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(1<sup>st</sup> Millennium BC)**

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## Introduction

The first millennium BC was a period of profound transformation in the central-western Mediterranean. On the one hand, the arrival from the 9<sup>th</sup> century BC of a large number of migrants from the eastern Mediterranean brought about major changes in the ethnic and linguistic panorama of large areas of this territory. It also led to –or at least facilitated– the introduction and dissemination of new skills and gave rise to intensive interaction with the populations previously established in those territories. This interaction took on diverse forms ranging from the establishment of authentic colonial systems –that entailed the control of the territory by the new arrivals and the marginalization and exploitation of the native population– to relations based on mutual benefit, in which the balance of forces between natives and allochthonous people clearly favoured the former from a political and demographic point of view. In this context, it is logical that there would have been intensive and diverse transformations. One of the most outstanding was the growth in the population, which is perceptible in many different regions, to the point at which it can be considered to have been generalised, albeit with different local and regional dynamics. At the same time, following experiences with a limited trajectory such as the El Argar, Terramare and Nuragic cultures, this demographic increment would have played an important role in the new development of complex societies founded on institutionalised inequality and the existence of political and administrative systems designed to perpetuate it. The hierarchized forms of territorial occupation and the formation of the first cities are one of the most obvious testimonies to this. In summary, this was a period of complex changes that saw the formation and disappearance of political entities of diverse natures and sizes. These ranged from the large Libyan territorial states to the Etruscan and Iberian city-states. Finally, there was the great conflict between Rome and Carthage that opened up the way for the emergence of a large empire covering the whole of the Mediterranean.

In this general context, one of the most important technological innovations to come about in the first millennium BC was the introduction and, more significantly, the generalization of iron metallurgy. This undoubtedly played an important, if not a crucial role in the processes of change we summarised briefly in the previous paragraph. The increase in techno-environmental efficiency that entailed the generalized use of iron tools led to an increase in the production of surpluses and, consequently, the power of the elites, as well as a sustained growth in the population. This in turn was closely linked to the development of social complexity and the expansion of cities. We cannot, therefore, underestimate the importance of the subject of this volume. However, veiled behind this generalization in the use of iron lie diverse local and regional situations that are linked both to the process involved in receiving and accepting the new technology and to the mechanism that, at a particular time, led to its large-scale use in primary production and weapons manufacture. Nobody today defends the functionalist perspectives that saw in the new technologies with the ability to improve productivity an inevitable opportunity to increase social production based on a more efficient control of the environment, reducing the input of work and, in short, favouring the “progress” of the human groups that adopted these innovations. From that excessively simplistic perspective, the adoption of technologies can be simply explained by the adaptive advantages their possession would have represented for the different societies, considered as undifferentiated entities rather than as compound, complex and internally conflicted blocks. In other cases, the introduction of iron has been seen as the chance to improve weaponry, thus endowing a decisive military advantage on the groups that possessed it. This could also have had decisive consequences for the formation of more broad-based, complex political entities.

Obviously, there is some truth to these interpretations, as alongside the internal conflicts proper to any society, there were also common interests that brought them together. However, they err by ignoring the costs involved in the introduction of new technologies and also the risks they presented for social stability. It is perfectly plausible to assume, for example, that a dominant social group would not have favoured the introduction of a technology that could have been used to improve weaponry, even though it would have helped them exercise their power, if they were not certain of being able to control the production and prevent its generalized use. Neither is there any certainty that all or most of the members of a society would have chosen to modify their ways of life by the generalized introduction of a new technology, unless they were forced to do so by circumstances linked to their survival or the imposition by a powerful elite. Such a change could have been imposed through coercion or it may have received consent based on ideology or, more frequently, a combination of the two. In this respect, we have to remind ourselves that an increase in techno-environmental efficiency did not necessarily result in a reduction in the amount of work put in, for example, by the peasants. It could simply have been used to augment the surpluses controlled by the elites, who were able to use them flexibly, both to ensure a supply for the population in the case of need (for example, in years of poor harvests) or, in normal circumstances, to further their own interests.

In other words, the adoption of a new technology and, above all, its generalized use, did not depend solely on its potential advantages from a productivity or military efficiency perspective. It would also have been contingent on the social and economic context in which it occurred and, in particular, on the interests of the dominant groups and their ability to impose them on the society as a whole. In order to fully understand these processes, it is necessary to describe and explain separately, in each region and each society, the conditions in which the process took place. This is, in fact, the objective of this volume, which aims to provide an overall perspective of this question in the central-western Mediterranean based on the particular regional processes, as well as a preface to the same question in the Aegean area.

In the studied territory, the explanation for the adoption of this iron technology by the different societies has traditionally been based on diffusionist approaches. It would have arrived from the Mediterranean Levant (the Hittite world, the Middle East or Cyprus), from where it would have reached the Aegean and the islands of the central Mediterranean and subsequently the rest of the Mediterranean. In the Maghreb and the far western Mediterranean this phenomenon is often linked to Phoenician trade; however, as Ramon and Sanmartí indicate in their contribution, we cannot rule out a dissemination route via sub-Saharan Africa, where iron technology is attested in the second millennium BC. In contrast to the diffusionist hypotheses, Kostoglou proposes as an alternative interpretation that the adoption of iron metallurgy was in fact the result of multiple innovations developed locally that would have taken place in a more or less accidental manner in diverse places and at different times. The possibility of a purely local development is also considered by Ramon and Sanmartí based on the finds made at Althiburos (Tunisia) that attest iron production in the 8<sup>th</sup> century cal BC, but the knowledge involved could date back to the previous century or even earlier.

At the current state of the research and as we can see from the studies compiled in this volume, the first iron objects are attested in diverse areas of the Mediterranean during the Bronze Age. This evidence is not only found in the Aegean (Kostoglou), but also in Sardinia (Lo Schiavo and Milletti), southern Italy and Sicily (Pacciarelli and Quondam), the Strait of Gibraltar (Suárez and Renzi), the south-east of the Iberian Peninsula (Vives-Ferrándiz and Mata) and even as far as the Atlantic. In northern Italy, apart from two doubtful cases during the Late Bronze Age, iron seems to have appeared suddenly in the 8<sup>th</sup> century BC (Paltineri *et alii*); however, in the north-western Alpine region (Switzerland and Slovenia) iron objects are documented between the mid-11<sup>th</sup> and the 9<sup>th</sup> centuries BC (Paltineri *et alii*). These early cases are undoubtedly prestige objects carried by travellers and traded for their intrinsic properties and rarity, rather than their functional value. According to the typological studies presented by Grevey and Gailledrat, this first period of dissemination of iron objects during the final stages of the Bronze Age continued into the first centuries of the first millennium BC. This would have carried on until the new technology had been adopted, under formulas and procedures that would have varied considerably, depending on the local conditions such as the effective power and interests of the elites and the nature of the relationships with the peoples of the east, such as the Phoenicians, among other possible factors.

In some of the territories studied, the chronology of the appearance of iron objects and the evidence of their manufacture is documented almost contemporaneously and even prior to the first attested colonial contacts. This is the case of Calabria and Sicily at the beginning of the first millennium BC (Pacciarelli and Quondam), as well as of Sardinia, although those first Sardinian productions are made of bronze enriched with iron or copies of bronzes, and appear to have been manufactured in domestic contexts. Significant production of iron objects in artisanal workshops in Sardinia would come in the 8<sup>th</sup> century BC (Lo Schiavo and Milletti). In general, however, the documentation of this aspect is sparse and very fragmentary in the areas occupied by the indigenous peoples of the western Mediterranean, given that in many regions the existence of workshops is not attested prior to the 6<sup>th</sup> century BC. This clearly contrasts with what occurred in Phoenician settlements or those with a strong Phoenician presence. Indeed, at various archaeological sites there is a very well documented and probably important production from the last decades of the 9<sup>th</sup> century, as Ramon and Sanmartí and Suárez *et alii* indicate for the Strait of Gibraltar region (at archaeological sites such as Acinipo and Los Castillejos de Alcorrín) and Vives-Ferrándiz and Mata for the Valencia area (La Fonteta, Baix Segura). Ramon and Sanmartí hypothetically link this production to the demand from Assyria (very well documented elsewhere) to the point of assuming that iron was one of the most important products sought by the Phoenicians in the western Mediterranean.

However, apart from iron production in the Phoenician cultural area, it is plausible to believe that from the 8<sup>th</sup> century and above all the 7<sup>th</sup> century BC in the territories dealt with in this volume there would have been a relatively important local production of iron objects, although they would have been mainly confined to prestige items used by a small number of people. These objects were often deposited in the tombs of their owners, which is where they are normally found, whereas they are only retrieved sporadically at other types of archaeological site. According to Beylier, the forging technique would have been mastered in southern Gaul from the second half of the 7<sup>th</sup> century BC, although there is very little direct evidence to show this. A similar chronology can be proposed for Catalonia, as there is definite evidence from the 6<sup>th</sup> century BC at La Serra del Calvari and Illa d'en Reixac. However, we also have to bear in mind that some scholars have defended the existence of iron production in this region as early as the 8<sup>th</sup> century BC in the settlement of Els Vilars d'Arbeca (Belarte *et alii*). In Sardinia, iron metallurgy became important from the 8<sup>th</sup> and above all the 7<sup>th</sup> centuries BC. In northern Italy it is well documented at least from the turn of the 7<sup>th</sup> to the 6<sup>th</sup> century BC, with evidence of production at Genova (Paltineri *et alii*). In contrast, and as previously mentioned, in Calabria and Sicily an earlier start for the first local productions –between the late 11<sup>th</sup> and 10<sup>th</sup> centuries BC– has been proposed (Pacciarelli and Quondam).

