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On the use of space at La Peña de Estebanvela (Ayllón, Segovia, Spain): An approach to economic and social behaviour in the Upper Magdalenian

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ABSTRACT

The use of space inside La Peña de Estebanvela Rock-shelter and the activities carried out away from the site are analysed in this article in order to reconstruct the economic and social behaviour of the human group that occupied the site in the Upper Magdalenian (15,010–14,610 cal BP and 14,290–13,730 cal BP). Level III, which is geologically homogeneous and has yielded a large lithic and faunal record was selected for this purpose. The micro-spatial analysis of the level has differentiated two significant units in the central sector of the deposit which may correspond to an area used for intensive flint knapping (Unit 2), and a multi-functional area where hunting weapons were prepared, prey was butchered and defleshed, and hides were processed (Unit 3). The study of the use of the territory around the site reveals a strategy of diversified hunting, especially between late spring and early autumn, oriented towards ibex, horse, red deer and, to a lesser extent, chamois, roe deer and lynxes. This activity was complemented by the use of other resources, like fishing and gathering plants. Stocks of flint and personal ornaments made from marine molluscs confirm the territorial mobility of the residents of La Peña de Estebanvela.

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1. Introduction

Inhabited areas and their probable use are analysed here in order to reconstruct the economic and social behaviour of the human group that occupied La Peña de Estebanvela during the Upper Magdalenian. Stratigraphic Unit III has been selected for this study as it fulfils a series of requirements allowing micro-spatial analysis. This level has yielded a wide archaeological record, most of which has been accurately positioned using total station. In addition, the large excavated surface area (19 m^2) and the volume of sediment removed (6 m^3) are sufficiently representative for this kind of study.

La Peña de Estebanvela is a rock-shelter located at an altitude of 1065 m in the Sierra de Ayllón at the northern end of the Spanish Central Range. It lies on a slope on the right bank of the River Aguisejo, a tributary of the River Riaza which flows into the River Douro (Fig. 1).

The rock-shelter was discovered in the early 1990s. Since the beginning of field work in 1999 until 2009, two multidisciplinary research projects have been carried out, funded by the Junta de Castilla y León, with the collaboration of the Consejo Superior de Investigaciones Científicas from 2004 onwards, allowing ten field seasons. The variety and wealth of the archaeological record, combined with a well-defined chrono-stratigraphic sequence and a large series of radiocarbon determinations have made it a key site for the study of the Magdalenian on the Spanish Northern Meseta (Cacho et al., 2007, 2008; Cacho, 2013).

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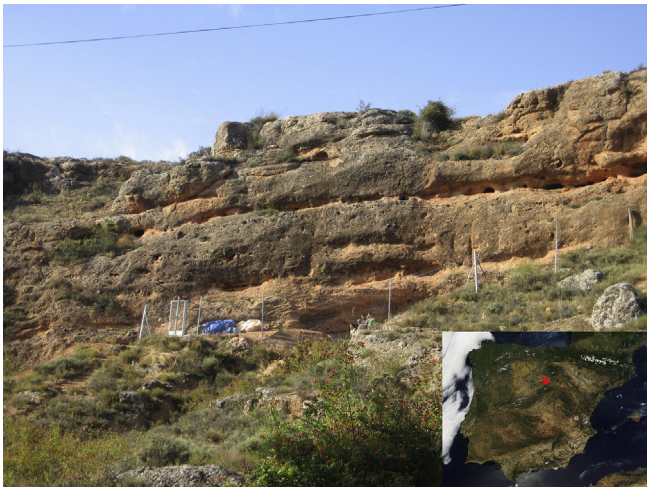

Fig. 1. View of the rock-shelter and its location.

We know also of other well-documented occupations in this region during the same period. For example, level 2 in Cueva del Gato at Epila (Zaragoza) has been dated in 21,440–21,040 cal BP and assigned to the Archaic Magdalenian. The Early and Middle Magdalenian at the Alejandre and Vergara at Deza (Soria) have been radiocarbon dated to 18,930–17,850 cal BP, 17,390–16,950 cal BP and 17,840–17,130 cal BP, respectively. The cave known as Cueva de Bolichera at Calcena (Zaragoza) has been assigned to the Upper Magdalenian.

Finally, the site La Peña del Diablo 1 at Cetina (Zaragoza), which has been radiocarbon dated to around just 12,980–12,500 cal BP (Utrilla et al., 2012), as well as La Dehesa del Tejado (Salamanca) (Fabián, 1997) provide some Late Magdalenian assemblages. Another site with similar characteristics is Cueva Palomera at Ojo Guareña Cave System (Burgos). Several radiocarbon datings, obtained through the analysis of paint pigments, situate these finds in the Final Magdalenian – Azilian. However, there is an older dating (19,210–18,250 cal BP) of vegetable carbon associated to human footprints at Galería de las Huellas, which would indicate that the cave had been used since the Early Magdalenian (Corchón et al., 1997).

The archaeological sequence of La Peña de Estebanvela ranges from the Middle Magdalenian (Levels VI and V) to the Upper Magdalenian (Levels IV and III) and Late Magdalenian (Levels II and I). Calibrated radiocarbon dating using the March 2007 version of the CalPal programme, dates these stratigraphic units between 17,770 and 17,190 cal BP and 13,720–12,610 cal BP (Jordá- Pardo and Cacho, 2013).

