Remarks on the Guideline Markings for Working and Placing the Marble Elements in the Area of the Tarraco Provincial Forum (Hispania Citerior)

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The aim of this paper is to present some of the marble objects, fragments of marble architectural decoration and marble mortars from Tarraco (Tarragona, Spain) on which we can observe carving lines associated with their working and positioning. The majority of these pieces come from the so-called "upper part" of the ancient capital of Hispania Citerior, which in Roman times was occupied by the Provincial Forum.

This group of marble artefacts preserves characteristics that can be linked to different stages in their production. Among the fragments of architectural decoration are some that preserve the guideline markings for shaping the piece. There are also partially-worked scale models used to transmit knowledge from the foreman to the skilled craftsmen, highlighting an interesting aspect of the work in ancient workshops, the transfer of know-how.

Scholars have rarely shown much interest in mortars, mainly because they are easy to make and their simple shape has not changed over the centuries. However, the mortars from Tarraco represent a significant component in our understanding of how they were made.

We will focus on the manufacturing process of certain types of ancient products, as well as on the production of marble artefacts by workshops directly connected to the construction site of the Tarraco Provincial Forum during the imperial period.

Introduction

In this contribution we give a brief presentation of the partial results of an ongoing project aimed at studying and understanding the quarry marks and carving lines of the *Provincia Hispania Citerior*[1] in Roman times.

We will present some of the carving lines used for working and positioning that have been observed on different fragments of marble from Tarraco's Provincial Forum, as well as on everyday objects, such as marble mortars. They are evidence of their widespread use in antiquity to sketch out guidelines for carving marble artefacts.[2]

The marble fragments are conserved in the exhibition and storage rooms of the National Archaeological Museum of Tarragona (MNAT). The architectural elements come from the upper part of the town, the area occupied by the Provincial Forum in Roman times. Most were discovered during the archaeological excavations carried

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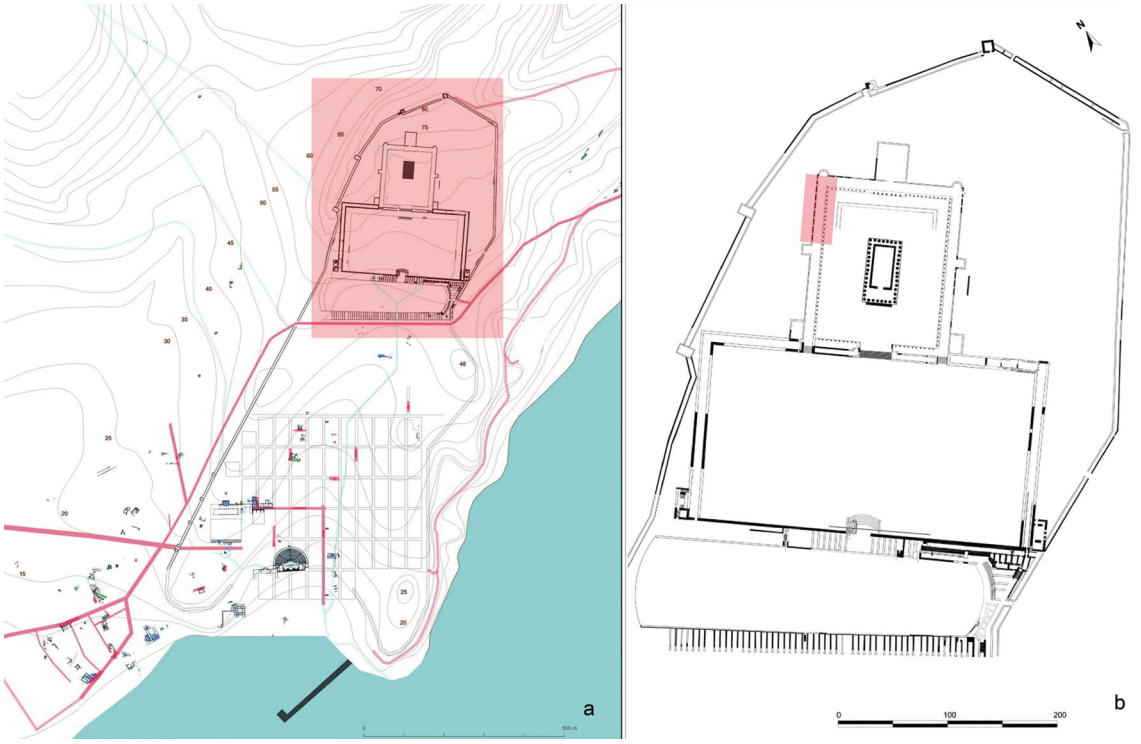

