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Djruchula Cave, on the Southern Slopes of the Great Caucasus: An Extension of the Near Eastern Middle Paleolithic Blady Phenomenon to the North

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The Middle Paleolithic blady phenomenon, identified in the form of systematic and intentional blade production in different regions of the Old World, is acknowledged by most prehistorians. Some significant changes in our understanding of this phenomenon have been realized since the paper in which Bar Yosef and Kuhn (1999) attempted to qualify the then largely admitted equation of blade technology and modern human behavior. Since then, discoveries of new pre-Upper Paleolithic blady assemblages and more detailed technological studies (Barkai, et al. 2003, 2005; Locht 2002; Meignen 2001; Shimelmitz 2009; Weinstein et al. 2003; Wurz 2002) have confirmed that the knowledge and ability to produce blades in series were already part of the technical repertoire long before the Upper Paleolithic. These early blade productions are not often well dated, but in our present state of knowledge this blady phenomenon seems to be globally discontinuous and not especially developed just prior the onset of the Upper Paleolithic; no striking evidence for a marked shift to the blade production at the end of the Middle Paleolithic has been observed. Available data demonstrate that blade industries occur in various areas and time periods prior to the Upper Paleolithic times.

In Southwestern Asia, blade production appeared quite early, in the Pre-Aurignacian and Amudian industries, in several sites: Yabrud (Syria) (Bakdach, 1982; Rust, 1950) and Haua Fteah (Lybia)(McBurney 1967) for the former, in Tabun (Garrod 1956), Abri Zumoffen/ Adlun (Copeland 1975; Garrod and Kirkbride 1961), Zuttiyeh (Gisis and Bar-Yosef 1974) and Maslouk (Skinner 1970) for the latter, both assemblages included in the Mugharan tradition (Acheulo-Yabrudian) and considered as late Lower Paleolithic. The Amudian has been dated to 264 +/- 28 000y in the deep archeological sequence of Tabun (Tabun unit XI (Mercier and Valladas 2003)). But more recently, the discovery and dating of a new long Amudian sequence seems to indicate that these Lower Paleolithic blady component could have started more than 380 000y ago and lasted till 200 000y (Barkai, et al. 2003; Gopher et al. 2010).

In this area, the blady assemblages are even much more common during the Middle Paleolithic times, often grouped under the name of "Early Levantine Mousterian" or "Tabun D-type" industries, an entity that we'll discuss infra. The more recent radiometric dating programs show that these Middle Paleolithic blady assemblages globally lasted from 270 000y (Tabun unit IX (Mercier and Valladas 2003)) to 160 000y (Hayonim lower E (Mercier, et al. 2007; Rink, et al. 2004; Valladas, et al. 1998) with more sporadic appearance later (Ain Difla, in Jordan, between 90-180 000y (Clark, et al. 1997)).

Middle Paleolithic assemblages encompassing a large blady component are also well documented in several places of Europe, mainly in the septentrional area (Northern France, Belgium, Germany). Elongated blank productions were scarcely present during Isotopic stages 6 to 8 as put forwards by Bordes (1977), but these blade-rich assemblages mostly developed during Isotopic stage 5/early stage 4 (Antoine, et al. 1995; Conard 1990; Delagnes 2000; Revillion 1989, 1994). In fact, blades seem to be scarce at the end of the Mousterian in Europe (Mellars 1996).

Early evidence of blade production has been identified in the Kapthurin formation, in South Africa, as a non dominant component of the assemblages, dated to around 240 000y ago (McBrearty, et al. 1996; Texier 1996). More generally, blades and elongated pointed flakes appear to be a regular component of Middle Stone Age assemblages in South Africa (Clark 1989; McBrearty and Brooks 2000; Wurz 2000, 2002), with a special mention for the Howieson's Poort industries including many blades and backed (geometric) pieces (Clark and Lindly 1990; Deacon 1989; Soriano et al. 2007; Wurz 2000, 2002). These industries have a restricted spatial distribution, south of the Zambezi river in southern Africa, and are quite late in the MSA (around 60-70 000y; Deacon and Geleijnse 1988; Deacon 1989; Grün, et al. 1990) but of main interest insofar those blades seem to be obtained by the soft hammer technique (Wurz 2002) or more precisely by marginal percussion with soft stone hammer (Soriano et al. 2007). Interestingly, the same technique has been idenfied even earlier (OIS 5) in the blady assemblages of the MSA I in Klasies River (South Africa) (Wurz 2002).

Other sporadic early appearances of Middle Paleolithic blade-geared industries are known in Tadjikistan (site of Khonako III; (Schäfer and Ranov 1998; Schäfer, et al. 1998) with a relative dating of 200/240 000y, and later) and, in Transcaucasia, with the so-called Djruchula-Koudaro group, that we'll present here.

Thus, in this broad and imprecise context, understanding the meaning of this global phenomenon and determining the relationships between these blady assemblages is presently difficult. To tackle this problem, not only more dating information is needed but also a better understanding of the different schemes of core exploitation recorded in these blade technologies in order to make an attempt at "organizing" the blady assemblage's variability and its significance in term of human history.

Since the late 80's the development of new analytical tools has led to a better recognition of different Middle Paleolithic core reduction strategies.

Through the framework of reconstructing the "chaîne opératoire", several dynamic processes of knapping for blade production have been identified. Our researches have been especially focused on investigating the basic conceptual processes which lay under the sequence of manufacturing steps in blade production. Different ways of organizing and exploiting cores in three dimensions (i.e. "conceptions volumétriques" in the French litterature; Boëda 1986) have been identified, along with their respective significative end-products and by-products.

On the bases of ethnographic observations, the reduction strategies, as sequences of technical gestures passed from one generation to the next by imitation/impregnation (Pelegrin 1995: 33-38) are considered to have been the expressions of technical traditions.The methods of blank production and transformation (and the concepts involved) stemmed from a socially meaningful body of knowledge transmitted from generation to generation (Dobres and Hoffman 1994; Lemonnier 1992; Levi-Strauss 1976; Mauss 1936 (translated 1979); Pelegrin 1990) thus would represent in our opinion the best markers for identifying groups who shared a set of technical tradition.

By deciphering the time span and geographical spread of a technical tradition, we can investigate the history and limits of the social interaction spheres. Such an approach has been especially developed in the Near East where the blady assemblages are largely represented.

THE NEAR EASTERN BLADY PHENOMENON

The Near East has been recognized for a long time as an area where a long tradition of blade manufacture/use took place through the Paleolithic even if the relationships between these various industries encompassing a significant blady component are still debated.

All these blade-based industries demonstrate different methods of flaking that most prehistorians only expressed in a binary scheme "Levallois" versus "non Levallois" technologies. With the development of the technological approach in the 90's, more detailed core reduction strategies have been described for these blade-geared industries (Barkai, et al. 2005, 2009; Marks and Monigal 1995; Meignen 1994, 1998, 2000, 2007, in press; Monigal 2001, 2002; Shimelmitz 2009) allowing more precise identification of lithic traditions and relationships between the different groups of blady tradition.

The earliest group, the Amudian/Pre-Aurignacian, remarkable blady industries interstratified in the flaky Acheulo-Yabrudian complex, have always been described as non-Levallois technologies. Often grouped together on the basis of their blady characteristics, their non Levallois technology and chronological position (Garrod 1956, 1970; Vishnyatsky 1994), they differ in fact in many points (Bordes 1977; Copeland 1975, 1983; Jelinek 1990; Meignen 1994; Vishnyatsky 2000; Monigal 2001, 2002), especially in the core-reduction strategies and retouched tool-kits dominated by Upper Paleolithic tools in both cases , but not of the same kind (burins, endscrapers, retouched blades for the Pre-Aurignacian, backed knives for the Amudian). In Tabun unit XI, the Amudian includes a large blady component, along with quite long and narrow thick blades, often with natural cortical back. They result from a very simple hard hammer core reduction strategy, with unidirectional removals struck from a unique striking platform (Jelinek 1990; Meignen 1994) obtained by the removal of a large transverse flake at the beginning of the reduction sequence (Monigal 2001, 2002). No specific core shaping was involved and the natural convexities of the block/pebble were exploited ("débitage direct"). Blades are struck in series, from a large part of the periphery of the core, with lateral convexities being maintained by the systematic removal of lames débordantes; consequently, numerous naturally backed knifes are produced which are characteristic of this industry (Barkai, et al. 2005, 2009; Jelinek 1990; Meignen 1994; Monigal 2001, 2002). The resulting cores are in general semi-prismatic (Meignen 1994, fig 3), but sometimes relatively flat (Monigal 2001).These elongated blanks have been clearly selected for retouching (more than half of all amudian blades in Tabun unit XI; Monigal 2001), often in classical backed blades considered as backed-knives, with abrupt or semi-abrupt retouch. In fact, this typical reduction strategy clearly aimed at the production of long sharp cutting-edge opposed to a back (natural or retouched) (Meignen 1994: 132; Barkai, et al. 2005, 2009). Contrary to what has been observed in the Pre-Aurignacian, other Upper Paleolithic tools such as burins and endscrapers are rare.