Level III, which is the object of this paper, is assigned to the Upper Magdalenian and dated to between 15,010–14,610 cal BP (Beta-232939) and 14,290–13,730 cal BP (Beta-232940). Its sedimentation took place during the temperate GI 1e period (Jordá-Pardo et al., 2013).

This level has provided a large assemblage of lithic artefacts (14,644), including 345 retouched pieces, and faunal (17,316 macrofaunal remains). In addition, it has supplied numerous personal ornaments, mostly made from shells, several bone artefacts and a few portable art objects.

2. The rock-shelter and its micro-spatial analysis

The micro-spatial study of Level III at La Peña de Estebanvela has been designed from two analytical perspectives: vertical and horizontal. The vertical analysis explored the integrity of the sedimentary unit, particularly as regards traits revealing possible post-depositional processes that might have occurred during sedimentation or later. For this, the orientations of the objects have been studied to confirm or rule out post-depositional movements. Similarly, the relationship between the volume or weight of the materials and the depth in which they were found has been analysed in order to identify possible flooding or ponding. This stratigraphic unit does not exhibit any internal organisation, but rather great homogeneity, which is an indicator of sedimentation in a short period of time, forming a single archaeological level (Jordá-Pardo et al., 2013). No clear orientation of the objects has been observed nor any correlation between weight and depth of the objects. This conclusion agrees with the results obtained by geo-archaeological (Jordá- Pardo et al., 2013) and taphonomic studies (Yravedra, 2007) at the site, confirming the integrity of the deposit forming this Level III.

An examination of the vertical distribution in this archaeological level was performed to differentiate three successive units with a greater density of remains, separated by sedimentary layers with lesser densities of archaeological remains. This division appears to correspond to different moments in the occupation of the site, and these will therefore be studied separately. The middle (U2) and lower units (U3) of this Level III in this area of the central sector of the site (squares D8, E8 and E9) are particularly significant (Fig. 2). Once the existence of three different units and the sedimentological integrity of the level had been established, the horizontal distribution of the objects was determined.

2.1. Analysis of unit 2

The analysis of the first of these dispersions in the middle unit showed the distribution of remains to have a particular shape. First, a semi-circular area in square E8 contains a large accumulation of remains. Second, an area much less dense in remains borders the former, helping to give it its shape.

The area of dense accumulation of materials is some 95 cm in diameter at its outer margin, and some 30 cm in diameter at its inner margin. Its borders become diffuse where the accumulation loses intensity and as one moves away from the centre of D8 and E9. The comparison of density of archaeological remains in this accumulation with the one registered in Level III as a whole in the above mentioned squares shows a different distribution pattern.

To determine the reason for this specific accumulation, especially in E8, we examined the distribution of the different types of lithic material recovered, following the logical stages of a lithic operative chain. The final aim was to spatially reconstruct the technical steps followed in the production of stone tools through the remains produced in that process and deposited on the occupation floor.

The first stages of the *chaîne opératoire* (acquisition and roughing-out of the cores) are barely represented in this area. Only 1.94% of the whole lithic assemblage in all the raw materials and 1.98% of the flint pieces correspond to this stage. This trend is similar in the case of rock crystal as remains corresponding to this phase only amount to 0.73% of the total number of pieces, and remains in quartzite and quartz are equally scarce. This suggests that this phase of roughing-out or "testing" the cores was performed away from the site, possibly at the sources of the raw materials, and they were brought to this site as preforms (Martos et al., 2013).

Flint, the most common raw material at La Peña de Estebanvela, represents 89.86% of the total assemblage in this stratigraphic unit and comes from nearby outcrops. The other raw materials (rock crystal, quartzite and quartz), although more abundant than in the upper levels, amount to very low percentages within the

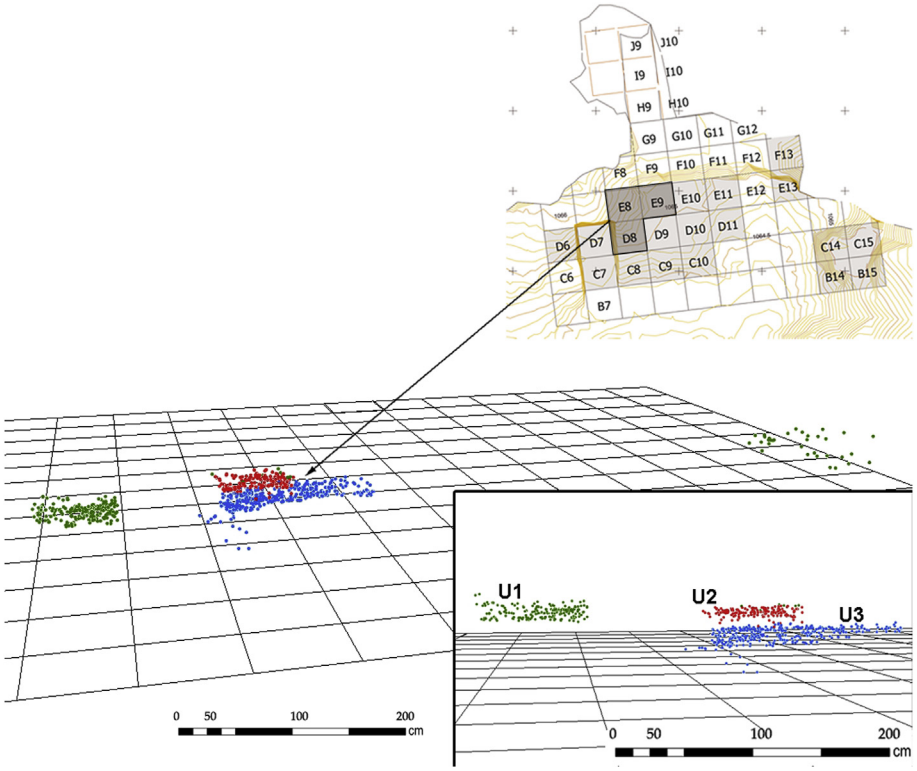

Fig. 2. Site plan. Vertical distribution of the archaeological remains in the three units identified in Level III.

assemblage (10.15%). These materials may have been procured in the conglomerate of the rock-shelter ceiling and along the bed of the River Aguisejo flowing below the site. Their use especially that of quartzite and quartz, appears to have been very occasional and opportunistic.

