On the Traces of the Disappeared City: The Study of the Marks as a Strategies for the Urban Design

Maria Grazia Cianci 1, Francesca Paola Mondelli 2

1 University of Roma Tre, Department of Architecture, Italy
2, University of Roma Tre, Italy
mariagrazia.cianci@uniroma3.it

Abstract. The story of the covering of the Rio Darro, the river along whose shores arose the city of Granada in the VII century b. C., has provided the opportunity to make a research in order to recognise and studying the marks left in the existing urban fabric by some very important pre-existing historical elements. The river, indeed, was the subject of a long work of cover throughout the centuries, which was started back in the XVI century with the arrival of the Catholics Kings in Granada, and concluded only in the 30’s, and from which the study is started. The research was then extended to the analysis of the urban evolution of the city, which develops along the riverbed and turns as direct results of its covering, leaving in the two streets built on top of it the trace and the wound of this serious loss of its cultural and natural heritage. Alongside this mark, the research investigates other two systems whose traces are still visible in the urban fabric of the today city: the one of the ancient walls, mostly disappeared, at the point where they crossed the river, and the one of the bridges, now lost due of the cover of the river itself, in the correspondence of which we can now find streets that brings their names. The research wants to show how the study of this systems allows a clear interpretation of the current urban fabric, and at the same time provides the elements for a recovery project of the historic memory of the city, working with due regard to the contemporary public spaces. The philological study of traces and signs of historic derivation, and the strategic reuse of them, allow the coherent reconnection of the ancient public spaces arrived to the present day, while creating new ones, claiming how the recovery of the cultural heritage might be not just the purpose but the tool through which it is possible to project the modern city.

1. Introduction
The study of a territory is a large process that passes through different phases and different experiences. First-hand experience is the most instinctual, first and empirical sensory approach to a landscape, assimilated through the gaze, smells, sounds, contact, which determine a subjective perception essential to a more scientific analysis. Transferring those perceptions onto paper through drawings is the first critical action with which a territory is analysed, a step that will never be free of a component of subjectivity that makes representation unique [1]. Not even the cartography, which is the instrument par excellence used for the representation of the landscape, remains far distant from these mechanisms, contributing to the gap between the real and the represented landscape that has always been a topic of discussion. In fact, in figurative images, alongside the more technical and scientific component of the data that we want to report, we will always find the expression of an interpretation that the author has considered pre-eminent in the understanding of a territory, and in which we could say that the first embryonic design gesture is already inherent. This is why the study
of maps, in the vast range of forms and scales in which they are available, is a fundamental step in the intricate process of analysing a territory. It will be from here, in fact, that through a careful and crossed reading, it will be possible to extract those data that in our turn we consider pre-eminent and expressive of that personal perception that will allow the reinterpretation of a territory according to a new reading and therefore a new representation, as the last and decisive phase of analysis. The study of a city, described from its oldest representations, from iconography, to historical maps, to the most recent spatial planning works, gives us the opportunity to appreciate not only the changes that have occurred over the centuries from a natural and anthropic point of view, but on the contrary, it often allows us to catch the political and social history of a people, the evolution of the ideals that guided the city at different historical moments, and it is only by putting in line the sequence of representations that we can finally reach a deep knowledge of a territory, by breaking it down and recomposing it in all its parts, and by acquiring with a critical spirit the messages contained in each of its representations. Nevertheless, this is not the only interesting question in the debate about reality and representation. From another point of view, in fact, we could say that if representation is made by a set of signs that describes a territory, it is also true that it is often in the territory itself that the concrete and real signs determined by the transformations are embedded. In the traces that persist in the urban spaces, or in the furrows that dig the orography of a land, the landscape is "self-represented", it is told for what it is and for what it has been, and it is precisely those signs that allow us to go back from the contemporary image to the past, posing questions from which historical research originates, to discover the causes that have determined the current landscape. To this day, in fact, technological evolution has meant that the representation of the territory has taken on increasingly technical, scientific, objective forms, and above all without a stronger criticism and interpretation. The new techniques of detection and the consequent availability of information made possible by open data software such as Google Earth, offer a more complete and realistic representation of the territory, although through a more mechanical and less analytical process. This has significantly changed the approach to territorial studies compared to previous times, but through a critical and conscious use of these tools you can start the process of knowledge of which we have spoken so far, tracking down those signs and traces existing and of which the orthophotos can be an excellent basis for a graphic reworking, constituting, today, new forms of representation in which you regain the interpretative and analytical character of urban studies and landscape [2].