Fig. 1: Tarraco, town plan at the end of the 1st cent. AD; b. plan of the Provincial Forum.

out in the north-western sector of the Cathedral cloister[3] and were part of the ancient Roman monumental complex. Other items came from uncertain contexts, although they are from the upper part of the town.[4]

Carving Lines on Fragments of Architectural Decoration

Guidelines on stone materials represent a graphic and geometric manifestation of the planning and execution phases of Tarraco's monumental complex.

The majority of the fragments come from the western sector of the worship area (fig. 1). However, it is impossible to ascertain exact chronological data from the excavation documentation, as the fragments are generally associated with backfill linked to the construction of the Roman building or immediately after it.

For space reasons, we will only present two of the eleven artefacts found, although they are the most interesting ones.

A completely smooth slab fragment (fig. 2) of bluish Luni marble, probably *bardiglio di Luni*, bears very interesting carving lines consisting of three concentric circles and three radial straight lines generated by the centre (no longer preserved) of the

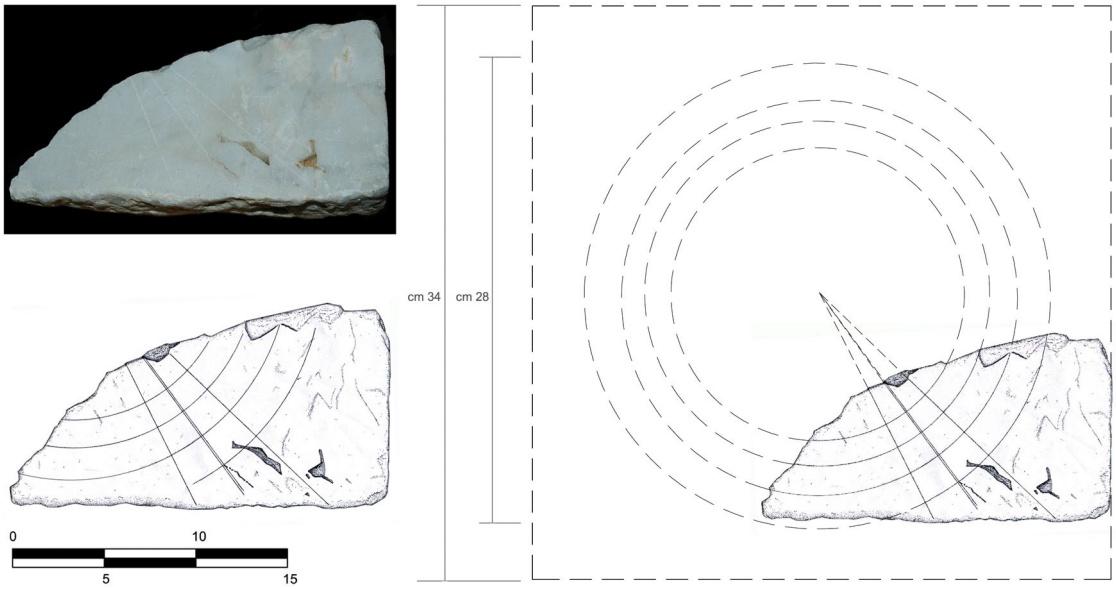

Fig. 2: Tarragona, MNAT, slab fragment with carving lines probably for the realisation of a cylindrical element: detail of the piece, drawing and reconstruction of the original dimension of the carved planning on the slab.

circumferences. Unfortunately, only a quarter of the carving lines are preserved on the fragment; however it can be completely reconstructed and probably represents the plan for the construction of a cylindrical element, a base, capital or column. We cannot rule out that it is the two-dimensional representation of the proportions of a cylindrical element or even a column, in which the radial straight lines could represent the study for a fluted column.

