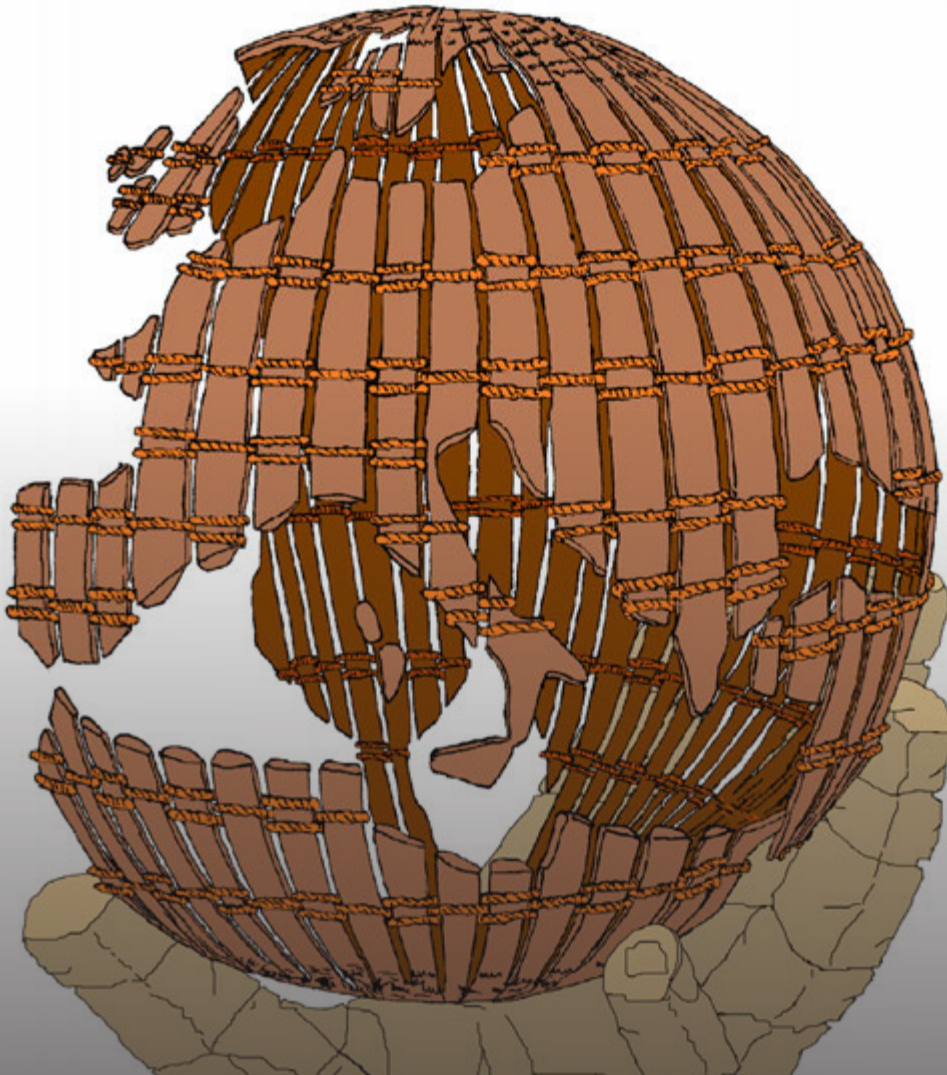


Terra, legno e materiali deperibili nell'architettura antica

Estratto

a cura di
CATERINA PREVIATO
JACOPO BONETTO



1. L'età preromana

ATTI DEL CONVEGNO INTERNAZIONALE DI STUDI
(PADOVA, 3-5 GIUGNO 2021)

COSTRUIRE NEL MONDO ANTICO 6

ROMA 2023
EDIZIONI QUASAR

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a cura di
CATERINA PREVIATO
JACOPO BONETTO

con la collaborazione scientifica di
ELIANA BRIDI, CHIARA GIROTTO, BEATRICE MARCHET

1. L'età preromana

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Building materials and techniques in Iron Age northern Iberia (C. 600-200 BC)*

1. Introduction

This article is about the building materials and techniques used in the Mediterranean coastal area of the Iberian Peninsula between c. 600 and 200 BC, a period that corresponds approximately to the development of the Iberian culture in this territory. It mainly focuses on the northern area of that culture, the north-eastern Iberian Peninsula (present-day Catalonia), although some examples of sites outside this area, particularly to the S, in the present-day Valencia region, are also taken into account (fig. 1). Archaeological research in the study area and period has been quite intensive in recent decades and has yielded a large amount of data regarding architecture, settlement organisation and construction techniques.

The Iberian culture had a complex social system characterised by, among other traits, a hierarchical settlement pattern with several levels, including towns, villages, hamlets and farms¹. In spite of the differences in size and function, most Iberian settlements shared several common traits. They were totally or partially protected by defensive walls, sometimes enhanced by towers and moats. The fortification often served as the perimeter wall of the settlement and houses sharing party walls were built up against it. Other settlements were organised in rows or blocks of houses that always shared party walls and were separated by streets (fig. 2).

The main construction materials were stone, earth, timber and plant matter. Walls were made of stone or, more frequently, they had a stone plinth and an earthen upper section. Similar techniques were used to build the walls of domestic, public and collective buildings, as well as structures such as defences. Roofs were made of timber, earth and plant matter. Earth, lime and stone were used for the internal finishings of the buildings, as well as for the fittings for domestic or artisanal use.

Most of the main traits of Iberian urban plans and building techniques originated in the Late Bronze Age or in the Early Iron Age. However, when each technique was initially adopted varied according to the territory. The use of the different building techniques attested in the Iberian period, as well as their origins, are discussed here. Particular attention is paid to the question of their autochthonous or exogenous nature.

