Excavations at the Middle Pleistocene Cave site of Galeria Pesada, Portuguese Estremadura: 1997-1999.

by
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Abstract

Excavations at the late Middle Pleistocene cave site of Galeria Pesada in Portuguese Estremadura have uncovered a series of lithic assemblages associated with abundant faunal remains. The lithic assemblages are all similar and consist of a combination of a few classic Acheulean tools, a rich series of bifacial tools (foliates, small asymmetric bifaces, Keilmesser, etc.), and a large number of scrapers, often on quartz. These assemblages, unknown to date in the rest of Iberia, are associated with Cervids and Equids, cut marks on which indicate extensive and intensive carcass modification and consumption by hominids.

Key-words: Lower Paleolithic. Middle Paleolithic. Lithic industries. Zooarchaeology. Galeria Pesada (Torres Novas, Portugal).

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Resumo

Trabalhos arqueológicos no sítio de gruta do Pleistoceno Médio final das Galerias Pesadas (Complexo cársico do Almonda, Torres Novas) puseram a descoberto uma estratigrafia onde se recolheu uma série de colecções de artefactos de pedra lascada associados a abundantes vestígios faunísticos. As colecções líticas são semelhantes entre si, e consistem na associação de raros utensílios típicos do Acheulense, com uma presença importante de utensílios bifaciais (foliáceos, pequenos bifaces assimétricos, Keilmesser, etc.), e ainda de um elevado número de raspadores, essencialmente em quartzo. Este tipo de indústrias, desconhecidas até ao momento no resto da Peninsula Ibérica, estão associadas a cervídeos e equídeos, cujas marcas de corte indicam uma modificação intensiva e sistemática das carcaças e respectivo consumo por parte dos hominídeos.

Palavras-chave: Paleolítico Inferior. Paleolítico Médio. Indústrias líticas. Arqueozoologia. Galeria Pesada (Torres Novas).

1. Introduction

Most of western Europe was occupied by hominids by about 500,00 years ago (Roebroeks and van Kolfschoten 1995), with occupation of northern Iberia, at Atapuerca TD6, among other sites, even earlier (Parés and Gonzàles 1995). Although Middle Pleistocene sites are known in many parts of Iberia (Echegaray and Freeman 1998, Raposo and Santonja 1995), with a few exceptions, they are open sites, usually without faunal associations. Even when fauna is present, as at Torralba, there is no general agreement as to whether the faunal presence resulted from hunting, scavenging, or was simply coincidental (Freeman 1975, Butzer 1982, Binford 1987, Shipman and Rose 1983, Gaudzinski and Turner 1996). While the archaeological remains from earlier Iberian Middle Pleistocene sites strongly parallel those from the rest of Europe (Bosinski 1996), with all variability accounted for by raw material and functional, rather than cultural, differences (Villa 1986), by the later Middle Pleistocene (OIS 6-8) major technological developments are evident (Otte 1996). This period, from ca. 300,000 to 128,000, with its appearance of a true Levallois technique and of recognizably different lithic industries across Europe, is seen as the beginning of the Middle Paleolithic by many (Bosinski 1982, 1996, Laville 1982, Tuffreau 1982), although the Lower Paleolithic continues, as well (Otte 1996).

Whether the technological changes that took place during the late Middle Pleistocene in Iberia represented a gradual shift from an Acheulean to a Middle Paleolithic Mousterian, as some propose (Echegaray and Freeman 1998), or were more complex, has been difficult to determine. Most sites simply lack undisturbed, intact cultural deposits, have questionable faunal associations, and cannot be absolutely dated. Even in the best of cases, it is unlikely that any European Middle Pleistocene site, with the possible exception of Schöningen (Thième 1996), would have the geological and cultural integrity found at the best of Upper Pleistocene sites.

The recently discovered cave site of Galeria Pesada, in Portuguese Estremadura, while not having the integrity of the best of Upper Pleistocene sites, contains sediments, archaeological materials, and faunal remains that are better associated than those of the vast majority of Iberian Middle Pleistocene sites. As such, the site has the potential for elucidating the details of technological patterning present in western Iberia, as well as how this technology related to environmental change, local resource availability, and economic adaptations. This paper represents a preliminary report of the excavations from 1997 through 1999. Excavations are still ongoing and it is quite possible that our understanding of some details may change, but enough is now known to suggest that traditional views of late Middle Pleistocene Iberian culture and adaptations will need revision.

2. The Galeria Pesada

The cave of Galeria Pesada is located in a south facing cliff, just north of the village of Almonda and south of Vale da Serra in Portuguese Estremadura (fig. 1). The cave is part of the Almonda karstic system and is situated in the distal portion of a syncline at the southeast of the Serra de Aire ridge, which has a maximum elevation of 678m.

The cliff, almost 100 m high, is full of interconnected karstic cavities and the present Almonda River flows out of the base of the cliff. Mapping of these underground galleries began in 1993 (Zilhão, Maurício, and Souto 1993), during which several galleries with collapsed entrances were found to have bones and artifacts lying on their surfaces. One deeply stratified Middle Paleolithic site, the Gruta da Oliveira, was opened only after the removal of considerable brecciated entrance collapse. This success led to a mapping of the interior artifact locations and to a survey of the cliff face for other possible collapsed gallery entrances, seen by brecciated sediments.

In 1997, one such locality was tested to see if, in fact, a gallery was behind a brecciated patch some 5 m below the top of the cliff. After the removal of about 123 cu m of breccia and limestone blocks, an entrance to a cave, the Galeria Pesada, was opened sufficiently to permit the excavation of 12 sq m at the extant cave entrance. The cave is located near the crest and is developed in a limestone reef of Jurassic age (Oxfordian and Batonian), consisting of fractured fine-grain limestone. In its present configuration, the brow flanks the west and turns northwards: the drip line probably extended ca.7 m. to the south during the period of sediment accumulation now being excavated.

By the end of the 1999 field season, the excavations consisted mainly of a one meter wide north/south trench (F9 through F19), which began at the cliff slope and penetrated northward into the cave proper, and a larger expansion of the excavations toward the east and west, in the area under the present drip line (fig. 2). Testing during 1997 at different points along the trench grid showed that artifact and bone bearing sediments lay under a thick layer of talus and roof collapse and above a very heavily cemented layer, the surface of which had extensive dissolution cavities. The base of this layer was not established and, since it was largely archaeologically sterile where tested, it was decided to use its surface as the lower limit of the excavations. Therefore, except for a small test in the trench itself (fig. 3: squares F12/13), excavations through 1999 were limited to sediments above this layer (Unix X, described below).

3. Sedimentary History

Overall, the sediments filling the cave are composed of intercalated clay layers and angular limestone clasts dipping strongly (20-25°) toward the back (northwest) of the chamber, and following the general karstic morphology. These sediments are locally cemented with calcium carbonate to varying degrees, resulting in "brecciated" deposits. Because of the repetitive nature of this style of sedimentation, it is difficult to distinguish among stratigraphic units, although there are certain lithological marker features that indicate possible limits. Since the archaeological materials are associated with these lithological units, it further strengthens the perceived stratigraphic divisions.

Utilizing both the west face profile of the trench outside the drip line (F14/19: see figure 2) and various profiles within the drip line (fig.2: south face of G-H11, the east face of F13, the north face of H-G 9), a stratigraphic geological sequence of six main units was recognized, in addition to a talus deposit that covered the older deposits and some fine materials that fill an erosional pocket in F14 (fig. 3). From bottom to top (fig. 3), the units may be briefly characterized, as follows:

Unit X. This is the basal part of all sections, as noted above. It is a heavily cemented clay and sand with sub-angular, flattish clasts, measuring 2-10 cm. These sediments dip toward the NW and contain local pockets of more uniform reddish clays, with a minimum thickness of 10 cm (fig. 3, bottom of F13/14). Its upper surface has semicircular and elliptical depressions 8-15 cm across by 10 cm deep (sub-aereal dissolution features), that commonly contain reddish clay infillings of the Unit IX sediments. A few artifacts and bone fragments occur in the top of the heavily cemented sediments, while a greater amount of material was recovered in the pockets and dissolution cavities. Those materials actually in the cemented sediments were attributed to archaeological Level F. Those in the pockets and cavities with sediments of Unit IX type were grouped with the artifacts and bone from that unit, discussed below. (Since 1999, it became clear that the pockets of reddish clay "in" Unit X were, in fact, connected to and were part of the Unit IX infilling of dissolution cavities.)

Unit IX. This unit is less stony and more fine grained than Unit X. It contains a greater proportion of matrix (silt-clay), with some limestone clasts locally, which are somewhat weathered. This layer conforms to the NW dip of Unit X and can be followed as a continuous layer from the northern edge of F13 to the southern edge of F9 (fig. 3). To the South (F12/13), the sediments are heavily clay; to the NW they become softer red clay with angular eboulis. This Unit contains abundant artifacts and faunal materials. To the SE, these are not so common and tend to occur solely in the solution cavities in the surface of Unit X. To the NW (ca. F11), artifact densities are greater and bone accumulations are more pronounced. The highest densities occur in the softer reddish clay with small eboulis. This archaeological and faunal material has been designated as archaeological Level E.

Unit VIII. This unit sits atop Unit IX with a distinct contact that is particularly marked at its bottom by angular pieces of rockfall that vary in size, typically 2-3 cm to much larger boulders measuring 45 cm across. In F9/10, the lower part of the unit is more clast supported, whereas the upper part is more fine grained. Artifacts and faunal materials of archaeological Level C are associated with the finer grained deposits: neither extends toward the south beyond about southern end of F10 (fig. 3). The contact between Units IX and VII is not clear toward the south because of extensive cementation, which creates difficulties in distinguishing stratigraphic boundaries.

