1 The earliest occupation of Europe: the Iberian peninsula

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A review of the Iberian evidence demonstrates that the oldest traces of human occupation date from the earlier part of the Middle Pleistocene. Though rare, the oldest lithic industries appear in all important river valleys of the continental interior. Larger assemblages already contain Acheulean bifaces, implying that the idea of an Iberian pre-Acheulean industrial ('pebble-culture') stage must be treated with caution.

1. Introduction

In the last two decades, it has become common practice to postulate the existence of archaic lithic industries in the Iberian peninsula, documenting an ancient human occupation. These ideas were partially due to the conception of an original Iberian Acheulean ("meridional Acheulean", F. Bordes 1971), presumably related to the North African Acheulean, and based on the occurrence of a high percentage of cleavers (Alimen 1975) and on the abundant use of quartzite as raw material. These ideas were considerably strenghtened as a consequence of the impact caused in Iberia by Biberson's work in the 1960s in Morocco, where he claimed to have defined a "civilisation du galet aménagé" (Biberson 1961), older than the Acheulean and apparently very similar to the Pebble Industries reported in the Portuguese littoral since the 1940s (Breuil and Zbyszewski 1942-45).

The later discovery of some identical finds, i.e. pebble tools, in the higher terraces of the Guadalquivir river (Bordes and Viguier 1971) and, more importantly, the identification (Bordes and Thibault 1977) and subsequent excavation (Querol and Santonja 1983) of the site of El Aculadero in the littoral near Cadiz, contributed to the recognition (or at least to the positive expectation) of an archaic human occupation in the Iberian peninsula: an occupation dating back to the Early Pleistocene, culturally defined as pre-Acheulean. Recently, the same idea has been reinforced by the discoveries in the Guadix-Baza depression of a small fragment of an occipital bone, supposedly human (Gibert 1985; Vega Toscano 1989), as well as of some lithic artefacts (Carbonell *et al.* 1982).

Today, however, it is widely believed that none of these finds can be accepted as proof of such antiquity because of the lack of solid dating evidence (sites in the Portuguese littoral and the Cadiz region), or because of doubts relating to the artificial character of the finds (the Guadix-Baza sites), or because the few and isolated lithic artefacts found in the interior of the Iberian peninsula will have to be disregarded (Santonja and Querol 1982) as they are insufficient evidence to support a hypothesis. In our present state of knowledge, it can be argued that the most ancient palaeolithic sites in Iberia can be dated to the beginning of the Middle Pleistocene. No sound evidence supports older dates (Santonja and Villa 1990; Aguirre 1991; Rolland 1992; Carbonell Roura 1992).

Severe limitations exist for the chronological framework of the Middle Pleistocene in Iberia, and sites are often difficult to date accurately within that period. With the exception of Atapuerca and Bolomor, these sites are all open-air localities and mostly related to fluvial sequences. Their chronological position is mainly determined by relative criteria. Absolute dating evidence for the initial Middle Pleistocene (prior to OIS 9) is only available from the site of Atapuerca (Burgos) and the Guadalquivir terraces. Two projects are presently in progress in order to obtain more absolute dates: one is concerned with such classic and important sites as Torralba and Ambrona (Soria), Bolomor (Valencia) and Cuesta de la Bajada (Teruel), the other is directed towards the open-air sites located in the Spanish sector of the Tagus basin.

Nevertheless, when the Middle Pleistocene sites of Iberia are studied in detail, they may provide evidence for placing them in a relative temporal sequence and it might thus be possible to differentiate between different major moments within that time-period. Even with these scarce data it might be possible to order the sites chronologically for the entire Middle Pleistocene, from its initial phases onwards.

2. Towards a relative chronology

The sequences of terraces known in detail, mainly from the Iberian continental interior, give us the most complete data presently available for placing the lithic industries in a chronological order. In addition, factors such as faunal associations, pedologic characteristics of the soils and some morphostratigraphic particularities of each area, can also be

used for a correlation between different fluvial valleys and/or distinct terraces levels.

Hence the knowledge of the different terrace systems constitutes one of the most important elements in the chronological order of the palaeolithic sites. In general, it can be said that the present Iberian hydrographic systems began to be formed after the deposition of the Villafranchian high detritic surfaces ("rañas"), dated to 2.5/2 Myr BP (Pérez González 1982 and 1982a; Molina 1991). Therefore, the highest river terraces in each major Iberian river can be attributed to the beginning of the Pleistocene. From that moment on a sedimentary process began, primarily controlled by tectonic factors and by the nature of the geological substratum. Climatic changes only had a secondary influence on this process. According to the number of terrace levels listed, three different terrace sequence formation models were identified in the continental Iberian interior (Pérez González *et al.* 1982):

1. The valleys with a large number of terrace levels (more than 20), with the highest at more than 150 m above the present river level.
2. The valleys with an intermediate number of terraces (8 to 10), and
3. Valleys with only a few terraces, with the highest at a mere 40 meters above the present river level.

This great diversity causes enormous problems, not only in the correlation between different river valleys, but also in the correlation between different geomorphological sectors within the same valley. Nonetheless, it is possible to make some general correlations and, in the case of the more developed valleys, it is even possible to isolate different series of terraces, based on the dimension of their escarpments, and to attribute them to consecutive periods within the Middle Pleistocene.

The almost complete lack of significant faunal associations in most open-air fluvial palaeolithic sites makes it very difficult to use any biostratigraphic reference tables, such as for instance the one established by E. Aguirre (1989):

EARLY PLEISTOCENE:

faunal associations of the groups

– "A": *Allophaiomys pliocaenicus*, together with Villafranchian carnivora like *Acinonyx*, *Viretailurus schaubi, Xenocyon rosi*.

Documented in sites such as Cueva Victoria, Orce 4, Incarnal and Bagur 2 and

– "B": *Allophaiomys pliocaenicus*, without Villafrachian carnivora, but with *Cuon priscus*, Mosbach wolf and new Bovidae, such as *Capra* and *Soergelia*.

Documented in sites such as Venta Micena 2, Barranco León and Orce 7.

INITIAL MIDDLE PLEISTOCENE (prior to OIS 13):

faunal associations of the

– "C" group: *Mimomys savini* with *Pitymys gregaloides* and *Pliomys episcopalis*, together with evolved *Mammuthus meridionalis* and, at the end of this time-period, *Mammuthus trogontherii, Dicerorhinus hemitoechus, Bison schoetensacki voigstedtensis*, different Cervidae, such as *Megaceros, Dama clactoniana* and *Cervus elaphus*.

Documented in sites such as Atapuerca TD-3 to TD-6, Huéscar 1 and Cueva del Congosto.

LATE MIDDLE PLEISTOCENE:

faunal associations of the groups

– "D": *Arvicola mosbachensis (= A. terrestris cantiana)* instead of *Mimomys savini*, together with *Panthera (Leo) fossilis, Mammuthus trogontherii, Elephas antiquus*, some archaic horses – *Equus altidens, Equus suessenbornensis* – and *Dicerorhinus etruscus, Bison priscus*, different Cervidae, etc. Documented in such sites as Cúllar de Baza I, Pinedo, Torralba and Ambrona (lower levels) and

– "E": similar to the preceding, without *Praemegaceros* and *Dolichodoriceros*, but with *Oryctolagus cuniculus, Equus caballus germanicus* and *Capreolus capreolus*.

Documented in such sites as Aridos, Solana del Zamborino, Atapuerca TD-TG 10-11 and TN-2 to 6, Pinilla del Valle, Ambrona (upper levels).

INITIAL LATE PLEISTOCENE:

faunal association of the

– "F" group: including the last *Elephas (P.) antiquus* and *Dicerorhinus hemitoechus*, with the appearance of *Rangifer tarandus, Capra pyrenaica, Rupicapra rupicapra, Equus caballus gallicus*.

Documented in Zafarraya, Carihuela, Cova Negra, Lezetxiki, Valdegoba, La Ermita, Abri Romani, etc.