There are many possible parallels; for example, the carving lines in the Temple of Apollo at Dydima, Turkey (4th century BC), where the plan of the temple and its naiskos is engraved in 1:1 scale. In particular, it is possible to appreciate the study for making the columns, including a horizontal section with radial divisions for the fluting process.[5] An example in which the incisions were made directly on the piece to be worked can be found in the temple of Claudio Marcelo Street in Cordoba (Spain), where concentric circles are engraved on the lower surface of a semi-finished column shaft, as well as radial lines for the fluting.[6]

The thinness of the Tarragona slab may be a clue for interpreting the incisions as a small-scale or full-scale plan, rather than guidelines for carving the piece.

A separate discussion and a certain emphasis is merited by a semi-finished cornice with particularly interesting carving lines (fig. 3a–b).

This piece serves to highlight the technical knowledge of artisans who, with great experience, shaped the marble. In fact, beyond the material execution, there

Fig. 3: Tarragona, MNAT, semi-finished cornice with highlighted carving lines on the front and on the left side.

is another aspect that must be considered in the workshops of the *marmorarii*, although it is not tangible and is often difficult for us to reconstruct: the transfer of expertise or know-how.

Before being worked, the artefacts would have needed a preliminary plan and, in some cases, a partial or full-scale reproduction that would allow and facilitate the precise execution of the original idea and was used by the craftsmen to reproduce the measurements and stylistic and decorative features of a specific monument.

As is well known, carving lines representing a scale reproduction can also refer to entire architectural elements. These representations allowed the master builder to show the executive processes and to create a model to be reproduced by the builders.

The piece is a block of fine-grained white marble with a triangular prism shape and a series of incisions on the front and on one of its sides referring to the planning and processing phase of the decorated fragment (fig. 3–4).

On the front surface, the process for shaping the piece is clearly visible: on the right side are the outlines of the mouldings of a cornice consisting of a *cyma reversa* (unfortunately partly chipped), an astragal, an *ovolo*, an astragal and a *cyma recta*; on the left flat side there is a series of engraved lines used for carving the mouldings.

This is a particularly relevant fragment as it summarises the planning and execution process on the same piece: the former is directly outlined through a series of straight lines and compass lines that project the dimensions of each part of the