In Tabun unit XI as well as in Abri Zumoffen/Adlun, Amudian assemblages present a significant flake component (of the Yabrudian type) aside these blady production. Conversely, in the site of Qesem Cave, in most of the layers an exclusive blade oriented core reduction strategy of the same kind as in Tabun unit XI has been recognized (Barkai, et al. 2003, 2005), thus without the flake component.

Unlike the Amudian-PreAurignacian industries, the more recent Early Middle Paleolithic blade productions, when discovered in long archeological sequences, are stratigraphically positioned above the Acheulo-Yabrudian complex (Abou Sif C-D) or between the Acheulo-Yabrudian complex and the bottom of the Middle Paleolithic sequence (Tabun unit IX; Hayonim lower E and F; Hummal Ia). In the other sites, they occur uniformly through the full stratigraphic sequence (Rosh ein Mor, Nahal Aqev, Sahba?)

Early Middle Paleolithic assemblages all characterized by the presence of a large blady component, have been till 1994 considered exclusively as Levallois technology, this assertion being based mostly on the morphology of the end-products (Bar-Yosef 1994; Bar-Yosef and Meignen 1992; Copeland 1975; Copeland 1981; Jelinek 1981; Jelinek 1982; Marks 1981). In 1995, Marks and Monigal described in the site of Rosh Ein Mor (Negev desert, Israel), along with a Levallois technology for elongated blank production, a hard hammer non Levallois single platform reduction strategy that they considered as close to the one used at Boker Tachtit 4, an Initial Upper Paleolithic industry found in the same area (Marks and Volkman 1983; Volkman 1983).

Seemingly, our work on the Levantine lithic assemblages, especially from Hayonim, has led us to underscore different volumetric concepts in blade production. Besides the classical Levallois method for elongated blank production (blades and points) previously recognized in assemblages such as Tabun IX, and here developed in Hayonim lower E and F, our researches have shown evidence, from 220/230 000 y ago, of other debitage systems, that we have grouped under the name of “Laminar method” (Meignen 1994, 1998, 2000). In term of geometric core construction (“volumetric concept” (Boëda 1988, 1994)), they are close to those documented latter, in Upper Paleolithic industries, even if the productivity and end-product regularity are clearly not the same (Meignen 2002).

These Laminar reduction strategies which fall within the Boëda’s definition of core conceptualized as a volume to be reduced in a continuous single process (Boëda 1988, 1990) are identified in the Hayonim lower E and F archeological assemblages by cores with markedly convex debitage surface, from which elongated blanks are struck in series from one (sometimes two) striking platform(s) (fig. 1: 1, 3; fig. 2: 2). Lateral convexities were maintained as in Rosh ein Mor by curving around the partial (or total) core periphery or by bending one side of the core by means of cortical “lames débordantes” (débitage tournant, débitage semi-tournant, in the French literature). Depending on the orientation of removals, different morphologies and volume organization of the cores would be recognized (Meignen 2000). Classical elongated pyramidal or semi-pyramidal cores result from unidirectional exploitation (fig.1: 1, 3); the striking platforms are often unfaceted, formed by one or few large removals with lateral orientation of the blow allowing the exploitation of the lateral sides of the core (Meignen 1998).

Bidirectional core exploitation has been identified in the form of cores, with 2 opposed platforms slightly twisted (“off axis”) (fig. 2: 2). From these 2 striking platforms, 2 reduction surfaces are exploited whose intersection creates the necessary convexities for the blank detachment. The resulting debitage surface is, as in the previous case, highly convex, and the morphology of the core is “semi-prismatic”. Such bidirectional exploitation has been also identified by specific overshot blades which take off the opposite “off axis” striking platform (fig. 2: 1).

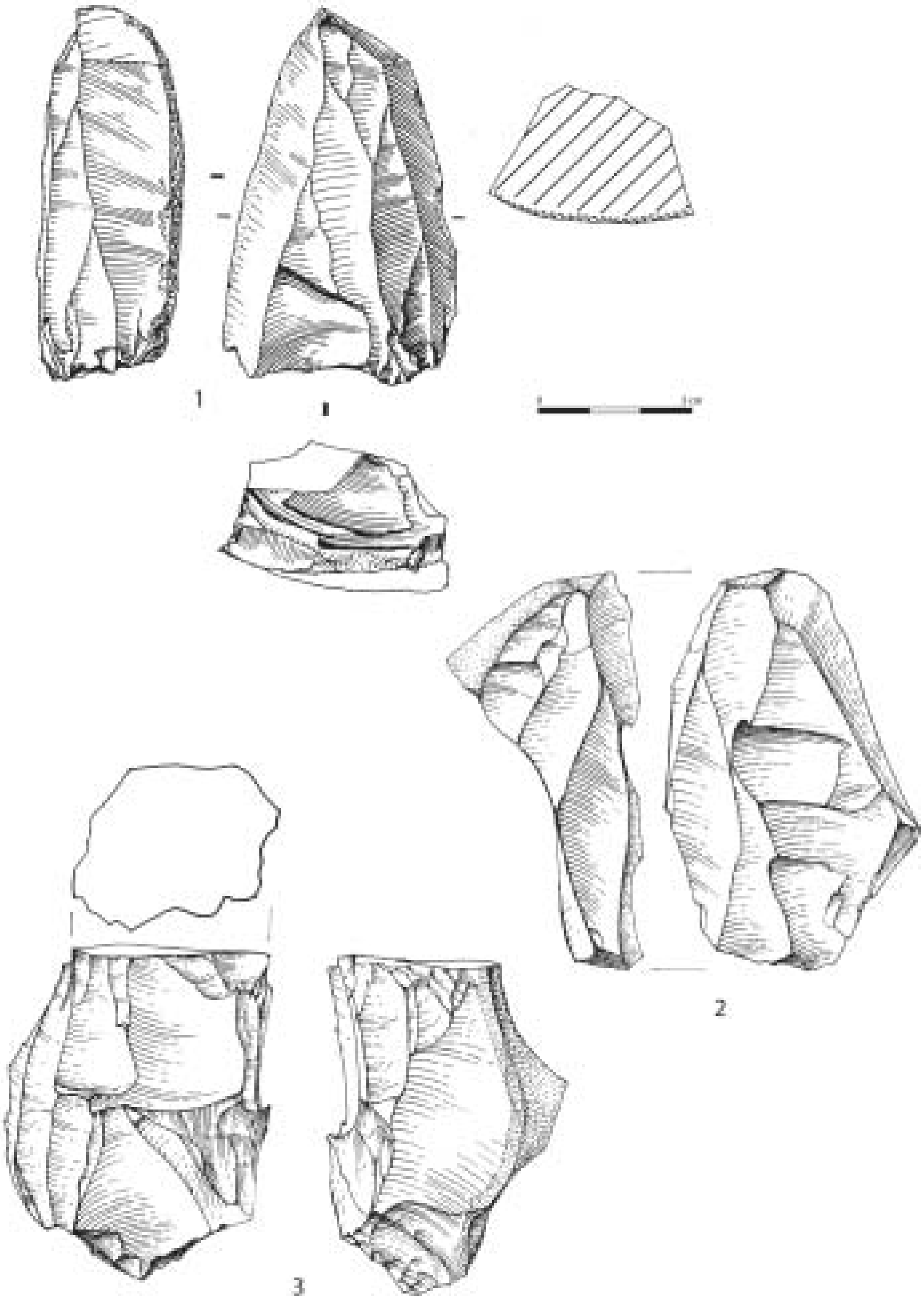

Figure 1: Hayonim cave: 1,3 unidirectional Laminar cores; 2 accidental overpassed blank from unidirectional core

