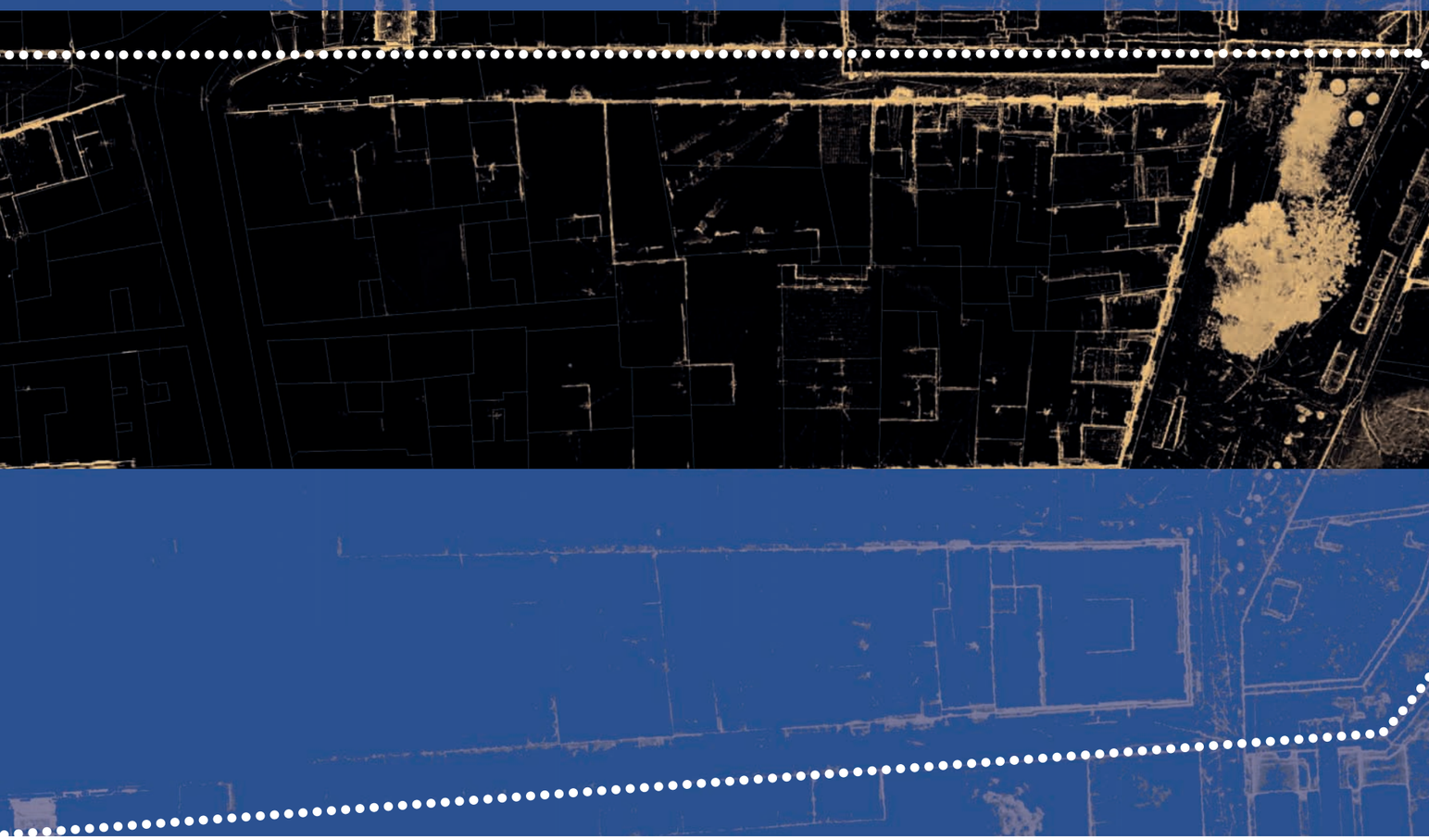
EL CIRC ROMÀ DE TARRAGONA. MONUMENT I CIUTAT
EL CIRCO ROMANO DE TARRAGONA. MONUMENTO Y CIUDAD
THE ROMAN CIRCUS OF TARRAGONA. MONUMENT AND CITY



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Tarragona 2023

Llibre finançat amb el suport de la Diputació de Tarragona i el Col·legi d'Aparelladors, Arquitectes Tècnics i Enginyers d'Edificació de Tarragona.

Aquesta obra deriva dels següents projectes de recerca: *Parámetros analítico-evolutivos de las técnicas constructivas del noreste de la Tarraconense en época tardoantigua* (HAR2015- 64392-C4-2P), *ARREL. Aplicació de jocs seriosos en entorns col·laboratius per la transmissió del patrimoni cultural de Catalunya* (2015ACUP 00089), *Técnicas constructivas y Arquitectura del poder en el noreste de la Tarraconense* (HAR2012-36963-C05-03).

https://doi.org/10.51417/trama_9

Aquesta obra ha passat revisió d'experts.

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Primera edició: febrer de 2023
Coordinació editorial: Publicacions de l'ICAC
Imatge de la coberta: vista en planta resultat de l'escaneig làser de l'entorn del Circ romà de Tarragona, autoria de l'ICAC.

Disseny de la col·lecció i de la coberta: Indústries Gràfiques Gabriel Gibert i Anna Ferré Boltà
Maquetació: Anna Ferré Boltà i Josuè Abdreu Aguadé

ISBN: 978-84-125214-0-5
DL: 158-2023


Calle de Santa Tecla

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THE ROMAN CIRCUS OF TARRAGONA, MONUMENT AND CITY

HTTPS://DOI.ORG/10.51417/TRAMA_9_05

PREFACE. TEN YEARS OF JOINT RESEARCH AND TEACHING

Archaeologists and architects, or architects and archaeologists, are two occupational *species* that have often coincided in the processes of managing the transformation of the urban landscape of Tarragona. Unfortunately, in most cases, these encounters have frequently resulted in conflicting approaches and interests that have ultimately alienated one discipline from the other. And so, we have frequently come up against each other when, in reality, we have often shared common methods and concerns about our historical past.

The architect has been a consolidated figure throughout European culture since classical times, and is today a recognised occupational segment within the groups of liberal professionals of our country. The archaeologist emerged, strictly speaking, as a result of the romantic concerns of the 19th century with a clearly self-taught profile. In Spain, Nationalism and what has come to be known as the "archaeology of restoration" influenced the promotion of research and the creation of the first university studies at the beginning of the 20th century. The protective legislation on historical heritage developed during the last decades has implemented the figure of the archaeologist in the processes of documentation, protection and transformation of our territory.

Architects have long been interested in the classical world, military architecture or medieval cathedrals, while archaeologists have structured their stratigraphic methodology around the framework of any site. Unfortunately, however, these compartmentalised working spaces have been reproduced in university education: the architects' training ignores the importance of traditional architecture whilst archaeological studies have focused on the analysis of material culture and historical fact.

This is an anachronism. Despite the new materials and resources available to modern architecture, knowledge of our heritage represents a necessary background for the documentation, restoration and conservation of the different building traditions that make up a historic city. In turn, the new technologies of topographic and photographic documentation bring the archaeologist closer to the volumetric complexity of the constructed work. Proof of this is the development of the sub-disciplines of architectural archaeology and building archaeology.

This book is the result of a teaching and research project carried out by members of the Catalan Institute of Classical Archaeology (ICAC) and the Technical School of Architecture (ETSA) of the Rovira i Virgili University (URV). Both institutions, established in 2002 and 2005 respectively, have joined forces to set up an interdisciplinary working space that provides university teaching and research with their own unique personality. In 2008, they began a joint teaching initiative as part of a subject in the URV's Bachelor's Degree in Architecture which, over time, has become a testing ground for the experimentation of the techniques used in the graphic representation of heritage. Students and teachers alike have participated in the documentation and analysis of Tarragona's historical sites, especially the Roman Circus. The work presented here is the result of an initiative that would not have been possible without the collaboration of the experts of the Tarragona History Museum at the time (Arcadi Abelló, Cristòfol Salom and Imma Teixell) and of the Tarragona Biblical Museum (Andreu Muñoz). We would also like to thank the selfless collaboration of the archaeologists Moisés Diaz and Josep Francesc Roig.

Architecture provides the technical, building and drawing knowledge, while archaeology provides the historical context as well as the descriptive and stratigraphic analysis. All this allows for, and teaches us, that today's historical heritage responds to a diachronic reality, the results of numerous projects of transformation, durability and readaptation. In this way, new architects will become fully aware of the specificity and variability of historical architecture.

Tarraco's Roman Circus is an excellent case study for developing this learning and methodological experimentation strategy. It is the result of 1900 years of history that allows us to understand the appearance of today's city as the result of an involuntary process of urban planning determinism. That is to say, we can identify and understand the medieval, modern or contemporary city by identifying the Circus' substratum.

Drawing is not only a technique, but also a way of learning and understanding.

1. THE CIRCUS PAST AND PRESENT: AN ANCIENT POLYHEDRIC CHALLENGE

1.1. The Roman Circus of Tarragona

With a surface area of four hectares, the omnipresence of the Circus makes it a heritage reality immanent in a significant part of the contemporary historical centre. Since the 5th century, the Circus has undergone a process of transformation which, from an urbanistic point of view, ended in the 14th century with the city's expansion as far as the *Muralleta*, today's Rambla Vella. As a result, the area of the old arena was reduced to the extension of the Plaça de la Font (Font's square), while the architectural structures around its perimeter would become the foundations of subsequent building projects.

Thus, the Circus became a vestige of a legendary past that recovered its prominence with the help of Renaissance wisdom. The professionalisation of archaeology in the 1980s, together with the new management approaches derived from the development of urban archaeology, almost always for salvage purposes, introduced the Circus into the political agendas of the municipal council and the recovered Generalitat de Catalunya. The first methodologically updated archaeological interventions were carried out during the administration of the historian Josep Maria Recasens, with the help of the archaeologist Xavier Dupré. In this context, it is worth mentioning the fundamental role of the *Taller-Escola d'Arqueologia de Tarragona* (TED'A) [The Tarragona Workshop-School of Archaeology] (Aquilué 2017).

Meanwhile, the Government of Catalonia implemented archaeological excavations within Tarragona's construction processes alongside the City Council's long-term urban planning policies, which included intervention and musealisation strategies on municipally-owned land. First, mention should be made of the 1973 General Urban Development Plan (PGOU), which did not include all the provisions of the 1966 *Historical Site* declaration. The General Plan was revised in 1982, while the Pilats Special Plan (PEP) for the protection and enhancement of the head of the Circus (DOGC 22-9-1982) and the Part Alta Special Plan (PEPA) (DOGC 29-6-1990) were also drawn up.

For the first time ever, a regeneration of the historic city centre was considered in which heritage would play an active part, while several others of its points also discouraged the continued private occupation of archaeological remains. At present, the *Municipal Urban Development Plan* (POUM, DOGC 05.07.2013) and the *Integral Plan of the Part Alta* (PIPA), Law 2/2004 of 4 July on the improvement of neighbourhoods of the Generalitat de Catalunya are being applied (cf. Menchon 2014). This process led to the creation of the museographic space located at the eastern end of the Circus, at the foot of the Praetorian Tower, together with other defensive structures from later periods.

The publication of the book *El Circ romà de Tarragona I. Les voltes de Sant Ermenegild* [The Roman Circus of Tarragona I. The vaults of Sant Ermenegild] (Dupré *et al.* 1988) was the first archaeological monograph made about the monument and it incorporated a compilation of historical cartography and existing planimetric documentation. This scientific project had continuity in TED'A's actions, not only in terms of intervention archaeology but also in relation to the dissemination and adaptation of the remains preserved in public businesses located within centuries-old privatised Circus vaults (Fig. 20-21).

The lack of continuity of the Workshop-School team reduced the momentum gained in previous years, leading to an overall unsatisfactory outcome. The study of the archaeological documentation generated during the TED'A's interventions was interrupted and the city's new heritage management lost all programmatic and integrative will. The absence of institutional coordination has become an established fact. In most cases, the primary responsibility for obtaining and analysing new archaeological data has been transferred to private archaeological companies, while the management and control of the latter is now the responsibility of the territorial services of the Generalitat and, in the case of municipal property, of the city's History Museum. The City Council created the short-lived *Centre for Urban Archaeology of Tarragona* (CAUT, 1990-1992) and subsequently established direct collaboration with the now-defunct Archaeology Service of the Rovira i Virgili University of Tarragona (1993 -1999).

The declaration by UNESCO and the recent rise in tourism have been the main driving forces behind the urban transformation and the museographic adaptation of the Circus site, which primarily focuses on its eastern end, as well as on two specific areas of urban sponging: the Plaça dels Sedassos and a segment of the Trinquet Vell street. Practically all the work carried out in the Circus this century has been

undertaken by private companies after having been awarded the contract through tenders. It was not considered appropriate to define multi-institutional scientific management projects for this four-hectare diachronic heritage site, nor to implement a master plan in a context of intense urban transformation within the framework of tourism and leisure development in the Part Alta of Tarragona, the oldest and most elevated part of the city. No permanent space exists where institutional and technical decision-makers can reflect together to contribute new elements of analysis and strategies for the future.

The current model limits archaeological research to the traditional development of urban archaeology, without considering the exceptional nature of the historic site in which it takes place. The establishment of a master plan is an absolute necessity in order to reorganise all the existing information, establish dissemination criteria and levels, according to the target audience and technological resources, synchronise town planning and museum activities as well as define a scientific project for what remains unexcavated or what needs to be conceived as an archaeological reserve, etc.

This work aims, in terms of the topographical documentation and graphic representation of the architectural heritage, to produce a homogeneous and coherent body of documentation based on current technical resources. It attempts to overcome the data fragmentation and the loss of the unitary concept of the monument, while at the same time it seeks a unified understanding of it as a three-dimensional monumental object that sometimes remains hidden and at other times stands untouched in today's city.

From our strictly technical perspective, the first plans and sections were drawn up in the 1980s, although we cannot ignore the topographical surveys that have been carried out since the 18th century. Gradually, the first precise urban plans were obtained, which put each excavation in the urban cadastre, placing the archaeological remains within the framework of the *Concilium Prouinciae Hispaniae Citerioris* (Macias *et al.* 2011). The Generalitat's Architectural Heritage Service commissioned the architect Salvador Tarragó to carry out the first complete topographical survey, completed at a scale of 1:100 (Tarragó 1993). The urban blocks of the Part Alta were also surveyed at a scale of 1:500 (Cantallops et al. 1990). We should also highlight the first compilation of archaeological and historiographical data (Cortés and Gabriel, 1985). These first actions coincide with the first graphic and educational representations of the Roman Circus, specifically a series of postcards by J.G. Sempere and X. Dupré, plus the TED'A's dissemination booklets (Aquilué 2017, fig. 6).

However, in the field of urban archaeology, the increasing number of excavations brought to light the difficulties of obtaining a global and precise planimetry. In 1990, the Department of Culture of Generalitat de Catalunya created the Urban Archaeology Programme with the aim of developing an archaeological inventory of the main historical cities in Catalonia. In our case, the programme took shape with the creation of the SICAUT (the Urban Archaeological Cartography Information System of Tarragona, 1993), but its results were not disseminated nor were they given any continuity. Later, the Tarragona Archaeological Plan was drawn up, but it too was unsuccessful (Rifà 2000). This was conceived as the continuation and updating of the SICAUT based on an understanding between the City Council, the Generalitat de Catalunya and the Rovira i Virgili University.