2. Traces and representation of Granada’s territory.
In this paper we will present the study that was conducted on the city of Granada, an urban and territorial context that is well suited to the application of the methods of analysis we are working on, given its particular relationship with the landscape, very characteristic and varied, as well as the result of a particularly complex and interesting urban history.

![Figure 1. Orography and hydrography of the province of Granada](image-url)
The city is located in Andalusia ‘Figure 1’, more precisely in the province of which it is the capital, half an hour from the coast from which it is separated by the presence of Sierra Nevada, an imposing mountain complex that reaches an altitude of almost 3,500 meters and whose figure dominates the city [3]. Less imposing but closer to the city centre, is the Sierra de la Alfaquera, the massif in which the Rio Darro arises, a river that crosses Granada before entering the Rio Genil, the most important river that has been incorporated by the city following its urban expansion, and which unlike the Darro flows in a wide plain to which it gives its name (the "Vega del Genil"). Whereas Granada is crushed by mountains to the east, on the west side it overlooks a vast alluvial plain that has allowed the economic development of the city, assuming such importance as to guide urban expansion along the north-south axis, building a ring road to the west, a real physical limit placed to protect the Vega. Morphology and hydrography have thus guided the development of the city since its foundation in the seventh century BC, which took place in the vicinity of the Rio Darro [4]. It is precisely the particular link between the city and the river established over the centuries that has been the focus of our research. The reasons for the birth of Granada near the Darro and not the Genil, the river of greater flow and length, a tributary of the Guadalquivir, lie in the different morphology that distinguishes the territories in which the two rivers flow. The territorial profile ‘Figure 2’ design very clearly describes the orographic conditions of the landscape closest to the city, to the east, characterized by hills and depressions sufficiently incised, thereby determining a territory that is strategic enough from a defensive point of view, although close enough to the river to be used for water supply and as a natural communication route. It was decided to represent this morphological condition through a design that brings together the territorial sections and a planimetric scheme of the city since it is intended to highlight the relationship between the Darro, its landscape, and its inclusion in the urban fabric of Granada, in the oldest and therefore most dense part from which it is narrowed.

![Figure 2](image_url)

**Figure 2.** Left: territorial profiles of the Darro valley. Right: sketch by Tomas Lopez of the Granada plain, for the geographical dictionary of Spain

2.1. *Ancient images of the landscape of Granada*

The system of territorial representation that combines profiles and plans is, as always, derived from the past. In fact, there is a drawing by Tomas Lopez ‘Figure 2’, one of the best Spanish cartographers of the 18th century, showing the Vega de Granada for the Geographical Dictionary of Spain, of the city of Granada and its surrounding territory. The drawing represents the orography through a system of profiles that are shaded and demolished on the plan in which we see the Rio Genil, the Rio Darro and other tributaries flowing. It is also schematically represented Granada, near the last stretch of the Darro, and other small villages and the main routes. It is one of the few historical images of the most cartographic type to represent not only the urban part of Granada (like the famous plans from De Vico onwards), but also the surrounding area [5].
To find others, we must draw on the maps drawn up by the Napoleonic army during the three years of occupation at the beginning of the 19th century, which, by focusing on military control, are carried out on a larger scale. In these images ‘Figure 3’ the city appears strongly related to its territory, which occupies the greater part of the representation, to the detriment of the urban part which is extremely simplified by reducing itself to a simple field. In the first image this area is interrupted only by the representation of the Rio Darro and its bridges: it is the natural element that creeps into the city that is the only interesting data from a territorial point of view. As for the anthropic elements, the representation focuses only on what is strategically interesting, and hence the walls and some routes that come out of the city towards the plain. This strong attention to territorial data is emphasized even more in the second image, in 1811, which at a much wider scale limits Granada to a red spot in the bottom right, but pays extreme attention to the representation of the orography, giving us a very clear image of the contrast between the plain and the Sierra that characterizes the landscape of Granada. The same accuracy is applied in tracing the roads that cross the Vega from the city, a fundamental fact for a study on the evolution of the routes.