2. Building materials and techniques in Iberian architecture

2.1 Stone as a building material: uses and functions

As stated above, stone was the preferred material for the lower part of walls and usually supported an earthen elevation. The stone plinth is often the only part of the walls that remains *in situ*. Its preserved height and the debris recovered from the destruction layers (stones, brick remains, earth fragments, earthen layers) are indicators of the use (or not) of other materials.

Houses sharing party walls built entirely of stone or with a stone plinth supporting an earthen elevation were not an innovation of the Iberian culture; they had existed in some territories of the study area

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1 Sanmartí 2004; Bonet, Mata, Moreno 2008.

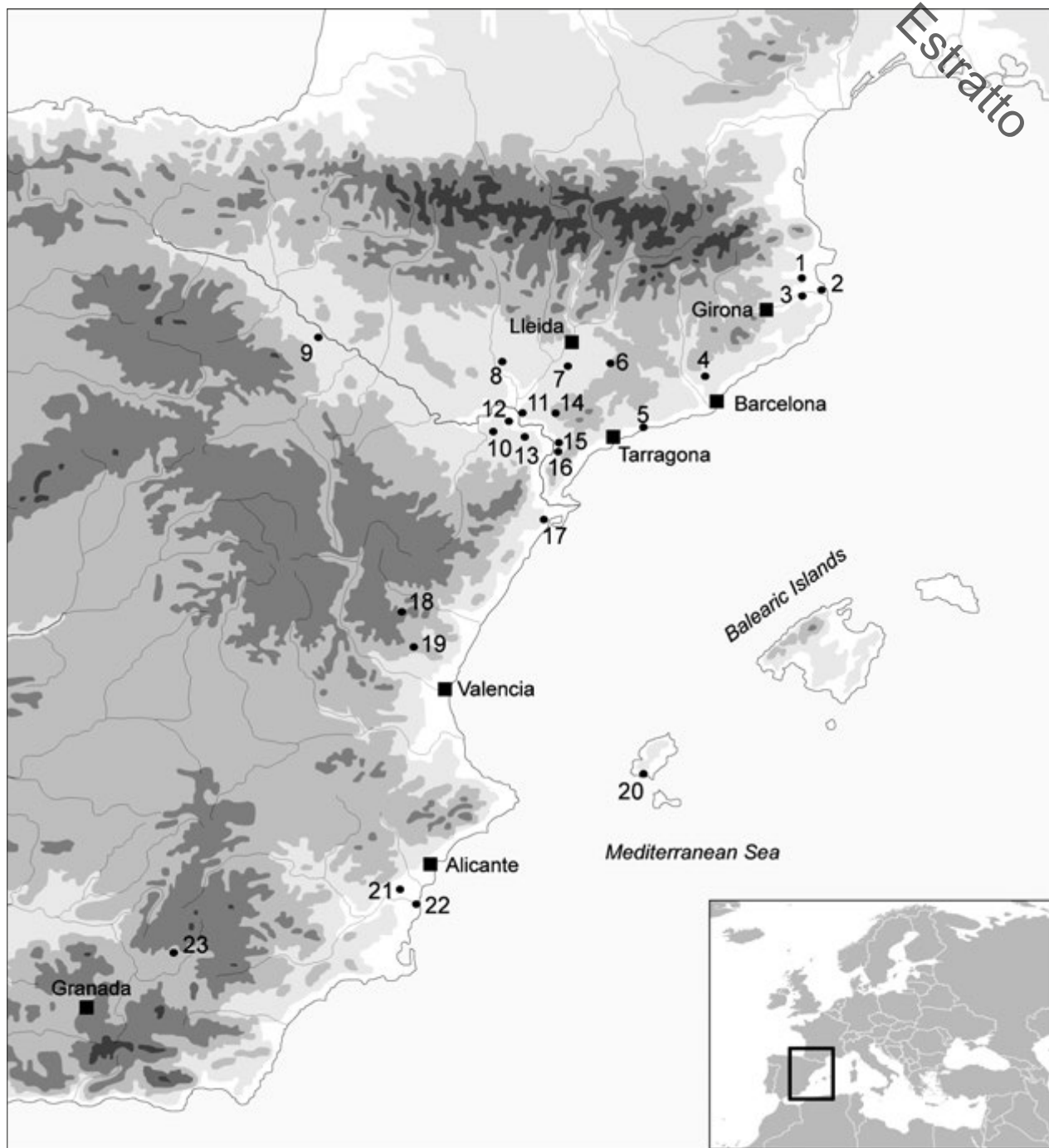


Fig. 1. Map of the eastern Iberian Peninsula and Balearic Islands showing the locations of the sites mentioned in this article (circles) and the main present-day towns and cities (squares) (Map background from Casa de Velázquez; Europe map from Wikimedia Commons): 1) Mas Castellar (Pontós, Girona) 2) Empúries / *Emporion* (L'Escala, Girona), 3) Puig de Sant Andreu and Illa d'en Reixac (Ullastret, Girona), 4) Can Roqueta (Sabadell, Barcelona), 5) Alorda Park (Calafell, Tarragona), 6) Vilars (Arbeca, Lleida), 7) Genó (Aitona, Lleida), 8) Vincamet (Fraga, Huesca), 9) Alto de la Cruz (Cortes de Navarra, Navarra), 10) Tossal Montañés (Valdeltormo, Teruel), 11) Sebes (Flix, Tarragona), 12) Turó del Calvari (Vilalba dels Arcs, Tarragona), 13) Coll del Moro (Gandesa, Tarragona), 14) Puig Roig (Masroig, Tarragona), 15) Castellet de Banyoles (Tivissa, Tarragona), 16) Barranc de Gàfols (Ginestar, Tarragona), 17) Sant Jaume (Alcanar, Tarragona), 18) Castellet de Bernabé (Olocau, Valencia), 19) Tossal de Sant Miquel (Llíria, Valencia), 20) Sa Caleta (Sant Josep de la Talaia, Ibiza), 21) El Oral (San Fulgencio, Alicante), 22) La Rábita (Guardamar del Segura, Alicante), 23) Cerro de la Virgen (Orce, Granada).

