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Morpho-technological study of the Lower and Middle Palaeolithic lithic assemblages from Maltravieso and Santa Ana cave (Cáceres, Extremadura). Comparison of two lithic assemblages knapped in milky quartz: Maltravieso cave –Sala de los Huesos- and level C of L'Arago cave (Tautavel, France)

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Abstract

The aim of this work is the technological study of the lithic record recovered at Maltravieso and Santa Ana cave, and to establish a preliminary technical evolution at the *Cacereño Complex* (Cáceres, Extremadura), where both sites are located. The features of the Santa Ana lithic record seem to fit, in broad terms, within the following schema: Mode 1 technology in Unit 1 and Mode 2 technology in Unit 2. On its part, the *Sala de los Huesos* site of Maltravieso cave lithic assemblage possibly belongs to Mode 3 technology. This one is knapped exclusively in milky quartz and we compare it with the lithic assemblage from the level C of L'Arago cave (France).

Keywords: Lithic industry, Pleistocene, Quartz, Extremadura.

Introduction and methodology

Maltravieso and Santa Ana cave (Carbonell *et al.*, 2005) are located in the southwest of Spain, in a karstic complex known as *El Calerizo Cacereño* (Cáceres, Extremadura) and L'Arago cave is situated in the southeast of France (de Lumley and Barsky, 2004).

The sediment package of Santa Ana cave is until now about 8 m. thick and is divided into 7 geological units, numbered from bottom to top.

This stratigraphy is known through the excavation carried out outside the cave; we documented as well a cut and fill, located in the central area of the excavation surface, in which the sediments and materials have been removed by erosion. The radiometric date -130 ± 8 Ky. BP for the stalagmitic formation of Unit 6- suggests that the Santa Ana cave upper units were formed during the middle Pleistocene (see Carbonell *et al.*, 2005). The *Sala de los Huesos* sediment package is placed between two stalagmitic floors and its radiometric dates are between 117 +17 / -14 Ky. BP and 183 +14 / -12 Ky. BP. The lithic record recovered is associated with faunal remains. It has been compared with the one from level C of L'Arago cave, since a big part of the french lithic assemblage is also knapped in milky quartz, and the radiometric dates show a similar chronology (300-100 Ky. BP.).

The technological analysis of the lithic assemblages studied has been carried out through the Logical Analytical System (Tab. 1) (Carbonell, *et al.*, 1992; Mosquera, 1995; Peña, 2006).

Results

Santa Ana cave

The assemblage is integrated by 89 artefacts without stratigraphic context, which came from the Cut and Fill sediments and 29 artefacts which

were collected *in situ*. A few implements from the Cut and Fill sediments shown similar technological features to those from Unit 1 and 2 thus were assigned to one of this group just by techno-morphological analogy (Peña, 2006).

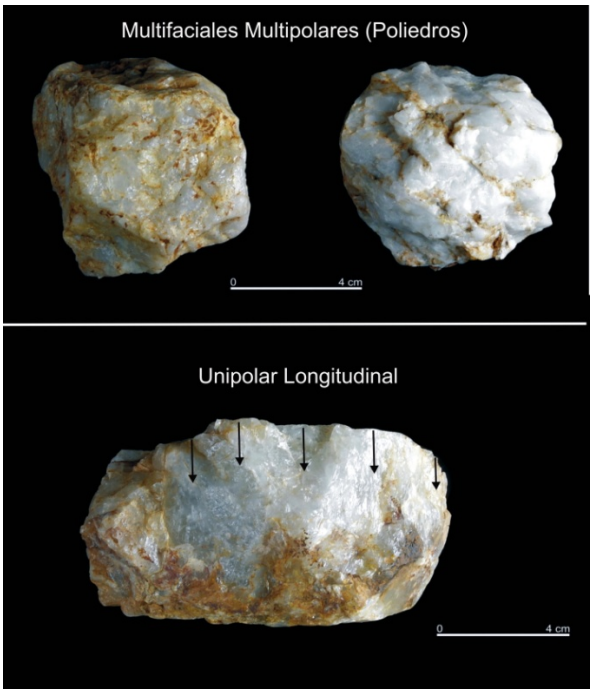

Fig. 1. Orthogonals cores - Multifacial Multipolar and Unipolar Longitudinal- from Unit 1, Santa Ana cave. Photographs: Gerard Campeny.

