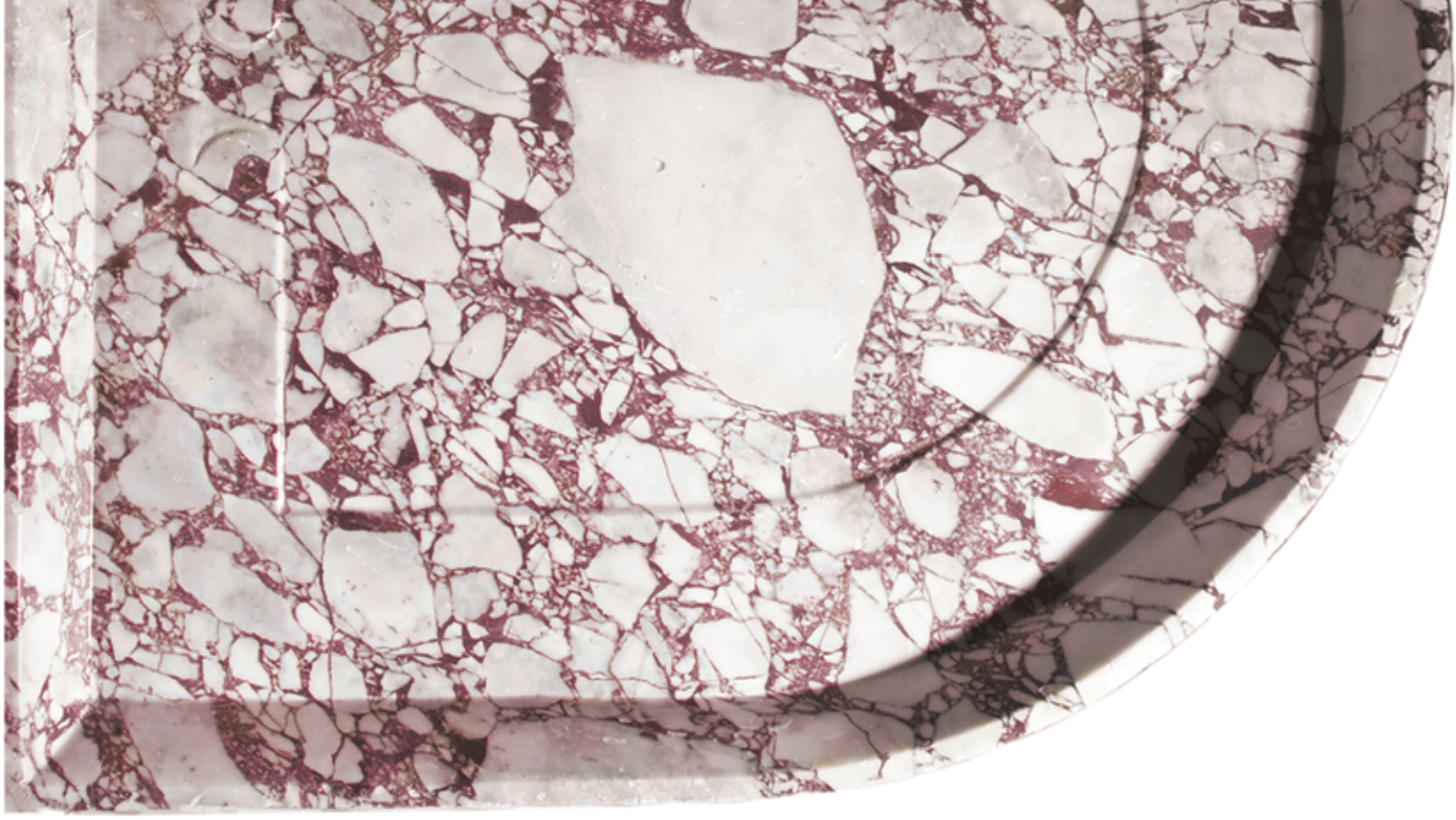
The Local Quarries of the Ancient Roman City of Valeria (Cuenca, Spain)

Atienza Fuente, Javier



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CONTENT

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THE LOCAL QUARRIES OF THE ANCIENT ROMAN CITY OF *VALERIA* (CUENCA, SPAIN)

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Abstract

The Hispano-Roman city of *Valeria*, in the province of Cuenca (Spain), is well known in the archaeological field worldwide for its significant archaeological and architectural remains and for the evidence of its splendour and development.
Less known are the quarries located near the city of *Valeria*. These quarries provided most of the blocks resulting in this public and monumental architecture.
The abundant existence of quality stone material, the geomorphological arrangement of the rocky layers that facilitated its massive exploitation and the existence of roads in the immediate vicinity that allowed the evacuation and transportation of extracted material to its final destination are features that facilitated the exploitation in the Roman age.
The preserved remains and the finding of some semi-finished stone elements are the starting points to establish the system of exploitation and utilization of construction resources in the immediate vicinity of this Roman city.