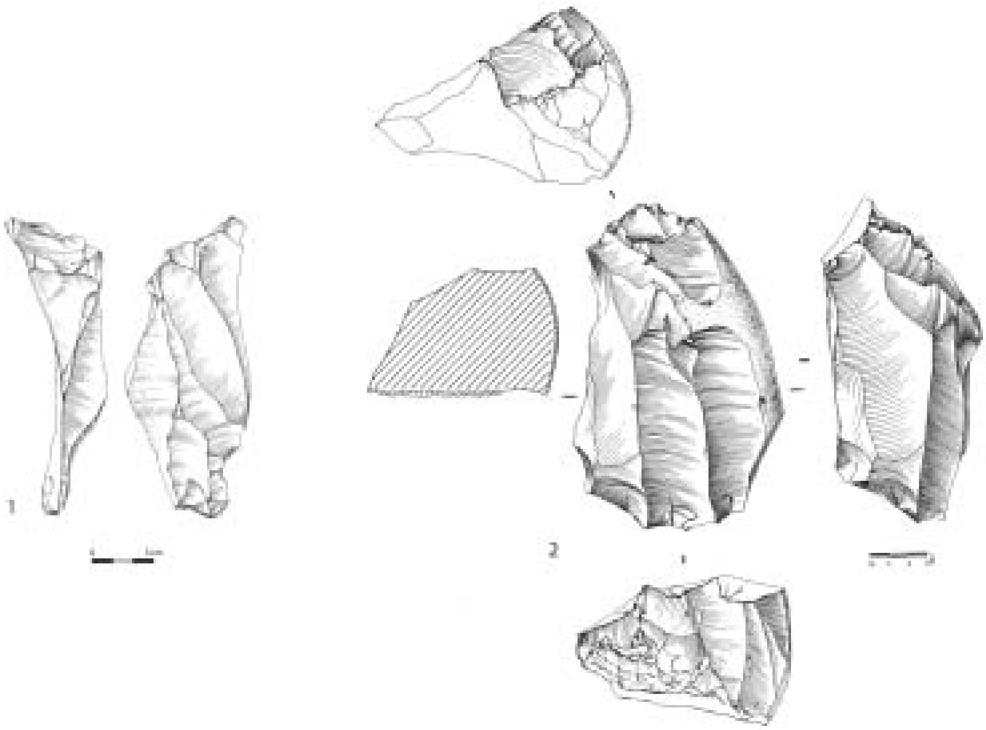

Figure 2: Hayonim cave: 1 intentional overpassed blank from bidirectional core; 2 bidirectional Laminar core with opposite “twisted” platforms

The characteristics of the striking platform, bulb of percussion and ventral surface of the products suggest direct percussion by hard hammer, and in some cases soft stone hammer.

Thus, two clearly distinct core reduction strategies (Levallois and Laminar) based on different volumetric concepts have been held simultaneously for blade production in these assemblages. Contrary to Levallois reduction strategies established on relatively flat flaking surfaces from which thin, wide elongated blanks have been struck, these Laminar reduction strategies result in narrow, thick elongated blanks, here frequently retouched in elongated points (fig. 3: 1, 2, 4, 6). Such characteristic retouched products have been also recognized in the assemblages of Abou Sif C-D in Israel, Hummal Ia in Syria, the 2 latter unfortunatly undated. Moreover, in Hayonim lower E and F, burins (dihedral, multiple and nucleiform burins) are also well represented (fig.3: 3, 5).

In fact, when more detailed studies are undertaken, the blady assemblages generally grouped under the name of Early Levantine Mousterian demonstrate quite diversified core reduction strategies and blank/tool productions. Of course, they all share a significant elongated component, more or less developed depending on the assemblage. But several

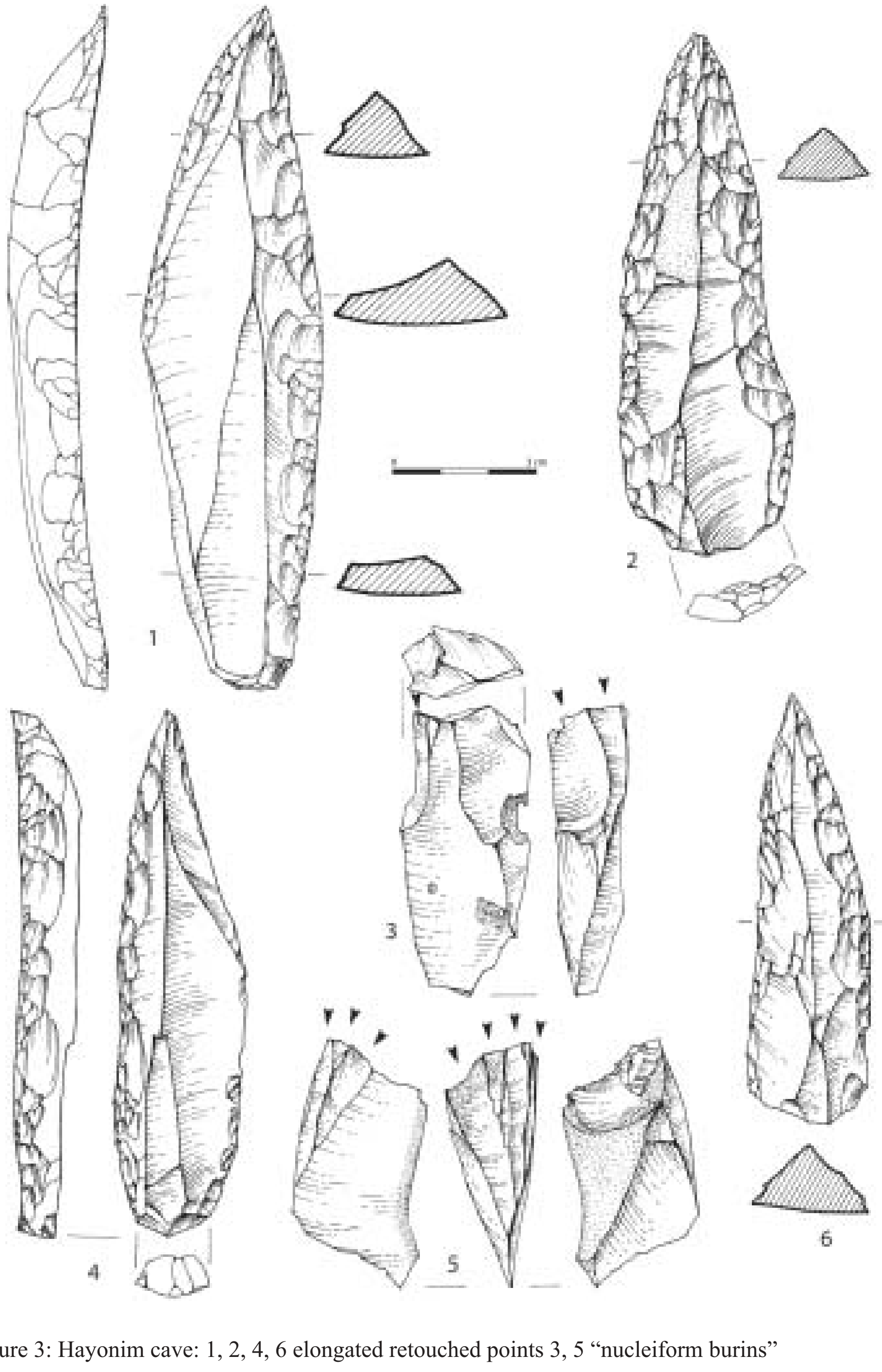

Figure 3: Hayonim cave: 1, 2, 4, 6 elongated retouched points 3, 5 “nucleiform burins”

researchers have already stressed the fact that the same blank morphology (blades, points) can be obtained in different lithic production systems (Boëda 1988, 1990, 1995; Marks and Volkman 1983; Meignen 2000). It means that to evaluate the technical knowledge of the prehistoric groups and characterize them, it is important to take into account not only the end-products, but also the reduction strategies (chaînes opératoires) adopted for producing them.

