

CONCEPTUAL AND INSTRUMENTAL INFLUENCES IN THE GRAPHIC REPRESENTATION OF URBAN PLANNING DURING THE 20TH CENTURY

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ABSTRACT:

This article is the continuation of the article published in *Geographia Technica* Issue No. 2/2014 entitled: “Conceptual and instrumental influences in the graphic representation of urban planning: from ancient times to the baroque” and the article published in *Geographia Technica* Issue No. 1/2015 entitled: “Conceptual and instrumental influences in the graphic representation of urban planning: the industrial Revolution and the 19th Century”. It thus ends a trilogy of articles that have sought to analyse the main influences that have shaped important changes in the representation of the town, graphically speaking. Of course, this historical overview has been approached, as the titles of the articles would suggest, by identifying the conceptual and instrumental changes undergone throughout history, and by the repercussions and influence they have finally had on the establishment and application of new graphic criteria applied to planning plans by architects, engineers and town planners.

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

1. THE 20TH CENTURY: A CENTURY OF CHANGES

In the early twentieth century significant steps were taken to formalize laws that followed the principles of urban planning. In 1909, Britain passed an urban planning law authorizing the local authorities to prepare schemes to control urban development. Also in 1909 the United States held the First National Congress on Urban Planning, whose example was soon followed by most developed countries. During the economic depression of the 1930s national and regional governments took a more vigorous role in urban planning. To promote economic development in the neediest regions, the United Kingdom authorized the appointment of a number of special commissioners with broad powers. Britain, France, the Netherlands, Spain and other European countries carried out many important housing projects. In fact, during the early twentieth century, urban development had far more opportunities for development and experimentation in American cities than in Europe. Until the mid-nineteenth century, the major American cities were basically built as seaports where the main economic activity was based on trade with Europe. But as of the second half of the nineteenth century, a transition began towards the development of domestic trade, and this also involved new approaches to urban planning. These approaches were complemented by the need for towns to adapt to the extraordinary growth caused by the industrial revolution. Thus, during the early twentieth century American urban planning became the best test field for new urban planning theories (**Fig. 1**).

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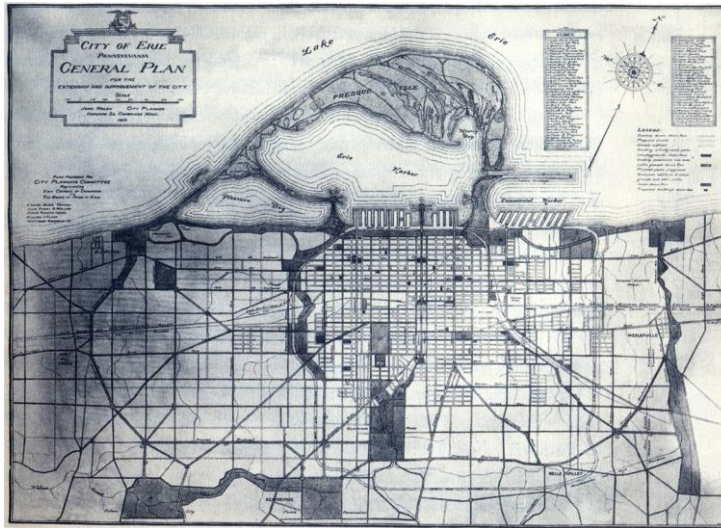


Fig. 1. Eire General Plan (Pennsylvania - USA), the work of John Nolan, 1913. It follows a similar pattern to the 1909 Chicago plan, with tree-lined promenades beside the lake, and large parks and tree-lined boulevards that connected the centre with the concentric radial ring around the city. (Peterson, 2003, p. 5)

Although urban planning may be considered to have been born as such during the Baroque developing primarily in the late eighteenth and early nineteenth centuries, it was in the early twentieth century that it began to be seen as a particular specialization and, in fact, it was when meetings and conferences were initiated between architects, engineers and urban planners to share their ideas and concerns.