Keywords
Valeria, Roman quarries, extraction methods

Study area location and purpose of the research

The archaeological site of *Valeria* is located in the province of Cuenca, approximately in the centre of the eastern half of the Iberian Peninsula (Fig. 1). The archaeological remains collected during extensive excavation work have resulted in the identification of this ancient Roman town of *Valeria*. It was founded *ex novo* in the first century A.D. grouping the indigenous populations of several settlements that were scattered around, part of a synoecism phenomenon that is also seen in other areas of the Iberian Peninsula in that same period.
The Roman city stands at the top of a limestone plateau isolated on its southern, eastern and western sides by deep canyons formed by the erosive action of the rivers Zahorras and Gritos.

The monumental architecture that became this Roman town has been repeatedly witnessed by the scale of the architectural remains exhumed along the archaeological excavations that have been carried out at the site, as well as building materials and architectural elements re-used on buildings of more recent times, a circumstance that has allowed their preservation in good condition.

To date, most archaeological excavations that have been conducted at the site in *Valeria* have focused mainly on the area around the *forum*. This has enabled the archaeologists to learn more about the architectural evolution of this public space and the buildings in its surrounding along a chronological period from the late Republican period until its final abandonment. In this regard, it should be noted that the urban re-development, around the turn of the era, notably transformed the physiognomy of the whole area of the *forum*, giving it a new spatial configuration while new buildings were being erected clearly to achieve a monumental architectural effect for these public spaces.

The aim of the research, which appears reflected in its most generic features in these lines, has essentially revolved around three main objectives. Firstly, to try to delimit the extent of the area of production of stone elements based on the distribution and dispersion of the extractive fronts located. Secondly, to try to identify, if the preserved remains allow this, the exploitation method or methods used. Thirdly, to try to locate stone elements in a semi-processed state capable of being correlated with the extractive fronts and generally, with the process or processes of elaboration of architectural and / or decorative stone elements of *Valeria*.

Extractive fronts

In *Valeria,* operational quarries had to have existed before the monumental process in the first century BC[1], which provided the perfectly squared blocks that constitute the supports for columns and pillars of the Late Republican *basilica*, some of which have been found during archaeological excavations in the area[2].

1 FUENTES DOMÍNGUEZ 2006, 113-114.

2 FUENTES DOMÍNGUEZ 1997, 113-125.

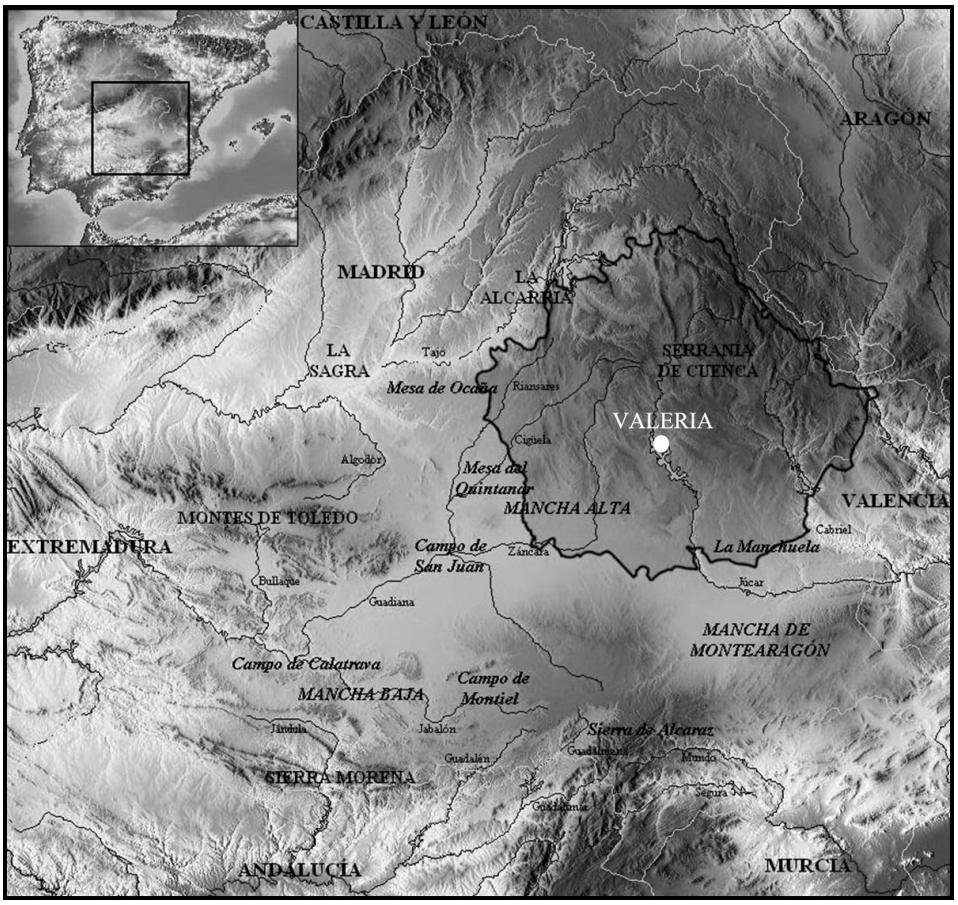

Fig. 1.
Location of the Hispano-Roman city of *Valeria* in the context of the Iberian Peninsula