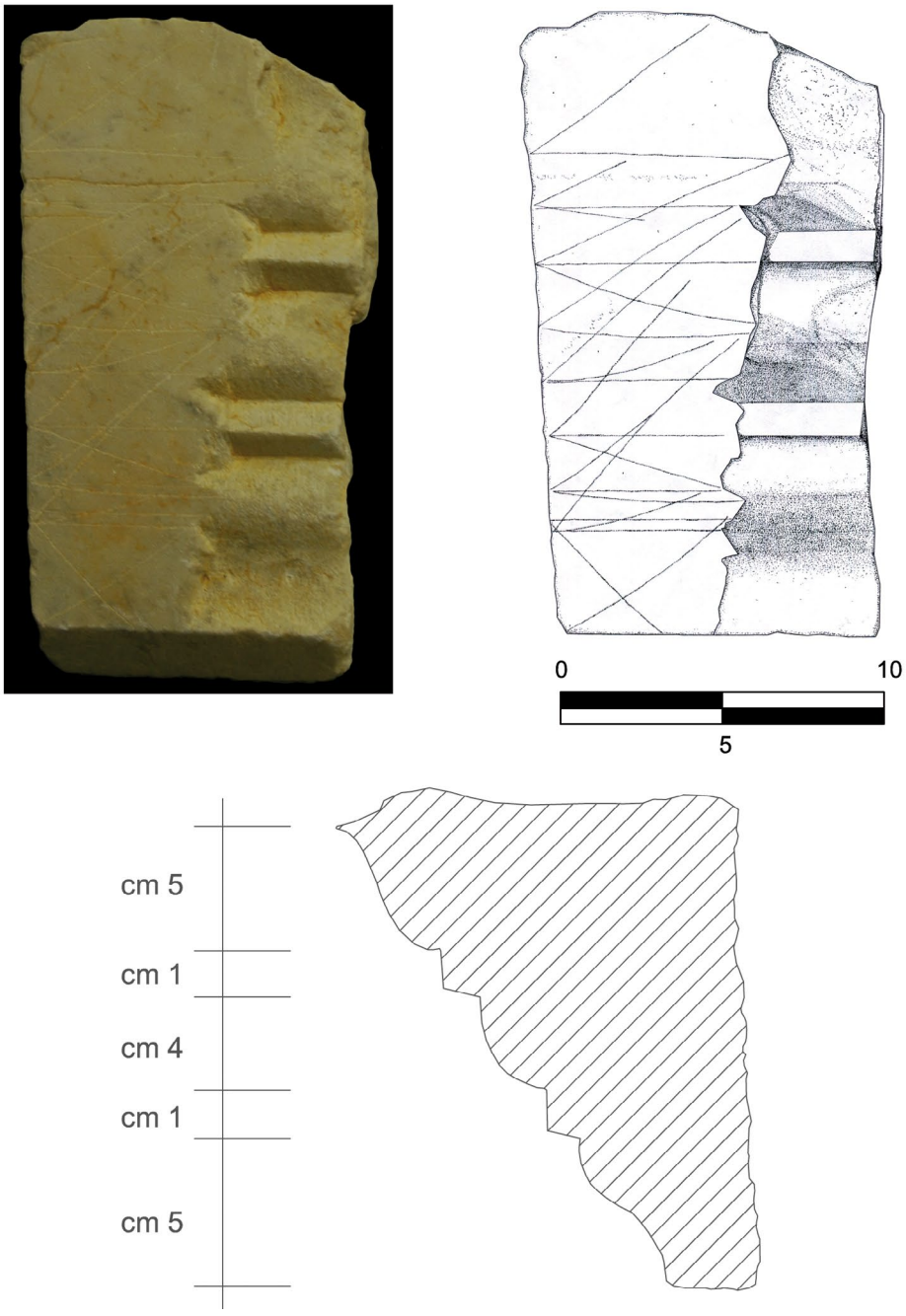

Fig. 4: Tarragona, MNAT, front side, drawing and section of the cornice.

moulding and the latter is the shaping of the mouldings, which is still in progress.

The design intention of the craftsman who worked the piece is evident. On one side (fig. 3), on a completely flat surface, there is an engraving of the section of the moulding with the concave profile of the *cyma recta* and *reversa* and a series

of small steps whose lines are projected onto the front of the piece (fig. 4). The steps would have corresponded to the projection of astragals and *ovuli*, the latter probably outlined firstly as steps with a rectangular section and then rounded to take on a convex profile.[7] A possible interpretation is that the guidelines of the moulded profile were drawn on one side of the marble piece and were then moved to the front to begin the shaping process. To complete the design, on the front of the fragment, a series of straight and curved lines are exact projections of the sides of the astragals, as well as the start and end points and the centre of the convex profile of the moulding.

This design plan, outlined with absolute precision with geometrically determined dimensions, was used to guide the stonemason as to the depth he had to reach in carving the marble.

The complex working process was perhaps dictated by the rigid proportional principles imposed by the choice of an architectural order, which required of the craftsman a considerable expertise and knowledge of the rules of plane geometry.

Due to the small size and the peculiar coexistence of the various phases of the working process, it is not risky to propose that the piece was something more than a simple unfinished product. Perhaps it was a useful working tool, a kind of example/model made by master builders or skilled workers and used to transfer the design idea of the cornice to the labourers, who had to reproduce the piece in a repetitive and standardised way.