Unit VII. This layer is most clearly seen on the west face of the trench (fig. 3: F9-13): it is not clear to the south of F13. It is a layer of silty clay, about 28--30 cm thick, with some rockfall, but the clasts are very rounded and weathered. There is local cementation, particularly under large boulders of the talus that sit on this layer north of the Fll/12 line. Artifacts and faunal materials occur in some numbers, making up archaeological Level B2, from about the middle of F13 toward the north, but are cut by erosion close to the F10/9 boundary (fig. 3), where a number of large rocks from the talus lie sloping downward to the north. The contact between those limestone boulders and the Unit VII sediments in that area is marked by extensive manganese staining on the underside of the rocks, suggesting considerable water flow at that contact.

Unit VI. This is exposed only along the west face of the trench. It is a 20 cm stony layer that is quite similar to Unit VII but with somewhat fresher clasts. The matrix is more cemented. It is sterile archaeologically. It did not show on the profile (fig. 3), when drawn.

Unit V. The remaining 80 cm or so of the cave deposits above Unit VI is a more homogeneous, less distinct mixture of silty clay and rock fragments, the latter varying in size from a few centimeters to larger. This layer is locally cemented, and locally softer. The clasts are somewhat weathered with mm thick rinds. Archaeological Level B1 occurs as a thin horizon of artifacts and bone here, sloping sharply downward to the west in squares F13 and F14 but flattening out just above Level B2 by square F11 and, finally, merging with it in F10. At the top of this unit there is an erosional feature filled with fine, sandy sediments probably derived from over the drip line.

In sum, as of 1999, the sedimentary history of the cave appears to mainly have involved deposition with a significant gravitation component. The general dip of the sediments and the absence of well-developed, clearly individualized horizontal units points toward an external, nearby source of the sediments – close to the area of the cave entrance.

4. The Archaeological Levels

The initial testing within the trench line took place both outside the drip line and within it, as separate efforts (e.g., F10 and F13). Both squares produced layers of artifacts at quite different elevations and in somewhat different sediments. This gave the impression of no fewer than seven possible stratigraphically different artifact accumulations. While additional excavations suggested that some seemingly different accumulations might be the same because of changes in the dip of the artifact layers, this was not fully resolved until after the 1999 field season, in spite of extending the trench from F9 through F19 (fig. 2). Still, in order to present the most accurate picture of the assemblages recovered through the 1999 field season, our present understanding of the actual artifacts layers to the south of F10 will be used.

As presented above, there are four clear, stratigraphically separated artifact layers inside the extant drip line (B1, B2, C, and E), one of which (C) begins inside the drip line, one of which (B2) extends only south to about the drip line, and two of which (B1 and E) extend outside the extant drip line for 2.5 m, at least, to the southern edge of G14. In addition, a few artifacts were recovered from the heavily brecciated Unit X: too few to consider here.

The stratigraphically youngest level, in geological Unit V, is first seen in F14 and continues into F10, where it is steeply eroded. It is in contact in F10 with limestone blocks that literally fell on the artifact bearing surface. In one case, a limestone block had broken a large flake as it fell, taking half the flake some 8 cm down, as the block pushed into the soft sediments, leaving the other half in place. This layer, however, is partly derived from, perhaps, just outside the excavation to the NW, since the level dips at a ca. 40 degree slope down to the NW and, in F11, drops off even more steeply, toward the North. In spite of this situation, which calls for an interpretation of artifact and faunal movement, the artifacts are in pristine condition: there are no signs of edge crushing, surface polishing, and all sizes of artifacts, from tiny chips to large bifaces, were in the same areas. Still, the area exposed in the trench is small and it is still possible that some patterns will be consistent with artifact and bone movement down this slope.

The second archaeological level, B2, while not extending as far south as B1, has the same dip as does B1, with the artifacts and bone in comparable condition. The vertical spread of artifacts and bone in both levels did not exceed ca.10 cm, factoring out the effects of the dip. The third archaeological level, C, occurred mainly north of F11. While it, too, sloped downward, it was more to the west and the degree of slops was much less – ca. 20 degrees. Again, there was little vertical spread of artifacts.

The lowest archaeological level, E, rests on the surface of Unit X. It is wholly associated with the clay sediment of that unit, including in dissolution cavities and pockets that appear below the surface of Unit X. Again, this layer dips sharply to the NW and, given the almost debris-free clay sediments that fill all depressions in Unit X, it would appear that the artifacts were mainly washed down the slope in a matrix of wet clay. Still, artifacts show no physical evidence of movement, as for the other levels, and in F11 there was a foliate fragment alongside five resharpening chips that could be refitted to it. Thus, while it certainly moved to some extent, this movement may have been "en mass," keeping spatially associated artifacts together.

The vertical spread of Level E artifacts is greater than for the other levels, but this is a function of the infilling of the dissolution cavities and pockets within Unit X. Where the surface of Unit X was reasonably intact, Level E artifacts formed a narrow band, resting on its surface.

5. The Lithic Assemblages

Although the levels are stratigraphically distinct, they appear very similar in the range and proportions of raw materials present, as well as in the range of typological forms. Using the 1999 sample of 1004 pieces from Levels B1, B2, C, and E (only 350 pieces were recovered in 1998), it is clear that the proportional occurrence of different raw materials is rather similar from level to level (Table 1). On average, half of all pieces are quartz, while about 45% are some form of quartzite, followed by small amounts of flint and trivial amounts of other materials, such as schist. The quartz occurs as small to medium sized pebbles that are found on the plateau of the Vale da Serra only 5 m above the cave. Quartzite cobbles, of varying qualities and sizes, are ubiquitous on the Vale da Serra, as well. Both of these raw materials are certainly locally available if not immediately so. Presently, flint is known in situ some 5 km to the NW of the Galeria Pesada, at the western end of the Vale da Serra. Of course, other sources may have been closer at the time of occupation. The exact sources of the more unusual raw materials, schist, for instance, are not presently known.

TABLE 1

Percentages of different Raw Materials by Level.

Raw Material	Level B1	Level B2	Level C	Level E
Quartz	54.1	51.5	56.2	46.8
Quartzites	44.9	44.1	38.7	48.4
Flint	0.6	3.7	3.8	4.4
Other	0.3	0.7	1.3	0.4
Sample size	316	134	315	248

Given the tendency for quartz to shatter during flaking, the equally high percentage of quartz in all the assemblages logically should be represented in more or less equal proportions of debris (chips and chunks). This is clearly not the case (Table 2), with debris varying from over half of Level B1 to under one quarter of Level B2. While quartz is often considered a very poor raw material to flake relative to other raw materials, in these assemblages quartz is flaked with considerable skill, not only to produce flakes but also to produce a large range of tools. Not only are scrapers (fig. 4*b*, *f*, *h*) and even bifacial tools (fig. 5*a*) commonly made on quartz but secondary retouch on quartz tends to be invasive (fig. 5*a*) and often sub-parallel (fig. 4*b*). The same may be said for most of the quartzites used: retouch on them is often invasive and very well controlled. This applies to both unifacial (fig. 6*b*) and bifacial retouch.

TABLE 2

Proportions of Major Artifact Classes by Level at Galeria Pesada.

Class	Level B1		Level B2		Level C		Level E	
	n	%	n	%	n	%	n	%
Tools	18	5.6	20	14.9	24	7.6	41	19.1
Flakes	110	34.5	76	56.7	148	47	82	38.1
Cores	16	5	8	6	18	5.7	2	0.9
Debris	175	54.9	30	22.4	125	39.7	90	41.9
Total	319	100	134	100	315	100	215	100

The low percentage of cores in every level is, in fact, more striking than the numbers suggest. The vast majority of cores recovered are on quartz pebbles: the only raw material where true core reduction is well attested. A few unquestionable quartzite cores were found (fig. 7*c*), as well as a number which are morphologically transitional between true cores and rough biface preforms.

In some cases, overall shape suggests biface production, but the depth of the flake scars argues for flake production (fig. 7*b*). A larger sample will be required before a secure line can be drawn between intentional blank production and blank production as part of bifacial tool production. There are numerous bifacial thinning flakes and, in fact, some of the larger were used in retouched tool production. An occasional blank has a dorsal scar pattern suggestive of the Levallois method, but it is quite possible that these came off bifaces during rejuvenation. Flint and quartzite flakes tend to have either crushed platforms, indicative of sharp angled striking platforms or the platforms are unfaceted. The quartz flakes, on the other hand, have mainly cortex platforms or, less commonly, unfaceted platforms.

Typologically, there appears to be no obvious differences among level assemblages. Yet, samples are much too small to afford meaningful proportional comparisons with each other or with other sites. In fact, the individual levels' tool samples are so small (Table 2) that presenting them in a type list with percentages would give an impression of significance that is unwarranted. Rather, the important aspect of the tool assemblage, no matter how small, lies in the quite unexpected range and combinations of utilized raw materials, retouch types, and tool forms which are, as yet, unreported for Iberia, at any period.

While there are only a small number of bifacial tools in every level, the variation in bifacial forms is striking. Although only isolated examples of classic, symmetric bifaces of Acheulean type (cordiform, ovoid, lanceolate) have been found, they are very well made, despite a possible tendency toward unretouched butts and an opposite tendency for the tips to be very flat and finely shaped. More numerous are a series of small, asymmetric bifaces on both flint (fig. 8*b*) and quartzite (fig. 8*c*), some of which are plano-convex in cross-section. As a group, these tend not to exceed 7 cm in length, as opposed to the "Acheulean" forms, which range from 10 cm to 14 cm in length. Another series of bifacial tools are foliates, on quartzite, which may be as small as the asymmetric bifaces but are usually larger and tend to be symmetric (fig. 8*a*): on some, a small portion of the base is unretouched (fig. 9*b*). They have very sharp distal tips and are very flat, relative to their widths: up to six times as wide as they are thick (fig. 6*c*) and a number are made on flakes. Another, partially bifacial tool is the naturally backed and bifacially retouched knife (Keilmesser) which occurs on quartz, as well as on quartzite (figs. 6*a*; 9*a*). These are, at times, very well retouched and, at others, they appear almost to be unfinished tools. Some are small, made on naturally backed flakes, while one approaches a biface in mass. One Keilmesser, made on a split biface, has two resharpening para-burin blows (fig. 9*a*), a resharpening technique well known in Central Europe (Conard and Fischer 2000). Also, there are a few bifacial scrapers. While samples are small, in every level, between 40% and 60% of all tools have some bifacial retouch, including those with bifacial retouch along a single edge (fig. 5*e*).