Graphically, to represent the town, the plan view started to assert itself for once and for all. However, towns and cities continued to be represented by images that had more in common with geographical maps than with graphic elements more related to architecture and urban planning. The early twentieth century also saw the introduction of the detailed plan showing and/or organizing a specific, limited area of the city. They were urban planning, or purely descriptive maps -arising through other needs- in which colour now became a system of classification or differentiation. Colour was no longer dealt with as in the plans of the Renaissance when their purpose was rather to represent the reality, more pictorial. Colour now began to become a semiological factor of the plan, which, along with the use of different kinds of lines began to compose a nascent urban symbolism. The different types of lines became a tool to indicate the routes followed by roads and railways and the new public transport systems that helped to develop the “post-industrial revolution” town. They also indicated the new boundaries of several series of sectorizacions (of the city, district, subsector, plan boundaries, etc.).

In the maps of the general plan of Helsinki of 1908 (**Fig.2**) colour was now a basic element for representing the new organization of the city. Not only the coastal and sea areas (shades of blue), or areas of undeveloped land (green) help with the interpretation of the plan, but the graphics of the zoning of existing urban land (shades of yellows and oranges) and the scheduled land (greeny-grey).



Fig. 2. General plan of Helsinki 1918. The work of E. Saarinen in collaboration with B. Jung. (Bosma & Hellinga, 1997, p.52)

It was in this period, the early twentieth century, that colours and textures started to be used regularly in urban plans. This recourse was already a most useful tool to categorize the land. The new arrangements, required for the development of towns and cities at the beginning of last century, found in the application of colour a graphically clarificatory element that simplified the interpretation of the plan. Even in urban theories such as Le Corbusier's "Ville Verte", textures and colours blend with more architectural drawing resources -projected shading or different kinds of line- to achieve the image desired by the author. Also at this time legends appeared with a description of the colours, patterns and textures and types of lines used, leaving aside the lengthy written explanations around the edges of the plans (Fig. 3).

1941.

LAND USE

SYMBOLS COVER TOTAL AREA OF USE, NOT ACTUAL AREA OF STRUCTURES

TYPE OF USE	NUMBER OF USES	AREA OF USES SQ. FT.	% OF TOTAL AREA	TYPE OF USES	NUMBER OF USES	AREA OF USES SQ. FT.	% OF TOTAL AREA
SINGLE FAMILY - DETACHED	37	53,820	.2	RAILROADS		6,494,606	32.9
SINGLE FAMILY - ATTACHED				PARKING & USED CAR LOTS	115	650,076	2.2
TWO FAMILY	62	113,273	.4	OTHER TEMPORARY BUSINESS			
THREE AND FOUR FAMILY	60	130,338	.5	PARKS & PLAYGROUNDS			
APARTMENTS WITHOUT BUSINESS	51	145,490	.5	CEMETERIES			
APARTMENTS WITH BUSINESS	34	188,956	.7	OTHER PUBLIC & INSTITUTIONAL	31	1,097,757	3.8
BUSINESS WITH DWELLING UNITS	133	423,966	1.5	STREETS & ALLEYS		8,163,223	28.7
COMMERCIAL	435	3,359,812	12.0	WATERWAYS		1,187,491	4.2
COM'L. & IND'L. (MIXED)	143	1,391,938	4.9	VACANT	526	2,217,432	7.8
INDUSTRIAL	317	2,763,137	9.7				

Fig. 3 Zoom of the legend of the map of land use in an area of the city of Chicago (Illinois-USA). Period 1939-1941. By the "Work Projects Administration". (Scott, 1995, p. 232)

The necessary physical reconstruction to which cities were subjected after the II World War contributed a new development to urban planning. In 1947 Great Britain promulgated its significant Law on Urban and Provincial Planning, which left all questions related with development under regional control and promoted the construction of new towns.

In the 1950s and 1960s, the expansion of the “new towns” in Britain gained further impetus by becoming the official policy, which led to the construction of a large number of new communities, many of which were around London.

Other European countries also gave great importance to urban planning after the II World War, carrying out considerable urban reconstructions in cities like Rotterdam (**Fig. 4**), in the Netherlands, Hamburg, in Germany, and Helsinki, in Finland, as well as other places.