This urban reform, which affected many of the public spaces, significantly, entailed complex planning, bearing in mind the need to have a constant flow of quality, stone construction material.

Although the locations of most extractive fronts are known, because many have been exposed since the abandonment, they have not previously been the object of any study or research, with only some generic and exceptional references in some publications[3]. To our knowledge, neither has any study, prospecting campaign or archaeological intervention taken place around the area of the quarries.

This situation was aggravated by the reconditioning works of the CM-2100 road in the 70s, which caused damage to some of the quarry fronts that were located within the working area[4].

The research conducted in the field has revealed the existence of a large extractive sector composed of at least a dozen extractive fronts or *loci*, of quite variable dimensions and with evident marks of exploitation in ancient times. This enabled us to pinpoint the exact location of some other quarry fronts, the existence of which were not previously known.

All of them are to the west of the Roman town of *Valeria*, on both sides of the sickle of the Zahorras River[5] (Fig. 2). The location of a large majority of the extractive fronts is on the western slope; they consist of vertical walls with surfaces covered completely or partly by curved grooves produced by the working tool while the operator progressed in the exploitation. In some cases, the grooves do not follow a single direction, but instead they alternate, so it is possible to intuit, even approximately, the size of the extracted blocks, because each change of direction seems to correspond with the beginning of the exploitation of a new layer. All exploitation

3 At the time of writing this paper, is scheduled the publication of the article ATIENZA J. (forthcoming): "Las canteras de piedra local de las ciudades hispanorromanas de *Segobriga* y *Valeria* en Cuenca: una aproximación a su estudio", in which there is a description of the quarry fronts.

4 The use of explosives caused the complete disappearance of some extractive fronts and partial damage to some others.

5 Located inside the town of *Valeria* was a small rocky outcrop where obvious signs of extraction of stone blocks can be discerned. However, it is very probable that this local operation was due to the work of ground preparation for the erection of a building.