In this regard, it has been observed that another cornice fragment from the same excavation context found in association with the Roman structures of the Provincial Forum presents the same sequence of mouldings and similar dimensions.

Guideline Markings on Marble Mortars

In Roman times different materials were used to make mortars: stone, terracotta, metal and wood. The stone or marble mortar was common in the Roman world, mainly as an object of daily use.[8]

The mortars found in Tarraco are of exceptional interest due to the lines engraved on almost all the examples that outline their geometry and above all their manufacturing stages. Many of them are unfinished and therefore show the close relationship between the two-dimensional geometric carving instructions and the shaping of the three-dimensional parts of the object.

In particular, three of the examples (fig. 5) in fine-grained white marble show us the procedure with which they were produced. It is precisely for this reason that it is important to reaffirm that it is an element of absolute importance that, thanks to the fragments found, allows us to reconstruct how the different working phases succeeded each other.

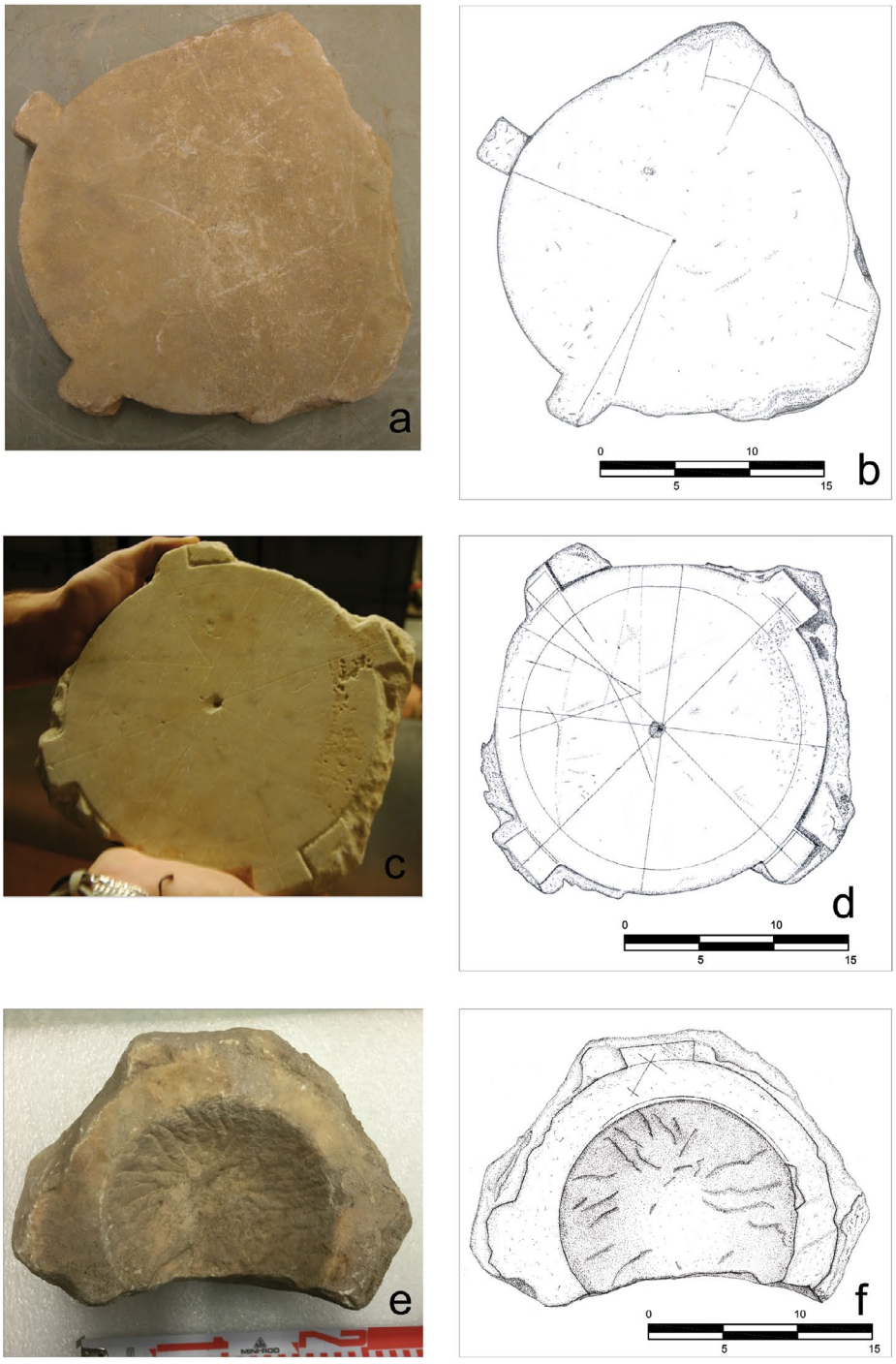

Fig. 5: Tarragona, MNAT, semi-finished mortars: a–b. detail of the top surface and drawing with carving lines in evidence; c–d. detail of the upper part of the piece and drawing with highlighted carving lines; e–f., detail of the upper part of the piece and drawing with highlighted carving lines.

One of the three artefacts definitely comes from the excavation of the northern area of the western portico of the Provincial Forum upper terrace (fig. 5a–b). Unfortunately, the other two lack precise information concerning the context in which they were found, although again they can be linked to the upper part of the town (fig. 5c–d and fig. 5e–f).

The first element examined (fig. 5a–b) is semi-finished on one side and presents some incisions that can be traced back to the first phases of the manufacturing process, when the marble block was only rough-hewn. The mortar has an almost circular shape with two handles; they have a rectangular section that protrudes horizontally from the edge. Both faces of the artefact are smooth. On half of the piece, both the circumference and the two handles are well defined, while the other half is still only rough-hewn and work has not even begun on the other two handles.

On one of the two surfaces there are incisions that can be identified as lines that intersect each other in the centre of the artefact, as well as a semi-circumference.

