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## Reviewed Article:

# Baking Bread in the Riff Area (Morocco): An Ethnographic Approach to the Study of Iron Age Archaeological Ovens

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We present the result of our fieldwork conducted in the Riff area (Morocco), where, through the participant observation technique, we have analysed the characteristics and functioning of several bread-baking traditional ovens that are still working in the region. We were able to

observe the *chaîne opératoire* of the process of baking bread, where women are the main actors. This approach has proved to be a useful tool to analyse the uses and functions of similar culinary structures in the past; in our case, we will apply the information provided by these observations to study the ovens attested to Iron Age settlements in different areas of the western Mediterranean. The combination of experimental archaeology and ethnoarchaeology can provide valuable information for studying ovens and domestic activities in these societies, such as practical aspects like the oven's construction techniques or the bread-baking knowledge (fuel used, the different steps of the process and their duration, etc.). Other valuable information we collected is related to the social sphere and community.



This ethnoarchaeological study provides us with a whole series of data that can be useful for the interpretation of the archaeological combustion structures in our study area and, more generally, in other periods of the past, such as the Iron Age in the western Mediterranean.

## Introduction

The analysis of space and the organisation of daily life are key elements in the study of past societies. Combustion structures (hearths and ovens) and their characteristics play an important role within the domestic space: location within the settlement or the house, type of spaces and structures related, people who used them and for what purposes are important aspects to be considered. The study of all these factors can provide very useful indications about how domestic activities were organised and how people related to each other.

Our research focuses on Iron Age combustion structures in the western Mediterranean (See Figure 1a). To analyse aspects directly related to their use, we are carrying out different analyses based on a wide sampling of protohistoric hearths and ovens in the north-eastern Iberian Peninsula, north of

France and the Balearic Islands. Their results provide information on aspects such as the building materials and construction processes, the fuels used, the temperatures reached or the foods that may have been cooked (Belarte *et al.*, 2023b).

This interdisciplinary approach to the archaeological fire installations has been complemented by experimental archaeology, which has allowed us to verify or rectify some of the hypotheses and interpretations regarding their construction and use. At the same time, it has allowed us to obtain an important corpus of reference samples to compare with the archaeological ones. Without abandoning this experimental approach, whose first results have already been published in this journal (Belarte *et al.*, 2022) as well as in others (Belarte *et al.*, 2023a), we have incorporated a third way of analysis, which is ethnoarchaeology, also to understand some of the structures or behaviours of the past through comparison. This approach provides important sources of information on the use of culinary structures. Among the many existing studies, we can highlight ethnoarchaeological research on domestic

combustion installations and fuel use conducted in the Iberian Peninsula (e.g. Albir, 2010) and the Maghreb (e.g. Zapata *et al.*, 2003; Portillo *et al.*, 2017).

It is this third way of analysis that is the focus of this paper. More specifically, we are presenting the results of the information gathered in the first phase of ethnographic exploration in the Riff area (Morocco), in which we have been able to observe and study several traditional ovens, whose morphology and dimensions are very similar to those of the Iron Age archaeological ovens in our study area (See Figure 1b). We have also been able to observe and even participate in the complete process of bread making in one of these ovens.

## Methodology

To carry out this ethnoarchaeological study we had the priceless help of a local guide and interpreter, who made it possible that the owner women and their families very kindly showed us their ovens and provided us with very valuable information about them.

Before the start of fieldwork, a specialised template was designed to record the characteristics and related information on each oven to be studied. We observed, analysed, measured, and photographed nine structures (Belarte *et al.*, in press, Fig. 5) and any surrounding elements related to their construction, use, and maintenance (fuel gathered, tools, associated spaces, etc.).

We also had the opportunity to participate in and document the entire process of making bread in one of these ovens. We accompanied the women of the family, who are usually in charge of carrying out this task, and we were able to document it step by step, from the collection of the fuel to the baking process, including the preparation of the dough and the bread. Although some families obtain flour by milling cereals, in this case it had been purchased from a local shop.

In order to document as best as possible the process of cooking this essential food, we decided to use the participant observation technique. This is a type of data collection method used in qualitative research and, specifically, in ethnography. Its aim is to gain a close and intimate familiarity with a given group of individuals or a particular community and their practices through intense involvement with people in their cultural environment. This methodology, therefore, not only consists of a scientific observation but also of being in the field and interacting with people about the experiences that are being observed (Verd and Lozares, 2016, p. 241). Our research required a natural, direct and open observation; meaning we observed the community and the situation as it developed on a daily basis. At the same time, the community knew we were there, could see and talk with us and knew from the start we were researchers. In order to achieve our goals, we also carried out a focalised and participant centred observation, focusing on the process of making bread (without losing sight of other social processes) and we participated in the activity without being too intrusive



(Guasch, 2002; Sanjuán, 2019). As a result, we were able to collect a large amount of great qualitative data and information, which we will expose in the following sections.

