BUILDING TERRITORIES AND LANDSCAPES

THE ESSENTIAL KNOWLEDGE OF A FORGOTTEN CULTURAL HERITAGE

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ANCIENT CARTOGRAPHY
CULTURAL HERITAGE

A deep knowledge of a building or a city centre is needed before undertaking any planning or restoring activities.
This knowledge becomes particularly essential when historical buildings or towns are concerned, but it seems to be less important when the subjects are territories and landscapes.

Such a resistance to change the scale, together with the lack of a true culture of landscape, are the result of wrong or restrictive scopes that ignore the heritage qualities produced by centuries of human traces. We focus on the construction of the territories and the landscapes by means of both innovative and traditional methodologies.

INTRODUCTION

The knowledge of the way both territory and landscape were built throughout the centuries is a fascinating task where historical, ethnographical, architectural, artistical, literary, natural, or archaeological phenomena meet within a particular area (UNESCO, 1972). This essential knowledge must be achieved prior to undertake any urban or regional planning, or even to plan any touristic or economic development.

Definitions of territory and landscape are outlined following criteria of objectivity. From the traditional geographic point of view, the territory is the set of natural elements which are studied under the scope of the Physical Geography, in addition to the set of human constructions which are studied by the Human Geography (Terán et al., 1987).

Fig. 1 Spanish Anonymous 17th century, *Carta topográfica de un tramo del río Pisuerga en las cercanías del lugar de Mave (Palencia) dividido en dos ramales mediante un presón. Real Chancillería de Valladolid, Ministerio de Cultura de España*. Local plans and views used in civil disputes were finished off by means of precise written descriptions that helped to avoid inaccurate drawings. Nevertheless, boundaries and property lines were represented in such a way that nobody could be led into error.

Fig. 2 Francisco Nande 1749, *Mapa del Puerto de Guadarrama y sus contornos en que se demuestra la nueva carretera*. *Archivo Cartográfico y de Estudios Geográficos del Centro Geográfico del Ejército, Ministerio de Defensa*, Madrid, Spain. Some of the roads that were built during the Kingdom of the Spanish Bourbons were accurately drawn and defined in every single detail, as it is shown in the maps. Most of them are still preserved, and along the field work they are measured and drawn, while all possible changes from the original projects are checked.

Although some of these phenomena have no physical materialization –such as a district boundary or a precinct–, all of them are measurable, and can be georeferenced.

On the other hand, the idea of landscape results from the perception that population has about a territory, being thus a subjective approach (European Council, 2000).

As a consequence, a transdisciplinary convergence is needed in order to have a deep knowledge of the construction of a particular region. From this perspective both historic (Figure 1) and current objective data, and subjective perceptions will be gathered (Chías, 2012).

Our main target is to know, describe, analyse, and diffuse such an interesting unknown heritage.

METHODOLOGY

Due to the circumstances, scales and features of these kind of researches, we designed a specific methodology to be applied worldwide, that gathers both the transdisciplinary focus and the use of modern information and communication technologies (ICT). To that effect we also foster the use of open source software. Our team is composed by architects, civil engineers, art historians, surveyors, computer experts,

sociologists, etc. This way we can cover the broad spectrum of tasks to be fulfilled throughout each research project.

Once the area to be studied is adequately delimited, the structure of the project must be defined in its different coordinated stages.

The first phase develops an exhaustive research of written, drawn, photographic, and cartographic sources stored in the main Spanish archives and libraries.

They bring to light essential historic and current data about the main components of the territory, as for instance old customs (Chías & Abad, 2014), traces of ruined buildings arising from toponymy (Chías & Abad, 2016a). Sources also bring information about the main historical routes with their elements, old towns and their development, traditional land uses and industries, landownership, etc.

At this first stage the old stone quarries are also located, together with the main constructions, fences, and bridges. Old Roman roads, their evolution and different layouts, that were traced according to political decisions or economic reasons, are also detected (Figure 2).

Fig. 3 Lucas Condant 1724, *Reconocimiento y origen del Río de Manzanares, del Río Samunil y sus agregados*. Archivo Histórico Nacional, Madrid, Spain. The map and its legend name and locate some towns and places upstream from Madrid: the castle of Manzanares, the Royal Estates of El Pardo and Casa de Campo, fountains, orchards and crops, bridges, mills with their owner's names, dams and watercourses, old and new channels. All of them were built along the river Manzanares and its main tributaries.

