

**THE CENTURIATION AND
STRUCTURING OF THE *AGER*
IN THE COLONY OF BARCINO:
ARCHAEO-MORPHOLOGICAL ANALYSIS
AND LANDSCAPE MODELLING**

Josep Maria Palet Martínez
J. Ignacio Fiz Fernández
Hèctor A. Orengo Romeu

of. Most of the studies on carts from the Iberian era deal with carts found in tombs and with their ritual and symbolic function. There is also considerable literature on the cart as an instrument of war, as part of the warrior's armaments. In addition, it should be noted that the ownership of carts is connected with an aristocracy, with a warrior or ruling elite, as demonstrated by the princely tombs found, which are comparable with similar tombs of the Celtic world in Central Europe. Ricardo Olmos talks of a path to the afterlife, reflected in the carts in tombs. In any event, it is evident that the cart is always associated with the idea of travel or transport.

It only remains to say that of the group of silos found in the port of Montjuïc, the largest two each have a singular feature: one is the silo in which the cart was located and the other is the silo in which the cistern-well was found. These have a different infill, with the first levels consisting of earth and stone until we reach a level of rubble that seems to serve as a seal for something, in the first case the cart and in the second the cistern. Both date from the same era, the 4th century AC, the high point of the entire complex. Consequently, it may be that the presence of the cart did not come about by chance but has a symbolic meaning, as Josep de Calassanç Serra i Ràfols asserted.

The structuring of the *ager* of the colony of Barcino is presented in this study that takes as its starting point the archaeomorphological research conducted in the 1990s in the plain of the Pla de Barcelona, the first ever territorial study of an area—the city of Barcelona and its surroundings—rendered confused by urban development. This circumstance meant that the methodology had to be rethought in order to adapt the research to the problems specific to the area of study. With regard to the Roman period, the results demonstrated the importance of the founding of the colony of Barcino, which went hand in hand with a restructuring of the regional road network and the organisation of the *ager* of the city by means of the system of centuriation.

The methodological innovation introduced in this study consists of the application of Geographical Information Systems (GIS). The previous archaeomorphological studies were revised using digital techniques: the treatment and georeferencing of maps and images obtained by remote sensing, automated metrology, photogrammetry, techniques for calculating visibilities, statistics and systems for generating 3D representations. The introduction of GIS in archaeomorphological studies made reconstructions reliable and ensures highly accurate planimetry, an essential aspect in the search for centuriations. GIS also enable cartographic information to be integrated quickly and accurately and provide an extraordinary analytical capability.

A regressive cartographic base was developed in which the most modern map made it possible to georeference the oldest cartographic elements using common control points. The initial map taken as the baseline was the digital 1:5,000 topographic map produced by the ICC (Catalan Institute of Cartography). In addition, the ICC's 1:5,000 orthophotographic series was also used and the plan of the city of Barcelona in the years 1933-1936, drawn by V. Martorell, was georeferenced. This map was used to georeference the oldest plans. The cartographic base also includes the orthophotos dating from 1947. A digital model of the terrain, in which each cell measures 5 x 5 m, was

developed using the altimetric information of the ICC's 1:5,000 digital topographic base. The archaeomorphological results of earlier studies were georeferenced and included in the cartographic base. The lines were redigitized but the reconstructed lines were adapted to the more reliable cartographic information provided by the new cartographic base. The calculation of visuals from prominent places in the plain applied to the study of the centuriation was one of the GIS applications employed and made it possible to address the problem of perceiving the territory as it was at the time of the founding and its subsequent manifestation in the geometric structure of the colony. Tools were used in the study to determine the visible areas from particular places in order to identify points from which the fundamental lines of the centuriation would have been defined. In Barcino, the study proceeded on the basis of the hypothesis of the location of a *locus gromae* at the highest point of the colony, the area of the Mons Taber. The centuriation would have been planned from this point with the aid of other visual elevations in the territory. The elevation would have served in effecting the *limitatio* works using initial visuals produced with the help of the *groma*. The research postulated that other topographical points that were easily visible in the territory would have been sought from this point and taken as a reference for applying the calculations needed to draw the structure of the centuriation, as well as the *ratio* that defined the modulation. The results show that the founding of Barcino occasioned the creation of the centuriation structure and a road network coeval with it. This road network was defined by the Via Augusta and the secondary roads off it that linked the urban centre to other areas outside the plain and the paths that were part of the grid system. It has been noted that various stretches of Via Augusta are connected following the theoretical grid of the centuriation, constituting the diagonal of various centuria. This indicates that there was a unified concept of the whole of the colony—urban founding, the road network and the centuriation—that can be precisely dated to