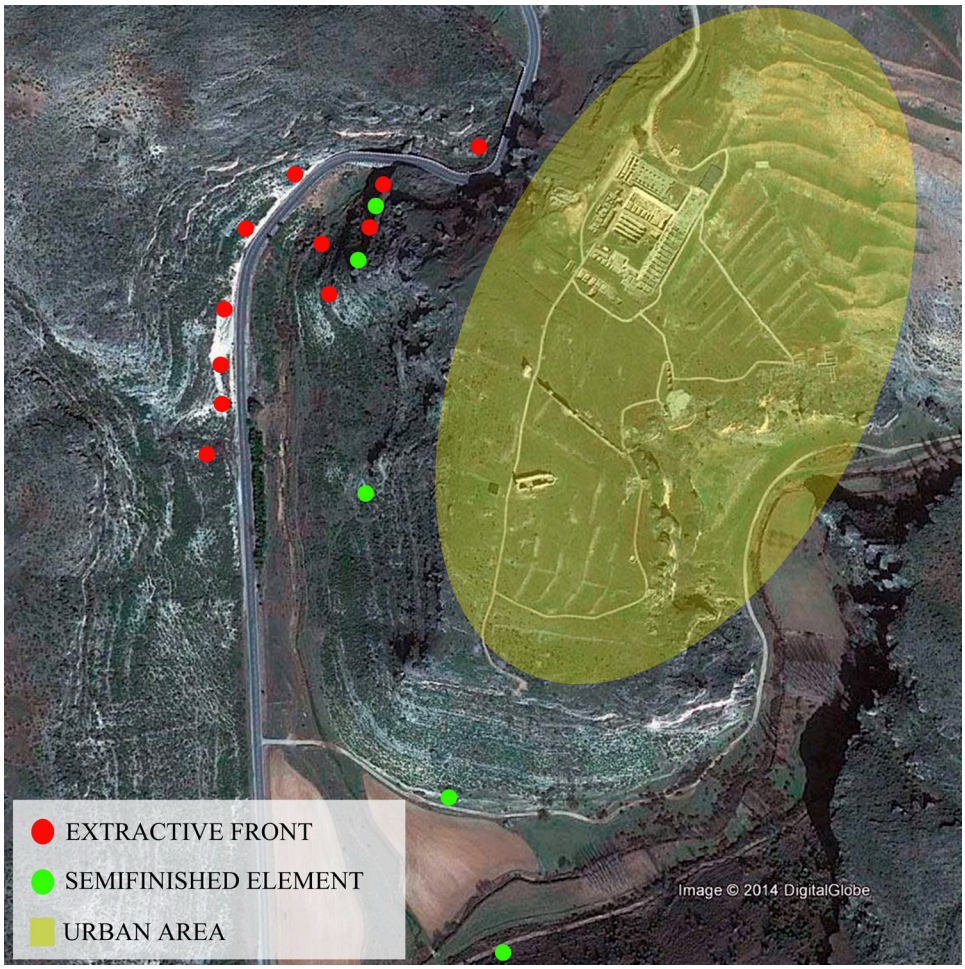

Fig. 2. Orthophotography of the studied area, signalling the exploitation area and extractive fronts, as well as the close relationship with the urban area of the city of *Valeria*

fronts located in this side are relatively small, not exceeding in any case, ten meters in length and two meters in height (Fig. 3).

On the eastern slope of the sickle, the location of possible extraction fronts is extremely difficult because of the accumulation of alluvial deposits that reach a large thickness and conceal them[6]. Only in three cases has evidence of extractive activities and of the tool used based on the marks left on the rock surface been found. At the northern end of the eastern slope, sheltered by a rocky ledge, the longest exploitation front found to date is preserved and exceeds 30 meters in length. In addition, in this extraction front, a row of abandoned blocks at different stages of the extraction process was also located. This has allowed the reconstruction, as a working hypothesis, of the extractive sequence of the blocks (Fig. 4).

6 In addition to the quarry fronts described in this section, during the prospecting work some rocky edges that run at a lower level following the main rocky layer have been located. They only raise a few centimetres above the layer of alluvial deposits, but the fact that they are completely straight along their length, suggests that they are hidden quarry fronts.

The rocky bank exploited corresponds to a limestone layer of about 150 cm in thickness. Because of its large thickness, this layer has been exploited by extracting two tiers of blocks juxtaposed horizontally. On the top row, no blocks are preserved, however there are traces of the extracted blocks; with a rectangular tendency, slightly alveolated, and separated from each other by a narrow rock ridge that individualizes them. Based on these marks, it is possible to infer that the approximate dimensions of the extracted blocks, varying in length from 150 cm or longer to 120 cm of smaller blocks and a thickness of between 70 and 75 cm (Fig. 5).

On the bottom tier, five blocks are preserved in an advanced stage of the extraction process. All blocks are separated from each other by some perimetric grooves that keep them attached to the rocky bank only on its lower surface. The perimetric grooves have a varying width (between 20 and 25 centimetres at the top, and between 12 and 15 centimetres in its lower part), a depth slightly higher than the thickness of the block to be extracted and a section of rectangular tendency. The fully conserved blocks present very uniform dimensions relative to its length (about 125 centimetres), while the width of them varies between 60 and 75 centimetres.