As previously mentionned for Hayonim, in most blade-geared assemblages, two reduction strategies for blade production appear to have been involved (following the Levallois and Laminar concepts), which result in elongated end-products with slightly different morphological attributes. In some assemblages, the main emphasis of blade production is on the Levallois core reduction at the expense of the Laminar concept (Tabun VI-IX, Monigal 2002; Rosh Ein Mor (following Monigal 2002, contrary to Marks and Monigal, 1995), Nahal Aqev, Douara IV (Meignen 2000; Nishiaki 1989); in other cases, the Laminar concept seems to be dominant (Hayonim lower E and F, Abou Sif). Only Hummal Ia assemblages seem to be related exclusively to a single core-reduction strategy (Laminar technology). Concerning the retouched tool-kits, if early Levantine Mousterian assemblages are usually described as having a relatively high proportion of elongated points and a wide range of Upper Paleolithic tools (burins, endscrapers, truncations...), along with the typical Mousterian scrapers, denticulates and notches, more careful examination of the presently known assemblages shows a more complex situation (Meignen 2007).

Some assemblages are clearly dominated by elongated retouched points and blades (and their variants) as described in Hummal Ia (Copeland 1985), Abou Sif (Neuville 1951) and Hayonim lower E and F; they are often established on the narrow thick elongated blanks struck according to the Laminar method. On the contrary, few assemblages happen to contain significant proportions of Upper Paleolithic tool types (burins, endscrapers, truncations, borers... IIIess between 20 to 30) and a lower ratio of elongated retouched points. These more balanced tool-kit have been recognized in sites such as Rosh Ein Mor (Crew 1976), Ksar Akil XXVIII (Marks and Volkman 1986), and to a lesser extent, Nahal Aqev (Munday 1977) and Tabun IX (Jelinek 1982) (see also Monigal 2002: fig 12-2), most of them in relation with the predominance of Levallois core reduction strategies.

K. Monigal (2002) suggested on these technological and typological criteria, to distinguish two clearly-cut groups: on the one hand, the assemblages of Abou Sif, Sahba, Hummal Ia, that she decided to group under the name of Hummalian (Monigal 2002: 529), on the other hand, Rosh Ein Mor, Nahal Aqev, Tabun VII-IX industries, the only ones that she would keep as Early Levantine Mousterian. Moreover, she claimed that they are chronologically and stratigraphically distinct with an "abrupt technological break" between them. The more balanced picture of the reduction systems and tool-kit components in all these blade-oriented assemblages that we exposed previously and also the more recently obtained results on chronology and lithic technology from Hayonim lower E and F make difficult to admit this too schematic point of view. As we previously expressed, the two different core-reduction strategies (Levallois and Laminar) most often coexisted in the expression of the technical knowledge of these Middle Paleolithic flint knappers, even in Rosh Ein Mor assemblages where the true blade technology (non Levallois) is present and was previously considered as dominant (Marks and Monigal ,1995: 275). Moreover, the Upper Paleolithic tool component appears to be developed as well in assemblages dominated by elongated retouched points, in the form of classical burins as we recognized them in Hayonim lower E and F (fig.3: 3, 5) (unpublished data). These brief comments already show that the suggested break between the two separated groups cannot be accepted even if different trends in both can be identified Moreover, available radiometric dates (Mercier and Valladas 2003; Mercier, et al. 2007; Mercier, et al. 1995; Rink, et al. 2004; Rink, et al. 2003; Valladas, et al. 1998) show that the 2 schematic groups identified by Monigal cannot be considered as chronologically successive as she claimed ("Lower Paleolithic" versus "Early Mousterian", an assertion made only on the basis of technology and typology; Monigal 2002: 529).

Indeed, based on the presently available radiometric dates, her Early Mousterian group (characterized by a dominant Levallois technology and a developed Upper Paleolithic tool-kit) that she considered as the most recent appears to be earlier (Tabun unit IX: 270 000y; Mercier and Valladas, 2003) or globally contemporaneous (Rosh Ein Mor: 200 000y; Rink et al. 2003) with the Laminar assemblages rich in elongated retouched points from Hayonim lower E and F developed from 160 to 230 000y (Mercier et al., 2007; Valladas and Mercier, 1998).

Thus these Early Middle Paleolithic complex comprises a quite diversified series of industries in which the blady component appears as the main common distinctive end-product even if not always developed at the same level. The technical repertoire of these Middle Paleolithic flint-knappers was even more diverse since most of these industries demonstrate aside the reduction methods for blade-production (Levallois and Laminar), specific short blank productions (flakes and often points) mainly obtained by all variants of the Levallois method. In fact only Hummal Ia is the exception. As a result of these diversified core-reduction strategies, the gamut of products is wide for the Early Middle Paleolithic and no chronological/evolutive trend is apparent (Meignen 2007, in press).

Intensive production of thick elongated points similar to those from the Near Eastern group including Hayonim, Abou Sif, Hummal, has been reported by Tushabramishvili (1963) and Liubin (1977, 1989) in a few sites of the Caucasus (Koudaro, Tsona, Djruchula) (fig. 4).

In the context of a research program supported by the American School of Prehistoric Research, Peabody Museum, and directed by O. Bar-Yosef, we have chosen to focus our studies on the site of Djruchula, the best documented, in order to understand whether or not these lithic assemblages are part of the same laminar phenomenon as the Levantine one, and eventually to test their chronological relations.

Figure 4: Map of the Caucasus area

DJRUCHULA INDUSTRIES FROM LAYERS 1, 2

These elongated blanks from Djruchula have always been considered as Levallois products (Beliaeva and Lioubine 1998; Golovanova and Doronichev 2003; Kozlowski 1998; Liubin 1977). Our re-examination of the Djruchula lithic collections stored in the Tbilisi Museum in 2002-2003 shows a more complex situation.

Djruchula cave

The cave of Djruchula is located in Imeretia (western Georgian Republic), on the southern slopes of the Great Caucasus, on the right bank and about 40 m above the Djruchula river. During his excavations in the 60's (1958-1967), David Tushabramishvili identified 16 lithological layers among which 2 archaeological layers (1 and 2) have been recognized, separated by 1m thick sterile sediments (Adler and Tushabramishvili 2004; Tushabramishvili 1984).

The very low densities of lithics as well as the assemblage composition suggest short-term occupations for both layers . In fact, the overrepresentation of the final stages of the chaîne opératoire is identified by high ratios of retouched tools, (especially in layer 1=51,3%; less obvious in layer 2=26,3%). This suggests the introduction into the cave of finished tools and blanks (Meignen and Tushabramishvili 2007), as personal gear (strategy of provisioning individuals (Kuhn 1992, 1995)). Our preliminary studies have shown that these imported pieces (mainly retouched points) are most often made on a red flint, of high quality, found at short distances of a few kms from the cave. The Cenomanian-Turonian flint outcrops are located on the plateau, above the river valley and the site (Adler and Tushabramishvili, 2004). These transported toolkits are completed by an expedient debitage made on the spot, on strictly local and lower quality raw materials such as flint and argilite found in the gravels of the river. In situ flaking (mostly on strictly local raw materials) is clearly less developed in layer 1 than in layer 2, thus probably indicating even shorter occupations in the former (cf Kuhn 1995). Primary flakes on non local raw material (red flint) are scarse. Thus, in the case of Djruchula, the flaking quality of the flint more than the distance from the raw material sources, never far away, seems to influence the techno-economical behavior.

All these preliminary data suggest that Djruchula cave was used as a short-termed occupation place (Meignen and Tushabramishvili 2007), possibly a task-specific location in the case of layer 1, as previously suggested by Adler and Tushabramishvili, 2004.

Retouched tool-kits

The composition of the retouched toolkit in both layers is noteworthy.