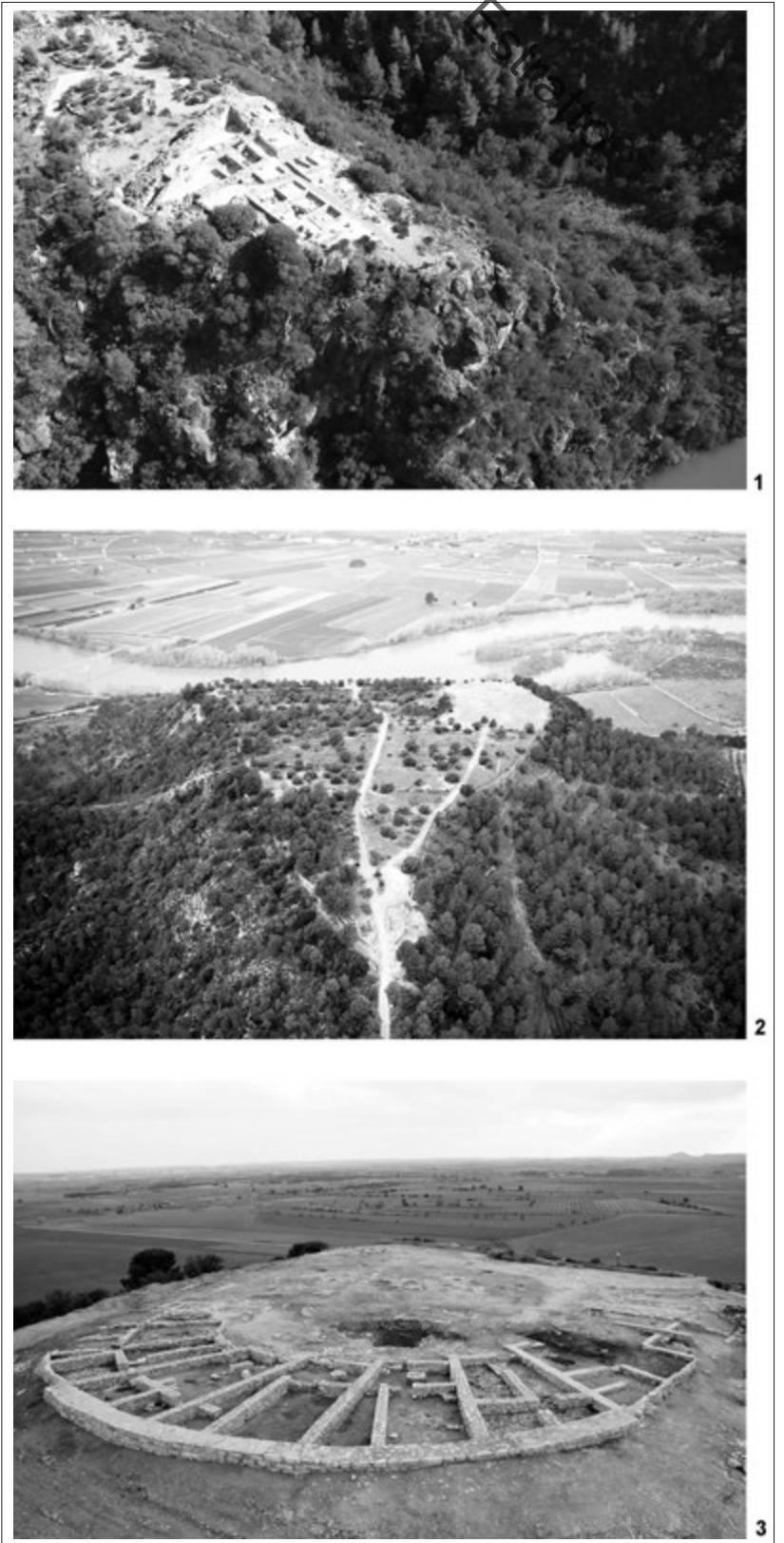


Fig. 2. Examples of hilltop Iberian sites: aerial views of 1) Castellot de la Roca Roja (Benifallet, Tarragona) (GRACPE-UB); 2) Castellot de Banyoles (Tivissa, Tarragona) (GRACPE-UB) and 3) Estinclells (Verdú, Lleida) (Equip Estinclells/ Museu Comarcal de l'Urgell-Tàrrrega/Centre d'Estudis Lacetans).

(Ebro and Segre-Cinca Valleys) from the beginning of the first millennium BC. As examples, we can mention Genó (Aitona, Lleida)² and Vincamet (Fraga, Huesca)³. Stone walls or plinths could be laid directly on the ground surface or in foundation trenches. At sites with several phases of use, walls were sometimes built on the remains of earlier structures, using them as foundations. Finally, where settlements were built on sloping ground, terraces were cut to obtain a horizontal construction area and the lower part of the rear walls was cut into the bedrock. Stone was also used to lay pavements, mainly in outdoor areas (streets, courtyards, porticoes) and less frequently inside houses, where it was mainly used for small areas with a specific purpose that needed to avoid moisture (e.g. a grinding area). Domestic features such as benches or different supports for daily activities were also often built with stone, sometimes combined with earth. In all cases, the stone blocks were laid with an earthen mortar. Once the structures had been completed, as we will see, they were usually covered with an earthen plaster, although other possibilities are attested.

