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Introduction

1.1. Objectives, methods and sampling

The general aim of this publication is to contribute to the study of the political and economic relationships within the communities occupying the North-Eastern Iberian Peninsula between the end of the fifth and the beginning of the fourth millennia cal BC. This objective has been materialised mainly through the study of the means of production of these communities as well as the interpretation of their funerary practices. More specifically, the economic and symbolic management of the so-called polished and bevelled artefacts (hereinafter referred to as "PBAs") was addressed in the framework of a general review of the historical period problematics, bearing in mind all the possible data concerning the materiality of the Pit Burial Horizon, in a process of raising and solving questions. In this sense, the polished and bevelled artefacts were understood as a means of arriving at sociological interpretations and not as an ultimate objective.

PBAs have played a fundamental role in the formulation of some of the most relevant paradigms and interpretations – in particular, those relating to the Pit Burial Horizon, and those concerning the Neolithic in general. Our objective here was to address the study of these instruments with a view to generating a *corpus* of new data which would allow us to resize and widen the current research interpretative margins. In order to effectively give these artefacts a new dimension, a functional and technological analysis, as well as a characterisation of the raw materials, have been conducted. The functional determination is the most important and revealing part of this work as no such use-wear analyses have been systematically performed on PBAs until now. This fact made it necessary to develop an applied methodology involving the implementation of an extensive experimental programme aimed at providing an interpretative reference framework enabling solid functional inferences to be drawn. The complete artefact biographies were reconstructed, from the way the raw materials were processed all the way to their economic and symbolic uses. In petrographic studies undertaken as part of this research, attention was paid to the characteristics of the raw materials and their origin at a very general level, summarising the studies carried out to date on rocks of Trans-Pyrenean origin and determining the petrographic characteristics of local materials through macroscopic observations.

The site sampling followed one basic criterion: a preference for data quality over quantity. That is why only archaeological assemblages consisting of more than 5 reliable structures were considered, while isolated contexts were disregarded. Furthermore, a thorough selection of the more dependable contexts was performed following the standards detailed by Duboscq (2017). A comprehensive review of all the Pit Burial contexts where PBAs could be traced was conducted according to these conditions, thus making it possible to assemble a coherent, comparable and meaningful sample. Each site was subjected to a detailed exploration so that an integral and integrated interpretation could be achieved in the framework of the other research projects already carried out or still in progress.

This work includes two main study areas: Vallès-Barcelonès and Penedès. The first is represented by the Bòbila Madurell-Can Gambús 1–2 (Sant Quirze del Vallès- Sabadell, Vallès Occidental) and the Prehistoric Mines of Gavà (Gavà, Baix Llobregat), whereas the second one comprises the archaeological sites of Mas d'en Boixos (Pacs del Penedès, Alt Penedès), Camí de Santa Maria dels Horts (Vilafranca del Penedès, Alt Penedès), Cal Pere Pastor (Vilafranca del Penedès, Alt Penedès), els Pujols (La Granada, Alt Penedès), la Serreta (Vilafranca del Penedès, Alt Penedès), Mas Pujó (Vilafranca del Penedès, Alt Penedès) and Pujolet de Moja (Olèrdola, Alt Penedès) (Figure 1).

The chronology of the sample was very accurate thanks to a total of 131 dates obtained through radiocarbon dating performed recently (Gibaja et al 2017, Morell 2019), as well as 37 dates previously published by other researchers, suggesting that the interval of probability of the Pit Burial Horizon was between 4000 and 3500 cal BC (Figure 2). Regarding the structures typologically assigned to the so-called Postcardial Early Neolithic at Penedès (Mestres 1981, Esteve 2000, Esteve 2007, Bouso and Esteve 2003) and Barcelonès (Bosch and Estrada 1994), having conducted several Bayesian Tests, Morell (2019) concluded that there was not enough empirical evidence to consider the so-called Postcardial Early Neolithic to be chronologically different from the Pit Burial Horizon. Consequentially, in this work, the data attributed to the "Postcardial Early Neolithic" was regarded as belonging to the "Pit Burial" Horizon.