Paradoxically, while the institutional administration did not respond to the needs of urban archaeology, Tarragona became a pioneer in the field of infographic reconstructions applied to historical heritage. Thanks to the collaboration between local archaeologists and a company from Reus, a line of research and virtual dissemination began in 1996 based exclusively on the digitisation of archaeological plans and sections. An initial three-dimensional reconstruction video was produced and later, with the support of the local council, two folders containing educational prints and the city's first visual archaeological guide were published. (Macias and Muñiz 2003, Macias *et al.* 2004 and 2005).

Later, based on the application of a GIS adapted by Ignacio Fiz (2002), the Catalan Institute of Classical Archaeology, in agreement with the City Council and the Generalitat, carried out an exhaustive documentary and planimetric compilation covering the information available until 2004 (Macias *et al.* 2007). The *Planimetria Arqueològica de Tarraco* project (the Archaeological Planimetry of Tarraco) thus made it possible, for the first time ever, to compile all the existing information on the subject and establish a new georeferenced network of topographical databases, which would be used to carry out the topographical correction of the planimetry of the large public buildings. All this information was also used in the making of a model of 2nd-century Tarraco, at a scale of 1:500. For the first time, technology made it possible to achieve a comprehensive and frequently updated document base, while technical resources made it openly accessible on the web.

Unfortunately, the Archaeological Planimetry of Tarraco project was never continued, despite the fact that the scientific, museographic and town-planning management benefits of the up-to-date documentation it provided are undeniable. However, said documentation has been an indispensable precedent for the continuation of the reconstruction of the Roman city's *planta urbis*. In this sense, the advances in the definition of global planimetries have been fundamental for the subsequent elaboration of hypothetical three-dimensional reconstructions and for the establishment of diachronic interpretative discourses of the Roman city (Mar *et al.* 2012 and 2015).

Within the context of the revolution in documentation and graphic representation techniques, the URV's Technical School of Architecture (ETSA) was incorporated into the documentation and study of historical heritage. The ETSA was created in 2005 to apply Massive Data Capture Systems (MDCS) to the study of historical heritage. For this reason, several professors from the ETSA's graphic documentation department, together with researchers from the ICAC, formed an interdisciplinary group focused on the study and teaching of architectural heritage. With the collaboration of the History Museum, this research group has documented the Circus' surrounding area in recent years using the most modern technologies available, seeing this part of the city as the result of a diachronic urban reality in which the architectural features of different historical periods have come together (Solà-Morales *et al.* 2018).

The results obtained show how MDCSs are useful in the documentation and three-dimensional understanding of large buildings. The use of laser scanning, combined with photogrammetry, represents a significant advance, making it possible to synchronise in a single model all the compositional elements of the Circus area, from the archaeological evidence of the subsoil to the superimposed contemporary constructions. In addition to the quality and accuracy of the information, it provides useful added value for heritage management and conservation. For example, for controlling the collapse of the load-bearing walls or calculating street volumes for the layout of urban facilities.

In terms of dissemination and graphical representation, the point clouds generated by the MDCS offer several avenues of work. From the generation of three-dimensional vector models, which are essential for creating virtual reality, to the editing or processing of the clouds themselves as a tool for representation and analysis. The latter can, from the visualisation of their reflectance values, allow for material analysis; while by generating silhouettes (sections) or transparencies (multiple views) we can add semantic content. Arbitrary sections of the three-dimensional models can be produced from the processed silhouettes of the point clouds in the form of radiographs or automated pseudo-etching (Puche *et al.* 2017). This new approach optimises cumbersome data manipulation tasks for the analysis and representation of architectural models.

Finally, the use of a Pegasus BackPack, a mobile laser scanner inside a backpack carried by an operator, within the framework of the ARREL project (Macias *et al*. 2017), enables three-dimensional models to be obtained in all urban areas and to link the data obtained in the street with those of the interiors of the buildings. This project and technological resource enabled the creation of a first collection of three-dimensional models of the Circus, freely accessible, on the Sketchfab portal[1], where one can enter and update all kinds of complementary content: informative orthophotos, links to scientific articles or open-access dissemination articles, etc.

We are immersed in a technological context that is continually transforming the language and the means of sharing our historical heritage in ways that no one can foresee. These new resources also provide management tools to institutional actors who, in our opinion, have not yet made the most of their potential. This two-dimensional work reflects a three-dimensional architectural reality which we have incorporated, as accurately as possible, into the digital spectrum. It is therefore a technical document,

1 https://skfb.ly/ortnw

the preparation of which allows us to make numerous and varied observations, while at the same time it is intended to become a metric knowledge base for subsequent actions.

Regarding the use of new technologies as a tool for dissemination, we are concerned about the intoxicating effect they have, since many experiences focus more on the immersive aspect - the creation of sensations - than on the generation of knowledge. The use of augmented reality, reproduced on a wide variety of devices, becomes a valid tool for tourist consumption but, in relation to the Roman Circus, it oversimplifies the heritage reality by focusing only on its classical-era tourist brand. These initiatives, together with the infographic panels that can be found around the archaeological site, are based on the desire to give the visitor or pedestrian an insight into the Circus as a whole. They are supporting elements of an identity or tourist brand and, simultaneously, a simplification that represents a discontinuity between the past and the present. We value the Circus as a historical enclosure in its diachrony, highlighting other periods while facilitating the understanding of the urban physiognomy of the current Part Alta as a result of Roman architectural determinism.

In conclusion, the problem does not lie in the existence of these initiatives but rather in a generalisation that represents a barrier to investment in the generation of greater knowledge, or in the development of more complex pedagogical proposals which require a greater effort on the part of the consumer. In this regard, we would like to highlight the added value of the Arrel project (Blay *et al.* 2017), an interdisciplinary project defined by the ICAC and the Logisim Research Group of the UAB as a *serious game* prototype initiative promoted by the Recercaixa 2015 call (Obra Social La Caixa and ACUP). This educational project focused on the diachronic, given that in Tarragona we have, within the historic site of the Circus, city walls from the Roman, medieval and modern periods. Our documentation aims to highlight all these elements in order to constitute a diachronic knowledge base that aims to enrich the museum's narrative. It is also necessary to incorporate particular and patrimonial characteristics that will help to individualise and shape the feeling of belonging to a community.

1.2. Two cities and a mountain (The Roman Circus of Tarragona: The skeleton of a living city)

The Part Alta, the historical centre of Tarragona, is an area of about 19 hectares that still contains, masked within the current urban planning which dates back to medieval times, many remnants of its Roman past. It is the steepest and most rugged part of the coastal hill which has been occupied, almost continuously since the 5th century BC, by a human community. The walls that today mark the boundaries of the Part Alta still offer the image of a perched and well-protected place, while the Rambla Vella, as did the *uia Augusta* in the past, separates this particular acropolis from the rest of the city (cf. Ramos i Riu 1989; Llop 2016) (Fig. 1 and 6).

Little is known about the internal organisation of the Part Alta during the late Republican period (2nd-1st century BC), but the evidence of its walls, the oldest erected by Rome outside the Italian peninsula, testifies to an active military function. It was no coincidence that Tarraco was Rome's gateway to the Iberian Peninsula, its main military headquarters and the point of arrival of the conquering troops. In turn, a residential and economic area developed around the harbour and the old Iberian nucleus. The urban and military layout of the Part Alta is one of the unanswered questions of current archaeological research, given that the monumentalisation of the 1st century AD and the passage of time have erased most of its remains.

Emperor Julius Caesar gathered, probably in the area that is now the historic centre, an assembly of Hispanic notables in the year 49 BC. And in 13 BC, Tarraco became the capital of *Prouincia Hispania Citerior*, the largest in the Empire. From this point onwards, it became an important administrative headquarters capable of managing the growing needs of half of the Iberian Peninsula: census and land registers, the treasury and the entire fiscal, judicial and military structure. The rise of Tarraco owes much to the emperor Augustus, who lived there for almost two years. Archaeological research dates the beginning of the monumentalisation of the city to this period.

The centre of the colony, located in the lower part of the city, began the process of transformation of the colonial forum, the construction of the theatre as well as the possible construction of public baths, the renovation of the port area and part of the road network. However, we know nothing of the emperor's official residence, although we must assume that the Part Alta housed a large courtly seat and a provisional imperial administration. Historical sources only report that Augustus received ambassadors in Tarraco from the island of Lesbos and India, as well as other representatives of the king of the Parthians, but the city would certainly receive many more ambassadors. Curiously, at present, the Circus area is presented to us as a diaphanous, undeveloped space, where only the remains of a pottery and the recovery of an extensive group of high quality decorative architectural terracotta stand out (Gebellí 2017 and López/Piñol 2008 respectively).

On the other hand, recent archaeological studies have shown the existence of a large building that anticipated the subsequent urban transformation (Vinci *et al.* 2014a). The well-known *Volta Llarga* (Long Vault) and other perpendicular vaults, together with a monumental entrance made of ashlars, are evidence of a large complex that was later used in the construction of the Circus. Both the precise chronology and the function of this enclosure, which had access to the outside of the city through an open doorway in the city walls, remain unknown.

Following the passing of Augustus, the transformation of the upper enclosure began, representing the definitive monumentalisation of the Roman acropolis, the remains of which were fundamental to the inclusion of Tarraco in UNESCO's World Heritage List in 2000. Here we highlight the construction of the sacred enclosure dedicated to the late emperor, which was built during the reign of his successor, Tiberius. The remains of this temple, built in 15 A.D., are still preserved underneath the Cathedral and its construction established the visual and axial reference point from which the later major projects were carried out. Even centuries later, the medieval cathedral was erected following the same symmetry axis as the Roman temple. And further down, the façades of the even-numbered houses on Major street have also been superimposed on this very same axis (cf. Macias *et al.* 2012 and 2014).

This first sacred project was later expanded by another, more ambitious one, which was carried out during the second half of the 1st century AD. The new religious square covered an area of 2 hectares and was built around the former Temple of Augustus, which remained standing while a second temple was built at the north end of the enclosure, dedicated to the dynasty of the Flavian emperors. Bordering the square was a lavishly decorated portico in imitation of the portico found in the Forum of Augustus in Rome.

Further down, on the level below it, the capital's great representation square or provincial forum was built, with a surface area of six hectares. At its foot was the Roman Circus, which covered an area of about four hectares. This last entertainment complex separated the *imperial city* from the rest of the metropolis. This grand project presided over Tarraco, developing a large terraced urban complex that followed the scenographic models that had already been experimented in Italy. The closest references were the imperial complex of the Palatine Hill and the Circus Maximus in Rome.

The *prouincia Hispania Citerior* was a province under the direct control of the emperor and the acropolis of Tarraco. It had been militarily occupied since 218 BC but had never been developed with streets and private houses. It was therefore possible to rapidly carry out a major urban development project with the investment of the local and provincial oligarchies who wanted to ingratiate themselves with the dynasty of the Julio-Claudian emperors. As a result, almost all of Tarragona's current Part Alta was divided into three main levels of circulation which, in a clear example of historical determinism, conditioned the medieval and modern urban planning of the historic centre of Tarragona (TED'A 1989).

In this context, Tarraco's Roman Circus has played a fundamental role and is the subject of continuous studies and scientific meetings (López Vilar 2017). Its location was an atypical case in Circus architecture, which preferred to occupy large spaces outside the walls in order to reduce the costs of expropriation and construction and so achieve extensive racetracks. In Tarraco, the wide availability of public land in the Part Alta, plus the desire to ceremonially connect the Imperial cult complex and the large forum with the *ludi circenses* were the causes of an anomaly which, ultimately, led to the construction of a smaller racing complex in comparison to the general norm. The whole project was a joint venture, both urbanistically and economically, as the elites of the great province of *Hispania Citerior* undertook to finance it. Proof of this is the fact that the construction of the Circus, as

well as that of the city's amphitheatre, was paid for by a *flamen*, the high priest in charge of the emperor's cult in the provincial capitals (Gorostidi and Ruiz 2017).

For all these reasons, the Circus became the link between the residential city and the higher political-religious complex of an imperial rather than municipal status. As its construction ran alongside the entire 2nd-century BC city wall, the connectivity between the two parts of the city was disrupted. From the point of view of spectator mobility, this enclosure was a bidirectional space covering an area of 4 hectares, and its interior was accessed mainly through the southern façade located opposite where the *uia Augusta* branched. Its construction was also intended to provide access to the provincial forum and the sacred precinct above it, regardless of whether the races were being held or not. On the other side, spectator access to the Circus on the northern façade also had to be considered, especially after the political and religious ceremonies which took place in the forum and the *temenos*, and which often preceded the races, were over. The building thus had a primary function, the *ludi circenses*, and a secondary urban function that focused on the ceremonial ritual of the imperial capital (fig. 6).

This is why the Circus did not consist, like many other buildings of its kind, of a mere lowering of the ground plus some perimeter boxes filled with earth to define the stands and the accesses. It was a complex challenge that had to resolve the viability and functional fit of the Acropolis within the city as a whole. It also controlled access to a part of the city legally belonging to the Empire and ensured the drainage of rainwater from the entire 19-hectare upper complex built within the city walls. These needs were technically met in a true work of engineering that turned the Circus into a permanent architectural reality, a reality that shaped the urban development processes that followed it over time.

The three urban complexes from Roman times - the Acropolis, Forum and Circus - are still recognisable in today's city, in terms of their layout, functionality and orography (fig. 1 and 35). The former site of pagan worship was almost entirely taken over by the medieval cathedral during the reoccupation of the 12th century, creating, as it did, a lower level of circulation than that of the Roman city. Thus, the pagan square stood at approximately 69.40 m above sea level, while the present-day Pla de la Seu (the Cathedral square) is about 67.50 m above sea level.

The perimeter and internal structures of the great square of the Provincial Forum conditioned an atypical medieval pseudo-grid town planning, except for some early roads that preceded the definitive consolidation of the repopulation process (Riu 1987). The large 14 m wide, raised podium that surrounded the square on three sides was lowered at a later date. We can appreciate the podium's circulation level on the western face of the Praetorium Tower (60.88 m), which is much higher than the circulation level of the current street (between 55 and 57.35 m); we can also observe, in the Forum square, the same pilasters that are preserved in the Praetorium at an elevation of 62.00 m. (fig. 14). Here we also find a reference to the podium in the remains preserved behind the Volta de Pallol (the Pallol Vault) (61.60 m). This comparison reflects the urban unity of the Roman project and the extensive transformations that took place in the city's historic centre. This podium has been quite altered, as evidenced by the height of the medieval streets that have followed it: Merceria street (between 61.70 m and 62.20 m), Civaderia street (between 61.70 m and 63.00 m), Santa Anna street (between 61.00 m and 63.20 m), etc.

On the one hand, the circulation level within the Forum's square generally increased, which is why the Roman square originally lay between 58.00 and 58.70 m above sea level, about 3 m below the perimeter podium. This difference in level can still be seen from the incline of the streets which run perpendicular to the Merceria and Civaderia streets: Calderers street (62.67 and 59.34 m), Mediona street (62.21 and 59.97 m), Ventallolls street (62.20 and 60.40 m), etc. On the other hand, the Major street, reminiscent of the ancient sacred road that connected the sacred complex with the tribune of the Circus, has a circulation level of between 61.70 and 55.70 metres. The same phenomenon of stratigraphic increase occurred in the Circus area. The Circus' arena was around 46-47 m above sea level, while the current level of the Plaça de la Font is between 46.80 and 48.80 m above sea level, and that of Cós del Bou street is between 49.70 and 47.15 m above sea level. However, the use level of Rera Sant Domènec street (53 m) indicates that in this sector, the circulation level is higher than that of the Circus.