Mostly made on blady blanks (73,5% in layer 1; 68% in layer 2), the retouched tool components are characterized by high proportion of elongated retouched points of different size (layer 1: 44%; layer 2: 28,4%) and retouched blades (14,9% in layer 1; 25,4% in layer 2) (fig. 5; fig.6: 1, 2, 4, 5). Interestingly the elongated points, intensively retouched, are most often made on the non local red flint. The presence of small retouching flakes in the same red raw material suggests a curated behavior for these imported tools (provisioning of individuals and curation strategy; cf Kuhn 1995), criteria which confirm the likely specific task location character of the place. Retouched elongated points demonstrate high variability in their size, morphologies and retouch localization (fig. 5: 1 to 5; fig. 6: 1, 2): they range from elongated pieces with both edges regularly retouched resulting in symetrical points, to blades pointed by abrupt retouch limited at the tip on one edge and resulting in asymetrical "backed knives", with all the intermediate morphologies. This variability in "pointed tools" has been already stressed by Copeland (1985) as a distinctive characteristic of the tool-kit in Hummal Ia. Neuville (1951) also described in Abou Sif C elongated points which grade into asymetrical pointed pieces that he called "pointes incurvées" (Neuville 1951: 51-52). We have encountered the same range of morphologies in Hayonim lower E and F. Convergent scrapers and short mousterian points are also well represented in these assemblages, giving them a "mousterian" character. Upper Paleolithic tools are unfrequent (less than 2% of the retouched tools).

But it must be stressed that the Djruchula elongated retouched points display a typical feature only recorded in this local group: they frequently bear inverse invasive retouch most often at their distal, and sometimes at their proximal parts (fig. 6: 3; fig. 7), resulting in partial bifacial shaping of the blank. In few cases, these invasive retouch were clearly intended to remove the protuberance of the percussion ripples on the ventral face, due to the hard