Of the 101 currently sites documented in the interior of Catalonia (the "Solsonès" area) and traditionally considered as belonging to the Pit Burial Horizon (Castany 2008), there were only 19 structures considered as reliable according to Duboscq (2017). 7 tombs and 11 domestic contexts were found to contain PBAs in reliable contexts. These were the sites of: El Llord 1 (Castellar de la Ribera), Palà de Coma (Cardona), Vinya Giralt (Cardona), Can Rajolí (Olius), Feixa del Moro (Andorra) and Camp del

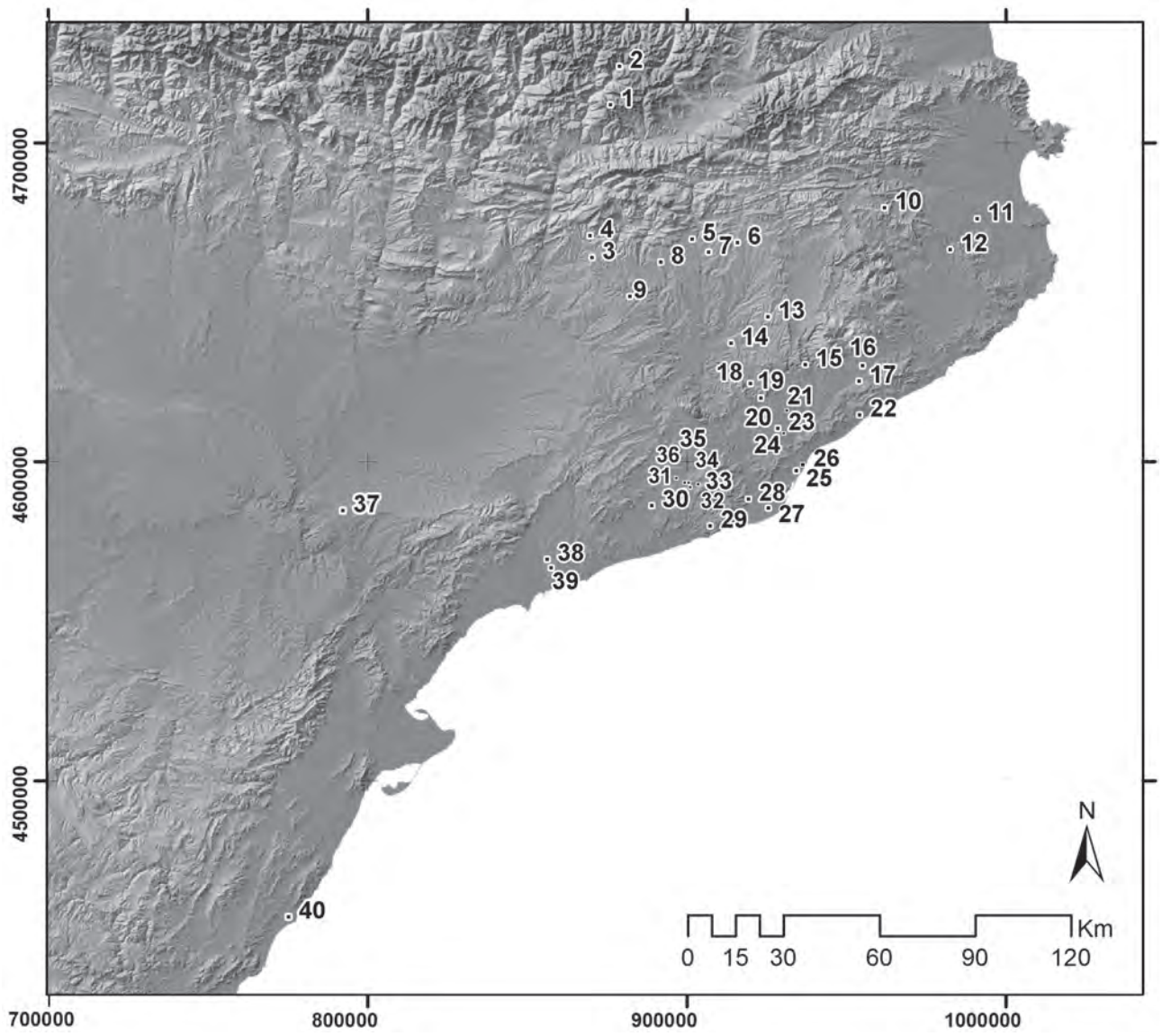

Figure 1. Map of the sites mentioned in this book: 1. Feixa del Moro, Camp del Colomer, 2. Segudet, 3. El Llord, 4. Ceuró, 5. El Serrat de les Tombes, 6. Ca l'Olaire, 7. Corral Canudes, 8. Costa dels Garrics de Caballol, 9. El Solar, 10. Cova de l'Avellaner, 11. Can Gelats, 12. Puig d'en Roca and Sant Julià de Ramis, 13. Cova del Toll, 14. Pla del Riu de les Marcetes, 15. Plaça Major de Castellar del Vallès, 16. Camí de Can Grau, 17. Bòbila d'en Joca, 18. Cova dels Lladres, 19. Ca l'Arnella, 20. Can Roqueta- Can Revella, 21. Bòbila Madurell- Can Gambús 1–2, 22. Bòbila Ravalet, 23. Can Marcet, 24. Can Fatjó, 25. Plaça de la Gardunya, 26. Carrer del Pi., 27. Mines Prehistòriques de Can Tintorer de Gavà, Cova de Can Sadurní, 29. Els Garrofers de Sta. Maria, 30. Hort d'en Grimau, 31. Mas d'en Boixos-1, 32. Pou Nou-2, 33. Els Cirerers, 34. Eix Diagonal and La Serreta, 35. Mas Pujó, 36. Els Garrofers, 37. Mina Vallfera, 38. Aeroport de Reus, 39. Coll Blanc, 40. Costamar.