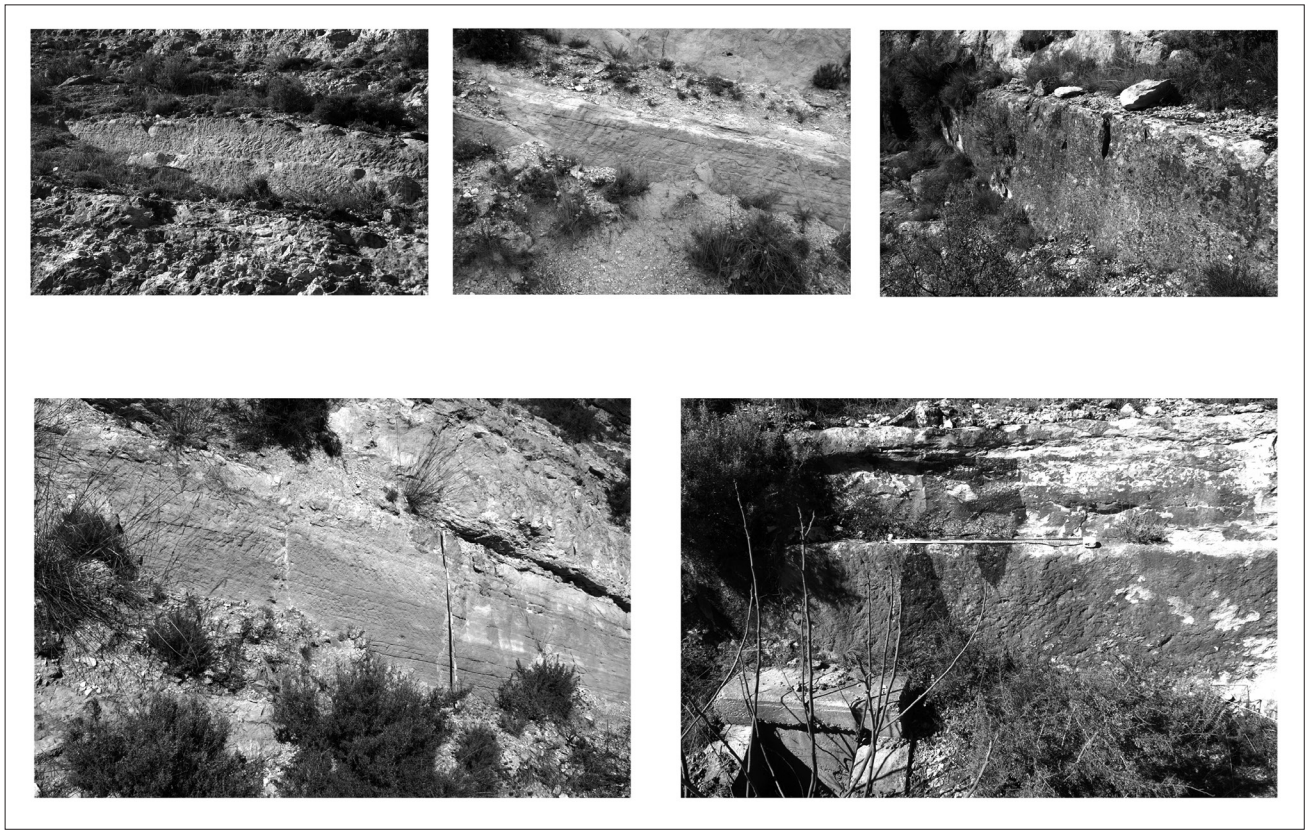

Fig. 3. View of the current state of some of the extraction fronts located on the west slope of the Zahorras River. In all of them the marks left on the rock face by the tools used during their exploitation are still preserved. The visible height of all these extraction fronts is about one meter

Fig. 4. View of the current state of some of the extraction fronts located on the east slope of the Zahorras River. The marks left by the pick during the block extraction process can still be observed on their surface