2.2 Earth construction

2.2.1 The use of adobe or mudbrick

Adobe or mudbrick is the best documented technique for earthen walls. Adobes are only occasionally preserved *in situ* (fig. 3) but even when they are not, fragments of individual bricks can often be identified in the destruction layers (fig. 4). This technique was used for domestic buildings and defensive walls. Examples of the latter can be seen at Els Vilars (Arbeca, Lleida)⁴ from the 6th century BC, and Illa d'en Reixac (Ullastret, Girona) from the 4th century BC⁵ (fig. 3, 2).

The adoption of adobe has often been attributed to an exogenous influence, *i.e.* contact with Greeks or Phoenicians. In the S of the Iberian Peninsula, the use of adobe has been proposed as early as the Chalcolithic. However, data from that period come mainly from earlier excavations, such as the site of Cerro de la Virgen (Orce, Granada)⁶, and the use of moulded bricks in those contexts is controversial. This issue has been widely discussed in previous publications⁷ and I will thus only include a brief summary here focusing on the study area. On the northern part of the Catalan Mediterranean coast (*i.e.* the coastal areas of present-day Girona and Barcelona provinces), a Phocaeen origin has been proposed for the adoption of this technique. Bronze Age settlements in the area consisted of groups of huts made of perishable materials and the use of adobe is not clearly attested before the first colonial contacts with the Phocaeans at Emporion (Empúries). This transition is particularly well documented at the indigenous settlement of Sant Martí d'Empúries, where the first Pho-

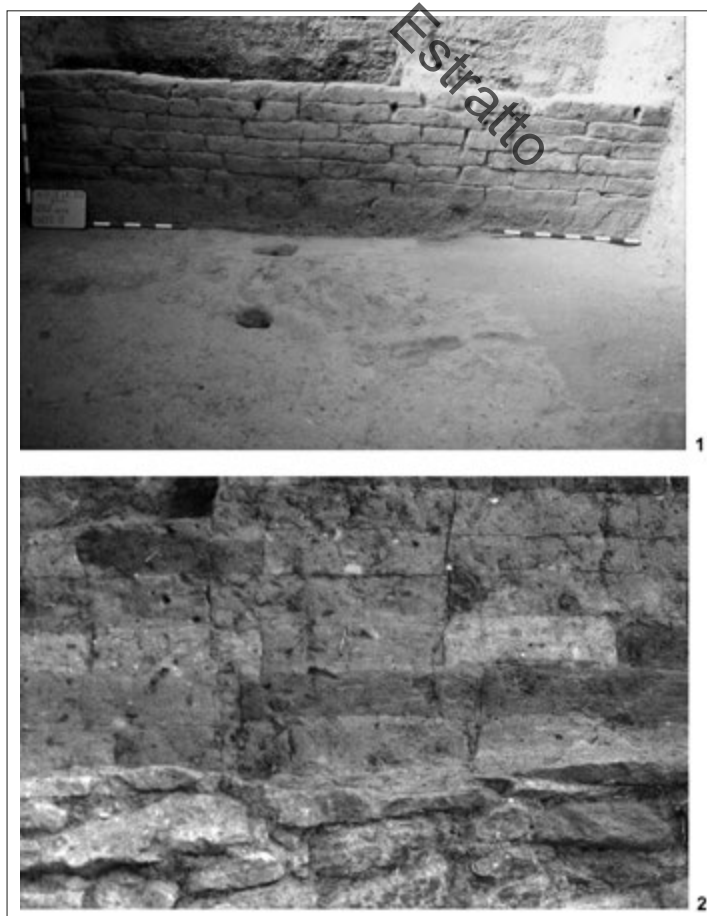


Fig. 3. 1) Adobe wall at Alto de la Cruz (Cortes de Navarra, Navarra), dating from the 8th century BC (F. Gracia); 2) Adobe elevation of the defensive wall at Illa d'en Reixac (Ullastret, Girona), from the 4th century BC (from Martín et al. 1999).

2 Maya, Cuesta, López Cachero 1998, 24.

3 Moya et al. 2005.

4 Junyent, Lafuente, López 1994, 86.

5 Martín et al. 1999, 24-25.

6 Kalb 1969.

7 Belarte 2001; Belarte 2009; Belarte 2011.



Fig. 4. Mudbrick destruction structures at Sebes, 5th century BC (Flix, Tarragona) (by M. C. Belarte).

caean foundation was established in the early 6th century BC. Shortly afterwards, the first houses with rectangular ground plans and walls with mudbrick elevations appeared⁸. A similar phenomenon has been well studied at Puig de Sant Andreu and Illa d'en Reixac, both in Ullastret, Girona⁹.

At the Early Iron Age sites in this area, the presence of mudbrick fragments has been sporadically indicated by their excavators in autochthonous contexts; these materials have mainly been recovered in secondary positions, such as the fill of silos or deposits¹⁰. One example of such finds is Can Roqueta (Sabadell, Barcelona), a group of huts in an Early Iron Age indigenous context where no colonial imports have been attested, and where the excavators mentioned the presence of mudbrick fragments with rounded edges and sizes of 10 x 13 x 12 cm and 10 x 15 x 8 cm¹¹. A thorough study of these materials should be undertaken in order to determine how they were made, as the published photographs are not sufficiently clear to distinguish whether they were produced in moulds or modelled by hand.

In the southernmost areas of coastal Catalonia (as well as in the north of the Valencian region and Lower Aragon) the use of moulded adobes is clearly attested from the middle of the 7th century BC. It has often been attributed to an oriental influence through trade with the Phoenician settlements in the S and the S-W of the Iberian Peninsula. However, this technique has been documented in earlier chronologies in inland territories outside the study area and without exogenous contacts. A paradigmatic case is Alto de la Cruz (Cortes de Navarra) in the Ebro Valley, where this technique was used at least as early as the 8th century BC (fig. 3, 1)¹².