Fig. 4 Tomás López 1773, *Mapa de la Provincia de Madrid*. In Atlas Wellington, ca. 1810. Biblioteca Nacional de España, Madrid, Spain. It is a factice atlas owned by the Duke of Wellington (as signed on the back cover) during the Peninsular War. The lack of accuracy of the topographical description is noticeable, while the location of the geographic elements results from their topological relationships.

Fig. 5 Tomás López ca. 1763-1802, *Diccionario geográfico-histórico de España*. Mss. Biblioteca Nacional de España, Madrid, Spain. Tomás López bestowed a grant in Paris provided by the Enlightened Spanish statesman Marquis of Ensenada, with the aim of improving the cartographic techniques. As 'Royal Geographer', López devoted himself to draw and print lots of maps that he produced by compilation. His atelier was in Madrid, at the Calle ancha "facing to Monastery of St. Bernard". He used all kind of geographic sources then honestly mentioned on each map. He tried to compensate the lack of information by sending a questionnaire –his famous Interrogatorio– to the priests and mayors of every Spanish town, no matter its importance, aiming to produce his finally unfinished Diccionario.

These variations can also be followed through the detailed descriptions of travellers and writers as Antonio Ponz (1785): "The new and solid made road to Castile goes from Madrid far beyond El Espinar. At the highest point of the Guadarrama Pass you can find a column with a lion on top, where an inscription by D. Juan de Iriarte is engraved: *Ferdinandus VI Pater Patriae Viam utrique Castellae superatis montibus fecit. anno salutis MDCCXLIX Regni sui IV*".

The research also collects datasets about changes in vegetation and woods, in rivers, and in other geomorphological features, as those related with mining (Chías & Abad, 2004) (Figure 3). The late encoding of topography by using contour lines, and its usual worth painting representation (see Figure 1) were frequently misleading when understanding the reality of territory (Chías & Abad, 2016b).

This fact was particularly serious in war campaigns, as it was stated by the French officer Bory de Saint-Vincent (1823) during the Peninsular War: "Crests, pikes, anastomosis, spurs, and all

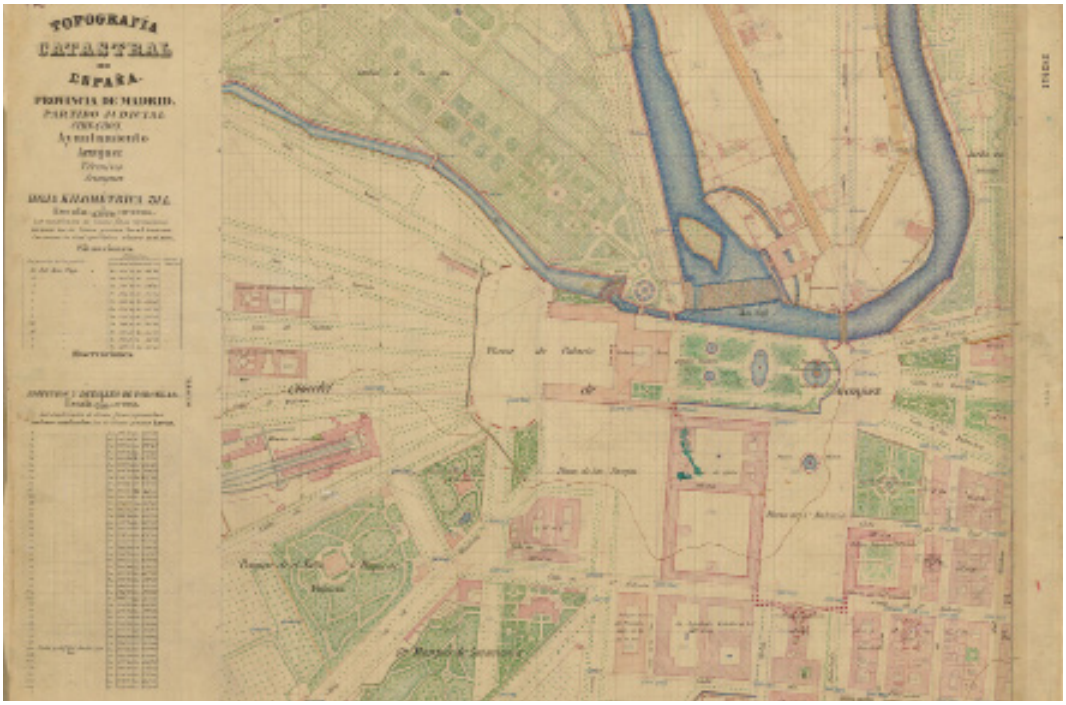

Fig. 6 *Junta General de Estadística 1860-1870, Topografía Catastral de España, Catastro de rústica, Hoja Kilométrica 31L* (Aranjuez). Instituto Geográfco Nacional, Madrid, Spain. This set of maps 1:2,000 was produced according to the highest standards of accuracy. The project included the related cadastral information of each plot. Although unfinished, the project is still an outstanding source of geographic, rural and urban information of the Spanish territories in the mid-nineteenth century. The set of their first drafts is still preserved. It served as the basis of the National Topographic Map (*Mapa Topográfico Nacional*, MTN) of Spain 1:50,000, that was produced two decades later.