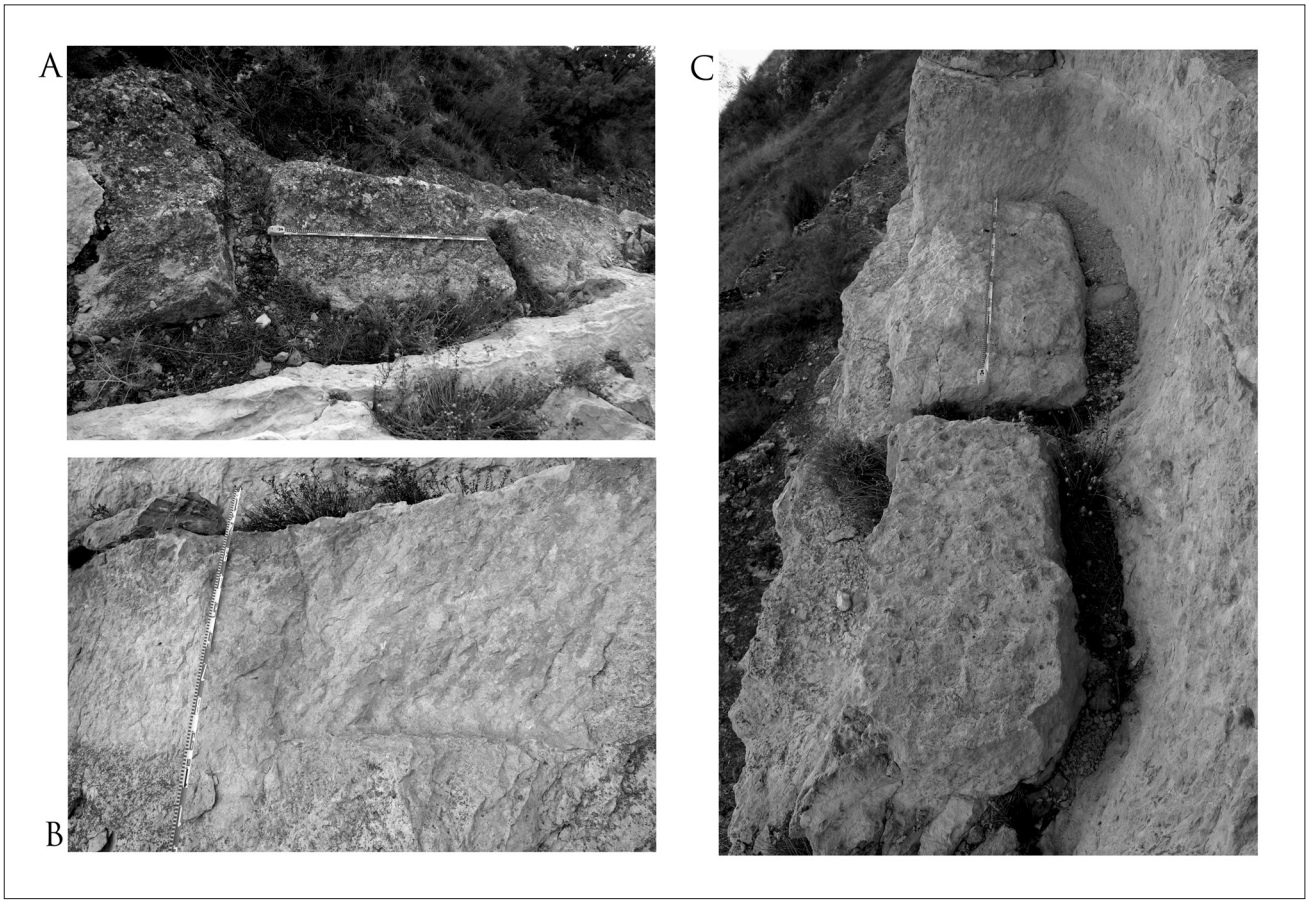

Fig. 5. Different views of the main exploitation front in the eastern side of the Zahorras River. Images A and C show several blocks abandoned in the middle of the extraction process, joined to the rocky bank at the bottom. In image B the marks left by the extraction of a block in the rock face is observed. Based on these marks it is possible to infer approximately the dimensions of the extracted block and calculate its volume

The extraction process of the blocks seems to have followed the following phases[7]:

1. Clearance of the upper surface of rock stratum subjected to exploitation and regularization with the peak of the surface, in order to get a plane of work as horizontal as possible. This regularization would extend over a slightly greater area than the width of the block to be extracted.

2. After regularizing the upper face of the rock bank, excavation was continued making perimetric grooves or channels that delimited dimensions of the block to be extracted, in regard to both its width and its length. These grooves have a depth slightly higher than the final thickness of the blocks and a width of between 15 and 20 centimetres, which is enough to work comfortably with a pick and subsequently, with a lever if necessary.

3. After this phase, the block was attached to the rocky bank only on its lower surface. To release the block, stratification joints are used also when two overlapping rock layers are encountered. When there were no stratification joints used or the rocky bank had a great thickness, it was possible that wedges or levers were used. By beating and putting pressure on these levers or wedges, the blocks were slowly released[8]. About the system or systems of release of the blocks that were used, no evidence was found during the visual inspection of the fronts located.

7 For a detailed description of the various systems of stone quarrying in practice in Roman times, see ADAM 1996, 25-55. A hypothetical description of the extraction system used in the nearby quarries of *Segobriga* can be read in ATIENZA 2010, 22-24.

8 The use of wedges and levers for extracting stone blocks is well documented in numerous Roman quarries spread across the length and breadth of the Empire, and there are many published papers about it. A detailed study of a local quarry where many traces of block extraction by wedges have been preserved was conducted by Antonio Pizzo for the granite quarries that supplied building material to Emerita Augusta. Their results have been published both in PIZZO 2010, 571-588, and also in PIZZO 2011, 365-390.

Fig. 6. Various views of one of the blocks located in the immediate vicinity of extractive area that presents different surface finishes: on the one hand, two of the perimeter edges appear finely worked with the chisel, while the central area has only been slightly roughly shaped with a pointed tool, such as a pick or a pointer

Semifinished elements

Often, the work undertaken in the quarries during the Roman period was not restricted to the extraction of the blocks and subsequently transporting them to the place of destination. Previous to transportation, it was necessary, especially in the case of moulded architectural elements (especially bases, cornices or capitals) or those with a very specific shape (column drums, monolithic shafts, etc.) to submit the blocks to a process of rough shaping that gave them an aspect as close as possible to the final form in which they were placed.[9]

This operation is by no means a trivial matter, because it significantly reduces and affects both the volume and the weight of the elements to be transported, factors that will directly affect both the construction costs and the logistics of supply of construction materials on the working site[10].

At least in three different points of the area studied, some elements, independent and isolated from one another, were found. These elements presented obvious marks and signs of having been worked after removal from the rocky bank.

One of the examples localized, corresponds to a parallelepiped block where the upper surface clearly presents two different processing phases: on the one hand, a groove or peripheral notch, of about 5 cm wide and another 5 cm deep, made by a smooth edged chisel, is observed; on the other hand, the central area is only roughly trimmed by an impact tool with a sharp edge (possibly a pointer or a pickaxe) (Fig. 6).

The remaining two examples are for cylindrical blocks that, in spite of being located in an isolated way and separated from one another by about a hundred meters present remarkable similarities, in length (130 centimetres in the larger model and 125 centimetres in the smaller), diameter (both between 45 and 48 centimetres), or stage of the manufacturing process, because in both cases, the surfaces of the pieces have been only roughly shaped using a pointer or a pick but without receiving a more refined treatment with a chisel (Fig. 7).

