

THE ROMAN QUARRIES OF THE TOWN AND TERRITORY OF LOS BAÑALES (UNCASTILLO, ZARAGOZA, SPAIN)*

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Abstract

The importance of the archaeological site of Los Bañales (Uncastillo, Zaragoza, Spain), as the imposing archaeological remains preserved (aqueduct, funerary monuments, *thermae*, forum, etc.) and the remarkable epigraphic repertoire of its territory suggest, is reinforced by its role as centre of a dispersed habitat, in form of *villae*, at a region of great agricultural potential. Located nearby the Roman route that linked Caesar Augusta (modern Zaragoza) with Pompelo (modern Pamplona), it flourished during Roman times between the 1st and 2nd centuries AD. However, a pre-Roman settlement probably existed already and 4th century AD pottery has been discovered there as well. In this context, the abundant use of local stone as raw material, not only for construction purposes but also as epigraphic support, stands out. It is a Miocenic, brown sandstone that crops out profusely in the zone. It appears in horizontal layers alternated with clay and silt deposits, which facilitates its extraction. As a first approach to the exploitation of stone resources in this territory, a survey has been conducted. So far, up to four points showing evidence of extraction have been identified. They are Punta Sampe, el corral de la Pesquera, Las Viñas and the way up to Los Bañales. Besides, a group of abandoned, roughly-hewn blocks near Punta Sampe extraction point has been identified, which might indicate the existence of a quarry workshop. The location of these quarries, in the environs either of the urban centre of Los Bañales or next to some of the *villae* scattered throughout the territory, as well as the absence of large quarries that might have supplied the constructive programs of the city seem to point towards a dispersed pattern of exploitation of stone resources rather than a centralized one.

Keywords

Los Bañales, Roman town, local stone, sandstone, quarries, building, epigraphy.

Introduction

“Los Bañales” is the traditional name which, from the documentation of the Middle Ages (Andreu *et al.* 2010), is still actually being used to name an ancient Roman town – probably Tarraca¹, mentioned by Pliny, Ptolemy and the *itineraria*² – located in the north part of the Conventus Caesaraugustanus, in the current municipality of Uncastillo (Zaragoza) (Fig. 1). The town, with an extension of 24 ha and very spectacular remains – including *balnea*, aqueduct, houses and a public square³ –, seems to have been the most important center along the road that, from the Ebro valley, linked Caesar Augusta with the Roman province of Aquitania⁴ passing through different important urban being currently researched: Cabezo Ladrero (Sofuentes, Zaragoza) (Jordán *et al.* 2010) and Campo Real/Fillera (Sos del Rey Católico/Sangüesa, Zaragoza/Navarra) (Andreu *et al.* 2008a; Andreu *et al.* 2010).

This real highway of ancient times – certainly paved by the Augustan legions that had also acted as civil engineers in well-known public buildings of Caesar Augusta (Beltrán Lloris 2007-2008) or Barcino (Gurt and Rodà 2005) and that are mentioned in different milestones in the area⁵ – passed also through the town of Cara – mentioned also by Pliny, in current Santacara (Navarra)⁶ – and led to Pompelo – current Pamplona (Navarra) – following the same route mentioned by Strabo⁷ as the connecting road between Tarraco – in the Mediterranean coast – and Oiasso, the most important sea-port in the north of the Iberian Peninsula⁸ and maybe the way the conventus Caesaraugustanus followed to reach the sea (Ozcáriz 2006).

Excavated in the 40s (Galiay 1944, 1949) and in the 70s (Beltrán Martínez 1977a; 1977b) and also briefly in 1999 and 2000, the site is now being object of study by an interdisciplinary team of Fundación Uncastillo with the academic support of UNED-Tudela and the financial funds of the local government of Aragón. The 2009

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1. Peréx 1998 and, all the references in Andreu 2006, 199-202.

2. Plin. *Nat. His.* 3, 24; Ptol. 2, 6, 67; and *Rav. Cosm.* 4, 43.

3. See the general and preliminary evaluation of its urbanism in Andreu *et al.* 2008b.

4. With all the evidences and previous literature in Moreno 2009.

5. *ERZ* 19, *IRMN*, 1 and *ERZ*, 11, with commentaries in Moreno *et al.* 2009, 205-206 (n. 3), 210-211 (n. 7) and 213-214 (n. 10).