Colomer (Andorra) (Masclans and Remolins 2018). The scarcity of evidence, coupled with the low quality of the data (most comes from excavations undertaken at the beginning of the 20th century) (Serra Vilaró 1927), made it impossible to draw conclusions as to the representativity of any possible results or to reach the same level of analysis as in the Vallès-Barcelonès-Penedès sites. Apart from the poor quality of the record, it is important to emphasise that the Solsonès funerary practices were significantly different from those found in the Vallès-Barcelonès-Penedès contexts, not only due to the type of the funerary container but also because of the almost complete absence of domestic structures as well as certain differences with regard to the grave goods assemblages (Dubosq 2017), which were a rather uncharacterised phenomenon. For all these reasons, a decision was made against including these sites in the sample.

Two more sites in which PBAs have been recorded in reliable contexts have been documented in the North East of Catalonia: Can Gelats (Aiguaviva, Girona) and the Sant Julià de Ramis necropolis (Sant Julià de Ramis, Girona). At the first of these locations, a small PBA was found in one of the two excavated burials (Gibaja et al. 2016-c), while at the second one, a PBA had been deposited as a grave good in Burial 1 (Riuró 1980), which is part of a cluster of 4 burials, half of which had been disturbed (Gibaja et al. 2017-a). Since this is a group of tombs in a context of non-comparable and isolated data, in this case too, a decision was made not to include them in the sample.

