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Experimental Approach to Flint Shaft Mining: Understanding the Extraction Process and the Technical Gesture at Casa Montero (Madrid, Spain)

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Since prehistory, human populations have developed specific knowledge related to the excavating and exploitation of underground resources. These abilities are reflected in the tools used to extract and process raw materials and the use of specific architectural expressions such as rock-cut tombs. As part of these practices, Neolithic human groups used a range of techniques that were closely connected to the environmental constraints of the subterranean sphere. As part of a study of both mining and burial structures in the Madrid region during the Neolithic period, we are investigating the technical gestures used in extracting flint from shafts by means of experimentation. The case study we have chosen is the Casa Montero mining site. With more than 4,000 extraction pits over a period of use of several hundred years, Casa Montero is one of the oldest flint extraction sites on the Iberian Peninsula. This study, therefore, focuses on the excavation of an experimental flint extraction pit like the structures found at Casa Montero.

> “ The example of Casa Montero mine, the size of the flint extraction pits, their large number, and the fact that they were exploited over a short period of time, raise questions regarding the organisation of the group or groups who extracted the flint. Experimentation here demonstrates the effectiveness of certain tools used and the technical choices made by Neolithic groups.

Introduction

The Casa Montero site (Madrid) (See Figure 1) constitutes one of the oldest flint mines known in Europe. Dated between 5350 and 5220 cal BC, it was during this short period that nearly 4000 extraction pits were carved (Díaz-del-Río, et al., 2023). Knowledge of the material sought, i.e flint, and the substrate in which it is found, sedimentary rocks (a succession of layers of dolomites, marls, and clays), allowed systematic exploitation of the area in such a short period of time and already testify the mining skills that these populations possessed (Capote, et al., 2008; Consuegra, et al., 2018). The tools employed in excavating the Casa Montero shafts and nodules extraction are known and well documented. They consist mainly of fluvial quartzite pebbles (61) and a few flint tools (31) (Capote, 2011; 2013). Thanks to the archaeological data on these tools and the dimensions of the extraction pits, it is possible to obtain information and put forward hypotheses about the technical gestures involved and the *chaîne opératoire* developed. A series of scenarios for the various steps in the process, essentially concerning the extraction and processing of flint, as well as the organisation of work and the collective dynamics surrounding this activity, have already been outlined in previous studies of this site (Capote, 2011; 2013).

Our study focuses on the process of carving out and implementing a negative structure in the ground and bedrock, such as the extraction shaft. We are investigating the extraction process, from the choice of extraction site to the carving of the shaft and the extraction of the flint blocks. Analysis of the technical gestures involved is essential to understand the correlations between techniques, tools, and geological and geomorphological constraints. Experimentation, therefore, emerged as a key methodological approach in this study. The main objective was to create a flint extraction pit in conditions like those found at Casa Montero. The tools used were produced at the Laboratorio de Arqueología Experimental (LAEX) of the Universidad Autónoma de Madrid (UAM) (Spain) during 2021, and the shaft was completed in autumn 2021.

Archaeological context and materials

Geological context and features of the mining structures

The Casa Montero flint mine is in the eastern part of Madrid, on an escarpment overlooking the confluence of the Jarama and Henares rivers (See Figure 1). The geological sequence is composed of beds of clay, dolomite, and silica rocks (sedimentary rocks from the Intermediate Unit of the Miocene). The stratigraphic column shows the existence of four major silicification episodes, each consisting of one or more silica levels (Bustillo, et al., 2009, p.178). The Neolithic flint extraction only affected the first three silica episodes (IV-II) formed on green and brown clays and magnesian smectites (Bustillo, et al., 2009; Consuegra, et al., 2018).

One of the most remarkable features of the mine is the intensive exploitation of the silica levels by means of 3794 vertical, deep, and narrow flint extraction pits in a 4-ha area known to date (Díaz-del-Río, et al. , 2008; Consuegra, et al., 2018; Díaz-del-Río, et al., 2023). There is some scarce evidence of open-air quarrying to access outcrops of the upper flint episode, documented in six small fronts (four of less than 3.5 m2, and one of 56 m2).