6. Plin. *Nat. His.* 3, 24, with all the references in Andreu 2006, 216-218.

7. Strab. 3, 4, 10, commented by Peréx 1986, 54 and recently by Beltrán Lloris 2006, 234.

8. All the literature, and the publications of M. Urteaga, cited in Andreu 2006, 193-194.

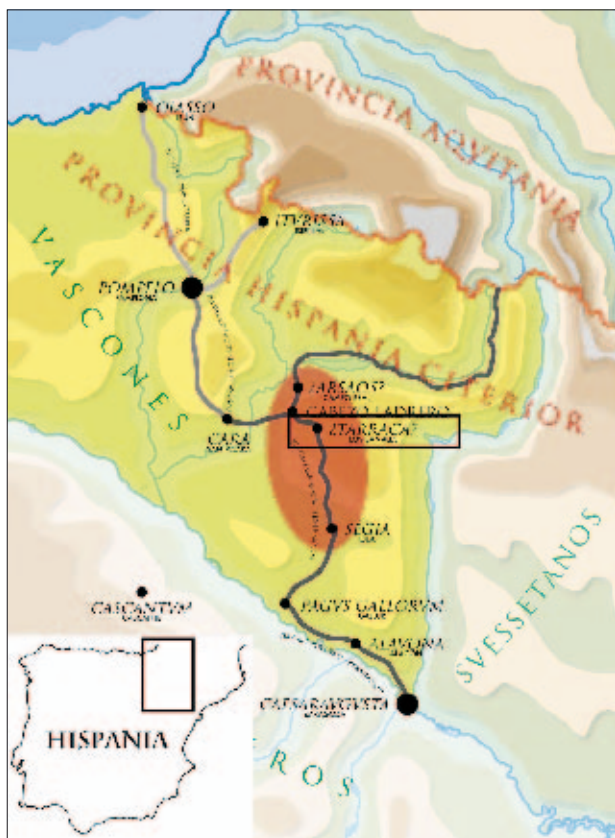


FIG. 1. Map showing the location of Los Bañales.

and 2010 archaeological campaigns have showed that the town, well urbanized in Augustan times, reached the municipal status – as all the unprivileged Spanish towns as a whole – in Flavian times (Andreu 2010). Well connected with the cultural influences from abroad – specially testified in an increasing catalogue of semicylindrical and barrel-shaped tombs named *cupae* (Andreu *et al.* 2008c) and in the attested imports of marbles from Greece, the Pyrenees and North Africa (Lapuente *et al.* in press) –, the town seems to suffer a critical process in the second part of 2nd century AD. It was, in fact, the first step to the final abandonment of the town, well testified in the second half of 3rd century AD, as other towns of the area (Andreu *et al.* 2011).

Apart from its monumental buildings (Fig. 2), recent and classical scholars have focused in the important rural settlement that surrounded the town (Andreu *et al.* 2009, 2010). It included suburban houses, rich *villae* and small farms well linked with the road to the north and that met their needs of stone supply by exploiting the local sandstone. Thus, the main purpose of this contribution is to present not only the evidences of stone extraction in the area but also the unpublished evidence of a quarry near Los Bañales that was probably linked with the construction of the aqueduct and maybe other buildings of the Roman town.



FIG. 2. View of some of the pillars of the aqueduct at Los Bañales.

The stone

The abundant use of local stone as raw material, not only for construction purposes but also as epigraphic support, stands out. The importance of this material was already pointed at the only paper published on this subject (Cisneros 1986).

The identification of stone was carried out exclusively with the petrographic analysis. It includes a description of the macroscopic characteristics -mineral composition, grain size, structure, color and odor-, and a description of the thin-section samples using petrographic optical microscope Olympus AX-70⁹ – paying special attention to the mineral composition, texture, and maximum grain size (MGS). To facilitate comparison of the different lithotypes was taken photomicrographs.

It is a yellowish brown Miocene (Aquitanian-upper Burdigalian) sandstone of coarse grain that crops out profusely in the area (Fig. 3). It emerges in horizontal banks or palaeochannels of limited extension with parallel stratification of 30-50 cm, alternated with clay and silt deposits which facilitates its extraction. The erosion of the strata caused the existence of many single blocks.

