CONCEPTUAL AND INSTRUMENTAL INFLUENCES IN THE GRAPHIC REPRESENTATION OF URBAN PLANNING: THE INDUSTRIAL REVOLUTION AND THE 19TH CENTURY

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ABSTRACT:
The graphic representation of a town or city has always been studied in different disciplines. Geographers, Civil Engineers, Architects and Urban Planners have established different graphic points of view regarding the representation of settlements and their planning. The graphic criteria used in representing the town have changed due to the logical evolution of instrumental techniques. However, it is not just the improved drawing tools or graphic media that have enhanced the representation of the planning and of the town but also the appearance of historical circumstances that have changed various cultural concepts directly affecting the shape of towns as well as their representation. This article is the continuation of the article published in Geographia Technica Issue No. 2/2014 (Gomis & Turón, 2014) entitled: "Conceptual and instrumental influences in the graphic representation of urban planning: From ancient times to the Baroque". It analyses and reflects as to the different instrumental and conceptual historical events that have significantly altered the graphic representation during the industrial revolution and the 19th century.

Key-words: *Drawing, Graphic representation, Urbanism, Urban planning.*

1. INTRODUCTION

We know that the evolutionary process of the graphic representation of planning is especially conditioned both by conceptual and by far more instrumental aspects, as is the case of changes in the techniques of drawing, printing and reproduction. These changes and concepts have been introduced gradually. This continuous incorporation of conceptual and instrumental conditioning factors, though temporally rather haphazard, has established a path that clearly characterizes the drawing and graphic representation of planning and urbanism.

Analysis of the plans of the study sample together with the development of the methodologies for the application and use of graphic resources observed in them, have provided a number of important considerations regarding the transformation and constants of graphics and the evolution of the model of representation of planning, that form the most interesting part of this work.

Nevertheless, even if no relevant standards are available regarding the drawing of different planning concepts, it can be seen how the drawing of planning has generally shaped an expressive language that has used repetitive graphic mechanisms and resources to represent like concepts. But, of course it is understood that they cannot be directly related with the graphic mechanisms defined by standardized drawing as their progressive generation takes place beforehand.

The graphic resources and criteria that have been used in the graphic representation of planning, probably in the beginning the result of abstraction work by the instigators of the discipline, have evolved to create their own, common and well-known language that has

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formed graphic guidelines and criteria that are indeed quite similar in most representations of planning; and whose origin lies in historical periods long before the advent of standardization, and, especially, taking the early representations made by illustrators and cartographers as a basis.

2. THE INDUSTRIAL REVOLUTION AND THE 19TH CENTURY

The industrial revolution, in many ways a consequence of the slow and continuous development of what we call "western society", began many years before the end of the eighteenth century. However, it is precisely in the late eighteenth and early nineteenth century that it enjoyed a real explosion due to the concentration in this short period of time of a number of changes and innovations -not just technical- that affected all areas of western culture and civilization.

The industrial revolution caused profound changes in the cities, especially in factory towns. Population growth and the concentration of large masses of population quickly turned them into "macrotowns". However, there were no suitable planning responses to this problem, with purely speculative prevailing in new designs of towns.

The town was divided into two distinct areas: the working class neighbourhoods, located around the factories consisting of clustered housing without the poorest living conditions and minimal standards of hygiene; and the residential areas of the wealthy bourgeoisie with wide avenues and green spaces. But the industrial revolution came about, also, thanks to another revolution; the liberal revolution, both in economic terms and in the political arena.