In terms of the categories of objects and their evolution, there was very little typological diversity in the early stages of iron production, given, as has already been stated, that they were essentially prestige items. The first were mainly fibulas, needles, razors, rings and spits (the last of these linked to the idea of the banquet), as well as the first weapons, especially in Sicily and Calabria (Pacciarelli and Quondam). An outstanding category is that of knives, which were, moreover, a new item with no precedents in other metals within the repertory of objects used by the autochthonous societies. In some areas the first iron objects were copies of those previously made of bronze, as has been described in Sardinia (Lo Schiavo and Milletti). We should also point out the presence of iron weapons in many of the territories studied, albeit documented in

variable numbers, in funerary contexts and mainly associated with tombs of males/warriors. Iron weapons are often interpreted as prestige symbols (Pacciarelli and Quondam) under the control of the elites (Beylier). However, in some cases and in various territories, weapons are found in the tombs of females, for example in Gaul (Beylier) and Sicily (Pacciarelli and Quondam). We can therefore assume that the presence of arms is not necessarily related to the gender of the deceased and that it symbolizes above all a social position and membership of an elite.

The different articles included in this volume demonstrate how the typological range of iron objects expanded, especially from the 6<sup>th</sup> century BC, when there was an intensification of the production of weapons and a consolidation of that of work tools. The data available for the 5<sup>th</sup>-4<sup>th</sup> centuries BC in the different territories studied –in some cases abundant and of remarkable quality– indicate, with local nuances, a generalized use of iron for the manufacture of objects related to all facets of human existence and activity. These include transportation, building and, above all, work tools (especially farming implements). Iron prestige objects continued to be made, although they became very much a minority item. It is therefore quite normal that, from this period on, it is common to find iron objects in habitation sites. Weapons are also found in contexts of violent destruction, and continue to be especially common in tombs.

The generalization and diversification of the production of iron objects is obviously linked to profound changes in the social and productive structures that are documented in the whole of the study area from the 6<sup>th</sup> century BC. These can be linked to various causes, above all of a demographic and political nature. These shifts were signalled by the beginning of an imperialist policy on the part of Carthage, the progressive transformation of Rome into a political and military power called to dominate the Italian Peninsula, the beginnings of the formation of the great Libyan monarchies, and the constitution on the Iberian Peninsula of hierarchized societies that evolved towards the formation of city-states and territorial states of a certain magnitude. Iron played an essential role in all these processes, which explains not only the typological diversification of the production, but also its extraordinary growth. The finds of workshops in the indigenous habitats becomes habitual from this time. They are often inside houses, in urban settlements such as Puig de Sant Andreu-Ullastret (Belarte *et alii*), Genova (Paltineri *et alii*), Lattara, Montlaurès (Beylier) and Bastida de les Alcusses (Vives-Ferrándiz and Mata), or in specialised nuclei such as Pontós, among many others. They are also found on the periphery of those towns (e.g. Ullastret), in villages and even in small rural habitats, such as those of Les Guàrdies (Belarte *et alii*) or Christol (Beylier).

Thus, from the 6<sup>th</sup> century BC, we can speak of a generalized production and use of iron. All this leads us to suspect the existence of sophisticated manufacturing systems, probably with differentiated productions in the various workshops. Above all the elites would have exercised control over this resource, which would have taken on a crucial importance for the economic production, the exercise of violence and the exaltation of power. The transformation and exploitation of iron has been studied in depth on a micro-regional scale in some areas of the Iberian culture, including the territory of Kelin/Los Villares (Valencia), with evidence from the 4<sup>th</sup> century BC until the Romanization (Quixal), and, on a strictly local scale, at the archaeological site of Les Guàrdies (El Vendrell, Tarragona) (Belarte *et alii*). However, the overall functioning of the production system, and particularly the organization introduced by the elites to prevent iron being used by the subordinated population for purposes other than production (particularly for the manufacture of weapons), is still not known in detail in any of the regions studied in the contributions compiled here (and in some of them, such as the Libyan kingdoms, it is virtually unknown). One of the major challenges facing current research is to undertake a systematic study to re-evaluate the documentation available for many settlements and to obtain new data. The objective of this would be to ascertain where the iron ore was transformed into metal, who controlled the process, how the iron was distributed to the different manufacturing workshops (aristocratic houses, village workshops, etc.) and, a crucial but particularly complicated aspect, to attempt to recognize the types of objects manufactured in each place. We trust the contributions in this volume will act as a starting point for new studies to be carried out with this focus.

Maria Carme Belarte, Maria Carme Rovira and Joan Sanmartí





## From prestige objects to the productive revolution: iron and siderurgy in Catalonia during the first millennium BC

M. Carme Belarte\*, F. Javier López Cachero\*\*,  
Enriqueta Pons\*\*\*, M. Carme Rovira\*\*\*\*  
and Joan Sanmartí\*\*\*\*\*

### Abstract

In this paper we present a diachronic analysis of the impact of iron metallurgy on the economy and socio-political organization of the area between the Pyrenees and the River Ebro between the 7<sup>th</sup> and the 2<sup>nd</sup> centuries BC. The data come from different types of sites and are studied from two perspectives: the production process (mining, ore processing, the manufacture of objects, workshops, waste, etc.) and the function of the manufactured objects, which have been classified into functional groups (agroforestry and artisanal tools, weaponry and cavalry equipment, culinary and domestic material, and personal garments). Likewise, the changes experienced in the use of iron are valued, with functions initially limited to the symbolic and prestige spheres, but later mainly linked to warfare and production. Explanations for this evolution are proposed based on the power strategies of the elites.

*Keywords:* Iron production, social organization, economy, Iberian culture, Protohistory, Catalonia

### Resum

En aquest treball es presenta una anàlisi diacrònica de l'impacte de la metal·lúrgia del ferro en l'economia i l'organització socio-política a l'àrea situada entre els Pirineus i l'Ebre, entre el segle VII i el segle II aC. La documentació prové de tot tipus de jaciments, i s'estudia a partir de dos eixos: el procés de producció (mineria, transformació del mineral i manufactura de les peces, tallers, residus, etc.) i la funció dels objectes fabricats, a partir de grans grups funcionals (utillatge agroforestal i artesanal, armament i equipament de cavalleria, material culinari i d'ús domèstic i guarniments personals). Així mateix, es valoren els canvis que experimenta l'ús del ferro, amb funcions limitades inicialment a l'esfera simbòlica i de prestigi i lligades més tard a l'armament i al treball, i es proposen explicacions per a aquesta evolució basades en les estratègies de poder de les elits.

*Paraules clau:* Siderúrgia, organització social, economia, ibers, protohistòria, Catalunya

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## 1. Introduction

In the north-east of the Iberian Peninsula, the first millennium BC was a period of accelerated transformations in historical processes. These ultimately led to the formation of hierarchical societies, the institutionalization of hereditary inequality and the emergence of political entities that extended over broad and densely-populated territories. In previous contributions (Sanmartí 2004, 2009a, 2009b,

2010, 2015; Sanmartí *et alii* 2006; Sanmartí, Plana, Martín 2015) we have described these processes of change and discussed their causes, considering the respective roles of population growth, trade with the Greek and Phoenician-Punic world, the possibility of movements of people and also technological changes, more specifically the introduction and generalization of iron metallurgy (Pons 1986-1987; Rovira 2007, 2012 with previous literature). In this contribution, we aim to continue looking at the last of