We do not possess such an exhaustive knowledge of the history of Tarragona as to know the different processes that led to this development. In any case, the Circus began, for reasons that are still unknown, a process of urban and functional transformation subsequent to that which took place in the sacred complex and the Forum. The abandonment of the Circus dates from the second half of the 5th century, while the transformation of the sacred complex and the square dates from the second quarter of the same century. However, we must imagine a process of uneven change across the four-hectare Circus, although we are still learning how this process could have taken place (cf. Macias 2000, Díaz *et al.* 2017a). From this period onwards, a process of looting and reuse of the work in *opus quadratum* began, while the vaults built in *opus caementicium* became spaces for shelter or, in medieval times, for the establishment of bothersome manufacturing sectors (Piñol/Mir 1995 and Piñol 2000).

Little is known about the transformation of the Circus between the 5th and 8th century, and even less about the so-called Muslim impasse (cf. Gonzalo 2013). With the medieval re-occupation of Tarragona in the 13th century, the area surrounding the Circus became suburbanised when a new wall was built, which took advantage of the dividing wall between the old Circus and the Provincial Forum (Menchon and Massó 1999). At the foot of this "old wall" is where the streets of l'Enrajolat and els Ferrers were formed over the Roman containment vaults of the lower terraces of the acropolis (the last excavation by Vilà *et al.* 2015). The present-day l'Enrajolat street still runs along the foot of this wall and, over the centuries, numerous doors and windows have been opened in its buildings, which are mainly accessible from la Nau street. In contrast, the houses in els Ferrers street have been built in front of the city wall, concealing it, although we can still see the towers that protected it at either end, the towers of L'Antiga Audiència (the Old Provincial Court) and the Praetorium, both of which were converted into castles during the repopulation of the city (v. Dupré and Carreté 1993; Díaz and Teixell 2017).

The new medieval suburb was given the name of El Corral, reflecting its use for livestock and fairs. It was not a residual space, the many preserved vaults would have been very convenient as dwellings or workshops and, we must assume, a significant weight in the city's economic development. We also know of the existence of the church of Sant Salvador del Corral, located near the tower of the Antigua Audiencia, before the urban consolidation of the city.

The names of the present-day streets included in the former Circus area reflect the original uses of this part of the city (cf. de Palma 1958, Salvat 1961), all of which have been archaeologically confirmed at the eastern end of the arena (Bosch *et al.* 2003). For example, the first reference to a *Boqueria* (the place which housed both the meat market and the slaughterhouse in medieval times) dates back to 1276, located at this time in the area around Baixada de la Misericordia and Trinquet Vell streets. At the end of the 14th century, it was moved to the eastern end and, as early as the beginning of the 15th century, we have records of the Boqueria courtyard or Comú courtyard. The medieval building, documented at the far end of the arena and visible after the restoration works of the museum, was not an isolated event, but the result of the definitive urbanisation of this part of the city after the raising of the city walls in the 14th century (fig. 7 and 15).

This is evidenced by the fact that the ground plan and urban alignment of this building is the continuation of the current Cós del Bou and Trinquet Nou streets. Both streets are aligned with the courtyard and are joined by a section that runs around the inside of the former head of the Circus. At this point, the vaults of the stands were cut away from the podium and used as buildings. Three chambers still have the sockets on which the entrance doors pivoted. All this evidence shows the urban vitality of the city in the 14th century, when important renovations were carried out on the city's castles, the Pla de la Seu was remodelled and during which time the construction of the Cathedral was almost completed.

The culminating work of this urban expansion was the city's new defensive enclosure. The new city wall, or *Muralleta*, was completed in the last third of the 14th century and was built parallel to the ancient façade of the Circus. Between the new wall and the walled façade of the Circus, a large earth embankment was placed so that sufficient width was gained to create a walkway over the new defensive wall. The Torre de Les Monges (Tower of the Nuns) is the most significant defensive element that has survived the

passage of time (Macias *et al.* 2001) (fig. 7 and 9).

We can safely say that this period was followed by the development of the urban layout that has remained substantially unchanged to the present day. If anything, the space that has undergone the most modifications is the Boqueria square, which, having been altered at the end of the 18th century, was finally urbanised with the Baixada de la Peixateria after the destruction caused by the Peninsular War. This new street took advantage of the large levellings and embankments, generated in part by the partial destruction of the Castell del Rei (the King's Castle), which had been badly affected by the cannons of the Napoleonic troops as they left the city. The layout of the present-day Baixada de la Peixateria meant that most of the vaults north of the *porta Triumphalis* were covered and abandoned.

The 16th-century descriptions by Lluís Pons de Icart, together with the 17th-century plans, already confirmed the full coexistence of the modern city with its heritage past. However, although the Circus area has remained largely unchanged in terms of roads, the current appearance of its buildings is essentially a work of the 19th century. What we have today is the result of various historical processes: the disasters of the Napoleonic occupation, the consequent loss of its military status, the disentailment (or ecclesiastical confiscations) of Mendizábal and, gradually, an increase in social demands for improved living conditions.

Until that time, the Part Alta was a closed area with regulated night-time access. While also having a significant urban presence of religious spaces. The new town planning revolved around the location of Tarragona's Town Hall in the Plaça de la Font, built over the old convent of Sant Domènec and the old Circus *carceres*, the Baixada de la Peixateria and the opening of Portalet street. The urban appeal of the new Town Hall led to the dignification of the square and to several attempts at remodelling and unifying its façades (Ortueta 2006, 222) (fig. 29 and 33).

It is clear that urban development has had a considerable impact on the conservation of the Circus building, and it is only recently that we have been able to speak of a full awareness of its cultural and identity values. Proof of this was the significant destruction of a segment of its façade and southern vaults as a result of the construction of the old Catalunya Cinemas in the early 1970s. Such destruction was justified at the time as the price to be paid for modernity and progress. Today, the cinemas no longer exist and instead, we find an innovative music bar. It should be noted that this episode was after the declaration of Tarragona as a Historic-Artistic Site (BOE, no. 69 of 22/03/66).

This should be interpreted as the epilogue of a period characterised by a lack of public and political awareness. Furthermore, the lack of resources of the then Provincial Archaeological Museum, during the Franco dictatorship, prevented the development of actions for the preservation of the architectural heritage When the Generalitat de Catalunya regained its powers, this represented a new period in which it took on the responsibility required by a modern city superimposed on a Roman Circus. Research and restoration work began to be carried out in order to raise public awareness of its classical past, although the building's historical development has led to different levels of conservation.

Thus, the area of the *carceres*, occupied by the Town Hall, presents a lower level of preservation, which contrasts with the level of preservation of the eastern end of the Circus. This last area, close to the Praetorian Tower, has been preserved in optimum conditions and has been converted into a museum area after the work coordinated by the teams of architects Andrea Bruno (1990-1994) and Estanislau Roca (1993-1995). The result has been an intense urban transformation next to the historic access to the *uia Augusta* (N-340), making it possible to define the museum area of the Circus-Praetorium: an area of approximately 3,240 m^2 that has become one of the city's iconic sights. It has been the result of twenty years of expropriations and debris, unanimously accepted by the public and of growing relevance in terms of tourist demand. It is currently the most visited museographic site in the city (fig. 4).

In the rest of the circus enclosure, its southern façade determined the alignment of the houses on the south side of Plaça de la Font and Trinquet Nou street. It is here that the Roman structure can best be seen, in such a way that the dividing walls of the urban estates became the abutments of the vaults. Sadly, save from a few fortunate exceptions, most of the roofs have been removed. Even so, in some of the dividing walls, we can still see the outline of the podium and the lower stands. As can be imagined, the ground floor of these buildings is currently occupied by commercial premises, mainly bars and restaurants. With regard to the northern end, the layout of the vaults is different, as the current result is the fruit of a combination of previous *substructiones*, or infrastructures, plus those corresponding to the supports of the stands. In contrast to the southern part, however, architectural solutions were provided for the levelling and terracing of the mountain in addition to the Circus' requirements (cf. Vinci *et al.* 2014a and Fernández *et al.* 2017).

The museumisation of the historic site is, therefore, one of the great urban and social challenges of the historic centre of Tarragona. The management of this sector mixes aspects of museum integration, economic sectorisation and housing policy. These objectives are not thoroughly addressed, nor is there a long-term strategy (see Macias 2020 for a final reflection).

The development of tourism in Tarragona, driven in part by the UNESCO declaration, has had an impact on the transformation of the Circus site undertaken by the City Council. On the one hand, the number of streets converted into pedestrian zones has increased in recent years. Additionally, actions have been carried out that have encouraged the creation of catering establishments and the consequent occupation of the thoroughfare by their terraces. This, together with the increase of tourist flats, mobility limitations and the concentration of festive activities, has sparked protests concerning the historic centre's regeneration policies, which promote the recreational aspect at the expense of the neighbourhood's quality of life.

From an urban planning point of view, we would highlight the long retaining vaults that have given rise to the current l'Enrajolat and els Ferrers streets. From these sites, the Tarragona City Council developed a process of museumisation based on expropriation, demolition and recovery of the Circus ruins. The actions carried out in Trinquet Vell street (former Casa dels Militars) and Plaça dels Sedassos have opted to give priority to the visual recovery of the *caementicium* framework of the stand, to the detriment of the conservation and enhancement of the medieval urban planning (Fig. 4 and 15). This action was not without controversy, as the project was not limited to urban planning and the creation of archaeological islands, per se, but it also included a controversial volumetric restoration project in the Plaça dels Sedassos. Here, a wooden reconstruction of the stands has been chosen which hides the original remains and dispenses with other contemporary technical solutions which do away with the need for heavy architectural work and which, from an economic point of view, are more reversible.

The question has even been raised whether it is necessary to create areas for the visualisation of repeated archaeological realities, which are much better preserved in the Circus-Praetorium sector and which, in practice, represent alterations to the medieval physiognomy of the historic centre. In contrast, the eastern end of the Circus, which connects with the Praetorian Tower, is a convincing and rational urban planning project that is fully accessible to the visitor. But it is a sector of the museum that is yet unfinished, as it still faces the challenge of expropriating the buildings of the Baixada de la Peixateria that are still standing (fig. 18 and 22).

Finally, the Circus is still a dynamic urban reality with significant challenges for the future. How can we dignify a UNESCO-recognised heritage city in a way that does not harm the locals? There is a need to find a binding space for multidisciplinary reflection that will set limits to these actions and which will understand that, beyond the tourist and economic profitability of historical heritage sites, cities are, first and foremost, spaces for residence and coexistence.

2. THE CIRCUS AS AN URBAN ELEMENT

2.1. Present-day building's and spaces within the ancient Circus

The following is a brief introduction to the general history of some of the elements that make up the current urban enclosure of the area formerly occupied by the Roman Circus.

Although the historical complex of the Roman Circus of Tarragona can see as an archaeological element, implicitly architectural, probably the best way to approach it is from its diachronic urbanity. This chapter takes a historical overview of this urban complex, read and interpreted from the different cartographies that have been made. This journey brings us not only to its evolution over time but also to the development of graphic representation criteria and technical resources of the topographical tools available for each period.

All of this reflects how the builders and town planners of Tarragona have adapted to or surpassed the imposing architectural structures of the Circus. Also, how the city has grown and healed, through its medieval walls, its historical fears and insecurities.

Careful observation of some of these maps and plans, sometimes surprisingly accurate for the period, reveals the prominence and omnipresence of the Roman Circus in the urban planning and daily life of Tarragona over the centuries. We cannot understand the city's present-day urban planning without knowing about the Circus. At the same time, the main urban planning actions of the 14th century and the first half of the 19th century, which repaired the damage caused by the Napoleonic war, help us to understand what the Roman building was like before its partial destruction.

To asses this reading, the text in the following section highlights four maps of Tarragona made between 1709 and 1882, on which the updated archaeological planimetry (drawn in red) produced by the Catalan Institute of Classical Archaeology and published in 2007 has been superimposed (Fig. from 88 to 91). This superimposition facilitates the interpretation of the relationship between the Roman Circus and the rest of the urban elements of each period, even for the most inexpert eye.

Nevertheless, it is not a definitive topographical document. Little by little, archaeology is rebuilding a historical puzzle that, as a challenge for the future, must include remains from the visigothic and medieval periods. Not only for documentary purposes but also as an educational strategy that reflects the complexity and richness of our historical landscape.

Cós del Bou and Trinquet Nou streets. The southern side of Trinquet Nou street is built upon the support structures of the southern stands of the Circus, as are the houses on the southern side of Plaça de la Font. The rhythm of the stands' supporting walls is more difficult to identify here if we only look at the elevations, but, if we look at the morphology of the buildings, we can clearly distinguish the modulation of the Roman building (fig. 33).

The façades on the north side of Cós del Bou street stand about 3 metres to the south of those on the same side of Plaça de la Font. This slight offset, together with a width of 7.5 metres, which is relatively generous considering the urban layout of the Part Alta of Tarragona, allows us to have a clear view along the street and recognise the ends of the Circus arena: to the east, the remains of the head of the Circus and, to the west, approximately over the *carceres*, the Town Hall.

At the eastern end of the block, defined by the Cós del Bou street and Trinquet Nou street, we find another building designed by the architect Francesc Barba i Masip: the current headquarters of the *Colla Jove dels Xiquets de Tarragona*, the local group of *castellers* or human towers. It dates back to 1865 and was originally a fish market. The location of the building at the end of the block gives it three façades; it consists of two levels of windows on each of the corners and the sections adjacent to the party walls, two double windows in the central sections of the lateral façades and a double door on the axis of the eastern façade, facing the head of the Circus. Barba i Masip chose a compositional language similar to that used in the ground floor of the Town Hall and the ground-floor mezzanine ensemble of the building located on the corner of la Palma street and Plaça de la Font: perfectly squared ashlars and openings with lowered arches, although here the stonework varies a little, as the strips marking the joints alternate with smooth walls and cubic bossages.

The Town Hall presides over the western side of the Plaça de la Font. Archaeology has shown how the spaces adjacent to the rear façade, which opens onto Rera Sant Domènec street, were built on the Circus' *carceres*. The southern dividing wall coincides with the line of the southern façade of the Circus, which was used as a base for the construction of the *Muralleta*, with which the fortified area of the city was extended in the 14th century. It is also evident, from the overlapping of the Town Hall with the archaeological plan, that its southern side coincides with the support structures of the Circus's southern stands. The current layout of the building dates back to the 16th century with the construction of the Sant Domènec Convent, which went through different phases of construction until its disentailment in 1835. The *Hacienda Nacional* (The National Treasury) gave it to the city in 1837 and, during the second half of the 19th century, it was remodelled to house the Town Hall based on a project drawn up by the architect Barba i Masip. It has two interior courtyards arranged in an approximately symmetrical way with respect to the axis defined by the main entrance and the monumental staircase that leads up to the main spaces on the first floor.

