Paléolithique moyen semblent donc avoir emporté avec eux des ensembles d'artefacts relativement peu spécialisés, formant une petite réserve de matière aux potentialités diverses. Ces objets, facilement transportables, permettaient de répondre à toutes sortes de besoins, tant au cours du déplacement qu'une fois sur le site. Ils présentent d'ailleurs des indices d'affûtage ou de recyclage plus importants que ceux en roches locales (*cf. curation strategy*, Binford 1979), témoins de la volonté d'en prolonger la durée de vie. La polyvalence potentielle de ces pièces renvoie, quant à elle, à la définition même de l'équipement personnel fournie par l'ethnoarchéologie, tout en mettant en lumière la capacité des groupes néandertaliens à anticiper leurs besoins techniques en adaptant l'équipement transporté à la multiplicité des situations fonctionnelles et économiques rencontrées. L'importance numérique des équipements importés, comme la part qu'ils occupent dans l'outillage, et l'entretien dont ils ont fait l'objet, varient donc selon les activités menées, les durées d'occupation ainsi que les modalités d'approvisionnement des sites (*provisionning of place v.s. provisionning of individuals*; Kuhn 1992, 1995). En filigrane, c'est l'existence de réseaux d'occupation complexes, et structurés, du territoire que ces modalités de circulation à distance des matériaux contribuent à mettre en évidence. Réseaux qui apportent un éclairage sur la gestion des territoires occupés par ces populations de chasseurs-cueilleurs moustériens où transparaît un aspect particulier de leur culture.

Mais bien que la diversité de formes que revêt l'équipement technique transporté apparaisse de plus en plus comme la « norme » au Paléolithique moyen, des différences se dégagent en fonction des techno-complexes. Celles-ci concernent principalement le caractère polyvalent ou non des matrices importées. Les pièces présentant un double statut, à la fois outil à forte longévité et source d'éclats potentiellement retouchables jouent ainsi un rôle essentiel, voire structurel, au sein des complexes industriels tant Quina qu'à pièces bifaciales (Bourguignon *et al.* 2004, 2006 ; Faivre 2006, 2008).

En contexte Quina par exemple, la mobilité des groupes se structure essentiellement autour de la circulation et l'exploitation de grands racloirs associant longs cycles de réaffûtage potentiel et possibilité de recyclage à des fins de production (ramification). Par contre, en contexte Levallois, ce qui est le cas de la majeure partie du pourtour méditerranéen français, ce type de matrice polyvalente s'avère plus rare, et surtout bien moins standardisé. La normalisation des éclats issus de la production principale, surtout dans ses modalités récurrentes, ne permet pas l'obtention « en série » de supports épais et asymétriques offrant de tels potentiels de réaffûtage et de ramification (*sensu* Bourguignon *et al.* 2004). La plupart des objets transportés correspondent plutôt à des matrices monovalentes ; c'est-à-dire des volumes permettant seulement la production (nucléus sur bloc, éclat-nucléus), l'utilisation directe ou la confection/réaffûtage de bords tranchants (supports bruts, outils déjà retouchés). Quelques pièces au statut bivalent sont toutefois ponctuellement reconnues dans les séries Levallois (*i.e.* racloirs amincis aux Canalettes et à Bize, racloirs amincis et racloirs Quina à encoche adjacente à la Roquette), objets ayant pu servir tour à tour, ou simultanément, d'outils et de nucléus (Lebègue 2012). Néanmoins, l'entretien, ou le statut accordé à ces objets importés (*i.e.* abandon rapide *v.s.* exploitation longue avec recyclage/réaffûtage) est, lui, intimement lié aux stratégies d'approvisionnement et au fonctionnement des sites. La gestion de ces outillages mobiles signe donc une gestion structurée et anticipée de l'espace et des ressources.

En Languedoc, à l'instar d'une grande partie de l'Europe, la distance maximale de déplacement des supports techniques, et probablement des groupes humains, reconnue jusqu'à présent est d'une centaine de kilomètres, peu importe qu'il s'agisse de produits débités, d'outils ou de nucléus. Cette limite de circulation pour des roches acquises de manière directe et transportées d'un lieu de villégiature à un autre nous indique que l'espace économique parcouru était bien plus vaste (Lebègue 2012) comme d'ailleurs au Maroc oriental (Wengler 2001). La multiplication d'études de cas met, quoi qu'il en soit, en évidence l'exploitation récurrente de certains affleurements ainsi que le rôle central joué par plusieurs silex dans l'économie des groupes, dépassant très certainement la simple réponse adaptative au milieu. Les mêmes gîtes sont fréquentés, et les matériaux circulent sous les mêmes formes techniques. Ces flux de matériaux (**figure 12**) reflètent également l'existence, le long du domaine méditerranéen, d'une aire de circulation entre la mer et les contreforts du Massif Central, induisant *de facto* des contacts entre différents secteurs géo-topographiques.

Outre cette homogénéité qui concerne les territoires d'approvisionnement et les roches exploitées, une forte cohérence se dégage également au niveau des modes de production appliqués. Le débitage Levallois récurrent centripète est ainsi omniprésent et dominant au sein des assemblages régionaux, peu importe le contexte lithologique, le type d'occupation, l'importance des assemblages et leur attribution culturelle ancienne (**figure 4**).

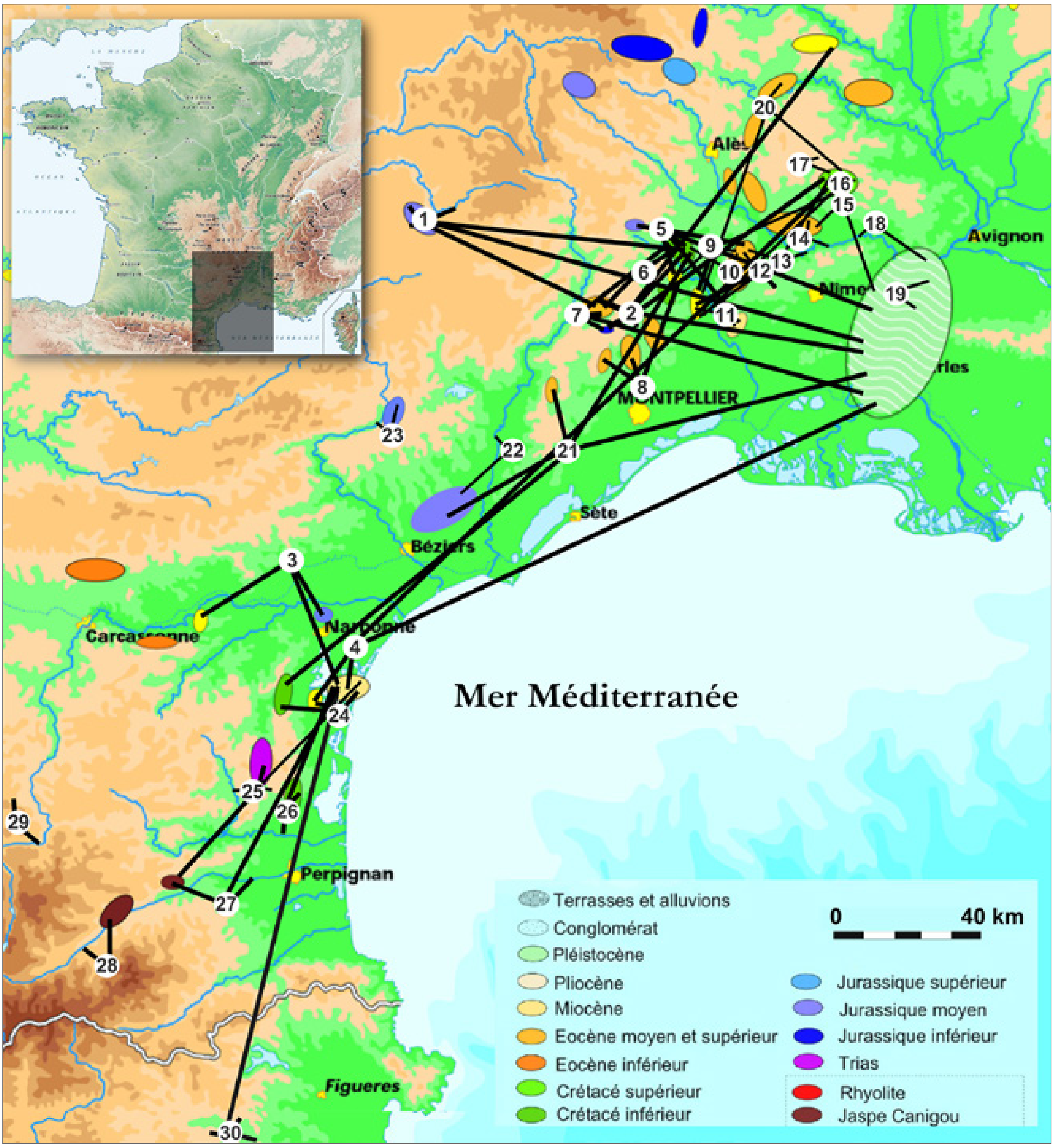


FIGURE 12 Carte des approvisionnements en matières premières des principaux sites moustériens du Languedoc méditerranéen et du Roussillon (d'après Grégoire, 2000 ; Dubois, 2003 ; Menras, 2008 ; Lebègue et. al. 2010 ; Lebègue, 2012). 1. Canalettes, 2. Hortus, 3. Bize, 4. Crouzade, 5. Roquette, 6. Salpètre de Pompignan, 7. Cayla, 8. Bourgade, 9. Pentegrade, 10. Macassargues, 11. B. de Sauvignargues, 12. Coudourous, 13. Calmette, 14. Esquicho Grapaou, 15. Coucouyon, 16. Brugas, 17. Fontarèche, 18. Balauzière, 19. Ioton, 20. Cros de Peyrols, 21. B. d'Antonègue, 22. Cours, 23. Cadenas, 24. Ramandils, 25. Arago, 26. Moutou la Joliette, 27. Montou, 28. El Mig, 29. Belvis, 30. Arbreda.

Cette stabilité des comportements techniques contraste avec la diversité des modes de production reconnue dans le Sud-Ouest à la fin du Paléolithique moyen (Delagnes & Meignen 2006 ; Jaubert 2011). Cette modalité opératoire, souvent poussée à son maximum (exhaustion quasi-systématique des nucléus), permet cependant d'associer productivité élevée, normalisation des produits recherchés et potentiel de ramification souvent exploité. L'emploi d'éclats-matrices apparaît d'ailleurs comme une constante dans les séries languedociennes. Selon les cas, celui-ci est lié à la constitution de l'équipement mobile, à des contraintes d'approvisionnement ou à des besoins fonctionnels spécifiques. Il constitue – avec l'ensemble du mode de gestion des matières premières, du répertoire technologique employé et plus largement des comportements liés à la gestion des ressources nutritionnelles du territoire – des traits culturels fondamentaux qui marquent l'originalité de ces groupes moustériens méditerranéens par rapport à ceux des régions voisines.

La révision des séries du Moustérien régional conduit également à privilégier une interprétation techno-économique des spectres typologiques particuliers de certains sites, anciennement attribués aux faciès Quina ou à denticulés (Lumley-Woodyear 1971 ; Meignen 1979). Les aspects qualitatifs et quantitatifs de ces outillages (proportion, composition, degré de transformation) ne peuvent être considérés indépendamment de la nature, des durées et du rôle des installations dans la gestion du territoire. Ainsi, à Bize-Tournal, la faible transformation des supports et la fréquence des denticulés se corrèlent avec des périodes d'occupation courtes, mais répétées à diverses saisons, marquées par d'importantes activités de boucherie et de débitage. À la Roquette, les particularités des industries (chaînes très fractionnées, taux élevés de transformation, aménagements scalariformes) résultent, pour leur part, de stratégies d'approvisionnement mises en œuvre lors d'installations courtes, où l'utilisation et l'entretien de l'équipement importé a largement prévalu. La valeur indéniablement fonctionnelle et/ou économique de ces caractéristiques techno-typologiques, d'ailleurs partagées par nombre de séries voisines, et l'absence de débitage Quina conduisent à remettre en question l'existence de techno-complexes Quina en Languedoc (**figure 4**).

Au final, le croisement des données relatives au savoir-faire technique, à la gestion des matériaux et aux modalités d'insertion des populations dans le territoire montre qu'aucune rupture ou transformation n'est perceptible à la fin du Paléolithique moyen entre le Rhône et les Pyrénées à l'ouest et les Alpes à l'est. Cette stabilité, à l'échelle de plusieurs centaines voire milliers d'années, pourrait traduire l'existence de groupes néandertaliens présentant des caractères propres à l'espace languedocien et provençal, voire au-delà. De plus, l'absence totale de roches issues des régions extra-méditerranéennes, comme la permanence dans le temps du statut de la plupart des sites, donc d'une certaine forme d'organisation territoriale, va aussi dans le sens d'une entité régionale présentant une dynamique propre, tournée vers l'espace méditerranéen.

En l'absence de barrière physique infranchissable, les spécificités du Moustérien régional pourraient dès lors traduire une « distance » sociale, territoriale, culturelle voire ethnique avec les populations qui occupaient les régions voisines. Les contacts entre celles-ci apparaissent toutefois comme indispensables, et probablement intégrés aux stratégies de subsistance, ne fût-ce que pour des raisons génétiques. Les déplacements d'objets sur de très longues distances peuvent, dans ce contexte, constituer de bons indices archéologiques de leur existence. Au sein de l'espace méditerranéen, les quelques cas de pièces transportées sur plus de 150 km, soutiennent, mais sans la démontrer, l'hypothèse de possibles mécanismes d'acquisitions indirectes, c'est-à-dire d'échanges entre groupes.

L'ensemble de ces éléments traduit l'existence de trames complexes, propres à ces sociétés de chasseurs-cueilleurs du Paléolithique moyen. Toutefois, la provenance des matières premières exploitées au sein des séries régionales, comparée à celle des occupations du tout début du Paléolithique supérieur (Bazile 2002; Bon 2002; Grégoire *et al.* 2009), révèle à ce jour une similitude assez surprenante des circuits territoriaux. Les mêmes matériaux circulent à moyenne et longue distance. L'argument économique lié à la disponibilité en matières premières, recevable pour le Biterrois et le Roussillon, ne peut être étendu à l'ensemble de l'espace régional (**figure 3**). En vallée du Gardon par exemple, peu de différences apparaissent entre l'approvisionnement des occupations moustériennes et aurignaciennes (l'Esquicho Grapaou, la Balauzière, la Laouza; Bazile 1998, 2002), et ce malgré des ressources régionales en silex nombreuses et diversifiées. D'autre part, le courant de diffusion Nord-est/Sud-ouest perçu pour les silex des Costières au Moustérien se retrouve à l'identique à l'Aurignacien (Bon 2002; Onoratini 2006). Cette fois encore, ce matériau d'origine rhodanienne ne semble pas circuler au-delà de la vallée de l'Aude, où il est notamment identifié à Bize (Sacchi 1986; Grégoire & Bazile 2005). De plus, dans ce secteur occidental du Languedoc, l'exploitation des formations tertiaires du bassin de Narbonne-Sigean est, comme lors de la période précédente, attestée dans la plupart des sites. Ce silex, qui devient même quasi exclusif au sein des rares occupations aurignaciennes au sud des Corbières, semble avoir également diffusé au-delà des Pyrénées. On le retrouve, comme au Moustérien, à l'Arbreda (couche H), ainsi que dans le site voisin du Reclau Viver (Soler *et al.* 1990; Fullola *et al.* 2007). Ce qui change avec l'Aurignacien, quel que soit le site, ce sont surtout les proportions de ces silex non locaux, voire exotiques, au sein des ensembles lithiques. Mais, si le rapport aux matériaux évolue, la persistance diachronique de certains circuits d'approvisionnement en silex à plus ou moins longue distance reste et traduit l'existence sur le long terme d'une aire de circulation privilégiée entre mer et montagne.

9 CONCLUSIONS

Les progrès effectués dans la connaissance des sources de matières premières en Languedoc-Roussillon et l'apport de nouveaux gisements moustériens récents ainsi que la révision de sites anciennement connus permettent de faire le point sur la gestion des matières premières lithiques utilisées par ces populations. Dans ces régions, les gisements connus sont généralement de taille modeste et correspondent à des occupations de courte durée. Certains sont toutefois des sites majeurs par l'importance des ensembles archéologiques qu'ils ont livrés au cours des fouilles anciennes comme les grottes de Bize et de la Crouzade; cependant, la confrontation des données techno-typologiques et archéozoologiques montre qu'il s'agit très probablement de brèves occupations répétées. Le cas des Canalettes est différent, puisqu'il s'agit d'incursions de groupes venant du Languedoc sur un plateau de moyenne altitude pour chasser durant la bonne saison (printemps et été).

Comme dans tous les gisements connus, la majorité des roches taillées proviennent de l'environnement immédiat et sont amenées sur les sites sous forme de blocs plus ou moins testés ou préparés. Dans quelques sites, une proportion importante de matière a été importée de l'espace semi-local (entre 3 et plus de 50 % selon les sites); cependant, elle ne correspond qu'à une quantité modeste de roches généralement de meilleure qualité que celles proches du site.

Ces imports sont surtout des nucléus préformés avec probablement quelques pièces façonnées prêtes à être employées. Le même constat concerne les roches provenant de loin (moins de 1 à 2 %), jusqu'à 80–100 km ; au-delà de cette limite, seuls quelques outils parviennent sur les gisements en provenance indirecte de gîtes distants parfois de 230 à 250 km. En définitive et à la différence d'autres groupes moustériens, ceux vivant le long de cette façade méditerranéenne privilégient dans leur équipement personnel le transport de nucléus préformés, souvent sur éclat, destinés à être débités au fur et à mesure de leurs besoins ainsi que quelques pièces finies parfois polyvalentes. Cela se traduit dans les habitats par un fort degré d'exhaustion des nucléus, la présence de produits de débitage en roche d'origine lointaine ainsi que par un fractionnement très important des chaînes opératoires.

Ces occupations sont l'œuvre de petits groupes ayant une forte mobilité résidentielle, ce qui incite fortement à nuancer l'idée d'une faible mobilité des populations néandertaliennes et de groupes isolés. Ils nomadisent sur un très vaste territoire où les lieux de séjour sont distants de 60 à 80–100 km si l'on considère que la roche d'origine lointaine présente dans chaque site est l'empreinte d'une zone de séjour antérieure. Quand l'on prend en considération l'ensemble des territoires parcourus autour de chaque site par ces petits groupes (**figure 12**), on perçoit l'importance et la complexité du réseau permettant de gérer l'espace collinéen des garrigues languedociennes jusqu'à la Méditerranée dont le trait de côte plus méridional que celui d'aujourd'hui permettait l'accès à une étendue de terre dont nous ignorons tout.

Les sources d'approvisionnement en matières premières lithiques sont toujours les mêmes et paraissent exploitées en relais d'un site à un autre, tout en délimitant un espace excluant les régions méridionales du Massif Central ainsi que le couloir de communication vers le Bassin aquitain à travers le seuil de Naurouze. Ce fait absolument remarquable met en évidence un espace de circulation entre mer et montagne où les roches d'origine lointaine indiquent des déplacements préférentiels de l'est vers le sud-ouest dans la région méditerranéenne avec au sud le franchissement des Pyrénées orientales vers la Catalogne. Ces schémas économiques et de circulation sont d'ailleurs très proches de ceux décelables au début du Paléolithique supérieur.

Cette homogénéité territoriale dans l'approvisionnement en roches débitables et la similitude des comportements liés à leur gestion observée dans les différents gisements se confirment également sur le plan technologique avec l'emploi massif du débitage Levallois récurrent dans toute cette région. La variabilité typologique observée dans quelques ensembles lithiques (enrichissement en denticulés, présence de pièces à retouches Quina) semble par contre plus dépendante des activités et du réaffûtage de certaines pièces. Ces observations et les progrès réalisés dans l'analyse des systèmes techniques conduisent à considérer que quelques attributions culturelles anciennes (Para-charentien, Charentien atypique, Moustérien de type Quina) proposées pour certains sites ne sont plus justifiées. Cette unité des traits techniques et comportementaux pour toute la région considérée dénote un substrat culturel commun pour tous ces groupes de la zone méditerranéenne qui conduit à en faire une entité spécifique dans le monde moustérien dont les limites à l'Est et au Sud au delà des Pyrénées restent à définir.

BIBLIOGRAPHIE

BAILLS H., MOIGNE A.-M., GRÉGOIRE S. (2003) – *La grotte des Conques à Vingrau (Pyrénées-Orientales), des chasseurs et leur territoire.* Liège, ERAUL 101, 222 p.

BARSKY D. (2001) – *Le débitage des industries lithiques de la Caune de l'Arago (Pyrénées-Orientales, France): leur place dans l'évolution des industries du Paléolithique inférieur en Europe méditerranéenne.* Université de Perpignan, Thèse de doctorat, 530 p.

BAZILE F. (1976) – *Le Paléolithique de la Costière méridionale dans son contexte géologique.* Université de Montpellier II (Science et Technique du Languedoc), Thèse de Doctorat, 209 p.

BAZILE F. (1998) – *Le Paléolithique supérieur en Languedoc oriental. Le milieu, les hommes*, Université de Perpignan, H.D.R., 229 p.

BAZILE F. (2002) – Matières premières minérales et Paléolithique supérieur en Languedoc Oriental : une entreprise délicate. In : In : J.-C. Miskovsky, J. Lorenz (dir.), *Pierre et archéologie.* Perpignan, Presses Universitaires de Perpignan : 151–176.

BERNARD-GUELLE S. (2005) – Territoires et mobilités des groupes moustériens en Vercors : analyse et discussion. *L'Anthropologie* 109 : 799–814.

BINDER D. (1998) – *Recensement des disponibilités en matières premières lithiques dans la région Provence Alpes Côte-d'Azur.* Rapport de synthèse sur les prospections thématiques en Provence Rhodanienne 1995–1997.

BINFORD L.R. (1979) – Organization and formation processes : looking at curated technologies. *Journal of Anthropological Research* 35 (3) : 255–273.

BINFORD L.R. (1980) – Willow smoke and dog's tails : hunter-gatherer settlements systems and archaeological site formation. *American Antiquity* 45 (1) : 4–20.

BINFORD LR. (1989) – Isolating the transition to cultural adaptations : an organizational approach. In : E. Trinkaus (ed.), *The Emergence of Modern Humans. Biocultural Adaptations in the Late Pleistocene.* Cambridge University Press : 18–41.

BISCHOFF J.L, ROSENBAUER R.J., TAVOSO A., LUMLEY H. DE (1988) – A test of Uranium-series dating of fossil tooth enamel : resultat from Tournal cave, France. *Applied Geochemestry* 3 : 145–151.

BOËDA É., GENESTE J.-M., MEIGNEN L. (1990) – Identification de chaînes opératoires lithiques du Paléolithique ancien et moyen. *Paléo* 2 : 43–80.

BON F. (2002) – *L'Aurignacien entre Mer et Océan. Réflexion sur l'unité des phases anciennes de l'Aurignacien dans le sud de la France.* Paris, Mémoire de la Société Préhistorique Française, XXIX, 253 p.

BOURGUIGNON L., DELAGNES A., MEIGNEN L. (2006) – Systèmes de production lithique, gestion des outillages et territoires au Paléolithique moyen : où se trouve la complexité ? In : L. Astruc, F. Bon, V. Léa, P.-Y. Milcent, S. Philibert (dir.), *Normes techniques et pratiques sociales : de la simplicité des outillages pré-protohistoriques.* Actes des XXVII[e] rencontres internationales d'archéologie et d'histoire d'Antibes (20–22 octobre 2005). Antibes, APDCA : 75–86.

BOURGUIGNON L., FAIVRE J.-PH., TURQ A. (2004) – Ramification des chaînes opératoires : une spécificité de Moustérien ? *Paléo* 16 : 37–48.

BOURGUIGNON L. & MEIGNEN L. (2010) – Ioton (Gard) 30 ans après : nouvelles considérations technologiques et techno-économiques sur l'industrie moustérienne. *Bulletin de la Société Préhistorique Française* 107(3) : 433–451.

BRESSY C. (2003) – *Caractérisation et gestion du silex des sites mésolithiques et néolithiques du Nord-Ouest de l'arc alpin.* Oxford, British Archeological Report - International Series 1114.

BRESSY C., GRÉGOIRE S., BAZILE F. (DIR.) (2010) – *Silex et Territoires préhistoriques. Avancées des recherches dans le Midi de la France.* Actes de la Table Ronde de Lattes (juin 2008). Les C@hiers de Geopré 1 (publication en ligne), 179 p.

BRESSY C. & PLATSCHEK C. (2008) – *Gîtes siliceux du massif de la Nerthe.* Rapport de prospection thématique, UMR 6636 LAMPEA et SRA PACA, 29 p.

BRIOIS F., BARRAGUÉ E., T. ET J., BOBOEUF M., CHALARD P., FOUCHER P., GRÉGOIRE S., JARRY M., LACOMBE S., MILLET D., SERVELLE CH., SÉVÈGNES, L., SIMONNET R. (2000) – *PCR Lithothèque des Matières premières siliceuses, Région Midi-Pyrénées*, rapport d'activité triannuel, inédit, 180 p.

CAUCHE D. (2002) – *Les cultures moustériennes en Ligurie italienne : étude des industries lithiques des grottes de la Madonna dell'Arma, d'Arma delle Manie et de Santa Lucia Superiore.* Université de la Méditerranée (Aix-Marseille II), Thèse de doctorat, 279 p.

CAUCHE D. (2007) – Les cultures moustériennes en Ligurie italienne : analyse du matériel lithique de trois sites en grotte. *L'Anthropologie* 111 : 254–289.

CAUCHE D. (2012) Productions lithiques et comportements techno-économiques de groupes humains acheuléens et moustériens en région liguro-provençale. *C.R. Palevol* 11: 519–527.

CAUCHE D., TOZZI C., VICINO G., LUMLEY DE H. (2002) – L'exploitation différentielle des matières premières lithiques par les moustériens dans deux sites de Ligurie (Italie). In: J.-C. Miskovsky, J. Lorenz (dir.), *Pierre et Archéologie*. Perpignan, Presses universitaires de Perpignan: 177–193.

CAUCHE D. & LEBÈGUE F. (2008) – Technologie et typologie des industries moustériennes des grottes de Grimaldi dans le contexte des cultures du Paléolithique moyen de l'Europe méditerranéenne. In: H. de Lumley (dir.), *Histoire et actualité de l'œuvre scientifique de S.A.S. le Prince Albert Ier de Monaco. 1895- 2005: Bilan et perspectives des connaissances sur les peuplements néandertaliens et les premiers hommes modernes de l'Europe méditerranéenne. Paris, Archives de l'Institut de paléontologie humaine* 39: 95–100.

CONARD N.J. (2001) – Advances and problems in the study of Paleolithic Settlements systems. In: N. Conard (dir.), *Settlement Dynamics of the Middle Paleolithic and Middle Stone Age.* Tübingen, Kerns Verlag: VII-XX.

CRESSWELL R. (1982) – Transfert des techniques et chaînes opératoires. *Techniques et Culture*: 143–163.

DELAGNES A. (2010) – Du rôle structurant de la mobilité dans les systèmes techniques du Paléolithique moyen. In: N. Conard & A. Delagnes (dir.), *Settlement Dynamics of the Middle Paleolithic and Middle Stone Age III*, Tübingen, Kerns Verlag: 373–396.

DELAGNES A., JAUBERT J., MEIGNEN L. (2007) – Les technocomplexes du Paléolithique moyen en Europe occidentale dans leur cadre diachronique et géographique. In: B. Vandermeersch, B. Maureille (dir.), *Les Néandertaliens. Biologie et culture.* Paris, édition du CTHS, Document préhistorique 23: 213–229.

DELAGNES A. & MEIGNEN L. (2006) – Diverisity of Lithic Production Systems during the Middle Paleolithic in France. Are there any chronological trends? In: S.L. Kuhn, E. Hovers (eds.), *Transition before the Transition: Evolution and Stability in the Middle Palaeolithic and Middle Stone Age.* Springer, Interdisciplinary Contribution at Archaeology: 85–107.

DEMARS, P.-Y. (1982) – *L'utilisation du silex au Paléolithique supérieur: choix, approvisionnement, circulation. L'exemple du Bassin de Brive*. Paris, CNRS, Cahiers du Quaternaire 5, 253 p.

DUBOIS PH. (2003) – *Exploitation des matières premières lithiques dans les industries du Paléolithique moyen en Languedoc oriental*. Université Montpellier III – Paul Valéry, Thèse de Doctorat, 786 p.

DURAN J.-P. (2002) – *Industries moustériennes en Languedoc, Roussillon et Catalogne au Würm ancien: la Combe, le Ratier, la Rouquette, les Anecs, Moutou-La-Joliette, la Caune de l'Arago, l'Arbreda*. Université de Perpignan, Thèse de Doctorat, 796 p.

FAIVRE J.-PH. (2006) – L'industrie moustérienne du niveau Ks (locus 1) des Fieux (Miers, Lot): mobilité humaine et diversité des compétences techniques. *Bulletin de la Société Préhistorique Française* 103 (1): 17–32.

FAIVRE J.-PH. (2008) – *Organisation techno-économique des systèmes de production dans le Paléolithique moyen récent du Nord Aquitain: Combe-Grenal et les Fieux.* Université de Bordeaux I, Thèse de Doctorat, 555 p.

FÉBLOT-AUGUSTINS J. (1997) – *La circulation des matières premières au Paléolithique*. Liege, ERAUL 75, 275 p.

FÉBLOT-AUGUSTINS J. (1999) – Raw Material Transport Patterns and Settlement Systems in the European Lower and Middle Palaeolithic: Continuity, Change and Variability. In: W. Roebroeks, C. Gamble (eds.), *The Middle Palaeolithic Occupation of Europe*. Leiden, University of Leiden Press: 193–214.

FERNANDES P., RAYNAL J.-P., MONCEL M.-H. (2006) – L'espace minéral au Paléolithique moyen dans le sud du Massif central: premiers résultats pétroarchéologiques. *Compte Rendus Palévol* 5 (8): 981–993.

FULLOLA J., MANGADO X., ESTRADA A. (2007) – Circulation des matières premières lithiques et des coquillages dans le Paléolithique supérieur du nord-est ibérique. In: J. Gomez de Soto (dir.), *La notion de mobilité dans les sociétés préhistoriques*. Actes du 130e congrès national des sociétés historiques et scientifiques (La Rochelle, 2005). CTHS (édition électronique): 57–66.

GENESTE J.-M. (1985) – *Analyse lithique d'industries moustériennes du Périgord: une approche technologique du comportement des groupes humains au Paléolithique moyen.* Université Bordeaux I, Thèse de doctorat, 567 p.

GENESTE J.-M. (1988a) – Économie des ressources lithiques dans le Moustérien du sud-ouest de la France. In: M. Otte (dir.): *L'homme de Néandertal, volume 6, la subsistance.* Actes du colloque international de Liège, (4–7 décembre 1986). Liège, ERAUL 33: 75–97.

GENESTE J.-M. (1988b) – Systèmes d'approvisionnement en matières premières au Paléolithique moyen et au Paléolithique supérieur en Aquitaine. In: M. Otte (dir.), *L'Homme de Neandertal, vol.8.: La mutation*. Actes du colloque international de Liège, (4–7 décembre 1986). Liège, ERAUL 35: 61–70.

GENESTE J.-M. (1991) – Systèmes techniques de production lithique: variations techno-économiques dans les processus de réalisation des outillages paléolithiques. *Techniques et cultures* 17–18: 1–35.

GIRESSE P. (2005) – Analyse minéralogique de 6 échantillons de silex du Languedoc-Roussillon. In: S. Grégoire (coord.), *Matières premières siliceuses en Languedoc-Roussillon*. Projet Collectif de Recherche, rapport d'activité pour l'année 2005.

GRÉGOIRE S. (2000) – *Origines des matières premières des industries lithiques du Paléolithique pyrénéen et méditerranéen. Contribution à la connaissance des aires de circulation humaines.* Université de Perpignan, Thèse de Doctorat 246 p.

GRÉGOIRE S., BAZILE F., BOCCACCIO G., BRESSY C., LEBÈGUE F., MENRAS C., POIS V., SAOS T., TERRADAS X., VAREA S. (2009) – *PCR Matières premières siliceuses en Languedoc-Roussillon, rapport d'activité triennal 2007–2009*, 107 p.

GRÉGOIRE S. & BAZILE F. (2005) – La diffusion du silex des Costières du Gard au Paléolithique supérieur. *Comptes rendus Palevol* 4: 413–419.

HÉLÉNA P. (1928) – La stratigraphie de la grotte de la Crouzade (Commune de Gruissan, Aude). *Bulletin de la Commission archéologique de Narbonne*, 27 (1926–1927): 5–50.

HENRY D.O. (1998) – Intrasite spatial patterns and behavioural modernity: indications from the Late Levantine Mousterian Rockshelter of Tor Faraj, Southern Jordan. In: T. Akazawa, K. Aoki, O. Bar-Yosef (eds.), *Neandertals and Modern Humans in Western Asia.* New York-London, Plenum Press: 127–142.

JAUBERT J. (2011) – Les archéo-séquences du Paléolithique moyen du Sud-ouest de la France: quel bilan un quart de siècle après François Bordes. In: F. Delpech & J. Jaubert (dir.), *François Bordes et la Préhistoire*. Actes du colloque international François Bordes (Bordeaux 22–24 avril 2009). Paris CTHS Éditions, Documents préhistoriques 29: 235–253.

JAUBERT J., BRUGAL J.-PH., CHALARD P., DIOT M.-F., FALGUÈRES CH., JARRY M., KERVAZO B., KONIK S., MOURRE V. (2001) – Un site Moustérien de type Quina dans la vallée du Célé, Pailhès à Espagnac-Sainte-Eulalie (Lot). *Gallia Préhistoire* 43: 1–99.

JAUBERT J. & DELAGNES A. (2007) – De l'espace parcouru à l'espace habité au Paléolithique moyen. In: B. Vandermeersch, B. Maureille (eds.), *Les Néandertaliens. Biologie et culture.* Paris, édition du CTHS, Document préhistorique 23: 263–281.

KARLIN C., BODU P., PELEGRIN J. (1991) – Processus techniques et chaînes opératoires. Comment les préhistoriens s'approprient un concept élaboré par les ethnologies. In: H. Blafet (dir.), Observer l'action technique: des chaînes opératoires, pour quoi faire? CNRS, Paris, p. 101–117.

KELLY R.L. (1983) – Hunter-gatherer mobility strategies. *Journal of Anthropological Research* 39 (3): 277–306.

KUHN, S. L. (1992) – On planning and curated technologies in the middle Paleolithic. *Journal of Anthropological Research* 48 (3): 185–214.

KUHN, S. L. (1995) – *Mousterian Lithic Technology. An Ecological Pespective*, Princton, Princeton University Press, 209 p.

LANGLAIS M. (2007) – *Dynamiques culturelles des sociétés magdaléniennes dans leurs cadres environnementaux. Enquête sur 7 000 ans d'évolution de leurs équipements lithiques entre Rhône et Ebre*. Thèse de Doctorat, Universités de Toulouse-le-Mirail et Barcelone, 550 p.

LEBÈGUE F. (2004) – *Les industries moustériennes du Languedoc: études techno-typologiques des gisements de la Crouzade et de Montou*. Muséum National d'Histoire Naturelle de Paris, Mémoire de D.E.A., 175 p.

LEBÈGUE F. (2010) – Comportements techno-économiques et espace parcourus par les Néandertaliens de l'Hortus. In: C. Bressy, S. Grégoire, F. Bazile (dir.), *Silex et Territoires préhistoriques. Avancées des recherches dans le Midi de la France*. Actes de la Table Ronde de Lattes (juin 2008), Les C@hiers de Geopré 1 (publication en ligne): 116–135.

LEBÈGUE F. (2012) – *Le Paléolithique moyen récent entre Rhône et Pyrénées: approche de l'organisation techno-économique des productions lithiques, schémas de mobilité et organisation du territoire: les Canalettes, l'Hortus, Bize-Tournal, la Crouzade, la Roquette II*. Université de Perpignan Via Domitia, Thèse de Doctorat 797 p.

LEBÈGUE F. (SOUS PRESSE). À propos du gisement moustérien de la Crouzade (Gruissan, Aude): relecture techno-économique de l'industrie lithique et révision de son attribution culturelle. *L'Anthropologie*, Paris.

LEBÈGUE F., BOULBES N., GRÉGOIRE S., MOIGNE A-M. (2010) – Systèmes d'occupation, exploitation des ressources et mobilité des néandertaliens de l'Hortus. In: N. Conard & A. Delagnes (eds.), *Settlement Dynamics of the Middle Paleolithic and Middle Stone Age volume III*. Tübingen, Kerns verlag: 455–483.

LEMONNIER P. (1976) – La description des chaînes opératoires: contribution à l'analyse des techniques. *Techniques et culture* 1: 100–151.

LUMLEY H. DE (1972) – *La grotte de l'Hortus (Valflaunès, Hérault). Les chasseurs néandertaliens et leur milieu de vie. Élaboration d'une chronologie du Würmien II dans le Midi méditerranéen.* Marseille, Études Quaternaires 1, 668 p.

LUMLEY-WOODYEAR H. DE (1971) – *Le Paléolithique inférieur et moyen du Midi méditerranéen dans son cadre géologique. Tome 2: Bas Languedoc, Roussillon, Catalogne.* Supplément à Gallia Préhistoire V. Paris, édition CNRS, 445 p.

LUMLEY-WOODYEAR M.-A. DE (1973) – *Anténéandertaliens et Néandertaliens du bassin Méditerranéen occidental européen.* Marseille, Études Quaternaires 2, 626 p.

MAGNIEZ P. (2010) – *Étude Paléontologique des Artiodactyles de la grotte Tournal (Bize-Minervois, Aude, France). Étude Taphonomique, Archéozoologique et Paléoécologique des grands Mammifères dans leur cadre Biostratigraphique et Paléoenvironnemental.* Université de Perpignan Via-Domitia, Thèse de Doctorat, 792 p.

MASSON A. (1981) – *Pétroarchéologie des roches siliceuses. Intérêts en préhistoire.* Université Claude-Bernard - Lyon I, Thèse de doctorat.

MASSON A. (1984) – Analyse pétrographique des silex utilisés par les Néolithiques de l'île Corrège à Leucate. In: J. Guilaine, A. Freises, R. Montjardin (eds.), *Leucate-Corrège, habitat noyé du Néolithique cardial.* Toulouse, Centre d'Anthropologie des Sociétés Rurales: 58–71.

MEIGNEN L. (1993) – *L'abri des Canalettes. Un habitat moustérien sur les grands Causses (Nant, Aveyron). Fouilles 1980–1986.* Monographie du CRA, 10, Paris, CNRS édition, 359 p.

MEIGNEN L. (1979) – Le Paléolithique moyen en Languedoc oriental. *Bulletin de l'École Antique de Nîmes* 14: 27–39.

MEIGNEN L., COSTAMAGNO S., BEAUVAL C., BOURGUIGNON L., VANDERMEERCH B., MAUREILLE B. (2007) – Aires d'approvisionnement en matières premières et aires d'approvisionnement en ressources alimentaires In: M-H. Moncel, A-M. Moigne, M. Azarello et C. Peretto, *Approches intégrées des comportements, Proceedings of the XV Internatinal Union for Prehistoric and Protohistoric Sciences* (Lisbonne, 4–9 septembre 2006). Oxford, British Archeological Report - International Series 1725: 127–139.

MEIGNEN L. & COULAROU J. (1981) – *Le gisement paléolithique moyen. La Roquette (Conqueyrac, Gard). I- Étude archéologique.* Valbonne, CRA note interne 26, 19 p.

MEIGNEN L., DELAGNES A., BOURGUIGNON L. (2009) – Lithic materials procurement and transformation patterns during the Middle Palaeolithic in Western Europe. In: B. Adams & B. Blades (eds.), Lithic *Materials and Paleolithic Societies.* Chichester, Wiley-Blackwell: 15–24.

MENRAS C. (2009) – Les industries lithiques de trois occupations de plein air et leur place dans le contexte Moustérien du Languedoc méditerranéen: le Cadénas (Bédarieux, Hérault), les Cours (Plaissan, Hérault) et le Serre du Coucouyon (La Capelle et Masmolène, Gard). *L'Anthropologie* 113 (2): 381–398.

MOLES V. (2008) – *Étude techno-économique et typologique des industries de la grotte des Ramandils (Port-La Nouvelle, Aude, France). Contribution à la reconnaissance d'une microproduction au Paléolithique moyen.* Université Paul Valéry - Montpellier III, Thèse de Doctorat, 375 p.

MONCEL M.-H. (2003) – *L'exploitation de l'espace et la mobilité des groupes humains au travers des assemblages lithiques à la fin du Pléistocène moyen et au début du Pléistocène supérieur. La moyenne vallée du Rhône entre Drôme et Ardèche.* Oxford, British Archeological Report - International Series 1184, 180 p.

MONCEL M.-H. (2011) – Technological Behaviour and Mobility of Human Groups deduced from Lithic Assemblages in the Late Middle and Early Late Pleistocene of the Middle Rhône Valley (France). In: N.J. Conard & J. Richter (eds.), *Neanderthal Lifeways, Subsistence and Technology: One Hundred Fifty Years of Neanderthal Study*, Vertebrate Paleobiology and Paloanthropology series 19. Netherland, Springer, p. 261–287.

NEGRINO F. & STARNINI E. (2003) – Patterns of lithic raw material exploitation in Liguria from the Palaeolithic to the Copper age. *Préhistoire du Sud-Ouest* supplément 5: 235–243.

ONORATINI G. (2006) – L'émergence de l'Homme moderne en zone nord-méditerranéenne. *Comptes Rendus Palevol* 5 (1–2): 193–202.

PARK S.J. (2007) – *Système de production lithique et circulation des matières premières lithiques au Paléolithique moyen récent et final. Une approche techno-économique à partir des l'étude des industries lithiques de la Quina (Charente).* Université de Paris X - Nanterre, Thèse de Doctorat, 336 p.

PARK S.J., FÉBLOT-AUGUSTINS J. (2010) – Circulation des matières premières et modalités d'exploitation territoriale au Paléolithique moyen récent dans le bassin de la Charente. In: N. Conard & A. Delagnes (eds.), *Settlement Dynamics of the Middle Paleolithic and Middle Stone Age III.* Tübingen, Kerns verlag: 396–425.

PELEGRIN J., KARLIN C., BODU P. (1988) – « Chaînes opératoires » : un outil pour le préhistorien. Technique préhistorique. *Notes et Monographies techniques* 25. Paris, CNRS édition : 55–62.

PERLÈS C. (1980) – Économie de la matière première et économie du débitage : deux exemples grecs. In : J. Tixier (dir.), *Préhistoire et technologie lithique*. Paris, cahier n°1 de l'URA 28 CRA-CNRS éditions : 37–41.

PERLÈS C. (1991) – Économie de la matière première et économie du débitage : deux conceptions opposées ? In : 25 ans d'études technologiques en préhistoire. Bilan et perspectives, Actes des rencontres d'Antibes (18–20 octobre 1990). Antibes, APDCA : 35–45.

PORRAZ G. (2005) – *En marge du milieu alpin. Dynamique de formation des ensembles lithiques et modes d'occupation des territoires au Paléolithique moyen*. Université de Provence, Thèse de doctorat, 387 p.

PORRAZ G. (2007) – Dans l'ombre des plus grands : les sites moustériens de l'abri du Pié Lombard (Alpes-Maritimes, France) et de la grotte du Broion (Vénétie, Italie). Présentation de leurs industries lithiques. In : *Un siècle de construction du discours scientifique en Préhistoire*. 26e Congrès Préhistorique de France (Avignon, 20–25 septembre 2004), Mémoire de la Société Préhistorique Française : 237–248.

PORRAZ G. (2010) – Regards croisés : la diffusion des jaspes de Ligurie orientale (Italie) et l'approvisionnent en matières premières lithiques de l'abri Pié Lombard (Paléolithique moyen, France). In : N. Conard & A. Delagnes (eds.), *Settlement Dynamics of the Middle Paleolithic and Middle Stone Age III*. Tübingen, Kerns verlag : 283–306.

PORRAZ G. & NEGRINO F. (2008) – Espaces économiques et approvisionnement minéral au Paléolithique moyen dans l'aire liguro-provençale. *Bulletin du Musée d'Anthropologie et de Préhistoire de Monaco*, suppl.1 : 29–39.

PRIMAULT J. (2003) – Exploitation et diffusion des silex de la région du Grand-Pressigny au Paléolithique. In : *Les matières premières lithiques en préhistoire*. Table Ronde internationale d'Aurillac (20–22 juin 2002), Préhistoire du Sud-Ouest, supplément 5 : 283–292.

RAYNAL J.-P., FERNANDES P., CORRE-LE BEUX M., SANTAGATA C. (2007) – Le Paléolithique moyen de Haute-Loire : origine, diversité, affinités. In : R. Desbrosse & A. Thévenin (dir.), *Arts et culture de la préhistoire, Hommages à Henri Delporte.* Paris, édition du CTHS, Documents préhistoriques 24 : 117–138.

RENFREW C. (1975) – Trade as Action ta a Distance. In : J.A. Sabloff & C.C. Lamberg-Karolsky (eds.), *Ancient Civilization and Trade.* Albuquerque, University of New Mexico Press : 3–59.

ROSSONI E. (2011) – *Les cultures moustériennes des Balzi Rossi (Grimaldi, Italie). Les collections du prince Albert Ier de Monaco*. Université de Perpignan Via-Domitia, Thèse de doctorat, 461 p.

SACCHI D. (1986) – *Le Paléolithique supérieur du Languedoc Occidental et du Roussillon*. Supplément à Gallia Préhistoire XXI. Paris, édition CNRS, 284 p.

SAOS T. (2003) – *Cadre stratigraphique, paléoclimatique et géochronologique du Languedoc-Roussillon au cours du Pléistocène supérieur d'après l'étude des remplissages de grottes.* Université de Perpignan, Thèse de Doctorat, 252 p.

SLIMAK L. (2003) – Les débitages Discoïdes moustériens : évaluation d'un concept technologique. In : M. Peresani (ed.), *Discoïd Lithic Technology. Implications and advances*. Oxford, British Archeological Report - International Series 1120 : 33–65.

SLIMAK L. (2004) – *Les dernières expressions du Moustérien entre Loire et Rhône*, Université de Provence, Thèse de Doctorat, 867 p.

SLIMAK L. & GIRAUD Y. (2007) – Circulation sur plusieurs centaines de kilomètres durant le Paléolithique moyen : Contribution à la connaissance des sociétés Néandertaliennes. *Comptes Rendus Palevol*. 6 (5) : 359–368.

SOLER N., TERRADAS X., MAROTO J., PLANA C. (1990) – Le silex et les autres matières premières au Paléolithique moyen et supérieur au nord-est de la Catalogne. In : M.R. Seronie-Vivien, M. Lenoir (eds.) : *Le silex de sa génèse à l'outil*. Cahiers du Quaternaire 17 : 453–460.

SORESSI M. (2004) – L'industrie des niveaux moustériens (fouilles 1998–1999). Aspects taphonomiques, économiques et technologiques. In : J. Airvaux (dir.), *Le site paléolithique de Chez-Pinaud à Jonzac, Charente-Maritime, Premiers résultats : étude sur la coupe gauche.* Préhistoire du Sud-Ouest, supplément 8 : 79–95.

TAVOSO A. (1984) – Réflexions sur l'économie des matières premières au Moustérien. *Bulletin de la Société préhistorique française* 81 (3) : 79–82.

TAVOSO A. (1987a) – Le remplissage de la grotte Tournal à Bize-Minervois (Aude). *Cypsela* 6 : 23–35.

TAVOSO A. (1987b) – Le Moustérien de la grotte Tournal. *Cypsela* 6 : 161–174.

TEXIER P.J., BRUGAL J.-PH., LEMORINI C., WILSON L. (1998) – Fonction d'un site du Paléolithique moyen en marge d'un territoire : abri de la Combette (Bonnieux, Vaucluse). In*:* J-P. Brugal, L. Meignen, M. Patou-Mathis (eds.), *Économie préhistorique : les comportements de subsistance au Paléolithique*. Actes des XVIII[e] rencontres internationales d'archéologie et d'histoire d'Antibes (23–25 octobre 1997), Sophia-Antipolis, APDCA : 325–361.

TEXIER P.J., BRUGAL J.-PH., LEMORINI C., THÉRY I., WILSON L. (2005) – Abri du Pont de la Combette (Bonnieux, Vaucluse) : variabilité intrasite des comportements néandertaliens. In : J. Jaubert & M. Barbaza (eds.), *Territoires, déplacements, mobilité, échanges durant la préhistoire. Terres et Hommes du Sud.* Actes du 126[e] Congrès National des Sociétés Historiques et Scientifiques (Toulouse, 2001). Paris, CTHS édition : 115–130.

TURQ A. (1990) – Exploitation des matières premières lithiques dans le Moustérien entre Dordogne et Lot. In : M-R. Séronie-Vivien & M. Lenoir (eds.), *Le silex de sa Genèse à l'Outil, tome II*. Paris, CNRS édition : 415–427.

VAQUER J. (1993) – Recherche sur l'origine des roches taillées dans l'abri du Roc de Dourgne. In : J. Guilaine (ed.), *Dourgne*. Toulouse, Centre d'Anthropologie des Sociétés Rurales : 231–247.

VAQUERO M. (1999) – Variabilidad de las Estrategias de Talla y Cambio Tecnológico en el Paleolítico Medio del Abric Romaní (Capellades, Barcelona). *Trabajos de Prehistoria* 56 (2) : 37–58.

WENGLER L. (1990a) – Économie des matières premières et territoire dans le Moustérien et l'Atérien maghrébin : exemples du Maroc oriental. *L'Anthropologie* 94 (2) : 321–334.

WENGLER L. (1990b) – Territoire et migration humaines durant le Paléolithique moyen. Le cas du Maroc oriental. *Sahara* 3, Milan : 35–44.

WENGLER L. (1991) – Choix des matières premières lithiques et comportement des hommes au Paléolithique moyen. In : J. Tixier (dir.), *25 ans d'études technologiques en préhistoire : bilan et perspectives*. Actes des XI[e] rencontres internationales d'archéologie et d'histoire d'Antibes (18–20 octobre 1990). Antibes, APDCA : 139–157.

WENGLER L. (1993) – *Cultures préhistoriques et formations quaternaires au Maroc oriental. Relations entre comportements et paléoenvironnements au Paléolithique moyen.* Université de Bordeaux I, Thèse de Doctorat d'État ès Sciences, 2 tomes, 1433 p.

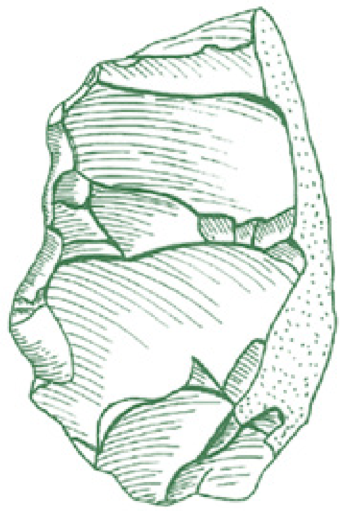
WENGLER L. (1995) – Levallois technology in the Middle Paleolithic of eastern Morocco. In : H.L. Dibble, O. Bar-Yosef (eds.), *The definition and interpretation of Levallois technology*. Philadelphie, Prehistory Press, Monographs in World Archaeology 23 : 315–331.

WENGLER L. (2001) – Settlements during the Middle Paleolithic of the Maghreb. *In* : N. Conard (ed.), *Settlement dynamics of the Middle Paleolithic and Middle Stone Age*. Kerns Verlag, Tübingen : 65–89.

WILSON L. (1986) – *Archéopétrographie des industries du Paléolithique inférieur de la Cauna de l'Arago (Tautavel, France).* Université Paris VI, Thèse de 3[e] cycle, 249 p.

WILSON L. (1996) – Mousterian raw material strategies in a regional context in Southern France. *In, Actes du XIII[e] Congrès UISPP*, Forli, vol.6, tome II : 783–791.

YOKOYAMA Y., NGUYEN H.V., QUAEGEBEUR J-P., JEAN-PIERRE F. (1987) – Datation par spectrométrie gamma non desctructive et résonance de spin électronique (ESR) du remplissage de la grotte Tournal à Bize. *Cypsela* 6 : 145–149.



Silex et coquillages. Approche à l'identification des territoires socio-économiques des Magdaleniens du vèrsant sud des Pyrenées catalans

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Résumé : Les territoires socioéconomiques des populations nomades du Paléolithique supérieur reposent sur la base de l'aperçu social des ressources, en définissant celles-ci comme des éléments orientés à la production et/ou reproduction des groupes des chasseurs-cueilleurs. Certaines productions humaines permettent par leurs caractéristiques, comme par exemple les spécificités d'origine des matières premières, de mieux appréhender ces territoires économiques et sociaux. Dans ce travail nous présentons un état des lieux et des résultats récents des analyses des matières premières, de l'approvisionnement et des voies de circulation des productions lithiques et de la malacofaune aménagée comme élément de parure des magdaléniens du versant sud des Pyrénées catalans.

Mots-clés : Matières premières, silex, malacofauna, Magdalénien, Catalogne, Grotte du Parco.

Abstract : *The socio-economic territories of the Upper Paleolithic nomad populations are founded on the basic overview of social resources, defining them as oriented elements to the production and / or reproduction of these groups. Some human productions allow us, by their characteristics such as the specificity of the origin of the raw materials, to better understand the economic and social behaviour. In this work we present an overview and recent results of analyses of raw materials, the procurement areas and mobility patterns of lithic productions and malacofauna manufactured as part of personal ornaments of Magdalenians of the southern slope of the Catalan Pyrenees.*

Key-Words : *Raw materials, flint, malacofaunal, Magdalenian, Catalonia, Parco cave.*

1 INTRODUCTION

Si nous parlons de populations humaines préhistoriques et de leur mobilité, il faut faire un rappel à quelques concepts clés. D'un côté, nous avons les espaces géographiques, des lieux définis par caractéristiques strictement naturelles (relief, lithologie, climatologie, réseaux hydrographiques, nature des sols, végétation, faune). Quand il y a une appropriation anthropique sur ces espaces géographiques, nous parlons de l'existence des territoires, lesquels possèdent une dimension humaine. Ces territoires sont des éléments dynamiques, car ils connaissent des variations selon le temps et l'espace et sont en plus des espaces d'interaction sociale (Mangado 2006).

Le changement entre espace géographique et territoire se produit quand les populations humaines reconnaissent l'existence des ressources, ces éléments de l'espace géographique reconnus culturellement par sa valeur à la reproduction économique, sociale et/ou symbolique de la communauté et qu'en plus peuvent être observés archéologiquement (Geneste 2004). Le paysage, en revanche, est la perception humaine des territoires – qu'il s'agit d'une perception individuel ou de la communauté – mais généralement il n'est pas tangible archéologiquement (Mangado 2006).

Les matières premières lithiques et la malacologie préservées dans un site archéologique, comme des ressources d'un territoire, sont des marqueurs aussi bien spatiaux que culturels et doivent être analysées depuis ces deux points de vue afin de bien pouvoir mener des études de déplacement de matières et/ou groupes humains.

D'une part, un utile lithique possède une valeur comme marqueur spatial, puisque la matière première sur laquelle il a été fabriqué provient d'un lieu physique et par moyen des études pétrologiques peuvent être associés à un endroit spécifique, permettant de faire une caractérisation à niveau géographique et géologique. De plus, l'utile lithique, après avoir été transformé par l'homme et devenir un produit de l'activité humaine, a une valeur comme émetteur d'information culturelle. D'autre part, les coquilles ont été profitées par les populations humaines préhistoriques en les concevant selon deux plans différents : l'économique, comme un élément à ajouter à leur diète -notamment dans les zones où sont plus abondants pendant certains moments de la Préhistoire (d'avantage pendant l'Epipaléolithique et périodes postérieurs) ; et le symbolique, en formant partie d'éléments de parure personnel. C'est en étudiant l'origine de ces coquilles avec une valeur symbolique qu'on pourra établir cette relation entre l'homme et le territoire. De cette manière, l'archéopetrologie et l'archéomalacologie, en étudiant les éléments comme ressources naturelles appropriés par des populations humaines, vont nous apporter des informations sur la territorialité d'une société humaine ou sur la mobilité d'un groupe dans l'espace et le temps.

2 LES MATIÈRES PREMIÈRES SILICEUSES ET LES COQUILLES EN TANT QUE RESSOURCES EN CATALOGNE PENDANT LA PRÉHISTOIRE

La Catalogne se situe au NE de la Péninsule Ibérique et elle présente un mosaïque de milieux géologiques et écologiques associés à l'existence de trois grandes unités géographiques : la Chaîne pyrénéenne, la Dépression centrale et le Système Méditerranéen -chaînes prelittorales- plus les réseaux hydriques, qui dessinent les bassins -du Fluvià, du Ter, du Llobregat et de l'Ebre -, les plus importants avec tous ses affluents.

La distribution des roches siliceuses dans cet espace géographique est irrégulière et il est important de souligner les régions du sud de la Catalogne - les terrains de l'Eocène des Chaînes prelittorales du Montsant - comme les zones les plus riches en silex (Ortí 1997).

Le versant sud des Pyrénées a été considéré pendant beaucoup de temps comme une zone pauvre en ressources siliceuses ; pourtant le développement des recherches depuis les années 80 a modifié cette image, notamment en ce qui concerne les chaînes extérieures et intérieures centrales (Terradas *et al.* 2004). Néanmoins, les chaînes intérieures orientales et les Pyrénées maritimes continuent à montrer un manque de ressources dont la qualité est très faible.

2.1 Principales formations géologiques avec silex en Catalogne

Dans la chaîne pré-littorale il faut souligner l'existence d'un silex continental évaporitique de l'Eocène, défini comme le Complex d'Ulldemolins. De plus, tout au longue de la chaîne prelittorale les séries du Triasique (Muschelkalk) possèdent des silex salins de faible aptitude à la taille.

Dans les chaînes extérieures et intérieures, les prospections menées ces dernières années ont permis d'identifier quatre formations géologiques avec silex très différents. D'abord, au Crétacé supérieur, le faciès Garum présente deux silicifications : l'une de type continentale évaporitique caractérisée par les lenticules de gypse ; et l'autre de type continentale lacustre, où prédominent les sections de characées (Maastrichtien). La formation lacustre du Rupelien, très similaire à celle lacustre du Maastrichtien, est un peu plus récent dans l'Oligocène, Les prospections ont permis aussi d'identifier dans les chaînes extérieures et intérieures un silex de type marin (Fm. Bona), dont la présence de foraminifères, comme miliolides, est définitoire de cette formation.

Dans les chaînes intérieures orientales, la présence de silex est moins abondante et en général il s'agit de nodules très diaclasés. Deux formations de l'Eocène s'étendent tout au long de la chaîne pyrénéenne. La première, la Fm. Corones, est du Cuisien inférieur, liée à une ambiance de formation du type continental lacustre. La deuxième, la Fm. Armàncies, du Cuisien supérieur, s'inscrit dans un régime de sédimentation marin, raison pour laquelle les spicules, les ostracodes et les foraminifères sont très caractéristiques. Tout au long de la chaîne pyrénéenne s'étend aussi une formation de lydiennes noires, stratifiées, datés du Carbonifère. À la limite des chaînes prépyrénéennes et la dépression centrale on trouve les séries conglomératiques de l'Unité de Vidrà Superior et Berga, qui sont composées par des fragments de silex originaux des formations situées en haut (Fm. Corones, Armàncies et lydiennes du Carbonifère) (Mangado *et al.* 2009).

Aux Pyrénées maritimes, les travaux de recherche ont permis de reconnaître trois formations avec silex (Mangado *et al.* 2009). Deux formations marines se trouvent au Massif du Montgrí : celle de l'Aptien, qui inclut un silex nodulaire et stratifié très diaclasé dans des calcaires du Crétacé inférieur ; et celle du Lias (Jurassique inférieur).

À la limite des Pyrénées maritimes et des Pyrénées centrales catalanes on trouve une formation carbonatée de l'Ilerdien (Eocène inférieur) avec des nodules de silex très diaclasés.

Finalement, aux Pyrénées centrales catalanes ressortent à côté du Massif du Canigou, des silicifications hydrothermales du Trias connues dans la littérature scientifique comme Jaspes du Canigou (**figure 1**).

En ce qui concerne la malacologie, bien que la consommation des ressources marines est documentée depuis le Paléolithique moyen (par exemple occupations néandertaliennes de Vanguard Cave (Stringer *et al.* 2008), leur exploitation systématique n'est pas attestée jusqu'à présent qu'à partir du Paléolithique supérieur.

La mer en général, et la Méditerranée en particulier, offrent une grande quantité de ressources que par leurs caractères périssables ont été exploités – principalement dans les sites où ils ont été approvisionnés –. Ceci rend difficile son évaluation étant donné qu'on peut penser qu'une bonne partie des gisements de la façade méditerranéenne sont à nos jours submergés après la transgression marine holocène (Aura 2001).

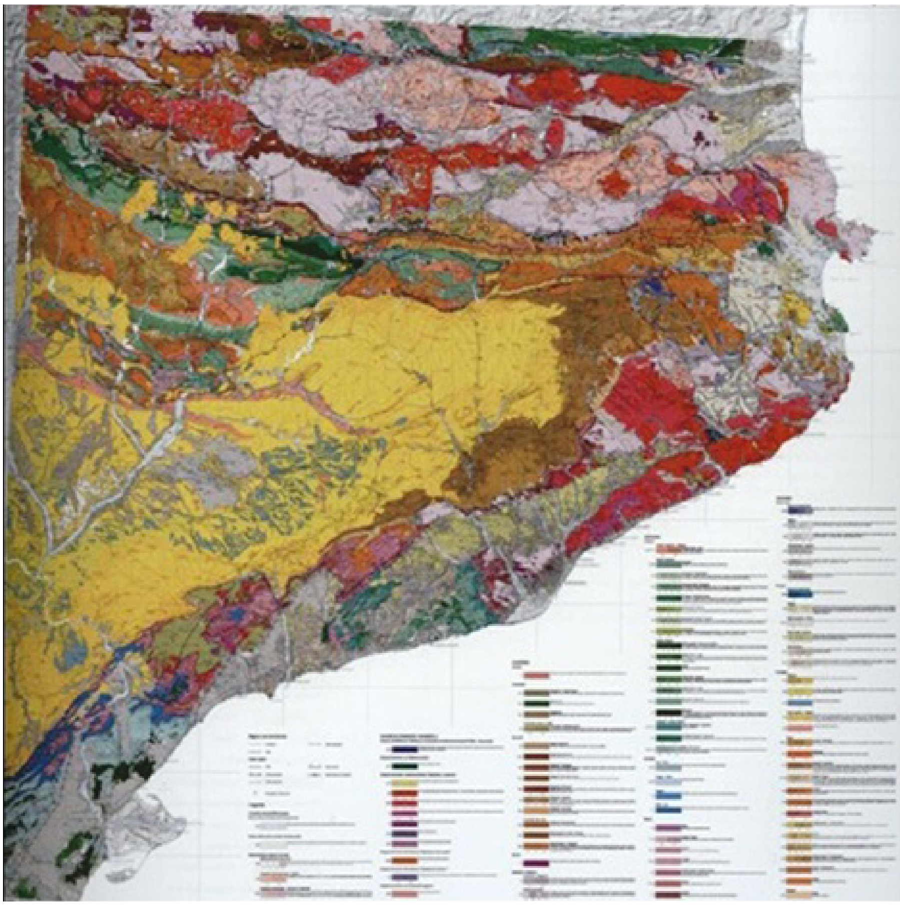


FIGURE 1 Carte géologique de la Catalogne. Échelle 1:250.000 IGC.

Nous avons un bon exemple d'exploitation intensive des ressources marines à la Grotte de Nerja (Málaga) (Aura 2001, Avezuela *et al.* 2010). Dans ce site, depuis le Dernier Maximum Glacial s'est incrémentée la consommation de poissons, hérissons de mer, oiseaux marins et mollusques. On observe ce même type de ressources – poissons et mollusques sans valeur ornemental – à certains gisements situés plus à l'intérieur (p.e. Santa Maira, dans la zone centrale du levant ibérique, qui se trouve à 32 km de la ligne de côte actuelle) mais toujours en une moindre quantité (Aura *et al.* 2009). Néanmoins, les matières en provenance de la mer employés comme ornements personnels ont parcouru des plus longues distances, soit par la mobilité des groupes humains, soit par l'échange avec des groupes situés dans de territoires plus à l'intérieur.

Pendant le Paléolithique supérieur les gastéropodes et les scaphopodes sont les mollusques les plus exploités pour fabriquer des objets de parure. Au sud-ouest de l'Europe les espèces les mieux représentées, parmi d'autres, sont : *Littorina obtusata*, *Trivia arctica*, *Nucella lapillus* et *Dentalium* sp. Certains gastéropodes proviennent d'habitats spécifiques comme *Cyclope neritea* et *Homalopoma sanguineum*, taxons typiquement méditerranéens qui sont notamment les mieux représentés dans les sites retenus pour cette étude.

3 LE MAGDALÉNIEN AU VERSANT MÉRIDIONAL DES PYRÉNÉES ORIENTALES

Le Magdalénien est la période du Paléolithique supérieur qui montre la plus grande occupation humaine au NE de la Péninsule Ibérique. Différents sites archéologiques ont été localisés dans les vallées et les montagnes pyrénéennes et il faut remarquer la vallée du Segre parce que dans cette zone s'y trouvent la plus part de sites de cette chronologie (**figure 2**) (Fullola *et al.* 2012).

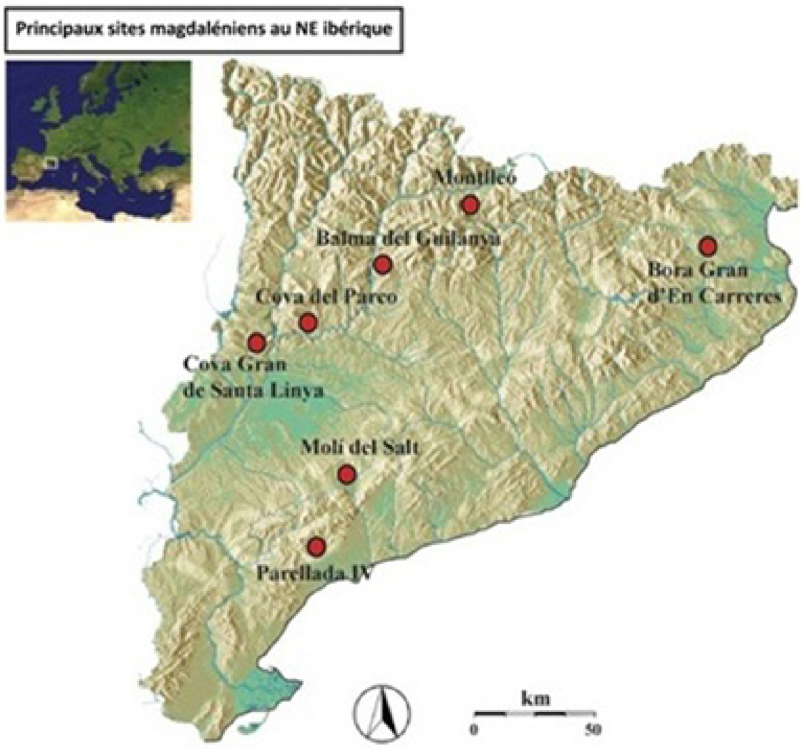


FIGURE 2 Principaux sites magdaléniens au N-E ibérique.

L'origine des études sur le Paléolithique en Catalogne débute vers la moitié du XIX^e^ siècle avec la découverte et la fouille de la Bora Gran d'en Carreras (Josep M. Corominas et temps après Ll. Pericot) (Soler 1976). Pendant les années 20 au 50 du XX^e^ siècle, Pericot contrôle les travaux des amateurs locaux aux différents sites magdaléniens. Finalement, dans le dernier tiers du XX^e^ siècle ont été découverts et fouillés différents sites magdaléniens dans le versant méridional des Pyrénées et Prépyrénées catalanes. La Grotte du Parco, découverte en 1974, est en fouille par le SERP de l'Université de Barcelone depuis 1987.

4 La Grotte du Parco (Alòs de Balaguer, Lleida)

Ce site magdalénien est l'un des premiers, parmi cette phase chronoculturelle au NE de la Péninsule Ibérique, découvert à l'intérieur de la Catalogne, dans l'aire pré-pyrénéenne, en occupant une des voies naturelles qui montent vers la chaîne pyrénéenne depuis le bassin de l'Èbre, tout comme les grottes de Chaves et Alonsé, déjà dans le secteur aragonais.

Les niveaux magdaléniens (datés entre 16 900 et 14 800 cal BP 2σ) présentent des caractéristiques qui nous font penser à l'existence des occupations structurées et complexes. Nous avons identifié un total de 41 structures de combustion avec des morphologies très variées parmi lesquelles il y a des foyers plats, des petites cuvettes délimitées par des galets, des foyers doubles, *etc.* qui témoignent des passes successives de groupes réutilisant ou réaménageant des espaces déjà structurés lors d'une précédente occupation.

En ce qui concerne les industries lithiques, il faut souligner que nous sommes face à un ensemble lithologique composé, presque de façon exclusive, par de silex. Néanmoins, nous avons identifié quelques galets de cornubianite, débités pour la production d'éclats utilisés en brut, des nucleus prismatiques en calcaire et des galets en granite, la plupart sans traces de percussion, mais brûlés, qui ont été découverts à l'intérieur de certains foyers. Ces matériaux nous amènent à nous interroger sur leurs fonctionnalités pendant l'occupation (Mangado *et al.* 2006–2007).

Au sein des vestiges en silex, l'étude archéopétrologique en lames-minces met en évidence deux types principaux de silicifications d'origine géologique et géographique divers (Mangado 2005) (**figure 3**) :

- la plupart des silex appartiennent à des milieux sédimentaires de formation évaporitique, localisés dans des gîtes primaires de calcarénites et calcaires du Crétacé supérieur et du Paléocène (faciès Garum, formation de Tremp dans les chaînes extérieures centrales). Ce silex peut se rencontrer également dans des gîtes secondaires. Leur abondance à proximité du site et la documentation des chaînes opératoires complètes pour cette matière première marquent un approvisionnement local. Ce silex est largement utilisé pour l'outillage domestique ;

- le second type est lié à des milieux sédimentaires carbonatés d'eaux douces. Les gîtes primaires de cette matière sont des calcaires lacustres de l'Oligocène initial (Sannoisien-Stampien) des Pré-Pyrénées, au contact avec la Vallée de l'Ebre. Ce silex se trouve également en position secondaire au pied des gîtes primaires. Compte tenant de la distance entre ces gîtes et le site (d'environ 40 km à vol d'oiseau) nous définissons cet approvisionnement comme régional. Ce type de silex fut intensivement exploité pour les débitages lamino-lamellaires ;

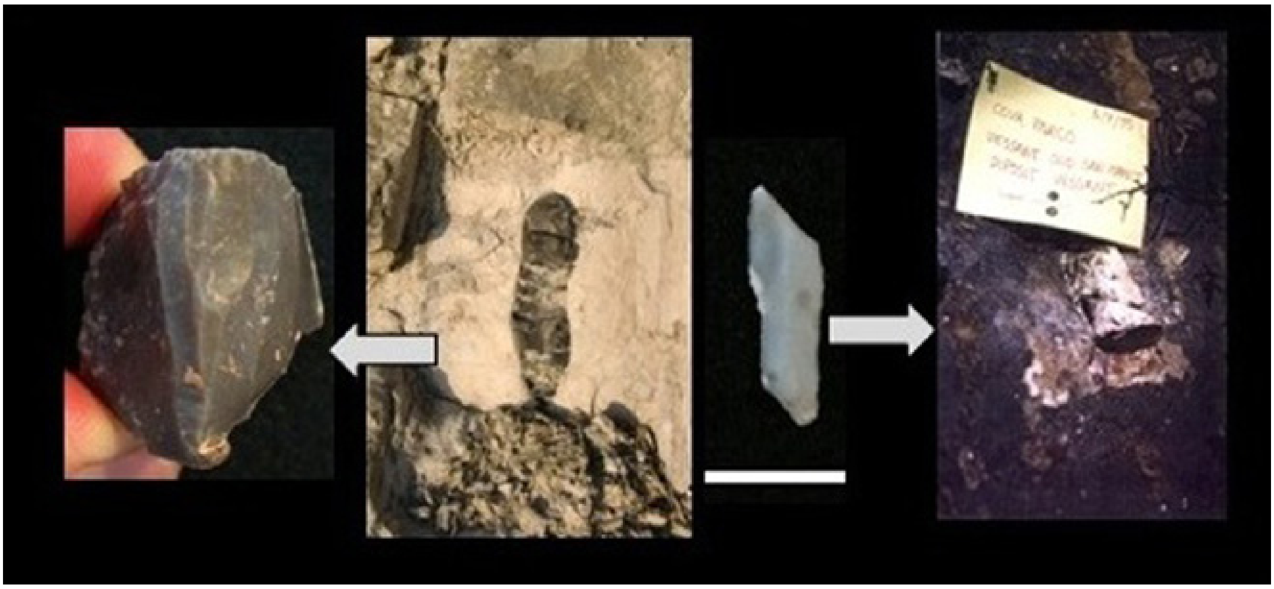


FIGURE 3 À gauche : silex noir de la Grotte du Parco avec son équivalent aux formations de l'Oligocen. A droite : silex blanche de la Grotte du Parco et un échantillon de silex aux calcaires du facies Garumnien.

- enfin, quelques outils en matières premières allochtones indéterminées pourraient témoigner, soit du transport sur de plus grande distance de pièces à longue durée accompagnant les groupes, soit d'échanges inter-groupes.

Le nombre et la variété des outillages lithiques mis à jour dans l'aire domestique de la grotte mettent en évidence des activités diversifiées. La plupart de l'équipement domestique a été réalisé sur place à partir des rognons en silex régional et local. Tandis que des gros volumes en silex local ont été abandonnés après des séquences de production laminaire simplifiée, le silex sannoisien témoigne d'une rentabilisation maximale des débitages laminaires et lamellaires.

L'équipement en matières dures animales des couches magdaléniennes du Parco est composé de plus d'une soixantaine de pièces. On trouve aussi bien des objets finis que des supports, des déchets et des pièces en cours de façonnage qui nous permettent de reconstituer l'schème opératoire d'exploitation de ces matières (Tejero 2005 ; Tejero & Fullola 2008). Plus de la moitié des objets du gisement ont été confectionnés en bois de cervidé. Le reste est en os et en coquille. Il existe une corrélation entre les matières premières et les morphotypes auxquels ils sont associés : les armatures de sagaies ont été fabriquées en bois de cervidé, la totalité des aiguilles (**figure 4**) sont en os et la parure est toujours en coquille à l'exception de dents craches de cerf perforés.

L'ensemble des mollusques façonnés comme éléments d'ornement personnel de Parco est composé de plus d'une centaine de pièces. Nous avons identifié 28 exemplaires d'une espèce de gastéropode d'origine fluviale *Theodoxus fluviatilis*, mais la plupart des coquilles ont une origine marine. On décompte jusqu'à présent 56 *Homalopoma sanguineum*, 9 *Cyclope neritea* et 5 *Cyclope* sp. Dans une moindre mesure, les groupes des bivalves et des scaphopodes sont aussi représentés, avec 2 *Clamys* sp., 5 *Pecten* sp., 2 *Dentalium vulgare* et 5 *Dentalium* sp. (**figure 5**).

FIGURE 4 Aiguille en os in situ trouvée à la Grotte du Parco.

FIGURE 5 1 : *Cyclope neritea*, 2 : *Homalopoma sanguineum*, 3 : *Dentalium* sp., 4 : *Theodoxus fluviatilis*. Récupérés à la Grotte du Parco.

5 LE SITE EN PLEIN AIR DE MONTLLEÓ (PRATS I SANSOR, LLEIDA)

Le site en plein air de Montlleó se trouve dans la vallée de la Cerdagne, au cœur des Pyrénées. L'endroit fait partie d'un petit affleurement rocheux de conglomérats d'âge post-miocène situé à 1134 mètres d'altitude. Le gisement de Montlleó fut découvert en 1998 à cause de la présence de plusieurs éléments lithiques et restes de faune dans une coupe d'érosion provoquée par l'exploitation d'une mine de lignite en plein air, qui est aujourd'hui abandonnée. Le SERP de l'Université de Barcelone y fouille depuis l'année 2000.

Trois datations situent l'occupation pendant le Magdalénien initial (Mangado *et al.* 2011), à l'épisode glaciaire GS2b, qui est le moins froid des épisodes glaciaires du Postglacial, entre 18 000 et 19 000 ans cal BP (2σ). Il y aurait de la glace en surface, mais nous ne sommes pas face à des véritables permafrosts, car les glaciers se développeraient à plus de 2000 m, restant toujours ouvert à cette période le pas pyrénéen du Col de la Perxa (Bergadà & Serrat 2006).

Nous avons récupéré des matières premières lithiques très diversifiées. D'une partie, il y a les matières premières d'origine locale (rhyolites, quartz, cristal de roche, lydienne); et d'une autre, le silex, de différents types et d'origine exogène, car il n'y a pas d'affleurements dans la vallée de la Cerdagne.

Les études archéopétrologiques, encore en cours, nous permettent d'annoncer à ce moment l'existence de silex d'origine diversifiée (continental lacustre, évaporitique et marin, et aussi la présence de silicifications hydrothermales) (**figure 6**). L'origine de ces matières n'est pas claire. Il faudra chercher dans les deux versants des Pyrénées, car aussi bien au sud qu'au nord affleurent silex d'origine lacustre (Sannoisien des chaînes extérieures en Catalogne et silex oligocènes dans le bassin de Narbonne-Sigean) et évaporitique (le Garumnien des chaînes extérieures en Catalogne, qui a son équivalent avec le Danien des Petits Pyrénées).

FIGURE 6 Observation macroscopique des différents types de silex récoltés à Montlleó.

Une autre origine possible pour les silex lacustres et marins pourrait être la Chaîne du Cadí, où s'y trouvent les formations Armàncies (avec silex marins) et Corones (avec silex lacustres). Par rapport à ces silicifications hydrothermales identifiées, elles pourraient avoir sa correspondance avec les jaspes du Canigou, qui affleurent à 60 km du site.

La variabilité typologique et fonctionnelle des industries lithiques de Montlleó montre la détermination à faire des outils différents pour des activités précises. L'outillage laminaire est débité à partir des supports apportés en brut au gisement - il n'existe pas de nucléus laminaires ni des séquences de réduction laminaire-. Nous trouvons aussi des outils fabriqués avec des éclats. Nous avons identifié, en plus, deux chaînes opératoires lithiques pour la production de lamelles, qui sont fabriquées sur place (Langlais 2007).

L'industrie en matières dures animales de Montlleó n'est pas très riche pour l'instant. Nous avons récupéré, pendant les fouilles programmées du site, certains éléments de parure bien caractéristiques du Magdalénien dans d'autres régions comme les Cantabres. Il s'agit de deux canines atrophiques de cerf (*Cervus elaphus*) perforés (**figure 7**).

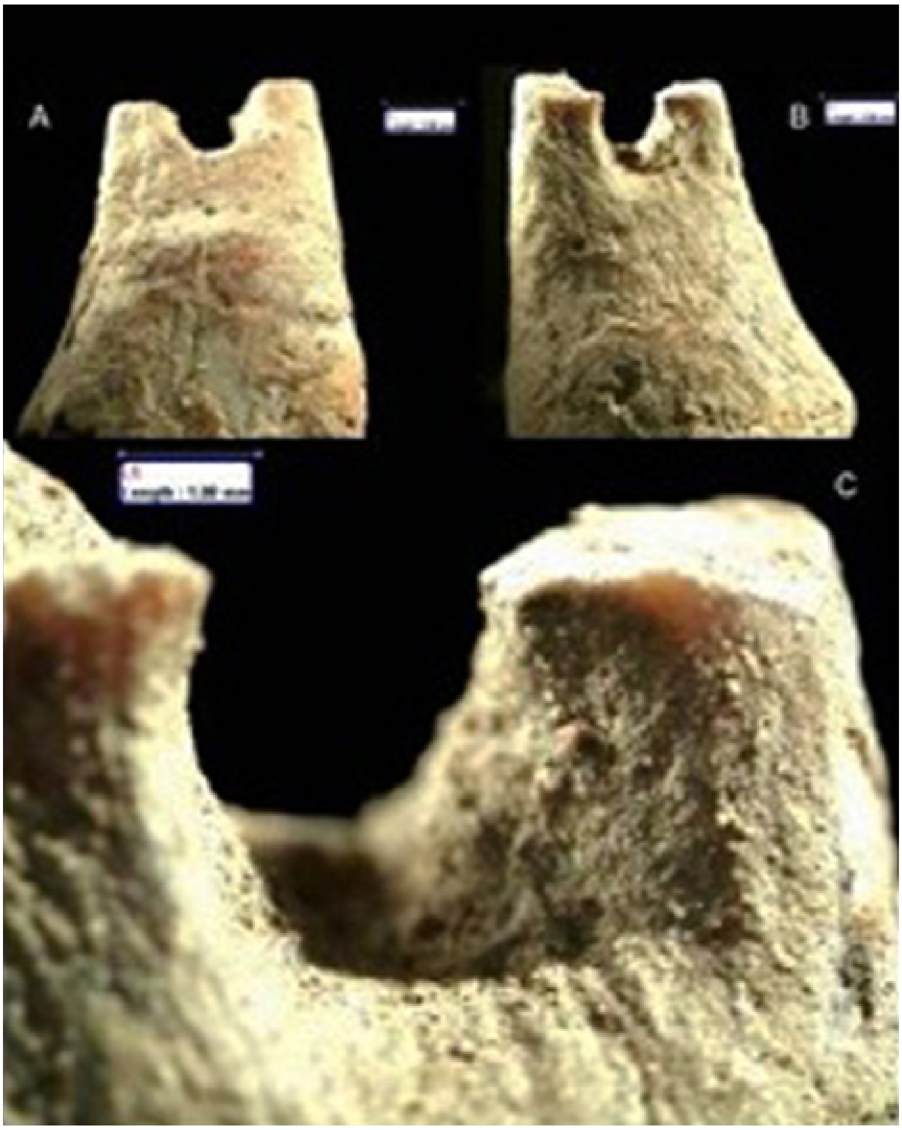


FIGURE 7 Canine atrophique de cerf perforé récupéré à Montlleó.

On compte aussi avec deux fragments de sagaie de type indéterminé car leurs bases ne sont pas conservées, et un probable support de type baguette, tous fabriqués en bois de cervidé (Tejero 2003–2004).

En ce qui concerne les coquillages trouvés à Montlleó, ils sont en moindre nombre qu'à Parco, mais nous verrons plus tard leur importance au sujet de l'établissement des territoires magdaléniens à la région étudiée car parmi les taxons représentées on trouve des espèces qui habitent aussi bien dans la Méditerranée que dans l'Atlantique (*Dentalium* sp, *Hinia incrassata*, *Trivia* sp) des espèces exclusivement méditerranéennes (*Cyclope pellucida* et *Homalopoma sanguineum*) et des espèces probablement d'origine atlantique (*Littorina obtusata*).

6 BALMA DEL GUILANYÀ (NAVÈS, LLEIDA)

Cet abri de petites dimensions se situe sur des séries conglomératiques à 1 157 m sm dans les Pre-Pyrénées orientales, à la commune de Navès, dans une vallée fermée et avec peu de visibilité, ce qui aurait fomenté la création d'écotones et l'exploitation des ressources végétaux et animaux. Il est fouillé depuis 2001 par une équipe de l'Université Autonome de Barcelone. Trois unités archéologiques ont été attribuées au Tardiglacier (K, Ej et E) et associés à une datation du Magdalénien final (12 180 ± 150BP) (Martínez & Mora 2009).

L'industrie lithique du niveau E est faite en grande partie en silex (80 %) mais les préhistoriques ont exploité aussi d'autres lithologies (quartz, calcaire, lydiennes et roches métamorphiques). L'origine de ces matières semble local, possiblement des séries conglomératiques des alentours, mais leur fouilleurs ne rejettent pas la possibilité de la présence de silex allochtone. Deux systèmes de taille ont été identifiés, l'un pour l'élaboration d'éclats et l'autre pour la production de lames, avec une tendance à la microlithisation de l'outillage. Dans ce niveau tardiglaciaire a été identifié un *Nassarius reticulatus*, qui pourrait être originaire de l'Atlantique ou de la Méditerranéen (Casanova *et al.* 2007).

7 COVA GRAN DE SANTA LINYA (SANTA LINYA-LES AVELLANES, LLEIDA)

Le site de la Cova Gran se trouve dans la commune de Santa Linya - Les Avellanes, dans l'un des affluents du Sègre (la Noguera Pallaresa). Ce gisement, découvert en 2002, est fouillé par une équipe de l'Université Autonome de Barcelone. Il s'agit d'un abri de grandes dimensions avec des occupations humaines comprenant du Paléolithique moyen à la Préhistoire récente. Le Magdalénien a été identifié dans le secteur P et dans l'unité S4 du secteur T, avec diverses couches archéologiques attribuables au techno-complex magdalénien ; on observe une dominance des burins sur les grattoirs et une tendance nette vers une microlithisation de l'industrie lithique ; quatre dates nous situent entre 20 400 et 17 700 cal BP 2σ, entre les phases initiales et moyennes du Magdalénien (Mora *et al.* 2011). En ce qui concerne l'industrie lithique, le silex est la seule matière première utilisée (Martínez *et al.* 2008).

8 Molí del Salt (Vimbodí, Tarragona)

Cet abri ouvert dans des séries conglomératiques de l'Oligocène se situe sur la confluence de la Dépression central et la Chaîne pré-littorale. Il est fouillé par une équipe de l'Université Rovira i Virgili de Tarragona. L'ensemble B présente deux niveaux archéologiques avec datations correspondant au Magdalénien final (entre 15 300 et 13 590 cal BP 2σ) (Vaquero *et al.* 2012 : 2788).

Par rapport à l'industrie lithique il y a une tendance à la fabrication de supports laminaires. Le silex est la matière la plus utilisée (95 %), mais d'autres roches ont été aussi taillées (quartz, quartzite et calcaire). Il y a aussi des percuteurs et pileurs d'schiste, granite et grès. L'étude archéopetrologique des matières premières lithiques révèle une origine locale pour ces matières non taillées et le quartz, le quartzite et le calcaire. Le silex a des origines diverses, mais avec une représentation importante du silex des affleurements locaux de l'Eocène (notamment du Complex d'Ulldemolins), à moins de 20 km du site. La présence de silex allochtones met en évidence aussi la possible existence de déplacements systématiques à zones plus éloignées de ce rayon de territorialité local (formations lacustres du Bassin de l'Èbre), ou bien l'existence des contacts avec d'autres communautés préhistoriques pour l'échange de matériaux (Soto *et al.* 2011).

Les matières dures animales ont été utilisées pour la fabrication d'outils appointés (**figure 8**). Dans les fouilles ont apparu trois fragments de *Pecten jacobeus* et un *Glycymeris glycymeris* complet et perforé (Vaquero 2004). *Pecten jacobeus* provient de la Méditerranée. L'origine de *Glycymeris glycymeris* est atlantique mais elle a pu coloniser la Méditerranée dans des phases froides (Taborin 1993), en fait, aujourd'hui on la trouve dans la Méditerranée et dans l'Atlantique.

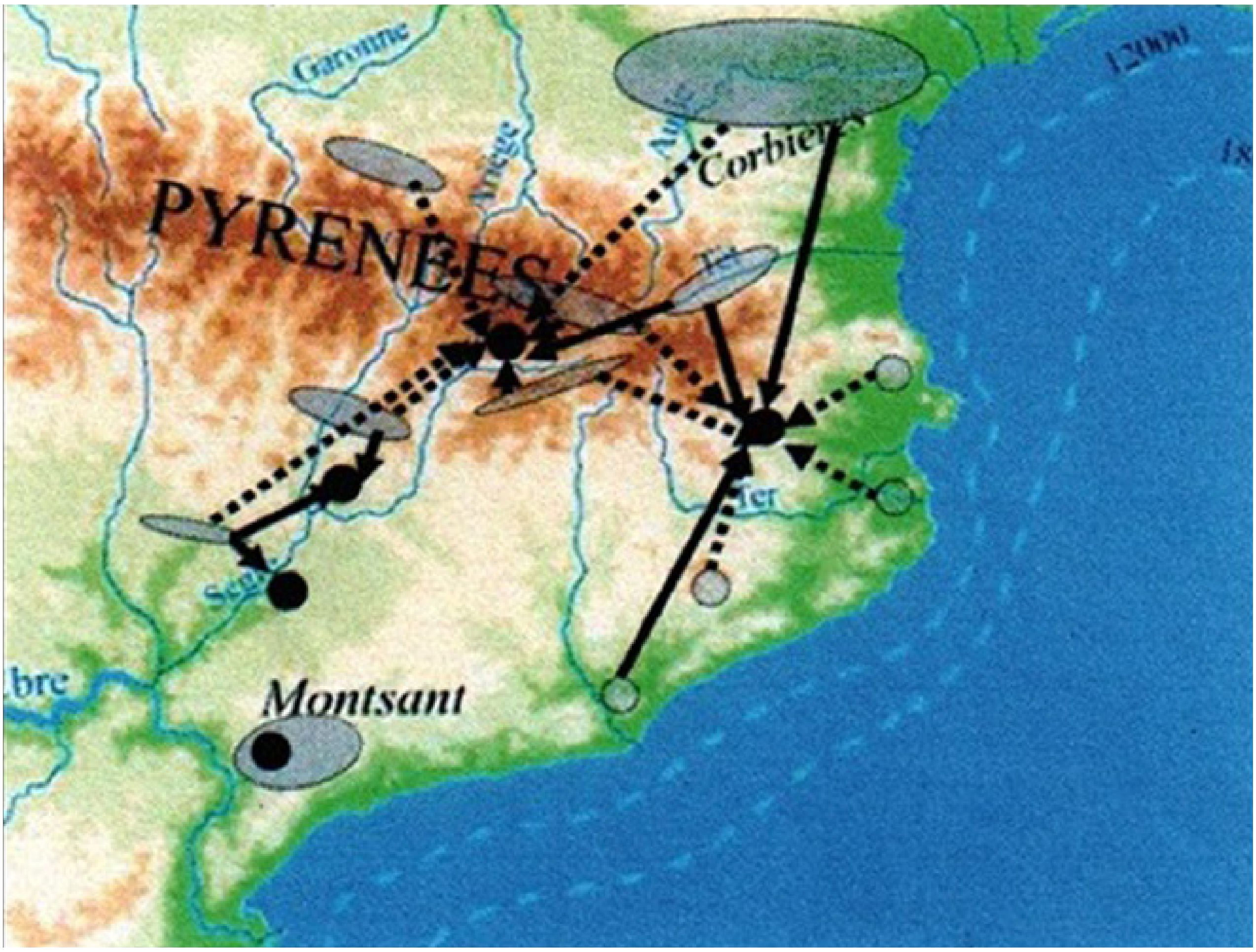
FIGURE 8 Industrie osseuse récupérée à Molí del Salt. (Vaquero 2004).

9 CONCLUSIONS : LES TERRITOIRES SOCIOÉCONOMIQUES

Les matières premières lithiques récupérées, notamment dans les sites situés aux chaînes pyrénéennes et pré-pyrénéennes, montrent l'existence d'une mobilité des matières et possiblement de personnes en suivant l'axe du Sègre, où sont situés les sites de Cova del Parco, Montlleó et la Cova Gran de Santa Linya. Dans cet aspect, une étude approfondi des silex de la Balma del Guilanyà s'annonce indispensable pour permettre nous apporter des nouvelles données sur la mobilité dans les vallées secondaires entre le Sègre et le Llobregat, qui pourraient avoir été utilisées comme lieux de circulation transversale à travers les Pré-Pyrénées. Par ailleurs, la présence de matières premières lithiques d'origine allochtone dans l'assemblage du Molí del Salt met en évidence l'existence d'une relation avec le Bassin de l'Ebre, ne restant pas isolé des autres sites magdaléniens de la Catalogne. De plus, la situation de Montlleó au cœur des Pyrénées et dans l'une des voies les plus abordables pour traverser cette chaine montagneuse par le Col de la Perxa, fait de l'étude approfondi des matières premières lithiques la clé de voute pour identifier la mobilité des groups de chasseurs-cueilleurs magdaléniens et sa relation avec les axes du Têt et du Segre, en établissant de cette manière une liaison très claire de ces groupes avec la Méditerranée (**figure 9**).

C'est indispensable donc chercher des nouvelles approximations méthodologiques pour l'archéopetrologie qui soient plus précises et qui nous permettent de résoudre les problèmes qui se sont mis à l'échelle de la loupe binoculaire et la lame-mince.

FIGURE 9 Les aires d'approvisionnement en silex des sites magdaléniens de la Catalogne.



De cette manière, l'analyse des matières premières lithiques par des méthodes plus complexes comme la fluorescence s'avère très utile pour résoudre le problème de la convergence de faces siliceuses entre les deux versants des Pyrénées, fait qui pourrait aider à comprendre si ces matières que nous trouvons aux sites magdaléniens pyrénéens proviennent d'un côté ou l'autre des Pyrénées, ou bien de tous les deux.

Il n'y a pas de doute en ce qui concerne le caractère symbolique donné par les magdaléniens aux espèces de coquillages présentes dans les gisements étudiés. D'abord, il faut penser que presque toutes les pièces sont perforées, un fait qui transforme les coquillages dans des objets de parure conçus pour les mener sur le corps en leur donnant une signification particulière qui, malgré tout, on est loin de connaître. Aussi, leur petite taille —*Homalopoma* et *Cyclope* n'ont que quelques millimètres, même pour les exemplaires les plus grands— rend nulle l'intérêt bromatologique à ces taxons. Par ailleurs, la distance de Parco et Montlleó aux sources d'approvisionnement de ces coquilles signale dans ce même sens, même pour la *Littorina obtusata*, consommé dans d'autres contextes géographiques et chronologiques (p. e. postpaléolithique cantabrique et de la côte atlantique), on n'a qu'un seule exemplaire à Montlleó.

Ce qui est intéressant à constater, d'après l'analyse des évidences de Parco, c'est justement le choix systématique des taxons de très réduite taille. Puis qu'on sait que l'éventail des espèces à disposition des magdaléniens était très large, on peut penser que les taxons choisis sont investis d'une signification spéciale de par certains de leurs attributs morphologiques ou esthétiques (forme, couleur…). Alors, c'est notamment la valeur *supra*-matériel, à la fois symbolique et sémiotique, attribué à ces objets ce qui contribue à sa mobilité liée à celle des magdaléniens et ses relations intergroupales. À ce sujet, selon certains auteurs (Taborin 2004), l'approvisionnement des coquillages est un reflet de dynamisme de la vie sociale de ces groupes chasseurs-cueilleurs et leurs liens avec des différentes bandes tout au long d'un territoire plus o moins large. Au sein de ce territoire les mécanismes d'échange – matériel et immatériel mais aussi démographique – montreraient un système fondé sur la solidarité parmi les groupes comme le seul moyen d'assurer la reproduction de chaque entité « familiale ». Ce pour cette raison qu'il ne faut pas évoquer des longs déplacements des groupes magdaléniens pour s'approvisionner des coquillages qui feront plutôt partie des échanges saisonnières pour les groupes établies le plus à l'intérieur.

La présence d'exemplaires de gastéropodes, aménagés comme éléments de parure dans des gisements éloignés des zones d'habitat naturel de chaque taxon, est documentée tout au long du Paléolithique supérieur, notamment pour les phases les plus récentes. Dans nos cas d'étude est particulièrement significative la présence de *Littorina obtusata* à Montlleó. *Littorina obtusata* habite aujourd'hui exclusivement sur la côte atlantique. L'origine atlantique de cette espèce a été discuté en raison de sa présence dans des sites de la côte méditerranéenne ibérique comme Cueva de Ambrosio (Avezuela et Álvarez-Fernández, s.p), Nerja (Jordá *et al.* 2006) ou Pirulejo (Muñoz, 1998), toutes dans la zone méridionale, andalouse, de la Péninsule Ibérique, où cette *Littorina obtusata* a pu mener de colonisations au cours des périodes froides de la fin du Pléistocène (Aura *et al.* 2010, Taborin 1993, Álvarez-Fernández 2006). Cependant, compte tenu de son origine atlantique on peut penser à la possibilité que son arrivée aux Pyrénées centrales ait été faite soit depuis le nord de cette chaine montagnarde, à travers du bassin aquitaine, soit depuis la vallée de l'Ebre. Pour les *Homalopoma sanguineum* et les *Cyclope*, leur origine méditerranéenne n'a pas empêché sa diffusion vers des territoires très éloignés de ce bassin marin comme l'Europe centrale où ils ont arrivé en suivant le bassin du Rhin (Alvarez-Fernández 2002a).

Mais, les *Homalopoma* et les *Cyclope* sont présents aussi dans la zone cantabrique de l'Espagne, aux niveaux magdaléniens de Tito Bustillo —les deux espèces— et El Horno —*Homalopoma sanguineum*— (Alvarez-Fernández 2002b, Vanhaeren, M., 2005). Cette circonstance a été exprimée jusqu'à nos jours par l'existence d'une voie nord-pyrénéenne entre la Méditerranée et l'Atlantique. Désormais, la présence des *Homalopoma* et des *Cyclope* à Montlleó et Parco, permet proposer aussi l'hypothèse d'un nouveau couloir à travers de la vallée de l'Ebre en unissant la Méditerranée et l'Atlantique (Estrada *et al.* 2010).

À mode de conclusion, nous voudrions insister sur l'idée que bien que les études sont encore en cours et qu'il reste beaucoup de travail à faire ; en ce moment nous pouvons constater l'existence des réseaux de mobilité ou d'échange à travers le territoire pyrénéen, au moins pendant le Magdalénien. Les Pyrénées n'ont pas été conçus comme un lieu de frontière, mais comme un espace de communication qu'on à déjà détecté au début du Magdalénien avec la présence des jaspes du Canigou au site de Montlleó, et que se poursuit au longue du Magdalénien, car on trouve des évidences de l'existence de ces échanges dans les niveaux de la fin du Magdalénien supérieur à la Grotte du Parco.

BIBLIOGRAPHIE

ÁLVAREZ-FERNÁNDEZ E. (2002a) – Ejemplares perforados del gasterópodo *Homalopoma sanguineum* durante el Paleolítico superior en Europa occidental. *Cypsela* 14 : 43–54.

ÁLVAREZ-FERNÁNDEZ E. (2002b) – Perforated *Homalopoma* sanguineum from Tito Bustillo (Asturias) : mobility of Magdalenian groups in northern Spain. *Antiquity* 76 : 641–646.

ÁLVAREZ-FERNÁNDEZ E. (2006) – *Los objetos de adorno-colgantes del Paleolítico superior y del Mesolítico en la Cornisa Cantábrica y en el Valle del Ebro : una visión europea. Salamanca*. Universidad de Salamanca.

AURA TORTOSA J.E., JORDÁ PARDO J.F., PÉREZ RIPOLL M. & RODRIGO GARCÍA M. J. (2001) – Sobre dunas, playas y calas. Los pescadores prehistóricos de la Cueva de Nerja (Málaga) y su expresión arqueológica en el tránsito Pleistoceno-Holoceno. *Archivo de Prehistoria Levantina* 24 : 9–39.

AURA TORTOSA J.E., JORDÁ PARDO J.F., MORALES J.V., PÉREZ RIPOLL M., VILLALBA CURRÁS M.P. & ALCOVER J.A. (2009) – Economic transitions in *finis terra* : the western Mediterranean of Iberia, 15–7 ka BP. *Before Farming* 2(4).

AURA J.E., JORDÁ PARDO J.F., PÉREZ RIPOLL M., BADAL E., MORALES J.V., AVEZUELA B., TIFFAGOM M. & JARDÓN P. (2010) – Treinta años de investigación sobre el Paleolítico superior de Andalucía : la Cueva de Nerja (Málaga, España). *In* : X. Mangafdo (ed.), *El Paleolítico superior peninsular. Novedades del siglo XXI. Barcelona*. Seminari d'Estudis i Recerques Prehistòriques, Universitat de Barcelona. p. 149–172.

AVEZUELA ARISTU B., JORDÁ PARDO J.F., AURA TORTOSA J.E., PÉREZ RIPOLL M., MORALES PÉREZ J.V., VILLALBA CURRÁS M.P. & ÁLVAREZ FERNÁNDEZ E. (2010) – Nerja Cave and the Sea : marine resources of the chambers of Vestíbulo and Mina in Epipalaeolithic times. In : *MESO2010. The 8th International Conference on the Mesolithic in Europe*, Santander, 13–17 septembre 2010.

AVEZUELA ARISTU B. & ÁLVAREZ FERNÁNDEZ E. (SOUS PRESSE) – Los objetos de adorno-colgantes durante el Solutrense en el SW de Europa. *In : Congreso Internacional El Solutrense. Centenario de las excavaciones en La Cueva de Ambrosio*, Vélez-Blanco (Almería, España), 25–29 juin 2012, Espacio, tiempo y forma.

BERGADÀ M.M. & SERRAT D. (2006) – Episodis sedimentaris i paleoambientals en el vessant meridional dels Pirineus orientals entre els c.20 – 11,5 ka cal BP. *In: Els Pirineus i les àrees circumdants durant el Tardiglacial. Mutacions i filiacions tecnoculturals, evolució paleoambiental (16 000–10 000 BP), Actes du XIV[e] Colloque Internationale d'Archéologie de Puigcerdà. Puigcerdà*. Institut d'Estudis Ceretans et Patronat F. Eiximenis. p. 105–128.

CASANOVA J., MARTÍNEZ J. & MORA R. (2007) – Traçant l'ocupació dels Pirineus*: la Balma* Guilanyà i els caçadors recol·lectors del Tardiglacial i l'Holocè antic al Prepirineu Oriental. In: *Tribuna d'Arqueologia 2006–2007*. Barcelona. Dept. de Cultura de la Generalitat de Catalunya. p. 59–83.

ESTRADA A., TEJERO CACERES J.M., MANGADO X., PETIT M.A., FULLOLA PERICOT J.M., BARTROLÍ R. & ESTEVE X. (2010) – From the Mediterranean Sea to the Segre River: perforated shells from Magdalenian levels of Cova del Parco (Alòs de Balaguer, LLeida, Spain). In: E. Àlvarez-Fernander & D. Carvajal Contreras (eds.), 2[nd]. *Meeting of the ICAZ Archaeomalacology Working Group. Not only Food. Marine, Terrestrial and Freshwater Molluscs in Archaeological Sites.* Santander, Munibe Suplemento 31: 70–77.

FULLOLA J.M., MANGADO X., TEJERO J.M., PETIT M.A., BERGADÀ M.M., NADAL J., GARCÍA-ARGÜELLES P., BARTROLÍ R. & MERCADAL O. (2012) – The Magdalenian in Catalonia (northeast Iberia). *Quaternary International* 272–273: 55–74.

GÉNESTE J.-M. (2004) – Mobilité des matières premières siliceuses et mobilité territoriale au Paléolithique supérieur. *Pré-actes du Xth Annual meeting of European Association of Archaeologists*.

JORDÁ PARDO J.F., AURA TORTOSA J.E., MARTÍN ESCORZA C. & AVEZUELA ARISTU B. (2010) – Archaeomalacological remains from the Upper Pleistocene- Early Holocene record of Vestíbulo of Nerja Cave (Málaga, Spain). In: E. Àlvarez-Fernander & D. Carvajal Contreras (eds.), 2[nd]. *Meeting of the ICAZ Archaeomalacology Working Group. Not only Food. Marine, Terrestrial and Freshwater Molluscs in Archaeological Sites.* Santander, Munibe Suplemento 31: 78–87.

LANGLAIS M. (2007) – *Dynamiques culturelles des sociétés magdaléniennes dans leurs cadres envionnementaux. Enquête sur 7000 ans d'évolution de leurs industries lithiques entre Rhône et Èbre.* Thèse de Doctorat. Université de Toulouse-Le Mirail.

MANGADO X. (2005) – *La caracterización y el aprovisionamiento de los recursos abióticos en la Prehistoria de Cataluña: las materias primas silíceas del Paleolítico Superior Final y el Epipaleolítico*. Oxford, BAR International Series 1420.

MANGADO X. (2006) – El aprovisionamiento en materias primas líticas: hacia una caracterización paleocultural de los comportamientos paleoeconómicos. *Trabajos de Prehistoria* 63(2): 79–91.

MANGADO X., FULLOLA J.M., PETIT M.A. & BARTROLÍ R. (2006–2007) – El paleolític superior final de la Cova del Parco (Alòs de Balaguer, La Noguera, Lleida). *Revista d'Arqueologia de Ponent* 16–17: 45–62.

MANGADO X., ORTEGA D. & TERRADAS X. (2009) – Disponibilitat de matèries primeres silícies i explotació antrópica a la vessant meridional dels Pirineus orientals. In: *Els Pirineus i les àrees circumdants durant el Tardiglacial. Mutacions i filiacions tecnoculturals, evolució paleoambiental (16 000–10 000 BP), Actes du XIV[e] Colloque Internationale d'Archéologie de Puigcerdà*. Puigcerdà, Institut d'Estudis Ceretans et Patronat F. Eiximenis, p. 211–226.