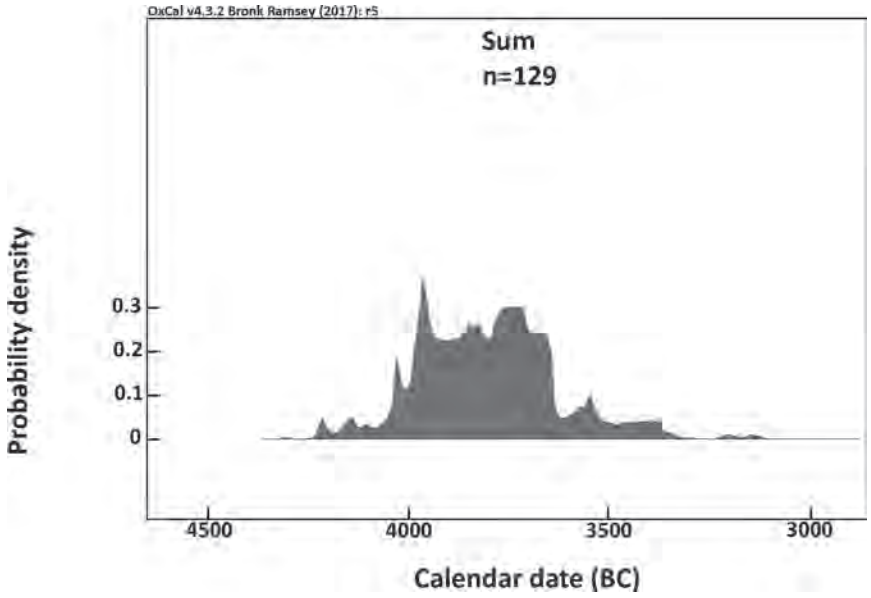

Figure 2. Pit Burial sum of probabilities.

1.2. Theoretical framework

The theoretical framework of this research follows the principles of "historical materialism", according to which it is possible to approach any social reality through its material remains (Castro Martínez et al. 1998, Sanahuja Yll 2002). Each social formation is organised in different ways to meet its needs and desires, establishing particular economic, political, symbolic and technological relationships. Depending on how people/groups participate in different production and consumption activities, specific social conditions can be identified, as they are considered the basic elements that configure the social life of humans (Ibid). Our goal was to recognise and explain these relationships as well as to understand what influence they had on the lives of these communities.

In order to generate historical knowledge (abstract) founded on an empirical basis (the archaeological record), a theoretical-methodological proposal was followed with a view to identifying and explaining the processes of social production and consumption. Work and consumption activities were documented by assigning archaeological objects to a series of basic analytical categories, such as work waste and products of work (e.g., extracted raw materials, working instruments, final products of use/consumption and objects of symbolic value used in political-ideological practices) (Castro, Escoriza and Sanahuja 2002). Use-wear analysis, as the key to answering three of the most basic questions (what is produced, how it is produced and who produces it) (Risch 2002) required in this process, led to the identification of production/consumption indicators through observing the traces of manufacture, maintenance and use. According to the physical, chemical, morphological and contextual characteristics of the archaeological objects, as well as the type of productive/consumption cycles in which they were involved, the objects were assigned to one or another explanatory category. Once all this data had been collected, it needed to be quantified and put in relation to its archaeological contexts, so that an explanation could be proposed regarding the socially interrelated materiality.

Special attention was given to explore the social work organisation through the study of those grave goods that can give information regarding the potential activities performed by the buried individuals. Considering grave goods as representative of the buried people's former belongings, gifts from mourners, or as a symbolic representation of the activities related to their identity (Arnold 2006, Hamlin 2001), a *binfordian* isomorphism between social organization and mortuary ceremonialism (Binford 1962; Ib 71) has been adopted. The procedures have been performed with caution when considering the social management of death, taking into account the possible bias derived from post-depositional factors as well from potential ceremonial concealments of status, gender or other social hierarchies.