The houses of the southern section of the Plaça de la Font form an ensemble, where the structures of the Circus have clearly conditioned the constructions that would be built later. The supporting walls of the Circus' stands constitute the base of the dividing walls that separate the different houses, so that the lines between their façades show us the rhythm of the spaces of the Roman building. The back of the properties adjoins the rear of the buildings that open onto the Rambla Vella, following the line of the Circus' southern façade. Most of the lower floors are currently occupied by publicly accessible premises, where you can see (and touch) the Roman walls. The architecture of the houses is not particularly noteworthy. They usually consist of a ground floor and four upper storeys; the typical bay of the Roman structures on which they rest is 18 feet (about 5.32 m), giving rise to similar façade compositions, almost invariably with two balconies per storey. We find two houses that break away from this compositional and decorative uniformity:

- The house of Juan Vila Granada, at number 27, is a building from 1900 by the architect Josep M. Pujol de Barberà. The large opening on the mezzanine floor stands out, it possesses a lowered arch that spans almost the entire width of the façade. Both the mezzanine and the ground floor, the latter of which has a double entrance for the shop and the general staircase, are made entirely of stone ashlars. On the upper floors, both the balcony slabs and the framing of the openings are made of stone. The ashlars of the jambs form an interlacing with the façade, consisting of a maroon-coloured mortar coating that reproduces the joints of an exposed brick wall.

  The façade of number 31 is notable for its Art Nouveau decoration, with the layout of the storeys arranged around a central symmetrical axis and featuring a central balcony and side windows. On the first floor, which in this case is the building's main floor, there is a large balcony that spans all three openings, while on the upper floors the balcony becomes narrower and cantilevered. The façade walls of the ground floor are resolved with a stucco decorated with motifs consisting of embossed ashlar masonry, interrupted by circular crowns with plant motifs that decorate the upper part of the openings. There are no traces of Art Nouveau decoration on the ground floor, which is built with ashlars. From a reading of the walls, it can be deduced that originally it also had a symmetrical layout, with a main central opening and two side openings, but it can be appreciated how the two on the right-hand side have been unified using a shoring in order to enlarge the access to the shop.

The houses on the eastern side, between the Cós del Bou street and Trinquet Nou street. The two on the right-hand side, on the Trinquet Nou side, possess a conventional composition of balconies. On the corner of Cós del Bou street we find a singular building in the context of the square: a 1944 work by the architect Salvador Ripoll Sahagún, boasting a composition in which we can recognise influences from both the futurist architecture postulated by Antonio Sant'Elia and the modern movement promoted by the Bauhaus and Le Corbusier. The corner of the property features, by means of tangent arches on both façades with different radii of curvature, a glass shop window on the ground floor, an overhanging gallery on the first floor and balconies on the 2nd, 3rd and 4th floors, all crowned by a circular drum with windows around the perimeter as a viewpoint to finish off the composition.

The houses on the northern side, as opposed to the southern side, do not follow the modulation of the

Roman structures. As they were built on the Circus arena itself, it is possible that the alignment of the façades that open onto the square is a fossilisation of the layout of the Circus' *spina*, but we do not possess any archaeological evidence to support this.

In the section between Baixada de la Misericòrdia and la Palma street, we find four buildings of considerable width which were built six storeys high, that is, one storey higher than the majority of the houses in the square. The rhythm of the façade openings is similar, so that those of numbers 24 and 26 seem to follow the same basic design, although the decorative details of the slabs and balcony railings are different. This uniform front contrasts with the three properties on the side of la Palma street: they are narrower, with façades that have only one opening per floor and which consist of a ground floor and three upper floors, with the upper levels having very limited headroom.

In the section between la Palma street and the Town Hall, the widths of the properties are quite heterogeneous, a variety that is transferred to the rhythm of the openings in the façade, but they always maintain similar heights, corresponding to the ground floor and four upper floors. The building with the most elaborate composition is the one on the corner of la Palma street (number 47). It dates from 1855 and was designed by the architect Francesc Barba Masip, who, as already mentioned, is one of the authors of the renovations that gave the Town Hall its current appearance. In fact, there are obvious clues to his authorship: as in the Town Hall, he proposed a composition of a façade where the base is resolved with squared ashlars with a recasting, emphasising the horizontal courses and the joints between the voussoirs of the lowered arches (here the base includes the ground floor and the mezzanine, while in the Town Hall it only includes the ground floor, although with a similar total height). Stone is used on the three upper floors to build the cornices, balcony slabs, corners, door jambs and thresholds, framing a stucco façade with terracotta decorations.

2.2. Interesting morphologies. Urban topographical anomaliesz

The urban layout of part of Tarragona's old quarter is conditioned by the pre-existence of the Roman Circus, as explained earlier. This is why it is easy to deduce the extent and shape of the Circus from contemporary topography, even though most of it is not visible today. It can be said that we are faced with a clear case of the fossilisation of ancient architectural elements that have shaped the layout of the city that surrounds them.

However, there are a series of alterations in this urban layout that seem to escape from this scheme and which, apparently, have little or nothing to do with the Roman topography. Nevertheless, a careful observation allows us to deduce that these cannot be understood without defining the existence of certain unique elements of the Roman Circus. In fact, it is precisely these alterations that have allowed us to identify or define some characteristic features that are not visible to us today.

We are talking about two street axes, one formed by Cavallers street and la Nau street and the other by Salines street and Rera Sant Domènec street. In addition to the specific cases of Sant Domènec street and the southern façade of Plaça de la Font.

The Cavallers street and La Nau street axis (Fig. 34-1). These two streets were built during the first urban development of the city in the 13th century (Salvat 1961, 97-98; Palma 1958, 29). It could be compared to a ring road that would have followed a route parallel to that of the 12th-century *Mur Vell* (Old Wall), connecting the two castles that were the two centres of power: the King's Castle and the ancient Bishop's Castle now Antiga Audiència (Salvat 1961, 109 and 165). Its uniqueness lies in the fact that, instead of following an orthogonal route like the rest of the urban fabric, it follows a bow-shaped route where the arrow would be located at the level of Major street. Its shape is difficult to understand, as the medieval city wall, which ran along l'Enrajolat street and Ferrers street, is completely straight.

The explanation can be found at the junction with the Major street. At this point, we know of the existence of either a ramp or a set of monumental stairs which, in Roman times, would have bridged the difference in level between the great representation square of the Forum (57 m above sea level) and the Circus (47 m above sea level) (Macias *et al*. 2007, print 4).

This stair system has been preserved under the current Baixada de la Misericòrdia, which allowed it to overcome the current difference in level (from the junction of Major street with La Nau street to the junction between Baixada de la Misericòrdia and Cós del Bou street there is also a 10 m height difference). At this point, there are four known vaults with a stepped section that would have belonged to the substructures of a ramp-stairway which, located on the pivotal axis, would have allowed the connection between the Forum's representation square and the Circus (p. 112 and 113).

Nowadays, the final part of these vaults is enclosed by modern walls and their exact length is unknown, although according to news referred to by Hernández Sanahuja (1952, 46), one of them reached Cavallers street, where, as stated by this author, the façade of number 2 (on the corner with Major street) was built on the final part of one of these vaults. This would indicate that the beginning of the ramp-stairway from the Roman period began precisely at this point.

It would also explain the curvature of Cavallers street and La Nau street. In the 12th century, when this area was first urbanised, the Roman ramp-stairway would still have existed and, therefore, it would have been impossible to make a straight connection between the two corner towers, forcing the two streets to make a curve in order to pass through the starting point of this ramp.

It is true that the two streets are not concentric and that La Nau street seems to have undergone a parallel displacement that is difficult to explain. It is also true that at the crossroads between La Nau street and Destral street, the remains of some Late Roman baths were found upon which present-day buildings are constructed (Macias *et al.* 2007, 188). As this crossroads has existed since the 13th century and contains ancient structures beneath, we must consider the possibility that, at the time of the construction of the medieval city, sufficiently relevant architectural remains were preserved at this point to adapt the urban fabric and create a new forced passageway that would move La Nau street to the south.

Salines street and Rera Sant Domènec street Axis (Fig. 34-2). Salines street follows an arc-shaped route, from els Ferrers street to Sant Domènec street, a stretch that coincides exactly with the northern half of the *carceres*. It would seem obvious that this route could be preserving the shape of this part of the Circus, and in fact, it is very consistent with the projection that would be made of the known remains located in the Town Hall.

The end of Salines street coincides exactly with the end of Sant Domènec street and falls on the same theoretical axis as the Circus' *euripus*. This has led us to believe that the *porta pompae* could have been located at this point, corresponding to a possible gateway in the city walls, already described by Hernández Sanahuja, where the current Torre del Tintorer (Dyer's Tower) (1892, 116; Hernández y Torres 1867, 14) is located.

Rera Sant Domènec street begins at a different point from this crossroads, indicating a completely different origin. The strange shape that is created at this point, forming almost a small square, is indicative of the contrasting origins of the streets that converge here. In fact, it is known that Rera Sant Domènec street was opened after the construction of the old Dominican convent of Tarragona (now the Town Hall building) in the 17th century and that, in medieval times, one of the entrances to the city was located at the junction of Salines street and Sant Domènec street (Hernández Sanahuja 1892, 116; Hernández and Torres 1867, 14).

Sant Domènec street (Fig. 34-3). It begins at Baixada de la Misericòrdia and ends at Salines street. It traces a clear diagonal line with the pre-eminent urban fabric, connecting the old Na Olivera gateway (the main access to the medieval city which leads to Major street) with the central point of the *carceres*, where there may have been one of the entrances to the Circus coinciding with one of the possible gates of the city wall (see Salines street). This street, therefore, would fossilise the main access route to the medieval city from the countryside, as is reflected in the route taken by the relic of the Arm of Santa Tecla when it first entered the city on May 17th, 1321 (Salvat 1961, 97).

The Baixada de la Misericòrdia, which nowadays connects the Major street with Portalet street, where one of the gates of the *Muralleta* used to be, was separated from the Plaça de la Font by an alley until the 15th century (de Palma 1958, 51). When the new gate was opened in the 14th-century city wall, the Baixada de la Misericòrdia - Portalet axis became the main access to the city while street of Sant Domènec became a secondary access.

The southern façade of the Plaça de la Font (Fig.34-4). It is well known that on the southern façade of the Plaça de la Font, each of the current buildings corresponds exactly to one of the vaults of the Roman

Circus. In fact, it is still possible today to perfectly observe and document both the abutments and, in some cases, the remains of the stands. However, this situation presents the anomaly that the current façades were displaced, in parallel, some 3.5 metres north of the podium wall of the Circus, as can be observed in the interior of the present-day buildings (fig. 33).

This phenomenon does not occur in Trinquet Nou street, where the current façade coincides exactly with the line marked by the Circus podium. We do not know how and why this façade was brought forward into the Plaça de la Font. It seems evident that it was done there and not in Trinquet Nou street due to the space available, which allowed the dimensions of the building plots to be increased without putting pressure on the road network.

2.3. Notes on the metrology of the Roman Circus of Tarragona

At first glance, the current urban morphology of the space occupied by the Roman Circus of Tarragona may seem rather chaotic. If we identify the layout of the main structures of the performance building, we can identify the guidelines of its structure: the long stands to the north and south, the *carceres* to the west and the Circus' head to the east. There is an underlying order. One might think that by representing only the identifiable or deducible Roman structures, cleaning up the alterations caused by the transformation processes that the area has undergone over the centuries, we would be able to identify an initial geometry of the Circus that responds to a project with a regular layout, as is the case with many Roman buildings. But that is not the case. From the outset, it served as a hinge building: the southern stands reflect the alignment of the residential *insulae* with the guidelines of the intramural passage of the *uia Augusta*, while the northern stands replicate the orientation of the great representation square that formed the intermediate terrace of the monumental acropolis of the Flavian period that crowned the city, a complex in which the Circus was the final piece (Macias *et al.* 2007, 25-40). Most likely, in addition to the geometric pre-existing structures, it also incorporated earlier ones; all of which would explain the apparent heterogeneity of its modulation and the architectural solutions that we find there.

However, this does not mean that the Circus was not a unified undertaking. It is clear that someone planned its construction and, as happens today in interventions in built environments, compromises were necessary to stitch together the pre-existing elements: we cannot fit the modulation of the Circus into a single grid, but we can distinguish strategies to give the building a certain metric uniformity, the most obvious being the use of a module of 18 *pedes* for the width of the vaults, which is altered more or less subtly with a certain regularity, whether to house singular elements, resolve encounters or adjust the total length of the stands. A module of 18 *pedes* fully consistent with the 90 *pedes* (18x5) used to structure the geometry of the second building project of the *Concilium Provinciae Hispaniae Citerioris Tarraco* (Puche 2010), evidence that allows us to propose a coordinated architectural planning of the whole of the Part Alta of Tarragona in the Flavian period: the Circus, the Forum's great representation square and the area of worship.

In the case of the Circus, the planners were skilful; they did not limit themselves to reproducing a typology, with slight variations, while also reducing its standard dimensions to fit it inside the walls. They knew how to work with a complex environment and elegantly set up a large entertainment building that housed horse races and, at the same time, resolved the transition between the residential city that rose up from the port on the south side and the architecture of power that presided over the city on the north side.

Northern stands (fig. 36). The northern stands have been the subject of two partial studies. The first, focused, on its eastern sector, determined that the structures of the so-called Long Vault were already part of the architectural section that resolved the gap between the representation square and the Circus area, before the completion of the construction of the latter (Dupré and Subías 1993; Vinci *et al.* 2014a). The set of vaults located in this sector can be understood as earlier substructures that had the function of supporting a small plaza that would serve to regulate the circulation between the two levels. The Long Vault is associated with 5 vaults that lie perpendicular to the head of the Circus, all of which have a rhythm between spaces that corresponds to a module of 18 feet and a depth of 25 feet; this proportion is a simple approximation to , with a formulation and accuracy similar to the fraction of 25/8 mentioned by Vitruvius as a solution for relating the diameter and perimeter of the wheels of a machine for measuring distances on roads (Vitruvius X, 14). If we extend the rhythm of the vaults' 18-foot module to the west, we find that it coincides exactly with the end of the Long Vault in a solid mass of ashlars. It houses a downspout that serves to bridge the gap between the sewerage system of the upper plaza and the one running through the Circus. We also find the 18-foot measurement in the separation between the ashlar wall belonging to the south side of the upper representation square and the inner face of the south wall of the Long Vault; the total length of the vault fits very well with 17 modules of 18 feet.

To the west of the Long Vault, there is a unique corridor: a stairwell that has the peculiarity of having direct access to the Circus arena, allowing one to climb up from it to the upper platform of the stands. There is the possibility that this was used to better distribute the spectators before and after the races, but it is also possible that its existence could be explained if it was conceived to be part of a regular route of ascent - beyond the dates of the *ludi circenses* - from the *uia Augusta* level to the representation square. Unfortunately, we are not yet able to fit this plan into the road network of the residential city; although restoration proposals have been made, the lack of evidence between Rambla Vella and Rambla Nova makes it difficult to verify.

The layout of a Long Vault ending in a singular space with a staircase is repeated in a roughly symmetrical manner in the western wing of the northern stands, although here the constructive elements are less known, less visible and less visitable, as they are more integrated into the buildings that have been constructed over them. This area, known as Volta de Sedassos (Sedassos Vault), was the subject of another specific study that determined that the stands rested directly on a solid bed of mortar, which contained a substruction vault built to reduce the volume of the construction backfill (Fernández *et al.* 2017).

Between the two staircases at the end of the long vaults, the metrics become more complex. The other supporting vaults are arranged perpendicular to the arena podium and have widely varying bays. In some sections, their widths correspond metrically to fairly exact multiples of the canonical Roman foot, but with apparently random variability: 15, 20, 24 feet. We also find some sequences where the 18-foot module seems to impose itself. In the very centre lies the *pulvinar*, its width of 100 feet can be linked to the width of the stairs connecting the central plaza to the worship area or to the width of the upper axial room (fig. 20 and 36).