The unifacial tools consist mainly of sidescrapers of various sorts. Retouch, again, tends to be invasive, even on what would seem to be the most intractable of materials. Yet, there is a wide range of retouch, particularly on quartzite. There are some marginally or partially retouched flakes (fig. 4*g*), as well as a number of scrapers with demi-Quina retouch: on quartz (fig. 4*b*) and on quartzite (fig. 7*a*). Given the probability of some artifact movement, surprisingly there are very few denticulates (figs. 4*a*, *e*; 5*e*) and even fewer notches, crushed edges are almost non-existent, and most of the denticulates could not have been formed by natural causes (fig. 4*e*). Among the scrapers, simple forms seem most common (fig. 4*b, d, i*) but double and multiple occur, as well. What makes the scrapers stand out are the number with ventral thinning or partial bifacial retouch (fig. 5*b, d*). This seems to be a common element, although it is not so common on the numerous sidescrapers made on quartz (fig. 4*b, f, h*).

Other tools are limited to simple retouched pieces, retouched fragments, an endscraper or two, a perforator, and a small series of "points." These are on quartzite, are fairly large, symmetric, have flat or concave bases, and have bifacial retouch along one edge and at the pointed end (figs. 5*c, f*; 6*b*).

6. **Faunal Remains**

The Galeria Pesada is rich in faunal remains, from animals as small as shrew to ones as large as rhinoceros. The number of bones recovered from 1997 through 1999 vastly exceeds the number of artifacts. Recovery techniques involved the collection and mapping of macrofaunal remains and the water screening through two sieve sizes (4 mm and 1mm.) of all fine sediments. The sediments recovered in the 1 mm screen were washed and treated twice in acetic acid baths, before final washing. Larger bones were soaked in water for short periods and the loose dirt gently removed. When larger bones were covered with breccia or a calcite crust, they were briefly soaked in weak acetic acid (8/10%) and then briefly soaked in water and washed to remove the acid remnants.

Given the large range of faunal materials recovered, from fish vertebrae and frog bones to deer antlers and horse teeth, their study has been undertaken by different specialists. Some categories of bone (fish and amphibians, for example) will only be studied when the excavations have been completed and their sample sizes known. Other groups, including most rodents, birds, mesofauna, and macrofauna undergo preliminary studies at the end of each field season. None of these studies is complete, even for the 1997-99 samples, so the following observations must be considered preliminary. Only when the full excavation samples have been studied will definitive conclusion be possible. Still, some clear patterns are already visible that shed considerable light on the relationship between the faunal remains and hominid subsistence behavior.

6.1 *Microfauna*

Thousands of small mammal bones were recovered, mainly during the 1998-1999 field seasons, including the orders Chiroptera, Insectivora, and Rodentia. From these, about 500 are identifiable and belong to 14 different species (Table 3). Bone condition ranged from heavily brecciated to perfect condition. Although the latter, including maxillae and mandibles with complete dental series are not uncommon, individual epiphyses and teeth make up most of the identifiable sample.

TABLE 3
Species List of Microfauna from Galeria Pesada.

Chiroptera
Rhinolophus sp. Lacépède, 1799
Myotis sp. Kaup, 1829 *gr. Myotis – blythi*
Miniopterus schreibesii Kuhl, 1819
Pipistrellus sp. Kaup, 1829
Insectivora
Talpa sp. Linnaeus, 1758
Galemys pyrenaicus Geoffroy, 1811
Sorex sp. Linnaeus, 1758 *gr araneus – coronatus*
Crocidura cf. russula Hermann, 1780
Rodentia
Eliomys quercinus Linnaeus, 1766
Allocricetus bursae Schaub, 1930
Apodemus sp. Kaup, 1829
Pliomys episcopalis Méhely, 1914
Arvicola sp. Lacépède, 1799
Microtus (Iberomys) brecciensis Giebel, 1847

Since samples by archaeological levels are still small and, as noted above, it is probable that these upper levels are temporally and culturally similar, all microfauna will be reported as a single unit. To date, there are no indications of differences among these levels, but larger samples may change this observation. The most abundant remains are those of *Apodemus sp.* and *Microtus brecciensis*, each representing about 25% of the sample. The species *Allocricetus sp.* and *Eliomys quercinus* together account for another 25%. These species suggest a mixed Mediterranean landscape with woods and open spaces with a xeric note. No cold species are present.

6.2 *Mesofauna*

For this preliminary report, mesofauna are limited to rabbit (*Oryctolagus cuniculus*), which accounts for over half of all the mammal bones recovered through the 1999 field season. Some 3,745 identifiable bones were recovered of which the vast majority (89%), representing at least 62 individuals, comes from Levels B1, B2, and C. This MNI is based on 127 tibias, the most abundant bone. In fact, hindlimb bones, and in particular tibias, greatly outnumber forelimb bones and skulls/mandibles and none of the bones recovered, to date, exhibits either burning or cut marks. This pattern of element distribution and condition does not match patterns of documented human exploitation, such as found the nearby late Pleistocene site of Picareiro Cave, where there is a more even distribution of body parts, there is evidence for burning, and for cut marks (Hockett and Bicho 2000). Thus, there is no evidence, as yet, for the cultural deposition of rabbits into the cave.

Rabbit bones may be deposited into caves either through predator or raptor activities, or both (e.g., Cruz-Uribe and Klein 1998; Hockett 1995, 1996, 1999;

Schmitt 1995). Owing to different body sizes and predilections of various carnivores and raptors, two different types of rabbit bones may be deposited in cave sediments: (1) those that are swallowed and subsequently pass through the predator's digestive tract and (2) those that are not swallowed and, instead, are left at kill or feeding sites. Bones exposed to digestive enzymes often leave recognizable taphonomic traces, such as corrosive damage, polishing, thinning, and staining (e.g., Andrews 1990; Dodson and Wexlar 1979). Of the over 3,300 rabbit bones identified from Levels B1, B2, and C, only a single calcaneus shows any taphonomic trace (digestive corrosion), indicating that the majority of these rabbit bones were not deposited via carnivore scats or raptor pellets. Additionally, previous taphonomic research (Hockett 1995, 1996) indicates that raptor pellets generally contain larger percentages of rabbit forelimb bones compared to hindlimb bones; that is, raptors generally swallow forelimbs more frequently than hindlimbs, since they are smaller.

The second cause of bone accumulation occurs at and below the roosting nests of large raptors, such as martial eagles, eagle owls, and golden eagles, where those portions of the rabbits that are not consumed accumulate. Under these conditions, hindlimb bones, and particularly tibia, are proportionately more numerous than forelimb bones. Figure 10 shows the patterning of rabbit bones from the indisputably human exploitation at Picareiro Cave (Hockett and Bicho 2000), from martial eagle roosts (Cruz-Uribe and Klein 1998, fig. 4), and from Galeria Pesada.

It is clear that the Galeria Pesada patterning parallels that of the martial eagle roosts and is radically different from that resulting from human exploitation. Thus, the data indicate that the vast majority of rabbit bones recovered to date from the Galeria Pesada were most likely deposited by large raptors, such as eagle owls or eagles. Since the excavations through 1999 were concentrated near the front of the original cave, where such raptors tend to build nests, the patterning of rabbit bones is fully consistent with raptor accumulations. It is not clear, however, that rabbit bones recovered well into the cave in the past two years will pattern in a similar way. It is still possible that rabbits were exploited by hominids at Galeria Pesada but, if so, the data are not yet available.

6.3 *Birds*

Bones of birds were common, if not abundant, but due to their fragmentary state when recovered from brecciated deposits, only about two-thirds could be identified, at least, provisionally. The presence of birds in the Galeria Pesada sediments may be explained by two factors. The first is that some of them lived in the cliffs in front of the cave, and others in the entrace of the cave, itself. (In fact, after the cave was opened sufficiently to look like a cave in the fall of 1999, by the following summer there were a number of bird nests in the crevices at the excavated entrance.) Among such birds were raptors that could have brought other birds to the site as prey, including parts of quite large birds that may have died naturally in the vicinity. While other predators, including humans, could have been involved, no bird bones to date show either cut marks or gnawing, so there is no proof for other than natural deaths and raptor accumulations.

In spite of the limited modes of acquisition, a wide range of birds are represented, normally by only a few bones each, except for the rock dove or stock dove, which probably lived around the cave entrance (Table 4). Still, the bird remains indicate a diversified environmental and topographic setting for the area around the cave, including a sluggish river, oxbow lake, or pool, sufficiently deep for diving ducks and shallows with vegetation. Also present were steep rock faces with fissures and caverns, dry open grassland, some flat areas with low vegetation, as well as the presence of woodlands, mainly with scattered, but mature, trees.

TABLE 4

Preliminary List of Birds from the Galeria Pesada.