## Iron Age ovens in the north-eastern Mediterranean

Iron Age habitat in the study area (Mediterranean coast of the Iberian Peninsula and the South of France) consists mostly of agglomerated-type settlements composed of rows of houses sharing party walls, whether organised around an open, central area or separated by streets. Stone, earth and timber are predominant building materials. Different types of houses have been identified, with a wide variety of floor areas, number of rooms, and space distribution. Diverse domestic installations and associated objects, mostly located inside houses, inform us about daily activities, such as food preparation and consumption, small-scale storage, or domestic craft productions.

Combustion structures are the most frequent features inside houses, although they can also be located in outdoor spaces. They can be divided into two categories: hearths, open structures with a burning surface of clayey earth built at ground level, and ovens, usually raised above the circulation level and covered by a dome. Unfortunately, the remains of the ovens' walls and domes are rarely preserved. Another difference between these two types of structures is that hearths are usually indoors, inside houses, while most ovens are outdoor features (Belarte *et al.*, 2016, p. 178; Belarte *et al.*, in press). These differences in location are often interpreted in social terms: hearths would be for private use, while ovens could have had a collective use, shared by several families, or controlled by a few elite families who would allow their use to the rest in exchange for a fee (Belarte *et al.*, 2016, p. 188). As for their uses, hearths are supposed to be mainly used to cook different kinds of meals, mostly boiled inside pots, or grilled, whilst ovens are interpreted as devoted to baking bread (Camañes, 2013; Santacana and Duran, 2011a, pp. 19-22; Santacana and Duran, 2011b, pp. 45-54). However, other uses are not excluded, such as roasting cereals, smoking or even cooking meat and fish (Nin 1999, p. 241). Experimental archaeology and ethnoarchaeology can be useful to verify the suitability of both kinds of structures for these uses.

## The contribution of experimental archaeology: building and using reconstructed ovens

Our project has experimented with replicas of the archaeologically documented types of combustion structures. The experiment was carried out at the *Ciutadella Ibèrica de Calafell* (Calafell, Tarragona, Spain), an archaeological site of the Iberian period (6th-1st century BC) that has been reconstructed and is open to the public (Pou *et al.*, 2001; Belarte and Sanmartí, 2023, pp. 265-296). The insides of the houses are decorated with finishes and recreations of hearths, benches, and other equipment and objects characteristic of the Iberian culture. This centre receives about 18,000 visitors annually, especially schoolchildren, and is also a centre for experimental archaeology and a member of EXARC.

Our experimental work was carried out in 2021 and 2022. For this, we used some of the replicas of existing combustion structures on the site (some partially remodelled by us), and we also built new ones. We intended to work with hearths of different morphologies and construction types, located both indoors and outdoors, following the archaeologically documented diversity.

We mostly worked with hearths (a total of six structures), and a single oven (Belarte *et al.*, 2022). After carrying out repeated combustions and keeping a systematic record of variables such as temperatures and fuels, extensive sampling of the structures and fuel remains was carried out, following the same interdisciplinary methodology used in archaeological structures (Belarte *et al.*, 2023a), for comparative purposes. Boiling and cooking tests were carried out using hand-made ceramic pots, both in indoor and outdoor hearths.

The oven, with an oval shape, an inner diameter between 1.00m and 1.50m and a height of only 0.60m (See Figure 2a), was small in size and did not allow for comfortable handling of materials or objects inside, as is required when baking bread. It was used, therefore, to boil water in a ceramic hand-made pot and not to bake bread. Regarding fuels, in the different combustions, we alternated wood, cow dung and goat dung as the base material, adding vegetal material such as branches, straw and palm leaves, moving the fuel remains and embers to the sides of the oven -but without removing them- to place the pot.

In addition to the structure we used, other replicas of ovens have been built at the *Ciutadella de Calafell* for educational purposes. They are larger and are located on a raised podium (See Figure 2b), which allows working more comfortably. In fact, they were built on the model of traditional Riffian ovens and are similar in size to those we have been able to observe ethnographically. In this case, the structures have been used to bake unleavened bread during school visits. Fuel composition is similar to that used in our experiments, and the bread is also baked without removing the embers.