Two main types of shafts can be seen at Casa Montero: at least 23 structures interpreted as test shafts with irregular profiles, no more than 2,5 m deep, and the rest of the structures that are extraction shafts with regular profiles and a vertical and very narrow cross-section described by the authors as chimney-shaped, around 8 metres deep, with the most notable cases exceeding 9 metres (Consuegra *et al.*, 2018). The shape of the shafts is mainly circular but has been usually altered by the extraction of the flint blocks, which takes place directly in the walls of the shafts in the case of those with sinuous profiles. The shapes of the shaft openings can vary due to the erosion encountered during extraction, but the average opening diameter is around 1.15 m. The main part of the structure is narrower with an average diameter of 80 cm. The small number of the test shafts compared with the quantity of shafts exploited and their spatial distribution within the limits of the mining area tends to demonstrate the extensive knowledge of the geomorphological characteristics possessed by the prehistoric populations (Consuegra, et al., 2018; Díaz-del-Río, et al., 2023).

Lithic mining tools at Casa Montero

The tools used for excavating the shafts and extracting the flint are partly known by means of the lithic assemblage of 100 complete stone tools: mallets, hammers, wedges, and picks and the tool marks that these or other organic tools left in the walls of the shafts (Capote, 2011; Terradas, Clemente and Gibaja, 2011; Capote, 2013; Consuegra, et al., 2018) (See Figure 2). The mallets and big hammers are made of quartzite (52), the wedges are both in quartzite (17) and flint (21) and picks are made of flint (10) (Capote, 2011; 2013). The quartzite pebbles were collected nearby, around one kilometre from the site, from the terraces of the Jarama river (Capote, 2011). The flint tools are made by recycling the abundant waste of lithic reduction that took place in the mine. For these quartzite and flint tools, the stages in the *chaînes opératoires* are limited (Capote, 2011). There is a set of 377 quartzite tools related to the flint working (hammers of different sizes) used once the nodules had been extracted and some tools related to other activities like anvils (24), pestles (5) and recycled tools (34) (Capote, 2011). Mining activities would need other tools related to the fabrication and use of ropes to pull up waste and flint blocks, like denticulated tools, scrapers, and chisels (Castañeda, et al., 2015). Unlike other flint mines, there are no known tools made of wood or deer antlers at Casa Montero (Terradas, Clemente and Gibaja, 2011).

Consideration on the organisation of work

This archaeological data has enabled researchers to make several observations and hypotheses about the organisation of work at the Casa Montero mining complex. Firstly, the shape of the shafts meant that no more than two people could work at a time. One person had to work in the shaft to extract the flint and another could be responsible for managing the waste and the extracted flint nodules. The narrowness of the shafts allowed people to climb up and down by means of foot, hands, and back against the walls. The absence of landslides demonstrates the stability of the structures for the safety of miners (Consuegra, et al., 2018; Díaz-del-Río, et al., 2023). The stratigraphic analysis of the shafts indicates that the flint was processed on-site, near the shafts. The knapping waste and soil were disposed of directly back into the pits to prevent accidents and maximize the exploitation of the mine (Consuegra, et al., 2007; Consuegra, et al., 2018).

Quartzites are not present at Casa Montero hill. The number of tools made from quartzite pebbles recorded in the shafts suggests the systematic pre-planning collection of these pebbles from the various river terraces in the vicinity. This planning would have involved selecting the shapes of the pebbles with a view to using them directly without prior modification (Capote, 2011; 2013). It should also be noted that there is no excessive exploitation of flint at Casa Montero; the pits are generally abandoned because of the risk of collapse and not once all the flint has been extracted. Similarly, researchers have suggested a seasonal activity in the wet warm season for better excavation in spring (Consuegra, et al., 2018).

Describing the technical gesture

The literature on technical gesture, *le geste technique* , in anthropology and archaeology is vast and is regularly based on the texts of Marcel Mauss (1936) and André Leroi-Gourhan (1965). The aim is to consider the body behind the tool acting in a specific environment. Gestural activity is defined by two sensory-motor systems: posture, which consists of the adjustment of the body and therefore a base, and movement, which is formed by displacements in relation to posture (Bril, 2010). The technical gesture is part of a particular practice or task and is expressed through movement and action. Nevertheless, an exhaustive description of the technical gesture is complex and will depend on the issues raised and the means of analysis. Several criteria can be considered when describing the movement: posture, movement, rhythm, trajectory, speed, and acceleration (Bril, 2010).