It is difficult to interpret the marks in this phase: the circumference, visible on the rough-hewn part, marks the edge of the piece that, in this section, has still to be worked. On the other hand, some of the lines seem to mark the edges of the mortar handles. A possible comparison, in which the artefact would have been designed with lines marking the sides of the handles, is a marble element from the area of the "Grande Tempio" at Luni. The piece has not been identified as a mortar, but only as a marble object. However, it could be interpreted as a semi-finished mortar on which the design phase of its manufacture has been marked out.

Of great interest is the second element (fig. 5c–d) that, in addition to being semi-finished, bears a series of engravings that are clearly visible and better defined than on the aforementioned piece and refer to the design phase of the object.

It is a marble object with an almost circular shape from which four elements with a rectangular section emerge, equidistant from each other and corresponding to the side handles of the mortar.

One of the two faces is only rough-hewn, while the other is perfectly smooth. On the latter there is a series of carving lines: two concentric circumferences, four straight lines that intersect in the middle and, affecting the artefact on its whole diameter, divide it into eight equal parts. Finally, on part of it there are another two lines that come together to form an acute angle.

It could be hypothesised that at least two of the straight perpendicular lines were drawn in order to create, starting from their point of intersection, the two concentric circumferences useful to delineate the edge of the mortar. It should be noted that the centre from which the circumferences are drawn with the compass is well defined.

The straight incisions pass exactly through the centre of the mortar handles and could have been used to define their specific position and size within the planning drawing on the marble element. This choice of carving line diverges from that found on the previous piece, where the lines defined the sides of the handles.

The object appears to be unfinished, as can be seen from the edges of the circumference, that are not yet perfectly chiselled in all their parts, and above all from the handles of the artefact, the shape of which is drawn, but do not protrude from the rough-hewn mass of the marble.

Finally, the third specimen (fig. 3e–f) shows a further processing phase, which does not represent the next step with respect to the pieces previously analysed, but is extremely interesting as it highlights a different process for making the artefact.