## The ethnographic approach: traditional ovens in the Riff area

### An introduction to the study area and Riffian architecture

The ethnographic work has been conducted at the Al Hoceima National Park (PNAH) (Figure 1b), in the central Riff, northern Morocco, on its Mediterranean coast. As covered in the *Atlas du Parc National d'Al Hoceima* (UICN, 2012), the region is characterised by geographical and biological diversity, with a rocky coastline and high cliffs. With 285 km<sup>2</sup> of land area, it is densely populated with around 15,000 inhabitants in over 36 douars (small groups of houses), as reflected in the census of 2004. The PNAH is composed of the five rural communes of Izmmourren, Ait Kamra, Rouadi, Snada, and Bni Boufrah. The ethnographic study we have carried out has taken place in Rouadi and Bni Boufrah.

The Riffian dwelling was the subject of ethnographic study by some military inspectors who were in the area during the Spanish protectorate (1912-1956). This is the case of Emilio Blanco de Izaga, who left a complete and illustrated description of the house, daily life and local customs (Blanco de Izaga, 1930). The majority of the dwellings have a central courtyard with rooms opened to it, organised on one floor. According to that author, the central courtyard was used to provide light for the rooms, and the ovens were often located there as well. Azul Ramírez, in a recent ethnographic study (2023, p. 74) points out that, until recently, domed bread ovens built with earth, used by women, were still employed in the courtyards, but these installations are being replaced by gas appliances, something we have also been told during our research.

Throughout our fieldwork stay, we observed that traditional architecture has been maintained in rural areas. The most visible construction materials employed are stone and earth, applied to build the walls of houses through different building techniques. They also had flat roofs made of earth, wood and other vegetal materials. In the few cases where we have been able to visit the interior, we could see that the houses are arranged around a courtyard. All of them have at least one traditional oven. These are situated in the open air, although out of sight, and are built primarily to bake bread. We could see one while being used, and as a result, his article focuses on it.

## Buildings, structures and utensils related to bread-baking

The oven in which we could observe and participate in the bread-making process is located in the commune of Bni Boufrah and was given number 3 in our inventory; from now on, we will refer to it with this numbering.

As in the rest of the observed structures, Oven 3 is located in an open space (See Figure 3), close to the house and within the perimeter of the property but separated from the dwelling. It does not have a fixed or movable roof but was covered with plastics or fabric while not in use to protect it from rainwater.

Oven 3 is attached to a small one-room building with a flat roof designed to store tools and utensils, and has enough space for occasional activities. During our visit, it was used to prepare and knead bread dough. In our ethnographic research, we have observed other examples of ovens associated with constructions attached to the house, which can also be used as storerooms or chicken coops, although other structures also exist.

Next to the ovens, we could find the following tools related to the bread-baking process (See Table 1):

Description of the tool	Uses and functions
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Tool made of strips of cloth attached to a wooden handle (mop) (See Figures 4, 8b)	Cleaning the inside of the oven's chamber
Circular wooden shovels with a long metal or wooden handle (long-handled shovel) (See Figures 4, 8a)	Handling, placing in the oven, moving and turning the loaves
Circular wooden shovels with a short wooden handle (short-handled shovel) (See Figure 9a)	Shaping the loaves and moving them from the table to the long-handled shovel
Small metal braziers and small metal cans (See Figure 8c)	Stocking up and reusing the embers
Metal bowl (See Figure 6a)	Mixing the ingredients to obtain the dough
A flat and rounded basket made of esparto with two handles (basket) (See Figure 6b)	Containing the flour
A metal or wood stick with the end bowed in an "L" shape (metal stick)	Mixing and removing the charcoal of the oven's chamber
Metal lids bowed in a "V" shape (V-shaped lid) (See Figure 8c)	Collecting and moving the embers

TABLE 1. DESCRIPTION OF THE TOOLS USED TO PREPARE THE DOUGH AND BAKE THE BREAD.

## Characteristics of the ovens

Riffian ovens are built on a podium of varying shapes, locally called *el hammala*. They can be angular or circular and have a bench or benches attached. Podiums are built of masonry, mud bricks, or fired bricks by the owners of the structure and before the oven is built on top. This podium can be solid or have an interior, empty space that can be used, for example, as a chicken coop or a rabbit hutch. The oven itself is built with a single chamber of circular or oval plan, with a domed superstructure, spherical or with a slightly pointed shape. The dome is built with different materials, covered with a lining and repaired periodically or when necessary. It has two openings, one on the top and one on the front, that have removable lids of different materials, such as ceramic pieces or reused metal elements. The combustion surface is of smoothed clay and has to be fired prior to bringing the oven into operation. One of the most peculiar features of these ovens is a sort of protruding ledge in the front opening (Figure 5a and 7b), designed and added in order to keep there the charcoal and embers while using the oven (Figure 7f; see also next section).