MANGADO X., MERCADAL O., BERGADÀ M.M., NADAL J., LANGLAIS M., TEJERO J.M., ESTEVE X., MEDINA B., RODRÍGUEZ N., GRIMAO J. & FULLOLA J.M. (2011) – Montlleó (Prats i Sansor, Cerdanya). Balanç de 10 campanyes d'excavació. *Tribuna d'Arqueologia 2009–2010*. Barcelona, Dept. de Cultura de la Generalitat de Catalunya, p. 27–52.

MARTÍNEZ J. & MORA R. (2009) – Balma Guilanyà (Prepirineo de Lleida) y el Aziliense en el noreste de la Península Ibérica. *Trabajos de Prehistoria* 66(2): 35–50.

MARTÍNEZ J., MORA R. & DE LA TORRE I. (2008) – La Cova Gran de Santa Linya i el poblament humà del vessant sud dels Pirineus al Plistocè superior i a l'Holocè. In *Tribuna d'Arqueologia 2007–2008*. Barcelona, Dept. de Cultura de la Generalitat de Catalunya, p. 69–92.

MORA R., BENITO-CALVO A., MARTÍNEZ-MORENO J., GONZÁLEZ MARCÉN P. & DE LA TORRE I. (2011) – Chrono-stratigraphy of the Upper Pleistocene and Holocene archaeological sequence in Cova Gran (south-eastern Pre-Pyrenees, Iberian Peninsula). *Journal of Quaternary Science* 26(6): 635–644.

MUÑOZ VIVAS V.E. (1998) – Elementos ornamentales de El Pirulejo (Priego de Córdoba, Córdoba) en el contexto de Andalucía. In : J.L. SANCHIDRIAN TORTI & M.D. SIMON VALLEJO (Eds.), *Las culturas del Pleistoceno en Andalucía*. Nerja, Patronato de la Cueva de Nerja, p. 189–196.

ORTÍ F. (1997) – Continental Evaporitic Sedimentation on the South East Border of the Ebro Basin (Catalanides) during the Paleocene to Lower Oligocene. In : G. BUSSON & B.C. SCHREIBER (Eds.), *Sedimentary Deposition in Rift and Foreland Basins in France and Spain.* New York, Columbia University Press, p. 388–396.

SOLER N. (1976) – La Bora Gran d'en Carreras. In : J. CANAL & N. SOLER (Coord.), *El Paleolític a les comarques gironines*. Girona. Servei d'Investigacions Arqueològiques de la Diputació de Girona / Associació Arqueològica de Girona i Centre d'Estudis Comarcals de Banyoles.

SOTO M., GÓMEZ B., VALLVERDÚ J. & VAQUERO M. (2011) – El territorio d'aprovisionament del sílex dels caçadors i recol·lectors del Molí del Salt (Vimbodí i Poblet – Conca de Barberà). *Aplec de Treballs (Montblanc)* 29 : 31–52.

STRINGER C.B., FINLAYSON J.C., BARTON R.N.E., FERNÁNDEZ-JALVO Y., CÁCERES I., SABIN, R.C., RHODES E.J., CURRANT A.P., RODRÍGUEZ-VIDAL J., GILES-PACHECO F. & RIQUELME-CANTAL J.A. (2008) – Neanderthal exploitation of marine mammals in Gibraltar. *PNAS* 105 : 14319–14324.

TABORIN Y. (1993) – *La parure en coquillage au Paléolithique*. Paris, CNRS.

TABORIN Y. (2004) – *Langage sans parole, la parure aux temps préhistoriques*. Paris, La Maison des Roches.

TEJERO J.M. (2003–2004) – El aprovechamiento no alimentario de las materias duras animales en la vertiente sur pirenaica durante el Tardiglaciar. Una visión de síntesis. *Espacio, Tiempo y Forma. Serie I Prehistoria* 16–17 : 99–117.

TEJERO J.M. (2005) – *El treball de l'os a la Prehistoria. Anàlisi tecnomorfològica de l'industria en matèries dures animals de la Cova del Parco (Alós de Balaguer). 2ª Edició Premi Memorial Josep Barberà.* Barcelona, Societat Catalana d'Arqueologia.

TEJERO J.M. & FULLOLA J.M. (2008) – L'exploitation non alimentaire des ressources animales pendant le Magdalenien au Nord-Est de la Peninsule Iberique. L'exemple de la grotte du Parco (Alos de Balaguer, Lleida, Espagne). *L'Anthropologie* 112(2) : 328–345.

TERRADAS X., ÀLVAREZ A., BARTROLÍ R., BORRELL F., CLOP X., FULLOLA J.M., GARCÍA-ANTON M.D., GIBAJA J.F., GÓMEZ B, GRÉGOIRE S., MANGADO X., MAROTO J., MARTZLUFF M., MOLIST M., ORTEGA D., PALOMO A., SALA R., SOLER N. & VILA A. (2004) – Estudio de la disponibilidad de rocas silíceas para la producción de instrumental lítica en la Prehistoria. In : G. Martinez, A. Morgado & J.A. Afonso (coords.), *Sociedades prehistóricas, recursos abióticos y territorio. Actas de la III Reunión de Trabajo sobre el Aprovisionamiento de Recursos Abióticos en la Prehistoria*, Loja, p. 63–72.

VANHAEREN M., D'ERRICO F., FANO MARTÍNEZ M.A. & ÁLVAREZ FERNÁNDEZ E. (2005) – La parure de la Cueva de El Horno (Ramales, Cantabrie, Espagne). In : V. Dujardin (ed.), *Industries osseuses et parures du Solutréen au Magdalénien en Europe, table ronde sur le Paléolithique supérieur récent*. Paris, Mémoires de la Société préhistorique française, p. 197–208.

VAQUERO M., ALONSO S., GARCIA CATALÁN S, GARCÍA-HERNÁNDEZ A., GÓMEZ DE SOLER B., RETTIG D. & SOTO M. (2012) – Temporal nature and recycling of Upper Paleolithic artifacts : the burned tools from the Molí del Salt site (Vimbodí i Poblet, northeastern Spain). *Journal of Archaeological Science* 39 : 2785–2796.

Des lamelles retouchées au Châtelperronien : diffusion d'idées entre derniers Néandertaliens et premiers Hommes modernes migrants

Morgan ROUSSEL

Résumé : Le Châtelperronien est l'un des techno-complexes marquant le passage du Paléolithique moyen au Paléolithique supérieur en Europe occidentale. Il montre l'association d'une industrie leptolithique spécifique avec des restes humains néandertaliens, des objets de parure, des pigments et de l'industrie osseuse. Plusieurs hypothèses ont été avancées pour expliquer cette association : acculturation, évolution indépendante ou encore mélanges post-dépositionnels. Nous présentons ici les résultats de l'analyse lithique de la séquence de Quinçay. Il est le seul gisement châtelperronien en grotte contenant plusieurs niveaux de cette industrie en séquence, scellés par un effondrement massif de la voûte. Aucun autre niveau du Paléolithique supérieur n'est détecté au-dessus de la séquence. Dans les trois niveaux, l'objectif de la production est orienté vers l'obtention de lames et de lamelles. La méthode de production utilisée est spécifiquement châtelperronienne et est clairement différente de la production leptolithique du début du Paléolithique supérieur ou de la production d'éclats du Paléolithique moyen. La méthode de production de longues lamelles est caractéristique du Châtelperronien, elle est identique dans son organisation volumétrique à celle utilisée pour les lames. Cependant, les lamelles retouchées sont typologiquement comparables à celles rencontrées en contexte protoaurignacien. Selon nous, cette donnée n'est pas le résultat de convergence ou de coïncidence, mais suggère un contact superficiel, à distance, entre groupes châtelperroniens et protoaurignaciens. L'idée « lamelles retouchées » a pu être empruntée par les Châtelperroniens en observant de telles lamelles armées sur des projectiles abandonnés sur des lieux de passage partagés. La méthode protoaurignacienne de production de lamelles n'est pas utilisée par les Châtelperroniens de Quinçay et elle leur était probablement inconnue. Ceci est cohérent avec le modèle de diffusion par stimulus. Nos résultats suggèrent la contemporanéité du Châtelperronien et du Protoaurignacien. Ces deux groupes n'ayant été que superficiellement connectés, leur intimité sociale reste donc assez faible.

Mots-clés : Châtelperronien, production laminaire et lamellaire, diffusion par stimulus, Protoaurignacien, intimité sociale

Abstract : *The Châtelperronian, one techno-complexes of the Middle to Upper Paleolithic change-over in Europe, shows an uncommon association of a specific leptolithic industry with Neanderthal human remains, pendants, pigments and bone-tools. Several hypothesis had been put forward to explain this association: acculturation, independent evolution or even post-depositional mixing. Here, we present results from the Quinçay lithics' analysis, the only Châtelperronian site with several Châtelperronian layers sealed by a large roof fall. No other Upper Paleolithic layers are detected above the sequence. In the three Châtelperronian layers, blades and bladelets are produced. The method of production used is specific to the Châtelperronian, by its unique set of procedures, and is clearly different from the early Upper Palaeolithic leptolithic production or from the Middle Palaeolithic flake production. In this sequence the way to produce long bladelets is typically Châtelperronian, it is identical in its volumetric organization to the one used for blades. However, the retouched bladelets are looking alike Protoaurignacian ones. We argue that this cannot be a convergence neither a coincidence, and that instead this is evidence of superficial contact, maybe even at distance, between Châtelperronian and Protoaurignacian groups. The idea and morphology of the retouched bladelets had been borrowed by Châtelperronian groups from Protoaurignacian groups, maybe only by seeing hunting weapons equipped with such bladelets on pathways. Meanwhile the specific method used by Protoaurignacian groups to produce bladelets remained unused (and was probably unknown). This is consistent with the stimulus diffusion model. Our results suggest that the Châtelperronian and the Protoaurignacian had been contemporaneous, but were only superficially connected. Social intimacy between the two groups might have been quite low.*

Key-Words : *Châtelperronian, blade and bladelet production, stimulus diffusion, Protoaurignacian, social intimacy*

1 INTRODUCTION

Le Châtelperronien est l'un des techno-complexes majeurs marquant le passage du Paléolithique moyen au Paléolithique supérieur en Europe de l'Ouest. En l'espace de quelques millénaires aux alentours de 40 ka BP, la population locale néandertalienne est complètement remplacée par celles des Hommes modernes migrants. Les possibles interactions entre ces deux groupes ainsi que les processus de remplacement d'une population par l'autre sont encore mal connus et sont âprement discutés. L'acquisition de nouvelles données sur les techno-complexes du début du Paléolithique supérieur permet d'envisager de nouvelles interprétations sur les modes de contacts entre ces deux populations.

2 ÉTAT DE LA QUESTION

Le Châtelperronien, situé dans un large Sud-Ouest de la France et dans le Nord de l'Espagne, est attribué aux dernières populations néandertaliennes depuis la découverte de restes humains néandertaliens en contexte châtelperronien (Lévêque et Vandermeersch, 1980 ; Hublin *et al.*, 1996). La production lithique châtelperronienne est dévolue vers l'obtention de lames, parmi lesquelles certaines aux normes techniques et métriques sont sélectionnées comme supports de pointes de Châtelperron (Pelegrin, 1995 ; Connet, 2002 ; Roussel, 2011). Dans les deux rares gisements où plusieurs niveaux châtelperroniens se succèdent en séquence : la grotte du Renne à Arcy-sur-Cure et Quinçay, l'industrie lithique est associée à des éléments de parures, des colorants et de l'industrie osseuse (Baffier et Julien, 1990 ; Granger et Lévêque, 1997 ; d'Errico *et al.*, 2001 ; White, 2001 ; Caron *et al.*, 2011).

Ces « comportements modernes » des derniers Néandertaliens châtelperroniens ont été utilisés pour élaborer des modèles interprétatifs, souvent irréconciliables, sur les possibles interactions entre les groupes châtelperroniens et les groupes aurignaciens. Plusieurs auteurs ont défendu le phénomène d'acculturation des derniers Néandertaliens par les Hommes modernes contemporains (Demars et Hublin, 1989 ; Harrold, 1989 ; Hublin *et al.*, 1996 ; Mellars 2005). D'autres auteurs ont défendu un phénomène d'évolution indépendante des dernières sociétés néandertaliennes avant tout contact avec les Hommes modernes (d'Errico *et al.*, 1998 ; d'Errico, 2003 ; Zilhão et d'Errico, 1999 et 2000). Dans ce cadre, il a été démontré que la production lithique du Châtelperronien n'avait aucun lien avec celle de l'Aurignacien ancien (Pelegrin, 1995).

Depuis l'élaboration originelle de ces deux modèles, les supposées interstratifications entre niveaux châtelperroniens et aurignaciens ont été définitivement rejetées (Bordes, 2002 et 2003 mais voir le débat Gravina *et al.*, 2005 *vs* Zilhão *et al.*, 2006). Également, l'Aurignacien ancien n'est plus considéré comme le premier techno-complexe du Paléolithique supérieur porté par les Hommes modernes depuis la redécouverte du Protoaurignacien (Bon, 2002 mais voir les travaux pionniers de Laplace 1966a). Enfin, la réalisation récente de datations radiométriques dans de nombreux gisements européens du passage Paléolithique moyen/Paléolithique supérieur permet d'affiner la résolution chronologique du Châtelperronien et du Protoaurignacien (*e.g.* Higham *et al.*, 2009 ; Higham *et al.*, 2010 ; Szmidt *et al.*, 2010 ; Hublin *et al.*, 2012 ; Talamo *et al.*, 2012). Ces nouvelles données viennent alimenter le débat sur la contemporanéité de ces deux groupes et permettent de proposer des modèles interprétatifs alternatifs à ceux évoqués précédemment.

Notamment, ce sont les liens entre le Protoaurignacien et le Châtelperronien qui sont dorénavant discutés. De rares séquences présentent une succession stratigraphique entre niveau châtelperronien et niveau protoaurignacien (n = 5 ; Gatzarria : Laplace 1966b ; Labeko Koba : Arrizabalaba et Altuna, 2000 ; le Piage : Bordes, 2002 ; la Grotte du Renne : Schmider, 2002 ; les Cottés : Roussel et Soressi, 2013). Le Châtelperronien y est toujours sous-jacent au Protoaurignacien. Le Protoaurignacien caractérisé par la production de longues lamelles au profil rectiligne ensuite transformées en grandes lamelles Dufour ou en types similaires (Le Brun-Ricalens *et al.*, 2009 ; Tsanova *et al.*, 2012) est daté entre 41, 5 ka - 39, 9 ka cal. BP (Banks *et al.*, 2013). Le fait que le Châtelperronien se trouve toujours sous le Protoaurignacien n'exclue pas par ailleurs, que des contacts à longue distance entre ces groupes aient pu avoir lieu compte tenu de leur contemporanéité chronologique et de leur répartition géographique similaire (Roussel, 2011 ; Hublin *et al.*, 2012 ; Talamo *et al.*, 2012).

En prenant en compte les données sur le Protoaurignacien, plusieurs auteurs considèrent un passage progressif du Paléolithique moyen vers le Paléolithique supérieur. L'apparition et l'émergence graduelle de nouveaux comportements techniques tel que la production de supports lithiques allongés transformés puis utilisés en pointes de projectile serait un facteur clé pour expliquer les changements culturels lors du passage du Paléolithique moyen au Paléolithique supérieur (Teyssandier, 2007 et 2008 ; Teyssandier *et al.*, 2010 ; Bordes et Teyssandier, 2011). La production lamellaire étant une, voire la, solution technique pour la mise en place de nouvelles stratégies de chasse à cette période (Bon, 2005 et 2006). Dans cette optique, pour certains auteurs, l'industrie lithique du Châtelperronien ne serait pas si différente de celle du Protoaurignacien, l'une pouvant d'ailleurs évoluer vers l'autre (Bordes, 2002 et 2006 ; Bordes *et al.*, 2008 ; Bordes et Teyssandier 2011). Si un lien technique, voire phylogénétique, entre ces deux industries reposant sur l'analyse de leur production laminaire respective est discutable (Roussel, 2013), l'existence d'une production lamellaire en contexte châtelperronien, et notamment à Quinçay (Roussel, 2011) fournit de nouveaux éléments pour discuter de leur relation et de leur proximité culturelle.

3 QUINÇAY : UN GISEMENT CLÉ POUR DISCUTER DES CONTACTS ENTRE DERNIERS NÉANDERTALIENS ET HOMMES MODERNES MIGRANTS

La grotte de la Grande-Roche-de-la-Plématrie à Quinçay (Vienne) a été fouillée pendant près de 20 ans par François Lévêque (Lévêque, 1979 ; Lévêque et Miskovsky, 1983). Ce gisement contient quatre niveaux en séquence (EG, EN, EM et EJ) sur une épaisseur stratigraphique de 1, 40 mètre. Le niveau à la base (EG) est attribuable au MTA de type B (Roussel et Soressi, 2010) et les trois niveaux sus-jacents (EN, EM et EJ) au Châtelperronien (Roussel, 2011). Ces quatre niveaux sont scellés par des blocs métriques provenant de l'effondrement du toit de la grotte et aucun autre niveau du Paléolithique supérieur n'existe en stratigraphie. Cette donnée confère un caractère exceptionnel à ce gisement puisque la présence de parures et d'industrie osseuse dans cette séquence châtelperronienne (Granger et Lévêque, 1997 ; Lévêque et Miskovsky, 1983) ne peut être le fait de phénomènes de contamination avec d'hypothétiques niveaux sus-jacents du début du Paléolithique supérieur. Cet argument peut être avancé pour discuter des caractéristiques techniques lithiques des trois niveaux indiscutablement châtelperroniens.

Tout comme la plupart des ensembles châtelperroniens, ce sont les pointes ou couteaux de Châtelperron qui dominent dans les trois niveaux de Quinçay (**figure 1**, nos 1 et 2). Les pièces à dos représentent de 17 % à 32 % du corpus typologique de chacun des niveaux (pour un total de 310 pièces sur 1 177 outils). Elles sont accompagnées d'un cortège d'outils le plus souvent sur lames : grattoirs, burins, lames retouchées et troncatures dont certaines, obliques, sont à rapprocher des pièces à dos compte tenu du support utilisé. Un outillage sur éclat existe également, tels des grattoirs, dont certains à front semi-circulaire et quelques racloirs, encoches et denticulés. Une production organisée d'éclats selon une méthode autonome du débitage laminaire n'existe pas à Quinçay. Les éclats utilisés comme supports proviennent de la chaîne opératoire laminaire : éclats de correction des convexités ou tablettes de ravivage. Associées à cet éventail typologique clairement châtelperronien, se trouvent dans chacun des niveaux des lamelles retouchées (Roussel, 2011 : 293–308).

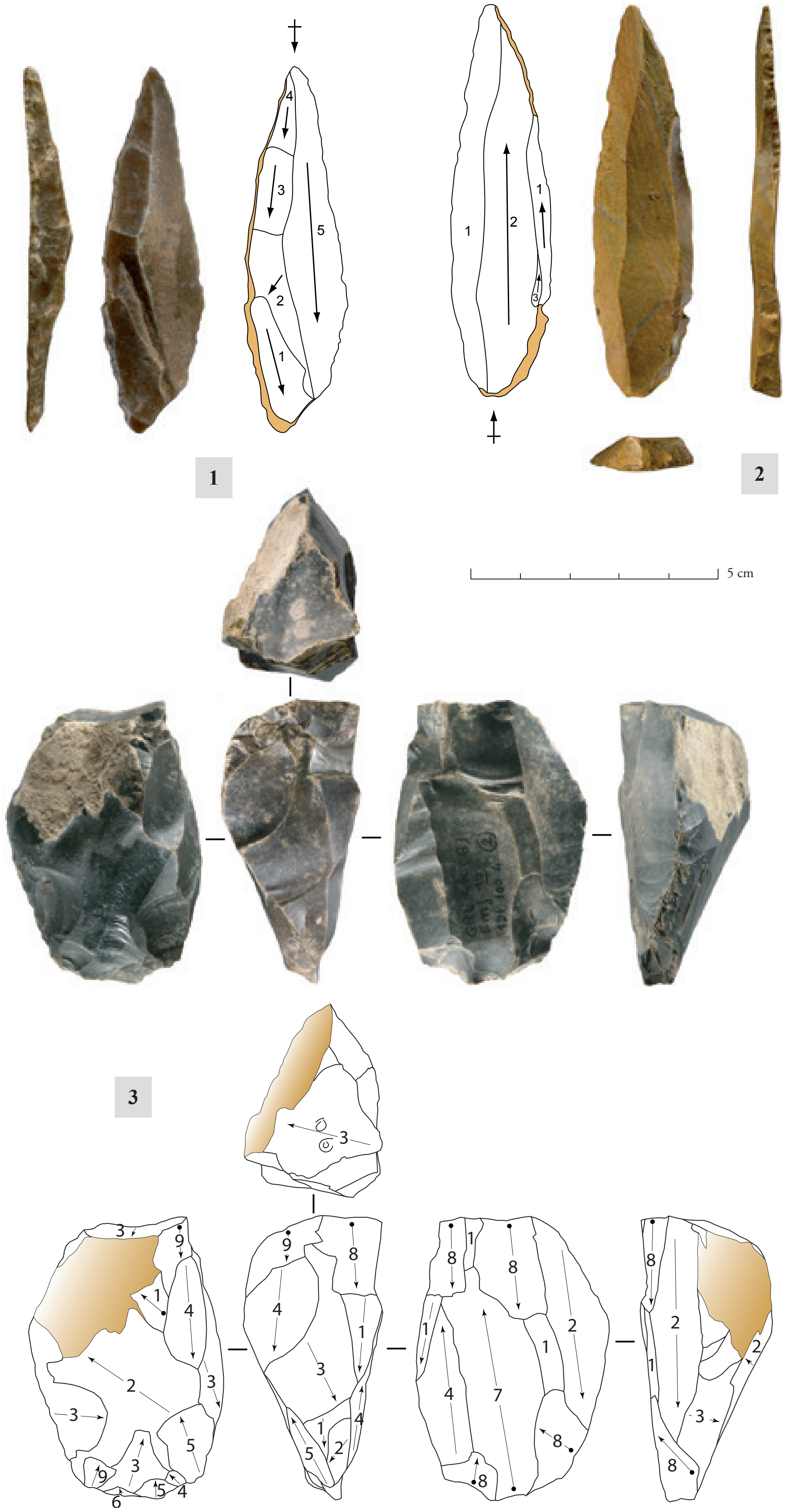
3.1 Une production laminaire châtelperronienne spécifique

À Quinçay, les nucléus à lames (n = 363) sont exploités avec pour objectif une production maximale. Ils présentent en leur état d'abandon une, deux ou encore trois faces exploitées. Ces faces étroites et larges sont adjacentes et juxtaposées et elles s'articulent selon un angle de 90° (**figure 1**, n° 3). Compte tenu de la méthode de production utilisée, les volumes à l'abandon présentent une section triangulaire ou rectangulaire (Roussel, 2011 : 253). Ces configurations volumétriques de nucléus à lames à l'abandon sont particulières au Châtelperronien et se retrouvent dans d'autres assemblages comme aux Cottés (Roussel et Soressi, 2013), à la grotte du Renne (Connet, 2002) ou à la Roche-à-Pierrot (Soressi, 2011).

La méthode de production de lames consiste en un recul du débitage oblique à l'axe de symétrie du volume. La dynamique du débitage suit un rythme en deux ou trois temps sur une table de débitage anguleuse. Cette méthode met en jeu un volume de départ dissymétrique. L'initialisation du débitage effectuée par le détachement d'une crête à un versant peut avoir lieu aussi bien sur une face étroite ou sur une face large. Chaque face est exploitée indépendamment l'une de l'autre et successivement. Se sont donc des séries unipolaires de lames de section symétrique qui y sont débitées. Le passage d'une face à l'autre est effectué par l'enlèvement d'une lame de section asymétrique à l'intersection de ces deux faces. Le débitage est unipolaire même lorsqu'un second plan de frappe est mis en place. À partir de ce dernier, décalé par rapport à l'axe du premier, c'est au moins une série unipolaire lames qui y est détachée. Par cette méthode, les Châtelperroniens recherchent essentiellement des supports de pièces à dos. Ils sont techniquement différenciés : soit des lames de section symétrique (80 %), soit des lames de section asymétrique (20 %), dont le profil est toujours légèrement courbe. L'obtention de ces deux types de supports de façon récurrente et normée est uniquement possible par l'exploitation successive de faces juxtaposées et par le maintien d'une angulation de 90° à leur intersection.

À Quinçay, les pièces à dos retouchées entières (n = 107) mesurent en moyenne 51, 7 ± 14 mm de longueur, 15, 7 ± 3, 8 mm de largeur avec un allongement moyen de 3, 35 ± 0, 73, pour une épaisseur moyenne de 5, 5 ± 1, 9 mm et une robustesse moyenne de 3, 1 ± 0, 96.

FIGURE 1 Industrie lithique châtelperronienne de Quinçay. 1 : pointe de Châtelperron. 2 : pointe de Châtelperron sur support de section asymétrique, notez le dos partiellement retouché. 3 : nucléus à lames et son schéma diacritique, notez la section triangulaire ainsi que l'articulation surface étroite/surface large dans un angle de 90°. Photos : S. Schätz, schémas diacritiques : M. Roussel.


1
2
5 cm
3

Les supports des pièces à dos possèdent des normes techniques et métriques strictes : courbure faiblement marquée, respect d'une largeur et d'une épaisseur minimums. Les lames ne possédant pas ces critères (trop courbes, trop larges ou trop épaisses) sont utilisées comme supports des autres outils. L'idée de dos est recherchée dès le débitage d'une partie des produits laminaires châtelperroniens. Dans la mesure où les lames de section asymétrique sont peu retouchées pour leur confection en pointes de Châtelperron (**figure 1**, n° 2), c'est l'idée même d'outil à dos qui est pensée en amont de la chaîne opératoire laminaire.

Par comparaison, les méthodes, les modalités, les procédures et les objectifs du débitage laminaire du Protoaurignacien ne trouvent pas de similitudes technologiques avec celles du Châtelperronien. La production laminaire du Protoaurignacien met en œuvre un recul du débitage parallèle, et non pas oblique, à l'axe de symétrie du volume. Le débitage laminaire protoaurignacien intègre progressivement plusieurs surfaces : la table et les flancs, sans rupture. C'est un débitage semi-tournant progressif et continu sur un même plan qui est effectué (Bon, 2002) et non pas un débitage séquentiel, comme au Châtelperronien (Roussel, 2011).

Les objectifs de la production laminaire du Protoaurignacien consistent à obtenir des supports appointés, mais également des supports laminaires plus larges et plus arqués, supports d'outils du fond commun comme les lames retouchées ou les grattoirs. La notion de dos n'est pas intégrée conceptuellement, ni même matériellement dans la production laminaire protoaurignacienne. Au Châtelperronien, c'est bien la recherche d'objets à dos, retouchés ou non, qui sous-tend cette production laminaire originale et différente de celle du Protoaurignacien. Dans ces deux cas, des objectifs différents conduisent à la mise en œuvre de concepts opératoires différents (Roussel, 2013). De ce fait, l'idée d'une filiation technique entre ces deux industries (Bordes et Teyssandier, 2011) sur la base de leur production laminaire respective ne peut pas être envisagée (Roussel, 2013).

3.2 Une production lamellaire châtelperronienne inédite

De très rares gisements châtelperroniens ont livré des éléments attestant un débitage de lamelles. Jusqu'à récemment, la production de lamelles avait été identifiée au sein de deux gisements châtelperroniens : Roc-de-Combe, couche 8 et La Côte, niveau 3 (Pelegrin, 1995). Cette production reste anecdotique, identifiée sur la base de quelques nucléus de petites dimensions qui peuvent être le résultat d'un processus de réduction des nucléus à lames (Pelegrin, 1995 : 133). Seul un nucléus provenant du niveau 3 de La Côte reflète une véritable intention du débitage lamellaire (Pelegrin, 1995 : 241). Malgré tout, aucune lamelle retouchée n'est associée à cette mince production lamellaire dans ces deux gisements. Seul le gisement de Quinçay présente clairement une production de lamelles de grandes dimensions associée à la présence de lamelles retouchées (Roussel, 2011).

3.2.1 Les lamelles retouchées

Dans les trois niveaux châtelperroniens de Quinçay se trouvent 40 lamelles retouchées. Elles représentent entre 3 % et 5 % de la composition typologique de chacun des niveaux (Roussel 2011 : 81). Trois types de lamelles retouchées sont identifiés : des lamelles à retouche marginale inverse (n = 30), des lamelles à retouche marginale directe (n = 8) ainsi que des lamelles tronquées (n = 2). Les premières sont présentes dans les trois niveaux et composent la majorité du corpus, les secondes n'existent pas dans le niveau sommital (EJ) et les dernières, anecdotiques, n'existent que dans le niveau basal (EN).

Parmi les 30 lamelles à retouche marginale inverse (**figure 2**), 29 d'entre elles sont retouchées sur un seul bord. Seul un exemplaire présente une retouche alterne. 80 % des lamelles retouchées unilatéralement le sont sur leur bord droit (n = 24). La retouche est continue dans la plupart des cas.

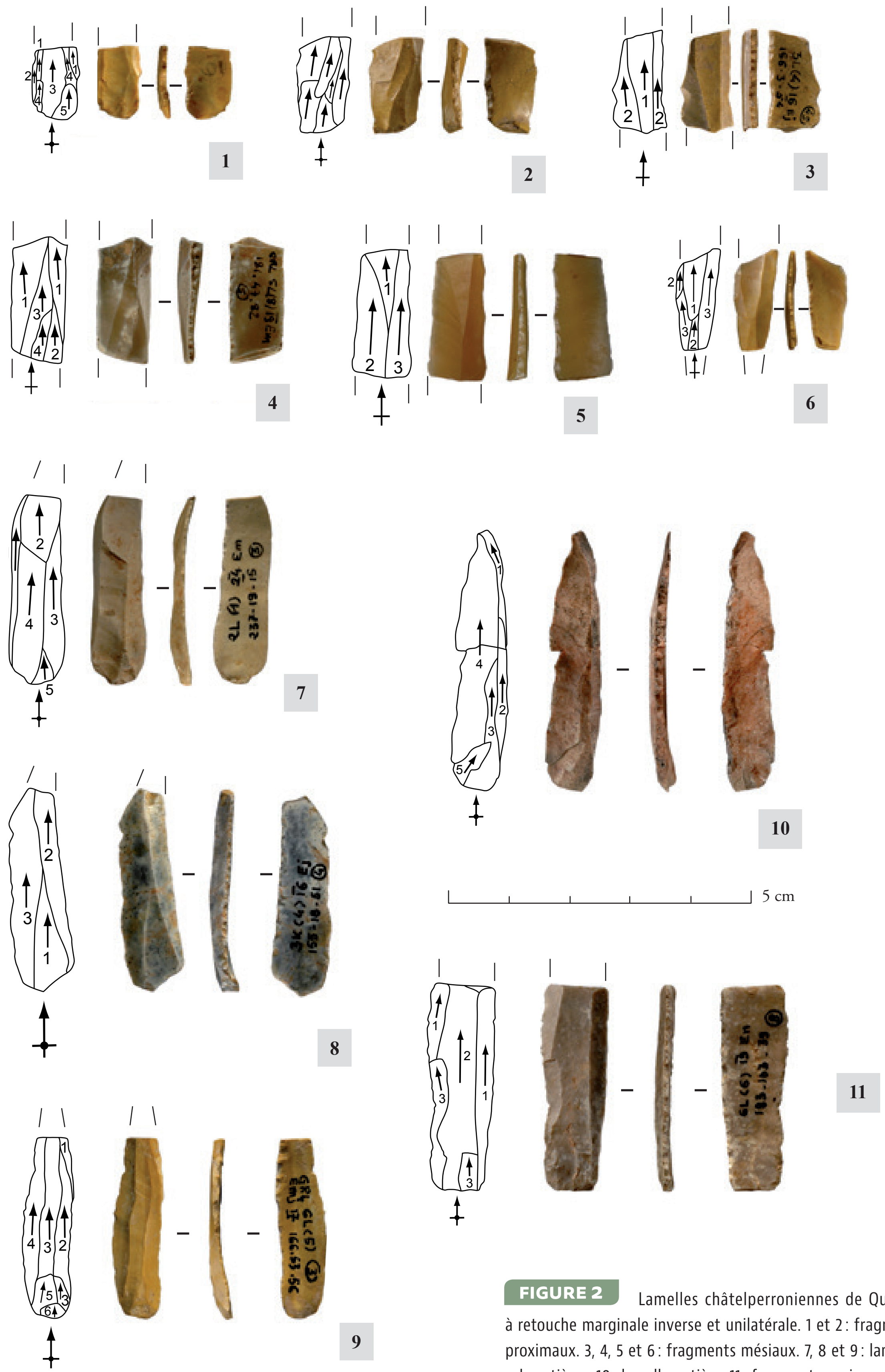


FIGURE 2 Lamelles châtelperroniennes de Quinçay à retouche marginale inverse et unilatérale. 1 et 2 : fragments proximaux. 3, 4, 5 et 6 : fragments mésiaux. 7, 8 et 9 : lamelles sub-entières. 10 : lamelle entière. 11 : fragment proximo-mésial. Photos : S. Schätz, schémas diacritiques : M. Roussel.

Dans ce corpus, une seule lamelle retouchée est entière (**figure 2**, n° 10), trois éléments sont considérés comme sub-entiers puisque seul l'apex manque sur quelques millimètres (**figure 2**, n^{os} 7, 8 et 9). Les autres exemplaires sont tout aussi bien des fragments courts (*e.g.* portion proximale ou mésiale ou distale) que des fragments longs (deux portions associées : *e.g.* proximal + mésial). Dans les cas des fragments les plus longs ainsi que pour l'exemplaire complet, la courbure du profil est légère. Il n'y a aucun élément courbe ou torse.

Les supports utilisés proviennent tous d'un débitage unipolaire. Lorsque le talon est préservé (n = 11) celui-ci est toujours lisse et la ligne extérieure du talon est abrasée. Tout en considérant la forte fragmentation de ces objets, les plus courts fragments tendent à montrer deux bords parallèles (**figure 2**, n^{os} 1 à 6). Comme l'apex est manquant sur les fragments les plus longs (**figure 2**, n^{os} 7, 8 et 9), l'aspect pointu ou appointé ne peut pas être discuté. Sur l'exemplaire complet l'apex semble appointé (**figure 2**, n° 10), la retouche du bord droit accentuant la convergence distale. Cette lamelle retouchée entière présente une longueur de 44 mm, une largeur de 8 mm, une épaisseur de 2, 4 mm, une robustesse de 3, 4 et un allongement de 5, 4. La mesure de la longueur des autres lamelles à retouche marginale inverse fragmentées permet de donner une idée de leur dimension, même si il n'est pas possible d'établir des moyennes de longueurs. Les fragments présentent le plus souvent une longueur supérieure à 15 mm. Ces fragments supérieurs à 15 mm de long sont tout aussi bien courts (n = 11) que longs (n = 7). Les trois lamelles sub-entières sont plus longues que 30 mm. En prenant en compte la lamelle complète, 19 lamelles à retouche marginale inverse sont plus longues que 15 mm soit 63 % du corpus.

Pour chacun des niveaux, leurs moyennes de largeur sont comprises entre 6, 4 mm et 8, 2 mm, d'épaisseur entre 1, 8 mm et 2, 1 mm et de robustesse entre 3, 7 et 5, 3. À partir de ces données techniques et métriques nous considérons que les 30 lamelles à retouche marginale inverse de la séquence châtelperronienne de Quinçay sont homogènes d'un niveau à l'autre. Il n'y a pas de variation technique entre elles et peu de variations dimensionnelles. Ces caractéristiques s'accordent pleinement avec les lamelles Dufour sous-type Dufour (Demars et Laurent, 1989 : 102–103) telles qu'identifiées dans les assemblages protoaurignaciens (Le Brun-Ricalens *et al.*, 2009).

Les lamelles à retouche marginale directe (n = 8), se trouvent dans le niveau basal (EN) et dans le niveau intermédiaire (EM). Elles sont toutes fragmentées et représentées le plus souvent par de courts fragments. Elles possèdent les mêmes caractéristiques techniques que les lamelles à retouche marginale inverse : support provenant d'un débitage unipolaire, faible courbure du profile, bords parallèles, talons lisses, un seul bord retouché, le plus souvent le bord droit (n = 5), associé à une retouche continue (n = 6). Leurs dimensions ne montrent pas de différence significative d'un niveau à l'autre. La longueur des fragments est comprise entre 9 et 36 mm (9–12 mm : n = 3 ; 12–15 mm : n = 4 ; 33–36 mm : n = 1). Leurs moyennes de largeur sont comprises entre 6, 7 mm et 9, 3 mm, d'épaisseur entre 1, 9 mm et 2, 3 mm, de robustesse entre 3, 1 et 5. Comparées aux lamelles à retouche marginale inverse, leurs moyennes de largeur, d'épaisseur et de robustesse sont similaires (**figure 3**). Les données techniques et métriques de ces deux types de lamelles permettent alors d'envisager qu'elles proviennent bien du même schéma de production.

Les lamelles tronquées (n = 2) du niveau basal sont complètes. Leurs dimensions et leurs caractéristiques techniques ne dépareillent pas des deux types précédents de lamelles retouchées. Il faut toutefois noter que la longueur originelle du support ne peut pas être évaluée compte tenu de l'aménagement de la troncature distale.

FIGURE 3 Moyennes des dimensions comparées entre lamelles à retouche marginale inverse et lamelles à retouche marginale directe des trois niveaux de la séquence châtelperronienne de Quinçay.

	Lamelles à ret. marg. inverse (n = 30)	Lamelles à ret. marg. directe (n = 8)
Largeur moyenne	7,52 ± 1,6 mm	7,78 ± 2,66 mm
Test PLSD Fisher	Ret. marg.inverse/Ret.marg.dir. : P = 0,72 NS	
Epaisseur moyenne	1,95 ± 0,8 mm	2,16 ± 0,6 mm
Test PLSD Fisher	Ret. marg.inverse/Ret.marg.dir. : P = 0,48 NS	
Robustesse moyenne	4,34 ±1,57	3,81 ±1,56
Test PLSD Fisher	Ret. Marg.inverse/Ret.marg.dir. : P = 0,4 NS	

3.2.2 Les nucléus à lamelles

Associés à ces lamelles retouchées, des nucléus à lamelles existent dans les trois niveaux (n = 51). Ce sont des nucléus prismatiques à lamelles sur blocs ou sur éclats. En fonction de leur morphologie et de la méthode utilisée, ceux-ci sont d'un point de vue technique indépendants des nucléus à lames (*i.e.* non issus de nucléus à lames réduits). D'un point de vue conceptuel, la méthode utilisée pour la production lamellaire est identique à celle de la production laminaire. Dans chacun des niveaux, ce sont les nucléus exploités sur au moins deux surfaces, une large et une étroite qui dominent alors que les nucléus exploités sur une unique surface sont minoritaires (**figure 4**).

FIGURE 4 Distinction des nucléus prismatiques à lamelles en fonction du nombre et de la qualité des surfaces exploitées des trois niveaux de la séquence châtelperronienne de Quinçay.

Nombre de surfaces exploitées	EN		EM		EJ	
Une étroite	1	8 %	4	12.5 %	-	-
Une large	4	31 %	2	6.25 %	1	17 %
Une indéterminée	-	-	2	6.25 %	-	-
Deux distinctes : une étroite + une large	5	38 %	16	50 %	4	66 %
Deux similaires : deux étroites ou deux larges	1	8 %	2	6.25 %	-	-
Trois	2	15 %	6	18.75 %	1	17 %
Total	13	100 %	32	100 %	6	100 %

Sans prendre en compte la qualité du support, plusieurs tendances caractérisent les nucléus à lamelles de cette séquence (**figure 5**). Les procédures techniques comme les étapes de mise en forme, de pleine production ou de maintien des convexités longitudinales et latérales ne varient pas, ou peu d'un niveau à l'autre. Tout d'abord, la production est majoritairement unipolaire. Le plan de frappe installé par un unique enlèvement est toujours lisse. La production est initialisée par le détachement d'une lamelle à crête à un versant. Au cours de la production des procédés de maintien des convexités sont mis en place mais ils restent peu fréquents. Occasionnellement, de simples néo-crêtes sont mises en place. Les convexités distales sont parfois maintenues par l'installation de rares crêtes distales. Les convexités longitudinales de la table sont maintenues par le débitage de courts éclats à partir d'un plan de frappe opposé, sans que toutefois la production ne soit menée à partir de ce dernier. Les négatifs d'enlèvements lamellaires montrent des bords la plus souvent parallèles et les évidences de négatifs à bords convergents sont anecdotiques. Les convexités longitudinales de la table de débitage sont toujours faibles indiquant la production de lamelles à profil légèrement courbe ou rectiligne.

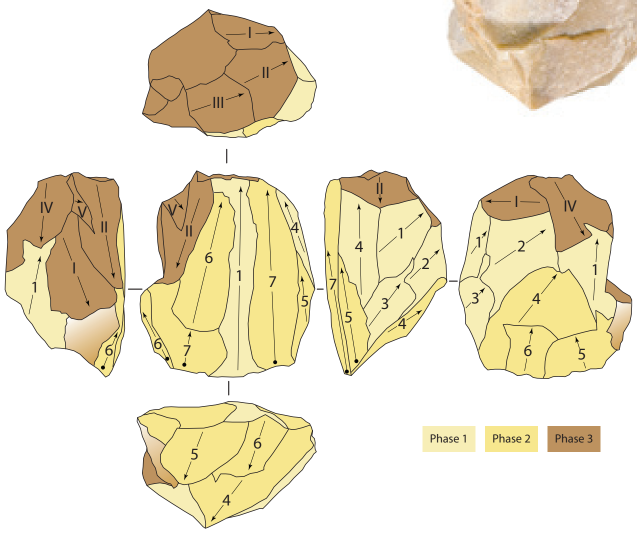


FIGURE 5 Nucléus à lamelles châtelperroniens de Quinçay. 1: nucléus exploités sur trois faces. Réorienté, il a subi plusieurs séquences de production lamellaire indépendantes. 2: nucléus à lamelles dont le support est un nucléus à lames repris. La table lamellaire est installée en distal de la table laminaire et lui est orintée perpendicualirement. La table de débitage s'étend sur une surface étroite et sur une surface large. Photos: S. Schätz, schémas diacritiques: M. Roussel.

La méthode de production des lamelles est spécifique. Chacune des surfaces du volume est traitée indépendamment (**figure 5**, n° 1). Chaque surface exploitée correspond à une table de débitage autonome. Sur chacune de ces surfaces se sont donc des séries de lamelles qui sont extraites indépendamment. La progression du débitage est alors menée à partir de deux surfaces contiguës et est oblique à l'axe de symétrie du volume. Cette progression peut être qualifiée de fronto-sagittale puisque l'axe de recul est disposé à l'intersection d'une surface étroite et d'une surface large. Dans ces cas, l'intersection de deux surfaces ou de deux tables lamellaires est comprise dans un angle de 90°. La section de ces tables contigües sera alors anguleuse ou triangulaire.

Également, dans chacun des niveaux, certains nucléus à lamelles sont réorientés (**figure 5**, n° 1). Après une première séquence de production lamellaire menée sur une surface, une seconde est menée à partir d'un second plan de frappe. Ce dernier peut être orienté à 90° ou 180° par rapport à l'axe du premier et n'est pas nécessairement situé sur la surface opposée au premier. De ce fait, la nouvelle surface exploitée peut, ou ne peut pas, être contiguë à la précédente. Les plusieurs séquences de production menées à partir de ces différents plans de frappe sont indépendantes les unes des autres. L'exploitation des surfaces est chronologiquement déconnectée. Ce procédé peut être qualifié de production unipolaire disjointe puisque chaque surface traitée est considérée comme une unique table de débitage active ou potentielle. De plus, quelques nucléus à lames ont été réutilisés comme nucléus à lamelles (**figure 5**, n° 2). La table de débitage lamellaire est déconnectée de la table laminaire, ces deux phases étant indépendantes. La réutilisation de ces supports est corrélable au procédé de réorientation puisqu'il s'agit d'utiliser de nouvelles surfaces disponibles aux convexités adéquates pour l'extraction de lamelles. Cette méthode mise en place pour la production de lamelles impliquant un recul oblique à l'axe de symétrie du volume ainsi que l'extraction de séries indépendantes de lamelles est identique à la méthode utilisée pour la production de lames (*cf. supra*).

En termes de dimensions, les objectifs de la production lamellaire effectuée dans les trois niveaux sont identiques. Les derniers négatifs complets correspondant à l'extraction de lamelles abouties donnent des valeurs similaires d'un niveau à l'autre. Leurs moyennes de longueur, de largeur et d'allongement ne sont pas significativement différentes (**figure 6**). L'allongement moyen de ces négatifs est resserré autour d'une valeur de 4 pour chacun des niveaux.

DIMENSIONS DES DERNIERS NÉGATIFS LAMELLAIRES	EN (N = 12)	EM (N = 22)	EJ (N = 5)	TOTAL MOYENNES*
Longueur moyenne	38,68 ± 11,73	32,2 ± 8,21	32,37 ± 9,95	34,21 ± 9,83
Test PLSD Fisher	EN/EJ : P = 0,22NS	EM/EN : P = 0,07NS	EJ/EM : P = 0,97NS	-
Largeur moyenne	9,84 ± 1,89	9,08 ± 3,54	8,2 ± 1,74	9,2 ± 2,92
Test PLSD Fisher	EN/EJ : P = 0,3NS	EM/EN : P = 0,47NS	EJ/EM : P = 0,55NS	-
Allongement moyen	3,98 ±1,17	3,92 ±1,35	4,08 ±1,55	3,96 ± 1,29
Test PLSD Fisher	EN/EJ : P = 0,88NS	EM/EN : P = 0,91NS	EJ/EM : P = 0,81NS	-

*Valeurs calculées à partir de 39 nucléus, 12 ne présentant pas de derniers négatifs complets.

FIGURE 6 Moyennes des dimensions des derniers négatifs lamellaires observés sur les nucléus prismatiques à lamelles des trois niveaux de la séquence châtelperronienne de Quinçay.

L'objectif de la production lamellaire à Quinçay est donc d'obtenir des grandes lamelles à bords parallèles et au profil légèrement courbe. Les dimensions des lamelles retouchées couplées aux dimensions des derniers négatifs de lamelles observés sur les nucléus prismatiques sont similaires. Bien que la plupart des lamelles retouchées soient fragmentées, au moins pour les lamelles Dufour sous-type Dufour et pour les lamelles à retouche marginale directe, il est tout de même possible d'affirmer que les supports sélectionnés sont issus de cette production lamellaire. Tout d'abord, les trois lamelles Dufour sous-type Dufour sub-entières ainsi qu'un fragment de lamelle à retouche marginale directe dépassent les 30 mm de longueur, tout comme la grande Dufour complète qui dépasse les 40 mm de longueur. Ces valeurs sont en accord avec celles issues des derniers négatifs observés sur les nucléus à lamelles (**figure 6** : 34, 2 mm ± 9, 8). Ensuite, les moyennes de largeur des exemplaires retouchés (**figure 3** : 7, 5 ± 1, 6 mm et 7,8 ± 2, 7 mm) sont sensiblement plus faibles que les moyennes de largeur observées à partir des négatifs (**figure 6** : 9, 2 ± 2, 9 mm). Cependant, il faut prendre en compte la phase de retouche qui a pu tronquer de 1 à 2 mm la largeur initiale du support. Dans ce cas, les largeurs moyennes des lamelles retouchées et des négatifs observés sur les nucléus ne seraient pas différentes. L'échantillon analysé de lamelles non retouchées provenant des trois niveaux (n=93) présente des caractéristiques métriques similaires (Roussel, 2011 : 404).

Dans les trois niveaux châtelperroniens de Quinçay, il existe donc bien une méthode de production spécifique de lamelles ainsi qu'une transformation des supports en lamelles à retouche marginale inverse. Ces dernières présentent les mêmes caractéristiques techniques que les lamelles Dufour sous-type Dufour (Demars et Laurent, 1989 : 102–103). Ce type de lamelles retouchées étant fréquemment produites au cours du Protoaurignacien, il est utile de d'analyser le mode de production des lamelles protoaurignaciennes afin de constater et de discuter des similitudes ou des différences avec le mode de production châtelperronien.

4 L'UNITÉ DE LA PRODUCTION LAMELLAIRE AU PROTOAURIGNACIEN

Les nombreuses études récentes sur le Protoaurignacien montrent que la production lamellaire possède une place prépondérante dans le système technique lithique (voir les exemples dans Le Brun-Ricalens *et al.*, 2005). Des différentes études concernant un large panel d'assemblages protoaurignaciens, deux grandes tendances se dégagent quant à la méthode de production mise en œuvre.

Tout d'abord, il s'agit notamment du processus de réduction lors de la production de lames et de lamelles. Les nucléus à lames sont souvent réduits en nucléus à lamelles dans une continuité qualifiée de *continuum opératoire* (Bon, 2006 ; Teyssandier *et al.*, 2010). Cela est attesté par exemple au Piage, couche K (Bordes, 2002 et 2006), à la grotte du Renne, niveau VII (Bon, 2002 ; Bon et Bodu, 2002), à Isturitz, niveau C4d (Normand, 2006 ; Normand et Turq, 2005), à Cueva Morin, niveaux 8 et 9 (Maíllo Fernández, 2005 et 2006), à la grotte El Castillo, niveau 16 (Maíllo Fernández et Bernaldo de Quirós, 2010), à l'Esquicho-Grapaou et à La Laouza (Bazile, 2005 ; Bazile et Sicard, 1999). Les longueurs des lames et lamelles se suivant sans rupture ainsi que les évidences de production de lamelles intercalées dans la production de lames sont deux arguments majeurs pour attester de ce processus de réduction continu. Il n'est pas par ailleurs inutile de mentionner que dans la plupart des assemblages protoaurignaciens, la production de lamelles à partir d'un schéma de réduction n'est pas la seule modalité utilisée.

Des productions autonomes de lamelles à partir de burin-nucléus, aussi appelé sur tranche d'éclat, ou à partir de nucléus carénés y sont associées (Bazile, 2005; Broglio *et al.*, 2005; Maíllo Fernández, 2005; Normand et Turq, 2005; Bordes, 2006; Maíllo Fernández et Bernaldo de Quirós, 2010; Porraz *et al.*, 2010; Bodu *et al.*, 2013). Dans d'autres assemblages protoaurignaciens, la production lamellaire est, ou semble être, indépendante de la production laminaire. C'est le cas à l'Arbreda, niveau H (Ortega Cobos *et al.*, 2005), à la grotte La Fabbrica, niveaux 3 et 4 (Dini *et al.*, 2012), à la grotte Mandrin, partie supérieure et moyenne du niveau 1 (Slimak *et al.*, 2006), aux Cottés, partie inférieure de l'US 04 (Roussel et Soressi, 2013).

Ensuite, dans la plus grande majorité de ces assemblages, la méthode de production utilisée qu'elle concerne aussi bien le schéma de réduction ou le schéma de production indépendante est décrite comme semi-tournante (*e.g.* Bordes, 2002: 337; Maíllo Fernández, 2006; Porraz *et al.*, 2010). Durant la progression du débitage, la table gagne sur les flancs et cela sans rupture technique. Il y a une intégration progressive de plusieurs surfaces dans une unique table de débitage. Ceci est possible par l'extraction de lamelles de flancs, larges et parfois outrepassantes, qui entretiennent les convexités latérales et longitudinales sur le nucléus. De ce fait, la table de débitage sera plus large en sa partie proximale que distale. Il en résulte une morphologie des nucléus à l'abandon le plus souvent pyramidale avec une section hémi-conique. La progression du débitage est parallèle à l'axe de symétrie du volume initial (voir le schéma de Bon, 2002: 158). Cette méthode de production permet d'obtenir des grandes lamelles au profil rectiligne ou légèrement courbe, celles extraites du centre de la table présentent des bords convergents.

À l'issue de cet exposé nous voyons que la méthode de production de lamelles au Protoaurignacien ne correspond pas à celle décrite pour la production de lamelles dans les niveaux châtelperroniens de Quinçay. Dans la séquence de Quinçay, la production lamellaire est autonome de la production laminaire, mais c'est bien la même méthode qui est utilisée. Cette méthode est spécifique au Châtelperronien. Elle concerne une production unipolaire disjointe de lamelles (ou de lames) sur des surfaces traitées indépendamment, suivant un recul oblique du débitage. Ceci conduit à l'obtention de tables anguleuses en section, l'intersection des surfaces s'articulant dans un angle de 90°. L'aspect des nucléus à l'abandon s'inscrivant le plus souvent dans un rectangle. La morphologie pyramidale des nucléus à lamelles protoaurignaciens, la section hémi-conique de leur table, l'intégration progressive des flancs au cours de la production, l'extraction de lamelles de flancs larges et outrepassantes, ou encore ou l'extraction de lamelles intercalées sont des caractéristiques absentes de la production châtelperronienne de lamelles (**figure 7**).

Les méthodes de production de lamelles au sein de ces industries sont donc bien différentes. Cependant, les objectifs de ces deux productions lamellaires sont similaires: obtenir des supports adéquats pour leur transformation en grandes lamelles Dufour-sous-type Dufour. Il est alors utile de s'interroger sur les facteurs culturels qui sont à l'origine de l'apparition du phénomène lamellaire chez les groupes châtelperroniens. En postulant que les groupes châtelperroniens aient été contemporains des groupes protoaurignaciens, qui par ailleurs partagent en grande partie le même espace géographique, ce sont les modalités de contact entre ces deux groupes que nous allons maintenant évaluer.

FIGURE 7 Comparaison des principales caractéristiques de la production lamellaire du Châtelperronien et du Protoaurignacien.

	DÉBITAGE LAMELLAIRE	
	CHÂTELPERRONIEN	PROTOAURIGNACIEN
Lien technique avec le débitage de lames	Complète autonomie. Indépendance des deux productions	Faible Autonomie. Continuum opératoire dominant. Indépendance des deux productions moins fréquente
Progression du débitage	Progression oblique ou recul fronto-sagittal Axe de recul est orienté à 45° par rapport à l'axe de symétrie	Progression semi-tournante ou frontale Axe de recul se confond avec l'axe de symétrie
Direction du débitage	Unipolaire Unipolaire disjoint	Unipolaire
Initialisation du débitage	Crête à 1 versant	Lame d'entame corticale Crête à 1 ou 2 versants
Entretien du débitage	Absence de lamelles de flancs larges et outrepassantes	Lamelles de flancs larges et outrepassantes
Objectifs du débitage	Grandes lamelles à bords le plus souvent parallèles Profil rectiligne ou légèrement courbe	Grandes lamelles à bords le plus souvent convergents Profil rectiligne ou légèrement courbe
Objectifs de la retouche	Retouche marginale inverse sur un seul bord cf. Dufour sous-type Dufour	Grandes lamelles Dufour sous-type Dufour ou assimilées
Exhaustion	Réorientation des nucléus fréquente	Réimplantation des tables lamellaires plus rares
Morphologie des nucléus a l'abandon	Morphologie rectangulaire	Morphologie pyramidale
Intrication des surfaces	Surfaces indépendantes	Surfaces intégrées
Section des tables de débitage	Table anguleuse ou triangulaire	Table hémi-conique

5 DISCUSSION

Afin de préciser les processus de transmission culturelle entre ces deux groupes nous avons utilisé le modèle interprétatif de G.B. Tostevin tel qu'il a été appliqué au passage du Paléolithique moyen au Paléolithique supérieur en Europe de l'Est (Tostevin 2007 et 2012). Suivant son modèle interprétatif (2007), les résultats de contacts visibles dans le système technique des groupes concernés sont dépendants de l'endroit où se sont produits ces contacts et dépendants de ce qui a été possible d'observer et d'apprendre.

Lorsque les contacts ont lieu entre deux groupes en des lieux à forte intimité sociale, *i.e.* lieux résidentiels, alors l'un des groupes a l'opportunité d'observer ou de pratiquer les comportements techniques de l'autre groupe. En suivant les besoins du groupe observateur, une « chaîne opératoire » spécifique peut être adoptée et reproduite sans modification (Tostevin, 2007 : 345, Tab. 28.1). Dans le cas que nous exposons, il semble que les contacts entre groupes châtelperroniens et protoaurignaciens ne se soient pas effectués en des lieux à forte intimité sociale. Par exemple, si les groupes châtelperroniens avaient eu l'opportunité d'observer le débitage lamellaire protoaurignacien, ils auraient pu le reproduire de façon similaire, *e.g.* méthode semi-tournante et/ou continuum opératoire. D'un autre côté, si les contacts sont plus ponctuels et ont lieu en des endroits à faible intimité sociale, *i.e.* lieux de passage partagés par les deux groupes, alors seule la morphologie finale d'un objet, *e.g.* les pointes de projectile, peut être observée. Dans ce cas, l'objet peut être reproduit sans connaitre les procédés initiaux de fabrication. C'est uniquement ce qui est vu qui est reproduit (Tostevin, 2007 : 345, Tab. 28.1)

C'est uniquement l'obtention de grandes lamelles et leur transformation en grandes lamelles Dufour qui est commun aux trois ensembles châtelperroniens de Quincay et aux ensembles protoaurignaciens. La production de lamelles au Châtelperronien est spécifique et est identique à celle utilisée pour la production de lames. La non intégration de la méthode de production lamellaire protoaurignacienne au sein des ensembles châtelperroniens est un argument de poids qui permet de constater que c'est bien uniquement l'idée « lamelle retouchée » qui se diffuse d'un groupe à l'autre. Ce phénomène correspond au concept de « stimulus diffusion » tel qu'énoncé par A. Kroeber (1940) et réutilisé par G.B. Tostevin (2007). Comme c'est uniquement l'idée d'un objet fini qui se diffuse entre ces groupes, alors nous envisageons qu'ils entretiennent un faible degré d'intimité sociale (**figure 8**).

Les lamelles retouchées sont des objets qui sont les plus à mêmes d'être transportés en dehors des lieux résidentiels puisqu'ils sont des objets produits en anticipation de tâches spécifiques dans le territoire. Durant le Protoaurignacien, une dichotomie est observée entre le registre laminaire et le registre lamellaire (Bon, 2005 et 2006). Pour les lames, les supports sont retouchés en une gamme d'outils dont la plupart sont utilisées dans la sphère domestique. Pour les lamelles, les supports retouchés, ou au moins une partie d'entre eux sont utilisés comme armatures de projectile (*e.g.* O'Farrell, 2005 ; Normand *et al.*, 2008 ; Porraz *et al.*, 2010 ; Pasquini, 2013). L'adoption du concept « lamelle retouchée » par les groupes châtelperroniens pourrait signifier un nouvel intérêt ou un renouvellement d'intérêt pour les projectiles en pierre (le statut fonctionnel des pointes de Châtelperron n'étant par ailleurs pas clairement défini). Cette transmission culturelle est unidirectionnelle, pour le moment aucun élément lithique châtelperronien ne semble être intégré dans le registre lithique du Protoaurignacien.

GROUPES CHÂTELPERRONIENS DE QUINCAY					
REGISTRE TECHNIQUE LITHIQUE	SIMILITUDES AVEC LE PROTO-AURIGNACIEN	VISIBILITÉ DANS LE TERRITOIRE	LIEUX DES CONTACTS	NATURE DES CONTACTS	DEGRÉ D' INTIMITÉ SOCIALE
DÉBITAGE LAMELLAIRE					
Méthode : Unipolaire disjoint. Recul oblique à l'axe de symétrie du volume	Méthode : non	Modérée (armatures utilisées et transportées en dehors des lieux domestiques)	Lieux de passage	Diffusion par stimulus	Faible
Objectif : grandes lamelles à bords parallèles, légèrement courbes. Transformation en Dufour sous-type Dufour	Objectif : oui				
DÉBITAGE LAMINAIRE					
Méthode : Unipolaire disjoint. Rythme en deux temps sur une table de débitage anguleuse	Méthode : non	Faible	Aucun	Absence de contact ou conservatisme	-
Objectifs : lames de section symétrique et asymétrique à bords parallèles. Transformation en pointes de Châtelperron	Objectif : non				

FIGURE 8 Synthèse des données et interprétation à propos de la nature et de l'importance des contacts qu'entretiennent les groupes châtelperroniens et protoaurignaciens.

Par ailleurs, Quinçay et la grotte du Renne sont les deux seuls gisements à présenter plusieurs niveaux châtelperroniens en stratigraphie dans lesquels se trouvent des évidences de parures et d'industrie osseuse associées à l'industrie châtelperronienne. Tous deux situés à l'extrémité septentrionale de la distribution des groupes châtelperroniens, la présence d'éléments travaillés en matière dure animale dans leur stratigraphie pourrait être également le résultat de contacts entre les groupes de Néandertaliens et d'Hommes modernes aux marges de leur distribution (Soressi et Roussel, 2014), comme nous venons de le documenter pour une partie de l'industrie lithique de Quinçay.

6 CONCLUSION

Dans la séquence châtelperronienne de Quinçay, la production lithique y est homogène, elle est spécifique puisqu'elle concerne tout d'abord un débitage séquentiel de séries de lames sur des nucléus aux sections triangulaires. Les produits obtenus, des lames de section symétrique mais également de section asymétrique sont utilisées comme supports de pointes de Châtelperron. Cette méthode de production tout comme ses objectifs sont différents de ce qui est documenté pour l'Aurignacien ancien (Pelegrin, 1995) ou pour le Protoaurignacien (Roussel, 2013). Ensuite, une évidente production de grandes lamelles y est documentée. Celle-ci est déconnectée de la production laminaire mais elle suit les mêmes principes généraux de production : débitage unipolaire disjoint de séries de lamelles, recul oblique du débitage à l'axe de symétrie du volume. Ce sont de grandes lamelles à bords parallèles et au profil légèrement courbe qui sont extraites de ces nucléus. Celles-ci sont transformées dans les trois niveaux en lamelles Dufour sous-type Dufour. Compte tenu de la proximité chronologique et géographique des groupes châtelperroniens et protoaurignaciens nous avons tenté d'évaluer les possibilités de contacts entre ces deux groupes et leurs effets. Comme c'est uniquement l'objectif « lamelle retouchée » qui est partagé entre ces deux groupes, et notamment les grandes lamelles Dufour, et non pas la méthode de production des lamelles, nous estimons que cette idée s'est diffusée d'un groupe à l'autre grâce à l'établissement de contacts occasionnés en des lieux de faible intimité sociale, comme des lieux de passage partagés, où seuls les produits finaux utilisés, *e.g.* des pointes de projectile, sont observables.

BIBLIOGRAPHIE

ARRIZABALAGA A. & ALTUNA J. (2000) – *Labeko Koba (Pais Vasco). Hienas y humanos en los albores del Paleolitico superior*. Sociedad de Ciencias Aranzadi Zientzi Elkartea, San Sebastian, Munibe 52, 395 p.

BAFFIER D. & JULIEN M. (1990) – L'outillage en os des niveaux châtelperroniens d'Arcy-sur-Cure. In : FARIZY C. (dir.), *Paléolithique moyen récent et Paléolithique supérieur ancien en Europe. Ruptures et transitions : examen critique des documents archéologiques*. Actes du colloque international de Nemours, 9–11 mai 1988, APRAIF, Nemours, Mémoires du Musée de Préhistoire d'Île de France 3, p. 329–334.

BANKS W., D'ERRICO F. & ZILHÃO J. (2013) – Human-Climate Interaction during the Early Upper Paleolithic : Testing the Hypothesis of an Adaptive Shift between the Proto-Aurignacian and the Early Aurignacian. *Journal of Human Evolution* 64 (1) : 39–55.

BAZILE F. (2005) – La composante lamellaire dans l'Aurignacien initial de la France méditerranéenne. In : LEBRUN-RICALENS F., BORDES J.-G. & BON F. (dir.), *Productions lamellaires attribuées à l'Aurignacien : chaînes opératoires et perspectives technoculturelles*. Actes du XIV^e^ congrès de l'UISPP, Université de Liège, 2–8 septembre 2001, MNHA, Luxembourg, ArchéoLogiques 1, p. 325–336.

BAZILE F. & SICARD S. (1999) – Le premier Aurignacien du Languedoc oriental dans son contexte méditerranéen. In : SACCHI D. (dir.), *Les faciès leptolithiques du Nord-Ouest méditerranéen : milieux naturels et culturels*. Actes du XXIVe Congrès Préhistorique de France (Carcassonne), 26–30 septembre 1994, Société préhistorique française, Paris, p. 117–125.

BODU P., BON F., TEYSSANDIER N. & PARIS C. (2013) – L'Aurignacien et les faciès à pièces carénées entre Yonne et Yvelines. In : BODU P., CHEHMANA L., KLARIC L., MEVEL L., SORIANO S. & TEYSSANDIER N. (dir.), *Le Paléolithique supérieur ancien de l'Europe du nord-ouest (35 000–15 000 BP). Réflexions et synthèses à partir d'un Projet Collectif de Recherches sur le Paléolithique supérieur ancien du Bassin parisien.* Actes du colloque SPF de Sens, 15–18 avril 2009, Société préhistorique française, Paris, Mémoire 56, p. 37–60.

BON F. (2006) – A brief overview of Aurignacian cultures in the context of the industries of the transition from the Middle to the Upper Paleolithic. In : BAR-YOSEF O. & ZILHÃO, J. (dir.), *Towards a Definition of the Aurignacian.* Actes du symposium de Lisbonne, 25–30 juin 2002, IPA, Lisbonne, Trabalhos de Arqueologia 45, p. 133–144.

BON F. (2005) – Little Big Tool. Enquête autour du succès de la lamelle. In : LEBRUN-RICALENS F., BORDES J.-G. & BON F. (dir.), *Productions lamellaires attribuées à l'Aurignacien : chaînes opératoires et perspectives technoculturelles*. Actes du XIVe congrès de l'UISPP, Université de Liège, 2–8 septembre 2001, MNHA, Luxembourg, ArchéoLogiques 1, p. 479–484.

BON F. (2002) – *L'Aurignacien entre Mer et Océan. Réflexion sur l'unité des phases anciennes de l'Aurignacien dans le sud de la France*. Société préhistorique française, Paris, Mémoire 29, 253 p.

BON F. & BODU P. (2002) – Analyse technologique du débitage aurignacien. In : SCHMIDER B. (dir.), *L'Aurignacien de la grotte du Renne. Les fouilles d'André Leroi-Gourhan à Arcy-sur-Cure (Yonne)*. CNRS, XXXIVe supplément à Gallia Préhistoire, Paris, 309 p.

BORDES J.-G. (2006) – News from the West : a reevaluation of the classical Aurignacian sequence of the Périgord. In : BAR-YOSEF O. & ZILHÃO, J. (dir.), *Towards a Definition of the Aurignacian*. Actes du symposium de Lisbonne, 25–30 juin 2002, IPA, Lisbonne, Trabalhos de Arqueologia 45, p. 147–171.

BORDES J.-G. (2003) – Lithic Taphonomy of the Châtelperronian/Aurignacian Interstratifications of the Roc-de-Combe and le Piage Sites (Lot, france). In : ZILHÃO J. & D'ERRICO F. (dir.), *The Chronology of the Aurignacian and of the Transitional Technocomplexes. Dating, Stratigraphies, Cultural Implications.* Actes du symposium 6.1 du XIVe congrès de l'UISPP, Université de Liège, 2–8 septembre 2001, IPA, Lisbonne, Trabalhos de Arqueologia 33, p. 223–244.

BORDES J.-G. (2002) – *Les interstratifications Châtelperronien/Aurignacien du Roc-de-Combe et du Piage (Lot, France). Analyse taphonomique des industries lithiques ; implications archéologiques*. Thèse de l'Université de Bordeaux I, Bordeaux, 365 p.

BORDES J.-G. & TEYSSANDIER N. (2011) – The Upper Paleolithic Nature of the Châtelperronian in Southwestern France : Archeostratigraphic and Lithic Evidence. *Quaternary International* 246 (1–2) : 382–388.

BORDES J.-G., LE BRUN-RICALENS F., CASTEL J.-C., DUCASSE S., FAIVRE J.-P., FERUGLIO V., HENRY-GAMBIER D., LACRAMPE-CUYAUBÈRE F., LAROULANDIE V., LENOBLE A., MARTIN H., MAUREILLE B., MORALA A., MORIN E., RENARD C., RENDU W., RIGAUD S., ROUGIER H., SZMIDT C., TARTAR E., TEXIER J.-P. & TEYSSANDIER N. (2008) – Les débuts du Paléolithique supérieur dans le Sud-Ouest de la France : fouilles 2004–2006 au Piage (Fajoles, Lot). Problématique et premiers résulats In : JAUBERT J., BORDES J.-G. & ORTEGA I. (dir.), *Les sociétés du Paléolithique dans un Grand Sud-Ouest de la France : nouveaux gisements, nouveaux résultats, nouvelles méthodes*. Actes de la séance SPF, Université de Bordeaux I, Talence 2006, Société préhistorique française, Paris, Mémoire 47, p. 261–288.

BROGLIO A., BERTOLA S., DE STEFANI M., MARINI D., LEMORINI C. & ROSSETTI P. (2005) – La production lamellaire et les armatures lamellaires de l'Aurignacien ancien de la Grotte de Fumane (Monts Lessini, Vénétie). In : LEBRUN-RICALENS F., BORDES J.-G. & BON F. (dir.), *Productions lamellaires attribuées à l'Aurignacien : chaînes opératoires et perspectives technoculturelles*. Actes du XIVe congrès de l'UISPP, Université de Liège, 2–8 septembre 2001, MNHA, Luxembourg, ArchéoLogiques 1, p. 415–436.

CARON F., D'ERRICO F., DEL MORAL P., SANTOS F. & J. ZILHÃO J. (2011) – The Reality of Neandertal Symbolic Behavior at the Grotte du Renne, Arcy-sur-Cure, France. *PLoS ONE* 6 (6) : DOI : 10.1371/ journal.pone.0021545.

CONNET N. (2002) – *Le Châtelperronien : Réflexions sur l'unité et l'identité techno-économique de l'industrie lithique. L'apport de l'analyse diachronique des industries lithiques des couches châtelperroniennes de la Grotte du Renne à Arcy-sur-Cure (Yonne)*. Thèse de l'Université de Lille 1, Lille, 445 p.

DEMARS P.-Y. & HUBLIN J.-J. (1989) – La transition Néandertaliens / Hommes de type moderne en Europe occidentale : aspects paléontologiques et culturels. In : VANDERMEERSCH B. (dir.), *L'Homme de Néandertal, Vol. 7 : L'extinction*. Actes du colloque international de Liège, 4–7 décembre 1986, Liège, ERAUL 34, p. 23–37.

DEMARS P.-Y. & LAURENT P. (1989) – *Types d'outils lithiques du Paléolithique supérieur en Europe*. CNRS, Paris, Cahiers du Quaternaire 14, 178 p.

DINI M., BAILLS H., CONFORTI J. & TOZZI C. (2012) – Le Protoaurignacien de la Grotte La Fabbrica (Grosseto, Italie) dans le contexte de l'arc nord méditerranéen. *L'Anthropologie* 116 (4) : 550–574.

D'ERRICO F. (2003) – The Invisible Frontier. A Multiple Species Model for the Origin of Behavioral Modernity. *Evolutionary Anthropology* 12 (4) : 188–202.

D'ERRICO F., JULIEN M., LIOLIOS D., BAFFIER D. & VANHAEREN M. (2001) – Les poinçons en os des couches châtelperroniennes et aurignaciennes de la grotte du Renne (Arcy-sur-Cure, Yonne) : comparaisons technologiques, fonctionnelles et décor. In : BODU P. & CONSTANTIN C. (dir.), *Approches fonctionnelles en préhistoire*. Actes du XXV[e] Congrès Préhistorique de France (Nanterre), Paris, Société préhistorique française, p. 45–66.

D'ERRICO F., ZILHÃO J., JULIEN M., BAFFIER D. & PELEGRIN J. (1998) – Neanderthal Acculturation in Western Europe ? A Critical Review of the Evidence and its Interpretation. *Current Anthropology* 39 (2) : S1-S44.

GRANGER J.-M. & LÉVÊQUE F. (1997) – Parure castelperronienne et aurignacienne : étude de trois séries inédites de dents percées et comparaisons. *Comptes Rendus de l'Académie des Sciences de Paris* 325 : 537–543.

GRAVINA B., MELLARS P. & BRONK RAMSEY C. (2005) – Radiocarbon Dating of Interstratified Neanderthal and Early Modern Human Occupations at the Chatelperronian Type-Site. *Nature* 438 : 51–56.

HARROLD F.B. (1989) – Mousterian, Châtelperronian and Early Aurignacian in Western Europe : Continuity or Discontinuity ? In : MELLARS P. & STRINGER C. (dir.), *The Human Revolution : Behavioral and Biological Perspectives on the Origins of Modern Humans*. Edinburgh University Press, Edinburgh, p. 677–713.

HIGHAM T., JACOBI R., JULIEN M., DAVID F., BASELL L., WOOD R., DAVIES W. & BRONK RAMSEY C. (2010) – Chronology of the Grotte du Renne (France) and Implications for the Context of Ornaments and Human Remains within the Châtelperronian. *Proceeding of the National Academy of Science* 107 (47) : 20234–20239.

HIGHAM T., BROCK F., PERESANI M., BROGLIO A., WOOD R. & DOUKA K. (2009) – Problems with Radiocarbon Dating the Middle to Upper Palaeolithic Transition in Italy. *Quaternary Science Reviews* 28 (13–14) : 1257–1267.

HUBLIN J.-J., TALAMO S., JULIEN M., DAVID F., CONNET N., BODU P., VANDERMEERSCH B. & RICHARDS M. (2012) – Dates from the Grotte du Renne and Saint-Césaire Support a Neandertal Origin for the Châtelperronian. *Proceedings of the National Academy of Sciences* 109 (46) : 18743–18748.

HUBLIN J.-J., SPOOR F., BRAUN M., ZONNEVELD F. & CONDEMI S. (1996) – A Late Neanderthal Associated with Upper Palaeolithic Artefacts. *Nature* 381 (6579) : 224–226.

KROEBER A.L. (1940) – Stimulus diffusion. *American Anthropologist* 42 (1) : 1–20.

LAPLACE G. (1966a) – *Recherches sur l'origine et l'évolution des complexes leptolithiques*. De Boccard, Paris, Mélanges d'Archéologie et d'Histoire, supplément 4, 574 p.

LAPLACE G. (1966b) – Les niveaux castelperroniens, protoaurignaciens et aurignaciens de la grotte Gatzarria à Suharre en Pays Basque (fouilles 1961–1963). *Quartär* 17 : 117–140.

LE BRUN-RICALENS F., BORDES J.-G. & EIZENBERG L. (2009) – A Crossed-Glance between Southern European and Middle-Near Eastern Early Upper Palaeolithic Lithic Complexes. Existing Models, New Perspectives. In : CAMPS M. & SZMIDT C. (dir.), *The Mediterranean from 50 000 to 25 000 BP. Turning Points and New Directions*. Oxbow books, Oxford, p. 11–34.

LEBRUN-RICALENS F., BORDES J.-G. & BON F. (2005) – *Productions lamellaires attribuées à l'Aurignacien : chaînes opératoires et perspectives technoculturelles*. Actes du XIV[e] congrès de l'UISPP, Université de Liège, 2–8 septembre 2001, MNHA, Luxembourg, ArchéoLogiques 1, 568 p.

LÉVÊQUE F. (1979) – Note à propos de trois gisements Castelperroniens de Poitou-Charentes. *Dialektikê, Cahiers de typologie analytique* : 25–40.

LÉVÊQUE F. & MISKOVSKY J.-C. (1983) – Le Castelperronien dans son environnement géologique. Essai de synthèse à partir de l'étude stratigraphique du remplissage de la grotte de la Grande Roche de la Plématrie (Quinçay, Vienne) et d'autres dépôts actuellement mis au jour. *L'Anthropologie* 87 (3) : 369–391.

LÉVÊQUE F. & VANDERMEERSCH B. (1980) – Découverte de restes humains dans un niveau castelperronien à Saint-Césaire (Charente-Maritime). *Comptes Rendus de l'Académie des Sciences de Paris*, Série D (291) : 187–189.

MAÍLLO-FERNÁNDEZ J.M. (2006) – Archaic Aurignacian Lithic Technology in Cueva Morín (Cantabria, Spain). In: BAR-YOSEF O. & ZILHÃO, J. (dir.), *Towards a Definition of the Aurignacian*. Actes du symposium de Lisbonne, 25–30 juin 2002, IPA, Lisbonne, Trabalhos de Arqueologia 45, p. 111–130.

MAÍLLO-FERNÁNDEZ J.M. (2005) – La production lamellaire de l'Aurignacien de la grotte Morin (Cantabrie, Espagne). In: LEBRUN-RICALENS F., BORDES J.-G. & BON F. (dir.), *Productions lamellaires attribuées à l'Aurignacien: chaînes opératoires et perspectives technoculturelles*. Actes du XIV[e] congrès de l'UISPP, Université de Liège, 2–8 septembre 2001, MNHA, Luxembourg, ArchéoLogiques 1, p. 339–357.

MAÍLLO-FERNÁNDEZ J.M. & BERNALDO DE QUIRÓS F. (2010) – L'Aurignacien archaïque de la grotte El Castillo (Espagne): caractérisation technologique et typologique. *L'Anthropologie* 114 (1): 1–25.

MELLARS P. (2005) – The Impossible Coincidence. A Single-Species Model for the Origins of Modern Human Behavior in Europe. *Evolutionary Anthropology* 14 (1): 12–27.

NORMAND C. (2006) – L'Aurignacien de la salle de Saint-Martin (Grotte d'Isturitz, commune de Saint-Martin d'Arberoue: Pyrénées-Atlantiques): données préliminaires sur l'industrie lithique recueillie lors des campagnes 2000–2002. In: BON F., MAÍLLO-FERNÁNDEZ J.M. & ORTEGA i COBOS D. (dir.), *Autour des concepts de Protoaurignacien, d'Aurignacien, archaïque, initial et ancien. Unité et variabilité des comportements techniques des premiers groupes d'hommes modernes dans le Sud de la France et le Nord de l'Espagne*. Actes de la table ronde de Toulouse, 27 février–1[er] mars 2003, UNED, Madrid, Espacio, Tiempo y Forma, Serie I (15), p. 145–174.

NORMAND C., O'FARRELL M. & RIOS-GARAIZAR J. (2009) – Quelle(s) utilisation(s) pour les productions lamellaires de l'Aurignacien archaïque ? Quelques données et réflexions à partir des exemplaires de la grotte d'Isturitz (Pyrénées-atlantiques: France). In: PÉTILLON J.-M., DIAS-MEIRINHO M.-H., CATTELAIN P., HONEGGER M., NORMAND C. & VALDEYRON N. (dir.), *Recherches sur les armatures de projectiles du Paléolithique supérieur au Néolithique.* Actes du colloque C83, XV[e] congrès de l'UISPP, Lisbonne, 4–9 septembre 2006, P@lethnologie 1, p. 7–46

NORMAND C. & TURQ A. (2005) – L'Aurignacien de la grotte d'Isturitz (France): la production lamellaire dans la séquence de la salle de Saint-Martin. In: LEBRUN-RICALENS F., BORDES J.-G. & BON F. (dir.), *Productions lamellaires attribuées à l'Aurignacien: chaînes opératoires et perspectives technoculturelles.* Actes du XIV[e] congrès de l'UISPP, Université de Liège, 2–8 septembre 2001, MNHA, Luxembourg, ArchéoLogiques 1, p. 375–392.

O'FARRELL M. (2005) – Étude préliminaire des éléments d'armature lithique de l'Aurignacien ancien de Brassempouy. In: LEBRUN-RICALENS F., BORDES J.-G. & BON F. (dir.), *Productions lamellaires attribuées à l'Aurignacien: chaînes opératoires et perspectives technoculturelles.* Actes du XIV[e] congrès de l'UISPP, Université de Liège, 2–8 septembre 2001, MNHA, Luxembourg, ArchéoLogiques 1, p. 395–412.

ORTEGA I COBOS D., SOLER MASFERRER N. & MAROTO GENOVER J. (2005) – La production des lamelles pendant l'Aurignacien archaïque dans la grotte de l'Arbreda: organisation de la production, variabilité des méthodes et des objectifs, In: LEBRUN-RICALENS F., BORDES J.-G. & BON F. (dir.), *Productions lamellaires attribuées à l'Aurignacien: chaînes opératoires et perspectives technoculturelles.* Actes du XIV[e] congrès de l'UISPP, Université de Liège, 2–8 septembre 2001, MNHA, Luxembourg, ArchéoLogiques 1, p. 359–373.

PASQUINI A. (2013) – *Les traces de notre passé européen. Le Protoaurignacien au début du Paléolithique supérieur: l'éclairage de la tracéologie.* Thèse de l'Université d'Aix-Marseille, Aix-en-Provence, 2 volumes: 331 p. et 147 p.

PELEGRIN J. (1995) – *Technologie lithique: le Châtelperronien de Roc-de-Combe (Lot) et de La Côte (Dordogne).* CNRS, Paris, Cahiers du Quaternaire 20, 297 p.

PORRAZ G., SIMON P., PASQUINI A. & ONORATINI G. (2010) – Identité technique et comportements économiques des groupes protoaurignaciens à la Grotte de l'Observatoire (Principauté de Monaco). *Gallia Préhistoire* 52: 33–59.

ROUSSEL M. (2013) – Méthodes et rythmes du débitage laminaire au Châtelperronien: comparaison avec le Protoaurignacien. *Comptes Rendus Palevol* 12 (4): 233–241.

ROUSSEL M. (2011) – *Normes et variations de la production lithique durant le Châtelperronien: la séquence de la Grande-Roche-de-la-Plématrie à Quinçay (Vienne).* Thèse de l'Université de Paris Ouest Nanterre - La Défense, Nanterre, 540 p.

ROUSSEL M. & SORESSI M. (2013) – Une nouvelle séquence du Paléolithique supérieur ancien aux marges sud-ouest du Bassin parisien: Les Cottés dans la Vienne. In: BODU P., CHEHMANA L., KLARIC L., MEVEL L., SORIANO S. & TEYSSANDIER N. (dir.), *Le Paléolithique supérieur ancien de l'Europe du nord-ouest (35 000–15 000 BP). Réflexions et synthèses à partir d'un Projet Collectif de Recherches sur le Paléolithique supérieur ancien du Bassin parisien.* Actes du colloque SPF de Sens, 15–18 avril 2009, Société préhistorique française, Paris, Mémoire 56, p. 283–297.

ROUSSEL M. & SORESSI M. (2010) – La Grande Roche de la Plématrie à Quinçay (Vienne). L'évolution du Châtelperronien revisitée. In : BUISSON-CATIL J. & PRIMAULT J. (dir.), *Préhistoire entre Vienne et Charente. Hommes et sociétés du Paléolithique*. Association des Publications Chauvinoises, Chauvigny, Mémoire 38, p. 203–219.

SCHMIDER B. (2002) – *L'Aurignacien de la grotte du Renne. Les fouilles d'André Leroi-Gourhan à Arcy-sur-Cure (Yonne)*. CNRS, Paris, XXXIV[e] supplément à Gallia Préhistoire, 309 p.

SLIMAK L., PESESSE D. & GIRAUD Y. (2006) – Reconnaissance d'une installation du Protoaurignacien en vallée du Rhône. Implications sur nos connaissances concernant les premiers hommes modernes en France méditerranéenne. *Compte Rendu Palevol* 5 (7) : 909–917.

SORESSI M. (2011) – Révision taphonomique et techno-typologique des deux ensembles attribués au Châtelperronien de la Roche-à-Pierrot à Saint- Césaire. *L'Anthropologie* 115 (5) : 569–586.

SORESSI M. & ROUSSEL M. (2014) – European Middle-to-Upper Palaeolithic Transitionnal Industries : Châtelperronian. In : SMITH Cl. (dir.), *Encyclopedia of Global Archaeology*, Springer, New-York, p. 2679–2693.

SZMIDT C., NORMAND C., BURR G.S., HODGINS G.W.L. & LAMOTTA S. (2010) – AMS ^{14}C Dating the Protoaurignacian / Early Aurignacian of Isturitz, France. Implications for Neanderthal-Modern Human Interaction and the Timing of Technical and Cultural Innovations in Europe. *Journal of Archaeological Science* 37 (4) : 758–768.

TALAMO S., SORESSI M., ROUSSEL M., RICHARDS, M. & HUBLIN J.-J. (2012) – A Radiocarbon Chronology for the Complete Middle to Upper Palaeolithic Transitional Sequence of Les Cottés (France). *Journal of Archaeological Science* 39 (1) : 175–183.

TEYSSANDIER N. (2008) – Revolution or Evolution : the Emergence of the Upper Paleolithic in Europa. *World Archaeology* 40 (4) : 493–519

TEYSSANDIER N. (2007) – L'émergence du Paléolithique supérieur en Europe : mutations culturelles et rythmes d'évolution. *Paléo* 19 : 367–390.

TEYSSANDIER N., BON, F. & BORDES J.G. (2010) – Within Projectile Range. Some Thoughts on the Appearance of the Aurignacian in Europe. *Journal of Anthropological Research* 66 (2) : 209–229.

TOSTEVIN G.B. (2012) – *Seeing Lithics. A Middle Range Theory for Testing for Cultural Transmission in the Pleistocene*. Harvard, American School of Prehistoric Research Monograph Series, 572 p.

TOSTEVIN G.B. (2007) – Social Intimacy, Artefact Visibility and Acculturation Models of Neanderthal-Modern Human Interaction. *In* : MELLARS P., BOYLE K., BAR-YOSEF O. & STRINGER C. (dir.), *Rethinking the Human Revolution. New Behavioral and Biological Perspectives on the Origin and Dispersal of Modern Humans*. Cambridge, McDonald Institute for Archaeological Research, p. 341–357.

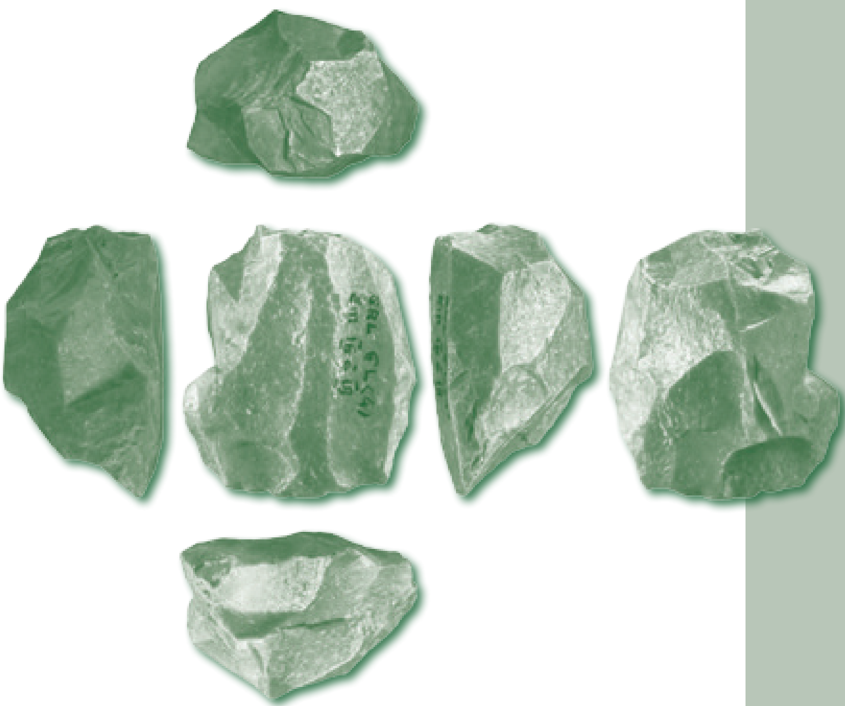
TSANOVA T., ZWYNS N., EIZENBERG L., TEYSSANDIER N., LE BRUN-RICALENS F. & OTTE M. (2012) – Le plus petit dénominateur commun : réflexion sur la variabilité des ensembles lamellaires du Paléolithique supérieur ancien d'Eurasie. Un bilan autour des exemples de Kozarnika (Est des Balkans) et Yafteh (Zagros central). *L'Anthropologie* 116 (4) : 469–509.

WHITE R. (2001) – Personal Ornaments from the Grotte du Renne at Arcy sur- Cure. *Athena Review* 2 (4) : 41–46.

ZILHÃO J., D'ERRICO F., BORDES J.-G., LENOBLE A., TEXIER J.-P. & RIGAUD J.-P. (2006) – Analysis of Aurignacian Interstratification at the Châtelperronian-Type Site and Implications for the Behavioral Modernity of Neandertals. *Proceedings of the National Academy of Sciences* 103 (33) : 12643–12648.

ZILHÃO J. & D'ERRICO F. (2000) – La nouvelle « bataille aurignacienne ». Une révision critique de la chronologie du Châtelperronien et de l'Aurignacien. *L'Anthropologie* 104 (1) : 17–50.

ZILHÃO J. & D'ERRICO F. (1999) – The Chronology and Taphonomy of the Earliest Aurignacian and its Implications for the Understanding of Neanderthal extinction. *Journal of World Prehistory* 13 (1) : 1–68.



Pérennité et évolution des territoires d'approvisionnement au Paléolithique supérieur : l'exemple de l'Épigravettien de la Grotte des Enfants (Ventimiglia, Italie)

Antonin TOMASSO

1 INTRODUCTION

Le thème de réflexion proposé par ce colloque, à savoir les modes de déplacements et de contacts au Paléolithique supérieur, est indissociable dans son énoncé de la question de l'organisation territoriale et des systèmes de mobilités. On ne peut envisager de discuter la notion de contacts à grande échelle sans se poser la question de l'étendue des territoires parcourus et exploités par les groupes étudiés. Dans ce travail, nous proposons de nous intéresser en particulier aux territoires d'approvisionnements en matières premières siliceuses qui constituent un des enregistrements les plus visibles de l'organisation territoriale des sociétés préhistoriques. Mais cet enregistrement n'est pas un enregistrement direct, il comporte de nombreux biais qui empêche de considérer ce territoire d'approvisionnement autrement que comme un espace théorique au sein duquel il faudra essayer de distinguer les différents espaces territoriaux que sont le *camp range* (*foraging radius* et *logistical radius*), l'annual range et l'espace social ou *visiting range* (Binford 1982).

L'image idéale d'un territoire d'approvisionnement fournissant une représentation directe du territoire parcouru impliquerait un ramassage systématique de matières premières durant les déplacements du groupe. Mais rien ne nous permet de considérer cette possibilité comme une règle générale si tant est qu'elle puisse se présenter dans la réalité. Tout d'abord parce que les ressources lithiques ne sont jamais réparties de manière uniforme dans l'espace, y compris dans les grands bassins sédimentaires ou elles peuvent être abondantes. Des différences de qualité liées à différents facteurs et des conditions variées de disponibilités induisent toujours une différentiation spatiale des ressources exploitables. Parallèlement, l'organisation territoriale des sociétés implique une répartition des activités dans le temps et dans l'espace qui a des conséquences sur l'approvisionnement en matières premières. Enfin, l'approvisionnement doit tenir compte des contraintes propres aux besoins et aux choix techniques opérés par les groupes : chaque matière première est plus ou moins adaptée à certains besoins techniques. Au-delà de ces biais, l'approvisionnement en matières premières n'est pas forcément réalisé par une récolte directe et peut être résolu via des transferts. L'importance de ces transferts dans les économies des sociétés de chasseurs-cueilleurs n'a plus a être démontrée (*e.g.* Testart 2007) et l'une des difficultés dans les études d'approvisionnements en matières premières lithiques consiste bien à trouver les éléments permettant de distinguer approvisionnements directs et approvisionnements indirects (Féblot-Augustin & Perles 1992). Distinguer ces deux mécanismes permettra alors de percevoir la limite entre territoire parcouru et espace social, au moins en termes d'échelles.

Le territoire d'approvisionnement est donc une entité complexe, formé par différents espaces appartenant eux mêmes à des catégories différentes du territoire des groupes (Geneste 1992). Dépasser les difficultés d'interprétations des données implique à la fois de s'attacher à analyser la structuration de ce territoire d'approvisionnement et de l'aborder dans une approche globale intégrant les données issues d'autres domaines : systèmes de mobilités ; circulations de biens autres que lithiques, d'idées et de savoir-faire. L'Épigravettien de l'arc liguro-provençal constitue un cas d'étude particulièrement intéressant à cet égard, pour deux raisons principales. Tout d'abord, la répartition discrète et la variabilité importante des ressources lithiques dans cet espace constituent un atout majeur pour percevoir finement l'origine géographique des approvisionnements. Par ailleurs, l'arc liguro-provençal se situe à la frontière de l'aire d'extension de l'Épigravettien méditerranéen (Bazile 2011 ; Brochier & Livache 2003, 2007 ; Montoya 2004 ; Palma Di Cesnola 2001) et se présente donc comme un espace de recherche intéressant pour interroger les relations entretenues entre les réseaux de transferts de bien, les territoires parcourus et le partage de même traditions techniques dans un espace donné.

Dans cet article, c'est la structuration du territoire d'approvisionnement en matières premières lithique que nous nous attacherons à caractériser en nous appuyant sur l'étude techno-économique des différents niveaux épigravettiens de la grotte des Enfants (*grotta dei Fanciulli* en italien) du complexe des Balzi Rossi à Ventimiglia (Imperia) en Ligurie, Italie. Ce travail se situe à la base de questionnements plus larges qui ne pourront être développés ensuite qu'en multipliant les résultats aujourd'hui trop ponctuels.

2 POUR UNE APPROCHE TECHNO-ÉCONOMIQUE

L'étude des matières premières dans les industries lithiques a connu ces dernières années un large développement méthodologique que nous ne détaillerons pas ici. Dans une optique techno-économique ou l'étude de l'ensemble des pièces d'une collection est indispensable, la détermination des roches grâce à l'utilisation du stéréomicroscope (ou loupe binoculaire) s'impose comme la méthode la plus efficace. Sur la base d'un référentiel régional solide (lithothèque) et complétée, quand cela est nécessaire, par des analyses plus lourdes (lames minces, géochimie…), cette méthode permet une détermination fiable et argumentée des ressources exploitées, au moins dans les contextes géologiques à dominante sédimentaire. La précision géographique des déterminations dépend grandement du contexte mais des développements méthodologiques récents permettent aujourd'hui des progrès importants dans des régions ou les formations géologiques sont monotones sur un vaste espace géographique (Fernandes & Raynal 2010).

Ces études doivent nécessairement s'appuyer sur un référentiel régional solide et systématique sous peine d'induire des erreurs de déterminations lourdes de sens (identifications erronées de circulations à très grandes distances par exemple). Le référentiel MP-ALP constitué pour l'arc liguro-provençal à partir des années 1990 et renforcé dans le cadre du PCR ETICALP (dir. Didier Binder) décrit ainsi l'ensemble des ressources disponibles entre la vallée du Rhône et les Apennins le long d'une large bande littorale incluant les premiers reliefs alpins. Encore en cours d'élaboration, ce référentiel a été partiellement publié dans le cadre de différents travaux (Barbier 1996; Blet 1999; Blet *et al.* 2000; Guilbert 2000; Porraz 2005; Simonucci 2000).

Le sens de l'approche techno-économique est de ne pas considérer la collection lithique comme un ensemble clos et homogène mais comme un assemblage résultant de différentes productions ayant chacune leur propre fonctionnement (Binder 1998). Les ensembles définis par une détermination systématique des matières premières, permettent alors de démêler les différentes dynamiques qui forment l'assemblage étudié. C'est sur la base d'une telle approche économique de l'approvisionnement (Geneste 1992) que nous pouvons appréhender la structuration du territoire d'approvisionnement. Ainsi, pour chaque ensemble individualisé, on s'attachera à déterminer les différents schémas opératoires mis en œuvres et la représentation des différentes étapes des chaînes opératoires: phase d'acquisition de la matière première; phase de configuration; phase de production et d'utilisation (Geneste 2010). Pour chaque ensemble, se pose la question des formes d'introductions sur le site (bloc brut et/ou préparé, nucleus en cours d'exploitation, supports ou produits finis…) et nous verrons qu'une détermination fine des différents faciès de matières premières permet, pour une même origine géographique, la détermination de modes d'introductions variés (blocs bruts et produits finis associés par exemple).

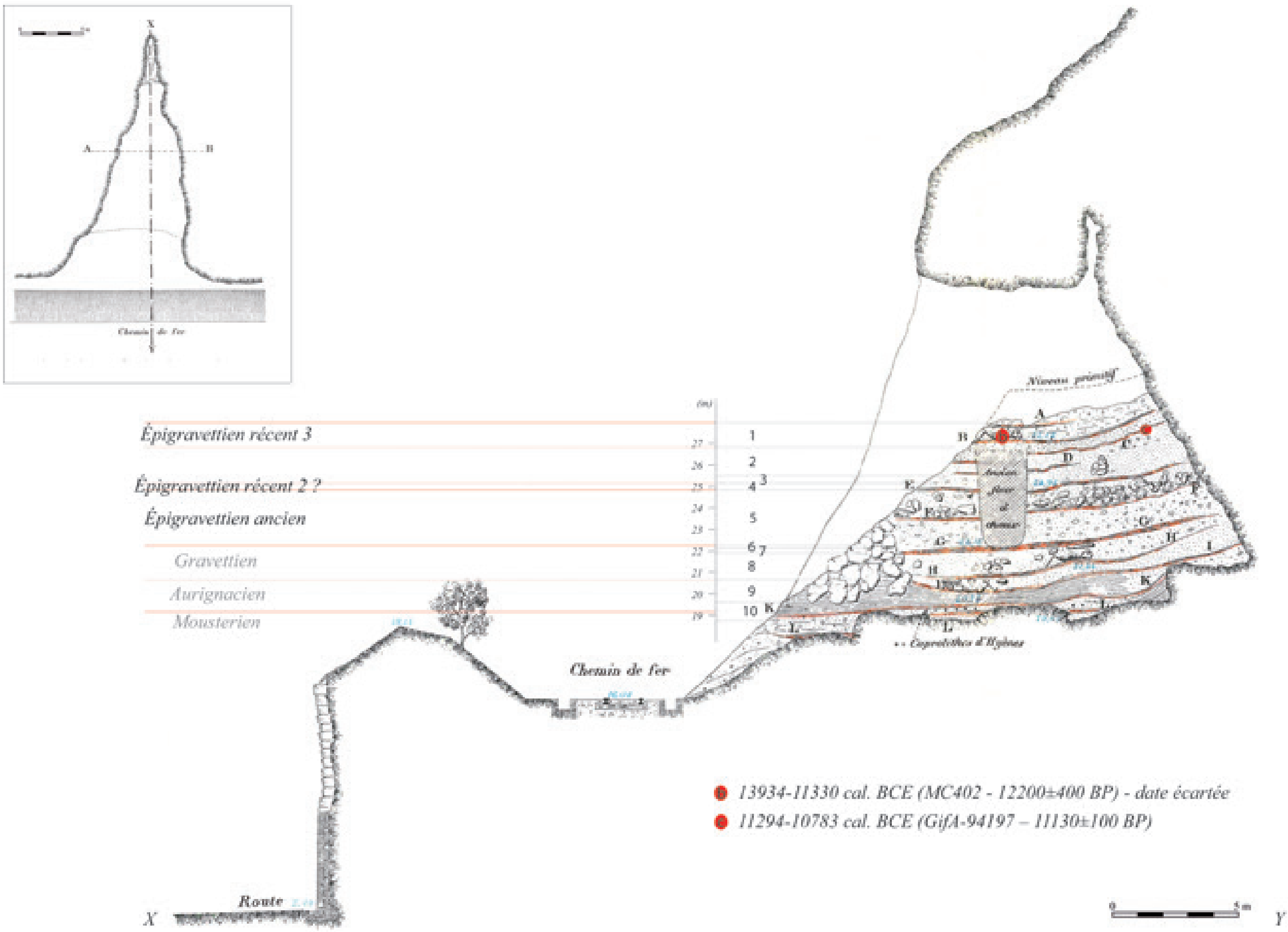
Certaines matières premières peuvent être associées ou non à des chaînes opératoires propres et, en fonction de leurs qualités et de leur disponibilité (liée notamment aux distances d'approvisionnements), des choix techniques peuvent différer pour répondre à un même objectif. Enfin, et même si ce type de question n'est pas toujours aisé à manipuler, l'emport ou non des productions réalisées aux dépens des matières premières se pose également.

3 LE CAS DE LA GROTTE DES ENFANTS

3.1 Présentation du site

La grotte des Enfants à Ventimiglia (Imperia, Italie) (**figure 1**, ci-contre) appartient au complexe des Balzi Rossi et a fait l'objet de plusieurs fouilles anciennes, par Émile Rivière tout d'abord (en 1874-1875) puis par le chanoine de Villeneuve en 1900 et 1901 (De Villeneuve 1906–1919) et enfin par l'Institut Italien de Paléontologie Humaine en 1928. Le matériel de fouille Rivière a été égaré et les fouilles de 1928 ont concerné les niveaux les plus anciens (Moustérien), ce travail ne concerne donc que les collections issues des fouilles de De Villeneuve. Lors de ces fouilles, les dépôts sont subdivisés en 10 coupes (numérotées de 1 à 10) d'épaisseurs variables et définies par les ruptures sédimentologiques (**figure 2**). Le matériel est récolté par coupes sans localisation dans l'espace. Des foyers, notés par une lettre de A à N (couches cendreuses ou sombres) sont définis au sein des coupes mais aucune indication n'est donnée sur la relation entre le matériel récolté et ces foyers. A posteriori, les pièces remarquables (grandes lames, matériel retouché, certains nucleus) ont été isolées et attribuées aux foyers alors que le reste des collections restait organisé par coupes.

FIGURE 2 Stratigraphie de la Grotte des Enfants (modifié d'après Cartailhac 1912).



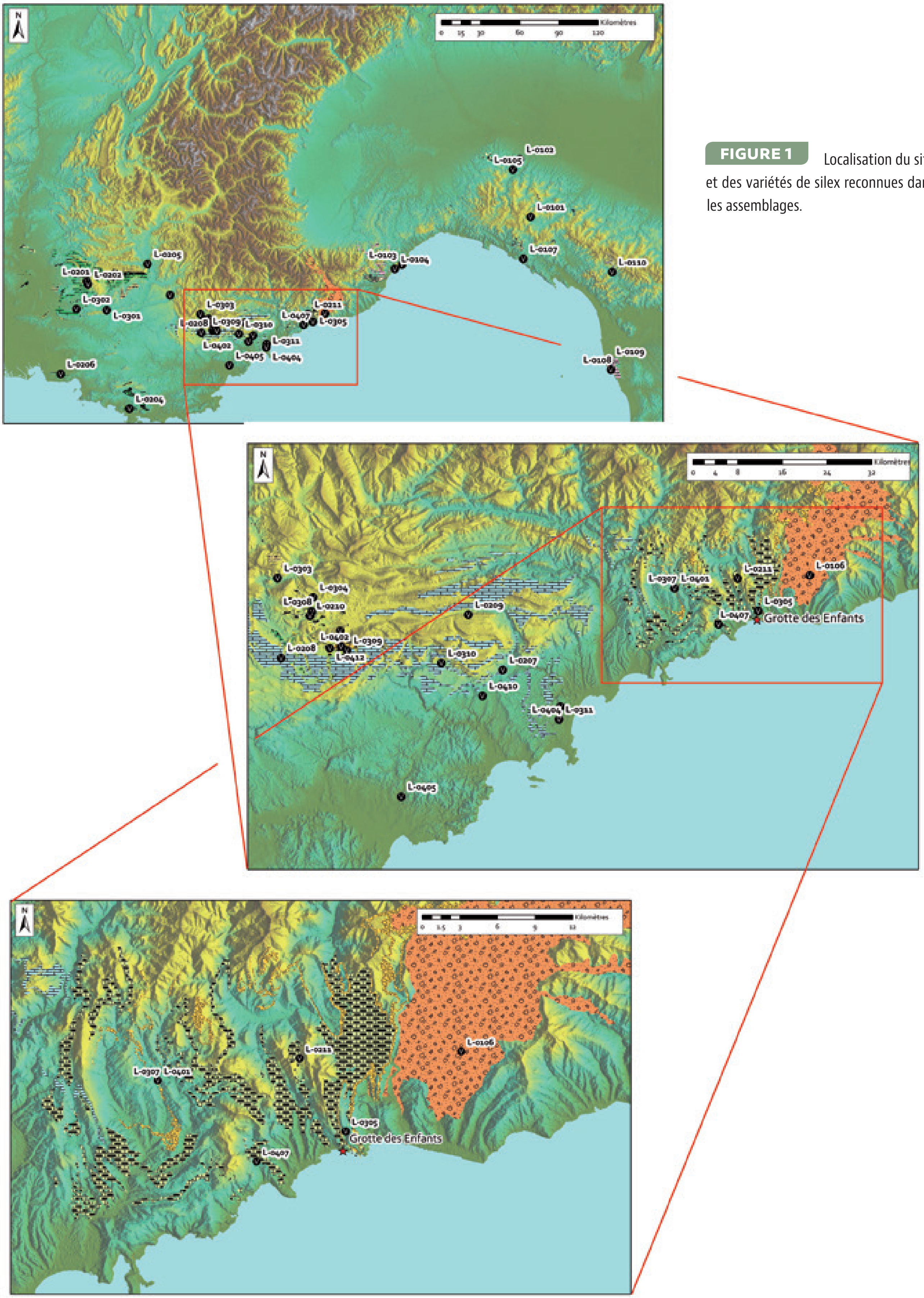


FIGURE 1 Localisation du site et des variétés de silex reconnues dans les assemblages.