The objects belonging to the first phase of the *chaîne opératoire* were grouped most in the south-west sector of E8, spilling over into the northern part of D8. The second stage in the *chaîne opératoire* is represented by unretouched blanks (flakes, blades and bladelets), which represents 17.96% of the total lithic assemblage, plus 12 cores and the resharpening flakes from them, as well as knapping waste.

Most of the blanks are made in flint (94.60%) and are primarily bladelets and, to a lesser extent, flakes and blades. The proportion of these blanks made of rock crystal is very low, and there are hardly any made of quartz or quartzite. The accumulation of the objects and the spatial distribution of the blanks confer the semi-circular shape described on the area.

The cores were found mostly in the southern part of E8 and the northern side of D8. Here were found five cores, in quartzite (2), quartz (2) and flint (1), which is an extremely low use index, possibly due to the quality of the raw material. In contrast, the cores found further away from this concentration had been worked more; also bearing in mind their small size, this suggests they had been discarded.

It is surprising that the rock crystal cores should have been exploited in the same way as flint cores (knapping of bladelets from prismatic cores, although without passing into the stage of retouching to make usable tools). Indeed, this use of rock crystal, which is proportionally significant in this area, is very hard to explain. Perhaps it was used for training purposes by an inexpert craftsman, maybe a child.

It is significant that first and second order blanks share the same space as the cores found in the first exploitation phases. This means that they can be related with the initial steps in the reduction of cores and the "trials".

The resharpening flakes are found across the semi-circular area described above, in the same space as the third order blanks and even of the extensively exploited cores. From a functional perspective, the significance of this arrangement suggests that they are elements discarded during the knapping process and not used as blanks to be retouched.

The debris, the pieces that break off during the reduction process or when the tools are being shaped, appears in very high densities. Its spatial distribution is similar to that of the blanks, and firmly establishes the semi-circular shape of the accumulation. This becomes less intense in E9 and D8, further away from the main centre of the shape. The loss of density appears proportional to the size of the blanks; waste of small size and volume (debris) shows a greater dispersion outside of D8.

The third and final *chaîne opératoire* phase recognised in the accumulation area is represented by retouched elements. Only 32 tools, all of them made from flint (2.95% of the total assemblage) have been found in this stratigraphic unit. They were found dispersed at random across the whole area, as the faunal remains.

The most common types of tools are backed bladelets and other retouched objects made from small bladelets, like the rest of the record in Level III. A concentration in a small part of E8 may be associated with a single tool consisting of bladelets inserted in a projectile made from a perishable substance such as wood or bone.

2.1.1. Interpretation of unit 2

This semi-circular structure would appear to correspond to a place where the intense knapping of flint, and other raw materials in much smaller proportions, took place during a single occupation

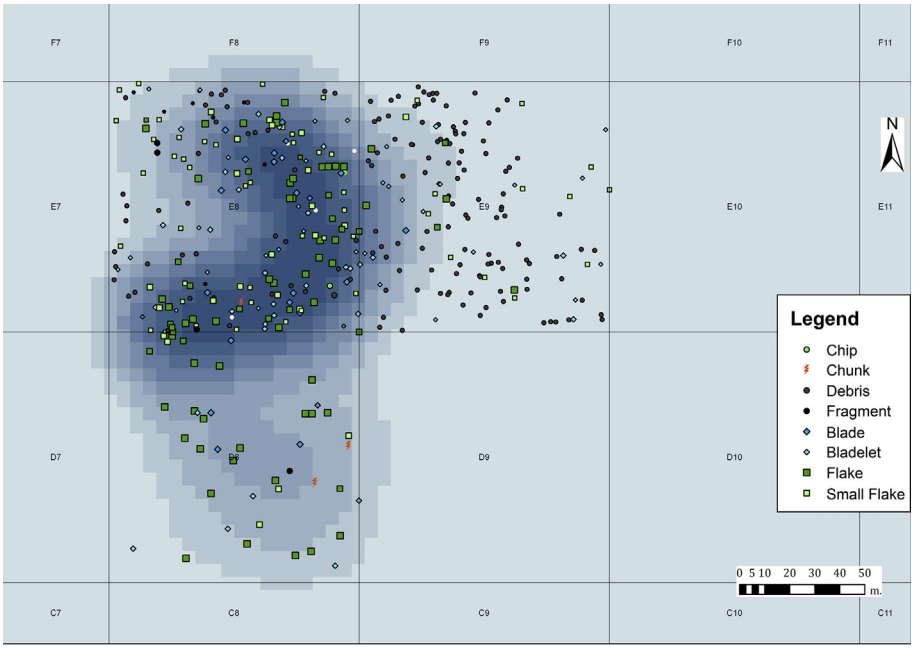

Fig. 3. Spatial distribution and density of knapping waste in Unit 2.