In the underground world, the technical gesture is subject to various constraints linked to the environment. In addition to the specific characteristics of the rock, these are mainly linked to the restricted nature of certain areas, temperatures, humidity and oxygen levels, and darkness. The study of technical mining gestures is thus made more complex by this underground environment. The literature and archives concerning recent mining activities, while remaining in the domain of operations with little or no mechanisation for which human action remains primordial, provide various treatises, manuals and iconographies making it possible to render the gestures that may have been employed. The technical mining gesture, defined by Gersende Piernas (2017) in the context of the French coal mines of the 19th and 20th centuries, refers to the " *combinaison de la posture et du mouvement du corps appliquée à un outil ou à une machine pour extraire le charbon et le remonter à la surface* "[1]. Identifying the prehistoric technical gesture requires a study of the structures and tools used, as well as experimentation to put into practice the various hypotheses that can be put forward. Applying the Piernas definition is no less interesting, forcing us to put the body back at the centre of the various actions carried out to find the flint, extract it and bring it to the surface.

In the case of the shafts at Casa Montero, the narrowness of the structures is a major constraint for the technical action and the bodies. The particularity of the site lies in the large number of shafts and therefore the repetition of movements in each shaft according to similar or even identical technical sequences. The experimental protocol developed seeks to respond to the specific issues raised by this archaeological context and to explore different paths of thought on the technical gestures employed and the constraints of the environment upon them.

Experimental protocol

Creation of experimental tools

The experimental toolkit is based on the archaeological evidence from Casa Montero, but also on other experimental protocols related to the carving of flint shafts, as well as on different issues raised by the archaeological context (Bostyn, Giligny and Lo Carmine, 2007; Hernández, et al., 2020). It was decided not to reproduce only archaeological tools known at Casa Montero, i.e., flint picks and quartzite hammerstones, but to create a coherent set of tools including objects made of perishable materials and hard animal materials, to cover all the phases and stages of the process (See Figure 3). To do so, we followed the considerations put forward by Bostyn, Giligny and Lo Carmine (2007) during the excavating of an experimental flint extraction pit at Flins-sur-Seine (Yvelines, France). This experiment proposed to conceive the mining tools as a set with various raw materials, shapes, and functions. The use of wooden tools, crowbars, and picks was of particular interest to us and seemed even more relevant in the context of Casa Montero to have a real overview of the *chaîne opératoire* and the possible technical gestures performed. Our concern was not to rule out any possibility. Likewise, based on evidence from other Neolithic flint mines in Spain, we have included deer antler picks in our tool assemblage. In fact, although deer antler picks were not found at Casa Montero (Terradas, Clemente and Gibaja, 2011), 14 elements have been recorded to date at the flint mining site of Pozarrate (Castilla y León, Spain) (Tarriño, et al., 2022). It therefore seemed essential to integrate this type of tool into our approach to assess this possibility.

Four groups of tools were created according to the raw materials used, and each tool was assigned a number: A. Flint tools; B. Tools on quartzite pebbles; C. Tools on deer antlers; D. Wooden tools (See Table 1). These tools were complemented by baskets made from plant materials found directly on the market, to help taking out the soil from the shaft. The morphology and dimensions of the flint and quartzite tools are as close as possible to those documented at the Casa Montero site. Particular attention was paid to the hafting of the flint and quartzite pieces. After several unsuccessful attempts, as the vegetable ties were not strong enough and loosened quickly, we opted to use sheep and goat skins. By rehydrating the skins, this system produced a natural glue that held the tools firmly in place when they dried (See Figure 4). All the tools were designed and made jointly by Javier Baena Preysler and Marie-Élise Porqueddu at the Laboratorio de Arqueología Experimental.

Experimental mining tools					
Groups and code	**Description**	**Weight (Kg)**	**Length (cm)**	**Width max. (cm)**	**Thickness max. (cm)**
A1	Flint pick	0,138	10,5	4,7	3,2
A2	Flint pick with handle	0,39	29	10,6	3,2
A3	Flint pick with handle	0,368	32	11	3
A4	Flint pick	0,158	11,2	4,4	3,2
A5	Flint pick	0,162	11	4,1	3,3
A6	Flint pick	0,144	11,2	4,4	3