Les collections lithiques de la grotte des Enfants ont fait l'objet de plusieurs études (Joris 2008 ; Onoratini & Da Silva 1972 ; Palma Di Cesnola 1979) et les attributions chronoculturelles proposées par ces études concordent globalement, malgré quelques différences relevant surtout de l'utilisation de cadres chronologiques différents. Nous ne développerons pas ici les critiques apportées depuis maintenant plus de 30 ans sur ces sériations établies sur les seuls décomptes typologiques, la chronologie établie pour l'Épigravettien italien à partir du modèle proposé par G. Laplace (1964) est largement remise en question (Bietti 1990, 1997 ; Broglio 1997) et un nouveau cadre chronologique est élaboré progressivement sur la base d'études technologiques des industries (Montoya 2004, 2008a ; Montoya & Peresani 2005 ; Tomasso *et al.* soumis). Aux critiques apportées aux modèles chronologiques utilisés lors des précédentes études, il faut ajouter l'absence de regard critique sur les collections étudiées, pourtant indispensable pour des collections issues de fouilles aussi anciennes. Ainsi, un retour critique sur les différentes collections nous a amené à écarter le matériel attribué à la coupe 3 composé d'une petite série de pièces retouchées, attribuables de manière générale au Paléolithique supérieur, et d'un plus grand effectif de pièces liées au Moustérien. Selon les fouilleurs (Cartailhac 1912) cette coupe était stérile ou presque et nous considérons donc que cette collection est le résultat d'erreurs de manipulations liées à la longue histoire muséographique de la série. La seconde collection posant un problème est celle attribuée au foyer D (coupe 2). Cette collection, parfaitement comparable à celle des autres foyers en terme de composition (pièces retouchées, pièces remarquables) n'est pas associée à une série plus complète comprenant le reste du débitage comme c'est le cas pour les autres coupes. Ne pouvant pas déterminer la représentativité de cette série, nous ne la prendrons pas en compte dans ce travail qui portera donc, au final, sur les coupes 5, 4 et 1 du site.

La faiblesse actuelle du cadre chronologique de l'Épigravettien et la rareté des dates ^{14}C nous obligent à rester prudent sur les attributions chrono-culturelles des différentes coupes de la collection. La coupe 5 est attribuable sans difficulté à l'Épigravettien ancien, période qui s'étend *a minima* entre 22 000 BP et la fin du LGM (Gioia *et al.* 2003), mais aucune subdivision interne à cette période ne permet de proposer une attribution plus fine. Aucune datation n'est disponible pour la coupe 4 mais, sur la base de comparaisons technologiques, nous pourrions évoquer un rapprochement avec l'ensemble 2 de l'Épigravettien récent (ER2) défini par C. Montoya (Montoya 2004, 2008a, b) daté du début du Tardiglaciaire, entre le Dryas ancien et la première moitié de l'Alleröd. Une datation ^{14}C récemment obtenue sur un élément de faune de la coupe 2 sus-jacente donnerait un terminus ante quem à 15 640–15 020 cal. BCE (LTL12311A, CEDAD Salento, 14 214 ± 70 BP) et tendrait à suggérer une attribution au Dryas I. Enfin, la coupe 1 a été récemment attribuée à l'ER3 (Tomasso *et al.* soumis) et serait datée de la fin de l'Alleröd. Cette attribution concorde avec une datation ^{14}C à 11 294–10 783 cal. BCE (GifA–94197, Gif sur Yvette, 11 130 ± 100 BP), obtenue sur la sépulture double des Enfants provenant de cette même coupe (Alciati *et al.* 2005).

3.2 Détermination des matières premières

Les déterminations de matières premières présentées dans ce travail s'appuient sur la description de critères objectivement définis, en particulier la structure, la texture, le granuloclassement et la nature des clastes. Nous ne décrirons pas le référentiel MP-ALP dans cet article mais nous utiliserons la classification des faciès qui a été proposée dans ce cadre, établie selon un modèle hiérarchisé qui distingue la variété au sein de laquelle sont définis des types réunissant eux-mêmes des faciès.

Les différentes matières premières reconnues dans les trois coupes présentées ici sont relativement constantes (**figure 3**), même si nous verrons que d'importants changements quantitatifs et qualitatifs différencient les différents assemblages. Ces matières premières appartiennent à un espace géographique très étendu allant du Vaucluse en France au nord-ouest de l'Émilie-Romagne en Italie (**figure 1**). Les distances évoquées dans le tableau de la **figure 3** sont exprimées en journées de marche. Elles sont établit sur la base d'un traitement SIG, prenant en compte la topographie du terrain et l'impossibilité de parcourir certains espace (espace maritime et pentes trop élevées). Ce traitement, relativement classique ne sera pas détaillé ici et les distances sont présentées à titre indicatif. L'aptitude à la taille (AT) est évaluée de manière globale (mais elle varie en réalité d'un faciès à l'autre) selon 3 catégories : médiocre (M), bonne (B) et très bonne (TB).

4 TECHNO-ÉCONOMIE DES ASSEMBLAGES

4.1 Caractérisation générale des assemblages

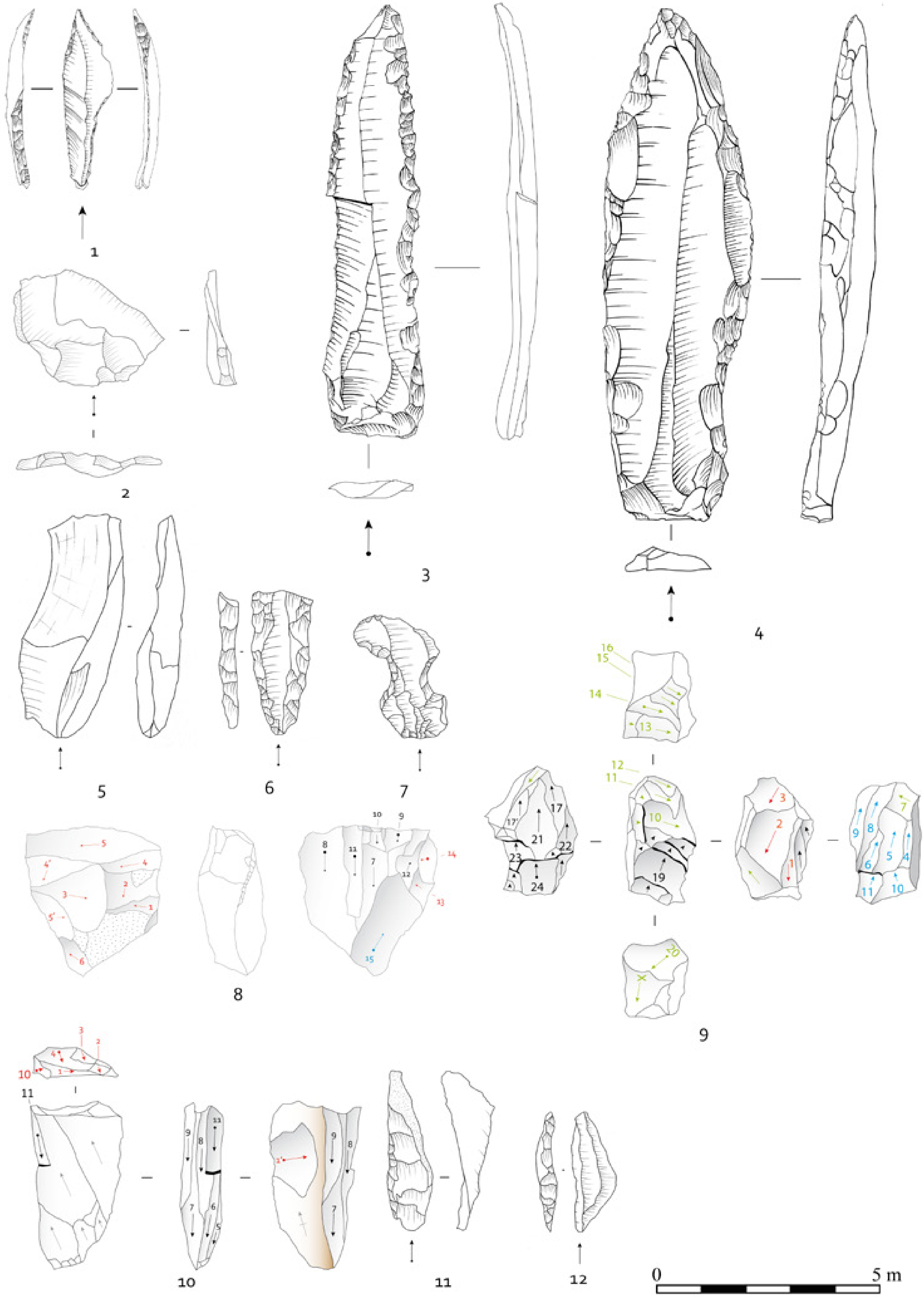
4.1.1 Coupe 5

La collection lithique issue de la coupe 5 regroupe un total de 1 022 pièces. La production laminaire constitue l'essentiel de l'assemblage, elle correspond à une grande diversité de matières premières issues de l'ensemble du territoire d'approvisionnement mais reste exceptionnelle pour les matières premières locales ou elle ne concerne que les meilleures qualités de silex. Le débitage est mené au percuteur tendre organique, dans une modalité unidirectionnelle en exploitant une surface de débitage cintrée et carénée. Les phases avancées du débitage, mal documentées, consistent en une succession de séquences unidirectionnelles exploitant le volume de manière intensive et évoluant vers l'installation d'une production lamellaire dans des modalités variées qui semblent dépendre des possibilités offertes par le nucleus, selon un fonctionnement fréquemment unidirectionnel séquentiel. Pour les matières premières provenant des espaces lointains la représentation de la chaîne opératoire est très fragmentaire : différents tronçons sont documentés selon les ensembles et de manière générale, ce sont des phases de pleins débitages qui sont dominantes avec des ensembles classiquement formés de quelques lames, brutes et retouchées, d'une ou plusieurs tablettes (**figure 4**, n° 2) et de quelques éclats. Pour ces ensembles, les nucleus sont rarement présents et sont systématiquement exploités de manière intensive (**figure 4**, n° 9). Parallèlement, plusieurs ensembles ne sont formés que de lames isolées, retouchées ou non (**figure 4**, n° 1). Ces ensembles, liés également à des faciès variés, montrent l'apport sur le site de support ou d'outils finis. À l'inverse, pour les matières premières locales et intermédiaires, toute la chaîne opératoire est représentée. On relève dans certains ensembles la présence de lames de largeurs comprises entre 20 et 35 mm et de longueurs pouvant dépasser 110 mm, généralement à retouche (bi)latérale rasante à semi-abrupte (**figure 4**, n°s 3 et 4). Cette catégorie de supports est systématiquement représentée par des produits isolés mais techniquement compatibles avec les débitages laminaires présentés plus haut et rien n'empêche qu'ils soient obtenus selon les mêmes modalités, voir sur les mêmes nucleus, en début d'exploitation. Dans tout les cas cette production a lieu hors du site (aucun produit associé).

DOMAINE	VARIÉTÉ		DISTANCE EN JOURNÉE DE MARCHE	AT	COUPE 5		COUPE 4		COUPE 1	
	CODE	NOM			EFFECTIF	%	EFFECTIF	%	EFFECTIF	%
proche	L-0305	Poudingues à Microdium de Ligurie, dit « silex de I Ciotti »	0,3	M	393	38 %	168	19 %	254	22 %
	L-0211	Turonien de l'arc de Nice	0,3	M			8	1 %		
total domaine proche					393	38 %	176	20 %	254	22 %
lointains	L-0106	Flysch de Baiardo	1,5	B	31	3 %	31	3 %	46	4 %
	L-0307	Poudingues à Microcodium du col de Nice	2	M			9	1 %		
	L-0207	Bajocien-Bathonien	3	M			1	0 %		
	L-0405	Roches volcanique de l'Esterel	4	M			3	0 %		
	L-0309	Microbrèches siliceuses de Mons	4	B	11	1 %	1	0 %	3	0 %
	L-0306	Eocène de l'arc de Castellane	4	B	57	6 %	30	3 %	14	1 %
	L-0209	Kimméridgien-Portlandien de Provence orientale	5	B			1	0 %	1	0 %
	L-0210	Turonien de l'arc de Castellane	5	B	6	1 %	7	1 %	1	0 %
	L-0304	Miocène de l'arc de Castellane	5	B			1	0 %		
	L-0208	Valanginien-Hauterivien	5	TB	28	3 %	28	3 %	17	1 %
	L-0308	Conglomérats Tertiaires Nord-Varois	5	B	9	1 %	25	3 %	11	1 %
	L-0103	Chailles et silex des Dolomie di San Pietro	6	M					4	0 %
	L-0303	Oligocène de l'arc de Castellane	6	B	29	3 %	32	4 %	2	0 %
	L-0204	Aptien sud provençal	7	TB	15	1 %			7	1 %
	L-0301	Oligocène du bassin d'Apt-Forcalquier	8	TB	134	13 %	115	13 %	75	7 %
	L-0205	Bédoulien de MontGervis	8	TB			3	0 %		
	L-0302	Éocène du bassin d'Apt-Forcalquier	8	TB	26	3 %	6	1 %	2	0 %
	L-0201	Barrémo-Bédoulien de Provence occidentale	9	TB	90	9 %	61	7 %	30	3 %
	L-0105	Silex des Calcare con Selce d'Émilie-Romagne	12	TB	5	0 %	21	2 %	7	1 %
	L-0102	Maiolica d'Émilie-Romagne	12	TB	87	9 %	228	26 %	281	25 %
	L-0107	Lydiennes et Radiolarites de La Spezia	13	B	12	1 %	7	1 %	37	3 %
	L-0101	Diaspri de Ligurie orientale	14	TB	22	2 %	49	5 %	153	13 %
	L-0110	Scaglia Toscana	14	B	3	0 %	2	0 %	16	1 %
		Scaglia Rossa (mal localisé)	>	TB	4	0 %	5	1 %	21	2 %
total domaine lointain					569	56 %	666	75 %	728	64 %
Indéterminé	Indéterminés Provence				3	0 %			3	0 %
	Indéterminés Italie				15	1 %	14	2 %	22	2 %
	Indéterminé				33	3 %	15	2 %	43	4 %
	Brulées (indéterminables)				9	1 %	21	2 %	75	7 %
	Indéterminables autres								16	1 %
Total Indéterminé					60	6 %	50	6 %	159	14 %
Total général					1022	100 %	892	100 %	1136	100 %

FIGURE 3 Variétés de matières premières identifiées et effectifs dans les assemblages.

FIGURE 4 Objets lithiques de la coupe 5 (no 1-4 et 9), et de la coupe 1 (nos 5-8 et 10-12). Dessins de l'auteur, sauf nos 1, 3 et 4 : dessins de Carole Cheval (http://www.artcheograph.fr/).



1
2
3
4
5
6
7
8
9
10
11
12
0
5 m

Certaines productions, associées essentiellement aux matières premières locales L-0305 ne sont pas laminaire même si l'objectif d'une production de supports allongés est perceptible. Ces productions d'éclats allongés reprennent les modalités du débitage laminaire mais se caractérisent par l'utilisation du percuteur minéral dur, par l'exploitation d'une surface plus courte que dans les débitages laminaires et par l'absence de régularité dans la progression. La majorité des éclats sont irréguliers, épais et souvent corticaux malgré la production de quelques supports laminaires à nervures plus ou moins parallèles. Les produits sont très rarement retouchés - retouche directe (bi)latérale et pièces esquillées principalement - et la finalité fonctionnelle de ces productions reste difficilement perceptible en l'absence d'analyse tracéologique. En fin de production, des séries de lamelles sont extraites dans des modalités unidirectionnelles séquentielles et, là encore, la régularité du débitage est très faible.

En plus des lamelles produites en fin d'exploitation des nucleus laminaires, une part importante de ces supports est réalisée dans des débitages longitudinaux sur tranche de lames (Ducasse et Langlais, 2007 pour la terminologie). Les lames redébitées dans ces productions, parfois des outils retouchés, semblent issues des débitages laminaires présentés plus haut et leur dimensions, telles que nous pouvons les percevoir, les apparentent généralement à la gamme des grandes lames. Ce débitage est associé principalement à la production d'armatures à dos rectiligne (microgravettes). Ces productions sont identifiables pour la totalité des zones d'approvisionnement mais sont absentes des ensembles issus des ressources locales. Cette absence peut s'expliquer en partie par l'absence de lames épaisses, régulières qui sont utilisées pour ces productions mais un critère économique peut aussi être évoqué : ces débitages pourrait répondre à une volonté d'économiser une matière première lointaine et difficilement remplaçable localement.

Coupe 4 **4.1.2**

L'assemblage de la coupe 4 regroupe un total de 892 pièces et si les schémas opératoires sont très différents de ceux reconnus dans la coupe 5, la constitution des ensembles, en termes d'économie, est quant à elle parfaitement semblable. La production laminaire en particulier marque une rupture nette dans les objectifs poursuivis comme dans les méthodes par rapport à la couche précédente avec l'exploitation au percuteur tendre minéral d'une surface de débitage à convexités (latérales et longitudinales) très faibles dans une modalité bidirectionnelle préférentielle. Des séquences de débitage de petites lames qui interviennent à la fin de l'exploitation des nucleus font d'avantage appel à un second plan de frappe opposé dans une alternance séquentielle assez rapide. Plusieurs éléments indiquent le déplacement progressif du débitage sur différentes faces du volume par la juxtaposition de surface successives. La constitution des ensembles laminaires est parfaitement comparable à ceux de la coupe 5 avec une majorité d'ensembles formés de quelques lames, brutes ou retouchées, d'une ou plusieurs tablettes et de produits liés à l'entretien du nucleus. Les nucleus sont rares, et systématiquement exploités au maximum. Comme dans la coupe 5, les ensembles en silex locaux et intermédiaires sont rares mais la chaîne opératoire est alors complète. On retrouve également, mais de manières plus discrète, une gamme de grandes lames, isolées, mais toujours compatibles techniquement avec les débitages laminaires. Des ensembles laminaires constitués uniquement de produits isolés retouchés ou bruts indiquent pour leur part l'importation de produits réalisés en dehors du site.

Des productions lamellaires suivant des modalités parfaitement comparables à celles du débitage laminaire sont documentées dans l'assemblage. Dans certains cas il est probables qu'elles s'inscrivent dans un continuum de débitage faisant suite au débitage laminaire, mais dans plusieurs autres, elles sont indépendantes et sont mises en place sur des lames ou des éclats.

Le débitage est mené à la pierre tendre en suivant les modalités déjà décrites pour le débitage laminaire et en exploitant des convexités faibles (installation du débitage sur l'une des faces de la lame ou de l'éclat redébités plutôt que sur la tranche). Des indices difficiles à comprendre puisque l'absence du tamisage limite l'information dans cette gamme de dimension, semblent indiquer l'existence d'un débitage microlamellaire dans des modalités carénée sur tranche longitudinale ou transversale (Ducasse & Langlais 2007 pour la terminologie). Dans l'un ou l'autre cas (débitage lamellaire et microlamellaire), les lames redébitées sont issues d'ensembles de silex lointains (plus d'une journée de marche à partir du site) et reprennent parfois des outils retouchés. Mais pour la seule production microlamellaire, les silex locaux semblent également avoir été exploités.

Des productions d'éclats allongés mises en places sur les silex locaux apparaissent comme une simplification du schéma opératoire laminaire, adapté aux matières premières médiocres. Ce débitage mené sur des blocs non aménagés au percuteur dur minéral est unidirectionnel. Les produits sont irréguliers, éclats plus ou moins allongés, généralement épais et sont très rarement retouchés.

Coupe 1 **4.1.3** L'assemblage de la coupe 1 regroupe un total de 1 136 pièces. Ici les schémas opératoires comme l'économie des ensembles sont très différents des deux assemblages précédents. Un débitage lamino-lamellaire, largement dominant en quantité, est réalisé au percuteur tendre minéral à partir de blocs peu préparés dans une modalité unidirectionnelle ou bidirectionnelle séquentielle exploitant une convexité latérale (cintre) relativement marquée et une carène très faible. Ce schéma opératoire fournit les supports nécessaires à la fabrication de l'outillage retouché et d'une partie des armatures difficilement quantifiable puisque la distinction entre les supports lamellaires de ce schéma et ceux du schéma lamellaire n'est pas systématiquement réalisable. Ces débitages sont réalisés sur une variété importante de matières premières. Cependant, deux sources dominent quantitativement l'assemblage : les silex et radiolarites d'Émilie-Romagne (L-0101 ; L-0102 et L-0105) et les silex locaux (L-0305). Dans les deux cas, les ensembles sont très variés en terme de faciès et les débitages sont menés intégralement sur le site depuis des blocs apportés bruts ou testés jusqu'à l'abandon des nucleus (**figure 4**, n[os] 15–8). L'utilisation d'au moins une partie de l'outillage produit est également attestée par son abandon sur place. La différence de qualité et de distance d'approvisionnement entre ces deux ressources n'implique que peu de différences entre les deux groupes d'ensembles. Les dimensions des blocs apportés sont parfaitement comparables (environ 60 mm au maximum) en dehors de rares indices de plus grands volumes (environ 80 mm) pour les seules ressources locales. Des adaptations dans les modalités opératoires sont perceptibles pour les matières premières locales, ou des accidents liés aux diaclases sont fréquents et gênent la régularité du débitage. Par ailleurs, on note une différence relative dans la production d'outillage retouché. Ainsi, l'outillage retouché représente environ 16 % des produits liés à ce schéma opératoire pour les matières premières locales alors que ce pourcentage atteint un peu plus de 38 % pour les silex d'Émilie-Romagne qui représentent à eux seuls à peine moins de 50 % de l'outillage sur ce type de production pour la totalité de l'assemblage. Cette différence en terme de productivité en outils retouchés peut avoir deux explications qui ne s'excluent pas l'une l'autre : la première est liée à la qualité des silex locaux, fortement diaclasés, produisant de nombreux cassons et pour lesquels il est plus difficile d'obtenir des produits réguliers, la productivité en support de ces débitages est nécessairement plus faible que pour les très bons matériaux d'Émilie-Romagne. L'autre explication peut être recherchée dans l'import sur le site de produits débités (retouchés ou non) pour les matières premières d'Émilie-Romagne.

Cet import, évident pour plusieurs sources de matières premières comme nous allons le voir, est beaucoup plus difficile à percevoir dans ce cas de figure ou une part importante de débitage *in situ* tend à masquer les autres dynamiques d'import. Cependant, la présence de supports difficilement compatibles en termes de dimensions avec le reste du débitage réalisé sur place tend à appuyer cette hypothèse d'un import d'une partie des supports. Pour les autres matériaux, les formes d'apports sur le site sont plus diversifiées : supports isolés (retouchés ou non) et/ou petits volumes à débiter (blocs divers). Pour ces derniers on remarque une variabilité plus grande des procédés opératoires qui exprime un opportunisme plus marqué dans le choix des volumes à débiter et dans la menée du débitage.

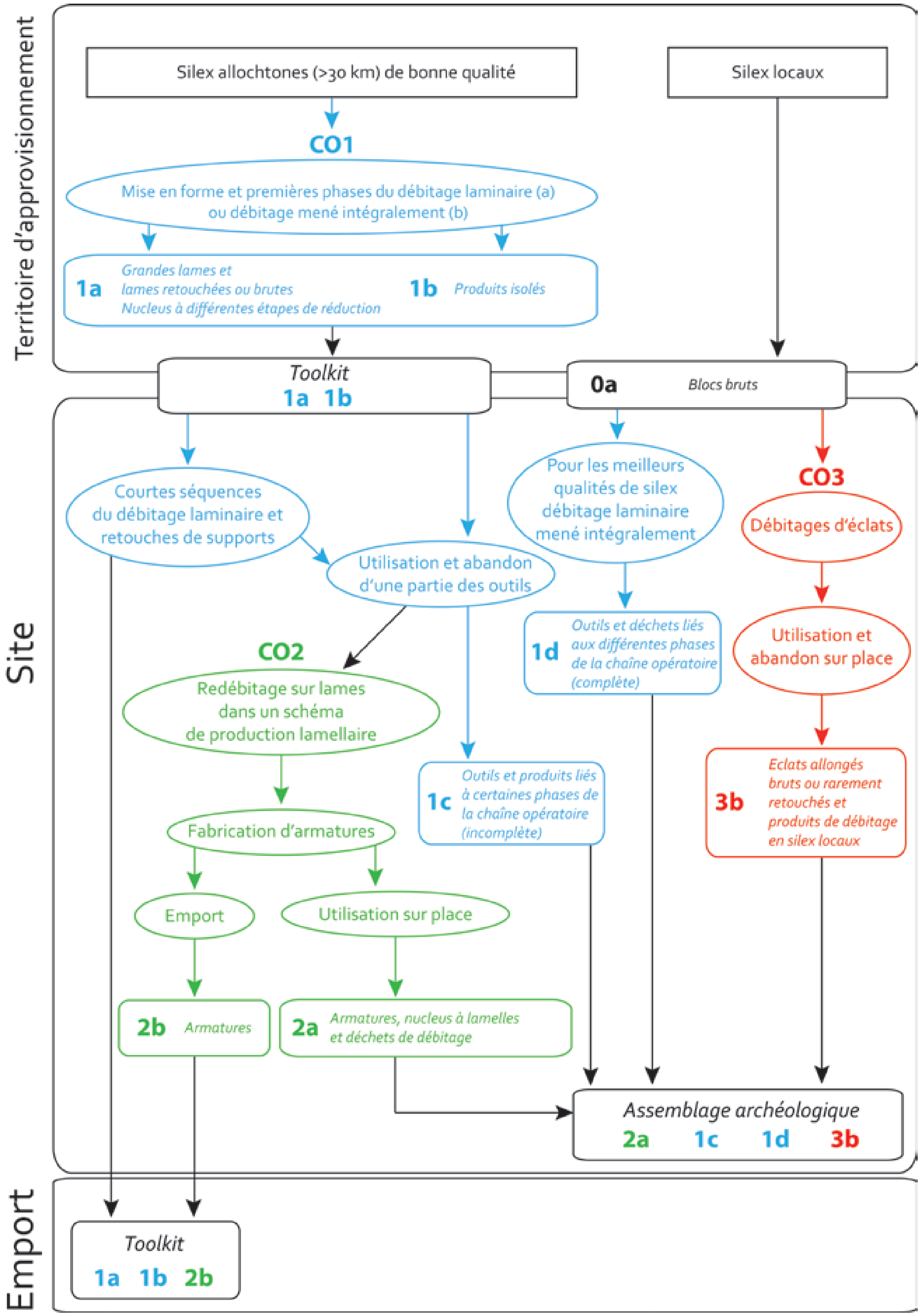
Le débitage lamellaire, mené sur convexités fortes : tranche d'éclat-lame dans la majorité des cas ou volume équivalent, notamment des fragments diaclasés ou éclats gélifs présentant une surface allongée et très cintrée encadrée par des flancs plus ou moins orthogonaux. Les lamelles sont extraites dans une modalité unidirectionnelle sur tranche longitudinale. Les lamelles produites sont destinées exclusivement à la production d'armatures à dos (en particulier des microgravettes et des triangles). Ces productions lamellaires sont présentes pour la plupart des sources de matières premières, y compris locales, associées ou non à la production lamino-lamellaire. Dans la majorité des cas, les chaînes opératoires sont représentées intégralement depuis la sélection du support jusqu'à l'utilisation et l'abandon d'une partie au moins des produits (**figure 4**, n^{os} 10–12). Malgré la difficulté à interpréter des ensembles très incomplets, faute de tamisage, il semble que la proportion d'armature pour les matières premières locales soit plus faible que pour les autres ensembles et la qualité des matières premières peut être invoquée pour expliquer cette différence. La question de l'origine des éclats débités n'est pas évidente à traiter, on notera simplement, que les volumes de départs sont compatibles avec les produits des débitages lamino-lamellaires, qu'ils soient produits sur le site ou importés.

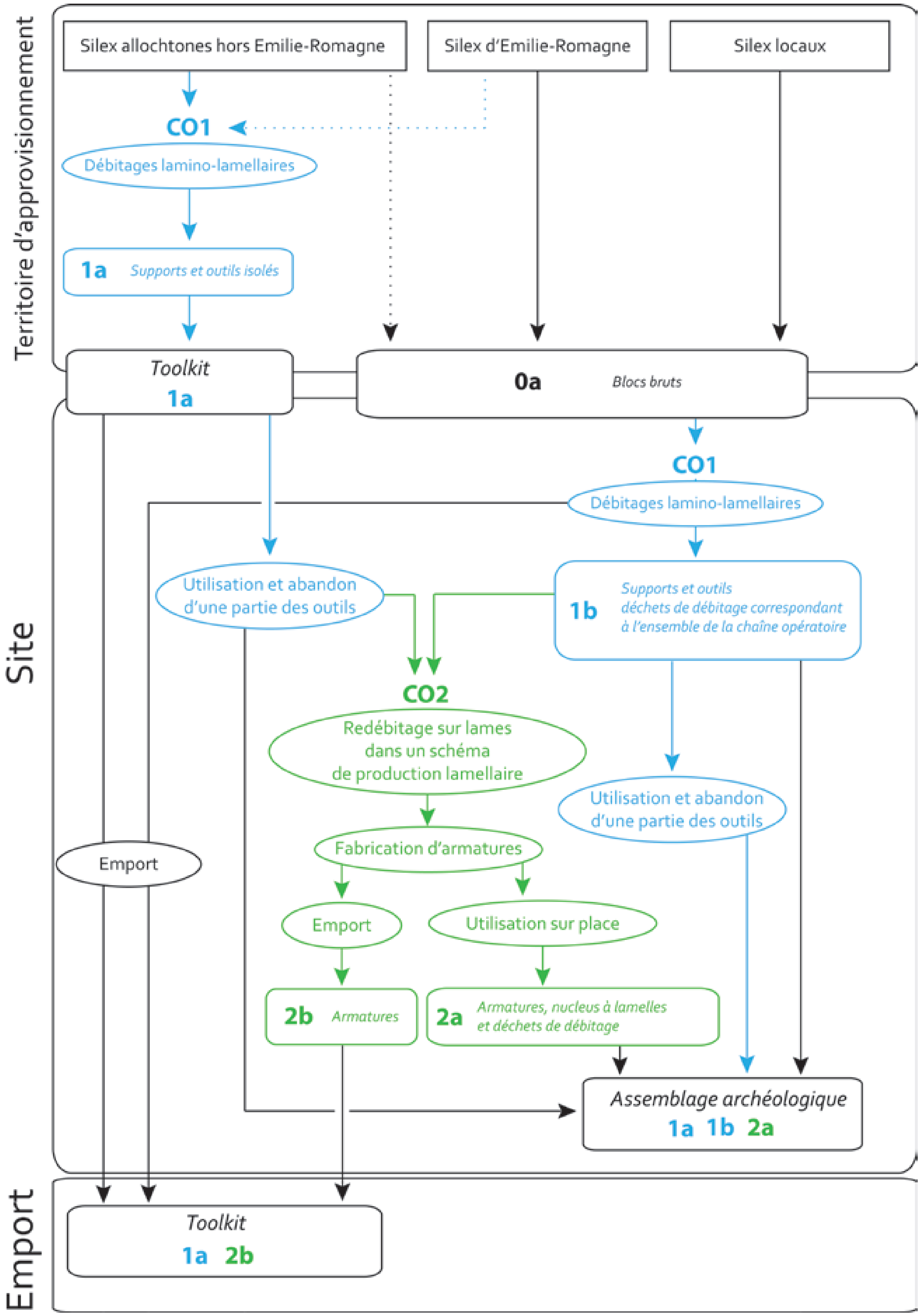
4.2 Synthèse et discussion

Dans les 3 assemblages, la diversité des matières premières est comparable et correspond à un territoire d'approvisionnement équivalent en étendue. Les sources de matières premières exploitées sont les mêmes à quelques variations près (**figure 3**) et l'approvisionnement est dominé par les sources lointaines (56 % pour la coupe 1 ; 75 % pour la coupe 4 et 64 % pour la coupe 5) alors que les ressources locales sont exploitées de manière complémentaire. Nous allons voir cependant que la structuration de ce territoire d'approvisionnement varie fortement entre les coupes 5 et 4 d'une part (**figure 5**) et la coupe 1 d'autre part (**figure 6**).

Dans les coupes 4 et 5, la qualité médiocre des matières premières locales a motivé la mise en œuvre de débitages d'éclats allongés qui apparaissent clairement comme une simplification du schéma opératoire laminaire. Pour ces matières premières les débitages sont menés intégralement sur le site et la retouche n'est représentée que par de rares aménagements de bord d'éclat par retouche directe, rasante à semi-abrupte. À l'inverse, pour la coupe 1, les mêmes matières premières sont utilisées dans des modalités parfaitement comparables à celles mises en œuvre pour des matières premières de très bonne qualité qui proviennent des gîtes d'Émilie-Romagne distants de plus de 12 jours de marche, malgré quelques adaptations dues à la qualité du matériau et une plus faible productivité en supports réguliers.

FIGURE 5 Synthèse de la dynamique de formation des ensembles pour les coupes 4 et 5.


Territoire d'approvisionnement
Silex allochtones (>30 km) de bonne qualité
Silex locaux
CO1
Mise en forme et premières phases du débitage laminaire (a)
ou débitage mené intégralement (b)
1a
Grandes lames et
lames retouchées ou brutes
Nucleus à différentes étapes de réduction
1b
Produits isolés
Toolkit
1a 1b
0a
Blocs bruts
Site
Courtes séquences
du débitage laminaire et
retouches de supports
Utilisation et abandon
d'une partie des outils
Pour les meilleurs
qualités de silex
débitage laminaire
mené intégralement
CO3
Débitages d'éclats
1d
Outils et déchets liés
aux différentes phases
de la chaîne opératoire
(complète)
Utilisation et
abandon sur place
CO2
Redébitage sur lames
dans un schéma
de production lamellaire
1c
Outils et produits liés
à certaines phases de
la chaîne opératoire
(incomplète)
3b
Eclats allongés
bruts ou rarement
retouchés et
produits de débitage
en silex locaux
Fabrication d'armatures
Emport
Utilisation sur place
2b
Armatures
2a
Armatures, nucleus à lamelles
et déchets de débitage
Assemblage archéologique
2a 1c 1d 3b
Emport
Toolkit
1a 1b 2b


Territoire d'approvisionnement
Silex allochtones hors Emilie-Romagne
Silex d'Emilie-Romagne
Silex locaux
CO1
Débitages lamino-lamellaires
1a Supports et outils isolés
Toolkit
1a
0a Blocs bruts
Site
CO1
Débitages lamino-lamellaires
Utilisation et abandon d'une partie des outils
1b Supports et outils déchets de débitage correspondant à l'ensemble de la chaîne opératoire
CO2
Redébitage sur lames dans un schéma de production lamellaire
Utilisation et abandon d'une partie des outils
Fabrication d'armatures
Emport
Emport
Utilisation sur place
2b Armatures
2a Armatures, nucleus à lamelles et déchets de débitage
Assemblage archéologique
1a 1b 2a
Emport
Toolkit
1a 2b

Par ailleurs, même si le taux de retouche est plus faible que pour d'autres ensembles, les catégories d'outillage recherchées sont les mêmes que dans le reste de la série, y compris pour les armatures. Les conditions de fouille rendent difficile tout questionnement sur la part d'emport hors du site au sein des différents ensembles. Dans certains ensembles pourtant, des indices d'emport sont visibles pour des matières premières lointaines débitées sur le site. Pour les matières premières locales, l'intégralité des chaînes opératoires est toujours représentée et aucun indice ne permet d'évoquer ce type de pratique. Les études de matières premières réalisées sur d'autres sites, souvent inédites, ne documentent aucune circulation des silex locaux en dehors des Balzi Rossi (ou de manière parfaitement anecdotique), alors que des ressources italiennes, plus lointaines, circulent en Provence pendant tout l'Épigravettien. Ces éléments, qui restent à confirmer, tendent à indiquer une consommation systématiquement locale de ces matières premières disponibles à proximité immédiate du site, quelle que soit la place de ces silex dans la production.

Une même dynamique de formation des ensembles domine les coupes 4 et 5 et consiste en l'apport de supports prédébités (bruts ou retouchés) accompagnés ou non par des blocs plus ou moins préparés et/ou par des nucleus en cours de débitage. Les séquences de débitage réalisées sur le site à partir de ces matières premières semblent relativement courtes et se limitent généralement à de petites séquences de production n'allant pas toujours jusqu'à l'épuisement du nucleus. Pour ces ensembles, on peut évoquer une pratique de production de quelques supports directement destinés à renouveler l'outillage : sur le site sont alors abandonnés des outils en fin d'utilisation et les déchets de ces courtes séquences de productions alors que le reste de l'outillage et le nucleus en cours de débitage sont emportés hors du site. À cette pratique est associée une volonté d'économie de ces matières premières lointaines qui s'illustre bien dans une exploitation très poussée des nucleus repris en nucleus à lamelle en fin d'exploitation et dans la récupération d'outils comme nucleus à lamelle dans le cadre des productions sur tranche qui ont donc ici une forte motivation économique. Dans la coupe 1, les formes de circulation des matières premières lointaines sont différentes et surtout elles varient en fonction des sources considérées. Pour les matières premières de Provence et certaines sources de Ligurie orientale et de Toscane septentrionale, on retrouve des pratiques en partie comparables aux coupes précédentes en termes d'apport (produits isolés associés ou non à des blocs à débiter) mais quand des débitages sont réalisés sur places, ils sont réalisés intégralement et non sous la forme de courtes séquences comme pour les coupes précédentes. Pour les ressources d'Émilie-Romagne qui sont très largement prépondérantes dans l'assemblage (à peine moins de la moitié) alors que les distances impliquées sont grandes, cet apport est réalisé de manière dominante sous forme de blocs bruts ou testés qui sont débités sur le site, une partie au moins des outils est également consommée sur place.

Dans les trois coupes, nous avons pu reconnaitre de petits ensembles de matières premières provenant d'Italie du Nord mais n'appartenant pas à l'aire couverte par notre référentiel. Ces ensembles représentent un pourcentage limité des assemblages (entre 3 et 4 %) et sont systématiquement représentés par des pièces isolées liées aux productions laminaires.

FIGURE 6 Synthèse de la dynamique de formation des ensembles pour les coupes 4 et 5.

La détermination précise des aires d'approvisionnements pour ces matériaux se heurte aux limites d'un référentiel régional dont l'étendue ne saurait atteindre une telle échelle et l'absence de référentiels disponibles pour le Nord de l'Italie ne nous permet pas aujourd'hui de préciser ces aspects. L'une des matières premières les plus évidentes pour ces distances importantes sont les silex de la Scaglia Rossa, formation à très bon silex principalement connue en Vénétie et dans les Marches, dans les deux cas pour des distances par rapport au site qui dépassent les 16 jours de marche. Sur la base de premières observations réalisées en prenant en compte des observations ponctuelles d'échantillons et des publications existantes (Bertola & Cusinato 2004; Bertola *et al.* 2007; Cancellieri 2010), il semble probable que les pièces présentes dans les ensembles de la Grotte des Enfants soient liées pour certaines à des sources alpines (Vénétie) et pour d'autres à des sources apenniniques (Marches). À l'inverse, les distances maximales de circulation vers l'Ouest sont représentées pas les silex bédouliens du Vaucluse (neuf journées de marches) et aucun indice de matières premières plus lointaines dans cette direction n'est perceptible dans les 3 assemblages. Le sens de cette asymétrie dans les directions d'approvisionnements entre l'Italie du Nord et le Sud de la France n'est pas évident à interpréter. Dans la basse vallée du Rhône, au-delà des silex bédouliens du Vaucluse, il n'existe pas de matières premières de grande qualité comparables aux sources d'Italie du Nord et d'Italie centrale. Cet élément à lui seul peut expliquer l'absence de circulation à très grande distance. Cependant, on ne peut s'empêcher de mettre en parallèle ce vaste territoire d'approvisionnement très asymétrique vers l'Italie du Nord avec l'extension de l'aire épigravettienne. Ce parallèle est renforcé par l'existence de circulations de matières premières italiennes plus à l'Ouest dans les Alpes Maritimes et dans le Var. Les données disponibles sont encore faibles et les questions de réciprocité des circulations de matières premières (de la Provence vers le Nord de l'Italie) devront également être posées afin de pouvoir interroger la relation existant entre un territoire de circulation de matières premières à très grande distance et un espace où des pratiques techniques sont partagées pendant une période de temps relativement longue.

5 CONCLUSION

L'analyse techno-économique des assemblages lithiques met donc en valeur des stratégies d'approvisionnements différentes exploitant un territoire d'approvisionnement à peu près identique durant toute la séquence épigravettienne de la Grotte des Enfant (coupe 5, 4 et 1). L'identité de territoire d'approvisionnement est un fait important, même si, dans ce travail, nous avons insisté particulièrement sur les aspects divergents de sa structuration économique. En effet, cette stabilité sur le long terme du territoire d'approvisionnement indique une pérennité dans l'implantation géographique des groupes humains alors que les changements environnementaux sont importants entre le LGM (coupe 5) et la fin de l'Allerød (coupe 1): l'étendue du territoire d'approvisionnement est ici indépendante des changements environnementaux. L'existence dans toute la période considérée de circulations de matières premières à très longues distances répondant à un même modèle et liées aux mêmes sources (Vénétie et/ou Marches) est un argument fort pour évoquer l'existence d'un espace social (le *visiting range* de Binford, 1982) stable dans le temps et fortement lié à un domaine géographique ou les mêmes traditions techniques épigravettiennes sont partagées.

Au-delà de ces éléments partagés, nous avons bien montré les changements importants dans la stratégie d'approvisionnement avec, dans ce domaine, deux situations très contrastées entre les coupes 5 et 4 d'une part (**figure 5**) et la coupe 1 d'autre part (**figure 6**).

Pour les coupes 4 et 5 la stratégie d'approvisionnement correspond à un modèle de type *provisioning individuals* (Kuhn 1995), c'est-à-dire à un apport de matières premières principalement assuré par le transport sous forme de *toolkit* incluant outils et réserves de matière première (nucleus). Cette stratégie correspond à l'ensemble des matières premières quelle que soit la région d'origine, en dehors des ressources locales et intermédiaires. La variété des faciès représentés quelle que soit la zone d'approvisionnement en est l'illustration la plus évidente : elle montre que des matières premières aptes à la production laminaire sont récoltées à différents moments et à différents endroits du territoire d'approvisionnement. L'autre illustration de cette stratégie est visible dans la généralisation des supports à vie longue, les lames à retouches (bi)latérales ou plusieurs générations de retouches sont discernables et avec plusieurs exemples évidents de recyclage de support (reprise en burin, redébitage pour la production de lamelles…). La sur-représentation des phases de production et d'utilisation de l'outillage indique un lieu de consommation de l'outillage et l'occupation du site est suffisamment longue pour que le besoin d'entretenir l'outillage soit visible et pour que des productions complémentaires soit mises en place sur les matières premières locales.

Pour la coupe 1 la situation est plus complexe puisque nous avons distingués, finalement, trois types d'ensembles en terme techno-économique. Les deux premiers type (ressources du domaine proche et ressource d'Émilie-Romagne) sont identique ou presque en terme économique et évoque un approvisionnement de type *provisionning of place* (Kuhn 1995) mais se distingue par une origine géographique totalement différente. Le troisième type regroupe l'ensemble des autres ressources exploitées. Pour les deux premiers types, l'assemblage est formé par l'ensemble des éléments de la chaîne opératoire depuis l'importation des blocs jusqu'à l'utilisation d'une part des outils : le site est un lieu de production de supports et cette fonction dans la production lithique est anticipée dans la stratégie d'approvisionnement. Pour le troisième type, la constitution des ensembles est différentes et évoque un approvisionnement de type *provisioning individuals*, avec l'apport conjoint de supports, d'outils finis et/ou de blocs de matières premières. Pour ces derniers, la diversité des volumes et des faciès évoque un ramassage opportuniste.

L'interprétation de ces changements reste un problème difficile à résoudre, la diversité des explications est grande, selon que l'on mobilise principalement l'approvisionnement direct ou que l'on accorde une place plus importante à l'approvisionnement indirect. Ainsi, l'approvisionnement massif en silex et radiolarite provenant d'Émilie-Romagne dans la coupe 1 pourrait représenter aussi bien l'image d'un déplacement du groupe entre ces deux zones qu'un transfert entre groupes exploitant des espaces voisins. S. Kuhn (1995) souligne la relation entre stratégie d'approvisionnement de type *provisioning individuals* et système de mobilité de type *residential mobility* (Binford 1980), ce qui correspondrait donc à la situation des coupes 4 et 5, et met en avant, à l'inverse, que la mise en place d'une stratégie de type *provisionning of place* implique une organisation spatiale du territoire importante et une certaine forme de stabilité résidentielle, ce qui correspondrait alors à la situation de la coupe1. L'idée selon laquelle les importants changements que nous percevons dans le territoire d'approvisionnement puissent représenter une modification profonde des systèmes de mobilités entre le début et la fin du Tardiglaciaire est évidemment envisageable et sur la base de résultats plus complet incluant notamment l'étude d'autres sites à l'échelle régional, il devrait être possible de discuter plus avant cette proposition. Ces études sont en cours et nous ne disposons pour le moment que de peu de données précises.

Dans l'Épigravettien récent, si la diffusion de matières premières italiennes en Provence est largement attestée, au moins jusque dans l'Estérel, des circulations inverses de la Provence vers l'Italie ne sont pour le moment pas démontrées. Pourtant leur existence ou non est lourde de conséquences sur l'interprétation de l'organisation des territoires à cette période. À l'inverse, dans l'Épigravettien ancien des indices de circulations de la Provence vers l'Italie sont documentés au moins pour les Arene Candide à Finale Ligure en Ligurie, province d'Albenga-Savona (G. Martino, comm. pers.) et réciproquement de l'Italie vers la Provence au moins jusque dans les Alpes Maritimes. L'existence d'un vaste espace ou les matières premières circulent facilement sur de grandes distances semble se dessiner pour cette période plus ancienne.

Ces résultats, qui restent préliminaires, font ressortir trois éléments forts : **(1)** l'extension des territoires d'approvisionnements, sur le long terme, apparait indépendante des importants changements environnementaux de la première moitié du Tardiglaciaire ; **(2)** au sein d'un même espace, des changements radicaux des stratégies d'approvisionnement sont perceptibles et indiquent des modifications profondes dans l'organisation socio-économique des groupes épigravettiens et **(3)** l'existence d'un domaine ou les mêmes traditions techniques sont partagées semble favoriser des transferts de matières premières à longue distance que nous ne percevons pas pour le moment la où les traditions techniques changent (vers l'Ouest du Rhône). Tous ces éléments sont encore à discuter et à préciser mais ils montrent encore une fois la richesse des informations qui peuvent être attendues d'une étude techno-économique des industries lithiques.

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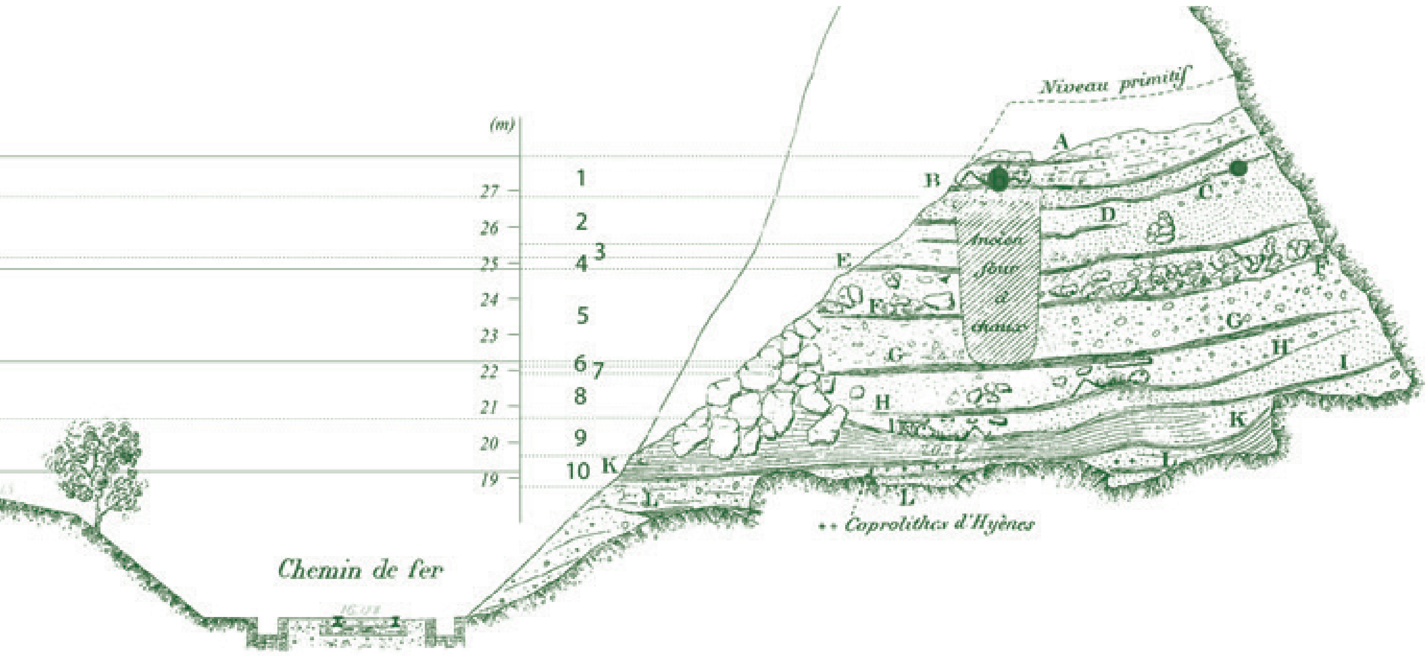


BIBLIOGRAPHIE

ALCIATI G., PESCE DELFINO V. & VACCA E. (2005) – *Catalogue of Italian Fossil Human Remains from the Palaeolithic to the Mesolithic*, ISITA (Istituto Italiano di Antropologia).

BARBIER M. (1996) – *Caractérisation des silex Urgoniens dans la région du Vaucluse*, Thèse de doctorat, Université de Bourgogne - Centre des Sciences de la Terre et EPHE, Préhistoire et paléo-écologie du Quaternaire.

BAZILE F. (2011) – De l'Épigravettien à l'ouest du Rhône ? *Paléo* 22 : 27–52.

BERTOLA S., BROGLIO A., CASSOLI P., CILLI C., CUSINATO A., DALMERI G., DE STEFANI M., FIORE I., FONTANA F., GIACOBINI G., GUERRESCHI A., CURIOLI F., LEMORINI C., LIAGRE J., MALERBA G., MONTOYA C., PERESANI M., ROCCI RIS A., ROSSETTI P., TAGLIACOZZO A. & ZIGGIOTTI S. (2007) – L'Epigravettiano recente nell'area prealpina e alpina orientale, In : F. Martini (dir.), *L' Italia tra 15 000 e 10 000 anni fa cosmopolitismo e regionalità nel tardoglaciale : atti della tavola rotonda (Firenze 18, novembre 2005)*, Milenni, Edifir, Museo fiorentino di preistoria "Paolo Graziosi", Firenze, p. 39–94.

BERTOLA S. & CUSINATO A. (2004) – Le risorse litiche dell'Altopiano di Folgaria e il loro utilizzo a Riparo Cogola. *Preistoria Alpina* 40 : 107–123.

BIETTI A. (1990) – The Late Upper Paleolithic in Italy : An Overview. *Journal of World Prehistory* 4 : 95–155.

BIETTI A. (1997) – Considération sur la définition de l'Epigravettien ancien en Italie, In : J.-M. Fullola & N. Soler (dir.), *El mòn méditerrani desprès del pleniglacial (18 000–12 000 BP)*, Sèrie Monogràfica, Museo D'archeologia de catalunya Girona, Girona, p. 131–146.

BINDER D. (1998) – Silex blond et complexité des assemblages lithiques dans le Néolithique liguro-provençal, In : A. D'Anna & D. Binder (dir.), *Production et identité culturelle : actualité de la recherche : Rencontres méridionales de Préhistoire récente, actes de la deuxième session, Arles (Bouches-du-Rhône), 8 et 9 novembre 1996*, APDCA, Antibes, p. 111–128.

BINFORD L.R. (1980) – Willow smoke and dog's tails : hunter-gatherer settlement systems and archéological site formation. *American Antiquity* 45(1) : 4–20.

BINFORD L.R. (1982) – The archaeology of place. *Journal of Anthropological Archaeology* 1 : 5–31.

BLET M. (1999) – *L'apport de l'ablation laser couplée à l'ICP-MS, à la caractérisation des archéomatériaux siliceux*, Thèse de doctorat, Université d'Orléans.

BLET M., BINDER D. & GRATUZE B. (2000) – Essais de caractérisation des silex Bédouliens provençaux par analyse chimique élémentaire. *Revue d'archéometrie* 24 : 149–167.

BROCHIER J.E. & LIVACHE M. (2003) – L'évolution des industries pléni et tardiglaciaires en Provence et dans le bassin bas Rhodanien, lignée évolutive et convergences. *Rivista di Scienze Preistoriche* 53 : 37–54.

BROCHIER J.E. & LIVACHE M. (2007) – Le Mas des Taillades à Fontvieille (Bouches-du-Rhône). Sériation des complexes tardigravettiens évolués dans la basse vallée du Rhône. *Rivista di Scienze Preistoriche* 57 : 67–82.

BROGLIO A. (1997) – Considérations sur l'Épigravettien italien. In : Fullola & Soler (dir.), *El mòn méditerrani desprès del pleniglacial (18 000–12 000 BP)*, Sériè Monogràfica, Museo D'archeologia de catalunya Girona, p. 147–158.

CANCELLIERI E. (2010) – *From the watershed to the Great Adriatic Plain : an investigation on humans and landscape ecology during the late Upper Paleolithic. The significance of lithic technology*, Thèse de doctorat, Università degli studenti di Siena.

CARTAILHAC E. (1912) – Archéologie. In : L. de Villeneuve (dir.), *Les Grottes de Grimaldi (Baoussé-Roussé*, Imprimerie de Monaco, Monaco, p. 215–324.

DE VILLENEUVE L. (1906–1919) – *Les Grottes de Grimaldi (Baoussé-Roussé)*. Imprimerie de Monaco, Monaco.

DUCASSE S. & LANGLAIS M. (2007) – Entre Badegoulien et Magdalénien nos coeurs balancent… Approche critique des industries lithiques du Sud de la France et du Nord-Est espagnol entre 19 000 et 16 500 BP. *Bulletin de la Société préhistorique française* 104 : 71–785.

FÉBLOT-AUGUSTIN J. & PERLES C. (1992) – Pespectives ethno-archéologiques sur les échanges à longues distance. Dans : *Ethnoarcheologie : justification, problemes, limites XIIe Rencontres Internationales d'Archeologie et d'Histoire d'Antibes*, APDCA, Antibes, p. 195–209.

FERNANDES P. & RAYNAL J.P. (2010) – Silex : une pétroarcheologie refondée. Dans : C. Bressy & S. Grégoire (dir.), *Silex et territoires préhistoriques. Avancées des recherches dans le Midi de la France.*, Les cahiers de Géopré.

GENESTE J.-M. (1992) – L'approvisionnement en matière première dans les systèmes de production lithique : la dimension spatiale de la technologie. In : M.e.a. (eds.) (dir.), *Technologia y Cadenas Operativas Liticas*, Treballs d'Archeologia 1, Barcelona : Universitat Autonoma de Barcelona, p. 1–36.

GENESTE J.-M. (2010) – Systèmes techniques de production lithique. Variations techno-économiques dans les processus de réalisation des outillages paléolithiques. *Techniques & Culture* 54–55 : 419–449.

GIOIA P., MUSSI M. & ZAMPETTI D. (2003) – L'Épigravettien italien et la chonologie au carbone 14. In : F. Widemann & Y. Taborin (dir.), *Geophysical and archaeological chronologies for the upper palaeolithic*, Edipuglia, Bari, p. 247–253.

GUILBERT R. (2000) – *Gestion des industries lithiques mésolithiques du sud-est de la France*. Thèse de doctorat, Université de Paris 1.

JORIS C. (2008) – Les industries épigravettiennes de la grotte des Enfants à Grimaldi dans le contexte du bassin méditerranéen, *Histoire et actualité de l'oeuvre scientifique de S.A.S. le prince Albert 1er de Monaco. 1895–2005 : bilan et perspectives des connaissances sur les peuplements néandertaliens et les premiers hommes modernes de l'Europe Méditérannéenne*, Archives de l'institut de paléontologie humaine, Fondation institut de paléontologie humaine, Paris, p. 121–131.

KELLY R.L. (1983) – Hunter-Gatherer mobility strategies. *Journal of anthropoligical research* 39(2) : 277–306.

KUHN S.L. (1995) – *Mousterian Lithic Technology, an ecological perspective*, Princeton University Press, 1, Princeton.

LAPLACE G. (1964) – Les subdivisions du Leptolithique italien. *Bulet. Paletn. Ital.*, p. 25–63.

MONTOYA C. (2004) – *Les traditions techniques lithiques à l'Épigravettien : analyse du Tardiglaciaire entre Alpes et Méditerranée*, Thèse de doctorat, Université de Provence.

MONTOYA C. (2008a) – Apport de l'analyse technique à la compréhension de l'évolution des groupes humains épigravettiens d'Italie Nord Orientale : la production lithique de l'US 15a–65 de Riparo Dalmeri. *Preistoria Alpina* 43 : 191–208.

MONTOYA C. (2008b) – Évolution des concepts de productions lithiques et artistiques à l'Épigravettien récent : analyses de collections des Préalpes de la Vénétie et des Préalpes du sud françaises. In : M. Mussi (dir.), *Il Tardiglaciale in Italia – Lavori in corso*, Bar International Series, p. 43–54.

MONTOYA C. & PERESANI M. (2005) – Nouveaux éléments de diachronie dans l'épigravettien récent des Préalpes de la Venetie. Dans : J.-P. Bracco & C. Montoya (dir.), *D'un monde à l'autre - Les systèmes lithiques pendant le tardiglaciaire autour de la méditerranée nord-occidentales - Actes de la table ronde internationale Aix en Provence 6–8 Juin 2001*. Mémoire de la Société Préhistorique Française, SPF, p. 123–138.

ONORATINI G. & DA SILVA J. (1972) – La Grotte des Enfants à Grimaldi. Les foyers supérieurs. *Bulletin du Musée d'Anthropologie Préhistorique de Monaco* 22 : 31–71.

PALMA DI CESNOLA A. (1979) – La serie epigravettiana della Grotta dei Fanciulli (Grimaldi) nel quadro del Paleolitico superiore ligure. *Rivista di Scienze Preistoriche* 34 : 3–44.

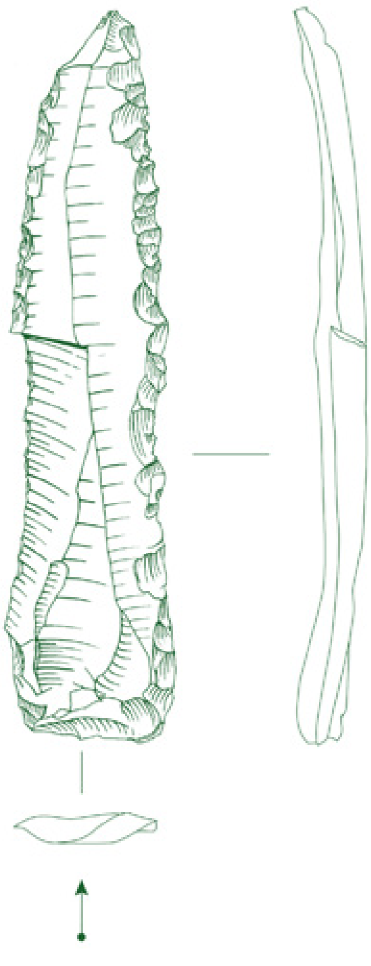
PALMA DI CESNOLA A. (2001) – *Le Paléolithique supérieur en Italie*. Préhistoire d'Europe, Jérome Millon, Grenoble.

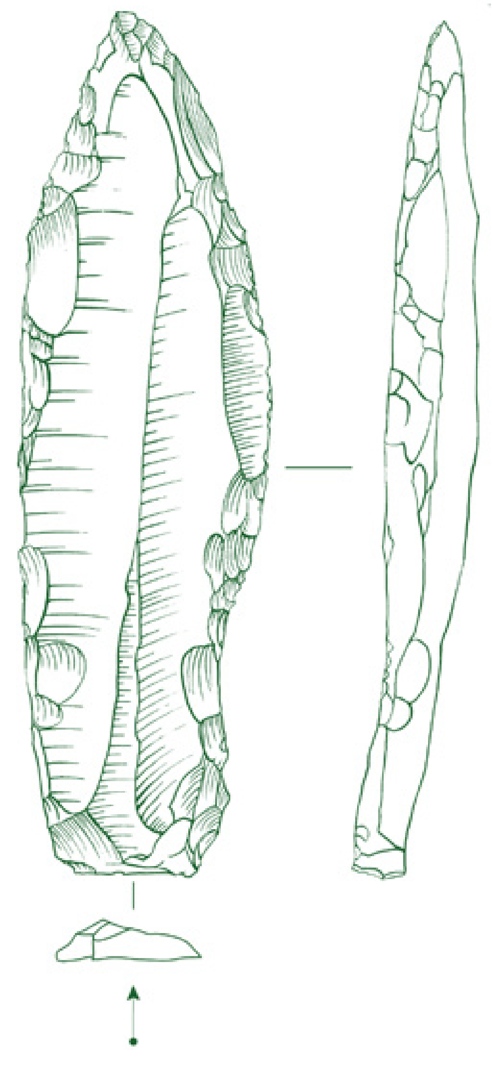
PORRAZ G. (2005) – *En marge du milieux alpin - dynamique de formation des ensembles lithiques et modes d'occupation des territoires au paléolithique moyen*, Thèse de doctorat - université de Provence 1.

SIMONUCCI C. (2000) – *Caractérisation des silex lacustres oligocènes du bassin d'Apt-Forcalquier*. Thèse de doctorat, Université de Bourgogne.

TESTART A. (2007) – *Critique du don : étude sur la circulation non marchande*. Syllepse, Paris.

TOMASSO A., NAUDINOT N., BINDER D. & GRIMALDI S. (SOUMIS) – Unité et diversité dans l'Épigravettien récent de l'arc liguro-provençal. Dans : M. Langlais, N. Naudinot & M. Peresani (dir.), *Les sociétés de l'Alleröd et du Dryas récent entre Atlantique et Méditerranée, séance de la SPF, Bordeaux*, 24–25 mai 2012, SPF, Bordeaux.





2012
Liège
UISPP
commission 8
Paléolithique supérieur

Thème V

ARTS

La grotte des Gorges (Jura) : un site inédit à l'interface des territoires symboliques du Paléolithique supérieur ancien

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Francesco D'ERRICO · Gérald BEREIZIAT · Didier CAILHOL · Christophe GRIGGO
Stéphane JAILLET · Marcel JEANNET · Hervé PAITIER

Résumé : La grotte des Gorges s'ouvre à quelques kilomètres au nord-est de la ville de Dole, dans un petit vallon situé en bordure du flanc sud-est du massif de la Serre, sur le territoire de la commune d'Amange. À la suite de premières prospections effectuées en 2008 dans ce site dans le cadre d'un Programme Collectif de Recherches sur la « Gestion des matières premières et implantation humaine autour du massif de la Serre », des tracés gravés ont été repérés sur le plafond de cette cavité, suivis par d'autres découvertes l'année suivante. Ces découvertes en paroi ont été complétées par d'autres, sur blocs cette fois, qui élargissent l'éventail graphique de ce site. L'ensemble de ces témoignages a conduit à la reconnaissance d'une grotte ornée et d'un site d'art mobilier dans un territoire qui jusqu'ici en était dépourvu. Les recherches menées par l'équipe ont en effet révélé la présence de nombreux ensembles gravés, et parmi eux plusieurs représentations animales, en paroi mais aussi sur des blocs. Nous proposons, sur la base de leur style et des thématiques rencontrées, de situer ces manifestations symboliques à une phase ancienne du Paléolithique supérieur. Cette attribution est corroborée par le contexte archéologique et par des datations ^{14}C obtenues sur plusieurs ossements dans la grotte. Les représentations identifiées sur les parois et blocs (cheval, mégacéros félins, mammouth), ainsi qu'une petite tête d'ours sculptée sur os, font écho au bestiaire des grottes de Roucadour (Lot), de Chauvet (Ardèche) et à l'art mobilier du Jura souabe (Allemagne). Elles viennent ainsi, en complément du contexte archéologique, apporter un éclairage nouveau sur la circulation des symboles et des thèmes au Paléolithique supérieur ancien, et placent la grotte des Gorges à un carrefour possible entre les sites rhénans d'une part, et les grottes ornées du sud de la France d'autre part.

1 INTRODUCTION

Depuis 20 ans, notre connaissance de l'art du début du Paléolithique supérieur, en particulier l'Aurignacien et le Gravettien, a été très largement enrichie. Les découvertes de nombreux sites majeurs, tels ceux d'Arcy-sur-Cure (Yonne) en 1990, Cosquer (Bouches-du-Rhône) en 1991, Chauvet (Ardèche) en 1994, La Garma (Cantabrie, Espagne) en 1996, Cussac (Dordogne) en 2000, Vilhonneur (Charente) en 2005, Margot (Mayenne) en 2005, ou plus récemment Coliboaia en 2010 en Roumanie, ont éclairé d'un jour nouveau les premières créations graphiques du Paléolithique supérieur ancien[1]. D'autres sites, tel El Castillo en Cantabrie, ont fait l'objet de nouvelles études attribuant certaines représentations au tout début du Paléolithique supérieur (Pike *et al.* 2012, Pons-Branchu *et al.*, 2014).

Plusieurs de ces sites ont bénéficié de datations directes et indirectes qui ont permis de préciser la chronologique des représentations : Cougnac et Pech-Merle les premières, en Quercy, Mayenne-Sciences en Mayenne, l'Aldène, dans l'Hérault ou plus récemment La Baume Latrone, dans le Gard[2]. D'autres encore ont vu une réévaluation de leur position chronologique par de nouvelles analyses des styles et des thèmes, comme la grotte de Roucadour en Quercy (Lorblanchet, 2007).

1. *Baffier, Girard, 1995 ; Clottes et al., 2011 ; Clottes dir., 2001 ; Arias et al., 2004 ; Aujoulat et al., 2001 ; Henry-Gambier et al., 2006 ; Pigeaud et al., 2006 ; Clottes et al., 2011.*

2. *Lorblanchet, 1994 ; Lorblanchet, Valladas, 1995 ; Pigeaud, Valladas et al., 2003 ; Ambert et al., 2005 ; Azéma et al., 2012.*

FIGURE 1 Carte de répartition des ensembles ornés « anté-magdaléniens ». Réalisation Stéphane Petrognani. DAO Alice Redou. D'après Petrognani, 2013.

2 PROBLÉMATIQUE

La carte archéologique des sites d'art ancien s'est donc diversifiée (**figure 1**).

Ces découvertes, avec leur lot de figures et de dates inédites, posent de nouvelles questions sur les premiers territoires symboliques. Elles alimentent une réflexion sur la circulation des symboles au Paléolithique supérieur ancien, à l'image de recherches qui existent depuis de nombreuses années autour du Magdalénien, dans lequel les sites abondent[3]. De premiers pas ont été effectués, suite à la découverte de la grotte Chauvet, sur les liens entretenus avec les statuettes des sites du Jura souabe, aux thématiques proches (Clottes, 2010). De même, la présence de figures féminines de profil à Cussac, en Dordogne, n'est pas sans évoquer une certaine proximité avec la statuaire féminine gravettienne qui s'étend sur l'Europe (Jaubert, Feruglio, 2013). Ces tendances s'accentuent encore lorsque l'on appréhende en détail les corpus iconographiques des sites, notamment les plus récemment découverts.

3. *Voir par exemple Fritz, Tosello, 2005; Pigeaud, 2008; Vialou, 2005*

La grotte des Gorges, dans le Jura, reflète parfaitement cette situation, au travers des productions graphiques qui y ont été mises au jour depuis la toute récente découverte de son art pariétal, en 2009. Située dans un territoire jusqu'ici vierge de grotte ornée, elle a révélé un art présent sur support pariétal et mobilier caractéristique des phases anciennes du Paléolithique supérieur. Les recherches en cours font apparaître des liens avec d'autres sites dont nous souhaitons faire ici une première approche, bien sûr provisoire, tant l'inventaire est appelé à varier durant son étude.

3 LA GROTTE DES GORGES, UN SITE INÉDIT

La grotte des Gorges est située sur la commune d'Amange, à quelques kilomètres au nord-est de Dole. Elle se trouve dans un petit vallon du flanc sud-est du massif de la Serre (**figure 2**). Un autre site stratifié se trouve à quelques kilomètres, dans la vallée du Doubs. Il s'agit de la grotte du Trou de la Mère Clochette, à Rochefort-sur-Nenon, connue par des fouilles anciennes qui ont révélé la présence d'occupations moustériennes, aurignaciennes et gravettiennes (Szmidt, Brou, Jaccottey, 2010). Des prospections récentes dans des vallons parallèles au vallon des Gorges ont cependant montré que le corpus des sites pourrait-être nettement plus riche.

La cavité s'ouvre dans des terrains de calcaire du Jurassique moyen, non loin de leur contact avec le massif granitique de la Serre. De nombreuses failles découpent ces calcaires et expliquent en partie l'existence d'un réseau karstique souterrain (**figure 3**).

Des sondages effectués en 2008-2009 dans le cadre du Projet Collectif de Recherche « Gestion des matières premières et implantation humaine autour du massif de la Serre », dirigé par Luc Jaccottey et Annabelle Milleville, ont révélé la présence de couches archéologiques du Paléolithique supérieur ancien avant que les premiers tracés gravés ne soient découverts au plafond de la grotte, puis sur des blocs de calcaire, malheureusement tous découverts hors stratigraphie.

3.1 La cavité

La grotte est de proportions modestes. Elle s'étend à présent sur 12 m, pour une largeur d'environ 6 m, mais la situation d'homéothermie de la partie profonde pourrait s'expliquer par l'influence d'un réseau plus développé (**figure 4**).

Il s'agit d'un drain qui s'est lentement mis en place sous un régime noyé avec un sens d'écoulement de l'entrée vers le fond. En témoignent les marques d'érosion (« coups de gouge ») visibles sur le plafond.

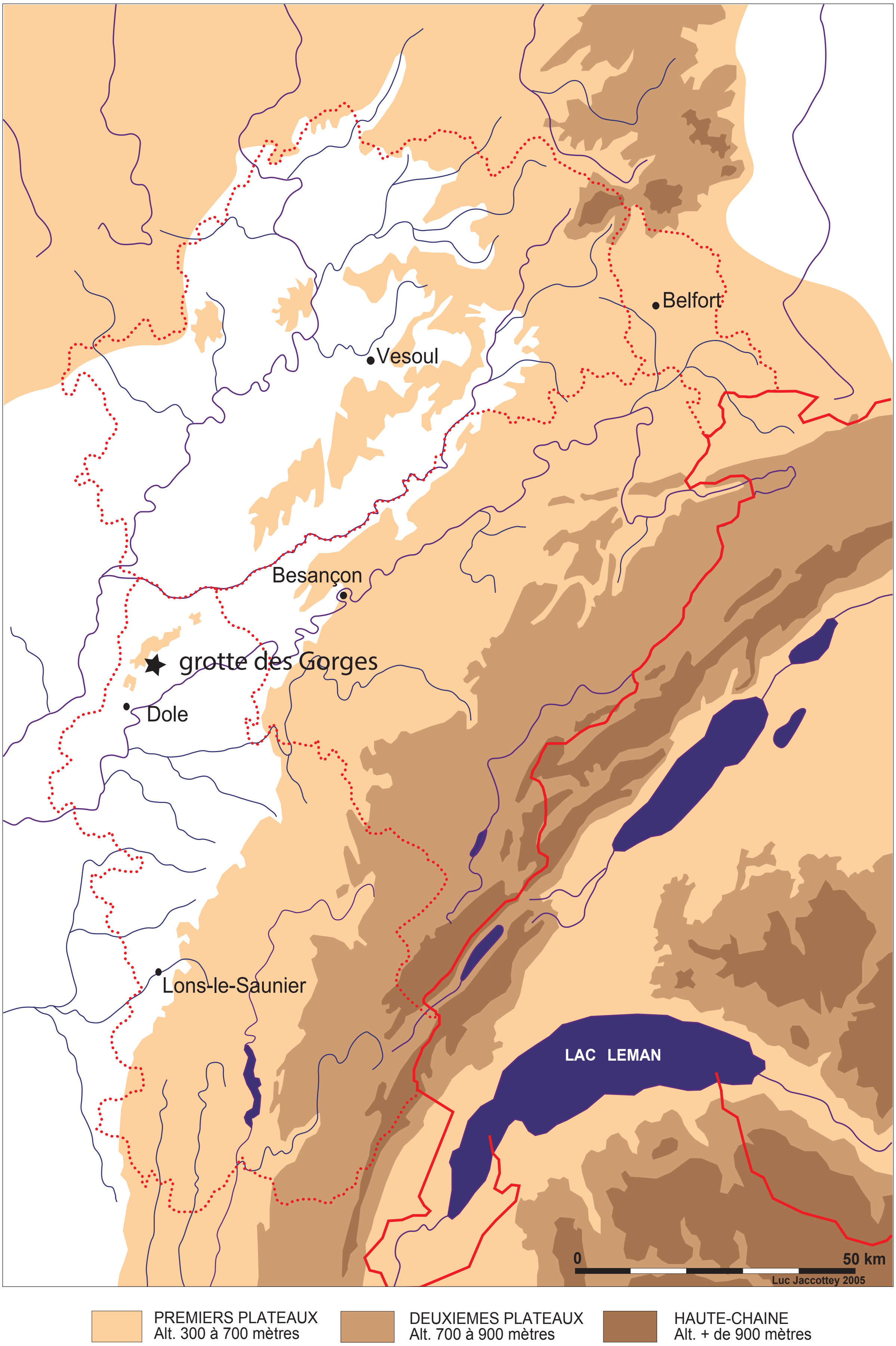

Belfort
Vesoul
Besançon
grotte des Gorges
Dole
Lons-le-Saunier
LAC LEMAN
0
50 km
Luc Jaccottey 2005
PREMIERS PLATEAUX
Alt. 300 à 700 mètres
DEUXIEMES PLATEAUX
Alt. 700 à 900 mètres
HAUTE-CHAINE
Alt. + de 900 mètres

FIGURE 3 Vue de l'intérieur de la grotte. Photo Serge David.

FIGURE 2 Localisation de la grotte des Gorges. Dessin Luc Jaccottey.

La cavité connaît ensuite une phase d'incision importante, puis le recul du porche permet son comblement par des cryoclastes intercalés avec des sédiments fluviatiles qui se déposent en fonction des variations du niveau d'eau dans la plaine alluviale.

Une modélisation 3D de la cavité est en cours par le laboratoire Edytem (Chambéry) pour les principaux volumes, et par Hervé Paitier pour le rendu photographique. Elle a déjà permis de tester l'ajustement des plans géologiques et leur connectivité entre l'escarpement rocheux externe et le plafond de la salle terminale de la grotte. Elle va se poursuivre en modélisant notamment toutes les coupes stratigraphiques, dans la perspective de comprendre l'évolution de la cavité et de son remplissage. Il sera alors possible de proposer une paléo-extension au porche de la cavité.

Les fouilles 3.2

Les premiers sondages ont nécessité le démontage d'un mur qui avait été construit par l'association communale de chasse d'Amange pour empêcher l'entrée des chiens. Une partie des pierres avaient été prises sur place, d'autres à l'extérieur. La construction de ce mur a sérieusement perturbé la stratigraphie à l'entrée de la cavité. Limitée à l'entrée en 2008, la fouille s'est ensuite étendue à l'intérieur (**figure 5**). En 2009, un sondage profond réalisé dans les carrés G10 à G12 a permis d'atteindre le substratum et donné la stratigraphie de référence du site (**figure 8**). Il a été prolongé en 2010 dans les carrés F12 – F13 pour suivre la couche reposant sur le substratum.

FIGURE 4 Plan des fouilles – état 2012. Relevé et dessin Serge David.

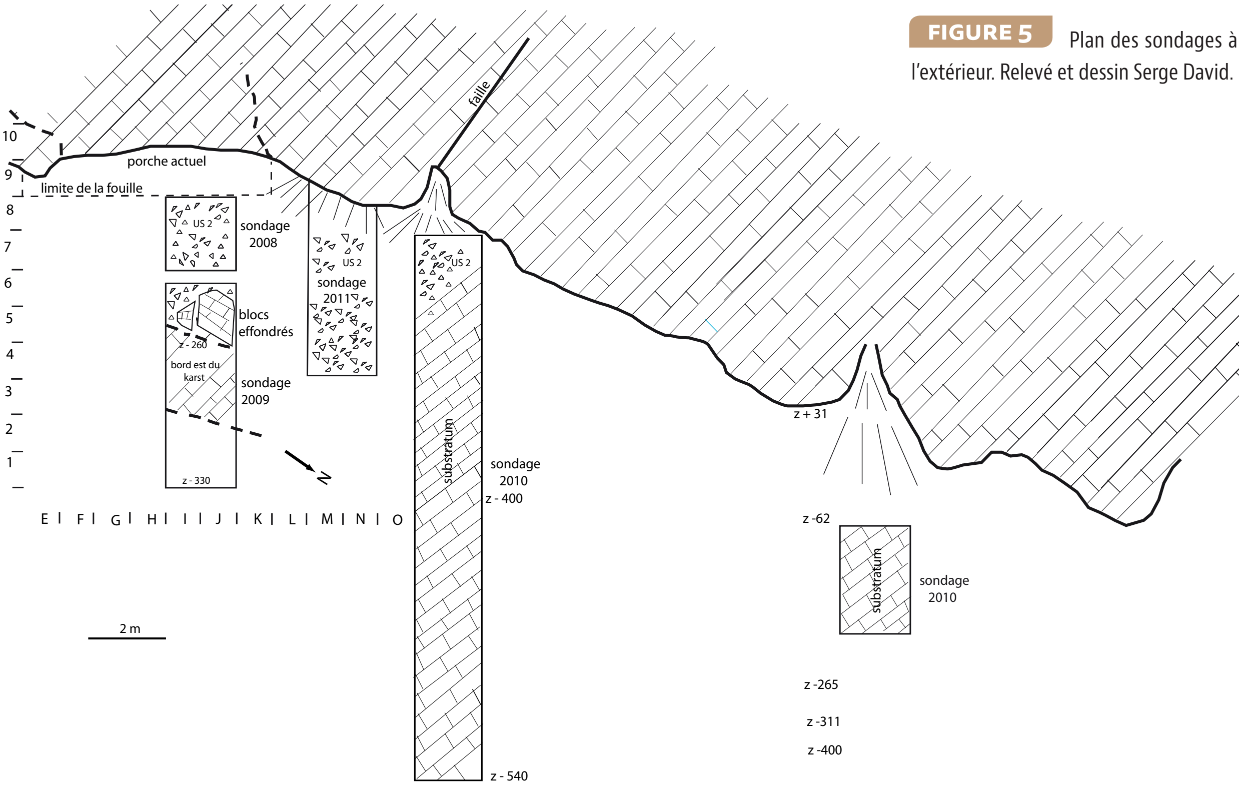


FIGURE 5 Plan des sondages à l'extérieur. Relevé et dessin Serge David.

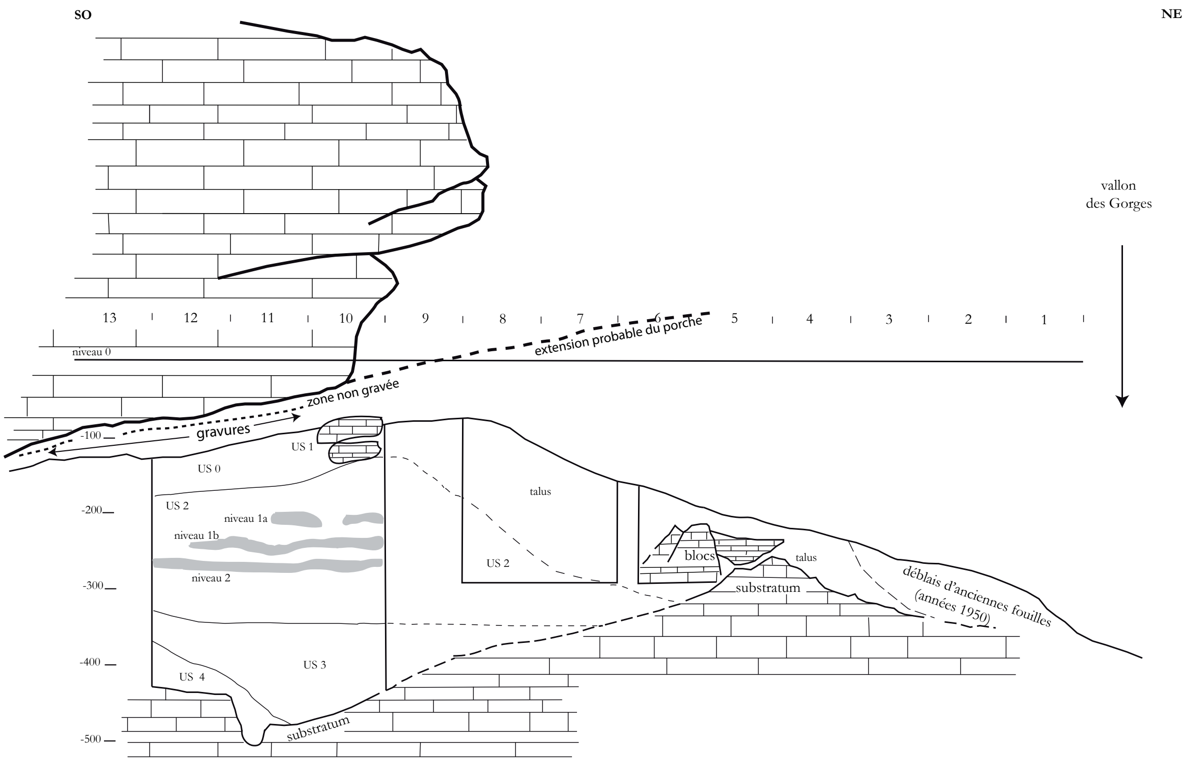


FIGURE 6 Coupe synthétique du site d'après les observations réalisées dans les lignes de carrés G-H-I. Extension probable du porche. Relevé et dessin Serge David.

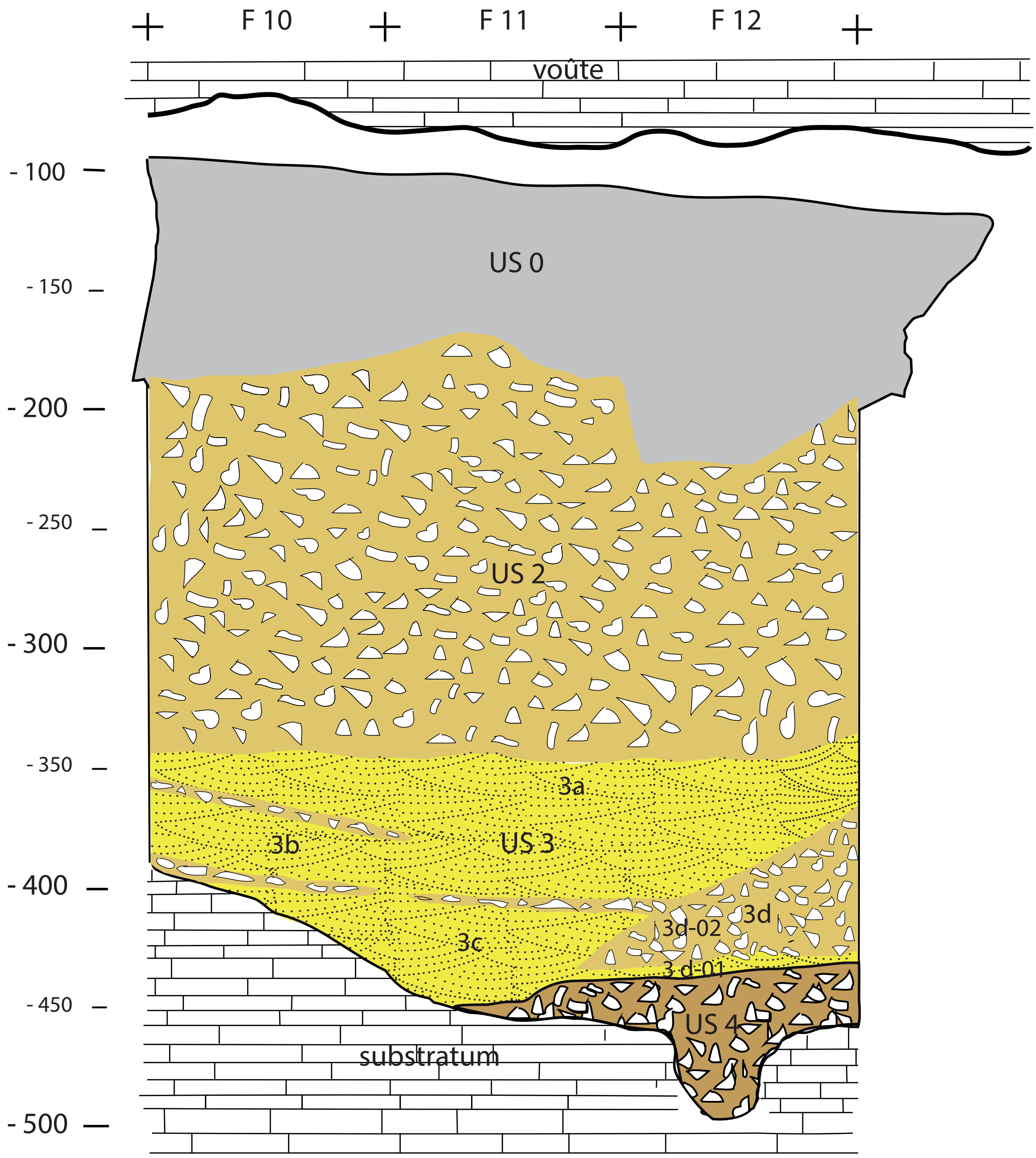


FIGURE 7 Stratigraphie du sondage profond (figure 4, S 1). Relevé et dessin Serge David.

En 2012, une coupe a révélé la complexité de la couche superficielle dans la partie profonde du karst et permis de nouvelles observations importantes (**figures 9** et **10**). Parallèlement, des sondages ont été entrepris à l'extérieur (**figure 6**). Une tranchée creusée en 2011 dans le talus devant la grotte (carrés I-J, lignes 1 à 8), dans le prolongement d'un premier sondage, a fait découvrir le bord est de la cavité et montré que l'accès actuel était une ouverture latérale. D'après les blocs des carrés I et J 5–6, on peut estimer le recul du porche à environ 4 m (**figure 7**). À l'extrémité de la tranchée, la présence, sous la couche humique, de déblais à composante essentiellement cryoclastique a démontré l'existence de creusements anciens dans la cavité, que des témoignages locaux permettent de situer au début des années 1950. Un peu plus au nord, dans les carrés M-N, le dernier sondage (2011) a fait apparaître l'ensemble cryoclastique à matrice limono-argileuse jaune (US 2) repéré dans la cavité. Le porche originel se situait donc probablement dans ce secteur.

La stratigraphie 3.3

Cinq unités stratigraphiques ont été identifiées (**figures 7** et **8**).

À la base, l'US 4 se présente comme un dépôt d'éléments grossiers emballés par des sables provenant du démantèlement d'un remplissage préexistant qui se situait probablement à l'extérieur (carrés M-N ?). Elle semble avoir été tronquée avant le dépôt de l'US 3. Ce niveau contient des pièces lithiques peu diagnostiques, à l'exception d'un fragment de lamelle Dufour, associées à des restes fauniques très fragmentés. Les fragments déterminables témoignent de la présence du Renne, du Mammouth, de l'Hyène des cavernes et de l'Ours des cavernes. Deux datations ^{14}C ont été obtenues sur esquilles : 34550 ± 600 BP OxA–22996 et 34250 ± 550 BP OxA – 22997 (dates non calibrées) (**figure 11**). La présence conjuguée du fragment de lamelle Dufour et des datations fait de l'attribution de cet ensemble à l'Aurignacien ancien l'hypothèse de travail la plus cohérente. Ces dates font écho à celles récemment obtenues sur les niveaux aurignaciens du Trou de la Mère Clochette (Rochefort-sur-Nenon), voisin de quelques kilomètres, où des fragments de pointes à base fendue ont été datés de 33750 ± 350 BP (Oxa–19621) et 35460 ± 250 (OxA–19622) (Szmidt, Brou, Jaccottey, 2010). Une autre parenté peut être envisagée avec le Proto-Aurignacien de la grotte du Renne à Arcy-sur-Cure (Schmider, 2002).

L'US 3 est constituée d'alluvions sableuses polyphasées dans lesquelles s'intercalent des niveaux cryoclastiques. Les figures de sédimentation indiquent un sens du courant allant de l'extérieur vers l'intérieur de la cavité. Cette couche s'est révélée quasiment stérile, à l'exception notable de la découverte en stratigraphie d'une pièce sculptée exceptionnelle, dont l'étude est en cours.

FIGURE 8 Stratigraphie des carrés K 9 et K 10 (figure 4, S 2). Relevé et dessin Serge David.

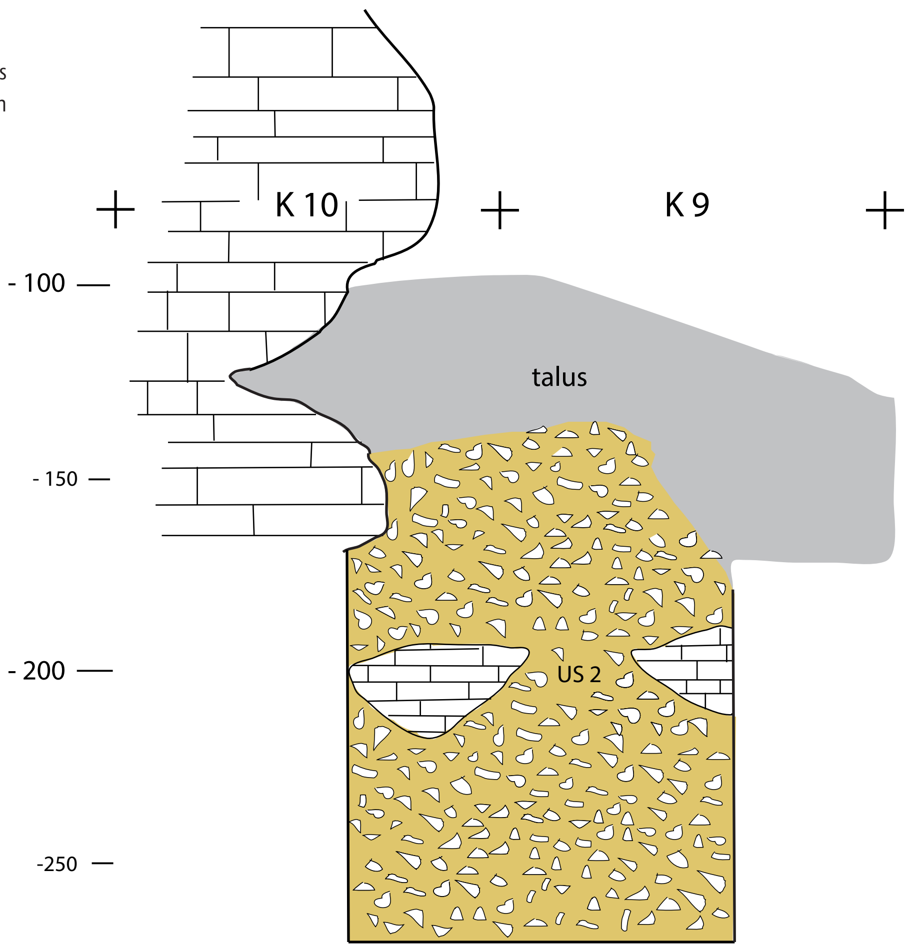


FIGURE 9 Coupe de l'US 0 dans les carrés C 17 à F 17 (figure 4, S 3). Photographie Hervé Paitier.

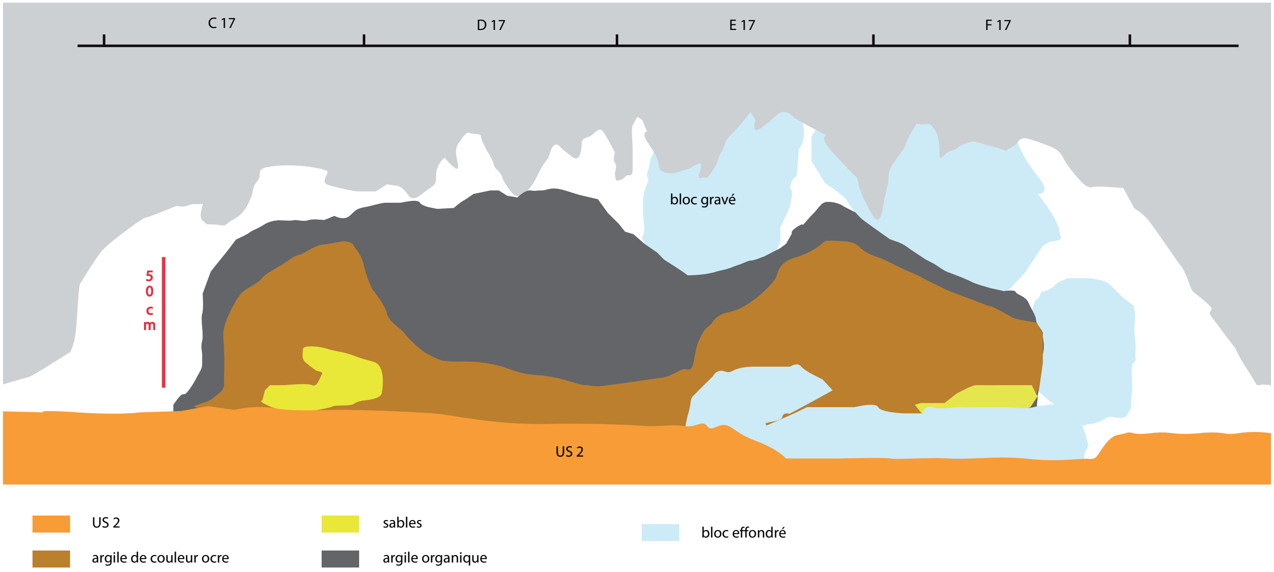


FIGURE 10 Coupe de l'US 0 dans les carrés C 17 à F 17. Dessin Serge David.

L'US 2 recouvre les alluvions de l'US 3. Composée d'éléments cryoclastiques pris dans une matrice sableuse à la base, limono-argileuse dans la partie supérieure, elle forme à l'aplomb du porche un talus dont la partie supérieure est stérile. Plus en profondeur, elle intègre 3 niveaux, de haut en bas 1a, 1b et 2 (**figures 7** et **8**), qui ont livré des restes de faune dominée par le Bison (niveaux 2 et 1 b) et par le Renne (niveau 1a) (étude en cours de Christophe Griggo). Les éléments anthropiques sont rares : l'industrie lithique et celle en matière dure animale sont quasiment absentes ; seuls un petit nombre d'ossements portent des traces de boucherie (stries ou marques de percussion). En revanche, 25 % environ des fragments de diaphyse présentent, à une seule extrémité ou aux deux, des traces de rongement par un grand carnivore comme l'Hyène des cavernes. La présence de fragments osseux régurgités d'une taille supérieure à 4,5 cm confirme cette attribution. De même, des dents isolées attribuées à de jeunes hyènes et une mandibule correspondant à une hyène très âgée recueillies dans les niveaux 1a et 1b permettent de penser que ce carnivore a joué un rôle important dans les dépôts osseux. Cependant, les os rongés et les restes d'Hyène ne sont pas assez nombreux pour interpréter la grotte des Gorges comme une tanière.

US 2 niveau 1a				Calibration BP 2 sigma
J 10 - n°4	esquille osseuse	29240 ± 170 BP	Lyon-5231 (GrA)	
J 10 -n°11	esquille osseuse	28620 ± 160 BP	Lyon-5230 (GrA)	
F 13 - n°4	mandibule d'hyène	33030 ± 750 BP	GifA 11511/SacA 27627	39620 – 35630
I 10	métatarsien de renne	30500 ± 1300 BP	GifA 12196/SacA 29928	37830 – 31810
J 10 - n°3	radio-ulnaire de bison	31390 ± 880 BP	GifA 12198/SacA 29930	38570 – 34850
M 6 – n°3	tibia grand mammifère	28650 ± 160 BP	Beta - 355063	33410 – 32760
M 6 – n°7	humérus de renne	29430 ± 190 BP	Beta - 355064	34610 – 33500
M 8 – n°99	bois de renne	30100 ± 180 BP	Beta - 358901	34930 – 34580
N 6 – n°3	tibia de renne	28010 ± 170 BP	Beta - 355065	32790 – 31620
US 2 niveau 1b				
J 10 - n°22, 23, 33	esquilles osseuses	30190 ± 180 BP	Lyon-5233 (GrA)	
F 12	fémur de renne	32100 ± 710 BP	SacA - 25147	38500 – 35120
G 13 – n°6	humérus de bison	19510 ± 170 BP	SacA - 25148	23800 – 22630
US 2 niveau 2				
I 11 - n°20	os	29390 ± 170 BP	Lyon - 5232 (GrA)	
E 12 -n°10	métapode de renne	32600 ± 1000 BP	GifA 12197/SacA 29929	39520 – 34990
I 13 - n°13	radius de bison	29740 ± 200 BP	Beta - 355062	34310 – 34180
US 4				
G 10 n°19	esquille osseuse	34550 ± 600 BP	OxA - 22996	
G 10 z 460-470	esquille osseuse	34250 ± 550 BP	OxA - 22997	

FIGURE 11 Dates ^{14}C.

Les premières observations faites en 2011 à l'extérieur, dans le sondage des carrés M8 et M9, permettent d'avancer une autre hypothèse (C. Griggo). Le niveau 1a, le seul fouillé pour le moment dans ces carrés, a livré une association faunique qui ressemble beaucoup à celle reconnue dans la grotte pour ce même niveau. Le Renne domine nettement avec 52,7 % des restes déterminables. Cependant, la faune est très fragmentée, l'industrie lithique est présente (vingt pièces), ainsi que des traces charbonneuses et des os brûlés. Il s'agit des restes d'une petite occupation humaine dans un contexte climatique très froid, à laquelle on peut sans doute rattacher des ossements découverts en 2008-2009 dans des carrés proches (J-K 9–10), en particulier des restes d'Ours des cavernes et de Rhinocéros, espèces attestées également dans les carrés M8 et M9. Un os de rhinocéros du carré J 10 portait des traces de rongement par une hyène. Sous réserve d'études plus approfondies, en particulier de la fouille des niveaux sous-jacents au niveau 1a dans le sondage extérieur, on peut avancer l'hypothèse que les niveaux à ossements de l'US 2 pourraient résulter d'occupations humaines de courte durée suivies du passage de carnivores.

Dix-sept datations ont été obtenues à partir de restes fauniques provenant de l'US 2 (**figure 11**). Les dates les plus anciennes sont 32600 ± 1000 BP pour le niveau 2, et même 33030 ± 750 BP pour le niveau 1a, qui a par ailleurs livré deux dates nettement plus récentes : 29240 ± 170 BP et 28620 ± 160 BP. La date la plus récente, 19510 ± 170 BP, a été obtenue pour le niveau 2.

Il n'est guère surprenant de constater des inversions de dates dans cette unité stratigraphique qui résulte du glissement à l'intérieur de la cavité d'un amas de cryoclastes accumulés à l'origine devant le porche. Ce mode de dépôt qui s'apparente à un flot de débris favorise le brassage du matériel. Le dépôt lui-même, composé de plaquettes et fragments calcaires, est propice à la redistribution verticale du matériel par autotamisage (Texier, 2000).

On peut avancer pour la date de 19510 ± 170 BP, beaucoup plus récente que les autres, l'hypothèse d'une mobilité due à ce phénomène. Aux processus naturels, il faut ajouter des facteurs biologiques susceptibles de remanier la couche, tels que la fréquentation de la cavité par les hyènes, les ours et récemment les blaireaux.

Abstraction faite de la date de 19510 ± 170 BP, la séquence se place dans les oscillations climatiques de la fin du stade isotopique 3. La faune révèle un net refroidissement entre le niveau 2, dominé par le Bison, et le niveau 1a dominé par le Renne. Dans le niveau 1a, des micromammifères comme le Lemming à collier et le Lemming brun témoignent d'un environnement arctique (étude en cours de Marcel Jeannet). L'intensité du froid incite à situer ce niveau dans un épisode rigoureux de la fin du stade 3 ou du début du stade 2. Du niveau 2 au niveau 1a, on peut proposer un calage chronologique entre 33 000 – 32 000 BP pour le niveau 2 et 29 000 – 28 000 BP pour le niveau 1a, sans exclure toutefois une date plus ancienne, antérieure à 30 000 BP, pour celui-ci.

L'US 1 est un niveau d'effondrement repéré à l'entrée de la cavité dans les carrés H-I 9 et J-K 10.

L'US 0 est dans la première partie du karst (carrés F à K, lignes 10 à 13) une accumulation de limon sableux à argileux brun, à blocs de 10 à 20 cm éparpillés en tous sens. Cet ensemble remanié se prolonge à l'extérieur par un talus de pied de falaise, également très hétérométrique, mais plus argileux et plus noir. Il a livré un grand nombre de blocs gravés. À l'intérieur, jusqu'à la ligne des carrés 16, ce remblai fait place à des argiles organiques de couleur grise provenant d'infiltrations depuis l'extérieur de la cavité. Au-delà, dans la partie profonde de la cavité, l'US 0 se décompose en plusieurs sous-ensembles (**figure 9**). On observe sur un effondrement de dalles qui surmonte l'US 2 des dépôts sableux résultant d'une circulation d'eau rapide. Une variation de compétence entraîne le passage à des dépôts d'argile ocre jaune. Pendant cet épisode se produit un deuxième effondrement. Un de ces blocs tombé dans le carré E 17 est gravé sur deux côtés. Les argiles ocre sont surmontées des argiles organiques de couleur grise reconnues dans la première partie de la cavité.

4 MANIFESTATIONS SYMBOLIQUES

La grotte des Gorges est un site exceptionnel, puisqu'on y rencontre à la fois de l'art pariétal et de l'art mobilier.

4.1 Art pariétal

L'une de ses originalités tient dans la situation des gravures, pour la plupart situées au plafond.

La paroi offre trois ensembles topographiques remarquables (**figure 5**). Le premier (secteur I) est une salle d'une dizaine de mètres de longueur, orientée N-S. Le plafond a subi des phénomènes de cryoclastie qui l'ont fendillé en de nombreux endroits. Il est très accidenté, traversé de micro-fissures, des éléments déterminants pour la structuration d'ensemble du décor. L'ensemble est très sec, sans dépôt de calcite autre que de petits filaments. Dans sa partie profonde en revanche, qui est encore active, un fort concrétionnement masque en partie la paroi. De cette salle partent des boyaux aujourd'hui colmatés. Une petite salle (secteur II) de 5 m de long, orientée NW-SE, part de la précédente pour aboutir à un couloir étroit en partie colmaté (secteur III).