When we measure the total depth of the stands from the outer face of the podium (the face visible from the arena) to the southern face of the retaining wall of the representation square, we get a total length of 58.5 feet. And if we combine this depth of the stands with the 18-foot module that defines - at least intermittently - various widths of the structures, we can identify a double golden rectangle: 29.25 x 18, which corresponds to a ratio of 1.625, an excellent approximation to the golden ratio Φ=1.618033...

The eastern head of the Circus and *carceres* (fig. 36). We have not been able to find a metrical or geometrical logic in the vaults supporting the stands in the southern half of the Circus. It would seem fitting that the axes of the supporting walls would converge at a single point, and that this would be the same point that defines the curvature of the podium. But that is not the case. Their guidelines are not quite perpendicular to the curve of the podium, nor do they seem to want to be parallel to each other. Of the six vaults, three are of similar width, around 14.5 feet at their narrowest point; the other three are narrower and vary in width. The *porta Triumphalis* is located on the axis of the head of the Circus.

Only the vaults on the south side of the head are known to us. The north side was destroyed during the Peninsular War and is still partially under present-day buildings. The same can be said of the podium in this sector, but the preserved sections make it possible to restore its geometry with a fair degree of certainty; it had a radius of curvature of 180 feet (the 18-foot module reappears, here multiplied by 10). Its centre of curvature does not coincide with the bisector defined by the podiums of the north and south stands, it is closer to the northern side. This means that the bow it defines, which spans around 77º, has a "bowstring" that is clearly rotated clockwise with respect to the longitudinal guidelines of the building, making the northern stands extend further east than the southern stands. Altogether, this is a subtle adaptation to the alignment of the section of wall against which the building is set on its eastern boundary.

As we have already mentioned, archaeological data from the west end of the building, the *carceres*, is scarce. A traditional interpretation on which most

restorations of the complete plan of the Circus are based, however, is that the curvature formed by the transition between Rera Sant Domènec street and Baixada del Roser street is fossilising its layout. We would thus find ourselves with a geometrically similar solution to that of the head of the Circus: an arch built at an angle to resolve the meeting of the stands with the line of the city wall that limits its maximum length, in this occasion at the western limit.

The southern stands (fig. 36). When we look at the layout of the Circus, it is clear that the north and south stands are not parallel. They open to the west. We have already said that we are looking at a hinge building, one which reflects the orientations of the urban structures that delimit it on its long sides. But that angle, so obvious in a survey, must have been hardly noticeable when the building was in operation. If anything, it would cause a slight perspective distortion effect in the long views, accentuating the vanishing lines in an easterly direction (the enclosure would appear longer) and concealing them in a westerly direction (the enclosure would appear shorter).

This effect of increasing or decreasing the apparent depth of a space has sometimes been used as a compositional device. A paradigmatic example would be the trapezoidal square designed by Michelangelo in the *Campidoglio* in Rome. This distortion was not intended when the Circus was built, but rather it responds to a previous urban planning reality, and in any case, it would be very subtle given that the rotation of the structures is minimal, around 3.46º. However, a shift in alignment that would have been visible, but which would have been difficult to identify on the ground plan, is the slight inflection in the southern stands, directly opposite to the *pulvinar* of the northern stands.

Although angularly it is a minor rotation (1.18º), it generates a slight concavity that would be perfectly perceptible from the seats located in the southern stands at its east and west ends, or from the seats in the southern half of the head. It is possible to hypothesise that they wanted to mark a transversal axis in the building, since the point where the change of direction occurs in the south stands is opposite the north stands; it could also be some kind of adjustment during the construction work, perhaps related to a singularity in the location of the inflection: it is located at the lowest point of the original orography.

It should also be noted that if we examine the layout of the Circus Maximus in Rome, we find a similar change of alignment, also located on the southern stands, but in a proportionally much shorter section and clearly associated with the *carceres*: it looks like an adaptation (a funnel) between the geometry of the starting boxes and the street, defined by the standard section of the building where the racers would finish.

If we look at the structures of the southern stands of Tarragona's Circus, we can see how the supporting walls are always perpendicular to the longitudinal direction of the building. There is no combination of vaults running longitudinally and transversally to the northern stands. Once again, we find the 18-foot module between axes that is characteristic between bays, but there are also many exceptions, such as vaults which alternate with bays of varying widths. But the rhythm is not evidently chaotic: after a succession of several "canonical" bays, we find a singularity, there is no random pattern as happens in some sections of the northern stands. It is possible that the vaults with wider interaxes were used as entrance ways. We also find singularities in the eastern end of the second bay, where the staircase leading up to the upper platform of the Circus' head is located, is narrower than the rest, causing a slight widening of the adjacent vaults. It is interesting to note that the oscillations in the width of these three bays were not perceptible in the façade of arches that opened to the south, on what is now the Rambla Vella; the floor plan shows how the pilasters of the façade are not aligned with the walls they conceal, thus adjusting the rhythm of the arcades they supported. This is the only section of the southern façade of the Circus that remains more or less intact. We do not know what solutions were adopted for those openings whose width was considerably greater than that of the standard module (there are vaults with interaxes of up to 30 feet), but we must suppose that, in some way, the façade absorbed these irregularities with the help of a compositional resource: doubling pilasters to maintain the width of the openings and the radius of the arches, or alternating, with a certain rhythm, wider openings covered by larger and higher arches which, perhaps, were integrated into a different decorative order in relation to a possible upper attic. Unfortunately, the identified remains of this façade do not allow us to further refine the reconstructive hypotheses for the time being.

If we measure the length of the vaults of the southern stands from the outside of the podium to the end of the supporting wall (the jamb from where the corridor behind the south façade of the building begins), we obtain a distance of 50 feet, which, in combination with the typical module of width between bays, gives a rectangle of 50x18 feet; that is, a double rectangle with the proportion 25/8, a good approximation to √2, which we have also identified in the vaults located at the eastern end of the long vault of the northern stands.

We also find a rectangle that approximates √2, in the corridor located between the vaults and the south façade mentioned above, but in this case with the long side parallel to the longitudinal direction of the building: the 18 feet of the width of the standard bays with respect to the 12.5 feet that we have from the outer face of the façade to the jamb where the supporting walls of the vaults begin.

An overview and conclusions. It is possible to propose a theoretical length of the major axis of the Circus based on the general modulation that structures the representation square: 2 squares of 540 feet (Puche 2010, 33-34), i.e., 1080 feet, which is 60 modules of 18 feet, or 319.68 m considering a Roman foot of 29.6 centimetres. This length is quite consistent with the situation of the scarce remains of the *carceres* located under the present Town Hall. However, we must consider that the building had to be designed keeping the sections of city wall in mind, which limited it at its eastern and western ends. This caused the slight turn clockwise that we have noted in the "string of the bow" that defines the geometry of the podium, a feature that can also be perceived in the *carceres*. This is the same reason why its axis is displaced to the west, breaking the alignment marked by the worship complex and the representation square.

A modulation inherited from the representation square, with its original size of 18 feet, would be coherent with the scattered but persistent presence of this module as the basic unit used to resolve the integration of the Circus as the hinge that would bridge the two parts of the city. In the area surrounding the long vault, we find the 18-foot module once more defining the vault's total length as well as the separation, with respect to the retaining wall, of the representation square and the width of the vaults adjacent to its eastern end. In the vaults flanking the *pulvinar*, the 18 feet consists of the interaxes of the standard bays. The radius of the arch which defines the curvature of the podium at the head of the Circus measures 180 feet and it is clear that most of the bays of the vaults in the southern stands respect the 18-foot rhythm.

The 18-foot module is also the basis of two proportions found in the Circus, typical of Roman architecture. On the one hand, we have the square root of 2, approximated with rectangles of 25x18 feet found in the vaults of the eastern end of the long vault, which predate the construction of the Circus, and the standard bays located in the southern stands; while the approximation of in the ambulacrum, which was constructed behind the southern façade, is resolvedwith a proportion of 18x12.5 feet. On the other hand, we have the golden ratio, which seems to be defining the depth of the northern stands (58.5 feet), because if we divide it by the module of 18 feet that we find in many of the transversal vaults, we reach a good approximation to $2\Phi \approx 2x1.625 = 58.5/18$.

The use of the golden ratio documented in the ground plan is replicated, not surprisingly, in the few surviving fragments of the elevation. This can be observed in the composition of the pilasters of the enclosing wall located in Forum's representation square, in the Praetorian Tower and in the Plaça del Pallol, where this ratio marks the relationship between the intercolumniation of the pilasters and their height (Vinci *et al.* 2014b, 93). We find it again in the eastern sector of the Circus façade, where the height of the arches maintains a golden ratio with the widths of the bays (Dupré *et al.* 1988, fig. II).

The presence of proportions in Φ and in √2 within the Circus' geometry should come as no surprise; they belong to the Roman builders' usual repertoire (Puche 2010, 16-18). We must not forget that both Φ and √2 can be drawn with a ruler and a compass. However, it is surprising that the former can be found in the basic modulation of the northern stands, while the latter serves to define the southern stands. The architectural heterogeneity of the structures of the northern stands is likely due to the fact that the Circus absorbed or overlapped, in part, structures designed in an earlier phase: long vaulted sectors and the *pulvinar*. It should be remembered that the construction of the Temple of Augustus in the upper part of the city, during the Tiberian period, should have involved an incipient project of urban

monumentalising of the upper part of the city prior to the great project of the Flavian period.

In this case, the attribution of Φ and √2 to the basic proportions of the north and south stands, respectively, could be read as the consequence of the application of different geometric resources by the planners, who on one side of the building had to integrate structures already present and, on the other, could work freely up to the layout of the *uia Augusta*.

Another possibility is to consider the Circus as a building that was designed at two different points in time or which underwent a change of design during the construction works. The two phases of execution detected in the eastern head of the Circus would testify to this transition. And it should also be noted that two distinct construction phases have been documented in both the worship complex and the representation square, corresponding to two different projects, the first of which is formulated using the proportion Φ and the other using the proportion of √2 (Puche 2010, 27-34).

2.4. Building elements and techniques

The Circus, as a building that performed various urban and scenographic functions, displayed the main constructive solutions of Roman monumental architecture in the second half of the 1st century AD. Furthermore, as it was a 4-hectare enclosure built on the Tarragona mountainside, its foundation systems took into account the unevenness of the slopes and the need for containment of the large levelling embankments, as well as its adaptation to the preceding construction elements. However, a careful analysis of the construction process has not yet been carried out, which should not be disassociated from the overall work carried out on the whole of the Part Alta (Puche *et al.* 2007; Puche 2010); nor of the containment structures that were built previously and incorporated into the new Circus complex (Vinci *et al.* 2014a).

This is a pending task that already has two partial studies (Fernández *et al.* 2017 and Díaz *et al.* 2017b) which show a clear relationship between functionality and construction technique. This can be observed in the selective use of *opus quadratum*, documented mainly in the podium wall and the southern façade, using the Mèdol stone, a bioclastic limestone from the Miocene (Gutiérrez García 2009, 146f). It was also a technique used in the delimitation of the ornamental and circulation elements of the stands. This work not only implied an aesthetic use but also a functional one, since the study of the *caementa* used in the stands indicates how the ashlars of the podium or the façade formed part of their own formwork system. The architectural analysis carried out in the Plaça dels Sedassos and Trinquet Vell street demonstrates this double function of the podium (Fernández *et al.* 2017, figs. 12 and 15.3). Moreover, we believe that the layout and placement of the podium would have been one of the initial stages in the project's topographic stakeout and commissioning.

The stone masonry has obviously been the material most affected by the subsequent plundering, as can be clearly observed at the eastern end of the Circus. Here, part of the podium is preserved in some of the segments while in others, there is clear evidence of the plundering that took place. We can also see how most of the stone seats in the stands have disappeared. Essentially, only the stone blocks used for seating on the long sides of the Circus have been preserved. This was mainly due to the fact that they rested on the abutments of the lower vaults and were used as dividing walls for contemporary buildings. It is also worth noting the miraculous preservation of part of the original façade in the south-eastern corner of the Circus.

As we have already seen in the upper precinct of the Provincial Forum, the manipulation -lifting and placing- of the ashlars can be observed in different places of the podium wall, as well as the signs of fixation between them: central lifting pins, joints for the lateral sliding of the blocks and, finally, swallow-tail staples as stabilising elements (cf. with Adam 1984, figs. 110 and 119; Giuliani 2006, 258s.; Díaz *et al.* 2017b, fig. 5) (fig. 41).

But the most extensive construction, which required a complex process of production of lime mortar, was the construction of *opus caementicium* vaults, conceived as the supports for the stands and the elements that defined the circulation spaces for the spectators, among which was the *arena* itself. The type of vaults used varies according to their location and functionality. Thus, at both ends and on the southern side, the construction was integral, extending from the podium to the line of the façade or the line of contact with the Republican wall. In some points of the façade and the southern podium, the presence of foundations in *opus caementicium* to bridge the hill's slope also stands out.

On the north side, though, a process of adaptation to the previously built longitudinal vaults stands out (Vinci *et al.* 2014a), possessing shallower foundations and, exceptionally, the presence of two large platforms. These consisted of two solid blocks built in sections that were partially lowered in modern times within the buildings of Plaça dels Sedassos and Trinquet Vell street (Fernàndez *et al.* 2017, fig. 21). For reasons unknown to us, these are sections of the stands that did not use supporting vaults and instead opted for the laying of costly stepped platforms. In the case of the Plaça dels Sedassos, a volume of 950 m^3 of mortar was quantified weighing an incredible amount (Fernández *et al.* 2017, 132, fig. 15).

In the aerial structures, the *caementa* walls are defined by *opus vittatum* facings, making this the most visible and distinctive feature of the Circus. It is a technique used in all the elevations of the *cauea*'s load-bearing walls and was the indispensable element during the shaping and forming of these structures. This construction technique has already been found in the port area of Tarraco, dating from the middle of the 1st century AD (Macias *et al.* 2007, print 497; Macias 2004, figs. 25 or 72); it is also documented in the foundations of the structures of the upper plazas, albeit with a larger and coarser finish (Macias *et al.* 2007, fig. 32, prints 35 and 45). This is the most notable technical advance in terms of construction and, in comparison with the evidence of the older upper enclosures, we can appreciate a notable improvement in its finish.

The ashlars used are made of a micritic limestone known as *llisós* which was extracted from local quarries (Gutiérrez García 2009, 212). Its massive presence throughout the Circus implies a specialised workforce and a complex working process, from the sourcing of material to the carving on site, possibly using a carving hammer. The frontal surfaces were cut with varying levels of smoothness and there is no evidence of facing. Furthermore, a detailed analysis of the quality of the *opus vittatum* faces shows a clear technical relationship between the wall and how visible it was to spectators or those moving from the *uia Augusta* to the Forum's square further up.