A7	Flint wedge	0,122	10,4	5,4	2
A8	Flint wedge	0,214	10,4	7	2,3
A9	Flint wedge	0,298	11,2	7,7	3,2
A10	Flint wedge	0,152	10,8	5,9	2,6
A11	Flint wedge	0,128	9,2	5,5	2,5
A12	Flint wedge	0,104	9	5,1	2,3
B1	Quartzite pick	0,21	11,6	4,2	3,5
B2	Quartzite hammer	2,07	17	8	7
B3	Quartzite hammer	2,422	21,1	11	4,6
B4	Quartzite hammer	0,782	15	5,8	4,2
B5	Quartzite hammer with handle	1220	46,4	14	4
B6	Quartzite hammer with handle	0,87	34,5	16	2,2
C1	Deer antler pick	0,528	44	23,2	1,7
C2	Deer antler pick	0,598	43	21,8	1,9
C3	Deer antler shovel	0,778	52	7	1,5
C4	Deer antler shovel with handle	X	119	18,5	4
D1	Wooden crowbar	X	152	X	4,5
D2	Wooden pick	0,306	59,6	X	3
D3	Wooden crowbar	X	142	X	5,5
D4	Wooden pick	0,914	57,8	X	5,6
D5	Wooden pick	0,956	46,5	X	6,2

TABLE 1. LIST OF EXPERIMENTAL TOOLS CREATED DURING THE PROJECT, ORGANISED BY GROUPS. DATA: M. É. PORQUEDDU.

Conditions and protocol adopted for carving out the flint extraction shaft.

The excavation of the experimental flint extraction pit was carried out by a team of nine people from a variety of backgrounds: seven students and archaeology professionals and two people who were complete strangers to the discipline. Some of the team members were experienced and had already carried out a wide range of experiments related to carving and/or working with flint. For others, it was either their first experience of an experimental protocol or their first contact with an archaeological operation. Although these differences in experience were sometimes palpable, the various discussions and intuitions of each person were able to correct the problems encountered. The physical condition of the participants must be considered, particularly their height. The group was heterogeneous, with people of average height and taller people.

The experiment was carried out on a vacant land-parcel in the Madrid municipality in a sedimentological and geological context like those found at Casa Montero. These were the criteria that motivated the choice of location for the experiment. Our intention was not primarily to find and extract flint nodules, but to understand the process involved in creating a structure such as the underground pit, and therefore to look at the techniques and technical gestures employed in dealing with the rock matrix containing the flint. Given the time at our disposal and the size of our team, we set ourselves the target of reaching a minimum depth of one metre. This objective also meets the safety standards we have set ourselves for this experiment. The dimensions of the shaft opening, and its shape are dictated by the archaeological sources. Photographs and videos were taken systematically to document the project. The aim was to provide an initial record of the movements made. Photographs were also taken of the condition of the tools as they were being used, to document the impact of the different techniques on each tool. A protocol for recording the tool marks left on the shaft walls was also put in place. The time required to produce the documentation was also recorded to better understand how long it took to carve out the experimental shaft.

The *chaîne opératoire* adopted initially consisted of two phases presented to the participants: firstly, opening the shaft using wooden crowbars, and then deeper carving of the shaft with the help of the other tools available. Several examples from previous experiments enabled us to establish the two main excavation phases to be followed during our experiment (Bostyn, Giligny and Lo Carmine, 2007). These different phases were characterised using different tools, techniques, and gestures. All the tools were always made accessible to the participants, who were able to choose their tools and change them regularly, depending on the actions to be carried out and the difficulties encountered. Most of the tools were tested in this way.

Results

The experimental flint extraction pit measures 1.20 metres in diameter at its opening (See Figure 5). The diameter at the base of the shaft is 90 centimetres and it is one metre deep (See Figure 6). The geological layers encountered are very similar to those documented at the Casa Montero mining complex. They are characterised by a succession of highly compacted layers of green and brown clays. No flint nodules were found. Excavating this structure took just under 9 hours of work spread over two days, the rest of the time being spent on documentation. Given the regular breaks and our lack of experience, it is reasonable to assume that the time taken by prehistoric populations to carve out a similar pit would have been much less.