3. The study of signs in the cartographic images of Granada.
   The study of the ancient maps has allowed us to analyse the urban development of Granada during the various stages of its expansion. We could distinguish two phases of study: the one that concerns the period from the foundation of the city until the end of the Nasrid era [6], and therefore the maximum expansion of the walls, and the one that concerns the growth and transformation of the city from the arrival of the Catholic Kings onwards.

3.1. From the foundation to the maximum wall expansion

If the geographical reasons have already explained to us the reasons and the places of foundation of the city, in the seventh century BC, as regards the city's structure in its Arab period must necessarily
refer to the Plan of the Arab Granada of Seco de Lucena, 1910. It must be said that images of the city in pre-Christian times are practically non-existent, or at least far from what can be called a more scientific cartography, involving some difficulties in the study of this important phase of the history of the city which for centuries has been attempted to erase the memory. Thankfully, however, it was from the mid-nineteenth century that a new interest in the Arab past of Granada began to be expressed, which led, among other things, to the drafting of this plan. Although it has been outdated by new studies, this plan remains a fundamental document for understanding the city's urban history, and has contributed to the elaboration of the images presented here. As we can see, the city is characterized through a development of walls that, by aggregation, embraced every new area of urban growth by attaching to the existing perimeter wall, arriving at the end of a system of very complex walls and articulated into multiple circuits hooked together ‘Figure 4’. The first enclosure is the one built in the Iberian era, in the 6th century BC, and which surrounded the upper part of the city, today's Albaycin district. In the XI century, in the Ziri period, the Alcazar fence was built inside the first nucleus and the first substantial expansions began to take place: it was the ziri walls that crossed the current historical centre of the city, crossing the Rio Darro at Puerta Real level, connect the existing wall with the first small Alcazaba fortress of the Alhambra. In the Almoravid era the most consistent change was the reinforcement of the existing fortifications, especially in the northern part where a new external wall was built, with a complementary function to the existing one. The following expansions took place in the Nasrid era: The Alhambra was built, a fortified city and autonomous centre of power, and in the meantime the walls were built around the new expansion zones that had arisen outside the Ziri fence, namely Albayzin in the north and Alferos and Loma in the south. At the end of the 15th century, the fortifications of Granada reached their maximum expansion [7].

3.2. By the Christian reconquest to the beginning of the 20th century.

The analysis of the development of the city changes from the sixteenth century onwards 'Figure 5'. In 1492 the arrival of the Catholic Kings in Granada marked the completion of the Christian reconquest, and therefore the end of the Arab rule in Granada. The need to provide a new image of the city was immediately felt, starting the first cartographic representations that have reached us. The first fundamental document is the Plataforma di Ambrosio de Vico ‘Figure 6’ of the late 16th century, a plan created not for the purpose of scientific knowledge, but to produce a new Christian image of the city, of strongly symbolic value as the last bastion of Islam to be regained. The city is represented in cavalier axonometry, in an attempt to regularise the Islamic framework and emphasizing religious buildings, designed on a larger scale. In this plan we begin to see the first signs of wall decay, particularly in correspondence with the new religious centres, as in the case of the Jesuit College, the religious order that is representative of these times. Although this representation is more symbolic than scientific, we can still begin to extract significant data regarding the walls, the first...

---

1 The studies on pre-Islamic and Islamic Granada of Orihuela and Vilchez (1990) and those on the urban geography of Granada of Bosque Maurel (1962).

2 Juan Calatrava, 2005.
expansions from outside them, towards Rio Genil, and also the first stretch of Rio Darro to be covered for the creation of Plaza Nueva. The elaboration of these signs has led to a representation that corrects the distortions given by the axonometric character of the plane, approaching reality and placing the city in its topographic environment.