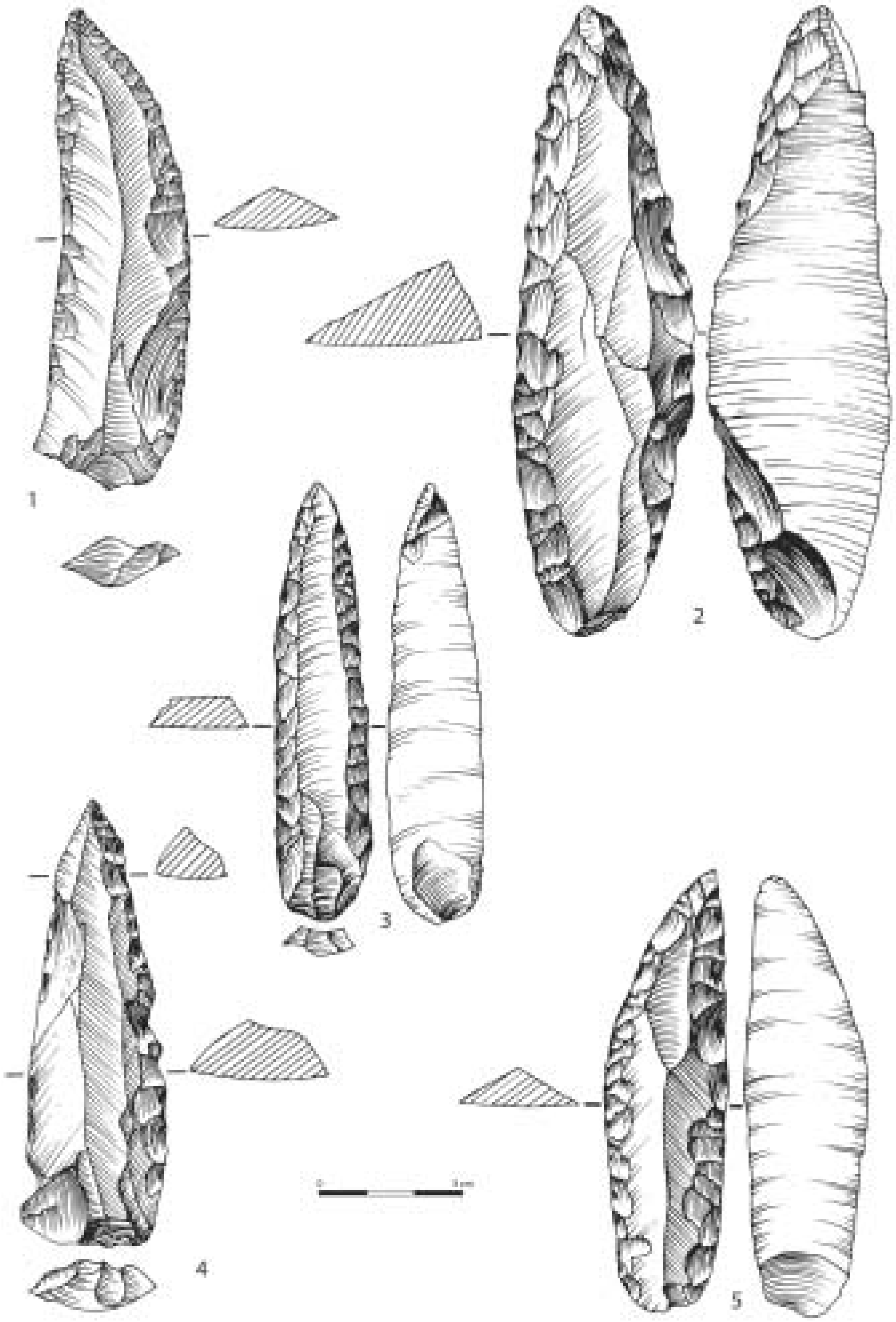

Figure 5: Djruchula Cave: 1, 2, 3, 4, 5 elongated retouched points

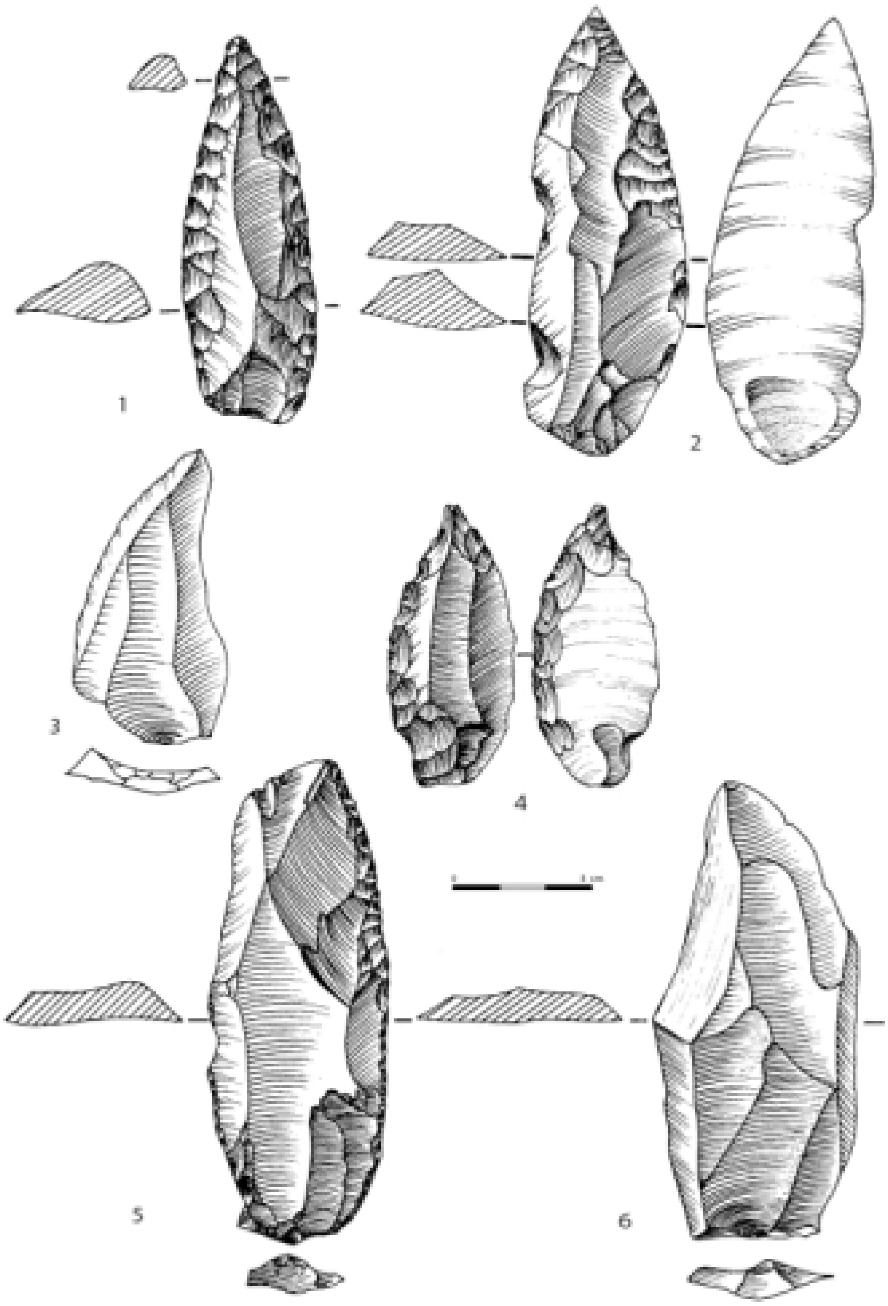

Figure 6: Djruchula Cave: 1, 2 elongated retouched points; 3 Levallois triangular flake; 4 bifacially shaped point; 5 retouched Levallois blade; 6 Levallois blade.

hammer technique. But most often this attribute should be considered as a stylistic element, as it is largely shared by all the blady assemblages of this area (the Djruchula-Kudaro group; Liubin1977, 1989) while practically absent in the Near Eastern assemblages.

Debitage system(s)

The reduction strategies were clearly geared towards elongated blanks (61% in layer 1, 41,2% in layer 2) but identifying the chaîne(s) opératoire(s) aimed at their production was not an easy task as part of the reduction sequence has not been executed on site. Yet the morphologies of the end-products, of some core-trimming-elements (CTE) (fig. 8) and a few cores helped to identify the debitage system(s) implemented (fig. 9-10).

Our technological analyses have shown, among the end-products of both assemblages, the combination of (1) wide thin elongated blanks with slightly oblique lateral sides in cross section (fig.6: 5, 6), therefore probably struck from cores with wide, slightly convex flaking surfaces, of the Levallois type, with (2) narrow thick blades with triangular or trapezoidal sections (fig.5: 2, 3, 4); these later morphologies imply relatively narrow cores with highly oblique lateral sides in cross section, thus totally different from the Levallois cores. These preliminary observations on the end-products suggested the coexistence of different core-reduction strategies for blade production, an hypothesis confirmed by the observed core and CTE morphologies. Few Levallois cores, exploited by unidirectional or bidirectional removals (in this case, often unidirectional convergent) (fig. 9: 2) have been identified by their characteristic morphologies with the 2 opposite secant surfaces, one for the preparation of the striking platform, the other for the removal of the Levallois products. At their last stage, they present a relatively flattish upper surface with elongated scars. But a series of unidirectional cores which demonstrate a highly convex tranverse section, with a flaking surface expanding to the lateral edges of the core (and in some cases, even around a large part of the periphery of the core) (fig.9: 1, 3) indicate the use of the Laminar system resulting in semi-pyramidal morphologies ("débitage semi-tournant"). Laminar bidirectional cores are much less frequent, recognized mostly on the base of significative CTE. Characteristic overpassed blades which take off the opposite off-axis platform (fig. 8), witness the same scheme as identified in Hayonim lower E and F. On these cores, 2 opposed platforms slightly twisted ("off axis") have been established from which 2 reduction surfaces are exploited by elongated removals (fig. 10). The resulting debitage surface is convex, and the morphology of the core is "semi-prismatic".

Aside this core reduction strategy for blades, short products (mainly quite elongated flakes), have been struck from Levallois cores (fig. 6: 3), a phenomenon previously described in most of the Near Eastern blady assemblages (Crew 1976; Marks and Monigal 1995; Meignen 1998, 2000; Monigal 2002). All these results recall the observations that we already published on the assemblages from Hayonim lower E and F, with the presence, aside the Levallois reduction strategy, of the "Laminar" debitage system.

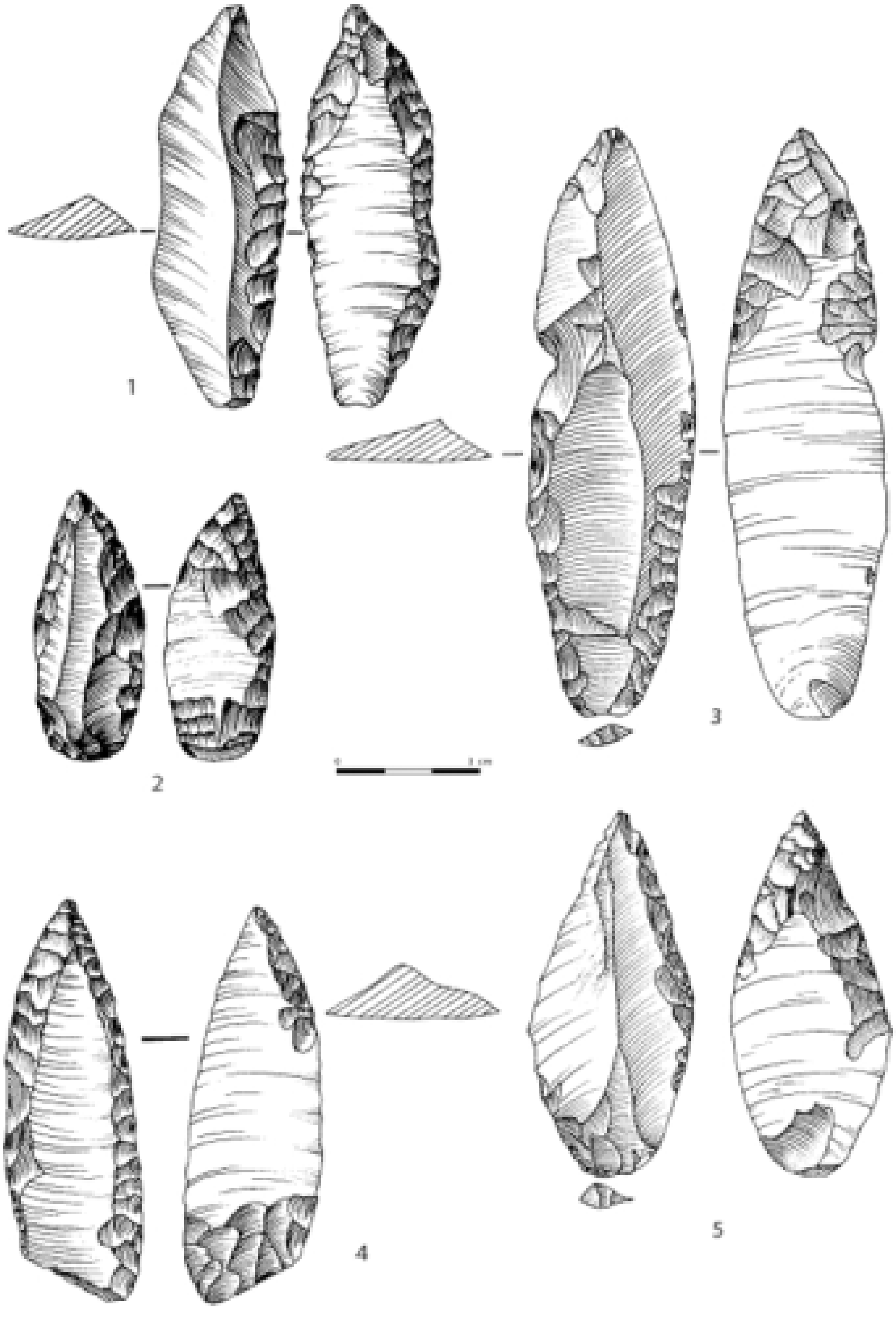

Figure 7: Djruchula Cave: 1, 2, 3, 4, 5 bifacially shaped points.