Regarding the technical gestures documented during this experiment, it is possible to characterise different gestures according to the steps in the *chaîne opératoire* . Several postures and movements were observed by the participants when opening the pit and during the first 20 centimetres of excavation (See Figure 7). These movements were adopted spontaneously by all the participants, whatever their experience. The first posture consists of standing with a slight flexion between the lower limbs. This posture was used when the crowbars were employed to open the shaft and later to widen the shaft, the diameter of which was reduced as the work progressed (See Figure 7, C). In this posture, the movements consisted of using the upper limbs and the upper body, moving up and down. Another posture was observed during the opening of the shaft and is linked to the use of deer antler picks: one knee on the ground with the spine slightly bent forward (See Figure 7, A and B). In this posture, the arms moved forward and up and down to gain strength when using the tool. Variations were observed in the use of one or both upper limbs. It is during this phase that the greatest freedom of movement is achieved, as the body is not constrained by a confined space. It was also possible to work with two people without any problems. The sediments encountered in the first 20 centimetres were also loose and presented no major difficulties.

During the second work phase, when the shaft was extended and deepened, a great variability in postures and movements was observed. This variability was due to various factors. The first was the depth of the shaft: during the excavation phase, some participants chose to sit on the edges of the shaft or to stand. However, when carving out the last 50 centimetres, which could be considered a new stage in the process, all the participants preferred to stand inside the shaft (See Figure 8). Another factor of variability is the tool and technique used. We chose, for example, to use a wooden pick by indirect percussion with a quartzite hammer, in the same way as a stonemason's chisel, and the participants spontaneously positioned themselves upright, with their spines bent forward, making movements with their upper limbs (See Figure 8, A). This technique proved effective only in smoothing the walls of the pit. The variability of movements observed is also linked to the inexperience of the participants in this type of activity, not knowing what posture to adopt to perform a movement with a similar intention, as in the use of a flint pick. Finally, another explanation for this fluctuation in technical gestures is linked to the restricted space represented by the extraction shaft, making the various tasks uncomfortable. This aspect was made more complex for tall participants for whom operations were very difficult and freedom of movement very limited. In addition to the restriction of movement observed in relation to the morphology of the shaft and its narrowness, we observed that the last 50 centimetres of sediment were particularly compact and difficult to carve out, causing the participants to repeatedly change the tools and techniques used to find the best combinations. During this phase, only one person could work at the same time. So, we coordinated our work in the shaft and took turns removing the sediment waste from the extraction site.

Discussion

Observations made of the technical gestures used by the participants enable us to support certain hypotheses about the work performed by the Casa Montero miners. Firstly, we note the effectiveness of the tools used in excavating the substrate encountered, in particular wooden and flint picks. Their lightness and shape were an asset, particularly when it came to excavating the bottom of the shaft. Some difficulties were encountered in the use of deer antler picks. Although effective, they were sometimes difficult to use, and it would be appropriate to reconsider their morphology. Similarly, their size did not allow us to use them in the lowest sections of the shaft. This is undoubtedly a bias linked to our experiment as deer antler picks were widely used by prehistoric populations in European mines. Quartzite tools were not found to be particularly suitable, as they were often too heavy (See Table 1) and not very malleable in such a restricted environment. In correlation with the archaeological data (Capote, 2011; 2013), their use is more likely to be related to the transformation of the extracted flint nodules. The use of such quartzite hammers in quarrying is most effective when working in open areas, quarries, or trenches, where there is a greater freedom of movement (Crew and Crew, 1990; Porqueddu, 2023).

As we had anticipated, the freedom of movement of the participants in the experiment was important during the opening of the shaft and the initial carving phases. Once the shaft was too deep to work from the outside, their movements became very constrained by the shape and dimensions of the shaft. The lack of experience and practice in this activity also comes into play, with participants finding it difficult to choose a posture and movement and constantly varying these. This is another experimental limitation to be considered here.

In terms of work organisation, the diameter of the shafts meant that only one person could perform the work inside the structure, while several people could intervene, but only from the outside. The major difficulty within the shaft is to maintain its walls so that its diameter does not reduce as the excavation progresses. This problem is partly responsible for the great variability in postures observed as the shaft is being carved out, as it is too narrow at the base. One possible hypothesis is that young people worked in these extraction pits, forming an integral part of the learning and socialisation processes already identified for flint knapping at Casa Montero (Castañeda, Consuegra and Díaz-del-Río, 2019). The trajectory of the excavation pick also needs more space if we consider an adult. This reason also supports the participation of young or thin/small people.

Conclusion

Although investigation on prehistoric mines and quarries from Palaeolithic to Bronze Age is abundant, experimentation on carving out mining shafts is not very frequent, but it is critical to answer important questions scarcely addressed. The results of the experiment must be considered in the light of the experience and knowledge of the participants and the conditions in which the experiment was carried out. Once these biases have been addressed, it is possible to go further in our understanding of mining sites. Mining gestures, and the embodiment of tasks and tools, mining tools marks, time expended can only be understood by experimentation.