Compositionally, it consists of angular-subangular quartz clasts of size less than 0.5 mm 20-25%, feldspar 5% (such as microcline, plagioclase and altered

9. Petrographic optical Olympus AX-70 microscope from Departamento de Ciencias de la Tierra, Universidad de Zaragoza (Zaragoza, Spain).

orthoclase), and abundant rock fragments. Among the rock fragments, the carbonates content is high: there are micritic limestone, microsparite and sparite (as cement), oxidized dolomite, biomicrite and bioclasts fragments (foraminifera). The content of silexite fragments is also high 5-10%. As accessory minerals, there are tourmaline, biotite, muscovite, rutile and zircon.

The homometric clasts have tangential contacts forming a skeletal dense texture (Fig. 4). They are cemented by carbonates with a variable content of iron oxides. Its percentage is difficult to distinguish of the remaining carbonate clasts.

From the data, using the classification of sandstones of Pettijohn (1957) (Fig. 5), the rock is classified as Calcareus Sandstone (Lithic arenite).

The evidence of extraction

Between autumn 2008 and spring 2009, two field surveys were conducted in the territory of Los Bañales. The aim was to verify the existence of several points of extraction, previously located during previous survey campaigns, and to check if they were indeed the Roman quarries that supplied the town and its territory of stone. In fact, the abundant use of local stone as raw material, not only as a building material but also as epigraphic support is an important element in this field not only in the Roman site but also throughout its area in later periods.

The results of this first approach allowed us to observe various aspects related to the exploitation of these resources in the area. Thus, besides the fact that it highlighted the importance of these areas where extraction evidence has been identified and documented, it made it possible to broadly outline the basic factors that seem to articulate the extraction of stone materials around Los Bañales.

The places where evidence of extraction has been preserved are several and located throughout the area (Fig. 6):

- Next to the *specus* of the aqueduct, where evident traces of block extraction are well preserved (Fig. 7). In fact, two levels of terraces are preserved and not only the negative evidence of rectangular blocks and the wedge sockets used to rip them off but also of traces of the pick on the vertical surfaces can be seen there. These present two different patterns: in spike and diagonal, parallel lines pattern. There are also trenches of quadrangular section of mainly 10 to 15 cms of width although some others of smaller size have been preserved as well.

Approximately 34 m³ of stone were quarried out from this point, even though not all of them susceptible of being used as building blocks for construction. It is, therefore, of a quarry whose product was limited, probably because it is an open extraction with a very specific purpose.

- Punta Sampe, where the evidences of extraction consist of wedge holes and their negatives on horizontal surfaces of the bedrock of the south slope this low hill.

- La Pesquera, where traces of extraction are found along the modern road. They are wedge holes and their negatives as well as a short, shallow trench (Fig. 8).



FIG. 3. Macroscopic appearance of the stone.

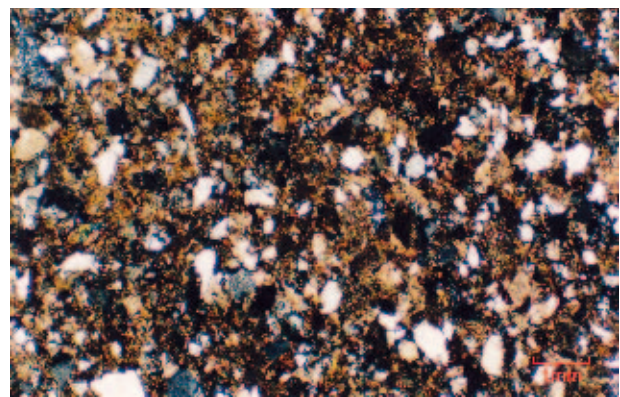


FIG. 4. Microphotography in crossed-polars showing representative texture.

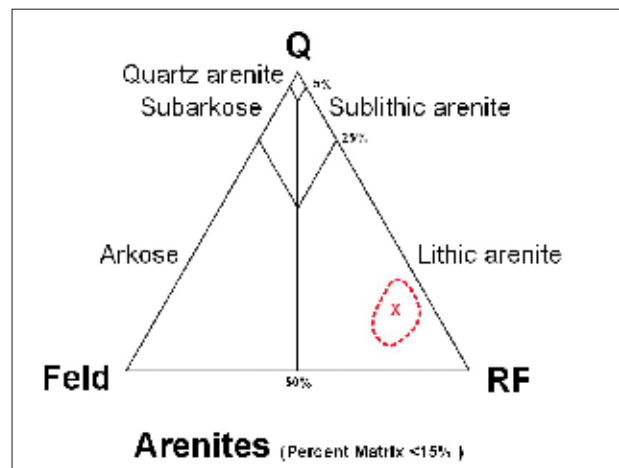


FIG. 5. QFR triangular Classification of sandstones. The percentage of quartz (Q), feldspar (Feld) and rock fragments (RF) allow the arenites to be further subdivided. Other frameworks constituents such as micas and heavy minerals are ignored (Pettijohn 1957).

