

VIRTUAL RECREATION AS A VALID SCIENTIFIC REPRESENTATION FOR RAISING PUBLIC AWARENESS

1. INTRODUCTION

Virtual Archaeology as a scientific discipline, although more than 10 years old, is still developing its theoretical corpus. Its joint parallel, or continuous development with what at the end of the 20th century and during the first decade of the 21st century was called ‘Digital Archaeology’, has meant, in our opinion, a difficult barrier to overcome (STAROPOLI *et al.* 2023). Thanks to the development of different international charters or treaties about the virtualisation of Heritage and Virtual Archaeology, the bases on which the specific rules are established in the field of research, documentation and conservation of historical and archaeological heritage are established. The Seville Principles - International Principles of Virtual Archaeology, ratified at the 19th General Assembly of ICOMOS in New Delhi in December 2017 (ICOMOS 2017), compile and materialise all the regulations necessary for the correct and optimal development of the discipline, and are currently in full development and methodological ebullition in terms of the practical application of this discipline in specific and cases of study.

This charter encourages a common workflow, a multidisciplinary method of intervention from the collective, trying to overcome the widespread professional individualism of the sector. This factor has been boosted by the emergence of collective open-access platforms, which have developed interesting tools through which to apply the postulates of Virtual Archaeology¹. From this theoretical approach, we decided to carry out a virtual recreation project of the Roman city of Épora (Montoro, Córdoba, Spain) (Fig. 1a), to observe the strengths and weaknesses of the discipline in terms of the development of this type of recreation work.

The city of Épora is located on the border between the Sierra Morena and the Cordovan countryside, in a strategic location that is key to understanding the ongoing occupation of the area (BAQUEDANO BELTRÁN 1987). The oldest archaeologically dated remains correspond to a series of finds of Mycenaean pottery from the excavations carried out in the ‘Llanete de los Moros’ (MARTÍN DE LA CRUZ 1979) (Fig. 1b). Dating from around the 12th

¹ We would like to highlight the communities developing open access tools such as the Extended Matrix (DEMETRESCU, FERDANI 2021), BIM (GALEANO *et al.* 2024), pyArchInit (<https://plugins.qgis.org/plugins/pyarchinit/>), as well as new initiatives developed from other postulates, such as IDOVIR (WACKER *et al.* 2023).



Fig. 1 – a) Location of the city of Montoro; b) location of the city in the meander of the River Guadalquivir (1. Cerro de Palomarejo, 2. Llanete de los Moros).

century BCE, this Late Bronze Age occupation is the foundation of the later Roman city of Épora, which we know from its material, constructional and literary remains (MARTÍN DE LA CRUZ 1987). Most of the remains of the Roman city (from 206 BCE onwards) and of the previous indigenous settlement are located in the Cerro del Palomarejo (Fig. 1b).

Historical and archaeological information on the Roman occupation of this area is scarce. Today we know of the importance of this site mainly from two sources. The casual findings of relevant elements such as Thoracata military sculptures, large capitals and architectural elements, abundant ceramic remains and building materials (RODRÍGUEZ NEILA 1990; ORTIZ GARCÍA 2013). On the other hand, the classical sources present Épora as a city of great prestige within the Roman province of Baetica. These include Épora, together with Gades and other cities in the S of the Iberian Peninsula, in the *foedus* signed with the Roman Republic, by which they became confederate cities during the second Roman-Carthaginian war, around 206 BCE (RODRÍGUEZ NEILA 1990).

This lack of information, beyond the general knowledge of Roman cities founded on previous settlements (GROS, TORELLI 1988; ORTEGA ANDRADE 1995; ADAM 1996; MARTÍN ESCORZA 2008; MÁRQUEZ MORENO 2019; FERNÁNDEZ OCHOA, MORILLO 2022) or specific knowledge of the remains of this period found in the municipality (MARTÍN DE LA CRUZ 1979, 1987; IBÁÑEZ CASTRO 1990; MELCHOR GIL 1991; LARA LÓPEZ 2019), has been the main basis for the development of this work of virtual recreation.

In addition to testing the tools and protocols of Virtual Archaeology for their implementation in virtual recreations, this study aims to disseminate

the potential for tourism and cultural development in the municipality to specialists in the field and the general public, emphasising the importance and need for the protection and enhancement of Heritage elements for the advancement of research into Romanised indigenous settlements in Baetica and research in the Roman city of Épora itself.