However, the biostratigraphical limitations of these groups are stressed by Aguirre himself, either because of the uncertainty and chronological overlapping between several groups, or because of the clearly occurring different "transitional" assemblages, especially those from around the Early/Middle Pleistocene boundary. In addition, it must be emphasised that almost all the associations used to establish the oldest phases are found in purely palaeontological sites. The few Iberian open-air lower palaeolithic sites with important faunal assemblages, well-placed morphostratigraphically in the local terrace sequences and containing convincing anthropogenic evidence, are all too recent to be considered in this paper.

To summarise, it can be concluded that the discussion concerning the most ancient human occupation of Iberia is limited, primarily by the insufficiency of the chronological

framework presently available. As far as the Middle Pleistocene is concerned, it is only possible to make a relative seriation between different sites, within limited zones of particular river valleys. However, this seriation does indicate in a few cases the existence of human occupation prior to OIS 9.

3. The archaeological sites

With the chronological framework just referred to in mind, it is possible now to present the most important sites and sequences which document the first human occupation of the Iberian peninsula (Fig. 1). Emphasis will be placed only on those sites where the dates can reasonably be attributed to the initial stages of the Middle Pleistocene, presumably prior to OIS 9 (Fig. 2).

Due to the physical characteristics of the different zones of the Iberian peninsula, we will consider successively the following geographical units (according to Lautensach 1967, modified):

(1) The north of Portugal, Galicia and the littoral of Cantabria;
(2) The northern Meseta and the Iberian cordillera;
(3) The western Portuguese littoral and the lower Tagus basin;
(4) The southern Meseta, including the Spanish depressions of the Tagus and Guadiana rivers, the mountains in between (Toledo mountains) as well as the southern ones (Serra Morena), and the Portuguese western plateaus (Alentejo);
(5) The Ebro depression and the Pyrenean zone;
(6) The eastern Mediterranean littoral;
(7) The Algarve, Andalusia and the Segura basin.

3.1. The North of Portugal, Galicia and the littoral of Cantabria

Compared with the profusion of Middle and Upper Palaeolithic sites known in this region, the Acheulean localities draw attention due to two factors: there are only a few sites and these are all open-air (with the exceptions of the El Castillo cave, and possibly the Lezetxiki cave). Another characteristic which should also be considered is that in general they have very small lithic assemblages, often not diagnostic from a typological point of view. In fact some may not be Acheulean at all but more modern, even post-Palaeolithic (Rodriguez Asencio 1983; Cano Pan 1991; Meireles 1986). None of the sites known so far can reasonably be attributed to an early phase of the Middle Pleistocene. On the contrary, it seems that the most significant ones (such as Gelfa, Budiño, Bañugues, Llagú, Paredes and El Castillo) should be dated to a relatively late phase of that time-period.

3.2. The Northern Meseta and Iberian cordillera

The northern submeseta is a region where a large number of sequences, places and lithic assemblages dating to the Middle Pleistocene can be observed and ordered into a relative chronology. Therefore, it gives us the most complete framework for a discussion of the earliest human occupation in Iberia.

In the western half of the region, west of the Trabancos-Pisuerga rivers' axis, there are relatively abundant Acheulean sites in fluvial contexts, even though they often consist of strictly superficial finds and none of them yielded significant faunal assemblages. The finds in the eastern zone are very scarce and not diagnostic, with only a few exceptions in the Douro Basin and in the Iberian cordillera. It should nevertheless be noted that it is precisely in this last sector that some of the most important and famous Middle Pleistocene Iberian sites have been found, such as Torralba, Atapuerca and Cuesta de la Bajada.

Almost all the major western river systems have lithic assemblages, manufactured mainly from locally rolled quartzite pebbles. These assemblages are in stratigraphic position within the middle terrace formations, or at the surface of the upper ones, or even sometimes at the top of the highest Neogenic surfaces. Although there may be some sampling errors due to insufficient field surveys, the existence of an extensive occupation of the territory seems clear. There is a preferential selection of locations: the confluence of rivers and the vestibular areas of secondary valleys – an observation that points to the importance of the subsidiary fluvial systems in the organisation of human movement during this period (Santonja 1992).

The sites are very diverse: some are in stratigraphic position, either with large lithic assemblages (Tera, Pisuerga and Tormes rivers) or with small lithic series (Orbigo, Agueda and Trabancos rivers). Others, very abundant, are surface sites, often numerous and dispersed over large areas (Santonja and Villa 1990; Santonja in press). In the absence of absolute dates and significant faunal associations, their chronology is based, as we mentioned earlier, on the analysis of the morphostratigraphic sequences of each fluvial valley (Pérez González 1982).

At the Pisuerga river, west of León and outside the Cantabrian cordillera, there are a total of 8 terrace levels (2-m to 125/130-m). More than twenty Acheulean sites were found there: all of them surface sites, with the exception of San Quirce which is located in the 50-m terrace level and attributed to an ancient phase of the Middle Pleistocene (Arnaíz 1990). This site originates from a very low energy environment (possibly not integrated into the original terrace formation process, a hypothesis which could perhaps contribute to the rejuvenation of the

Fig. 1. Map of the Iberian peninsula, with sites mentioned in the text.

Northern Portugal, Galicia and littoral of Cantabria – 1: Gelfa; 2: Budiño; 3: Bañugues; 4: El Castillo.
Northern submeseta and Iberian cordillera – 5: La Maya; 6: Gargabete; 7: Monfarracinos; 8: San Quirce; 9: Atapuerca; 10: Ambrona; 11: Torralba; 12: Cuesta de la Bajada.
Western Portuguese littoral and lower Tagus depression – 13: Mirouço; 14: Alto Leião; 15: Magoito, Açafora, Aguda; 16: Vale do Forno/Alpiarça; 17: Quinta do Cónego/Pousias.
Southern submeseta – 18: Monte do Famaco; 19: El Sartalejo; 20: Pinedo; 21: El Espinar; 22: Aridos; 23: San Isidro; 24: Porzuna; 25: Albalá; 26: El Martinete.
Ebro depression and pyrenaic zone – no sites are presented in the map.
Eastern mediterranean littoral – 27: La Selva; 28: Puig d'en Roca; 29: Cau del Duc; 30: Mollet; 31: Bolomor.
Algarve, Andalusia and Segura basin – 32: Aldeia Nova; 33: El Aculadero; 34: Laguna de Medina; 35: Solana del Zamborino; 36: Cúllar-Baza I.

chronological attribution referred to above). An abundant lithic industry (made on local quartzite and quartz, with only some 7% of retouched tools, especially scrapers and denticulates, a few cleavers and pebble tools), has been documented, an industry apparently clustered spatially and in association with ash and a possible hearth, but without faunal remains.

The most important area with Middle Pleistocene lithic industries in the centre of the northern submeseta, with the exception of the Esla river valley and its main tributaries, is the Pisuerga river, north of Valladolid. Here are a total of 8 terrace levels, 6 of which have Acheulean-like assemblages.

In the Douro valley, the lithic assemblages are very rare. However, some of them, because of a morphostratigraphic position in the higher terrace levels (e.g. Monfarracinos and Toro, both located at the 80-m terrace level), should be considered as evidence of the most ancient human

	North of Portugal, Galicia and Cantabria	Northern Meseta and Iberian cordillera	Western littoral and lower Tagus	Southern Meseta	Eastern mediterranean littoral	Algarve, Andalusia and Segura basin
LATE PLEISTOCENE	Gelfa	La Maya I	Alpiarça (upper levels)	A. Oxígeno Porzuna El Martinete		
130 Kyr						
	? Budiño ? El Castillo ? Bañugues	Galisancho La Maya II Cuesta de la Bajada	Mealhada Almonda (EVS) Liz (Q3) Monte Famaco Alpiarça (middle levels)	San Isidro (lower levels) Aridos Sartalejo	? Cau d'en Borrás ? Tossal de la Font Bolomor	? El Aculadero Aldeia Nova Solana del Zamborino Guadalquivir T11
340 Kyr						
MIDDLE PLEISTOCENE		? San Quirce ? Torralba ? Ambrona (lower levels) La Maya III	Qta. Cónego ? Alpiarça (lower levels)	? Pinedo		Laguna Medina Guadalquivir T8
500 Kyr						
		Atapuerca TD6 Monfarracinos ? Atapuerca TD4 ?		El Espinar ? La Mesa ?		Cúllar Baza I Guadalquivir T6
730 Kyr						
EARLY PLEISTOCENE			? Magoito ? ? Mirouço ? ? Seixosa ?		? La Selva ? ? Puig d'en Roca ?	*Venta Micena ?*

Fig. 2. Chronological position of the most important Iberian Lower Palaeolithic sites.