(Martos et al., 2013). In this way, the accumulation would include all the waste and blanks made in the technological process (Fig. 3). In contrast, the empty space in the western part of the excavated area might be associated with the knapper's position. This structure in Level III may be compared with dispersion patterns of knappers' materials observed in ethnoarchaeological research and experimental studies (Callahan, 1976; Baena, 1998), in which the spatial correspondence between an activity and the dispersion of remains derived from it have been documented.

The concentration of cores in the south-west sector (E8) suggest this was an area where raw materials were stored for knapping, or even cores that were discarded because they were exhausted. This deposit of raw material, together with the first blanks removed from the cores (of first and second order), may represent an intermediate phase between the initial roughing-out of nodules and the systematic and intensive knapping of the cores.

Debitage products (flakes and blades) and the waste are distributed in a semi-circle around an empty area. These were rejected for the further manufacture of retouched tools.

This structure seems to be an epicentre for the dispersion of a large percentage of debris and small flakes, which may be associated with the dispersion of waste during the lithic knapping process.

2.2. Analysis of unit 3

Just as in the middle unit in Level III, an accumulation of remains in E8 and E9, extending towards D8, has been detected in the lower layer of Unit 3. Like in the previous structure in the middle Unit 2, a spatial study was carried out combining all the data in the lithic record (techno-typological and traceological) in order to reconstruct the technical actions and the *chaînes opératoires* performed there.

A total of 2055 lithic elements were recovered, among which there was hardly any evidence of the initial stages of the *chaînes opératoires* (acquisition of raw material/debitage and the transformation of nodules and cores) (just 2.92% of the elements). This, plus the small number of cortical remains found, confirms the idea that the debitage of the nodules was performed outside the site (Martos et al., 2013).

The second *chaîne opératoire* phase is represented by a total of 329 lithic remains (16.02% of the total assemblage). These are concentrated above all in E8. Very few cores involved in this stage of the *chaîne opératoire* show anything but random positioning; the same is true for the resharpening flakes (0.88%) sharing the same space.

As for the remains from the last phase of the *chaîne opératoire*, the retouched tools, are distributed very irregularly with five small accumulations and an empty area, in the eastern parts of E8–D8 and the western part of E9.

Out of a total of 51 retouched tools found in this unit, backed bladelets predominate (34%), with a significant accumulation of them in the south-west corner of E8. These display a high proportion of fractures by bending, which suggests that, as in the accumulation in the middle Unit 2, they may have been hafted in a projectile made from perishable materials (bone or wood) that has not been preserved. The other main group of retouched tools consists of endscrapers, whose spatial distribution is not significant, although their functional analysis provided particularly interesting information.

Much more significant is the distribution of the faunal remains. The zooarchaeological studies carried out at La Peña de Estebanvela have identified 3700 remains from this area. They were found grouped above all in the northern part of E8 and E9. The most abundant species among the identified remains is ibex, followed by horse and red deer, and to a lesser degree, chamois, roe deer and lynx (Yravedra and Andrés, 2013).

Among them, a predominance of lower limbs (phalanges, sesamoids and distal epiphyses of metapodials) contrasts with the general trend in this level. E8, E9 and D8 contained 65% of all the ibex phalanges found across the whole of Level III, along with 73% of all the red deer phalanges and 41.7% of all the horse phalanges. This is quite significant, considering that in the other squares in this level, these anatomical parts are not common (Table 1).

Table 1
Spatial distribution of the phalanges of the most common taxa in Level III (red deer, horse and ibex).

Square	Total	%
B14	1	1.1
B15–C15	1	1.1
C14	1	1.1
C7	2	2.3
C8	1	1.1
D10	1	1.1
D6	4	4.5
D7	5	5.7
D8	6	6.8
D9	1	1.1
E11	2	2.3
E13–F13	3	3.4
E8	39	44.3
E9	21	23.9
Total	**88**	

The over-representation of these anatomical parts in this area is not a random occurrence nor due to differential preservation, as other parts that are easily preserved, such as teeth, are found with percentages of under 10% both in this unit and in the rest of the level. As a result, this concentration of phalanges, sesamoids and metapodial distal epiphyses is thought to be intentional and correspond to human activities in this area, as all these skeletal parts may be associated with the skins of hunted animals.

2.2.1. Interpretation of unit 3

In the lower part of Level III at first sight no specific areas have been identified, but on examining the situation in closer detail different concentrations of remains are associated with the particular activities carried out there. However, the most significant accumulation in this area is that of faunal remains, with an abundance of the lower limbs, such as phalanges, sesamoids and distal epiphyses of the metapodials. These bones usually stay attached to the skin when the animals are being skinned and later when the skins are treated. The results of the traceological study of the endscrapers found in the same sector also point towards this functional interpretation. The study has observed their use for scraping skins (both fresh and dry hides) (Figs. 4 and 5) (Martín- Lerma, 2013).

To conclude, the spatial analysis of the occupation floors in Level III at the rock-shelter has been able to identify two activity areas. The first, in the middle unit, was used for the intensive production of lithic tools, above all in flint. A second structure in the basal unit can be classed as a multifunctional area, where, together with the repair and hafting of hunting weapons, animal skins were scraped and treated.