Fig. 4 Rotterdam reconstruction plan (Netherlands), 1946, by WG Witteveen. (García Barba, 2011)

Colour definitively became an essential tool for visual discrimination to establish different zonings. The use of ink and black and white are still, and shall continue to be, the fundamental elements of base plans. However, colour is used on plans that are more representative of scheduled city plans and “the use of textures and patterns in black and white continues for reproductions for use in everyday work and consultation” (Soriano, 1988, p. 55). From the second half of the twentieth century laws required developing a complex planning document that analyses the town’s overall growth needs and materializes the solutions proposed by the planning technician. This is what can generically be called the “General Plan.”

This basic planning document is approved, adopted and maintained with periodical reviews. In its common expression the plan translates into a series of legal documents controlling the growth of the city. Hence contemporary urban planning, besides continuing to take care of the physical design, addresses in the same way the many far-reaching socio-economic decisions that must be taken.

Graphically, the second half of the twentieth century is characterized by the practical disappearance of colour in plans. The emergence of new forms of reproduction, basically the economical and precise blueprint technique, meant that drawings, from the outset, were structured bearing in mind the technological constraints that would limit the features of the copies made of them. It was the era of adhesive sheets of patterns and textures in black and white or in shades of grey (**Fig. 5**).

During these years, many of the graphic techniques used in the representation of planning arrangements, from the beginning, were established with the criteria of saving time and resources, making the most of the opportunities that the new reproduction technique provided for technicians. The concept of urban planning studios with their technical draughtsmen colouring in the drawings of the planned new cities practically disappeared. In this period thematic maps began to appear in order to meet the representational needs required by the complex general plan document. Blueprints on tracing paper or polyester facilitated the production of accurate base maps.

These base maps served as a basis for the different themed representations required by the complex representation of the new plans. Colour had disappeared, patterns and textures, manual or adhesive, were the main elements involved in categorizing the various zonings represented on the map. Black and the various shades of grey became the visual resource used by technicians to distinguish graphically between different intentions in the representation of routes and surfaces.

The distinctions between types of lines base their sensationalism, basically, on the type of line and not so much the colour variant. This apparent regression in the graphic effectiveness of the plans produced in the late twentieth century, however, thanks to the new economical reproduction techniques, involved the exceptional dissemination of planning drawings and documents to facilitate consultation, discussion and dissemination. Only in very special cases were coloured plans kept. They were generally unique plans, coloured on a paper copy of the original from which copies were made using photographic techniques (**Fig. 6**).

In another vein, in the 1960s the first computer-aided design programmes started to be developed, although until computers were more widely used, in the late 1980s, their use was certainly restricted to highly specialized sectors. In her book "Tools of the imagination: drawing tools and technologies from the eighteenth century to the present" Susan Piedmont-Palladino, (2007) explains the interesting and dramatic process that drawing tools underwent in the last 20 years of the 20th century. These tools did not substantially alter the graphic result of the maps made during the last decade of the twentieth century.

Graphic criteria continued to be marked by the constraints of map reproduction, in which the blueprint technique was still employed. The graphic precision of the general layout of the drawing did increase, however, especially facilitating the drawing of textures and patterns, both insofar as accuracy and the variation of types.

In the mid-1990s large format inkjet printers came onto the market replacing the now "outdated" ink plotters. At the start, these inkjet printers led to the gradual disappearance of blueprints, and hence it became sufficiently economical to print originals to make planning documents. Finally, in the late 1990s and early this century, these large format inkjet printers definitively incorporated colour, and so colour reappeared in the production of planning maps