1.3. A critical revision of the social hypothesis: a state of the art

Although the term "Cultura dels Sepulcres de Fossa" (a.k.a. the "Pit Burial Horizon") was used repeatedly by prehistorians during the first half of the 20th century (Serra Vilaró 1927, Serra Ràfols 1930, Maluquer de Motes 1945), it was Muñoz (Muñoz 1965) who characterised it as a cultural entity for the first time on the basis of a systematic study of funerary practices. Those practices included burial graves dug in the subsoil containing grave goods assemblages composed of smooth pottery surfaces, flaked lithic tools, prismatic flint cores, bone awls, polished stone axes and variscite ornaments. Due to the stylistic parallels of the pottery and some similarities in relation to the typology of the tombs, analogies were quickly drawn between this evidence and other context

such as the *Chaséen* culture (France), the *Vasi a Bocca Quadrata* (Italy), and the *Chamblandes* (Cortaillod) graves in Switzerland. Even today, these similarities are explained through a proposal suggesting that long-distance exchange networks existed between these communities (Tarrús 2002, Schmitt 2015, Moinat and Chambon 2007, Vaquer 2014, Zemour 2013).

In the seventies and eighties of the last century, three "facies" were distinguished, whereby geographical areas were associated with particular types of funerary structures. Firstly, there is the "Vallesian" Neolithic, which was characterised by the presence of pit burial necropolises located in the lower areas of Eastern Catalonia, mainly in the proximity of the rivers of the pre-littoral depression, and whose population was mechanically considered to be basically agrarian. Secondly, the "Solsonian" Neolithic was distinguished by the presence of burial cists located in the Pyrenean and Pre-Pyrenean plateaus, which were *a priori* attributed to pastoral communities due to the high altitude of the location. Finally, the "Empordanès" Neolithic, individualised because of the presence of corridor sepulchres, was mainly situated in the Empordà region (North-East of Catalonia) (Cura 1975, Tarrús 1987).

Especially since the end of the eighties, a qualitative leap has been made in deepening the knowledge of the period. Many archaeological interventions have been undertaken, techniques and analyses promoted by the *New Archaeology* have been implemented, while social hypotheses have been proposed, regarding the economic organisation, exchange systems as well as the presence of possible social hierarchies.

During these years, the number of sites increased following excavation conducted at several locations, especially in the Penedès and Vallès-Barcelonès areas. The most noteworthy ones in the Vallès-Barcelonès are Bòbila Madurell-Can Gambús 1–2 (Blanch Espuny, Lázaro and Alaminos 1990, Bordas et al. 1992, Roig and Coll, 2008, Artigues Conesa, Bravo and Hinojo 2006), some sectors of the Prehistoric Mines of Gavà (Villalba et al. 1986, Villalba, Bañolas and Arenas 1992, Bosch and Estrada 1994, Borrell, Estrada, Bosch and Orri 2005), Carrer del Pi (Cebrià Escuer and Miró Alaix 2018), Reina Amàlia (Gonzalez Harzbecher and Molist 2011), Camí de Can Grau (Martí, Pou and Carlús 1997), Ca l'Arnella (Pou and Calvet, Martí, Mozota, Armentano, Martín and Gibaja 2014), Can Fatjó (Roig in 2018a), Can Marcet (Roig 2018b), Can Roqueta-Can Revella (Palomo and Rogríguez 2003, Terrats and Oliva 2009, Poveda et al. in press), Plaça de la Gardunya (Velasco Artigues 2018), Plaça Major de del Vallès (Roig and Coll 2005), Can Sadurní (Blasco, Edo and Villalba 2011) (Figure 1).