2. STATE OF THE ART

According to the Seville Principles, virtual reconstruction is understood as: «The attempt at visual recovery from a virtual model, at a given point in time of a human-made construction or object from the past based on existing physical evidence of that construction or object, scientifically reasonable comparative inferences and in general all studies carried out by archaeologists and other experts linked to archaeological heritage and historical science» (ICOMOS 2017).

On the other hand, virtual recreation is defined as: «The attempt at visual recovery, from a virtual model, of the past at a given time of an archaeological site, including material culture (movable and immovable heritage), environment, landscape, uses and in generating cultural significance» (ICOMOS 2017). In current research applying the discipline of Virtual Archaeology, the main work carried out focuses on the virtual reconstruction of spaces and constructive elements. This virtual reconstruction constitutes a graphic representation of the different reconstructive hypotheses put forward by the virtualisation specialists and/or archaeologists responsible for the fieldwork. The scientific traceability of these studies is correctly and efficiently materialised using semantic tools and protocols such as the Extended Matrix (DEMETRESCU 2015; DEMETRESCU, FANINI 2017; DEMETRESCU, FERDANI 2021). However, these protocols are specially designed for insertion within specific virtual reconstruction workflows.

Virtual recreation, on the other hand, although is also scientifically validated using the parameters established for this purpose, does not have a tangible archaeological materiality and therefore apparently lacks scientific accuracy. The insertion or representation of elements that have not been archaeologically verified *in situ*, however, should not be underestimated in our opinion. This is the case, for example, of the insertion of different constructive elements such as houses or modular domestic spaces from the Roman period, as well as the use of daily objects found in Roman Hispania (common pottery, Terra Sigillata type pottery, lamps, etc.). Furthermore, the recreation of urban spaces, as well as the inclusion of humanising elements in the virtual works, should not be understood from idyllic or romanticised positions, but as a human contextualisation of the spaces, in clear connection with the improvement of the communication and dissemination of these projects. These

elements, developed with good judgement, establishing parallels, reliable historical-archaeological sources, etc., can be and are a very positive point in virtual recreation works.

The methodology that we have carried out is based on the postulates of Virtual Archaeology. Thanks to the implementation of this discipline in the processes of historical-archaeological research and analysis, we can carry out virtual reconstructions and recreations with a high level of scientific reliability. The predominant tool for data collection, as mentioned previously, is the Extended Matrix. Using this tool, we can compile all the historical information on the settlement, as well as all the primary or secondary archaeological sources that we find in relation to the settlement. All this compilation of data allows us to capture the different characteristics that this settlement would have had. This approach would not only be carried out in a specific approach based on the material and constructive findings available to us, but also includes general aspects that fill in the gaps that the lack of systematic research in the municipality has led to. This general information on settlements from this historical period and the influence of the preceding cultural background, despite not having been archaeologically confirmed, can be appreciated in other settlements of similar nature.

3. CASE STUDY

To carry out our case study, the virtual recreation of the Roman city of Épora, we first need to know the specific archaeological evidence of the settlement. The archaeologically dated remains from the Roman period are mainly based on the appearance of abundant ceramic remains from that period, scattered on the surface around the promontory of the ‘Llanete de los Moros – Cerro de Palomarejo’, which at the time must have been topographically unified (SICRE-GONZÁLEZ 2023). The summary and the existing problems regarding the definition and study of these archaeological remains can be seen in the development of previous works (ORTIZ GARCÍA 2022), although it is worth mentioning that, given the magnitude of the documented remains, the city must have been established as a first-rate municipality during the first moments of Roman rule in the Iberian Peninsula. This fact is also confirmed by the passage of the Via Augusta through the surroundings of the settlement (MELCHOR GIL 1991).