The group of ovens that we have observed in the PNAH coincide in general terms with the description left by Blanco de Izaga (1930), as far as dimensions and materials are concerned. According to him, the domes were lined and whitewashed with clay, and he highlights the perfection with which this work was carried out. He also mentions that the smoke outlet at the top was covered with the curved bottom of their pottery vessels. Some of the tools we describe in Table 1 are represented in an illustration by the author (See Figure 4).

As for the particular traits of Oven 3 (See Figure 5), it is built on a quadrangular podium (135cm height and approximately 160cm on each side) made of mud bricks, which also works as a rabbit hutch (See Figure 5b). It has one bench attached on its left side (See Figure 5d), which is always unoccupied in order to allow people to sit on it, hold the tools, or even climb it to manipulate the oven's top opening (during maintenance and the bread-baking process).

The chamber has an oval plan and the dome is made with fired bricks and an exterior covering of mud and straw. This structure is 100cm high and a maximum of 120cm in diameter. During our stay, we observed that traditional domes were built with shaped mud tempered with vegetal materials. Afterwards, they were covered. Recently, the domes are beginning to be built with modern and industrialised materials, such as fired bricks (Figure 5c). The owners told us this material was introduced to reduce the time needed in the construction process since constructing a fired brick dome is quicker than a mud one because it is not necessary to let it dry after every course. Regardless of the material used, the dome is always covered on its outer side with mud, so all of them look similar. In no case did the oven users mention that fired brick allowed to reach higher temperatures or keep the heat for a longer time than raw mud.

Oven 3 has two openings. The frontal one is located at the base of the dome (40cm wide x 35cm high), while the second is on its top (approximately 20cm in diameter). Both of them have round metallic lids, which were originally part of a cylindrical barrel. One aspect that caught our attention was the frontal lid, which had a closing mechanism where a hinge united it with the oven (See Figure 5a). As with all the ovens seen during our fieldwork, Oven 3 also has a ledge on its frontal side, just below the opening.

## Lighting and using the oven for bread-baking

Baking bread in traditional earthen ovens is falling into disuse in the Riff area. While many houses have one of these, baking bread and cooking are increasingly done on gas appliances. The main reason is the time required for the complete process of baking bread with a traditional oven, as well as the need to collect the fuel beforehand. As mentioned above, we had the opportunity to see and participate in the long and laborious process of making and baking bread in the traditional way, thanks to the owners of Oven 3. Below, we describe the process and its different stages (See Figures 6 and 7; see also Table 1).

The first step is to prepare the dough. This task was carried out by the women of the family in the shed adjacent to the oven. For this purpose, several low wooden tables were moved inside this building, covered with fabrics. The mixture to obtain the dough was prepared in a metal bowl (See Figure 6a), where warm water was poured, and the different ingredients were added: flour, salt, natural leaven (sourdough), and chemical leaven. The flour and leaven mixture is placed in a basket and poured little by little into the basin of water. To knead the



dough, the women work on their knees on a mat or cloth. Once the suitable consistency is obtained, the dough is left to ferment for about 30 minutes.

Meanwhile, the fuel is collected from the near-by open-air area where it is previously stored (See Figure 7a), it is prepared and placed inside the oven (See Figure 7b). The fuel is mainly composed of vegetal elements: branches of trees and shrubs, palm leaves, and cacti. On this occasion, wild olive tree branches were used. According to our informers, cardboard is occasionally added as well. Another procedure that caught our attention was that the interior of the oven was completely filled with fuel. We also noted the absence of logs or large pieces of wood.

During this process, we had the opportunity to see how the maintenance of the oven was done. Right before lighting the fuel, the owners saw that some of the oven's parts, such as the ledge, the hinge mechanism, or the podium, were deteriorated. In a few minutes, they repaired them by adding a new covering (See Figure 7c) with mud prepared on the spot.

We would like to highlight that in the PNAH area, where shrub vegetation is abundant, dung is not employed as fuel, although it is stored and used as fertiliser. However, in other areas of the Maghreb, this is a usual fuel material (Portillo *et al.*, 2017; Zapata *et al.*, 2003). The properties of dried dung as fuel are well known, and its use is attested since the Neolithic (Portillo *et al.*, 2014). Experimental archaeology has also confirmed the efficiency of different kinds of dung as fuel (Belarte *et al.*, 2022; Budka *et al.*, 2019).