Interrogation marks on the left denote serious doubts about the chronology; on the right, denote serious doubts about the anthropic evidence claimed to exist and/or the artefactual character of the assemblages. Within each space-time case sites are present without any chronological order.

occupation in the region. They date possibly to the early Middle Pleistocene or even to the end of the preceding period – if the artefactual nature of the few flaked pebbles and flakes found *in situ* in those levels is accepted.

To the east of the Trabancos river, in the southern half of the Douro basin, Lower Palaeolithic sites are almost unknown, while in the western valleys, between the Trabancos and Agueda rivers, biface and cleaver industries are frequently found. The most important sites are located in the Tormes, Huebra, Yeltes and Agueda river valleys, where in certain areas (mostly in the middle sector of each drainage system) several very complete morphostratigraphic sequences were recognised. Here, the sites are located at various geomorphological positions:

(a) on the surface of all terrace levels, assemblages have been found without any visible edge wear and varying in the number of artefacts;

(b) on the surface of the middle level terraces often large assemblages have been found, characterised by clearly worn edges;

(c) within the same terrace levels a few artefacts have been found in stratigraphic position (e.g. La Maya II and La Maya III);

(d) in the lower level terraces and other alluvial deposits, there are large assemblages with bifaces, cleavers, etc. (e.g. La Ermita, La Maya I and Villagonzalo).

In the Tormes river valley, where more research has been carried out, the Acheulean industries are all dated to the Middle Pleistocene. They have been located in the 56-m terrace level (La Maya III), the 62-m level (Gargabete), and the 8-m terrace level (La Maya I). There is no evidence of older assemblages, and those that are stratigraphically more recent than the 8-m terrace, located in the colluvial covering deposits, are clearly post-Acheulean (Santonja and González 1984).

Finally, in the eastern part of the Iberian river system region, the Acheulean sites are very rare (Santonja in press). Some of these, however, are of particular relevance due to their geological and geographical locations and to their taphonomic histories which led to the preservation of a large set of evidence (fauna, human remains, lithics, etc.). Four of the sites are worth mentioning:

(a) Atapuerca (Aguirre *et al.* 1987 and 1990; Carbonell *et al.* 1992), the importance of this site stems from the human remains found there. The existence of lithic industries is, however, also worth mentioning, including a very small number of artefacts (not entirely convincing) from a level (TD4) located "immediately" over a magnetic inversion, considered to be the Matuyama/Brunhes transition (and thus apparently dated to the initial Middle Pleistocene), and another assemblage, with bifaces, found in a level (TD6) attributed to OIS 13 on the basis of palaeontological data (it is the last level in the Atapuerca TD sequence where *Mimomys savini* is present);

(b) the classic sites of Ambrona and Torralba, located in a passage area between the Douro, Ebro and Jarama-Henares basins, and connected to the Mediterranean littoral by the Jaloca river valley (Fig. 3). The exact anthropogenic nature and chronological position of these sites within the Middle Pleistocene are still under discussion. There is no positive confirmation of dates presumably older than OIS 9. Nevertheless, these dates are possible for the "lower complex" levels in each site (Santonja and Villa 1990);

(c) Cuesta de la Bajada, located in the upper sector of the Alfambra river valley (50/60-m terrace), in Teruel (Santonja *et al.* 1992), dating from a relatively evolved Middle Pleistocene phase, perhaps post OIS 9.

3.3. The Western Portuguese littoral and lower Tagus depression

The Iberian western littoral is the region where the first occurrence of presumably very ancient pebble-industries, has been registered (Breuil and Zbyszewski 1942-1945). Located in the Portuguese Estremadura (Magoito, Açafora, Praia da Aguda, etc.), these lithic assemblages (Fig. 4) – almost all surface finds – were collected on the top of raised beaches. Their age was calculated according to the general glacio-eustatic model (the higher finds related to the 90-m level beaches were attributed to the mediterranean Sicilian time-period). In the 1970s identical finds were published, extending the collection of original observations both in a temporal and spatial sense: older sites, on the top of still higher beaches (such as Alto Leiäo, on a beach with a height of 150-m, claimed to be dated to the Calabrian II), and new finds along the littoral in the extreme southern part of the territory (such as Mirouço which is located in the western part of the Algarve).

Doubts concerning the dates of all Portuguese lithic assemblages referred to before, have been expressed

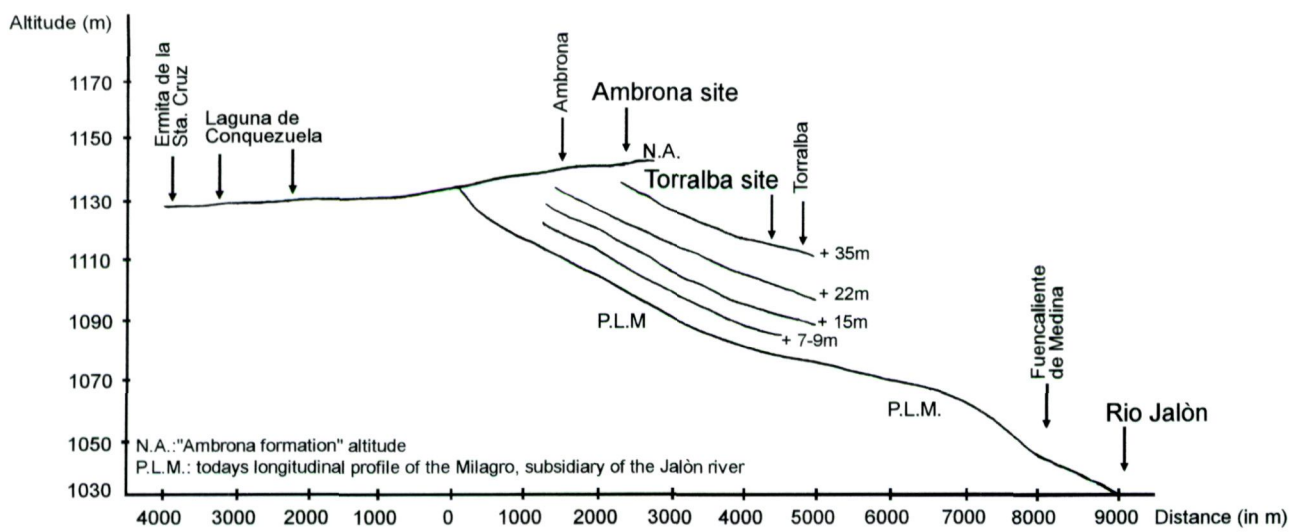

Fig. 3. Morphostratigraphic position of Ambrona and Torralba sites, within the terraces system of the Jalón river (after A. Pérez-González and M. Santonja).

repeatedly, using geological, geomorphological and typological arguments (Raposo 1985; Raposo and Carreira 1986). On the basis of present-day evidence, it must be concluded that Portuguese littoral "pebble-cultures":

(a) do not document beyond doubt any Early Pleistocene human occupation;
(b) may not constitute an independent techno-complex, either in a chronological (pre-Acheulean) or in a typological (pebble-culture) sense. In view of the limitations imposed by the small sized pebbles available in those raised beaches, they should be regarded as local variants of successive Palaeolithic techno-complexes.