Water Birds
Egretta alba? Linnaeus, 1758 - great white egret
Ciconia sp., stork
Cygnus cf. olor J.F.Gmelin, 1789 - mute swan
Anas sp., dabbling duck
Aybthya sp., pochard
Cf. *Mergus albellus* Linnaeus, 1758 - smew
Haliaeetus cf. albicilla Linnaeus, 1758 - white tailed eagle
Scolopax rusticola Linnaeus, 1758, - woodcock
Forest Birds
Buteo buteo Linnaeus, 1758 - buzzard
Columba palumbus Linnaeus, 1758 – wood pigeon
Caprimulgus europaeus / ruficollis - nightjar or red-neck nightjar
Picus viridus Linnaeus, 1758 - green woodpecker
Forest/Cliff Birds
Columba livia / oenas - rock or stock Dove
Cliff Birds
Corvus monedula Linnaeus, 1758 - jackdaw
Cliff/Open landscape Birds
Pyrrhocorax graculus Linnaeus, 1766 - alpine chough
Open landscape Birds
Alectoris sp., partridge.
Athena noctua Scopoli, 1769 - little owl.
Corvus corone / frugilgus – carrion crow or rook
Pica pica Linnaeus, 1758, magpie
Ubiquitous Birds
Bubo bubo Linnaeus, 1758 - eagle owl
Falco sp., falcon
Extinct Birds
Corvus cf. antecorax Mourer-Chauviré, 1975

While this microenvironmental variety is not present in the immediate area today, most of the species recovered do not imply marked differences with present conditions. Nevertheless, the actual, present distributions of *H. albicilla* and *M. albellus* point to colder settings in the Serra de Aire than today or in their actual breeding and wintering areas.

Only a single bird, *Corvus cf. antecorax,* has temporal significance. As presently understood, this form of *Corvus* persisted until the end of MNQ 24 (Mourer-Chauviré 1993); that is, it was extinct by the end of the Middle Pleistocene. Although there have been speculations about its possible survival into the Upper Pleistocene and its relationship with *C. corax* (Florit et al. 1989, Hernández Carrasquilla 1995a, 1995b, Tyberg 1998), no change in its systematics or chronological status has been proposed. Given the other dating data from the Galeria Pesada, these *Corvus cf. antecorax* remains are Middle Pleistocene.

6.4 *Macrofauna.*

It is estimated that somewhat over 2,200 large vertebrate remains were recovered during the 1997 through 1999 field seasons, of which from 50% to 63% were unidentifiable fragments, depending upon the level. This material came from the three major archaeological levels of the upper portion of the geological sequence (Levels B1, B2, and C). Taxonomic determinations are still preliminary and the faunal list presented here also includes materials recovered during the 2000 field season (Table 5), although the observations of proportional occurrences relate solely to the 1997-1999 samples.

TABLE 5
List of Large Mammals found at Galeria Pesada.

Primates:	*Macaca sylvanus (florentina?)* - macaque
Rhinocerotidae:	**Stephanorhinus** *cf. hemitoechus* - extinct rhinoceros
Equidae:	*Equus sp. aff. mosbachensis* - extinct horse
Cervidae:	*Cervus elaphus* ssp. indet. red deer
	Dama vallonnetensis - extinct fallow deer
Caprinae:	cf. *Capra* sp.
Ursidae:	*Ursus arctos* - brown bear
Canidae:	*Canis* aff. *mosbachensis* - extinct wolf

Regardless of level, the associations of large fauna have the same spectrum of herbivores, by decreasing order of frequency: fallow deer, red deer, horse, and few rhinoceros, caprids, and primate remains. The caprids are found only in Levels B2 and C. A single lower molar of monkey came from Level C (and additional material was found in 2001, Brugal et al, in prep.) and is of similar size with specimens from Early and Middle Pleistocene French sites such as Escale and Orgnac (Tillier and Vandermeersh 1976). To date, it is the first reported discovery of a fossil primate in the Pleistocene of Portugal. Carnivores are uncommon (1.8% of NISP): brown bear in the B levels and a small canid in Level C. The latter is clearly a wolf with a short muzzle, acute premolars, and relatively small molars, probably similar to Middle Pleistocene sub-species, such as the *mosbachensis* line. While only adult canids were found, both adult (at least one a male because of the presence of a baculum) and juvenile bears are present, indicating the use of the cave, at times, as a hibernating den. Tortoise shell fragments are common throughout, but tend to increase in frequency from Level C to Level B1.

Herbivore remains, especially Cervids and Equids, dominate the large mammal bone assemblages (Table 6). In Level B1 they account for ca. 44% of identifiable pieces, compared to carnivores which account for only 2% of the NISP. While Level B2 had a lower density of faunal remains, relative to the areas excavated, herbivores accounted for 39% and carnivores only 1%. Level C had the densest faunal accumulations and the herbivore NISP was 36.5% and that of carnivores only 2.3%. The latter are mostly adult canids. Not only do herbivores dominate the faunal assemblages, but the rate of identified specimens is relatively high because the two main taxonomic groups fall into two clear separate size classes. This makes it possible to identify even small shaft fragments. On the other hand, within the Cervids, for most of the postcranial elements it is difficult to distinguish between *Dama* and *Cervus* because they are close in both size and morphology, even when using characteristic features (Lister 1996). Thus, many pieces, including axial elements and long bone splinters, have been recorded as indeterminate cervids (Table 6), although some may be caprids. While Equid remains are not abundant, they include teeth of young adults, as well as several long bone splinters, ribs or coxal parts, and epiphyseal fragments (femur, tibia, radius, scapula, etc.).

TABLE 6

Macrofaunal remains by NISP and Level from Galeria Pesada.

	Level B1	Level B2	Level C	Total	% Total
n squares	5	8	6		
Chelonian	21	14	15	50	2.47
Caprid	0	6	1	7	0.35
Cervid	161	192	273	626	30.93
cf. Cervid	5	8	0	13	0.64
Equid	7	22	30	59	2.92
cf. Equid	4	1	12	17	0.84
Rhino	1	1	2	4	0.2
Herb indet	14	32	22	68	3.36
Ursid	2	1	0	3	0.15
cf. Ursid	1	1	0	2	0.10
cf. Canid	1	0	0	1	0.05
Carnivore indet	0	0	8	8	0.4
Mammal indet	4	3	4	11	0.54
Indeterminate	241	346	568	1155	57.07
Total N	462	627	935	2024	100
Cut-marks	19	47	50	116	5.73
Trampling s.l.	24	8	16	48	2.37
Carnivore-marks	2	4	8	14	0.69
Impact	2	8	11	21	1.04

Among the Cervids, the genus *Dama* seems to dominate the genus *Cervus*. The Galeria Pesada fallow deer are relatively large, similar to the "*Cervus*" s.l. *nesti vallonnetensis* described at the Early Pleistocene site of Le Vallonnet, in southeast France, having a strong and curved brow tine that starts at an oblique angle right from the burr, without any gap (Lumley et al. 1988: fig. 14). The forms from Le Vallonnet and Galeria Pesada clearly share the same specific antler morphology. In *Dama dama clactoniana*, the European Middle Pleistocene fallow deer, the brow tine is smaller, often twisted and starts with a short angle from the burr. (Azanza and Sanchez 1990). Because of this typical antler morphology, a provisional attribution places the deer from Galeria Pesada as a distinct species, *Dama vallonnetensis*. It would be the first appearance of this species in Portugal and the last occurrence (LAD) in Western Europe. In fact, until now, finds of fallow deer remains have been rare in Iberia. It is poorly documented in Portugal; three isolated remains have been attributed to *Dama dama* from three last glacial sites (Cardoso 1989). In Spain at Toralba, Solana del Zamborino, and Pinilla del Valle, *D. d. clactoniana* is known from the late Middle Pleistocene. *D. nestii? vallonnetensis* lived in Western Europe during the late Early – Middle Pleistocene and have been found at Le Vallonnet, Untermassfeld, Selvella, Casa Frata, Pirro Nord, and, perhaps, at Atapuerca. The survival of this species during the Middle Pleistocene in Portugal, again, points to the tendency for late occurrences of species in the Iberian Peninsular. This is the case for a range of species still found in Iberian Upper Pleistocene deposits: for instance, *Elephas antiquus* (Brugal and Raposo 1999), *Hyaena prisca* and *Canis lupus lunellensis* (Cardoso 1993), *Arvicola cantiana* (Jeannet 2000).

Altogether, the dominance of Cervids (ca. 81% of the total NISP), followed by Equids (ca. 10%) suggest cool, temperate conditions with a mosaic of biotopes, depending upon local topography: less forested areas on the plateau above the cave and wooded patches with open areas in the valley in front of the site. Throughout the sequence, horse shows the most proportional variation, decreasing from Level C at 12.3% of NISP, to 9.6% in Level B2, to 5.5% in Level B1. This might be correlated with a minor paleoenvironmental change from a more open landscape, a bit colder or dryer, during Level C, to a landscape with more forested areas and slightly more humid conditions during Level B1. This is supported by the presence of caprids only in the lowest two levels and by the increase in Cervids (fallow deer and red deer) from the bottom to the top.

The bone and dental specimens are well preserved with only a few encrusted and/or weathered, permitting effective analysis of the bone surface modifications and breakage. The dominant Cervid elements include all parts of the skeleton in every level, with a peculiar under representation of patella, carpal, and tarsal bones. This pattern appears to be similar for both *Dama* and *Cervus*, suggesting comparable taphonomic processes. Antlers are often broken into relatively small pieces and shed antlers are present. Maxillary and mandibular fragments are as frequent as isolated teeth. In the combined samples, hind limb elements are a little better represented (14.2%) than front limb elements (11.4%), but this is unlikely to have statistical significance. There is good representation of axial elements, including a few series of thoracic vertebrae. For levels B1 and B2, both have an estimated MNI of 4 (one very young, one juvenile, one young adult, and one adult), while in Level C, the estimated MNI is 6 individuals (two foetal/neonates, one juvenile, one young adult, one adult, and one older adult). The presence of new-born elements demonstrates some spring season of death, at least, in Level C.