3. The area outside the rock-shelter and territorial mobility

The present study has opened a window on the interior of the site and succeeded in identifying some of the activities carried out during the occupations in Level III. However, this micro-spatial view should be completed with an analysis of the outer area, where other tasks were performed, in order to approach the way of life, use of territory and social behaviour of the Magdalenian group occupying the site. This examination of the outer area begin the direct surroundings and gradually enlarged the radius of the territory in which this human group moved towards the furthest places of which we have evidence of their presence or contacts in the archaeological record.

La Peña de Estebanvela is located at a height over the modern course of the river, which in this section flows through a canyon or ravine. To the west it connects with the plains of Aranda de Duero and, to the east with the Almazán basin, which through the Jalón valley in turn links with the Ebro basin. This means the site is in a privileged strategic position on a communications route.

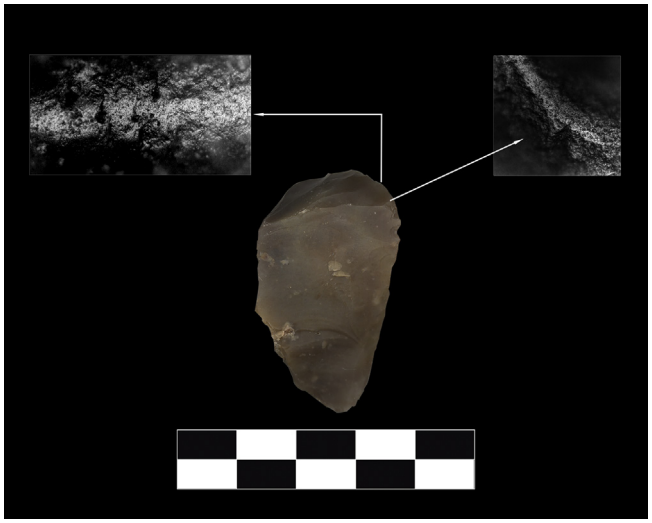

Fig. 4. Endscraper from Unit 3 with use-wear traces (polish and blunting) produced by processing hide (200×).

This position makes it an unsurpassable hunting site, as it has access to a wide range of environments favourable to the different taxa found in the deposit. The crags around the rock-shelter and its altitude, at a little over 1,000 m above sea level, make this an ideal place for ibex. In the same way, the proximity of the Sierra de Ayllón, and other mountains in the area, explain the presence of chamois. The plains near the site, in the direction of the modern town of Ayllón, would have been appropriate for the open spaces suited to equids, represented in this level by *Equus ferus* and *Equus hydruntinus*. This faunal spectrum would be completed thanks to the nearby River Aguisejo, which provided sufficient moisture for tree cover and woodland environments, ideal for *Cervus elaphus*, *Capreolus capreolus*, *Lynx pardinus* and *Oryctolagus cuniculus* (Yravedra and Andrés, 2013).

The best represented species during the occupation in Level III, apart from the lagomorphs, is ibex, followed by horse and red deer, with smaller numbers of chamois, roe deer, lynx and *Equus hydruntinus*, indicating a diversified hunting strategy. Juvenile and

Fig. 5. Thick endscraper from Unit 3 with use-wear traces (polish and blunting) produced by processing hide (200×).

young adult individuals, between 4 and 6 years of age, predominate (Arceredillo, 2013). This hunting pattern has several advantages, as young individuals provide meat of better quality and are easier to catch when they become independent and separate from the protection of the group (Table 2).

Table 2
Taxonomical profiles according to the MNI in Level III. Ages: A: Adult. Y: Young. I: Infant.

Level III			
	A/Y/I	MNI	%
Equus caballus	2/1/1	4	14.3
Equus hydruntinus	1/0/0	1	3.6
Cervus elaphus	2/1/0	3	10.7
Capreolus capreolus	1/0/0	1	3.6
Capra pyrenaica	6/1/1	8	28.6
Rupicapra pyrenaica	1/0/0	1	3.6
Lynx pardinus	1/0/0	1	3.6
Oryctolagus cuniculus	7/1/1	9	32.1
Total		**28**	

Studies approaching the seasonality patterns for the occupations in this level indicate that the rock-shelter may have been used between late spring and early autumn (Yravedra, 2007). This time coincides with the breeding and nursing seasons of some of the ungulates, which would be hunted at the time of their greatest vulnerability, which would make their capture easier (Arceredillo, 2013).

The skeletal profiles identified in Level III comprise bones from all the anatomical regions, which suggests the prey were brought to the site whole. In the case of horses and also probably of red deer, the animals must have been butchered at the kill site before being transported. Owing to their size, both animals must have been disarticulated to divide the skeletons in lighter sections so that they could be carried, just as some modern hunter–gatherer societies do (Binford, 1978; Bunn et al., 1988, 1991; O'Connell et al., 1988, 1990, 1992).

A noticeable bias is seen in the anatomical representation patterns in Level III (Table 3). The limbs bones, such as the phalanges, are the most abundant and make up about 30% of the identified elements of each taxon. However, taphonomic reasons explain this over-representation.

The great fragmentation of the large mammal osseous assemblage meant that out of a total of 17,316 fragments, only 3.8% were identifiable. As a result of the fragmentation, only 5.6% of the remains are longer than 3.1 cm, and all the others are shorter than 3 cm (Yravedra and Andrés, 2013).