A few Acheulean lithic industries have been found in some river valleys of the western Iberian littoral. The most famous site is Mealhada, in the Certima river valley, where lithic artefacts ("Upper Acheulean") have been found in association with faunal remains, reviewed by Antunes *et al.* (1988). *Oryctolagus cuniculus, Homotherium latidens, Elephas (Palaeoloxodon) antiquus, Equus caballus, Hippopotamus incognitus, Cervus elaphus*, and *Bos primigenius* are attributed to a later ("Rissian") phase of the Middle Pleistocene. The only possible evidence of an ancient Acheulean occupation comes from the surveying and excavation work recently carried out in the Lis river valley (Cunha-Ribeiro 1987, 1992). A total of 5 terrace levels were documented; two of these, the highest one, Q1a, and the penultimate one, Q3, have Acheulean assemblages, on the surface and in stratigraphic position. Although there are no absolute dates available for these two sites, the geomorphological position of the industries suggests the existence of a considerable amount of time between them, with an initial Middle Pleistocene date for the older one – a hypothesis supported by typological data coming from the site of Quinta do Cónego/Pousias (Cunha-Ribeiro 1990-91).

The last area to be focused on is the lower Tagus basin where abundant Acheulean industries are known from the surface of and in stratigraphic position within the middle terrace levels (+ 20/40-m terraces) (Breuil and Zbyszewski 1942-45; Zbyszewski 1946). The Alpiarça region is especially important due to the occurrence of successive stratigraphic Acheulean horizons. At Vale do Forno, for instance, G. Zbyszewski (1946), has described a sequence of 9 stratigraphic units, chronologically ordered from the initial Middle Pleistocene (conventional "Mindel") to the initial Late Pleistocene (early "Würm", represented by colluvial deposits). The biface industries occur in all sequences: from the basal gravels (level 2), where they were named "Clactono-abbevillian" (H. Breuil's and G. Zbyszewski's terms), to the upper silt and clay deposits. Recent TL dates for the upper levels, where "evolved" Acheulean and "Micoquian" assemblages are present, confirmed the idea (Raposo *et al.* 1985) of its relatively recent age (final Middle Pleistocene and initial Late Pleistocene). However, the base of the sequence is dated only by classic glacio-eustatic criteria, which makes it impossible to confirm the early date proposed for the first biface industries of this region.

3.4. The Southern Meseta

In contrast to the northern area, the southern submeseta is a complex region from a structural point of view. Basically, it is composed of two enormous sedimentary basins – the Tagus, including the Madrid region, and the Guadiana, including La Mancha and Calatrava. These basins are separated by ancient reliefs (Toledo mountains) and limited by Central, Iberian and Penibetic systems.

In the Madrid region, the terraces of Manzanares (with lithic industries mainly made in flint) and Jarama (with assemblages mostly made in quartzite) constitute one of the most classic areas for the study of the Acheulean in the whole of Iberia (*v.* Santonja and Villa 1990). Unfortunately, almost all of these sites have been destroyed by urbanization (Santonja and Querol 1980) and none can be attributed to an initial Middle Pleistocene phase. The oldest sites in the area, San Isidro (lower level) and Aridos (particularly important because of the faunal associations and the exceptional preservational conditions observed in an elephant butchery level (Santonja and Querol 1980), probably date to a relatively late Middle Pleistocene phase. Many others, such as Arriaga and Arenero de Oxígenio belong to much more recent periods, including the initial Late Pleistocene.

From the Jarama/Tagus confluence up to the Portuguese territory, numerous sites with Acheulean lithic industries have been located along the Tagus valley and in its tributaries (mainly the Alagón-Jertes system and the Ponsul). Some are stratigraphic finds, found within the middle and upper terrace levels. The oldest assemblages, in the Tagus + 70-m terrace (El Espinar) and in the + 120-m Alagón terrace (La Mesa), have only a few uncharacteristic artefacts. The most significant lithic assemblages are found only in relation with the middle terrace levels. These assemblages correspond to two different chronological phases of the Middle Pleistocene, which are well represented by three important sites:

- Pinedo (Fig. 5) (Tagus valley, + 22-m terrace) (Querol and Santonja 1979), apparently from the older phase, even if new data on the local terrace systems would be necessary to determine the exact chronological position of this site;
- El Sartalejo (Alagón valley, + 24/26-m terrace) (Santonja 1985) and

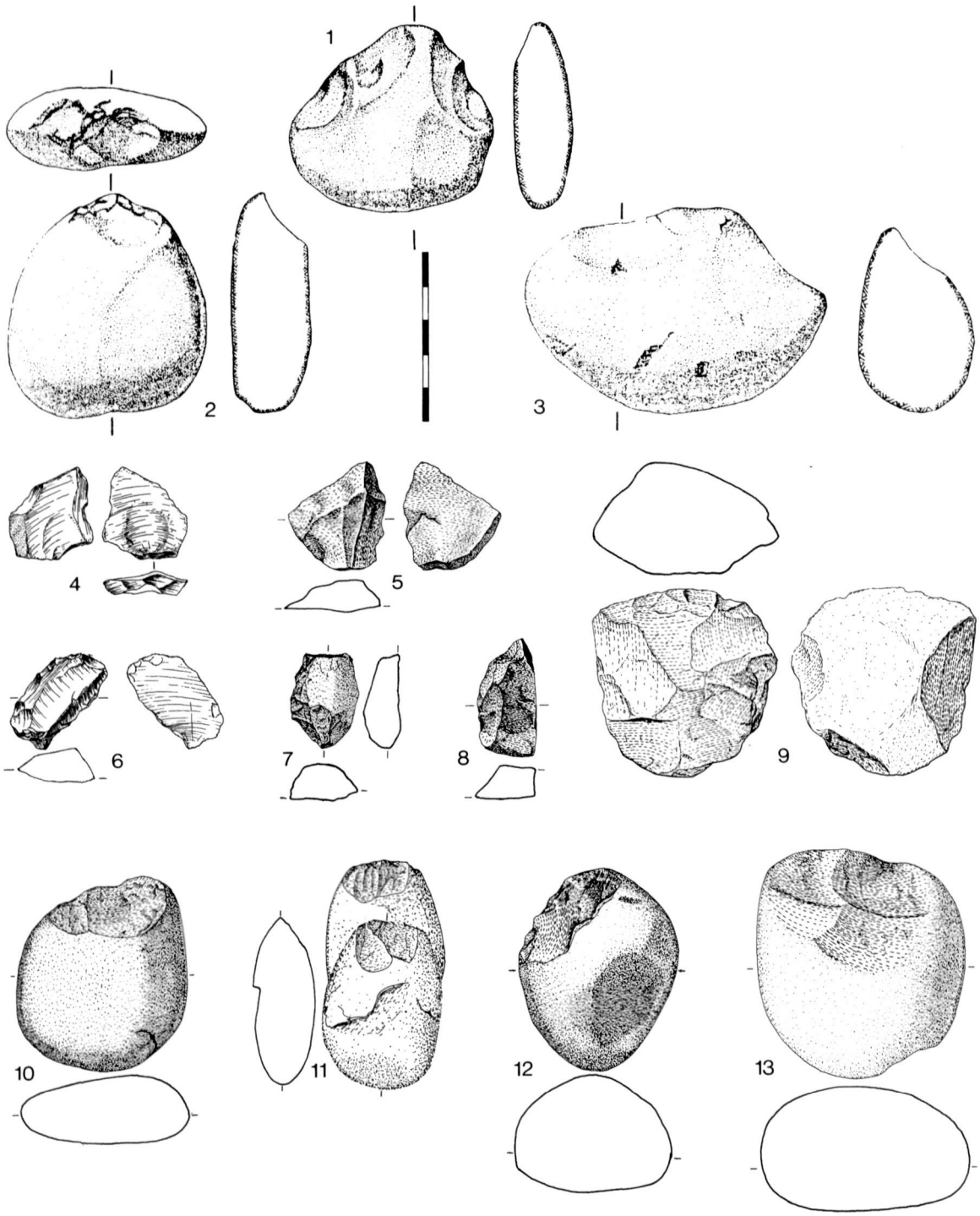

Fig. 4. Supposedly "archaic" ("pre-Acheulean") assemblages.
1, 3, 10, 12 and 13: choppers; 2, 11: chopping-tools; 4, 5: pseudo-levallois points; 6 to 8: scrapers; 9: discoid core.
All in quartzite, except 4 and 6 in flint.
Provenance – 1: Magoito; 2 and 3: Seixosa; 4 to 13: El Aculadero.
After L. Raposo 1985 (1 to 3), M.A. Querol and M. Santonja 1983 (4 to 13). Scale in cm.