Moreover, the adoption of mudbrick did not always take place immediately after colonial contacts. For example, the archaeological site of Sant Jaume-Mas d'en Serrà (Alcanar, Tarragona) (7th-6th century BC) has high percentages of Phoenician amphorae, stone walls more than two metres high (and an estimated height of 3,40-4 m taking into account an upper storey)¹³, but has not yielded any adobe remains¹⁴. We should not forget that mudbrick was not used in the Phoenician settlement of Sa Caleta (Ibiza) – where the houses are built entirely of stone – or on the island of Ibiza in general¹⁵.

As for the characteristics of Iron Age adobes in the study area, the best-preserved units (particularly when the site was destroyed by a fire) yield information about their size and modules, the use of plaster or painted decoration, etc. The available data suggest that a diversity of modules was used, sometimes on the same site. Among the sites that have provided abundant data on the use of bricks from this period we can mention Barranc de Gàfols (Ginestar, Tarragona)¹⁶, Puig Roig (El Masroig, Tarragona)¹⁷, El Turó del Calvari (Vilalba dels Arcs, Tarragona)¹⁸ and Tossal Montañés (Valdeltormo, Teruel)¹⁹.

8 Aquilué 1999.

9 Martín 1991, 36; Martín, Sanmartí-Gregó 1976-1978; Martín et al. 2010.

10 Marcet, Petit 1985.

11 Carlús et al. 2007, 102 and 66, fig. 57a.

12 Munilla, Gracia, García 1994-1996.

13 García i Rubert 2016, 191.

14 Mateu 2016, 191.

15 Dies Cusí 2001, 83.

16 Sanmartí et al. 2000, 127.

17 Genera 1995, 32.

18 Diloli, Bea, Sardà 2018, 79-82.

19 Belarte 2006.

| Site | Adobe dimensions (cm) (length x width x height) | Date (century BC) | Reference |
|-----------------------|--|----------------------|--|
| Puig Roig | 46-50 x 19-20 x 15-16 | VII | Genera 1995, 32 |
| Barranc de Gàfols | 60 x 40 x 10-14 | VI | Sanmartí et al. 2000, 127 |
| Barranc de Gàfols | 30-40 x 12-14 x 12 | VI | Sanmartí et al. 2000, 127 |
| Barranc de Gàfols | 22-30 x 14-20 x 12 | VI | Sanmartí et al. 2000, 127 |
| Barranc de Gàfols | 30 x 20 x 12 | VI | Sanmartí et al. 2000, 127 |
| Alorda Park | 40 x 25 x 10 | V | Belarte 1997, 85 |
| Illa d'en Reixac | 40 x 30 x 10 | IV – III | Chazelles 1999, 82 |
| Alorda Park | 26-28 x 16-18 x ? | IV | Belarte 1997, 85 |
| Coll del Moro | 20-25 x 22 x 9-13 | III | Jornet et al. 2014 |
| Coll del Moro | 21 x 12 x 9-13 | III | Jornet et al. 2014 |
| Coll del Moro | 15 x 30 x 9-13 | III | Jornet et al. 2014 |
| Castellet de Banyoles | 35 x 25 x 10 | III | Vilaseca, Serra Ràfols, Brull 1949, 17 |
| Castellet de Banyoles | 40 x 25 x 10 | III | Asensio et al. 2012, 186 |

Tab. 1. Dimensions of well-preserved adobes from different Iron Age sites in the study area.

Barranc de Gàfols was destroyed by a fire that led to the combustion of adobes and other earthen elements in the first quarter of the 6th century. The complete mudbricks recovered correspond to different modules, among which we identified four main groups (tab. 1). This diversity contrasts with the uniformity of the units identified in other settlements of the area. Puig Roig, for example, which is somewhat older, was also destroyed by fire; there the adobe bricks all correspond to the same module (tab. 1).

In the following centuries (5th-2nd century BC), the use of uniform modules is mentioned at several sites, including Illa d'en Reixac in Ullastret (tab. 1). In other cases, different modules are combined, e.g. at Alorda Park (Calafell, Tarragona), Coll del Moro (Gandesa, Tarragona), Castellet de Banyoles (Tivissa, Tarragona) (tab. 1) and Mas Castellar (Pontós, Girona)²⁰.

The differences in modules in the same settlement may correspond to the adaptations required for each type of structure (for example, narrower bricks for interior walls, smaller pieces for the corners or squarer shapes for domestic features, etc.). With regard to differences between sites, it is possible that there were regional variations and external influences (Hellenic, Punic, Italic, etc.), although the data published thus far are not sufficient to propose hypotheses in this respect. Research into Iberian metrology suggests that different Iberian regions used different modules in their urban planning²¹. However, the relationship between these different modules and the dimensions of the adobes is not conclusive enough.

Information on the laying of mudbricks comes from the few examples where they have been preserved *in situ* in wall elevations or other structures. They are predominantly laid out in rows of stretchers, as in the cases of Illa d'en Reixac (Ullastret) and Alto de la Cruz (fig. 3), or in headers and stretchers, as at most sites in the Valencia region to the S of the study area, such as Castellet de Bernabé (Olocau)²².

Mudbricks were laid with earthen mortar, which often remains partially adhered to the bricks. The marks, probably made by fingers, on one side of the bricks (fig. 5, 1) are believed to have been intended to facilitate the adhesion of the mortar²³. Other researchers have proposed that they were a method of accounting used during the production of the adobes²⁴.