A very noticeable attribute of the herbivore bone sample is the high percentage of "marked" bones (Table 6). After a systematic analysis under a binocular microscope, the causes of these marks may be estimated for the combined sample as follows: ca. 6% cut marks made with stone tools; ca. 2.5% made by sedimentary action; ca. 1% caused by carnivore activities; and, ca. 1% caused by human impact fractures: large notches and, particularly, typical small bone flakes (e.g., see Tixier et al 1998: fig. 6). The frequencies are higher when specific bone groups are considered: for instance, for Cervid bones, the percentages are 7.8% for Level B1, 16% for Level B2, and 12.5% for Level C. Not only were the percentages higher, but the cut marks occurred on those cephalic, axial, and long bone elements clearly documenting dismemberment and meat removal. Indeed, the morphology and the location of cut marks demonstrate an important hominid involvement with *Dama, Cervus,* and *Equus.*

For the *Equus,* for instance, there are disarticulation marks around the cavity of pelves in Level B2 and the same marks are seen on Cervids around the glenoid cavity of a scapula, the distal end of tibias, on the medial face of an astragalus, below the proximal head of a femur, etc. Most of the cut marks are found on diaphyses, indicating both the cutting and scraping of soft tissue (muscles). These marks are associated with a high degree of long bone breakage, showing green fractures: combined, these are fully consistent with intense hominid butchering and marrow extraction.

When the above is combined with the low percentage of carnivore remains, the absence of hyaenid species (well known for their collecting and bone crushing habits, *i.e.,* Brugal et al 1997), as well as the limited amount of bone damage from punctures and teeth-scoring of wolf-sized animals, it is possible to postulate that active consumption by humans was responsible for most of the Cervids and Equids recovered from Galeria Pesada. In fact, in some cases, punctures are recorded actually on top of cut marks. The low frequency of basipodial bones (carpals and tarsals) might be related to carnivore destruction (Marean 1991).

According to the skeletal elements present for deer, it appears that the carcasses would have been brought back to the cave more or less complete. On the other hand, the horses could have been hunted or even scavenged in the vicinity of the cave and only some bones elements introduced into the cave. Examples of other mammal species are still too rare to address questions of their acquisition or consumption.

7. **Discussion**

How should these assemblages and their associated faunal remains be understood in light of what is presently known of Portuguese Middle Pleistocene prehistory? First, even based on the present data, Galeria Pesada clearly falls into the mid to late Middle Pleistocene, even though Iberia is known for its late surviving species. Absolute dating is now in progress and, while there are not yet definitive results, preliminary indications are that Level B1 will date somewhere between 240,000 and 180,000 years ago (Rink, personal communication). Thus, the assemblages come from a period very poorly known in Portugal, as well as in Iberia, more generally. It is also a period in Europe where both Lower and Middle Paleolithic are known to coincide, as noted above. Therefore, it is far from clear how these assemblages should be characterized. The presence of a few typical Acheulean bifaces, and the absence of the diagnostic triangular Mousterian form, suggests an Acheulean designation. Yet, the rest of the assemblages include tool forms and technological techniques not yet reported from any Iberian Acheulean assemblage. The prominence of small asymmetric bifaces, combined with bifacial foliates, naturally backed, bifacially retouched knives (Keilmesser), a tendency toward ventral thinning of unifacial tools, as well as the absence of a demonstrable Levallois method, places these assemblages outside of anything yet reported from Iberia. In fact, their closest technological and typological analogue lies in the Micoquian (*Keilmessergruppe*) of central Europe. While it might be tempting to proclaim possible connections, such seem highly unlikely, since the Micoquian of Germany is now well dated to no earlier than the beginning of the last glacial (OIS4) (Conard and Fischer 2000). While comparable Eastern Micoquian has been placed firmly into the Last Interglacial (OIS5) (Chabai in press), this, too, is not only too recent for Galeria Pesada but much too far away to posit meaningful connections. Within Iberia, there are simply no comparable assemblages, of any age. At the moment, the Galeria Pesada assemblages stand alone, typologically and technologically.

The seeming lack of obvious assemblage connections in Iberia may be due to a number of factors. Known Iberian Middle Pleistocene sites, being in the open, not only have undergone extensive post-occupational artifact movement and sorting, but originally, they may well have represented specialized activity loci, presumably hunting and/or scavenging. The assemblages from Galeria Pesada, some of which may have originally been just outside the cave (B1 and B2 and, possibly E), while another (C) probably had its artifacts actually discarded inside the cave, might well represent a quite different range of activities. Certainly, from the extensive cut marks and other modifications on the Cervid and Equid bones, extensive butchering and defleshing took place, as well as the breaking up of bones for marrow. These activities suggest more than highly ephemeral occupations, since both primary and secondary butchering took place in the cave. This is confirmed by the evidence for tool rejuvenation. On the other hand, the paucity of flint and quartzite cores, as well as the high percentages of retouched tools in the assemblages, would argue against much primary workshop activities. On balance, therefore, these assemblages may represent the material remains of, if not base camps, then of camp sites where a range of activities took place.

Yet, is it likely that these assemblages, rich in tools unreported from elsewhere in Iberia during the Middle Pleistocene, were mere functional facies of the better known Acheulean of the nearby Tagus Valley and inland Estremadura, or even farther afield ? This seems unlikely. While the paucity of "typical" Acheulean biface forms might be understood in functional terms, as might the absence of cleavers, the extremely rich and varied bifacial tool component at Galeria Pesada, at least, should be hinted at, in some other known assemblage. For instance, the Micoquian site of Milharós on the Tagus River (Raposo 1996), totally lacks the non-classic biface forms, as well as the rich diversity of raw material selection. On a more general level, the described technology of known Middle Pleistocene assemblages in Iberia (Sala, Carbonell and Boj 1996) and, particularly, that used on quartzites (Moloney 1996), seems quite distinct from what has been found at Galeria Pesada. Part of this apparent disjunction may lie in that the Middle Pleistocene is very long and the sites being compared may span a few 100,000 years. It is possible that the Galeria Pesada occupations date to the very end of the penultimate glacial, while most of the other known Middle Pleistocene site may be considerably older. Only time and additional data can resolve this.

Even if the Galeria Pesada assemblages are aberrant compared with other reported Iberian Middle Pleistocene assemblages, their technological and typological configuration indicates that the transition from Acheulean to Middle Paleolithic was not always, if ever, a smooth, almost seamless shift from classic Acheulean bifaces, few flake tools, and Levallois technique to no Acheulean bifaces, many flake tools and a continuation of the Levallois technique. Rather, they indicate, at least, some experimentation to produce a large series of different tools within bifacial technology, combined with the production of unifacial retouched tools, but usually on byproducts of bifacial reduction. It is really only the utilization of quartz that seems to have led to a developed blank production from true cores, but here, as well, bifacial retouch of working edges was common. There is nothing in this that points to the known patterns of Iberian Middle Paleolithic, although it must be admitted little is known of the early Upper Pleistocene Middle Paleolithic in most of Iberia.

Regardless of the obscure relationship between the Galeria Pesada assemblages and other reported Iberian Middle Pleistocene sites, the Galeria Pesada itself provides a preliminary view of a potentially complex hominid adaptation. The faunal materials, both mammal and bird, point to a seasonal occupation during the spring/summer, but not during the winter. Not only are there foetal Cervids, young bear, but the large number of bird bones and the raptor deposited rabbit bones all suggest that during the winter, the cave was not usually occupied by hominids, since hibernating bears and raptors tend not to share space with people. The multiple levels, as well as discrete artifact lenses within them, suggest that the Galeria Pesada was revisited frequently. Thus, there appears to have been, at least, a partially patterned seasonal round, although where these hominids were the rest of the year is unknown.

In spite of the wide range of species found in the cave, only the Cervids and Equids, at the moment, can be attributed safely to hominid activities. While it is possible, even likely, that tortoise and even some of the larger birds (e.g., heron) were exploited by hominids, their presence in the cave, as well, may be attributable to hunting and scavenging by large raptors. Still, it is clear from the extensive cut-marks on the Cervid and Equid bones that these animals were intensively exploited by the hominids who visited the Galeria Pesada. Was this exploitation hunting, scavenging, or a combination of both? It is still too soon to tell: samples are too small. Yet, the presence of whole Cervids indicates that, whether hunting or scavenging, these hominids had access to Cervid carcasses before any other carnivore. In this, they were certainly effective in acquiring meat and once acquired, they knew how to butcher the Cervids efficiently.

In sum, the first few years of excavations at the Galeria Pesada have uncovered an aspect of Iberian late Middle Pleistocene hominid technology and adaptations not previously known. It is hoped that continued excavations and additional data will confirm and enlarge the tentative picture presented here.

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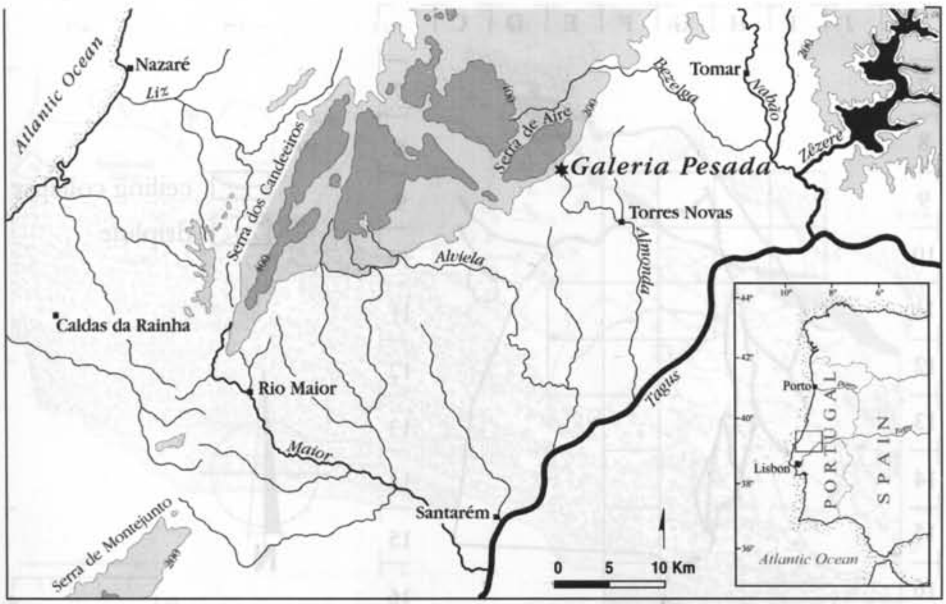

Figure 1 – Map showing location of Galeria Pesada in Portuguese Estremadura.