The *Unit 1* assemblage is almost knapped exclusively in milky quartz, but there are few items knapped on translucid quartz. Both raw materials are immediately available.

The collection is composed by 19 items, 14 has been recovered from Unit 1 and 5 from the Cut and Fill sediments. There are 15 cores, 3 flakes and 1 hammerstone. The cores (Fig. 1) have been grouped into four sets on the basis of their common features:

- 2 milky quartz blocks shown 1 removal.
- The Unipolar group has cortical and non-cortical striking platforms. Its main features are the orthogonal disposition of the platforms and scarce exploitation of the knapping surfaces.
- The Unipolar alternant group are bifacial knapping in the horizontal plane from the sagital or the transversal plane, thus they have sinuous edges. They're scarcely knapping.
- The Multifacial Multipolar (polyhedrons) group has 3 or more striking/knapping platforms, most of them non-cortical. The polarity of the scars is multipolar, generally orthogonal and the flake angle is close to 90º. This group is the one where the knapping process is more advanced.

The *Unit 2* assemblage is knapped mainly in quartzite (14 items), but also other materials as milky quartz (1 handaxe) and breccia (1 cleaver) are present. All these lithic raw materials are locally available. The collection is completely composed by heavy duty tools (16 items), between which the operative standards handaxe and cleaver are well represented. A total of 8 objects were found in Unit 2 (4 1GNBC, 3 2GNBC and 1 hammerstone). Added, 9 items (4 1GNBC and 5 2GNBC) were recovered from the Cut and Fill sediments. Their techno-typological features allow us to assign them to the first one by analogy.

The blanks of 8 of these tools are large flakes (2GNBC: 4 handaxes and 4 cleavers), and 7 artefacts were directly shaped on slabs (1GNBC: 4 handaxes, 2 picks, and 1 chopping-tool) (Fig. 2). The remaining tool is a cleaver, which blank is a natural fragment of breccia.

Regarding the shapes of the morphotypes, the handaxes are mainly elongated and some of them show prominent distal trihedrals, while the cleavers are exclusively transverse edged.

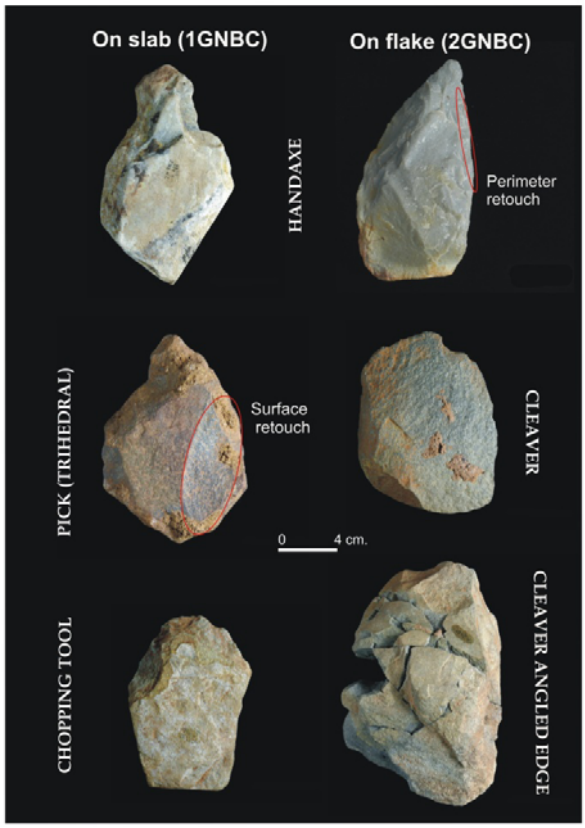

Fig. 2. Heavy-duty-tools morphotypes from Unit 2 of Santa Ana cave. Concept of surface and perimeter retouch are represented. Photographs: Gerard Campeny.