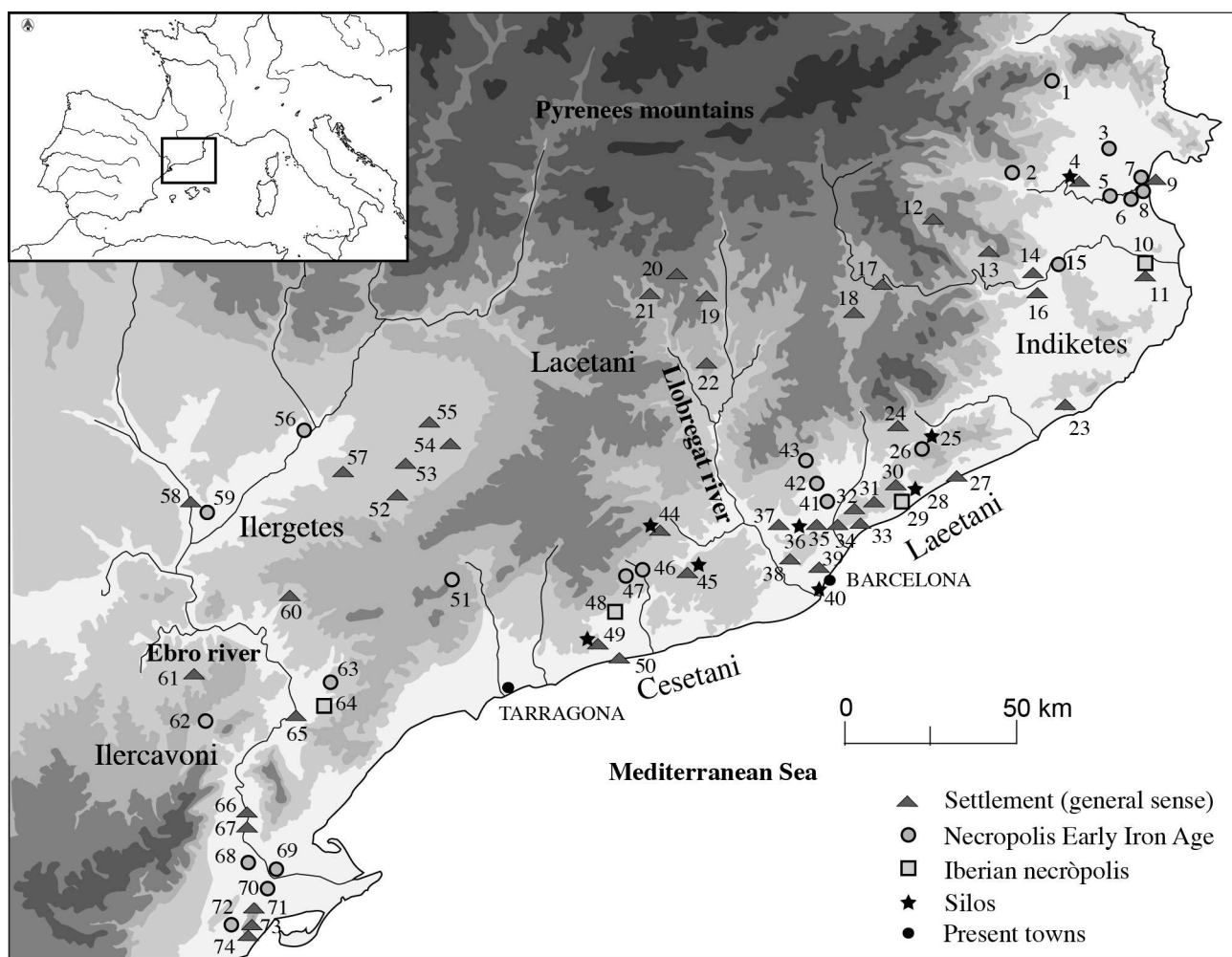


Figure 1. Map of the study area showing the location of the Iberian ethnic groups as well as the sites mentioned. They are represented by different symbols according to their type (habitat, Early Iron Age or Iberian period necropolis, silos):

1) Mas Baleta III; 2) Can Bec de Baix; 3) Pla de Gibrella; 4) Castell de Perelada; 5) Mas Castellar de Pontós; 6) Camallera; 7) Vilanera; 8) La Parrallí; 9) North-east wall; 10) Neàpolis d'Empúries; 11) Sant Martí d'Empúries; 12) Puig de Serra; 13) Puig de Sant Andreu and Illa d'en Reixac; 14) Porqueres; 15) Bora Tuna; 16) Sant Julià de Ramis; 17) Anglès; 18) La Creueta; 19) L'Esquerda; 20) Camp de les Lloses; 21) Turó del Montgrós; 22) Sant Miquel de Sorba; 23) Anseresa; 24) El Castellvell; 25) Costa de la Vila; 26) Puig Castellet; 27) Puig Alt de Can Viver; 28) El Coll; 29) Turó del Vent; 30) Torre dels Encantats; 31) Can Miralles-Can Modolell/Cal Ros/Can Bartomeu/Can Rodon; 32) Turó dels Dos Pins; 33) Burriac; 34) Sant Miquel de Vallromanes; 35) Castellruf; 36) Turó d'en Boscà or Mas Boscà; 37) Puig Castellar de Santa Coloma de Gramenet; 38) Turó de ca n'Oliver; 39) Sitges de l'UAB and Facultat de Medicina; 40) Can Xercavins; 41) Penya del Moro; 42) Turó de la Rovira; 43) Sitges del Port; 44) Can Piteu and Can Roqueta; 45) Pla de la Bruguera; 46) Granja Solei; 47) Torre Roja; 48) La Massana; 49) Turó de la Font de la Canya; 50) Mas d'en Boixos; 51) Molí d'en Rovira; 52) Can Canyís; 53) Les Guàrdies; 54) Alorda Park; 55) La Milmanda; 56) Els Vilars d'Arbeca; 57) Tosal de les Tenalles de Sidamon; 58) Els Estincel·ls; 59) Tossal or Castell del Mor; 60) El Molí d'Espígol de Tornabous; 61) La Pena; 62) La Pedrera; 63) Margalef; 64) El Calvari; 65) Pedrós i Roques de Sant Formatge; 66) La Serra del Calvari; 67) El Puig Roig; 68) Turó del Calvari; 69) Coll del Moro de Gandesa; 70) Tosseta dels Guiamets; 71) Coll del Moro de la Serra d'Almos; 72) Castellet de Banyoles; 73) Aldovesta; 74) L'Assut; 75) Les Planetes; 76) Mianes; 77) Mas de Mussols; 78) L'Oriola; 79) La Ferradura; 80) Les Esquarterades; 81) Sant Jaume-Mas d'en Serrà; 82) Moleta del Remei.

these processes and to extend our discussion to an analysis of the way in which iron was produced during the Iberian period. This is a very important subject considering the essential role played by iron in subsistence production and the reproduction of the social order.

The number of iron objects retrieved from archaeological sites is considerable, although, as will be seen, with significant biases depending on the period. We have also gleaned relatively important information about working spaces, which demonstrate that production was carried out in different contexts and perhaps also in diverse ways and with distinct purposes.

## 2. Nature of the data and research methodology

This paper is based on 1,281 objects retrieved from 91 archaeological sites, including both necropolises and habitation sites<sup>1</sup> (Fig. 1). While this is a large number, we cannot ignore the fact that an undetermined number of iron objects have yet to be published and have not been included. Nevertheless, the documentary basis is important enough from both the numerical and the qualitative point of view.

The information available to us has been managed using a database containing different fields, including typological, spatial, contextual and chronological information. The archaeological objects included in the database have been classified according to their territorial origin, more specifically to the Iberian ethnic groups, the existence and geographical distribution of which can be reconstructed from literary and numismatic sources. They are Cessetania, Ilercavonia, Ilgercia, Laetania and Indigecia. However, northern inner Catalonia has been considered as a single area, despite its well-attested ethnic diversity, due to the small number of iron objects found there (Fig. 1).

The analysed objects come from four different contexts (habitational, silo, funerary and ritual deposit). However, for practical purposes, they have been reduced to only two, funerary and non-funerary, that represent 59% and 34% respectively, while ritual deposits and silos account for only 3% and 4% respectively (Fig. 2). Objects found in silos have obviously been classified as non-funerary, except for the few cases where such structures had been reused as tombs. Ritual deposits have been classified according to the find context, which can either be funerary (Can Piteu - Can Roqueta, Sabadell, Barcelona) or non-funerary (for example, Structure 24 at Can Miralles-Can Modolell, Cabrera de Mar, Barcelona and Structure 169 at Turó de la Font de la Canya, Avinyonet del Penedès, Barcelona).

The information available on necropolises is generally quite complete, as it comes from sealed deposits that are usually published in detail. The non-funerary contexts are often more problematic, sometimes due to a lack of or only a partial publication and sometimes because the publications –particularly the older ones– do not include all the iron objects.

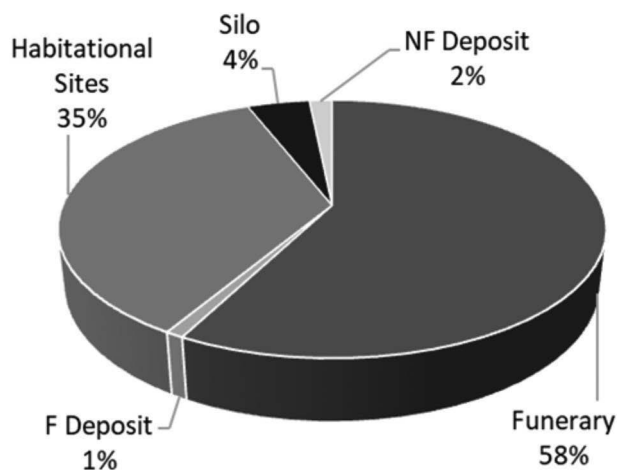


Figure 2. Chart showing the distribution of the different types of site considered in the paper.

Regarding chronology, we distinguish six periods: I (prior to 650), II (650-550 BC), III (the Early Iberian Period, *ca.* 550-450 BC), IV (the Middle Iberian Period 1, *ca.* 450-300 BC), V (the Middle Iberian Period 2, *ca.* 300-200 BC) and VI (the Late Iberian Period, 2<sup>nd</sup>-1<sup>st</sup> century BC). The last stage, when the study territory was already under Roman control, is taken into account in our quantification, although the data have not been included in the discussion, as they go beyond the scope of this scientific meeting, which is devoted to the introduction and dissemination of iron among the Mediterranean protohistoric societies.