**ACCESS ROADS TO THE NORTH-WEST
AND SOUTH-WEST GATES
OF BARCINO THROUGH THE
ARCHAEOLOGICAL EVIDENCE**

Francesc Busquets
José Espejo
Vanesa Triay
Alex Moreno
Alessandro Ravotto

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between the time of the founding of Barcino and the works on the road that we know of from the milliaries dating from the 8th century BC. The research conducted has made it possible to document that the centuriated structure was planned using a basic module of 15 by 20 *actus*, together with blocks modulated to 15 *actus* that survived in two areas of the plain. The centuriation extended across the flatter parts of the plain, avoiding hilly areas such as Montjuïc, the slopes of Guinardó and the peaks of Collserola. In these places, the roads followed the relief. Even so, the centuriation covered a relatively small area of the *ager Barcinonensis*, in the Pla de Barcelona, and extended from the coast roads but did not penetrate into the lowest delta lands.

The work reveals the usefulness of employing GIS to study centuriated landscapes. The study of visuals shows the relationship between four highly visible topographical points that would have served as references in the application of geometrical calculations to draw the main limits of the centuriated structure: the Mons Taber and, in the territory, the hills of El Putget and Les Tres Creus and the elevation of Santa Madrona on Montjuïc. The study of visuals between these points makes it possible to deduce the theoretical design of the main *limites* of the centuriated area and to determine the 15 x 20 *actus* module of the grid.

The body of data included in the study has made it possible to determine in detail the function of the Augustan centuriation, a typically Roman approach to rationally organising the space, in apportioning the land in the *ager*, but also in dividing land not assigned into a grid structure. The territory of Barcino reflects a multifaceted reality, with the existence of land not assigned in the theoretical grid or of centuria that were not all ploughed.

In this article, we present the results of recent excavations that have made it possible to document new stretches of road. The excavations concerned are those conducted at numbers 9 and 11-13 on Avinguda del Portal de l'Àngel, numbers 41-47 on Carrer Canuda, numbers 2-4 on Carrer de la Flor (in progress at the time of writing) and at number 140 on Carrer Hospital. These stretches of road lie in the areas immediately outside the walls on the west side of Barcino and correspond to the north-west and west thoroughfares. This characterisation of the space leads us in turn to attempt to contextualise the archaeological evidence existing in these two roads into the Roman city. In other words, it is our aim to clarify the panorama of the archaeological knowledge that we have of the accesses to the north-west gate of the *decumanus* and the south-west gate of the *cardo*. At the present time, we have archaeological evidence of three different road thoroughfares. If we analyse the engineering works and the characteristics of the construction of each of these stretches of road, we can learn what types of *viae* existed in the west and north-west sector of the *suburbium* closest to the city.

The road located at the properties on Avinguda del Portal de l'Àngel was made using stones of various sizes and small fragments of pottery incrustated into well-beaten clayey and sandy soil that lies directly on the natural geological ground. The result was a top wearing surface that was very hard and compacted. In addition, in the largest stretch documented, at least two levels can be observed. We believe that these levels correspond to successive repairs to the base course over time. The north-east/south-west orientation of the roadway is scored by narrow longitudinal lines identified as the tracks left in the surface by wheeled vehicles.

In the two smallest stretches found to the west of the first length of road, the evidence reveals a poorer state of conservation and the absence of any upper layer of repairs. Even though the technique used is the same, just one layer of less than 10 cm in depth has been recorded. As indicated earlier, this is probably due to the fact that this is a

later repair in which a stretch of unknown dimensions was completely relaid but less carefully than the original.

The excavations have made it possible to document the north-east edge of the road, yet the width of 4.8 m that is visible does not represent the full breadth of the roadway since it extends into the neighbouring property. Nevertheless, thanks to the planimetry provided by those in charge of the work, we have been able to determine that the full width was 5.4 m. In principle, it would seem that none of the *limites* typical of this kind of construction have been preserved, perhaps because they were removed so that the stone could be put to re-use elsewhere.

The section of the road seems to indicate that the surface of the roadway must have been slightly convex at the centre to ensure that water drained off, thereby preventing puddles and standing water. However, this central crown disappeared over the course of successive repairs.

The other stretch of road documented thus far, which is situated in what is now Plaça Vila de Madrid, reveals engineering works consisting of various roadbed layers, which augmented the top wearing surface. These successive changes to the levels of the top surface used by traffic should be seen as reforms and repairs carried out during the time that the road was in use, above all in response to possible floods and the accumulation of alluvial silt resulting from the frequent spates of the torrents in the area, as well as to the continuous occupation of the area as a necropolis between the 1st and the 3rd centuries AD.