The objective of filling the oven to the top with highly flammable material was to quickly reach a high temperature, and ensure that the fuel burned and was consumed in a short time (See Figures 7d and 8a). In fact, in approximately 30 minutes (the same time it takes for the dough to rest) it had already been reduced to embers. From time to time, they tossed the fuel, helped by a metal stick. In this respect, Blanco de Izaga mentions that with little wood, Riffian ovens quickly reached the necessary temperature, although he does not specify how much fuel was used or how it was placed in the oven.

After the dough has stood for 30 minutes, the loaves of bread are made (in the meantime, the fuel is burning). The loaves are circular and flat, with a diameter of about 20cm. Sprinkling some whole wheat flour on their top (See Figure 6b), they are shaped with the hands and flattened (See Figure 6c). Afterwards, the loaves are covered with a cloth and let to settle. Six kilos of flour allows for 17 loaves of bread to be obtained.

Once the loaves are ready and the fuel has been reduced to embers, the top opening is covered with a lid. The next step is to collect the charcoal from the chamber, first moving it to the protruding ledge placed in the front opening with the metal stick and a kind of mop. Then the embers are removed with a V-shaped lid, to the small metallic cans and the little braziers (so they can be reused) (See Table 1 and Figures 7e, 8b and 8c).

They left some of the embers on the ledge, which are covered with a metallic lid (See Figure 8b) so that the heat is retained. Afterwards, the inside of the chamber is cleaned with the mop, previously dampened in a pot of water (See Figure 8b). Finally, the table where the loaves were placed is taken out of the shed and put next to the oven. Helped by the short-handled shovel, women pick up the loaves (See Figure 9a) and small holes are made in their upper side so that they do not swell. Once this is done, they are moved to a long-handled shovel and placed in the oven (on the clean combustion surface) (See Figure 9b). Finally, the metallic frontal lid is closed (See Figure 7f). The oven has a capacity of approximately 13 loaves, so they were baked in two rounds. This is the usual capacity of these ovens, according to what we have been informed, and it also coincides with what Blanco de Izaga (1930, p. 53) mentions.

Bread is baked in a few minutes, just with the heat accumulated during the fuel combustion process. This is another aspect to be highlighted: the absence of fuel and embers inside the chamber during the baking of the bread. In the process, the loaves are moved and turned with the help of the long-handled shovel. From time to time, to keep the heat, they added some of the embers previously collected. Once they were baked, women took them out of the oven with the long-handled shovel, and before putting them on the table to cool (See Figure 9c), they wiped off the ashes with a cloth. The last step of the whole process was to put the loaves on tables inside the shed and cover them with a cloth.

## Beyond bread: different purposes of the ovens

Of the nine ovens we were able to observe and document, we could only see Oven 3 in operation. The rest were only used occasionally. Some were already in disuse and even destined for secondary uses. As an example, one of the ovens had served as a chicken coop. An exception was Oven 9, which was still under construction to replace an earlier structure that had been damaged. Their owners mentioned the elevated cost of its construction (in terms of material and builders' salaries). This indicates that, although their use is declining, they still are present in the Riffian societies. Particularly, the cost of their construction indicates that they are still valued structures. It is also significant that in some houses that have two ovens, the new structure has not replaced the old one, but the latter is still standing, although it is used for auxiliary functions and not strictly culinary ones.

In all the cases observed, when we asked the owners/users of the ovens about their purpose, the answer was unanimous: to bake bread. But in the course of the conversation, other secondary or complementary uses have been mentioned, some of which we have even been able to observe. Certain activities are carried out by making the most of the heat once the oven has been lit. For example, some users told us that cakes were also baked in addition to bread. In the case of Oven 3, after baking the bread, the oven was used to brown the chicken that was being prepared for dinner. Our informers mentioned other possibilities, mainly related to cooking or preparing/preserving food: drying fish, cooking tomatoes to make

conserves, roasting barley to obtain semolina, preserving bread, and storing dry bread. Drying clothes is also mentioned among their possible secondary uses, not related to cooking.

## The social dimension of bread-making: a female activity

As noted, women are the ones who mainly use the ovens, but also the traditional builders of the ovens in the Riff are women. Some are specialised in performing this task, with the technique of shaped mud, and may have built the ovens of the whole village, as was the case of one of the builders we met. The introduction of industrialised materials such as fired bricks has come hand in hand with male builders who construct the inner structure of the oven dome, which can be assisted by women that also add the mortar covering it. Be that as it may, the construction of ovens is an ancestral tradition, a know-how that women have passed down through the generations. In the first decades of the 20th century, Blanco de Izaga emphasised the precision with which women carried out this work, in contrast to the construction work done by men, which he described as *burdo* (crude) (Blanco de Izaga, 1930, p. 155).