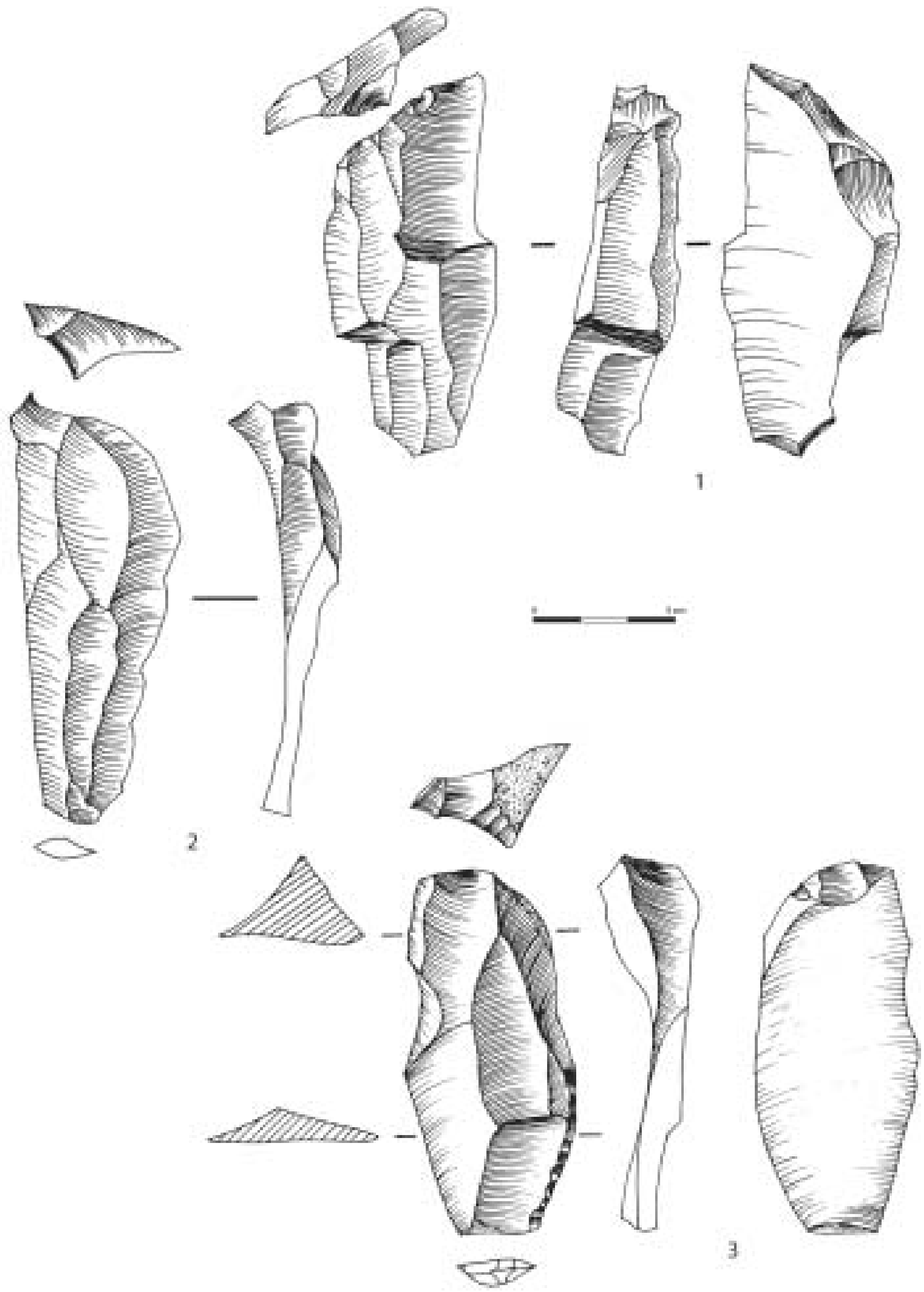

Figure 8: Djruchula Cave: 1, 2, 3 intentional overpassed blanks from bidirectional cores with opposite "twisted" platforms.

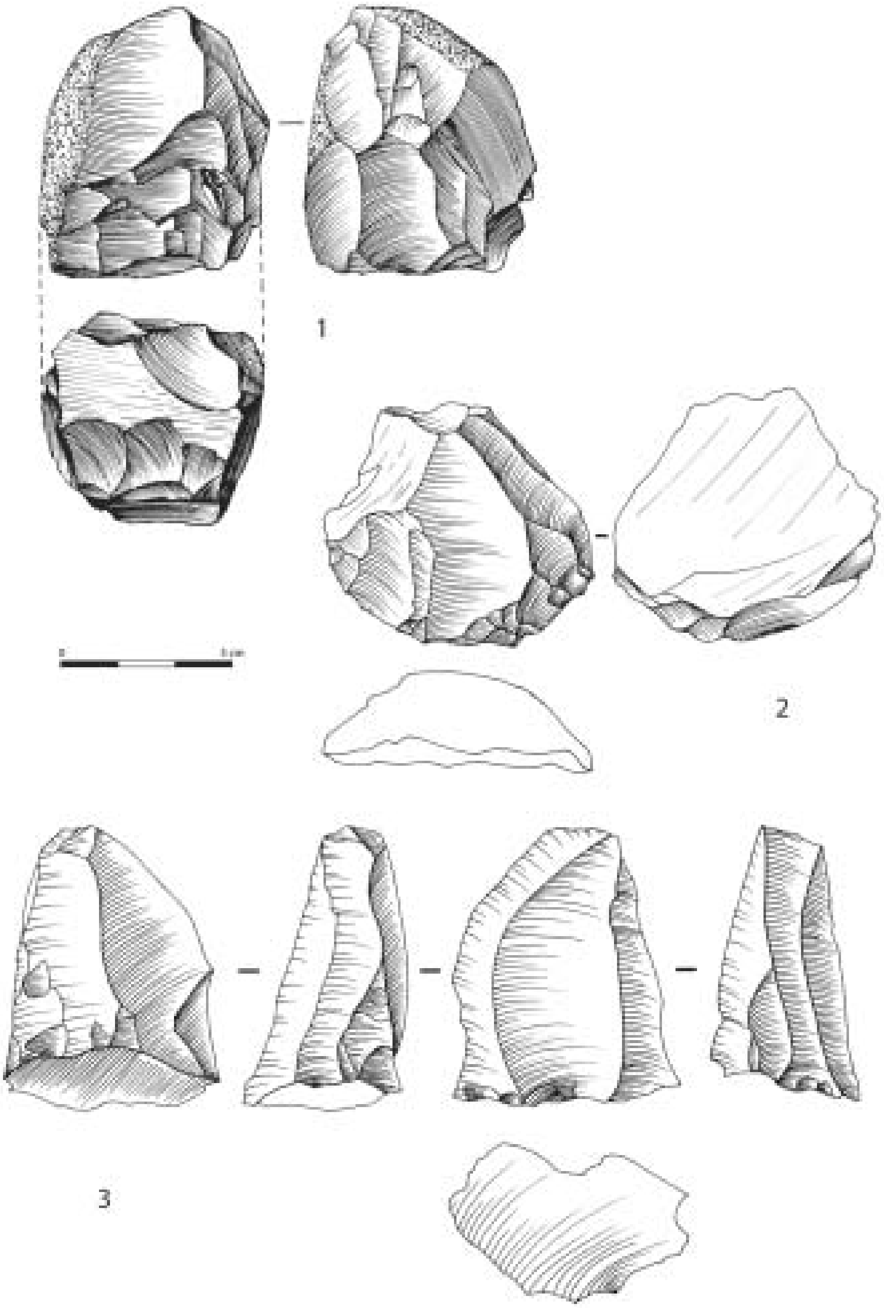

Figure 9: Djruchula Cave: 1, 3 unidirectional Laminar cores; 2 unidirectional Levallois core.