20 Pons 2002, 63-64 and fig. 7.9.

21 Olmos 2009, 68.

22 Guérin 2003, 228.

23 Sanmartí et al. 2000, 128.

24 Guérin 2003, 222.

Adobes were also used for paving, although only occasionally. They are mainly attested in the Valencia area, for example at El Oral (San Fulgencio, Alicante)²⁵. In Catalonia this type of floor is rare: one of the few examples comes from an artisanal installation at Coll del Moro, in Gandesa, more specifically the compartments related to the processing of flax fibres dating from the end of the 3rd century BC²⁶. The use of adobes for domestic features has been documented since the Early Iron Age. At Barranc de Gàfols, three bricks placed perpendicularly against a wall inside a room could have been used to support shelves²⁷. In the Iberian period, domestic features such as benches were sometimes built with adobes, e.g. at Illa d'en Reixac²⁸ in the 4th century BC, at Alorda Park²⁹ or Castellet de Banyoles by the end of the 3rd century BC. At the last of these, in Building 10 that had a sacred function, three adobe benches were attached to the perimeter walls³⁰ (fig. 6). Hearths built with adobes are also attested at Illa d'en Reixac³¹ and to the S of the study area at El Oral³².

2.2.2 Rammed earth

Many researchers have assumed that rammed earth was used in the Iberian period. As a rule, this technique is characterised by the use of a formwork. The earth is poured in a mostly dry state, sometimes mixed with lime or gravel but without plant or other organic material, and stabilised in the formwork by tamping it with a rammer.

In the Spanish and Catalan literature on Iberian construction techniques, particularly in publications prior to the 1990s³³, the words *tapial* and *tàpia* (the Spanish and Catalan terms respectively for “rammed earth”) were often used as a generic synonym for “earthen construction”, or as an alternative where there were no adobe remains. However, no prior consideration was made as to their meaning as a specific building technique. This question, which is not exclusive to the Iberian sphere and also affects other territories, has been criticised in recent decades³⁴. Recent efforts on an international level to establish an appropriate terminology in different languages for each variant of the multiple possibilities of earthen construction has resulted in a glossary in four European languages³⁵.

In the Spanish case, this common assumption of the use of rammed earth since the protohistory is probably due to the omnipresence of this technique, together with adobe, in the traditional architecture of large areas of the Iberian Peninsula. The use of rammed earth on the Iberian Peninsula is mentioned by Pliny the Elder³⁶, who described the excellent consistence and durability of walls made in wooden formworks in Spain and Africa. Although this source is not contemporary to the Iberians, this statement suggests that if Pliny observed it in the 1st century AD, this technique was not introduced by the Romans but was already in use by the indigenous populations. However, there is no clear archaeological evidence for the use of wooden formworks to build walls in the Iron Age. It is also perfectly possible to build a regular rammed earth wall without them, shaping the material by hand or with tools, as is still done in many different parts of the world from northern Europe³⁷ to Asia³⁸.

In the study area, the remains of rammed earth walls have rarely been preserved *in situ*. The few examples there are correspond mainly to internal partition walls. Among them, we can mention Sebes (Flix,

25 Abad, Sala 2001, 122.

26 Rafel, Blasco, Sales 1994, 128.

27 Sanmartí et al. 2000, 52-55.

28 Chazelles 1999, 85.

29 Asensio et al. 2005, 601.

30 Asensio et al. 2012, 186.

31 Chazelles 1999, 59 and fig. 6.13.

32 Abad, Sala 1993, 176, fig. 151.

33 Gusi, Olaria 1984, 19; Maluquer de Motes 1986, 17.

34 Chazelles, Poupet 1985, 156; Sánchez García 1995, 350; Belarte 1997, 54; Belarte 2001, 30; Belarte, Gailledrat 2003, 283; Pastor 2017, 20.

35 Knoll et al. 2019.

36 Plin. nat. 35.48.

37 Lebas et al. 2007.

38 Scherrer 2003, 220-223, figs. 9-12.



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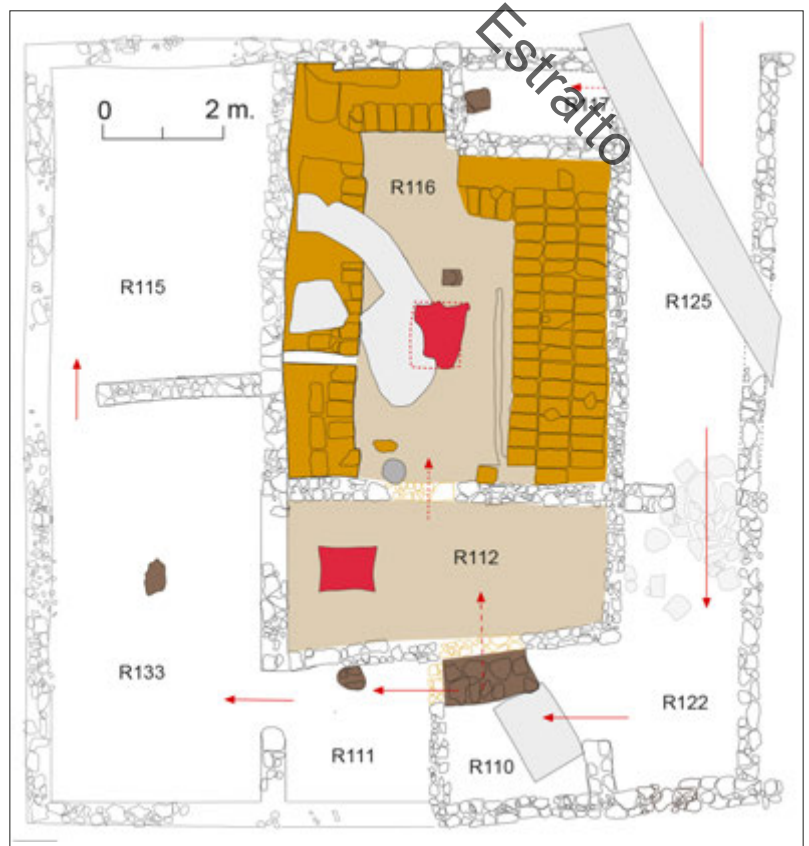


Fig. 6. Adobe benches attached to the perimeter walls of Building 10 at Castellet de Banyoles (Tivissa, Tarragona), dating from the 3rd century BC (from Asensio et al. 2012, 186).