At the Penedès area excavations have been performed, among others, at Mas d'en Boixos (Esteve 2000, Bouso and Esteve 2003, Esteve 2007, Vidal 2007, Feliu 2014, Pedro 2012), Camí de Santa Maria dels Horts (Esqué et al. 2015), Cal Pere Pastor (Esqué et al. 2015), els Pujols (Esqué et al. 2015), la Serreta (Esteve et al. 2011, Oms and Esteve 2011), Mas Pujó (Esqué et al. 2015), Pujolet de Moja (Mestres et al. 1997, Nadal, Senabre and Mestres 1995), l'Hort d'en Grimau (Mercadé in press), Pou Nou 2 (Farré et al. 1995) and Horts de Can Torràs (Coll and Roig 2005) (Figure 1). More punctual archaeological interventions have been undertaken at different areas such as the Pyrenees, where the site of Feixa del Moro (Remolins et al. 2016a, Remolins et al. 2016b, Llovera 1986) and Camp del Colomer (Fortó et al. 2013) have been excavated, and in the demarcation of Girona, such as Can Gelats (Gibaja et al. 2016-c), Sant Julià de Ramis (Riuró and Fusté 1980, Gibaja et al. 2017a) and Puig d'en Roca (Riuró and Fusté 1980).

The site distribution map reveals a clearly unequal distribution, which is attributable to the fact that modern urbanisation has affected the area to varying extents. The quality of the data is also uneven, since the recently urbanised areas (Vallès-Penedès-Barcelonès) are where the best known, most extensive and well-worked sites are located.

In the framework of this fieldwork and certain doctoral theses, some analytic methods have started to be implemented, such as archaeobotanical (Antolín 2013, Piqué 1993), archaeofaunal (Saña 1992, Ib 1994) and artefactual studies (Gibaja and Clemente 1996, Gibaja 2003, Terradas and Gibaja 2002, Blasco, Villalba and Edo 1998, Masvidal, Gonzalez and Mora 2004, Palomo 2012, Oliva Poveda 2015). Advancements have also been made in the debate about burial typologies (Pou et al. 1994, Pou et al. 1996, Pou and Martí 1995, Mercadal and Vives 1992, Gibaja 2004, Gibaja et al. 2010), subsistence patterns (Alaminos and Blanch 1992, Martín, Bordas and Martí 1996, Masvidal and Mora 1999, Saña et al. 2015), domestic spaces (Plasencia 2016) and exchange systems (Edo, Villalba and Blasco 1992, Fíguls, Grandia and Weller 2012, Weller and Fíguls 2012, Vaquer et al. 2012, Borrell et al. 2012).

Although this new data was logically very revealing, in the absence of a general project aimed at synthesising it, the research was largely confined to doctoral theses in very specific fields (for example, traceology, technology or archaeobotany), to articles on specific topics as well as to the compilation of excavation reports. The research was fragmentary in such a way that no general objectives were defined, nor were there any projects aimed at working with a significant corpus of deposits and materials using a unified methodology. Consequently, no major advances were made regarding the formulation of interpretative hypotheses around the socio-political organisation of these communities, except for the proposal by the IMF-CISIC group (Gibaja and Clemente 1996, Gibaja, Clemente and Vila 1997, Gibaja 2003) regarding the possible sexual division of labour.

It was also not possible to clarify the economic and settlement model of the Pit Burials, nor to ascertain the

importance of the different productive branches among the sites or the existence of complementarity/self-sufficiency systems between the areas. Traditionally, it has been proposed that with the beginning of the Pit Burial funerary practices, the settlement pattern underwent a change (Ribé 1996), whereby the number of cave settlements decreased in favour of settlements in plain areas. This shift, together with the fact that structures such as silos as well as grinding tools, domestic fauna and archaeobotanical remains were the most commonly documented evidence, led to the proposal of a mixed settlement model based on agriculture and livestock.

In the few cases in which archaeobotanical studies have been conducted (Antolín 2013, Piqué 1993), the results, though interesting, have failed to shed a light on the kind of agriculture that was practised: itinerant, intensive or extensive. Apart from research projects conducted by Antolín and Piqué, the only other approach that has thus far been taken to analysing agricultural practices consisted in the identification of numerous sickle blades through use-wear analysis (Gibaja 2003). However, no systematic studies of grain storage capacities have been performed to date. There are only fragmentary studies focusing on some very specific areas such as Penedès (Mestres, Farré and Senabre 1998) or a sector of Bòbila Madurell (Plasencia 2016). There have been no reviews or functional studies of cereal grinding instruments, while in most of the excavated sites, such utensils have not even been properly inventoried.