Maltravieso cave: Sala de los Huesos.

A total of 65 objects were found in *Sala de los Huesos*. Quartz is the only raw material exploited at this site and the mostly part is milky vein quartz variety (84,6% of the total), although is present translucid and hyaline quartz (3,1% each). Natural Bases of quartzite are present (9,2% of the total). The structural categories are represented in the as follow: simple flake products (PB, PBF, and FPB) are more than the half of the assemblage. They are followed by the cores (10 1GNBE), the chunks (7), the tools (2 1GNBC and 4 2GNBC) and finally the Nb (natural bases or hammerstone) are quite well represented (n=6); most of them are quartzite cobbles (5) and just one is a quartz cobble. We can observe the presence of areas with extremely concentrated pitting in 3 of them. The object classified as *bola* is unusual in European middle Pleistocene sites. All the structural categories produced during the successive stages of the *chaîne opératoire* are represented. The assemblage includes all types of artefact sizes, it's quite heterogeneous, although the small (26-45 mm) and medium specimens are the most abundant (46-75 mm).

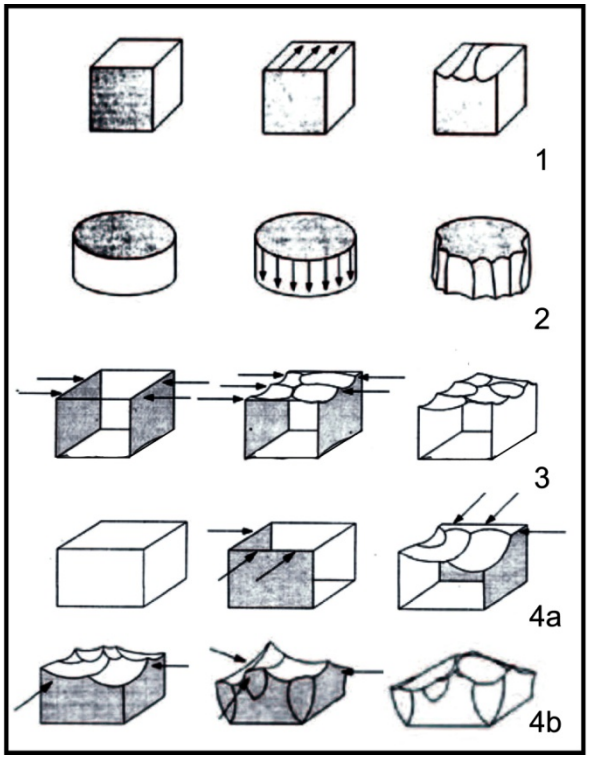

Fig. 3. Models of exploitation: (1) Unipolar longitudinal method (orthogonal technique) (2) Tournante (orthogonal technique) (3) Bipolar method (bidirectional) (4) Centripetal. (Modified from: Carbonell *et al*., 1995, 1999.

The cores: The blanks are milky quartz fragments, except one which is a translucid quartz cobble, knapped by the centripetal method. The cores are basically knapped by the Unipolar Longitudinal method (unidirectional and single striking platform). The *Tournante* and the Bipolar method (bidirectional) just have an object each and we understand them like a variant of the Unipolar Longitudinal method (Figure 3). Bipolar on anvil method is used like a complementary variant of freehand percussion. We observed a rarely recurrent knapping of the cores.

The tools: the tool assemblage is made up for a double scraper and a chopper, both knapping on milky quartz fragments and for 4 flake-tools (2 denticulate, 1 notch and 1 double tool: a notch plus a lateral scraper). Generally they have a scarce configuration of the perimeter, but some of them are more carefully knapped than others. For example, one of the notch and the scraper are configurated through two generations of retouch.