All the objects have been classified on the basis of their specific function in 164 different types, which in turn have been regrouped into six functional families in order to make the data analysis easier. In addition, there is one group of miscellaneous items and another including indefinite objects. Within the first category –“distinctive objects” – we included various items considered as indicators of social status, such as those related to clothing, ornamentation, personal care and cavalry equipment.<sup>2</sup> The second group is made up of weaponry, both offensive and defensive. The presence of weapons, mainly in tombs, as well as the fact that they are often found bent out of shape so as to render them useless, confirms both their symbolic and social nature, beyond their functionality. A third group is the tools used in agriculture and a fourth artisanal tools. A fifth group is composed of elements related to fire (firedogs, grills, spits, tripods). We have considered knives as a separate category, given that their functional ambiguity means they can be used both as multifunctional personal instruments or kitchen implements. Moreover, considering their frequent presence in funerary contexts, they could have also been used in ritual and prestige practices (sacrifices, food distribution in funeral banquets, etc.). We also believe that their role changed at different times during the Iron Age. Finally,

<sup>1</sup> The different sectors of the necropolis of Coll del Moro in Gandesa were counted separately.

<sup>2</sup> Including different types of mounts (horse, donkey, etc.).

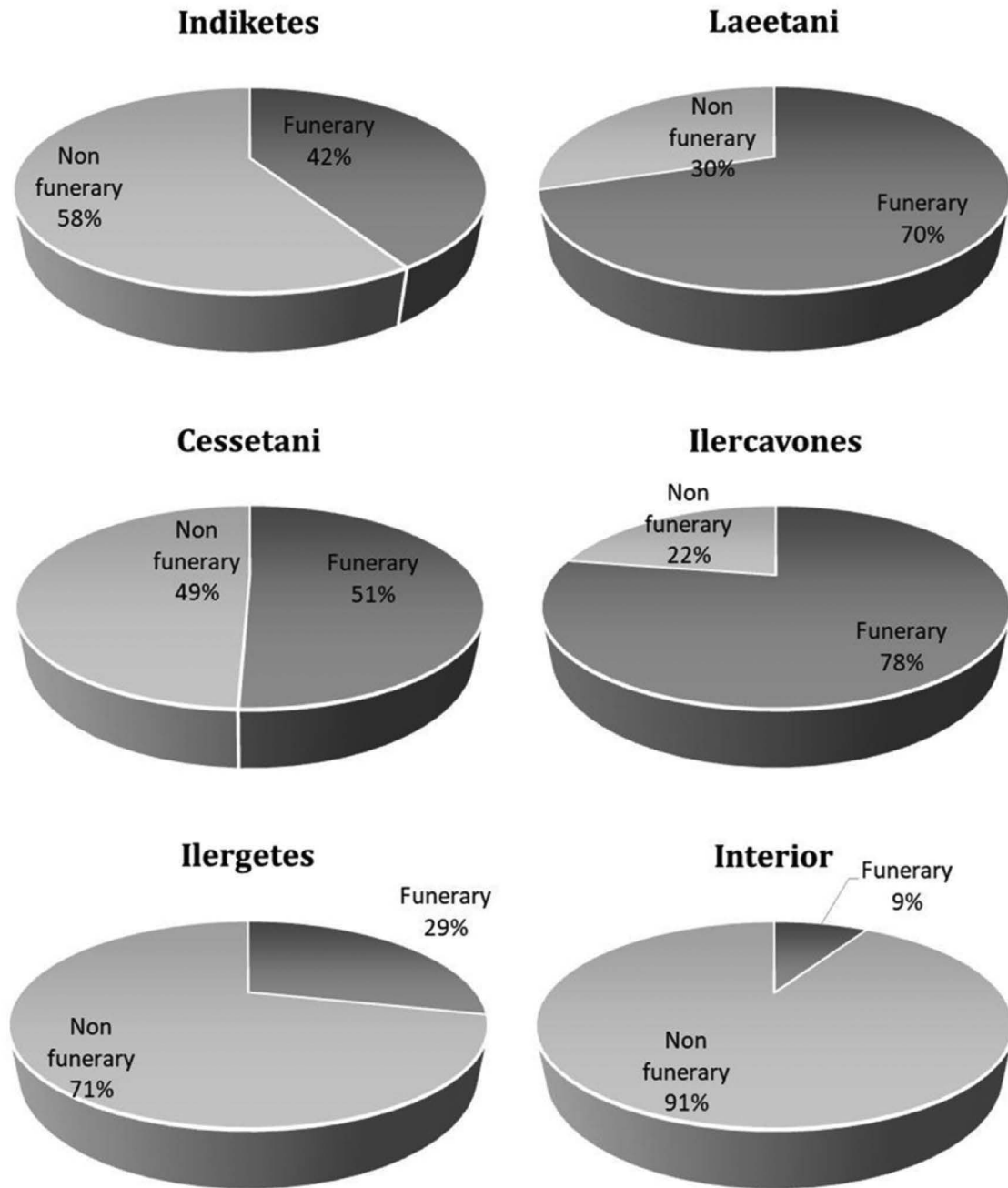


Figure 3. Charts showing the distribution of habitats with respect to the necropolises, according to the territories.

we have included two more groups without any specific functional character. One contains the objects associated with vehicles (for example, cartwheel rims), blacksmithing items and elements related to building (nails, clamps, etc.), as well as objects with disparate, unrelated functions that, due to the small number of examples, would not be shown on the graphs if they were considered separately. The second non-specific group is made up of objects with an indefinite shape or function.

### 3. Results

The available information is not homogeneous and reveals important imbalances concerning the contexts (funerary and non-funerary), geographical distribution and dating of the finds. In terms of the first aspect, the data analysis shows an extraordinary territorial diversity, as most funerary items come from sites in Laeetania and Ilercavonia, while those from habitation sites are from Indigecia and northern-

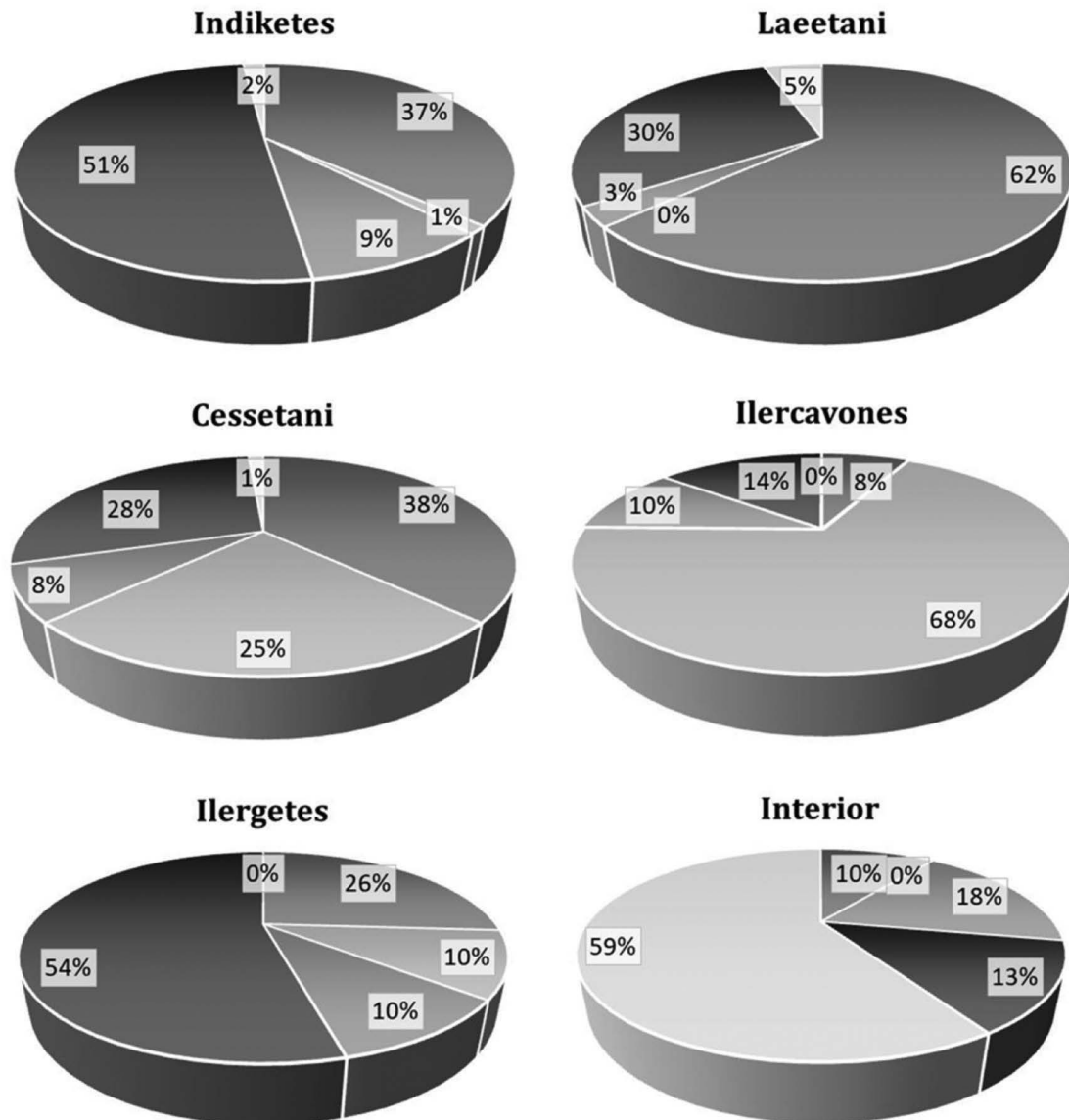


Figure 4. Charts showing the total number of objects by phases and territories.

central Catalonia. However, in Cessetania there is a greater balance between the find contexts (Fig. 3).