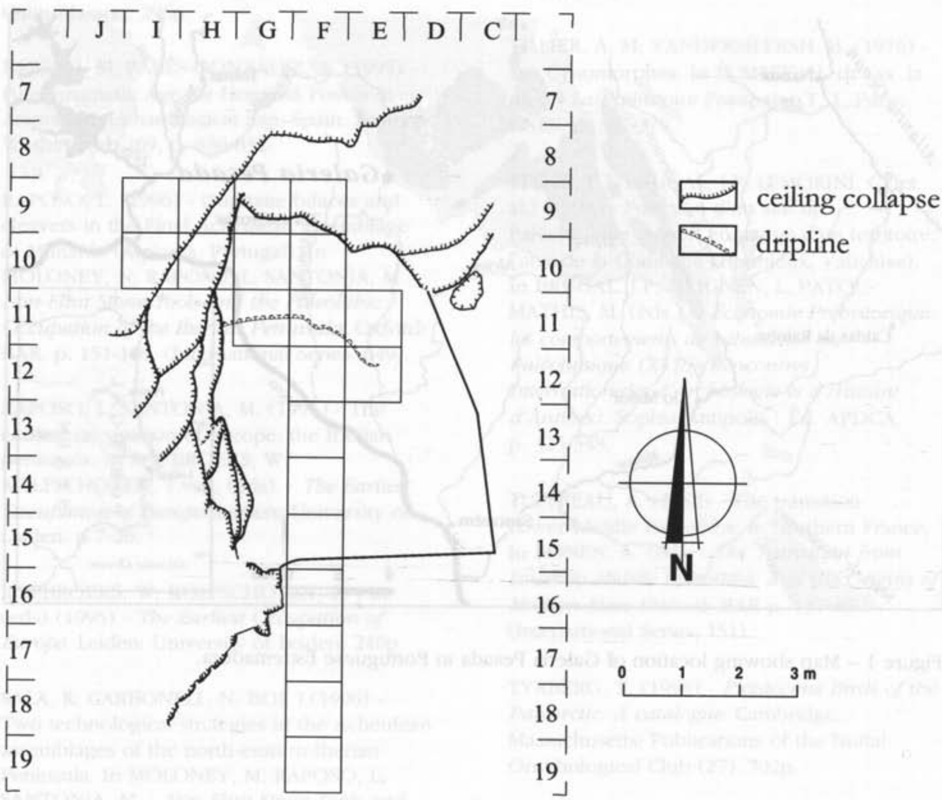

Figure 2 – Plan of excavation units for the 1998-1999 field seasons.

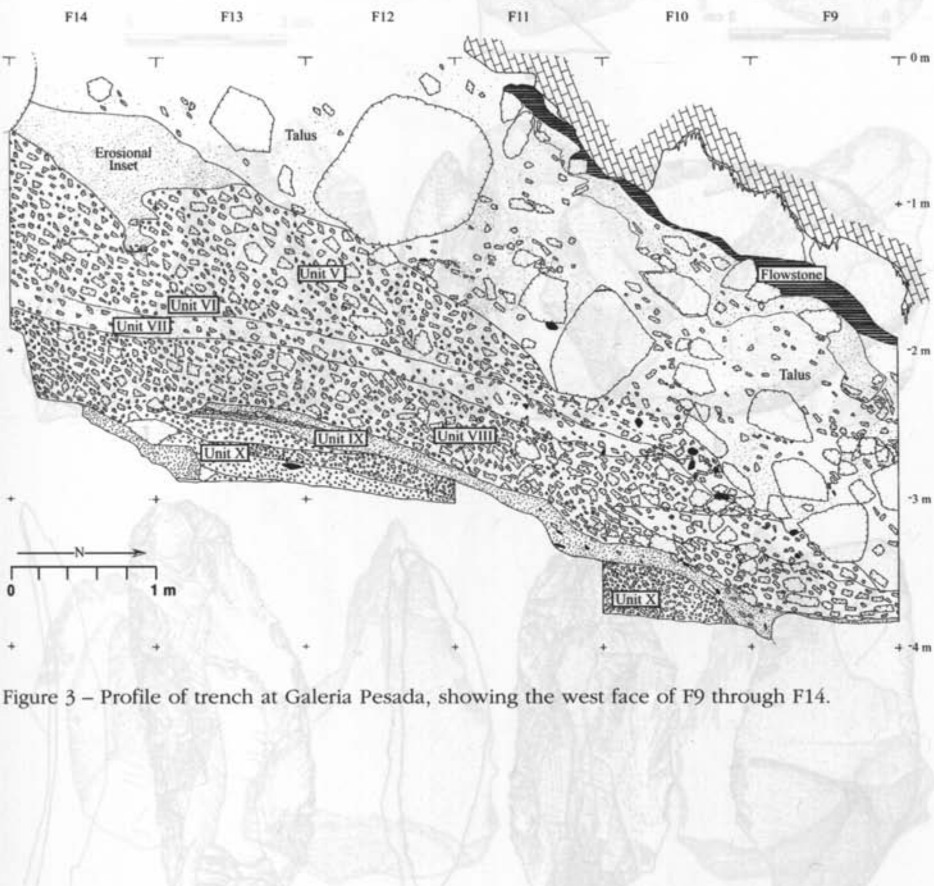

Figure 3 – Profile of trench at Galeria Pesada, showing the west face of F9 through F14.

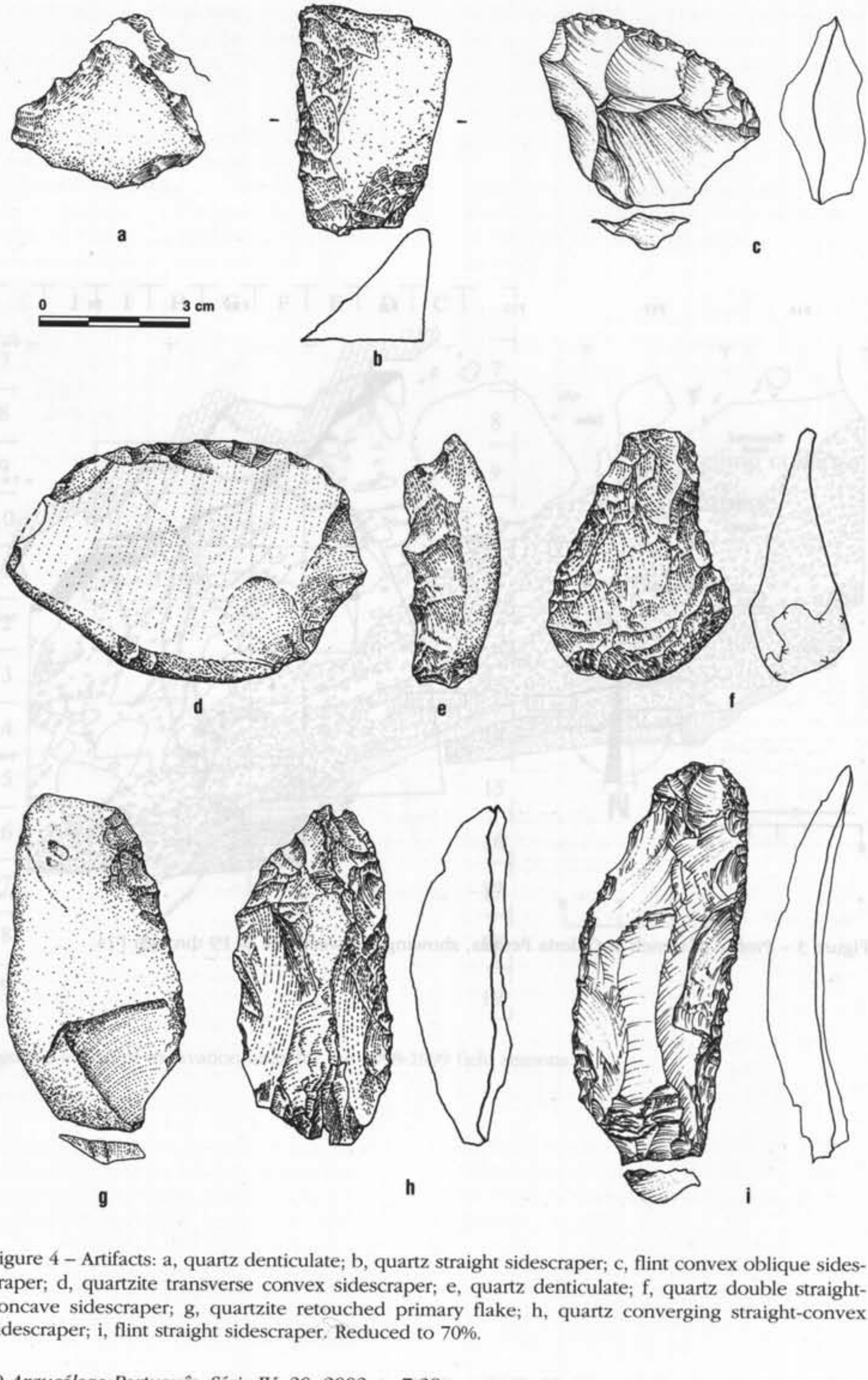

Figure 4 – Artifacts: a, quartz denticulate; b, quartz straight sidescraper; c, flint convex oblique sidescraper; d, quartzite transverse convex sidescraper; e, quartz denticulate; f, quartz double straight-concave sidescraper; g, quartzite retouched primary flake; h, quartz converging straight-convex sidescraper; i, flint straight sidescraper. Reduced to 70%.