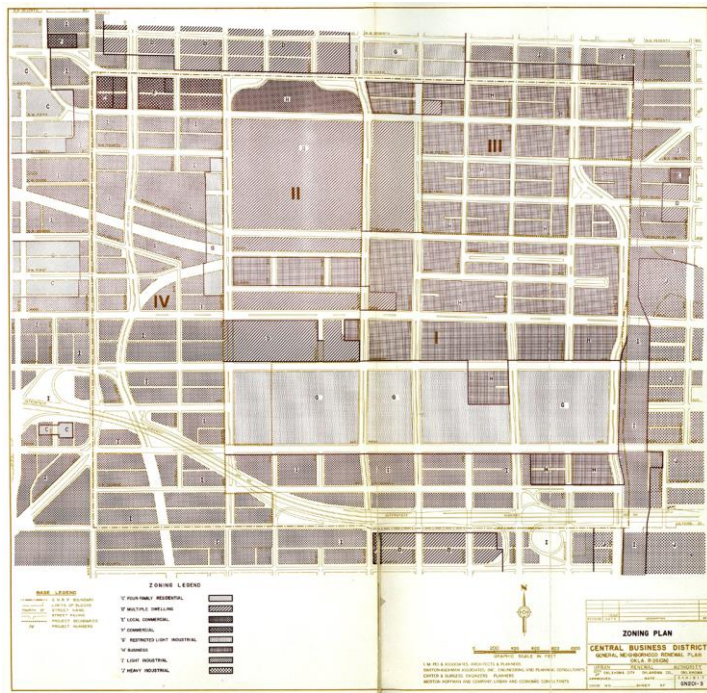


Fig. 5. Zoning map of the central district of Oklahoma City (Oklahoma-United States) dated 1965. The work of I. M. Pei & Associates, Architects & Planners, Barton-Aschman Associates Inc. Engineering and Planning Consultants, Carter & Burgess Engineers Planners and Morton Hoffman and Company, Urban and Economic Consultants. (Goodban & Hayslett, 1965, p. 158)

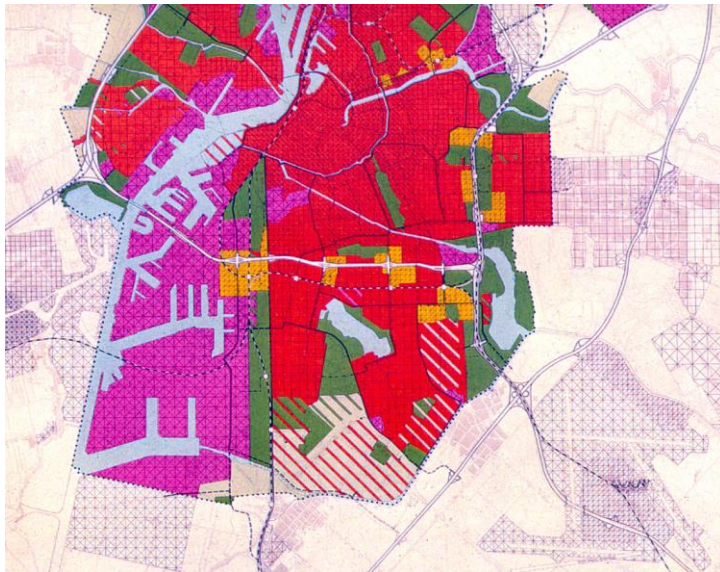


Fig. 6. Map of land use in central Amsterdam (Netherlands). Urban development plan for the city in 1965. Note how colour has been applied to a copy of a plan conceived from an initial black and white graphic structure. (Jolles, Klusman, & Teunissen, 2004, p. 88)

2. CONCEPTUAL INFLUENCES

In fact, conceptual changes in the graphic representation of urban planning during the twentieth century were scarce. Indeed, the concepts that had undergone a graphic change in the representation of towns were carried over from the nineteenth century. Now, during the twentieth century, especially from the second half of the century, laws required developing a complex planning document analysing the town's overall growth needs and objectivizing the planning solutions proposed by the planning staff. This is what generically we call the "General Plan". It is a document that, due to its length and comprehensiveness, was inevitably forced to split the graphic information into a collection of thematic maps developing and showing the various aspects defined and regulated by the plan.

In order to represent the proposed planning sufficiently precisely, a single map was no longer enough. The graphic information about planning now had to be multiplied in several plans. This concretely affected the new representation of urban planning. These new needs would involve the graphic fragmentation of urban planning information and the theming of the information provided by each plan to the observer.

3. INSTRUMENTAL INFLUENCES

As mentioned in the previous article (Gomis & Turón, 2015), in the late 19th and early 20th centuries, the use of colour became generalized in order to categorize the land of the city. In order to satisfy the need to indicate and categorize property we have already seen that colour became an extremely useful resource. 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. Until the first half of the twentieth 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.