Level C, L'Arago cave

A total of 1062 objects, without chunks, were found in level C. Quartz is the dominant raw material exploited, milky quartz is the best represented (51% of the total) and is followed by translucid quartz (20% of the total). But the lithic assemblage is characterised by a wide diversity of rocks like flint (13%), quartzite, quartzite sandstone, sandstone, hyaline quartz and hornfels, which are scarcely represented (less than 5%). In the *chaîne opératoire* of milky quartz the flaking products (PB, PBF, FPB) are the best represented (80,4%). They are followed by the retouched objects (2GNBC and 1GNBC): 10,3% and the cores (1GNBE and 2GNBE): 8,6%. Hammerstones fragments (FBnb) are 0,4% of the total. The Level C assemblage includes all types of artefact formats, although is quite homogeneous cause micro (11-25 mm) and small specimens (26-45 mm) are the most abundant. We think that hominids preferentially produced these tools of relatively small size.

The cores: milky vein quartz which comes from the alluvial deposits of the local river, is basically knapped by two flaking method: the Unipolar (Tournante and Longitudinal) and the Centripetal method. Bipolar on anvil method is used like a complementary variant of freehand percussion. Most of the cores are exhausted (Peña, 2006).

Interpretation and discussion

Santa Ana cave

Unit 1 is older than Unit 2 and probably, as the current research suggest, it maybe belongs to lower Pleistocene. Furthermore, in Unit 1 basically are present quartz cores and flakes, but retouched flakes and heavy duty tools which are characteristic of Mode 2 are absent, a type of tools that constitute nearly the whole Unit 2 lithic assemblage, knapped mainly in quartzite, where cores and flakes are absent. In Unit 1 is mostly present Orthogonal method (Unipolar and Multipolar) and a big part of the cores are in scarcely knapping. All of them are knapping in quartz which is a raw material immediate available. There's a probably relation between knapping methods and blanks. The knapping platforms which are orthogonal respect to the flaking platforms could be associated to parallelepiped and/or cubic thick fragments.

Meanwhile, the angular fragments are suitable to be knapped through the Unipolar alternant method. The main objective would be the production of flakes with worthy edged.

Thus, the *chaîne opératoire* would be basic and short. These features mean expedient strategies and a total absent of planning.

In Unit 2, depending on the blank type, different configuration processes can be observed. Many of the slabs seem to have been selected according a kind of preform, which makes easier the ulterior configuration. In fact, the quartzite slabs chosen to shape a part of these large cutting tools are thinner, more elongated, and morphologically more regular than the big flakes selected to produce the other part of the assemblage. Accordingly, the slabs show mainly shaping by means of extent flaking (surface configuration), while the flakes show an intensive retouch of edges (perimeter configuration) (Fig. 2).

Diachronic differential use of raw material has been documented in Santa Ana cave: in Unit 1 quartz was used for production processes meanwhile in Unit 2 quartzite was used for configuration processes. Thus it could mean that:

- The selection of raw material in Unit 2 is more careful than in Unit 1

- Unit 2 record shows an improvement of the control of the territory. We have localized the main primary position quartzite source in La Mosca range (about 5.5 Km far from the site.), where the hominids could acquire large flakes and select slabs to be used as blanks

- Possible transport of heavy-duty tools of Unit 2. Given the total absence of knapping waste, all these processes of production seem to have been occurred outside the cave, which can be pointing to short and probably specialised visits of the enclave by the hominid groups.

The characteristics of the assemblages, their differences and their stratigraphic position allow us to assign them to a technical Mode: Unit 1 assemblage could be Mode 1 and Unit 2 lithic record belongs to Mode 2 assemblages (Peña, 2006.).

Comparison between Sala de los Huesos site and level C of L'Arago cave

Most of the blanks of the cores recovered at Sala de los Huesos, because of their origin, are parallelepiped. Thus the easier way to knapped them is by Unipolar method with natural or prepared platforms. Meanwhile most of the blanks of the cores recovered at level C, which come from the alluvial deposits of the local river (the Verdouble), are often square-shaped, with rounded edges even if the shape of these cobbles vary a lot. This fact allowed hominids to select them, which is shown in the variety of the knapping methods: the most common are Unipolar and Centripetal methods. The fluvial-cortex developed is good enough to be used like natural platforms. Bipolar on anvil method is used, in both assemblages, like a complementary variant of freehand percussion.