thinkable black chiselled features, were multiplied to separate slopes falling towards the Mediterranean Sea and the Ocean, showing a rugged Alpine appearance. However, wide plains [...] just extend where these supposed mountains should be. Confused about these directions, the military man estimates about hindrances or defence places he will never find; the naturalist dreams about a steep propitious to his researches, that will turn into an arid horizontal area".

Maps are essential sources of information. However, ancient maps were scarcely used in traditional researches about the territory and the landscape, due to a lack of a basic cartographic knowledge that hindered their adequate interpretation. Early map symbolization before the 19th century were hard to read and understand, being as beautiful as ambiguous (Chías, 1994) (Figures 4, 5). Each ancient map resulted from political interests. According to these targets, maps showed a deliberately selected range of geographical features.

Along the 19th century the international monosemous conventional signs were gradually being accepted worldwide, what made their interpretation easier.

On the other hand, the evolution of the surveying and printing techniques increased the cartographic accuracy, although the depicted elements always resulted from various selection processes (Figure 6). Finally, the choice of the scale brings a wide range of possibilities in the cartographic representation.

In our research project, each geographic element or phenomenon is stored in a relational multiformat database. It includes structured sets of data about the type and epoch, their precise location, the way to access, together with other information related to history, style, administration, etc. A detailed description together with the main sources are also provided (Chías et al., 2007).

The field work is developed along the second phase, when we check if the element is preserved or destroyed. Attention is also paid to the overall condition.

The element is then drawn and surveyed, photographed and georeferenced. According to the importance of the ele-

Fig. 7 José de Hermosilla y Sandoval 1757, *Vista del Monasterio de El Escorial*. Biblioteca Nacional de España, Madrid. The set of drawings produced by Hermosilla, Arnal, and Villanueva illustrated the works about the Spanish monuments fostered by King Fernando VI. He was conscious of the lack of Spanish heritage knowledge and diffusion, but also of the importance of ancient architecture to train the new architects at the Real Academia de Bellas Artes, he had just created in Madrid. Hermosilla met the team of engineers Balthazar Bécaud and Bernardo Cillera, which were surveying the Monastery. Although these drawings should have been printed, they were finally used as a decoration in the royal rooms at Aranjuez Palace (Chías, 2015). This drawing brings a neoclassical perspective of the monument.

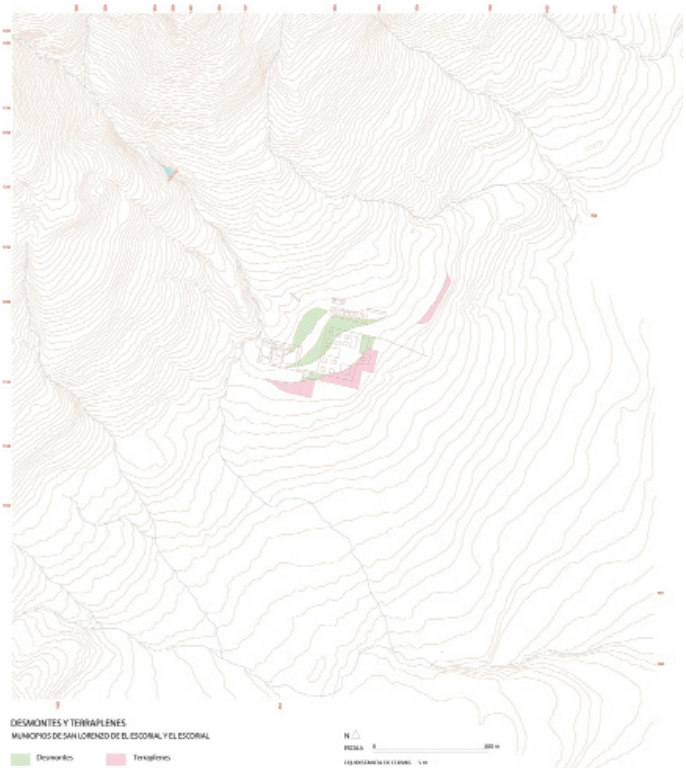

Fig. 8 P. Chías and T. Abad 2016c, Map showing the earthworks made while levelling the ground of the Monastery of San Lorenzo of El Escorial. The digital cartographic basis, scale 1:25,000, allows to measure the cubic meters removed during the construction, as well as the topographic profiles before and after the construction of the platforms of the Monastery and the surrounding *Lonja*, and *Terreros*.

ment, it is depicted in full detail by means of photogrammetry or laser scanner techniques, or simply sketched.