In addition to the importance of the archaeological remains, the significance of the Roman city is explicitly stated in the literary sources. These sources confirm the relevance of the Roman city, as well as the historical importance of the remains made during the discoveries made in the 18th and 19th centuries (VICENT ZARAGOZA 1977; MARCOS POUS 1978). All this specific information on the settlement, although it does not present an excavated

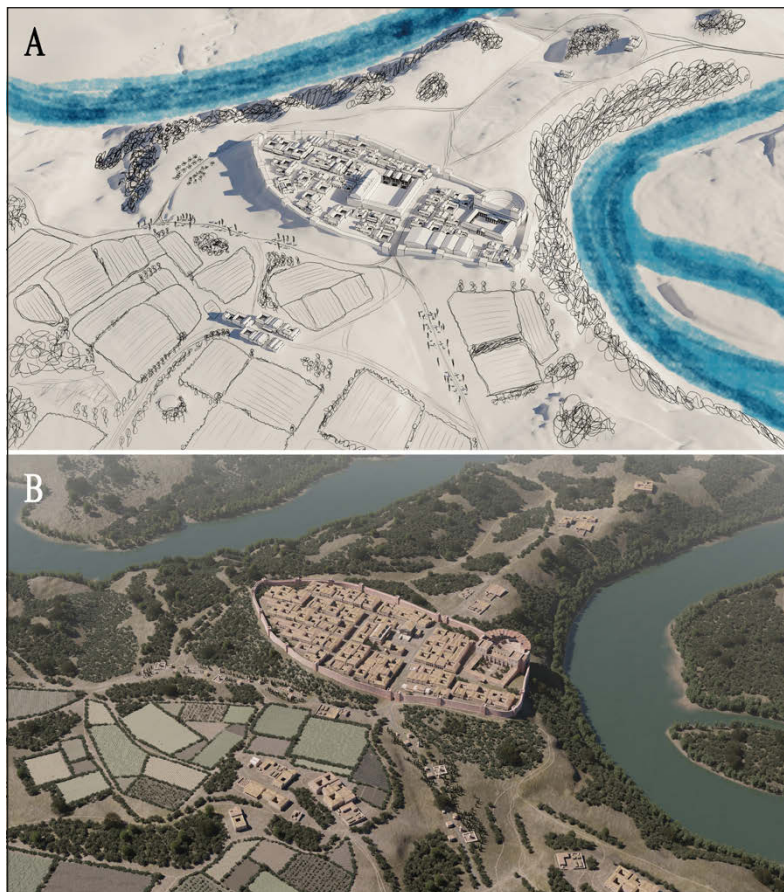


Fig. 2 – a) Sketch of the virtual recreation; b) final result of the virtual recreation.

and documented Roman city on the surface, presents a series of elements that make this Roman settlement be catalogued as a first-rate urban entity. Taking all these data into account, reconstructive hypotheses can be made based on contrasted data that suggest different possibilities regarding the urban configuration of the settlement.

Firstly, the main nucleus of the city must have been located on the promontory, and from the importance reflected in the sources it must have been of considerable size. Being located along the route of the Via Augusta, this city must have had a series of public buildings and public supply structures characteristic of the Roman period. However, the settlement as well as these new buildings built as part of a Romanisation programme are located and

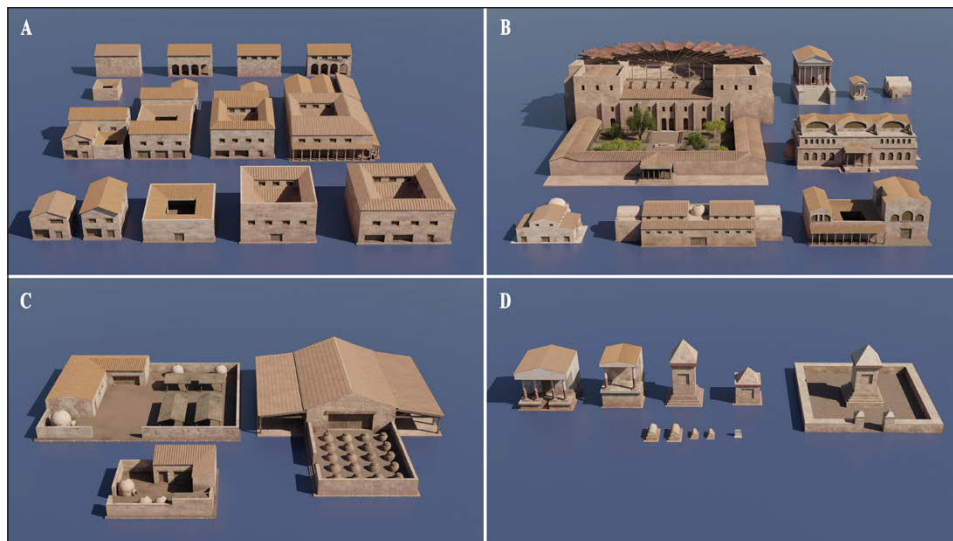


Fig. 3 – Virtual reconstruction of structures from the Roman period: a) residences and domestic spaces; b) public buildings; c) production spaces; d) funerary structures.