There's a differential use of raw material in Sala de los Huesos: quartz have used mainly for production processes to get flakes, meanwhile quartzite cobbles were saving like natural bases of hammer. This fact points to a minimum degree of planning, just reduced to the transport of the quartzite cobbles. Raw materials are managed in a more complex way in level C than in Sala de los Huesos site, as the wade range of resources used shows. Maybe the reason is that most the different raw material comes from the Verdouble, in the immediate vicinity of the cave or it could be the possible different site function.

In level C there are more retouched flakes than in Sala de los Huesos site. Furthermore, most of the cores are completely exhausted or in the last stages of reduction and some of them were knapped on flakes. This could reflect a intention to make raw material savings, given that transport them to L'Arago cave required more energy than to Sala de los Huesos site, where we observed that nearly all the cores were discarded before entering a reduction stage other

Logical Analytical System	Anglophone terms
Natural base	Cobbles, pebbles or blocks selected in order to flake them or use them as hammers.
First Generation Negative Base (1GNB) They can be tools or First Generation Negative Base Configuration (1GNBC) and cores or First Generation Negative Base Exploitation (1GNBE)	Cobbles, pebbles, slabs or blocks once flaked. They show the scars of the flakes detached from their surfaces.
Positive Base (PB)	Flakes detached from the 1GNB
Positive Base fragmented (PBF)	.Broken flakes that preserve the platform and the bulb
Fragment of Positive Base (FPB)	Flakes that don't preserve the platform and the bulb, just the mesial or the distal piece of the flake.
Second Generation Negative Base (2GNB). They can be tools on flakes or Second Generation Negative Base Configuration (12GNBC) and cores on flakes or Second Generation Negative Base Exploitation (1GNBE)	Retouched or exploitated flakes (cores on flakes) whose blanks were PB. That is flakes (PB)—detached from the 1GNB—that have been retouched or use like cores. The common retouched flakes, such as denticulates, notches, side-scrapers, etc.

Tab. 1. Compared terminology between the Logical Analytical System and the most common terms in Anglophone archaeological literature (modified from Carbonell *et al*., 1999).

than the initial or the middle one and there's any cores on flakes. Other explanation could be the fluctuant intersite variables such as site function, number of inhabitants or the recurrence of the site occupations, that in level C could correspond to successive occupations or maybe the activities performed by the inhabitants of the cave could be more diversified whereas in Sala de los Huesos site they appear to be reduced or very specialised.

The relationship between these different accumulation types, on the one hand, and lithic procurement and reduction strategies, on the other, could be assessed in the light of further research.

In the light of the data the basic technical substratum of these assemblages is quite similar, thus the differences between them are possibly produced by economic reasons and probably the different functionality of the sites. Under the expedient character of the knapping methods from *Sala de los Huesos* there's a perfect adaptation to the technical features of milky quartz, which is available very close, and to the blanks morphology. The morphotechnological features that *Sala de los Huesos* lithic assemblage shows doesn't fit perfectly with any Mode technology but the dates (180-117 Ka), the absence of Mode 2 morphotypes and the comparison with Level C justify its position into the variability of Mode 3 technology (Peña, 2006).

Conclusion

This is the first study about Lower and Middle Palaeolithic lithic record within stratigraphical context in Extremadura. The technological features of these lithic assemblages have shown data which can justify this preliminary schema: Mode 1 technology in Unit 1 and Mode 2 technology in Unit 2 of Santa Ana cave and on its part, the *Sala de los Huesos* site of Maltravieso cave lithic assemblage possibly belongs to Mode 3 technology. These lithic records allow us to establish a preliminary diachronical technical evolution at the *Cacereño Complex*, where Mode 1, Mode 2 and Mode 3 are present.