In this particular case, Oven 3 was normally used by two women who were sisters-in-law. It was they who carried out the whole process of bread making. According to our informant, the oven was usually lit collectively, and each family unit contributed a small part of the fuel to economise on resources. Once the loaves have been baked, they share them. Thus, we can see how, even though the oven has an owner, as long as there is collaboration in the lighting, the resulting product is collective. We were able to observe that, at the final moment of the process (at dusk), other women, relatives of the two owners, joined and began to chat. Both in the process of making the bread and in the gathering afterwards, children were present. Some of the male relatives appeared, but the whole process is a social and collective act of strengthening ties between the women, whether or not they are extended family and, therefore, between the whole community.

On the other hand, we would like to mention that our informers told us, regarding Oven 6, that in the summer they also sold cakes to the tourists. Women, therefore, have an active role not only in the domestic world but also in the family economy.

Finally, we could see that new traditional ovens made of mud bricks are still being constructed, although the old ones are usually preserved. They are thus covered with a cloth or plastic and have maintenance work done on them. Hence, we can deduce that traditional ovens confer a type of prestigious good linked to women whose work is highly regarded.

## Bread making in the Riff: useful lessons

This ethnoarchaeological study provides us with a whole series of data that can be useful for the interpretation of the archaeological combustion structures in our study area and, more generally, in other periods of the past, such as the Iron Age in the western Mediterranean.

The structures we have been able to observe in the Riff area share formal characteristics (size, general shape, materials) with those documented in Iron Age sites. For the latter, it has been proposed that they were mainly used for baking bread, although some researchers (e.g. Nin 1999; Santacana and Duran 2011a, p. 20 and 2011b, p. 49) have also pointed to other possible functions, such as roasting cereals, smoking or cooking meat or fish. Most of these uses are mentioned among the functions of the ovens observed in the Riff.

We are aware that the structures observed during this work are not necessarily used for the same purposes or in the same ways that the Iron Age ovens, but they provide us with interesting points to reflect on. Amongst them, information on the techniques and methods of construction of the domes is of special interest because it is precisely this part that has rarely been preserved in archaeological ovens. So is the knowledge of the uses and related matters on which archaeological information is practically non-existent, for example, the actual process and steps involved in making bread. Fuel preparation, lighting of the oven and fuel management during the process (removal of embers for baking bread, reuse of these) are also key elements that cannot be understood only from the archaeological record. This last process allows us to see the large amount of fuel used to bake the bread according to the case study. This is why many of these ovens have a shared character among family members. As we could see during our fieldwork, even if each archaeological oven was owned by one family, they would allow for shared use too. These social issues and community uses can be taken into account as well when studying the Iron Age ovens interpreted for baking bread, that were also mostly located in open spaces, and probably had, in most cases, a shared use.

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## | Gallery Image



FIG 1. STUDY AREAS: A) EASTERN FAÇADE OF THE IBERIAN PENINSULA; B) LOCATION OF OUR ETHNOARCHAEOLOGICAL WORK IN AL HOCEIMA NATIONAL PARK, RIFF (MAP BACKGROUND: FREEWORLDMAPS.NET, MODIFIED).



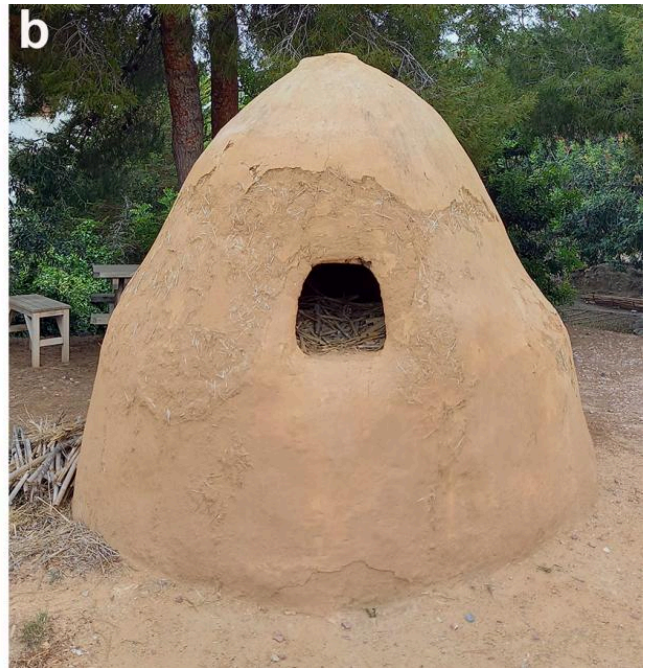


FIG 2. EXPERIMENTAL OVENS FROM CIUTADELLA IBÈRICA DE CALAFELL. A) OVEN USED DURING THE EXPERIMENTAL WORKS B) OVEN BASED ON THE RIFFIAN MODEL. PHOTOS BY THE AUTHORS.