At the end of the 18th century, criticism of the symbolic representation of the city of the Plataforma de Vico began to be expressed. In 1795, Francisco Dalmau created the first cadastral plan of the city of Granada ‘Figure 6’: it was no longer a symbolic representation, but a scientific one. The grid with which the plan is divided shows the will to control and measure the territory. This cartography shows us a city not very different from that of the sixteenth century, with no substantial expansions except for the area of the Triunfo, north-west. The attention is thus once again focused on the changes made to the city walls, which are gradually continuing to disappear. It is at this point that we see the entire section that surrounded the city to the west disappear, skirting the Plaza Bib-Rambla, crossing the Darro and reaching Plaza Campillo. Anyway, the sign of the presence of the walls in this stretch remains in the folds of the building fabric: the curve that we see today assume to the buildings from Puerta Real to Plaza Campillo, when opening in an area that constitutes the Piazza de la Fuente de las Batallas, would not be explainable if we did not know that it follows the curve of the ancient ziziered walls that passed here. Another note of particular interest is the disappearance of the Darro at a second point, in the area of Puerta Real. It must be said, however, that although Dalmau represents this stretch of the river covered, he was only reporting a prediction proposed in 1791 but not yet realized. The work was in fact only carried out later, in the second half of the 19th century, following two episodes of overflowing of the river [8].

![Figure 6. Plataforma Ambrosio de Vico (end of 16th century) and the Francisco Dalmau Plane (1796).](image)

The advancement of the process of disappearance of the ancient walls is visible in the Plan of J. Contreras dated 1853 ‘Figure 7’. The city still appears almost unchanged: it was in fact a plan drawn up to control and study the territory in preparation for the major interventions that would change the urban axis in the nineteenth century. In this phase remains three main stretches of the walls: a portion of Albayzin, a stretch of the ancient Alcazaba, and a third stretch that connected the Alhambra with the Bermejas Tower. Rio Darro is still only covered at Plaza Nueva and Puerta Real.

The state of conservation of the walls as it has reached the present day is that represented in the Plano de Granada of 1909 ‘Figure 7’, realized by the geographical and statistical institute, and in which in fact the stretch of fortifications from Torre Bermejas to the Alhambra is missing. In addition to this data, the plan also shows a hint of expansion beyond the Rio Genil, and the continuation of the buildings in the north direction. Unlike the previous maps, this map is finally oriented north³.

³ This had been done only in the maps drawn up by the French army.
abandoning the orientation with the east at the top chosen to perceive the Alhambra and the Cathedral more central in the representation. Particularly interesting are the traces left in the urban fabric by the great transformations of the nineteenth century: the Rio Darro covered for a now consistent (though not yet entirely), leaves room for the construction of Calle Reyes Catolicos, and from there to the square of the Triunfo is built the Gran Via de Colon, through a typically nineteenth-century disembowelment [9].

Figure 7. J. Contreras Plane of Granada (1853) and Granada Plane of 1909.

4. Traces of the urban fabric in the historic centre of Granada.

The majority of the north-south expansion that configures the current Granada's shape has therefore taken place from about the middle of the 20th century onwards. As we said earlier, the choice to protect the Vega by building the ring road to the west of the city has meant that Granada in its central part was kept small, while including within this sector a variety of urban fabrics that differ in relation to the time of expansion they belong to. This richness of shapes and imprints was represented in a sort of abacus that compares the different geometries drawn in planimetry from the buildings, distinguished by colour ‘Figure 8’:

Figure 8. Analysis of the traces of the buildings in the historic center.