The analysis by chronological phases also shows a strong imbalance between the data from diverse territories, which prevents making major generalizations. In addition, some particularly rich sites considerably distort the final count. For example, the importance of the pre-Iberian period in the Laetanian region is absolutely conditioned by the necropolis of Can Piteu, which has a large number of graves (López Cachero, Rovira 2012). Similarly, the necropolises concentrated in the Lower Ebro (Rafel *et alii* 2012 with previous literature) mean that the Early Iberian Period is over-represented in the Ilercavonian zone. In turn, the inland area of northern Catalonia is completely anomalous

due to the very few contexts, most of which are dated to the Late Iberian Period. We also emphasize that in inner Catalonia the number of funerary contexts becomes progressively lower throughout the chronological sequence (Fig. 4).

The best represented functional category is weaponry (mainly offensive), followed by knives, distinctive elements (mostly objects related to clothing), and agricultural tools, which are double the number of craft tools (Fig. 5).

If we compare the diachronic evolution of funerary and non-funerary contexts, we see an important shift (Fig. 6): during the first phases objects from funerary contexts (dark-grey line) prevail, whilst from the Middle Iberian Period onwards the tendency changes and the finds from settlements and silos (pale-grey line) are more numerous. The

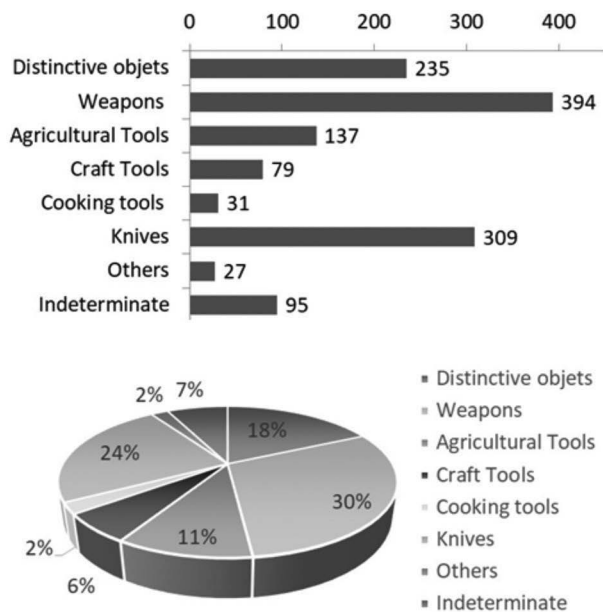


Figure 5. Graph showing the percentages of the different categories of objects.

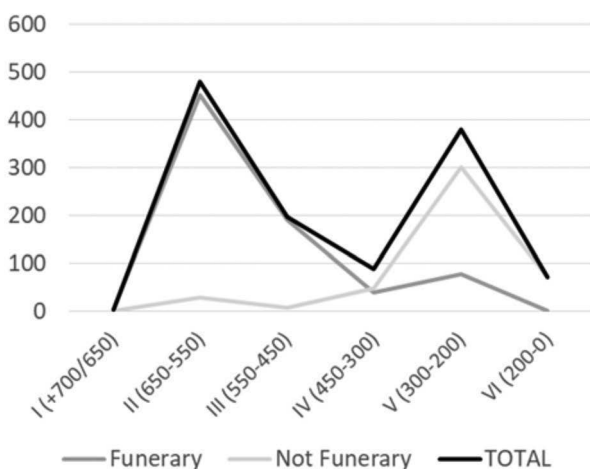


Figure 6. Comparison of the diachronic evolution of the presence of iron in funerary and non-funerary contexts.

black line, which represents the total, proves, by comparison with the other two, the main tendency in each phase.

Several conclusions can be drawn from the analysis of functions (Fig. 7 and 8). The first is that the most frequent objects during the initial periods are knives and the so-called “distinctive” objects (personal ornaments, clothing items, etc.). During the Early Iberian Period, these elements see a decline (less so in the case of knives), which is even more obvious from the Middle Iberian Period. This shift is explained partly by the progressive reduction of funerary contexts in the archaeological record, and partly by the fact that some

objects that were made of iron in pre-Iberian times, such as fibulae, were made of bronze in later periods.

In contrast to knives and “distinctive” objects, there is a considerable increase in the amount of weapons from the pre-Iberian to the Early Iberian Period, although they decline at the beginning of the Middle Iberian Period. Their numbers increase again between 300 and 200 BC, decreasing once more in the 2<sup>nd</sup> century BC. Except for the large increase from the pre-Iberian to the Early Iberian Period, this mainly reflects the variation in the number of tombs attested in the different periods (there are no necropolises dated to the 4<sup>th</sup> and 2<sup>nd</sup> centuries BC), rather than any variation in the number of weapons deposited in the graves, or the proportion of graves containing such items. On the other hand, the increase detected between 300 and 200 BC is associated to some extent with destruction layers linked to violent events during the Second Punic War and/or the Roman conquest. The evolution of agricultural and artisanal tools is similar to that of weaponry. They are very numerous in Phase V (300-200 BC), but a large number of those items, particularly agricultural tools, are not precisely dated.

Objects related to cooking and eating are most frequent during the first phases, especially due to the presence of a significant number of spits. Their volume decreases in line with the number of necropolises, but increases again during the Middle Iberian Period.

The elements related to vehicles (basically cartwheels) show a completely different evolution to the rest, as they are concentrated in Phases IV (450-300) and VI (200-0).

Blacksmithing tools are not well enough documented in the literature. Although they existed as early as Phase IV, they are not evident until Phase V and increase considerably during Phase VI.

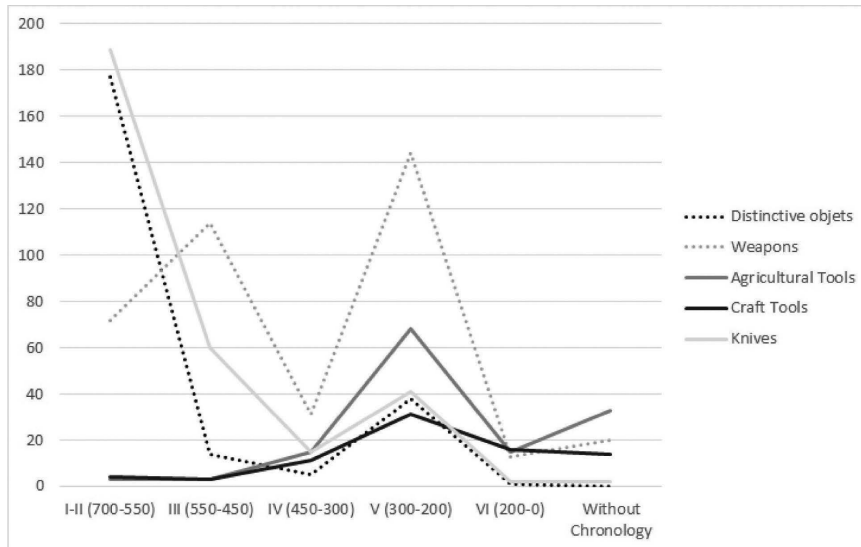
Generally speaking, the analysis of all the data clearly shows that iron objects were normally deposited in graves and only by accident in habitational contexts, in circumstances that precluded their later recovery, after the sites had been abandoned.

## 4. Discussion

### 4.1. The origin of iron metallurgy in Catalonia

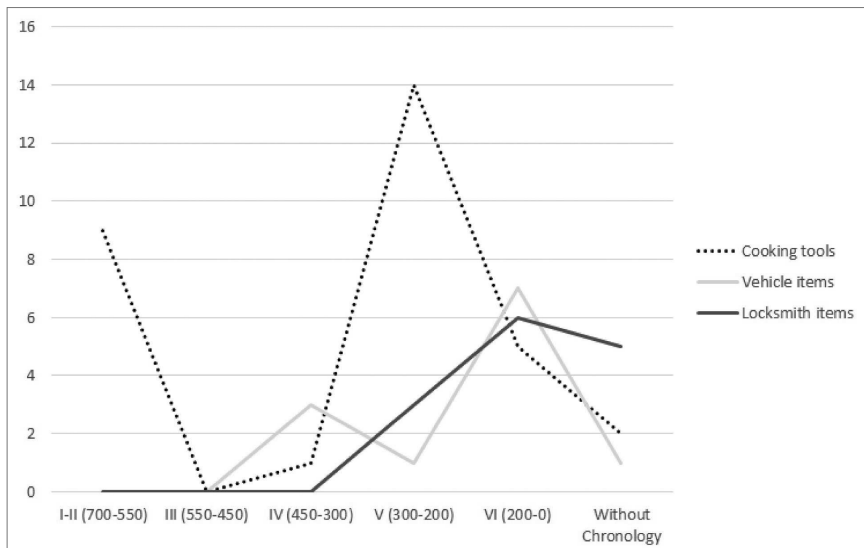
This subject has traditionally been considered from a diffusionist perspective, based on the idea that the technical knowledge involved in iron production had arrived either from the European continent or with the Phoenicians, whose presence in the Western Mediterranean goes back, as is well known, to the end of the 9<sup>th</sup> century BC, if not before. However, the archaeological evidence on both iron objects and workshops is too scant to be able to provide an adequate answer to this question (Pons 1986-1987; Rovira 2007, 2000 and 2012 with previous literature). In fact, both possibilities are perfectly compatible (Rovira 1998, Álvarez; Sanchís *et alii* 2016).