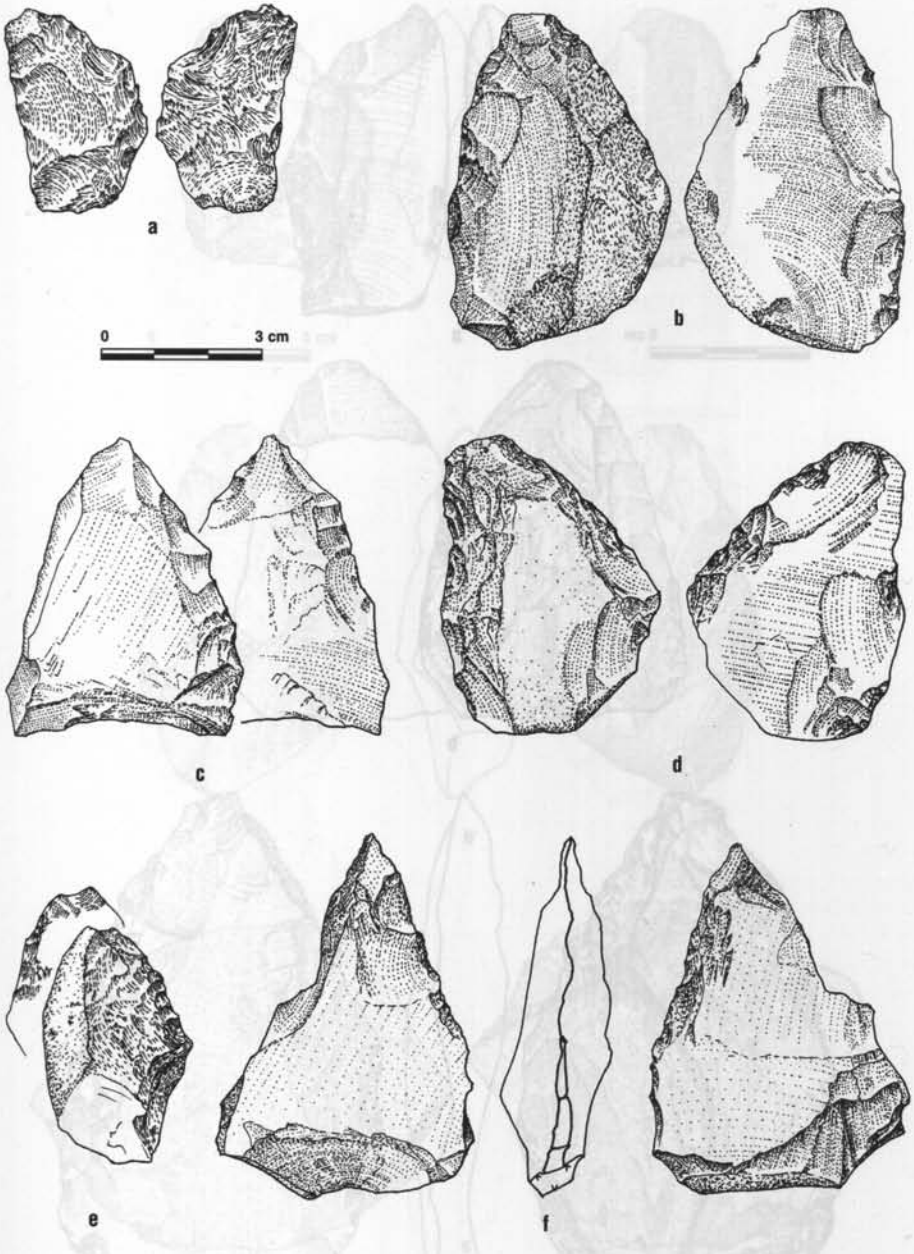

Figure 5 – Artifacts: a, quartz bifacial sidescraper; b, quartzite converging scraper with ventral thinning; c, f, quartzite "points" with bifacial side and tips; d, quartzite converging sidescraper with one bifacial edge and one with ventral thinning; e, quartz bifacial denticulate. Reduced to 70%

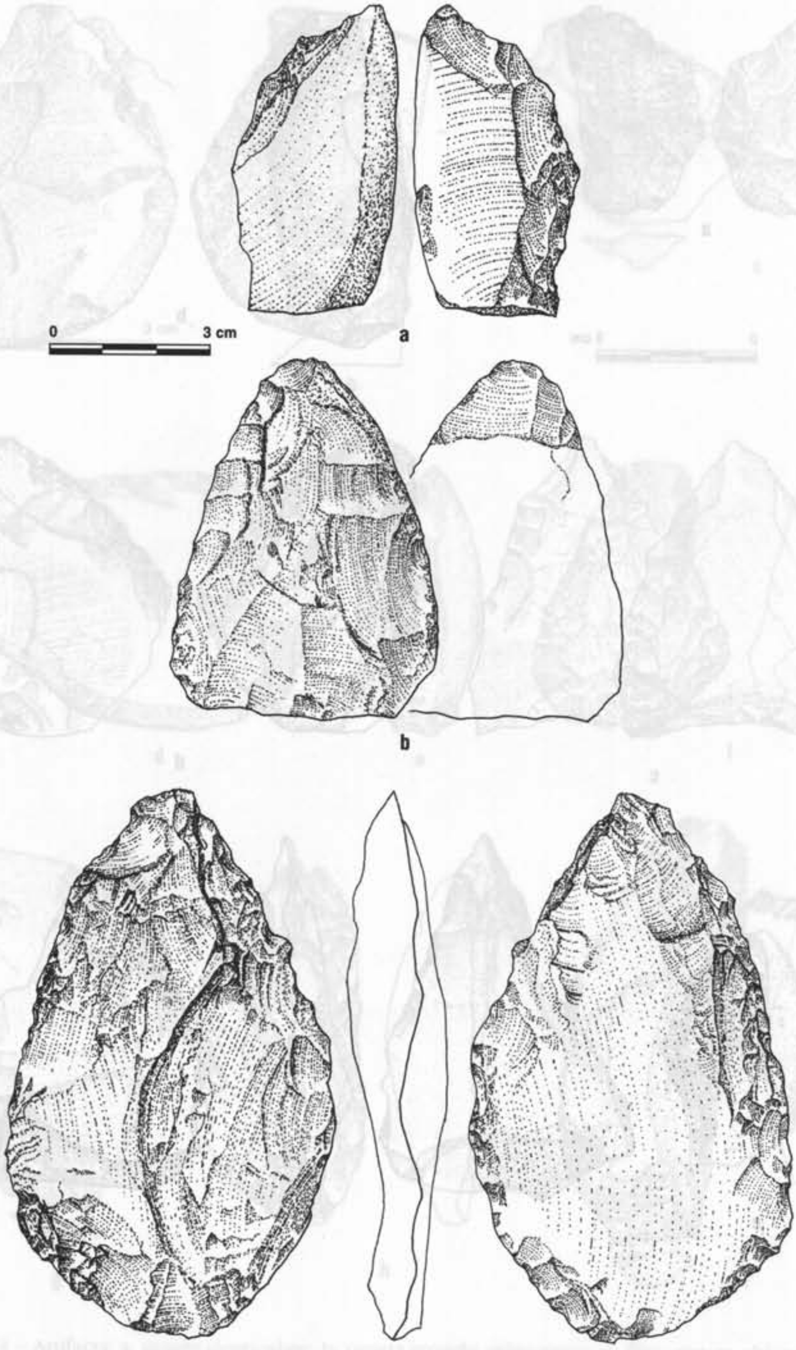

Figure 6 – Artifacts: a, quartzite early stage naturally backed bifacial knife (keilmesser); b, quartzite "point" with bifacially retouched tip; c, quartzite partially bifacial foliate made on flake. Reduced to 70%.

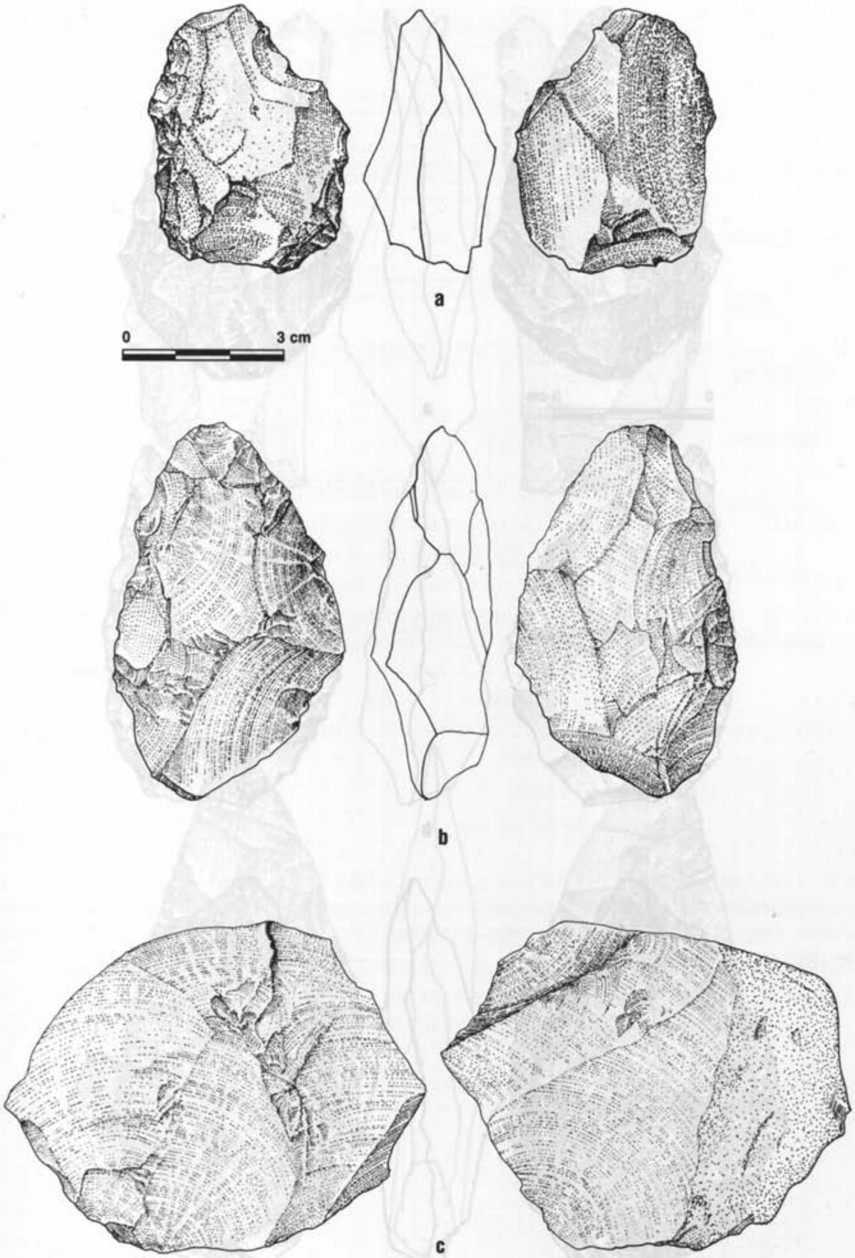

Figure 7 – Artifacts: a, quartzite core made into a scraper; b, quartzite core, approaching bifacial preform in shape; c, quartzite flake core. Reduced to 70%.