The situation is identical as regards the reconstruction of livestock practices. The majoritarian presence of domestic animal remains, together with the taxonomic determination of some sets, showed the presence of cattle, followed by intermediate levels of ovicaprids and a small percentage of *suids*. It is believed that the communities used cattle primarily for secondary products and for traction (Saña 1992, Ib 1994). However, these studies are very fragmentary and based on very few settlements, mainly Bòbila Madurell-Can Gambús and the Prehistoric Mines of Gavà. Finally, no specific studies on animal remains (such as isotopic studies) have been performed. Consequently, the existent data is still insufficient to perform economic reconstructions aimed at revealing the type of livestock exploitation and herd management practised by these communities.

There remain other issues that are yet to be resolved, such as that of objects transported over distances of between 50 and 700 km. These are the nuclei and blades made of "honey" flint probably originating from western Provence (Léa 2005), the jadeite and eclogite PBAs from the Western Alps (Vaquer et al. 2012) and the obsidian blades of Monte Arci (Sardinia) (Terradas et al. 2014, Gibaja et al. 2014). The exact chronologies in which these supposed "exchanges" took place are not settled, nor have the precise areas of origin of these alpine metamorphic rocks and flint been ascertained. Although there is enough evidence to propose that not everyone had access to these items, it is still to be determined whether this differential access was due to an uneven distribution according to the needs of the communities or if it was, indeed, the result of these products being controlled by a minority.

Due to the incompleteness of this data set, until recently, the archaeological reality of the Pit Burial Horizon was conceived as a "cultural unity". This is an axiom that has not yet been broken, and, in general, all the evidence is mechanically associated with a supposedly agro-pastoralist society that shared a system of beliefs. However, there is no solid basis to describe their economy nor to speak of funerary homogeneity throughout the entire territory supposedly occupied by this "culture".

Since 2011, some advances have been made within the framework of the project entitled "*Approach to the first Neolithic communities of the NE Iberian Peninsula through its funerary practices*" lead by Dr Gibaja, as part of which a homogeneous and systematic analysis of many sites was performed, aimed at facilitating the creation of new empirical paradigms for the interpretation of the social materiality of these communities. Several aspects have been approached at a large scale as part of this project, such as radiocarbon dating (Morell 2019, Gibaja et al. 2017-b), technology, lithic and bone functionality (Gibaja and Terradas 2012, Masclans et al. 2016, Mozota and Gibaja 2015), studies of the origin of raw materials (Terradas and Gibaja 2002, Terradas et al. 2014), taphonomy and anthropological features of the exhumed individuals (Alliès 2016), or the palaeodiet (Fontanals 2015, Fontanals 2016) and funerary practices (Roig et al. 2010, Martín et al. 2016, Alliése et al. 2014, Alliése 2016). The project has effectively provided the basis for a better understanding of how the funerary practices were followed throughout the territory (Gibaja et al. 2017-c; Gibaja et al. 2018, Gibaja et al. 2019) and laid the foundation for further solid studies related to the existence of social hierarchies and sexual division of labour (Duboscq 2014, Duboscq 2017, Masclans et al. 2019).