There is a differential use of raw material in the *Cacereño Complex*: quartz have used mainly for production processes meanwhile quartzite cobbles were saving like natural bases of hammer and quartzite flakes and slabs used to be involved in configuration processes. Maybe the reason is the different raw material procurement; this region is plenty of quartz, so is readily available and quartzite is more difficult to find.

The comparison between the lithic assemblages from Sala de los Huesos site and level C plus the features of the Santa Ana cave Unit 1 lithic record have allowed us to characterize milky quartz exploitation. We can make an outline of the variability range in the quartzknapping methods and its possible constraint factors that in our point of view could be two. First, the mechanics properties probably mean a constraint in order with the knapping methods application. This milky quartz is a difficult material to knapp, as it tends to shatter along cleavage planes, yielding abundant debris, or angular chunks, with none of the typical flake characteristics of a conchoidal fracture. Second, it is noteworthy that in the three archaeological sites studied there's an adaptation of the knapping methods and configuration processes to the natural shapes of the blanks. As we have observed there's a dichotomy:

Parallelepiped fragments whose origin is milky vein quartz: Orthogonal technique (Unipolar and Multipolar methods) / Angular fragments (milky vein quartz) and rounded edged fragments which comes from the alluvial deposits of the local river: Unipolar alternant and Centripetal methods.

Quartzknapping doesn't involve the lack of other kind of better quality raw materials, like flint, if we take L'Arago cave's case as an example. It could be related with their more or less presence in the area and with if the sources of the different raw material are local or immediate. Also, we must to take into account another matter like the waste of energy and profitability, which are unavoidably in relation with the different kinds of occupation. We infer that, since milky quartz is used in several contexts, like *Sala de los Huesos* , level C and Unit 1 of Santa cave. These factors allow us to understand that *Sala de los Huesos* lithic assemblage is within the wide variability of Mode 3 technology (Peña, 2006). The use of very different raw materials and their morphological and physical constraints provides, to some extent, the most plausible explanation to this variability, but factors such as site use must also be taken into account.

References

Carbonell, E., Canals, A., Sauceda, I., Barrero, N., Carbajo, A., Díaz, O., Díaz, I., Fernández, R., García, F.J., Peña, L., García, M., García, M., Gil, J., S., G., León, L.M., Mancha, S., Mancha, E., Mejías, D., Merino, R.M., Morano, M., Morcillo, A., Muñoz, L., Rodríguez, A., Julià, R., Giralt, S. & Falguères, C. (2005) La grotte de Santa Ana (Cáceres, Espagne) et l'évolution technologique au Pléistocène dans la Péninsule ibérique. L'anthropologie 109, pp. 267-285

Carbonell, E., Mosquera, M., Ollé, A., Rodríguez, X.P., Sala, R., Vaquero, M. & Vergés, J.M. (1992) New Elements of the Logical Analytic System. Cahier Noir 6, pp. 5-61

de Lumley, H. & Barsky, D. (2004) Évolution des caracteres technologiques et typologiques des industries litiques dans la stratigraphie de la Caune de l'Arago. L'anthropologie108, pp. 185-237

Mosquera, M. (1995) Procesos Técnicos y Variabilidad en la Industria Lítica del Pleistoceno Medio de la Meseta: Sierra de Atapuerca, Torralba, Ambrona y Áridos. Tesis doctoral., Departamento de Prehistoria. Universidad Complutense de Madrid.

Peña, L. (2006) Caracterización y estudio morfotécnico de las industrias líticas del Pleistoceno Inferior y Medio de los yacimientos en cueva de Santa Ana y Maltravieso en el Calerizo Cacereño (Cáceres, Extremadura). Comparación de dos conjuntos líticos en cuarzo lechoso: la Sala de los Huesos de la cueva de Maltravieso y el nivel C de la cueva de L'Aragó (Tautavel, Francia). Tesis de Licenciatura. Inédita., pp. 300, Departament d'Història i Geografia. Tarragona: Universitat Rovira i Virgili de Tarragona.

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