A large number of digs has been carried out in necropolises and settlements dated to the pre-Iberian period (700-550 BC), including many sites that were destroyed and suddenly abandoned. These have provided a large number of objects, including ferrous items. As has already been stated, the first



	I-II (700-550)	III (550-450)	IV (450-300)	V (300-200)	VI (200-0)	Without Chronology	
Distinctive objets	177	14	5	38	1	0	235
Weapons	72	114	31	144	13	20	394
Agricultural Tools	3	3	15	68	15	33	137
Craft Tools	4	3	11	31	16	14	79
Knives	189	60	15	41	2	2	309
Cooking tools	9	0	1	14	5	2	31
Vehicle items	0	0	3	1	7	1	12
Locksmith items	0	0	0	3	6	5	14
Indeterminate	31	3	7	39	7	9	96
	485	197	88	379	72	86	1307

Figure 7. Diachronic evolution of the five categories of the most represented objects.



	I-II (700-550)	III (550-450)	IV (450-300)	V (300-200)	VI (200-0)	Without Chronology	
Distinctive objets	177	14	5	38	1	0	235
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Vehicle items	0	0	3	1	7	1	12
Locksmith items	0	0	0	3	6	5	14
Indeterminate	31	3	7	39	7	9	96
	485	197	88	379	72	86	1307

Figure 8. Diachronic evolution of the categories of the most sparsely represented objects.

iron objects were found mainly in funerary contexts, suggesting that this new metal had an important social dimension beyond its utilitarian value. The type of object found in tombs enhances this view, as most are ornamental items (bracelets, annular elements and fibulae—mainly serpentine and, later, with a bilateral spring—) and still more frequently knives (Rovira, López-Cachero 2016). Other kinds of iron objects also show up, but only sporadically and at a later time. This is the case of cavalry elements and objects related to cooking, such as spits (Pons, Garcia Petit 2008). Among the objects produced, only a few belong to new types, most remarkably serpentine fibulae (Rovira, López-Cachero 2016) and knives, as the previous grip system (straight or ring-ended), which is characteristic of Bronze Age knives, was replaced by a riveted grip (Rivalan 2011).

It is noticeable that the first iron agroforestry tools are axes. The oldest come from Sant Jaume-Mas d'en Serrà (Alcanar, Tarragona) and Can Roqueta II (Sabadell, Barcelona) (Rovira 2007). The presence of metal is quite high in some pre-Iberian necropolises, particularly in the El Vallès area (Can Piteu/Can Roqueta (Sabadell, Barcelona) and Pla de la Bruguera (Castellar del Vallès, Barcelona), where more than 60% of the graves contain metal grave goods, mainly fairly standardized iron objects. The binomial knife-serpentine fibula is the most representative association of metal items (López Cachero, Rovira 2012), which is also true in necropolises in the Languedoc, such as Grand Bassin (Mailhac, Aude), Le Peyrou (Agde, Hérault) and, to a lesser extent, Castres (Tarn) (Rovira, López Cachero 2016). This indicates intensive trans-Pyrenean relations, which, in turn, enhances the northern alternative for the dissemination of iron, particularly considering that some items found in the Languedoc are quite old, such as some late-8<sup>th</sup>-century-BC knives (Nickels 1989; Janin, Chardenon 2000; López Cachero *et alii* 2009).

As regards technical knowledge, an important indication is a partially reduced ferrous ore nodule found in an 8<sup>th</sup>-century-cal-BC combustion structure in Vilars d'Arbeca (Rovira 1998; Rovira Llorens 2000, 215; GIP 2003). This may be evidence of an early attempt to transform iron ore, although it does not prove the existence of consolidated iron production. The available analytical data are not sufficient to confirm the use of local ores in other areas during the second half of the 7<sup>th</sup> century BC, as has been proposed for the knife from Pedrós (Segrià, Lleida) and the spearhead from Roques de Sant Formatge (Seròs, Segrià, Lleida) (Vázquez *et alii* 2005). In fact, the first slag containing iron ore reduction residue is dated to the 6<sup>th</sup> century BC at La Serra del Calvari (La Granja d'Escarp, Segrià, Lleida), Illa d'en Reixac (Ullastret, Baix Empordà, Girona) and Peña del Moro (Sant Just Desvern, Baix Llobregat, Barcelona). These sites provide the first undisputable proofs of siderurgy which are found throughout the studied territory (Rovira 1999; 2012). The analyses of the earliest iron objects reveal that new metallurgical techniques were used: knives, for example, were made from a folded, self-welded sheet (Rovira 2008) and the cutting edges could have been hardened by carburizing and tempering, as attested at Pla

de la Bruguera (Montero *et alii* 1999). Other procedures, such as torsion work and welding by adding copper—both detected in serpentine fibulae—could be considered as even more sophisticated (Rovira 2008; Rovira, López Cachero 2016). These objects are distributed in the area between the Llobregat and the Rhône Rivers; however, we do not know the precise manufacturing location.

Be that as it may, and as previously stated, the documented objects in this period (until the middle of the 6<sup>th</sup> century BC) are almost always found in funerary contexts and are usually knives or items of personal ornamentation. The finds at habitational sites are very scarce, although more functionally diverse, as they include agroforestry utensils (hatchets, axes and hoes), spits and horse-bits. This kind of tool, except hatchets and axes, are usually found in remarkable graves and in association with other prestige goods that would have played a role in the political economy as the possessions of chiefs of outstanding lineages and their closest environs.

Some of us have pointed out in other papers (Sanmartí *et alii* 2006; Sanmartí 2010; 2015) that at this time there are no elements to suggest the existence of a stratified society or political entities with an important territorial scope, in contrast to those of the Iberian period in the same territory. However, it appears evident that Early Iron Age societies were undergoing a progressively accelerated transformation that led them, from the mid-6<sup>th</sup> century BC—or perhaps in some cases even before—to new forms of organization based on hereditary inequality (GIP 2003; Junyent, López 2016; López-Cachero, Rovira 2012; Garcia Rubert 2015) and, quite quickly, to the formation of archaic, agrarian states (Sanmartí 2004, 2009).

The limited number of weapons, and their absence in funerary contexts until the first half of the 6<sup>th</sup> century BC could indicate that there was no coercive power until that time and that an egalitarian ethos was still dominant in those societies. In any case, we do not know to what extent the lineage chiefs were in a position to promote their own iron production or if they depended on exchanges. In the first case, this would have involved mobilizing part of the peasant population to work seasonally on the reduction of iron at the mineral outcrop points, where it was also easy to produce the large amounts of coal required. In both cases, it seems clear that iron was a very valuable element that was not abandoned in the habitat sites.

#### 4.2. The Early Iberian Period

The available data are much more biased for the Early Iberian Period (550-400 BC), since our knowledge of the habitat sites is very limited, except for one notable exception, Els Vilars (Arbeca, Les Garrigues, Lleida) (Junyent, López 2016). Most of the finds come from necropolises, which are mainly concentrated in southern Catalonia, especially around the mouth of the River Ebro. Consequently, the data are also biased in relation to the actual use and production of iron in this period, since the objects found in tombs were usually selected in order to emphasize the social personality



of the deceased, while data on the technology used in the production processes is easier to retrieve from habitational sites, which, as we have said, are poorly known, mainly due to the alterations caused by subsequent occupation phases.

As a result of the aforementioned factors, our documentation on the Early Iberian Period has to do mainly with weaponry, while the information on tools is limited, although of great interest: a couple of hoes and an axe were found at Coll del Moro (La Serra d'Almos, Tivissa, Ribera d'Ebre, Tarragona); another hoe at Illa d'en Reixac (Ullastret, Baix Empordà, Girona), and a *dolabra* at Vilars (Arbeca, Les Garrigues, Lleida) (Rovira 1998). The only post-reduction structure from this period was documented in Room 2A of this last site and dated to between *ca.* 550 and 450 BC. It is a very elongated basin dug in the ground and lined with terracotta and has two flat stones at one end that formed a working surface (Rovira 1998; 2000).

There is important evidence of profound changes in social organization from the second half of the 6<sup>th</sup> century BC onwards. A stratified society was developing, with clear testimonies of coercive power on the part of the elites. This change in the social organization, about which we have written previously, may have been due to various causes, among which we believe population growth played an important role. Moreover, everything we have discussed in the previous section indicates that it was not a direct consequence of knowledge of iron metallurgy, although possession of this technological knowledge must have played a very important role in the consolidation of the elites' power, in both the political and subsistence economies.