In the mid-twentieth century, one of the most notable changes occurred in the representation of technical drawing in general. This change is a direct result of the establishment of a fast and affordable system of reproduction or copying. At the beginning of the twentieth century things had already evolved in the manufacture of semi-transparent paper, ending in 1952 with the manufacture of the first sheets of polyester-paper. This, together with the optimization the blueprint process of copying, meant the disappearance of the chromaticism of urban planning drawings.

From the 1950s and 60s on, plans were principally approached observing monochrome criteria. The quality, economy and speed provided by blueprints offered some advantages that allowed the immediate sacrifice of such an essential and appealing value of graphic representation as is colour. Colour was only applied for especially significant and/or important plans, plans that are for the most part unique. Other representations were approached, from the outset, in black and white or, for variety, patterns and textures in the range of greys. At the same time, drawing tools also underwent improvements, ink pens and ruling pens were replaced by fountain pens whose quality improved day by day. Adhesive decals of textures, patterns, texts or symbols appeared. Draughtsmanship reached its peak with the need to develop the entire range of thematic maps required by the general plan. The base plan, and copies thereof on which the different aspects of the planning information required was represented, became fundamentally important.

This monochromatic representation model based on drawings with ink and adhesive decals on varieties of tracing and/or polyester paper and subsequent blueprinting, was to remain until the end of the 1980s. The emergence and implementation of CAD tools in the late 1980s and early 90s was to bring about a change, though not a complete one, to this model. During the 1990s, CAD tools facilitated draughtsmanship, but were constrained by the systems of printing and reproducing plans. While the use of CAD tools eased the recovery and the addition of colour in urban development plans, they were greatly limited, on the one hand, by the existing printing equipment, which still worked with varieties of pen tips, and, especially, by the maintenance of the blueprint process of generating copies.

These limitations meant that, despite the availability of new drawing tools that allow specifying the quality of the work and incorporating colour, it was this latter issue that was sacrificed, due to the limitations that still existed when transferring the drawing onto a “paper medium”. It should be mentioned, however, that during this period, drawing tools hitherto used to draw plans disappeared. The templates of letters and symbols or decals of patterns and textures are elements that were quickly eliminated, since the CAD engines and their utilities would render them completely unnecessary. Of course the discipline of urban planning as such does not allow doing away with basic drawing tools, tools that are still used in sketches or preliminary works today. The drawing board, the compass, the parallel rule, the right angle and the set square, etc, though increasingly in disuse, are often required in some phases of work. This is perhaps rather due to habit than strict necessity.

From the end of the 1990s the use of large format inkjet printers started to become generalized. In this case, generalization meant that their price allowed the incorporation of these printing tools a reasonable cost. Thus, planners could no longer incorporate colour into their plans. And this happened for two reasons: firstly because computer-assisted design programmes have allowed this since some time ago, and secondly, and in this case more decisively, because machines are available that enable colour printing and copying of the plans that have been drafted, and at a more than acceptable cost. Copying was now replaced by the printing of as many originals as required. Changes in the fonts used to label the various aspects of the plans, the use of several types of lines, the progressive reduction of the general thicknesses of the lines that provided the precision and clarity of the drawing, the use of colours or thicknesses that keep the base plan at second level, etc., are variations on the use of graphic resources that have been implemented and that, seen in their entirety, have brought clear graphic and visual benefits to urban planning drawings.

4. CONCLUSION

During the twentieth century graphic variations in the representation of urban planning were not due to conceptual changes but were basically brought about by profound changes in graphic and reproduction techniques. This development was accentuated during the 1990s and the first decade of the 21st century.

These changes in the instrumental techniques that have taken place throughout the historical process have been in parallel to the conceptual changes. In spite of everything, they are mainly concentrated at the end of the whole process, and especially those produced as of the second half of the 20th century, a time when conceptually speaking the graphic representation of urban planning did not undergo any substantial variations.

It therefore seems that the evolution of graphics applied to the representation of the city and its planning follows a temporal development that could be established, put in simple terms, on the basis of some conceptual changes at the start and, subsequently, the introduction

of various changes in instrumental techniques. This introduction of changes in instrumental techniques seems not to have finished. Today, the replacement of paper with consultation on computer screens of current planning as well as the use of photoplans, will probably lead to new changes in the graphic approach to new urban planning documents. It is likely that a new change is taking place in the graphic conception of urban planning maps.

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