There are still few traces of an initial design phase of part of the rim inner edge, indicating that the cavity still had to be enlarged, and intersecting lines next to one of the two handles, which are difficult to interpret.

It is noteworthy that in this case, unlike the other pieces, the execution phase began with the hollowing out of the inside of the basin, while the whole exterior of the piece is still completely irregular.

Beginning to emerge from the shapeless mass of marble are the rim and at least two of the handles, which seem to have a trapezoidal profile. One of these still has very irregular contours, while the shape of the other is already defined and the surplus material remains to be completely removed.

The distinct process of execution is probably due to the fact that this mortar is a variant on the others previously described. In fact, it has a hemispherical cap like the others, but with a deeper basin.

Conclusions

The elements taken into consideration in these pages represent a first step for analysing some of the aspects linked to the construction of a large public monument. In fact, the carving lines pertinent to the Provincial Forum of Tarragona have particular relevance for collecting data useful for understanding the working and organisational processes for making marble artefacts.

In a context such as the Tarraco Provincial Forum construction site, the examples presented, which are only a small part of those found,[9] highlight the presence of highly specialised professional craftsmen with the solid notions of geometry necessary to model the raw marble with absolute precision.

This is what emerges, for example, from the semi-finished cornice (fig. 3–4) on which the coexistence of the design of the mouldings with the execution phase of those still in progress allows us to reconstruct the entire working process. This process begins by recording on the piece the actual measurements of each individual element to be carved. It has been hypothesised that this cornice could also have been a kind of model-example made by the master builders for the labourers who had the job of making the pieces while respecting the rigid proportions imposed by

Fig. 6: Luni, engraving with the representation of mortars production in a stone quarry.

the choice of a specific architectural style. This highlights another aspect of marble production and standardisation in the construction of architectural elements.

Likewise, the carving lines for the design phase found on the wall slabs, on which the incisions are guidelines for modelling curved and convex elements, as well as the use of the compass and a series of radial straight lines (fig. 2), show, on one of the fragments examined, the drawing for carving a cylindrical element, possibly a base or a column.

Also important are the traces found on marble mortars, not only for defining their production characteristics, but also because the mortars were simple elements produced both in quarries and workshops, where they were also used to test the skills of apprentice labourers (fig. 6).

The importance of the elements considered here is what the carving lines tell us about the different stages of the working processes. Moreover, these artefacts are the first confirmation that Roman marble mortars were made in Tarragona. The context of the finds and the imported materials used to make most of them limits, in our opinion, the production to a specific period in the urban economy of the capital of the province of Hispania Citerior: the construction of the Provincial Forum. It does not seem risky, therefore, to hypothesise that the production and intended use of the artefacts is strictly connected to this particular moment in the life of the town.

In conclusion, the study and preferred interpretation of the so-called carving lines open up new perspectives for understanding the different stages, from the planning to the production of marble elements. They not only show us traces of the processing phase, but also give us real clues that in some cases allow us to reconstruct the whole execution process of marble artefacts, from the planning to the making.

Notes

[1] This contribution is part of a wider study on Carving Instructions in Hispania. The study is also part of a financed project: I+D (HAR2015-65319-P) "*Officinae Lapidariae Tarraconenses*. Canteras, talleres y producciones artísticas en piedra de la Provincia Tarraconensis", directed by Prof. Diana Gorostidi.

[2] For a wider presentation of the evidence discussed in this paper, with state of the art and deepened bibliographical section, see: Ottati – Vinci 2016; Vinci – Ottati 2017.

[3] Menchon et al. 2004.

[4] Vinci – Ottati 2017 with bibl.

[5] Haselberger 1980; 1983a, 1983b, 1983c; 1986a, 1986b; 1994; 1995; 1997.

[6] Gutiérrez Deza 2005: 121–124 cat. N. TR068.

[7] A summary about the process for manifacturing a cornice see: Rockwell 1989, 89.