FIG 3. OVEN WHERE THE BAKING OF BREAD WAS CARRIED OUT AND ADJACENT BUILT STRUCTURES. PHOTO BY THE AUTHORS.



FIG 4. TRADITIONAL OVEN AFTER BLANCO DE IZAGA (1930, P. 52).

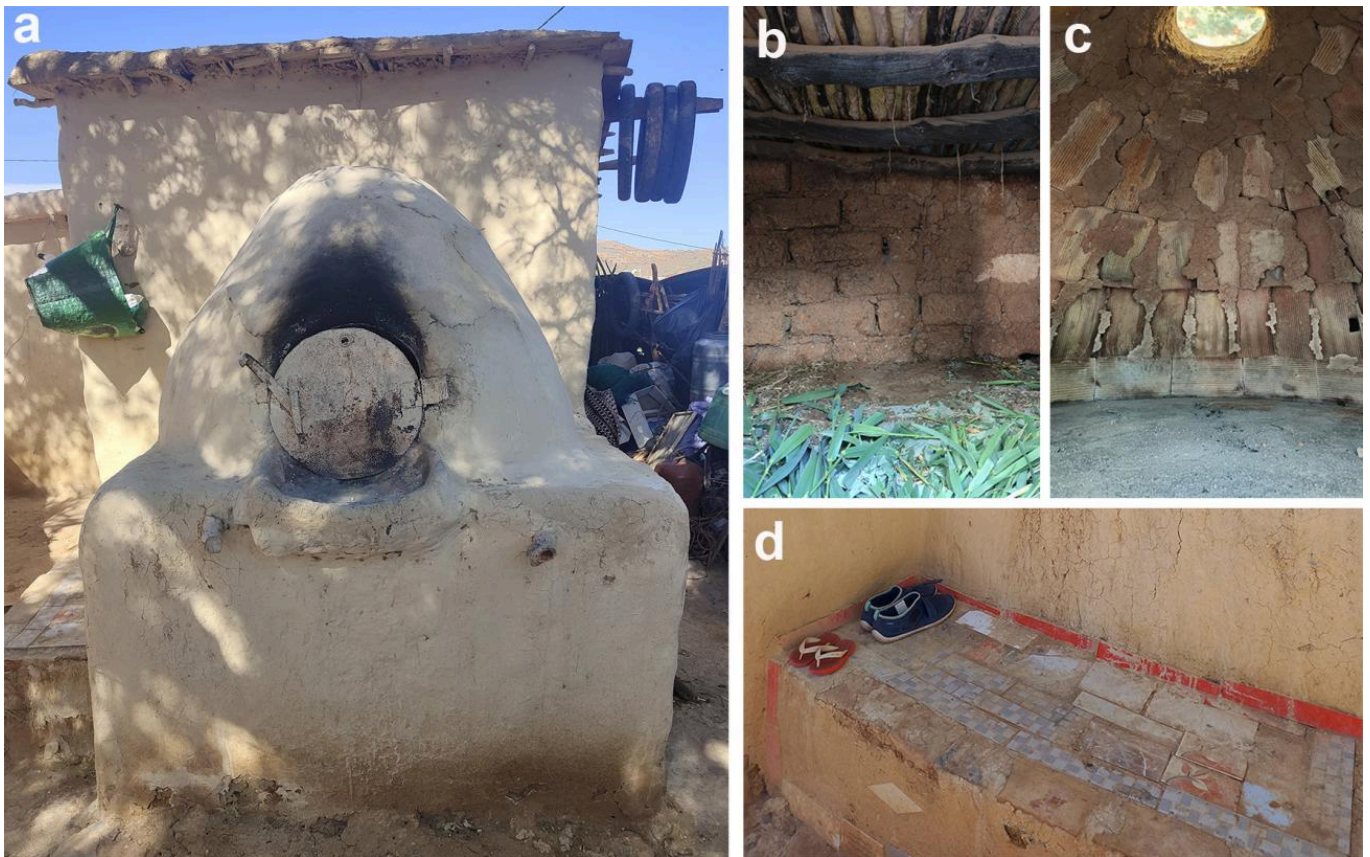


FIG 5. OVEN 3, WHERE THE PODIUM (A) AND ITS INTERIOR OF MUD BRICKS (B), THE DOME IN FIRED BRICKS (C), AND THE BENCH (D) CAN BE SEEN.