in an existing settlement. Although we do not know if the existing structures were demolished to build a new settlement, considering the historical considerations of the process of the city's accession to the Roman orbit, as well as the natural evolution of this type of city with an autochthonous tradition, we consider that a mixed pattern must have been established. This model would respect certain previous structures, but gradually tend towards an urban and spatial organisation of the settlement under the guidelines of the new political elite. Many other assumptions have emerged from this hypothesis, such as the existence of an ordered and structured defensive system, taking into account its direct historical link with the second Roman-Carthaginian war; the more than possible existence of public buildings (theatre, temples, basilicas, public squares, etc.); the configuration of a funerary space at the gates of the city and around its main access points; as well as elements existing in this type of rural settlement and their direct relationship with the economic exploitation of the surrounding territory (villas, farmhouses, mills, etc.).

All this evidence, although not archaeologically confirmed in the settlement, can be inferred from the study of this type of site in the historical-archaeological context in which it developed. For this reason, we assume them as our own in the absence of archaeological data on the Roman city of Épora, to use them as a guide in the virtual recreation that is the subject of this study. The virtual recreation work began with the general planning of the



Fig. 4 – Different views of the results of the virtual recreation of the Roman city of Épora (Montoro, Spain).

space and the internal structuring of the settlement using a sketch in which the hypotheses of the recreation were first set out (Fig. 2a), which later, with the relevant modifications, concluded with the final model (Fig. 2b).

During the development of this sketch, work began on modelling the structures and buildings that were to form part of the recreation, always basing ourselves on existing examples and archaeologically confirmed constructions in other regions of Roman Hispania. These buildings range from domestic spaces and residences (Fig. 3a) to public buildings, temples, baths, cisterns, and roads (Fig. 3b), as well as buildings related to productive spaces (Fig. 3c) and collective and individual funerary structures (Fig. 3d). All these structures, although not archaeologically confirmed in the city of Épora, by direct comparison and inferred from the study of other settlements with similar characteristics, offer a wide range of possibilities in the configuration of virtual recreation.

4. CONCLUSIONS AND DISCUSSION

The development of this virtual recreation has led to interesting conclusions. The first of these concerns the scientific traceability of this work which, although it does not provide a high level of historical-archaeological evidence allows and enables us to understand the essential characteristics of

a culturally Ibero-Roman city. We understand that the different hypotheses put forward in the recreation do not adjust to the more than possible different archaeological reality of the settlement, but they do allow us to understand the capacities and potential of the territory. Even taking all this into account, it is necessary to transmit to any user and consumer of this virtual content that the hypotheses on which this study is based and structured are clear, reliable, and historically contrasted comparatively with other urban spaces of the same chronology and cultural tradition. To this end, we developed an infographic to show the different realities reflected in the virtual recreation, adjusted as far as possible to the archaeological data currently available to us (Fig. 4).

On the other hand, we have seen how the tools and protocols of Virtual Archaeology, in this case, the Extended Matrix, although they allow us to capture the broad outlines of the reconstructive hypotheses originating in the virtual recreation, we consider that there is a certain margin for improvement. Perhaps specific tools could be developed for the insertion of different levels of evidence in terms of the considerations made within the virtual recreation, considering the different sources from which the data necessary for its development are obtained.

All of this should be discussed in specific forums, allowing for the collective enrichment necessary for the continuous evolution and development of the discipline. The increase in the number of works that implement this methodology will undoubtedly provide the necessary experience to continue improving and executing this type of protocol more efficiently.

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ABSTRACT

Virtual Archaeology is a developing scientific discipline that seeks to open windows into the past. Born from the 'Seville Principles', it is a powerful tool in the virtualisation of heritage, promoting a multidisciplinary approach and overcoming professional individualism. A case study is presented on the virtual recreation of the Roman city of Épora in Montoro (Córdoba, Spain) using historical-archaeological and literary data. Virtual reconstruction differs from virtual recreation in its focus on the physical representation of archaeological elements, while virtual recreation focuses on the visual recovery of the past of a specific archaeological site or context, which is not fully or partially confirmed. The study shows how Virtual Archaeology tools and protocols can be improved and highlights the need for specific forums to collectively discuss and improve the discipline.