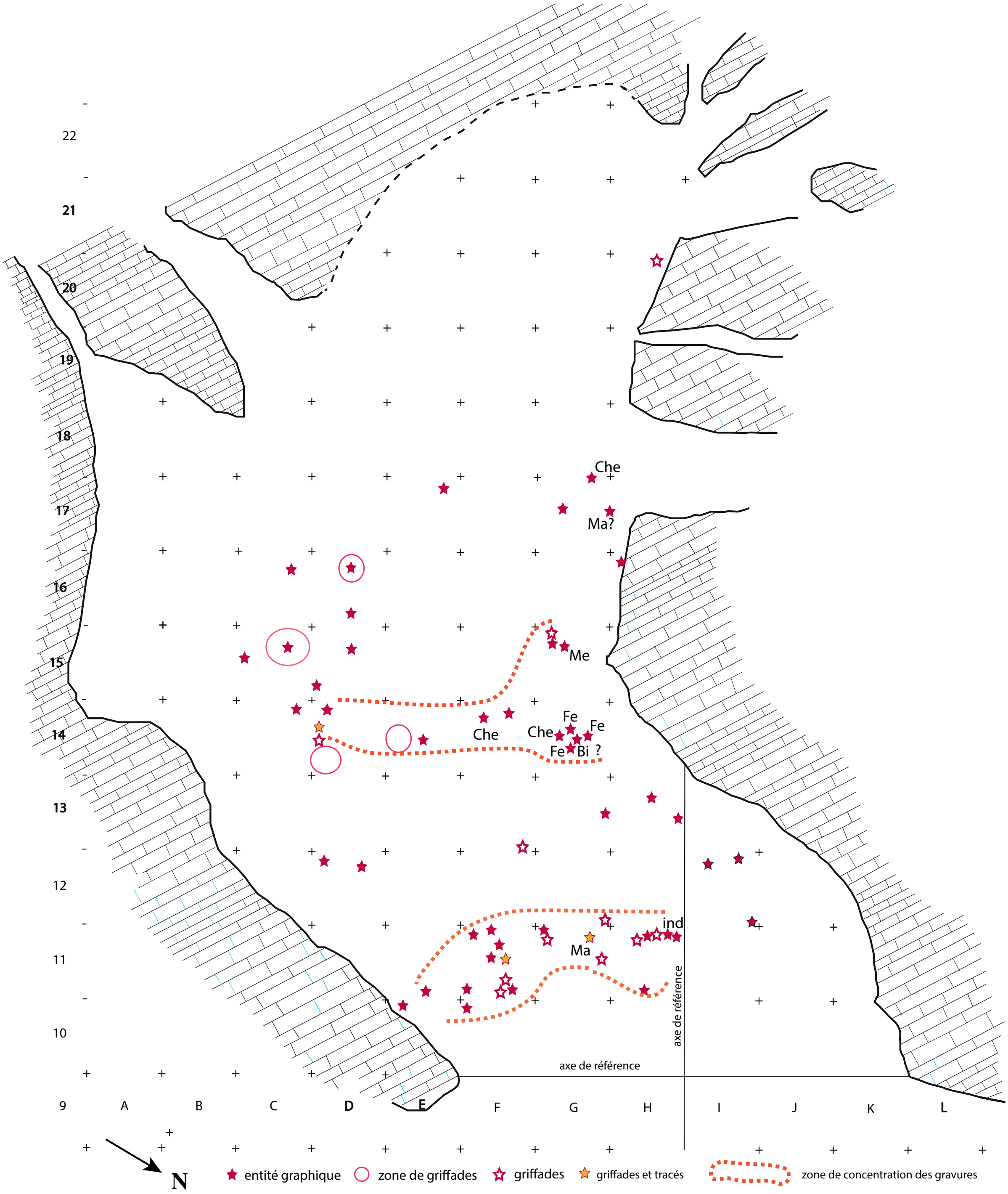
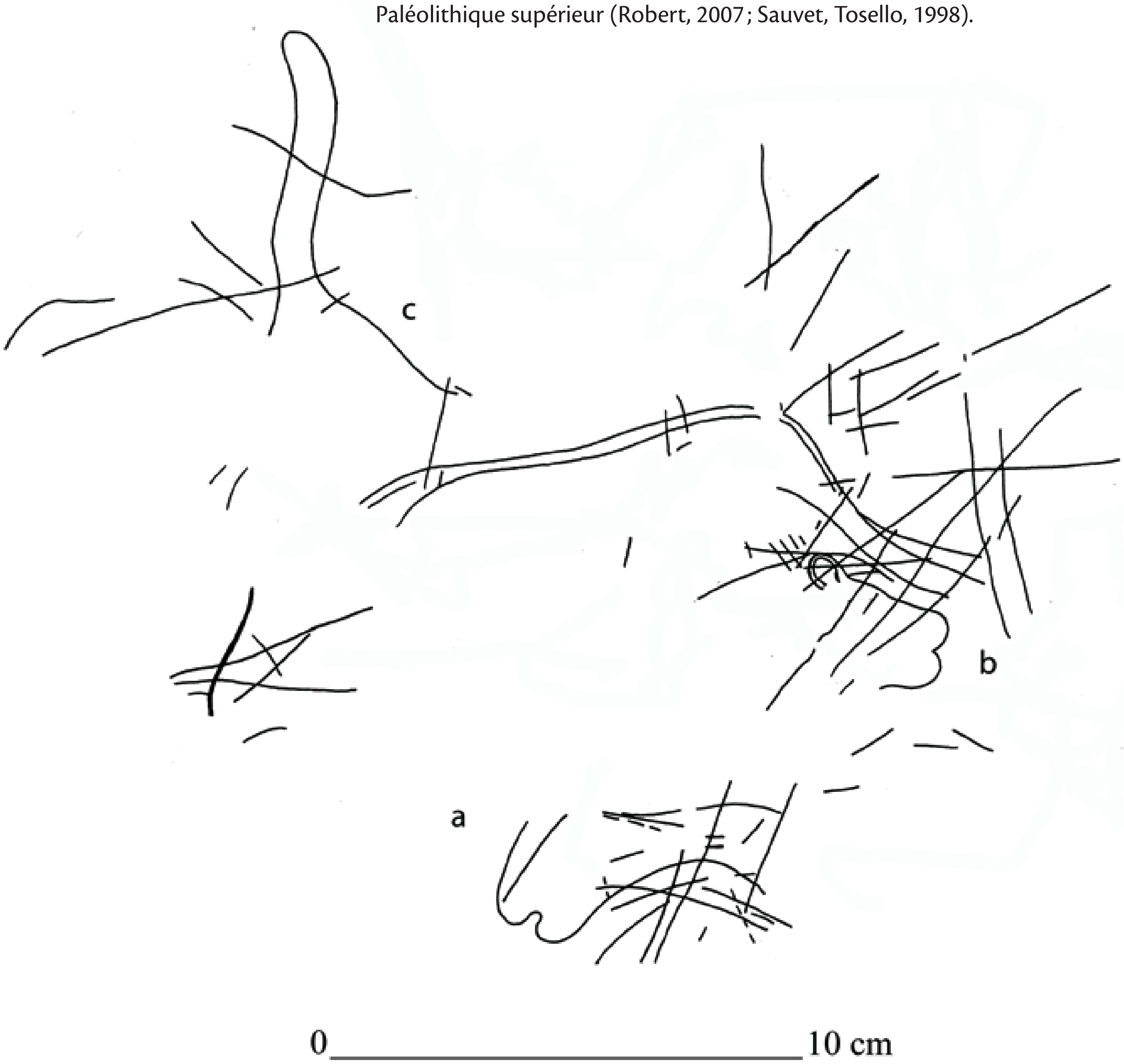


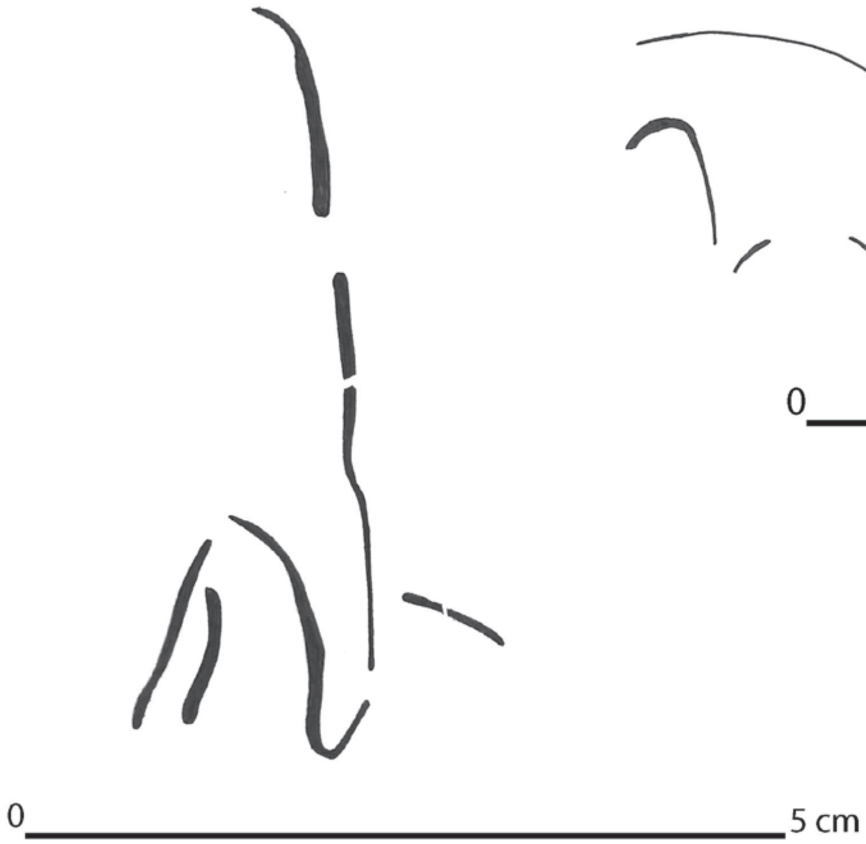
FIGURE 12 Plan de répartition des entités graphiques de la grotte des Gorges. Etat en 2013. Che = Cheval. Fe = Félin. Ma = Mammouth. Me = Mégacéros. Ind = indéterminé. Relevé Serge David, Eric Robert et Stéphane Petrognani. Dessin Serge David.

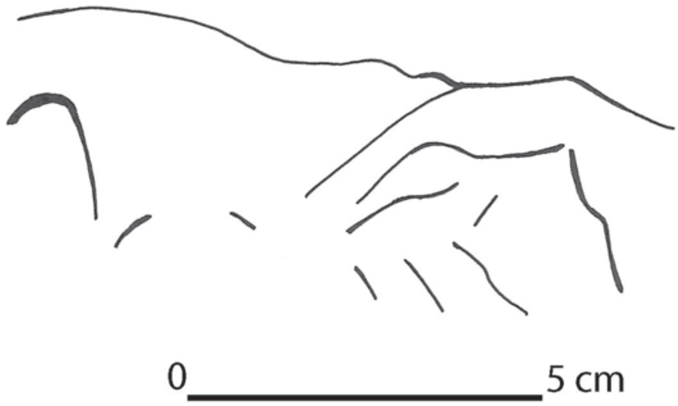
Les gravures se répartissent dans ces trois secteurs (**figure 12**). Dans le secteur I, elles se concentrent surtout sur le plafond et sur les retombées de voûte, vers le fond en particulier. Elles se concentrent (si on suit le carroyage) sur les bandes 11 et 14, situées de part et d'autre d'une large concavité centrale, ce qui peut donner des indications sur les possibilités de cheminement à l'époque de leur réalisation, ainsi que nous fournir des pistes quant à un éventuel « programme iconographique » (Gonzalez, 2011).

La lecture est rendue difficile par le fendillement important de la roche ainsi que par la présence de nombreuses griffades, dont certaines recouvrent des gravures. Nous avons mis en place un protocole d'analyse basé sur les critères diagnostiques établis par Michel Lorblanchet (2003). Pour résumer, si les traits vont par groupe de 4 ou 5, régulièrement espacés, si l'attaque du trait est oblique, si le profil du tracé est appuyé au début et s'amenuise vers la fin, il est hautement probable qu'il s'agisse de griffades. Des dépôts de manganèse recouvrent aussi les parois. Par ailleurs, certains secteurs (des retombées de voûte essentiellement) sont affectés d'un poli de passage (ours ?).

Les gravures sont assez petites, dépassant rarement les 10 cm (**figures 13** et **14**). Elles se répartissent en deux ensembles : des séquences de traits parallèles ou obliques, qui épousent les volumes et les reliefs de la paroi ; des gravures figuratives (un cheval, une biche, un mammouth, des félins et un bovidé), cadrées par des fissures. Cette tendance s'explique notamment par les caractéristiques des supports choisis par les artistes : préférentiellement les très nombreux accidents qui rythment la structure du plafond, redents et becquets rocheux qui orientent manifestement l'organisation et la répartition du décor. Cette utilisation privilégiée de certains reliefs naturels s'apparente à un phénomène bien connu au Paléolithique supérieur (Robert, 2007 ; Sauvet, Tosello, 1998).







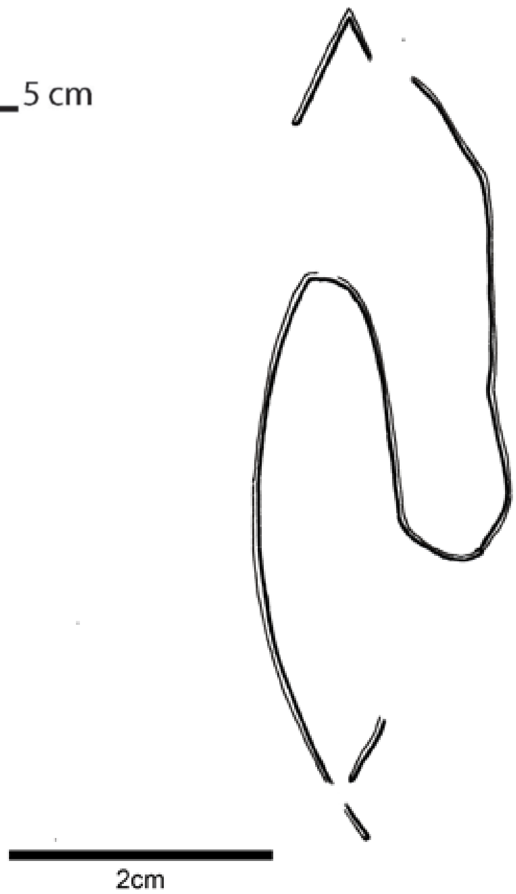


FIGURE 13 Tracés figuratifs. Figures du secteur I. Ci-contre : félins ; à droite : tête de cheval (F14-1) ; en haut à gauche : mammouth ; en haut à droite : animal acéphale. Carrés G 14, G 11, F 14 et C 14. Relevés Romain Pigeaud, Stéphane Petrognani, Eric Robert.

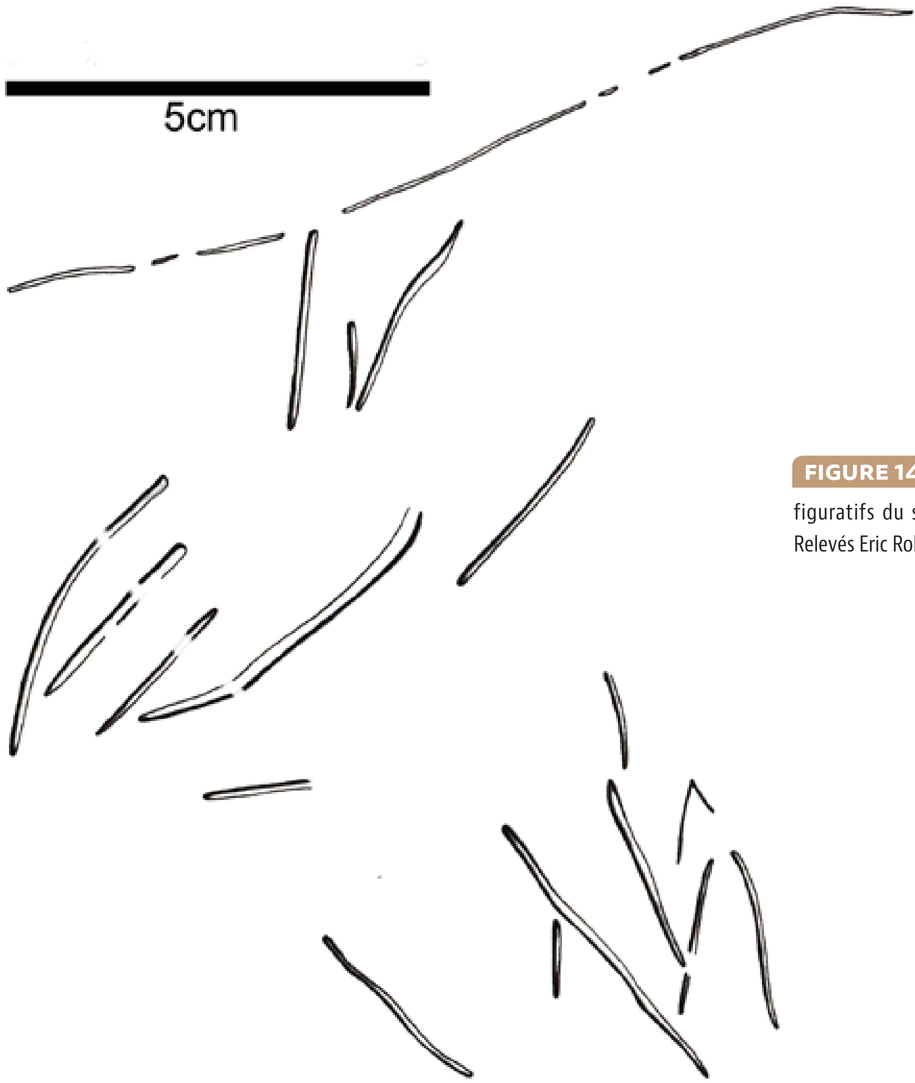


FIGURE 14 Exemple de tracés non figuratifs du secteur I (ensemble F11-5). Relevés Eric Robert.

Les gravures du secteur II sont de mêmes dimensions. Pour le moment, une tête de mégacéros a été formellement identifiée (**figure 15**). Il en est de même pour le secteur II, dont les gravures sont encore en cours de lecture, un panneau mis à part (**figure 16**), sur lequel sont associés des séquences de tracés ainsi qu'un possible animal schématique.

4.2 Les blocs gravés

Les blocs sont de trois calcaires différents : crayeux, oolithique et micritique, de provenance locale, dont certains présentent des traces d'aménagement (raclages, préparation du volume par des enlèvements). Certains de ces blocs pourraient être des fragments de voûtes anciennement détachés de la paroi. D'autres, gravés sur plusieurs faces, sont manifestement des pièces mobilières strictes.

Ils ont malheureusement été tous découverts hors stratigraphie. La plupart se trouvaient dans le remblai massif découvert dans la cavité après la destruction du mur. Certains proviennent d'un mur fermant la grotte qui a été détruit en 2008 en préalable aux sondages. D'autres enfin proviennent du talus qui se trouve devant la cavité.

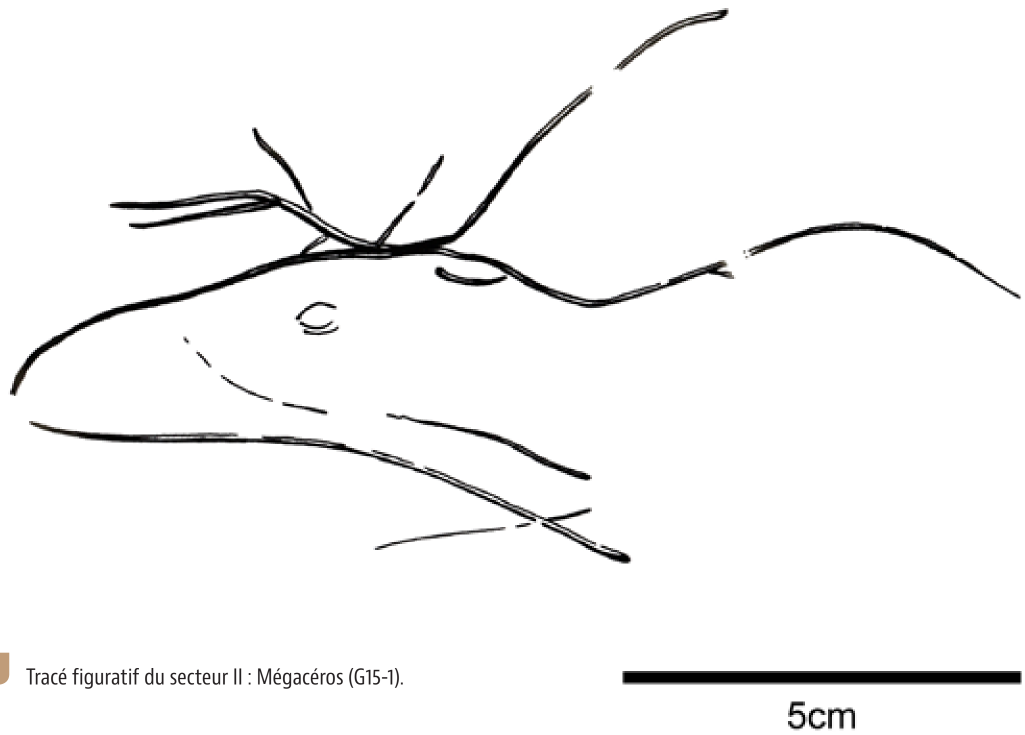
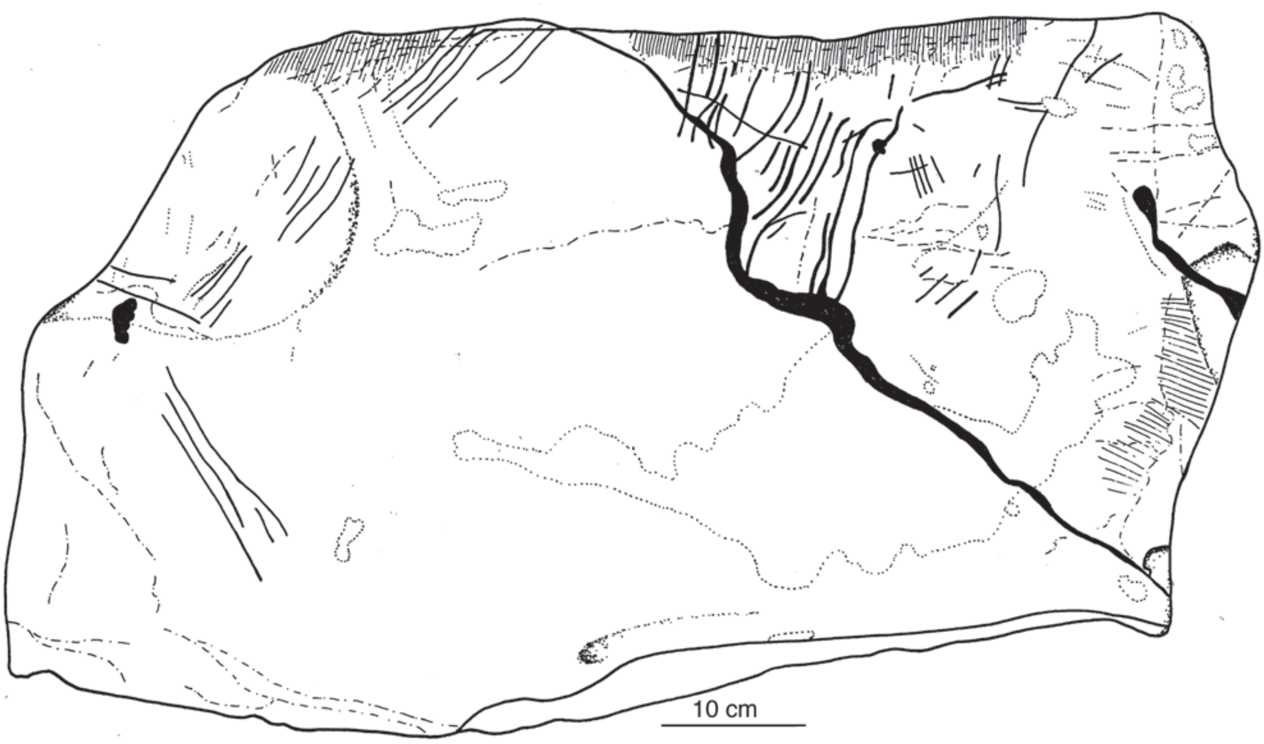


FIGURE 15 Tracé figuratif du secteur II : Mégacéros (G15-1).

FIGURE 16 Panneau gravé (carré G 17) (secteur III). Séquence de traits à gauche et animal schématique à droite. Noter les griffades sur les bords du panneau. Relevé Romain Pigeaud.



Au total, 37 blocs ont été retenus (inventaire 2012), de tailles et de dimensions variables (entre 20 et 70 cm). Ils présentent la même organisation habituellement reconnue dans l'art mobilier (Tosello, 2003), c'est-à-dire des entités graphiques figuratives ou abstraites, mêlées à des traits « parasites », produits de la taphonomie ou bien d'activités symboliques qui nous échappent. Certains (les plus grands) présentent des compositions complexes avec plusieurs figures associées. D'autres portent une seule figure, centrée sur la plus grande surface du support (**figure 17**, planche suivante).

Pour le moment, le décor semble homogène avec celui des parois : têtes de cheval, de cervidés, séquences de traits, mais aussi rhinocéros et ursidé.

4.3 La tête d'ours

Le dernier type de support présent est un exemplaire unique, mais ô combien exceptionnel, puisqu'il s'agit d'une petite sculpture, témoin très rare dans l'art paléolithique (**figure 18**, ci-contre).

Cet objet a été découvert à l'automne 2010, à l'occasion d'une rectification de la stratigraphie du sondage profond, au cœur de l'US 3. Il provient très probablement d'une occupation située à l'extérieur de la cavité et démantelée par l'érosion. Toutes les zones proéminentes présentent un poli post-dépositionnel intense.

Sa position stratigraphique entre l'US 2 (niveau 2) et l'US 4 permet de situer cette sculpture entre 32 000 et 34 000 BP.

Il s'agit d'une tête animale en ronde-bosse.

Selon l'analyse menée par l'un d'entre nous (R. Pigeaud), en s'appuyant sur des clés d'identification (Man-Estier, 2012), l'oreille arrondie (et non pointue), la tête trapézoïdale (et non carrée) et le museau épais indiquent un ursidé. Il s'agit probablement d'un Ours brun car on ne remarque pas le stop frontal caractéristique de l'Ours des cavernes.

Un étude taphonomique et technologique est en cours (F. d'Errico).

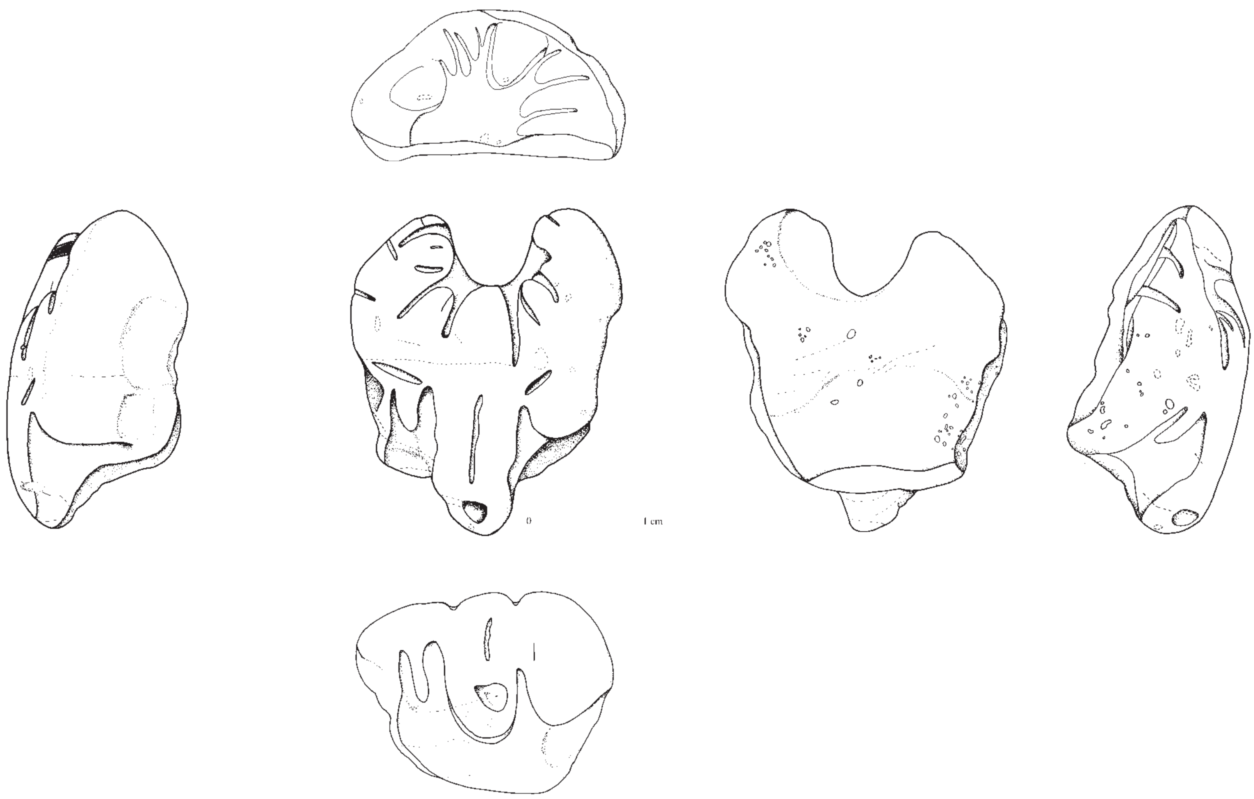
5 DISCUSSIONS

5.1 Analyses stylistiques

Les gravures figuratives des parois sont de simples silhouettes peu détaillées. Elles sont le plus souvent réduites à la tête ou au protomé, et traitées en simple profil. La gravure du bovidé du carré G 11 mise à part, le pelage n'est pas reproduit. Le mégacéros du carré G 15 et le cheval du bloc 2011–1 sont les seuls à être dotés d'un œil.

Le seul thème présent à la fois sur les blocs et les parois est celui du cheval. Un constat fidèle à ce que l'on connaît pour les périodes anciennes, où il constitue le thème le mieux représenté, dans plus de 31 % des cas (Petrognani, 2013). Il subsiste une différence (provisoire au vu de l'accumulation des découvertes ?) entre les blocs et la paroi. Sur les premiers, les chevaux ont une crinière stylisée « en cimier » ou en double trait (la figure de gauche du bloc 2011 – 1), et sont affligés en majorité d'un « bec de canard », c'est-à-dire avec un décroché caractéristique sous la pointe du bout du nez (Azema, 2010 ; Petrognani, 2013). Sur la paroi en revanche, une tête de cheval (celle du carré F 14) se singularise par le traitement de sa gorge, en continuité avec la ganache, avec une oreille pointue.

FIGURE 18 Tête d'ours sculptée en os. Photo Hervé Paitier. Relevé Romain Pigeaud.



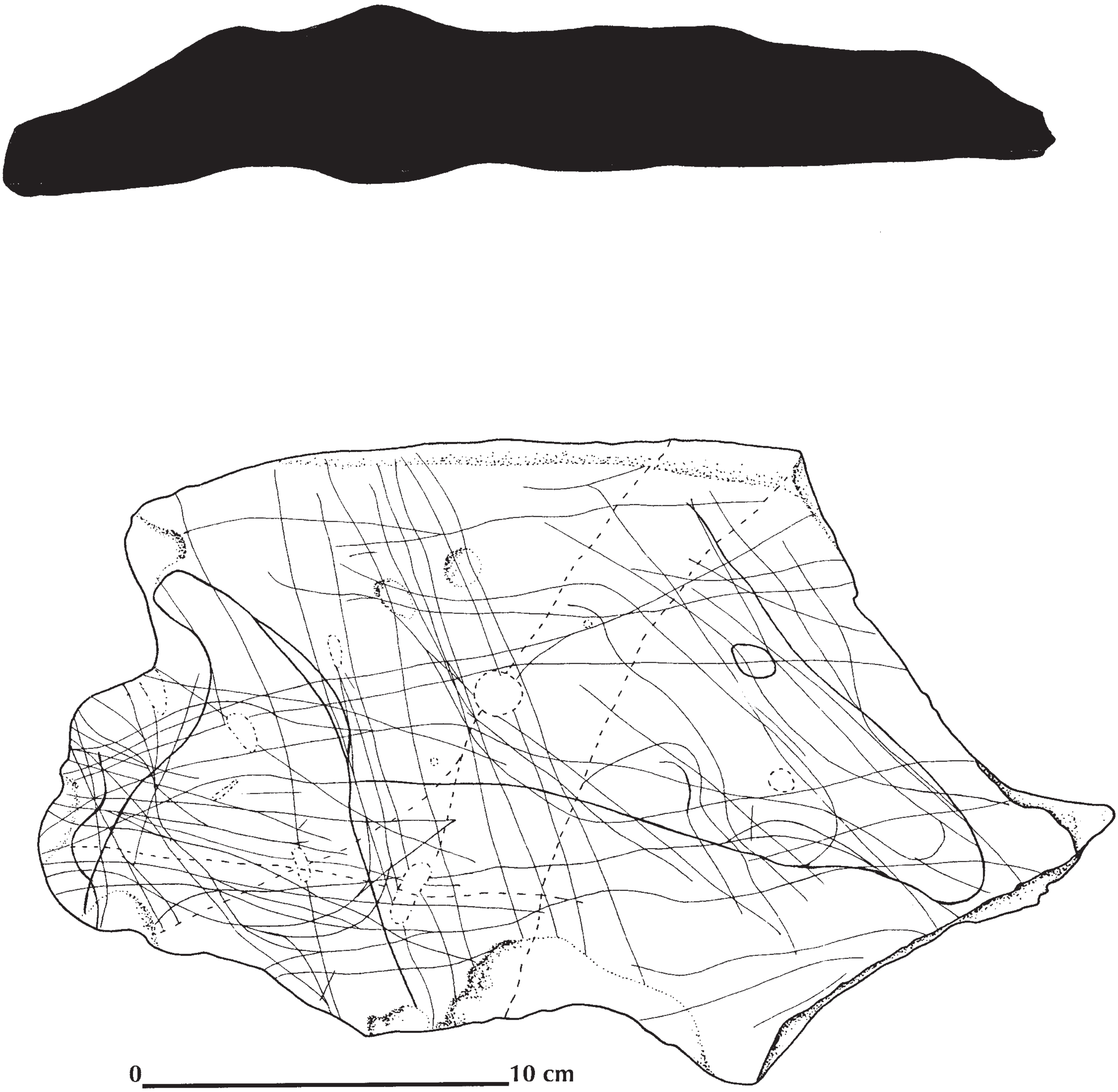
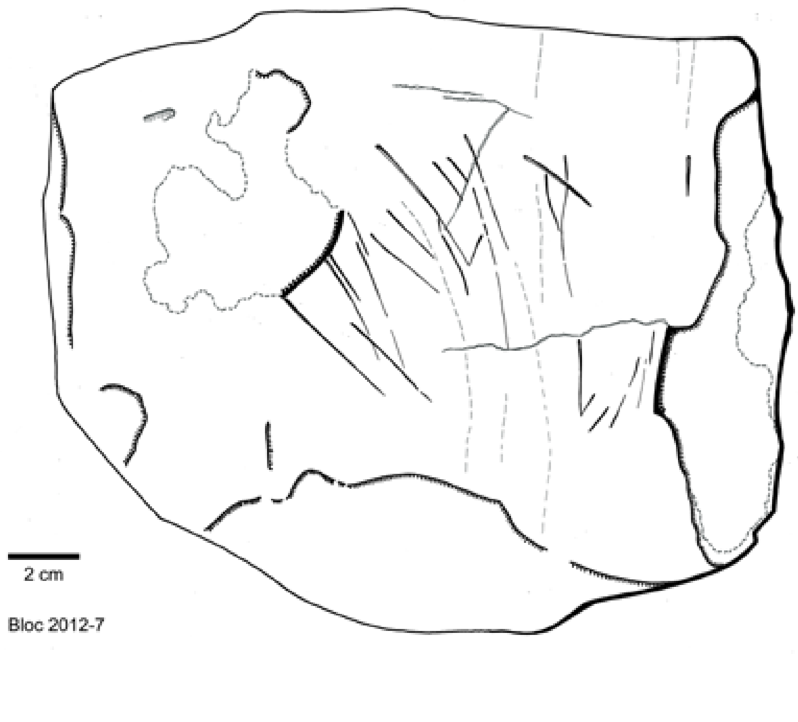


FIGURE 17 Exemple de blocs gravés. Au-dessus : tête de cheval stylisée (à droite) et corps de cheval (à gauche) ; ci-contre, en haut : ensemble de figures dans lesquelles on reconnaît une tête de cervidé (à gauche) et plusieurs têtes de cheval stylisées ; ci-contre, en bas à gauche : rhinocéros ; ci-contre, en bas à droite : ensemble abstrait. Blocs 2011 – 4 , 1 et 6 et 2012-7. Relevés Stéphane Petrognani, Romain Pigeaud et Eric Robert.

Bloc gravé 2011-4



Bloc 2012-7

La figure du rhinocéros est réduite à quelques traits : une ligne gravée incurvée qui se complète, après une interruption dont on ne peut définir le caractère volontaire (utilisation pour l'œil ?), d'une ligne appointée, caractéristique de la forme d'une corne. La forme générale ainsi que le port de tête assez bas confirment bien la nature du taxon représenté, en profil droit (Azéma, 2009 ; Petrognani, 2013).

Il en est de même pour le mégacéros, représenté en profil gauche. Malgré la finesse du trait et sa petite taille, le tracé de la bosse (l'élément directeur pour l'identification, voir Petrognani, 2013) est clairement reconnaissable, tout comme le museau allongé et l'amorce des bois, malheureusement dégradée par un enlèvement récent sur la paroi.

Les félins sont aisément reconnaissables avec une queue flochée et la tête au profil rectiligne, fermé par un museau stylisé en deux arcs convexes accolés (Azéma, 2009, 2010 ; Clottes, Azéma, 2005 ; Petrognani, 2013), dit aussi museau en « trèfle » (Lorblanchet, 1972).

Quant au mammouth, le profil droit avec la tête en pain de sucre et la trompe sont aisément reconnaissables (Petrognani, 2013).

5.2 Datation et attribution chronologique

Chronologiquement, l'art figuratif des Gorges se situerait, selon les dates en notre possession, dans une fourchette comprise entre 33 000 et 29000 ou 28 000 ans avant notre ère.

Les blocs gravés ont tous été trouvés hors stratigraphie (US 0, mur, talus extérieur). Il est possible qu'ils proviennent d'un remaniement de l'US 2 par des fouilles anciennes ou par les travaux de construction du mur. Des blocs calcaires avec dépôts algaires noirâtres analogues à certains blocs gravés existent d'ailleurs dans l'US 2. Quoi qu'il en soit, les thèmes et le style sont très proches des œuvres pariétales et leur sont clairement sinon contemporains, du moins attribuables au même groupe culturel.

Pour les gravures, si l'on admet qu'elles furent réalisées en position debout, elles peuvent être mises en relation avec le niveau 2 de l'US 2, qui est antérieur à 30 000 BP. Mais si on postule, en raison de leur petite taille, qu'elles furent réalisées dans un espace exigu, après le dépôt de l'US 2, elles seraient plus récentes, sans calage chronologique possible, si ce n'est par les thèmes et le style attribuables au Paléolithique supérieur ancien. Il est possible également, vu les conditions d'accès, que les gravures du secteur III (inatteignable une fois le comblement de la grotte réalisé) soient plus anciennes.

La présence de la tête d'ours sur os en stratigraphie constitue un argument supplémentaire pour l'attribution ancienne de l'art de la grotte des Gorges. Elle participe surtout, par la nature du support comme par le thème identifié, aux rapprochements thématiques avec d'autres sites, et permet de questionner la place de la grotte des Gorges dans la géographie symbolique des périodes anciennes (Hahn, 1986 ; Floss, Conard, 2010).

Nous sommes donc forcés d'en revenir au style.

5.3 Supports comparables

Les thèmes et styles des figures identifiées, tout comme la présence de certains supports, ouvrent des rapprochements privilégiés avec certains sites, ce que nous allons voir à présent, au travers des correspondances thématiques et stylistiques possibles à l'Aurignacien et au Gravettien en Europe.

Les divers supports identifiés dans la grotte des Gorges offrent eux-mêmes des rapprochements intéressants.

5.3.1 La statuaire aurignaco-gravettienne

La sculpture de la tête d'ours en ronde-bosse renvoie à une thématique de l'Aurignacien du Jura souabe, celle des « animaux dangereux » (Hahn, 1986), parmi lesquels on note la présence de deux ours en ivoire (Vogelherd et Geissenklösterle) sur quarante pièces complètes et fragments (Floss, 2007).

5.3.2 L'art sur blocs

Les blocs calcaires sont aussi l'un des points remarquables de la grotte des Gorges. Bien que peu nombreuses, quelques comparaisons sont précieuses dans l'optique d'une meilleure compréhension du dispositif orné jurassien. L'abri Castanet (Dordogne) présente un bloc de calcaire gravé, tombé de la voûte. Les approches géologiques et contextuelles permettent d'apporter une datation aux alentours de – 37 000 ans (date calibrée), et ce notamment grâce à l'assurance que ce bloc se localisait avant l'effondrement à portée de main des Aurignaciens qui occupaient le lieu à l'époque (White *et al.*, 2012). À son image, évoquons également plusieurs séries de blocs gravés aurignaciens, notamment ceux de l'abri Cellier (Delluc, Delluc, 1991). Autre parallèle possible, avec le site du Bouil-Bleu (Charente-Maritime), au sein duquel a été retrouvée une pierre gravée présentant une figuration d'un cheval à « bec de canard ». L'art mobilier est documenté comme issu des couches aurignaciennes (Airvaux, 2001). Bien que thématiquement et stylistiquement éloignées, les pierres ornées du site de Fumane, dans la plaine de la Vénétie (Italie), témoignent quant à elles d'une production symbolique encore plus diversifiée chez les artistes du début du Paléolithique supérieur. Ces fragments de roches, véritables éclats de parois colorées, révèlent des images souvent incomplètes, la peinture semblant continuer au-delà de la surface des fractures (Broglio *et al.*, 2005).

Ces quelques exemples confirment la présence d'un art sur bloc dès le début du Paléolithique supérieur, et révèlent une ouverture territoriale assez large. Si les supports sculptés orientaient plutôt vers l'Allemagne et l'Europe centrale, la présence de blocs évoque, elle, des liens possibles vers le centre-ouest de la France.

La présence de supports caractéristiques nous conduit vers la confirmation d'une attribution aux phases anciennes du Paléolithique supérieur, et plus particulièrement l'Aurignacien. Sur le plan des parallèles possibles, on voit en revanche que les pistes sont nombreuses, et parfois lointaines. La prise en compte des thèmes et des styles permet d'affiner et de préciser la place qu'a pu occuper la grotte des Gorges dans les réseaux symboliques des phases anciennes.

5.4 Comparaisons stylistiques et thématiques

Le peu de détail des figures plaide en soi pour une attribution ancienne (Petrognani, 2013).

Pour les chevaux à « bec de canard », ce mode de figuration reste majoritaire aux phases anciennes, jusqu'au Solutréen, et couvre des territoires très étendus (**figure 19** et Petrognani, 2013). Parmi les parallèles, il faut souligner justement une figure du Bouil-Bleu déjà cité, sur un bloc issu de couches aurignaciennes. On retrouve aussi ce style dans une petite grotte aurignacienne de Dordogne, la Croze à Gontran, ainsi qu'à Chauvet ou Roucadour (Lorblanchet, 2010). Si ce style ne constitue pas un élément précis du calage chronologique, il ouvre avec ces deux dernières grottes des parallèles que nous retrouvons par la présence commune d'autres thèmes cette fois plus rares.

C'est le cas du mégacéros. Quasi exclusif des phases anciennes, surtout de l'Aurignacien et du Gravettien, on retrouve ce thème à Arcy-sur-Cure (2), Pech-Merle (1), Margot (3) et surtout Chauvet (7), et à Roucadour, dans le nord du Lot, là où on en trouve le plus (16 figures). S'il y a une assez grande diversité dans le tracé de ces animaux, il faut noter que la forme du museau évoque de plus fortes similarités avec plusieurs figures de Roucadour[4] (**figure 20**).

4. Nous remercions Michel Martin pour nous avoir fourni un inventaire à jour.

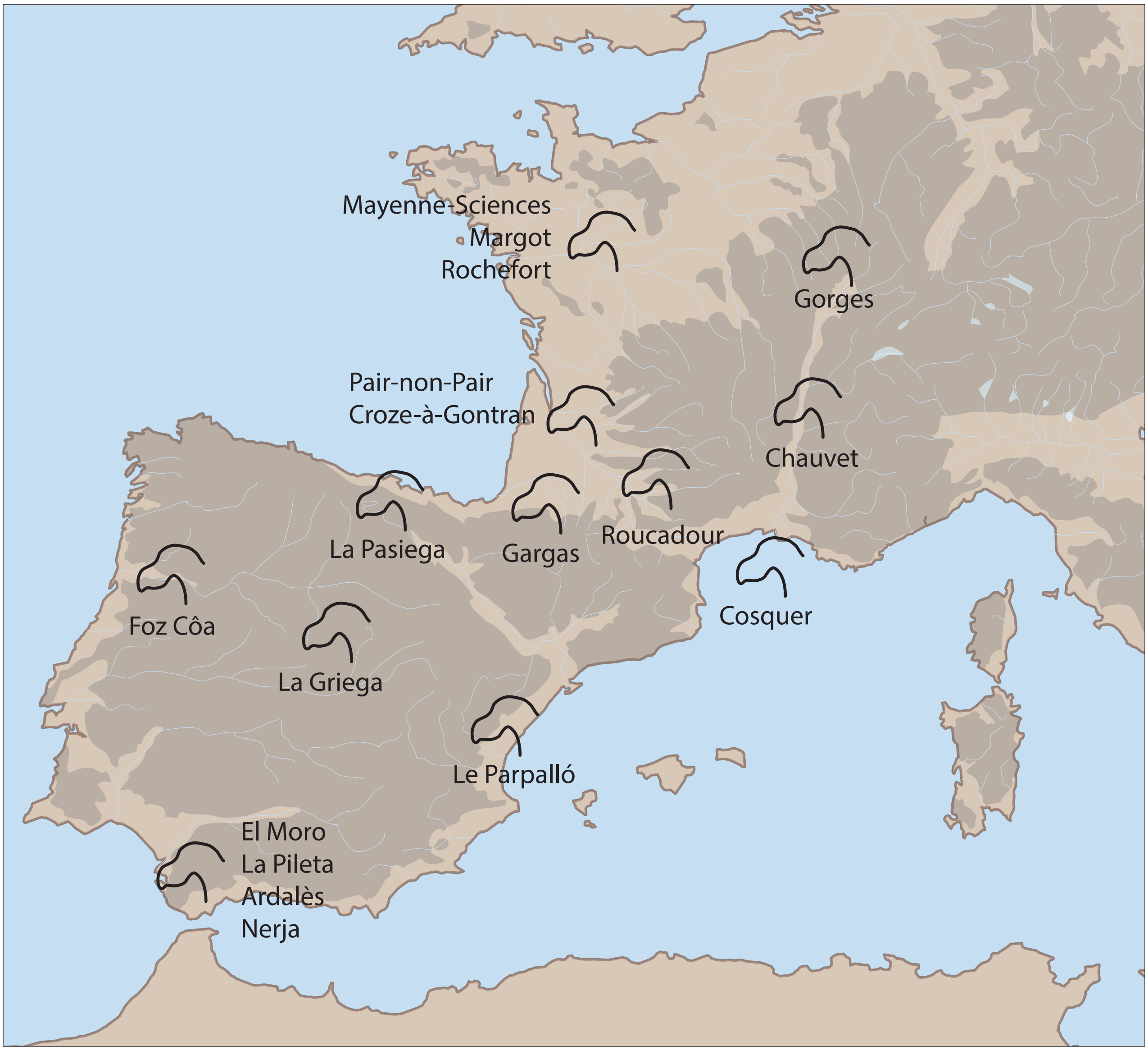


FIGURE 19 Répartition géographique des chevaux à « bec de canard ». Réalisation Stéphane Petrognani. DAO Alice Redou. D'après Petrognani, 2013.

Les liens avec ces sites se renforcent avec d'autres occurrences, encore plus spécifiques des phases anciennes, que sont l'ours, le félin et le rhinocéros.

Outre son support original, l'ours est aussi l'un des thèmes favoris des périodes anciennes, en particulier à l'Aurignacien. On le retrouve en particulier à Chauvet, avec 16 figures, l'Aldène (2 figures), Margot (1 figure) ou Arcy-sur-Cure (3 figures). On note également sa présence à Roucadour (1 individu).

La proximité renouvelée avec Chauvet et Roucadour s'accentue avec le troisième thème figuratif clairement distingué sur les parois de la grotte des Gorges, celui du félin. Celui-ci est présent au sein d'un panneau qui offre une lecture très complexe car les gravures, déjà fines dans leur morphologie, sont oblitérées ici par un poli d'ours. Toutefois, parmi les tracés partiellement altérés et entremêlés, on distingue deux petites têtes de félin et une queue flochée. Outre ce thème, le dessin du museau en « trèfle », tel qu'il apparaît pour au moins un cas, constitue un atout supplémentaire dans les liens avec les grottes. Il faut ainsi souligner la présence de tels museaux à Chauvet, Roucadour ou l'Aldène (Petrognani, 2013). La thématique du félin, même si elle n'est pas absente de périodes plus

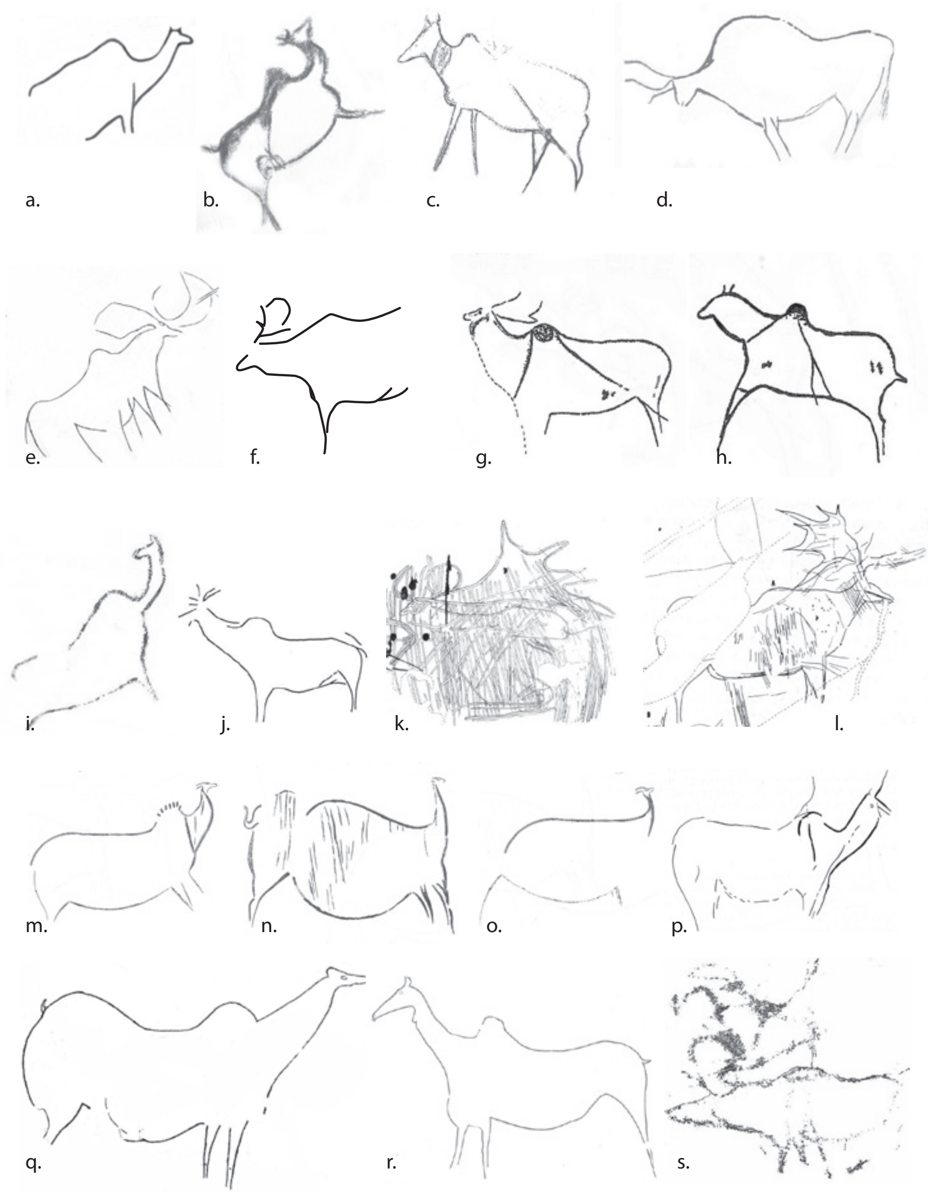


FIGURE 20 Représentations de Mégacéros.
a : Arcy-sur-Cure ; b-c : Chauvet ; d-e : Cosquer ; f-h : Cougnac ; i : La Garma ; j : Pair-non-Pair ; k : Pech-Merle ; l : Siega Verde ; m-o : Le Combel : p : La Grèze ; q : Roucadour ; s : La Pasiega. (Relevés D. Baffier ; Baffier et Feruglio. Dessins V. Feruglio. Relevés M. Lorblanchet ; C.González Sainz ; B. et G. Delluc ; M. Lorblanchet ; J. Alcolea ; M. Lorblanchet ; B. et G. Delluc ; M. Lorblanchet ; C. González Sainz. D'après Petrognani, 2013.

récentes (on en retrouve au Magdalénien à la Marche, au Solutréen à Gabillou ou Lascaux), est majeure dans ces sites déjà croisés, surtout à Chauvet (72 figures) et Roucadour (22 figures). On retrouve de manière plus rare ce thème aussi à Arcy-sur-Cure, mais également à Pech-Merle, dans la galerie du Combel. Enfin, il faut préciser que la présence des félins trouve aussi un écho dans le Jura souabe et en Europe orientale pour certaines des figurines sculptées.

Dernière thématique très présente dans les phases anciennes, celle du rhinocéros. Bien que l'exemplaire de la grotte des Gorges soit incomplet, sa silhouette est caractéristique, comme l'illustrent d'autres exemples en particulier à l'Aldène et à Chauvet. La proximité formelle entre ces deux derniers sites a déjà été soulignée (Sacchi, 2000), une proximité d'autant plus intéressante que la grotte de l'Aldène, pour laquelle le parallèle a été aussi appuyé avec les félins ou les ours, est aujourd'hui attribuée à une période contemporaine des réalisations de Chauvet (Ambert *et al.*, 2005). Le thème du rhinocéros trouve également écho dans l'une des gravures de la grotte des Bernoux (Dordogne), cavité rapportée également au début du Paléolithique supérieur (Petrognani, 2009, 2013). Soulignons que parmi les huit rhinocéros de Margot, certains sont attribués par R. Pigeaud à la phase la plus ancienne de la décoration (Pigeaud, 2013; Pigeaud, Hinguant *et al.*, 2010, 2013). Rappelons également le rhinocéros de la Grande Grotte d'Arcy-sur-Cure (Baffier, Girard, 1998).

6 BILAN : QUELLES CIRCULATIONS ENVISAGER ?

L'identification de thèmes originaux dans la grotte des Gorges, appuyée par la présence originale de certains supports (os sculpté et blocs calcaires), ouvre la voie à une insertion de ce site inédit à la fois dans une chronologie corroborée par le contexte archéologique et les dates sur la faune et au cœur d'un réseau symbolique du Paléolithique ancien dont la maille s'étend au fil des découvertes.

Le croisement de différents critères (thèmes du cheval, du mégacéros, du félin, de l'ours, du rhinocéros, présence d'une statuette, chevaux à « bec de canard »…) autorise des passerelles apparemment privilégiées avec certains sites, et par là même d'envisager plusieurs scénarios. Bien sûr, ceux-ci ne sont que des pistes de recherches, qui seront amenées à évoluer en fonction du développement des travaux dans la grotte des Gorges et de l'analyse du répertoire iconographique.

La localisation de la grotte des Gorges au sein de la carte des sites du Paléolithique supérieur ancien, dans une région vierge de ces témoignages, est un élément clé pour appréhender les contacts éventuels entre les groupes ayant rayonné sur ces territoires.

On peut dresser de nombreux parallèles avec divers grottes, mais quatre liaisons semblent privilégiées, au niveau de la co-occurrence des thèmes, styles et supports, et au-delà d'elle, quatre axes possibles pour l'échange des thèmes et idées (**figure 1**):

- la grotte Chauvet (thèmes cheval, mégacéros, lion, ours, rhinocéros, style « bec de canard »): 400 km. Il s'agit clairement ici du lien le plus étroit, ce qui marque une cohérence claire avec l'Aurignacien. Chauvet à elle seule possède sur ses parois la panoplie des thèmes et styles dont les caractéristiques jalonnent les premières créations graphiques paléolithiques. Elle ouvre aussi un axe orienté vers la vallée du Rhône et au-delà avec le cas de l'Aldène, pour laquelle les proximités sont aussi soulignées.

- le Jura Souabe (ours sculpté, thèmes cheval, lion, ours): 500 km. Il s'agit là d'un lien vers l'est. Les données chronologiques sans cesse reculées pour les niveaux archéologiques posent toujours la question de l'antériorité de ces créations sur les ensembles pariétaux (et/ou mobiliers) de France et d'Espagne. Selon N. Conard, l'art aurignacien du Jura Souabe remonterait à 40 000 BP (Conard, 2007). Si l'on suit ces dates, l'art de la grotte des Gorges se placerait dans un contexte de diffusion, après 35 000 BP, de cet Aurignacien vers le sud-est par le fossé rhénan, l'axe du Doubs et le couloir Saône-Rhône.

- Roucadour (thèmes cheval, mégacéros, ours, lion, styles « bec de canard », museau en trèfle, museau du mégacéros): 530 km. Cette ouverture est plus problématique. Si les liens apparaissent saisissants, notamment par le style (les museaux des félins et le tracé du mégacéros en particulier), le calage de la grotte de Roucadour est incertain (Lorblanchet, 2007), et les autres sites de la région avec lesquels des parallèles existent seraient plutôt liés au Gravettien (Lorblanchet, 2010). Faut-il y voir dès lors une continuité pour cette région de traditions nées et développées à l'Aurignacien ?

Au-delà du Lot se pose aussi la question des liens avec la Dordogne. Aucun site n'offre de répétition des liens, mais ponctuellement (Mensan *et al.*, 2012 ; Petrognani *et al.*, 2014 ; Delluc, Delluc *et al.*, 1983 ; Delluc, Delluc *et al.*, 1991), à la Croze à Gontran, Castanet, les Bernoux notamment, voire plus loin Pair-non-Pair (Gironde), des parentés aurignaciennes contemporaines des Gorges semblent identifiables, sous des traits et des combinaisons toutefois assez différents. Signe de déclinaisons différentes (régionales) d'une même construction et thématique ?

- Arcy-sur-Cure (thèmes cheval, ours, mégacéros, félin, rhinocéros) : 180 km. La proximité est d'autant plus marquante qu'il s'agit du site le plus proche de la grotte des Gorges. Les datations disponibles ici semblent légèrement postérieures à celles de la grotte des Gorges, même si la prise en compte des marges de sécurité présente un recouvrement partiel. La situation, aussi, est intéressante car elle pourrait témoigner d'un axe menant vers le nord, peut-être transversal, sur du plus long terme, jusqu'aux grottes de Mayenne (Margot et Mayenne-Sciences), dont les phases gravettiennes recèlent plusieurs des caractéristiques originales de la grotte des Gorges.

Les quatre parallèles privilégiés que nous avons soulignés, parmi le nombre important de concordances établies, sont d'autant plus intéressants qu'ils se font aussi à l'appui de datations directes, à l'exception notable de Margot et Roucadour. Cette dernière cavité, sans datation directe des images, a fait l'objet d'une large discussion au niveau de son attribution chronologique (Lorblanchet, 2007). Une part de ses thèmes (notamment les cercles échancrés) rappelle les sites de la phase ancienne de l'art du Quercy, tels Pech-Merle ou Cougnac. D'autres caractères formels et stylistiques, en revanche, font écho assez largement avec la grotte Chauvet comme nous avons pu le voir, ainsi qu'avec la grotte des Gorges.

Proposer des schémas de circulation entre ces axes est très hasardeux, étant donné le manque de finesse des dates et les fourchettes parfois larges pour la réalisation des œuvres. Malgré tout, la grotte inédite des Gorges semble placée à un carrefour de plusieurs axes au cœur de l'Aurignacien, entre vallée du Rhône (Chauvet, l'Aldène), circuit du Nord-ouest (Arcy-sur-Cure et peut-être Margot), et de l'Est (Jura souabe), le cas de Roucadour restant quant à lui problématique.

On ne peut que supposer différents types de scénarios, qui restent avec des points d'interrogation.

7 CONCLUSION

Au carrefour entre le Jura souabe, les vallées de la Loire et de l'Ardèche, les plus anciens sites du Quercy et les sites septentrionaux comme Arcy-sur-Cure, la grotte des Gorges constitue une nouveauté dans une région encore vierge de toute découverte, un site propice à une meilleure compréhension des réseaux symboliques du Paléolithique supérieur ancien.

À la lumière des parallèles thématiques et stylistiques, à l'appui des contextes archéologiques, plusieurs scénarios peuvent être envisagés sur la place occupée par la grotte des Gorges dans la circulation des symboles à cette période.

- Elle pourrait constituer un point de passage, une étape intermédiaire de circulation entre des sites et/ou régions riches, tels le Jura Souabe et les sites aurignaciens français, diffusant vers la vallée de l'Ardèche et de la Loire d'une part, vers le nord d'autre part. Cette hypothèse s'appuierait plutôt sur une attribution de l'art au segment le plus ancien des dates à notre disposition, entre 34 000 et 32 000 BP. Elle est confortée par la présence de la tête d'ours antérieure à 32 000 BP. Rappelons aussi la présence à proximité d'une occupation aurignacienne, le Trou de la Mère Clochette, autour de 34 000 – 35 000 BP.

- Elle pourrait constituer un point parmi d'autres, dans un schéma de diffusion plus large, avec plusieurs centres majeurs dont par exemple la grotte Chauvet. L'hypothèse pourrait alors s'appuyer sur le réseau médian des dates des Gorges (entre 32 000 et 30 000 BP).

- La dernière piste que l'on peut envisager serait celle d'un site appartenant à une phase intermédiaire, entre Aurignacien et Gravettien, témoignant de la transmission de traditions graphiques (autour des thèmes et du style) entre des sites comme ceux du Jura, de Chauvet, de l'Aldène et des sites comme les Gorges, aux confins des deux cultures, voire intégrés aux débuts de la phase gravettienne, comme Arcy-sur-Cure ou Roucadour. L'attribution de l'art des Gorges correspondrait alors plutôt à la dernière série de dates connues, autour de 29 000 BP.

Si le Jura souabe apparaît toujours le point d'ancrage des premières créations artistiques aurignaciennes sur support mobilier, la circulation qui s'ensuit est plus difficile à établir.

Les liens entre les sites de Dordogne et ceux de l'Ardèche semblent ténus, en particulier pour les débuts de l'Aurignacien, malgré quelques caractères communs.

La période aux frontières de l'Aurignacien et du Gravettien, mal caractérisée pour l'art, pourrait-elle être le moment d'un phénomène de diffusion plus large dont témoigneraient les sites du Quercy ? Verrait-elle l'émergence de liens renforcés entre la vallée du Rhône d'une part, et le Quercy voire la Dordogne d'autre part, qui se prolongent au Solutréen (Jaubert, Feruglio, 2013) ?

Définir avec précision et certitude des modes de contacts et de circulations des populations reste périlleux à ce stade. L'arrivée régulière de nouvelles dates, issues de recherches en cours (encore récemment à l'abri Castanet ou à Geissenklösterle) (White *et al.*, 2012) modifie en permanence nos connaissances, tend à reculer toujours plus l'ancienneté des comportements artistiques et nous interroge quant à ce phénomène.

L'apport de ces dates comme les corrélations de plus en plus recherchées avec les contextes archéologiques sont à n'en pas douter les voies à suivre pour approfondir ces questions. La grotte des Gorges, avec la richesse et la diversité de ses créations artistiques, y occupera sans nul doute une place importante.

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BIBLIOGRAPHIE

AMBERT P., GUENDON J.-L., GALANT P., QUINIF Y., GRUNESEIN A., COLOMER A., DAINAT D., BEAUMES B., REQUIRAND C. (2005) – Attribution des gravures paléolithiques de la grotte d'Aldène (Cesseras, Hérault) à l'Aurignacien par la datation des remplissages géologiques, *C. R. Palevol*, 4, p. 275–284.

ARIAS P., GONZALEZ SAINZ C., MOURE A., ONTANON R. (2004) – La Galerie Inférieure de La Garma (Cantabria, Espagne) : Recherche et conservation d'un complexe archéologique exceptionnel, *Nouvelles de l'archéologie*, 95, p. 41–45.

AUJOULAT N., GENESTE, J.-M., ARCHAMBEAU C., DELLUC M. DUDAY H. GAMBIER D. (2001) – La grotte ornée de Cussac (Dordogne). Observations liminaires, *Paléo*, 13, p. 9–18.

AZEMA M. (2009) – *L'art préhistorique en action. Tome 1 : les animaux modèles*. Arles-Paris, Errance, 224 p. (Les Hespérides).

AZEMA M. (2010) – *L'art préhistorique en action. Tome 2 : les animaux figurés*. Arles-Paris, Errance, 472 p. (Les Hespérides).

AZEMA M., GELY, BOURRILLON R., GALANT P. (2012) – L'art paléolithique de la Baume Latrone (France, Gard) : nouveaux éléments de datation, *International Newsletter on Rock Art*, 64, p. 6–12.

BAFFIER D., (2005) – La Grande Grotte d'Arcy-sur-Cure (Yonne, France). Persistance de l'iconographie aurignacienne, *in* Collectif, *Pitture paleolitiche nelle Prealpi Venete, Grotta di Fumane et Riparo Dalmeri*, Memore del Museo Civico di Storia Naturale di Verona, 2 Serie Sezione Scienze dell'Uomo, 9, Preistoria alpina, NR. Speciale, p. 76-82.

BAFFIER D., GIRARD M. (1998) – *Les cavernes d'Arcy-sur-Cure*. Paris, La Maison des Roches (Terres Préhistoriques).

BAFFIER D., FERUGLIO V. (2001) – La galerie des Mégacéros, *in* J. Clottes (dir.), *La grotte Chauvet, l'art des origines*, Seuil, p. 118-127.

BALBIN BEHRMANN R. DE, ALCOLEA GONZALEZ J. J. (2001) – Siega Verde et l'art paléolithique de plein air : quelques précisions sur son contenu, sa chronologie et sa signification, *in* J. Zilhão, Th. Aubry, A. Faustino Carvalho eds., *Les premiers hommes modernes de la Péninsule Ibérique. Actes du Colloque de la Commission VIII de l'UISPP*, Trabalhos de Arqueologia 17, p. 205-236.

BOUGARD E. (2013) – Une pratique du Gravettien d'Europe centrale : la terre cuite, *in* M. Otte (dir.), *Les Gravettiens*. Arles-Paris, Errance, p. 301–306 (Les Hespérides).

CLOTTES J. (DIR.) (2001) – *La grotte Chauvet, l'art des origines*. Paris, Le Seuil (Arts Rupestres).

CLOTTES J. (2010) – Les mythes, *in* M. Otte (dir.), *Les Aurignaciens*. Arles-Paris, Errance, p. 237–251 (Les Hespérides).

CLOTTES J., AZEMA M. (2005) – *Les félins de la grotte Chauvet*. Paris, Le Seuil, 125 p. (Bibliothèque de la grotte Chauvet).

CLOTTES J., GELY B., GHEMIS C., KALTNECKER E., LASCU V.T. (2011) – Un art très ancien en Roumanie. Les dates de Coliboaia, *International Newsletter on Rock Art*, 61, p. 1–3.

CONARD N. (2007) – De nouvelles sculptures en ivoire aurignaciennes du Jura souabe et la naissance de l'art figuratif, *in* H. Floss et N. Rouquerol (dir.), *Les chemins de l'Art aurignacien en Europe*, Actes du colloque international Aurignac 2005, Aurignac, éditions Musée-forum Aurignac, cahier 4, p. 317–330.

DELLUC B. ET G. (1991) – *L'Art Pariétal Archaïque en Aquitaine*. Paris, XXVIII[e] supplément à Gallia-Préhistoire, 393 p.

DELLUC B. ET G., (1991) – Pair-non-Pair *in* : *L'Art pariétal archaïque en Aquitaine*, XXVIII[e] suppl. à Gallia-Préhistoire, C.N.R.S., Paris, p. 55-108.

DELLUC B. ET G., GALINAT B. (1983) – La Croze à Gontran, grotte ornée aux Eyzies-de-Tayac (Dordogne), *Ars Praehistorica*, t. 2, p. 13-48.

FLOSS H. (2007) – L'art mobilier aurignacien du Jura souabe et sa place dans l'art paléolithique, *in* H. Floss et N. Rouquerol (dir.), *Les chemins de l'Art aurignacien en Europe*, Actes du colloque international Aurignac 2005, Aurignac, éditions Musée-forum Aurignac, cahier 4, p. 295–316.

FLOSS H., CONARD N. (2010) – L'art mobilier du Jura souabe, *in* M. Otte (dir.), *Les Aurignaciens*. Arles-Paris, Errance, p. 201–214 (Les Hespérides).

FRITZ C., TOSELLO G. (2005) – Entre Périgord et Cantabres : les Magdaléniens de Marsoulas, *in* J. Jaubert et M. Barbaza (dir.), *Territoires, déplacements, mobilité, échanges durant la Préhistoire*, Actes du 126[e] congrès national des sociétés historiques et scientifiques. Paris, CTHS, p. 311–327.

GONZALEZ R. (2001) – *Art et espace dans les grottes paléolithiques cantabriques*. Grenoble, éd. Jérôme Millon, 464 p. (L'Homme des Origines). Traduction M.-Ch. Groenen.

GONZÁLEZ SAINZ C. (2003) – El conjunto parietal paleolítico de la Galería inferior de La Garma (Cantabria). Avance a su organización interna. In R. de Balbín Behrmann y P. Bueno Ramírez (eds.), *El Arte Prehistórico desde los inicios del siglo XXI. Primer Symposium Internacional de Arte Prehistórico de Ribadesella*. (Octubre, 2002), Asociación Cultural Amigos de Ribadesella. pp. 201-222.

HAHN J. (1986) – *Kraft und Aggression : die Botschaft der Eiszeitkunst im Aurignacien Süddeutschlands ?* Tübingen, Archaeologica Venatoria, 7.

HENRY-GAMBIER, D., BEAUVAL C., BARATIN J.-F., AUJOULAT N., AIRVAUX J. (2006) – Découverte d'un réseau karstique orné au lieu-dit Les Garennes, commune de Vilhonneur, Charente, *Préhistoire du Sud-Ouest*, 13, p. 25–35.

IAKOVLEVA I. (2013) – L'art mobilier du Gravettien, *in* M. Otte (dir.), *Les Gravettiens*. Arles-Paris, Errance, p. 237–270 (Les Hespérides).

JAUBERT J., FERUGLIO V. (2013) – L'art pariétal gravettien en France, *in* M. Otte (dir.), *Les Gravettiens*. Arles-Paris, Errance, p. 191–207 (Les Hespérides).

LORBLANCHET M. (1972) – l'Art préhistorique en Quercy. Les grottes peintes et gravées, *Bull. Soc. des Études du Lot*, p. 27–35.

LORBLANCHET M. (1994) – Le mode d'utilisation des sanctuaires Paléolithiques, *Monografias*, 17, éd. Museo y Centro de Investigacion de Altamira, p 235–251.

LORBLANCHET M. (2003) – Des griffades au tracés pariétaux. *Préhistoire du Sud-Ouest*, 2, p.

LORBLANCHET M. (2004) – L'art pariétal du Quercy, éd. Loubatières, Portet-sur-Garonne, 95 p.

LORBLANCHET M. (2007) – À la recherche de l'art pariétal aurignacien du Quercy, *in* H. Floss et N. Rouquerol (dir.), *Les chemins de l'Art aurignacien en Europe*, Actes du colloque international Aurignac 2005, Aurignac, éditions Musée-forum Aurignac, cahier 4, p. 187–208.

LORBLANCHET M. (2010) – *L'art pariétal des grottes ornées du Quercy* . Arles-Rodez, Le Rouergue, 348 p.

LORBLANCHET M., CACHIER M., VALLADAS H. (1995) – Datation des chevaux ponctués du Pech-Merle, *International Newsletter on Rock Art*, 12, p. 2–3.

MENSAN R., BOURRILLON R., CRETIN C., WHITE R., GARDÈRE P., CHIOTTI L., SISK M., CLARK A., HIGHAM T., TARTAR E. (2012) – Une nouvelle découverte d'art pariétal aurignacien in situ à l'abri Castanet (Dordogne, France) : contexte et datation, *PALEO*, 23, p.171-188.

PETROGNANI S. (2013) – *De Chauvet à Lascaux. L'art des cavernes reflet de sociétés préhistoriques en mutation.* Arles, Errance, 250 p. (Les Hespérides).

PETROGNANI S. (2013) – L'art des Gravettiens : continuité et originalité, *in* M. Otte (dir.), *Les Gravettiens*. Arles-Paris, Errance, p. 191–207 (Les Hespérides).

PETROGNANI S., ROBERT E., BOCHE E., CAILHOL D., LUCAS C., LESVIGNES E. (2014) – Au cœur des premières manifestations graphiques du Paléolithique supérieur : Nouvelles découvertes dans la grotte des Bernoux (Dordogne), *Bulletin de la Société Préhistorique Française*, tome 111, 3, p. 413–432.

PIGEAUD R. (2013) – L'Ouest : carrefour ou périphérie ? Observations sur l'art pariétal et mobilier du Paléolithique supérieur ancien des 'grottes de Saulges', *in* P. Bodu, L. Chehmana, L. Klaric, L. Mevel, S. Soriano, N. Teyssandier (dir.), *Le Paléolithique supérieur ancien de l'Europe du Nord-Ouest, réflexions et synthèses à partir d'un projet collectif de recherche sur le centre et le sud du Bassin* parisien, Actes du colloque de Sens, 15–18 avril 2009, éd. Société Préhistorique Française, *Mémoire* LVI, p. 251–282.

PIGEAUD R., RODET J., DEVIESE T., DUFAYET C., TRELOHAN-CHAUVE, BETTON J.-P., BONIC P. (2006) – Palaeolithic cave art in West France : an exceptional discovery : the Margot Cave (Mayenne). *Antiquity*, 80, 309. http : //antiquity.ac.uk/projgall/pigeaud/

PIGEAUD R. (2008) – Les cavernes vagabondes. Mobilité des thèmes, mobilité des styles, *in* J. Gomez de Soto (dir.), *La notion de mobilité dans les sociétés préhistoriques*, Actes du 130e Congrès des Sociétés Historiques et Scientifiques, « Voyages et Voyageurs », La Rochelle, 18–23 avril 2005. Paris, CTHS. p. 19–37. http://cths.fr/ed/edition.php?id=4257

PIGEAUD R., HINGUANT S., POMMIER V., BONIC P. (À PARAÎTRE) – La grotte Margot (Thorigné-en-Charnie, Mayenne) : un sanctuaire complexe aux influences multiples, *Préhistoire, Arts & Sociétés*.

PIGEAUD R., HINGUANT S., RODET J., DEVIESE T., DUFAYET C., HEIMLICH G., MELARD N., BETTON J.-P., BONIC P. (2010) – The Margot Cave (Mayenne) : a new Palaeolithic sanctuary in West France, *in* K. Sharpe et J. Clottes (éd.), *European Cave Art*, in L. Oosterbeek (éd)., *Actes du XVe Congrès de l'Union Internat. Des Sc. Pré- et Protohistoriques (UISPP)*, Lisbonne, 4–9 septembre 2006, session C85, vol. 35, *BAR International Series* 2108, p. 81–92.

PIGEAUD R., VALLADAS H., ARNOLD M., CACHIER M. (2003) – Deux dates carbone 14 en spectrométrie de masse par accélérateur (SMA) pour une représentation pariétale de la grotte ornée Mayenne-Sciences (Thorigné-en-Charnie, Mayenne) : émergence d'un art gravettien en France septentrionale ?, *C. R. Palevol*, 2, p. 161–168.

PIKE A. W., HOFFMANN D. L., GARCIA-DEZ M., PETTIT P. B., ALCOLEA J. BALBIN R. DE, GONZALES SAINZ C., DE LAS HERAS C., LASHERAS J. A., MONTES R., ZILHAO J. (2012) – U-Series Dating of Paleolithic Art in 11 Caves in Spain, *Science*, 336, p. 1409–1413.

PONS-BRANCHU E., BOURRILLON R., CONKEY M. W., FONTUGNE M., FRITZ C., GARATE D., QUILES A., RIVERO O., SAUVET G., TOSELLO G., VALLADAS H., WHITE R. (2014) – Datation par les séries de l'uranium de formations carbonatées associées à des représentations rupestres : intérêt et limites, *BSPF*, t.111-3, 211-224.

ROBERT E. (2007) – L'utilisation des reliefs pariétaux dans la réalisation des signes au Paléolithique supérieur, *L'Anthropologie*, 104, 4, p. 467–500.

SAUVET G., TOSELLO G. (1998) – Le mythe paléolithique de la caverne, *in* F. Sacco, G. Sauvet (dir.), *Le propre de l'homme, psychanalyse et préhistoire*, Lausanne, Delachaux et Niestlé, chapitre 3, p. 55–90 (Champs psychanalytiques).

TOSELLO G. (2003) – *Pierres gravées du Périgord magdalénien. Art, symboles, territoires*. XXXVIe supplément à Gallia-Préhistoire, Paris, CNRS éditions, 584 p.

VIALOU D. (2005) – Territoires : sédentarités et mobilités, *in* D. Vialou, J. Renault-Miskovsky, M. Patou-Mathis (dir.), *Comportements des hommes du Paléolithique supérieur en Europe, Territoires et milieux*, Liège, ERAUL, 111, p. 75–86.

WHITE R., MENSAN R., BOURRILLON R., CRETIN C., HIGHAM T., CLARK E., SISK M., TARTAR E., GARDÈRE P., GOLDBERG P., PELEGRIN J., VALLADAS H., TSINERAT-LABORDE N., SANOIT (DE) J., CHAMBELLAN D., CHIOTTI L. (2012) – Context and dating of Aurignacian vulvar representations from Abri Castanet, France, *PNAS*, 109, 22, p. 8450–8455.

Convergence et divergence thématique et stylistique dans l'art du Gravettien d'Europe orientale

Lioudmila IAKOVLEVA

Résumé : L'objet de cet article est la discussion du concept de convergence et de divergence thématique et stylistique que nous observons au Paléolithique supérieur dans l'art du Gravettien d'Europe orientale. Dans cette démarche, en appuyant sur les études formelles des œuvres d'art, on s'interrogera sur les traits particuliers et généraux de leurs conventions stylistiques, de leur matière première d'exécution, de leur valeur esthétique et de la conception thématique de l'iconographie des répertoires figuratifs (constance des représentations féminines et variabilité sélective des représentations animalières). La grande richesse de cet « art », qui syncrétise des formes artistiques figuratives et non figuratives dans certains sites, conduit à nous interroger sur l'existence de systèmes artistiques codés de nature socio – symbolique, qui s'exprime dans ces lieux socialisés et symbolisés par un groupe ou un réseau de groupes à travers leur territoire. L'existence de ces systèmes de signification complexe, nés des besoins de fonctions socio-symboliques des sociétés paléolithiques, se manifeste dans leur territoire, notamment dans plusieurs sites d'habitat résidentiel mettant en œuvre un large spectre ces multiples fonctions.

Abstract : *The purpose of this paper is the discussion of the concept of thematic and stylistic convergence and divergence which we observe during the upper Palaeolithic in the art of the Gravettian of Eastern Europe. In this approach, supported by formal studies of works of art, it is question of the specific and general features of their stylistic conventions, their raw material for their implementation, their aesthetic value and the thematic design of the iconography of figurative directories (permanence of female representations and selective variability of animal representations). The wealth of this "art", which syncretize figurative and non-figurative artistic forms in some sites, led to the existence of coded artistic systems of socio – symbolic nature, expressed in these socialized and symbolized places by a group or a network of groups through their territory. The existence of these systems of complex meaning, born with the needs of socio-symbolic functions of Palaeolithic societies, occurs inside their territory, particularly in several types of dwelling settlements implementing a broad spectrum of multiple functions.*

1 INTRODUCTION

Dans le Gravettien oriental, les manifestations artistiques sont particulièrement abondantes, sous des formes diverses, dans les sites d'habitat résidentiel de plein air qui possèdent des structures d'habitats complexes construites en gros ossements de mammouths. Ces sites d'habitat sont connus dans la grande plaine russe, sur un espace géographique limité aux régions contigües du Don moyen et de la Desna, à Kostienki 1 niveau I, Kostienki 4 niveau I, Kostienki 11 niveau II, Kostienki 13, Avdeevo, Gagarino, Khotylevo 2 et plus au Nord à Zaraysk (Abramova 1962, 1995; Amirkhanov *et al.* 2009; Gavrilov 2012; Gvosdover 1993, 1995; Demeschenko 1993, 1999, 2006; Efimenko 1958; Fradkin 1965; Iakovleva 1999, 2000, 2009, 2013; Khlopatchev 2006; Praslov & Rogatchev 1982; Praslov 1985; Sinitsyn 2012; Tarassov 1979; Zamiatnine 1934; Zaverniaev 1978) (**figure 1**).

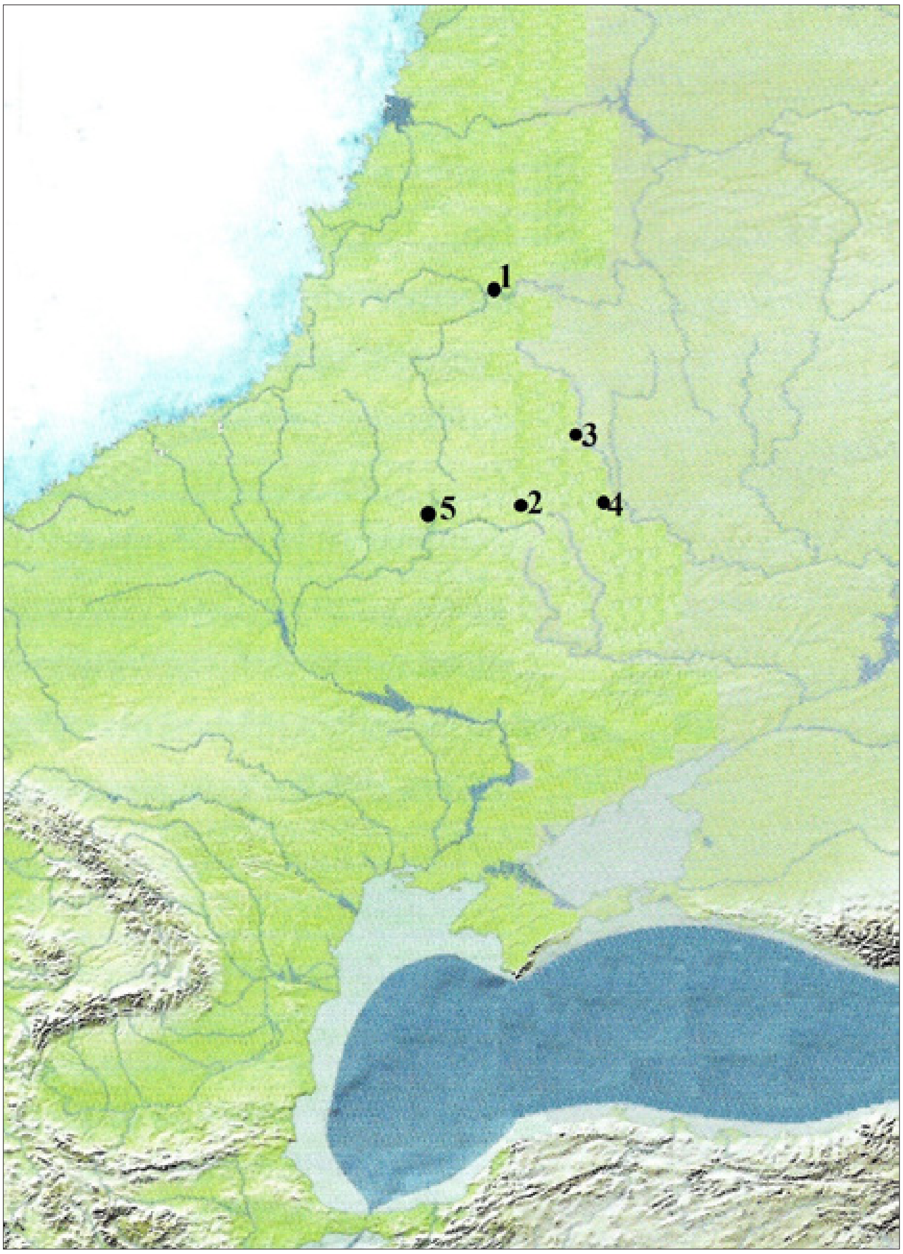

FIGURE 1 Carte des sites d'habitat avec art mobilier du Gravettien d'Europe orientale : 1. Zaraysk ; 2. Avdeevo ; 3. Gagarino ; 4. Kostienki 1, niveau I - Kostienki 4, niveau I - Kostienki 11, niveau II - Kostienki 13 ; 5. Khotylevo 2 (composée par L. Iakovleva).

La présence répétitive des mêmes types d'œuvres (sculptures - outils décorés – parures) dans plusieurs habitats résidentiels fait apparaitre les traits particuliers et généraux des conceptions thématiques et stylistiques, qui ont établi les traditions artistiques de valeur socio –culturelle des groupes de chasseurs-collecteurs d'une économie semi–sédentaire basée sur l'environnement de la steppe à mammouths. La question de l'émergence de ces traditions peut être resituée dans un contexte d'appropriation de territoire, notamment par des groupes de chasseurs de faciès Kostienki-Avdeevo, qui constituent un système socio – symbolique à différents échelles, intégrant l'architecture en ossements de mammouths, l'art mobilier et la parure. En même temps, l'imagerie de leur identité sociale collective prend racine et se reflète dans l'idéologie universelle des sociétés du Paléolithiques supérieur.

2 LES CARACTÉRISTIQUES DE L'ART MOBILIER DU GRAVETTIEN ORIENTAL

Entre 24 000 BP et 21 000 BP, l'apogée de cet art mobilier se révèle sous la forme d'une sculpture en ivoire de mammouth, d'une sculpture en marne calcaire, ainsi que d'outils décorés en ivoire et en os. Les objets de parure en ivoire, en os, en pierre et en coquillages, sont aussi représentés de façon sélective et variable dans les différents niveaux d'occupations. La particularité de cet art anthropomorphe et zoomorphe s'exprime à travers les statuettes figuratives en *ronde bosse* et le décor figuratif en *ronde bosse aplatie* et en *contour découpé* sur les outils. L'application d'un décor géométrique gravé sur les statuettes féminines, sur plusieurs types d'objets utilitaires et sur des objets de parure fait ressortir une intention artistique délibérée et précise pour les pièces portant des motifs géométriques élaborés, portant une signification particulière. Il est caractéristique que les mêmes types de motifs géométriques se retrouvent sur les décors des statuettes féminines, sur certains types d'outils et sur des objets de parure, révélant un marquage de nature socio-symbolique d'objets aux fonctions multiples.

L'art figuratif sculpté, particulièrement épanoui, montre une grande diversité stylistique des formes réalistes et schématiques des représentations humaines et des représentations animales. La variété stylistique des expressions sculpturales, réalisées dans des matériaux de qualités très diverses, illustre la maitrise parfaite du traitement de l'ivoire, de la marne calcaire et de l'os. L'utilisation de la corne et du bois de renne est assez rare. Les œuvres achevées sur différentes matières, sur un même site, illustrent que, malgré des contraintes techniques propres au traitement des matériaux, les sculpteurs obtiennent la forme voulue d'une figure bien définie en trois dimensions.

Dans l'art figuratif du Gravettien oriental, la préférence nette pour deux matières premières (marne calcaire et ivoire de mammouth) est associée à la création de statuettes zoomorphes et anthropomorphes. La fabrication de figurines en pierre tendre locale, facile à sculpter en ronde bosse à l'aide d'outils en silex, a été identifiée dans les habitats de Kostienki 1, niveau I, Kostienki 4, niveau I, Kostienki 11, niveau II, Kostienki 13, Khotylevo 2 et Avdeevo, (Efimenko 1958 ; Rogatchev 1962 ; Abramova 1962, 1995 ; Gvosdover 1995 ; Gavrilov 2012).

La marne calcaire de teinte claire est abondante dans la région de Kostienki, permettant l'approvisionnement de morceaux calcaires de formes précises et compatibles au mieux avec les futures œuvres sculptées. Ces morceaux font l'objet d'un stockage dans l'habitat. La fabrication de séries de centaines de statuettes sur chaque habitat, ainsi que leur utilisation intense est démontrée par la variabilité des états de façonnage des morceaux de marne calcaire ainsi que par les nombreuses œuvres achevées.

L'ivoire, une matière dure animale abondante fourni par les longues défenses de mammouths, est une matière privilégiée pour la création de la sculpture mobilière. Les qualités précieuses de l'ivoire, comme la dureté, la clarté, la brillance et la luminosité, en font une matière incontournable pour la fabrication des statuettes humaines et animales, ainsi que des objets de parure (bracelet, diadème, pendeloque) et de plusieurs types d'outils domestiques et d'armes de chasse, suivant différentes techniques de taille propre à ces traditions culturelles.

L'iconographie de l'art mobilier donne une nette préférence aux images féminines qui recouvrent un large répertoire des représentations du corps féminin entier ou partiel (régions corporelles), ou même segmenté (organes) comme les vulves de Kostienki 1/I et Avdeevo. Des figurines humaines, entières ou partielles, sans indication de sexe, sont aussi présentes.

Les images animales tiennent aussi une place assez importante dans l'art mobilier. À plusieurs reprises, les figurines animalières coexistent avec les figurines humaines dans le même site d'habitat, constituant un riche assemblage figuratif. En revanche, certains sites d'habitat livrent un répertoire figuratif exclusivement zoomorphe, comme Kostienki 4/I ou Kostienki 11/II, tandis que d'autres sites d'habitat révèlent un répertoire figuratif anthropomorphe avec une nette préférence pour les représentations féminines. Les représentations animales varient d'un site à l'autre, révélant l'attirance pour les figurations d'herbivores : mammouth, rhinocéros, cheval, bison, bœuf musqué, ainsi que des carnivores : félidé, lion, ours, mustélidé, et des oiseaux. Cette iconographie animale relaie le bestiaire de l'art aurignacien, de même que l'existence de créatures singulières, comme des animaux non identifiés, des anthropozoomorphes, des zoomorphes composites ou des monstres. La grande importance de ces images variées se révèle notamment dans l'iconographie de Kostienki 1/I.

2.1 Variabilité des répertoires figuratifs dans les habitats du Gravettien oriental

I. *Répertoire limité aux représentations féminines / anthropomorphes*

- **Gagarino** (fouilles S. Zamiatnine, L. Tarassov)
  - Statuettes : femme / anthropomorphe

- **Kostienki 13** (fouilles A. Rogatchev)
  - Statuettes : femme

II. *Répertoire limité aux représentations animales*

- **Kostienki 11, niveau II** (fouilles A. Rogatchev)
  - Statuettes : mammouth, rhinocéros, ours, animal à interprétation diverse,
  - Outils décorés : zoomorphe

- **Kostienki 4, niveau I** (fouilles A. Rogatchev)
  - Statuettes : mammouth, ovibos, bison, animal à interprétation diverse,

III. *Répertoire élargi, composé de représentations féminines / anthropomorphes et de représentations animales*

- **Zaraysk** (fouilles H. Amirkhanov, S. Lev)
  - Statuettes : femme / bison

- **Avdeevo, structure d'habitat n°1**
(fouilles M. Voevodskyi, M. Gvosdover, A. Rogatchev)
  - Statuettes :
    - femme (entier, partiel) / anthropomorphe
    - mammouth ;
  - Outils décorés : zoomorphe /anthropomorphe / féminin

- **Avdeevo, structure d'habitat n°2**
(fouilles M. Gvosdover, G. Grigoriev, E. Boulotchnikova)
  - Statuettes :
    - femme (entier, partiel) / anthropomorphe
    - mammouth, animal à interprétation diverse,
  - Outils décorés : zoomorphe / anthropomorphe / féminin

- **Kostienki 1, niveau I, structure d'habitat n°1** (fouilles P. Efimienko)
  - Statuettes :
    - femme (entier, partiel), vulve / anthropomorphe / anthropozoomorphe,
  - mammouth, félin, ours, loup, cheval, oiseaux, zoomorphe composite/ monstre, animaux à interprétation diverse,
  - Outils décorés : zoomorphe /anthropomorphe / féminin

- **Kostienki 1, niveau I, structure d'habitat n°2** (fouilles A. Rogatchev, N. Praslov)
  - Statuettes : femme / mammouth,
  - Outils décorés : zoomorphe /anthropomorphe

- **Khotylevo 2** (fouilles F. Zaverniaev, K. Gavrilov)
  - Statuettes : femme / anthropomorphe
  - Outils décorés : zoomorphe / anthropomorphe

3 RÉALISME ET SCHÉMATISME DE L'ART MOBILIER DU GRAVETTIEN ORIENTAL

L'art du Gravettien oriental s'affirme dans le parallélisme des représentations réalistes et des représentations schématiques. La coexistence de ces deux traditions artistiques de représentations figuratives dans un même habitat illustre l'influence simultanée de formes artistiques diverses (Kostienki 1/I, Avdeevo, Khotylevo 2). Le réalisme de la représentation figurative s'appuie sur la morphologie caractéristique du corps humain ou animal, la posture du corps et les détails anatomiques montrant un choix prédéfini pour la mise en forme d'une figure reconnaissable au premier regard. Pourtant, dans ce réalisme (dont le terme n'est pas identique au réalisme académique appliqué aux Beaux-Arts), se traduit par une volonté de représentation stylistique : négligence, réduction, exagération de certaines parties anatomiques du corps, aussi que de leurs détails, qui donnent une originalité certaine aux images. Les œuvres sculptées schématiques, à leur tour, montrent le laconisme et la sobriété d'une forme fortement stylisée. Ce sont ces concepts stylistiques qui formalisent la constance et la variabilité des images réalistes et des images schématiques mettant en valeur un contenu socio-culturel aux normes esthétiques établies.

Tout d'abord le réalisme s'enracine et se diversifie dans les statuettes féminines en ronde bosse en ivoire (Kostienki 1/I, Avdeevo, Khotylevo 2, Gagarino, Zaraysk) ainsi que dans les statuettes féminines en ronde bosse en marne calcaire (Kostienki 1/I, Kostienki 13, Avdeevo). Sans oublier que les figurines schématiques (féminines et anthropomorphes), sous des formes sculpturales variées, sont également présentes dans les mêmes habitats.

Dans l'art animalier, le réalisme est assez rarement exprimé. Cependant la petite tête de lionne sculptée en marne calcaire de Kostienki 1/I (Efimenko 1958 : 389–390) et la récente découverte d'une statuette de femelle de bison sculptée en ivoire par un artiste particulièrement doué de Zaraysk fait preuve d'un indiscutable réalisme animalier établi et poussé jusqu'au naturalisme (Amirkhanov *et al.* 2009 : 290–306). En revanche les images animalières schématiques prennent une ampleur particulière sur les figurines sculptées en marne calcaire et sur les manches figuratifs des outils en os.

3.1 L'imagerie féminine

Actuellement vingt-huit statuettes féminines en ivoire plus ou moins entières, représentant une femme de la tête aux pieds (sans ou avec des traces d'endommagements anciens), ont été trouvées à Kostienki 1/I, Avdeevo, Gagarino, Khotylevo 2 et Zaraysk. Dans ce décompte, il faut ajouter les deux figurines féminines entières en marne calcaire, restaurées dans leur état initial à Kostienki 1/I.

Le concept de stylisation le plus utilisé, qui s'inscrit dans une tradition réaliste, est une représentation en ronde bosse d'un corps féminin nu en position statique, debout avec la tête légèrement inclinée en avant, sans visage (à l'exception d'une statuette d'Avdeevo), le thorax avec les épaules assez étroites et légèrement arrondies, les seins volumineux et le plus souvent tombants, les bras un peu atrophiés, soit s'arrêtant à leur partie supérieure, soit figurées entières avec les mains posées soit sur les seins (statuette de Gagarino), soit sur le ventre souvent bombé (parfois gravide), les hanches et les fesses arrondies et bien marquées, les jambes légèrement fléchies au niveau des genoux. La variabilité de la posture d'un corps féminin debout, mais plus penché en avant, est connue seulement par quelques statuettes opulentes de Khotylevo 2 et Gagarino. En fait ces figurines, exécutées dans une dimension très réduite, donnent des représentations féminines assez proches de la réalité par leurs dimensions qui répètent les proportions anatomiques du corps féminin avec ses variabilités morphologiques et qui révèlent des formes plus souvent opulentes mais aussi des formes plus au moins sveltes (**figure 2**).

L'originalité de certaines vénus est marquée par le décor géométrique, qui fait la spécificité de chaque figure. Cette décoration géométrique, assez discrètement gravée, représente sur certaines statuettes une coiffure, des colliers, des bracelets avec ou sans ornementation, des ceintures et des bandeaux décorées ou non et d'autres types de décoration corporelle. Ce concept artistique de la représentation d'une nudité féminine enrichie par la décoration de la tête et/ou la parure du corps possède une variabilité à Kostienki 1/I, Avdeevo, Gagarino et Zaraysk. La tradition de la décoration caractéristique de la tête isolée est confirmée aussi par les têtes sculptées de Kostienki 1/I et Avdeevo. Plusieurs statuettes fragmentées du même site portent aussi un décor géométrique semblable. La précision du traitement de tous ces détails, en comparaison avec des parures décorées trouvées dans le même habitat, met en évidence que les décorations corporelles portées par les femmes possèdent en réalité la même ornementation géométrique. En effet, ce décor indique les détails de l'ornementation du corps nu féminin, qui peuvent avoir des significations individuelles de caractère socio–symbolique.

FIGURE 2 Trois statuettes féminines en ivoire d'Avdeevo. Photo L. Iakovleva.

La posture figée, l'absence de visage, les rotondités fortement soulignées des parties molles (seins, hanches, ventre, fesses et cuisses, ainsi que la partie pubo-génitale), toutes ces conventions stylistiques, mettent en valeur la formule de la glorification de la nudité et de la sexualité de ces vénus « aveugles et muettes ». Les figurines s'épanouissent et s'individualisent dans le jeu stylistique du volume rendu par les rotondités caractéristiques du corps féminin, parmi lesquels se trouvent plusieurs images de femmes gravides et multipares. Ainsi, un état proche de l'accouchement est plus nettement illustré sur la petite statuette féminine nue, sans tête, en position accroupie avec les bras posés sur le gros ventre conique, de 5,5 cm de hauteur, de Kostienki 13 (Rogatchev & Beliaeva 1982 : 144–145). Une autre minuscule statuette en marne calcaire, de hauteur 2,7 cm, d'une femme enceinte sans tête, en position droite classique avec les bras posés sur le gros ventre, autour d'un grand nombril, a été trouvée à Avdeevo st.2 (Gvosdover 1995 : 144–145).

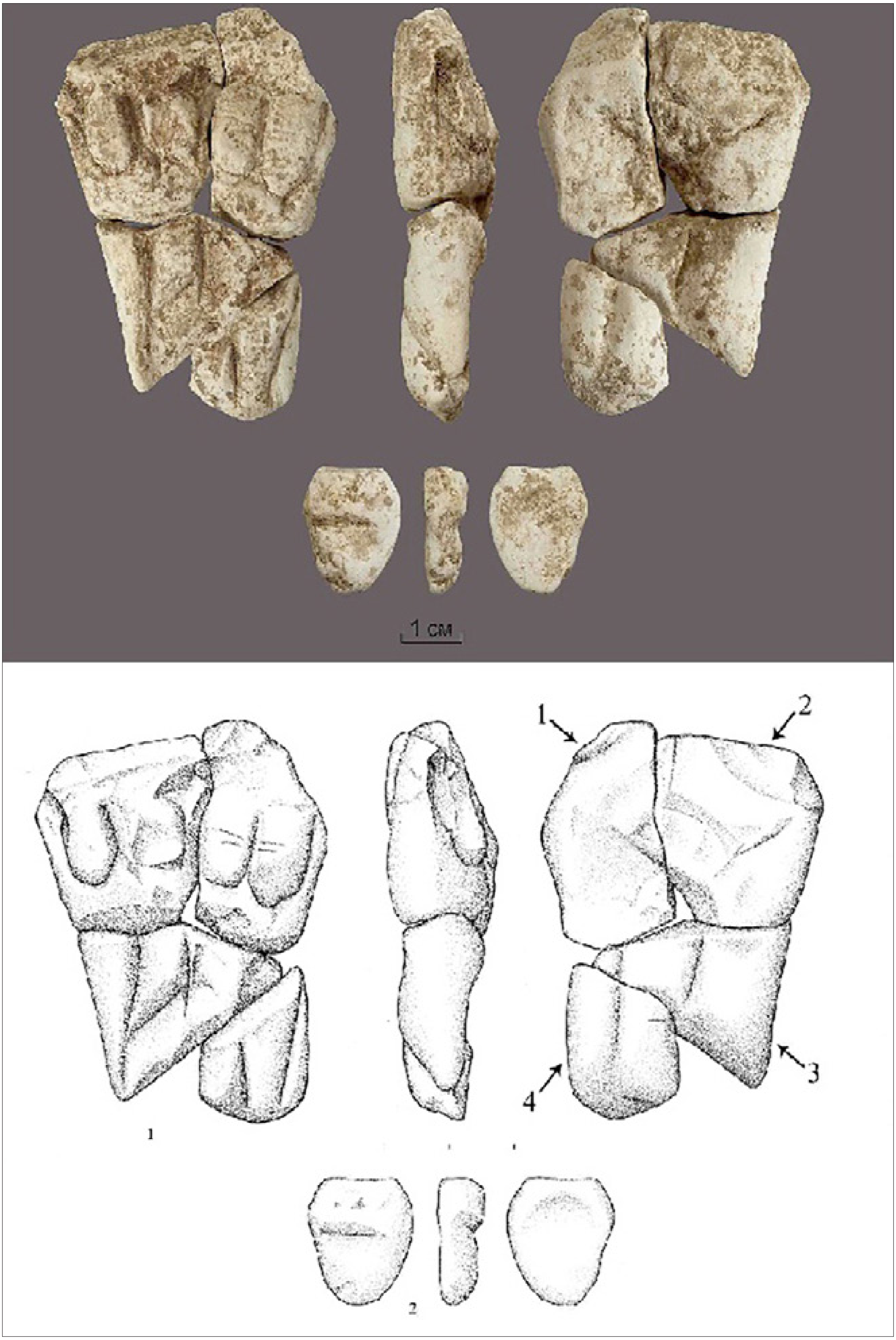
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FIGURE 3 Représentation de deux corps féminins fracturés en marne calcaire de Khotylevo 2 (d'après Gavrilov, 2012).

La nudité et la sexualité des femmes (enceintes ou non) s'affirment et se répètent dans les nombreuses représentations féminines du corps partiel (régions corporelles), en marne calcaire, à Kostienki 1/I, Avdeevo et Khotylevo 2, ainsi que dans les représentations féminines segmentées (organes), notamment les vulves en marne calcaire de Kostienki 1/I et d'Avdeevo. Dans cette grande série, il faut donner une place importante et particulière à la sculpture *en bas-relief* (58,5 x 44, 5 x 15 mm) qui représente deux corps féminins nus, dépourvus de têtes, de bras et de pieds, sculptés côte à côte à Khotylevo 2 (Gavrilov 2012). Malgré la fracturation de l'objet en quatre morceaux, le concept initial de leur représentation apparaît, corps féminins nus, posture droite, seins tombants et jambes jointes (**figure 3**). Cette pièce, trouvée sur la surface du sol de l'habitat, donne un rare exemple d'une œuvre achevée avant sa fracturation en quatre morceaux, faite probablement au cours d'un rituel. Ces traces de pratique rituelle sont révélées également par les nombreuses figurines en marne calcaire représentant différentes parties du corps féminin à Kostienki 1/I et Avdeevo. Il est bien évident que l'intensité et la diversité des activités, répétées à plusieurs reprises dans les habitats résidentiels, a fait disparaitre un certain nombre d'objets (destruction / réutilisation / rejet / déplacement) qui empêche de reconstituer la forme initiale de ces œuvres fragmentées.

Cependant, quelques exemples de remontage de parties corporelles illustrent la représentation du corps féminin avant sa fracturation. Le premier exemple est une petite figurine féminine en marne calcaire de hauteur 4,1 cm, à Avdeevo st.2, restaurée à partir de nombreux fragments, qui fait apparaitre un corps féminin nu, dépourvu de la tête et des bras (Gvosdover 1995, p. 148). La femme est représentée en position accroupie avec les jambes écartées et fortement repliées en arrière. La poitrine est plate ainsi que le ventre mais la partie pubo - génitale et la vulve sont bien marquées.

Une autre figurine restaurée montre une femme sculptée entière. Son remontage à partir de trois fragments ramassés en différents endroits proches de l'habitat de Kostienki 1/I, st.1, a permis de reconstituer une statuette féminine de grande taille, de 17,5 cm de hauteur, en position classique figée, debout, avec une grande tête globuleuse légèrement penchée en avant, sans visage, les bras terminés aux coudes, les gros seins, le ventre bombé et la saillie fessière, qui sont juste esquissés. Les jambes épaisses sont jointes et légèrement pliées aux genoux. Cette figurine massive, sans détails anatomiques et qui n'est pas complètement dégagée de la préforme de la pierre, révèle un modèle sculptural, bien traité par une mise en forme sommaire des rondeurs des parties molles et l'esquisse triangulaire de la patrie génitale, qui sont caractéristiques du corps féminin. Un coup donné au niveau de l'épaule gauche près du cou a cassé dans sa longueur la statuette qui a alors terminé sa fonction dans l'habitat (Efimenko 1958 : 351 ; Abramova 1995, p. 190 ; Iakovleva 2012, 2013 : 255–256, 262) (**figure 4**).