– Monte do Famaco (Fig. 6) (GEPP 1977; Raposo 1987), from the younger one.

Pinedo is a site in secondary position with only a few non-diagnostic faunal remains (*Oryctolagus cuniculus, Elephas (Palaeoloxodon) antiquus, Equus, Hippopotamus amphibius, Cervus elaphus*, etc.), but it has nevertheless been possible to collect almost 6000 artefacts. This vast industry allowed the precise typological definition of what has been interpreted as an ancient stage in the evolution of the Acheulean, but where the influence of local raw materials (mainly quartzite cobbles and pebbles) could also play an important role.

El Sartalejo is a site where some 600 artefacts were collected in a systematic surface survey, allowing the establishment of an evolved typological stage within the Acheulean.

Monte do Famaco is also a surface site, where an intensive survey led to the definition of an apparently spatial patterning in the distribution of the lithic industry, which consisted of more than 1500 artefacts.

If, in addition to these sites, we take into consideration some sites located in different terraces, and if we also keep in mind all terrace sequences of adjacent valleys, it will be possible to build a chronological framework, in general identical to the one already presented for the northern Meseta (especially in the Tormes river valley): the oldest finds from the upper level terraces can be placed in the beginning of the Middle Pleistocene; Pinedo, as well as some other sites in the same geomorphological position (such as Monte do Famaco, worn series, Raposo 1987), are dated to a more recent phase of the Middle Pleistocene, but new observations on the exact position of the different terraces within each fluvial valley are necessary (in this regard, the exact datation of Pinedo, which could be more recent than previously thought, is particulary relevant); El Sartalejo and Aridos must be placed in a late Middle Pleistocene phase, but again, older than several other sites, still characterised by the presence of biface industries located in the lower terraces.

In the extreme southern part of the region, across the entire Guadiana river basin, the localities with Middle Pleistocene industries are rare. In La Mancha, for instance, there is a considerable number of surface sites, which are often very large and spatially extensive and probably represent workshop areas, dating to different periods but mainly to post-Acheulean times (Santonja 1986). At Calatrava, the Guadiana river (with 5 terraces levels) and the Jabalón river (with 8 terrace levels), both have Acheulean industries in the lower terraces (El Martinete, Alabalá, Porzuna), all of them dating to the late Middle Pleistocene or, perhaps, to the initial Late Pleistocene (Santonja 1981).

3.5. The Ebro depression and Pyrenean area

Following the idea expressed earlier about the scarcity of Middle Pleistocene lithic industries in the eastern part of the northern Meseta and the Iberian cordillera, the Ebro river region and the Pyrenean zone seem to be almost deserted. Assemblages possibly dating to the final Middle Pleistocene are only reported from the Najerilla sub-basin (Utrilla 1984). They can, probably, be related to the Atapuerca sites due to the geographical connections between the two regions.

It is difficult to explain the scant evidence, which is still to be confirmed by new and more intensive field work. However, one thing is certain: it cannot be attributed to the non-preservation of sediments, since the Ebro and several other rivers in the region present well developed Middle Pleistocene deposits, occasionally formed in very low energy environments (such as the Gallego river), in which any human occupation would be preserved.

3.6. The Eastern mediterranean littoral

Again in this region, there are not many Middle Pleistocene archaeological finds. In Catalonia, the existence of archaic pebble industries has been reported, dating to the beginning of the initial Middle Pleistocene or even to the final Early Pleistocene. These assemblages, in the Ter river valley (Puig d'en Roca) and in the La Selva area (Carbonell *et al.* 1978), are mainly surface finds and, consequently, impossible to date precisely. Nor can the assemblage of the Cau del Duc cave (Lumley-Woodyear 1971) be dated exactly. In this cave taphonomic processes may have mixed apparently old Acheulean tools with other, clearly more recent, ones.

The existence of an Acheulean cave occupation in this region is, however, one of its most striking aspects. In the Castellón and Valencia areas to the south of the Ebro river, the occurrence of some Middle Pleistocene human occupations in at least three caves has been reported: Cau d'en Borrás, Tossal de la Font (Carbonell *et al.* 1979; Gusi Jener *et al.* 1983; Arsuaga and Bermudéz de Castro 1984) and, more importantly, at Bolomor, presently under excavation (Fernández Peris 1990), where recent TL and amino-acid dates suggest that the basal part of the sedimentary sequence could be older than OIS 9.

Very few of these finds have been found in the remaining area of the Mediterranean littoral, up to Gibraltar. Here, the Middle Pleistocene sites are extremely scarce and only in some very restricted places, mostly in fluvial contexts (such as the upper Guadalhorce valley, near Malaga), there are a few references to small assemblages of quartzite bifaces and cleavers, without clear dates however (Barroso *et al.* 1993).