- The oldest part of the city, the Albayzin, is indicated in light yellow. The construction fabric in this sector is very irregular and consists of small buildings;
- Then we have the historical centre: the building fabric here is very varied both in form and size, due to the numerous interventions that, as we have seen, starting with the Christian reconquest and throughout the nineteenth century have transformed the urban fabric of the historical centre;
• The city of the 17th and 18th centuries: the urban fabric is much more regular. There are still small buildings in the area that develops at the foot of the Alhambra hill;
• The city of the early 1900s: expansion began mainly towards the north and south. In the urban fabric of the centre, therefore, only a few buildings of considerable dimensions are inserted, while following the small buildings positioned on the slopes of the Alhambra;
• The city in the mid-1900s: the urban fabric is made up of buildings of considerable size and almost always regular, although the fabric is less dense than in previous phases;
• The modern city: the fabric is mainly made up of large buildings with a very regular weave behind the ring road.

5. Traces of the disappeared river and bridges in Granada’s urban fabric.
If up to now we have analysed the traces left by the wall system and the transformations of the urban fabric, particular attention must be paid to the signs deriving from the covering of the Rio Darro, which we have mentioned. To reconstruct the story, which began in the early 1500s and ended in the 1930s, we started with the recognition of the changes in the various historical maps, in which we see a progressive disappearance of the river [10]. From this first analysis we have come to a re-elaboration of the data that on one hand has led to focus attention on the transformations of the urban fabric near the river, on the other hand focuses on the succession of bridges that in different eras crossed it. The study of the bridges was fundamental to give historical significance to the roads that rose up near them and that today still remain, as they are the sign of the connections and relationships between public spaces and buildings of interest in the two parts of the city that were once separated from the river.

Figure 9: Coverage status of the Rio Darro in middle age, 1515 and 1854.

• In the Islamic period the Darro was crossed by nine bridges, of which only two are preserved today: The Puente de los Labadores, the Puente Chirimías ‘Figure 9’.
• At the beginning of the 1500s the first bridge of the Christian era was built, at the level of Puerta Real: the Puente de la Paja, the Puente del Cadi no longer crosses the river (it has arrived today only in a state of ruin), and from the maps also the Puente de lo Justo disappears. The Puente de los Leñadores also disappeared after the river cover for the Plaza Nueva ‘Figure 9’.
• With the covering of the Darro in Puerta Real, the Puente de la Paja disappears. However, the Puente de Espinosa and the Punete Cabrera, which still exist today, were built and, following the expansion of the city towards the Rio Genil, two new crossings were also built on the Darro: the Puente Castañeda and the Puente de la Virgen. The Dalmau also has a newly built bridge between the Puente del Carbon and the Puente de los Curtidores ‘Figure 9’.

4 There are still doubts today about the real existence of this bridge, since we have not received images that represent it. However, it is reported in Seco de Lucena's Plan of the Arab Granada, and its name seems to derive from the fact that in Islamic times it gave access to the Court.
• As the Darro roofing works progressed, between 1857 and 1866 the Puente del Carbon, the Punete de los Curtidores and the newly built bridge brought back by the Dalmau to the previous phase disappeared ‘Figure 10’.
• The completion of the work on the current Calle Reyes Catolicos between 1867 and 1880 also cancels the Puente de los Zapateros ‘Figure 10’.
• Finally, in the 1930s, the coverage of the last stretch of the river on the current Calle Acera del Darro led to the disappearance of Puente Castañeda and Puente de la Virgen ‘Figure 10’.

Figure 10. Coverage status of the Rio Darro in 1857-1866, 1867-1880 and 1933.

Of all these bridges, traces remain today in some of the streets that still bear the name, and that once stood at them, while the roads built above the course of the Darro (Calle Reyes Catolicos and the Darro Maple) are today the strong sign in the urban fabric of its ancient passage in the city, almost like a scar that testifies to the serious loss that the city of Granada suffered through the work of the so-called "Embovedado" [11].