Fig. 5. 1) Marks on bricks from Coll del Moro (Gandesa, Tarragona), 3rd century BC (M. C. Belarte); 2) Painted decoration on a brick from Barranc de Gàfols (Ginestar, Tarragona) (M. C. Belarte), 6th century BC; 3) Earthen roof fragment from Barranc de Gàfols (Ginestar, Tarragona), 6th century BC (by M. C. Belarte).

Tarragona), a 5th century BC settlement where all but one of the walls had mudbrick elevations. This was a partition wall about 30 cm wide³⁹, a width that was insufficient to allow the earth to be rammed inside a formwork (fig. 7); we thus interpret the technique used to build this wall as shaped rather than rammed earth.

Evidence of the use of a formwork comes from the site of Illa d'en Reixac in Ullastret (Girona). It was used to build a bench in the 4th century BC. The earth had been placed on site in a plastic state and molded

³⁹ Belarte, Noguera, Olmos 2018, 372 and fig. 6.



Fig. 7. Partial view of the Sebes (Flix, Tarragona) site, dating from the 5th century BC, with the rammed earth wall in the foreground (by M. C. Belarte).

during its drying with the help of a wooden board⁴⁰. This example does not strictly correspond to rammed earth, but it shows that the idea of a formwork to build such an earthen structure existed.

Further to the S of the study area, walls built with rammed earth have been documented at different sites. At La Rábita (Guardamar del Segura, Alicante), a wall dating from the 6th century BC was built by superimposing thick layers of earth separated by thin layers of lime. The possibility of a formwork has not been excluded⁴¹, although, considering its width of about 35 cm, it is more likely that the shaped earth technique was used. At El Oral (San Fulgencio, Alicante, dating from the 5th century BC) an earth and stone wall leaves the door open to both interpretations: rammed or shaped earth⁴².

In some cases, the use of rammed earth has been proposed after a meticulous macroscopic study of the material making up earthen destruction layers consisting of compacted earth with no inclusions or adobe fragments. This can be seen at Alorda Park (Calafell, Tarragona)⁴³, where the tech-

nique has also been proposed in the reconstruction of the site⁴⁴.

Micromorphological analyses could give more information about the specific procedure for building an earthen wall (*i.e.* if the earth was mixed with water, plants or other materials; if it was compacted, modelled, *etc.*). Unfortunately, these analyses are still rare in the study of earthen walls from Iberian contexts.

2.2.3 Earth as a plaster for walls, roofs and interior finishings

Walls were mostly plastered with earth, although lime was also used. It has been well documented, still adhered to the adobes, at most archaeological sites. When the mudbricks are not *in situ*, the remains of plaster on one or more faces are a useful indicator to interpret how the adobes were laid in the construction.

Earthen plaster was composed of the same material used to make the mudbricks; it was mixed with small plant stalks and finished with a more liquated coat. Occasionally plasters preserve the remains of a painted decoration, normally consisting of geometric patterns (bands, parallel lines, *etc.*) (fig. 5, 2). In Alto de la Cruz (Cortes de Navarra), schematisations of the human figure are also depicted⁴⁵.

Earth was also used as plaster in the construction of roofs to protect the buildings from water infiltrations. The archaeological remains of these roof covering layers consist of fragments of earth about 20 cm in width with numerous imprints of plants, reeds and timber. They are found in the destruction layers of many settlements (fig. 5, 3) and indicate that a thick layer of earth covered a base of plant matter supported by a row of small parallel trunks.

Researchers have different theories regarding the slope of the roofs. These range from almost flat roofs to sloping ones with different degrees of inclination. Judging from ethnographic parallels and experimental archaeology, it seems most likely that they were either flat or very slightly sloping, as a heavily sloping roof would have been less resistant to rainwater erosion, which could have washed away the earth layer and caused serious damage to the construction⁴⁶.

40 Chazelles 1999, 83.

41 Belarte, Gailledrat 2003, 292.

42 Sala 2001, 183-184.

43 Belarte 2001, 33, fig. 12.

44 Pou et al. 2001, 101.

45 Maluquer de Motes 1954, 158.

46 Belarte 1997, 91.

The interior finishings of the buildings were mainly made of earth. It was used for the interior plastering of walls and for floors and domestic features such as benches, hearth and oven combustion surfaces, oven domes, etc.

2.2.4 Wattle and daub

In the Late Bronze Age and Early Iron Age, wattle and daub was a common technique in the coastal areas of the Catalan territory to build walls. In the Iberian period, when construction with stone and adobe or massive earth became generalised, the wattle and daub technique was probably limited to internal partitions or some kinds of furniture such as shelves, beds, etc. Evidence of this is found in earthen fragments with plant imprints recovered from the destruction layers of many sites, whose thickness is not sufficient to suggest they were part of the roof covering.

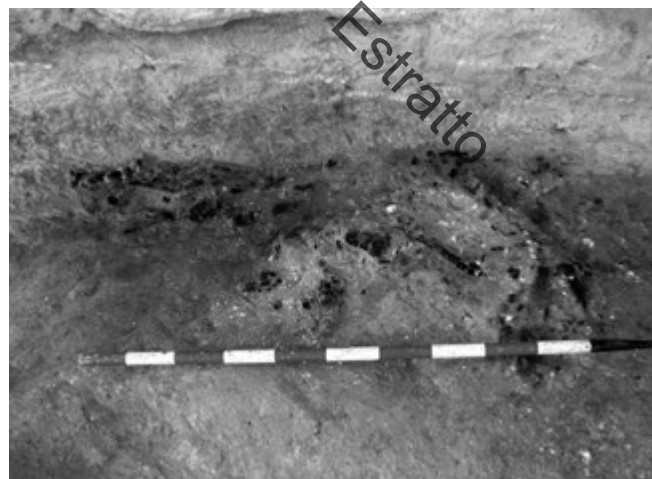


Fig. 8. Carbonised timber structures at Sebes (Flix, Tarragona), 5th century BC (by M. C. Belarte).