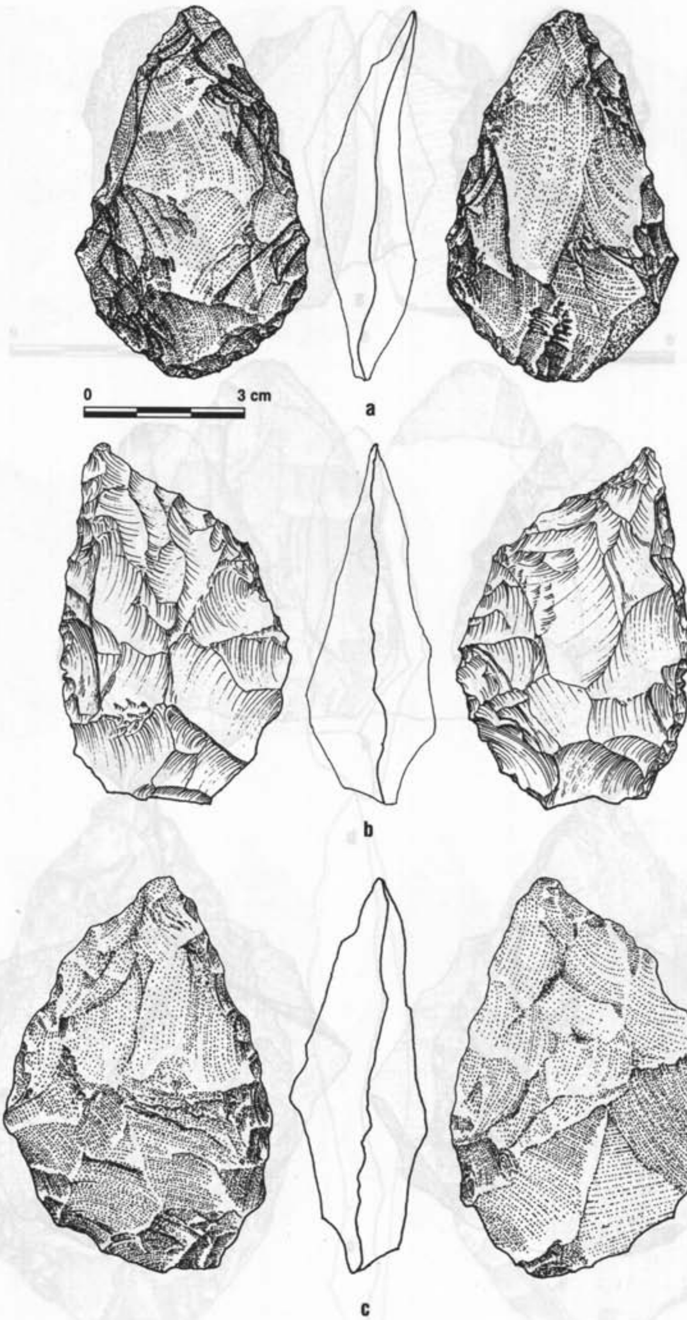

Figure 8 – Artifacts: a, quartzite bifacial foliate; b, small flint asymmetric biface; c, small quartzite asymmetric biface. Reduced to 70%.

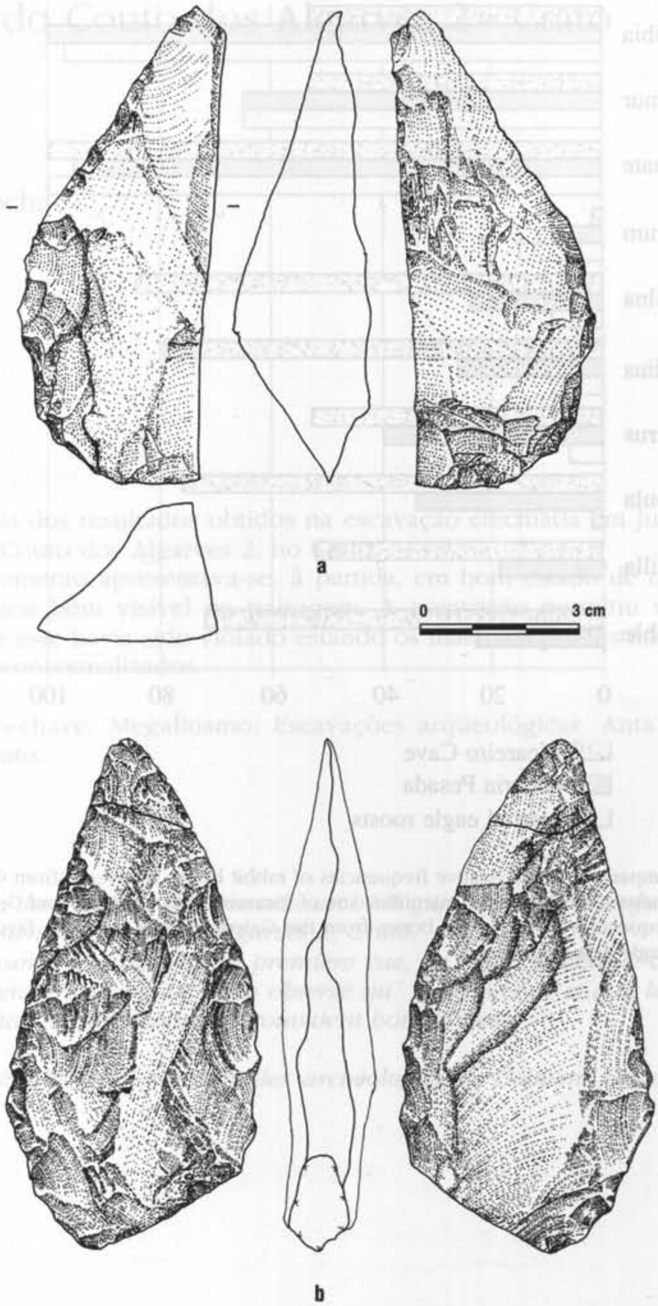

Figure 9 – Artifacts: a, split quartzite handaxe made into a Keilmesser with two para-burin blows, one on each face; b, quartzite bifacial foliate with part of the base unworked. Reduced to 70%.

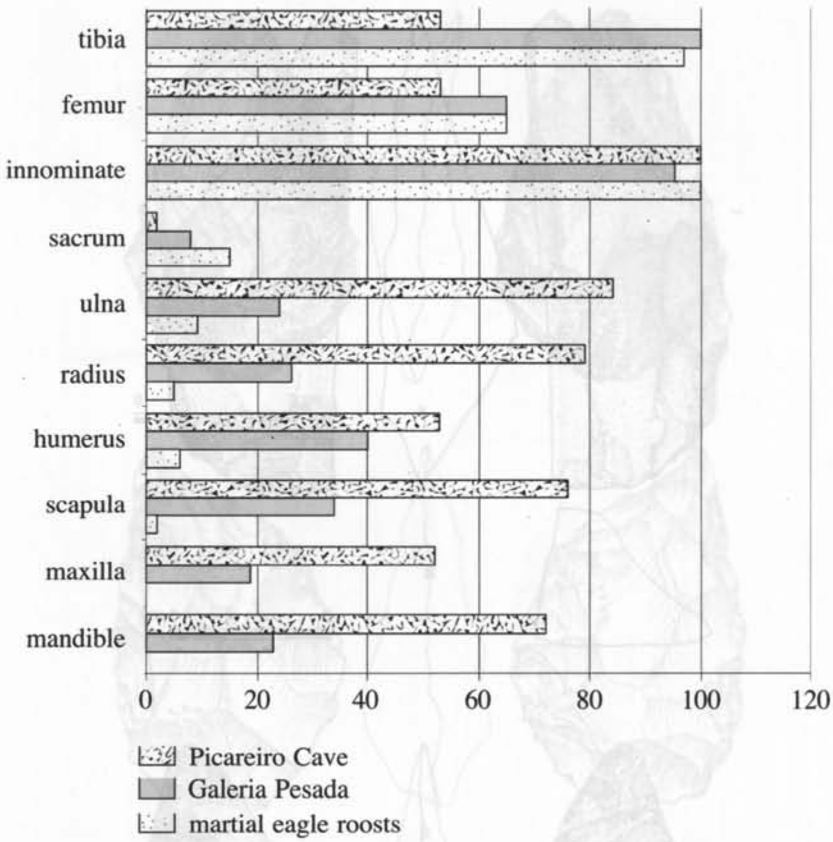

Figure 10 – Comparison of the relative frequencies of rabbit bones recovered from Galeria Pesada, modern eagle nests, and the Upper Paleolithic site of Picareiro Cave (Strata F and G; Magdalenian). The relative frequencies of the rabbit bones from the Galeria Pesada compare favorably to those from modern eagle nest assemblages