FIG 6. PREPARING THE DOUGH AND THE LOAVES. PHOTO BY THE AUTHORS.





FIG 7. STORAGE (A) AND ADDITION OF FUEL (B). QUICK REPAIR OF THE OVEN (C) BEFORE IT IS PUT INTO USE (D). REDUCTION OF THE FUEL TO EMBERS AND ITS EXTRACTION IN THE LEDGE (E AND F). PHOTOS BY THE AUTHORS.

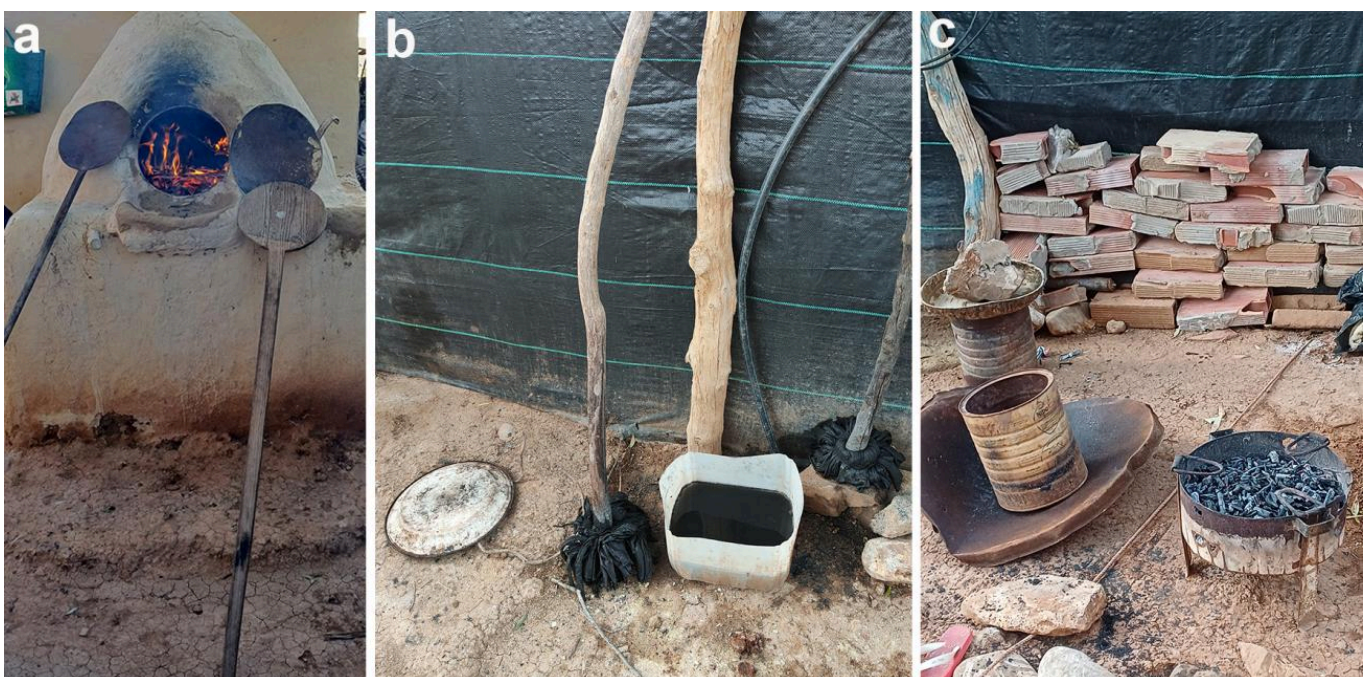


FIG 8. TOOLS. A) THREE LONG-HANDLED SHOVELS. B) TWO MOPS, THE POT OF WATER WHERE THEY ARE DAMPENED AND THE METALLIC LID. C) THE V-SHAPED LID, TWO SMALL METALLIC CANS AND THE LITTLE BRAZIER.



PHOTOS BY THE AUTHORS.



FIG 9. PROCESS OF PUTTING THE LOAVES IN THE OVEN (A AND B) AND ONCE THEY ARE BAKED (C). PHOTOS BY THE AUTHORS.