3. Timber and plants

No timber has been preserved *in situ* in the analysed contexts. It is only found in a carbonised state in the destruction layers where a fire was involved (fig. 8). The most common species attested are pine and oak. Most of the carbonised timber belonged to the roof beams, although other elements, such as doors, lintels, vertical roof supports and even furniture, have been identified. In a few cases with very well-preserved carbonised pieces of timber, it has been possible to identify different types and sizes and how these were placed in the construction⁴⁷. Occasionally, the use of timber can be inferred from negative imprints, such in the case of a wooden threshold at Illa d'en Reixac⁴⁸.

Plants are usually reduced to ashes and are less often identified. However, the negative imprints of timber and plants are sometimes preserved in earthen fragments that have combusted as a result of an accidental (or deliberate) fire (fig. 5, 3).

4. Other materials

Stone, earth and timber were the most common materials used at the time in the study area. In addition, the use of lime and pottery should be mentioned, especially for wall and floor coverings.

Lime is attested from the 8th century BC in Phoenician colonial contexts in the S of the Iberian Peninsula; its use spread along the Mediterranean coast and is documented in Catalonia from the late 7th-early 6th centuries BC.

Another material used in construction was pottery. It was usually fragmented, after the objects were no longer of use for their original function. The most frequent use of pottery sherds throughout protohistory was in preparation layers (below the earthen combustion layers) of hearths and ovens⁴⁹.

The combination of lime with other elements made it possible to create new types of floor and wall coverings based on lime and sand mortar, sometimes including indigenous ceramic fragments, to obtain a kind of *opus signinum*. This material is documented from the 4th century BC onwards in the N of Catalonia at Ullastret⁵⁰ and its use became more frequent during the 3rd century BC⁵¹.

47 Rocafiguera 2005.

48 Chazelles 1999, 87, fig. 8.11.

49 Belarte 1997; Belarte 2021.

50 Martín et al. 2004.

51 Belarte 2001, 36.

Bricks and tiles would be introduced by the end of the Iberian period (2nd-1st centuries BC), although their use would only be sporadic until the Early Roman Empire⁵². Indigenous materials and techniques would continue to be used during the first years of Romanisation⁵³.

5. Conclusions

Iron Age Iberian architecture and construction techniques are often interpreted as the result of exogenous influences, *i.e.* contacts with the Phocaeans at Emporion, in the north-eastern Iberian Peninsula, or with Phoenician traders from the colonial foundations in the S of the Iberian Peninsula. It has often been claimed that the earliest examples of adobe walls are those of the southern Iberian Peninsula, all of them in colonial contexts. However, as we have seen, in northern and inland territories close to the study area, such as the Ebro Valley, the first use of mudbrick as well as the first settlements consisting of houses sharing party walls predate any exogenous influence. As for rammed earth, the situation remains uncertain and there is no clear evidence of its use in the Iberian period. The first centuries of the Roman conquest (until the beginnings of the Early Empire) do not involve important innovations in building materials and techniques. New plans and modules would be adopted⁵⁴, but mudbrick walls and earthen roofs were still in use. In summary, stone, earth and timber were widely used in Iron Age architecture in the study area. Earth appears to have been the preferred material and was used for multiple purposes. However, the origins and first use of certain techniques, or even the evidence of their use, are not always clear. We hope that this picture will be completed in the near future, as more archaeological research is carried out, with increasingly accurate excavation and recording methodologies thanks to the growth in multidisciplinary analyses.

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Riassunto

Questo articolo presenta una sintesi aggiornata dei materiali e le tecniche di costruzione utilizzati nella penisola iberica nord-orientale (odierna Catalonia) durante il cosiddetto Periodo Iberico (600 - 200 BC ca.).

Gli insediamenti iberici erano caratterizzati da file di case che condividevano i muri divisorii ed erano separate da strade. I muri erano in pietra o con zoccolo in pietra e alzato in terra, solitamente adobe. È inoltre documentato l'utilizzo di altre tecniche, come la terra battuta. I tetti erano in legno, coperti con materiale vegetale e intonacati con argilla. La terra era inoltre impiegata per pavimenti, intonaco e attrezzature domestiche come focolari, banchi ecc., assieme ad altri materiali, per lo più pietra e calce.

Vengono inoltre discussi i precedenti di questi edifici nella tarda età del bronzo-prima età del ferro e le origini delle tecniche di costruzione utilizzate nell'architettura iberica.

Parole chiave: Età del Ferro, Protostoria, Penisola Iberica nord-orientale, cultura iberica, tecniche di costruzione

Abstract

This paper consists of an updated synthesis of the building materials and techniques used in the north-eastern Iberian Peninsula (present-day Catalonia) during the so-called Iberian Period (c. 600 - 200 BC).

Iberian settlements were characterised by rows of houses sharing party walls and separated by streets. Walls were made of stone or with a stone plinth and earthen, usually adobe, elevations. The use of other techniques, such as rammed earth, is also documented. Roofs were made of wood covered with plant matter and plastered with clay. Earth was also used for floors, plastering and domestic equipment such as hearths, benches, etc., together with other materials, mainly stone and lime.

The precedents for these buildings in the Late Bronze Age-Early Iron Age and the origins of the construction techniques used in Iberian architecture are also discussed.

Keywords: Iron Age, protohistory, north-eastern Iberian Peninsula, Iberian culture, construction techniques

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