The most affected parts by this problem are the humerus, femur, radius and tibia. These bones were systematically broken to extract the marrow, and consequently no whole limb bones have been found. This reveals a quite intense use of resources, which at times even included the intentional breakage of phalanges (Fig. 6) to use the marrow in those bones, as documented at other Upper Palaeolithic sites in Iberia (Mateos, 2000). Ribs, vertebrae, scapulae and pelvis bones are also highly fragmented as a consequence of sedimentary pressure and other diagenetic processes. As a result, numerous portions of flat bones could not be identified exactly and they were included within the indeterminate remains.

The cut-marks observed on different horse, red deer and ibex bones, as well as on the rabbits, show that all these animals were used for their meat. In this way, numerous defleshing marks have been seen on ribs, scapulae, humeri, femora, tibiae and radii. Together with these, disarticulation marks have been observed on some epiphyses, articular bones and at the ends of some ribs (Yravedra and Andrés, 2013). It is striking that 50% of horse bones longer than 2 cm display cut-marks, and similarly 13.3% of the red deer bones and 22.6% of ibex remains (Fig. 7).

In addition to the marks associated with those processes, skinning marks have been observed on horse cranial and phalange fragments. In contrast, no red deer phalanges display cut-marks and only 3.9% of the ibex phalanges. These results are highly significant as they suggest a differential use of the animals. It should be considered that, in the case of red deer and ibex, the phalanges were attached to the skins, and for this reason they do not display marks. This confirms some of the micro-spatial evidence described above for the distribution in the basal unit in Level III. Marks have been seen on the long bones of the lagomorphs, such as the humeri, indicating that they were used by the human group.

The scarcity of burnt bone remains (with hardly any thermal alterations) suggests that the meat was probably cooked off the bone. The fat on the axial bones and the epiphyses appears, therefore, not to have been used. There appears to have been no system for the elimination of waste.

Table 3
Skeletal part profiles according to the MNE of the most common taxa in Level III.

MNE								
Level III	Oryctolagus	%	Capra	%	Cervus	%	Equus	%
Horn		0.0	1	1.1	1	3.0		0.0
Skull	2	2.0	2	2.1	2	6.1	1	2.3
Jaw	2	2.0	2	2.1		0.0	1	2.3
Mandible	9	9.1	2	2.1		0.0	2	4.5
Vertebra	6	6.1	8	8.4		0.0	3	6.8
Rib	2	2.0	5	5.3	2	6.1	6	13.6
Scapula	4	4.0	1	1.1		0.0		0.0
Humerus	7	7.1	4	4.2	1	3.0	1	2.3
Radius	7	7.1	4	4.2	1	3.0	2	4.5
Ulna	6	6.1	3	3.2	1	3.0	1	2.3
Carpal	5	5.1	12	12.6	1	3.0	6	13.6
Metacarpal		0.0	2	2.1	1	3.0	1	2.3
Pelvis	2	2.0	1	1.1	1	3.0		0.0
Femur	5	5.1	3	3.2	2	6.1		0.0
Patella		0.0	3	3.2		0.0		0.0
Tibia	7	7.1	6	6.3		0.0	2	4.5
Metatarsal		0.0	2	2.1	1	3.0		0.0
Metapodial	15	15.2		0.0	1	3.0	2	4.5
Tarsal		0.0	2	2.1	2	6.1	2	4.5
Phalange	20	20.2	29	30.5	11	33.3	12	27.3
Sesamoid		0.0	3	3.2	5	15.2	2	4.5
Total	**99**	**100.0**	**95**	**100.0**	**33**	**100.0**	**44**	**100.0**

Fig. 6. Broken red deer phalanges from Level III.

Fig. 8. Flint outcrop in the Sacramenia-Fuentidueña basin.

All these factors demonstrate that this site was a suitable place for a diversified hunting strategy, especially favourable in a certain period of the year, and this must have been one of the reasons why the human group selected La Peña de Estebanvela for their settlement. The proximity of the river, at the foot of the rock-shelter, meant that fishing could also be practised, as shown by the *Salmo trutta* vertebrae in the deposit. The trout were of a medium and small size (smaller than 500 mm), as would be expected at the head of a river with cold, oxygenated water (Perea and Doadrio, 2013).

Another river resource exploited was the firewood from the riverside forest, which was gathered and taken to the rock-shelter for fuel. According to the anthracological study, this was mostly willow, with some evidence of hazel and alder (Ruiz-Alonso et al., 2013). It is surprising that willow was chosen as fuel, as it burns quickly and has little calorific value, but this might be justified by its abundance a short distance from the site and the ease of gathering it.

Another reason for this over-representation of willow wood might be some craft activity associated with the use of this wood (basketry?). Willow provides straight, soft and pliable branches that can stand friction and blows. The stems and branches are highly valued for basketry as it is a light but robust wood (Aseguinolaza et al., 1989; Verde López et al., 1998; López González, 2002; Oria de Rueda and Díez, 2003). This or other activities performed at the site or in the immediate surroundings might generate *Salix* waste as a sub-product used as fuel.

The occupation of the site in late summer and the autumn would allow the gathering of numerous plant species ripening at that time, such as hazel nuts and pomoideae. These grew in the surrounding area as their remains have been found in small numbers by the anthracological study. This scarcity of the remains may be due to the plant resources being consumed without needing any processing and therefore without coming into contact with fire. This would mean that the remains were not carbonised, which would favour their preservation, or perhaps the resources were consumed outside the rock-shelter (Ruiz-Alonso et al., 2013).