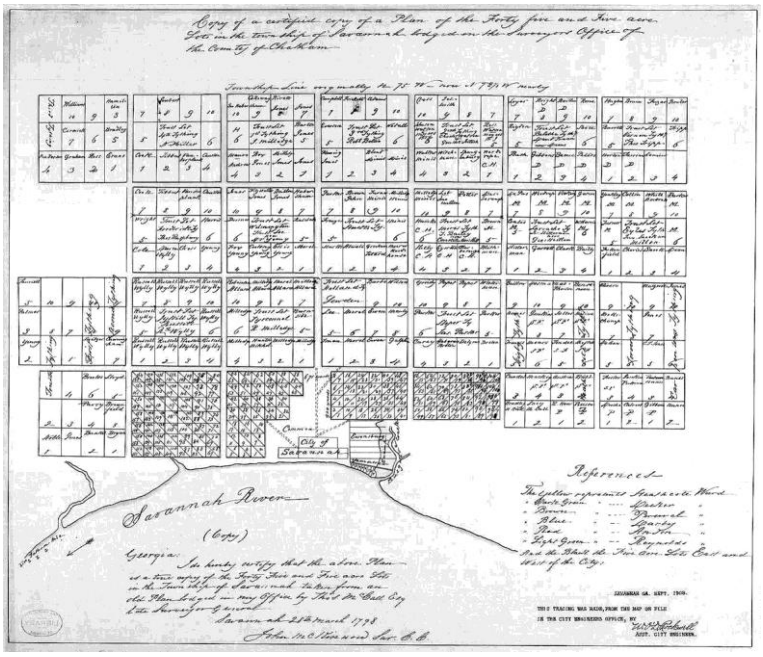

Fig. 1 Map of Savannah (Georgia-USA) in 1798. Anonymous, archive of Chatham County (Georgia). The original plan seems to be the work of James Edward Oglethorpe dating from 1733 (Panerai et al., 2004: p. 123).

The revolution in the political sphere, which had antecedents in England during the seventeenth century, would first take place with the independence from the metropolis of the English colonies in 1776 and ending in France in 1789 with the French Revolution and the final removal of the old regime. The triumph of the revolution meant the rise to political power of the bourgeoisie with its corollary of economic liberalism, "laissez faire, laissez passer". Utopian conceptions began to appear that sought to create new towns in accordance with industrial development and with better living conditions for the workers.

These utopian conceptions had rather a more symbolic than a technical value, because the projects were not feasible as they were based on the construction of newly-built towns, forgetting the old urban centres which were highly populated and could not be demolished. However, these new ideas would go on to have an indirect influence on the projects to extend the old European towns and cities and the new towns and cities of the Americas (**Fig. 1** and **2**).

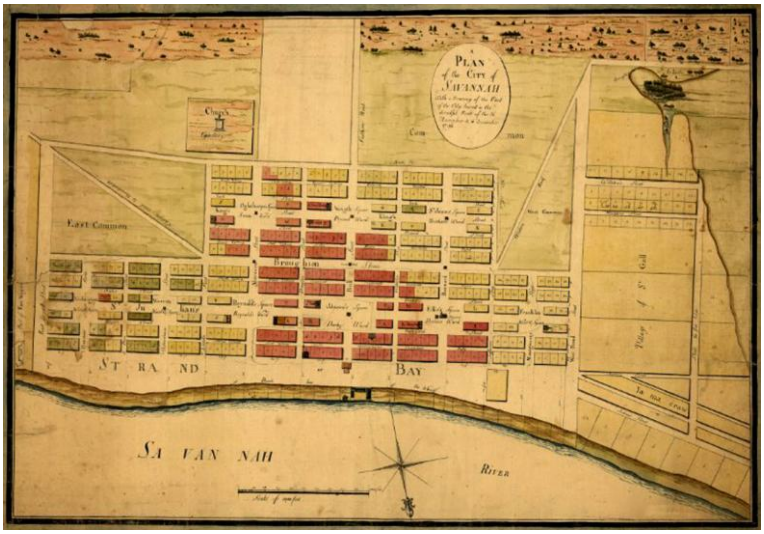

Fig. 2 Map of the district of Beauregard in Bâton Rouge (Louisiana - United States) in 1806. Ink and watercolour on paper by A. La Carriere Latour, LSU Library (Louisiana) (Bazart, 2008: p. 67).

The most accepted solution was the grid layout, both for economic reasons -land speculation- and for sociopolitical reasons -better organization of the population-. In these plans dating from the late eighteenth and early nineteenth centuries the town begins to be drawn establishing distinctive zones and clearly representing the portions of property into which the urban land is divided.

To represent the town in aspects that are purely urbanistic, the bird's eye view disappears and the plan view is used in preference. It should be remembered, however, that these towns are newly built or are in the very early stages of planning. As already explained, in Europe during the nineteenth century, the society and the economy changed radically and hence so did the concept of the town. Industrial capitalism appeared and a new society was created, the class society, with the bourgeoisie dominating the political power and the proletariat increasingly exploited enduring dire living conditions. The bourgeoisie was to dominate the

economic and soon the political power. Its concept of property was different from what existed in the modern age: it was absolute property, free from servitude and could be bought and sold.