The example of Casa Montero mine, the size of the flint extraction pits, their large number, and the fact that they were exploited over a short period of time, raise questions regarding the organisation of the group or groups who extracted the flint. Experimentation here demonstrates the effectiveness of certain tools used and the technical choices made by Neolithic groups. The technological knowledge underlying the adaptation of carving techniques and tools to the geological context could be a key factor in explaining the heterogeneity of flint extraction during the Neolithic.

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1 Which can be translated as "a combination of posture and body movement applied to a tool or machine to extract coal and bring it to the surface".

Keywords experiment
mining
carving

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FIG 1. LOCATION MAP OF THE CASA MONTERO SITE. THE MAP WAS CREATED ONLINE ON HTTPS://WWW.ARCGIS.COM/. THE BASE USED IS THE FOLLOWING: WORLD TOPOGRAPHIC MAP. SOURCE: HTTPS://BASEMAPS.ARCGIS.COM/ARCGIS/REST/SERVICES/WORLD_BASEMAP_V2/VECTORTILESERVER DESIGN: M. É. PORQUEDDU.

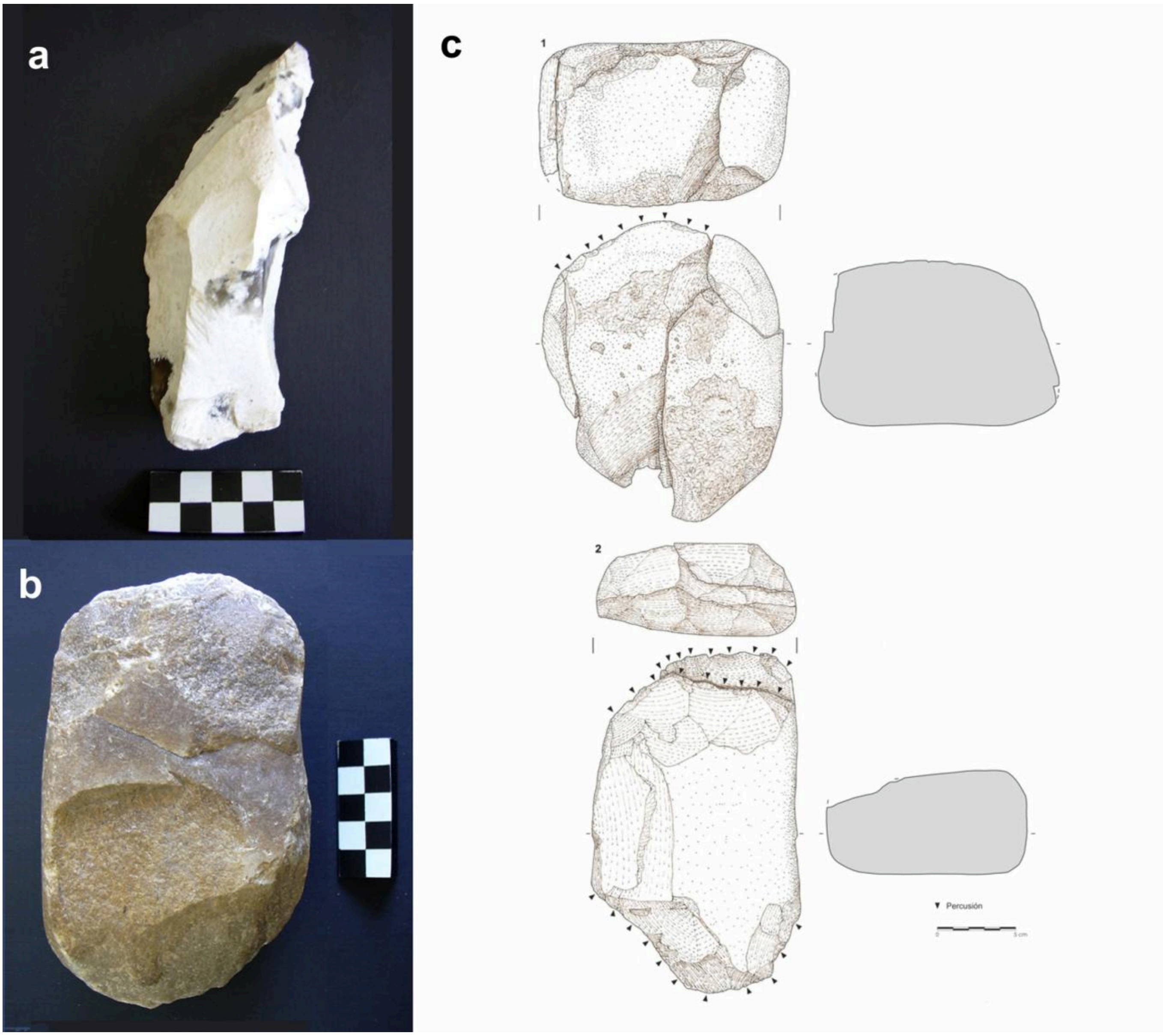

FIG 2. ARCHAEOLOGICAL MINING TOOLS FROM CASA MONTERO. A. FLINT FLAKE REUSED AS MINING PICK. B. AND C. PERCUSSION TOOLS ON QUARTZITE (CAPOTE 2013). DRAWING: P. FERNANDEZ. PHOTO AND DESIGN BY: N. CASTAÑEDA. COPYRIGHT PROYECTO CASA MONTERO.

FIG 3. EXAMPLES OF EXPERIMENTAL TOOLS AVAILABLE AS PART OF OUR EXPERIMENTAL KIT. A. TWO DEER ANTLER PICKS. B. TWO FLINT PICKS. PHOTO AND DESIGN BY: M.É. PORQUEDDU.