There are many cases that explain this aesthetic distinction. For example, most of the abutments of the vault in sector 1 of the Plaça dels Sedassos were erected in an irregular shape, with the exception of the section corresponding to the stairwell that led to the *ima cauea*; it can also be observed by the door of the podium, where the masonry consists of well-squared ashlar (Fernández *et al.* 2017) (fig. 50). The same is true of the vaults at the eastern end (Dupré *et al.* 1988). The abutments of the vaults A, B, C and I are made of *opus vittatum*, unlike those of D, E, F, G and H (nomenclature of Dupré *et al.* 1988). The latter were exclusively for the support of the stands and were built with pseudo-*opus incertum* and *opus caementicium* walls. We can also conclude that the walls of the so-called *uia tecta*, the southern vaults connected to the *uia Augusta* and the area around the *porta Triumphalis* Gate were very carefully constructed. The selection was not only by areas but also by walls. Around the large staircase preserved in a doorway in the façade (Dupré *et al.* 1988, fig. 30), the quality of the ashlar varies depending on whether the stones were above or below the steps. On a smaller scale, this can also be seen in the staircase in sector 4 at Sedassos, where the same wall has *opus vittatum* above the circulation ramp and *opus caementicium* below (fig. 49). Therefore, the ashlar masonry served a double function: to form the internal mortar filling of the walls, thereby avoiding the use of wood, while also providing a visual finish.

As a general practice, each construction grid of the abutments was formed by 5 or 6 courses of ashlars which do not present a clear metric homogeneity. They consisted mainly of rectangular or square blocks, except for the ashlars that served as lintels for the scaffolding holes, which were always elongated. In all these cases, the scaffolding fittings were contemporary with the building process. In terms of dimensions, the ashlars were between 9 and 11 cm high and between 10 and 20 cm wide.

The need to optimise the construction process of the Circus can be seen in the perfect alignment between the lime mortar foundation platforms located in the northern stands and its respective seating rows. In the Trinquet Vell sector, we can appreciate how the rows of seats formed the different layers of mortar above the podium, saving on timber formwork. At the same time, in the Sedassos sector, we can see how the elevation of the sections of the abutments of the longitudinal vaults was parallel to the expansion of the stands. Thus, it seems that the use of timber

was restricted to scaffolding and vault formwork. Behind this was a clear desire to reduce the cost of the construction process by avoiding as far as possible the use of removable formwork and, as for the carving of the ashlars, only those parts that were visible or that defined the doors or other openings were carefully finished.

So, for example, the inner face of the upper row of the podium, with the exception of the *balteus*, was quite irregular and the blocks of the *ima cauea*'s *praecintio* had to be cut on site for their proper fit (Fernández *et al.* fig. 16, Roig *et al.* 2017, fig. 3). We can also appreciate how the parts of the stone seats that were not visible were not uniformly carved. This is evident in the upper part of the ashlar masonry which was hidden by the upper row of seats, as can be observed in the irregular traces of mortar where they were attached (Fernández *et al.* fig. 17). This is directly linked to the fact that the rows of ashlars were laid out on a bed of mortar that had been deliberately spread, this allowed the stone to settle better and, at the same time, meant that the carving of the lower part did not require millimetric precision (Fernández *et al.* fig. 24).

All of this indicates that the Circus was the final result of a very well organised project which was carried out in a very limited working space, this was due to the extension and scenographic position within the walls of the complex which was to house the great ceremonies of the *Concilium Prouinciae Hispaniae Citerioris*. It is a small Circus that was wedged between the upper Forum, the *uia Augusta* and the walls of the late Republican wall. Its architects did not consider the partial demolition of the wall to obtain more building space, and the construction of the northern vaults wisely took advantage of the transverse retaining vaults that had been built previously. Thus, the upper part and surrounding area of the Circus featured a wide perimeter platform, identified with the neologism *uisorium* in the local bibliography, where, hypothetically, a wooden grandstand could have been erected. We should note that the working area was the same as the building site, and it could only be accessed from the ends of the enclosure and through the *uia*. Under these conditions, it is difficult to imagine how the reception and collection of the building materials would have been managed, as well as the coordination with the final squaring of the architectural elements. Fortunately, the Circus arena would have played a key role as a logistical area.

3 THE CIRCUS DRAWN

3.1. The subject of heritage

In 2008, a teaching adventure began between architects and archaeologists: an elective course that for a few years was called *Heritage Representation Techniques and, later, Virtual Representation and Restoration. Architecture and the city*. To make the reading easier, we will refer to it as either the *subject* or the *heritage elective*. The initial teaching staff was made up of Josep M. Macias and Josep M. Puche, from the Catalan Institute of Classical Archaeology (ICAC); and Pau Solà-Morales and Josep M. Toldrà, from the Higher Technical School of Architecture (ETSA) of the URV. The initial teaching staff has been maintained to date but, over several years of the subject's existence, it has been enriched with the collaboration of Agustí Costa, Ivan Fernández, Anna Ferré, Ferran Gris and Serena Vinci. The object of study was the monumental acropolis of Roman Tarragona, where the Circus has been the most intensely covered area.

The subject has always been characterised by its aim to be a testing ground for the available techniques in the graphic representation of heritage, within the framework of an interdisciplinary dialogue between architects and archaeologists. We have also sought the collaboration and have given a voice to the professionals and entities in charge of the management of the structures studied, which is why at different times we have been accompanied by Arcadi Abelló and Cristòfor Salom, from the Tarragona City Council History Museum; Imma Teixell, first from Tarragona City Council and now from the Generalitat de Catalunya; and Andreu Muñoz, from the Biblical Museum of Tarragona. Finally, we would like to thank the collaboration of the archaeologists Moisés Díaz and Josep F. Roig.

We would like to emphasise that with the experimental nature of many of the exercises in the heritage elective, we wanted to generate an atmosphere of creative and dialectic freedom in the interaction between students and teachers. To put it more simply: we approached the exercises in an open-ended, investigative way, where the results to be obtained were neither clear nor implicit in the statements. We have encouraged the students to try out different graphic solutions, and they have been actively involved in coordinating the activities. Now, more than 10 years later, we can state that the relaxed atmosphere of the subject, which encourages the formulation of questions rather than giving closed answers, has often become the starting point for further research, some of which has already been presented in papers and articles. The main motivation for publishing this book was to make available to the readers the results obtained in the heritage elective, especially the surveys, which we believe have value in themselves and can be a starting point for future research work.

The freedom given to the students regarding graphic representation has come at a price for the elaboration of this book: it has been necessary to redraw the surveys in order to give them coherence to facilitate the reading of the book as a whole. Below is a summary, in chronological order, of the subjects covered in the elective.

2008 – The Praetorian Tower. We structured the subject in two parts: the first focused on surveys and the second on research, a framework that has been maintained over the years. The object of study chosen was ambitious: the Praetorian Tower.

In the first part of the course, we divided the students into groups and each group was assigned a space or part of the building. Each group had to generate a 3D model of their area, based on a common topographic reference base and data collection using conventional means (sketching, tape measures, distometers and some perspective restitution). We thought that this would give us a good enough overall fit. This wasn't the case; when we put the different 3D models together, the result looked like a disjointed Peter Eisenman building. We found inadequacies in the survey methodology used, which was an extension of the one we had taught the students in a 2nd-year architectural drawing course and which they themselves had successfully used in modelling façades of historic centres. Unfortunately, its application to a building as complex as the Praetorian Tower revealed many limitations. The models obtained, essentially composed of combined basic geometries (AutoCAD solid models), did not adapt well to the irregularities of the surfaces, the collapses, the structural deformations and the superimposition of phases found in the Tower. The topographical control, based on establishing vertices and reference edges, also proved insufficient; it could not avoid obvious misalignments at the points of contact between the work of the different teams.

The positive thing about this experience is that it pushed us, in subsequent years, to test the application of mass data capture systems in surveys of historical buildings. Moreover, as can be seen from the material generated during this course, we did manage to compose a fairly good conventional survey (plans, sections and elevations); the obvious problems that were difficult to solve with the 3D models were more controllable in 2D, where the pinpoint accuracy of the topographic points was an easier reference to follow. It can also be said that the second part of the course was very profuse: we studied the diachronic evolution of the Praetorian Tower and formulated reconstructive hypotheses regarding the configuration of the sector in Roman times.

2009 – The Long Vault of l'Enrajolat street. We divided the first part of the course, dedicated to surveys, into two lines of work. On the one hand, we compiled a planimetry of the Long Vault and l'Enrajolat street, with a detailed topographical support to ensure the coherence of the drawings made by the different student groups. Tarragona City Council asked us to provide the material generated to serve as a starting point for the urban development project of l'Enrajolat street, which was drawn up and executed by the architect Carles Brull. This experience was a first attempt at collaborating with administrations in the survey of structures with heritage value. It has subsequently been continued through agreements and technology transfer projects where some of the students, who had taken the elective subject, have had the opportunity to come into contact with the professional world through scholarships.

On the other hand, we simultaneously carried out a photogrammetric survey of part of the structures we were documenting. The software we had at that time, *Topcon*'s *Image Master*, had very limited features compared to the software we use today, especially with regard to the automation of procedures: cameras had to be calibrated, points of coincidence between photographs had to be marked and we only worked with stereoscopic pairs. The results obtained with the photogrammetries may not have been of great value in themselves, but the work allowed us to understand the possibilities that this technique offered.

The second part of the course consisted of a study of viable architectural solutions to resolve the changes in elevation between the upper platform of the Circus, the so-called representation square of the *Concilium*

Prouinciae and its perimeter podium. Based on the excavations, the students composed a simplified 3D model of the connection point between these three levels, trying to arrange ramps and stairs, with similar typologies to those documented in the Circus itself or in other examples of Roman architecture.

2010 – The structures of the north side of the Circus. The aim was to clarify the connection between the structures of the northern stands and those of the buildings built above it that make up the current urban fabric, on either side of the axis formed by Ferrers street and l'Enrajolat street.

The reference planimetries for the Roman structures were the surveys of the years prior to the Long Vault sector and those included in the *Archaeological Planimetry of Tarraco*, as well as the documentation referenced in the bibliography of the same planimetry. As for the structures built above it, mostly residential buildings, the starting point was the surveys carried out by the Part Alta Special Plan.

2011 – General sections of Tarragona's Part Alta. The photogrammetry technique was tested on the Roman walls preserved behind the cloister of Tarragona's Cathedral, at the back of the portico of the Flavian-era *temenos*. We compared the photogrammetric model with a first survey test using a second optical data capture system, laser scanning, although with a very low sampling density (around one point every 5 centimetres) since we generated it without specific instruments or software; our working tool was a robotic topographic station (Topcon IS) that allowed us to programme an automated registration of a matrix of points. The results were processed in conventional CAD programs. By using two methodologies combined in a single software, we were able to check the perfect coherence of the two 3D models obtained, with deviations of just a few millimetres between the points recorded with the station and the mesh generated from the photographs.

The fact that we were working on the upper platform of the acropolis led us to compose two sections that crossed the entire urban complex of the Part Alta. It is necessary to acknowledge that the documentation generated is the result of our own work and the combination of surveys carried out previously, such as that of the Special Plan for the Part Alta or independent architectural projects such as those of the College of Architects or the *Plan Nacional de Catedrales* (the National Plan for Cathedrals). The diversity of the sources required intensive redrawing, updating and layout work, establishing a uniform level of detail and graphic style appropriate to the chosen scale of printing.

2012-2013 – Anastylosis of the *temenos and the temple*. There was a two-year hiatus from fieldwork, during which strategies were tested to get the most out of the 3D models. We studied the architectural articulation of the temple of Augustus and the portico that defined its *temenos*, using photogrammetric digitisation of pieces on display or stored in the National Archaeological Museum and the Biblical Museum. The students' experimentation in the elaboration of 3D models provided them with a pragmatic approach to the specific program, and the elaboration of reconstructive hypotheses provided them with an insight into the principles of Roman architecture: metrics and proportions. They were also able to see the limitations and difficulties of archaeological research based on partial remains.

2014 – Scanning of the Long Vault els Ferrers street. From this moment on, laser scanning takes centre stage. We have increasingly lighter equipment, computers are now more powerful, digital imaging is faster and cheaper and software is improving overall. This also applies to photogrammetry. In fact, in the first photogrammetry programs, it was necessary to carry out a time-consuming calibration process and then manually orientate the photographs (we have already mentioned Topcon's *Image Master* as an example of this early period). From a certain point, the whole process became almost completely automated (as we have been able to verify with programs such as Autodesk's *123D Catch*, Agisoft's *Photo Scan* and its successor, *Metashape*).

The methodology already experimented with in 2011 was improved upon using laser scans as an overall metric reference of the surveys, complemented with partial photogrammetries of areas of special interest or difficult access. Despite the accuracy and thoroughness of the results obtained with the scan, the point cloud that resulted was difficult to visualise and work with; it was necessary to process it in order to obtain graphic documentation that could prove useful and manageable (we have worked, among others, with open-code software such as Meshlab, or Leica's 3D Reshaper and its successor, Cyclone). Surveys were carried out in a little-known and little-drawn area: the Long Vault under els Ferrers street, contextualising it in surveys that covered Cavallers street and Plaça dels Sedassos.

2015 – Scanning of the Long Vault of l'Enrajolat street and the Circus' head. We revisited the area covered in the first two editions of the elective: the Praetorian Tower and the Long Vault, adding the southern band of the Circus Head, but now using laser scanning as a reference tool for the surveys. The students' work further developed and extended the strategies tested in the previous course to render intelligible the enormous volume of data provided by the scans. In some cases, we synthesised the surfaces of the models into a succession of slices, both vertical and horizontal. The vertical slices made it possible, for example, to represent the structure of the stands' supporting vaults as if they were the ribs of a ship's frame. The horizontal cross-sections obtained from a point cloud formed a model that can be assimilated to topographic contour lines, a representation technique widely used in many disciplines.

We also studied the possibilities offered by the algorithms of point cloud recording and editing programs, which make it possible to convert point clouds, suitably adjusted, into surfaces, which can be worked on to visualise sections, project images onto their planes or generate rendered views to give realistic volumes to models. The 2D visualisations obtained could be completed with the traditional codes of architectural and archaeological drawing.

2016-17 – The Plaça de la Font drawn by hand. It was a new break in the usual dynamics of the heritage elective. Although the students also carried out surveys using mass data capture systems, the core work of the course consisted of redrawing the public areas of the ground floor of the Circus area by hand. It was based on a planimetric database which was obtained by merging all the scans we had carried out in the sector up to that point and by filling in the gaps with direct measurements and existing documentation. When we talk about public areas, we are referring not only to the streets and squares but also to the interiors of the commercial premises that occupy almost all the ground floors of the houses which, in many cases, are dedicated to catering services (bars, restaurants and the like). In the summer, they expand into the public thoroughfare through terraces and generate an intense leisure hub, something that is not always easy for the residents of the Part Alta to accept. In short, we have integrated into a single document the graphic representation of the structures that define the public space of the Circus sector and the uses to which it is put, in the hope that, beyond the recording of the phenomenologies detected, it may be useful for articulating analyses on which to base proposals for transformation.

2017-18 – Redrawing of the different sectors from laser scanning. We wanted to provide an overview: to compose coherent and uniform surveys of all the parts of the Circus that we had studied while maintaining a single drawing style, without delving into the proposals or interpretations that we had encouraged in the work of previous courses. It was easy to understand and respect the fact that we did not want to include projective or reconstructive proposals, but to set a code of style that would obviate interpretations was a bit more complicated. Having examined publications on the Circus for many years, along with our own studies and the fieldwork carried out in the optional elective as well as in the research that has resulted from it, we became very familiar with the identification of the structures of the Roman spectacle building, the approximate layout of the missing sections, the constructive sequences or the contemporary alterations.