One of these pieces has traditionally been identified as an epigraphic milestone, not only because of its cylindrical shape, but due to its location, over one of its circular faces, on one side of one of the leading roads of the city. However, after the field survey and comparison of the typological characteristics of these two cylindrical elements, my opinion is that in both cases, column drums are produced following precise indications and measures that appear to be the same. In the case of the stone element considered a milestone, the absence of the characteristic cubic base of these indicator elements can not be explained by possible breakage or loss of material because both the top and bottom surfaces of this piece are perfectly worked and no evidence of fracture is to be seen. Moreover, it does not fit very well in the identification of this piece as a milestone and in fact lacks all kinds of epigraphic remains because this circumstance directly affects its functionality as signalling element[11].

It is quite possible, however, that one or more of the extractive fronts that were on the eastern slope of Zahorras River may have been intended for the extraction and processing of cylinder blocks (drums column or

9 The processing of the extracted blocks, either in the quarry itself or in specific installations located in the vicinity, has been studied in detail for some imperial marble quarries by RUSSELL 2013, 239-249.

10 About the costs of overland transport of construction stone materials, see RUSSELL 2013, 95-105.

11 The diameter of these two pieces is the same as some column drums located in the *forum* area.

Fig. 7.
Isolated cylindrical elements located in the immediate area around the exploitation area. The two elements have a great similarity in their dimensions and also in the treatment of their surfaces, which are presented only slightly roughly shaped, without reaching the typical polishing of this type of element. The item on the left is upright and situated on one side of the road that runs along the vicinity of the extractive area and, therefore, has traditionally been identified as an anepigraphic milestone

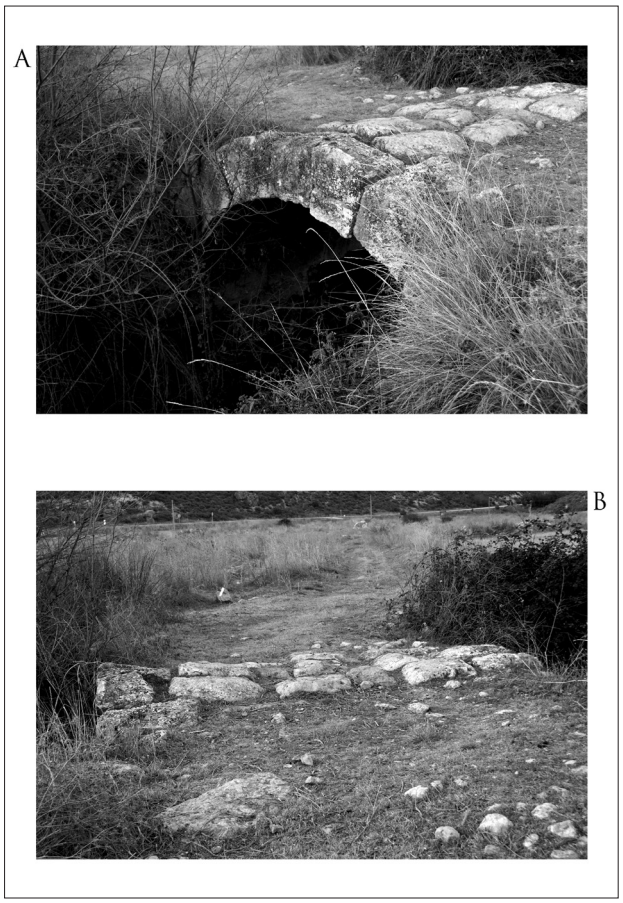

Fig. 8. Remains of a Roman bridge preserved in the vicinity of Valeria that formed part of the infrastructure of the road that passed through the vicinity of the extractive area

monolithic shafts) in series, with precise measures, aimed at a specific work or as a result of an order of material with specified morphological characteristics[12].

The appearance of these elements in the immediate vicinity of the extractive fronts area seems to indicate that the blocks, once extracted, were processed and treated with different tools in order to give them a setting as close as possible to the final form. This operation, which is attested in other quarries in the same period, allowed reduction of the volume and weight of the blocks before transportation to the place of positioning. These factors (volume and weight), along with the distance to cover, were the main determinants to be considered in total costs of construction.

An efficient system of supplying construction material required a roadway, as close and accessible as possible to the exploitation fronts of quarries, which would

12 The current state of research on local quarries in *Hispania* and its Roman provinces is not enough to confirm for certain the existence of extractive fronts for the production of a certain type of product. However, it is interesting to note that in some marble quarries located in modern Turkey, there seem to have been extraction areas specialized in the production of monumental monolithic shafts, some of which were abandoned in the quarries themselves. A Spanish example that might point in the same direction is situated in the sandstone quarries in the surroundings of the Roman site of *Tiermes*, where at least two extractive fronts seem to have been intended for the production of tombstones.