Digital drawings, together with the set of actual and historic images (Figure 7), are also collected and stored in the databases. The digital cartographic basis is produced as a parallel process at a scale of 1:25,000. It is composed by layers representing each type of geographic element. The map includes both hypsometric and planimetric information. It is distributed in sheets which correspond to those of the National Topographic Maps of Spain (MTN50).

Geographical features are located on the map according to the georeferenced data that were collected during the fieldwork (Figure 8).

Databases and cartography are then integrated into a geographic information system (GIS). It allows users to create interactive queries –user-created searches–, analyse spa-

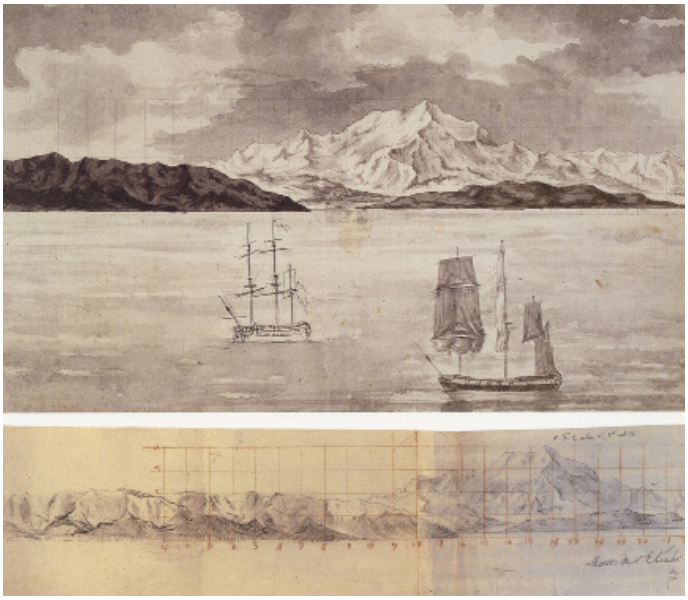

Fig. 9 Felipe Bauzá, *Las corbetas Descubierta y Atrevida ante el monte San Elías. Dibujo y Apunte preparatorio*. Museo Naval, Madrid, Ministerio de Defensa de España. Surveying techniques of coastal profiles were mastered by Spanish cartographers and naval officers since Antonio de Ulloa and Jorge Juan took part in La Condamine's expedition. Among them the works and drawings of the naval officer Felipe Bauzá must be highlighted. He was trained by the famous Tofiño when he was drawing his essential *Atlas Marítimo de España*. Bauzá also took part in the Malaspina Expedition, and in the later Espinosa Expedition, drawing highly detailed interesting views of coasts and landscapes.

tial information, and edit data in thematic maps. This late output is particularly interesting because it can produce sets of historical maps that show the different phases in the construction of the territory.

Another outstanding result is the set of thematic maps about civil works such as roads, navigation channels, or water supply systems. The development of towns, or industries such as mills, saltworks, etc., can also be studied.

CONCLUSIONS

Through the last decades we designed an essential methodology, that is pioneer and useful in researches involving the territory and the landscape. It can be applied to many different geographical areas, both in Spain and abroad.

Among the main conclusions of our work one must be highlighted. It is the influence that geographic features and landscape qualities have in the location and development of human activities. Towns, roads, or pre-industrial workings are just a sample.

Comparative analysis gives also interesting information about the successive historical periods and their traces on the territory.

The validity and interest of the methodology and its results was evidenced by the many financed national and regional research projects we obtained, that have caused an outstanding set of scientific publications.

On the other hand, diffusion is guaranteed by means of web sites with various access levels, permitting to get information about the territory to different groups of users.

Finally, this essential knowledge can be directly applied in heritage catalogs and preservation norms. A knowledge that makes possible to preserve the remains and traces of a past that otherwise would have been neglected.

Fig. 10 Félix Borrell 1901, *Paisaje de El Escorial*. Museo Nacional del Prado, Madrid (now at the Spanish Congreso de los Diputados), Spain. Landscape pictures and views are essential complements to other documents. They bring information about Geomorphology, vegetation, and buildings. When compared with actual views, they become useful in visual impact assessment.

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