Avec une autre statuette féminine de Kostienki 1/I, st.2, on retrouve à peu près les mêmes types de cassures au niveau des épaules et du cou, ainsi qu'au niveau des pieds. Cette fois, la figurine a été cassée après son achèvement et sa tête a été très éloignée de son corps (Praslov, 1985 : 183–184). Il s'agit de la vénus en marne calcaire de 11,4 cm de hauteur, de Kostienki 1/I, st.2 qui, après sa reconstitution (la tête et les jambes étaient cassées), montre une femme enceinte, en position debout et figée avec sa tête dépourvue de visage, les bras légèrement inclinés en avant avec les mains posées sur son gros ventre. Dans cette position classique, la nudité féminine est mise en volume et en symétrie par la rotondité des seins, des fesses, des cuisses et du ventre, qui caractérisent l'état de grossesse. La coiffure, les bandeaux et les bracelets, qui parent la vénus, accentuent la beauté de sa nudité et son individualisation (Iakovleva 2013 : 256) (**figure 5**).

FIGURE 4 Statuette féminine remontée après cassure ancienne en marne calcaire (Kostienki 1/I, st. 1). Photo L. Iakovleva.

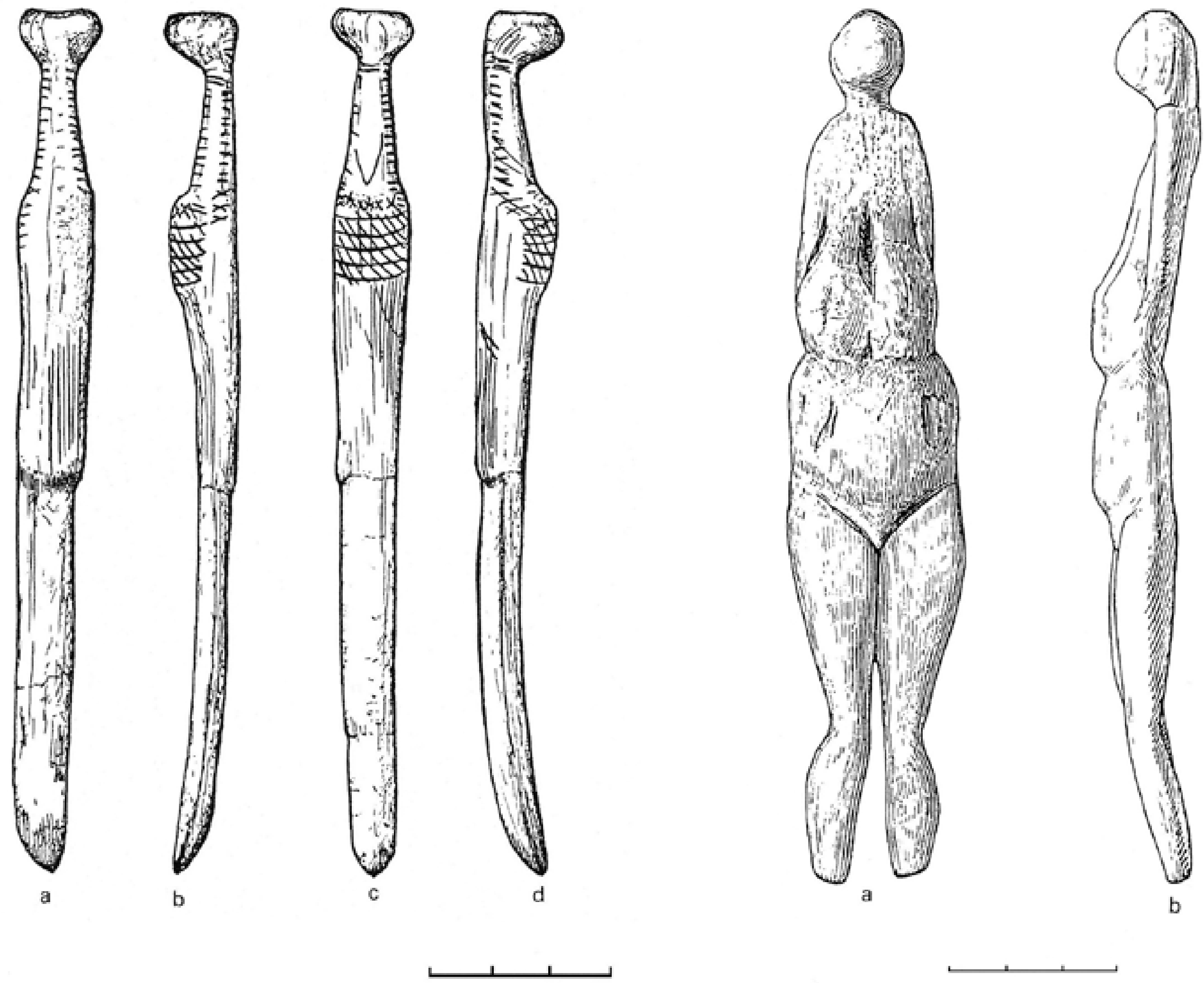
FIGURE 5 Statuette féminine remontée après cassure ancienne en marne calcaire (Kostienki 1/I, st. 2). Photo L. Iakovleva.

Le même concept stylistique se retrouve dans une autre statuette féminine vigoureusement sculptée en marne calcaire et volontairement cassée dans le même habitat. La partie inférieure du corps, restée intacte, de 13,5 cm de hauteur, figure aussi une vénus nue et gravide parée de bracelets et d'un bandeau (Abramova 1995 : 213–214).

La matière osseuse d'animaux d'espèces diverses a servi parfois de supports naturels pour la création sculpturale au Gravettien. Un exemple de transformation stylistique simple, qui suit la forme d'un support osseux, est donné par les deux statuettes anthropomorphes schématiques sculptées en ronde bosse sur des métapodes de mammouth du Gravettien oriental à Avdeevo (Gvosdover 1995 : 185). Une de celles-ci, la figurine anthropomorphe, de 9 cm de hauteur, est une simple modification de la forme naturelle de l'os, difficile à façonner dans le tissu spongieux du métapode, sans avoir eu besoin de préciser le moindre détail. Le même concept a été appliqué, pour la mise en forme de sept figures anthropomorphes fortement schématisées, sur métapodes de mammouth dans l'art gravettien d'Europe centrale à Predmosti en Moravie (Valoch 1996 : 142).

Les représentations féminines et anthropomorphes fortement schématiques, habilement intégrées dans la forme des outils en os et en ivoire (épingles, perçoirs, spatules, outils indéterminés) sont connues à Avdeevo et Kostienki 1/I. Ces outils de forme allongée et pointue ou arrondie à une extrémité, portent un décor sculpté *en ronde bosse* sur le manche, qui évoque une tête anthropomorphique. La position de la tête légèrement penchée en avant ainsi que la courbure du corps fait ressortir la ressemblance certaine de ces outils, ornés de gravures géométriques, avec des statuettes de femmes (Gvosdover 1995). L'un des outils les plus révélateurs à Avdeevo, est une représentation féminine schématique sur une spatule de 15 cm de hauteur, sculptée *en ronde bosse*, avec une tête caractéristique, légèrement penchée en avant. La partie supérieure du corps est allongée et ornée d'un chevron et de courtes stries parallèles transversales droites et croisées. Le ventre est bombé et couvert d'une ornementation géométrique composée de lignes transversales parallèles avec des lignes obliques parallèles superposées. En fait, cette représentation féminine originale sculptée sur le manche de l'outil est complètement tenue (et cachée) en main pendant le travail, ce qui révèle une utilisation particulière (**figure 6**).

FIGURE 6 Spatule avec représentation féminine en ivoire et statuette féminine en ivoire d'Avdeevo (d'après Gvosdover 1995, fig. 96 et 142).



En conclusion, l'imagerie de la femme du Gravettien oriental s'applique dans la sculpture en ronde bosse et se complète et se diversifie dans certains types d'outils en os et en ivoire d'usage domestique particulier (spatule, perçoir, épingle). Les éléments de parure en marne calcaire, de forme ovalaire « vulvaire » avec une perforation, pourraient en faire partie.

3.2 L'imagerie des animaux

La volonté de représenter un animal entier et/ou partiel se révèle dans plusieurs habitats. La statuette de femelle de bison de Zaraysk (cité plus haut) qui représente un animal entier, sculpté en ronde bosse en ivoire de 16,4 cm de longueur et 10,4 cm de hauteur, traduit un naturalisme de représentation rendu aussi bien par le contour général que par les proportions respectées de son corps et par les détails anatomiques sculptés et gravés contribuant à une représentation parfaite d'un animal réel et vivant (**figure 7**). De même, un animal partiel bien vivant représentant une minutieuse tête de lionne de Kostienki 1/I, st.1, de 2 cm de hauteur (cité plus haut), a été exécuté, en marne calcaire, en ronde bosse, avec beaucoup de soin. L'animal est identifié par la face et le profil de la tête, ainsi que par les détails anatomiques des oreilles, des yeux et de la bouche, finement modelés et gravés (**figure 8**). En fait ces deux images animalières réalistes et détaillées révèlent l'intention de représenter un carnivore, notamment une femelle - chasseur, prédatrice puissante (tête de lionne de Kostienki 11/I, st.1) ainsi qu'un grand herbivore paisible, proie potentielle (femelle de bison de Zaraysk).

La nette préférence pour le schématisme s'affirme par contre dans les séries de statuettes zoomorphes entières et partielles qui s'expriment dans la marne calcaire. Ce grand répertoire figuratif traduit la complexité de lecture de ces œuvres fortement schématiques, sculptées en ronde bosse qui, du fait de leur stylisation originale, peuvent être l'objet d'interprétations variées (Abramova 1962, 1995 ; Gvosdover 1995 ; Demeschenko 1999 ; Fradkin 1969 ; Efimenko 1958 ; Iakovleva 2012, 2013).

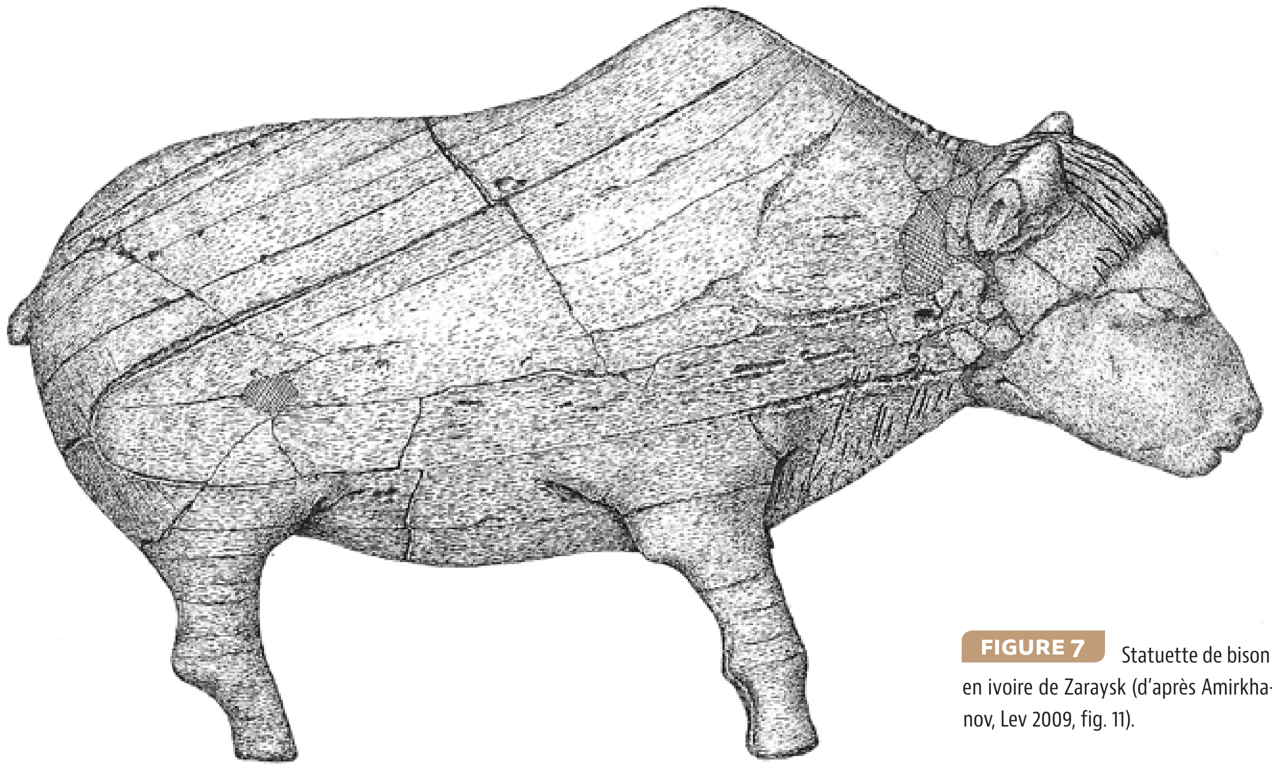
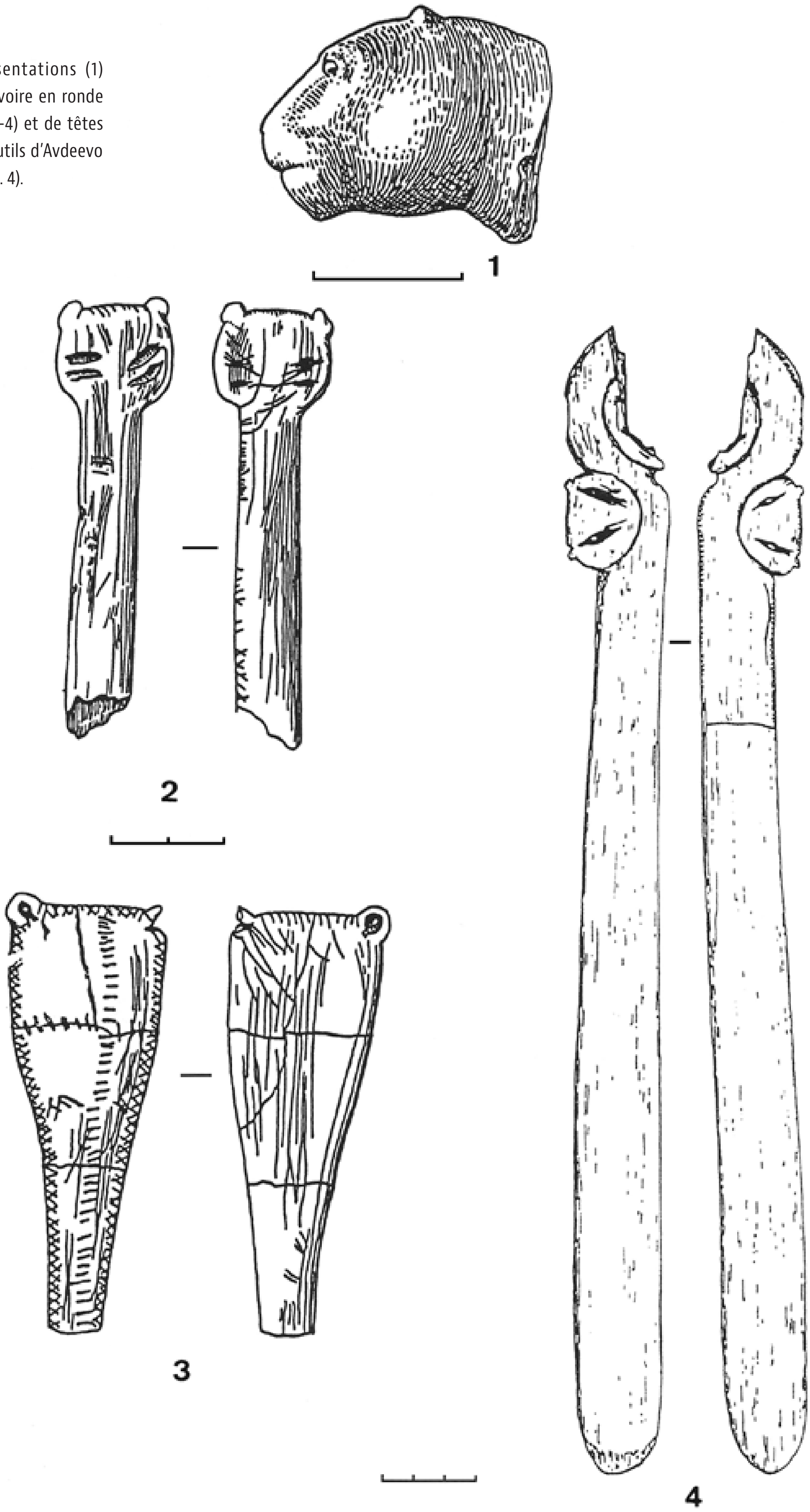


FIGURE 7 Statuette de bison en ivoire de Zaraysk (d'après Amirkhanov, Lev 2009, fig. 11).

FIGURE 8 Représentations (1) d'une tête de lionne en ivoire en ronde bosse de Kostienki 1/I ; (2-4) et de têtes de félidés sur manche d'outils d'Avdeevo (d'après Iakovleva 1999, fig. 4).



Les petites statuettes entières en ronde bosse représentent des animaux, juste évoqués par un contour général sobre avec une touche caractéristique de l'espèce figurée. Cependant ces formes animalières minimalistes, dépourvues de détails anatomiques, offrent des images tout-à-fait originales de mammouths, de rhinocéros à Kostienki 11/II, de mammouths, de bisons et de bœuf musqué à Kostienki 4/I, de mammouths à Kostienki 1/I auxquels on ajoutera les mammouths en grès et en os d'Avdeevo.

La tendance à la schématisation, poussée jusqu'au l'abstraction extrême, empêche l'identification de l'espèce de nombreuses autres figures zoomorphes entières, de petite taille. En effet, malgré ses contraintes impératives, la statuaire animalière schématique éclaire, d'un trait précieux, le mode de présentation des statuettes, posées debout sur leur base aplatie, sur une surface quelconque, où les figurines peuvent être regroupées de différentes façons. En outre, le répertoire animalier est considérablement élargi et enrichi par des séries de têtes zoomorphes schématiques.

Cette sculpture originale, dans plusieurs cas, s'appuie fortement sur les accidents naturels recherchés sur les morceaux de marne calcaire. Le modelage d'une tête est l'art de traduire une préforme naturelle d'origine « zoomorphe » par quelques touches sculptées, pour mettre en évidence un contour avec les détails anatomiques juste esquissés. Dans cette sculpture, l'asymétrie des détails anatomiques par rapport à l'axe nasal de la tête a joué un rôle important. La déformation du museau par l'asymétrie, recherchée et accentuée dans la préforme naturelle, dévoile un procédé artistique particulier, pour aboutir à la liaison entre matière choisie et forme finalisée, qui apparaît lors d'une lecture attentive. La grande série des têtes zoomorphes de Kostienki 1/I est des plus révélatrices de ce mode d'expression originale. La complexité et la particularité du répertoire de têtes zoomorphes se manifeste par la coexistence de figurines d'animaux réels comme le lion, l'ours, le cheval, les oiseaux et de statuettes imaginaires. Parmi ces dernières, il y a les têtes zoomorphes composites, qui évoquent les traits de plusieurs carnivores différents, comme une tête d'ours – lion ou une tête de lion-ours-loup. L'attirance pour les représentations composites se retrouve également dans les têtes anthropozoomorphes, ainsi que dans les têtes de monstres fantastiques. L'observation rapprochée de ces petites têtes sculptées, qui peuvent facilement tourner, se retourner et pivoter entre les mains, sous différents angles, fait apparaître leur originalité.

La schématisation assez ferme et sobre, cette fois, d'un corps animal réalisé dans une matière osseuse spongieuse, se répète, à Avdeevo, avec la statuette de mammouth, de 9,5 cm de longueur, sculptée sommairement en ronde bosse probablement sur un fragment de vertèbre du même animal (Gvosdover 1995 : 124). Le choix de la partie spongieuse de l'os, qui empêche un traitement sculptural précis, n'est pas un hasard, si on compare avec la schématisation semblable de la statuette de mammouth sculptée en grès du même habitat et toutes les autres statuettes de mammouths en marne calcaire du Gravettien oriental, qui nous convainc de l'existence d'une même tradition schématique de la représentation du mammouth sur différentes matières (Iakovleva 2013).

Une autre approche de schématisation originale, d'images zoomorphes et anthropozoomorphes, notamment les têtes sculptées avec la technique de contour découpé sur les manches de longes spatules en côtes de mammouths, se manifeste à Avdeevo, Kostienki 1/I et à Khotylevo 2. (Abramova 1962, 1995 ; Gvosdover 1995 ; Demeschenko 2006 ; Efimenko 1958 ; Iakovleva 2013). Le manche de spatule forme une tête vue de face, très schématisée et variée. Parfois, celle-ci représente seulement le contour de la tête, sans aucune autre précision.

L'autre variante se manifeste par la représentation d'une tête zoomorphe vue de face avec deux petites oreilles dressées (probablement des petits carnivores : félidé, mustélidé).

Plus souvent la tête, avec (ou sans) les deux oreilles, est façonnée avec quatre perforations allongées et/ou incisions profondes, posées en oblique, symétriquement, parallèlement et assemblées par paires, vraisemblablement pour marquer les yeux et les traits du museau schématisés (Avdeevo et Kostienki 1/I). Plusieurs spatules à tête sculptée portent une décoration géométrique, composée de fines stries droites obliques ou croisées, qu'embrasse le contour de la tête en descendant sur les deux bords longitudinaux de la partie supérieure de la spatule et parfois prolongée jusqu'à la moitié de la longueur de la pièce. L'originalité stylistique de ce type d'objets se révèle également par une certaine variabilité du traitement de la tête et par des motifs géométriques gravés différents sur chacune des deux faces de la spatule. Sur quelques pièces, le décor géométrique sur l'une ou l'autre face de la spatule a été complété par des lignes parallèles transversales, gravées sous la tête et parfois se répétant en un ou deux intervalles plus bas. En outre, le motif de chevrons est présent sur plusieurs spatules et des fragments à Avdeevo.

La disposition de motifs géométriques semblables sur plusieurs spatules et sur des statuettes féminines, a conduit à l'hypothèse que ces outils ornés étaient des représentations féminines schématiques à Avdeevo et à Kostienki 1/I (Gvosdover 1985 : 38–39). En fait la complexité et la variabilité de la composition sculpturale et ornementale sur ces spatules à tête révèlent plutôt des représentations anthropozoomorphiques *en contour découpé* où imagerie féminine et imagerie animalière se mêlent et s'imbriquent.

L'autre variante d'une représentation zoomorphique élaborée, mais nettement différente des autres, est à Avdeevo une spatule sur une côte de mammouth, de 37 cm de longueur, sculptée *en contour découpé* à tête de félidé avec des grands yeux allongés et de petites oreilles, qui est localisée sur le côté du manche, pour laisser la place à une autre tête hypothétique semblable mais fracturée. La pièce est ornée de fines stries croisées, qui soulignent le bord du manche sculptée en descendant sur les deux bords longitudinaux de la partie supérieure de spatule (**figure 9**).

La tradition des représentations d'une tête zoomorphe schématique, sculptée *en contour découpé* ou *en ronde bosse* aplatie sur l'extrémité des outils en ivoire (perçoir, épingle) se manifeste dans les habitats d'Avdeevo, de Kostienki 1/I et de Khotylevo 2 (**figure 10**). À cette tradition, s'ajoutent aussi deux perçoirs à tête zoomorphe de Kostienki 11/II.

Au registre zoomorphe, se rattachent aussi les phalanges et les métapodes de renard polaire/renard commun, de loup et de lièvre, ornées de gravures géométriques à Avdeevo (Gvosdover 1985, 1995 ; Abramova 1995). Une imitation d'un métapode sculpté en ivoire en ronde bosse a été trouvée à Zaraysk (Amirkhanov *et al.* 2009 : 206, ill. 27).

La thématique zoomorphe se reflète aussi dans la parure en dents de petits carnivores : loup et renard polaire/renard commun. Les dents de renard polaire/renard commun (canine et plus rarement incisive) percés ou parfois incisés sont les éléments de *parure corporelle ou vestimentaire zoomorphe* les plus caractéristiques du Gravettien oriental (Zaraysk, Avdeevo, Kostienki 1/I, Kostienki 13, Kostienki 4/I, Gagarino, Khotylevo 2).

FIGURE 9 Manche à tête de félidé sur une spatule en côte de mammouth d'Avdeevo (détail). Photo L. Iakovleva.

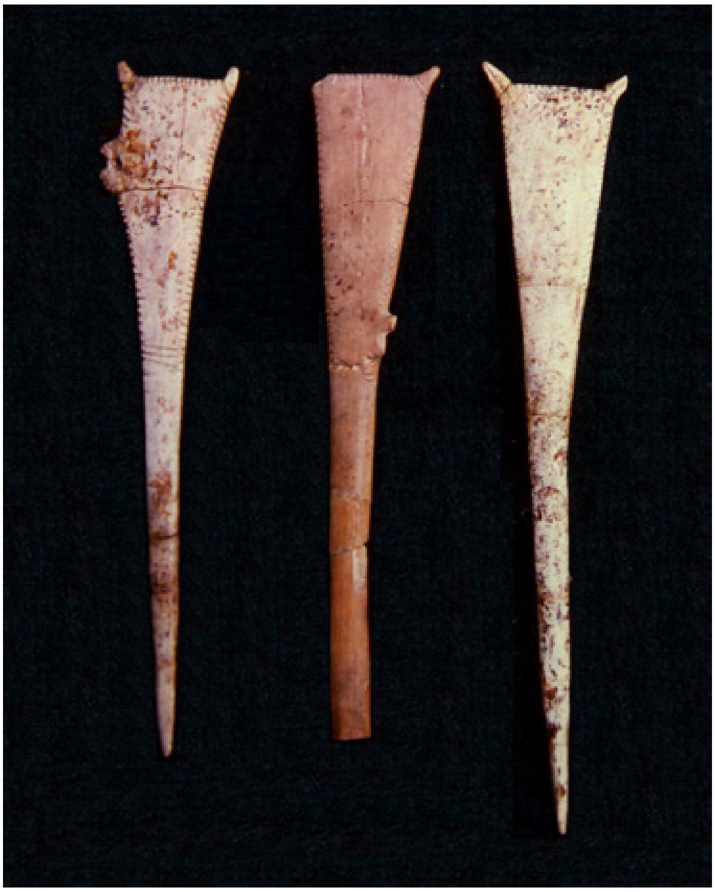


FIGURE 10 Outils à tête zoomorphe en ivoire d'Avdeevo st. 2. Photo L. Iakovleva.

La variabilité cet élément de parure, d'une signification particulière, se traduit par une petite série de parure en dents de renard polaire, qui ont été façonnées en forme de griffe « *claw – shaped pieces* » et aussi imitées en ivoire à Avdeevo (Gvosdover 1995 : 86–87). Une dent de renard polaire de forme semblable a été trouvée à Zaraysk (Amirkhanov *et al.* 2009 : 205, ill. 25).

Le mode d'utilisation des dents de renard polaire comme des éléments homogènes composant une même parure corporelle a été nettement révélé par un collier constitué de 45 dents percées de ce petite carnivore, trouvées sur le sol d'habitat à Avdeevo (Gvosdover 1995 : 84), ainsi que par l'assemblage de 34 dents du même animal trouvé dans une fosse à Zaraysk (Trousov & Jitinev 2008).

Enfin l'imagerie animalière du Gravettien oriental illustre la volonté de marquage zoomorphe des trois principales catégories d'objets de fonctions diverses : la sculpture (ivoire/marne calcaire), les outils en os d'usage domestique particulier (spatule, perçoir, épingle), les éléments de parure en dents de carnivore (loup et plus fréquemment renard polaire/renard commun).

4 CONCLUSION

Les manifestations artistiques des sites d'habitat résidentiel du Gravettien oriental, tout d'abord, révèlent l'attirance particulière pour la sculpture mobilière *en ronde bosse* façonnée en ivoire et en marne calcaire. La diversité stylistique des formes réalistes et schématiques des statuettes féminines et des statuettes animales montre l'épanouissement d'un art figuratif sculpté, qui a ses propres traditions culturelles.

L'autre trait caractéristique des manifestations artistiques est donné par le décor figuratif et ornemental qui enrichit certains types d'outils dont l'usage liée à un aménagement architectural et à l'entretien de l'habitat en ossements de mammouths, ainsi qu'aux divers travaux domestiques. En effet le choix répétitif de types d'objets décorés indique un marquage symbolique dans le fonctionnement de l'habitat. La complexité de ce marquage se manifeste dans l'ornementation géométrique variée, simple ou complexe, qui est gravé sur des objets utilitaires, sur des parures, sur des statuettes ainsi que sur des défenses et des os. La caractéristique des mêmes types de motifs géométriques décorant des statuettes féminines, certains types d'outils d'usage sélectionné (spatule, perçoir, épingle) et des objets de parure (bracelet, diadème) révèle probablement une sorte de marquage de nature socio –symbolique de ces objets aux fonctions multiples, qui est la notation d'un système artistique codé mis en œuvre dans l'habitat.

Enfin la richesse, la variabilité et l'originalité des représentations féminines et des représentations zoomorphes de l'art mobilier du Gravettien oriental illustrent et confirment les concepts d'idéologie universelle des chasseurs cueilleurs du Paléolithique supérieur où la société humaine, pour se représenter elle–même, s'enracine fortement dans l'environnement des animaux sauvages et où l'imagerie féminine et l'imagerie animalière se mêlent et s'imbriquent.

BIBLIOGRAPHIE

ABRAMOVA Z.A. (1962) – *L'art paléolithique sur le territoire d'URSS*. Corpus des Sources archéologiques A 4–3 (en russe).

ABRAMOVA Z.A. (1995) – *L'art paléolithique d'Europe orientale et de Sibérie*. Grenoble, Jérôme Million.

AMIRKHANOV H.A. ED. (2009) – *Les recherches paléolithiques à Zaraysk* 1999–2005. Moscou, Paleograph Press (en russe).

DEMESCHENKO S.A. (1993) – Les nouvelles représentations sculptées des animaux de la collection du site d'Alexandrovka (Kostienki 4). *Archéologie russe* 3 : 214–217 (en russe).

DEMESCHENKO S.A. (1999) – L'image de l'ours dans l'art paléolithique européen. *Revue archéologique du musée de l'Hermitage* 34 : 7–29 (en russe).

DEMESCHENKO S.A. (2006) – Les caractéristiques de l'ornementation de la culture de Kostienki – Avdeevo. *Archéologie russe* 1 : 5–16 (en russe).

EFIMENKO P.P. (1958) – *Kostienki 1*. Moscou – Leningrad, Nauka (en russe).

FRADKIN E.E. (1969) – La sculpture poly-iconique de Kostienki 1 (d'après le matériel des fouilles de P.P. Efimenko de 1931 – 1936). *Ethnographie soviétique* 1 : 135–142 (en russe).

GAVRILOV K.N. (2012) – New female figurines from the site Khotylevo : 2. Actes du Congrès IFRAO, Tarascon-sur-Ariège, septembre 2010. Dans : J. Clottes (dir.) (2010–2011), *L'art préhistorique dans le monde*. Préhistoire, Art et Sociétés 65–66 : 1291–1297.

GVOSDOVER M.D. (1993) – Les ossements façonnés du nouveau site d'habitat paléolithique supérieur d'Avdeevo (fouilles 1982–1988). *Anthropologie et Histoire de la Culture*, p. 29–59 (en russe).

GVOSDOVER M.D. (1995) – *Art of the Mammoth Hunters the Finds from Avdeevo*. Oxford, Oxbow Monograph 49.

IAKOVLEVA L.A. (1999) – L'art dans les habitats du paléolithique supérieur d'Europe orientale. *L'Anthropologie* 103(1) : 93–120.

IAKOVLEVA L. (2000) – The Gravettian art of Eastern Europe as exemplified in the figurative art of Kostienki 1. In : W. Roebroeks, M. Mussi, J. Svoboda & K. Fennema (eds), *Hunters of the Golden Age : The Mid Upper Palaeolithic of Eurasia 30 000 – 20 000 BP*. Leiden, Analecta Praehistorica Leidensia 31 : 125–134.

IAKOVLEVA L. (2009) – De l'art mobilier au système socio-symbolique dans le Paléolithique supérieur ancien et moyen d'Europe orientale. Dans : F. Djindjian & L. Oosterbeek (eds), *Espaces symboliques dans l'art préhistorique*, BAR International Series 40 : 21–32.

IAKOVLEVA L. (2012) – Les manifestations artistiques, un vecteur de la connaissance socio - culturelle des sociétés du Paléolithique supérieur. Actes du Congrès IFRAO, Tarascon-sur-Ariège, septembre 2010. Dans : J. Clottes (dir.) (2010–2011), *L'art préhistorique dans le monde*. Préhistoire, Art et Sociétés 65–66 : 314–315.

IAKOVLEVA L. (2013) – L'art mobilier du Gravettien : *les Gravettiens.* Sous la direction de M. Otte. Paris, Errance, p. 236–270.

KHLOPATCHEV G.A. (2006) – *Les industries des ivoires du paléolithique supérieur de l'Europe orientale.* Saint-Pétersbourg. Nauka (en russe).

PRASLOV N.D. (1985) – L'art du paléolithique supérieur à l'Est de l'Europe. *L'Anthropologie* 89(2) : 181–192.

PRASLOV N.D. & ROGATCHËV A.N., EDS. (1982) – *Le Paléolithique de la région de Kostienki–Borschevo sur le Don, 1879–1979*. Leningrad, Nauka (en russe).

ROGATCHEV A.N. (1962) – Les sculptures schématiques d'animaux de Kostienki (Anosovka II). Dans : Z.A. Abramova (1962), *L'art paléolithique sur le territoire d'URSS*, p. 78–80 (en russe).

ROGATCHEV A.N. & BELIAEVA V.I. (1982) – Kostienki 13 (le site de Kelsiev). Dans : N.D. Praslov & A.N. Rogatchëv, *Le Paléolithique de la région de Kostienki –Borschevo sur le Don, 1879–1979*, Leningrad, Nauka, p. 140–145 (en russe).

SINITSYN A.A. (2012) – Figurative and decorative art Kostienki : Chronological and cultural differentiation. Actes du Congrès de l'IFRAO, Tarascon- sur-Ariège, septembre 2010 – L'art pléistocène dans le monde. Dans : J. Clottes (dir.) (2010–2011), *L'art préhistorique dans le monde*, Préhistoire, Art et Sociétés 65–66 : 1339–1359.

TARASSOV L.M. (1979) – *Le site de Gagarino et sa place dans le Paléolithique européen.* Léningrad, Nauka (en russe).

TROUSOV A.V. & JITINEV V.C. (2008) – Le collier des dents de renard polaire du site de Zaraysk. *Homme. Adaptation. Culture*, p. 427–234 (en russe).

VALOCH K. (1996) – *Le Paléolithique en Tchéquie et en Slovaquie*. Grenoble, Jérôme Million.

ZAMIATNINE S.N. (1934) – *La station aurignacienne de Gagarino*, Moscou – Léningrad (en russe).

ZAVERNIAEV F.M. (1978) – La sculpture anthropomorphe du site Paléolithique supérieur de Khotylevo. *Archéologie soviétique* 4 : 145–161 (en russe).

Relationships between recent Magdalenian societies in Cantabrian Spain, through the technical and formal analysis of frontal representations of ibex

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Abstract: In connection with the question of mobility and contacts between Magdalenian societies, this paper presents the preliminary results of a review of one of the classic themes in late Magdalenian art: the representations of zoomorphs, particularly ibex, viewed from the front, found essentially in portable art. These motifs are known in both Cantabrian Spain and southern France, and in archaeological literature are often regarded as evidence of long-distance relationships between Magdalenian groups. The direct analysis of practically all the known examples in Cantabrian Spain has provided a more precise knowledge of the theme at technical and formal levels, and has introduced the technological approach for the first time in northern Spain. The study of the artistic record, from the *chaîne opératoire* viewpoint, has succeeded in identifying and ordering the sequence of movements followed in the process of producing the images. The technical and formal choices made by the artists reflect cultural traditions. The identification and comparison of these traditions in a certain geographical area can determine whether or not the same tradition was shared by different groups and is therefore a way to know the mobility and degree of interaction among Magdalenian societies. The homogeneity seen in the sequence of actions producing the representations of ibex seems to indicate that the artists in Cantabrian Spain shared the same *savoir-faire*, and the little information currently available about this type of representation on the other side of the Pyrenees is in harmony with the results from Spain. However, greater variability is seen from the formal point of view, and the significance of this is hard to determine in the light of the present data.

1 INTRODUCTION

It is now some decades since the search for the relationship between *static* and *dynamic* led to the proponents of *New Archaeology* undertaking actualist studies, such as ethnoarchaeological research. This allowed them, in L. Binford's words (1988:121) to overcome – at least from a theoretical point of view – the "sedentary view of the world" that had reigned in research on Palaeolithic societies until then.

We know now that, in general, hunter societies operate over wide territories and this mobility obviously hinders any attempt to understand Palaeolithic sites in isolation. They gain meaning and can be interpreted in their local and regional context. A site provides information about itself, but also about its regional context; the integration of data of different kinds enables a characterisation of the activities carried out at a certain place, which makes it possible to propose hypotheses about the existence of other locations where different, perhaps complementary activities were carried out.

Therefore, studies at a regional scale are especially relevant (Menéndez 2012:13–14), although such an approach is not without its problems – for example, the issue of the synchronicity of the sites. However, if high-quality information is obtained from the Palaeolithic record, that is to say, if the social acts that produced the archaeological remains can be determined, significant hypotheses can be put forward about mobility and the way a society managed its territory. Such a preliminary proposal, based on the study of a single site, can be tested by examining all the sites known within a certain geographical area. Only in this way can a model of the population dynamics in a given area of study be established (Fano & Rivero 2012).

In the case of research on Magdalenian societies in Cantabrian Spain, the question of mobility is not new (see, for example, González Sainz 1989; Moure 1994; Utrilla 1994; Corchón 1995). However, perhaps it has been regarded as one more aspect of research, when in reality it is an issue that should be taken into account in any field of study about these groups, due to their nomadic nature.

In recent years, several studies have highlighted the topics of territories and the mobility of Magdalenian societies in northern Spain, with a clear interest in long-distance relationships (Corchón *et al.* 2012; Fritz *et al.* 2007; Sauvet *et al.* 2008). At the same time, other studies have considered mobility over shorter distances, as has been attempted for the drainage basins of the Rivers Sella and Asón, in Asturias and Cantabria respectively (Menéndez 2003; Menéndez *et al.* 2005; García Moreno & Fano 2011).

The significance of long-distance relationships, like those that have been proven with groups in the Pyrenees and south-west France, currently seem difficult to apprehend, although more and better information is gradually coming available about the circulation of goods, such as flint and personal adornments, or ideas related to graphic activity or technical processes. One of the keys to further advances in this matter is the need to pay greater attention to short-distance movements, within what Gamble (2001) called the landscape of habit, the space in which the routines of life in society were performed, in contrast with the social landscape, which is the territory over which long-distance relationships were maintained. It will be difficult to understand long-range interaction if the relationship of sites with their immediate surroundings are not known.

As mentioned above, both parietal and portable art have played a major role in reflections on the mobility of Magdalenian societies. Analogies, both in the themes and in the formal and technical characterisation, have often been used as the basis for such reflections (Fritz *et al.* 2007; Sauvet *et al.* 2008). However, unlike in France, in Cantabria Spain the technological approach has only recently been applied to art studies (Rivero 2007, 2011) and therefore, in general, the comparative analysis of the representations has not gone beyond stylistic aspects.

Zoomorphic figures, mainly ibex, depicted from the front, a classic theme found mostly in Late Magdalenian portable art, are a good example of this situation. These are motifs found in both Cantabrian Spain and southern France, and often regarded in archaeological literature as evidence of long-distance relationships. In the case of the French record, in addition to the inventory drawn up by S. Tymula (1991), a microscopic study of five examples from La Vache (Ariège) revealed the same technical scheme (Fritz 1999). In contrast, in northern Spain, the studies of these motifs have included few technological observations.

As a result, this kind of motif loses much of its potential to inform about mobility and contacts between the societies who produced this type of graphic expression. The study of the artistic record from the chaîne opératoire point of view enables, among other aspects, the identification and sequencing of the actions made to produce the decorative elements, which, together with stylistic analogies, favours an approach to the recognition of a single (or different) “cultural identity” in the records being studied (Fritz 1999; Rivero 2012).

2 OBJECTIVES

A project is currently focused on studying zoomorphs depicted frontally, with two objectives. In the first place, a more detailed understanding of this theme, which appears on a large number of portable objects and in a small number of parietal contexts, will be obtained. The exhaustive catalogues of I. Barandiarán (1973) and M.S. Corchón (1986) are still vital for information about the theme in its portable version. However, the increase in the corpus of representations since the 1980s advises the updating of the catalogue, while the new study techniques permit more precise readings of the engraved or painted figures (González Sainz *et al.* 1985). At the same time, as noted above, the introduction of the technological approach to the study of this type of representations signifies a qualitative leap in the understanding of the theme.

This greater precision enables the second basic objective of the project: to achieve, by the direct study of the materials, a more critical view to what these figures can contribute towards understanding the long and short-range mobility of Late Magdalenian societies, as commented in the previous section. In this way, a more precise assessment can be made about the variability/homogeneity of the theme – at formal, stylistic and technical levels – along the northern Spanish coast. These observations should be completed, in a later stage of the project, with the direct study of the figures documented in southern France.

This paper aims to present some of the interim results of the project in connection with the two objectives explained above. Thus, first, the corpus of motifs that has been analysed will be described, and the methodologies employed to analyse the portable and parietal depictions. This study reveals clear variability within the theme, in this case of the ibex figures, which are the representations being studied here. Second, some preliminary data will be presented about the nature of this variability along the Cantabrian coast.

3 MATERIALS AND METHODS

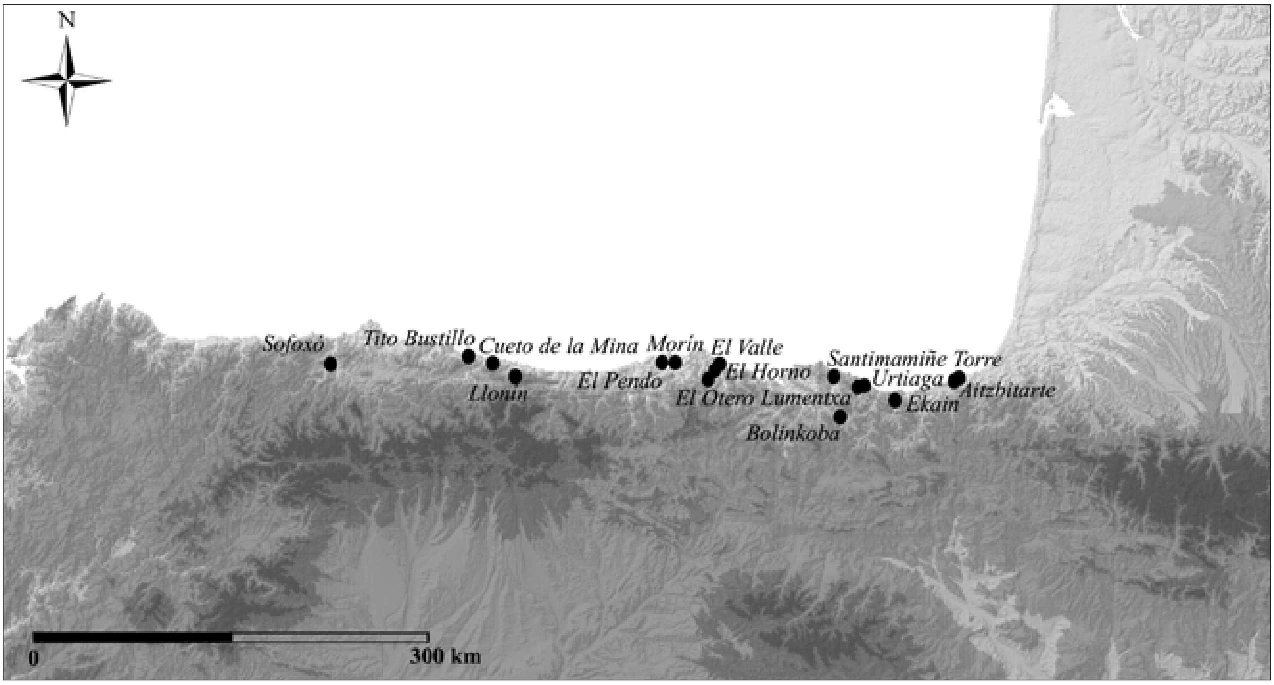
The corpus being studied includes a total of 16 archaeological sites and 50 figures, both parietal and portable, which for the Cantabrian record is a practically exhaustive review of the objects and walls decorated with ibex depicted from the front, according to the latest inventories (Utrilla & Mazo 1996; Barandiarán 1994; González Sainz 1993) (**figures 1** and **2**). The only examples not included in this direct re-study of these figures are from La Paloma in Asturias (a figure on a spear point), and from Abauntz in Navarre, a site in the Pyrenean foothills but whose archaeological record exhibits clear links with Cantabrian Spain (two cobble-stones with over 25 motifs, *cf.* Utrilla *et al.* 2009).

The review of the corpus of representations found that the morphological criteria used to identify this type of figure needed to be restricted. It has traditionally been thought that frontally-viewed ibex form a homogeneous group, in which the main characteristic is the simplified representation of the elements by which an ibex can be recognised from the front, mainly the horns, although other elements like the body and head might be present. However, as the figures became increasingly schematic, some of these elements were omitted, resulting in a series of V-shaped lines that are occasionally hard to assimilate with a figure of an ibex.

To seek a solution to this problem and refine the corpus of study as much as possible, some minimum criteria were fixed to be able to define a motif as an ibex viewed from the front. Hence, from the morphological point of view, a representation of this kind should possess three essential elements: horns, ears and head, although the latter may sometimes be omitted if it is represented together with the body, as two long parallel lines.

These criteria have made it possible to distinguish, among the ibex viewed frontally published in the literature, several representations that cannot be assimilated with the type and are better interpreted as a series of angles.

FIGURE 1 Location in Cantabrian Spain of the sites with frontal ibex depictions that have been studied (portable art: Sofoxó, Tito Bustillo, Cueto de la Mina, Llonín, El Pendo, Morín, El Valle, El Horno, Lumentxa, Bolinkoba, Santimamiñe, Urtiaga, Ekain, Torre, and Aitzbitarte; parietal art: El Otero and Ekain).



SITE	NUMBER OF FIGURES ANALYSED	NUMBER OF OBJECTS
Sofoxó	1	1
Tito Bustillo	2	1
Cueto de la Mina	3	2
Llonín	4	1
El Pendo	12	9
Morín	1	1
El Valle	3	2
El Horno	2	1
Santimamiñe	1	1
Bolinkoba	2	1
Lumentxa	1	1
Urtiaga	8	3
Ekain	1	1
Torre	2	1
Aitzbitarte	1	1
TOTAL	44	27

FIGURE 2 Sites with portable art that have been studied, with the number of figures analysed and the number of objects they are represented on. In the case of parietal art, five motifs have been studied in Ekain Cave, and one in El Otero Cave.

Thus, out of the total number of figures studied, 32 % of them have been omitted. They include motifs such as those depicted on spear points from Bolinkoba and Santimamiñe which, additionally, share the characteristic of not belonging to the chronological period generally attributed to this type of figure (Late Magdalenian) (**figure 3**). At the same time, the revision *in situ* of all the accessible parietal figures has succeeded in identifying examples that had not been recognised until then, such as a painted ibex in Cueva de Ekain (vid *infra*) (Fano *et al.* 2012).

The engraved figures on portable objects that were maintained in the corpus have been studied microscopically in order to determine the order in which the lines were carved and the direction of the movement. These parameters can determine the technical method used to depict a figure, and can therefore be used to compare different figures. This methodology follows the principles of *chaîne opératoire* analysis, as first defined by Leroi-Gourhan (1964, 1965) and later adapted to the study of the archaeological record in general (Pelegrin *et al.* 1988) and portable art in particular by F. D'Errico (1994) and C. Fritz (1999).

For the microscopic analysis of the figures a Leica S8APO stereo microscope, a Leica DM2500 microscope, a Nikon SMZ800 stereo microscope and a Dino-Lite AD–7013MZT handheld microscope were used, in all cases with built-in image capture systems.

In the case of parietal depictions, the study was conditioned by their state of conservation and the limited analytical possibilities of the paintings as regards the individualisation, order in which the lines were painted and movement direction.

The reconstruction of the sequence of actions is a way to identify a society's *savoir-faire* regarding its artistic production. The technical and formal choices made by the artists reflect their cultural traditions. The study and comparison of these traditions within a given geographical area can determine whether or not the same tradition was shared by different groups and it therefore becomes a way to know their mobility and the degree of interaction between them.

4 SOME PRELIMINARY RESULTS OF THE STUDY

The direct study of the objects has, in the first place, succeeded in renewing the existing documentation about these motifs. This involved a detailed formal and technical description, macro- and microphotographic studies and drawings of the figures, including aspects such as the representation of relief and the characteristics of the objects and the incisions. In some cases, such as the bone from Torre Cave and other cylindrical objects, photomontages could be assembled to see the whole object in a single image, with the consequent advantages for understanding the decoration (**figure 4**).

As stated above, some of the figures that were studied had to be eliminated as they did not meet the requirements corresponding to a frontal representation of an ibex. Out of the total of 44 engraved figures on portable objects, only 30 were retained in the corpus. In contrast, as well as the parietal engraving in El Otero Cave and the four paintings in Ekain Cave, an additional fifth painted ibex was identified in the latter cave.

FIGURE 3 Some examples of representations that have been excluded from the corpus of frontally viewed ibex: a. Lumentxa; b. Santimamiñe; c. Bolinkoba (detail, 10x).

The microscopic analysis of the portable representations has been able to obtain information about movement directions in 66 % of the objects, and about the order in which the incisions were made in 36 % cases. Out of these representations that have provided information about the engraving technique, the similarities are very marked. In 85 % of the objects, the direction followed to make the incisions was the same: downwards for the lines forming the horns, head and ears. Fewer figures provide information about the order of execution, as the lines do not always cross each other. However, in these cases, the same uniformity can be seen (90 %) (**figure 5**).

The homogeneity seen in the sequence of engraving is not a response, as might at first be thought, to the relative simplicity of the figures. From the technical and formal viewpoint, the frontal ibex representations are quite variable, from simple representations formed by incisions produced with a single movement of the cutting tool, to figures of greater technical (dissymmetrical V-section incisions, relief) and formal complexity (presence of such attributes as the coat and roughness of the horns, *etc.*) (**figure 6**). However, the technical methods are the same in nearly all the examples that have been studied. In addition, in some cases like the second ibex on the bone from Torre and the spear point from Cueto de la Mina, the direction of the engraving is inverse, or upwards, but this seems to be the consequence of the position of the object in the hand: the engraving direction was the same, but the object was inverted.

It is more difficult to analyse the parietal figures (**figure 7**), due to the problems with individualising the lines and determining the order in which they were executed, especially in the case of paintings. However, a technological study was possible for three painted ibex in Ekain Cave and the engraving in El Otero Cave. In all these cases, the figures were constructed following the same downwards procedure from the upper part of the figure, the horns, to the lower part, either head or body, depending on the anatomical parts represented in each example. However, this is a very small sample, insufficient for any statistical treatment.

These technological observations, displaying clear homogeneity in the sequence in which the figures were produced, mean that it can be proposed that the artists who carried out this type of motifs shared the same *savoir-faire*. Indeed, the available information about the French record (from La Vache) suggests the same hypothesis (Fritz 1999:153).

FIGURE 4 Photographic montage with 10x micrographs of the engraved bird bone from Torre (Gipuzkoa).

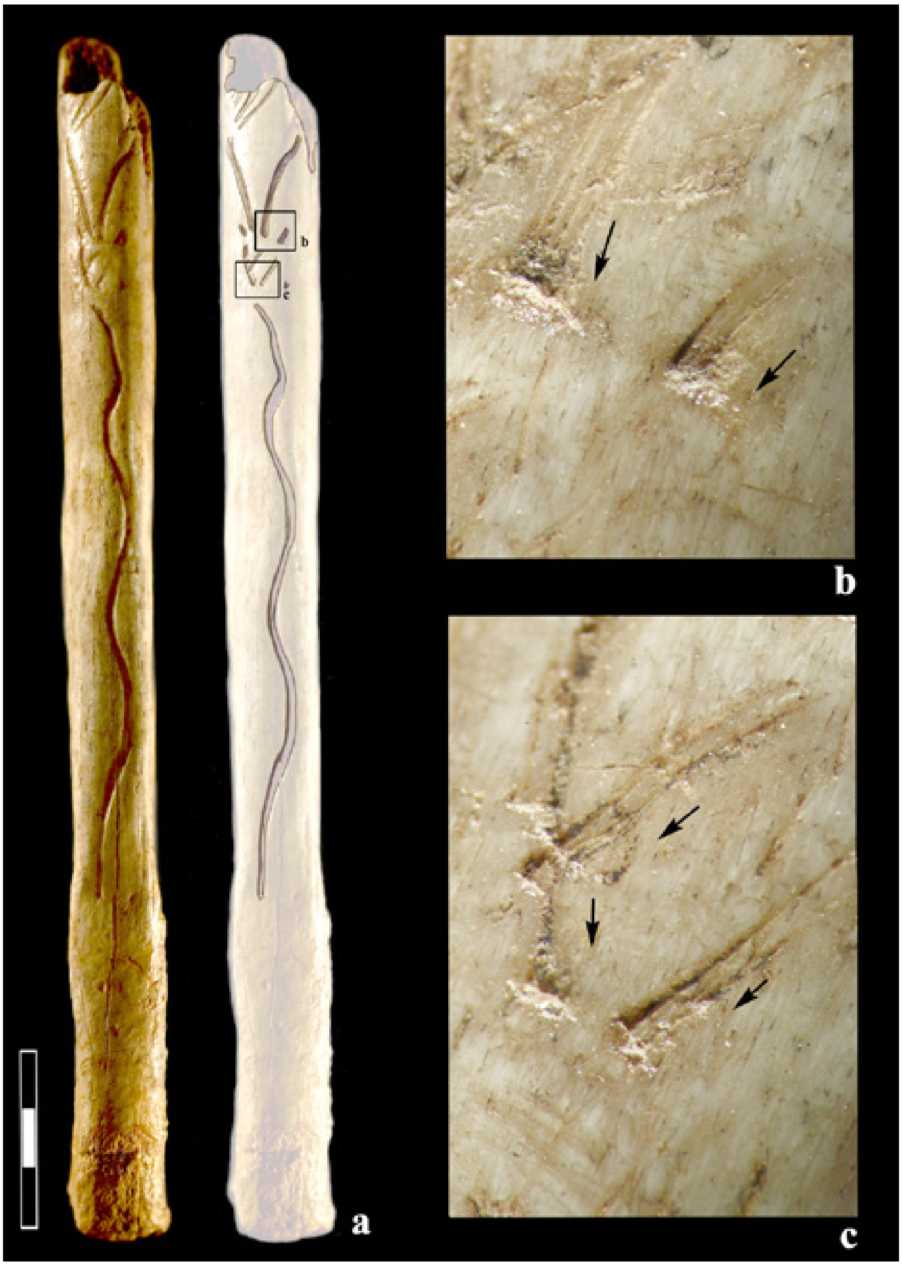


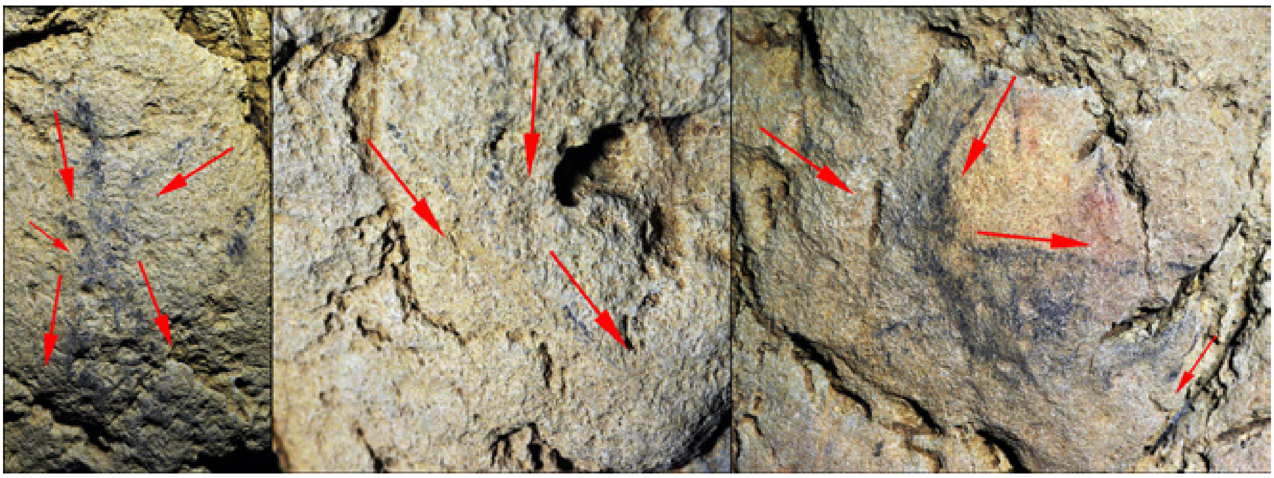
FIGURE 5 Engraved rib from El Pendo (Cantabria) with a frontal view of an ibex: a. Photomontage and tracing of the engravings; b. Lines of the horn and ear, engraved downwards (10x); c. Lines of the head drawn in the same direction (10x).

As one of the present authors has noted in connection with the Middle Magdalenian artistic record (Rivero 2011), the common technical patterns could be associated with the existence of systems for learning and transmitting knowledge within Magdalenian societies. At the same time, the convergence at a technical level that has been observed takes the discussion about stylistic aspects a step further, by introducing new data of interest in assessing the nature of long distance contacts in the Late Magdalenian.

Similarly, the formal variability observed through the direct study of the material could also contribute towards that more critical outlook being sought, from the perspective of art studies, on the contacts and mobility of Magdalenian groups. This formal heterogeneity is clearly seen, for example, in the different angles between the two horns, the presence of such attributes as the roughness of the horns, whether or not the head and its internal lines are depicted, the beard, and the varying degrees of representation and schematisation of the body (in profile, as a sinuous line, or two parallel lines as a prolongation of the head, and so on).

FIGURE 6 Some examples of frontally viewed ibex showing the technical and formal variability of this kind of figure: a. Pressure flaker from Urtiaga and detail of the ibex (10x); b. Rib from Llonín and details of the ibex on the reverse side (10x); c. Chisel from El Valle; d. Perforated baton from El Pendo; e. Chisel from Tito Bustillo; f. Perforated baton from El Pendo.

FIGURE 7 Order in which the three black ibex were painted in Ekain.



These interim observations have not detected any pattern of variability along the northern Spanish coast, in the form of regional peculiarities. While the simplest variation, consisting solely of horns engraved with a single line, ears and face or body, is the most widespread, no models are unique to a certain area or site. However, most of the sites have yielded a single representation of this kind, or a single object decorated with frontally-viewed ibex (see **figure 2**), and this makes it difficult to determine intra-regional differences. *A priori*, all the evidence suggests that, just like the technical methods, the formal characteristics of the theme, as diverse as they were, were shared along the Cantabrian coast, and the use of one or another appears to have been the artist's choice. However, the direct study of a large number of representations documented in the south of France will provide a more precise view of these aspects, as well as allowing the introduction of statistical tests, due to the considerable increase in the number of examples. In this way, hypotheses can be tested and possible specific formal models in the representation of frontally-viewed ibex might be compared.

5 CONCLUSION

For some time, art has been offered as conclusive proof of the mobility of Magdalenian societies. This study has shown that research into the *savoir-faire* of Late Palaeolithic artists can contribute a more critical approach to the nature of contacts among Magdalenian groups. After many decades of reflections based on formal and stylistic observation, the introduction of the technological approach to the study of art, which is a novelty in northern Spain, provides another element for discussion within research on a decidedly complex matter. The example presented here, focusing on the representations of ibex as seen from the front, reveals that the absence of technological observations reduces the potential of art as a source of information about the contacts among Magdalenian hunter societies. Thus, the homogeneity seen in the sequence of movements followed to depict the ibex seems to suggest that the artists in Cantabrian Spain shared the same *savoir-faire*; and the available information does not indicate any great differences on the other side of the Pyrenees. However, from the formal point of view, greater variability can be recognised and it is difficult to determine the significance of this in the light of the present data. To analyse these aspects in greater depth, it is necessary to widen the technical study to the French record, or extend the analysis to other similar themes, such as the representations of red deer stags viewed from the front. The technical and formal analysis of these representations, their thematic associations and the type of objects decorated will obtain complementary data to the present study. It is evident that a full study of single theme, such as frontally-viewed zoomorphs, can only attain moderate progress in our understanding of the mobility of Magdalenian groups, in comparison with aspects mentioned in the introduction, such as the question of short-distance mobility, which is hard to address when most of the sites possess a single representation or decorated object. However, there is little doubt that it is a research strategy that may make interesting advances in the understanding of one of the most significant cultural traits of Magdalenian societies.

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REFERENCES

BARANDIARAN I. (1973) – *Arte mueble del Paleolítico cantábrico*. Zaragoza, Universidad de Zaragoza.

BARANDIARÁN I. (1994) – El Arte mueble del Paleolítico Cantábrico. Una visión de síntesis en 1994. In : T. Chapa & M. Menéndez (eds.), *Arte Paleolítico*, Complutum 5 : 45–79.

BINFORD L. (1988) – *En busca del pasado.* Barcelona, Crítica.

CORCHÓN Mª S. (1986) – *El Arte Mueble Paleolítico Cantábrico. Contexto y análisis interno*. Madrid, Ministerio de Cultura.

CORCHÓN Mª S. (1995) – El Magdaleniense Medio. Nuevos datos sobre la ocupación de la Cornisa Cantábrica entre el 14 000–13 000 BP. In : A. Moure (ed.), *Elefantes, ciervos y ovicaprinos : economía y aprovechamiento del medio en la Prehistoria de España y Portugal*. Santander, Servicio de Publicaciones de la Universidad de Cantabria, p. 119–158.

CORCHÓN Mª S., ÁLVAREZ-FERNÁNDEZ E. & RIVERO O. (2012) – Contactos extra-cantábricos en el Magdaleniense medio : nuevos datos de la Cueva de Las Caldas (Oviedo, Asturias). In : P. Arias *et al.* (eds.), *El Paleolítico Superior Cantábrico. Actas de la Primera Mesa Redonda. San Román de Candamo (Asturias), 26–28 de abril de 2007*. Santander, Universidad de Cantabria, p. 113–127.

D'ERRICO F. (1994) – *L'Art gravé azilien. De la technique à la signification*. Gallia Préhistoire, supplément XXXI, Paris, CNRS.

FANO M.A. & RIVERO O. (2012) – El territorio y la movilidad de los cazadores del final del Paleolítico : algunas reflexiones metodológicas. In : P. Arias *et al.* (eds.), *El Paleolítico Superior Cantábrico. Actas de la Primera Mesa Redonda. San Román de Candamo (Asturias), 26–28 de abril de 2007*. Santander, Universidad de Cantabria, p. 207–216.

FANO M.A., RIVERO O. & GÁRATE D. (2012) – Cueva de Ekain. Revisión arte paleolítico. I Campaña. *Arkeoikuska* 2011 : 399–341.

FRITZ C. (1999) – *La gravure dans l'art mobilier magdalénien, du geste à la représentation*. Paris, Maison des Sciences de l'Homme.

FRITZ C., TOSELLO G. & SAUVET G. (2007) – Groupes ethniques, territoires, échanges : la « notion de frontière » dans l'art magdalénien. Dans : N. Cazals, J.E. González Urquijo & X. Terradas (coord.), *Frontières naturelles et frontières culturelles dans les Pyrénées Préhistoriques*. Santander, Universidad de Cantabria, p. 165–181.

GAMBLE C. (2001) – *Las sociedades paleolíticas de Europa*. Ariel Prehistoria, Barcelona.

GARCÍA A. & FANO M.A. (2011) – Los sitios paleolíticos en su paisaje : la cueva de El Horno en el contexto de la cuenca del Asón (Cantabria). *Zephyrus* 67 : 15–26.

GONZÁLEZ SAINZ C. (1989) – *El Magdaleniense Superior-Final de la región cantábrica.* Universidad de Cantabria-Tantín, Santander.

GONZÁLEZ SAINZ C. (1993) – En torno a los paralelos entre el arte mobiliar y el Rupestre. *Veleia* 10 : 39–56.

GONZÁLEZ SAINZ C., MUÑOZ E. & SAN MIGUEL C. (1985) – Los grabados rupestres paleolíticos del Otero (Secadura, Cantabria). *Sautuola* 4 : 155–164.

LEROI-GOURHAN A. (1964) – *Le geste et la parole* : I. *Technique et langage*. Albin Michel, Paris.

LEROI-GOURHAN A. (1965) – *Le geste et la parole* : II. *La mémoire et les rythmes*. Albin Michel, Paris.

MENÉNDEZ FERNÁNDEZ M. (2003) – Arte prehistórico y territorialidad en la cuenca del río Sella. In : R. Balbín & P. Bueno (eds.), *Arte Prehistórico desde los inicios del siglo XXI. Primer Symposium Internacional de Arte Prehistórico de Ribadesella*. Asociación Cultural Amigos de Ribadesella, Ribadesella, p. 185–200.

MENÉNDEZ M., GARCÍA E. & QUESADA J.M. (2005) – Magdaleniense inferior y territorialidad en la Cueva de la Güelga (Asturias). In : N. Ferreira Bicho (ed.), *O Paleolítico. Actas do IV Congresso de Arqueologia Peninsular*. Universidade do Algarve, Faro, p. 63–75.

MENÉNDEZ M. (2012) – Territorialidad y territorio en los estudios paleolíticos. In : P. Arias *et al.* (eds.), *El Paleolítico Superior Cantábrico. Actas de la Primera Mesa Redonda. San Román de Candamo (Asturias), 26–28 de abril de 2007*. Santander, Universidad de Cantabria, p. 13–20.

MOURE ROMANILLO A. (1994) – Arte paleolítico y geografías sociales. Asentamiento, movilidad y agregación en el final del paleolítico cantábrico. *Complutum* 5 : 313–330.

PELEGRIN J., KARLIN C. & BODU P. (1988) – « Chaînes opératoires » : Un outil pour le préhistorien. *Technologie préhistorique. Notes et monographies techniques* 25 : 55–62.

RIVERO O. (2007) – Aproximación al estudio de las cadenas operativas del grabado sobre soporte pétreo : análisis tecnológico de una representación de équido del Magdaleniense medio de Las Caldas (Asturias, España). *Zephyrus* 60 : 97–111.

RIVERO O. (2012) – Una nueva mirada al arte mobiliar del Magdaleniense Medio de la Región Cantábrica y los Pirineos : la contribución del análisis de cadenas operativas. In : J. Clottes (dir.), *L'art pléistocène dans le monde / Pleistocene art of the world / Arte pleistoceno en el mundo. Préhistoire, Art et Sociétés, Bulletin de la Société Préhistorique Ariège-Pyrénées* 65–66 : 1411–1426.

RIVERO O. (2011) – La noción de aprendizaje en el arte mobiliar del Magdaleniense Medio cántabro-pirenaico : la contribución del análisis microscópico. *Trabajos de Prehistoria* 68(2) : 275–295.

SAUVET G., FORTEA J., FRITZ C. & TOSELLO G. (2008) – Crónica de los intercambios entre los grupos humanos paleolíticos. La contribución del arte para el período 20 000 – 12 000 años BP. *Zephyrus* 61 : 33–60.

TYMULA S. (1991) – *Animaux et humains en vue frontal. Étude des représentations mobilières et pariétales pyrénéennes*. Maîtrise de Préhistoire, Université de Paris I.

UTRILLA P. (1994) – Campamentos-base, cazaderos y santuarios. Algunos ejemplos del paleolítico peninsular. In : *Homenaje al Dr. Joaquín González Echegaray*. Monografías del Centro de Investigación y Museo de Altamira 17. Ministerio de Cultura, Madrid, p. 97–113.

UTRILLA P. & MAZO C. (1996) – Arte mueble sobre soporte lítico de la cueva de Abauntz. Su aportación a los estilos del Magdaleniense tardío. *Complutum Extra* 6(1) : 41–62.

UTRILLA P., MAZO C., SOPENA M. C., MARTÍNEZ BEA M. & DOMINGO R. (2009) – A palaeolithic map from 13.660 cal BP : engraved stone blocks from the Late Magdalenian in Abauntz Cave (Navarra, Spain). *Journal of Human Evolution* 57 : 99–111.

Indices de contacts eurasiatiques au temps des Vénus gravettiennes

Aurélien SIMONET

Résumé : Au cœur du Paléolithique supérieur, les statuettes féminines représentent l'indice le plus troublant en faveur de l'hypothèse d'une communauté de pensée eurasiatique aux alentours de 25 000 avant le présent. Ces Vénus se retrouvent ainsi des Pyrénées (France) aux plaines sibériennes du lac Baïkal avec les mêmes caractères intrinsèques (disposition axiale stricte, nudité, focalisation sur les organes sexuels, tête quadrillée, *etc.*). Mais quelles sont les autres parentés techniques et/ou idéologiques qui peuvent être proposées à partir du reste du matériel archéologique ? Cet article expose différents indices confortant l'hypothèse de nombreux contacts eurasiatiques au Paléolithique supérieur moyen à l'aide de l'ensemble des données matérielles disponibles (pratiques funéraires, art mobilier, industrie lithique et osseuse).

1 INTRODUCTION

Des dizaines de statuettes féminines gravettiennes, rapportées aux phases moyennes et récentes, ont été découvertes en France, en Italie, en Europe centrale et en Russie (Delporte 1993). D'autre part, le travail anthropologique de D. Henri-Gambier montre que le comportement gravettien adopté face à la mort avec l'apparition de sépultures primaires, unique, double ou triple, sur l'ensemble du territoire européen et russe représente un autre critère unificateur (Henri-Gambier 2005, 2008b). Les sépultures appuient l'idée d'une communauté de pensée européenne voire eurasiatique déjà illustrée par les statuettes féminines. Est-il possible de trouver d'autres comportements unificateurs à l'échelle de l'Europe qui illustreraient l'importance des déplacements et/ou des contacts dans les phases moyennes du Paléolithique supérieur d'Eurasie ?

2 DES NIVEAUX DE LECTURE DIFFÉRENTS SELON LES SPÉCIALITÉS

La compréhension du Gravettien, partagé entre une manifestation européenne et une étude régionaliste, souffre de l'esprit de spécialisation.

D'un côté, la rareté des « Vénus » conduit davantage à une perception homogène de l'Europe gravettienne : l'exemple classique de cette approche est représenté par le travail fondateur de Delporte (1993) que l'on retrouve dans les études plus récentes de R. Bourrillon (2009) et de M. Mussi *et al.* (2010).

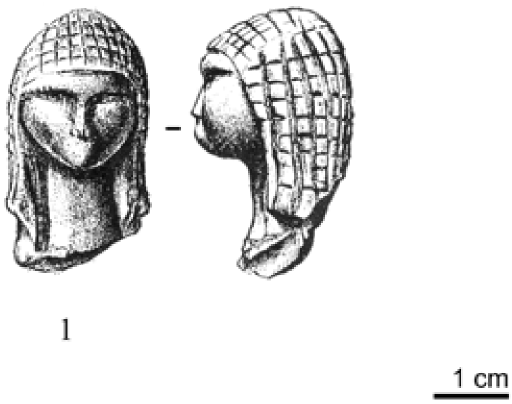
À l'extrémité opposée, la complexité et la richesse des industries lithiques est appréhendée sous une forme régionaliste, échelle d'étude induite par le caractère fastidieux de l'analyse technologique. Le meilleur exemple de ce type d'étude est représenté par les travaux exemplaires de Laurent Klaric sur les industries lithiques du Gravettien du nord de la France (Klaric 2003, 2007). Si les études sur les statuettes féminines invitent à surévaluer les contacts eurasiatiques, celles sur les industries lithiques minimisent l'intérêt d'une approche géographique large, sous-évaluant de fait l'importance des déplacements humains et/ou des contacts.

Entre ces deux chemins d'enquête, la documentation anthropologique produit une vision plus ambiguë du Gravettien, avec des constantes européennes (apparition de dépôts primaires) et des pratiques funéraires plus régionales (sépultures en fosse en Europe centrale et orientale contre dépôt sur le sol en Europe occidentale) (Henry-Gambier 2008b). Les recherches de S. Villotte mettent en avant une prédominance des lésions biomécaniques des enthèses au niveau du membre inférieur des individus gravettiens qui conforte l'hypothèse d'un mode de vie nomade avec de grandes distances parcourues (Villotte 2011), facilitant ainsi la diffusion des idées. Les études anthropologiques sur les adaptations structurelles des os longs montrent aussi que les distances parcourues par les groupes humains se réduiraient après le Dernier Maximum glaciaire (Holt 2003) ce qui est cohérent avec les observations archéologiques concernant l'art mobilier.

3 LE PIVOT EURASIATIQUE : LA SYMBOLIQUE FÉMININE

Les statuettes féminines du Gravettien sont parmi les objets les plus célèbres, les plus prestigieux et les plus commentés de la Préhistoire (Delporte 1993 ; Leroi-Gourhan 1970 ; Otte 1995). La « Figurine à la Capuche » de Brassempouy, la Vénus de Lespugue ainsi que celle de Willendorf représentent quelques unes des plus belles œuvres préhistoriques (**figure 1**).

FIGURE 1 Statuettes féminines gravettiennes : 1. La « figurine à la capuche » de Brassempouy (France) en ivoire de mammouth, d'après Piette et de Laporterie, 1894, fig. 5 ; 2. Statuette de Willendorf II (Autriche) en calcaire recouverte d'ocre rouge, d'après Anati, 2003 ; 3. Vénus de Lespugue en ivoire de mammouth, d'après Saint-Périer, 1924, fig. 1.



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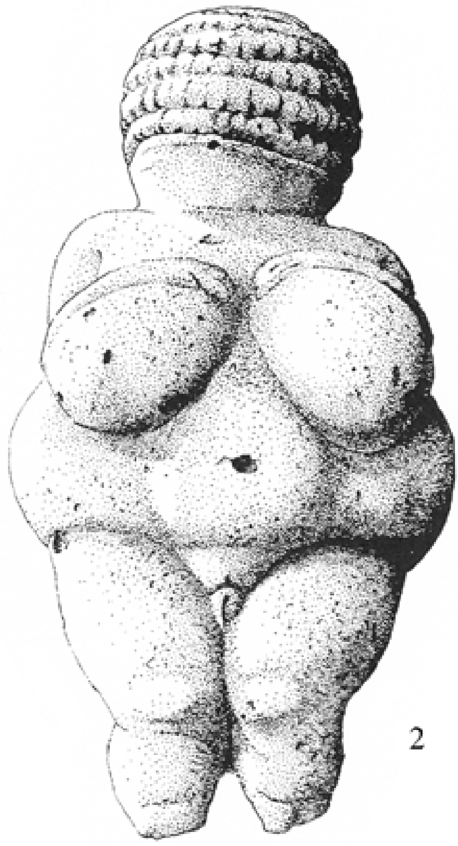

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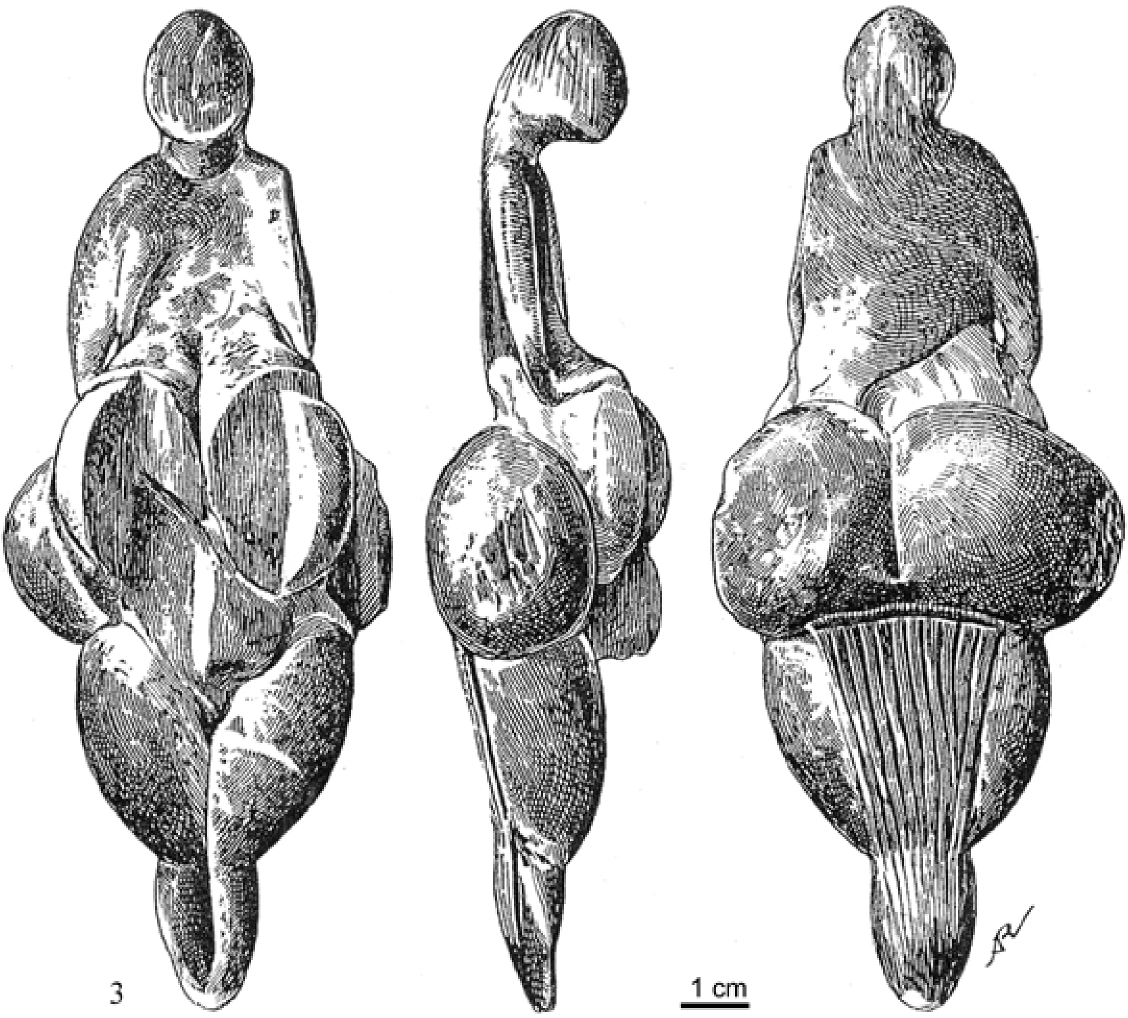

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Mais elles sont également l'indice le plus troublant vers l'hypothèse de contacts eurasiatiques aux alentours de 23.000 B.P. puisqu'elles se retrouvent des Pyrénées aux plaines sibériennes du lac Baïkal avec les mêmes caractères intrinsèques : les représentations féminines sont nues et suivent une disposition axiale stricte avec une hypertrophie des organes correspondant à la reproduction et à la nutrition des enfants (hanches, fesses, seins). Les pieds sont absents et, la plupart du temps, les bras manquent également. Ceux-ci sont parfois atrophiés ou bien s'appuient sur les énormes seins et sur le ventre. La tête n'est pas systématiquement représentée et lorsqu'elle est indiquée, sa simplification montre que la statuette ne représente pas un individu mais un concept rattachée à la féminité. Elle a en effet une forme sphérique ou en pointe et dans de rares cas seulement une sorte de quadrillage se retrouve à l'endroit de la chevelure. Enfin, les statuettes se terminent souvent en pointe et ne peuvent pas se maintenir debout. L'hypertrophie des organes sexuels féminins conduit à une construction losangique, synecdoque puissante dont le message reste à interpréter. À ces rondes-bosses s'ajoutent les représentations féminines de Laussel sculptées sur la paroi d'un abri et sur des petits blocs (Lalanne & Bouyssonie 1946). À Předmostí, en République tchèque, deux représentations féminines sont gravés sur un fragment d'os et d'ivoire de mammouth (d'Errico *et al.* 2011) tandis que dans le sud-ouest de la France, à Pech-Merle ou à Cussac, on les retrouve gravées sur les parois de cavités ornées (Lemozi 1929 ; Aujoulat *et al.* 2002).

En Russie, les fouilles des grands sites gravettiens de plein air ont mis en évidence la disposition caractéristique des statuettes féminines à l'intérieur des dépressions des espaces domestiques, le plus souvent dans les petites fosses-dépôts spéciales, creusées dans le sol d'habitat et recouvertes de scapulas de mammouth (Abramova 1995).

La symbolique féminine pourrait également se retrouver sous une forme plus stylisée comme le montrent les médaillons de Kostienki I interprétés comme des représentations schématiques de sexes féminins (Efimenko 1958). Enfin, que penser de la convergence morphologique entre les deux pièces en stéatite rainurées de la grotte des Enfants aux Balzi Rossi (Ligurie, Italie) et des médaillons de Kostienki (Villeneuve *et al.* 1906–1912) ? Ces objets rappellent également les disques rainurés constituant le mobilier funéraire de la sépulture gravettienne de Brno II en Moravie (Oliva 1996) (**figure 2**).

4 LES PRATIQUES FUNÉRAIRES

Dans une symétrie idéologique vie-mort avec ces statuettes féminines, l'analyse de la documentation anthropologique révèle dès le début du Gravettien des comportements nouveaux pour le Paléolithique supérieur européen. Le sort des défunts de l'Aurignacien est en effet totalement inconnu (Henry-Gambier 2008b). En revanche, à partir du Gravettien, des sépultures primaires préservant l'intégrité du corps sont connues sur l'ensemble du territoire européen (**figure 3**). En Europe, 28 sites gravettiens ou contemporains auraient livré des vestiges humains relevant d'un possible traitement funéraire, principalement en France, en Italie et en République Tchèque mais aussi en Espagne, en Russie et en Sibérie (Henry-Gambier 2008b). Avec Cussac (Dordogne, France) et la grotte du Visage (Charente, France), c'est également au Gravettien que sont attribués les deux principaux exemples de dépôts funéraires liés à des grottes ornées (Jaubert 2008). Une constante gravettienne pourrait porter sur la topographie de ces sépultures. Elles sont en effet toujours installées près d'un surplomb rocheux (Cussac, Vilhonneur, Balzi Rossi, Cro-Magnon, Pataud). Et même en Europe centrale où les grottes sont rares, les gravettiens semblent avoir intentionnellement recherché la proximité d'une falaise comme à Předmostí (Svoboda 2008).

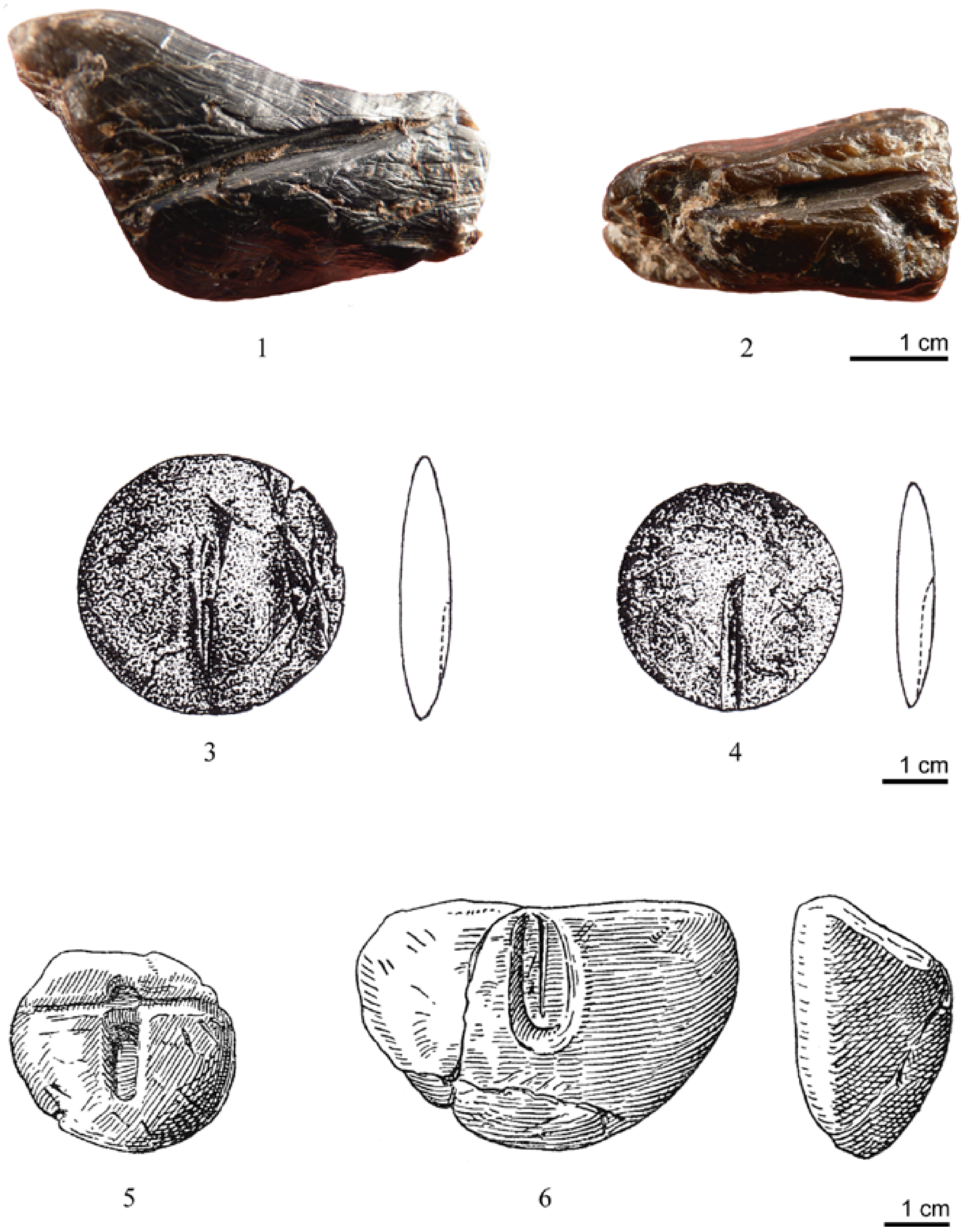
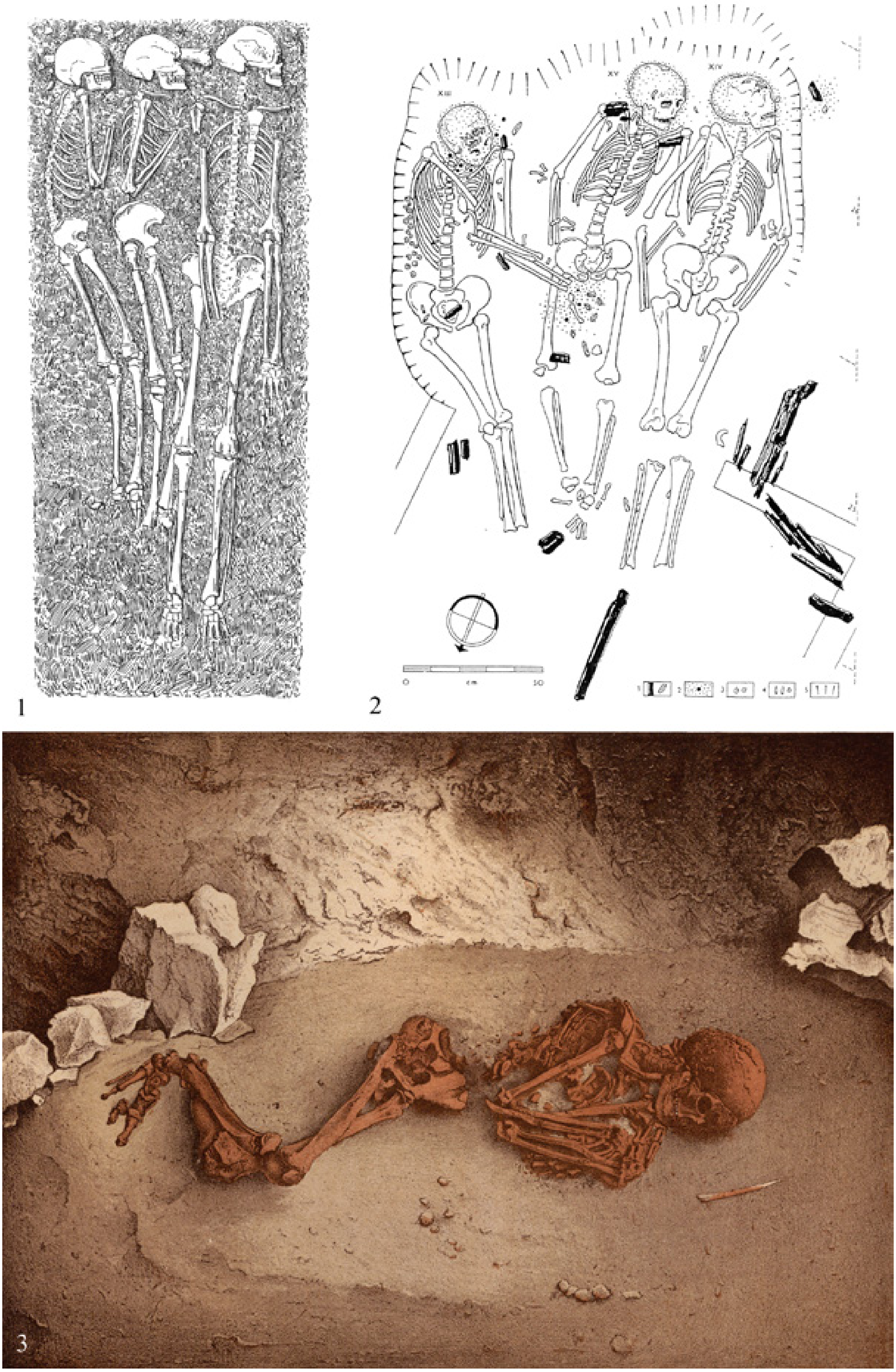


FIGURE 2 Pièces rainurées gravettiennes qui symbolisent peut-être le sexe féminin : 1–2. Objets raclés et rainurés en stéatite, Balzi Rossi, grotte des Enfants (Italie), couche H, photographie A. Simonet ; 3–4. Sépulture de Brno II (République Tchèque), rondelles d'os et de molaires de mammouth, d'après Oliva, 1996, fig. 6 ; 5–6. Pièces en argile cuite de Kostienki I, 1 (Russie), d'après Efimenko, 1958, fig. 168.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Une autre série de constantes européennes concerne l'échantillon des individus au sein des dépôts funéraires. La très grande majorité des dépôts funéraires contient un seul individu mais il existe également des dépôts doubles en Russie, en Autriche et en Italie (Sungir 2–3; Veneri Parabita 1–2; Grotte des Enfants 5–6; Krems A-B; peut-être Mal'ta). Deux dépôts triples se retrouvent en République Tchèque (Dolní Věstonice 13–15) et en Italie (Barma Grande 2–4) auxquels s'ajoute peut-être le locus 3 de Cussac (**figure 3** – n^os^ 1 et 2). Předmostí, Cro-Magnon et Pataud offrent quant à eux des dépôts multiples ou collectifs (Henry-Gambier 2008b). Dans la phase moyenne du Paléolithique supérieur, les groupes humains partageaient donc une même logique de gestion de la mort mais l'expriment selon des modalités propres. Par exemple, si le mobilier funéraire d'Europe centrale comprenait des disques de pierre perforés (Brno II, Pavlov I, Předmostí), celui du pôle ligure se singularise par la présence de grandes lames de silex (Balzi Rossi, Arene Candide). Quoi qu'il en soit, une cohérence métaphysique existe entre les Vénus et les sépultures comme le montrent les scapulæ de mammouth recouvrant les fosses des Vénus également trouvées au sommet de certaines tombes d'Europe centrale et orientale. Concernant la sélection des individus enterrés, deux pistes de recherche permettraient éventuellement de trouver des points communs à l'échelle de l'Europe. La première concerne l'hypothèse de relations biologiques qui se retrouveraient dans la triple sépulture de Barma Grande (Formicola 1988), dans la triple sépulture de Dolní Věstonice (Alt *et al.* 1997) ainsi qu'à Baousse Da Torre 1 et 2 (Villote *et al.* 2011). La deuxième hypothèse est celle d'un recrutement d'individus atteints de pathologie (Formicola 2007; Villote *et al.* 2011).

FIGURE 3 Sépultures gravettiennes : 1. Grotte de la Barma Grande (Balzi Rossi, Italie), triple sépulture BG2/3/4, d'après Verneau, 1912, fig. 1 ; 2. Sépulture triple de Dolní Věstonice II (République Tchèque) ; 1. Restes de bois qui pourraient avoir servi de couverture ; 2. Colorant rouge ; 3. Coquillages utilisés comme éléments de décoration et de parure ; 4. Dents perforées, utilisées comme éléments de décoration et de parure (pendentifs) ; 5. Limites de la fosse. D'après Klima, 1995, fig. 76 ; 3. Balzi Rossi, grotte du Cavillon (Italie), Lithographie extraite de Rivière, 1887, pl. XI.

5 LES POINTES À CRAN EN SILEX

Avec les Vénus, les armatures à dos et notamment les pointes à dos représentent un critère fort caractéristique du Gravettien. Mais, appartenant au fond commun des sociétés paléolithiques, les pointes à dos ne représentent pas un bon fossile directeur. Leur typologie raisonnée fine conduit quant à elle à identifier des particularismes régionaux et chronologiques (Klaric *et al.* 2002; Pesesse 2006; Simonet 2011) mais n'aboutit pas à l'identification d'une pièce qui serait commune à plusieurs groupes gravettiens à l'échelle de l'Europe. Le manque d'audace dans l'approche française des industries lithiques pourrait également expliquer cette absence.

En revanche, la notion d'armature à dos crantée se retrouve sur l'ensemble de l'Europe gravettienne et pourrait témoigner de contacts entre les groupes (**figure 4**). Elle a été inventée dès les phases anciennes du Gravettien comme le montrent les exemplaires de La Gravette en Dordogne (France) (Lacorre 1960; Pesesse 2008). En France, la réévaluation des collections anciennes et les fouilles récentes de Brassempouy ont mis en lumière la série de pointes à cran gravettiennes la plus importante de France (Simonet 2012 et **figure 4** – n° 1). Or, c'est également Brassempouy qui a livré le plus grand nombre de statuettes féminines en France. Mais les pointes à cran apparaissent également sur des sites sans statuettes rapportés à la phase récente du Gravettien. Elles sont ainsi présentes au niveau de la brèche à ossements de chevaux de Solutré qui a fait l'objet de quatre datations situées entre 22 650 ± 500 B.P. et 24 050 ± 600 B.P. avec une moyenne de 23 350 B.P. Quelques pointes à cran analogues existent également à Saint-Martin-sous-Montaigu, en Saône-et-Loire. Les deux dates obtenues sont de 24.150 ± 550 et de 22 900 ± 600 B.P. (Combier 2003).

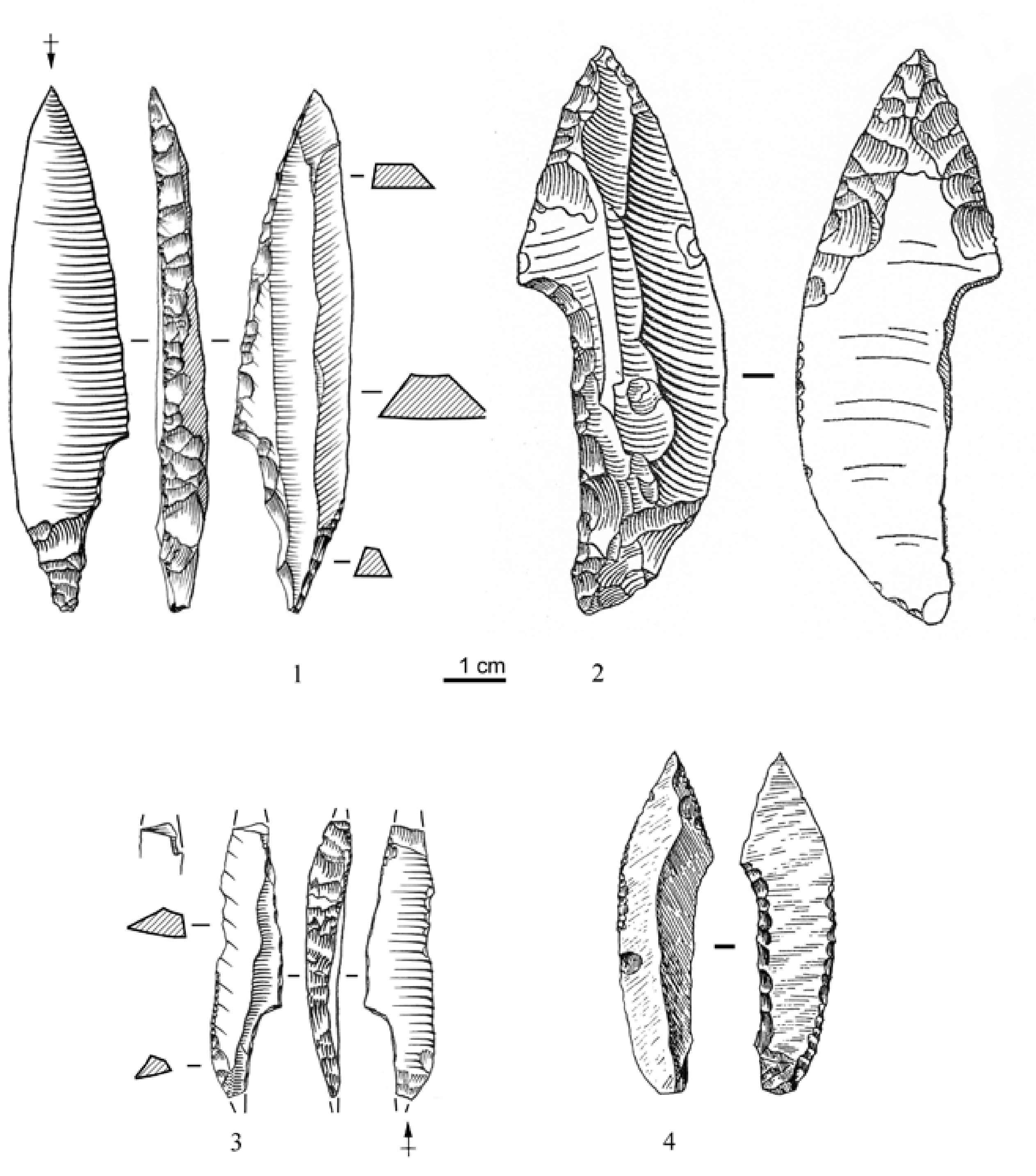

FIGURE 4 Pointes à cran gravettiennes : 1. Brassempouy, secteur GG2 du fond de la grotte du Pape (France), dessin A. Simonet ; 2. Pointe de Kostienki, Kostienki I, 1, d'après Efimenko, 1958, fig. 55 – n° 2 ; 3. Balzi Rossi, grotte des Enfants (Italie), dessin A. Simonet ; 4. Willendorf II, niveau 9 (Autriche), d'après Felgenhauer, 1956-1959, fig. 44 – n° 2.

Au sein du pôle ligure, elles se retrouvent sur le site à statuettes féminines multiples des Balzi Rossi (Italie). Une petite série de 4 pointes à cran a été découverte dans le niveau gravettien G à burin de Noailles de la grotte des Enfants (Onoratini & Da Silva 1978 ; Simonet 2010 et **figure 4** – n° 3). Selon Cartailhac (Villeneuve *et al.* 1906–1912), un autre exemplaire serait associé à la sépulture gravettienne GE4 de la grotte des Enfants.

En Autriche, les pointes à cran se retrouvent sur le site à Vénus de Willendorf où elles singularisent le niveau 9 (Felgenhauer 1956–1959 et **figure 4** – n° 4). Bien qu'elles ne soient pas directement associées à des statuettes féminines, on retrouve des séries de pointes à cran en Petite Pologne au site de Kraków-Spadzista (Kozlowski *et al.* 1974). Ce gisement, qui est l'un des principaux témoins gravettiens d'Europe centrale, possède deux datations, l'une de 20.600 ± 1 050 B.P., l'autre de 23 040 ± 170 B.P. Avec 48 exemplaires, il a offert la collection gravettienne de pointes à cran la plus importante d'Europe centrale et orientale qui n'est pas directement associée à des statuettes féminines (Otte 1981). Des séries de pointes à cran dont restent à étudier les relations avec les statuettes féminines se retrouvent également en Slovaquie occidentale à Moravany-Podkovica et à Nitra-Cerman (Zotz 1968). Ce dernier site est daté à 23 000 ± 3 000 B.P. (Otte & Noiret 2004). Enfin, on en trouve en Moldavie roumaine à Mitoc-Malu Galben, daté entre 24.000 et 23 000 (Otte & Noiret 2003).

Les pointes à cran sont caractéristiques des sites à statuettes du Gravettien récent d'Europe orientale sous la forme de la pointe de Kostienki (**figure 4** – n° 2). Sur la Plaine russe, les grands ensembles de Kostenki 1-I, Kostienki 13, Kostienki 14-I, Kostenki 18, Avdeevo, Gagarino, Zaraysk et Khotylevo II relèvent de cet horizon à pointes à cran (Otte & Noiret, 2004).

L'idée de la pointe à cran est donc inventée dès les phases anciennes du Gravettien. Mais, à l'instar du symbole féminin, ce sont les phases moyennes et surtout récentes du Gravettien qui connaîssent une véritable explosion du phénomène dont l'apogée se situe vers 23 000 B.P. Une raréfaction de ces pièces est alors perceptible entre 23 000 et 20 000 B.P. dans le contexte gravettien d'Europe centrale et orientale (Otte & Noiret 2004). En ce qui concerne les exemplaires occidentaux, le doute demeure sur leur attribution chronoculturelle. Les exemplaires de Brassempouy et des Balzi Rossi sont-ils attribuables au Gravettien moyen ? Ils seraient alors antérieurs à ceux d'Europe centrale et orientale. Doivent-ils être davantage attribués à une phase récente du Gravettien d'Europe méditerranéenne qui conserverait des burins de Noailles ? Dans cette seconde hypothèse, il y aurait une concordance chronologique à l'échelle de l'Europe gravettienne dans le phénomène des pointes à cran.

6 LES GRANDES LAMES DE SILEX

Dans le domaine de l'industrie lithique, seul le phénomène des grandes lames permet, avec les pointes à cran, d'enrichir le débat concernant l'hypothèse de contacts européens au Gravettien (**figure 5**). Des grandes lames de silex sont ainsi associées à plusieurs sépultures du groupe gravettien de Ligurie. Le cas le plus spectaculaire est représenté par la sépulture du jeune « Prince » des Arene Candide dont la main droite serre une grande lame de silex longue de 25 cm et large de 4 cm (Giacobini & Malerba 1995 ; Onoratini *et al.* 2011 et **figure 5** – n^{os} 1 et 7). La datation radiocarbone AMS d'un fémur a donné 23 440 ± 190 B.P. (Pettitt *et al.* 2003).


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Aux Balzi Rossi, chacun des défunts de la sépulture triple BG2/3/4 de la Barma Grande est accompagné d'une grande lame dont les longueurs sont comprises entre 17 et 26 cm (**figure 5** – n° 6). Deux la serraient dans une main, l'autre était disposée sous la tête (Verneau 1892 ; Henry-Gambier 2008a). L'association de grandes lames aux défunts se retrouve dans d'autres sépultures des Balzi Rossi notamment à Baousso da Torre 1. Deux lames de silex sont accolées en arrière du crâne du squelette de la célèbre sépulture du Cavillon découverte par Rivière le 26 mars 1872 (Rivière, 1887). Toujours aux Balzi Rossi, c'est dans la grotte de Baousso da Torre que E. Rivière (1887) aurait découvert une série de grandes lames (**figure 5** – nos 3 et 4). Plusieurs d'entre elles auraient été retrouvées près de la paroi gauche de la grotte, à une profondeur de 3 m 70 (Rivière 1887 : 247). Ces belles pièces, aujourd'hui perdues et seulement connues par les lithographies publiées par Rivière, sont d'autant plus intéressantes qu'un des exemplaires remonterait avec la lame accolée au scapulum droit de Baousso da Torre 1.