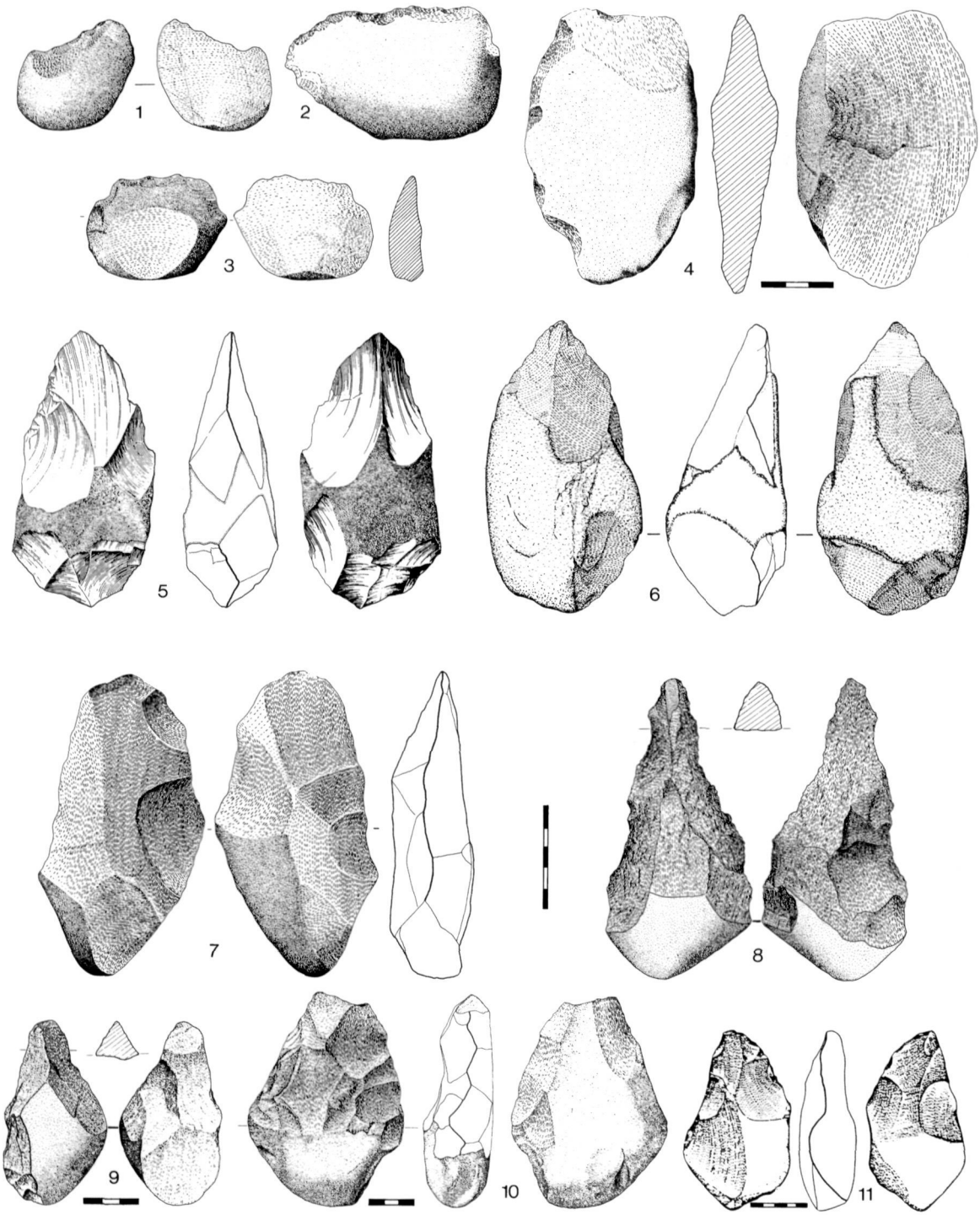

Fig. 5. Acheulean assemblages presumably older than OIS 9.
1: scraper; 2 and 3: denticulates; 4: cleaver; 5 to 7, 10 and 11: bifaces; 8 and 9: trihedrals.
All in quartzite, except 5 in flint.
Provenance – 1 to 9: Pinedo (after M.A. Querol and M. Santonja 1979); 10: La Maya III (after M. Santonja and A. Pérez-González 1984); 1: Laguna Medina (after F. Giles Pacheco *et al.* 1993). Scale in cm.

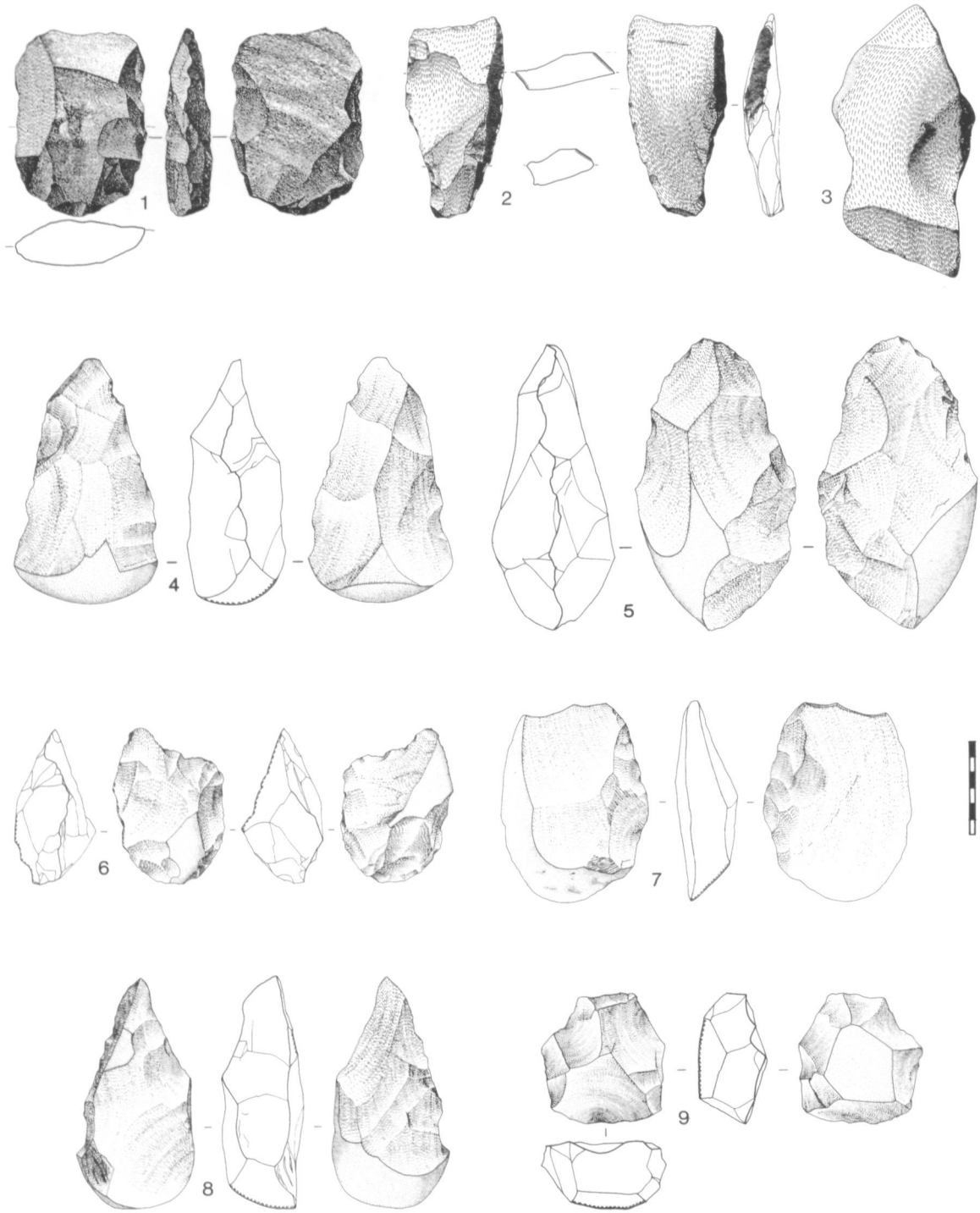

Fig. 6. Acheulean assemblages presumably younger than OIS 9.
1, 2 and 7: cleavers; 3: core used to obtain a large cleaver flake; 4 to 6: bifaces; 8: trihedral; 9: Levallois centripetal core.
All in quartzite.
Provenance – 1: La Maya II (after M. Santonja and A. Pérez-González 1984); 2 and 3: El Sartalejo (after M. Santonja in press); 4 to 9: Monte do Famaco (after L. Raposo *et al.* 1993a). Scale in cm.

3.7. The Algarve, Andalusia and the Segura basin

In the south of the Iberian peninsula, the major geographical unit is the hydrographic basin of the Guadalquivir river. It is a complex zone because of its geological substratum and its morphostructural characteristics, which has a number of particularities to be treated separately from the eastern Plio-Pleistocene depressions.

The oldest human occupations claimed to be documented in this region are related to the littoral areas, especially in the Cadiz zone. The most significant site is El Aculadero (Bordes and Thibault 1977), where a vast pebble-industry found in stratigraphic order has been studied in detail (Querol and Santonja 1983) (more than 22,000 artefacts in fewer than 100 excavated sq. meters). This site was initially considered to be the equivalent of stage III of the Moroccan "civilisation du galet aménagé" (Biberson 1961). Unfortunately, it has so far not been possible to date precisely any of these supposedly ancient sites, including El Aculadero, which seems much more recent (final Middle Pleistocene or a little earlier) than was initially supposed. In consequence, like in the Portuguese western littoral, the apparent techno-typological archaism of these lithic industries, made on small sized pebbles, should rather be attributed to raw material limitations than to any particular great antiquity.

The idea of the nonexistence of an archaic Early Pleistocene occupation in this region has also been reinforced by recent work carried out near Sevilla in the Guadalquivir lower and middle course, in an area where abundant Acheulean assemblages are known. The local morphostratigraphic fluvial sequence has been described in detail by Díaz del Olmo and Vallespí (1989, 1993), allowing the identification of a total of 14 terrace levels, with a chronology supported to a certain extent by several absolute dates (U/Th and palaeomagnetism). In brief, the following sequence can be presented:

- between the T3 terrace level (+ 169-m) and the T4 level (+ 142-m) the Jaramillo event (950/890 Kyr BP) can be placed;
- the T6 level, with a normal polarity, is dated to the Brunhes epoch;
- some lacustrine deposits related to the T10 level (+ 55-m) have been dated to the Biwa phase (300 Kyr BP);
- and the Las Jarillas carbonated deposit, at the top of level T10 (+ 29-m), is dated to 80 Kyr BP (U/Th)(Diaz del Olmo *et al.* 1989 and 1993).