- El Pueyo, near the Roman town remains, where traces of extraction by using wedges is visible (Fig. 9), although there are also evidences of modern extraction.

- Puyarraso, which includes two different areas: the upper part of the hill, where a long, shallow trench and

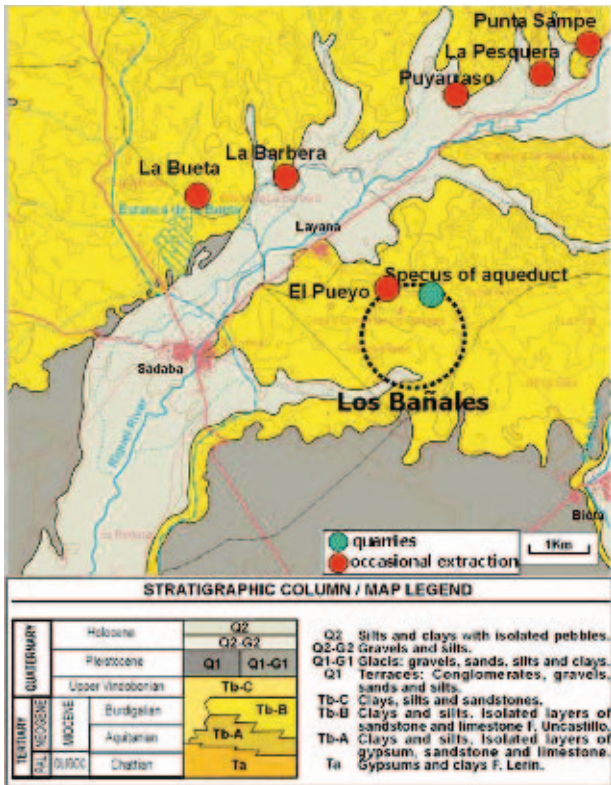


FIG. 6. Geological map showing the location of the main extraction points (IGME 1976, with modifications of the authors).

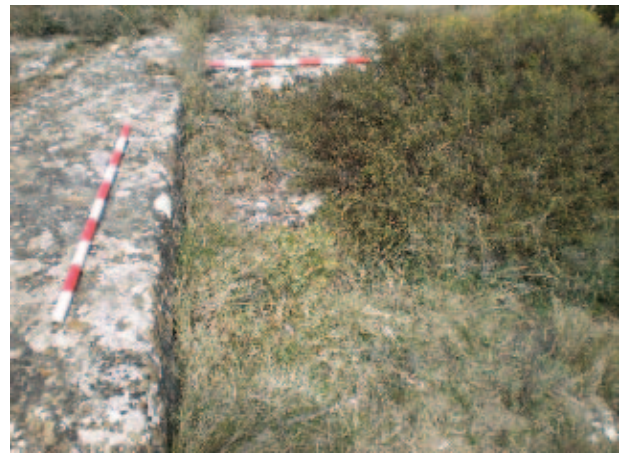


FIG. 8. Evidence of extraction at La Pesquera.



FIG. 9. Traces of elongated, rectangular wedge sockets at El Pueyo.



FIG. 7. View (from east) of the quarry near the *specus* of the aqueduct.

a couple of almost quadrangular blocs were located; and the foothill area next to the A-1202 road, where a quite numerous group of wedge sockets are preserved.

– **La Barbera**, on the small hill next to La Barbera cottage an example of a trapezoidal wedge socket has been found.

– **La Bueta**, near the homonymous pond, two lines of wedge sockets quite similar in shape and size to those at La Barbera were located (Fig. 10). They all were dug in horizontal surfaces.

Brief considerations

Although this is merely a first approximation and that we lack a solid chronology due to the absence of archaeological excavations, the data currently available gives some insight to the organization and use of stone resources in the territory of Los Bañales.