En dehors du pôle ligure, cette forte valeur symbolique conférée à certaines grandes lames pourrait se retrouver sur le site à Vénus de Laussel. Bien que le contexte stratigraphique et paléo-topographique précis des Vénus d'Europe occidentale est inconnu, l'une des rares précisions topo-stratigraphiques de Laussel concerne un petit lot de pièces groupées par le Dr. Lalanne avec l'indication *« silex allant avec la sculpture »* c'est-à-dire la Vénus à la corne (Lalanne & Bouyssonie 1946 : 87). Or, ce lot contient notamment deux lames brutes dont une grande lame à crête (**figure 5**– n° 8). Ces pièces, interprétées comme un « trophée » par Bouyssonnie (Lalanne & Bouyssonie 1946, p. 99), représentent-elles un dépôt intentionnel ? Une grande lame aurait également été retrouvée près du « Vieillard » de Cro-Magnon (Lartet & Christy 1865–1875), contribuant ainsi à renforcer l'hypothèse de l'attribution gravettienne proposée par D. Henry-Gambier (2002) sur la base de la datation d'un coquillage de la parure associée aux vestiges humains et de la présence de 3 pendeloques en ivoire de mammouth caractéristiques du Gravettien (**figure 5** – n° 5).

En Roumanie, une vingtaine de lames en silex a été déposée intentionnellement près d'une paroi rocheuse dans le niveau gravettien VII du site de Ripiceni-Stânca (Chirica & Chirica, ce volume). On retrouve un investissement symbolique sur des grandes lames sur le site à Vénus de Zaraisk en Russie qui offre les fouilles les plus récentes et par conséquent les mieux documentées d'un site à Vénus gravettien. Si Zaraisk est d'ores et déjà connu pour avoir livré deux statuettes féminines et une statuette de bison retrouvées au fond de fosses (Amirkhanov *et al.* 2009 ; Amirkhanov & Lev 2009), plusieurs regroupements de grandes lames brutes ont également été découverts dans des fosses (S. Lev, com. pers. et **figure 5** – n° 2). À Avdeevo (Russie), des grandes lames de silex accompagnaient parfois les Vénus déposées au fond des fosses avec de l'industrie osseuse et des vestiges fauniques (Abramova 1995). C'est donc probablement du côté russe que la question de la portée symbolique de certaines grandes lames de silex au Gravettien progressera.

FIGURE 5 Grandes lames gravettiennes à caractère symbolique certain (1, 2, 6, 7) ou probable (3, 4, 5, 8) : 1. Sépulture de l'adolescent dit « le Prince » des Arene Candide (Ligurie, Italie), photographie © Ministero per i Beni e le Attività Culturali-Soprintendenza per i Beni Archeologici della Liguria ; 2. Ensemble de grandes lames retrouvé dans la fosse 25 à Zaraisk (Russie), photographie © K. Amirkhanov et S. Lev. ; 3–4. Deux exemplaires de la concentration de grandes lames retrouvées par E. Rivière dans la grotte de Baousso da Torre aux Balzi Rossi (Italie). D'après Rivière, 1887, pl. 3 ; 5. Produit laminaire trouvé en même temps que le crâne du Vieillard de Cro-Magnon (France). D'après Lartet & Christy, 1865–1875, planche XX – n° 3 ; 6. Balzi Rossi, Barma Grande (Italie), grande lame de silex tenue en main par l'individu BG2 placé à gauche dans la triple sépulture. D'après Mussi, 2000, fig. 3 ; 7. Grande lame tenue en main par le jeune « Prince » des Arene Candide (Italie), photographie J. Magail © Musée d'Anthropologie préhistorique de Monaco ; 8. Grande lame retrouvée près des statuettes féminines de Laussel (France), d'après Lalanne et Bouyssonie, 1946, fig. 57 – n° 4.

7 LES POINTES EN IVOIRE DE MAMMOUTH

Les pointes en ivoire, dont certaines sont décorées d'incisions géométriques, semblent également représenter un élément fédérateur qu'il serait utile d'étudier (**figure 6**). Elles ont été identifiées à Brassempouy, dans le secteur GG2 du fond de la grotte du Pape (Goutas & Simonet 2009 et **figure 6** – n° 1). Deux baguettes en ivoire décorées d'incisions en chevron sont également présentes dans la collection Piette formée à partir des fouilles du XIXe siècle (Simonet 2012). Enfin, la réévaluation des deux collections anciennes de Brassempouy correspondant aux fouilles de P.-E. Dubalen et J. de Laporterie confirme l'importance des pointes de projectile en ivoire à Brassempouy attribuables au Gravettien avec 2 baguettes en ivoire dans la première et de 4 pointes de sagaies et 1 baguette en ivoire dans la seconde (Lefebvre A. 2012).

En France, le site de Lespugue en livrerait plusieurs exemplaires (C. San Juan-Foucher, com. pers.). Avec Brassempouy, le travail de N. Goutas montre que les seules séries conséquentes, d'une dizaine de pièces chacune, proviennent du Gravettien moyen d'Arcy-sur-Cure (grotte du Renne) et du Gravettien récent de Laugerie-Haute Est (Goutas 2013).

En Autriche, le niveau 9 de Willendorf offre 3 double-pointes en ivoire de mammouth (Felgenhauer 1956–1959). Par ailleurs, l'une d'entre elles porte des motifs géométriques qui, bien qu'ils ne soient pas strictement identiques à ceux de Brassempouy, partagent néanmoins une certaine ressemblance tant par leur nature anguleuse (en chevrons ou en épi) que par leur composition relativement complexe (Goutas & Simonet 2009 et **figure 6** – n° 2).

En République Tchèque, Předmostí (Klima 1977), Dolní Věstonice (Klima 1963) et Pavlov I (Brühl 2005) offrent des pointes en ivoire de mammouth qui portent parfois des incisions parallèles et en chevron dont le style évoque celui des pointes de Brassempouy (**figure 6** – n° 3).

Les sites russes à statuettes offrent également des pointes en ivoire dont certaines sont décorées (Gvozdover 1995). Celles de Khotylevo II sont les plus travaillées du Gravettien (Zaverniaev 1981). Quant à Sungir, que penser des sépultures datées de 22 930 ± 200 et 23 830 ± 220 B.P. pour chacun des deux enfants (Sungir 1 et 2) et 24 100 ± 240 pour Sungir 3 (Pettitt & Bader 2000) ? Contemporaines du Gravettien, elles partagent avec ce phénomène l'importance symbolique des armes d'ivoire. De nombreuses lances d'ivoire étaient ainsi associées au plus jeune des enfants tandis qu'un exemplaire massif d'une longueur de 2,40 mètres était déposée près des deux corps (Bader 1998).

Enfin, le site de Mal'ta a également livré de nombreuses pointes en ivoire. Un exemplaire a par ailleurs été retrouvée dans la sépulture de deux enfants (Cauwe *et al.* 1996 ; Derevianko *et al.* 1998).

Comme pour les pointes à cran, l'association entre les statuettes féminines et les pointes en ivoire est rarement démontrée. Elle est probable à Brassempouy, Lespugue, Willendorf et au sein des sites russes. Un travail doit être entrepris pour mieux identifier et caractériser ces pointes. La question du degré de leur valeur culturelle selon les contextes écologiques, radicalement différents entre la Sibérie et la France où la facilité de l'approvisionnement en ivoire n'est pas comparable, est délicate.

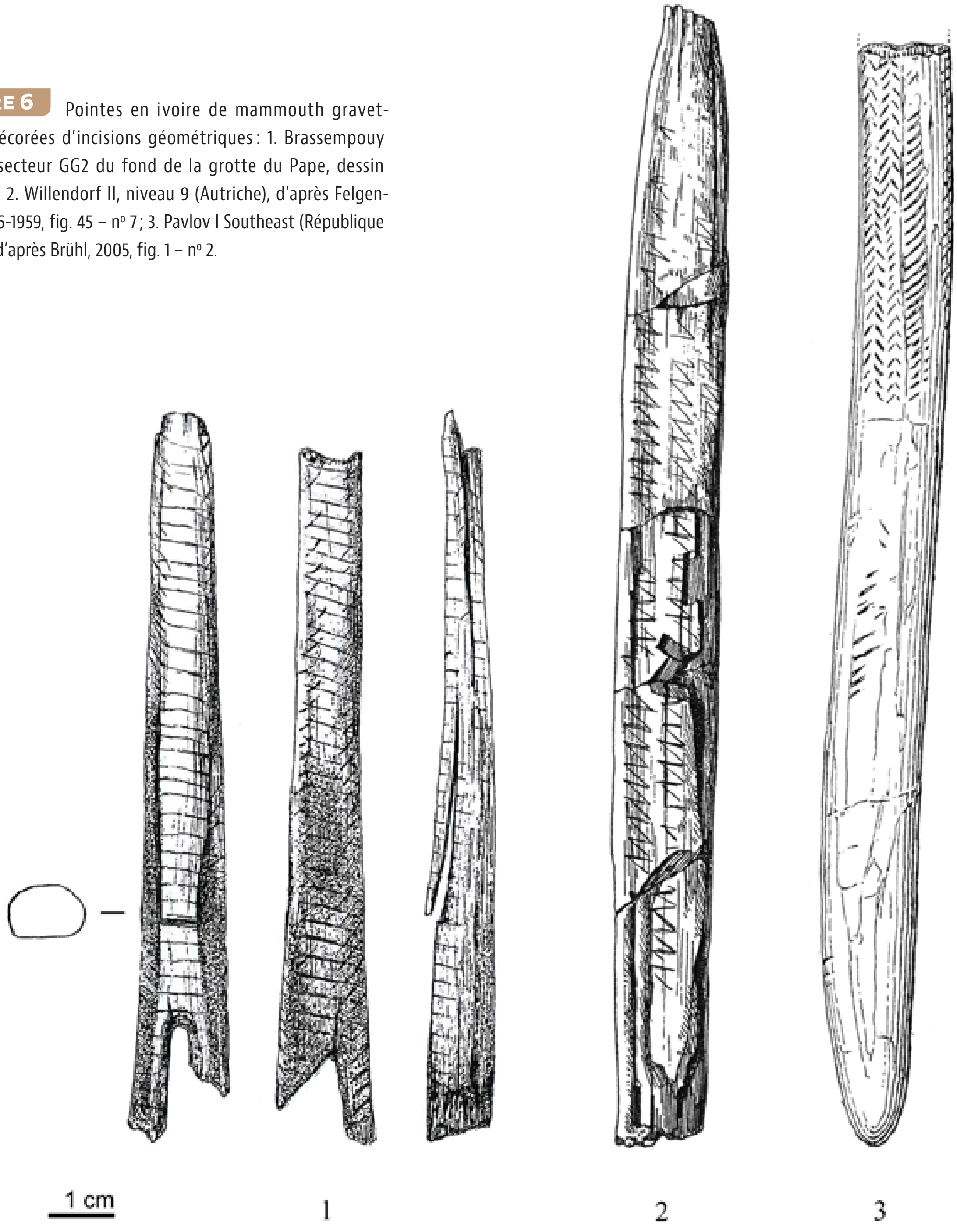


FIGURE 6 Pointes en ivoire de mammouth gravettiennes décorées d'incisions géométriques : 1. Brassempouy (France), secteur GG2 du fond de la grotte du Pape, dessin F. Bongni ; 2. Willendorf II, niveau 9 (Autriche), d'après Felgenhauer, 1956-1959, fig. 45 – n° 7 ; 3. Pavlov I Southeast (République Tchèque), d'après Brühl, 2005, fig. 1 – n° 2.

Néanmoins, leur présence dans des contextes écologiques synchroniques variés, alors qu'elles sont rares voire inexistantes dans les autres phases chronologiques de certaines zones géographiques, représente d'ores et déjà un argument important vers la reconnaissance d'une unité idéologique. Dans l'exemple de Brassempouy, le choix de l'ivoire de mammouth fossile ne peut pas être interprété comme un déterminisme écologique, ce qui renforce sa valeur symbolique.

8 LES BÂTONS PERCÉS

Dans l'industrie osseuse, d'autres pièces d'exception émergent dans l'Europe gravettienne. Quatre bâtons percés en bois d'Élan, dont trois décorés d'incisions radiales autour du trou, sont associés à la sépulture du jeune « Prince » des Arene Candide (Giacobini & Malerba 1995). Or, le niveau gravettien VII de Molodova V, qui offre d'ailleurs des pointes à cran et des pointes en ivoire de mammouth, est caractérisé par la présence de six grands bâtons perforés, dont cinq trouvés côte à côte, confectionnés dans du bois de Renne. L'un est décoré d'une silhouette humaine en faible relief (**figure 7** – n° 2). Ce niveau a donné les datations maintenant anciennes de 23 000 ± 800 (MO.11) et 23 700 ± 320 (GIN.10) (Černyš 1973). Dans ce contexte, les deux bâtons percés en bois de cerf du mobilier funéraire de Sungir 1 et 2 complètent la symbolique « armement et travail de l'ivoire » dont l'ensemble pourrait très bien avoir été conçu par un esprit gravettien (Bader, 1998). Dans la phase finale du Gravettien de l'abri Pataud (France), un bâton percé intègre une nouvelle fois un ensemble d'objets extra-ordinaires associés à des vestiges humains (Chiotti *et al.* 2009).

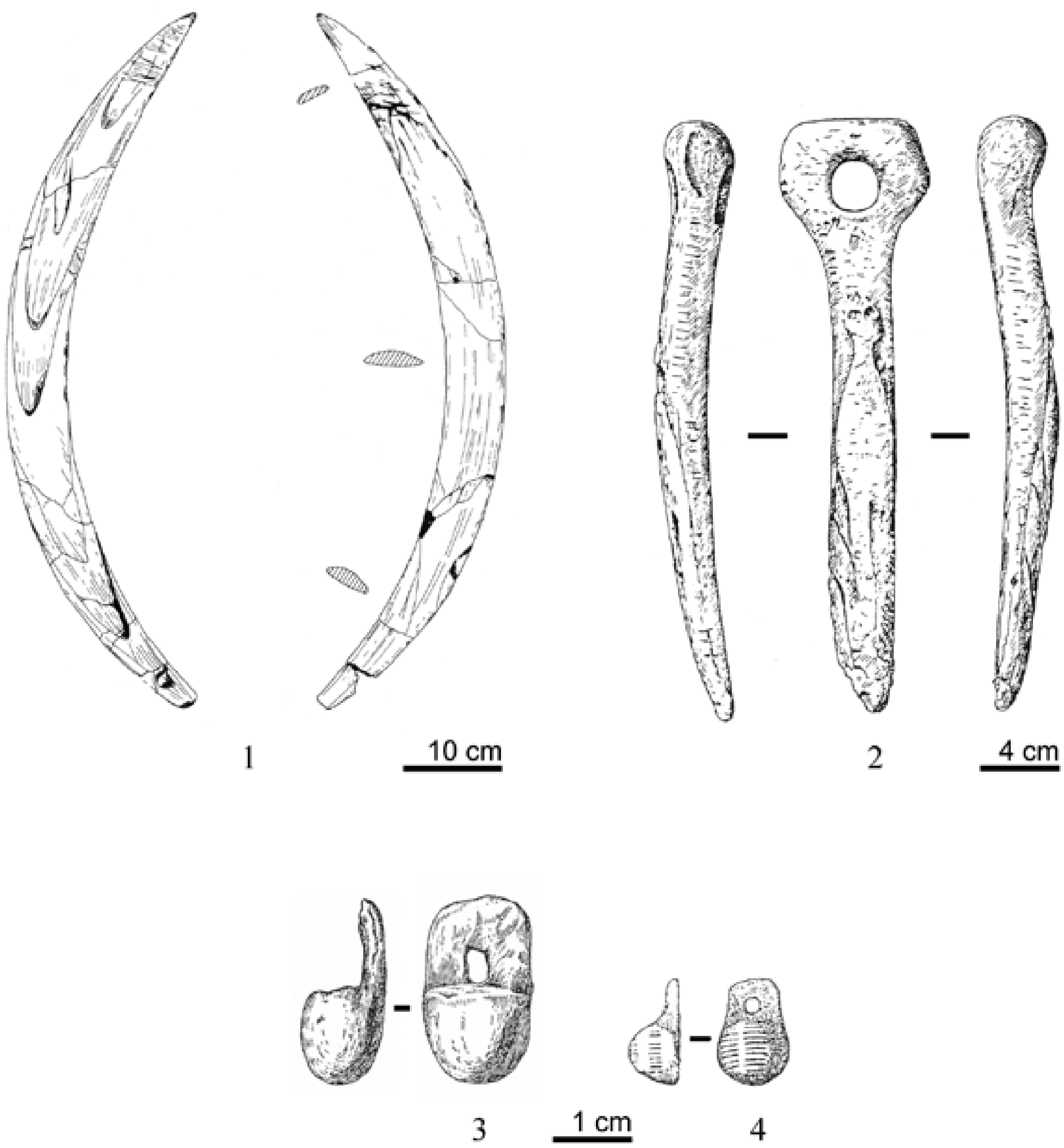


FIGURE 7 1. Oblazowa (Pologne), objet cérémoniel ? d'après Kozlowski, 1992, fig. 56 ; 2. Molodova V (Ukraine), niveau VII, bâton perforé en bois de renne décoré d'une figure anthropomorphe en léger relief, d'après Otte, 1981, fig. 249 ; 3. Parure claviforme de Kostienki I, 1 (Russie), d'après Efimenko, 1958, fig. 124 – n° 4 ; 4. Parure claviforme en ivoire de mammouth ornée d'incisions associée à la triple sépulture BG2/3/4 de Barma Grande (Italie), d'après Verneau, 1892, fig. 18–19.

9 LE « BOOMERANG » D'OBLAZOWA

En Pologne, le dépôt d'un grand objet incurvé en ivoire de mammouth, interprété comme un boomerang, dans le fond de la grotte d'Oblazowa rappelle le dépôt d'armes du fond de la grotte du Pape de Brassempouy (Valde-Nowak 2000, 2003 et **figure 7** – n° 1). L'occupation a été attribuée au Gravettien d'après la présence d'un andouiller de Renne orné de demi-cercles concentriques qui offre une parenté stylistique avec les décorations du Gravettien morave. Cet assemblage pourrait-il exprimer une sorte d'équivalent polonais du geste décrit à Brassempouy avec lequel il partage la thématique du dépôt d'armes dans un espace exigu et la valeur symbolique accordée à l'ivoire de mammouth ?

10 LA PARURE

Avec les éléments de projectiles, certaines parures évoquent également l'existence de contacts européens au Gravettien. Inconnues dans l'Aurignacien, les pendeloques en ivoire de grande dimension caractérisent le Gravettien. Si les diadèmes, bandeaux, anneaux, disques, tubes sont très fréquents au sein du Gravettien d'Europe centrale et orientale, des pièces exceptionnelles existent aussi en Europe occidentale comme la pendeloque aux serpentiformes de Brassempouy (Piette 1895), la célèbre Cyprée de Pair-non-Pair (Breuil & Cheynier 1963) ou les perles bilobées de Barma Grande aux Balzi Rossi (Verneau 1892). Plus impressionnante encore est la similarité morphologique entre les pendeloques claviformes des sites gravettiens du pôle ligure (Balzi Rossi & Arene Candide) et celles du site à Vénus de Kostienki en Russie (**figure 7** – nos 3 et 4). Elles témoignent d'un réseau de communication très fort, avec des pôles à Vénus qui concentreraient les pièces d'exception, uniques au niveau régional mais récurrentes au niveau européen. Dans cette trame européenne, ne pourrait-on pas inclure Sungir ? Le riche mobilier funéraire des sépultures de Sungir, comprenant des milliers de perles, trouve un écho avec les parures en coquillage de la sépulture de la grotte du Cavillon aux Balzi Rossi et du « jeune Prince » des Arene Candide. L'usage des coquillages dans la parure rapproche d'ailleurs les groupes gravettiens d'Europe occidentale de ceux d'Europe centrale (Taborin 2000). Ces derniers utilisaient des gîtes fossiles tout comme les gravettiens de Brassempouy utilisaient de l'ivoire fossile (Taborin 2000 ; Goutas & Simonet 2009), montrant ainsi la suprématie des valeurs sur les conditions écologiques.

11 CONCLUSION

En 1938 naissait l'identification générique et archéologique, doublement précurseur, de la civilisation gravettienne avec la constatation d'une récurrence européenne de l'association entre les pointes à cran et les statuettes féminines (Garrod 1938). Avec le choix de la terminologie périgordienne, l'Europe occidentale emprunta néanmoins la voie particularisante du nationalisme. Dans un esprit de synthèse impressionnant, Garrod soulignait pourtant que les pointes à cran et les statuettes féminines étaient le lien entre les sites aussi éloignés que Grimaldi en Italie, Willendorf en Autriche, Kostienki I et Gagarino en Russie. Il faut d'ailleurs reconnaître à L'Abbé Breuil la paternité de cette constatation. Il fut en effet le premier, en 1937, à rechercher des rapports de correspondance synchroniques entre l'Europe orientale et l'Europe occidentale fondée sur la récurrence de l'association entre des statuettes féminines et des pointes à cran, citant tour à tour Grimaldi, Willendorf et Laussel (Breuil 1912 et **figure 8**). L'essentiel était déjà écrit.

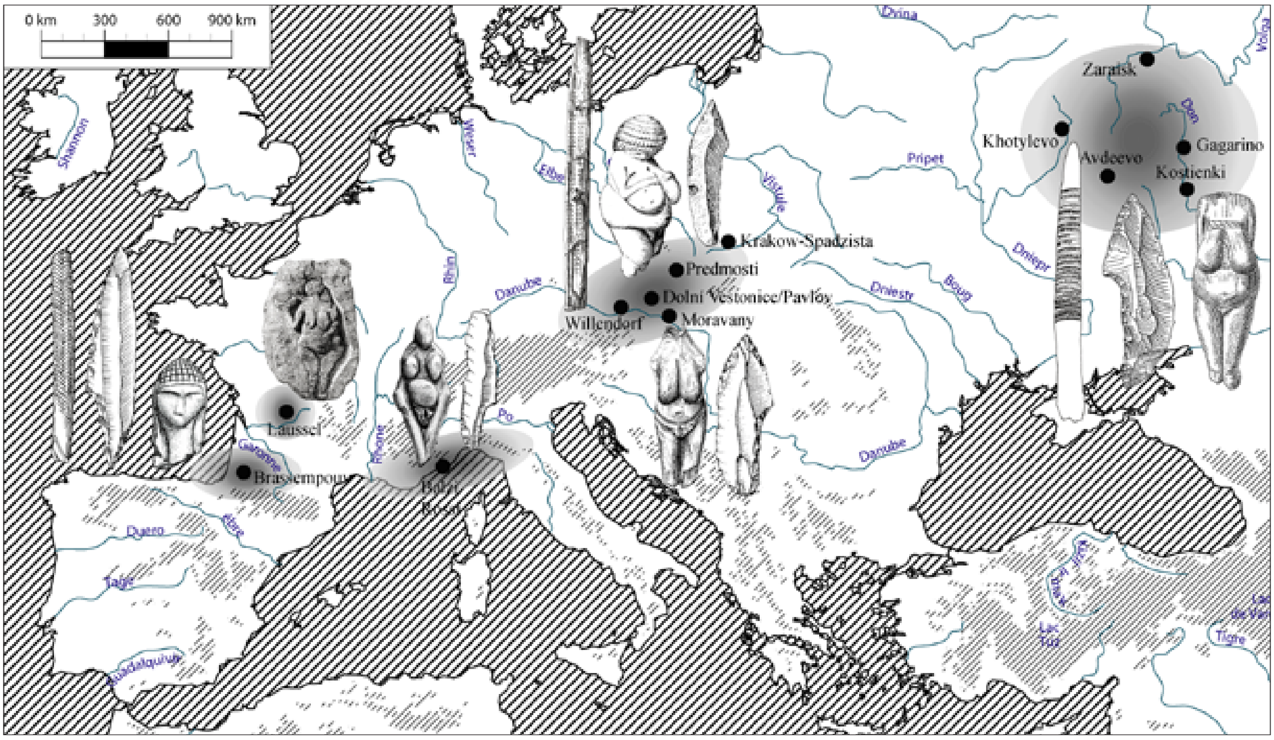
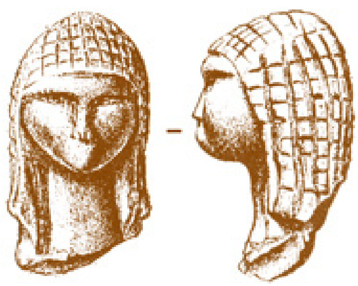


FIGURE 8 Unité symbolique du gravettien européen autour des concepts de Vénus, de pointes à cran et de pointes en ivoire décorées (Carte A. Simonet).

Et pourtant, face à l'évidence, 70 ans d'oubli ont été engendré par la particularisation des études, le cloisonnement disciplinaire, la méconnaissance des écrits des grands maîtres et l'esprit de spécialisation. Seuls les travaux de Marcel otte ont poursuivi l'objectif de mettre en valeur cette cohérence métaphysique entre des vestiges aussi diversifiés que sont l'art, les outils ou les sépultures (Otte 1993; 2012; Otte *et al.* 2009). Cette démarche singulière est d'autant plus nécessaire que l'Archéologie, à force d'accumuler des données, perd sa raison d'être: la reconnaissance d'une ligne de force spirituelle, des premiers hominidés à nos jours, qui relie les différentes logiques synchroniques comme celle que nous venons d'exposer brièvement pour le Gravettien, et dont la synthèse a été malheureusement trop rarement tentée (Leroi-Gourhan 1964, 1965; Mc Luhan 1977; Malraux 1974, 1976, 1977; Otte 2012).



BIBLIOGRAPHIE

ABRAMOVA Z.A. (1995) – *L'art paléolithique d'Europe orientale et de Sibérie*. Grenoble, Éditions Jérôme Million.

ALT K.W., PICHLER S., VACH W., KLÍMA B. & VLČEK, SEDLMEIER J. (1997) – Twenty-five thousand-year-old triple burial from Dolní Věstonice: an ice-age family? *American Journal of Physical Anthropology* 102: 123–131.

AMIRKHANOV H., AKHMETGALEEVA N., BUZHILOVA A., BUROVA N., LEV S. & MASCHENKO E. (2009) – *Palaeolithic studies in Zaraisk 1999–2005*. Moscow, Paleograph Press (en russe).

AMIRKHANOV H. & LEV S. (2009) – Une statuette de bison découverte dans le site de Zaraïsk (région de Moscou, Russie). *Bulletin de la Société Préhistorique Française* 106(3): 457–475.

ANATI E. (2003) – *Aux origines de l'art*. Paris, Fayard.

AUJOULAT N., GENESTE J.-M., ARCHAMBEAU C., DELLUC M., DUDAY H. & HENRY-GAMBIER D. (2002) – La grotte ornée de Cussac – Le Buisson-de-Cadouin (Dordogne): premières observations. *Bulletin de la Société Préhistorique* 99(1): 129–137.

BADER N. (1998) – *Upper Palaeolithic site Sungir (graves and environment)*. Moscou, Scientific World.

BOURRILLON R. (2009) – *Les représentations humaines sexuées dans l'art du Paléolithique supérieur européen: diversité, réminiscences et permanences*. Thèse de doctorat, Université de Toulouse II - Le Mirail.

BREUIL H. (1912) – *Les subdivisions du Paléolithique supérieur et leur signification*. Congrès International d'Anthropologie et d'Archéologie Préhistoriques, Compte Rendu de la XIV° session, Genève, 2e édition en 1937.

BRUEIL H. & CHEYNIER A. (1963) – *La caverne de Pair-Non-Pair, Gironde. Fouilles de François Daleau*. Documents d'Aquitaine (II), Publication de la Société archéologique de Bordeaux.

BRÛHL E. (2005) – The Bone, antler and ivory tools. In: J.A. Svoboda (dir.) (2005), *Pavlov I Southeast: a window into the Gravettian lifestyles*. Brno, Academy of Sciences of the Czeh Republic, Institute of Archaeology at Brno, The Dolní Věstonice studies 14: 252–293.

CAUWE N., MEDVEDEV G., LIPNINA E., CLARS L., COUPE D., MODRIE S., MUXHARRAMOV S., OSADTSHY S., PETTITT P., REBRIKOV P., ROGOVSKOÏ E., SULERJITSKY L., VOROBEVA G. & XHENZIXHENOV A D. (1996) – Mal'ta en Sibérie: Présentation du programme de recherche des Musées royaux d'Art et d'Histoire de Bruxelles et de l'Université de l'État à Irkoutsk. Bruxelles. Société royale belge d'anthropologie et de préhistoire, *Anthropologie et préhistoire* 107: 109–130.

ČERNYŠ A. P. (1973) – *Paleolit i Mesolit pridnestrovia (Paleolithic and mesolithic of the Dnestr area*. Moscou.

CHIOTTI L., NESPOULET R., HENRY-GAMBIER D., MORALA A., VERCOUTÈRE C., AGSOUS S., LENOBLE A., MARQUER L. & GRIMAUD-HERVÉ D. (2009) – Statut des objets « extra-ordinaires » du Gravettien final de l'abri Pataud (Les Eyzies-de-Tayac, Dordogne): objets abandonnés dans l'habitat ou dépôt intentionnel? Dans: Boonardin S., Hamon C., Lauwers M. & Quilliec B. (dir.), *Du matériel au spirituel: réalités archéologiques et historiques des « dépôts » de la Préhistoire à nos jours*. XXIXe Rencontres internationales d'archéologie et d'histoire d'Antibes, 15–18 octobre 2008, Éditions APDCA, Antibes p. 29–46.

COMBIER J. (2003) – Pointes à cran du Sud-Est de la France (du Gravettien au Magdalénien final). *Préhistoire du Sud-Ouest* (supplément) 6: 129–143.

DELPORTE H. (1993) – *L'image de la Femme dans l'Art Préhistorique* (2e édition). Paris, Picard.

DEREVIANKO A.P. *et al.* ÉD. (1998) – *The Paleolithic of Siberia: new discoveries and interpretations*. Urbana, University of Illinois Press.

D'ERRICO F., LÁZNIČKOVÁ-GALETOVÁ M. & CALDWELL D. (2011) – Identification of a possible engraved Venus from Předmostí, Czech Republic. *Journal of Archaeological Science* 38: 672–683.

EFIMENKO P.P. (1958) – *Kostenki I*. Moscou (en russe).

FELGENHAUER F. (1956–1959) – *Willendorf in der Wachau*. Mitteilungen Der Prähistorischen Kommission 8–9.

FORMICOLA V. (1988) – The triplex burial of Barma Grande (Grimaldi, Italy). *Homo* 39: 130–143.

FORMICOLA V. (2007) – From the Sunghir children to the Romito dwarf: aspects of the Upper Paleolithic funerary landscape. *Current Anthropology* 48: 446–453.

GARROD D. (1938) – The Upper paleolithic in the light of recent discovery. *Proceedings of the Prehistoric Society* 4: 1–26.

GIACOBINI G. & MALERBA G. (1995) – Les pendeloques en ivoire de la sépulture paléolithique du « Jeune Prince » (Grotte des Arene Candide, Finale Ligure, Italie). Dans: J. Hahn, M. Menu, Y. Taborin, Ph. Walter & F. Wideman (dir.), *Le travail et l'usage de l'ivoire au Paléolithique supérieur*. Roma, Istituto Poligrafico e Zecca dello Stato, p. 173–187.

GOUTAS N. (2013) – Nouvelles données sur l'industrie osseuse des grottes du Renne et du Trilobite à Arcy-sur-Cure (Yonne, France): vers l'identification de nouveaux marqueurs techniques et culturels du Gravettien moyen à burins du Raysse. In P. Bodu, L. Chehmana, L. Klaric, L. Mevel, S. Soriano, N. Teyssandier dir., *Le Paléolithique supérieur ancien de l'Europe du Nord-Ouest*, mémoire LVI de la Société préhistorique française, p. 89–115.

GOUTAS N. & SIMONET A. (2009) – Le secteur GG2 de la grotte du Pape à Brassempouy (Landes): un dépôt intentionnel d'armes gravettiennes? *Bulletin de la Société Préhistorique Française* 106(2): 257–291.

GVOZDOVER M. (1995) – *Art of the Mammoth Hunters: The Finds from Avdeevo*. Oxford, Oxbow books.

HENRY-GAMBIER D. (2002) – Les fossiles de Cro-Magnon (Les Eyzies-de-Tayac, Dordogne). Nouvelles données sur leur position chronologique et leur attribution culturelle. *Bulletins et mémoires de la Société d'Anthropologie de Paris* 14(1–2): 89–112.

HENRY-GAMBIER D. (2005) – Les populations européennes du Paléolithique supérieur. Dans: O. Dutour, J.-J. Hublin & B. Vandermeersch (eds.), *Origine et évolution des populations humaines*. Paris, éditions du CTHS, p. 151–176.

HENRY-GAMBIER D. (2008a) – Les vestiges humains des Baoussés-Roussé (Italie): bilan et perspectives. Dans: H. Lumley de & A. Hurel (dir.), *Histoire et actualité de l'œuvre scientifique de S.A.S. le Prince Albert Ier de Monaco. 1895–2005: bilan et perspectives des connaissances sur les peuplements néandertaliens et les premiers hommes modernes de l'Europe méditerranéenne*. Archives de l'Institut de Paléontologie humaine 39: 143–156.

HENRY-GAMBIER D. (2008b) – Comportement des populations d'Europe au Gravettien: Pratiques funéraires et interprétations. *Paléo* 20: 399–438.

HENRY-GAMBIER D., BEAUVAL C., AIRVAUX J., AUJOULAT N., BARATIN J.F. & BUISSON-CATIL J. (2007) – New hominid remains associated with gravettian parietal art (Les Garennes, Vilhonneur, France). *Journal of Human Evolution* 53(6): 747–750.

HOLT B.M. (2003) – Mobility in Upper Paleolithic and Mesolithic Europe: evidence from the lower limb. *American Journal of Physical Anthropology* 122(3): 200–215.

JAUBERT J. (2008) – L' « art » pariétal gravettien en France: éléments pour un bilan chronologique. Dans: J.-P. Rigaud, *Le Gravettien: entités régionales d'une paléoculture européenne. Paléo* 20: 439–471.

KLARIC L. (2003) – *L'unité technique des industries à burins du Raysse dans leur contexte diachronique. Réflexions sur la diversité culturelle au gravettien à partir des données de la Picardie, d'Arcy-sur-Cure, de Brassempouy et du Cirque de la Patrie.* Thèse de doctorat, Université de Paris I – Panthéon-Sorbonne.

KLARIC L. (2007) – Regional groups in the European Middle Gravettian: a reconsideration of the Rayssian technology. *Antiquity* 81: 176–190.

KLARIC L., AUBRY T. & WALTER B. (2002) – Un nouveau type d'armature en contexte gravettien et son mode de production sur les burins du Raysse (la Picardie, commune de Preuilly-sur-Claise). *Bulletin de la Société Préhistorique Française* 99(4): 751–764.

KLIMA B. (1963) – *Dolní Věstonice.* Academia, Praha.

KLIMA B. (1977) – *Předmosti, ein Mammutjägerplatz in Mähren*. Brno, Archeologiky ustav Sav Brnë.

KLIMA B. (1995) – Dolní Věstonice II. Études et recherches archéologiques de l'Université de Liège, *The Dolní Vestonice studies* 3.

KOZLOWSKI J.K. (1992) – *L'Art de la Préhistoire en Europe orientale*. Paris, CNRS éditions.

KOZLOWSKI J.K., VAN VLIET B., SACHSE-KOZLOWSKA E., KUBIAK H. & ZAKREWSKA G. (1974) – Upper palaeolithic site with dwellings of Mammoth bones. Cracow, Spadzista street B., *Folia Quaternaria* 44.

LACORRE F. (1960) – *La Gravette, le Gravétien et le Bayacien*. Laval, imp. Barnéoud.

LALANNE G. & BOUYSSONIE J. (1946) – Le gisement paléolithique de Laussel, fouilles du Docteur Lalanne. *L'Anthropologie* 50: 1–164.

LARTER E., CHRISTY H. EDS. 1865–1875 – *Reliquiae Aquitanicae, being Contributions to Anthropology and Palaeontology of Périgord and the Adjoining Provinces of Southern France*. London, William and Morgate.

LEFEBVRE A. (2012) – *Brassempouy (Landes, France). L'industrie osseuse des collections de Laporterie et Dubalen conservées au musée Despiau-Wlérick de Mont-de-Marsan et à la Maison de la Dame à Brassempouy*. Rapport d'étude, Communauté de Communes Coteaux et Vallées des Luys.

LEMOZI A. (1929) – *La grotte-temple du Pech-Merle, un nouveau Sanctuaire préhistorique*. Paris, éditions Auguste Picard.

LEROI-GOURHAN A. (1964) – *Le geste et la parole. Tome I: Technique et langage*. Paris, Éditions Albin Michel.

LEROI-GOURHAN A. (1965) – *Le geste et la parole. Tome 2: La mémoire et les rythmes*. Paris, Éditions Albin Michel.

LEROI-GOURHAN A. (1970) – Observations technologiques sur le rythme statuaire. Dans: *Échanges et communications. Mélanges offerts à C. Lévi-Strauss*. La Haye, Mouton, p. 658–676.

MALRAUX A. (1974) – *La métamorphose des dieux. Tome II: L'irréel*. Paris, Éditions Gallimard.

MALRAUX A. (1976) – *La métamorphose des dieux. Tome III: L'Intemporel*. Paris, Éditions Gallimard.

MALRAUX A. (1977) – *La métamorphose des dieux. Tome I: Le Surnaturel*. Paris, Éditions Gallimard.

MC LUHAN M. (1977) – *Pour comprendre les médias: les prolongements technologiques de l'homme*. Paris, Seuil.

MUSSI M. (2000) – Heading south: the gravettian colonisation of Italy. In: W. Roebroeks, M. Mussi, J. Svoboda & K. Fennema (dir.), *Hunters of the Golden Age. The Mid-Upper Palaeolithic of Eurasia 30 000 – 20 000 BP*. Leiden, University of Leiden, p. 355–367.

MUSSI M., ALTAMURA F., BOLDUC P., CINQ-MARS J., MARCO A. DE & ZUCCHINI E. (2010) – Les « vénus » du Gravettien et de l'Épigravettien italien, témoignages de rapports sur longues distances au travers de l'Europe et de l'Eurasie. *Congrès de l'IFRAO, septembre 2010 – Symposium: L'art pléistocène en Europe (Pré-Actes).*

OLIVA M. (1996) – Mladopaleolitický hrob Brno II jako příspěvek k počátkům šamanismu, *Archeologické rozhledy* 48: 353–383.

ONORATINI G. & DA SILVA J. (1978) – La grotte des Enfants à Grimaldi, les foyers supérieurs. *Bulletin du Musée d'Anthropologie et de Préhistoire de Monaco* 22: 31–71.

ONORATINI G., SIMON P., NEGRINO F., CAUCHE D., MOULLÉ P.-É., ARELLANO A., BORGIA V., VOYTEK B. & ARRIGHI S. (2011) – Du sud de la montagne de Lure aux sépultures de Grimaldi: le silex zoné stampien dit « du largue ». Un matériau de prestige du Paléolithique supérieur liguro-provençal. *Bulletin du Musée d'Anthropologie préhistorique de Monaco* 51: 51–74.

OTTE M. (1981) – Le gravettien en Europe centrale. Éd. De Tempel Brugge, *Dissertationes Archaelogicae Gandenses* 20.

OTTE M. (1993) – *Préhistoire des religions*. Collection Préhistoire, Paris, Masson.

OTTE M. (1995) – Valeur symbolique de la représentation humaine: le cas féminin. Dans: H. Delporte (dir.), *La Dame de brassempouy. Actes du colloque de Brassempouy, juillet 1994*. ERAUL 74: 195–214.

OTTE M. (2012) – À l'aube spirituelle de l'Humanité. Une nouvelle approche de la Préhistoire. Paris, Odile Jacob.

OTTE M. & NOIRET P. (2003) – L'Europe gravettienne. Dans: R. Desbrosse & A. Thévenin (dir.), *Préhistoire de l'Europe des origines à l'âge du Bronze*, Actes du 125e Congrès national des Sociétés historiques et scientifiques, Lille 2000, Paris, Éd. du CTHS, p. 227–239.

OTTE M. & NOIRET P. (2004) – Évolution du Gravettien au Moyen Danube, In: J.A. Svoboda & L. Sedláčková (dir.), *The Gravettian along the Danube*, Institute of Archeology, AS CR, p. 8–32.

OTTE M., NOIRET P. & REMACLE L. (2009) – *Les hommes de Lascaux: civilisations paléolithiques en Europe*. Paris, A. Colin.

PESESSE D. (2006) – La « pointe à dos alternes », un nouveau fossile directeur du Gravettien ? *Bulletin de la Société Préhistorique Française* 103(3): 465–478.

PESESSE D. (2008) – *Les premières sociétés gravettiennes: analyse comparée des systèmes lithiques de la fin de l'Aurignacien aux débuts du Gravettien*. Thèse de doctorat de l'Université d'Aix Marseille 1.

PETTITT P.B. & BADER N.O. (2000) – Direct AMS Radiocarbon dates for the Sungir mid Upper Palaeolithic burials. *Antiquity* 74: 269–270.

PETTITT P.B., RICHARDS M., MAGGI R. & FORMICOLA V. (2003) – The Gravettian burial known as the Prince ("Il Principe"): new evidence for his age and diet. *Antiquity* 295: 15–19.

PIETTE É. (1895) – La station de Brassempouy et les statuettes humaines de la période glyptique. *L'Anthropologie* 6(2): 129–151.

PIETTE É. & LAPORTERIE J. DE (1894) – Les fouilles de Brassempouy en 1894. *Bulletin de la Société d'Anthropologie de Paris* 5(4): 633–648.

RIVIÈRE É. (1887) – *Paléoethnologie de l'Antiquité de l'Homme dans les Alpes maritimes*. Paris, Éditeur Baillière.

SAINT-PÉRIER R. DE (1924) – La statuette féminine de Lespugue (Haute-Garonne). *Bulletin de la Société Préhistorique Française* 21(3): 81–84.

SIMONET A. (2010) – Les armatures lithiques du Gravettien à burins de Noailles du niveau G de la grotte des Enfants (Balzi Rossi, Ligurie, Italie): premiers éléments d'enquête. *Bulletin du musée d'Anthropologie préhistorique de Monaco* 50: 55–68.

SIMONET A. (2011) – La pointe des Vachons: nouvelles approches d'un fossile directeur controversé du Gravettien à partir des exemplaires du niveau IV de la grotte d'Isturitz (Pyrénées-Atlantiques, France) et des niveaux 4 des abris 1 et 2 des Vachons (Charente, France). *Paleo* 22: 271–298.

SIMONET A. (2012) – *Brassempouy (Landes, France) ou la matrice gravettienne de l'Europe*. Liège, ERAUL 133.

SVOBODA J.A. (2008) – The Upper Paleolithic burial area at Předmostí: ritual and taphonomy. *Journal of Human Evolution* 54: 15–33.

TABORIN Y. (2000) – La parure des Gravettiens de l'Europe occidentale et centrale. *Bulletin de la Société Préhistorique Ariège-Pyrénées* 55: 11–18.

VALDE-NOWAK P. (2000) – The boomerang from Oblazowa and its prehistoric context. Dans: C. Bellier, P. Cattelain & M. Otte (dir.), *La chasse dans la Préhistoire / Hunting in Prehistory*, ERAUL 51, CEDARC, Artefacts 8: 88–94.

VALDE-NOWAK P. (2003) – Oblazowa Cave: nouvel éclairage pour les mains de Gargas? *International Newsletter on Rock Art Art* 35: 7–10.

VERNEAU R. (1892) – Nouvelle découverte de squelettes préhistoriques aux Baoussé-Roussé, près de Menton. *L'Anthropologie* 3(5): 513–540.

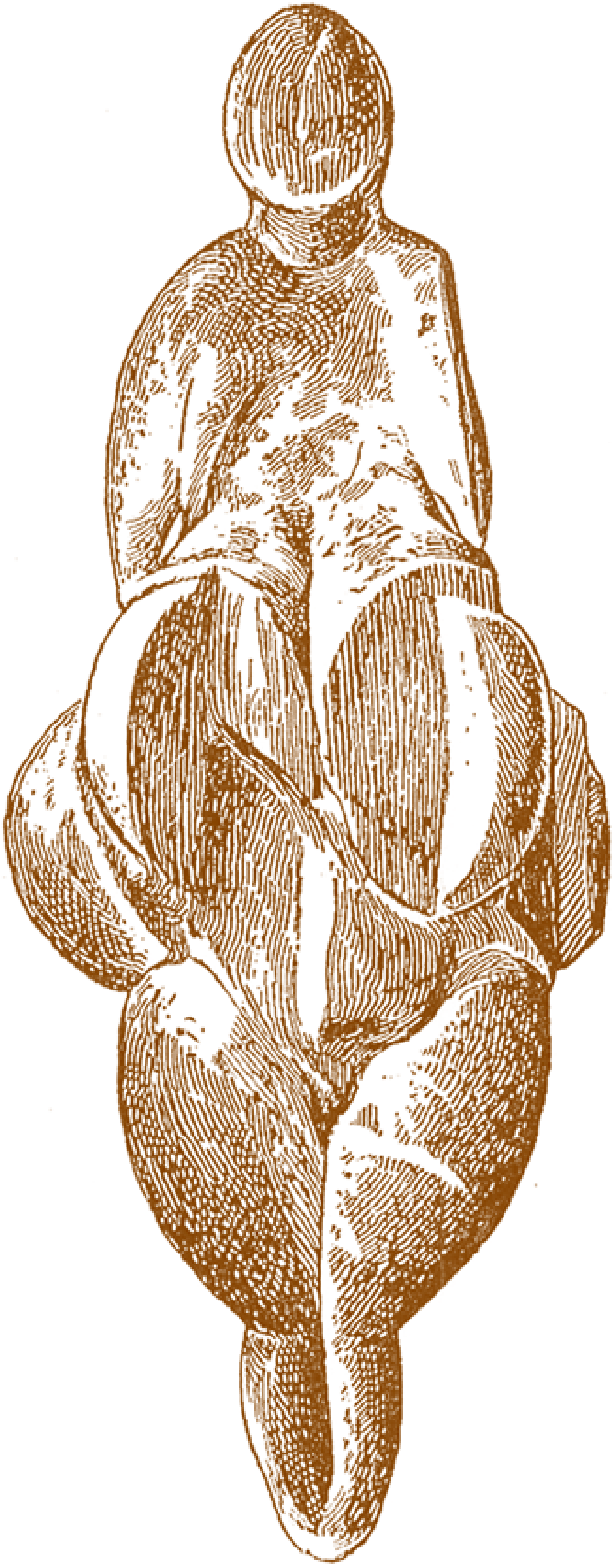
VILLENEUVE L. DE, BOULE M., VERNEAU R. & CARTAILHAC E. (1906–1912) – *Les grottes de Grimaldi, Baoussé-Roussé*. Tome 1-fascicule 1: historique et description par le chanoine L. de Villeneuve, tome 1-fascicule 2–4: géologie et paléontologie par Marcellin Boule, tome 2-fascicule 1: anthropologie par René Verneau, tome 2-fascicule 2: Archéologie par Émile Cartailhac, Monaco, Imprimerie de Monaco.

VILLOTTE S. (2011) – Les comportements au Gravettien: apport des « marqueurs osseux d'activité ». Dans: D. Pesesse, N. Goutas, L. Klaric & P. Guillermin (dir.), *À la recherche des identités gravettiennes: actualités, questionnements et perspectives*, Société préhistorique française, Mémoire 52: 217–224.

VILLOTTE S., KNÜSSEL C. J., MITCHELL P.D. & HENRY-GAMBIER D. (2011) – Probable carpometacarpal and tarsal coalition from Baousso da Torre Cave (Italy): Implications for burial selection during the Gravettian. *Journal of Human Evolution* 61: 117–120.

ZAVERNIAEV F.M. (1981) – La gravure sur os et sur pierre du site du Paléolithique supérieur de Khotylevo. *Archéologie soviétique* 4: 141–158 (en russe).

ZOTZ L. (1968) – Die Venusstatuette von Moravany nad Vahom. *Slovenská archeológia* 16: 5–16.



L' « objet artistique » est-il méthodologiquement un artéfact comme les autres ?

Anne-Catherine WELTÉ

Georges-Noël LAMBERT

Résumé : Dans cette communication, des objets utilitaires ornés en matière organique (cuillères / spatules) datés du Magdalénien supérieur et trouvés en Europe sont comparés, de même que les figures féminines schématiques présentes dans l'art mobilier de cette période. La discussion porte sur l'éventualité que les similitudes existantes dans chacune de ces catégories puissent révéler des relations/contacts entre des groupes humains éloignés.

Abstract : *The aim of this communication is to comparate some decorated tools in organic material (spoons /spatula), some shematic female figures ("FFS") on mobile art, which were found in upper Magdalenian in Europe. Discussion focuses on wether their similarities can demonstrate relations/contacts between remote human groups.*

1 INTRODUCTION

Dans l'Europe du Magdalénien supérieur, des objets rares en matière dure animale, telles les cuillères – spatules, ont contribué à mettre en corrélation des sites proches ou lointains. C'est également le cas des représentations féminines schématiques (FFS), du type de Lalinde-Gönnersdorf présentes sur des supports mobiliers variés. Ces similarités /similitudes sont-elles réellement révélatrices de contacts entre des groupes humains géographiquement plus ou moins éloignés, et en ce cas selon quelle(s) modalité(s) se sont-ils effectués ? C'est ce que nous nous proposons d'examiner, avec cette réserve que les informations dont nous disposons sont fort incomplètes (ancienneté des fouilles et des datations, absence d'analyses, en particulier tracéologiques) et n'autorisent que des hypothèses…

2 LES « CUILLÈRES/SPATULES » DU MAGDALÉNIEN SUPÉRIEUR

La *cuillère* est un objet d'usage quotidien, formé d'un cuilleron (partie creuse) et d'un manche (tige). *« Ses trois fonctions essentielles sont de collecter, transporter et transférer des "fluides", masses mobiles liquides ou solides qu'il faut emprisonner pour les maintenir en place et les transporter, avant de les transférer. C'est un contenant mobile, à cavité peu profonde, à ouverture large et de faible capacité. Son manche placé dans le plan d'ouverture de la cuillère, est l'organe de préhension qui permet le transport »* (Leroi-Gourhan 1971, 1973). Dans la typologie des éléments récepteurs, le terme s'applique à des *« objets en os, ou plus rarement en bois de cervidé, en ivoire ou coquille… au manche allongé de section et de longueur variables, s'évasant vers la partie distale pour former le cuilleron qui présente une concavité plus marquée, aux bords émoussés et dont la forme peut être variable. En général, le manche est plus long que le cuilleron »* (Buisson & Peltier 1993). Objet d'usage également, la *spatule* est un petit instrument large et plus ou moins aplati, pour mélanger, remuer, étaler. Pour A. Leroi-Gourhan la spatule ou palette est une *« pièce d'os, de forme généralement ovale allongée, terminée assez souvent par une partie plus étroite formant un manche court ou par un découpage en forme de queue de poisson), en général très soigneusement polie et le plus souvent décorée. L'usage de ces objets est inconnu [….] des spatules pour mélanger l'ocre sur la palette, de petites cuillères pour déguster la moelle dans les os ou tout autre instrument […] ou tout autre usage » … « Cet objet pouvait servir au travail des peaux* **»** (Leroi-Gourhan 1965–1995).

La pièce princeps a été découverte à Gourdan (Hte-Garonne, France), par Éd. Piette qui la publia comme « cuiller » en 1874. Cette appellation a été maintenue par D. Buisson et A. Peltier (1993), mais cet objet est exposé au MAN sous le terme « spatule ou cuillère ». Les trois pièces de la grotte de La Vache (Ariège, France), salle Monique, ont aussi été appelées « cuillers », terme conservé par D. Buisson et G. Pinçon (2003). Exhumée en 1950–1951 par P. Darasse (**figure 1**), la « cuiller(ère) » de Fontalès a été dénommée ainsi par son inventeur (1955), puis par D. Buisson et A. Peltier (1993), mais A. Leroi-Gourhan (1965–1995) la range parmi les « spatules et palettes…dont certains exemplaires complets possèdent un véritables manche ». En ce qui concerne les pièces de Pékarna (**figure 2**, A et B), découvertes très tôt et qualifiées de « couteaux » (Breuil 1925) ou « poignards » (Absolon 1939), elles sont surtout désignées comme « cuillères » (Valoch 1970, Jelinek 1976, Kozlovski 1992, Buisson & Peltier 1993), ou « spatules » (Leroi-Gourhan 1965–1995, Delluc 1987–1990), Laznickova 2002, 2005), ou « spatules-cuillères-pelles » (Vialou 2004).

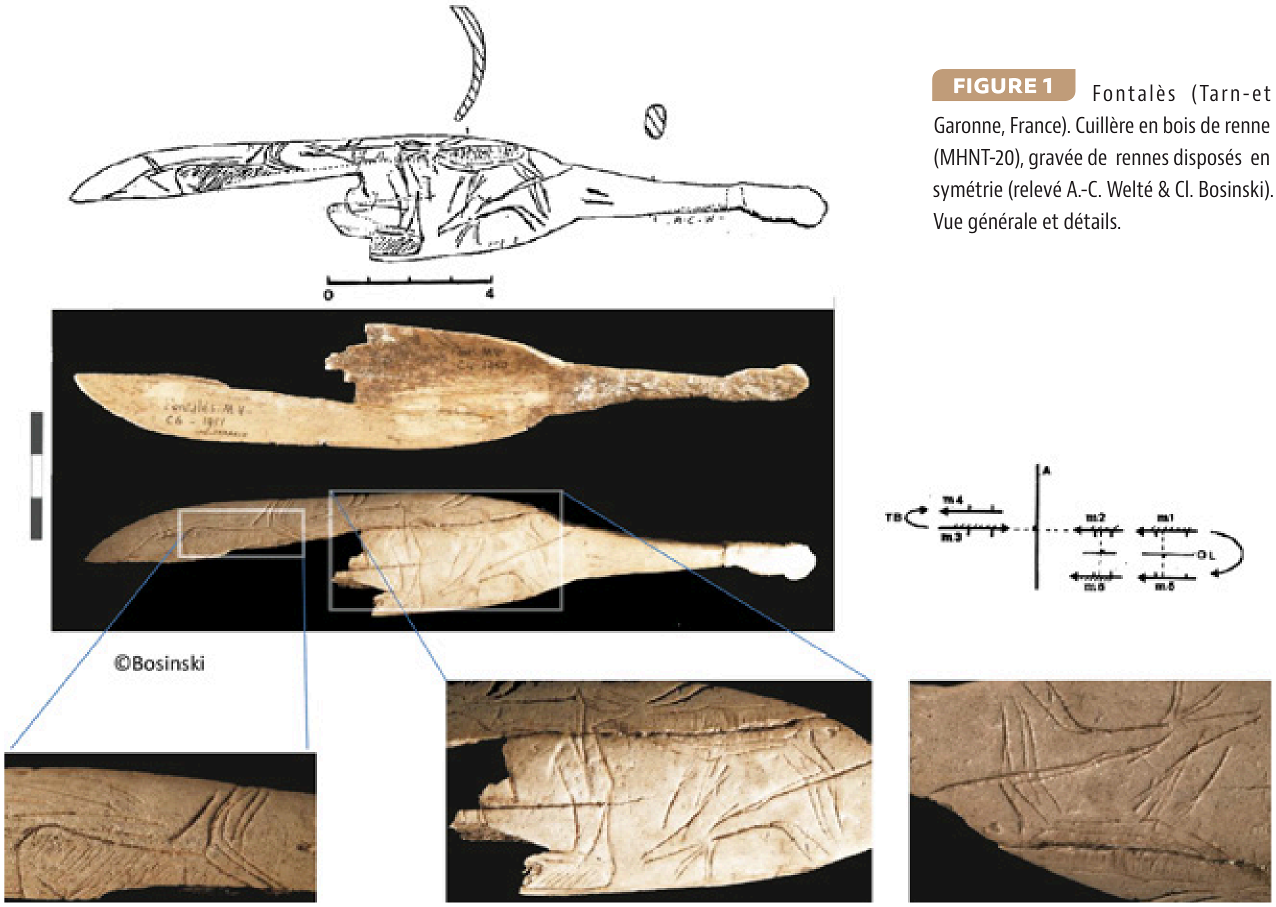


FIGURE 1 Fontalès (Tarn-et Garonne, France). Cuillère en bois de renne (MHNT-20), gravée de rennes disposés en symétrie (relevé A.-C. Welté & Cl. Bosinski). Vue générale et détails.

FIGURE 2 Pékarna (Moravie, Tchékie) : A. Spatule MZM 21 001 ; B. Spatule MZM 21 002 (cl. Couleurs M. Oliva, cl. NB M. Laznickova).

À ce jour, douze exemplaires ont été recensées, provenant de quatre sites géographiquement très éloignés (au moins 2 500 km à vol d'oiseau), soit cinq exemplaires dans le Sud-Ouest français (La Vache, Gourdan, Fontalès) et sept en Moravie (Pékarna). Le cadre chronologique est celui du Magdalénien supérieur, les dates disponibles (souvent anciennes et peu nombreuses sur des stratigraphies puissantes) se situant sur près d'un millénaire [13.140 ±120 BP (Gif A 93 6327) à Fontalès, 12 940 ± 250 BP (Lyon 2 553); 12 670 ± 80 BP (Grn 14 828) à Pékarna; 12 800 ± 140 BP (Gif 7 603) et 12 540 BP (Gn 2 025) à La Vache; 12 290 ± 100 BP (Gif 8 227) à Gourdan]. Ces pièces sont-elles effectivement similaires? Leurs similarités révèlent-elles des liens entre elles?

2.1 Morphologie et morphométrie

La **figure 3** réunit des observations réalisées sur la cuillère de Fontalès, auxquelles ont été ajoutées, dans la mesure du possible selon leur état, celles des pièces des Pyrénées (Buisson & Peltier 1993). La grotte du Courbet (Tarn, France) en aurait livré un exemplaire qui n'a pas été retrouvé. Le tableau relatif aux pièces de Pékarna (**figure 4**) est emprunté à M. Laznickova (2005). Toutes sont très fragmentées: les cassures affectent le cuilleron (Fontalès, La Vache), la zone fonctionnelle mince (Pékarna) ou le manche (Gourdan).

Des cinq exemplaires du Sud-Ouest, quatre sont en bois de cervidé, et un en os. Brisés, leur longueur minimale est de 104 mm et peut dépasser 185 mm. Le manche, épais (4–6 mm) est dans le plan du cuilleron. Il a été aménagé par des encoches, des incisions, des étranglements, ou sculpté en forme de patte. La partie fonctionnelle est de forme ovalaire allongée, plus ou moins déprimée. Les dimensions varient du simple au double. Pour la fonction de *contenant mobile* le cuilleron de Fontalès (8 mm de profondeur) semble le plus approprié; mais quoique moins creuses, les autres pièces peuvent avoir été utilisées pour déplacer de faibles quantités, les remuer, les étaler. Les seules traces relevées à ce jour sont la présence d'ocre sur la pièce en os de La Vache qui peut être liée à la présence d'un colorant plus ou moins solide (poudre, pâte, liquide) préparé ou étalé.

Anciennement publiés, les sept exemplaires découverts dans la grotte de Pékarna ont été récemment analysés; deux d'entre eux – les plus complets- avaient fait l'objet de reconstitution, ou de remontage. Tous sont en os (mandibule de cheval). La longueur maximale (hors reconstitution) est de 285 mm. Le manche est court.

FIGURE 3 Caractères morphologiques et morphométriques des cuillères du Sud-Ouest.

FONTALÈS	LA VACHE	LA VACHE	LA VACHE	GOURDAN
MHNT-20	MAN 83 641	MAN 83 642	MAN 83 643	MAN 47 440/G
Bois de renne	Bois de cervidé	Os	Bois de cervidé	Bois de renne
Cuilleron brisé au moins à 2 reprises		Cuilleron brisé longitudinalement	Cuilleron brisé en oblique	Manche brisé
Lt > 185 mm	Lt > 185 mm	Lt > 104 mm	Lt > 149 mm	Lt > 135 mm
Ep. Manche: 5 mm	Ep. Manche: 6 mm	Ep. Manche: 6 mm	Ep. Manche: 4 mm	Ep. Manche: 5 mm
Manche sculpté en forme de patte. Transition/biseaux polis	Manche allongé avec étranglement	Manche allongé avec étranglement	Manche allongé sans étranglement.Incisions //sur 2 cotés face inférieure	Manche allongé avec encoches s/arêtes, et losanges dur faces inférieure et supérieure
Poli	Lustré	Lustré	Lustré	Lustré
Lc: 120 mm	Lc: 100 mm	Lc > 23 mm	Lc: 272 mm	Lc: 107 mm
Larg.c: 35 mm	Larg.c: 16 mm	Larg.c: 35 mm	Larg.c: 35 mm	Larg.c: 28 mm
Prof.c: 8 mm	Prof.c: 2,5 mm	Prof.c: 2,5 mm	Prof.c: 2 mm	Prof.c: 1,5 mm
Décor figuratif dur cuilleron		Traces d'ocre		

OBJET N°	CARACTÉRISTIQUE	LONGUEUR MAX.	LARGEUR MAX.	ÉPAISSEUR MAX.	MANCHE	PARTIE FONCTIONNELLE
21. 001	Spatule reconstituée	255	74	5	+	+
21. 002	Spatule entière	285	53	3	+	+
21. 003	Fragment distal	84	42	3	–	+
21. 004	Fragment proximal	93	42	5	+	+
21. 005	Spatule inachevée	238	67	4	+	+
22. 226	Fragment	66	33	3	–	+
22. 227	Fragment	43	14	4	–	+
22. 228	Fragment	78	35	5	–	+

FIGURE 4 Tableau morphologique et morphométrique des spatules de Pékarna - Moravie (d'après M. Laznickova 2005).

La partie fonctionnelle est « plate (3 à 5 mm d'épaisseur), de section linéaire, de forme ovale » (Laznickova 2005). Leur utilisation pour remuer, saupoudrer, disperser, étaler parait possible, toutefois on peut s'interroger sur la possibilité d'y déposer de petits volumes de substance plus ou moins fluides ? Aucune étude tracéologique n'a été réalisée sur ces exemplaires.

2.2 Les décors

La gravure non figurative affecte surtout les manches : losanges sur deux faces à Gourdan (MAN 47 440/G), incisions parallèles sur plusieurs cotés à La Vache (MAN 83 643), lignes droites et segments parallèles obliques à Pékarna. Sur la zone fonctionnelle, on ne la rencontre que sur les pièces moraves qu'elle « borde » en quelque sorte de lignes parallèles et de brefs segments parallèles obliques. Sur les deux faces de la pièce 21002, on peut noter, plein chant, des éléments courbes ou rectilignes groupés par trois, et des séries de lignes courtes doubles, bordées toujours des segments brefs parallèles obliques.

La gravure figurative consiste en la représentation d'animaux. Dans le Sud-Ouest français, seule la pièce de Fontalès est concernée, qui réunit six rennes (c'est un minimum, puisque la pièce est cassée), et dont le manche a été mis en forme par sculpture : s'agit-il d'une patte animale comme le suggérait l'inventeur ? Ces rennes sont disposés dans une composition très élaborée de symétrie d'opposition (Welté 2001, et **figure 1**). À Pékarna, les espèces animales –limitées au protomé- sont présentes sur trois exemplaires (Laznickova 2005). Elles sont plus variées : bison, antilope, cheval (quatre individus), animal indéterminé (deux individus). Sur la pièce 21 001, la disposition est assez complexe, jouant toujours sur les symétries d'adossement et de tête-bêche (**figure 2**, A).

2.3 Discussion

Ce petit lot d'objets est réalisé en matière dure animale ; seule la nature de celle-ci varie : os à La Vache, Gourdan et Pékarna, bois de renne à La Vache et Fontalès.

Tous comportent un manche pour la préhension et une zone supposée fonctionnelle, de forme allongée. Cette morphologie similaire présente des variantes : manche bref après étranglement à Pékarna, plus long dans le Sud-Ouest, flèche plus ou moins lancéolée. Les pièces moraves sont plus grandes, et l'exemplaire de Fontalès est à la fois d'un tiers plus petit que les précédentes, mais plus grand que ceux du Sud-Ouest. Les pièces du Sud-Ouest présentent de légères dépressions, bien moins accusées que celle de Fontalès.

Toutes ont été utilisées comme le montrent les zones plus ou moins étendues lustrées, émoussées ou polies, et peut-être les fractures (si elles ne sont pas dues au séjour dans le sol, ou aux accidents de fouilles). Pour quel(s) usage(s) ?

S'agit-il d'un usage quotidien ? L'utilité d'un contenant mobile est grande (même les grands primates en confectionnent). Mais le petit effectif est surprenant…

Il est vrai que d'autres objets de ce type ont pu être réalisés en matière périssable (bois, écorés, feuilles) et disparaitre.

Leur faible profondeur amène à s'interroger sur l'état du produit transporté (fluide, granules, pâte, poudre) ainsi que sur sa nature. À quelle(s) catégorie(s) se rattachait-il :

- alimentaire comme la récupération de liquide, de la moelle des os (Piette 1874), de miel, des graines, des baies ;
- ou d'un genre plus rare, à la limite exceptionnel, voire dangereux (boisson particulière, colorant, fard, hallucinogène, poison).

Mais à ce jour aucune trace d'un éventuel contenu n'a été observée, à l'exception de la pièce de La Vache MAN 83642 qui avait conservé des traces d'ocre rouge sur toute sa surface. Quels étaient les gestes avec lesquels la cuillère/spatule était utilisée ? Aucune analyse tracéologique n'a été effectuée qui pourrait fournir des indications.

Quelques-unes portent des décors figuratifs très élaborés, fondés sur les jeux de symétrie intra spécifique (affrontement, adossement, tête-bêche) à Fontalès -ou interspécifique à Pékarna.

Ces quelques pièces apparaissent très proches même si elles ne sont pas identiques en raison d'une morphologie variable (longueur du manche, profondeur du « cuilleron ». Leur petit effectif amène à penser qu'elles n'étaient pas d'usage quotidien, mais sans doute exceptionnel. Mais quel(s) usage(s) et dans quel(s) cadre(s) ? S'agit-il d'objets de prestige ? Sont-elles réservées à des pratiques exceptionnelles (ornementation, aspersion, libation) ? Était-ce pour la consommation d'un produit, pour une utilisation privée, personnelle, cérémonielle, sociétale ?

Enfin il convient de noter que ces objets proviennent de sites majeurs très fréquentés en raison de la puissance de leur stratigraphie, liée sans doute à une présence humaine assez longue, et fréquente.

3 LES « FIGURES FÉMININES SCHÉMATIQUES » DU TYPE LALINDE-GÖNNERSDORF

Les « figures féminines schématiques dites FFS » (Delluc & Delluc 1995) n'ont pas été d'emblée reconnues comme des silhouettes féminines abrégées. En effet, les graphismes des blocs gravés de La Roche à Lalinde (Dordogne), découverts en 1927 par L. G. Peyrille ont été interprétés d'abord comme des têtes d'oiseaux par D. Peyrony (1930 : 26), mais dans le même article, cet auteur rappelait l'interprétation d' H. Breuil, qui, ayant observé les statuettes trouvées au Pétersfels (Allemagne), pensait qu'il s'agissait de « femmes sans tête très stylisées ». Depuis, les découvertes des figures féminines schématiques se sont succédées, en particulier à la Gare de Couze (Dordogne) où F. Bordes en 1932 exhume entre les couches H et G1 une dalle calcaire portant une FFS au torse plus détaillé où sont reconnaissables la nuque, un bras, un sein et le renflement pubien, ce qui « confirme le caractère féminin des figurations de ce type » (Delporte 1993). Avec le site de Gönnersdorf (Allemagne) (Bosinski & Fisher 1974), les multiples exemplaires gravés (402) ont permis d'établir toutes les étapes vers l'ultra-schématisation de cette représentation de la femme (**figure 5**).

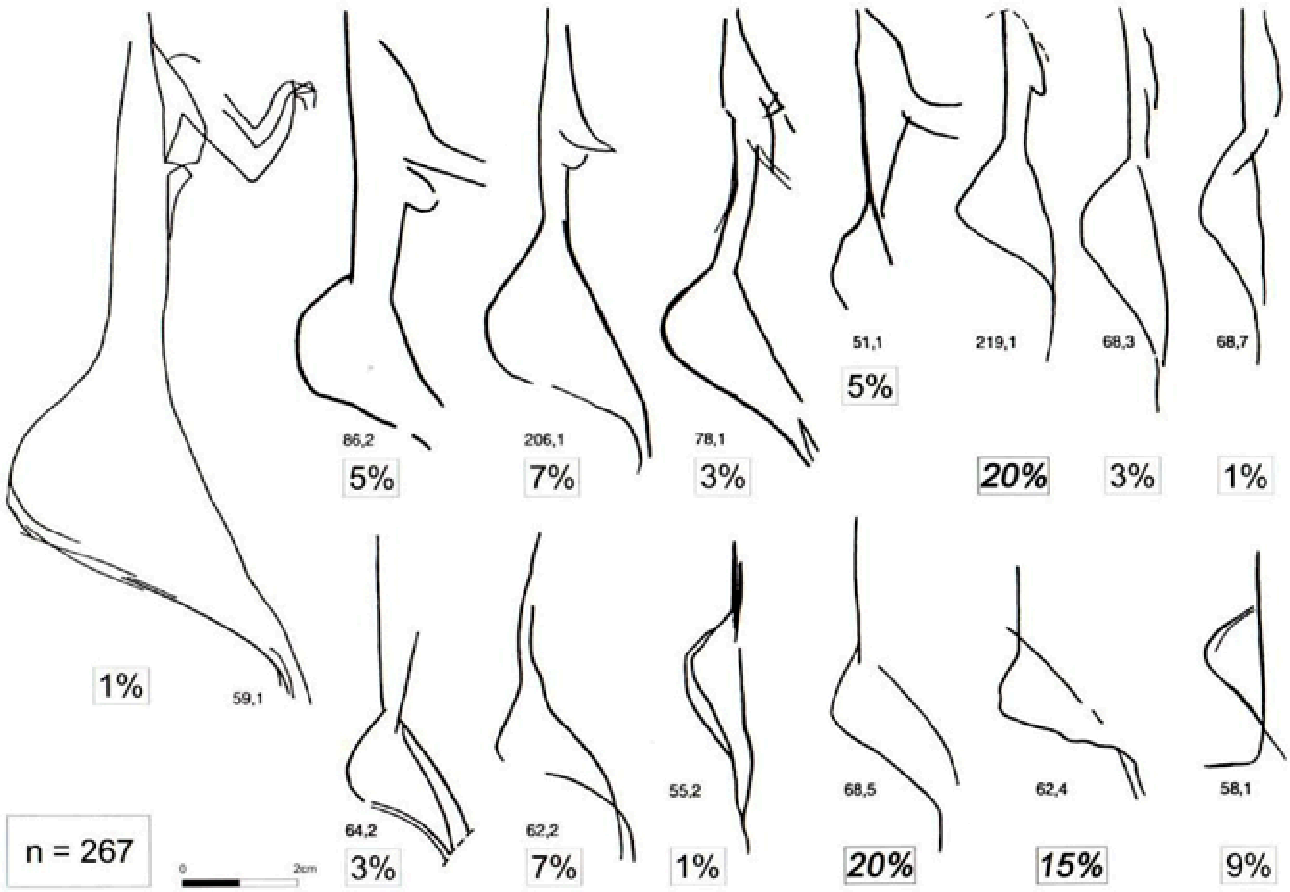


FIGURE 5 Typologie des Figures féminines schématiques (FFS) de Gönnersdorf (Allemagne) (d'après Bosinski, d'Errico & Schiller 2001, Bosinski 2011).

FIGURE 6 Figures féminines schématiques antérieure au Magdalénien supérieur (A : Moulin-neuf), ou postérieures (B : Niederbiber).

Dans l'art mobilier européen, ces représentations sont très nombreuses : d'après la littérature et mes observations personnelles, leur effectif atteint les 600 images gravées ou sculptées réparties dans plus d'une trentaine de sites …Cet effectif doit être considéré comme provisoire en raison des révisions de collection à effectuer et donc des redécouvertes (ou des suppressions) éventuelles, ainsi que des découvertes à venir. Sur un espace très vaste - de l'Espagne à la Moravie et à la Pologne, (**figures 8** et **9**) leurs images gravées se répartissent de manière très inégale en deux ensembles principaux : la Rhénanie (avec le rôle « écrasant » de Gönnersdorf) et le Sud-Ouest français, tandis que les statuettes paraissent sont plus disséminées (avec l'importante contribution de Wylczyce). Chronologiquement, elles sont dans leur quasi-totalité, datées ou rapportées au Magdalénien supérieur et final, de 13 680 ±130 BP (La Magdeleine-la Plaine) – jusqu'aux alentours de 12 500 BP, soit un peu plus d'un millénaire. À l'Azilien, leur présence parait devenir exceptionnelle (ainsi dans les sites allemands de Petersfels et Niederbiber) , de même que leurs éventuelles expressions au Magdalénien moyen à Laugerie-Basse (Dordogne) ou à Moulin-Neuf (Gironde). Ces images sont-elles similaires ? Matérialisent-elles des liens entre ces sites dont le plus grand nombre a livré d'abondants vestiges de toutes sortes d'activités, et où les hommes peuvent avoir effectués des séjours longs et répétés ?

3.1 Caractères des « figures féminines schématiques » gravées : aspect, nombre, attitude

Les gravures s'inscrivent de préférence sur les supports lithiques (calcaire, schiste, grès…), dont les formes sont brutes (plaquette, plaque, dalle, bloc, fragment) ou transformées (godet, pendeloque, polissoir, *etc.*), et les poids très variés (de 100 gr à 5,5 kg à Fontalès). Les supports en matière dure organique (os, bois de cervidé, le plus souvent en l'état de fragment brut) sont peu fréquents.

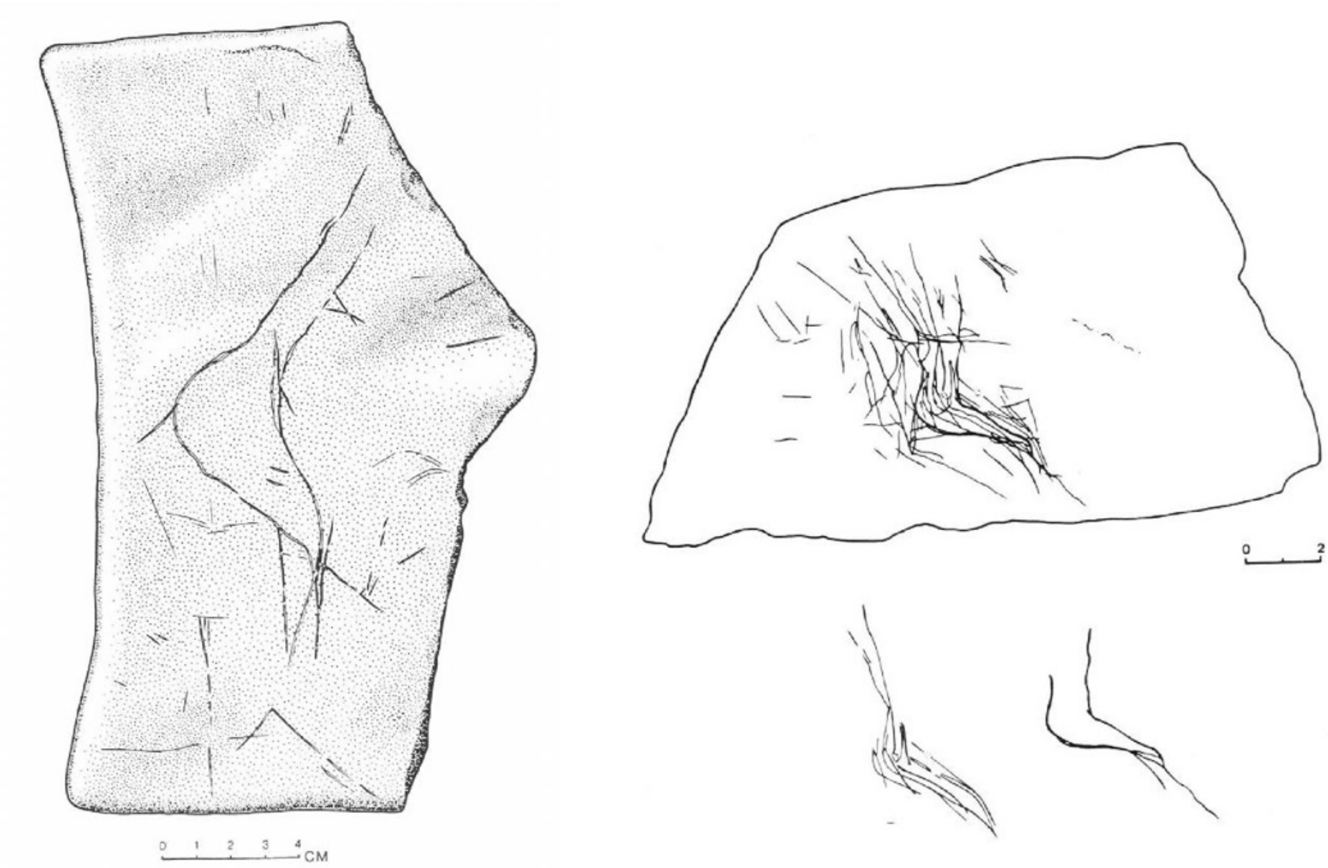
Toujours représentées de profil, les formes féminines sont très abrégées. La tête est toujours absente. Pour la grande majorité d'entre elles le torse/buste se réduit à un ou deux traits, sans bras ni seins. Rares sont celles qui portent de façon certaine bras et sein, ou seulement un appendice difficile à identifier. La cambrure est plus ou moins forte, le fessier en général développé, l'abdomen plat, le triangle pubien non indiqué. La majorité de ces figures se termine au niveau des genoux par une ligne ou deux, plus ou moins droite(s) ou recourbée(s) vers l'arrière.

La FFS peut être représentée seule sur un support intact, ou ayant suffisamment conservé d'espace autour d'elle (Gare de Couze (MNP 92.4.1) (Bordes *et alii* 1963), à Fontalès (MHNT–36), au Courbet (BM 518), au Petersfels (Albrecht 1979), à Pékarna (plaquette section E, Svoboda *et alii* 1998), ou accompagnées. Dans ce cas leur disposition est variée. Elles peuvent s'organiser :

- en file de deux orientées dans le même sens (à Gönnersdorf n° 55, ou 219), et en partie superposées (à Andernach n° 31), ou dans le même sens mais inversé (à Gönnersdorf n° 86), ou en sens opposé et face à face (à Gönnersdorf n° 81 et 176 ; à La Magdeleine-La Plaine (Tarn-et-Garonne), ou croisées (à Gönnersdorf n° 78 et 79), ou dos à dos (à Gönnersdorf n° 80) ;

- en file de trois ou plus, orientées dans le même sens à Gönnersdorf (n° 68, 73, 232), à Hohlenstein (Allemagne), parfois en superposition plus ou moins importante à Andernach (n° 16a), à Gönnersdorf (n° 65) ou bien en sens opposés, face à face à Gönnersdorf (n° 206, 225), à La Roche à Lalinde (bloc du Field Museum de Chicago) ;

- en « tourbillon/spirale » à Fontalès (MHNT–34), La Roche à Lalinde (MNP 30.1.1).



A

B

FIGURE 7 Courbet (Tarn, France). Figures féminines du type Lalinde-Gönnersdorf gravées sur pierre. A : FFS gravée au verso d'un godet (lampe ?) (BM-64-12-26-1124 / BM 518), relevé P. Dean ; B : FFS gravée sur plaquette Alaux (relevé A.-C. Welté).

Les attitudes sont diverses. La plupart d'entre elles – verticales, penchées en avant ou légèrement cambrées- paraissent statiques. La flexion des genoux conjuguée à la rectitude du torse permet d'envisager une position assise à Fontalès (MHNT–34-M2), au Courbet (BM 518 et plaquette Alaux - **figure 7**, Welté & Cook 1992–1993), à La Magdeleine-La Plaine (plaquette E fig. c et d, Ladier 2001), à La Roche à Lalinde, à Gönnersdorf (n° 203). D'autres semblent dynamiques, dans des postures très naturelles comme pour se rendre dans un lieu déterminé à Gönnersdorf (205), ou pour converser à La Roche à Lalinde (Field Museum) ou Gönnersdorf (n° 76, 81, 206). Récemment a été avancée l'hypothèse de danses (Bosinski 2011, et Collectif 2011) qui ne parait guère convaincante. Enfin aucune scène maternelle n'est représentée : si au dos d'une des silhouettes de la plaquette n° 87 de Gönnersdorf la petite forme gravée et rattachée à cette dernière a pu être interprétée comme un enfant transporté dans le dos, cela reste du domaine de l'éventualité, la seule certitude étant un élément attaché dans le dos…

3.2 Caractères des « figures féminines schématiques » sculptées (aspect, attitude)

Reprenant le même modèle graphique, les statuettes sont sculptées dans toutes sortes de matériau lithique : calcaire, schiste, galet de rivière, silex, jayet, et organique : ivoire, os, bois de cervidé. Leurs dimensions sont très variables : 21 cm à Andernach (en ivoire), moins de 3 cm à Monruz (Suisse) (Egloff 1995). Les attitudes sont similaires à celles des gravures : très droite à Andernach et à Fontalès, cambrée à Oëlknitz (Allemagne), assise au Courbet (Ladier 1992) et pour certaines pièces du Petersfels (Peters 1930).

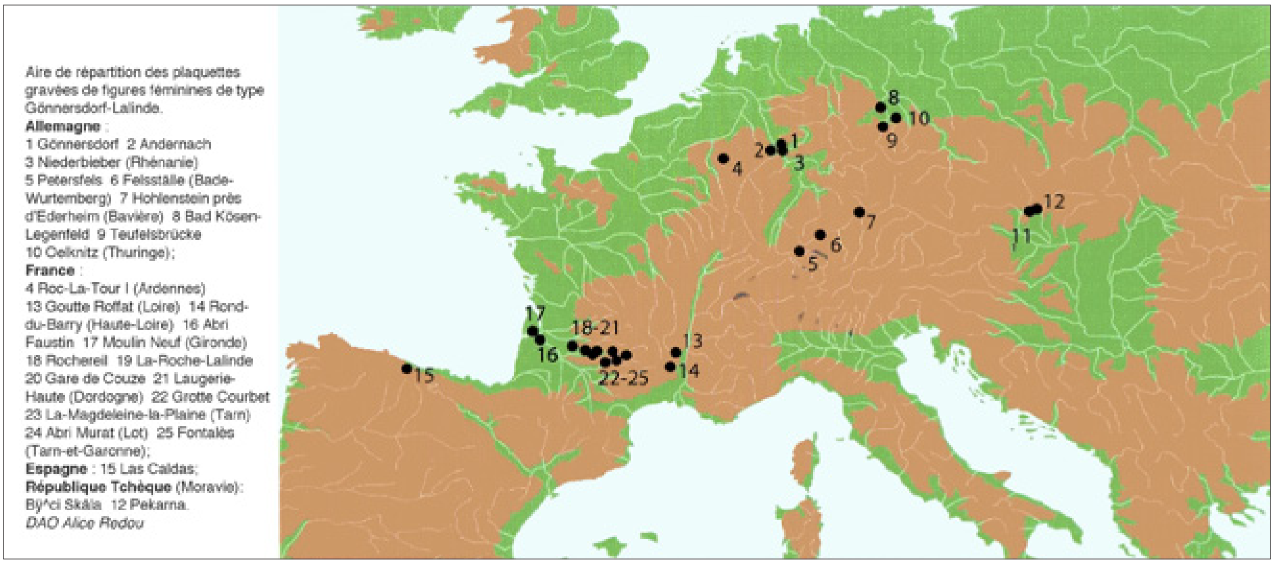
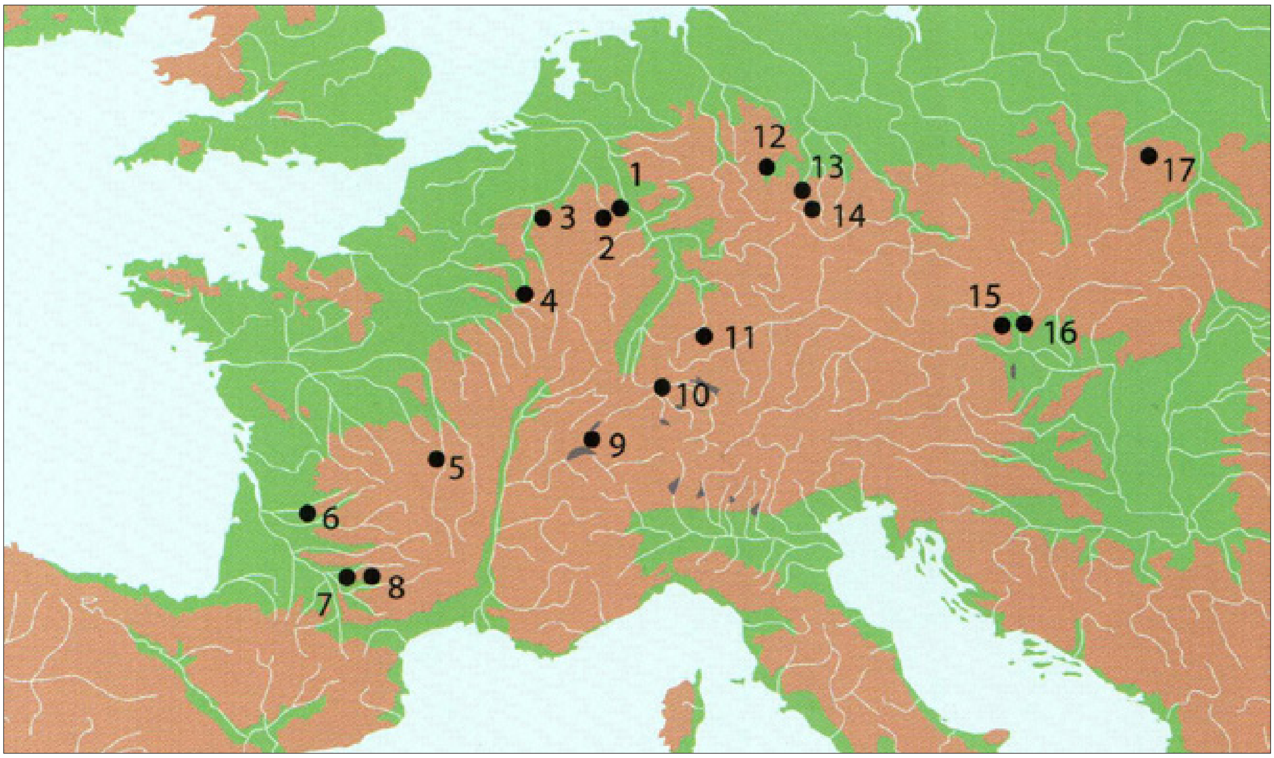


FIGURE 8 Carte de répartition des plaquettes gravées de Figures féminines du type Lalinde- Gönnersdorf (d'après Bosinski 2011).

FIGURE 9 Carte de répartition des statuettes féminines du type Lalinde- Gönnersdorf (d'après Bosinski 2011, modifiée). Allemagne : 1. Gönnersdorf, 2. Andernach (Rhénanie), 10. Petersfels, 11. Hohelenstein-Stadel (Baden-Würtemberg), 12. Nebra (Saxe-Anhalt), 13. Oelknitz, 14. Garsitz (Thuringe). Belgique : 3. Mégarnie. France : 4. Farincourt (Hte-Marne), 5. Enval (Puy-de-Dôme), 6. Laugerie-Basse (Dordogne), 7. Grotte Courbet (Tarn), 8. Fontalès (Tarn-et-Garonne). Suisse : 9. Monruz (canton de Neuchâtel). Tchéquie : 15. Pékarna, 16. Byci Skala (Moravie). Pologne (Wylczyce).



3.3 Quel contexte archéologique ?

Dans ce cadre spatio-temporel très vaste, les figures féminines schématiques manifestent un graphisme bien reconnaissable, mais en même temps elles apparaissent variées par leurs supports, leurs dispositions, leurs attitudes… Comment comparer la figure isolée sur plaquette de Murat aux groupes de La Roche à Lalinde et aux files de Gönnersdorf, les silhouettes sans remplissage interne (Fontalès, Courbet, La Magdelaine-La Plaine), avec celles qui portent des barres fessières transversales (Fontalès, Murat, La Roche à Lalinde), ou qui sont entièrement striées (Gönnersdorf), des plus réalistes (La Gare de Couze, Gönnersdorf), aux plus elliptiques (plaquette de Pékarna, fouilles1986–87, niveau 8, section E), et la statuette en ivoire d'Andernach à celles en silex de Wilczyce ?

Le contexte archéologique pourrait-il livrer des informations complémentaires qui permettraient de conforter ces similitudes graphiques ? Les recherches récentes sur le terrain et dans les musées, conjuguées aux études de laboratoire, peuvent en livrer, ce qui n'est pas souvent le cas lorsque les pièces ont été trouvées lors de fouilles anciennes, ou lorsque les magdaléniens eux-mêmes les avaient reléguées dans des zones de rejets.

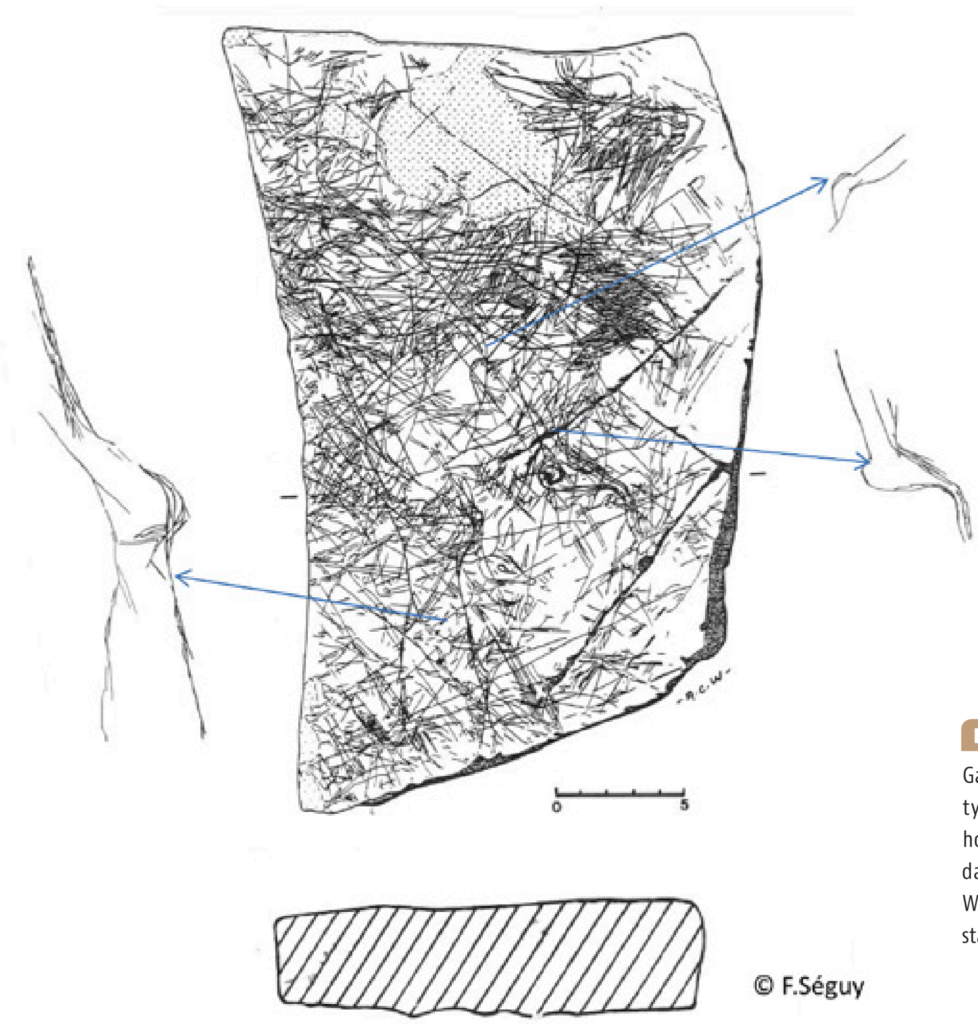
1. Pour un même graphisme, une FFS gravée sur un support organique a-t-elle eu le même rôle qu'une FFS sur un support lithique ? Une FFS réalisée sur une plaquette légère et facile à transporter était-elle semblable de sens et de fonction que la même FFS sur une lourde dalle ?

2. Les FFS paraissent rarement être réalisées sur des objets d'usage. Particulièrement intéressante est la silhouette gravée sur la face plane d'un bloc du Courbet (BM 64 – 12 – 26 – 1124 / BM 518) (**figure 7**), restée inconnue jusqu'en 1989 date à laquelle les transformations dans le rangement du matériel ont permis de la découvrir (Welté & Cook 1992–1993). L'autre surface de ce bloc montre une dépression naturelle, à l'intérieur de laquelle sont observables des zones sombres et rougies (pourpre foncé) sans doute dues à l'ignition car aucune trace de colorants n'a été observée. La FFS a été réalisée au dos de ce godet (lampe ?) brisé, et elle est très bien cadrée sur la surface lisse. Intègre malgré la proximité du bord fracturé, elle amène à s'interroger sur la relation éventuelle support-décor. Aucune indication dans ce sens n'a été observée.

Toujours dans la vallée de l'Aveyron, du site de La Magdeleine-La Plaine (couche c4, avec présence d'un foyer) provient une plaque calcaire, dont la face décorée présente une concavité centrale bordée d'un ressaut naturel (godet ?). C'est dans ce godet qu'ont été gravés deux groupes de deux figures féminines schématiques, emboîtées deux à deux et disposées face à face (Ladier 2001).

3. Dans l'espace habité, les supports lithiques gravés de FFS ont pu être utilisés comme éléments de pavage, ce qui peut entrainer fractures et déplacements en raison des occupations longues et successives. Mais très souvent, dans les sites anciennement fouillés, blocs, plaques et plaquettes ont été aussi trouvés en plein habitat, sans autres précisions. À Fontalès, la dalle MHNT–34 (**figure 10**) a été trouvée face gravée sur le sol, mais cela peut être d'origine naturelle. À Monruz, où un pavage a été retrouvé, une petite statuette a été découverte près d'un foyer. Au Petersfels, la plaquette gravée d'une FFS n'a pas été trouvée en place, à Pékarna non plus.

Nombre de statuettes en ivoire et en bois de cervidé ont été découvertes dans de petites fosses à Nebra, Oëlknitz, Gönnersdorf, Andernach ; Quelles sont ces fosses ? à l'origine peut-être des fosses à cuisson (Bosinski 2011), puis des dépotoirs/ évacuations ? Ou encore des lieux de dépôts utilitaires à conserver, ou d'autres fonctions encore inconnues ? Peut-on envisager des « rites de fondation ? »



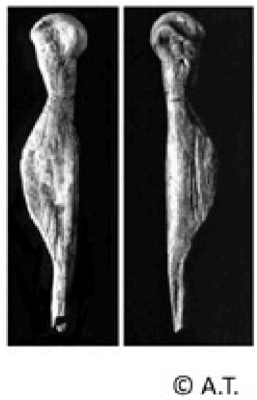


FIGURE 10 Fontalès (Tarn-et Garonne, France). Figures féminines du type Lalinde-Gönnersdorf : A. Trois silhouettes (et des animaux) gravées sur dalle calcaire MHNT-34 (relevé A.- C. Welté) ; B. Stylet de renne aménagé en statuette féminine (MHNT-38) (cl. A.M.P).

4. La recherche des traces d’usage ouvre le débat sur la durée d’utilisation. La statuette de Fontalès (MHNT–38, **figure 9**) montre une usure localisée à la saillie fessière et aux deux dépressions qui l’encadrent (Welté 2001), ce qui révèle une assez longue manipulation, mais dont il est impossible de préciser la durée, la fréquence et les circonstances…C’est le cas également de quelques statuettes en schiste de Gönnersdorf dont le contour a été poli. De même les bords de la plaquette de l’abri Murat (fouilles Lemozi, foyer R, n°4666) sont arrondis et usés, ce qui paraît indiquer aussi un usage prolongé (Lorblanchet & Welté 1987).

Les pendeloques en jayet (à Pékarna, Monruz…) sont en général très lisses, comme si elles avaient été portées (en pendentif, ou cousues sur un vêtement), ou comme si elles avaient été souvent manipulées. Cet aspect très poli contraste avec certaines d’entre elles qui sont à l’état d’ébauche, ou seulement inachevé et à la surface plus rugueuse (à Pétersfels entre autres).

5. À ce jour, aucune FFS gravée ou sculptée n’a été trouvée en milieu funéraire.

L’examen des représentations des figures féminines schématiques dévoile une certaine hétérogénéité d’abord entre elles-mêmes, et aussi par leurs nombres, leurs dispositions, leurs attitudes et les supports sur lesquels elles s’inscrivent. En outre à l’intérieur d’un même site cohabitent des types différents, comme à Gönnersdorf, au Courbet, à Fontalès ou à Pékarna.

La schématisation extrême ne laisse pas que d'interroger sur le modèle féminin que ces graphismes sont censées représenter. Démunies de tête (et donc des organes sensoriels), les FFS ne peuvent établir de communications. L'absence fréquente de seins, l'abdomen plat, semblent indiquer que ces figures ne sont pas en relations avec la fonction fondamentale de la femme, la maternité ; ce qui parait être renforcé par l'absence de scènes maternelles (au contraire de ce qui est observable chez les animaux). Même le triangle pubien n'est en général pas indiqué : seuls la cambrure et le volume du fessier indiquent la femme et paradoxalement les sexes féminins isolés sont présents à cette période.

Pourtant ce modèle a été partagé pendant plus d'un millénaire en Europe : l'unité dans la schématisation suppose bien une communauté de concept, donc des liens entre les groupes qui partagent la même base culturelle et symbolique malgré une pratique graphique différenciée.

4 ÉLÉMENTS DE CONCLUSION

Les similitudes observées sur les objets artistiques étudiés– transportables par définition- amènent à s'interroger sur leurs origines : résultent-elles de phénomènes de diffusion, de contacts entre les groupes ?

En ce qui concerne les cuillères/spatules, le matériau du support, la morphométrie, l'existence d'un manche de préhension précédant la zone fonctionnelle et leur réalité vraisemblablement exceptionnelle relèvent des similarités, de même que la disposition en symétrie élaborée de leurs décors figuratifs. Cependant leur morphologie même est différente, et l'étude tracéologique fait défaut, qui permettrait de préciser leurs usages. Leur regroupement géographique à la fois dans le Sud-Ouest français et en Moravie fait apparaitre une solution de continuité importante, comme si cet objet avait perdu toute justification d'existence. Or tout phénomène de rupture entre ces deux groupes est contredit par l'existence des FFS, dont le modèle graphique particulier s'est imposé dans les mêmes sites et la même fourchette chronologique, ainsi que dans quelques sites approximativement contemporains qui peuvent être considérés comme autant de jalons intermédiaires entre ces deux pôles.

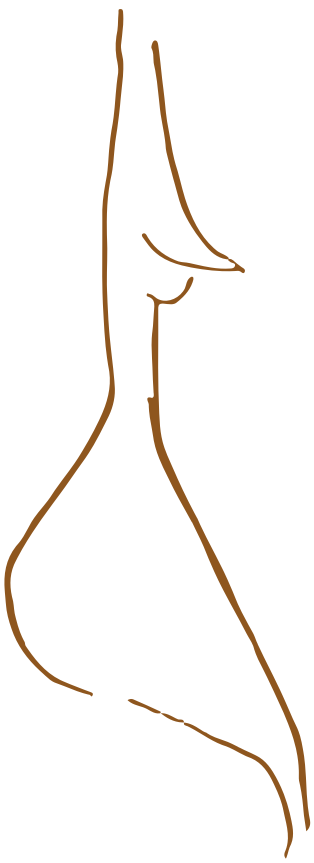
L'ensemble de ces sites recensés s'étend des Pyrénées à la Pologne, entre le 43° et le 50° de latitude Nord, dans un espace auquel l'alternance des montagnes et des plaines confère cet aspect particulier en « marqueterie », et dont l'un des axes majeurs de circulation en terres basses libérées des glaces est la vallée du Danube, qui rejoint le couloir naturel Rhin-Rhône-Saône, voie d'accès à l'Europe occidentale. Dans cet espace, matières premières lithiques et coquilles (pour la parure des vivants et des morts) circulent. Cet état de fait est bien attesté par de nombreuses observations (Fernandez 2000 ; Feblot-Augustin 1997 ; Floss 2000) et les distances peuvent être importantes. À Fontalès a été reconnue la présence de charophytes des Pyrénées, et de flysch de la région de Tarbes, distants au plus de 300 km. À Moosbühl (Suisse) l'ambre jaune qui y a été découvert oblige à placer une source d'approvisionnement à près de 800 km. À Andernach (Allemagne), les distances d'approvisionnement peuvent s'étirer jusqu'à 600 km pour le silex de la Meuse, et les quartzites des Ardennes. À Öelknitz (Allemagne), un approvisionnement lointain en silex est prouvé par la présence matériau provenant de la région de Swieciecho. En Moravie, ces zones d'approvisionnement se situent au Nord et au Nord-est, à des distances qui peuvent atteindre 450 km pour Pékarna. Les coquilles fossiles sont également retrouvées loin de leurs zones d'origine.

À Fontalès les coquilles fossiles de *Glycyméris* sp. proviennent des sites pliocènes de la vallée du Rhône et du Roussillon,et/ou des sites pléistocènes de la côte française atlantique et de la Méditerranée. Des coquilles de *Natica* sp. viennent forcément de loin : côtes de la méditerranée, côtes atlantiques françaises, voire marocaines et /ou portugaises. En Allemagne (Gönnersdorf, Andernach, Petersfels) les coquilles méditerranéennes retrouvées représentent un acheminement de 600 km, les coquilles des littoraux atlantiques étant encore plus éloignées. En Suisse (Monruz, Schweizerbild, Kesslerloch…) les coquilles peuvent provenir du cours supérieur du Danube (300 km) ; du bassin de Mayence (250 km environ) du bassin Parisien (autour de 400 km)… (Welté & Lambert 2004).

Ainsi émergent les circulations de matières premières lithiques et de coquilles sur de longues distances. Les groupes de chasseurs-cueilleurs-pêcheurs se déplacent en suivant les troupeaux de rennes dont les déplacements sont structurés par la transhumance. On admet en général des déplacements moyens annuels de l'ordre de 80–100 km, avec un glissement de 200 à 300 km des zones de chasse dû aux modifications climatiques pendant ce millénaire.

Si en plaine, les territoires de chasse peuvent être vastes, ils se resserrent selon les accidents et étroitures (gués, défilés, seuils…) du relief. Les contacts directs peuvent avoir lieu, de même que les échanges. Ces contacts sont très vraisemblables, car d'autres similitudes existent depuis la présence de rondelles perforées dans nombre des sites recensées, jusqu'à l'existence d'animaux fusionnés d'espèce différente (cheval/rupicapra), limités à la tête et inscrits sur dalle à Fontalès, entiers et gravés sur os à Pékarna (Welté & Lambert 2011). Mais certains cheminements (ambre balte, coquilles méditerranéennes voire atlantique) dépassent en amplitude ceux des chasseurs magdaléniens ce qui amène à envisager des échanges dans le cadre de relations sociales (négociations, alliances), sans pouvoir vraiment les préciser…

Dans cet espace très vaste en forme d'un arc de cercle (sans présomption de l'orientation du déplacement en raison des incertitudes des datations) depuis les Pyrénées (cuillère et statuette à Gourdan), la vallée de l'Aveyron, la vallée du Rhône, les basses terres du Jura suisse, l'Allemagne jusqu'à la Moravie (cuillères/spatules et FFS de Pékarna) et la Pologne (FFS de Wylczyce), des groupes humains ont en commun la même base culturelle et symbolique. Des expressions particulières existent. Elles peuvent être locales et liées à la permanence de traditions. Elles peuvent aussi être dues à des influences externes liées aux rencontres d'origines diverses : déplacements économiques, fréquentation de sites où ont été réalisées toutes sortes d'activités.



BIBLIOGRAPHIE

ABSOLON K. (1939) – Les nouvelles fouilles dans la grotte de Pékarna et les poignards faits en mâchoires de cheval. Dans : *Mélanges de Préhistoire et d'Anthropologie offerts au Professeur Comte H. Bégouën*, p. 257–262.

ALBRECHT G. (1979) – *Magdalenian-Inventare vom Petersfels*. Tübinger Monographien zur Urgeschichte 6, Archeologica venatoria Verlag.

BORDES F., FITTE P. & LAURENT P. (1963) – Gravure féminine du Magdalénien VI de la Gare de Couze (Dordogne). *L'Anthropologie* 67 : 269–282.

BOSINSKI G. (2011) – *Femmes sans tête*. Paris, Errance.

BOSINSKI G. & FISHER G. (1974) – *Der Magdalenien-Fundplatz Gönnersdorf 1. Die Menschendarstellungen von Gönnersdorf der Ausgrabung von 1968*. Wiesbaden, Franz Steiner Verlag, GM-BH.

BOSINSKI G., D'ERRICO F. & SCHILLER P. (2001) – *Die gravierten Frauendarstellungen von Gönnersdorf 8*. Stuttgart, Steine.