FIG 4A. PRODUCTION OF AN EXPERIMENTAL FLINT PICK. A. FLINT KNAPPING BY JAVIER BAENA PREYSLER. PHOTO BY: M.É. PORQUEDDU.

FIG 4B. PRODUCTION OF AN EXPERIMENTAL FLINT PICK. B. HANDLING OF THE PICK USING A WOODEN HANDLE AND GOATSKIN AND SHEEP SKIN TIES PREVIOUSLY MOISTENED FOR MALLEABILITY. PHOTO BY: M.É. PORQUEDDU.

FIG 5. VIEW FROM THE OPENING OF THE EXPERIMENTAL EXTRACTION SHAFT. PHOTO BY: M. É. PORQUEDDU.

FIG 6. VIEW INSIDE THE EXPERIMENTAL FLINT EXTRACTION SHAFT. PHOTO BY: M. É. PORQUEDDU

FIG 7A. TECHNICAL GESTURES USED DURING THE OPENING OF THE EXPERIMENTAL MINING SHAFT. A. POSTURE ON ONE KNEE ON THE GROUND AND MANIPULATING THE TOOL WITH ONLY ONE ARM. PHOTO AND DESIGN BY: M. É. PORQUEDDU

FIG 7B. TECHNICAL GESTURES USED DURING THE OPENING OF THE EXPERIMENTAL MINING SHAFT. B. POSTURE ON ONE KNEE ON THE GROUND BUT HANDLING THE OBJECT WITH BOTH ARMS. PHOTO AND DESIGN BY: M. É. PORQUEDDU

FIG 7C. TECHNICAL GESTURES USED DURING THE OPENING OF THE EXPERIMENTAL MINING SHAFT. C. STANDING POSTURE AND UPPER BODY MOVEMENT WHEN USING CROWBARS. PHOTO AND DESIGN BY: M. É. PORQUEDDU

FIG 8A. TECHNICAL PROCEDURES EMPLOYED WHEN ENLARGING THE EXPERIMENTAL EXTRACTION SHAFT. A. HANDLING A WOODEN PICK WITH INDIRECT PERCUSSION, REQUIRING A STANDING POSTURE. PHOTO AND DESIGN BY: M. É. PORQUEDDU

FIG 8B. TECHNICAL PROCEDURES EMPLOYED WHEN ENLARGING THE EXPERIMENTAL EXTRACTION SHAFT. B. SQUATTING POSITION WHEN USING A FLINT PICK. PHOTO AND DESIGN BY: M. É. PORQUEDDU

FIG 8C. TECHNICAL PROCEDURES EMPLOYED WHEN ENLARGING THE EXPERIMENTAL EXTRACTION SHAFT. C. POSTURE ON ONE KNEE ON THE GROUND WHEN USING A FLINT PICK. PHOTO AND DESIGN BY: M. É. PORQUEDDU