Thus, the places where extraction has been identified can be divided into 2 main categories:

- well-attested quarries, of which we have only the example, the next to the *specus* of the aqueduct one, and
 - points where only an occasional extraction took place and therefore cannot be considered as quarries.
- All the other points of extraction identified during the survey belong to this category (La Pesquera, Puyarraso, Punta Sampe, La Barbera, La Bueta and El Pueyo).

Similarly, the different systems of extraction documented in these two groups suggest that they were result of diverse strategy of exploitation. Indeed, extraction at the quarry near the *specus* of the aqueduct followed the usual method in ancient times, consisting of the prizing out of square or rectangular blocks by using small trenches and wedges. However, at all the other points the extraction was performed by taking advantage of the strong horizontal stratification of the local sandstone and the use of rectangular wedges of relatively large size which were in-



FIG. 10. Elongated, rectangular wedges sockets at La Bueta.

serted perpendicularly to produce a vertical fracture of the rock. Although the use of a strong bedding in conjunction with wedges for the extraction of blocks of varying size has also been documented in ancient times, it was a technique much less employed than the other one¹⁰. Once the blocks were prized out, these were roughly hewn at the foot of the point of extraction. Some of these roughly-hewn objects, probably future *cupae*, a type of funerary epigraphic monument very common at the area, have been identified near Punta Sampe (Fig. 11).

Even though we cannot rule out an ancient date for this sort of works, there are several factors that point in the opposite direction. In first place, it does not seem probable that two so different extraction techniques would have been applied in such a small geographical context during the same period and, moreover, to extract the same type of stone. Indeed, both the quarry near the *specus* and the sporadic extraction points (La Pesquera, Puyarraso, Punta Sampe, La Barbera, La Bueta and El Pueyo) were opened in the same geological layer, thus no lithological differences may have influenced on the change of technique.

On the other hand, the presence of several buildings and monuments (or its remains) at the territory around



FIG. 11. Roughly-hewn block, probably a future *cupa*, found near Punta Sampe.

Los Bañales could explain the existence of these scattered points where sporadic extraction was performed. Yet, these buildings were erected with very regular-size and well-shaped ashlar; to reach this stage, irregular blocks of large dimensions that were pulled off from the occasional extraction points (La Pesquera, Puyarraso, Punta Sampe, La Barbera, La Bueta and El Pueyo) would have needed a major roughing and carving work. Since we have the example of the quarry near the *specus* in a short distance, which shows that it was possible to remove blocks already roughly outlined, the use of another technique that requires a much more laborious work and effort after extraction is surprising.

Last but not least, the existence of so many buildings of later periods, in particular those of medieval times¹¹, in our case-study territory must be taken into account. Although much of the building stone could be reused from the Roman town, it is likely that specific building needs were solved by the quick and easy removal of stone taking advantage of the natural bedding of nearby outcrops.

Therefore, two different extraction patterns have been applied at the territory of Los Bañales. On the one hand there are points where occasional extraction took place, which are either near the town of Los Bañales or one of the Roman villas or monuments scattered throughout the area. On the other hand, a less dispersed pattern is represented by the quarry near the *specus* of the aqueduct; from it, a greater volume of building stone to use in a nearby place (i.e., either in the aqueduct pillars, or in the same town) was extracted.

Nevertheless, we must bear in mind that these hypotheses are the result of an initial approximation that must be completed in the near future, extending the survey to areas further away from the town. Indeed, new information on other points of extraction or quarries that could have

10. Indeed, the extraction using trenches and wedges has been widely described and discussed by several authors, among which we highlight the contributions of A. Dworakowska, J. Röder, T. Kozelj and J.-C. Bessac (Bessac 1996; Dworakowska 1983; Kozelj 1988; Röder 1957). Nevertheless, extraction by using only wedges has been documented in some sites in northeastern Spain (Gutiérrez García-M. 2009, 270) and its most significant example is Ampurias, where wedge holes have been identified in some blocks of the Neapolis wall (Bessac 1993, 297-298).

11. Both military and religious buildings (the castle of Sádaba, the castle of Uncastillo and the numerous churches of both towns, etc.) are an important heritage of this area, but local stone was widely used also in less important buildings (houses or manor houses, stables, etc.).

supplied stone to the Roman town are key to corroborate or dismiss the conjectures on how stone exploitation was managed at Los Bañales presented in this paper.

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