To obtain flint, the occupants at this site followed the course of the river to the Maderuelo area, about 20 km to the west. In the south-east sector of the Sepulveda-Ayllón basin, in its middle unit (Maderuelo limestone lithofacies), and in the Sacramenia-Fuentidueña basin, 23 flint outcrops have been located. Much of the lithic equipment at La Peña de Estebanvela is made from opaline flint and flint with a micro-quartzitic texture, which are very common in these units, although they are also found at the base of some stratigraphic columns in the Sepulveda-Ayllón basin and particularly in the Sacramenia-Fuentidueña basin. Most of these outcrops are in Upper Miocene formations, where the flint nodules

Fig. 7. Ibex rib with cutmarks from Level III.

Fig. 9. Detail of a flint nodule in the Sacramenia-Fuentidueña outcrop.

are of varying colours (brown, grey and white) (Figs. 8 and 9) (Armenteros, 1986; Armenteros et al., 1995).

These nodules can sometimes reach sizes of over 1 m in diameter, which would imply an initial roughing-out at the outcrops before the flint could be taken to the site. This would explain the limited appearance of the first phase of the *chaîne opératoire* in the rock-shelter. One exception is the find in the eastern part of Level III (squares B15–C15) of a group of several unworked nodules and trial cores in the same type of flint, probably from the Fuentidueña area. Further cores, several flaking products and a perforator complete the lithic repertoire that can be linked with this accumulation.

The nodules and cores in this accumulation weigh a total of 5.66 kg, which is 28.35% of the weight of all the lithic material found in this level. The find of much of this unworked or barely knapped raw material, piled up on a section, deliberately dug into the contact with strongly cemented calcareous sediment associated with the bedrock in the rock-shelter, is another argument in favour of the hypothesis that this is an intentional accumulation or store of lithic raw material (Cacho et al., 2008: 151).

Caches of this type have been found at other Magdalenian sites in many different places. In northern Spain, at Entrefoces, in the region of Cantabria, an accumulation of prismatic bladelet cores was found in a lower Magdalenian level (González Morales, 1990: 35). Another flint "cachette" or stock has also been cited at the Catalan site of La Cova Gran de Santa Linya, in Early Upper Palaeolithic levels (Mangado et al., 2010: 64).

Other objects in the archaeological record at La Peña de Estebanvela indicate movements to or contacts with more distant places, as in the case of personal ornaments; practically all these personal ornaments found in Level III are made from marine molluscs, mainly *Cyclope neritea* and *Trivia arctica* but also *Pecten maximus*, *Trivia pulex*, *Littorina obtusata* and *Turritella communis* (Fig. 10). Several of the *T. arctica* specimens, located in the structure at the base of Level III, interpreted as an area where animal skins