The first lithic industries found in stratigraphic position within this sequence, are related to the T6 level, dated to the initial Middle Pleistocene. Consequently, they do not confirm the supposedly earlier occupation referred to in the littoral, nor can they be more informative about a cultural affiliation because of their scarcity. The first and rare bifaces appear in level T8, dated to the first half of the Middle Pleistocene, prior to OIS 9. However, only from level T11 onwards are the Acheulean assemblages extensively represented, with large numbers of retouched tools: bifaces, cleavers, trihedrals, clear flake-tools and, for the first time, the use of the Levallois method. In addition, it should be noted that up to level T10 quartzite is used in all industries; flint is only used in the later levels. This change is probably related to varying raw material availability as a result of changes in sedimentary fluvial processes.

Acheulean industries were also found in the Guadalete river, an ancient Guadalquivir branch, which began to form its own terrace system during the Middle Pleistocene (Zazo *et al.* 1985). These industries, made on compact limestone and quartzite, were located in 4 successive terrace levels (F. Giles Pacheco *et al.* 1992). The older one (+ 45/50-m) can, perhaps, be attributed to an earlier phase of the Middle Pleistocene and reveals the existence of Acheulean industries (such as the Laguna Medina site, Giles Pacheco *et al.* 1989 and 1993) equivalent to those of Pinedo.

In the Portuguese Algarve, in the western sector of the region, the only significant Acheulean industries are found in the Guadiana estuary. Some of these industries are in stratigraphic position in the 8-12-m terrace level (such as Aldeia Nova - Feio 1946). These are, however, small assemblages and not precisely dated.

Finally, the important eastern tertiary depressions must be mentioned: Granada, Guadix-Baza-Orce, Huercal-Overa and Vera. The deposits in the last two depressions originated mainly in marine environments while the others are characterised by drainage and continental deposits. The importance of these depressions derives mainly from the very complete depositional sequence they present, revealing an almost sedimentary continuum from the Late Miocene to the Late Pleistocene, including different well-dated palaeontological sites.

Nevertheless, the anthropogenic evidence is scarce (Santonja and Villa 1990). Without considering, because of their ambiguity, the supposedly human remains found at Venta Micena and dated, by biostratigraphical criteria, to more than 900 Kyr BP, the oldest site in the area is Cúllar-Baza I (Ruiz Bustos and Michaux 1976). It is dated, based on biostratigraphical arguments (faunal association including among many others *Acanthodactylus eritrurus, Eliomys quercinus, Apodemus sylvaticus, Arvicola mosbachensis (= A. terrestris cantiana), Microtus brecciensis, Canis etruscus, Mammuthus trogontherii, Equus suessenbornensis, Equus altidens, Dicerorhinus etruscus, Praemegaceros verticornis*) to the initial Middle Pleistocene, perhaps prior to Pinedo. The small lithic

industry from this site (only six flakes and two choppers) does not allow a typological diagnosis (Vega-Toscano 1989), but it is nevertheless very important because it documents beyond any doubt the human occupation of this area (and, therefore, for the Iberian peninsula) in a period where it is very difficult to find well-dated sites.

Solana del Zamborino, another and from an archaeological point of view certainly the most important Middle Pleistocene site in the same depression (Botella *et al.* 1975), probably dates from a later phase. Its fauna (Aguirre's group "E") contains, among others, *Eliomys quercinus, Eliomys lusitanicus, Arvicola sapidus, Apodemus flavicollis, Panthera leo spelaea, Felis lynx pardina, Felis sylvestris, Macaca sylvanus, Elephas (Palaeoloxodon) antiquus, Equus caballus torralbae, Dicerorhinus hemitoechus, Hippopotamus* sp., *Cervus elaphus, Dama* sp., *Capreolus capreolus, Bos primigenius, Bison priscus* (Martín Penela 1987). The anthropogenic evidence, apart from an abundant lithic industry (Fig. 7) mainly on quartzite and quartz (but also on some local flint), with scrapers, denticulates and a few bifaces, includes also some habitational features: a hypothetical "trench", interpreted as a hunting trap, and an apparently convincing hearth, defined by a circle of five quartzite pebbles, with an impressive amount of charcoal and ash in the middle.

4. Conclusions

We have reviewed the most important sites and morphostratigraphic Iberian sequences, which may indicate the possible occurrence of human occupational traces prior to OIS 9. The general conclusion is that these occurrences do exist, although they are very scarce and often dubious.

To begin with, it has been observed in several regions that no real evidence can be dated beyond any doubt to such an ancient period. This applies to northern Portugal, Galicia and Cantabria, and also to the Ebro river depression and the Pyrenean zone. In some other regions, such as the Portuguese western littoral and the Mediterranean eastern zone, there is some evidence which can be reasonably dated to the initial Middle Pleistocene, but without absolute certainty. Only in the continental interior (northern and southern Meseta) and in the Guadalquivir valley did we find proof of such an ancient occupation, although even in this case there is no clear evidence of an older human presence dating back to the Early Pleistocene.

In consequence, the oldest human traces in the Iberian peninsula must be dated to the initial Middle Pleistocene. Their exact date, however, is not well established, since most sites are dated by relative morphostratigraphical criteria. Even in the few sites from which absolute dates were obtained, not one of their archaeological horizons has been dated directly.

It is worthwhile to note, however, that these oldest lithic industries, in spite of their rarity, do appear in all the most important river valleys of the continental interior: Douro, Tagus and Alagón, Guadiana and Guadalquivir, thereby documenting an extensive human occupation. The lack of solid equivalent evidence in the whole littoral is puzzling, but this may possibly be attributed to the chronological uncertainty of the finds located in ancient raised beaches.

The oldest lithic assemblages of the Iberian peninsula are very scarce. In general, the sites placed at the top of fluvial morphostratigraphical sequences present only a few artefacts, usually fewer than ten (flakes and pebble tools). Bifaces have not yet been discovered but this may be due to the sample size. The first significant and relatively well-dated Iberian industries have already the kind of large cutting tools used to define the Acheulean (*sensu lato*). Consequently, the idea, accepted in the last two decades, of the existence of a pre-Acheulean industrial stage in Iberia, in the form of the so-called "pebble-cultures", must be treated with caution.

Contrary to what has been suggested occasionally, the biface industries in Iberia are not all relatively recent. In all major fluvial sequences reviewed, and also in some sites located in other geological environments (Atapuerca, for instance), we saw that the first large cutting tools, including bifaces, trihedrals and cleavers, appear prior to OIS 9. Again, they appear in very small numbers and the sites documenting this initial industrial bifacial phase are relatively rare – an occurrence in great contrast to the abundance and variety of Acheulean assemblages and sites dated to the second part of the Middle Pleistocene and, in some regions at least, to the initial Late Pleistocene.