The third road documented, the stretch found in the area of what is today Carrer Hospital, was constructed using a technique based on a solid course made up of medium-sized unevenly-shaped pebbles. The top surface used by traffic has not been observed.

The construction of this kind of roadway usually followed the same pattern. Two parallel trenches were dug and the edges (*umbos*) were marked by means of two walls, the *limites*, built using reasonably regular stones. The soil in between was then removed and the

trough refilled with pebbles or medium-sized or large regular stones, which consolidated the base (*gremium*) on which the top wearing surface (*summum dorsum*) was laid.

In the case of Carrer Hospital, the base consists of a single layer of pebbles of irregular shape laid to a depth of 20 cm directly onto clay.

As remarked earlier, the documented remains of the Carrer Hospital roadway are incomplete and hence we are unable to say what the width of the road was. A maximum width of 2.8 m has been documented, as has one of the two *limites*, namely the northern one which consists of two rows of reasonably regular stones some 50 cm wide.

Given the importance of the road in question, since it was one of the main access routes to the city of Barcino, it is reasonable to suppose that it must have been of considerable width. It is likely that the roadway was more than 5 m (between 17 and 20 Roman feet) wide, in other words, sufficient for two carts to pass by each other.

If we analyse all this information from the point of view of space and chronology, we can arrive at a series of conclusions and hypotheses regarding the way that the western road network in the immediate environs of the city of Barcino was structured.

The *decumanus* of the city, to the north, would have extended in a north-west direction and for the first few hundred metres would have run parallel to one of the city's aqueducts. This thoroughfare has been preserved in what is now Carrer dels Arcs. We do not know how wide it would have been but it must have spanned the distance from the aqueduct (to the east) to a funeral monument of the mausoleum kind that must have been situated on the western side of the path, beyond the edge of the roadway.

Some 200 m from the city's northern gate, this road crossed another path running south-west to north-east.

We currently have no information regarding the north-west side, but it has been possible to document more than 30 m of the stretch that ran south-west. Some 140 m towards the south-west of this preserved stretch, the road came to another crossroads. Another road in the

north-west/south-east direction ran completely parallel to the access road to the north *decumana* gate and some 175 m equidistant from it. It is interesting to note that this distance is virtually the equivalent of the Roman measurement of 5 *actus* or 600 Roman feet. The crossroads of these two roads would have been situated at the point where what is today Carrer Canuda would have run into the present-day Plaça Vila de Madrid.

We only have archaeological evidence for the south-east side of this new thoroughfare. Towards the north-west, certain morphological signs point to the fact that it would have headed in the direction of what is today Sarrià. This stretch has been interpreted since its discovery in the 1920s as a *via sepulchralis*. We also know of some 30 m of its length. In width, it is very similar to the previous road yet its measurements are less precise—between 4 and 5 m—for the reasons described earlier. In its engineering, however, it is very different, as it has a series of wearing surfaces or courses laid one on top of the other. It is possible to deduce from the preservation of the road in a number of streets and from the topography of medieval Barcelona that it continued towards the south-east. If we extend the thoroughfare, we can see that it runs along Passatge Magarola, through Pla del Pi (where a pedestal previously described was recently found) and along Carrer Cecs de la Boqueria before joining up with the south-east thoroughfare into the city at the south gate of the *cardo* of Barcino.

Of the thoroughfare that ran west from the south-west gate, we know of just one stretch located near Plaça Pedró on what is today Carrer Hospital. As mentioned earlier, this thoroughfare has been identified with the branch of Via Augusta that headed towards the Llobregat.

Few traces have been discovered thus far, but in the characteristics of their construction they closely follow the standard section of a Roman road as described by the Latin author Statius while observing the building of a stretch of the Via Domitiana in Italy, featuring *limites*, *umbos*, *gremium*, *summum dorsum*, etc. The finding of this small stretch has

archaeologically confirmed that this thoroughfare ran eastwards towards Creu Coberta.

We believe that the origins of the structure of the western network of roads into Barcino date back to the colony's founding in the 1st century BC. At the same time that the city was founded, a centuriated network was established with a complex planned road network in association with it that linked the entire colony's area of influence. This road system was one of the cornerstones of the structure of the *ager barcinonensis*, at least in the western *suburbium* until the late Empire. This is evident in the orthogonality of all the structures found thus far, which meticulously follow the alignments and orientations of the road network.