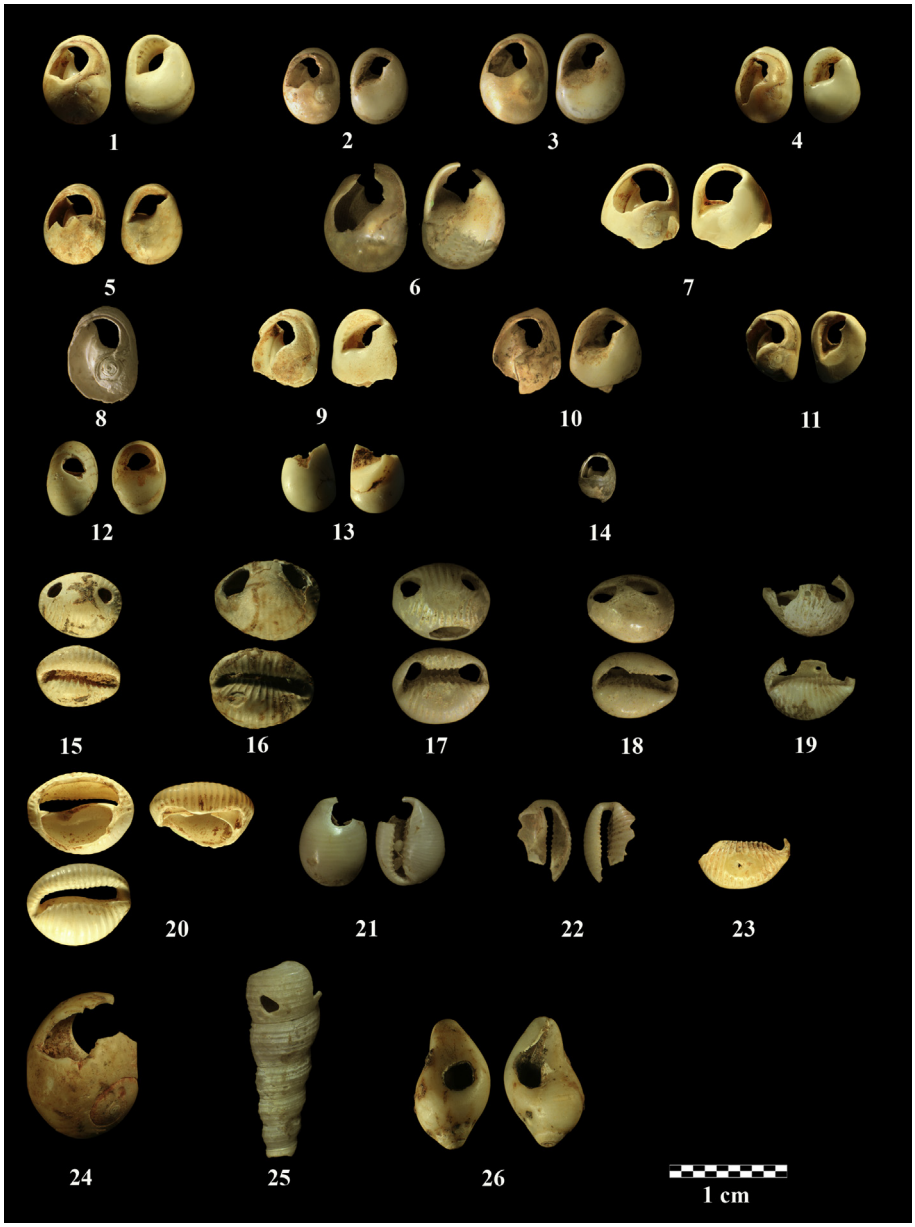

Fig. 10. Personal ornaments made from marine gastropod shells in Level III. 1–11: *Cyclope neritea*. 12–14: *Theodoxus fluviatilis*. 15–20, 22–23: *Trivia arctica*. 21: *Trivia pulex*. 24: *Littorina obtusata*. 25: *Turritella* sp. 26: Indeterminate.

Fig. 11. Recreation of the surroundings of La Peña de Estebanvela during the Upper Magdalenian. Illustration by Luis Pascual.

were processed, were found very close to each other, suggesting that they must have formed part of the same element of adornment.

The use-wear traces on these shells show that they were sewn to clothes or otherwise fixed. However, this is not the only system documented at the site, as other personal ornaments would have been suspended from a cord or liana, as the use wear observed on *Cyclope neritea* shells indicates (Avezuela, 2013). These objects are evidence of either direct or indirect contacts with the coast. The origin of these molluscs might be either the Mediterranean or Atlantic coasts. Only two of the species, *Cyclope neritea* and *Trivia pulex*, are exclusively Mediterranean, suggesting that the occupants at La Peña de Estebanvela maintained direct or indirect contact with the Mediterranean coast. In contrast, *Pecten maximus* and *L. obtusata* are today only found in the Atlantic.

The environments these marine species are associated with (cliffs, beaches, tidal plains and coastal lagoons at river mouths) may have been found on both Mediterranean and Atlantic coasts in the late Upper Pleistocene and early Holocene (Jordá- Pardo, 2007). However, how did these marine molluscs reach the site? Marine species made into personal ornaments and beads are quite common at inland sites, even several hundred kilometres from the shore. In this way, it may be mentioned that one of Mediterranean species found at La Peña de Estebanvela (*Cyclope neritea*) was also found in Magdalenian levels at the northern Spanish site of Tito Bustillo (Álvarez-Fernández, 2006).

It is possible that these molluscs reached the site through exchanges with other groups that the occupants came into contact with during their seasonal movements. Unfortunately there are few data allowing confirmation of this hypothesis, owing to the scanty archaeological record at Magdalenian sites in the central Iberian Plateau contemporary with this level in La Peña de Estebanvela (Avezuela, 2013).

Another option is that they were gathered by the occupants at La Peña de Estebanvela themselves. The zooarchaeological data show that the site was occupied in summer and autumn (Yravedra, 2007). For the rest of the year they would move to other latitudes seeking milder conditions, possibly on the coast, where they would be able to gather the molluscs and make them into adornments. In this case, why have no unpierced specimens been found at the site, stored as a reserve of raw material, as occurs with continental *T. fluviatilis* molluscs? One possible answer to this question is that this reserve of marine molluscs would have been exhausted by the end of the occupation and the raw material for making adornments was gradually replaced by continental mollusc shells (*T. fluviatilis*) the occupants would have direct access to during their stay in the rock-shelter.

4. Conclusions

It is not easy to reconstruct the nature of this site during its occupation as the archaeological deposit has been affected by the partial collapse of the rock-shelter. However, the test pits performed during the excavations showed that the deposit extended towards the east (next to the flint cache) and at least 3 m towards the back of the rock-shelter. In this way, the surface area available during the occupation documented in this level would have been significantly larger than the area existing today.

This spatial study of Level III has determined that the occupants at La Peña de Estebanvela knapped lithic tools during their stay, mainly to make hunting weapons. They also butchered and defleshed their prey, as well as breaking the limb bones to extract the marrow for its consumption. Other evidence indicates they processed the skins of the animals they hunted, possibly to make their garments, as the finds of needles also suggests (Tejero et al., 2013).

These activities, together with the manufacture of portable art objects and some hearths (Cacho, 2013), among other factors, suggest that despite the importance of hunting at the site, this cannot be considered a hunting camp, but a residential site. It would have been occupied by a group that was not too large (a nuclear family?) during a certain length of time, the duration of

which cannot be determined precisely but which would not have been very short. In this respect the cache of flint in the same level is of particular interest, as it implies the forethought of a supply of raw material, which would be unlikely in the case of a very brief occupation at the site.

Although hunting was the main occupation of the human group using the rock-shelter, other tasks have been documented, such as fishing, and gathering fruit and wood, which indicate the intensive exploitation of the immediate environment, on the banks of the River Aguisejo (Fig. 11). The occupants also obtained resources further from the site, such as the flint extracted at outcrops some 20 km away. The first roughing-out of the nodules would have been carried out at the outcrops, and the flint would later have been taken to the camp as preformed pieces.

Another part of the archaeological record, the marine molluscs used for personal ornaments, is an indicator of the group's mobility, as they may have made seasonal movements to regions with a milder climate during the winter, possibly to the coast. This would corroborate the likelihood of contacts with other contemporary Magdalenian groups.

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