Most of the ferric material known between the second half of the 6<sup>th</sup> century BC and the 5<sup>th</sup> century BC comes from funerary contexts, especially in the lower Ebro and nearby areas. There are several reasons to maintain the hypothesis that the necropolises of this period were reserved for members of the elites (the small number of tombs, the discontinuity in relation to the Early Iron Age cemeteries, the presence of other precious objects in the tombs, and elements –Egyptian or Egyptian-type scarabs– related to magic). This also supports the hypothesis that iron weapons were used especially, if not exclusively, by the emerging aristocracy of the Early Iberian Period. Thus we believe that aristocratic power was based on the shared belief in a special relationship between the elites and the supernatural world (perhaps also a form of particular survival in the afterlife), and that the iron weaponry deposited in the tombs was its symbolic expression. This armament, however, also materializes the aristocracy's ability to exert coercion. In these graves, therefore, we see clearly manifested the two pillars on which power was sustained: the acceptance of subordination, legitimized by the relationship with the supernatural world of the individuals who stood at the highest level, and coercion, which is the “physical apparatus for removing or otherwise dealing with those who failed to get the message” (Fried 1967, 230-231).

Concerning the productive sphere, we believe there were probably iron instruments used on a large scale,

allowing the progressive expansion of Eurasian-type agriculture, which is directly linked to the use of the iron plough drawn by animals (Wolf 1966, 30-32). Indirect evidence in this regard is the consolidation of the power structures formed in the mid-6<sup>th</sup> century BC, since this would not have been possible without large-scale economic resources in the hands of the elites. This in turn implies major growth in the population and agricultural production. Such an intensification would probably not have been possible without the large-scale use of iron implements, both for the expansion of the crops into previously uncultivated areas and for the maintenance of fallow lands.

Bearing in mind the strategic importance of iron for the elites, it is logical to assume that they ensured their control of its production. Possibly the most efficient way to achieve this was the supervision of the mining of the ore and its distribution to the rest of the population in sufficient amounts to meet the desired production objectives of the élites. The finds of smelting residue at Penya del Moro and Vilars d'Arbeca (Rovira 1998), among other sites, indicate that part of the raw material was transferred to the settlements. The manufacture and maintenance of work tools would have taken place in urban and rural smithies (Rovira 2000 and 2012). The logical consequence of what is suggested here is that the production of iron weaponry would have been controlled by the aristocracy. It goes without saying that all this is very difficult to prove with the available data, since we have no information on the extraction sites in the Early Iberian Period, nor do we know where and under what circumstances the iron objects were manufactured. Our hypothetical reconstruction does not exclude certain objects being imported from other areas, especially luxury weapons, such as antennae-swords and daggers or falcata-type swords.

#### 4.3. The Middle Iberian Period

During the Middle Iberian Period (4<sup>th</sup>-3<sup>rd</sup> centuries BC) the information available is considerable. It comes mainly from habitat sites, especially those that were abandoned around 200 BC (a particularly conflictive time), or from silos refilled with waste. In addition to this, many iron items were retrieved from the necropolises of Burriac (Cabrera de Mar, Barcelona) (Rubio de la Serna 1888; Barberà 1968; Barberà 1970; Garcia 1993), which are dated to the 3<sup>rd</sup> century and the first years of the 2<sup>nd</sup> century BC. This means that, for this period, we presumably have quite comprehensive information about the different functional categories.

In general, there is a predominance of weapons, both throwing (especially spearheads and spears) and bladed (swords and daggers) with their scabbards. Among the defensive elements, shields are particularly frequent. Agricultural tools are also well represented; they attest great functional diversity (small sickles, ploughs, sickles, pruners and other minority types). Knives are also numerous. Other functional categories are seldom present. Among these we find handmade tools intended for different crafts (punches, chisels, axes, shears, etc.), clothing or ornamental items (usually fibulae), culinary instruments, cavalry and carriage

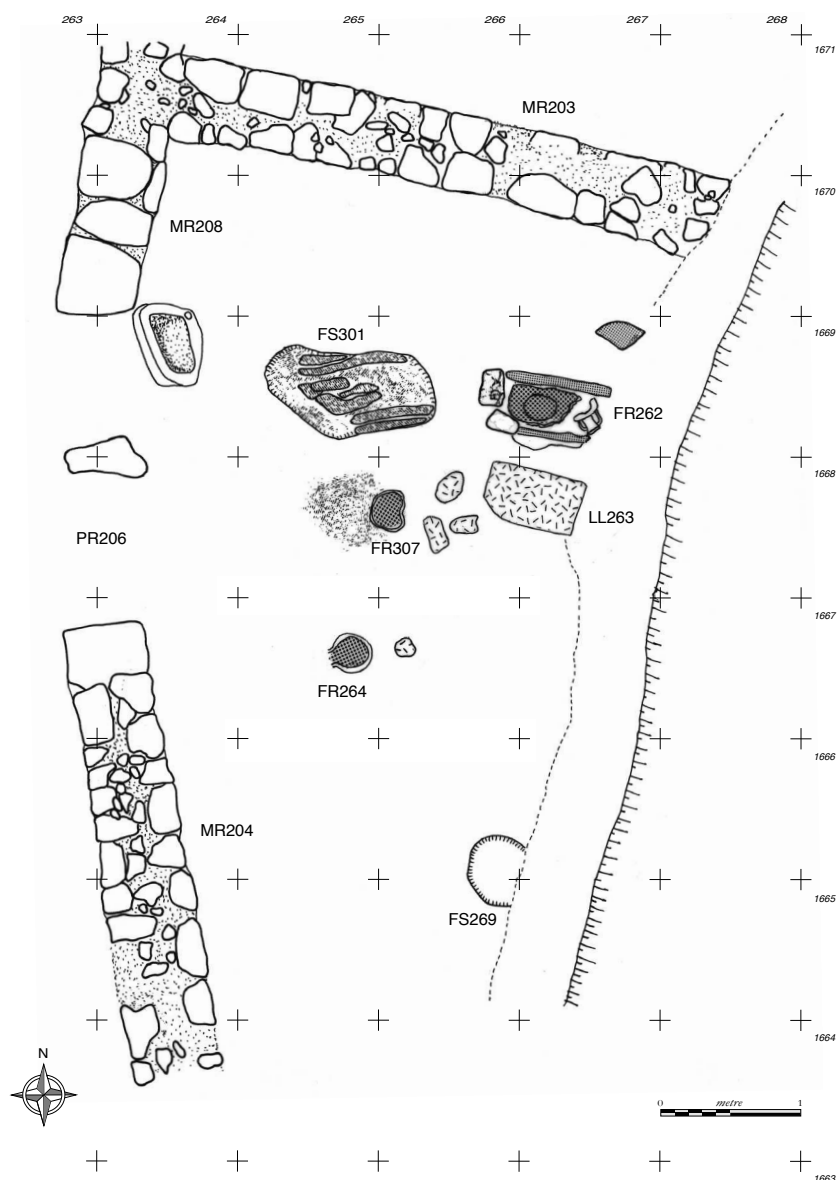


Figure 9. Plan of the metallurgic workshop (Department 9 of House 1) in the Iberian agricultural settlement of Mas Castellar de Pontós site (225-200 BC). Rectangular smithing hearth (FR262); pit for charcoal (FS301) and, next to the door, a stone sink for quenching and cooling metallic objects. The central small holes were used for heating/casting bronze or other melting metals (FR307 and FR264).

equipment, personal care items and locksmith pieces. All this shows a common and widespread use of iron, which had become an essential material in primary production, architecture, armament and many other aspects of everyday life. The production of iron instruments, therefore, was vital to the economy of these communities.

A very important aspect is that for the first time we have relatively solid information on the processes of ore extraction and the location and characteristics of a series of blacksmiths' workshops. The complete chaîne opératoire for iron production is attested only at Les Guàrdies (El Vendrell, Baix Penedès, Tarragona). Here, open-air ore mining points (mixtures of iron oxides and clay) and furnaces for ore processing, smelting and smithing were found (Morera

and Rigo 1999). We do not, however, have any information on the objects that were manufactured at this site. It is plausible to suppose, but in no way provable, that this small production centre was controlled by the settlement of Alorda Park (Calafell, Baix Penedès, Tarragona) located just over three km away, as that was a centre of power on a micro-regional level, according to different data (Asensio *et alii* 2005).

A so-called "smith's building" has been documented at the site of Turó de la Font de la Canya (Avinyonet del Penedès, Alt Penedès, Barcelona). It is dated to the 3<sup>rd</sup> century BC and consists of a domestic space (Room 12) and a working area (Room 14), where a small rectangular furnace and another circular one were found. They both

had walls reddened by intense heat and small amount of iron slag inside and a circular stone structure in the same room could be interpreted as an anvil. Thirty pieces of slag and iron debris were also found in Silo 121 (López 2015).

The workshops of Turó de Les Maleses (Montcada i Reixac, Vallès Occidental, Barcelona), and, to a certain extent, those excavated at Els Estinclells (Verdú, Urgell, Lleida) give us a more or less clear picture of the smiths' activity in villages and small settlements inhabited essentially by peasants. At Els Estinclells, a small workshop was excavated (Room 2A). It is recognizable from the presence of iron slag, hearths (one of them about 1 sq. m in size) and a large rectangular stone interpreted as an anvil (Asensio *et alii* 2005, 471). It is obviously a smithy that would have been used to repair iron objects, and even perhaps to make small ones. At Turó de Les Maleses, another workshop was discovered that, in the 4<sup>th</sup> century BC, occupied a single space in a three-roomed house. In a second period, ending in the 3<sup>rd</sup> century BC, the smith's area was complemented by a space for the reduction of the iron ore, making the entire building devoted to metallurgical activity (Durán, Hidalgo, Moly 2014). It is important to emphasize that at this small site, which is made up of tiny houses, a dwelling of comparatively large dimensions has been considered as an aristocratic residence, although the metallurgy workshop is clearly segregated from it, since it is located about thirty metres eastwards. As in the case of Els Estinclells, we do not know what kind of objects were manufactured or handled in this facility, nor, of course, in what amounts.