The prototype city was Paris, and Haussmann's reform was the model for implementation worldwide. Haussmann (minister to Napoleon III) proposed an orderly city, featuring the conditions of hygiene of the enlightened: sewers, lighting, broad tree-lined avenues, etc. But in addition, the city was built with policing criteria since the proposed urban plan, whether radial or orthogonal, or any other, would allow the repression of any revolutionary demonstrations. However, this is not the most important aspect of Haussmann's model, but rather the fact that it subjects the old town to an entire urban surgical intervention, demolishing the old to build the new, and all financed by the public authorities. The first significant occurrence is interior reform, the creation of the urban centre.

In fact, at the start of industrialization, the available theoretical-urban planning background came from the systemizations made during the Baroque period. Concepts developed by architects and engineers and supported by the technical and administrative staff of the enlightened rationalist authorities in which "the reasons and objectives pursued with the first general planning regulations are clearly exposed" (Santamera 2007: p. 387).

The first land use by-laws date, therefore, from the late eighteenth and early nineteenth centuries and began to regulate, among others: the safety of buildings against fire; hygienic principles of ventilation, sunlight, the quality of the supply of drinking water and sewage disposal; street widths and alignment; the provision of essential facilities; regulation heights and styles for facades.

In another vein, since the beginning of the second half of the nineteenth century the first technical treatises on the city began to appear. In the 1850s, Idelfons Cerdà produced his work on the extension of Barcelona (**Fig. 3**). In Germany between 1875 and 1910 the following authors published their works on the city: Reinhard Baumeister (1876), Josef Stübben (1890) and Rudolf Eberstad (1910). All of these works represented the first theoretical, ordered formulations of the rationalizing principles of the industrial city. Graphically, the city plans made during the nineteenth century are really quite heterogeneous.

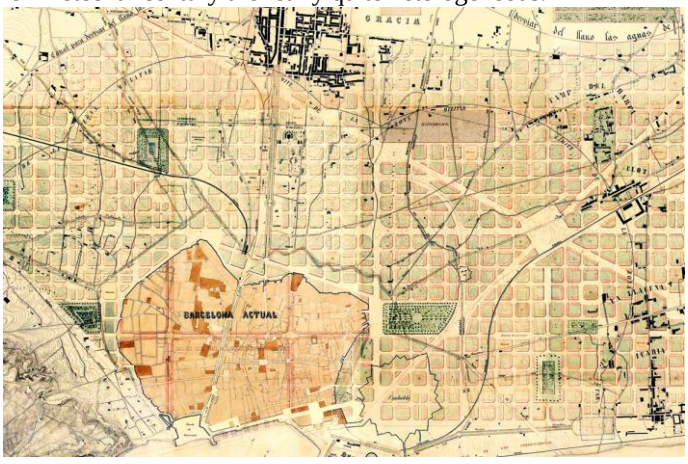

Fig. 3 Part of the original map of the "Plan of the surroundings of the city of Barcelona and project for its Reform and Extension" by Idelfons Cerdà in 1859. Original scale 1:5.000. Archive-Library of the Royal Academy of Fine Arts of San Fernando in Madrid. Barcelona City Council: Cerdà Year.

In fact, it depends largely on the concerns of the professional drafting the representation. From representations approached using techniques and concepts that are more specific to the seventeenth and early eighteenth centuries to plans drawn based on far more urbanistic criteria, whether due to the precise definition of an organized street or due to the application of the grid concept and a clear organization of public and private spaces. Plans also appeared with clearly represented zonings (**Fig. 4**) related with the regulations that began to be established or also to the administrative divisions into which towns and cities were fragmented as a result of their rapid growth. Ink on paper drawings and colours applied using the technique of watercolour or gouache.