[8] According to A. Caffini (2009), an ornamental function for these objects cannot be excluded a priori (e.g. small basins or drinking troughs for birds placed in the gardens). However, it is difficult to determine exactly which kind of substance each type of mortar was used for. From Pliny it is possible to deduce only some indications and suggestions regarding the use of materials according to the substances that had to be ground. For example, the use of compact stone is recommended for the production of colouring powders and medicaments, to avoid the alteration of the shredded substance due to the mixing of any residues with the inner walls of the mortar.

[9] For a wider presentation with bibliography: Vinci – Ottati 2017.

Image Credits

Fig. 1a: Macias et al. 2007, fig. 19. – Fig. 1b: Macias et al. 2007, fig. 19 re-elaborated version by M. S. Vinci. – Fig. 2–5: photos and drawings by authors. – Fig. 6: photo by S. Salvioni.

References

Gutiérrez Deza 2005

M. I. Gutiérrez Deza, Líneas guía para la elaboración de los elementos arquitectónicos en el Templo de Culto Imperial de la Provincia Baetica, Romula 4, 2005, 115–136.

Caffini 2009

A. Caffini, Appendice: elementi di arredo. I bacili/mortai, F. Slavazzi – M. Volonté (eds.), Sculture, materiali architettonici e di arredo delle raccolte archeologiche di Cremona (Corpus Signo¬rum Imperii Romani, Italia, Regio X, Cremona) (Mila¬no 2009) 195–215.

Haselberger 1980

L. Haselberger, Werkzeichnungen am Jüngeren Didymeion, IstMitt 30, 1980, 191–215.

Haselberger 1983a

L. Haselberger, Bericht über die Arbeit am Jüngeren Apollontempels von Didyma, IstMitt 33, 1983, 90–123.

Haselberger 1983b

L. Haselberger, Die Bauzeichnungen des Apollontempels von Didyma, Architettura 13, 1983, 13–26.

Haselberger 1983c

L. Haselberger, Die Werkzeichnung des Naiskos im Apollontempel von Didyma, in: W. Hoepfner (ed.), Bauplanung und Bautheorie der Antike. DiskAB 4 (Berlin 1983) 111–119.

Haselberger 1986a

L. Haselberger, I progetti di costruzione per il Tempio di Apollo a Didime, Le scienze 210, 1986, 96–106.

Haselberger 1986b

L. Haselberger, Planos del templo de Apolo en Dídyma, De Investigación y Ciencia 113, 1986, 94–103.

Haselberger 1994

L. Haselberger, Ein Giebelriss der Vorhalle des Pantheon. Die Werkrisse vor dem Augustus-Mausoleum, RM 101, 1994, 279–308.

Haselberger 1995

L. Haselberger, Un progetto architettonico di 2000 anni fa, Le scienze 324, 1995, 56–61.

Haselberger 1997

L. Haselberger, Architectural likenesses: models and plans of architecture in classical antiquity, JRA 10, 1997, 77–94.

Menchon et al. 2004

J. J. Menchon – A. Muñoz – I. Teixell, Pla Director de la Catedral de Tarragona. Memòria dels treballs arqueològics duts a terme a les Cases dels Canonges anys 2000–2003, excavation report (Tarragona 2004).

Ottati – Vinci 2016

A. Ottati – M. S. Vinci, Algunas observaciones sobre una producción de morteros a Tarragona en época imperial, Zephyrus LXXVIII, 2016, 151–172.

Rockwell 1989

P. Rockwell, Lavorare la pietra. Manuale per l'archeologo, lo storico dell'arte e il restauratore (Roma 1989).

Vinci – Ottati 2017

M. S. Vinci – A. Ottati, Dal progetto alla realizzazione: alcune osservazioni sui tracciati di posizionamento e di lavorazione dall'area del Foro Provinciale di Tarraco, in: P. Pensabene – F. Caprioli – M. Milella (eds.), Decor – Decorazione e architettura nel mondo romano, Atti del Convegno Roma, 21–24 maggio 2014 (Roma 2017) 717–733.