BREUIL H. (1925) – *Notes de voyage paléolithique en Europe centrale*. Extraits de l'Anthropologie XXXIII, XXXIV et XXXV. Paris, Masson.

BUISSON D. & PELTIER A. (1993) – Cuillers à cuilleron élargi. Dans : H. Camps-Fabrer (dir.), *Fiche typologiques de l'industrie osseuse préhistorique. Cahier VI. Éléments récepteurs.* Treignes, Cedarc, UISPP, Commission de nomenclature sur l'industrie de l'os préhistorique, p. 141–144.

COLLECTIF (2011) – *Mille et une femmes de la fin des temps glaciaires*. Catalogue de l'exposition du Musée national de Préhistoire, Les Eyzies-de-Tayac, Paris, RMN.

DARASSE P. (1955) – Deux Œuvres d'art magdaléniennes de l'abri de Fontalès, près St-Antonin (Tarn-et-Garonne). Bulletin de la Société préhistorique française 52 : 715–717.

DELLUC B. & DELLUC G. (1987–1990) – Le Décor des objets utilitaires du Paléolithique supérieur. Dans : J. Clottes (dir), *L'Art des objets au Paléolithique. 2- Les Voies de la Recherche*, Colloque international Foix–Le Mas-d'Azil, Paris, Ministère de la Culture, Actes des Colloques du Patrimoine 8 : 39–72.

DELLUC B. & DELLUC G. (1995) – Les figures féminines schématiques du Périgord. *L'Anthropologie* 99 : 236–257.

DELPORTE H. (1993) – *L'Image de la femme dans l'art préhistorique*. Paris, Picard, 2e édition 1993.

EGLOFF M. (1995) – Les Figurines féminines magdaléniennes de Neuchâtel (Suisse). Dans : *La Dame de Brassempouy*. Liège, ERAUL 74 : 71–87.

FERNANDEZ E.A. (2001) – L'axe Rhin-Rhône au Paléolithique supérieur récent : l'exemple des mollusques utilisés comme objets de parure. *L'Anthropologie* 105 : 547–564.

FLEBOT-AUGUSTIN J. (1997) – *La circulation des matières premières au Paléolithique*. Liège, ERAUL 75.

FLOSS H. (2000) – Le couloir Rhin-Saône-Rhône : axe de communication au Tardiglaciaire ? Dans : *Les derniers chasseurs-cueilleurs d'Europe occidentale*. Acte du colloque international de Besançon 1988, Presses Universitaires Franc-Comtoises, p. 313–321.

JELINEK J. (1976) – *Encyclopédie illustrée de l'Homme préhistorique*. Paris, Gründ.

KOZLOWSKI J.K (1992) – *L'Art de la Préhistoire en Europe centrale*. Paris, CNRS.

LADIER E. (1992) – La Vénus du Courbet. *L'Anthropologie* 96 : 349–356.

LADIER E. (2001) – Nouvelles figures schématiques du type Lalinde-Gönnerdorf dans la vallée de l'Aveyron. *Paléo* 13 : 265–274.

LENOIR M. & WELTÉ A.-C. (2002) – Les figures animales de la plaquette de Moulin-Neuf (Saint-Quentin-de-Baron, Gironde). Nouvelles observations. *Préhistoire du Sud-Ouest* 9 : 179–184.

LAZNICKOVA M. (2005) – Les spatules de la grotte de Pékarna (Moravie, république Tchèque). Dans : V. Dujardin (dir.) (2005), *Industrie osseuse et parures du Solutréen au Madalénien en Europe. Table ronde sur le Paléolithique supérieur récent*, Société préhistorique française 39 : 221–230.

LAZNICKOVA-GONYSEVOVA M. (2002) – L'art mobilier magdalénien en matières dures animales de Moravie (République tchèque). Aspects technologique et stylistique. *L'Anthropologie* 106 : 525–564.

LEJEUNE M. (1987) – *L'art mobilier paléolithique et mésolithique en Belgique*. Université de Liège, Artefacts 4.

LENOIR M. & WELTÉ A.-C. (2002) – Les figures animales de la plaquette de Moulin-Neuf (Saint-Quentin-de-Baron, Gironde). Nouvelles observations. *Préhistoire du Sud-Ouest* 9: 179–184.

LEROI-GOURHAN A. (1965) – *Préhistoire de l'art occidental*. Paris, Mazenod, 1re éd. et édition revue par B. et G. Delluc (1995), Paris, Citadelles et Mazenod.

LEROI-GOURHAN A. (1971) – *L'homme et la matière*. Paris, Albin Michel.

LEROI-GOURHAN A. (1973) – *Milieu et techniques*. Paris, Albin Michel.

LORBLANCHET M. & WELTÉ A.-C. (1987) – Les Figurations féminines paléolithiques du Quercy. *Bulletin de la Société des Études du Lot* 108: 3–58.

LORBLANCHET M. & WELTÉ A.-C. (2002) – Complément à l'étude de l'art mobilier de l'abri Murat (Rocamadour, Lot): les figures féminines du Magdalénien quercynois. *Préhistoire du Sud-Ouest* 9: 163–178.

PETERS E. (1930) – *Die altsteinzeitliche Kulturstätte Petersfels*. Augsburg.

PEYRONY D. (1930) – Sur quelques Pièces intéressantes de la grotte de la Roche, près de Lalinde (Dordogne). *L'Anthropologie* 40: 18–29.

PIETTE É. (1894) – Histoire de la cuiller. *Congrès de l'Association française pour l'avancement des sciences (Afas)*, Lille, p. 679–684.

SVOBODA J., HORACEK I., LOZEK V., SVOBODOVA H. & SILAR J. (1998) – The Pekarna Cave. Magdalenian stratigraphy, environment, and the termination of the loess formation in Moravian karst. *Antropozoïkum* 24: 61–79.

VALOCH K. (1970) – Œuvres d'art et objets en os du Magdalénien de Moravie (Tchécoslovaquie). *Bulletin de la Société Préhistorique de l'Ariège - Préhistoire ariégeoise.* 25: 79–93.

WELTÉ A.-C. (2001) – *L'art mobilier magdalénien de Fontalès (Tarn-et-Garonne) dans la vallée de l'Aveyron: les représentations anthropomorphes et zoomorphes.* Thèse de Doctorat d'Etat es Lettres et Sciences Humaines: Université de Franche – Comté, UFR des Sciences du Langage, de l'Homme et de la Société; et UMR 6565, Laboratoire de Chrono-Ecologie.

WELTÉ A.-C & COOK J. (1992) – Un Décor exceptionnel (silhouette féminine stylisée) sur godet de pierre de la grotte du Courbet (France). *Comptes rendus des séances hebdomadaires de l'Académie des Sciences de Paris* 315(2): 1133–1138.

WELTÉ A.-C & COOK J. (1993) – Nouvelle gravure féminine de la grotte du Courbet. *Bulletin de la Société préhistorique de l'Ariège, Préhistoire ariégeoise* 48: 107–122.

WELTÉ A.-C. & LAMBERT G.-N. (2004) – *L'art mobilier du Magdalénien supérieur des sites de la vallée de l'Aveyron et d'Europe centrale: relations et/ou convergences?* Liège, ERAUL 107: 239–248.

WELTÉ A.-C. & LAMBERT G.-N. (2012) – Mythes et symboles dans les manifestations artistiques du Paléolithique supérieur: la place des assemblages animal/animal et animal/humain. Dans: J. Clottes (dir.), *L'art pléistocène dans le monde / Pleistocene art of the world / Arte pleistoceno en el mundo.* Art et Sociétés, Bulletin de la Société Préhistorique Ariège-Pyrénées 55–56: 302–303, CD: 1749–1762.

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Thème VI
DÉBATS GÉNÉRAUX

Contacts et déplacements des groupes humains dans le Paléolithique superieur européen : les adaptations aux variations climatiques des stratégies de gestion des ressources dans le territoire et dans le cycle annuel

François DJINDJIAN

Abstract: *The accumulation of data on the activity of Palaeolithic human groups networks (source of raw materials, location of sites, Hunt seasonal, etc.) allows gradually to highlight strategies for the territory occupation of which the main parameters are the mobility, the territory area, the food resource management and the seasonality of activities in the annual cycle.*

Local Opportunistic strategy. *The area of the territory is limited (less than 1000 km^2). Mobility is low. Hunting is opportunistic. The settlement is permanent in a rockshelter. If there is exhaustion of the food resources, the group must abandon its settlement and emigrated in another region. Contacts between human groups are limited. Such a strategy is adopted by the Mousterian groups during the OIS 4 and begins to change with groups of transition MP/UP industries. It is taken up during the maximum ice age from 21 000 BP at the time of the abandonment of the occupation of the middle Europe by Gravettian groups and their refuge to the Mediterranean regions (see below the seasonal mobility strategy).*

Extended planned strategy. *The area of the territory is large (30 000 to 100 000 km^2). Mobility is high. There is a specialization of the travels and of the site locations : distant sources of raw materials, specialized hunting, seasonal sites, bivouac, art caves, within a recognized territory where movements are common. Contacts between human groups of the same network are numerous (meeting points) promoting exchanges and standardization of material culture. Camp-sites are seasonal. The food resource management is specializing in hunting the herds of large migrant mammals (reindeer, bison) or horses. This strategy marks the success of the network organization of the human groups during the upper Palaeolithic period (Aurignacian, Gravettian, Magdalenian).*

Semi-sedentary strategy. *The residential camp-sites are occupied about ten months in the year. The territory is large (30 000 to 100 000 km^2). There is a mammoth based food resource through accumulations of animals, of natural or hunted origins, which are found systematically nearby sites, as a food supply, fuels, building materials for the dwellings and raw material for the manufacture of tools and weapons. Technical inventions without future are noted : terracotta figurines, polishing. Art is developed. Food is stored in pits dug in permafrost near the dwellings. This strategy is known in only three short and specific episodes in the history of the European upper Palaeolithic : Pavlovian (around 27 000 BP in Moravia), Eastern Gravettian (24 000 – 21 000 BP in Central and Eastern Europe), Mezinian (Upper and middle Dnepr basin around 15 000 to 14 000 BP).*

Seasonal mobility strategy. *The territory is open to an uninhabited North where the human groups organize summer raids. The residential camps are located in the southern regions during half part of the year. Movements are carried out on several hundred kilometers during summer for specialized hunting (reindeer) and for the supply of good quality flint. The territories of refuge are less extended and partitioned (Solutrean in sub-Cantabrian and sub-Pyrenean regions, Adriatic Epigravettian, Epigravettian of the Black Sea). This strategy corresponds to the short time of the maximum ice age climate amelioration (Late Solutrean and Late Badegoulian in Western Europe, Sagvarian in Central Europe and Molodovian in Eastern Europe).*

Restricted Planned strategy. *The territories are limited (1.000 to 10.000 km^2). The human groups are located in specialized camp-sites. The diversification of food is pushed to its maximum (opportunistic hunting, specialized hunting of altitude with the conquest of the altitude, fishing, shellfish collecting). The supply of raw material is local in the territory and depends on the quality of outcrops that are found. Art is little developed. This strategy concerns the Epipaleolithic groups and is continuing during the Holocene.*

1 INTRODUCTION

Les avancées des recherches sur le Paléolithique supérieur européen des vingt dernières années sont les plus marquantes dans les études sur les origines des matières premières (et plus particulièrement dans celles qui révèlent les circulations les plus lointaines), et dans les études zoo-archéologiques liées à la spécialisation de la chasse, à sa saisonnalité, à son rôle alimentaire dans le cycle annuel. Les recherches sur les concepts de territoires en découlent naturellement à condition de leur appliquer une approche systémique évitant les dangers de l'hyperspécialisation et sans oublier d'y intégrer la culture matérielle via les systèmes techniques.

À l'occasion du XV^{e} congrès UISPP de Lisbonne en 2006, le colloque XVI, que la commission IV avait organisé conjointement avec la commission VIII, sur le thème des concepts de territoire au Paléolithique supérieur, avait permis déjà de faire le point sur l'avancement des idées et des recherches sur ce thème. C'est à cette occasion que nous avions introduit (Djindjian 2009), l'idée de stratégies socio-économiques différenciées des groupes de chasseurs-cueilleurs dans le Paléolithique supérieur européen et conclu que ces stratégies avaient une profonde influence sur les changements de systèmes techniques et donc de la culture matérielle.

Cinq stratégies avaient été alors proposées et définies :

- stratégie opportuniste locale ;
- stratégie planifiée étendue ;
- stratégie semi-sédentaire ;
- stratégie de mobilité saisonnière ;
- stratégie planifiée restreinte.

L'objet du présent article est ici de développer de façon beaucoup plus détaillée ces différentes stratégies, de les formaliser par des schémas systémiques de référence et d'étudier les conséquences de la mise en œuvre de ces stratégies dans les « cultures » du paléolithique supérieur européen. Cette approche permet en outre de relier pour la première fois environnement et climat, systèmes techniques (culture matérielle), économie et sociologie des groupes humains paléolithiques et, à ce propos, de montrer la faisabilité d'une nouvelle voie, paléoéconomique et systémique pour l'étude des sociétés préhistoriques.

2 LA MOBILITÉ DES GROUPES PALÉOLITHIQUES

L'étude de la mobilité des groupes paléolithiques a été peu traitée dans la littérature, sinon par des approches anthropologiques. Une référence classique est évidemment l'article de Binford (1980) qui propose de distinguer deux attitudes extrêmes :

- une mobilité des habitats *(« residential mobility »)* : les groupes de chasseurs-cueilleurs installent leurs habitats à proximité des ressources alimentaires. Cette stratégie « opportuniste » est mise en œuvre par des petits groupes très mobiles (familles nucléaires) qui n'édifient pas de grands camps résidentiels ;

- une mobilité des groupes *(« logistic mobility »)* qui se caractérise par des camps de base plus importants où résident les familles, et des camps satellites où une partie du groupe se rend pour acquérir ces ressources (camps de chasse, gîtes de matières premières, etc.) ou pour les stocker dans des caches.

Binford oppose ainsi des *« foragers »* caractérisés par une mobilité de circulation faible et une mobilité des habitats élevée, à des *« collectors »* caractérisés par une mobilité de circulation forte et une mobilité des habitats faible. Bien que cette définition puisse être perçue comme un sophisme plus que comme un système, la publication de Binford a incité les ethno-archéologues à analyser les stratégies d'occupation du territoire des populations qu'ils étudiaient à son crible (par exemple Fitzhugh & Habu 2002). Certains d'entre eux ont proposé une évolution linéaire des stratégies opportunistes vers les stratégies planifiées, reprenant le concept de l'évolution stadiale marxiste de N. Marr mais en inversant les conclusions d'Efimienko : modèle planifié matriarcal du Gravettien oriental et modèle opportuniste familial du Magdalénien (Efimienko 1953). Nous avions écrit déjà dans (Djindjian *et alii* 1999 : 132), qu'il fallait plutôt rechercher les raisons d'un tel changement de stratégie dans des adaptations aux variations climatiques.

Les dernières sociétés de chasseurs-cueilleurs ont fait l'objet de nombreuses études par les anthropologues nord-américains et australiens, dont on peut trouver une synthèse récente dans Kelly (2007). La diversité des solutions mises en œuvre par ces sociétés toutes holocènes (gestion des ressources alimentaires, mobilité, reproduction, taille critique des groupes, mécanismes intergroupes, *etc.*) nous amène à prendre conscience que la reconstitution des sociétés de chasseurs-cueilleurs pléistocènes, et particulièrement en période pléniglaciaire, doit se faire plus à partir des données de terrain que par un comparatisme ethnographique, qui nous est beaucoup plus utile dans l'apprentissage du fonctionnement systémique de ces sociétés (c'est-à-dire en identifier les processus moteurs), que dans la projection de sociétés subactuelles sur nos sociétés préhistoriques. Dans cette approche, par exemple, les simulations de Wobst (1974) sur la taille critique des groupes, Winterhalder (1986) sur l'optimisation de la chasse et du partage en relation avec la taille du groupe, de Read (1998) sur les taux d'échanges intergroupes de fiancés et sur le temps moyen entre deux maternités ou de Hamilton *et alii* (2007) sur l'analyse fractale de la structure d'échelle des regroupements (individus, familles, groupe, réseau) à partir des données de Binford (2001) nous sont extrêmement utiles.

3 LA STRATÉGIE OPPORTUNISTE LOCALE (FIGURE 1)

3.1 Définition et propriétés d'une stratégie opportuniste locale

La superficie du territoire est restreinte (500 à 1 000 km^2). Cette superficie correspond peu ou prou à une journée maximale de marche, soit un maximum de vingt kilomètres autour de l'habitat, qui est une résidence permanente, le plus souvent en abri naturel.

En conséquence, sur un territoire restreint, même bien situé sur des itinéraires de déplacement animal, la capacité alimentaire carnée *(« carrying capacity »)* est bornée. La chasse est donc opportuniste, tout gibier comestible étant une cible potentielle. Cette règle n'implique pas systématiquement une chasse généraliste, elle doit également profiter des opportunités du territoire (pièges naturels, falaises, ravines, voies de passage) pour réaliser des chasses spécialisées laissant les vestiges de sites d'abattage, qui jouent un rôle fondamental dans la stratégie alimentaire.

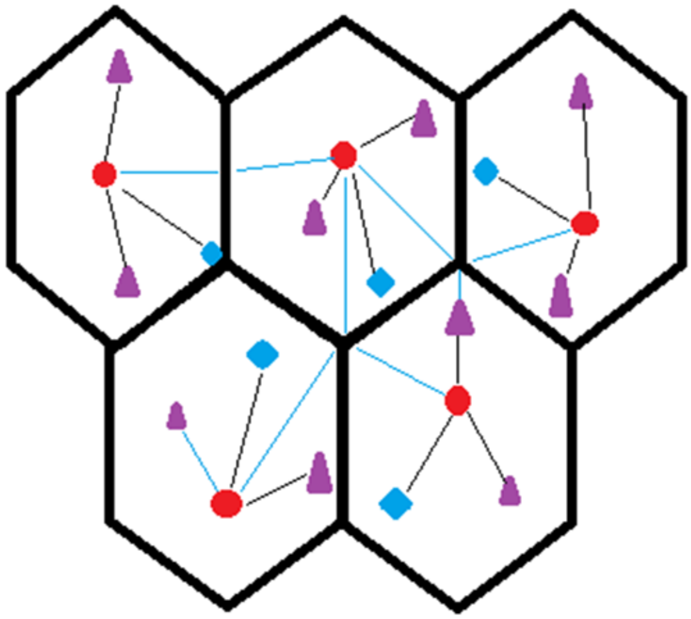

FIGURE 1 Modèle géométrique de la stratégie opportuniste locale (Ronds rouges - habitats ; Triangles violets - sites d'abattage ou de chasse ; Carrés bleus - gîtes de matière première).

Mais le prélèvement doit être contrôlé. Car en cas d'épuisement, le groupe doit abandonner son habitat et s'installer dans un autre territoire.

La mobilité, limitée à des circulations courtes pour la chasse ou l'approvisionnement en matières premières, sur la superficie du territoire, est donc faible. La matière première est en conséquence particulièrement variée, dépendant des seuls gîtes accessibles dans le territoire : soit, un gîte de bon silex s'y trouve, et il sera heureusement exploité ; soit, il n'en existe pas, et il faut alors se résoudre à exploiter des gites offrant des matières premières de substitution : quartzite, dolérite, phtanite, quartz, chaille, rhyolithe, jaspe, opale, radiolarite, porphyre, *etc.* L'industrie de pierre taillée offrira alors une grande variété de matières premières sur lesquelles les objets ont été taillés, et même, avoir une composition différente : à bonne matière première, plus d'objets à façonnage exigeant ; à matière première de second choix, plus d'objets à façonnage rudimentaire !

La mobilité, également, va jouer un rôle non négligeable dans le choix des techniques de taille et dans la variabilité de la composition des types d'objets. La mobilité en effet implique de pouvoir voyager « léger » sur de longues distances, et donc d'emporter avec soi des objets finis (lames, lames Levallois) et des nucléus légers et productifs (biface acheuléens, bifaces moustériens et micoquiens, nucléus prismatiques à lames et lamelles). À l'opposé, la faible mobilité n'oblige pas cette portabilité et induit l'abondance dans les habitats de nucléus moins productifs (débitage Quina, discoïde, Levallois) et d'industries sur éclat (Clactonien, Tayacien, Moustérien à racloirs, encoches et denticulés, *etc.*).

Les contacts entre groupes humains, aussi, sont limités. En effet, la probabilité de rencontrer un autre groupe dans un territoire aussi limité, est faible, sauf, et cela est nécessaire pour la survie des groupes humains, de susciter des rencontres en des lieux accessibles. Le système ne peut en effet fonctionner sur un mode totalement autarcique.

Le modèle géométrique qui représente le mieux une structure sociale de ce type est la maille hexagonale bien connue des cristallographes et des géographes (**figure 1**). Dans ce modèle, le nombre maximal de contacts possibles avec des groupes voisins est de six, nombre qui diminue en cas d'absence de voisins c'est-à-dire dans le cas de mailles lacunaires. Il faut noter l'importance des sommets des hexagones, qui sont les lieux de rencontre des groupes des territoires contigus (trois groupes concernés) et qui peuvent être des habitats communs. Nous retrouvons ici l'application du modèle géographique de Christaller avec la primauté au fait commercial qui se décline ici dans une primauté aux contacts. Mais nous pouvons tout aussi bien considérer un lieu de rencontre qui serait le milieu d'un côté de l'hexagone limité cette fois à deux territoires contigus, et qui correspond à la primauté du transport (ou ici du déplacement le plus court pour une rencontre). Un mécanisme saisonnier peut également être intégré à ce modèle sans le modifier dans sa nature avec des déplacements vers des espaces inoccupés (haut de vallées, altitudes).

À ce stade, trois hypothèses peuvent être approfondies :

- **H1.** La capacité alimentaire carnée d'un territoire de 500 à 1.000 km2 en période glaciaire permet de nourrir, avec un renouvellement annuel du stock, un groupe d'un effectif d'une trentaine de personnes.

- **H2.** La capacité alimentaire carnée ne permet de nourrir, avec un renouvellement annuel du stock, qu'un groupe plus réduit, jusqu'à une limite minimale d'une dizaine de personnes. La densité démographique des chasseurs-cueilleurs holocènes connue d'après les études ethnographiques varie entre 0,01 h/km2 chez les Inuit à 0,15 h/km2 chez les Hadra de Tanzanie (Hassan 1981). Sur un territoire de 1 000 km2, une densité de 0,01 h/ km2 donne un groupe d'un effectif de 10 individus. Nous reviendrons ci-dessous dans le chapitre VII sur la question démographique par comparaison avec la stratégie planifiée étendue. Notons cependant qu'une superficie de territoire de 500 à 1 000 km2 n'est pas particulièrement faible. La superficie de la France, si tous ses km2 étaient également hospitaliers, ne pourrait accueillir que 500 à 1 000 de ces territoires.

- **H3.** Le volume de prélèvement ne permet pas quel que soit l'effectif du groupe, un renouvellement annuel du stock, et tôt ou tard, le groupe est forcé à émigrer pour un nouveau territoire vierge d'occupation humaine, quand le stock alimentaire est épuisé, ou quand l'énergie nécessaire pour chasser avec succès un stock de plus en plus faible ou de plus en plus difficile à capturer, devient trop épuisante pour le groupe.

3.2 Les groupes humains qui appliquent une stratégie opportuniste locale

La stratégie opportuniste locale est adoptée par les groupes moustériens pendant l'OIS 4 et commence à changer progressivement à l'OIS 3 avec les groupes des industries de transition Paléolithique moyen/Paléolithique supérieur.

L'arrivée du climat froid et sec de l'OIS 4 entre 75 000 BP et 55 000 BP environ, après le long interglaciaire de l'OIS 5 (115 000 –75 000 BP), provoque certainement un effondrement démographique et un reflux vers le sud de l'Europe des groupes néanderthaliens. Bien que la révision du système chrono-stratigraphique soit toujours attendue pour l'Aquitaine, et avec une intégration avec les données connues de l'Europe centrale et méditerranéenne, il est cependant possible de tirer quelques tendances de l'évolution des industries lithiques dans leur contexte chrono-stratigraphique :

- au début de l'OIS 4, la diminution rapide du débitage Levallois ;

- tout au long de l'OIS 4, un développement très important des racloirs, ainsi que des encoches et denticulés, dont le rapport très variable semble dû à des contraintes d'approvisionnement de matières premières plutôt qu'à une quelconque tradition technique ou culturelle ;

- au début de l'OIS 3, la croissance rapide du débitage Levallois, l'apparition de pièces bifaciales (Moustérien de tradition acheuléenne, Micoquien), la réapparition du débitage Levallois laminaire et le développement des couteaux.

L'étude des distances d'approvisionnement en matières premières met en lumière assez systématiquement une distance inférieure à vingt kilomètres et le choix de matières premières variées, lié à leur disponibilité dans le territoire restreint.

Les études archéozoologiques sur les taphocénoses du Paléolithique moyen n'ont pas encore atteint le niveau de connaissance de celles du Paléolithique supérieur, bien que depuis une vingtaine d'années des travaux prometteurs aient été publiés. Des sites d'abattage et de boucherie *(« kill sites ; butchering sites »)* ont été récemment étudiés : La Borde (aurochs), Coudoulous, Wallertheim, Mauran (bison), Chez Pinaud (renne), Solutré (renne et cheval), qui mettent en évidence la capacité des groupes moustériens à trouver des sites naturels (pièges, pieds de falaise, passages étroits, *etc.*) facilitant la chasse (Jaubert *et al.* 1990 ; Farizy *et al.* 1994 ; Gaudsinski 1995 ; Jaubert *et al.* 2005 ; Niven *et al.* 2012).

L'existence de ces sites argumente particulièrement le choix judicieux du territoire et l'efficacité de son occupation. Par ailleurs, la taphocénose des habitats révèle la diversité de la faune chassée qui y est ramenée totalement ou partiellement : Pech de l'Aze 1, niveau IV (cerf, renne, auroch, bison, cheval, chevreuil) avec une saisonnalité complémentaire : bison en hiver, cerf au printemps/été (Rendu *et al.* 2009) ; Combe-Grenal niveaux XVII à XXXV : cerf, renne, bison, aurochs, cheval, bouquetin ; Saint-Césaire, niveau moustérien : bison, renne, cheval.

La plupart des restes humains néanderthaliens proviennent de cette période et l'accentuation des traits physiques morpho-crâniens, par rapport à ceux des Néanderthaliens anciens, semble confirmer un échange génétique limité à mettre en relation avec un cloisonnement géographique pléniglaciaire, une faible mobilité et le territoire restreint précédemment décrit.

Il n'est pas question d'en déduire ici que le modèle de la stratégie opportuniste locale est celui de tous les porteurs d'industries du Paléolithique moyen et de tous les groupes néanderthaliens. Il serait d'ailleurs particulièrement intéressant de mieux connaitre les stratégies de ressources alimentaires des groupes humains et leurs industries de l'OIS 7 à l'OIS 5.

Ainsi, le débitage laminaire, associé ici avec un nucléus plus productif et un outillage portable synonyme de plus grande mobilité, apparait bien avant le Paléolithique supérieur :

- Stade isotopique 7 (250 000–200 000 BP) correspondant à un interglaciaire. Les assemblages voient l'apparition de la technique Levallois (définissant ainsi les débuts du Paléolithique moyen) dans une industrie de débitage sur éclat. Mais la technologie laminaire est déjà connue (Tabun D au Levant, Saint-Valery sur Somme en France).

- Stade isotopique 6 (200 000–135 000 BP) correspondant à une phase pléniglaciaire. Les assemblages montrent la prédominance de la technologie Quina (racloirs).

- Stade isotopique 5 (135 000–75 000 BP) correspondant à une phase interglaciaire. Les assemblages montrent la prédominance de la technique Levallois. La technologie du nucléus prismatique à lames est présente (en France, par exemple, Riencourt les Bapaume, Seclin, Bettancourt Saint-Ouen, Rocourt, sites de la rivière Vanne dans l'Yonne, sites du Bergeracois, etc.).

- Stade isotopique 4 (75 000 – 55 000 BP) correspondant à une période pléniglaciaire. Les assemblages montrent une prédominance de racloirs ainsi que d'encoches et denticulés.

- Stade isotopique 3 (55 000 – 28 000 BP) correspondant à une période interpléniglaciaire.

Aux débuts de l'OIS 3, les assemblages voient le nouveau développement de la technique Levallois, l'apparition des pièces bifaciales, des bifaces et des couteaux, l'apparition de la technique Levallois laminaire et de la technique prismatique laminaire et lamellaire (Moustérien de tradition acheuléenne en Europe occidentale; Bohunicien (Oliva 1984) en Europe centrale et Kremenicien en Europe orientale (Stepanchuk & Cohen 2000–2001); Micoquien en Europe centrale et orientale, *etc.*), anticipant l'émergence rapide des industries de transition pendant la seconde partie de l'OIS 3 (Uluzzien en Italie du sud et en Grèce, Castelperronien en Europe occidentale, Szélétien en Europe centrale, Strélétien et Gorotsovien en Europe orientale, Jerzmanowicien et Lincombien en Europe septentrionale, *etc.*). Au même moment dans le bassin supérieur du Danube puis descendant sur les côtes de Méditerranée occidentale, la première phase de l'industrie aurignacienne (très Ancien Aurignacien) apparait, exactement comme une autre solution technique au même processus de diversification technologique polymorphe de l'OIS 3.

Un cas extrêmement révélateur du polymorphisme évolutif de cette période de l'OIS 3 nous est fourni par le bassin inférieur du Rhône où vers 40 000 BP, une industrie locale du paléolithique moyen, le Néronien, est caractérisée par une production de lames et lamelles et le développement de microlithes taillée sur un silex de bonne qualité approvisionné à plus de 100 km. Il est superposé par un Moustérien final classique puis par un très ancien Aurignacien (Slimak 2008).

Bien plus tard, en plein Paléolithique supérieur, le débitage sur éclat réapparait au maximum glaciaire à partir de 21 000 BP, au moment de l'abandon de l'occupation de l'Europe moyenne par les groupes gravettiens et leur repli vers les régions méditerranéennes (*cf. infra* la stratégie de mobilité saisonnière), dans les industries qui lui succèdent en Europe occidentale, le Solutréen ancien et le Badegoulien ancien. Les caractéristiques archaïques de l'industrie du Solutréen ancien ont été souvent remarquées, au point de faire naitre l'hypothèse d'une origine du Solutréen dans un Moustérien très tardif de la basse vallée du Rhône (Smith 1966). Il est aussi significatif de rappeler que le Badegoulien, souvent considérée comme l'industrie « laide » du Paléolithique supérieur arrive juste après les belles feuilles de laurier et pointes à cran du Solutréen supérieur, considérée comme la plus esthétique des industries du Paléolithique supérieur (Bordes 1968).

Cette contradiction entre d'un côté le Solutréen ancien et de l'autre le Solutréen récent (nous avons redéfini les termes Solutréen ancien (ex-inférieur) et Solutréen récent (ex-moyen et supérieur) dans Djindjian *et alii* 1999), se retrouve dans l'hypothèse formulée par M. Otte d'un Solutréen ancien évoluant du Gravettien final et d'un Solutréen récent acculturé par l'arrivée dans le Sud de l'Espagne via le détroit de Gibraltar des derniers Atériens (Otte 2011). En fait, l'explication systémique de ces changements brutaux dans les industries du maximum glaciaire est l'abandon de l'Europe moyenne par les groupes du Gravettien vers 21 000 BP. Durant leur reflux vers le Sud de l'Europe, les groupes humains, ayant perdu les gîtes de matières premières et la chasse spécialisée aux herbivores durant leurs migrations, sont condamnés à régresser à une stratégie opportuniste locale et à des matières premières de mauvaise qualité exactement comme les moustériens de l'OIS 4, mais ils ne perdront pas la longue tradition de la technique de nucléus prismatique qu'ils limitent à la production de lamelles, ce qui donne un aspect aurignacoïde à certaines industries: Proto-Solutréen (ex-Aurignacien V), Badegoulien, Épi-aurignacien, Muralovkien (Djindjian 1986). Le débitage sur éclat réapparait néanmoins (pointe à face plane similaire à la pointe Levallois du Solutréen ancien; débitage en tranche de saucisson, burin transverse et raclettes du Badegoulien).

Quand le climat change pour un épisode plus humide mais toujours très froid, comme entre 20 000 et 19 000 BP (Solutréen récent) ou entre 18 000 et 16 500 BP (Badegoulien récent), les groupes adoptent une stratégie de mobilité estivale (*cf. infra*) leur permettant de circuler vers le Nord durant l'été, d'exploiter de nouveau les gîtes de bon silex et les ressources des herbivores migrateurs (renne). C'est le cas en Europe occidentale (Solutréen récent, Badegoulien récent), en Europe centrale (Sagvarien, Épigravettien ancien) et en Europe orientale remontant à partir du pourtour septentrional de la mer Noire, un lac à cette époque les vallées du Dniestr, du Dniepr et du Don (Molodovien, Épigravettien ancien). Les industries abandonnent alors les matières premières de substitution et le débitage sur éclat (Djindjian *et alii* 1999; Djindjian *et alii* 2006).

4 La stratégie planifiée étendue (figure 2)

4.1 Définition et propriétés d'une stratégie planifiée étendue

La superficie du territoire est vaste (30 000 à 100 000 km^2 et plus). La mobilité est grande. Les habitats sont saisonniers. Il y a spécialisation des déplacements et des sites: sources lointaines de matières premières, chasses spécialisées, sites saisonniers, bivouacs, grottes ornées, à l'intérieur d'un territoire reconnu où les déplacements sont permanents. Les contacts entre groupes humains d'un même réseau sont nombreux pouvant même favoriser des regroupements de courte durée (points de rencontre multiples plutôt que site unique d'agrégation) favorisant les échanges et l'uniformisation de la culture matérielle. La **figure 2** montre la schématisation d'une stratégie planifiée étendue, les différents types de sites, l'espace de circulation d'un groupe et les multiples occasions de rencontre entre plusieurs groupes.

L'interpénétration des espaces de circulation met en évidence les propriétés de cette stratégie par rapport à toutes les autres:

- chaque parcelle de territoire est partagée entre plusieurs espaces de déplacement de groupes humains, permettant une plus grande densité démographique,

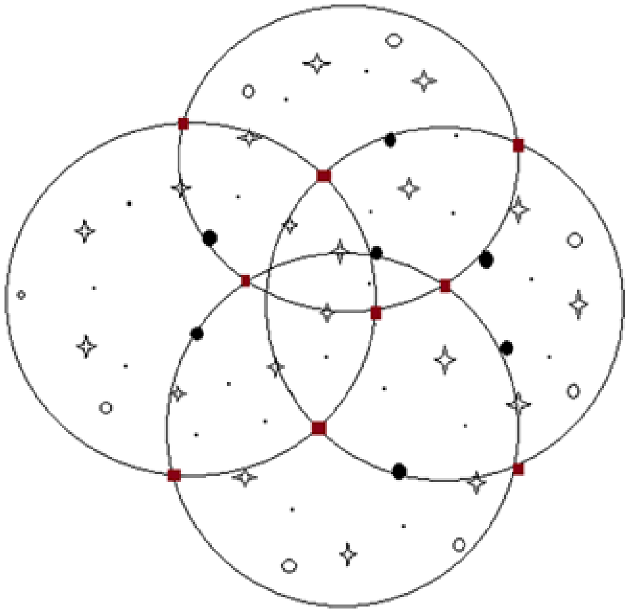

FIGURE 2 Modèle géométrique de la stratégie planifiée étendue (Étoiles - habitats saisonniers ; Carrés rouges - camps de chasse ; Points noirs - gîtes de matière première, Cercles - bivouacs).

- les espaces de déplacement d'un groupe humain ont une superficie beaucoup plus importante, offrant ainsi une bien meilleure capacité alimentaire au groupe et un effectif optimal (une trentaine de personnes),

- la spécialisation sur la chasse aux troupeaux d'herbivores migrants comme le renne (nord-sud et bas de vallée – haut de vallée), ou se déplaçant sur une vaste plaine comme le bison ou empruntant les mêmes itinéraires comme le cheval, permet à différents moments du cycle annuel et pour de nombreux groupes humains, de se procurer une alimentation à profusion et de faire des réserves,

- la mobilité permet de multiplier les rencontres, et en conséquence les échanges de savoir, de savoir-faire et d'individus (*cf. infra*), favorisant l'homogénéité de la culture matérielle et l'adaptation plus rapide à des changements d'environnement,

- le succès du système permet la croissance démographique qui rend possible la constitution d'un nouveau groupe à partir de plusieurs groupes existants, permettant de coloniser de nouveaux territoires,

- le recouvrement des espaces de déplacement permet un développement à l'infini du peuplement sur des espaces vierges, et l'existence d'une même culture matérielle sur des millions de km2,

- le territoire se termine à la limite d'un territoire d'un autre réseau de groupes humains (et donc d'une autre « culture »), à la limite d'un territoire sans capacité alimentaire suffisante ou à la limite d'une barrière géographique naturelle : rivages, glaciers, montagnes sans col franchissable à moins de 600 mètres d'altitude (Djindjian 1995).

- La mise en œuvre d'une stratégie planifiée étendue nécessite la socialisation de plusieurs innovations :

- la mémorisation d'évènements importants (périodes de migrations) associée à la gestion du temps (probablement un calendrier lunaire);

- la mémorisation des lieux, et donc la capacité d'orientation et de navigation (probablement à partir des rivières et d'amers caractéristiques dans le paysage);

- le marquage du territoire, du groupe humain et des individus, qui permet aux groupes de s'identifier comme faisant partie du même réseau, et de vérifier que les espaces traversés font partie du territoire (*cf. infra*, l'art).

À ce jour, pour le Paléolithique supérieur européen, aucune modélisation de la ressource alimentaire dans le cycle annuel n'a été hélas tentée, à l'image des travaux de Keene (1979), de Jochim (1976) ou d'Hassan (1981) pour l'Holocène. La taphocénose donne déjà des premières indications sur la forte spécialisation saisonnière de la stratégie alimentaire qui se spécialise dans la chasse aux troupeaux de grands mammifères migrants (renne, bison) ou aux chevaux, qui constituent près de 90 % de la taphocénose des habitats paléolithiques de l'Europe moyenne.

La taphocénose du Magdalénien en Aquitaine est révélatrice de cette spécialisation. Les abris sous roche des vallées de la Dordogne et de la Vézère en Périgord et en Quercy, souvent situés près d'un gué sur la rivière, ont livré des débuts de l'Aurignacien à la fin du Magdalénien une taphocénose dominée par le renne. Au Magdalénien, cette dominance varie entre 80 et 95 % des espèces représentées. Cette importance du renne est liée à une installation pour la chasse au moment de la migration saisonnière des rennes des basses vallées vers les hautes vallées des rivières descendant du massif central dans la plaine aquitaine. Mais où étaient donc localisés les groupes pendant les autres périodes de l'année ? Et quelle est la raison de la contradiction entre la représentation d'un modèle bison/cheval dans l'art pariétal magdalénien et la taphocénose presqu'exclusive du renne, à l'origine de la fameuse expression « l'Âge du renne » des préhistoriens de la fin du XIX° siècle ?

C'est dans la plaine aquitaine, que les bisons et les chevaux ont été chassés par les groupes magdaléniens. Malheureusement, les dépôts des rivières descendant des Pyrénées et du massif central ont enfoui les habitats du paléolithique supérieur (comme ceux de la plaine du Pô) sous plus de dix mètres de sédimentation. Ces sites de plein air ne sont donc généralement pas décelés. Nous avons cependant la trace de cette chasse en périphérie de la plaine aquitaine. En Gironde, dans le Magdalénien moyen de Jaurias, Fongaban, Roc de Marcamps, Moulin Neuf, Chaire à Calvin, la faune se répartit entre bison, cheval et antilope saïga. Le renne n'est présent qu'en faible proportion (5 à 10 %). Au Sud, dans les sites des Landes, sur un territoire de chasse ouvert sur la plaine aquitaine, dans les abris de Duruthy/Dufaure, l'ensemble cheval/bison/renne est dominant dans le Magdalénien moyen, mais une évolution apparaît dans le Magdalénien supérieur où le renne devient dominant, lié à leur installation dans les courtes vallées du nord des Pyrénées libérées par la fonte des glaciers, puis dans l'Azilien avec son remplacement par le cerf venu du Pays basque.

Dans le pays basque, la Cantabrie et les Asturies, c'est en effet le cerf qui est dominant dans des proportions le plus souvent supérieures à 80 % des restes fauniques. Mais il existe une autre catégorie de sites, où le bouquetin est dominant dans les mêmes proportions, supérieur à 80 %, révélant une spécialisation de la chasse en fonction de l'altitude et de la saison. Sur le versant Nord des Pyrénées, une situation analogue est connue dans les sites d'altitude où le bouquetin est dominant à près de 80 %.

La stratégie alimentaire dans le cycle annuel des groupes magdaléniens du Nord des Pyrénées est donc basée sur un système d'approvisionnement à trois étages: bison/cheval dans la plaine; renne dans les vallées; bouquetin dans les sites d'altitude. Le modèle est analogue en pays basque et en Cantabrie: bison/cheval de la plaine aquitaine ou de la zone côtière (comme à Altamira), cerf des habitats des basses vallées; bouquetin dans les sites d'altitude.

En Europe moyenne, par contre, c'est le cortège renne/cheval qui est très largement dominant, dans les bassins de la Loire, de la Saône (Solutré), du Rhin (Gonnersdorf, Andernach), dans le Bassin Parisien (98 % de renne à Pincevent et à Verberie, 91 % de cheval à Marolles/Grand Canton), en Belgique, en Suisse (70 % de cheval, 20 % de renne à Champréveyres).

Aux débuts du Paléolithique supérieur, la faune de l'OIS 3 était cependant plus diversifiée. Par exemple, en Aquitaine, l'aurochs, le cerf mégacéros, l'âne hydruntin, le sanglier, le chevreuil sont présents mais disparaissent vers 27 000 BP, avec la péjoration climatique de l'OIS 2, pour se réfugier dans la péninsule ibérique subcantabrique et subpyrénéenne. Ils ne reviendront en Aquitaine qu'à partir du Bölling. Le cerf, jusqu'alors très présent, n'y subsistera au maximum glaciaire que de façon endémique. À partir de 27 000 BP, en Europe moyenne, la spécialisation des ressources alimentaires sur le bison, le cheval et le renne est aussi la conséquence de l'environnement de l'OIS 2.

4.2 Les groupes humains qui appliquent une stratégie planifiée étendue

La Stratégie planifiée étendue marque le succès de l'organisation des groupes humains en réseau au Paléolithique supérieur: Aurignacien et Gravettien de 34 000 à 21 000 BP, Magdalénien de 16 500 à 12 500 BP, que seul l'environnement trop inhospitalier du maximum glaciaire a enrayé. L'ampleur du territoire et la multiplication des rencontres entraîne la diffusion des savoirs et des savoir-faire, homogénéisant la culture matérielle, sur des aires qui surprennent par leur ampleur: l'Aurignacien présent d'Ouest en Est de l'Atlantique à l'Oural et jusqu'au Moyen-Orient (Caucase, Levant, Iran), et du Sud au Nord, de Gibraltar au Pays de Galles.

Le Gravettien ne présente pas autant de différences avec l'Aurignacien que les innovations de la technologie lithique le laissent croire. Après tout, l'apparition de la retouche abrupte n'est que l'invention d'un emmanchement latéral, tandis que le pédoncule n'est qu'une amélioration d'un emmanchement axial déjà existant dans l'Aurignacien. Le Gravettien semble d'après les données actuelles apparaitre vers 29.000 BP en Europe centrale au même endroit que le premier Aurignacien. Il diffuse vers l'Ouest par les mêmes cheminements. Mais, à la différence de l'Aurignacien, le Gravettien va subir les effets de la péjoration climatique croissante qui va bientôt vers 27.000 BP isoler les territoires gravettiens et les différentier en des séquences particulières. En Europe moyenne, les conditions d'un climat froid et sec et l'environnement de toundra ne redeviennent favorables aux steppes froides et aux migrations des herbivores que vers 16.500 BP. C'est le moment où le Magdalénien se constitue dans un territoire restreint aquitaino-cantabrique évoluant à partir du Badegoulien récent. Puis, la recolonisation de l'Aquitaine jusqu'aux Charentes s'effectue. L'Europe moyenne est atteinte, vers 15.500 BP, par le bassin de la Loire, l'accès au bassin de la Saône, et dans un cheminement inverse à celui de l'Aurignacien et du Gravettien, l'arrivée en Europe centrale (Rhin, Danube) jusqu'en petite Pologne. L'amélioration climatique de Bölling permettra au Magdalénien supérieur de s'installer sur l'ensemble de l'Europe (Belgique, Allemagne) puis très certainement par une adaptation particulière se différencier dans le Cresswellien en Angleterre et le Hambourgien sur la côte septentrionale de l'Europe.

4.3 Réseau, super-réseau et territoire de groupes de chasseurs-cueilleurs

Dans le cas de l'Aurignacien, du Gravettien et du Magdalénien, l'uniformisation de la culture matérielle sur un espace considérable (européen) a des implications sur les modes de communication et de transmission intergroupes. En effet, les groupes humains doivent fonctionner en réseau et se rencontrer fréquemment pour échanger (des personnes, des savoirs et des savoir-faire) sinon leur culture matérielle se différenciera. Le schéma de la **figure 2** montre comment l'imbrication forte des espaces de déplacement des groupes permet à la fois la mise en commun de sites saisonniers de chasse spécialisée et de gîtes de matière première, la rencontre des groupes sur ces sites et l'expansion naturelle des groupes dans des espaces vierges de toute occupation humaine. La colonisation d'espaces vierges se fait ainsi par la démultiplication des groupes (et donc en s'appuyant sur une croissance démographique) tout en conservant la capacité des rencontres intergroupes. La transmission intergroupe (par contact) se fait de proche en proche sans qu'il y ait un contact entre les deux groupes géographiquement les plus extrêmes de la même culture (entre l'Aquitaine et l'Iran ou entre l'Angleterre et les Pouilles).

À ce niveau de la discussion intervient un paramètre important, celui de la superficie de l'espace de déplacement d'un groupe. Elle est variable car elle dépend à la fois de la capacité alimentaire dans le cycle annuel, des ressources en matières premières, de la géographie physique (barrières naturelles, vallées, plaines, latitude) de l'espace de vie du groupe. Plus la *« carrying capacity »* (au sens large) est élevée, plus les espaces de circulations sont resserrés et plus la densité des groupes est forte.

L'espace aquitaino-cantabrique en est un bon exemple :

- chasse opportuniste au cheval dans toutes les zones de basse et moyenne altitude ;
- chasse saisonnière au bison dans la grande plaine aquitaine et dans ses marches (Charentes, pays basque et Cantabrie), dans ses parcours saisonniers de pâturage ;
- chasse saisonnière au renne dans les temps de migration haut de vallée/bas de vallée dans les rivières qui descendent du massif central (Dordogne, Vézère, Lot, etc.) ;
- chasse saisonnière au renne dans les courtes vallées du nord des Pyrénées (à partir de 14.000 BP avec la fonte des glaciers qui libèrent les altitudes) ;
- chasse saisonnière au cerf dans les vallées des espaces côtiers de Cantabrie et d'Asturies ;
- chasse saisonnière au bouquetin dans les espaces de haute altitude des massifs cantabriques et pyrénéens.

À l'opposé, la même tradition culturelle peut se concrétiser par des espaces de circulations beaucoup plus vastes et une densité plus faible des groupes. Cette situation s'observe particulièrement en Europe centrale et orientale, du fait de la latitude élevée et du climat continental accentuant les mécanismes migratoires et de la rareté des gîtes de bon silex. Ainsi en est-il sans doute des groupes gravettiens et magdaléniens qui traversent le massif des Carpates par la porte de Moravie ou par la porte de Poprad, et qui organisent un espace de circulation saisonnière entre Nord (Petite Pologne) et Sud (Slovaquie).

Le concept de territoire que nous avons défini comme celui de la Culture ne veut donc pas dire que le territoire a été parcouru du Nord au Sud et d'Est en Ouest par le même groupe humain. Il signifie que les groupes qui en font partie partagent entre eux la même culture matérielle et qu'ils s'identifient au niveau individuel, intragroupe et intergroupes par des moyens d'expression (« Art ») qui leur permettent de se reconnaître entre eux.

Il signifie qu'il y a aussi des frontières hermétiques entre Cultures différentes. Nous en connaissons au moins deux exemples. Le premier exemple est la frontière entre les groupes du Magdalénien moyen et ceux du Mézinien entre 15 000 et 14 000 BP en Pologne qui s'est traduit par l'extermination d'un group magdalénien dans la grotte de Mascyska. Un deuxième exemple est la progression, bloquée par les groupes épigravettiens, de la colonisation des groupes du Magdalénien moyen vers la côte languedocienne (Gazel, Canecaude, Bize) qu'aucun obstacle géographique n'empêche de progresser, et qui n'atteindront le delta du Rhône qu'au Magdalénien supérieur, leur permettant alors une autre remontée vers le Nord par la vallée du Rhône.

La question se pose alors d'introduire le concept de réseau de réseaux pour désigner des territoires culturels très vastes que les changements de zoocénoses (et donc d'économie alimentaire), les variations de latitude et de longitude et les barrières géographiques naturelles vont naturellement différentier. Nous connaissons plusieurs exemples de cette situation. Le premier exemple est celui du Magdalénien moyen au moment où celui-ci, à partir des Charentes, commence la colonisation du bassin de la Loire, franchit le passage entre Loire et Saône (par la Dheune et la Bourbince), puis remonte le Doubs vers la porte de Bourgogne, arrive au Rhin qu'il remonte jusqu'au lac de Constance pour arriver dans la haute vallée du Danube, qu'il descend pour arriver dans la plaine de Pannonie. L'économie alimentaire de ces groupes du Magdalénien moyen que nous révèle la taphocénose des sites, est basée sur la chasse au renne et au cheval. Au Bölling, le Magdalénien supérieur aura colonisé l'ensemble du territoire de la grande plaine septentrionale : Bassin parisien, Belgique, Rhénanie, bassin de l'Elbe, Bohème. Il est ainsi possible de distinguer au Magdalénien moyen deux réseaux, le premier est le réseau aquitaino-cantabrique et le second est le réseau de l'Europe moyenne, dont la connexion s'effectue entre Loire et Charentes. Nous retrouvons ici l'ancienne proposition de distinction entre le Magdalénien « à navettes » et le Magdalénien « hispanique » (Allain, Desbrosse & Kozlowski 1985). Une différentiation se développe en effet dans la culture matérielle dans l'industrie osseuse (navettes, sagaies de Lussac-Angles) et dans les manifestations de l'Art. Le Cresswellien et l'Hambourgien représentent un stade plus marqué de différenciation de l'industrie lithique (abandon des lamelles à dos, développement des pointes).

Un deuxième exemple est celui du Gravettien oriental (*cf. infra* §5) dont nous connaissons les sites en Europe centrale et en Europe orientale sur une superficie de plus d'un million de km^2 (de Willendorf à Kostienki et de Krakow-Spadzista à Zaraisk). La question se pose ici aussi de l'existence de plusieurs réseaux de circulation Nord-Sud, contigus : en Europe centrale de Krakow-Spadzista à Moravany et Willendorf ; en Europe orientale de Kostienki à Zaraisk, et avec une connexion possible entre les deux réseaux se situant en Biélorussie.

Le paramètre des 30 000 à 100 000 km^2 de surface des territoires correspond donc à une notion flexible dans l'expansion (le territoire aquitaino-cantabrique au Magdalénien inférieur) ou la régression du territoire (le reflux gravettien au Protomagdalénien) et dans sa multiplication (réseau, super-réseau).

4.4 Iconocénoses de l'art pariétal et mobilier pour l'Aurignacien, le Gravettien et le Magdalénien européen

Les études sur le bestiaire représenté dans l'art pariétal et mobilier paléolithique fournissent des résultats probants quand le problème est traité en corrélant les iconocénoses avec les zoocénoses au niveau du territoire de peuplement au lieu de les traiter comme jadis en essayant de corréler sans succès les iconocénoses et les taphocénoses au niveau du site (Djindjian 2004a, 2004b, 2006, 2009).

Concernant l'Aurignacien et le Gravettien, qui ne sont pas différentiés par le bestiaire, trois iconocénoses sont mises en évidence : une iconocénoses continentale (60 % du bestiaire figuré est représenté par l'association mammouth/ rhinocéros/félin/ours), une iconocénose atlantique (plus de 50 % du bestiaire figuré est représenté par l'association cheval/bison-aurochs /mammouth) et une iconocénose méditerranéenne (association cheval/aurochs). La cartographie de ces iconocénoses met en évidence deux grands territoires aurignaciens et gravettiens, la zone aquitaino-cantabrique pour le premier, la zone Danube-Rhin-Saône-Rhône pour le deuxième.

Concernant le Magdalénien moyen, plusieurs modèles sont mis en évidence.

- **Modèles A :** association cheval / bison dominante. Le modèle A1, à dominante cheval / bison est représenté majoritairement sur le versant nord des Pyrénées, en pays basque et sur la côte cantabrique. Il est également représenté dans toutes les frises sculptées magdaléniennes connues en abris sous-roche : Angles sur-l'Anglin (Vienne), Chaire à Calvin (Charentes), Reverdit et Cap-Blanc (Périgord).

La variante A2, à dominante cheval/bison + mammouth/rhinocéros + tectiforme, est présente uniquement dans quatre grottes ornées du Périgord : Rouffignac, Font de Gaume, Combarelles I/II et Bernifal (*cf. infra*).

- **Modèles B :** association cheval / renne dominante. Le modèle B2, à dominante cheval/renne avec mammouth/rhinocéros des régions de l'Europe moyenne, est connu à partir de l'art mobilier des habitats de La Marche (Vienne), la Goutte-Roffat (Loire), Arlay et la Colombière (Jura), Gonnersdorf et Andernach (Rhénanie), Pékarna (Moravie), datés du Magdalénien moyen et supérieur.

Le modèle B1, à dominante cheval/renne des vallées du Périgord/Quercy, est connu à partir de l'art mobilier des abris sous-roche mais également dans des grottes ornées des vallées descendant du massif central : abris de Laugerie-basse, la Madeleine, Limeuil (Périgord) et de Sainte-Eulalie (Quercy) ; grotte de la Forêt à Tursac (Périgord) et grotte du Pergouset (Quercy). Ces sites sont datés du Magdalénien moyen et supérieur.

Ces zones de bestiaires marquent-ils l'existence de territoires de réseaux ? Nous avons argumenté à plusieurs reprises que les modèles A1 et B2 correspondaient peu ou prou aux deux réseaux magdaléniens évoqués précédemment : le réseau aquitaino-cantabrique A1 et le réseau de l'Europe moyenne B2. La zone du Périgord et Quercy révèle cependant une intéressante complexité : le modèle A1 y est présent par des abris sous–roche sculptés, le modèle B1 par des petites grottes ornées et l'art mobilier de grands abris et le modèle A2 intrigue par son syncrétisme multi-modèle dans quatre grottes majeures éloignées que de quelques kilomètres autour des Eyzies. Faut-il donc ajouter au système de territorialité proposé, la notion de saisonnalité (on ajoutera alors au cheval/renne de B1 en Périgord/ Quercy, un de ses équivalents, le cheval/biche de la côte cantabrique et asturienne) et la notion de point de rencontre (A2 = A1 + B2 + B1) ?

5 LA STRATÉGIE SEMI-SÉDENTAIRE

5.1 Définition et propriétés d'une stratégie semi-sédentaire

Le territoire est vaste (100 000 km^2). Les campements sont occupés dix mois dans l'année. La durée d'occupation est liée à l'exceptionnelle circonstance d'une économie basée principalement sur le mammouth.

À proximité de chaque campement, et liée à lui, fonctionnellement et stratigraphiquement, se trouve une accumulation d'ossements de mammouths largement exploitée par le groupe humain. L'origine de cette accumulation est très probablement naturelle : suite à un changement d'humidité du climat, les chutes de neige à la fin de l'automne et en hiver empêchent les troupeaux de mammouths de se nourrir de l'herbe de la steppe, et les condamnent à mourir de faim et d'être recouverts de neige à la tempête suivante. Ces accumulations sont trouvées le plus souvent dans les ravines profondes de versants de vallées, qui offrent la seule protection contre le vent et les tempêtes mais qui se remplissent rapidement de neige. Les cadavres, gelés, sont découverts au début du printemps, à la fonte des neiges, par les groupes humains qui prospectent systématiquement pour les découvrir et s'installent à leur immédiate proximité. Les cadavres gelés exploités systématiquement servent alors de ressources alimentaires, de combustibles, de matériaux de construction des cabanes et de matière première pour la fabrication d'outils et d'armes de jet.

La taphocénose est caractéristique de cette économie alimentaire : prédominance des restes de mammouths ; importance des restes d'animaux à fourrure : carnivores (loup, renard, glouton, ours, félin) et rongeurs (marmotte, lièvre) ; présence d'herbivores (renne, bison, cheval, bœuf musqué). Le mammouth est également chassé, comme le rhinocéros, mais individuellement et dépecé sur le lieu de sa mort. À eux seuls, les restes d'herbivores ne peuvent nourrir la population totale d'un campement pendant la longue période d'occupation. C'est donc la découverte du troupeau de mammouths gelés qui fournit à la fois la possibilité d'installer l'habitat et le stock alimentaire de l'ensemble du groupe humain pour la saison.

Comment préparer et conserver ce stock de nourriture pour une consommation annuelle ?

Binford (1993) a suggéré que les nombreuses fosses situées autour des cabanes (et dont on a extrait le lœss pour colmater les ossements de mammouths dans la construction des parois), creusées jusqu'au permafrost, ont pu servir notamment de réfrigérateur naturel pour la conservation des aliments pendant l'été. Quand cette réserve alimentaire est épuisée, bien que complétée par la chasse additionnelle aux autres herbivores, mammouths compris, le camp est abandonné. Ces campements ont donc probablement une durée de fonctionnement d'une année, du début du printemps, date de leur création au début du printemps de l'année suivante, dans un cycle annuel qui se répétera chaque fois que des troupeaux de mammouths seront piégés par l'humidité du climat qui perturbe le climat idéal très froid et très sec de la steppe à mammouths.

Après abandon du site, la distribution des restes osseux de mammouths est caractéristique :

- dans les accumulations d'ossements de mammouths, la prédominance absolue des côtes, vertèbres, sternums, os de pieds (phalanges, métapodes, carpes, tarses et sésamoïdes) et des os hyoïdes, l'absence des autres parties anatomiques, et la présence de nombreux petits foyers entre les carcasses, d'outils en silex pour le dépeçage et d'outils en os de mammouths (pics, tranchets);

- dans les structures d'habitats, la prédominance absolue d'omoplates, bassins, os longs, crânes, mandibules et défenses de mammouths, extraits des accumulations comme matériaux de constructions des cabanes. Mais d'autres ossements ont été récupérés dans les environs à la surface du sol, notamment d'individus mâles adultes et qui présentent souvent une altération de surface *(« weathering »)* liée à une présence prolongée à la surface du sol. Il faut également noter la présence importante d'outils: défense de jeunes mammouths (pic), fragments de bassins et d'omoplates (tranchet) et côtes appointées.

L'utilisation systématique d'ossements frais de mammouths pour alimenter les foyers diminue le stock osseux qui ne représente plus en moyenne que 15 à 20 % des ossements du squelette.

Les habitats à cabanes en os de mammouths (quelle que soit leur architecture, *cf. infra*) ont été occupés sur une longue durée du cycle annuel ainsi que le confirment les études de saisonnalité (renne au printemps, marmotte en été, animaux à fourrure l'hiver).

Mais nous connaissons également des sites sans cabanes en os de mammouths qui ont fait l'objet de camps saisonniers pour l'approvisionnement en matières premières (près des gîtes de silex, des zones d'affleurement de coquillages fossiles du Sarmatien et d'ambre fossile) et la chasse spécialisée au cheval, à la marmotte ou à un autre mammifère (**figure 3**). Ainsi plusieurs sites à cabanes en os de mammouths sont connus pour avoir été réoccupés ainsi pour une durée courte: l'accumulation d'ossements de mammouths avait été totalement recouverte de colluvions et n'était plus visible mais des ossements émergeaient des cabanes effondrées révélant l'ancienne occupation. Le groupe s'est alors installé naturellement entre les cabanes presque totalement enfouies et sur l'emplacement de la ravine comblée récupérant à l'occasion des ossements de mammouths sortant du sol.

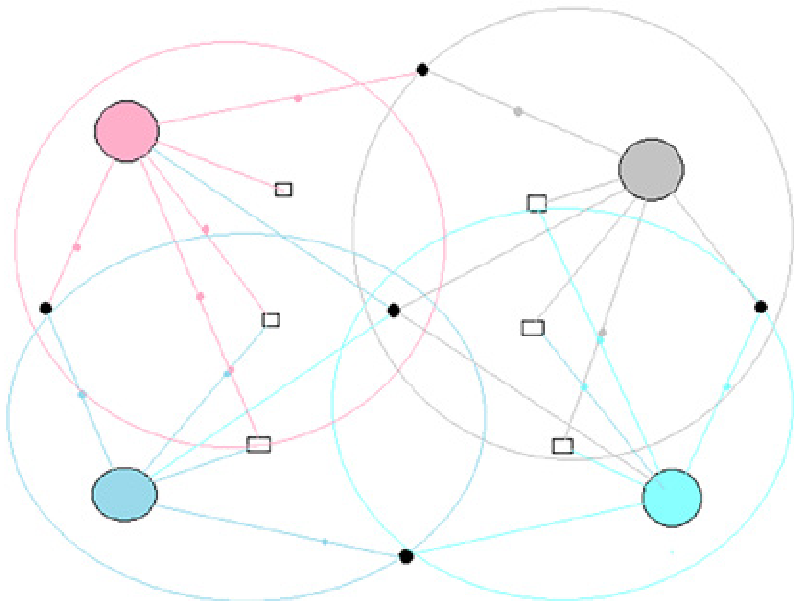

FIGURE 3 Modèle géométrique de la stratégie semi-sédentaire (Grands cercles - habitats ; Rectangles - camps de chasse ; Points noirs - gîtes de matière première).

Enfin, les accumulations d'ossements de mammouths ont été soit totalement exploitées (quand elles ont été découvertes à la fonte des neiges et alors un camp a été érigé à proximité immédiate), soit partiellement exploitées (quand elles ont été découvertes après la fonte des neiges ou que les carcasses soient impropres à la consommation) pour la matière première (ivoire, ossements) et le combustible (dans ce cas, des outils en silex en petit nombre y sont trouvés comme à Sevsk ou à Berelekh), soit non exploitées (car jamais découvertes) comme à Jouravka.

La présence longue d'occupation, même si l'habitat a été quitté, partiellement ou totalement par le groupe pour ses déplacements saisonniers dans le territoire, a permis des inventions techniques sans lendemain : figurines en terre cuite (Pavlovien) et polissage (Kostienki). La découverte de la terre cuite est le résultat d'un mécanisme de serendipité : un foyer installé sur un sédiment lœssique et utilisé plusieurs mois durant cuit le lœss !

L'art mobilier (ivoire, ambre, dent, pierre tendre, coquillage) est particulièrement développé sous la forme de sculptures, de peinture, de gravure et d'objets de parures. L'art pariétal, sous la forme de peintures et de gravures sur les ossements de mammouths et par l'association des os des parois des cabanes (emboitement des mandibules, alignements d'os longs), est également présent, preuve que l'art n'est pas le seul fait des grottes mais aussi des habitats.

5.2 Les groupes humains qui appliquent une stratégie semi-sédentaire

La stratégie semi-sédentaire concerne seulement trois épisodes particuliers et courts dans l'histoire du Paléolithique supérieur européen : le Pavlovien (vers 27–26 000 BP en Moravie), le Gravettien oriental (24 000 –21 000 BP en Europe centrale et orientale) et le Mézinien (bassin moyen et supérieur du Dniepr vers 15 000–14 000 BP).

Le Pavlovien (*stricto sensu* correspondant aux occupations du Gravettien ancien datés autour de 27 000 –26 000 BP) est bien connu par les sites de plein air de la colline de Pavlov (Dolni Vestonice, Pavlov I et II, Milovice) qui dominent un lac et par le site de Predmost, en Moravie. Les structures spatiales laissées par les ossements à Dolni Vestonice (Absolon (1924–1939), Klima (1947–1991), Svoboda), Pavlov (Klima 1947–1991) et Milovice (Oliva 1986–91) font toujours aujourd'hui l'objet de discussions quant à leur interprétation. À Dolni Vestonice, B. Klima a mis en évidence deux structures d'habitat circulaires de six mètres de diamètre, délimitées par des pierres, un remblai en lœss et des trous de calage, avec des foyers intérieurs et des fosses extérieures. À proximité, une ravine comblée a fourni une accumulation d'ossements de mammouths de 45 mètres de long sur 12 mètres de large. À Pavlov, B. Klima a découvert onze structures d'habitat circulaires similaires. À Milovice, M. Oliva a découvert plusieurs structures d'habitat circulaires à foyer central, définies par des cercles de gros ossements de mammouths (omoplates, bassins, os longs, mandibules) collectées sur les accumulations d'ossements de mammouths situées à proximité (dont il ne reste qu'une surreprésentation des côtes, vertèbres et os du pied) (Klima 1994, 1995 ; Svoboda 1994 ; Oliva 2009). Aucune étude aujourd'hui n'a été effectuée pour essayer de situer ces sites exceptionnels dans le territoire de circulation des groups pavloviens.

Le Gravettien oriental correspond à un peuplement maintenant bien daté entre 24 000 et 21 000 BP, marquant la fin de la présence du Gravettien en Europe centrale et orientale. Les principaux sites connus sont situés en Europe centrale (Krakow-Spadzista en Pologne à Cracovie ; Moravany en Slovaquie ; Willendorf II en Basse-Autriche) et en Europe orientale où ils occupent un territoire très vaste comprenant le bassin du Don (Kostienki, Gagarino, Khotylevo II), de la Oka (Zaraisk) au Nord, de la Desna (Avdeevo sur la Seim, affluent de la Desna, en Russie, Puchkari, en Ukraine), du Pripiet en Belarus (Berdysh et Iurovichi). L'industrie lithique est caractérisée entre autres par la présence des pointes de Kostienki et des couteaux de Kostienki. Les structures d'habitat sont caractéristiques : un alignement d'une dizaine de foyers entouré par une distribution ovalaire de grandes et de petites fosses (Kostienki, Avdeevo). À Krakow-Spadzista, une accumulation d'ossements de mammouths a été reconnue ainsi qu'une partie de la zone d'habitat.

Le Mézinien est un peuplement du bassin moyen et supérieur du Dniepr maintenant bien daté après rectification (Iakovleva 2009) à une période courte entre 15 000 et 14 000 BP. Les cabanes en os de mammouths de Gontsy, Dobranichivka, Mézine, Mejiriche et Ioudinovo, les plus spectaculaires de toutes, sont circulaires ou ovalaires, d'un diamètre d'environ quatre à huit mètres, sauf exceptions. Elles sont situées à une distance de dix à vingt mètres l'une de l'autre (jusqu'à au moins quatre cabanes trouvées à Gontsy, Dobranichivka, Ioudinovo et Mejiriche) et sont généralement entourées d'un nombre variable de fosses de un à trois mètres de diamètre, ayant servi à l'extraction du lœss, au stockage et parfois comme dépotoir. Un ou plusieurs foyers sont généralement situés à l'intérieur de la cabane, sauf exception. L'architecture est caractéristique : les fondations sont un cercle des crânes enfoncés ; les parois sont constituées de grands os de mammouths : crânes, omoplates, bassins, os longs, mandibules qui ont été aménagés (trous, appointements et creusements) de façon à les lier entre eux. Le choix et l'agencement géométrique de ces os dans les parois individualisent chaque cabane. Ces structures sont entourées par des zones d'activités et des foyers de plein air, des zones de rejets, des zones de dépeçages d'animaux et à proximité des grandes accumulations d'ossements de mammouths qui ont été exploitées comme matériaux de construction des cabanes, matière première pour la fabrication d'armes et d'outils, comme source de combustible pour les foyers et comme ressource alimentaire.

Dans cette grande plaine, sans grottes ni abris naturels et sans affleurements rocheux, l'art pariétal s'exprime pleinement dans les habitats par des peintures et des gravures sur les ossements des parois des cabanes et l'art mobilier particulièrement riche se manifeste notamment par des statuettes féminines, des outils décorés, des objets de parures (bracelets et diadèmes en ivoire, pendeloques) et des gravures sur défenses.

Hormis les habitats à cabanes en os de mammouths les plus célèbres et les plus recherchés, d'autres sites sont connus, à occupation courte et sans cabanes, spécialisés dans la chasse au cheval (Fastiv) ou à la marmotte (Jouravka), près de gîtes de matières premières (comme à Kanev ou à Puchkari) marquant une occupation résidentielle longue de l'habitat avec des déplacements lointains pour le silex, l'ambre, les coquillages fossiles des affleurements du Sarmatien ou les coquillages des rivages de la mer noire.

Le territoire du Mézinien est celui du bassin moyen et supérieur du Dniepr et de ses affluents (Pripiat, Desna) ; il est limité au Sud par la limite entre la steppe/toundra de la zoocénose du mammouth, du rhinocéros, du cheval et du renne et la steppe de la zoocénose du cheval, du bison et de l'antilope saïga, qui correspond à une constante environnementale dans le paysage de l'Ukraine et de la Russie méridionale européenne (zone du tchernoziom et zone des steppes). Les dénominations anciennes de culture de Mézine (nord de l'Ukraine), de culture de Mejiriche (Ukraine moyenne) ou de culture d'Elisseevichi (Desna en Russie) ne sont que des variantes locales d'une même entité culturelle et territoriale. La question d'un peuplement équivalent dans le bassin du Don (« culture de Zamiatnine ») est bien posée par les deux grandes cabanes de Kostienki XI Anosovka II, site malheureusement unique et mal daté.

6 LA STRATÉGIE DE MOBILITÉ SAISONNIÈRE

Définition et propriétés d'une stratégie de mobilité saisonnière

6.1 Le territoire est ouvert vers un espace inhabité où les groupes humains font des incursions saisonnières. Ces espaces sont généralement un Nord inhabité et inhabitable toute l'année. Il faut distinguer cette stratégie de la stratégie planifiée étendue où sont intégrés dans le territoire des espaces d'occupation saisonnière, par exemple des chasses d'altitude ou des chasses spécialisées en des lieux précis liées à des temps de migrations d'espèces animales. La démonstration nécessite une étude de saisonnalité précise pour démontrer que les habitats n'ont été occupés que durant l'été.

Les peuplements sont situés dans les régions méridionales pendant une grande partie de l'année. Des déplacements sont effectués sur plusieurs centaines de kilomètres l'été pour la chasse spécialisée (généralement le renne) et pour l'approvisionnement en silex de bonne qualité. Les territoires de repli dépendent de la géographie méditerranéenne et leurs occupations correspondent à une stratégie opportuniste locale. Les territoires de mobilité estivale correspondent aux espaces inhabités de l'Europe moyenne, jadis occupés avant le maximum glaciaire. Y accéder nécessite parfois des cheminements longs et des passages à travers des cols praticables au maximum glaciaire, c'est-à-dire en dessous d'une altitude maximale d'environ six-cent mètres.

Les groupes humains qui appliquent une stratégie de mobilité saisonnière

6.2 Les groupes humains qui appliquent une stratégie de mobilité estivale au maximum glaciaire sont les suivants (**figure 4**) :

- Solutréen récent et Badegoulien récent en Europe occidentale ;
- Sagvarien en Europe centrale ;
- Épigravettien ancien des Balkans ;
- Molodovien du bassin du Dniestr et Épigravettien ancien du pourtour septentrional de la Mer Noire.

Cette stratégie est basée sur l'existence de deux épisodes climatiques situés vers 20 000 – 19 000 BP pour le premier et 18 000 – 16 500 BP pour le second. L'existence de ces épisodes, est démontrée par l'existence de sols fossiles dans les séquences lœssiques d'Europe centrale et orientale (Ivanova 1969 ; Haesarts 1990). Dans une étude récente de corrélation des séquences de référence en milieu non anthropique (Bosselin & Djindjian 2002), nous avons montré que ces épisodes étaient caractérisés par une augmentation d'humidité sans changement de température dans le climat très froid du maximum glaciaire, favorisant le développement de la couverture végétale, et donc de la démographie des herbivores et le retour saisonnier des groupes humains.

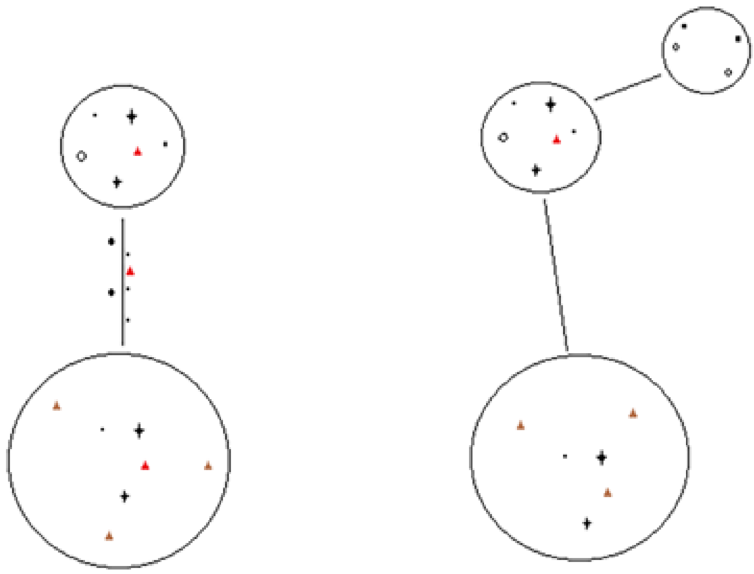

FIGURE 4 Modèle géométrique d'une stratégie de mobilité saisonnière.

En Hongrie, dans la plaine de Pannonie, le Sagvarien est caractérisé par des sites d'habitats saisonniers de plein air d'occupation estivale, spécialisés dans la chasse au renne, et présents seulement pendant ces deux épisodes (Dobosi 2009). Ces groupes viennent soit de l'Est, installés sur le bassin inférieur du Danube en Roumanie et Bulgarie, par les portes de Fer soit du Sud, installés sur le pourtour du golfe adriatique, par le col de Postojna en Slovénie.

En Europe orientale, à partir de 21 000 BP, les groupes humains du Gravettien oriental abandonnent la grande plaine et se réfugient entre 21 000 BP et 17 000 BP, sur le pourtour septentrional de la Mer Noire, à l'époque un lac de superficie beaucoup plus restreinte. La taphocénose de ces sites, fournissant une industrie aurignacoïde (Muralovkien) et une industrie d'Épigravettien ancien, révèle une très forte dominance bison/cheval/saïga avec la présence du renne. Contemporains, les habitats épigravettiens (Molodovien *stricto sensu*) de la vallée du Dniestr et de ses affluents sur le versant Nord des Carpates (Moldavie, Ukraine, Roumanie), dont les mieux étudiés sont Molodova V et Cosaoutsy, présentent une taphocénose à dominante renne et cheval. Plus au Nord, la steppe-toundra, est le domaine du mammouth, du rhinocéros, du renne, du cheval et du bœuf musqué où les groupes font des incursions estivales pour la chasse au renne et l'approvisionnement en matières premières.

Plus complexe en apparence, semble être la situation d'Europe occidentale. Il est en effet difficile d'imaginer le Périgord, centre du monde de la préhistoire, dépeuplé au maximum glaciaire ou être seulement l'objet d'une occupation saisonnière. Les études archéozoologiques de Castel (Castel *et alii* 2005) mettent en évidence une occupation saisonnière fin de l'hiver/printemps pour les sites solutréens de Périgord et des Charentes et des chasses spécialisées estivales au renne en haut de vallées du massif central (Dordogne, Lot, Aveyron), dans le Nord : Loire (Fressignes), Yonne (Trilobite) jusque dans la Saône (Solutré), et d'extraction du silex dans des gîtes du bassin de la Loire (Les Maitreaux) ou de la Seine (La Celle Saint-Cyr).

Deux hypothèses peuvent alors être discutées :

- les Solutréens sont présents toute l'année en Aquitaine, et font des incursions estivales vers le Nord ou en haut de vallées du massif central pour des chasses spécialisées au renne et pour l'approvisionnement en matières premières ;

- les Solutréens ne sont pas présents toute l'année en Aquitaine (et de même en Ardèche). La suggestion de Castel d'une présence au Nord l'hiver n'est pas crédible en plein maximum glaciaire. Aussi faut-il chercher une solution plus au Sud. C'est le sujet de la communication donnée à un colloque sur le Solutréen, « Quarante ans après Ph. Smith (1966) » qui s'est déroulée à La Claise en 2006. Dans cette publication (Djindjian 2013), je proposais l'idée d'un peuplement solutréen et badegoulien réparti dans le cycle annuel entre la péninsule ibérique (subcantabrique et subpyrénéenne), l'Aquitaine et seulement durant les épisodes climatiques favorables, des circulations estivales vers le Nord, vers les hauts de vallées du Massif Central et la corniche cantabrique et asturienne.

Plusieurs arguments étaient données dont les principaux étaient :

- une forte présence solutréenne dans le sud de la péninsule ibérique (Andalousie, vallée du Tage, du Douro) avec des sites d'art pariétal en grotte et en plein air ;

- l'occupation de la Meseta par les groupes solutréens, en circulation depuis et vers les bassins du Duro, du Tage et de l'Andalousie, marquée par de nombreuses grottes ornées (La Griega, Los Casares, La Hoz, El Reno, El Turismo, El Cojo) ;

- le passage des groupes solutréens de la Meseta à la vallée de l'Ebre, avec l'importance de la voie naturelle de la vallée du Jalon (Utrilla 1997) ;

- le passage du Solutréen à travers les cols du pays basque entre vallée de l'Ebre et la plaine Aquitaine : Abauntz, Coscobilo, Etxauri (Utrilla 1997) ;

- la présence de pendeloques en défenses de sanglier dans plusieurs sites solutréens d'Aquitaine (Malpas, Roc de Sers, Le Gabillou, Combe-Saunière, Grotte XVI, etc.) ;

- des coquillages d'origine strictement méditerranéenne découverts dans les seuls niveaux du Solutréen supérieur en Charente, Périgord et Quercy, indiquant des déplacements vers le rivage méditerranéen des groupes humains (Languedoc, Levant espagnol mais aussi Andalousie) ;

- l'existence d'une iconocénose méditerranéenne (cheval, aurochs, cerf, biche, bouquetin) en Aquitaine dans des grottes ornées (Lascaux, Le Gabillou, Le Placard) ou des abris-sous roche (Bourdeilles, Badegoule) attribuées à la période Solutréen/Badegoulien, ainsi qu'en Ardèche (Ebbou, Tête du Lion).

7 La stratégie planifiée restreinte

Définition et propriétés d'une stratégie planifiée restreinte

7.1 Les territoires sont restreints (1 000 à 10 000 km^2). Les groupes humains sont installés dans des habitats spécialisés. La diversification des ressources alimentaires est poussée à son maximum (chasse opportuniste, chasse spécialisée d'altitude avec la conquête des hauteurs, pêche, oiseaux, rongeurs, collecte de coquillages). L'approvisionnement en matière première est local dans le territoire et dépend de la qualité des gites qui y sont trouvés. L'art est peu développé.

Les groupes humains qui appliquent une stratégie planifiée restreinte

7.2 Cette stratégie est la conséquence d'une réduction progressive de la stratégie planifiée étendue, du fait de la disparition d'espèces animales chassées due à une extinction d'origine anthropique (bison dans la plaine aquitaine ?) et/ou d'une émigration pour cause de changement de climat (mammouth vers la Sibérie à partir de 14 000 BP, renne vers le Nord de l'Europe à partir de 13 000 BP). La même amélioration climatique voit l'arrivée en Europe moyenne d'espèces réfugiées au maximum glaciaire dans le pourtour méditerranéen (aurochs et cerf à partir de Bölling, puis sanglier et chevreuil à partir d'Alleröd), mais dont l'éthologie n'est pas identique à celle des rennes, bisons et chevaux. La forêt envahit le paysage steppique. Les groupes humains doivent s'adapter et changer leurs techniques cynégétiques (invention de l'arc et développement des microlithes). Par ailleurs, le succès du modèle magdalénien en Europe occidentale et centrale avait vu dans sa dernière phase (Magdalénien supérieur) une occupation ou une acculturation quasi-complète (péninsule ibérique, nord de l'Europe), s'adaptant même à des stratégies alimentaires locales de plus en plus diversifiées, tout en augmentant du fait du succès de son système, la densité démographique des groupes, et par la même réduisant les espaces de circulation. Quand le changement climatique de la fin de la glaciation survient, les groupes épigravettiens sur la côte tyrrhénienne, sur le golfe adriatique, dans les Balkans et même dans le Levant s'adaptent d'autant plus facilement que ce processus avait débuté pour certains d'entre eux depuis le 15° ou le 16° millénaire BP. Pour les groupes magdaléniens, ce processus débute au 13° millénaire BP, et se traduit par l'azilianisation de la culture matérielle (groupes aziliens et groupes à Ferdermesser), les groupes occupant le plus souvent les mêmes sites et les mêmes espaces. Mais progressivement, à partir du Dryas III (Brommien, Swidérien, Ahrensbourgien, *etc.*) puis du Préboréal (Mésolithique), un processus de différenciation s'active qui voit les cultures matérielles se différencier régionalement et leurs territoires se réduire progressivement, tandis que les stratégies alimentaires se diversifient et se spécialisent. Dans les régions qui possèdent une capacité alimentaire élevée et diversifiée dans le cycle annuel, ces processus conduiront progressivement à une sédentarisation des groupes, étape nécessaire pour le passage à l'agriculture dans les régions de grande diversité et de grande densité animale et végétale (croissant fertile au Moyen-Orient).

8 Démographie des groupes de chasseurs-cueilleurs (figure 5)

Dans le cas d'une stratégie opportuniste locale, l'effectif d'un groupe dans son territoire de 1 000 km^2 définit la densité démographique de la population. Elle est très faible de l'ordre de 0,01 h/ km^2.

Dans le cas d'une stratégie planifiée étendue, un pixel de territoire de 1.000 km^2 appartient à l'espace de circulation de plusieurs groupes, en nombre variable suivant la superficie de leur espace de déplacement et leur densité démographique. Soit donc un territoire de superficie T, une distribution aléatoire de densité d de points Mi figurant les centres virtuels de l'espace de déplacement des groupes, le rayon de l'espace de circulation de chaque groupe (supposé ici

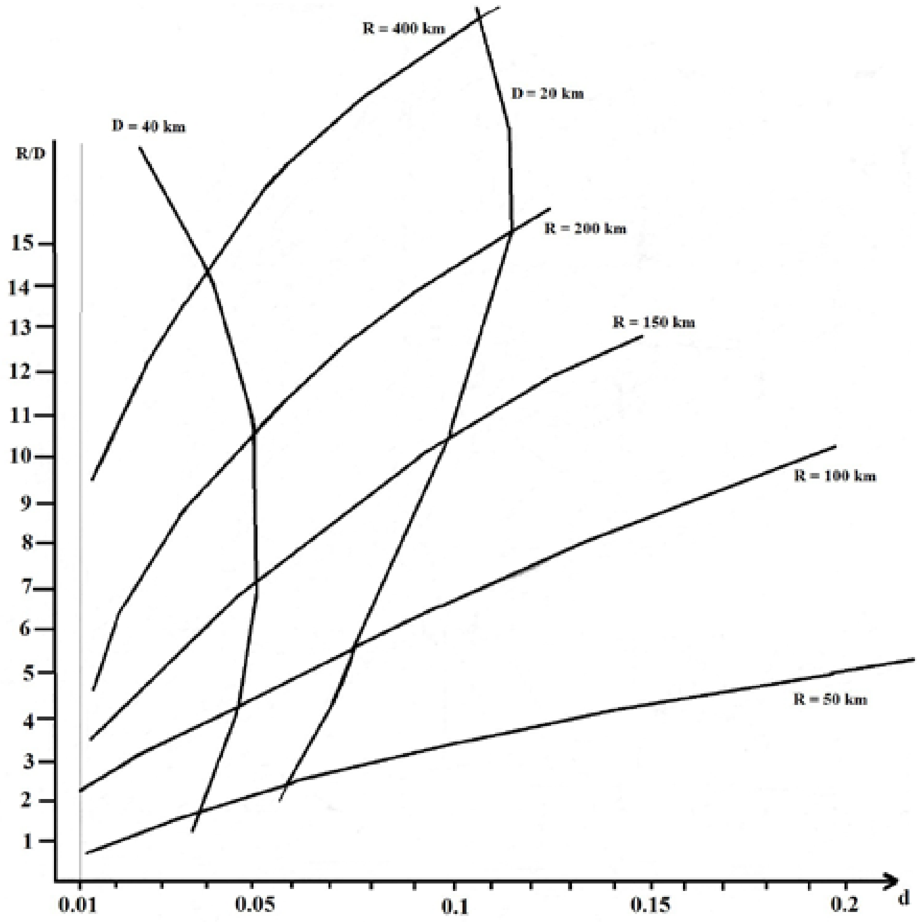

FIGURE 5 Abaque démographique, R/D en fonction de d (R - espace de circulation des groupes humains ; D - distance moyenne intergroupe ; d - densité de population).

circulaire) Ri et la distance moyenne intergroupe Dii'. Le nombre d'espaces de circulation de groupes recouvrant un pixel aléatoire de 1 000 km^2 donne une estimation non biaisée de la densité de population de la stratégie planifiée étendue. Elle est fonction de T, Ri et Dii'. Plus les Ri sont élevés et les Dii' faibles, plus la densité moyenne par 1 000 km^2 est élevée. Nous ne donnerons pas le détail des calculs, mathématiquement trop complexes ici. Par contre, nous pouvons exposer un modèle simplifié qui donne un ordre de grandeur approché des relations entre ces différentes variables. Le modèle simplifié est une distribution uniforme de groupes d'effectif identique (trente-trois individus) dans un territoire de superficie T (100 000 km^2), ayant le même rayon R d'espace de circulation et la même distance moyenne intergroupe D. Il suffit de compter le nombre de cercles de déplacement qui coupent un cercle quelconque et qui est constant (puisqu'ils jouent tous un rôle identique dans une distribution uniforme). Ce nombre, qui mesure la relation entre d et R/D, s'exprime de façon simple par une suite arithmétique de raison $4n - 3$, pour n variant de 2 en 2 ou de raison $2n - 1$ pour n variant de $\sqrt{2}$ en $\sqrt{2}$.

Il est alors possible de construire le graphique de la **figure 5** qui représente les variations du rapport R/D en fonction de d. Pour un rapport R/D variant de 1 (équivalent au modèle de la stratégie opportuniste locale) à 10 (grands espaces de déplacement et distance intergroupe faible), la densité varie de 0,01 h/km2 à 0,15 h/km2. Les abaques correspondant à R = 50 km, 100 km, 150 km, 200 km et 400 km ont été tracées ainsi que les celles correspondant à R = 20 km et 40 km.

Nous retrouvons ici les ordres de grandeur proposés par Hassan (1981).

L'abaque montre que le bon fonctionnement de la stratégie planifiée étendue se situe entre un espace de déplacement d'un rayon de 50 km (ou 10.000 km^2) à un rayon de 400 km (ou 500 000 km^2) avec une distance intergroupe moyenne de 20 à 50 km. Cette stratégie permet une densité démographique de varier de 0,01 h/km2 à 0,1 h/km2.

Elle montre également que le passage continu d'une stratégie opportuniste locale à une stratégie planifiée étendue est possible d'abord en augmentant progressivement l'espace de déplacement sur une même abaque de distance intragroupe (par exemple celle à 40 km) puis en se déplaçant sur l'abaque de rayon de déplacement (par exemple celle à 150 km) pour accroitre le nombre et donc la densité des groupes (à condition de trouver à chasser des espèces circulant ou migrant en groupe important, comme le bison ou le renne et de résoudre la planification alimentaire du cycle annuel, jusqu'au maximum de la potentialité alimentaire).

Le processus inverse est identique.

Il est ainsi possible de proposer une densité de population des groupes moustériens de l'OIS 4 tombée à 0,01 h/km2 dans une stratégie opportuniste locale, puis remontant progressivement à l'OIS 3 vers une densité de 0,01 à 0,03 h/km2, pour les industries du Moustérien final et les industries de transition conservant une stratégie opportuniste locale, puis passant à l'Aurignacien ancien, vers 34 000 BP, dans une stratégie planifiée étendue avec une densité de population qui peut atteindre voire dépasser 0,1 h/km2. Le maximum glaciaire verra un déclin démographique des groupes impossible à estimer avec les données actuellement disponibles. Le processus va s'inverser avec le Magdalénien qui reviendra dès le Magdalénien moyen à une densité de l'ordre de 0,1 h/km2, qui va continuer à croitre au Magdalénien supérieur puis avec l'Épipaléolithique vers des valeurs supérieures à 0,1 h/km2 dans une stratégie opportuniste restreinte.

Dans le cas d'une stratégie semi-sédentaire, il est plus difficile d'évaluer la démographie des groupes car elle basée sur la densité des troupeaux de mammouths dans la grande plaine orientale et septentrionale. Sur la base d'une alimentation journalière par individu de 50 kg d'herbes, correspondant à une surface de 1 000 m^2, un troupeau de vingt individus, annuellement, broutera une surface d'environ 7,5 km^2 arrondi à 10. La grande plaine orientale occupe en période pléniglaciaire un espace steppique de 1 000 000 de km^2, soit 100 000 troupeaux (s'ils étaient seuls à consommer), soit une densité de 0,1 troupeau/km2. Le modèle de Redmann (1982), qui prend en compte à juste titre la biomassse simultanée de l'ensemble des mammifères, conclut à une densité plus faible de 0.402 individus au km^2 soit 0.02 troupeau au km^2. Chaque groupe humain s'installant au printemps à côté d'un troupeau de mammouths mort pendant l'hiver, la densité des groupes est égal au taux de troupeaux qui vont périr pendant l'hiver. Par exemple, si ce taux varie de 1 % à 5 %, la densité des groupes varie de 100 à 500 groupes sur le territoire de 500 000 km^2 soit une densité de 0.007 à 0,035 h/km2. La densité démographique des groupes humains étant directement liée au taux de disparition des troupeaux de mammouths pendant l'hiver, qui n'est pas calculable, il n'est guère possible d'être plus précis. Si le taux est élevé, la démographie est élevée, mais la durée de vie du système est courte (plusieurs centaines d'années pour le Mezinien), du fait de la disparition progressive des mammouths dans le territoire. Si le taux est faible et permet un renouvellement démographique compensant les pertes, la durée de vie du système peut être longue (quelques milliers d'années pour le Pavlovien et le Gravettien oriental) mais la démographie sera plus faible.

9 LE MOTEUR DU FONCTIONNEMENT INTERGROUPE D'UN RÉSEAU DE GROUPES DE CHASSEURS-CUEILLEURS

Le changement d'échelle, depuis le niveau du site et du groupe humain, à celui du territoire et du réseau de groupes, amène naturellement à aborder le sujet de l'existence et du contenu des mécanismes de fonctionnement intergroupes d'un même réseau.

Il est malheureusement clair que les bons vieux modèles anthropologiques ne nous sont d'aucune aide ici, soit que leur applications à des dizaine de milliers de kilomètres et des dizaines de milliers d'années de distance ne soit guère possible, soit que surtout ils définissent des organisations fourre-tout (bande, tribu, chefferie) ou qu'ils mettent l'accent sur des mécanismes particuliers (et exceptionnels au yeux de l'anthropologue comme le don, la kula, le potlatch, *etc.*) des relations sociales intragroupe ou intergroupes en perdant l'intégration de ces processus dans un système global. Conscient de cette lacune, Testart (2005) a proposé une approche plus systémique des sociétés premières pour essayer d'y définir des relations sociales qui intègrent et expliquent ces mécanismes d'exception. Dans la classification des sociétés que Testart effectue, le type « Monde 1 » correspond aux sociétés qui n'effectuent pas de stockage de biens de consommation, de biens d'utilisation courante ou de biens de prestige. Les sociétés de chasseurs cueilleurs du paléolithique supérieur sont caractéristiques de ce type « Monde 1 », ou sociétés sans stockage. Notons au passage que la propension de nombreux préhistoriens à imaginer des échanges de proche en proche à la place des approvisionnements directs à longue et même à moyenne distance, trouve ici son épilogue : ces modes d'échanges sont associées à des sociétés avec stockage, dites « Monde 2 », et n'ont pas d'existence dans les sociétés sans stockage du « Monde 1 ».

Comme nous l'avons évoqué précédemment, le bon fonctionnement du système n'a pas besoin d'une rencontre planifiée annuelle de tous les groupes dans un seul et même endroit. Au contraire, les regroupements à plusieurs groupes dans des points de rencontre multiples sont beaucoup plus efficaces. Dans ces rencontres, il est plus utile de se communiquer des savoir (localisation de gués, cols, gîtes de silex ou de coquillages fossiles, rendez-vous de chasse, *etc.*) et des savoir-faire techniques (taille du silex ou de l'industrie osseuse, nouveau type d'outil, d'éléments de projectile ou d'emmanchement, nouveau procédé de chasse ou de piégeage, *etc.*), voire d'effectuer des actions de concert (chasse, approvisionnement) que de s'échanger des objets, les ressources pour les fabriquer étant accessibles et ouvertes à tous les groupes.

Il n'en est pas de même pour les individus. Testart (2005) décrit deux systèmes connus pour les mariages qui se font presque toujours entre personnes de deux groupes différents :

1. le service pour la fiancée ou l'uxorilocalité temporaire (connue chez les populations Inuit), est un exemple de système ouvert, qui oblige le fiancé à s'installer dans le groupe de sa promise et de se mettre à son service pendant un certain temps. Passé ce temps, il peut retourner dans son groupe de naissance avec sa fiancée ;

2. les classes matrimoniales (connue chez les aborigènes australiens) est un exemple de système fermé, qui oblige aussi à chercher le mariage dans un autre groupe, mais avec des obligations permanentes du gendre vis-à-vis de la belle-mère, générant des prestations matrimoniales de longue durée, que Testart appelle justement des *« obligations viagères »*.

Ainsi le moteur du fonctionnement intergroupe est celui de l'accouplement nécessaire à la fertilité du groupe, à sa régénérescence continuelle, génération après génération. C'est aussi la possibilité de la multiplication des groupes dans les environnements favorables de croissance, à la fusion des groupes en cas d'environnement défavorables de décroissance ou en cas d'évènements funestes qui ont décimé un groupe. Dans le cas Inuit, le fiancé vient avec ses objets dans le groupe de sa fiancée puis la fiancée vient avec ses objets dans le groupe du fiancé. Ce ne sont donc pas les objets qui sont échangés ici, mais les individus porteurs de leurs objets.

10 CONCLUSION

La clé de la modélisation des systèmes socio-économiques des groupes humains du paléolithique moyen et supérieur d'Eurasie se trouve sans doute dans notre capacité de reconstituer le cycle alimentaire annuel des groupes humains dans leur territoire de déplacement. La principale nourriture en période glaciaire étant une nourriture carnée, c'est de la connaissance éthologique et de la reconstitution des zoocénoses que viendra la connaissance des stratégies de ressources alimentaires dans le cycle annuel et de l'organisation socio-économique des groupes humains.

Ainsi, à une faune de faible mobilité, vivant en petits groupes sur une territoire restreint, peuvent être associés des petits groupes humains de faible mobilité, vivant dans un territoire restreint, selon un cycle annuel ubiquiste, et fabriquant une culture matérielle peu portable et peu productive sans nécessité d'expression « artistique ».

À une faune de mobilité forte, en environnement de steppe froide et/ou de steppe toundra, constituée de troupeaux nombreux effectuant des migrations saisonnières, peuvent être associés des groupes d'effectif plus important appartenant à un réseau de forte densité démographique, se déplaçant sur un territoire important mais variable selon les ressources disponibles, appliquant une stratégie planifiée étendue sur un cycle annuel fortement spécialisé, fabriquant une industrie portable et productive et marquant ses individus, ses groupes et son territoire par une expression « artistique » importante dans laquelle la relation à l'animal chassé est primordiale.

La stratégie de mobilité saisonnière apparait alors comme un système mixte entre les deux stratégies précédentes, facilitant le passage de l'une à l'autre, selon l'amélioration ou la péjoration climatique.

Dans ce contexte, la stratégie semi-sédentaire basée sur une économie du mammouth, représente une exception d'autant plus remarquable, qu'elle anticipe l'avenir par des inventions sans lendemain.

Seul l'environnement holocène, avec la stabilité du système et la diversification sinon l'enrichissement des ressources alimentaires, permettra une croissance de la densité démographique dans une stratégie planifiée restreinte, qui annonce dans les régions à forte diversité végétale et animale, la sédentarisation de certains groupes.

BIBLIOGRAPHIE

ALLAIN J., DESBROSSE R., KOZLOWSKI J.K. & RIGAUD A. (1985) – Le Magdalénien à navettes. *Gallia Préhistoire* 28(1): 37–124.

BINFORD L.R. (1993) – Bones for stones: considerations of analogues for features found on the Central Russian plain. *From Kostienki to Clovis. Upper Paleolithic- Paleo-Indian adaptations.* New York and London, Plenum press, p. 101–124.

BINFORD L.R. (1980) – Willow smoke and dog's tails: Hunter-Gatherer Settlement Systems and Archaeological Site Formation. *American Antiquity* 45(1): 4–20.

BINFORD L.R. (2001) – *Constructing frames of reference: an analytical method for archaeological theory building using ethnographic and environmental data sets*. Berkeley, CA, University of California Press.

BORDES F. (1968) – *Le Paléolithique dans le monde*. Paris, Hachette, L'Univers des Connaissances.

BOSSELIN B. & DJINDJIAN F. (2002) – Un essai de reconstitution du climat entre 40 000 BP et 10 000 BP à partir des séquences polliniques de tourbières et de carottes océaniques et glaciaires à haute résolution. *Archeologia E Calcolatori* 13: 275–300.

CASTEL J.C., CHADELLE J.P. & GENESTE J.M. (2005) – Nouvelle approche des territoires solutréens du Sud-Ouest de la France. Dans: J. Jaubert & M. Barbaza (eds), *Territoires, déplacements, mobilité, échanges pendant la préhistoire. Terres et hommes du Sud. Éditions du Comité des travaux historiques et scientifiques, p.* 279–294.

DJINDJIAN FR. (1995) – L'influence des frontières naturelles dans les déplacements des chasseurs cueilleurs au Würm récent. *Prehistoria Alpina* 28(2): 7–28.

DJINDJIAN FR. (1996) – Les industries aurignacoïdes en Aquitaine entre 25 000 BP et 15 000 BP. Preprints du Colloque XI du XII° Congrès UISPP Forli (Italie), *The late Aurignacian*. Forli, ABACO 6: 41–54.

DJINDJIAN FR. (2004a) – L'Art paléolithique dans son système culturel: essais de corrélation. I. Chronologie, « Styles » et « Cultures ». Dans: M. Lejeune & A.C Welté (eds), *L'Art du Paléolithique supérieur*. Liège, ERAUL 107: 249–259.

DJINDJIAN FR. (2004b) – L'Art paléolithique dans son système culturel. II-De la variabilité des bestiaires représentés dans l'art pariétal et mobilier paléolithique. Dans: *La Spiritualité*. Liège, ERAUL 106: 127–152.

DJINDJIAN FR. (2009) – Le concept de territoires pour les chasseurs cueilleurs du Paléolithique supérieur européen. Dans: F. Djindjian, J.K. Kozlowski & N. Bicho (eds), *Le concept de territoires pour les chasseurs cueilleurs du Paléolithique supérieur européen*. BAR International Series 3: 3–25.

DJINDJIAN FR. (2009) – L'art pariétal et l'art mobilier pour l'identification des territoires de peuplement dans le Paléolithique supérieur européen: l'approche par les bestiaires. Dans: F. Djindjian & L. Oosterbeek (eds), *Espaces symboliques dans l'art préhistorique*. BAR International Series 40: 3–20.

DJINDJIAN FR. (2010) – Territoires aurignaciens en Europe occidentale: faciès industriels et manifestations artistiques. Dans: *Art rupestre et communications: espaces symboliques et territoires culturels*. Université de Toulouse-le Mirail, Préhistoire, Art et Sociétés, Revue de la société préhistorique Ariège Pyrénées, 63: 17–32.

DJINDJIAN FR. (2013) – L'apport des données de l'art solutréen dans les problématiques de circulations des chasseurs cueilleurs au maximum glaciaire en Europe occidentale. Colloque international « Le Solutréen, 40 ans après Smith, 1966 » Preuilly-sur-Claise, 29–31 octobre 2007. In: *Le Solutréen 40 ans après Smith, 1966*, 47e supplément à la revue archéologique du centre de la France. ARCHEA-FERACF, Tours, p.275–296).

DJINDJIAN FR., SAPOZHNIKOV I., STEPANCHUK V. & SAPOZHNIKOVA G. (2006) – Upper palaeolithic chronology, cultural facies and economic complexes of the northern black sea area. In: J.L. Sanchidrian Torti, A.M. Marquez Alcantara & J.M. Fullola I Pericot (eds), *La cuenca mediterranea durante el paleolitico superior 38 000 – 10 000 anos*. Malaga, Fundacion Cuevade Nerja, p. 46–59.

DJINDJIAN FR., KOZLOWSKI J.K. & OTTE M. (1999) – *Le Paléolithique supérieur en Europe*. Paris, Armand Colin.

EFIMIENKO P.P. (1953) – *Les sociétés primitives*. 3e édition, Kiev (en russe).

EFIMENKO P.P. (1958) – *Kostienki 1*. Moscou-Leningrad, Nauka (en russe).

DOBOSI V. (2009) – Constancy and change in Upper palaeolithic, Hungary. In: Fr. Djindjian, J.K. Kozlowski & N. Bicho (eds), *Le concept de territoires pour les chasseurs cueilleurs du Paléolithique supérieur européen.* BAR International Series 3: 123–134.

FARIZY C., DAVID F. & JAUBERT J. (DIR.) (1994) – *Hommes et bisons du Paléolithique moyen à Mauran (Haute-Garonne).* Paris, CNRS, XXXe supplément à Gallia Préhistoire.

FITZHUGH B. & HABU J. (2002) – *Beyond foraging and collecting. Evolutionary change in Hunter-Gatherer settlement systems*. New-York, Plenum.

GAUDZINSKI S. (1995) – Wallertheim Revisited: a re-analysis of the Fauna from the Middle Palaeolithic Site of Wallertheim (Rheinhessen/Germany). *Journal of Archaeological Science* 22: 51–66.

GVOSDOVER M.D. (1995) – Art of the mammoth hunters; the finds from Avdeevo. *Oxford Monograph* 49.

HAESARTS P. (1990) – Évolution de l'environnement et du climat au cours de l'Interpléniglaciaire en Basse-Autriche et en Moravie. Dans: *Feuilles de pierre. Les industries à pointes foliacées du Paléolithique supérieur européen*. Liège, ERAUL 42: 523–538.

HAMILTON M.J., MILNE B.T., WALKER R.S., BURGER O. & BROWN J.H. (2007) – The complex structure of hunter–gatherer social networks. *Proceedings of the Royal Society B7* 274: 2195–2203.

HASSAN F.A. (1981) – *Demographic archaeology.* New York, Academic Press.

IAKOVLEVA L. (2009) – L`art mézinien en Europe orientale dans son contexte chronologique, culturel et spirituel. *L'Anthropologie* 113: 691–752.

IAKOVLEVA L. (2012) – *L'art des origines de l'Ukraine.* Kiev, Korvinpress (en ukrainien).

IVANOVA I. (1969) – Étude géologique des gisements paléolithiques de l'U.R.S.S. *L'Anthropologie* 73: 5–48.

JAUBERT J., LORBLANCHET M., LAVILLE H., SLOTT-MOLLER R., TURQ A. & BRUGAL J.-PH. (1990) – Les chasseurs d'Aurochs de La Borde - un site du Paléolithique moyen (Livernon, Lot). Paris, MSH, *Documents d'Archéologie Française* 27.

JAUBERT J., KERVAZO B., BRUGAL J.-PH., CHALARD P., FALGUERES CH., JARRY M., JEANNET M., LEMORINI C., LOUCHART A., MAKSUD F., MOURRE V., QUINIF Y. & THIEBAUT C. (2005) – Coudoulous I (Tour-de-Faure, Lot), site du Pléistocène moyen en Quercy. Bilan pluridisciplinaire. Dans: N. Molines, M.-H. Moncel & J.-L. Monnier, *Données récentes sur les modalités de peuplement et sur le cadre chronostratigraphique, géologique et paléogéographique des industries du Paléolithique inférieur et moyen en Europe*. BAR International Series 1364: 227–251.

JOCHIM M.A. (1976) – *Hunter-gatherer subsistence and settlement: a predictive model.* New York, Academic Press.

KEENE A.S. (1979) – Economic optimization models and the study of hunter-gatherer subsistence settlement systems. In: C. Renfrew & K.L. Cooke, *Transformations: mathematical approaches to culture change*. New York, Academic Press, p. 369–404.