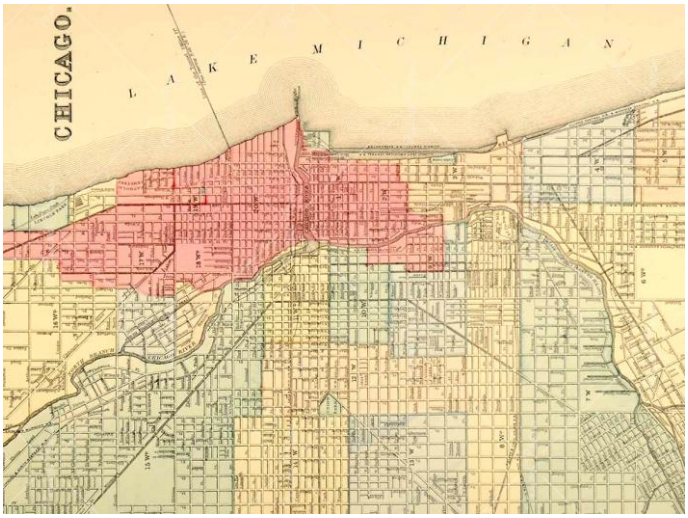

Fig. 4 Map of the city of Chicago in the state of Illinois (USA) in 1872. (Peterson, 2003: p.237).

Interestingly, bird's eye plans were still drawn and published almost up until the late nineteenth century (**Fig. 5**). The appearance of treatises on descriptive geometry decisively influenced an improvement in the graphical representation of these images. It was in the United States, however, that a taste for this kind of representations of cities remained, and not in Europe, where the avant-gardists began to break onto the scene and discredit figurative imagery in any area.

Fig. 5 Perspective of Laredo (Texas-USA) in 1892. Lithograph attributed to Henry Wellge (1850-1917). Amon Carter Museum, Fort Worth, Texas. University of Texas Libraries.

3. CONCEPTUAL INFLUENCES

A major qualitative leap forward in the representation of the city and its planning was provided by the industrial revolution. In this case, it was not the change in the model of the town and its arrangement, which indeed existed, but the emergence of the concept of property and the appearance of the bourgeoisie. Now it became absolutely necessary to represent property and parcelling. If until such time this concept was irrelevant in the drawings of cities and their planning, now it was to become a non-negotiable factor, property had to be specified and represented with all its boundaries. As a direct consequence of the value acquired by property, the authorities were forced to regulate the conditions under which it could be exploited, and the bourgeoisie wanted to have full and detailed knowledge of it. Thus, it was not sufficient to draw the property, but it was absolutely necessary to establish some constraints.

The need arose to categorize urban spaces in order to identify what rules or standards were applicable to the property drawn. The precise definition of the property, of the plot, and thus its graphically represented categorization, is a graphic characteristic of a conceptual nature that was definitively introduced to the representations of city planning. This planning thenceforth would not only define the form of the plan of the town and how its growth was to be structured, but would also have to categorize it in order to award the property a use and specific value and aid the administration to regulate and control it and the bourgeoisie to exploit it.

4. INSTRUMENTAL INFLUENCES

The improvement of the tools, materials, drawing techniques -projective and descriptive geometry- and cartographic techniques, led to graphic refinement in the representation of the city and its planning that progressed until the mid-nineteenth century.

This refinement, however, continued to use paper and ink as the fundamental technique. Copying and reproduction continued to be done by printing or, at the end of the 19th century, by applying experimental photographic techniques. In the late 19th and early 20th centuries, with the emergence of what we have come to call "modern urbanism", the use of colour became generalized in order to categorize the land of the city.

The generalization of the coloured pencil, which could be applied to a base copy of the original plan, made it easier. In order to satisfy the need to indicate and categorize property we have already seen that colour became an extremely useful resource. Coloured pencil, watercolour or "gouache" were devices used by urban planners to categorize the different zonings of the new planning.

The copy of a base map on paper, ink drawing upon it and the application of colour basically using coloured pencil is the primary technique that was used to draft planning plans in the late nineteenth century and the first half of the twentieth century. We see then, that until the end of the 19th century all the changes that instrumental techniques had on the representation of urban planning were basically a consequence of the improvement or the addition of materials, drawing tools and implements.

5. CONCLUSION

During the industrial revolution and the nineteenth century, towns' and cities' zoning arrangements appeared represented in plan view, a result, first of all, of the ordinances that

were beginning to be applied to control certain building criteria, and secondly, for the administrative divisions into which the towns and cities were divided due to their rapid growth. Also at this time appeared the representation of property and plots, a direct consequence of economic liberalism. The changes in the instrumental techniques that have taken place throughout the historical process have been in parallel to the conceptual changes. But during the industrial revolution and the 19th century only the introduction of materials, drawing tools and implements improved slightly the new city drawings.

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