It is tempting to want to give different graphic representations to all this acquired knowledge but, although in many cases we were faced with very consensual readings, going beyond the existing and verifiable morphology of the structures could have distorted the objectivity sought by the survey included in the prints found in the final part of this volume. As can be seen, the style is strict and transparent, and we say transparent almost in a literal sense, as if we had tried to use the minimum amount of ink, avoiding solid colour fills or patterns. The thickness of the lines makes it possible to distinguish the sectioned outline of the structures, but at no time is it intended to approximate their internal constructive composition: the geometry of their "outer skin" is represented exclusively. The work and research we had done testing strategies to facilitate the visualisation of the point clouds are synthesised here by including in the surveys what are called "building x-rays": these become a backdrop to some parts of the drawings, providing information on the characteristics of their facings that we consider necessary but that were obtained from automated processes. In short, we have tried to articulate a neutral and rigorous survey.

Let's hope it will be useful.

3.2. The evolution of archaeological drawing in the Circus of Tarragona

The Roman Circus of Tarragona has always been a visible and remarkable building, so it should not surprise us that we find it reproduced or referenced, either directly or indirectly, from the first moments of the Christian reoccupation of the city. The first known document that makes an indirect reference is the cession that in 1128 the archbishop of Tarragona, St. Oleguer (1118-1137), made to the bishop of Vic, Ramon Gaufred, of the church of Sant Salvador del Corral (or animal pen). At that time, this was the toponym that defined the space outside the walls, delimited by the remains of the Roman Circus, and that infers its fundamental use.

Throughout the Middle Ages, reports on this area abound and almost always refer to a marginal occupation (cf. Dupré *et al.* 1988). From 1368 onwards, this sector lost its suburban condition and became a kind of city expansion after the construction of the *Muralleta*, the new defence of the city, which was built taking advantage of the Circus façade (Bosch *et al. 2003)*.

The first written references to the structures of the "corral" as a Roman building date back to 1573, when Ponç d'Icart published his Libro de las grandezas y cosas memorables de Tarragona [The Book of the Great and Memorable Things of Tarragona] (the original in Catalan was not published until 1984), amid the rediscovery and revaluation of the classical world. Ponç d'Icart correctly identified the still visible remains of the Circus and gave a brief description, going so far as to measure it. According to him, in the Spanish version, it was 400 *varas* long by 100 *varas* wide. These are Tarragona *varas*, which measure 0.7 m in length, resulting in a building that measures 280 m by 70 m In the Catalan version, he measured it in Montpellier *canas*, stating that it was a building of 160 by 40 *canas*. The Montpellier *cana* measures 1.785 m, which results in a building measuring 285.5 by 71.5 m.

In fact, the Circus measures about 75 m wide in the central part and 283 m long on the podium on the southern side, which shows the quality of Ponç d'Icart's work. His work can be considered the first scientific study of the Circus, although he did not provide any graphic documentation, at least any that has survived. No specific plan of the Circus can be found until well into the 18th century. It is remarkable that none of the illustrators who passed through Tarragona between the 16th and 18th century devoted any prints or illustrations to the Roman Circus. Not even in Wyngaerde, who documented other Roman monuments such as the Arch of Berà, the Tower of the Scipios or the Amphitheatre. This was probably due to the integration of the Roman remains into the fabric of the city, which meant that, although it was well known, it did not show a monumentality worthy of note. This can be clearly seen in the various maps we know of the city during the 17th century (Terrado 2017), which show the Plaça de la Font but never indicate the existence of Roman structures (fig. 60 to 63 and 65).

It is significant that the first known plan of the Roman Circus is the plan that the military engineer Juan Rafael Silvy made of the head of the Circus and the adjacent vaults in 1748 (Fig. 64) (v. Dupré 1988 *et al.* for a planimetric compilation of the main historical representations of the Circus). Silvy was Provincial Lieutenant of Artillery (Gaceta de Madrid, No. 17, pg. 42 of 26/04/1735). He was very active in Catalonia with the construction or design of several military projects, he was also known for his work in Tortosa, Sant Carles de la Ràpita, the Balaguer mountain pass, Tarragona and for the cannon factory in the Barcelona shipyards. The purpose of this plan, the *Planos y perfiles de los almacenes de S. Felipe y la Fusteria de Tarragona* [Plans and profiles of the warehouses of San Felipe and the Carpentry of Tarragona], was to document this sector of the Circus in order to adapt it correctly for military warehouses. This is why both the part of the adjacent city wall and the Sant Carles bastion, as well as the tower of Les Monges, are included. He also drew the sections of the vaults as well as various openings made in the upper part of the vaults. Any historical reference is ignored and there is no indication that we are looking at a Roman building.

Although it is a finished plan, the degree of detail and precision and the fact that it includes the sections, make this an exceptional document as it portrays exactly what the head of the Circus looked like before the demolitions that occurred during the Napoleonic retreat in 1813. This plan is followed by other similar ones, always with the intention of documenting military spaces that add little or nothing to Silvy's plan.

The second plan (fig. 66 I 67) worth mentioning is to be found in volume 24 of *España Sagrada* (Flórez 1769) and is the work of the architect and sculptor from Valls, Francesc Bonifàs. This plan shows the preserved remains of the Circus as they were at the time, free of superimposed buildings. It can be considered to be the first archaeological plan of the Circus. It shows the great historical interest they had in the building, as there was a notable effort to represent it in its original form. The known vaults of the two stands are drawn, which, although simplified, correspond to the ones we know today, and it presents the singularity of showing an elevation in the southern stands, cut off just behind the façade that looks onto the Rambla Vella. This shows both the corridor parallel to the façade and the vaults that would have supported the *suma cavea*. Oddly enough, he does not include any section of the head of the Circus, which leads us to believe that at the time its existence was unknown, even though the stands had been preserved there. It tries to be a realistic drawing, or at least as close to reality as possible, as it shows the eroded and missing parts and even indicates the areas that could not be accessed because they were full of debris. The only concession that is made is in the area of the *carceres*, occupied, if not destroyed, by the convent of the Dominicans, where a theoretical elevation was drawn of how it was thought they would have been originally.

The next representation of the Circus that we would like to highlight is included in the *Voyage pittoresque et historique de l'Espagne* [Picturesque and historical journey through Spain] by Alexandre de Laborde (1806). Specifically, the prints XLVII -*Plan du port et de la ville de Tarragone*- [Plan of the port and the town of Tarragona] (Fig. 68) and LVL - *Détailes des monuments de Tarragone* [Details of the monuments of Tarragona] (Figs. 69 and 70). These engravings are based on the charcoal drawings made by J. Moulinier and J. Legier. In the second illustration, the Circus shares the limelight with the aqueduct and the Amphitheatre; these, together with the Arch of Berà and the Tower of the Scipios which are depicted individually, represent the city's main Roman monuments. The plan of the Circus is very similar to the one published by Enrique Flórez, but more simplified. Thus, for example, neither the Long Vault nor the Sedassos Vault appear. But it does have the singularity of being superimposed on the urban plan, showing the relationship that existed between the monument and the city at the end of the 18th century.

This type of superimposition is not very common in drawings from the 18th and 19th century and, in fact, we only know of Ferrabosco's plan of St. Peter's Basilica in the Vatican in 1624, where he superimposes the plan of the Baroque building with the plan of the Constantinian basilica. This makes this plan, despite its simplicity, a *unicum*, since it not only explains a specific historical reality but also the relationship between this reality and the contemporary city of the authors. This superimposition can also be seen, albeit more simplified, in the general plan of the city (Fig. 68-70), where there is a clear intention to highlight the existence of the Roman building despite the fact that it was largely hidden.

In his book, Laborde gives a brief history of the Tarragona Circus and makes references to Flórez's work. Furthermore, from the visible remains, and despite not knowing the layout of the *carceres*, he tried to make an approximation of the length of the monument, which he estimated at 1100 Castilian or Burgos feet (1/3 of a Castilian *vara* or 0.278 m), approximately 306 m. The other new feature of Laborde's drawings can be found in the sections where, for the first time, the state of the stands, the height of the podium and the so-called *visorium* are represented. These sections correspond to the head and the southern side of the Circus, the latter showing how the first three steps of the *ima cavea* have been preserved. Despite these details, the drawing shows clear errors of interpretation, such as not differentiating the space occupied, on the southern stands, by the corridor or *ambulacrum* parallel to the façade line. He also erred in the depiction of the doors connecting the vaults to the corridor, which were topped by semi-circular arches and not by an architrave.

It was not until the mid-19th century that planimetric documentation was carried out for archaeological purposes or, at least, with a certain historical interest. The majority of this graphic corpus was generated by B. Hernández Sanahuja, who devoted much of his efforts to the study of the Circus. In the *Memoria Descriptiva del Circo de Tarragona* (Descriptive Report of the Circus of Tarragona), an unpublished manuscript, he carries out a painstaking study which incorporates a detailed general plan that improves on the one carried out by Bonifàs. Among other

details, it includes the vaults that disappeared after the Napoleonic army blew them up during their retreat and the two central vaults of the Baixada de la Misericordia.

Several partial sketches made by the same author, most probably before 1880, were made public. The *Boletín Arqueológico de la Real Sociedad Arqueológica Tarraconense* [Archaeological Bulletin of the Royal Archaeological Society of Tarragona] published in 1952 (Nogués 1952) a sketch plan of the vaults located in the central sector of the northern stands (fig. 77). It recorded the measurements, with annotations, of the vaults between the Long Vault (which is included) and the Plaça dels Sedassos, adding those located under the Baixada de la Misericòrdia. Among the observations are those that refer to several marbles stands still preserved in the area of contact between the Trinquet Vell street and the Baixada de la Misericòrdia, these indicate that they are identical to those found in the place where the Pulvinar restaurant would later be located.

Two drawings by the same artist still exist which, in this occasion, are more interpretative than descriptive in nature. We refer to an artistic reconstruction of how he imagined the monumental area of the Part Alta of Tarragona to be (fig. 78) and a romantic reconstruction of the head of the Circus (fig. 79). In the first one, Hernández makes a very loose reconstruction (far from reality) of how the Circus ought to have looked like; without structuring the *cavea* and with a very regular distribution of the *vomitorium*. He also proposed a monumental entrance in correspondence with the current Portalet street. The second is a curious reimagining of an abandoned but still intact Circus. It is worth noting that here he also considered that the stands would have had a single *cavea* and that there would have been a large *visorium* at the top.

After Hernández Sanahuja, there was no global attempt at documenting the site until the 1960s, when Miquel Aleu (2005) carried out a new planimetry and an update on the state of the Circus (fig. 84 and 85). Dr. Aleu, both as a City Councillor in several areas and as president of the *Real Sociedad Arqueológica Tarraconense* [Royal Archaeological Society of Tarragona], was very active in all matters related to the archaeology and history of Tarragona, an interest that was reflected in various thematic manuscripts that, with few exceptions, have remained unpublished. His plan, painted in watercolour and housed in the National Archaeological Museum of Tarragona, depicts all of its structures and tries to be descriptive: it points out the known remains, marks in dashes the missing but probable parts, and superimposes it on the present-day layout. The only interpretative concession he makes is to place an access to the arena right on the current Portalet street, probably as a reference to Hernández's plan.

There is also an error in the alignment of the northern vaults, which shows some angulation. This, plus the unique layout of Cavallers street and la Nau street, which break the orthogonality of the medieval urban grid, allowed him to hypothesise that the Circus had an oval rather than a rectangular ground plan on the outside. In addition to the plan, he made several very explanatory and illustrative sketches in which he objectively explains everything he saw and understood.

From 1982 onwards, there was a radical change in the way we understood the Circus de Tarragona. The recently created *Direcció General de Patrimoni de la Generalitat de Catalunya* [General Directorate of Heritage of the Catalan Government] commissioned the architect Salvador Tarragó to carry out a planimetric survey of all the preserved remains of the Roman Circus and their location within the current urban fabric (fig. 86 and 87). This commission complemented the survey, also at a scale of 1/500, that the architects Cantallops and Romaní carried out of the layout of the Part Alta (Cantallops *et al.* 1990). This was the first modern, comprehensive and exhaustive survey of the Roman Circus, as all the buildings known to contain remains were accessed and documented (Tarragó 1993). A general plan of the Circus was drawn up as well as detailed plans and sections, to a scale of 1/100, of the visible vaults of the Trinquet Vell street. This plan includes the layout of the medieval walls as well as its different towers, and identifies the large ashlar walls, dating from the Roman period, which are located in the area of contact between the Circus and the large representation square. A series of dotted lines indicates the layout of structures that are known to exist but are either not visible or have disappeared.

This plan presents two relevant inaccuracies. The first shows a northward inflection of about 5º on the podium line of the southern stands, starting in the eastern quarter. The other is an error in the printing phase of the documentation, which caused the upper part of the northern stands to be shifted horizontally in relation to the rest of the plan. This resulted in the anomaly consisting of a series of walls with unlikely shapes and inflections (fig.87). These anomalies have been recurrent in most of the subsequent planimetries, which have always been based on Tarragó's plan. Even the slant of the podium has been reproduced in the great model that was built of 2nd-century Tarraco.

Since 2007, all the planimetries carried out on the Circus have been based, to a greater or lesser extent, on the results of the *Planimetria Arqueològica de Tarraco* [Archaeological Planimetry of Tarraco] project (Macias *et al*. 2007). This was a joint initiative of the Government of Catalonia, the Tarragona City Council and the Catalan Institute of Classical Archaeology in which all the Roman remains documented in the city up to 2004 were positioned as accurately as possible (Fig. 93). As for the Circus, it allowed the printing error in Tarragó's plan to be corrected, realigning the abutments of the northern stands and better defining the slant he had identified.

It is a purely descriptive plan, devoid of any interpretative intent, except for a sketch of the line of the *carceres* and the layout of the stands in the area of the head of the Circus, which were blown up in 1813. All the existing elements are indicated and named, from the different preserved staircases to the known sewers and their theoretical layout. The project aimed to show and position all the elements known up to that time while also wanting to generate a solid documentary base on which the appropriate studies and interpretations could be made in the future. In addition, the Planimetry project provides the graphic information with specific and concrete references for each finding, which allows the graphic information shown to be contextualised and verified at all times. All of this has made the plan an indispensable point of reference in the archaeology and urban planning of Tarragona.

The latest update of the planimetry of the Roman Circus was published in 2016 (fig. 94). The project *Tarraco. Arquitectura y urbanismo de una capital provincial romana* [Tarraco. Architecture and town planning of a Roman provincial capital], by the Setopant research group of the Rovira i Virgili University, incorporates new graphic representation techniques and takes a new urban and architectural route (Mar *et al.* 2015). The plan of the Circus is sectioned at the level of the vaults, distinguishing between the known parts; the supposed parts, those we know for sure existed based on the remains; and the hypothetical parts, which are supposed or theorised but of which we have no proof. Thus, the *spina* and *carceres* (numbered) are represented as hypothetical elements, although this last component is scarcely documented (cf. Colominas and Ruiz de Arbulo 2017). It also proposed a theoretical layout of the vaults located in the head of the Circus, which were demolished in 1813 and which are well documented both archaeologically and by Silvy's planimetry; however, it was drawn with an inaccurate orientation and with a high degree of uncertainty.

This proposal is a reworking of its own based on the previous planimetries, which for the first time brings the northern stands right up to the city walls. The inflection made by the southern stands was removed, but the error of the abutments of the northern vaults of Tarragó's plan was repeated arbitrarily. In the southern sector, they placed a doorway in each space where there is currently no archaeological evidence of the existence of any vaults. This results in 7 doorways which open onto the *uia Augusta*, all of which vary in width and are positioned without any apparent order or rhythm.