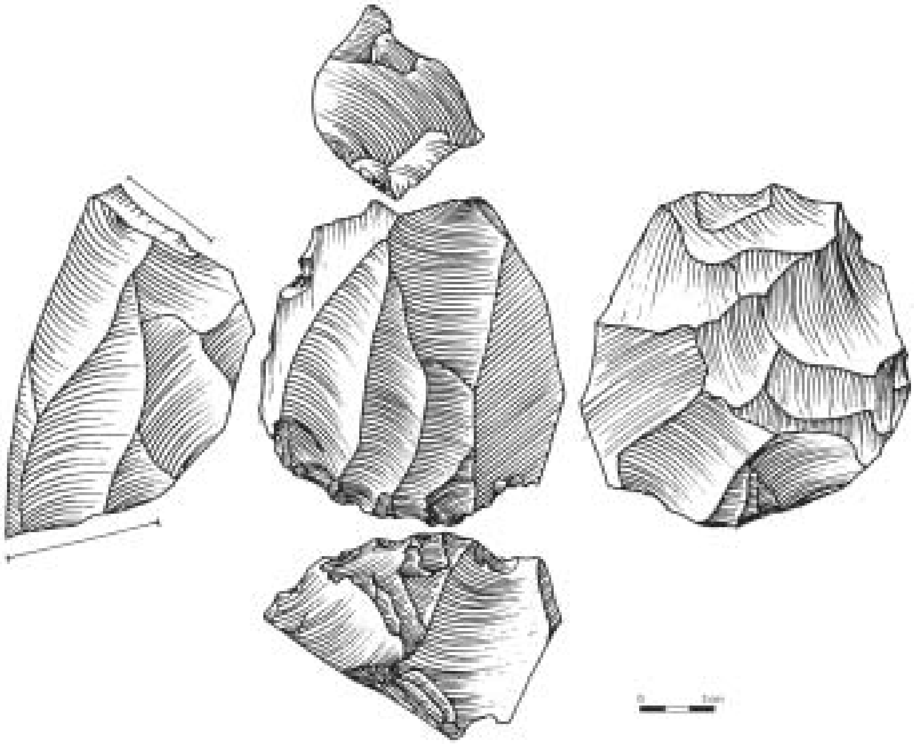

Figure 10: Djruchula Cave bidirectional Laminar core with opposite “twisted” platforms.

Thus the core-reduction strategies as well as the retouched toolkits dominated by Mousterian tool types (especially elongated retouched points and their variants) in Djruchula are closely analogous to what we have previously described for the group of Levantine blady assemblages formed by Hayonim lower E and F, Abou Sif and Hummal Ia. However the partial bifacial shaping of the distal/proximal parts of the retouched points, by invasive flat retouches is very rarely observed on the Near Eastern elongated points; it seems to be the hallmark of Djruchula and neighboring sites (the Djruchula-Koudaro group) assemblages.

Bifacially shaped tools are in fact characteristic of Micoquian industries in Central and Eastern Europe, that started during Isotopic stage 5 for the earliest occurences and largely spread over Isotopic stages 4 and 3. As an hypothesis, and of course providing a compatible dating, we suggested (Meignen, oral communication 2004) that this process of thinning/ shaping partially the points could be considered as the result of a Northern Caucasus influence inherited from the Eastern Micoquian groups that extended as far as this area. But TL dating results recently obtained (Mercier et al., in press) giving an early age for Djruchula assemblages (000 210/260y for layer 2 and circa 140 000y for layer 1) contradict now this hypothesis. Therefore it is difficult, in our present state of knowledge, to suggest any specific link between Northern and Southern Caucasus groups on the base of this yet specific process of bifacial thinning/shaping.

MIDDLE PALEOLITHIC BLADY CHARACTERISTICS

As Djruchula assemblages share common characteristics with most of the Middle Paleolithic Near Eastern blady assemblages, it is worth to sum up them now and establish in what aspects they are contrasted with the early Upper Paleolithic industries in this area. Globally, in these Middle Paleolithic assemblages, the blade production is never exclusive; these industries most often have additionnal reduction sytem(s) for producing short blanks (points and flakes). Moreover the blades themselves frequently result from diverse débitage concepts. Diversity is thus the main characteristic of these blade-producing techno-complexes. The Hummalian could be the exception to these general rules.

As in the Upper Paleolithic blady technologies, an organized systematic production of elongated blanks in series is observed, resulting in a relatively large blady component (20-50%). Moreover the volumetric concepts adopted are essentially alike those identified in the later Upper Paleolithic prismatic blade production. However cores in the Middle Paleolithic context were most often reduced along the widest face of the block in contrast with the Upper Paleolithic mode often along the narrow side.

If Middle Paleolithic blade-oriented reductions were geared to the production of numerous blades in series as in the Upper Paleolithic assemblages, the series were in general shorter; this is partially due to more knapping accidents when hard hammer technique is used (hinging or overpassing blades) (Pelegrin, personal communication). As a consequence, a lower productivity per core is observed in the Middle Paleolithic reduction.

At the same time, regularity and standardization of the blades appear not to be the rule in the Middle Paleolithic production. The intra-assemblage variability in the morphometry of the end-products is quite high, with in general more robust and less regular, less standardized blades than in the Upper Paleolithic.This is related to the technique used, direct percussion with a hard stone hammer and also to a less careful preforming of the core, dominant in these Middle Paleolithic blade-oriented assemblages .

In contrast, at the beginning of the Upper Paleolithic in the Near East (Early Ahmarian industries), a proper core shaping (to control the orientation of the striking platform, the longitudinal curvature (“carène”) and the transversal/frontal convexity (“cintrage”) of the cores) or in some cases, a strict selection of raw material nodules with adequate morphology (keeled and nosed configuration) (for instance Davidzon and Goring-Morris 2003 for part of the Nizzana XIII production; Monigal 2003; Phillips 1988), as well as a significant change in the technique and gesture of percussion (soft hammer, abrasion of the core platform, tangential gesture), allowed Upper Paleolithic flintknappers to obtain more standardized end products and more numerous blades per core. A deep technical investment in the first step of the chaîne opératoire (core preparation stage) and a reduction stream which self-maintained the necessary convexities of the flaking surface all along the reduction sequence were the crucial points for the continuous removal of blades of regular morphologies. This self-maintenance, all along the reduction stream, of the decisive core-attributes established during the first step of the chaîne opératoire by a careful core-shaping, is an unknown phenomenon in the Middle Paleolithic blade technologies.

CONCLUSIONS

Based on previous researches conducted within this area, Southern Caucasus appears to have been intensively occupied during Middle Paleolithic and Upper Paleolithic times, notably Emeritia where Djruchula cave is located, probably due to the combination of numerous rockshelters and caves, abundance of high quality raw materials and availibility of natural ressources (rich and diversified animal and vegetal communities) (Adler and Tushabramishvili 2004; Adler et al. 2006a).

As we described it here, Djruchula assemblages, by all their technological features would most probably represent, during early Middle Paleolithic times (before Isotopic stage 5), the presence, in Southern Caucasus, of blade-producing groups of the same technical tradition as the Hayonim/Hummal/Abou Sif people. Therefore, they were probably "members of a larger social and mating network demarcated by the Caucasus mountains to the North" (Adler and Tushabramishvili, 2004).

This situation is quite similar to the one encountered in the Late Middle Paleolithic during which the contacts between the Zagros-Taurus area and Southern Caucasus are established based on technological affinities between assemblages from both areas. Adler and Tushabramishvili (2004) suggested that "a pattern of repeated population contraction and expansion over the course of the Pleistocene may help explain the long-term technotypological similarites documented between Caucasus and more southern areas". These population moves may have been in relation with the successive climatic and environmental ressource changes, specially perceptible in such a contrasted area. Severe conditions of glacial periods may have provocated temporary abandonment of the zone, a phenomenon observed in Djruchula where 1m thick deposits between the occupations of layer 1 and 2 have been found archeologically sterile.

The Caucasus mountains are seen in all these scenarios as a natural barrier to mobility to the Northern areas (Northern slopes of the Caucasus and the Russian plains) probably most of the time during the Pleistocene. Yet mobility to north was sporadically possible along the Black Sea and Caspian sea coasts, during the regression periods of both water bodies (Kozlowski 1998) and for instance, probably during the Upper Paleolithic times (Adler et al. 2006b).

As we pointed out in this paper, the presence of specific bifacial shaping on the elongated retouched points from Djruchula let doubt hang over the possible contact with northern Micoquian tradition people... Presently available dating results argue against this hypothesis, but in my opinion we must keep it in mind for further researches in this area.

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