KELLY R.L. (2007) – *The foraging spectrum: diversity in hunter-gatherer lifeways.* New York, Percheron Press.

KLIMA B. (1994) – *Pavlov I, Excavations 1952–53.* Liège, ERAUL 66.

KLIMA B. (1995) – *Dolni Vestonice II, Ein Mammuthjägerrastplatz und seine Bestattungen*. Liège, ERAUL 73.

NIVEN L., STEELE T.E., RENDU W., MALLYE J.-B, MCPHERRON S.P., SORESSI M., JAUBERT J. & HUBLIN J.-J. (2012) – Neandertal mobility and large-game hunting: The exploitation of reindeer during the Quina Mousterian at Chez-Pinaud Jonzac (Charente-Maritime, France). *Journal of Human Evolution* 63: 624–635.

OTTE M. (2011) – Contacts entre Afrique du Nord et Europe durant la Préhistoire. Dans: *Actes du colloque international Préhistoire maghrébine* (1re éd.), Tamanrasset, CNRPAH 1: 193–207.

OLIVA M. (2009) – Milovice, site of mammoth people below the Pavlov hills. Brno, Moravske Zemske Museum, *Anthropos* 27.

PRASLOV N.D. & ROGATCHEV A.N. (ED.) (1982) – *Le Paléolithique de la région de Kostienki-Borschevo sur le Don 1879–1979.* Leningrad, Nauka (en russe).

READ D.W. (1998) – Kinship based demographic simulation of societal processes. *Journal of Artificial Societies and Social Simulation* 1(1).

REDMANN R.E. (1982) – Production and diversity in contemporary grasslands. In: M. David M. Hopkins, John V. Matthews, Jr. Charles E. Schweger & Steven B. Young (eds), *Paleoecology of Beringia*, Academic Press, New York, p. 223–239.

RENDU W., ARMAND D., PUBERT E. & SORESSI M. (2009–10) – Approche taphonomique en cémentochronologie: réexamen du niveau 4 du Pech-de-l'Azé I (Carsac, Dordogne, France). *Paléo* 21: 223–236.

ROGATCHEV A.N. (1955) – Kostienki IV, habitat préhistorique sur le Don. *MIA* 45 (en russe).

SLIMAK L. (2008) – The Neronian and the historical structure of cultural shifts from Middle to Upper Palaeolithic in Mediterranean France. *Journal of Archaeological Science*, p. 1–11.

SMITH P E.L. (1966) – *Le Solutréen en France*. Publications de l'Institut de Préhistoire de Bordeaux, Mémoire 5, Bordeaux, Delmas.

SVOBODA J. (1994) – Paléolit Moravy à Sleszka (The Paleolithic of Moravia and Silesia). Brno, *The Dolni Vestonice Studies* 1.

TESTART A. (2005) – *Éléments de classification des sociétés*. Paris, Errance.

UTRILLA P. (1997) – Le couloir de l'Ebre après le pléniglaciaire : influences méditerranéennes et atlantiques. Dans : J.M. Fullola & N. Soler (eds), *Le monde méditerranéen après le pléniglaciaire 18 000 – 12000 BP*, Gérone, Éditeur Centre d'investigations archéologiques 17 : 431–443.

VALOCH K. (1996) – *Le paléolithique en Tchéquie et en Slovaquie*. Série Préhistoire d'Europe 3, Grenoble, Jérôme Million.

WINTERHALDER B. (1986) – Optimal foraging : Simulation studies of diet choice in a stochastic environment. *J. Ethnobiology* 6 : 205–223.

WOBST H.M. (1974) – Boundary conditions for Palaeolithic social systems : a simulation approach. *American Antiquity* 39(2) : 147–178.

La « Transculturation » : un nouveau paradigme parmi les modèles de transition

Foni LE BRUN-RICALENS

In Memoriam Fernando Ortiz (1881–1969)

« Chaque culture représente un développement historique original, qui s'est effectué d'une part en fonction du milieu social et géographique, d'autre part en fonction de la matière dont elle a utilisé le matériel culturel qui lui est venu soit de l'extérieur soit de sa propre faculté de création ».

F. Boas, 1911.
The Mind of Primitive Man.

Abstract: *Several models have been proposed to explain processes underlying the transition between different techno-cultural assemblages in prehistoric archaeology. These 'transitions' either represent phenomena of 'gradualism' connected to in situ evolution or 'diffusionism' by various 'acculturation' processes prone to external influences (direct loans) and necessarily implicating long-distance migrations of populations. Following a review of the original formulation of these two processes, an alternative paradigm is proposed – 'transculturation'. Borrowed from ethnologists and introduced by F. Ortiz in 1940, this process is characterised by the integration (through indigenous re-interpretation) of external influences via indirect loans derived from intimate interpersonal contacts. In the sense of the term employed here, transculturation can take several different forms (imitation, assimilation, hybridisation, re-interpretation) that are better suited to accounting for the diverse transformations evident in the archaeological record. Contrarily to acculturation which imposes new (foreign) manners of doing things, transculturation reinvests the people hidden behind each techno-culture as the primary agents of their own transformation in that they may or may not be open to the diffusion of certain external ideas and have the possibility of re-interpreting them rather then suffering them.*

Key-Words: *cultural and social anthropology, ethnology and archaeology, processes of techno-culural change, models of transitions, gradualism, diffusionism, technical and cultural transfer, direct and indirect loans, acculturation versus transculturation.*

Résumé : En archéologie préhistorique, deux principaux modèles sont traditionnellement employés pour expliquer les changements observés entre les technocomplexes. Les « transitions » seraient essentiellement issues soit d'un « gradualisme » par évolution sur place, soit d'un « diffusionnisme » par « acculturation » qui prône des influences externes par emprunt direct nécessitant des migrations humaines sur de longues distances. Après un rappel des définitions princeps de ces deux processus, il est proposé ici un autre paradigme alternatif, à savoir celui de « transculturation ». Emprunté aux ethnologues, ce concept défini en 1940 par F. Ortiz, caractérise l'intégration par ré-interprétation autochtone d'influences allochtones par emprunt indirect issues de contacts de proche en proche. À notre sens, la notion de transculturation pouvant se décliner à plusieurs degrés (imitation, assimilation, hybridation, ré-interprétation, *etc.*) rend mieux compte des diverses transformations observables dans les registres archéologiques. De plus, contrairement à l'acculturation qui impose une nouvelle manière (étrangère) de faire, la transculturation redonne la primauté aux ensembles technoculturels d'être les propres acteurs de leur transformation en étant réceptifs ou non à certaines diffusions d'idées externes, en ayant la possibilité de les nuancer au lieu de les subir.

Mots-Clés : Anthropologie culturelle et sociale, Ethnologie et Archéologie, processus de changement technoculturel, modèles de transition, gradualisme, diffusionnisme, transfert techniques et culturels, emprunts direct et indirect, acculturation *versus* transculturation.

1 INTRODUCTION

En Préhistoire, plusieurs paradigmes ont été émis pour expliquer les processus de transition entre divers ensembles technoculturels. Parmi les hypothèses formulées pour comprendre ces transformations, deux principaux scénarios sont régulièrement avancés. Ils opposent les partisans d'un **gradualisme** autochtone, aux défenseurs d'un **diffusionnisme** allochtone. En d'autres termes, les premiers prônent une évolution sur place autonome interne, alors que les seconds sont pour une acculturation avec contact direct externe, sous-tendant le déplacement partiel de population (migration).

Or, dès qu'on essaye d'appliquer ces deux modalités extrêmes aux faits archéologiques, il s'avère qu'elles paraissent inadaptées, car trop réductrices et caricaturales. Afin de pouvoir nuancer ces deux propositions paroxystiques, il est proposé de rappeler leurs définitions *princeps*. Sur ces bases, sera ensuite proposé un modèle alternatif emprunté à l'Ethnologie.

2 RAPPELS HISTORIOGRAPHIQUE ET TERMINOLOGIQUE

Les modèles paléocomportementaux employés en Archéologie préhistorique (Otte, 2007; Gallay 2007) ont été très tôt en grande partie empruntés à l'Ethnologie (Leroi-Gourhan, 1968).

En premier lieu, il est proposé de rappeler les définitions *princeps* relatives au *gradualisme* et au *diffusionnisme*, ensuite seront abordées certaines notions relatives au concept de **culture**, notamment l'*enculturation*, l'*acculturation* et l'*interculturation*.

2.1 Gradualisme

Hérité des Sciences Naturelles suite aux travaux du milieu du XIX^{e} siècle du naturaliste anglais Charles Robert Darwin (1809–1882) et du gallois Alfred Russel Wallace (1823–1913) sur l'origine des espèces (Darwin & Wallace, 1858; Darwin, 1859), le *gradualisme* est une variante de l'*évolutionnisme* qui se distingue par son caractère unilinéaire. Ce courant défend l'idée selon laquelle les nouvelles espèces surviennent, sous l'action de la sélection naturelle, par lente transformation graduelle des espèces ancestrales, c'est-à-dire par évolution sur place. Par analogie à cette théorie évolutive, certains anthropologues à la suite de l'américain Lewis Henry Morgan (1818–1881), utilisent la notion de *gradualisme* à propos de cultures autochtones qui mutent sans apports / influences extérieures aux groupes ethniques et culturels considérés (Morgan, 1877). Dans le cas présent de *culturation gradualiste*, la genèse de cette culture s'effectue en autarcie par évolution et inventions internes.

2.2 Diffusionnisme

Le *diffusionnisme* est une théorie défendue précocement (Tylor, 1871; Bastian, 1900) par l'anthropologue britannique Edward Burnett Tylor (1832–1917) et l'anthropologue allemand Adolf Philipp Bastian (1826–1905), l'ethnologue germano-américain Franz Boas (1858–1942), puis les anthropologues écossais James Georges Frazer (1854–1941) et anglais William Halse R. Rivers (1864–1922). Le *diffusionnisme* est un courant de pensée qui, postulant la rareté des processus d'invention, soutient l'idée que les cultures se développent et se transforment par contacts interculturels via le biais d'emprunts techniques et culturels auprès de groupes humains avoisinants ou/et de migrations de populations.

2.3 Culture (matérielle), enculturation, acculturation et interculturation

La présente contribution étant orientée vers des implications archéologiques inspirées de modèles ethnologiques (Eggert, 1978a), la notion de *culture* sera traitée essentiellement au sens de *culture matérielle* (Warnier, 1999) et s'intéressera de ce fait en particulier au changement technique. Lorsqu'ils parlent de *culture*, les anthropologues / ethnologues comprennent sur un plan dynamique et structurel, deux stades : l'*enculturation* et l'*anomie*, c'est-à-dire l'acquisition, le développement, puis le déclin jusqu'à la disparition de ladite *culture* (**figure 1**).

FIGURE 1 Terminologie employée en ethnologie pour dénommer les phases d'une culture.

ENCULTURATION			ANOMIE
Endoculturation	Acculturation Transculturation Contre-acculturation	Reculturation	Déculturation

La phase initiale de l'*enculturation* dénommée *endoculturation* désigne la phase de transmission transgénération du savoir aux jeunes par les anciens et la famille. Ensuite, l'*enculturation* connaît une phase de maturité (entre autres structuration ou restructuration) qui est marquée soit par une *contre-acculturation*, soit par une *transculturation* ou une *acculturation*, voire parfois une *reculturation*.

2.3.1 Enculturation

Le début du XX^e siècle voit l'essor du *Relativisme culturel* issu du *Kulturelrelativismus* de F. Boas. Dans la continuité des travaux de ses élèves (Kroeber, 1923 et 1949 ; Benedict, 1934 ; Kluckhohn, 1949 ; Kroeber & Kluckhohn, 1952), en particulier les anthropologues américains Alfred Louis Kroeber (1876–1960), Ruth Fulton Benedict (1887–1948) et Clyde Kae Maben Kluckhohn (1905–1960), certains ethnologues comme l'américaine Margaret Mead (1901–1978) proposent d'introduire le terme d'*enculturation* (Mead, 1956 et 1963, avec la distinction de trois formes d'*enculturation* : *postfigurative, configurative and prefigurative enculturation*) pour désigner la transmission et l'acquisition d'une *culture* nouvelle (Herskovits, 1967 ; Poirier, 1968 ; Panoff et Perrin, 1973). Par *enculturation*, on entend le processus d'apprentissage par un groupe/individu de connaissances possédées par son propre groupe.

2.3.2 Acculturation

Employé dès 1880 par l'explorateur américain John Wesley Powell (1834–1902) lors de ses études sur les sociétés indiennes (Powell, 1883), le terme d'*acculturation (Kulturfall* de F. Boas) a été repris et développé dans les années trente à la demande du *Social Science Research Council* des États-Unis par les chercheurs américains Melville Jean Herskovits (1895–1963), élève de F. Boas (Herskovits, 1928 et 1948), Ralph Linton (1893–1953) (Linton, 1936 et 1940) et Robert Redfield (1897–1958). En 1936, ces derniers proposent collectivement dans le « *Memorandum on the study of acculturation* » (Redfield *et al.*, 1936) la définition suivante de l'acculturation : .*« (...) those phenomena which result when groups of individuals having different cultures come into* ***continuous first-hand contact****, with subsequent changes in the original cultural patterns of either or both groups »*, que l'on peut traduire par *« ensemble des phénomènes qui résultent quand des groupes d'individus ayant des cultures différentes entrent en* ***contact direct et continu****, et (que ces contacts) entraînent des changements subséquents à l'intérieur des « patterns » culturels originaux de l'un ou des deux groupes »*. Le terme *pattern* est à considérer au sens de « modèle culturel initial ».

À cette définition, était ajoutée une note pour bien expliciter le sens du terme *acculturation*, à savoir qu'elle n'est qu'une forme parmi d'autre du changement culturel et qu'elle ne doit pas être confondue avec l'*assimilation*, ni avec la *diffusion*.

Malgré différentes applications, soixante ans après, c'est toujours cette définition qui prévaut comme le rappelle Denys Cuche qui défend l'emploi du terme *acculturation* dans le même *sens strict* que celui proposé initialement en 1936 par M. J. Herskovits et ses cosignataires (Cuche, 1996). Par acculturation, il entend *« les processus dynamiques par lesquels une société/culture évolue au contact d'une autre en adoptant des éléments extérieurs propres à cette autre culture par **emprunt direct*** » (*op. cit.*, 1996). De ce fait, l'*acculturation* est par essence diffusionniste (Balandier, 1955).

2.3.3 Interculturation

Karoline Mazurié de Keroualin distingue dans ses modèles de diffusion arythmique (Mazurié de Keroualin, 2003, p. 12) les emprunts directs *partagés* (dans l'amitié) avec échange réciproque, de ceux *imposés* (dans l'hostilité), rappelant la « conflict theory » du britannique Max Hermann Gluckman (1911–1975) qui serait selon lui le moteur principal des changements, ces derniers pouvant aller jusqu'au remplacement (substitution). La première catégorie d'emprunts (contre-transfert) caractérise la notion « d'acculturation antagoniste » mise en évidence par l'ethnopsychanalyste Georges Devereux (1908–1985), notion qui sera à l'origine du concept d'*interculturation* développé par le sociologue contemporain Jacques Demorgon (Demorgon, 2004).

3 QUID DES PROCESSUS DE TRANSFORMATION ? LES NOTIONS D'INVENTION, D'INNOVATION ET D'EMPRUNT EN ETHNOLOGIE ET EN ARCHÉOLOGIE

Les lignes précédentes ont rappelé d'un point de vue théorique que chaque culture voyait sa structure évoluer dans le temps, et bien que de nature différente en fonction des cas, cette structure pouvait être décomposée en trois cycles principaux (**figures 1** et **2**). Après avoir abordé les développements **internes** propres aux cultures, il est proposé de traiter à présent les phénomènes interagissant **entre** les cultures, entre des traditions culturelles et techniques différentes.

Les processus de transformation / changement / évolution au sein aussi bien des sociétés que des cultures matérielles, ont fait l'objet de diverses investigations anthropologiques et archéologiques de terrain, notamment entre les deux dernières guerres mondiales (pour une synthèse consulter Mercier, 1968 ; Albert, 1995). Les étapes majeures de ces recherches sont exposées ci-après en rappelant – aussi bien dans les domaines ethnologiques, qu'archéologiques – les principales approches relatives aux échanges de production de la créativité humaine ; de l'invention à la diffusion des innovations, des modalités de transfert à celles d'emprunt.

3.1 Approches ethnologiques

En Ethnologie, la question sur les mécanismes de transformation socio-culturelle a été abordée et étudiée de façon récurrente par nombre d'anthropologues permettant l'élaboration avant et surtout après guerre de divers travaux de synthèse (Hobgin, 1958). Dans leurs ouvrages respectifs *Man and Culture* publié en 1940 et *The Nature of Culture* paru en 1952, les anthropologues américains Clark Wissler (1870–1947) et A. L. Kroeber abordent les différents types de rapport existant entre les cultures. A. L. Kroeber distingue, entre autres, « diffusion volontaire » de « diffusion involontaire » en nuançant ceux « par contacts », de ceux « par stimulation ». En 1953, dans son ouvrage *Innovation : the basis of cultural change*, H. G. Barnett (1906–1985) souligne le rôle moteur de « l'innovation » prolongeant

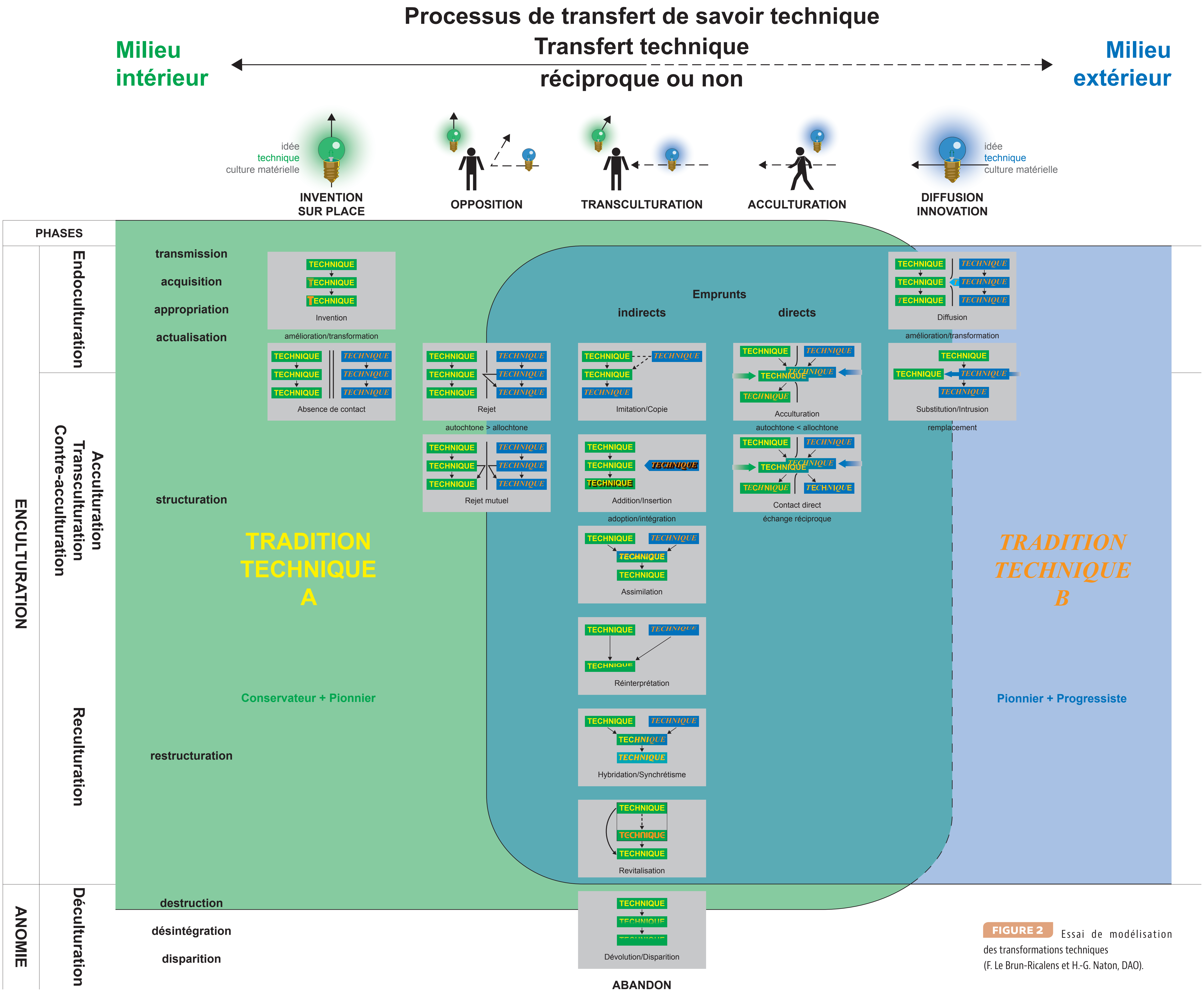

FIGURE 2 Essai de modélisation des transformations techniques (F. Le Brun-Ricalens et H.-G. Naton, DAO).

FIGURE 2 Essai de modélisation des transformations techniques.

des réflexions initiées dans des essais antérieurs (Barnett, 1940) consacrés à la « priorité du changement technique ». Idées développées en 1962 par M. Rogers Everett dans son livre *Diffusion of Innovations*. À la même époque, M. J. Herkovits dans le cadre de son paradigme « Cultural Drift » défend l'idée du « two-way process » (Herskovits, 1952), relation bilatérale jouant simultanément entre deux traditions culturelles. Ces influences réciproques (ou non) se faisant à différents stades généralement dans les deux sens (« cross-cultural »), rappellent l'approche du structuro-fonctionnaliste britannique Alfred Reginald Radcliffe-Brown (1881–1955) qui conseille de tenir « compte des degrés divers d'intégration de la société et des faits de changement » (Radcliffe-Brown, 1952 ; d'après Mercier, *op. cit.* p. 1004). Les travaux des anthropologues de l'école de Vienne comme Wilhelm Schmidt (1868–1954) et Wilhelm Koppers (1886–1961) s'intéressent aux mécanismes des changements interculturels et développent différents concepts dont celui de *Kreiskultur* (Schmidt & Koppers, 1937).

Plus tard, en 1985, l'ouvrage de Robert Boyd et Peter J. Richerson *Culture and the Evolutionnary Process* présente une synthèse théorique sur les différents mécanismes à prendre en considération sous l'angle de règles et principes d'évolution transférés au domaine culturel. Concernant la nature des éléments à l'origine de ces processus, l'anthropologue français Roger Bastide (1898–1974) emploie en 1971 dans son *Anthropologie appliquée*, les termes de « causalité interne » et de « causalité externe ». Cette hypothèse est proche des travaux pionniers proposés dès 1941 par Felix Maxwell Keesing (1902–1961) qui distinguait les « innovations primaires » (= inventions) des « innovations secondaires » (= emprunts).

Ces modèles anthropologiques s'avèrent pertinents pour être transférés et adaptés à l'Archéologie afin d'élaborer de nouveaux modèles comme le tentera André Leroi-Gourhan (1911–1986).

À ce stade, il est utile de rappeler la subtile distinction entre **« invention »** et **« innovation »**. Sous le vocable « invention », du latin *inventio* (trouver, découvrir), on entend la découverte d'un nouveau concept (qui peut demeurer sans lendemain à l'échelle individuelle, ou d'un groupe). Sous le vocable « innovation », du bas latin *innovatio* (renouvellement), on entend un changement dans les processus de pensée visant à appliquer une action nouvelle (une invention) à une plus grande échelle. Une *innovation* se distingue d'une *invention* dans la mesure où elle s'inscrit dans une perspective applicative (application, transmission, diffusion) dont le succès découle de l'adaptation de l'*invention* (nouvelle solution efficace proposée pour résoudre un problème) aux besoins d'une société et que celle-ci a les connaissances théoriques et maîtrise les expériences pratiques minimales pour la reproduire.

3.2 Approches archéologiques

En Archéologie préhistorique, les modalités régissant les contacts entre cultures ont également fait l'objet d'investigations en s'inspirant en majorité des réflexions et concepts développés par l'Anthropologie culturelle, en particulier les aspects touchant aux techniques des cultures matérielles (Guille-Escuret, 2003). Dans ce domaine, les travaux fondateurs pour une « Anthropologie techno-économique » de l'éthno-archéologue A. Leroi-Gourhan, élève de Marcel Mauss (1872–1950), annoncent une voie originale de la recherche francophone centrée sur les moyens d'études des activités techniques et leurs auteurs.

A. Leroi-Gourhan énonce dès 1945 dans le cadre de sa synthèse *Milieu et Techniques*, différents types de processus entre ce qu'il qualifie le « milieu extérieur » et le « milieu intérieur » (Leroi-Gourhan, 1945, p. 333 ; ce que Gilbert Simondon nomme les « conditions d'ambiance » (2005, p. 230) ; d'après de Beaune, 2008, p. 71) qu'il définit comme suit :

- *Milieu extérieur :* « Tout ce qui matériellement entoure l'Homme (pris ici dans son acception double, à l'échelle du groupe et de l'individu) : milieu géographique, climatique, *minéral*[1], animal et végétal » (Leroi-Gourhan, 1945, p. 333).

- *Milieu intérieur :* Tout « …ce qui est propre à l'Homme (…) à chaque moment du temps, (…) instable et essentiellement vivant, (…) à l'image d'un tissu organique (…), constituant un bain extrêmement complexe de traditions mentales » (Leroi-Gourhan, 1945, p. 334).

1. *Rajouté par l'auteur.*

A. Leroi-Gourhan (Leroi-Gourhan, 1945, p. 335–339) précise que le processus d'emprunt technique (Soulier, 2007) requiert des « conditions (…) favorables » du *milieu intérieur*, propices « pour adopter ou inventer », les solutions demeurant limitées en raison du « déterminisme technique » et de la « tendance propre au milieu intérieur ». Le futur directeur du laboratoire d'Ethnologie préhistorique à l'Université de Paris I Sorbonne démontre que ce processus se situe à l'interface des *milieux intérieur et extérieur* en recherchant le meilleur équilibre entre les deux. C'est-à-dire une amélioration du contact de la *tendance intérieure* avec le *milieu extérieur*, « une adhérence de plus en plus étroite », « avec une prise progressive sur le milieu extérieur ». A. Leroi-Gourhan en rappelle les limites d'interprétation, notamment la prudence à observer entre « convergence et diffusion » et « groupes centraux et périphériques » (Leroi-Gourhan, 1945, p. 433–434). Il distingue les emprunts « directs », des emprunts « indirects » (Leroi-Gourhan, 1946, p. 11–13), ces derniers étant plus « insidieux » parce qu'ils donnent des productions « démarquées et naturalisées » qui paraissent « autochtones au premier examen » (Leroi-Gourhan, 1946, p. 11–13). Dans *Milieu et techniques*, A. Leroi-Gourhan présente trois explications à l'échec de l'emprunt ; selon que le groupe ethnique est en état « d'infériorité technique », « d'inertie technique » ou « de plénitude technique » (Leroi-Gourhan, 1945, p. 375). À ces propositions, afin de considérer aussi l'absence d'emprunt (en insistant sur la signification de cette absence), Catherine Perlès ajoute la notion de « non-transfert » (Perlès, 2007, p. 324–325).

De récents travaux ethno-archéologiques comme ceux d'Alain Gallay et d'Agnès Gelbert menés en Afrique noire (Gallay, 1992 ; Gelbert, 2003), ont proposé des modélisations pour expliquer certains « processus d'emprunt », transferts techniques / savoir-faire intra- et interculturels. Applications pratiques des approches théoriques énoncées par A. Gallay à propos des « règles transculturelles » (Gallay, 1986, p. 175–188), les différents modes et modalités de changement technoculturel observables au sein des groupes étudiés offrent d'intéressants exemples de transfert technique. L'approche logiciste de A. Gallay récuse pour le phénomène d'innovation technique – avec l'exemple de l'origine de la métallurgie du fer en Afrique de l'Ouest –, la possibilité de distinguer entre « invention et diffusion » à partir de la seule documentation archéologique en raison de son « ambiguïté » (Gallay, 2001).

Sur le plan archéologique, l'un des travaux de synthèse théorique le plus abouti et incontournable est celui publié en 1968 par David L. Clark. Au-delà des réflexions sur les différentes notions de « culture » employées en archéologie (*artefact-type system, assemblage, technocomplex*, etc,), le chapitre intitulé *Entities and Processes* présente les développements, les définitions et les modélisations fondamentales les plus communément admises (entre autres : *stimulus bow-wave diffusion, culture creep versus invasion model, flux and counterflux diffusion models)* auxquels nous renvoyons le lecteur pour toutes investigations portant sur les *archaeological processes* et *distribution and diffusion models*, (Clark, 1968, p. 411–431) en l'invitant aussi à consulter l'ouvrage édité en 1998 par James G. Cusick (Cusick, 1998).

S'interroger sur les changements techniques en Archéologie conduit à s'interroger sur les processus régissant les inventions (Kiefer, 1967 ; Collectif, 1999 ; Eisenhauer, 1999 ; Bettinger *et al.*, 2006). Dans « L'homme et l'outil » publié en 2008, Sophie A. de Beaune, en faisant écho entre autres aux travaux du philosophe français Gilbert Simondon (1924–1989), s'interroge sur la notion d'inventions et d'innovations techniques ainsi que ses modalités de diffusion et dissémination durant la préhistoire (Simondon, 1958 et 2005). Pour elle, « l'invention revient à combiner d'une manière nouvelle des éléments déjà présents » (de Beaune, 2008, p. 75) et résulte de « l'association par l'esprit de ce que l'expérience dissociait » (de Beaune, 2008, p. 78). Elle y décrit les processus d'inventions et de transmission. Ce pertinent petit recueil dresse un inventaire des mécanismes d'invention en proposant en particulier le « processus analogique »[2], qui met l'accent sur la présence nécessaire d'aptitudes cognitives, sans oublier la prise en compte comme facteur, de la part socioculturelle. En effet, certains choix et orientations technoculturelles sont issus de « raisons pleinement sociologiques » (de Beaune, 2008, p. 128) qui prennent ou non en considération l'héritage traditionnel. Dans cet essai qui s'appuie sur un travail antérieur (de Beaune, 2004), est introduit à propos de la notion d'invention, le terme « d'exaptation » qui est à distinguer de la notion d'adaptation. Le terme d'exaptation cité par Sophie A. de Beaune (2008, p. 83–84) a été créé par Stephan Jay Gould et Elizabeth Vrba pour désigner « le choix, au temps actuel, d'utiliser à certaines fins des éléments destiner à d'autres fonctions (ou aucune), l'*exaptation* étant employée ici dans le sens d'un perfectionnement indirect, involontaire.

2. *Par exemple, d'après S. de Beaune par glissement technique d'un geste déjà connu sur un nouveau matériau, ou encore l'utilisation d'un outil connu avec un geste jusqu'alors réservé à un autre outil.*

3.3 Les mécanismes élémentaires du changement technoculturel : élaboration d'un modèle synoptique

Dans le prolongement structurel du cadre précédemment défini (**figure 1**) qui montrait le cheminement temporel possible d'une *culture*, un tableau synoptique hiérarchisé (**figure 2**) présente une synthèse des propos abordés adaptée pour toute culture matérielle, avec l'exemple du transfert technique (Creswell 1982 et 1992). Y sont illustrées les principales modalités de transferts techniques et culturels, en prenant comme cas de figure une tradition technique « A » à tendance conservatrice favorisant le *gradualisme* par évolution sur place, sous l'influence ou non (rejet, *contre-acculturation*) d'une tradition technique « B » à tendance progressiste favorisant le *diffusionnisme* par emprunt direct (*acculturation*) ou indirect (*transculturation*). Les nuances indiquées dans ce dernier type d'influences sont détaillées dans le chapitre suivant consacré à la *transculturation*.

4 UN PARADIGME ETHNOLOGIQUE MÉCONNU EN ARCHÉOLOGIE : LA « TRANSCULTURATION »

Si l'on s'en réfère à la définition *princeps* du terme *acculturation* défini par l'anthropologue américain M. J. Herskovits et ses confrères (Herskovits, 1938, 1948 ; Linton, 1940 ; Redfield *et al.*, 1936), cette dénomination ne devrait être appliquée, au sens strict — tel qu'utilisé aujourd'hui par les anthropologues/ethnologues — à savoir qu'aux transformations issus de contact / emprunt **direct** (*op. cit.* 1936).

4.1 *La transculturation* : un modèle alternatif entre *acculturation* et *contre-culturation*

Pour expliquer des changements issus de contact / emprunt **indirect**, il existe un ancien modèle employé en Ethnologie mais peu usité, à notre connaissance, en Archéologie préhistorique : la transculturation. Employée depuis la seconde moitié du XX^e^ siècle par nombre d'anthropologues/ethnologues, la *transculturation* (ré-interprétation locale d'emprunt indirect) est à distinguer pleinement de l'*acculturation* (emprunt direct).

Pour mémoire, le terme de *transculturation* (initialement « *transculturación* ») a été proposé et défini en 1940 par l'historien et sociologue cubain Fernando Ortiz (1881–1969) dans son ouvrage fondamental *Contrapunteo cubano : del tabaco y del azúcar* préfacé par le fonctionnaliste polonais Bronislaw Kasper Malinowski (1884–1942). Ce modèle défend l'idée qu'une culture, si elle est disposée à recevoir (voir refus d'emprunt § 3.2), peut incorporer des éléments extérieurs de manière indirecte tout en conservant son indépendance. Sans aliéner son identité, ces nouveaux éléments sont plus ou moins (ré)interprétés à différents niveaux en fonction de son propre héritage culturel, c'est pourquoi R. Bastide préfère employer les termes d'« entrecroisement » et d'« interpénétration » (Bastide, 1971), ce que A. L. Kroeber avait appelé dans un premier temps « idea diffusionism / stimulus diffusionism » (Herskovits, 1940 ; Tostevin, 2007) reformulé ensuite en « trans-cultural diffusionism ».

Le paradigme de *transculturation*, offre tout un éventail de possibilités à une tradition technique « A » d'incorporer à différents degrés, en totalité ou en partie, une influence provenant d'une autre tradition technique « B ». La *transculturation* peut s'exprimer sous diverses formes[3], notamment par :

- **imitation (copie) :** du latin *imitari* (reproduire), reproduction d'un modèle qui a valeur d'exemple (action de refaire le plus fidèlement à l'identique). Pour des précisions, consulter notamment « les lois de l'imitation » publiées en 1890 par le juriste et sociologue français Gabriel Tarde (1843–1904) et les travaux du sociologue américain Everett M. Rogers (1931–2004).

- **addition (insertion) :** du latin *additio* (ajouter, donner à), action de réunir au moins deux éléments ensemble.

- **assimilation :** du latin *assimilatio* (rendre semblable), action de convertir en semblable (en assemblant et combinant/intégrant au moins deux éléments différents).

- **ré-interprétation :** action d'interpréter une nouvelle fois un modèle en y apportant une touche personnelle/indigène (proche de la réinvention, avec un perfectionnement ou non).

- **hybridation (syncrétisation) :** du grec *hybris* (union illégitime), action issue du croisement de deux éléments différents, et du grec *sugkrêtismós* (union de deux crétois), mélange cohérent au sein d'un système d'au moins deux éléments étrangers (variante de l'addition, dans le sens ou chaque élément coexiste en gardant ses particularités).

- **revitalisation :** du latin *re-vitalis* (de nouveau la vie), action de redonner de la vitalité à un élément originel (renaissance).

Il est vrai qu'il est difficile d'atteindre en Archéologie – à partir des vestiges matériels conservés –, les mêmes niveaux de précision et de nuance que ceux observés en Ethnologie. Cependant, il s'avère pertinent de montrer l'éventail des possibles et les principales tendances afin d'inviter les archéologues à les rechercher dans le registre archéologique. **En effet, le paradigme de la *transculturation* correspond, à notre sens, beaucoup plus à la réalité paléohistorique, étant donné qu'il propose différentes réponses souvent mieux adaptées, en fonction des individus, des groupes et des lieux géographiques, en laissant le centre d'inertie propre à chaque culture d'être l'acteur de son changement.**

3. *Inspiré et modifié d'après l'excellent ouvrage allemand de Dieter Haller, 2005, 87–91.*

5 UN MODÈLE AUX RETOMBÉES SYNCHRONIQUE ET DIACHRONIQUE

Le modèle de *transculturation* avec ses diverses nuances d'emprunt indirect tient, en complémentarité du modèle d'acculturation basé sur l'emprunt direct, une place prépondérante dans les processus de changement culturel. Dans une perspective archéologique, l'application de ces variabilités de contact ouvre des voies novatrices d'interprétation.

D'une part sur un plan synchronique, le paradigme d'Ortiz propose un éventail de transformations technoculturelles, adaptées au cas par cas et pouvant évoluer chacune différemment dans le temps en fonction des régions, des ressources, des groupes et des individus.

D'autre part sur un plan diachronique, ce modèle offre également l'intérêt de pouvoir appréhender certains mécanismes pouvant être à l'origine des changements chrono-culturels observés, notamment ceux « entre » les technocomplexes archéologiques, bref une vision plus dynamique du sens réel des « lignes » séparant les cases de classification.

En effet, depuis quelques années, les investigations s'intéressent de plus près aux phases charnières (Guillomet-Malmassari, 2007), considérées souvent à tort comme des involutions. Au contraire, ces arythmies sont le reflet dynamique d'une recherche perpétuelle du meilleur équilibre possible entre les « milieux intérieur et extérieur » pour reprendre les termes et concepts d'A. Leroi-Gourhan. Il est pertinent de chercher à comprendre les mécanismes singuliers de cette recherche d'équilibre. Pourquoi et comment des groupes technoculturels passent-ils d'un stade à un autre ? Les périodes de mutation (phases de plus grande réceptivité ?), quelque soit leur amplitude, les continuités et discontinuités (Eggert, 2005, p. 296–307), peuvent trouver en partie la nature de leur explication dans des contacts *transculturels*. Il en ressort que la circulation de nouvelles idées, l'adoption ou la réinterprétation d'améliorations techniques ne nécessitent pas –obligatoirement– le déplacement d'êtres humains.

6 PERSPECTIVES CONCLUSIVES : LA TRANSITION *PALÉOLITHIQUE MOYEN / PALÉOLITHIQUE SUPÉRIEUR* REVISITÉE

En Europe pour le passage du Paléolithique moyen au Paléolithique supérieur, même si quelques auteurs défendent pour l'Europe une évolution sur place depuis les technocomplexes du Paléolithique moyen vers le Paléolithique supérieur, la majorité des chercheurs s'accorde pour voir dans cette fameuse « transition », la trace d'une *acculturation* par la colonisation, plus ou moins brusque, de l'Eurasie par l'Homme anatomiquement moderne. Entre ces deux positions existe une position intermédiaire qui consiste à découpler l'évolution culturelle de l'évolution biologique. Cette nouvelle position est celle qui nous semble la mieux rendre compte des données disponibles sur le terrain, témoignages d'une apparition progressive et en mosaïque de nouveaux comportements socio-économiques (Le Brun-Ricalens et Bordes, 2007). La *transculturation* permet d'expliquer la perception d'une image monolithique d'un processus polygénétique. Ce que nous observons dans le registre archéologique nous semble d'ordre essentiellement historique, et ne peut-être interprété en terme de vagues de peuplement. Pour expliquer les changements technologiques reconnus sur les industries lithiques et osseuses issues de sites du sud-ouest de la France qui documentent cette période, nous privilégions l'hypothèse de la *transculturation* (Le Brun-Ricalens et Bordes, 2009 ; Bordes *et al.*, 2011).

« …il n'est pas nécessaire d'invoquer des déplacements de population ; les idées, les objets, peuvent circuler sans que les hommes eux-mêmes aient besoin de bouger. »
Claude Lévi-Strauss, 1988, p. 202
Les Voies de l'Homme

« Les hommes ont été beaucoup moins loin et moins vite que leurs produits. »
André Leroi-Gourhan, 1946, p. 7
Archéologie du Pacifique Nord

D'après les transformations technologiques identifiées dans la succession chronologique des industries attribuées dans cette région à savoir : Moustérien final, Chatelperronien, Proto-Aurignacien, Aurignacien ancien, les changements s'inscrivent plus en continuité qu'en rupture.

Comparable à un phénomène d'évolution progressive arythmique couplée éventuellement à un « transfert technique », (Creswell, 1982 et 1992, Haudricourt, 1987), le modèle de la *transculturation* n'a pas besoin d'envisager la migration de groupes humains sur de grande distance, l'intégration progressive d'une nouvelle idée technique pouvant s'inscrire dans le prolongement d'un héritage technique traditionnel.

> *« …des peuples en marche (…) se déplaçant avec leur matériel (…). Il n'en serait probablement rien, on verrait quelque chose d'aussi fugace que le jeu de la lumière sur une mince couche de pétrole à la surface de l'eau. Le courant du temps déplacerait bien un peu les Hommes comme l'eau entraîne la tâche de pétrole en la déformant, mais le plus sensible serait un chatoiement insaisissable qui courrait sur des molécules pratiquement immobiles. »*
>
> André Leroi-Gourhan, 1943, p. 10
> *L'HOMME et la Matière*

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GLOSSAIRE TERMINOLOGIQUE

- **acculturation** : du latin *ad-* (en direction de) et de culture, dérivé du latin *culter, cultura* (cultiver au sens activité humaine), ensemble des processus dynamiques par lesquels une culture impose à une autre des éléments extérieurs à cette autre culture par **contact / emprunt direct**.
- **addition (insertion)** : du latin *additio* (ajouter, donner à), action de réunir au moins deux éléments ensemble.
- **anomie** : du latin anomos (sans loi, sans ordre), dérèglement, désordre social, voire absence d'organisation sociale pouvant mener à la désintégration d'une culture (suite à la disparition des normes communément acceptées).
- **assimiliation** : du latin *assimilatio* (rendre semblable), action de convertir en semblable (en assemblant et combinant/intégrant au moins deux éléments différents).
- **contre-acculturation** : manifestation par des groupes d'un sentiment de rejet, voire d'hostilité envers la culture qui cherche à les dominer. Elle se manifeste parfois par un repli sur soi.
- **déculturation** : perte de toutes les valeurs culturelles de référence, sans assimilation en contre partie de celles des autres. Elle touche les sociétés les plus vulnérables, mises en contact « brutal » avec une culture dominante.
- **enculturation** : processus d'apprentissage par un groupe/individu de connaissances possédées par son propre groupe.
- **endoculturation** : phase initiale de l'enculturation qui désigne la phase de transmission transgénération du savoir aux jeunes par les anciens, la famille.
- **hybridation** : du grec *hybris* (union illégitime), action issue du croisement de deux éléments différents.
- **imitation** : du latin *imitari* (reproduire), reproduction (copie) d'un modèle qui a valeur d'exemple (action de refaire le plus fidèlement à l'identique).
- **interculturation** : action concernant les contacts entre différentes cultures caractérisée par une démarche active prenant en considération les éléments constitutifs et les interactions entre les autres cultures (recherche de compréhension en se mettant à la place de l'autre culture). L'interculturation apparaît de ce fait plus impliquée que la « multiculturation » et « pluriculturation », qui reflètent des juxtapositions et cohabitations de cultures.
- **reculturation** : mouvement de retour aux sources, de recherche et de reconstruction d'un patrimoine perdu. Le processus conduit à des résultats plus ou moins « authentiques ».
- **réinterprétation** : action d'interpréter une nouvelle fois un modèle en y apportant une touche personnelle/indigène (proche de la réinvention).
- **revitalisation** : du latin re-vitalis (de nouveau la vie), action de redonner de la vitalité à un élément/système originel (renaissance).
- **syncrétisation** : du grec *sugkrêtismós* (union de deux crétois), mélange cohérent au sein d'un système d'au moins deux éléments étrangers (variante de l'addition, dans le sens ou chaque élément coexiste en gardant ses particularités).
- **transculturation** : processus dynamiques par lesquels une culture évolue au contact d'une autre en réinterprétant en fonction de ses traditions culturelles par **emprunt indirect** des éléments extérieurs propres à cette autre culture.

BIBLIOGRAPHIE

ALBERT B. (1995) – Anthropologie appliquée ou anthropologie « impliquée » ? Ethnographie, minorités et développements. In : Baré J.-F. (ed.), *Les applications de l'anthropologie : un essai de réflexion collective depuis la France*. Éditions Karthala, Collections « Hommes et sociétés », 87–118.

COLLECTIF (1999) – Das aktuelle Thema : Erfindung – Innovation – Idee. *Archäologische Informationen* 22 (2), 203–277.

BALANDIER G. (1955) – Sociologie actuelle de l'Afrique noire. Dynamique des changements sociaux en Afrique centrale. Presses Universitaires de France, Paris, 510 p.

BARÉ J.-F. (1991) – Acculturation. In : Bonte P. et Izard M. (dir.), *Dictionnaire de l'Ethnologie et de l'Anthropologie*. Presses Universitaires de France, Paris, 1–3.

BARNETT H.G. (1940) – Culture Processes. *American Anthropologist*. Vol. 42 (1), 33–37.

BARNETT H.G. (1953) – *Innovation : The Basis of Cultural Change*. Mac Graw Hill,New York, 462 p.

BASTIAN A.PH. (1900) – Die wechselnden Phasen im Geschichtlichen Sehkreis. Vol. I-IV, D. Reimer, Berlin, 30 p., 14 p., 12 p., 48 p.

BASTIDE R. (1971) – *Anthropologie appliquée*. Payot, Paris, 256 p.

BEAUNE S.-A. DE (2004) – The invention of technology : prehistory and cognition. *Current Anthropology*, 45 (2) : 139–162.

BEAUNE S.-A. DE (2008) – *L'homme et l'outil. L'invention technique durant la préhistoire*. Collection « Le passé recomposé ». CNRS éditions, Paris, 166 p.

Benedict R. F. (1934) – *Patterns of Culture*. Houghton Mifflin, New York, 290 p.

BETTINGER R.L., WINTERHALDER B. & MCELREATH R. (2006) – A simple model of technological intensification. *Journal of Archaeological Science* 33 (4), 538–545.

BOAS F. (1911) – *The Mind of Primitive Man*. The Mac Millan Company. New York, 94 p.

BOIREL R. (1955) – *L'invention*. Collection « Initiation philosophique », Presses Universitaires de France, Paris, 112 p.

BOIREL R. (1961) – *Théorie générale de l'invention*. Bibliothèque de philosophie contemporaine, Presses Universitaires de France, Paris, 407 p.

BONTE P. & IZARD M. (DIR.) (1991) – *Dictionnaire de l'Ethnologie et de l'Anthropologie*. Presses Universitaires de France, Paris, 756 p.

BORDES J.-G., LE BRUN-RICALENS F., BACHELLERIE F. & MICHEL A. (2011) – *Towards a new transition : New data concerning the lithic industries from the beginning of the Upper Paleolithic in Western Europe*. In : Derevianko A.P. & Shunkov M.V. (Eds) - *Characteristics features of the Middle to Upper Palaolithic transition in Eurasia : development of culture and evolution of Homo species*. Proceedings of the International Symposium of Denisova cave, Altaï, Russia (July 4–10, 2011), Publishing Department of the Institute of Archaeology and Ethnography SB RAS, Novossibirsk, 11–23.

BOYD R. & RICHERSON P. J. (1985) – *Culture and the Evolutionnary Process*. University of Chicago Press, Chicago, 331 p.

CLARK D. L. (1968) – *Analytical Archaeology*. Methuen & Co Ltd, London, 684 p.

COLLARD M., SHENNAN S. & TEHRANI J. (2005) – Branching, blending, and the evolution of cultural similarities and differences among human populations. *Evolution and Human Behaviour* 27 (3), 169–184.

CRESWELL R. (1982) – Transferts de techniques et chaînes opératoires. *Techniques et Culture* 2, 143–163.

CRESWELL R. (1992) – Tendance et fait, logique et histoire. *Techniques et Culture* 21, 37–59.

CUCHE D. (1996) – *La notion de culture en sciences sociales*. La découverte (Repères 205), Paris, 124 p.

CUSICK J.G. (ÉD.) (1998) – *Studies in Culture Contact : Interaction, Culture Change and Archaeology*. Occasional Paper 25, Center for Archaeological Investigations, Southern Illinois University. Carbondale, 501 p.

DEMORGON J. (2004) – *Complexité des cultures et de l'interculturel. Contre les pensées uniques*. Economica, Paris, 336 p.

DURKHEIM E. (1885) – *Le suicide : étude de sociologie* (13[e] édition, Presses Universitaires de France, Paris, 2007, 463 p.).

DURKHEIM E. (1893) – *De la division du travail social.* (7e édition, Presses Universitaires de France, Paris, 2007, 407 p.).

EGGERT M.K.H. (1978a) – Prähistorische Archäologie und Ethnologie : Studien zur amerikanischen New Archaeology. *Praehistorische Zeitschrift* 53 (1), 6–164.

EGGERT M.K.H. (1978b) – Zum Kulturkonzept in der prähistorischen Archäologie. *Bonner Jahrbuch* 178, 1–20.

EGGERT M.K.H. (2005) – *Prähistorische Archäologie. Konzepte und Methoden.* (2 Auflage) A. Francke Verlag, Tübingen & Basel, UTB 2092, 412 p.

EISENHAUER U. (1999) – Kulkturwandel als Innovationprozeß : die fünf großen „W" und die Verbreitung des Mittelsneolithikums in Südwestdeutschland. In : Das aktuelle Thema : Erfindung – Innovation – Idee. *Archäologische Informationen* 22 (2) : 215–239.

EVERETT M.R. (1962) – *Diffusion of Innovations.* Free Press of Glencoe, Macmillan Company, New York, 367 p.

GALLAY A. (1986) – *Archéologie demain.* Éditions Belfond, Paris, 320 p.

GALLAY A. (1992) – A propos de la céramique actuelle du delta intérieur du Niger (Mali) : approche ethnoarchéologique et règes transculturelles. In : *Ethnoarchéologie : justification, problèmes, limites.* 12e Rencontres internationales d'Archéologie et d'Histoire d'Antibes. APDCA, Juan-les-Pins, Antibes, 67–89.

GALLAY A. (2001) – Diffusion ou invention : un faux débat pour l'Archéologie ? In : Descoeudres J.-P., Huysecom E., Serneels V. and Zimmermann J.-L. (eds), *The Origins of Iron Metallurgy*. Proceedings of the First International Colloquium on The Archaeology of Africa and the Mediterranean Basin. Genève, 4–7 juin 1999. *Mediterranean Archaeology* 14, 13–26.

GALLAY A. (2001) – Quels paradigmes pour la préhistoire ? Un historique. In : Évin J. (dir.), *Un siècle de construction de discours scientifique en Préhistoire.* Actes du XXVIe Congrès préhistorique de France (Congrès du Centenaire de la Société préhistorique française) Avignon, 21–25 septembre 2004. Société préhistorique française, vol. 1, 301–312.

GELBERT A. (2003) – *Traditions céramiques et emprunts techniques dans la vallée du fleuve Sénégal.* Collection « Référentiels ». Maison des Sciences de l´Homme. Éditions Épistèmes, Paris. 104 p. et 1 CD-Rom.

GOULD S.J. & VRBA E. (1982) –Exaptation – a missing term in the science of form. *Paleobiology*, 8, 4–15.

GUILLE-ESCURET G. (2003) – Les techniques, entre tradition et intention. *Techniques et culture*, 42, 97–110.

GUILLOMET-MALMASSARI V. (2007) – Approche épistémologique de la notion de transition dans la Préhistoire française à la fin du XIXe siècle. In : Évin J. (dir.), *Un siècle de construction de discours scientifique en Préhistoire.* Actes du XXVIe Congrès préhistorique de France (Congrès du Centenaire de la Société préhistorique française) Avignon, 21–25 septembre 2004. Société préhistorique française, vol 1, 293–300.

GUYAU J.-M. (1885) – *Esquisse d'une morale sans obligation, ni sanction.* F. Alcan, Paris, 254 p.

HALLER D. (2005) – *Ethnologie*. Deutscher Taschenbuch Verlag, München. 308 p.

HAUDRICOURT A.G. (1987) – *La Technologie Science Humaine : Recherches d'Histoire et d'Ethnologie des Techniques*. Maison des Sciences de l'Homme, Paris, 343 p.

HERSKOVITS M.J. (1928) – *The American Negro : a study in racial crossing.* Knopf, New York, 92 p.

HERSKOVITS M.J. (1938) – *Acculturation, the Study of Culture Contact*. Augustin, New York, 136 p.

HERSKOVITS M.J. (1940) – Stimulus Diffusion. *American Anthropologist.* Vol 42 (1), 1–20.

HERSKOVITS M.J. (1948) – *Man and his Works. The Science of Cultural Anthropology*. A. Knopf, New York, 678 p.

HOBGIN H.I. (1958) – Social change. Watts, London, 257 p.

KEESING F.M. (1941) – *The South Seas in the Modern World*. Institute of Pacific Relations International Research Series. New York, 391 p.

KEESING R.M. (1976) – *Cultural Anthropology. A Comparative Perspective.* Holt, New York, 637 p.

KIEFER K. (1967) – *Die Diffusion von Neuerungen*. Heidelberger Sociologica 4, Tübingen, 98 p.

KLUCKHOHN C. (1949) – *Mirror for Man*. Whittlesey House, New York, 313 p.

KROEBER A.L. & KLUCKHOHN C. (1952) – *Culture : a critical review of concepts and definitions*. Cambridge, Mass. The Museum. Harvard University Press, 47, 181 p.

KROEBER A.L. (1909) – Classificatory systems of relationship. *Journal of the Royal Anthropological Institute of Great Britain and Ireland*, 39, 77–84.

KROEBER A.L. (1923) – *Anthropology.* Harcourt, Brace & Company Inc., New York, 523 p.

KROEBER A.L. (1949) – An authoritarian panacea. American Anthropologist. Vol. 51 (2), 318–320.

KROEBER A.L. (1952) – The Nature of Culture. The University of Chicago Press, Chicago, 438 p.

LE BRUN-RICALENS F. (2007) – Des modélisations à éprouver et à affiner : transculturation *versus* acculturation. In : F. Le Brun-Ricalens, A. Hauzeur et F. Valotteau (dir.), Le bassin mosellan : terre de rencontres entre bassins rhénan et parisien. *Archaeologia Mosellana* 7, Luxembourg, 21–25.

LE BRUN-RICALENS F. & BORDES J.-G. (2007) – Les débuts de l´Aurignacien en Europe occidentale : unité ou diversité ? Du territoire de subsistance au territoire culturel. Die Anfänge des Aurignacien in Westeuropa : Einheit oder Diversität ? Vom Subsistenzraum zur Kulturlandschaft. In : Floss H. et Rouquerol N. (eds) - *Les chemins de l´Art aurignacien en Europe. Das Aurignacien und die Anfänge der Kunst in Europa.* Actes du Colloque international d´Aurignac, 16–18 sept. 2005, éditions Musée-Forum Aurignac, Cahier 4, Toulouse, 37–62.

LE BRUN-RICALENS F., BORDES J.-G. & EIZENBERG L. (2009) – A crossed-glance between southern European and Middle-Near Eastern early Upper Palaeolithic technocomplexes : Existing models, new perspectives. *In* : Camps, M. and Szmidt, C. (eds.), *The Mediterranean from 50 000 to 25 000 BP : Turning points and new directions.* Oxbow Books, Oxford, 11–34.

LEMONNIER P. (1991) – De la culture matérielle à la culture ? Ethnologie des techniques et Préhistoire. In : *25 ans d'études technologiques en préhistoire. Bilan et perspectives.* Rencontres internationales d'Archéologie et d'Histoire d'Antibes. APDCA, Juan-les-Pins, Antibes, 15–20.

LEMONNIER P. (ÉD.) (1992) – *Elements for an Anthropology of Technology.* Museum of Anthropology, Anthropological, Papers, 88, Ann Arbor, 420 p.

LEMONNIER P. (1993) – *Technological choices. Transformation in Material Cultures since the Neolithic*. Routledge, London & New York, 1–35.

LEROI-GOURHAN A. (1943) – *L'HOMME et la Matière.* Evolution et Techniques. Albin Michel, Paris, 366 p.

LEROI-GOURHAN A. (1946) – *Archéologie du Pacifique Nord. Matériaux pour l'étude des relations entre les peuples riverains d'Asie et d'Amérique.* Travaux et mémoires de l'Institut d'Ethnologie, tome XLII. Université de Paris, 542 p.

LEROI-GOURHAN A. (1968) – L'Expérience ethnologique. In : Poirier J. (dir.) – *Ethnologie générale*. Encyclopédie de La Pléiade : 1816–1825.

LÉVI-STRAUSS CL. (1988) – « …nous avons lui et moi essayé de faire à peu près la même chose. », *André Leroi-Gourhan ou les Voies de l´Homme*, actes du Colloque du CNRS, mars 1987, Albin Michel, Paris, 201–206. citation p. 202.

LINTON R. (1936) – *The study of Man ; an introduction*. New York, 503 p.

LINTON R. (1940) – *Acculturation in seven American Indian Tribes*. Appleton Century, New York, p. xvii.

MALINOWSKI B.K. (1941) – *The dynamics of culture change.* Yale university press, New Haven. (*Les dynamiques de l'évolution culturelle (1970)*. Payot, Paris, 239 p.).

MAZURIÉ DE KEROUALIN K. (2003) – *Genèse et diffusion de l'Agriculture en Europe : agriculteurs, chasseurs, pasteurs.* Éditions Errance, Collection des Hespérides, Paris, 184 p.

MEAD M. (1963) – Socialization and enculturation. *Current Anthropology* 4 (2), 184–188.

MEAD M. (1956) – *New lives for old : cultural transformation-Manus.* Morrow, New York, 560 p.

MERCIER P. (1968) – Le changement social et culturel. In : Poirier J. (dir.) – *Ethnologie générale*. Encyclopédie de La Pléiade : 1004–1036.

MORGAN L.H. (1877) – *Ancient Society or Researches in the lines of Human Progress from savagery through Barbarism to Civilization.* Holt, New York, 560 p.

MORTILLET DE G. (1882) – *Le Préhistorique, antiquité de l'Homme.* C. Reinwald. Paris. 642 p.

ORTIZ F. (1940) – *Contrapunteo cubano del tabaco y del azúcar. (Advertencia de sus contrastes agrarios, economicos, historicos y socials, su Etnografia y su Transculturación).* Préface de B. Malinowski. La Havane, 300 p.

OTTE M. (2007) – Évolution du discours scientifique en Préhistoire paléolithique. In : Évin J. (dir.), *Un siècle de construction de discours scientifique en Préhistoire.* Actes du XXVI[e] Congrès préhistorique de France (Congrès du Centenaire de la Société préhistorique française) Avignon, 21–25 septembre 2004. Société préhistorique française, vol. 1, 277–281.

PERLÈS C. (2007) – Diffusions, emprunts, refus d'emprunts : les acteurs humains. In : Rouillard P., Perlès C. et Grimaud E. (dir.), *Mobilités, Immobilismes. L'emprunt et son refus.* Colloques de la Maison René-Ginouvès, Archéologie et Ethnologie. De Boccard, 319–326.

POWELL J.W. (1883) – Human evolution. *Transactions of the Anthropological Society of Washington*, 2 : 176–208.

PRZYLUSKI J. (1942) – *L'Évolution humaine*. Presses Universitaires de France, 264 p.

RADCLIFFE-BROWN A.R. (1952) – *Structure and Function in Primitive Society*. Cohen & West, Londres.

REDFIELD R., LINTON R. & HERSKOVITS M. (1936) – Memorandum on the study of acculturation. *American Anthropologist* 38, 149–152.

ROGERS E.M. (1952) – *Diffusion of Innovations.* Glencoe, New York, 367 p.

SAHLINS M. (1976) – *Culture and Practical Reason.* University of Chicago Press, Chicago, 252 p.

SCHMIDT W. & KOPPERS W. (1937) – *Handbuch der Methode der kulturhistorischen Ethnologie.* Aschendorff, Münster, 338 p.

SIMONDON G. (1958) – *Du mode d'existence des objets techniques.* Aubier, Paris, 265 p.

SIMONDON G. (2005) – L'invention *dans les techniques. Cours et conférences.* Collection « Traces écrites ». Le Seuil, Paris, 347 p.

SOULIER P. (2007) – La notion d' « emprunt » chez André Leroi-Gourhan. In : Rouillard P., Perlès C. et Grimaud E. (dir.), *Mobilités, Immobilismes. L'emprunt et son refus.* Colloques de la Maison René-Ginouvès, Archéologie et Ethnologie. De Boccard, 15–23.

TARDE G. (1890) – *Les lois de l'imitation.* Alcan, Paris, 432 p.

TORRENCE R. & VAN DER LEEW S.E. (1989) – What's new about innovation ? . Introduction in : Van der Leew S. E. & Torrence R., *What's New ? A Closer Look at the Process of innovation.* One world Archaeology 14, Unwin Hyman, London, 1–15.

TOSTEVIN G.B. (2007) – Social Intimacy. Artefact visibility, and Acculturation Models of Neanderthal-Modern Human Interaction. In : P. Mellars, K. Boyle, O. Bar-Yosef, C. Stringer (eds), *Rethinking the Human Revolution : New Behavioural and Biological Perspectives on the Origins and Dispersal of Modern Humans.* MacDonald Institute for Archaeological Research Monographs, Cambridge, chapter 28, 341–357.

TYLOR E. (1865) – *Researches into the early history of mankind and the development of Civilisation,* London, 295 p.

TYLOR E. (1871) – *Primitive Culture.* 2 vol., London.

WARNIER J.-P. (1999) – *Construire la culture matérielle. L'homme qui pensait avec ses doigts.* Presses Universitaires de France, Paris, 190 p.

WISSLER C. (1923) – *Man and Culture.* T. Crowell, New York, 371 p.

La mobilité rapide, caractère propre au Paléolithique supérieur d'Eurasie

Marcel OTTE

Résumé : La relation entre nature et culture passe par des voies symboliques réciproques. Tout dans l'animal s'intègre dans les activités humaines traditionnelles, comme l'habitat, l'outillage et la prédation. Ce caractère particulier a permis une extrême survivance des valeurs jusqu'à aujourd'hui. La condition essentielle tient à la mobilité, au moins partielle de certains membres du groupe qui ont laissé leurs traces, parfois étalées sur des centaines de kilomètres. Les traditions au Paléolithique supérieur agissent tel un filet de symboles, d'actes et d'actions. La monte du cheval paraît s'imposer, au moins partiellement et pour des groupes limités. Les idées se diffusent à grande vitesse, rendues évidentes par l'extrême extension des techniques et des arts. Tout s'oppose donc de ce point de vue aussi antre le Paléolithique moyen et le Paléolithique supérieur.

Mots-clés : monte du cheval – extension – Eurasie – mobilité

Abstract: *The relationship between nature and culture can be understood in terms of reciprocal symbolic pathways. All parts of an animal are integrated into traditional human activities, including shelter, tools and hunting. This particular character has enabled an extreme survival of values up to the present. The essential condition is due to mobility, at least partial mobility of some members of the group, which has left evidence in the archaeological record, sometimes over hundreds of kilometers. Traditions during the Upper Palaeolithic act as a network of symbols, acts and actions. Horse riding appears to have been necessary, at least in part and for limited groups. Ideas are spread rapidly, as seen by the widespread expansion of techniques and art. All elements of prehistoric culture are therefore opposed when comparing the Middle and Upper Palaeolithic.*

Key-Words: *horse riding, expansion, Eurasia, mobility*

INTRODUCTION

En période froide, l'extrême extension des steppes eurasiatiques fut surtout marquée par la combinaison de l'ensoleillement à des conditions atmosphériques très continentales, avec des vents violents mais surtout secs, aux origines des dépôts poudreux (« lœss ») où les habitats prolifèrent. Lors du comblement de la mer Caspienne, le recul de la mer Noire, le territoire exondé de la mer du Nord, l'absence totale de barrières géographiques unifiait l'Asie septentrionale à son appendice européen, extrême occidental (**figure 1**). Seul ce cadre doit être considéré dans toute étude culturelle paléolithique, comme les innombrables mouvements migratoires l'ont attesté au fil de l'histoire récente : Villanoviens, Minoens, Étrusques, Ibères, Huns, Hongrois, Mongols, Turcs, par exemple. À une extrême extension géographique de l'Asie a toujours correspondu à la fois de puissantes masses démographiques, donc de régulières vagues migratoires, autant vers l'Occident (« Hommes modernes ») que vers l'Orient (Aïnous, Japonais, Amérindiens, Inuits). Il n'est donc possible de comprendre l'Europe que par ses échanges avec ses immensités voisines, dont l'Asie en contact direct et constant et, épisodiquement, l'Afrique par la Sicile et Gibraltar. Cependant, l'Europe, essentiellement située en hautes latitudes, possède d'évidentes analogies, géographiques et humaines, avec l'Asie septentrionale, de Moscou à Vladivostok. Ceci fut bien compris lors des conquêtes, le long de ce « couloir » par Pierre le Grand qui unifia l'ensemble des peuples, progressivement « acculturés », mais en sens opposé, vers l'Est. Cette unité fondamentale ne fut pas totalement acquise depuis toujours, mais possède une particulière acuité avec l'Homme moderne, leur mythologie conquérante, leurs armes, leur art, leur très forte mobilité.

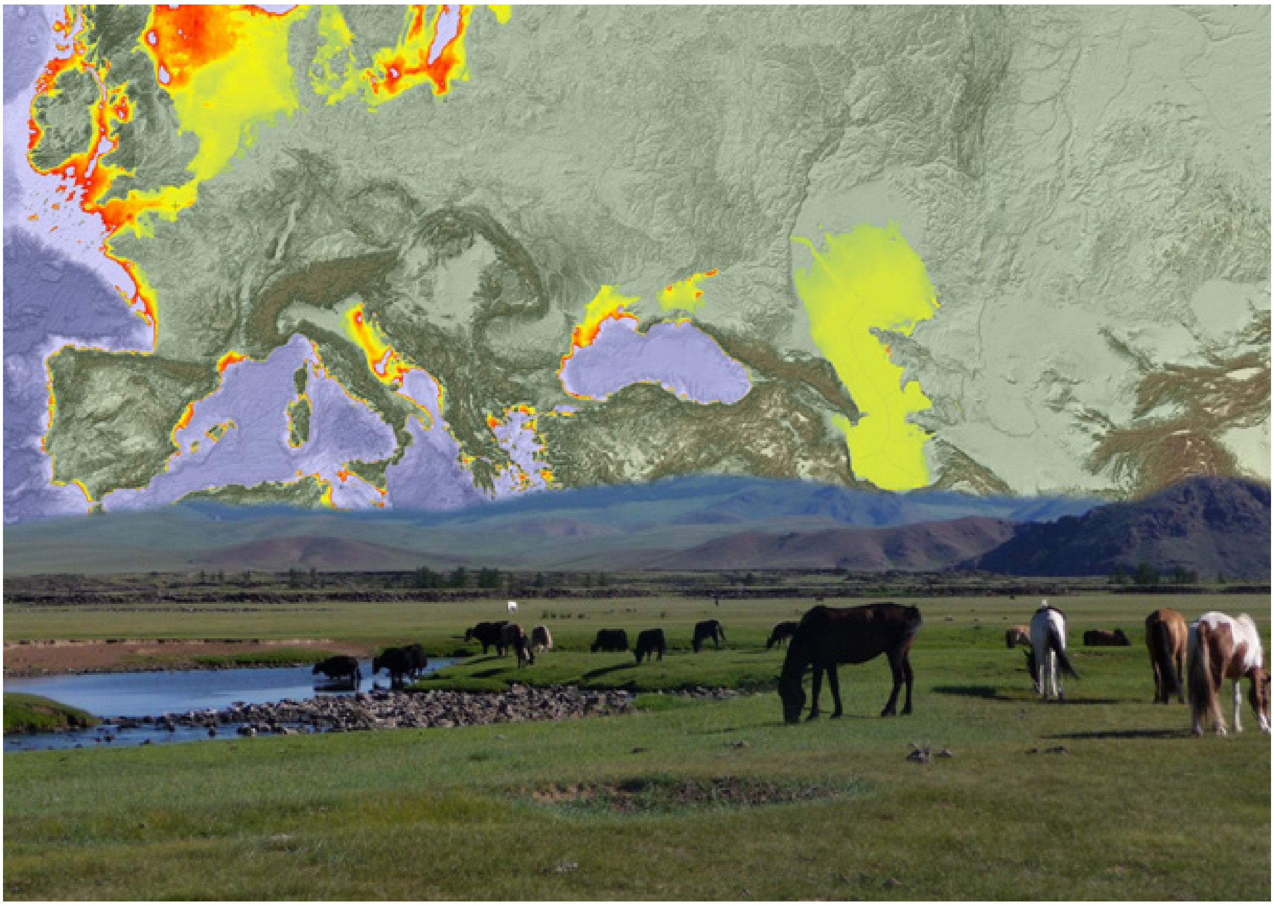


FIGURE 1 Steppes et herbivores unissaient toute l'Europe au climat froid, mais sec et ensoleillé. La remontée des niveaux marins accentuait les vents continentaux et unifiait le paysage, d'Est en Ouest (Carte : Jean-Noël Anslijn).

Chacun s'accorde à reconnaître l'unité paneuropéenne des civilisations aurignaciennes ou gravettiennes, alors que les styles du Paléolithique moyen sont fortement marqués régionalement.

Ces unités culturelles fulgurantes (arts de Chauvet, Ardèche et Coliboaia, Roumanie) exigent des explications théoriques appropriées. Fussent-elles provisoires, elles s'imposent à toute pensée éprise de logique. À nos yeux, il s'agit de diverses composantes de nature spirituelle, mais à reflets matériels incontestables. Elles tiennent tout simplement à l'idée qu'une société se fait d'elle-même, et de sa place dans l'univers. Ce « tout simplement » contient une dose d'hyperbole, ressentie par chacun. Mais il nous est totalement interdit d'extraire l'homme paléolithique de toutes les lois qui forgent toute l'humanité partout sur la Terre : elles possèdent une structure diachronique cohérente, assortie d'une multitude de variations qui leur donnent leur substance, en quelque sorte en négatif de leurs infinies particularités. Cette dualité a souvent fait renoncer à toute tentative globale par la confusion de ces deux catégories, incluses simultanément dans tout comportement humain : ses capacités et ses réalisations. Ainsi s'expliquent à la fois la phobie devant « la comparaison ethnographique » (l'exemple confondu avec la règle) et l'impunité des délires philosophico-préhistoriques propres à certaines écoles, séparés par des bras de mers réels ou par des océans conceptuels.

La voie naturelle liant l'Europe à l'Asie fut déjà tracée par les Néandertaliens, jalonnée par les populations d'anatomie constante, de Spy à Techik-Tass, et nulle part ailleurs. Populations homogènes mais aux multiples composantes culturelles, à l'inverse des événements ultérieurs.

À l'époque actuelle, l'immensité de ces steppes se retrouve surtout limitée à l'Asie, avec des restes d'extensions ukrainiennes. Mais les conditions, froides et sèches, les étendaient loin au cœur de l'Europe occidentale, approximativement dans les terrains lœssiques actuels. Territoires extrêmement favorables aux troupeaux d'herbivores, donc des sources alimentaires mobiles qu'ils constituaient (**figure 1**). « Cette ouverture » sur la steppe, herbeuse et froide, imposait des relations intimes entre les sociétés humaines (tels les Évenks, les Bouriates ou les Amérindiens actuels) et les herbovires. Ils se connaissent, à l'individu près, se reconnaissent et se respectent mutuellement, cas les aires propices au pâturage sont autant repérées par l'animal que par l'homme et la notion de « domestication » n'y possède aucun sens. Les rapports à l'animal nutritif passent par une large gamme de subtilités, dans laquelle les statuts de « sauvages » ou de « domestiques » sont exceptionnels (Carole Ferret, 2009), et parmi lesquels la monte occasionnelle ne modifie en rien les statuts des uns et des autres. Mais, dans nos contextes paléolithiques, elle justifie par exemple la rapidité d'extension, l'extrême homogénéité culturelle et la brutale évolution saccadée, à caractère historique, propres aux hommes modernes européens. Cette intimité aux grands herbivores, ne se limite pas aux seuls chevaux, mais s'étend aussi aux bovidés, aux rennes, aux yacks, aux éléphants, toujours montés aujourd'hui dans toute l'Asie, sans rien perdre de leur anatomie sauvage, seul l'impalpable comportement a pu changer, d'ailleurs provisoirement.

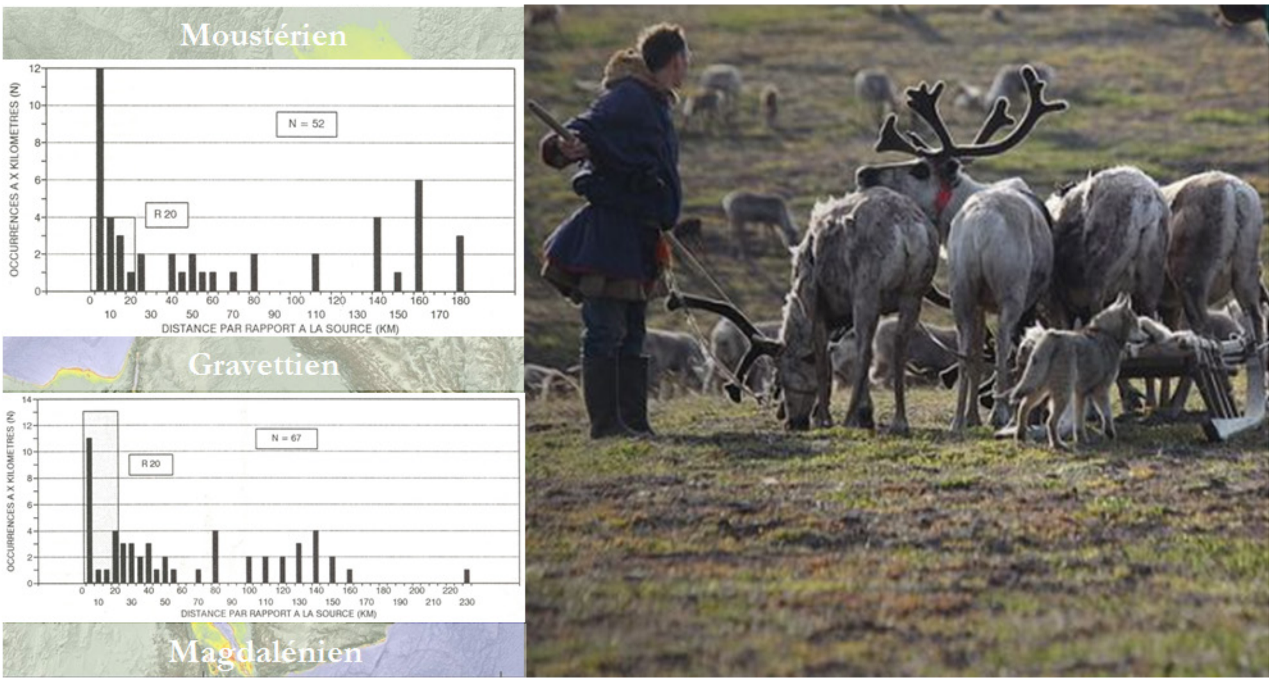
La différence fondamentale entre Néandertaliens et populations européennes récentes se réduit donc à des variations anatomiques extrêmement superficielles, de l'ordre de toutes celles qui distinguent les populations de la Terre entière aujourd'hui (**figure 2**). Mais leurs réalisations se distinguent, non dans leurs aptitudes mais dans leurs modalités. Par exemple, la prodigieuse complexité exprimée dans les méthodes de mise en forme, préalables aux outils, atteint la perfection avec les Néandertaliens. Aucune autre population connue n'a pu subsister, sans fléchir quant aux mythes et quant aux rites, aussi

FIGURE 2 Les variations anatomiques humaines ne furent pas davantage marquées dans le temps, qu'aujourd'hui dans l'espace (Néandertal, en bas à gauche). La subtilité des modes de vie néandertaliens, étalés sur 300 mille ans, manifestaient une parfaite adaptation, souple et puissante, à tous les milieux.

longtemps durant (de l'ordre de trois cent mille ans !) dans une subtilité comportementale telle que sa structure nous paraît perpétuelle autant que ses variantes qui l'illustrent sans l'altérer. Cet équilibre, si puissant et si vivace a laissé la place aux plus humiliantes considérations, réduites dans l'expression « Néandertal » considérés comme « sous-hommes ». Si un sens devait être cherché à une telle absurdité, il ne pourrait se situer que dans la phobie, affirmée par ceux qui la proclament. Quant à leur propre statut, placé dans un processus qui dépasse leur condition personnelle : l'angoisse « justifie » tous les dogmes aux yeux des vivants. Parmi la large gamme d'expressions spirituelles assumées par les Néandertaliens, se situent les rituels funéraires, les trophées, le foyer et la musique (**figure 3**). En termes purement logiques, rien de tout cela ne peut choquer, seul un atavisme morbide actuel y freine la réflexion, pour le plus grand dommage des sciences et de notre propre dignité. Lorsque les peuples nouveaux apparaissent en Europe avec une forte démographie, ils emportent avec eux une métaphysique toute neuve, fondée sur une relation à la nature nouvelle, spécialement sous sa forme animale. Outils, décors et représentations subissent le basculement d'œuvres en bois vers celles incarnées par l'animal : les rapports ont complètement changé, l'humanité saute le pas vers un affranchissement biologique, en suite logique avec ses premiers pas d'être bipède : elle se dégage davantage encore de sa condition naturelle, par la maîtrise systématique du concurrent animal direct, celui qui l'incarne, comme un défi. Les pendeloques ornent l'homme, au statut d'intermédiaire entre les forces spirituelles et les comportements animaux. Dès lors, les ramures servent d'arme et les canines de trophée (**figure 4**).

FIGURE 3 Les styles régionaux basculèrent depuis les délimitations moustériennes territoriales étroites (gauche) à une étourdissante uniformité continentale, tels des peuples, associés par leurs valeurs propres (droite).

FIGURE 4 Les réseaux territoriaux se manifestent par les aires d'extension reconstituées via les distances d'origine des matières premières (d'après Feblot-Augustin, 1997). Très courtes au Moustérien (en bas), elles s'étirent désormais jusqu'à 500 km avec les peuples modernes, illustrant en outre leur mobilité initiale, dans les centres d'où leur densité les a écarté.



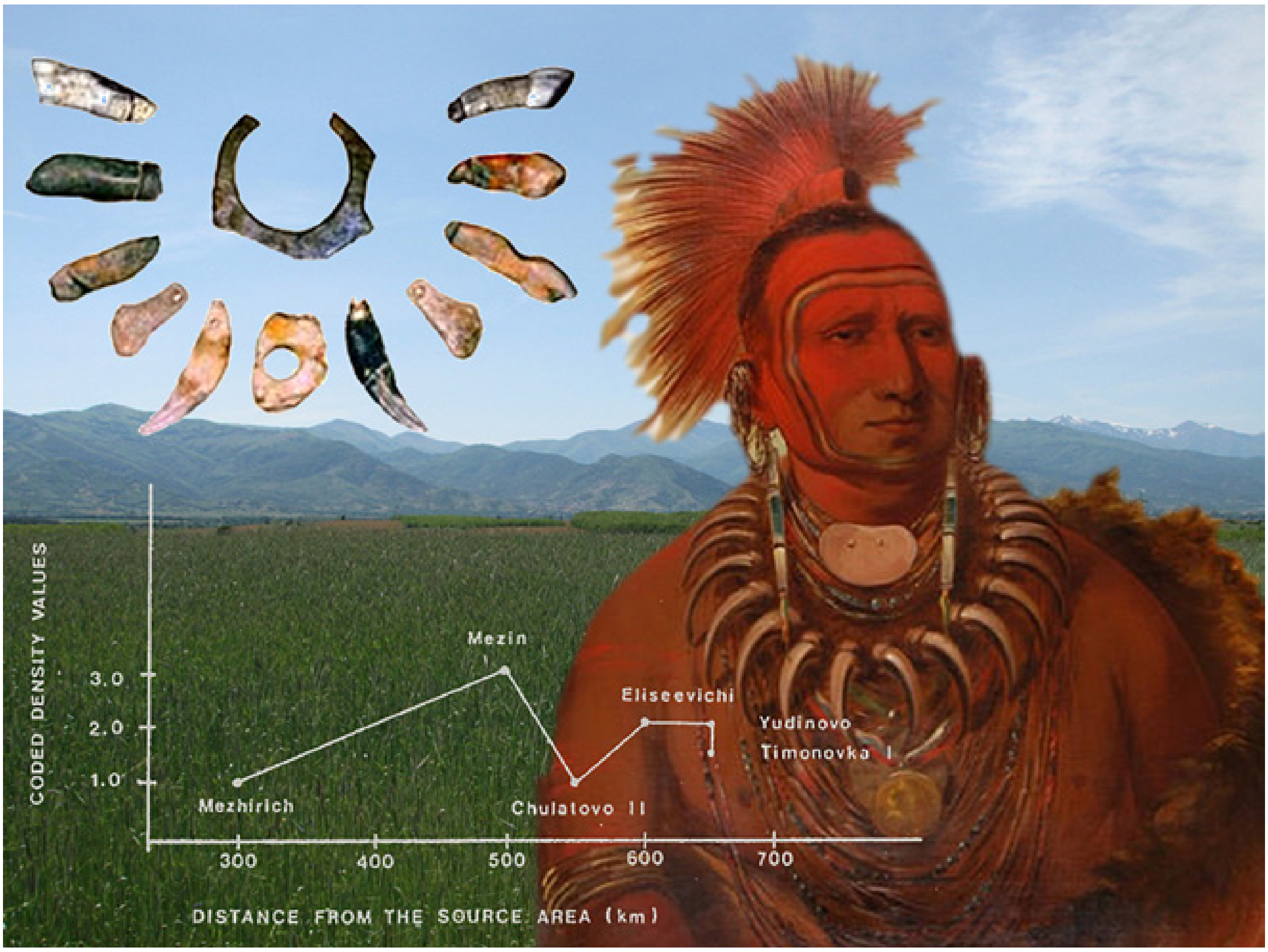


FIGURE 5 Les pendeloques en coquilles marines, marques des sociétés modernes, manifestent des distances d'approvisionnement bien plus vastes encore, jusqu'à 1000 km. Elles mesurent à la fois l'importance sociale prise par ces investissements au profit d'une élite, et les systèmes de relais auxquels leur approvisionnement pouvait donner lieu (diagramme, d'après Olga Soffer).

Cette nouvelle intensité dans l'occupation territoriale se manifeste de la façon la plus crue via les aires parcourues (**figures 4** et **5**) : les matériaux proches abondaient au Moustérien, leur source s'éloigne jusqu'à 500 km dans les réseaux nouveaux du Paléolithique supérieur. La mobilité y est beaucoup plus forte et les traditions culturelles constituent de vastes réseaux territoriaux, où on peut parler d' « histoire des civilisations » au sens classique du terme. La parure accentue encore cette densité des réseaux, puisque leur aire d'expansion s'étire sur 1000 km (**figure 5**).

L'augmentation démographique a suivi le même cours (**figure 6**) comme l'avait calculé Fekri Hassan (1981). Une courbe de population s'élève en asymptote, avec l'introduction des armes propulsées, arcs et sagaies selon la variété des gibiers ou la personnalité du chasseur. Les marques systématiques portées sur ces pointes, démontrent l'importance, accordée par le groupe, au coup mortel donné par l'un de ses membres. De telle sorte que la structure religieuse, où les forces spirituelles s'organisent, justifie et garantit les répartitions sociales, au sein du groupe dont le sort est ainsi mis entre les mains des intermédiaires de rares individus qui, par la chasse, agissent sur ces forces naturelles au profit de l'humanité. Il ne s'agit plus de mises à mort alimentaires mais de véritables sacrifices, où l'animal constitue le lien d'échange. Un très simple calcul démontre la force prise par la nouvelle démographie (**figure 7**). En calculant le nombre de sites connus au Paléolithique ancien ou supérieur, il faut multiplier par 20 pour obtenir l'équivalent en termes d'occupation territoriale, en dépit d'une durée infiniment plus longue pour la première que pour la seconde. Le paysage est alors totalement « humanisé ».

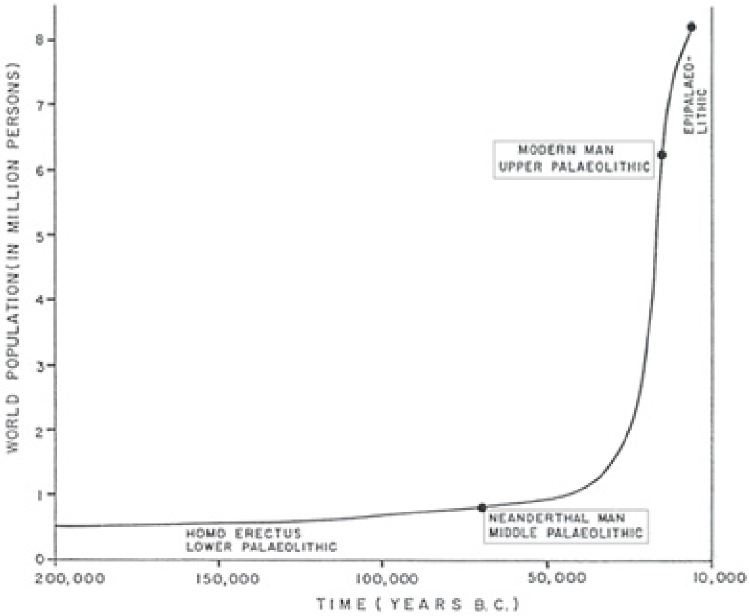


FIGURE 6 Une explosion démographique avec le Paléolithique supérieur par de nouvelles armes, un plus grand réseau de connexions sociales, mieux adaptées aux immenses steppes pléistocènes et aux mythologies expansionnistes (diagramme encadré de Fekri Hassan, 1981, planche dans Fitzhugh *et al.*, 1988).

FIGURE 7 Augmentation extraordinaire, exprimée en nombre de sites commun au Paléolithique moyen (gauche) et supérieur (droite). Cette intense occupation territoriale (20 fois plus de sites !) doit encore être multipliée par l'énorme différence de durée entre les deux périodes (300 à 30 mille ans).

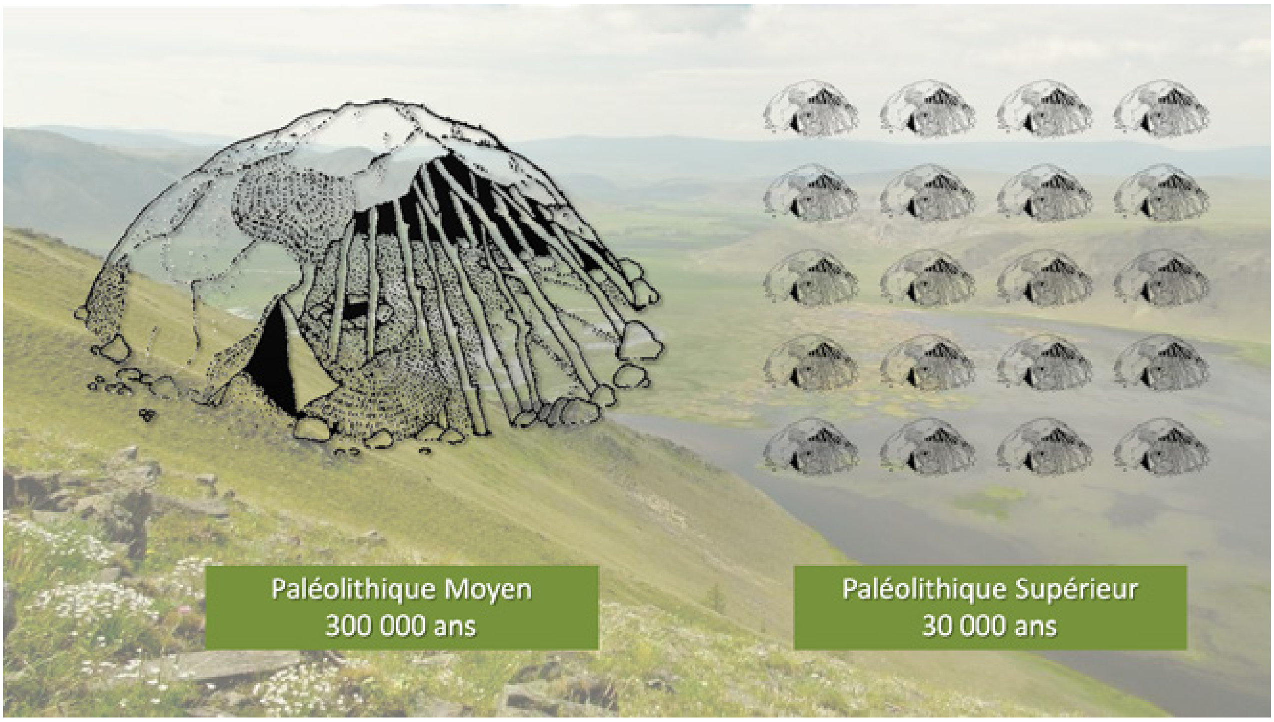


FIGURE 8 La steppe froide favorise le développement exponentiel des grands herbivores, dont les chevaux, les rennes, les bovidés et les mammouths. À l'instar des populations humaines, leur monte occasionnelle paraît à la fois la plus probable et la plus naturelle dans des sociétés harmonieusement associées. La statuette, ambigüe entre homme et nature (Hohlenstein-Stadel), accentue cette intention d'intégration, aussi indispensable, logique qu'abso-lument universelle.

Les populations actuelles, encore attachées à ce mode d'équilibre, étalé du mythe au territoire (Evenks, Bouriates) jouent sur les déplacements saisonniers selon les différentes espèces d'herbivores (rennes, chevaux, bovidés), toutes montées occasionnellement mais sous forme extrêmement limitée par rapport à la masse du gibier potentiel : aucune trace anatomique ne peut donc y être décelée. La figuration humaine elle-même se manifeste selon cette ambiguïté (**figure 8**) où l'individu se trouve métamorphosé en animal, redoutable mais figurativement maîtrisé. L'emprise sur le temps, combinée à celle de l'espace, apparaît par la foudroyante expansion des colons aurignaciens et par la pratique courante des calendriers humains, encore employés aujourd'hui par les peuples nomades, car le soleil possède une course variée selon la mobilité des observateurs eux-mêmes (**figure 9**).

Les dalles gravées d'animaux se tournent désormais vers le cosmos afin de prolonger cet appel à la nature. De Chaleux à l'Altaï (**figure 10**), elles incarnent l'esprit des animaux, comme si elles incarnaient spontanément cette relation via la représentation. Les chamans asiatiques utilisent encore ce procédé afin de raviver cette relation, au cours de cérémonies régulières et en regravant la silhouette altérée. L'emprise fut donc complète sur le paysage steppique, ouvert et lumineux, favorable aux troupeaux autant qu'aux hommes, unis par l'échange imposé par la monte occasionnelle (**figure 16**). Les calendriers, les sagaies (**figure 11**), les instruments de toutes fonctions furent tirés des restes animaux au titre de matériaux résistants, mais surtout par le transfert qu'ils opéraient ainsi spontanément entre l'ensemble du monde vivant, solidarisé par la steppe et par l'esprit qui en émane : ses ciels prestigieux, ses paysages sans fin, ses vents animés et glacés. La complémentarité des méthodes liées à la propulsion (arcs et sagaies) se trouve attestée par d'innombrables populations actuelles où leurs emplois s'adaptent selon un grand herbivore mis à mort à longue ou à courte distance (**figure 12**). Aucune opposition ne les distingue, durant ces dizaines de millénaires, mais tout les unit, selon le procédé requis et selon le statut pris par la mort animale dans la population du chasseur.

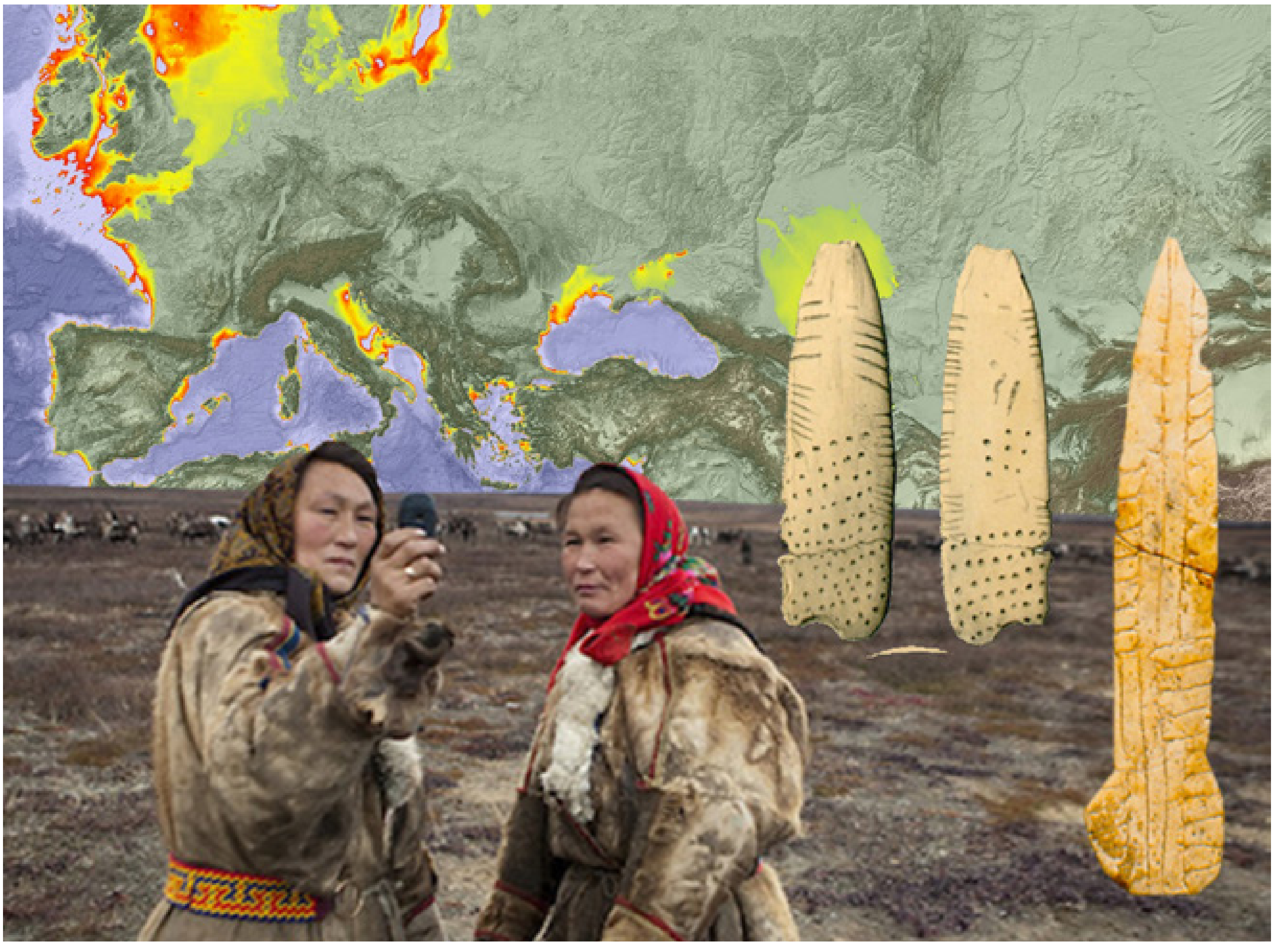


FIGURE 9 Le temps est désormais capté via les décomptes lunaires, marqués sur des lames osseuses mobiles, comme les populations elles-mêmes en mouvement. Ils justifient l'unité territoriale au Paléolithique supérieur (Calendrier de Remouchamps).

FIGURE 10 L'harmonie entre l'humanité et la nature passe aussi par la représentation animale, abondante à l'Ouest (Chaleux), encore active à l'Est (Altaï, figures actuelles). Les figures, tournées vers le cosmos, tentent d'affermir ce lien régulièrement, via l'avivage rituel de l'image lors des cérémonies chamaniques.

FIGURE 11 Les matières osseuses entrent dans toutes les composantes techniques, d'autant plus précieuses qu'elles compensent la carence en bois végétal dans un environnement steppique.

Leurs systèmes de pensée, d'une foudroyante diffusion, se manifestent plus encore dans les arts rupestres, fixes et pourtant identiques, de l'Ardèche à la Roumanie (figure 13). Il ne s'agit plus seulement d'armes, de pendeloques ou d'emprises sur le paysage mais d'une diffusion spirituelle, c'est-à-dire d'un filtre que tout style installe entre l'œil et la réalité, de la façon la plus légère et la plus abstraite, enfin la plus sacrée, et pourtant transportable par les mêmes traditions, sur les milliers de kilomètres. L'animation, extrêmement éphémère fut captée au même titre que la prise de possession du réel (figure 14). Les fresques de Chauvet (32.000 ans) évoquent ces moments successifs, ces jeux entre individus et troupeaux, ces chatoiements eux-mêmes qu'ont la robe des chevaux au galop dans la steppe : tout est prétexte à saisir le sens caché dans la réalité afin de l'introduire dans la forme maîtrisée par l'homme au titre symbolique. Les preuves matérielles quant à l'intimité de cette relation se retrouvent doublement attestées, par la présence systématique de l'animal monté des steppes actuelles et les gravures d'entraves faites de cordes, liées sur le strict modèle de cavaliers actuels (figure 16).

L'habitat, creusé et durable se retrouve en Sibérie actuelle, à l'identique des traces aurignaciennes, trente mille ans plus tôt, à Climaoutsi en Moldavie, lorsque la structure restait fixe tandis que les populations migraient saisonnièrement, prenant précisément de tels abris comme points de repère dans un paysage ouvert (figure 15). Les récipients, mobiles et légers, étaient alors faits de vanneries finement tressées et de poches animales naturelles tels les estomacs de chevaux ou de chameaux, nettoyés, refermés et parfaitement étanches. Mais les nombreux fragments de céramiques jalonnent également

FIGURE 12 Les armes combinent les différentes formes de propulsion, utilisées selon le gibier ou la fonction. Lourdes et longues, les sagaies basculent l'animal, mais l'arc précise sa mise à mort, en même temps qu'il s'adapte aux gibiers fugaces, sous couvert forestier et à courte distance (Cattelain, Cziesla, Catlin).

les sites du Paléolithique récent (**figure 15**, à droite) lorsqu'une vaisselle hâtivement montée et cuite servait aux bouillons (Algonkins subactuels) puis restait abandonnée, à l'état de tessons, épais et grossiers, dont le transport eut été encombrant, lourd et fragile.

La remontée des eaux lors du réchauffement postglaciaire, produit un paysage en mosaïques, renforcé par la croissance d'arbres permanents, là où les denrées, en se diversifiant, permettaient une vie et une économie étalée au fil de l'année. Si l'habitat se fixe par la diversification des ressources alimentaires, la cristallisation des traditions s'accentue et la démographie parcellisée augmente. De telles conditions rendent la monte d'herbivores peu favorable, peu propice et bientôt inutile. Nos illusions datent de là : les animaux montés ne reviendront qu'avec le Néolithique récent lorsque la cassure entre sauvagerie animale et domestication civilisée sera consommée. Involontairement, voire inconsciemment, nous poursuivons le mythe biblique, à création récente, totalement idéalisée et où l'homme, au nom de Dieu, a radicalisé sa prétention à la position de maître de l'Univers sous la forme d'éleveur et de cavalier (**figures 16** et **18**).

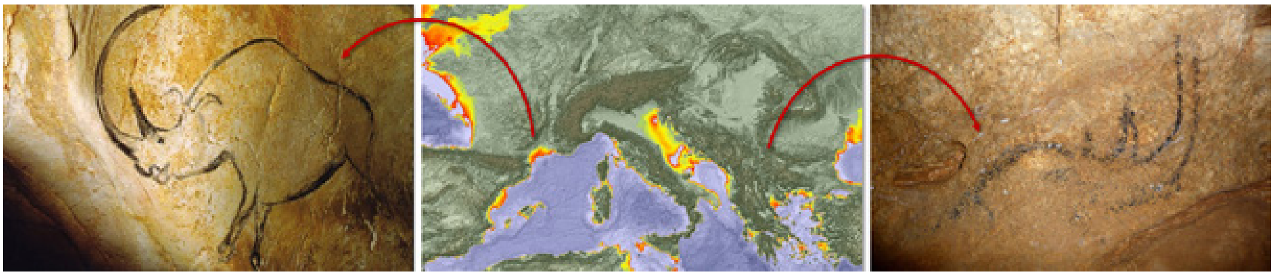


FIGURE 13 Le style, tel un voile abstrait, manifeste des réseaux serrés les plus subtils, par exemple entretenus à l'Aurignacien entre la Roumanie et l'Ardèche (Photos : J. Clottes).

FIGURE 14 L'animation, les divers plans, les textures, les teintes sont toutes empruntées à la nature afin d'en saisir la vie, de la maîtriser et de la mettre à notre service via le mythe.

FIGURE 15 L'habitat semi-enterré de l'Aurignacien à Cosaoutsi (Moldavie) possède son prolongement direct dans les maisons des taïgas sibériennes où le nomadisme n'exclut en rien la fixité des maisons, à occupations périodiques. La vaisselle, faite de vanneries finement tressées ou de récipients animaux (vessies, estomacs) est incassable et légère, propre aux déplacements. Mais il suffit d'un arrêt de quelques semaines pour réaliser de frustres poteries, aussitôt abandonnées sur place.

FIGURE 16 Dans de telles steppes, ouvertes à l'infini, les rapports d'échanges spontanés grâce à la course, maîtrisent la distance et la réflexion aidant au repérage des ressources. Elles apparaissent aussi spontanée qu'universelle (Carole Ferret), exactement comme les liens furent gravés sur les silhouettes de cheval découpées en plaquettes osseuses pyrénéennes (Arudy).

FIGURE 17 La remontée des eaux et la couverture forestière au tardiglaciaire morcellent le paysage mais augmentent les ressources, fixes et sauvages, spécialement celles issues des points d'eau. Le maintien des danses profanes actuelles évoque leur rôle sacré lors des cérémonies paléolithiques.

FIGURE 18 Les animaux fugaces et isolés imposent une chasse précise, silencieuse et rapide, possible par l'arc. Cette arme ne correspond donc pas à une « invention » mésolithique, mais prend une spéciale ampleur à ce stade par contrecoup des modifications sociales (sédentarité et paysages). Plus profondément, l'usage accentué de l'arc provoque la béance entre l'homme et l'animal, dépourvu de sa protection naturelle par la fuite. Symétriquement, l'homme peut ainsi gagner une position privilégiée au sein de la Création : le virus du Néolithique en découle directement avec ses panthéons désormais à l'image de l'homme, où l'animal se réduit au rang d'attributs.

Par sa fonction physique, coordonnée, ostentatoire et solidaire, la danse recherche dans les profondeurs de l'âme ce qui n'était rien d'autre que des actes religieux (**figure 17**), transcendant la position humaine, dans toute société en harmonie naturelle savamment codifiée (**figure 18**).

Désormais, l'abattage et la mise à mort furent confondus, dans des paysages forestiers aux animaux frêles et fugaces : la précision s'impose, accentuant le statut démiurgique de l'homme « opposé » aux forces naturelles plutôt qu'y être associé. Il quitte ainsi le statut onirique du « Paradis perdu » pour se perdre lui-même dans l'aventure aléatoire du destin qu'il croit pouvoir maîtriser. La fatalité de l'histoire s'y était rapidement radicalisée, jusqu'à nous.

BIBLIOGRAPHIE

HASSAN F. (1981) – Demographic Archaeology. New York: Academic Press.

FERRET C. (2009) – Une civilisation du cheval, Paris: Belin.

FITZHUGH W.W. & CROWELL A. (1988) – Crossroads of continents. Cultures of Siberia and Alaska. Washington: Smithsonian Institution Press.

LESKOV A.M. & MÜLLER-BECK H. (HRSG.) (1995) – Arktische Waljäger vor 3000 Jahren : unbekannte sibirische Kunst. Kempten: Hase, V. & Koehler.

FÉBLOT-AUGUSTINS J. (1997) – La circulation des matières premières au Paléolithique. Tome 2. Liège: Eraul 75.

DUPAIGNE B. & KLING K. (2000) – Asie nomade. Hazan: Maisons du monde.

Grotte d’Espalungue,
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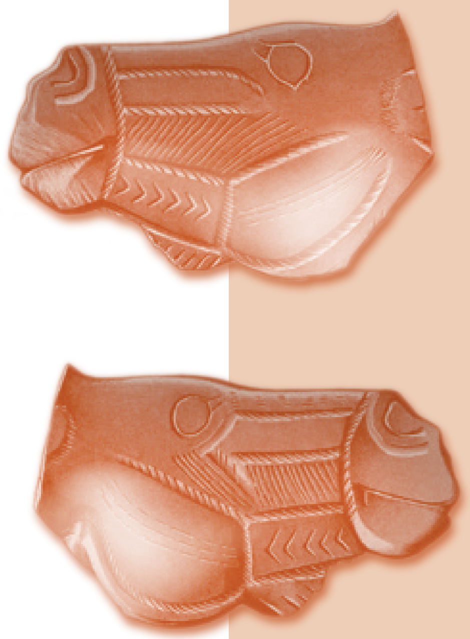
J. Pilloy, pl. XCIII,
L’Art pendant l’Âge du Renne



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