Finally, it is necessary to mention the dissemination projects based on graphic documentation. On the one hand, there is the traditional and always useful format of the models, of which we can highlight two projects promoted by the Tarragona History Museum. The first is the large wooden model preserved inside the Praetorian Tower, which depicts the Circus during the Middle Ages and which follows Tarragó's documentation. The second was the large model of Tarraco in the 2nd century AD which, as far as the Circus is concerned, also follows Tarragó's documentation; the rest of the model incorporates the data from the *Archaeological Planimetry of Tarraco* and the research project on the Cathedral of Tarragona.

Additionally, the first virtual representation worth mentioning dates back to 2003 and corresponds to the project developed by the company Digivision (Macias and Muñiz 2003; Macias *et al*. 2004). It counted with the participation of the Tarragona City Council in a series of virtual reconstructions of the Roman monuments of Tarragona, with emphasis on

the contrast between these reconstructions and the present-day city. Although it had a solid scientific basis, its purpose was purely informative, aiming to provide a better understanding of the archaeological reality of present-day Tarragona.

In 2016, as a continuation of the "Tarraco. Architecture and urban planning of a Roman provincial capital" project, the Tarraco360º[2] website was launched, along with an informative publication (Mar *et al.* 2017) which shows various virtual reconstructions based on the research project's planimetry (fig. 95). However, some inconsistencies between the two formats are apparent. In the planimetry, the southern façade has 58 arches of varying widths and therefore the same number of vaults (Mar *et al.* 2015, fig. 117; Mar *et al.* 2017, 5.10-11). In contrast, the 3D representation shows 62 identical arches on the façade (Mar *et al.* 2017, 5.19).

2018 marked a major step forward, with the appearance of *Imageen Tarraco*: a platform, launched by the Tarragona Tourist Board, which uses augmented reality technology to showcase the Roman remains of Tarragona and other Roman cities. It stems from the project developed by Digivision, making the most of the possibilities offered by today's technology. Not only is it an augmented reality platform, but it also displays various photorealistic animations that provide a dynamic explanation of both the monument and its relationship to the present-day city (fig. 96).

The latest experience in virtual models has been provided by the Arrel project, which was created within the framework of the Recercaixa calls for proposals and is led by the ICAC and the UAB. This project developed a software prototype for mobile devices, similar to a *Serious Game*, to enable the exploration of the Circus. As part of this project, a large amount of three-dimensional and photogrammetric information was created and published on the virtual 3D model visualisation platform Sketchfab[3], which included diachronic models that showed what the Circus was like in Roman times, the Middle Ages and the present day (fig. 97 to 99).

4. THE CIRCUS AS AN URBAN MONUMENT

It makes no sense to speak of the Roman Circus of Tarragona as if it were an isolated object, an architectural ensemble from a bygone era, a series of remains preserved exclusively for museum use. If we tried to create an enclosure to encompass the entire Roman Circus of Tarragona, as has been done for other historical monuments, we would run into an insurmountable problem: in order to do so, we would have to demolish buildings, close streets and shops, clear squares and, in short, do away with all the activity of a part of a city which, at present, is fully active. To speak of the Circus, in Tarragona, is to speak of the city. And talking about the city means talking about memory, mobility, identity, its inhabitants and, ultimately, about life.

Tarragona is a city that has expanded and grown shaped by its historical remains; remains that have been superimposed and have ended up generating a series of layers from different periods which now coexist with each other, sometimes in harmony, sometimes in conflict. From the identification, drawing and reading of these layers, we are able to understand the structure that has shaped the urban development of the city over the centuries, allowing us to identify the most significant elements in the history of the city. This is the case of the Roman Circus, a central element both for its location and its size. Thus, by understanding, drawing and reading the layout of the Circus, we can explain the position and morphology of the other buildings that have been built on top of it, and which, in most cases, have used this Roman structure as a foundation and support. The Plaça de la Font and its houses; the layout of els Ferrers street, l'Enrajolat street and Salines street, as well as the Baixada de la Misericòrdia and the location of the Town Hall are all examples that reveal the city's Roman past on the surface.

Not only has it influenced the morphology of the city, shaping squares, streets and buildings, but, beyond its contribution to the urban layout, it has also influenced the lives of the city's inhabitants. The remnants of the past have served as a foundation and have endured and mutated throughout history, establishing different ways of using the urban space, influencing the management of tourism in the city or contributing to the generation of a collective identity forged through the collective memory linked to these remains.

All cities (especially the older ones) were built around sacred places: small hills, hollows, rivers or some other element that has, since ancient times, acquired this quality. As could not be otherwise in the case of Tarragona, it was the Part Alta that played this central role, thanks to its elevated position on a hill, facing the sea.

In the 1st century AD, the Roman temple was built there, which may have inherited its sacredness from an earlier tradition, now unknown. The *sancta sanctorum* is surrounded by spaces of representation and worship, along with all the organs of the different state systems. The temple is replaced by the Cathedral, and the Roman provincial buildings by the bishopric and other offices of power, but the sanctity of the site is maintained and reinforced. This dynamic has gradually shaped the hill as a centre of power, but also of worship, and has endowed the current Part Alta with a degree of urban centrality which, although it does not correspond to the geometric centre of the city, has defined the purposes and activities of this part of the city.

This condition of centrality is difficult to define: the emotional core of cities is fabricated over centuries, by the superimposition of layers upon layers of history, events and relationships. But all the inhabitants know that this area is special, an area to which one returns to time and time again; an area that confers an extra sense of identity and urbanity. A city without a centre is a naked city in which these traits cannot develop.

And despite the fact that, over the years, the Part Alta has been changed and neglected, at times when its physical appearance and the quality of its spaces did not correspond to this collective importance, the strength of its centrality continues to survive, awaiting better times. It is a power of resistance that has been woven between the space and its inhabitants, a power that has enabled this centrality to persist, allowing it to be revived through memory.

So, when we say that the historical centre carries a sacred and emotional weight, we are referring to this phenomenon. The local residents identify with this history which, in turn, makes them *Tarragonins*, Tarragona's people: it is their history. The memory of all the *Tarragonins*, both those of today and those who have come before them, takes shape within these streets, these stones, these sacred places, and transforms it into a reservoir of collective memory. It is, so to speak, the tangible, living record of its own identity.

The historical centre represents the city's culture, its past and its memory, all of which are revived ritually in the festivities, whether sacred or folkloric, that take place each year. The *Baixada de l'Àliga* [the Descent of the Eagle] is a parade which takes place on the 21st of September where a big figure in the shape of a crowned eagle parades through the streets of Tarragona. The *Pilars Caminants* [the Walking Pillars] is an event that takes place on the 1st of May in which the local *castellers*, the human towers, raise a single four-person tower and walk from the Cathedral, down its steps and through the streets of Tarragona until they reach the Town Hall in the Plaça de la Font. These and many other parades and processions, festive activities that are very popular in Tarragona, have their high point, that is, the most-awaited and expected by all due to its difficulty, in the Baixada de la Misericòrdia, just above the vaults of the Circus' stands. And no wonder, since the cathedral and the sacred places that give rise to a large part of these festivities are located in the very heart of the city.

It is interesting to note the slow and continuous shift of this centrality - at least in terms of formality and geometry - throughout the nineteenth and twentieth century. The bourgeoisie of Tarragona demanded and built a new city outside the medieval centre. It would be a more magnificent and striking city for their representation and enjoyment, as befits their newfound status as the ruling class. Thus, the construction of the Eixample, with its new social centre along the Rambla Nova, and later the extension of the city to the east, with the Plaça Imperial Tarraco and the star-shaped streets leading off it, multiplied the surface area of the city by five and offered different uses and mobility to the city.

2 https://www.tarraco360.com
3 https://skfb.ly/oyRW6

As a result, the city attempted to push its historical past into a corner and forget the location of its original centre. The Part Alta was partially abandoned and became a problematic area of the city. The neighbourhood began to suffer a series of problems typical of an empty city, such as the appearance of structural defects due to a lack of maintenance, making it necessary to demolish some of the houses. Likewise, this abandonment encouraged the occupation of some dwellings which then led to a certain degree of degradation and social exclusion, contributing even more to its abandonment.

But with the recovery of the Part Alta, where the main archaeological excavations were carried out, including those in the area of the Roman Circus (1980s), the significance of this quarter gradually recovered. It is only when the remains were revealed, and with them the collective memory, that this part of the city was once again reclaimed. It is as if we could trace a line connecting architectural heritage and urban life. The Special Plan for the Part Alta de Tarragona (PEPA), approved in 1986, also marked an important change in Tarragona. The city's political actors demonstrated this new outlook by approving a plan that focused its attention on the urban planning of this part of the city.

This recovery had also been enhanced, or rather accompanied, by the creation of an identity brand, especially for tourism, which focused on the area surrounding the city's Roman strata. On the one hand, this situation contributed to and accelerated the generation of an urban identity in its inhabitants, and helped to open up and diversify the city's economy. But on the other hand, this promotion of the site as a tourist product gave rise to a rather superficial narrative, designed to quickly reach a foreign audience. This process tends to simplify the reality of the city, and ends up trivialising some of its qualities while leaving others forgotten. In Tarragona, it is the Roman stones that have been left bare in this discourse, forming the image and imaginary of the city as a Roman enclave but perhaps forgetting its role as a substratum and its complex coexistence with the rest of the historical strata.

A recent case, the Tarraco Viva festival, is a clear example of the fragile balance between cultural dissemination and tourist discourse. Founded in 1999, its aim has always been to disseminate knowledge about the Roman period, especially in relation to Tarragona's archaeological heritage. The festival's great success can be attributed to the involvement of many of the city's inhabitants, who have joined in an activity that is gradually gaining presence in the collective imagination. It has also had a good impact on tourism, attracting a large number of visitors during the event. But while it is easy to see the benefits it brings, it must also be understood that this is a festival that emphasises and reinforces the monohistorical discourse of the city and which, above all, bases its dissemination capacity fundamentally on theatrical and themed recreations, with the danger of falling into a reinterpretation of itself.

It is easy to see how in some cases, this discourse has had a direct translation into the architectural intervention on some of the archaeological remains. In Tarragona, the visibility and enhancement of the city's past have been done too many times with the uncovering of Roman and medieval remains. In order to make the remains fully visible - and visitable - the buildings that covered them, and of which they formed part, have been demolished on numerous occasions, leaving large wounds in the urban fabric. In the case of the Circus, a large part of the head and part of the stands in Enrajolat street and Plaça dels Sedassos have been laid bare. The stones have literally been stripped to reveal a single historical stratum. And the result is, from a museographic point of view, uneven.

If we take the extreme case of the city of Pompeii as an example and compare it with the city of Tarragona, we will see that the most obvious difference is that in the first case the city has remained intact, frozen, almost photographically, at a specific historical moment. As a result, Pompeii is an inanimate, lifeless city, nothing more than a ruin preserved by volcanic ash.

Tarragona, on the other hand, is a city that has remained active, a city that has grown over the centuries and accumulated layers of life in each of its historical stages: a complex and lively entity that displays, within this complexity, all of its values. It would make no sense at all to think of it as a dead ruin, as an object to be displayed in a showcase beyond the reach of its citizens. But the simplification of the discourse has too often sought to recover Roman materiality as an end in itself, without considering its capacity to generate economic activity and forge a city. This process has not taken sufficient account of the urban complexities that intersect to give the city its value and to shape its centrality. Without all this complexity, without it being lived and relived, the city loses its meaning.

The difficult task facing the people of Tarragona, who have entrusted it to the professionals and decision-makers in charge of the city (historians, archaeologists, town planners, architects, politicians, technicians and restorers), is precisely that of ensuring that both the *seeing* and the *living* are compatible. On the one hand, there is the desire to be able to *see* the remains, to perceive the past directly with our eyes and senses, to perceive it and to be able to understand it in some way so as to continue shaping the layers of collective memory. On the other hand, the need to also be able to *live* the city, to allow ourselves to enjoy its spaces, precisely in order to ritually relive this memory, periodically, without allowing it to become just a fairy tale.

This conjunction can sometimes be complicated, requiring decisions to be taken with the utmost care and knowledge. It demands the scientific and exhaustive knowledge of the archaeological heritage in each and every one of its strata, while also requiring the necessary attention and consideration with which to face up to the complexity of urban life. It makes no sense, therefore, to suggest that this is a task that can be undertaken by a single discipline in a segmented way. Success will always come from the collaboration between various agents who can contribute different points of view and draw up comprehensive and decisive proposals. Heritage must be experienced, not just observed from a distance. We must strive for the urban management that promotes the diversification of the local economy as opposed to monoculture, the continuous employment of the city as opposed to tourist seasonality, and the establishment of a living diachronic memory linked to heritage as opposed to superficial discourse.

The role that archaeologists and architects have in this urban project is to understand heritage as an indispensable part of the city, establishing a strong link between the place, its inhabitants and its memory. This book aims to contribute to the enhancement of Tarragona's archaeological heritage as an integral part of a living, breathing city. As archaeologists and architects, we wanted to share, outside our classrooms, over ten years of collective work by recognising, drawing and understanding the fascinating layers of history that make up this city, all in order to make it more accessible to the public. Getting to know the Roman Circus of Tarraco better allows us to revisit the city's memory and reinforce its value as a physical element as well as an element of our cultural identity, so that we may continue to care for and experience this unique heritage for many years to come.

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ISBN: 978-84-125214-0-5
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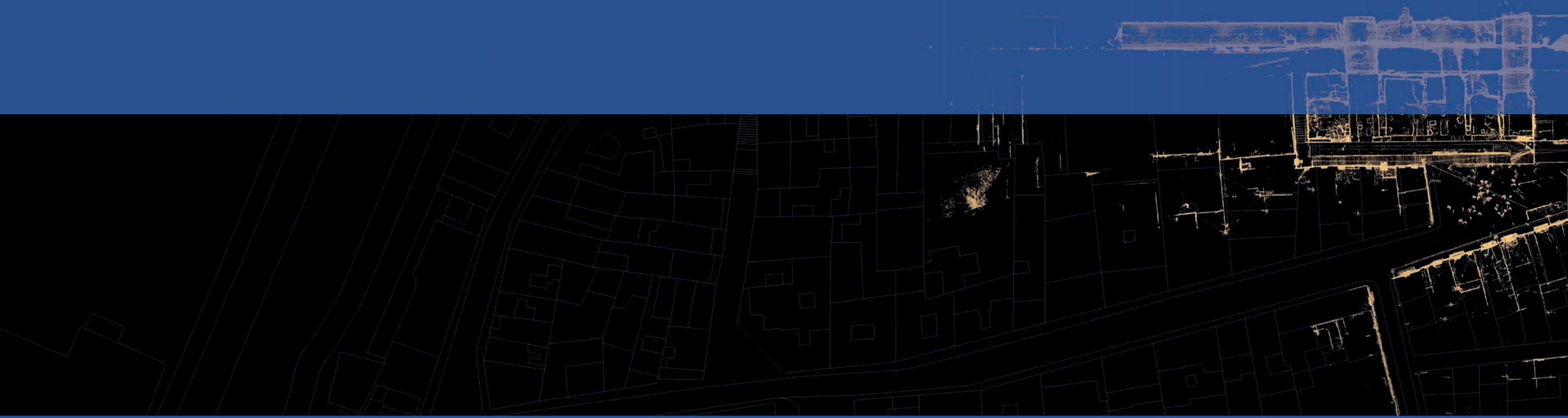

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