6. Design suggestions: traces as project elements.

Figure 11. Project layer scheme

All the signs of the past that, as we have seen, remain in the contemporary city, from the walls to the river which disappeared, to the bridges that crossed it, are the occasion for a project of the memory of the city which had been lost. The enhancement of public spaces in the historic centre of Granada is a process that can be carried out simply by emphasising these existing traces, so as to make the relationships and meanings of existing architecture and spaces perceptible to passers-by. The research therefore results in obtaining from history the elements for the drafting of a landscape project on an urban scale, which retracing the course of the river, tells the story of Granada's past time after time. The systems involved in the project will be those analysed ‘Figure 11’: the river route on Reyes Catolicos and Acera del Darro streets, the system of ancient bridges that crossed it and that are used as elements of transversal connection of the main public spaces of the city, and the sign of the ancient wall circuit that wants to suggest the boundary between the oldest and the most recent public spaces, motivating, as we have seen, also the reason for the urban development of the city in a certain
direction. Clearly, according to the different urban contexts that the project encounters, these elements will be proposed and used following different strategies. In particular, in the case of the river recovery, this can be materially discovered, also giving rise to the reconstruction of the destroyed bridges, or simply evoked through a particular soil modelling and a strategic use of materials [12]. This choice will also be made for the vegetation system of the project, which will act in a sensitive way to the natural element of water, moving away or getting closer to the path of the river depending on when this remains covered or is brought to light. The intention of the project is to recreate suggestions that make the city of the past perceptible [13].

7. Conclusions
The study of signs at different scales, from the territorial to the more urban, is what allows the deepest understanding of the city and the landscape. Whether it's the curves that describe valleys and ridges, or the paths on which the urban expansions are attested, or the shapes taken by the fabrics as a result of the historical stratifications, these are the lines to look at to retrace the history of each place and it is in these same lines that we must find the founding pillars for a conscious landscape project. The goal of the analysis will never be an end in itself, but always in order to acquire the right tools for the design of contemporary landscapes, tracking down the strengths and greater identity through a constantly open research.

References
[1] CIANCI, Maria Grazia. Metaphors, representations and interpretations of landscapes. Florence, Italy, 2008. (in Spanish)
[2] GHIO, Francesco, METTA, Annalisa, MONTUORI, Luca. Open Papers, written on the landscape. Pisa: ETS Edition, 2012. (in Spanish)
[3] MORON GARCIA, I.. Evaluation of the landscape of the Darro Valley. Granada, Spain, 2009. (in Spanish)
[4] GIRON LOPEZ, C. Around Darro: the gold valley. Granada, Spain: Caja General de Ahorros de Granada, 2000. (in Spanish)
[5] CALATRAVA, J., RUIZ MORALES, M. The Plans of Granada 1500-1909. Granada, Spain: Diputacion Prov. De Granada, 2005. (in Spanish)
[6] ORIHUELA UZAL, A.. Granada, between Zirids and Nasrids. In Art and culture of Al-Andalus. The power of the Alhambra. February 2014, Intervention held within the seminar organized by the Patronage of the Alhambra y Generalife, the Fundación El Legado Andalusí and Casa Árabe, Granada, Spain.
[7] LODDO, D. & MARTORELLI, S. Park of the walls of the Alhacaba and recovery of the ancient Porta Monaita in Granada. Study for an conscious intervention (thesis). University of Roma Tre, Rome, Italy. 2015.
[8] ISAC, A.. Urban History of Granada. Granada, Spain: Diputacion Prov. De Granada, 2007.
[9] GALLEGO BURIN, A.. Granada, artistic and historical guide of the city. Granada, Spain: Comares, 1961. (in Spanish)
[10] BARRIOS ROZUA, J.M.. The missing Muslim Granada. El legado andalusí. 2010, vol. 11 (42), pp. 14-25. (in Spanish)
[11] SERRERA CONTRERAS, R. M. The Darro and the Romantic Granada. Granada, Spain: Caja General de Ahorros y Monte de Piedad de Granada, 1990. (in Spanish)
[12] ONTIVEROS ORTEGA, E., SEBASTIAN PARDO, E., VALVERDE ESPINOSA, I., GALLEGRO ROCHA, F.J.. Study of the construction materials of the walls of the Albayzin (Granada). PH Boletín del Instituto Andaluz del Patrimonio Histórico. 2008, vol. 16 (66), pp. 32-47. (in Spanish)
[13] Caja Granada. Dauro: a river in the image of the city. Granada, Spain: CajaGranada, 2009. (in Spanish)