At Turó de Ca n'Olivé there are also several smith's hearths located on the periphery of the settlement, close to the wall (Francès *et alii* 2005, 503), a location that is attested in other cases (Rovira 2000). Another workshop was active at Castellruf (Santa Maria de Martorelles, Barcelona) from the mid-3<sup>rd</sup> century and the very early 2<sup>nd</sup> century BC (Gasull *et alii* 1995). It was abandoned suddenly and stands out for the find of a batch of spearheads near the furnace, probably due to be recycled. This is not surprising, given the conflict situation related to the Second Punic War and the Roman conquest, to which we have already alluded. Workshops of the type described must have been quite common in the towns and villages of the Middle Iberian Period, as people would have needed to repair tools and probably make them as well. One such workshop must have also existed in Puig Castellar (Santa Coloma de Gramenet, Barcelona) (3<sup>rd</sup> century BC), judging by the large amount of iron slag found on the slopes of the mountain and described by Serra Ràfols (1968).

The available data suggest a different situation in the settlements where an important presence of the aristocracy has been inferred, such as Mas Castellar (Pontós, Alt Empordà, Girona) or Puig de Sant Andreu (Ullastret, Baix Empordà, Girona). Here we find workshops integrated into the large stately homes, which, in addition, have yielded a large number of weapons. At Puig de Sant Andreu there are several furnaces inside the aristocratic building in Zone 14, dated to the 4<sup>th</sup> and 3<sup>rd</sup> centuries BC (Martín *et alii* 2005). The settlement of Illa d'en Reixac, despite being much less

excavated, has also contributed to the finds of reduction and post-reduction iron debris (Rovira 1998a). Iron slag has also been found in extramural areas, where it would have been more practical to locate multipurpose industrial workshops (Plana, Martín 2000).

At Mas Castellar de Pontós, evidence of metallurgy has been found in contexts from the 5<sup>th</sup> century BC onwards. In the last phase (3<sup>rd</sup> century - early 2<sup>nd</sup> century BC), two workshops are documented in a large house: one of them, in Sector 9, had a working surface formed by two flat stones and beside the furnace there were other collateral pits and a sink for water. The workshop located in Sector 4 had a secondary role: it contained a pit with bronze and iron waste and some smith's tongs on the door to an adjoining room (Pons 2002; Rovira 2012) (Fig. 9 and 10).

Regarding the social organization in this period, we can assume that not only was there a stratified society, but also a true administrative system and state institutions. The craftsmen in iron workshops of various categories and locations, making different productions, would have had different social identities. In the case of workshops incor-

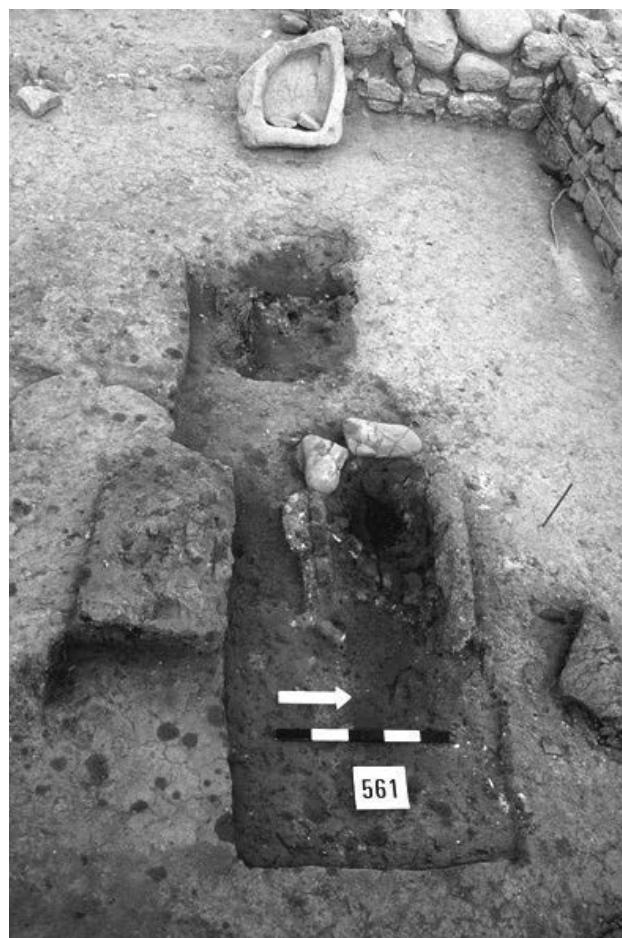


Figure 10. Part of the metallurgy workshop at Mas Castellar de Pontós (Department 9 of House 1) during the excavation. View of the smithing hearth in the foreground, the charcoal pit behind, and, in the background, the water sink.

porated into large aristocratic houses, it seems probable that the smith would have been a member of the house's family or at least one of its clients. In the latter case, we can also imagine production on a certain scale, which would have included tools of different kinds for both agricultural and craft activities, iron parts for vehicles, cavalry equipment and weapons, whose production may have been concentrated –or mainly concentrated– in this kind of facility. The smaller workshops would have primarily been allocated the repair and manufacture of tools, or at least of some of them, while the production of weapons would have been absent. If that were true, and needless to say we are only speaking of hypotheses, the aristocracy's control over production would have covered the entire chaîne opératoire, from the extraction and distribution of the ore –limiting the quantity of raw material available to each type of settlement– to the manufacture of the most valuable items.

## 5. Conclusions

The data available for the study area reveals a relatively important use of iron objects during the Early Iron Age (*ca.* 700-550 BC), although there is no solid evidence that production took place in this territory. This, however, may be due simply to the location of workshops outside the habitational sites, perhaps near the raw material sources, which would make them difficult to recognize. In short, whether these objects were produced locally or were imported or both is currently an unanswerable question. In any case, there is no objective evidence to lead us to believe that the Early Iron Age communities in this area were ignorant of the techniques involved in the manufacture of iron objects.

The nature of the finds (objects of personal care and adornment, knives and sometimes weapons) and the fact that they are found mostly in tombs indicate that it was largely a matter of prestige items. This must have stemmed from the fact that iron was a new type of metal. We can also assume that the structure and ideology of these communities did not make it easy for the leaders to impose the investment and additional workload necessary for large-scale iron production on the rest of the population. In addition, human aversion to change and the risks linked to the introduction of new technologies may also have prevented the introduction of large-scale iron production for over a century (Kim 2001). In fact, it can be demonstrated with different examples from diverse geographic areas that the large-scale adoption of iron was practically never immediate (*Ibidem* and papers by Beylier, Vives and Mata, Lo Schiavo and Quondam, Pacciarelli and Milletti or Paltineri *et alii* in this volume).

The situation is radically different from the mid-6<sup>th</sup> century, in the Iberian period, since the presence of a large number of weapons in the graves indicates that iron production was firmly implanted. The lack of solid data on habitational sites prevents us from stating with certainty whether the number of iron tools underwent an equivalent increase, although the demographic growth from the mid-6<sup>th</sup> century BC makes this assumption at least plausible, since

iron tools must have been a key element in increasing the carrying capacity of the territory.

In our opinion, the causes of these mutations lie in the formation, during the 6<sup>th</sup> century BC, of an aristocracy able by definition to impose a change of this magnitude. There are numerous independent signs that demonstrate this evolution of the social structure, both in the funerary field – which reveals the emergence of an ideology that legitimizes inequality – and in the population patterns, which become increasingly hierarchical and centralized, with the formation of the first urban centres. We presume that iron weaponry was necessary to materialize and emphasize the coercive power of this aristocracy, and that also, in order to increase its wealth, this social group promoted the cultivation of new land and the intensification of production through the expansion of fallow agriculture. All this obviously needs efficient tools, preferably made of iron. Unfortunately, we have little information on the workshops related to this production, but we can assume that they were controlled, directly or indirectly, by aristocrats.

The logical consequence of what we have just described is a new population growth, clearly evidenced by the increasing number of settlements and the growth in size of many habitat sites. This led to the emergence of an administrative system, which was necessary to maintain control of production, including the manufacture of iron items, and to obtain surpluses, the main objective of the elites.

The existence of workshops is systematically attested in the Iberian settlements of this period, regardless of their size and importance, which shows that the production of iron items was common and intensive. The impossibility of knowing precisely what was manufactured at each location prevents us from knowing how production was organized. However, we can assume that objects made in small peasant settlements were not the same as those made in the large aristocratic houses of Ullastret or Mas Castellar de Pontós. If that were the case, it is logical to think that the workshops in those houses produced (totally or partially) the elements required to control the rest of society, i.e. weapons and perhaps also agricultural tools. This would imply a strict supervision by the elites over the extraction of ore and its transformation into raw metallic iron, which was possibly distributed to the rest of the population in limited and controlled quantities (among other reasons to prevent them from being converted in weapons). It is therefore possible that workshops located in small rural settlements were devoted to the manufacture and repair of tools for agricultural and artisanal production, but rarely, if not exceptionally, weapons.

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