1.4. PBAs and the generation of new explanatory hypotheses

Within the framework of the Pit Burial Horizon, PBAs have not been subject to any systematic and concrete study, which is remarkable, considering that they always feature when hypotheses are formulated. PBAs have been considered as key elements within the funerary ritual, given their recurrent presence among the grave goods accompanying the dead (Muñoz 1965, Castany 2008, Gibaja et al. 2010). This fact is closely linked to the conception of these tools as "prestige" or "symbolic objects" in the context of long-distance networks which were controlled by a small number of people and which facilitated the exchange of items assigned a high social value (Vaquer and Léa 2011, Vaquer et al. 2012, Pétrequin et al. 2012b, Borrell and Bosch 2012). It is believed that the "controllers" of these exchange networks were individuals who mediated the exchanges and who, owing to their

privileged status within the communities, would have accumulated the "results" of their position of power in the form of elements such as axes and adzes. In respect of children's burials in which such artefacts were deposited, it is proposed that they could be interpreted as a reflection of the social status of the children's parental units.

Specific studies relating to the technology of PBAs have also been conducted in some sites, such as the Prehistoric Mines of Gavà (Bofill and Borrell 2009), surface materials from the Solsonès area (Fíguls 2013), and some of the tools found in Camp del Colomer (Martínez Rodríguez 2015). PBAs have also been subject to punctual studies related to the possible sources of provision of local (Risch and Martinez 2008, Weller and Fíguls 2007, Clop 2004) as well as non-local (Vaquer et al. 2012) raw materials. At this point in time, functional attributions are practically non-existent, as there is no empirical evidence that supports the few assertions that have been made in this regard.

In conclusion, not all the analytical and interpretative possibilities that the study of PBAs could potentially provide have been explored. From the perspective of this work, there are several key research lines that must be examined. Firstly, it is essential to contextualise and inventory the PBAs found in the Pit Burial Horizon. The bibliography usually makes inaccurate references to the importance of these items in the framework of the productive and symbolic relationships of the period, but until now, no inventory has been made of all structures with reliable contexts in each site and this data has not been placed in relation to the total number of contexts in which PBAs have been found. This review is a prerequisite for formulating interpretative hypotheses based on a solid knowledge of the archaeological reality.

Secondly, PBAs analysis can provide new data regarding the main productive activities of the Pit Burial Horizon. For instance, the study of the possible origin and main characteristics of the raw materials can provide information concerning mobility patterns, extraction and distribution methods and the value of the invested workforce. A technological analysis of the PBAs can provide insights into the productive processes involved in their manufacture as work objects, while a functional analysis can provide data on the production processes in which PBAs participated as working tools. All these elements are a first step towards determining how these instruments were managed and towards expanding our understanding of the different activities performed by the studied communities.

Thirdly, studying the PBAs can help to provide clarification and widen our knowledge of funerary practices, beyond what is already known at this stage, i.e. that the presence of PBAs is more or less recurrent among grave goods assemblages and that some of them were made of non-local raw materials. This can only be achieved through a solid characterisation of the activities represented by the artefacts found in funerary contexts and an accurate determination of the raw materials and the documented technical processes. This task should be accomplished with a view to contrasting the results with those of studies undertaken on domestic contexts and identifying differences or similarities between areas.

At the same time, it is also essential to clarify the presence of differences between the studied communities. Many of the interpretations and hypotheses are based on interpretative generalisations made in relation to very specific parts of the record that do not necessarily correspond to the totality of the material remains that were part of the Pit Burial Horizon. Thus, it is important to perform benchmarking based on the productive activities represented in the record, according to the communities, the raw materials used and the documented technological processes.

Ultimately, studying PBAs can greatly contribute to clarifying the presence of dissymmetries or social differences both within and between the Pit Burial communities. Just as previously done with other types of objects, such as chert or bone (Gibaja 2003, Millan and Gibaja 2015), it could be determined whether the PBAs, the raw materials used, data referring to the functionality of these tools and their techno-morphological features are represented equally among the deceased individuals found in the record. At this point, it would be fundamental to identify patterns that would allow certain groups to be singularised, for example, those that had accumulated a greater amount of objective value in their grave goods, or to be able to find evidence that could give rise to aspects such as the sexual division of labour or the presence of differential treatment for reasons of age or membership to other groups that have not yet been identified.