The verification of such a vast chronological distribution, and the influence of some general models built elsewhere (in France, by H. Breuil and F. Bordes; in Morocco, by P. Biberson; in Algeria, by H. Alimen; etc.), led to a search for general evolutionary trends in the Iberian Acheulean. The existence of a sequence of stepped linear stages has been defended: "lower", "middle", "upper" and "final" Acheulean, some of which further divided in order to obtain greater "precision". We believe that this kind of detailed division serves no purpose, due to the nonexistence of solid and numerous absolute chronological references and to the scarcity of many assemblages. In view of the limitations imposed by the relative temporal framework currently used, in particular when inter-fluvial correlations must be made, we think that at present it is not possible to ascertain to which causes the lithic diversity and variability should be assigned: time, space, raw material availability, cultural affinities, etc. It is true that within the few fluvial morphostratigraphical sequences where different and successive chronological Acheulean stages have been

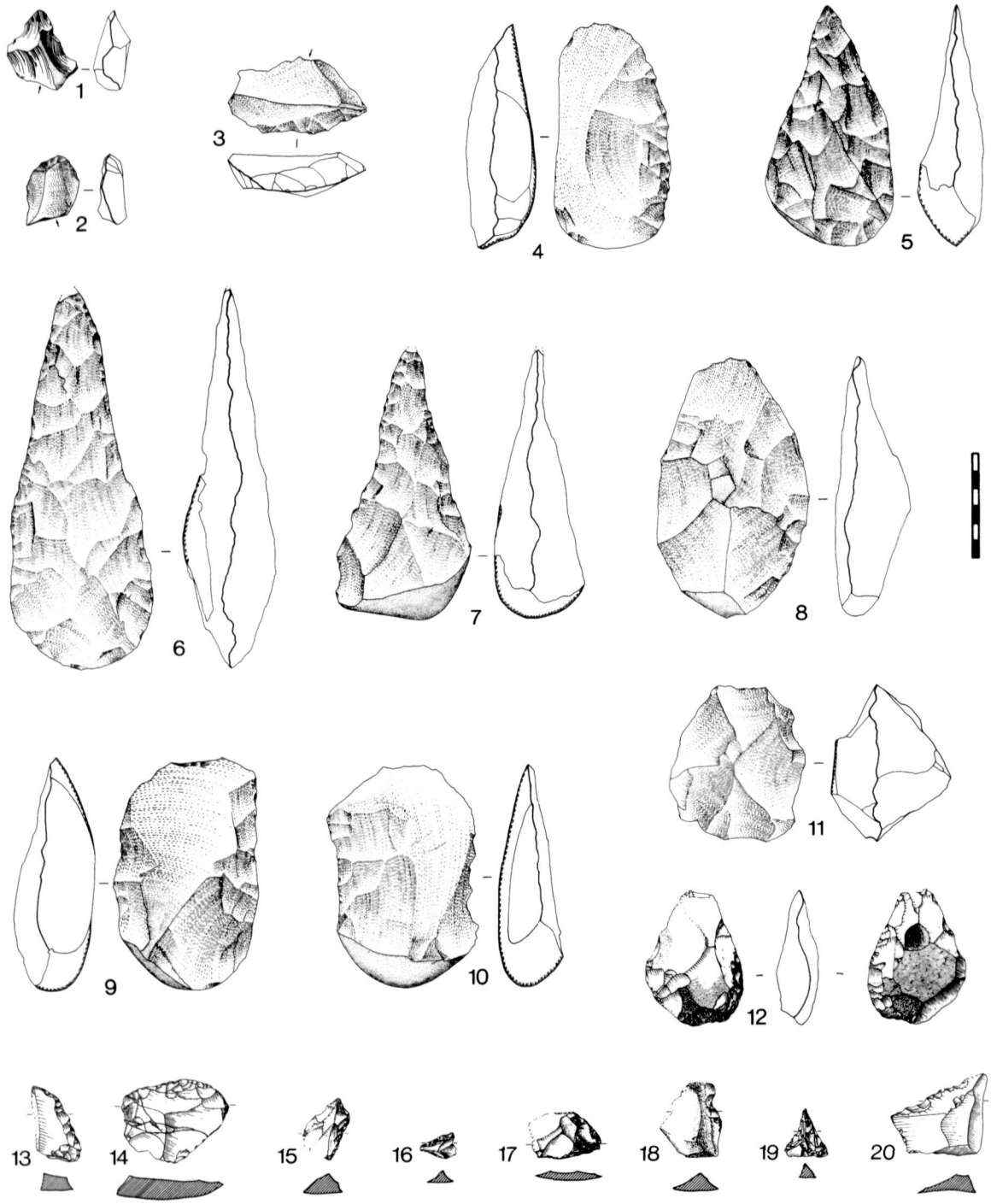

Fig. 7. Upper/Final Acheulean assemblages (final Middle Pleistocene or initial Late Pleistocene).
1: Tayac point; 2 and 17: endscrapers; 3, 4 and 14: sidescrapers; 5 to 8 and 12: lanceolate, micoquian, ovalar and cordiform bifaces; 9 and 10: cleavers; 11: bipyramidal centripetal core; 13, 16, 18, 19 and 20: denticulates and notches; 15: backed knife.
1, 12 to 20: flint; 2 to 11: quartzite.
Provenance – 1 to 11: Milharós (Alpiarça) (after L. Raposo *et al.* 1985); 12 to 20: Solana del Zamborino (after M.C. Botella *et al.* 1976).
Scale in cm.

established with some certainty, the earliest biface industries present more "primitive" technical and typological characteristics (see the summary presented in Santonja and Villa 1990:87). They are, however, not sufficient to support any generalization. With the present data-base, we believe that it is only possible to distinguish a final stage of the Acheulean in all biface industries, frequently named "Micoquian" (Manzares river, lower Tagus drainage, at Alpiarça, Guadiana, and little else), and dated, at least partially, to the initial Late Pleistocene. In relation to the Middle Pleistocene phases, the sole aspect to be retained is the scarcity of bifaces prior to OIS 9 and their abundance thereafter. This is an observation which could be subject to speculation in view of the models that suggest an intermittent initial occupation of Europe and thus question the character of the relationship (continuity/break) between the first handaxe industries (Acheulean 'Abbevillian') and the more recent Middle Pleistocene Acheulean assemblages.

The development of absolute dating programmes, either of archaeological sites or of geological formations, in fluvial contexts (as has already been initiated in the Guadalquivir river and is now being executed in the Spanish Tagus basin), clearly should be one of the first priorities of the Iberian Middle Pleistocene research. It would also be important to date some of the coastal sites, especially of the western Portuguese littoral and of the Cadiz region. With such a rigorous and detailed chronological framework, which will allow a judicious selection of particular sites and sequences, it will be useful to re-evaluate, among other questions, the existence of general evolutionary trends within the Acheulean, the functional archaeological nature of each site, the geographical distribution of different sites (within each region and all over Iberia), the relations existing between Iberia and adjacent areas, and so on. These are very important questions, particularly since, whatever model is used, it seems clear that only in southernmost Europe we can expect a continuous Middle Pleistocene archaeological record, free from significant environmental constraints. Such is the case of the Iberian subcontinent.

Final remark

Between the initial elaboration of this paper (September 1993) and its final revision (March 1995) some new observations suggested once again the possible occurrence of a scarce human occupation in Iberia, dating back to the final Early Pleistocene. Near Venta Micena, in the Guadix-Baza basin, a site containing a small, but inquestionable, lithic industry, Fuentenueva 3, has been located (Alain Turq, personal communication, to be published in the "*Compte Rendu de l'Académie des Sciences*", Paris), apparently dated to the Jamarillo event (*c.* 950/890 Kyr BP) on the basis of geomorphological, sedimentary and faunal criteria. This idea seems to be reinforced by new chronological data on the lower beds of the Atapuerca sequence (TD4 to TD6 levels) and on the middle-upper terraces of the Douro river. In this regard, the hypothesis of a final Early Pleistocene occupation in Iberia remains an open question, especially because it seems clear now that around 1 Myr ago humans were already at the southern frontiers of Europe, from the Caucasian area to the littoral of Morocco. The critical approach used in this paper plays an important role, as it became current in the last two decades to accept uncritically almost all indications of ancient human occupations in Iberia, and elsewhere. But, as W. Roebroeks already noted (1994, 302), one of the advantages of the "short chronology" scenario, favoured by ourselves and most of the participants in the "Tautavel meeting", is that "it is easy to falsify". Maybe the recent finds from Iberia, if proven to be valid in the future, can yield the evidence which is currently still missing.

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