Fig. 9.
Aerial photograph where the course of the Roman road that ran around the nearby quarry fronts can be discerned

allow both the evacuation of the blocks already extracted and ready, to the place of positioning or processing, and also, but inversely, the repair and replacement of materials and tools that the main extraction workers needed[13].

The great transformation undergone in the closest surroundings to where the extractive fronts were located, on the sickle of the Zahorras River, during the aforementioned works to improve the course of the CM-2100 road, was very intense, for it included the use of blasting with explosives at certain points. This circumstance largely altered the original landscape of the area of the quarries exploitation, even deflecting the original course of the Zahorras River, eliminating totally or partially some of the quarry fronts that were closest to the bottom of the sickle, where, in all probability, there could have been a road that, in addition to circulating the extracted stone building material, connected this area to the urban centre of *Valeria*, the principal place of reception of much of the extracted material[14].

In any case, the presence of a road a few hundred meters from the area where the main extractive fronts were located, as well as the remains of a Roman bridge near the junction of the rivers (the Zahorras, to the west; the Gritos, at the east) suggest the existence of at least one branch line that would have rendered service to the quarrying area, although modern reforms, the continuing erosion and deposition of sediment at the bottom of the valley have hidden its presence (Figs. 8 and 9).

The lack of comparable archaeological data makes it difficult to determine at what point the exploitation of the rocky extractive fronts stopped. The fact that some of them have retained some blocks that were in an advanced stage of extraction could point in the direction of a sudden, fortuitous and relatively rapid interruption in the production of stone building, although at present it is impossible to specify any details about the cause for such discontinuance of the exploitation of the quarries.

For decades, archaeological excavations in the surroundings of the forum have enabled the excavation of practically all this urban area and understanding of some details of its architectural evolution throughout the earliest centuries AD. Thus, from the second half of the fourth century, the abandonment of some of the most important buildings in this area as well as the transformation and renovation of others is documented.[15]. These circumstances, traceable in other towns and urban centres of the same period located at the nearby environment of *Valeria*, put into circulation huge quantities of building materials for re-use in new buildings, which could have caused a significant decline in the demand for new stone material, and therefore, a decline in productive activity carried out in quarries.

13 In the relatively near Roman city of *Segobriga* (Saelices, Cuenca) the roadway runs exactly between the extraction fronts opened on both sides. ATIENZA 2009, 126-127.

14 On the background of the current bed of the Zahorras River, at certain points and when the flow rate is low, parallel grooves that could belong to the ruts of the carts that were passing through this area can be observed.

15 The basilica annexed to the *forum*, for example, was being dismantled at that time and some of its construction elements were found stored and ready for reuse in other buildings. FUENTES DOMÍNGUEZ 2006, 205-206.

In connection with the re-use of building material, in one of the lower rooms of the eastern cryptoporticus of the *Nymphaeum,* a deposit of architectural elements was found which consisted, among other pieces, of several bases and column shafts, which according to the archaeological evidence found at the time of its discovery and excavation, with the appearance of tools associated to stonecutting work, might have been processed for subsequent reuse[16].

Conclusions

The extraction area of stone material, used in both decoration and construction, is concentrated exclusively along both sides of the sickle of the Zahorras River, with no trace of extractive activity in any other area around the town of *Valeria*.

A clear differentiation is observed regarding the dimensions and degree of exploitation of the different extractive fronts located; so, while the fronts located on the western slope of the sickle are all of reduced dimensions, the main extraction front located on the eastern slope appears to have significantly greater dimensions and complexity.

The extractive fronts would have produced blocks with cubic and cylindrical shapes, their surfaces being firstly basically roughly shaped. After extraction, these blocks thus formed would be moved to a nearby area, but different from the place of extraction, where they would receive a more refined treatment on their surfaces.

The existence of an easy, quick and efficient method of removal of the blocks may have determined the location of the extraction area and, therefore, the opening of the exploitation fronts.

This circumstance is particularly evident in the case of *Valeria*, where extractive fronts were not opened in areas of difficult access even though the material capable of being exploited, was plentiful and had optimal constructive qualities.

The absence of systematic archaeological excavations in the area studied does not allow definitive conclusionsto be drawn. This is particularly relevant in the area surrounding the main extraction front of the northern slope of the Zahorras River. Here, although practically buried in alluvial deposits and covered by vegetation, it has been possible to locate, identify and document the latent prints of new extractive fronts in a site that seems to have been configured as a broad platform of extraction.

16 OSUNA, SUAY, FERNÁNDEZ, GARZÓN, VALIENTE, RODRÍGUEZ COLMENERO 1978, 43-53.

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